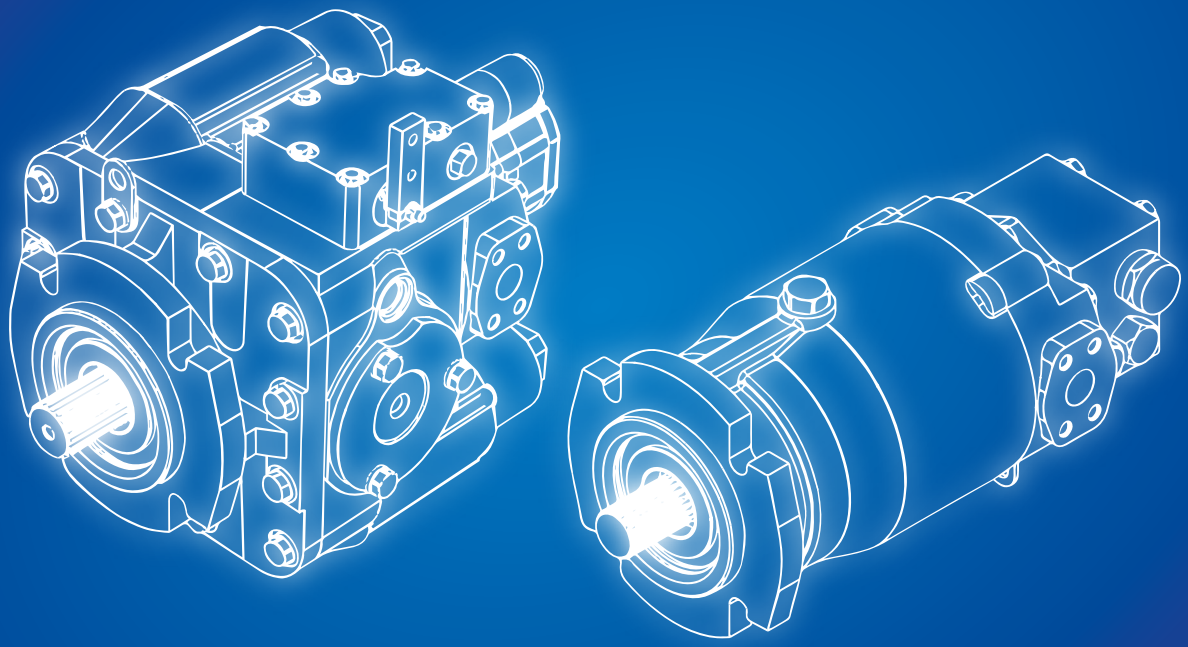
HYDROSILA



Axial Piston Pumps and Motors for Closed Circuit

series S, H, H2

HS-AC-06/042025

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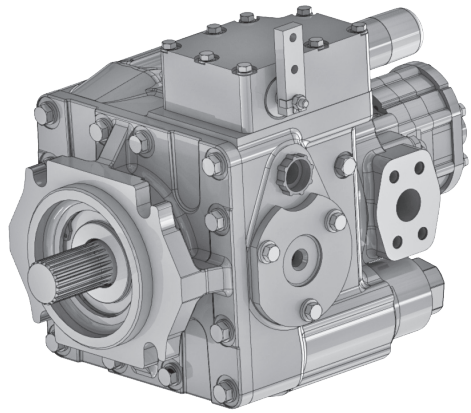
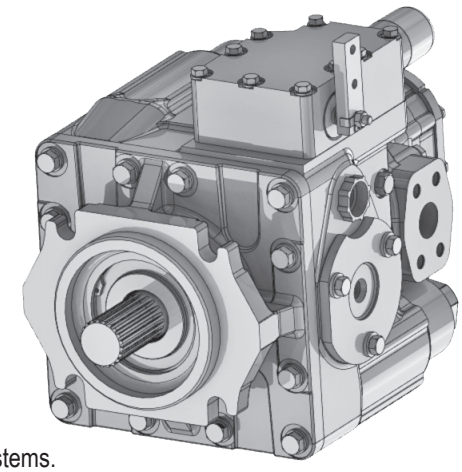
PVS



Variable displacement axial piston pumps for closed circuits. Rated pressure up to 350 bar.
Displacement 33…90 ccm.

- Swashplate design.
- Maximum pressure 420 bar.
- High volumetric efficiency.
- Low noise level.
- Mounting flanges according to SAE.
- Hydromechanical and electrical 3-position control systems.

PVH



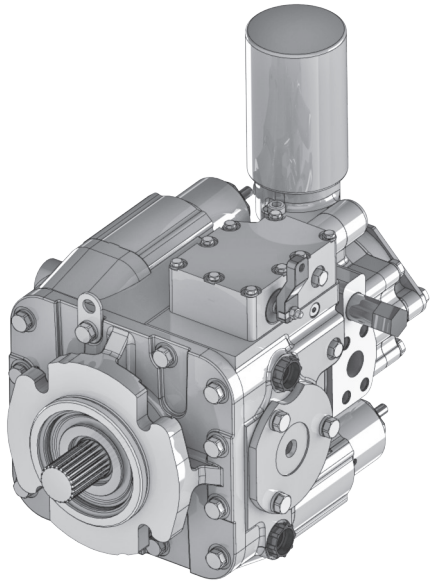
Variable displacement axial piston pumps for closed circuits. Rated pressure up to 420 bar.
Displacement 33...112 ccm.

- Swashplate design.
- Maximum pressure 450 bar.
- High volumetric efficiency.
- Low noise level.
- High pressure relief valve.
- Mounting flanges according to SAE.
- Hydromechanical, hydraulic proportional, electrical 3-position and electric proportional control systems.
- Through drive according to SAE.

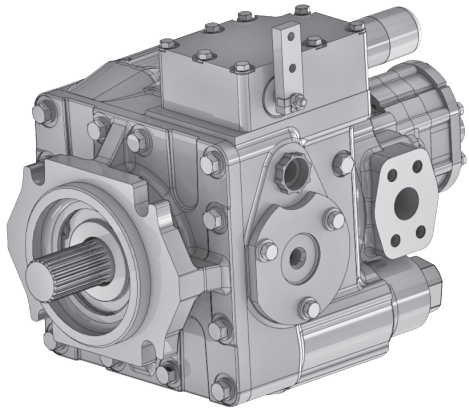
PVH2

Variable displacement axial piston pumps for closed circuits. Rated pressure up to 420 bar.
Displacement 75...112 ccm.

- Swashplate design.
- Maximum pressure 480 bar.
- High volumetric efficiency.
- Low noise level.
- Filter mounted on charge pump.
- High pressure relief valve.
- Mounting flanges according to SAE.
- Hydromechanical, hydraulic proportional, electrical 3-position and electronic proportional control systems.
- Through drive according to SAE.



GENERAL INFORMATION



Variable displacement axial piston pumps in swashplate design for closed circuits. They are used in hydrostatic transmissions, that consist of a pump and hydraulic motor. The proven design, based on the Sauer 20 Series, is reliable and durable in the field.
Flow direction changes due to the turning of the swashplate in opposite directions relative to its neutral position.

Control systems:
MH – hydromechanical proportional control system. Allows to keep the swashplate in position given by the control lever, maintaining the pump flow at a set level.
ER – electrical 3 positioned control system. Used for on - off - on operating scheme. Maximum displacement setting optional.

Design features:
- Swashplate design.
- Build-in charge pump.
- Smooth flow direction change.
- Bimetallic bearing plate has a high wear resistant.
- Lightweight plunger provides reliability in operation at high speeds.
- Tapered roller bearings allow the pump shaft to withstand high radial and axial loads.
- Through drive according to SAE.
- Mounting flanges according to SAE.

TECHNICAL CHARACTERISTICS

Displacement code		**33**	**52**	**71**	**90**
Displacement max	ccm	33,3	51,6	69,8	89
Maximum flow	l/min	113,5	151,8	186,3	218,9
Maximum pressure in high pressure line	bar	420			
Rated pressure in high pressure line	bar	350			
Maximum drain pressure	bar	2,5			
Maximum speed	min^{-1}	3590	3100	2800	2600
Minimum speed	min^{-1}	500			
Rated speed	min^{-1}	1500			
Maximum swashplate angle	Degr	±18			
Rated power	kW	18,7	29	39,3	63,3
Weight (without fluid)	kg	45	55	63	78

ORDERING EXAMPLE

PV S 90 / MH R D 1 A 1 A1 B N ⎽

PV - variable displacement axial piston pump
S - Series S (Sauer 20th series)
90 - displacement 89 ccm
MH - control system (hydromechanical)
R - rotation: clockwise
D - shaft option (23 teeth, 16/32 pitch, (37,68mm))
1 - pilot pump relief valve setting 13,2 bar to 14,4 bar
A - main ports A&B (SAE J518c 3/8 inches for 350 bar)
1 - control valve (standard)
A1 - charge pump displacement (18,06 ccm) - gear type
B - orifice diameter (ø0,76 mm)
N - climatic version
⎽ - special features

FORMULAS

Flow $q_v = \frac{V_g \cdot n \cdot \eta_v}{1000}$ [l/min]

Input torque $T = \frac{V_g \cdot \Delta p}{20 \cdot \pi \cdot \eta_{mh}}$ [N·m]

Input power $P = \frac{2 \cdot \pi \cdot T \cdot n}{60000} = \frac{q_v \cdot \Delta p \cdot \eta_t}{600}$ [kW]

V_g - displacement (ccm)
Δp - pressure drop (bar)
n - speed (min^{-1})
η_v - volumetric efficiency
η_{min} - mechanical-hydraulic efficiency
η_t - overall efficiency

ORDERING INSTRUCTIONS

PV	S		/												

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS	PV

SERIES	S

DISPLACEMENT, CCM	CODE
33,3	33
51,6	52
69,8	71
89,0	90

CONTROL SYSTEM	33	52	71	90	CODE
Hydromechanical	●	●	●	●	MH
Electric for 3 positions [1]	●	●	●	●	ER

ROTATION	CODE
Clockwise	R
Counterclockwise	L

DRIVE SHAFT	33	52	71	90	CODE
14 tooth, 12/24 pitch, (31,22 mm)	●	●	●	●	A
19 tooth, 16/32 pitch, (31,73 mm)	●	●	●	●	B
21 tooth, 16/32 pitch, (34,5 mm)	●	●	●	●	C
23 tooth, 16/32 pitch, (37,68 mm)	-	-	-	●	D
cone 1:8, SAE J501, (35 mm)	●	●	●	●	E
20 tooth, 16/32 pitch, (33 mm)	●	●	●	●	F
27 tooth, 16/32 pitch, (44,03 mm)	-	-	-	●	G
Straight (ø34,93 mm)	●	●	●	-	K
Цилиндрический (straight) (ø44,45 мм/mm)	-	-	-	●	L

CHARGE PUMP RELIEF VALVE SETTING	33	52	71	90	CODE
13,2 bar - 14,4 bar	●	●	●	●	1
17,6 bar - 19,6 bar	●	●	●	●	2

MAIN PORTS 'A' & 'B'	33	52	71	90	CODE
SAE J518c 3/8 inches for 350 bar	●	●	●	●	A
SAE J518c 7/16 inches for 350 bar	●	●	●	●	B

SPECIAL FEATURES*	CODE

CLIMATIC VERSION	CODE
Temperate	N
Tropical	T

CONTROL ORIFICE	33-90	CODE
No orifice	●	A
ø0,76 mm	●	B
ø1,05 mm	●	D
ø1,6 mm	●	E

CHARGE PUMP CPX	33	52	71	90	CODE
Gear type 18,06 ccm - standard	-	●	●	●	A1
Gear type 18,06 ccm - with adjustable relief valve	-	●	●	●	A2
Gear type 18,06 ccm - standard	●	-	-	-	A3
Gear type 18,06 ccm - with adjustable relief valve	●	-	-	-	A4
Gear type 12,3 ccm - standard	-	●	●	●	B1
Gear type 12,3 ccm - with adjustable relief valve	-	●	●	●	B2
Gear type 12,3 ccm - standard	●	-	-	-	B3
Gear type 12,3 ccm - with adjustable relief valve	●	-	-	-	B4
Gear type 8,2 ccm - standard	●	-	-	-	C1
Gear type 8,2 ccm - with adjustable relief valve	●	-	-	-	C2

CONTROL VALVE	33	52	71	90	CODE
Standart	●	●	●	●	1

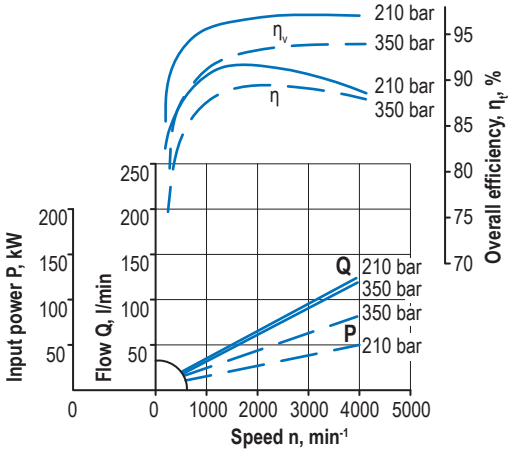
1) Control valve with electro control is not supplied

Notes: ● Standard; ○ Optional; **–** Not available.

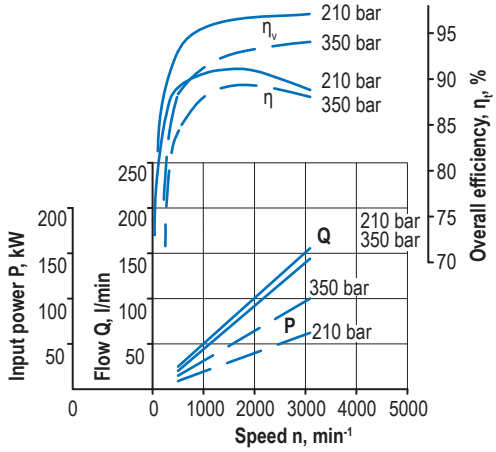
NOMINAL SIZES

Efficiency, flow and input power vs. speed (at maximum swashplate angle)

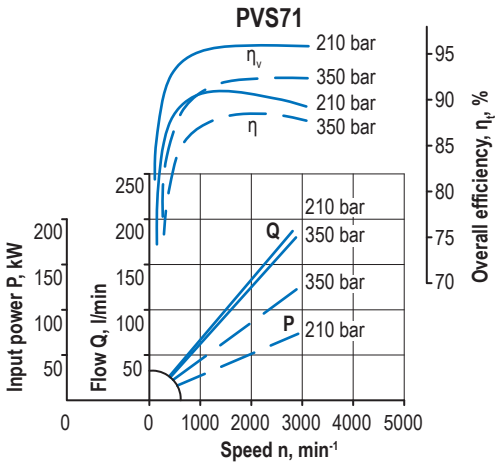
PVS33



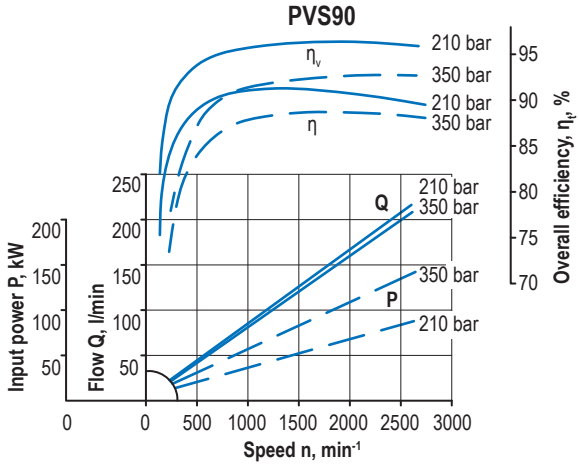
PVS52



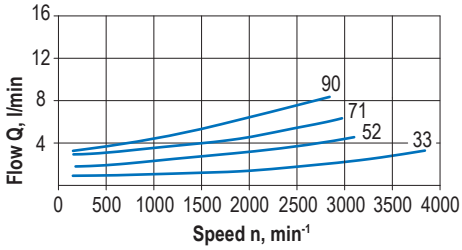
PVS71



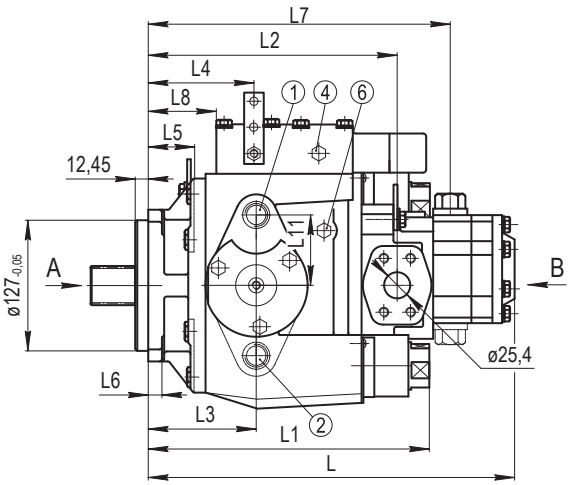
PVS90

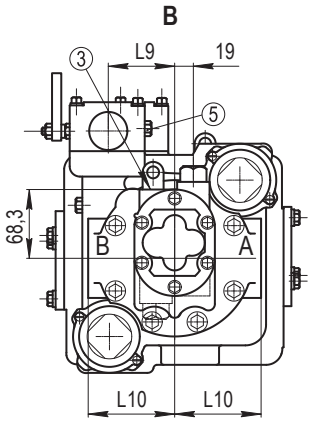


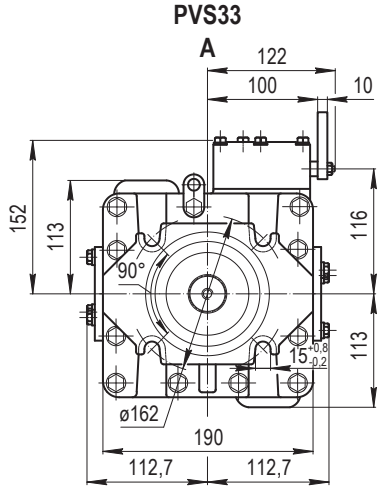
Drain leakage vs. speed

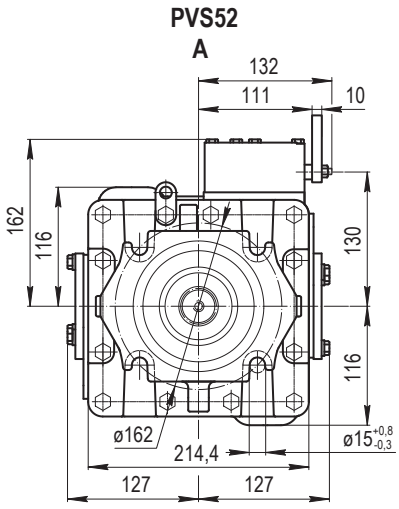


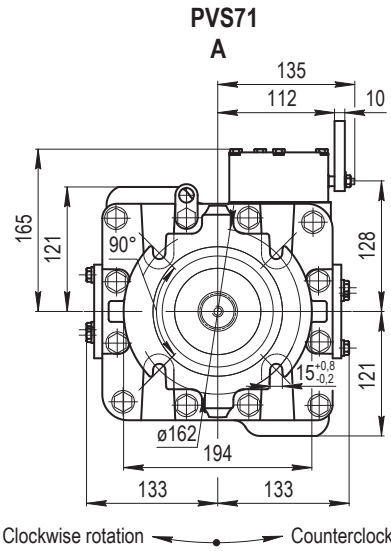
PUMPS WITH HYDROMECHANICAL CONTROL SYSTEM

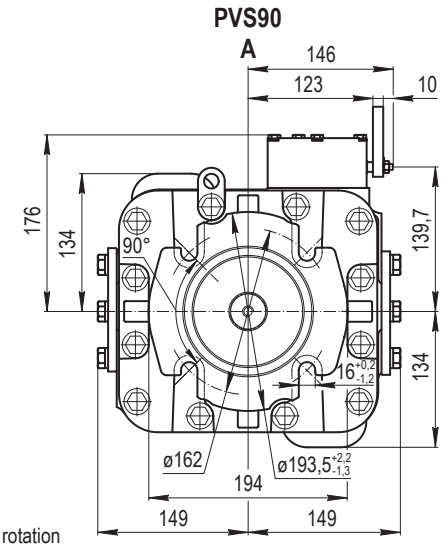








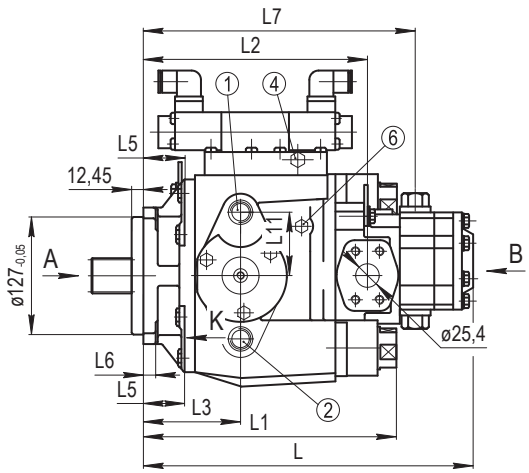


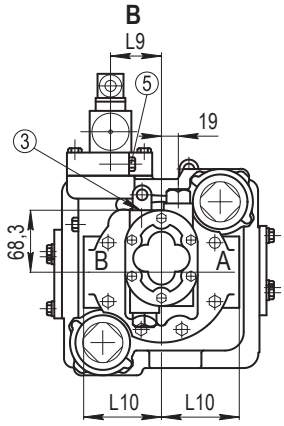


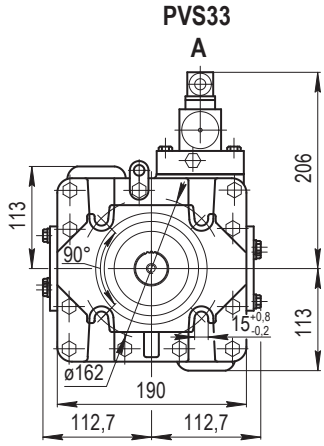
OVERALL DIMENSIONS

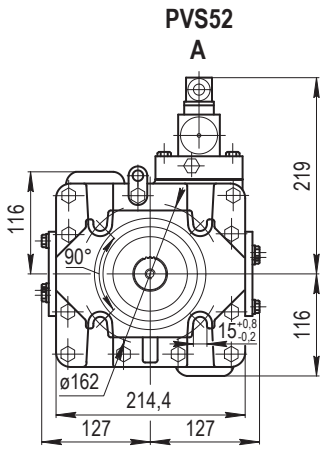
Frame Size	Dimensions [mm]											
	L	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}
PVS33	340	270	224	100	93,7	47,6	16	284	58	55,6	81	62
PVS52	364	276	244	106	105	48		300	71	65,5	87,3	68,07
PVS71	381	311	259	111	119			314	83	68	85,8	71,4
PVS90	394	320	270	118	127	49	17,5	327	91	77,8	95,25	77,8

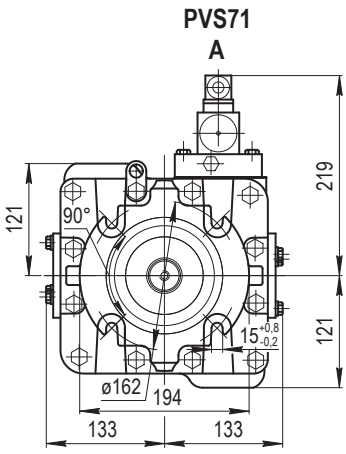
PUMPS WITH ELECTRIC 3 POSITIONED CONTROL SYSTEM

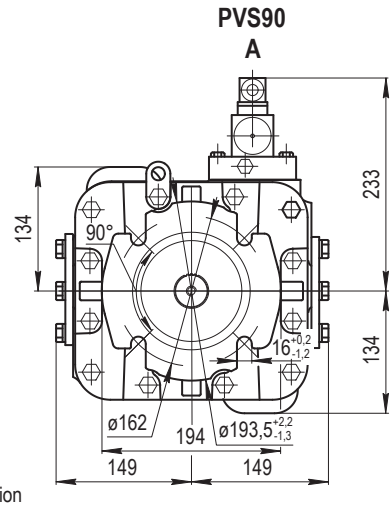












Clockwise rotation — Counterclockwise rotation

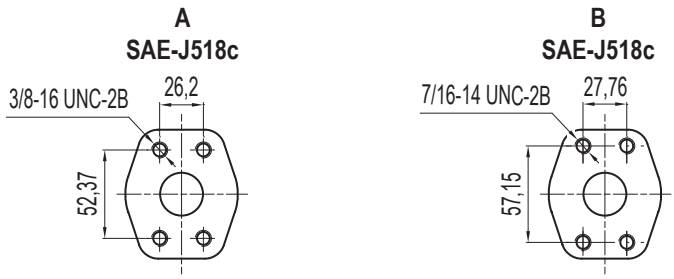
OVERALL DIMENSIONS

Frame size	Dimensions [mm]											
	L	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}
PVS33	340	270	224	100	-	47,6	16	284	-	55,6	81	62
PVS52	364	276	244	106	-	48		300	-	65,5	87,3	68,07
PVS71	381	311	259	111	-			314	-	68	85,8	71,4
PVS90	394	320	270	118	-	49	17,5	327	-	77,8	95,25	77,8

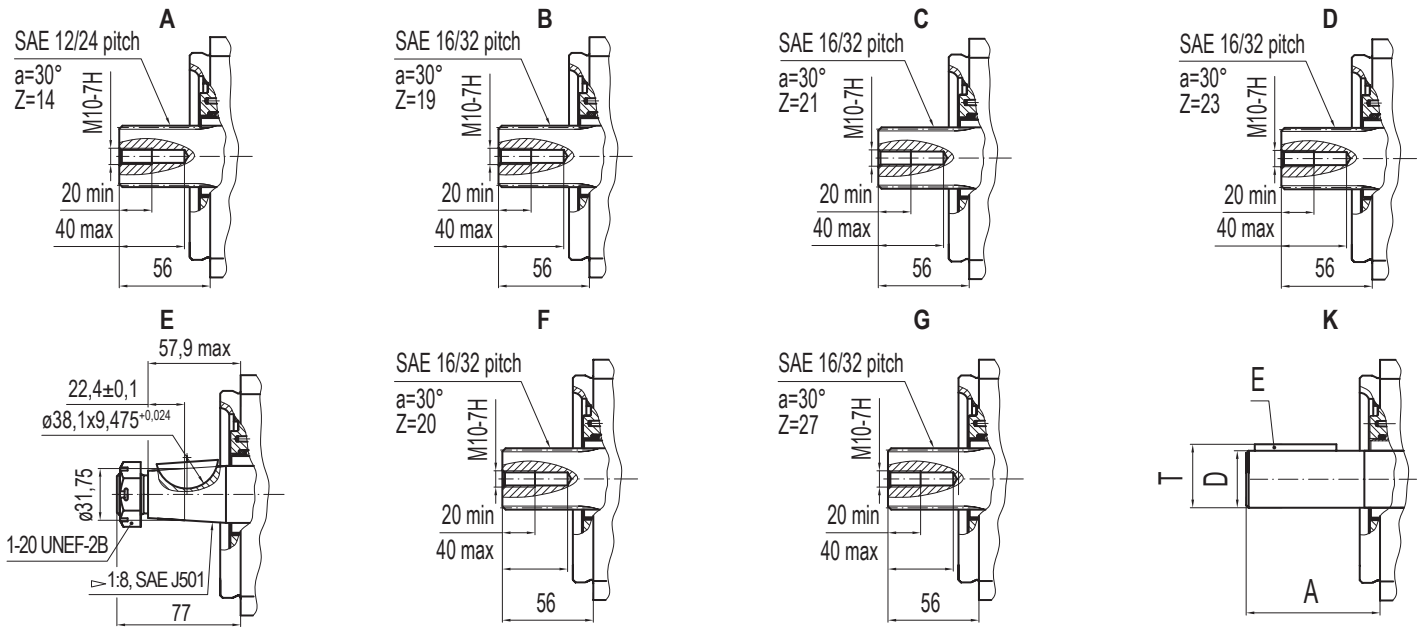
DRAIN PORTS SIZE

Frame Size	Ports		Frame Size	Ports	
	«1»; «2»; «3»	«4"; «5"; «6"		«1»; «2»; «3»	«4»; «5»; «6»
PVS33	7/8-14 UNF-2B	7/16-20 UNF-2B	PVS71	7/8-14 UNF-2B	7/16-20 UNF-2B
PVS52			PVS90		

PORT OPTIONS 'A' & 'B'



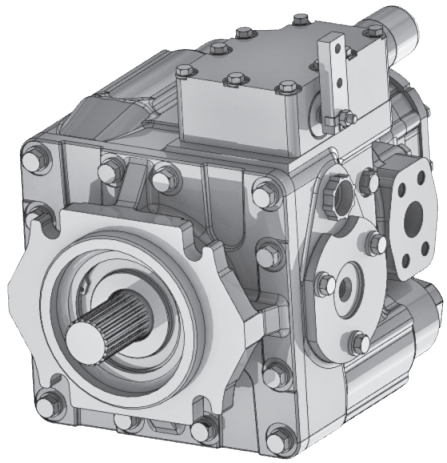
SHAFT OPTIONS



CYLINDRICAL SHAFTS, 'K' DESIGN

Frame size	A	D	Frame size	T	E
PVS33/52/71	77 max	34,93	PVS33/52/71	38,47	7,976x7,976x50
PVS90		44,45	PVS90	48,8	9,576x9,576x50

GENERAL INFORMATION



Variable displacement axial piston pumps in swashplate design for closed circuits. They are used in hydrostatic transmissions, that consist of a pump and hydraulic motor. The proven design, based on the Sauer 20 Series, is reliable and durable in the field. Modernization of the PVS series has significantly improved the technical and performance characteristics of the units and retained the famous reliability and durability. These pumps meet the requirements of heavy duty applications. Tandem pumps available.
Flow direction changes due to the turning of the swashplate in opposite directions relative to its neutral position.

Control systems:
MH – hydromechanical proportional control system. Allows to keep the swashplate in position given by the control lever, maintaining the pump flow at a set level.
ER – electrical 3 positioned control system. Used for on - off - on operating scheme. Maximum displacement setting optional.
HD – hydraulic proportional control system. Allows to keep the swashplate in position by an hydraulic control signal.
EP – electrical proportional control system. Provides a stepless change in the pump displacement by an electrical signal.

Design features:
- Swashplate design.
- Build-in charge pump.
- Smooth flow direction change.
- High pressure relief valve.
- Bimetallic bearing plate has a high wear resistant.
- Lightweight plunger provides reliability in operation at high speeds.
- Tapered roller bearings allow the pump shaft to withstand high radial and axial loads.
- Shaft seals (face seal or lip seal) provide reliable external tightness.
- Mounting flanges according to SAE.
- Through drive according to SAE.

TECHNICAL CHARACTERISTICS

Displacement code		**33**	**52**	**71**	**90**	**112**
Displacement max	ccm	33,3	51,6	69,8	89,0	110,8
Maximum flow	l/min	113,5	204	275,8	314,5	391,6
Maximum pressure in high pressure line	bar	450				
Rated pressure in high pressure line	bar	420				
Maximum drain pressure	bar	2,5				
Maximum speed	min^{-1}	3590	4160		3720	
Minimum speed	min^{-1}	500				
Rated speed	min^{-1}	2500				
Maximum swashplate angle	Degr	±18				
Rated power	kW	60	93	125,9	160,5	199,8
Weight (without fluid)	kg	51	61	69	85	

ORDERING EXAMPLE

PV H 90 / MH 1 R 2 D 2 A C 1 E1 3 A B N 3

PV - variable displacement axial piston pump

H - Series H

90 - displacement 89 ccm

MH - control system (hydromechanical)

1 - controls (no pressure limit)

R - rotation: clockwise

2 - shaft seal (lip seal)

D - shaft option (23 teeth, 16/32 pitch, (37,68mm))

2 - charge pump relief valve setting 22,5 bar to 24,5 bar

A - relief valve option (without relief valve)

C - main ports A&B (SAE J518c 3/8 inches for 350 bar)

1 - control valve (standard)

E1 - charge pump 19 ccm - gerotor type

3 - tandem option (SAE J744c A (82,55 D-6x13x16H9x3,5D10))

A - filtration (FS finlter in pilot pump suction line)

B - orifice diameter (ø0,76 mm)

N - climatic version

3 - special features

ORDER CODE SYSTEM

PV	H		/									

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS	PV

SERIES	H

DISPLACEMENT, CCM	CODE
33,3	33
51,6	52
69,8	71
89,0	90
110,8	112

CONTROL SYSTEM	33	52	71	90	112	CODE
Hydromechanical	●	●	●	●	●	MH
Hydraulic proportional	-	-	○	●	●	HD
Electric for 3 positions [1)]	●	●	●	●	●	ER
Electronic proportional	-	-	○	●	●	EP

CONTROLS	33	52	71	90	112	CODE
No pressure limit	●	●	●	●	●	1
With pressure limit	-	-	○	●	●	2

VOLTAGE OF THE MAGNET (EP ONLY)	33	52	71	90	112	CODE
12V	-	○	○	●	●	A
24V	-	○	○	●	●	B

ROTATION	CODE
Clockwise	R
Counterclockwise	L

SHAFT SEAL	33	52	71	90	112	CODE
Face seal	●	●	●	●	●	1
Lip seal	○	○	●	●	●	2

DRIVE SHAFT	33	52	71	90	112	CODE
14 tooth, 12/24 pitch, (31,22 mm)	●	●	●	●	●	A
19 tooth, 16/32 pitch, (31,73 mm)	●	●	●	●	●	B
21 tooth, 16/32 pitch, (34,5 mm)	●	●	●	●	●	C
23 tooth, 16/32 pitch, (37,68 mm)	-	-	-	●	●	D
Cone 1:8, SAE J501, (35 mm)	●	●	●	●	●	E
20 tooth, 16/32 pitch, (33 mm)	●	●	●	●	●	F
27 tooth, 16/32 pitch, (44,03 mm)	-	-	-	●	●	G
Straight (ø34,93 mm)	●	●	●	-	-	K
Straight (ø44,45 mm)	-	-	-	●	●	L

CHARGE PUMP RELIEF VALVE SETTING	33	52	71	90	112	CODE
13,2 bar - 14,4 bar	●	●	●	●	●	0
17,6 bar - 19,6 bar	●	●	●	●	●	1
22,5 bar - 24,5 bar	-	-	○	●	●	2

HIGH PRESSURE RELIEF VALVE	33	52	71	90	112	CODE
No relief valve	●	●	●	●	●	A
With relief valve	-	-	-	●	●	B

HIGH PRESSURE RELIF VALVE SETTING	33	52	71	90	112	CODE
260 bar	-	-	○	●	●	1
300 bar	-	-	○	●	●	2
340 bar	-	-	○	●	●	3
380 bar	-	-	○	●	●	4
420 bar	-	-	-	●	●	5
450 bar	-	-	-	●	●	6

SPECIAL FEATURES*	CODE
Zero position indicator	1
Built-in bypass valve	2
Displacement limit	3
Drain port size 1 1/16-12UN-2B	4
Shaft outlet 76.2 mm	5
Flange: 4 grooves, ø17 mm	6
Flange: 4 grooves, ø17 mm, a hole on mounting surface for a ø14 mm pin	7
	8

CLIMATIC VERSION	CODE
Temperate	N
Tropical	T

CONTROL ORIFICE	33-112	CODE
No orifice	●	A
ø0,76 mm	●	B
ø1,05 mm	●	D
ø1,6 mm	●	E

FILTRATION	33	52	71	90	112	CODE
Filter mounted on charge pump suction line	●	●	●	●	●	A
Filter mounted on charge pump pressure line	-	-	○	●	●	B

TANDEM MOUNTING	33	52	71	90	112	CODE
SAE J744c A (ø82,55 mm, 9 tooth) m=1,5875	-	-	○	●	●	1
SAE J744c AA (ø82,55 mm, 11 tooth) m=1,5875	-	-	○	●	●	2
SAE J744c A (ø82,55 mm, D-6x13x16H9x3,5D10)	-	-	○	●	●	3
SAE J744c B (ø101,6 mm, 13 tooth) m=1,5875	-	-	○	●	●	4
SAE J744c B (ø101,6 mm, 14 tooth) m=2,1166	-	-	○	●	●	5
SAE J744c B (ø101,6 mm, D-6x18x22H9x5D9)	-	-	○	●	●	6

CHARGE PUMP	33	52	71	90	112	CODE
CPX						
Gear type 18,06 ccm - standard	-	●	●	●	●	A1
Gear type 18,06 ccm - with adjustable relief valve	-	●	●	●	●	A2
Gear type 18,06 ccm-standard	●	-	-	-	-	A3
Gear type 18,06 ccm - with adjustable relief valve	●	-	-	-	-	A4
Gear type 12,3 ccm - standard	-	●	●	●	-	B1
Gear type 12,3 ccm - with adjustable relief valve	-	●	●	●	-	B2
Gear type 12,3 ccm - standard	●	-	-	-	-	B3
Gear type 12,3 ccm - with adjustable relief valve	●	-	-	-	-	B4
Gear type 8,2 ccm - standard	●	-	-	-	-	C1
Gear type 8,2 ccm - with adjustable relief valve	●	-	-	-	-	C2
CPG						
Gerotor type 19,0 ccm - standard	-	-	●	●	●	E1
Gerotor type 19,0 ccm - with adjustable relief valve	-	-	●	●	●	E2
Gerotor type 22,0 ccm - standard	-	-	-	○	○	F1
Gerotor type 22,0 ccm - with adjustable relief valve	-	-	-	○	○	F2

CONTROL VALVE	33	52	71	90	112	CODE
Standart	●	●	●	●	●	1
Low noise	-	-	-	●	●	2

MAIN PORTS 'A' & 'B'	33	52	71	90	112	CODE
M12 for 480 bar	-	-	●	●	●	A
SAE J518c 7/16 inches	-	-	●	●	●	B
SAE J518c 3/8 inches	●	●	●	●	●	C

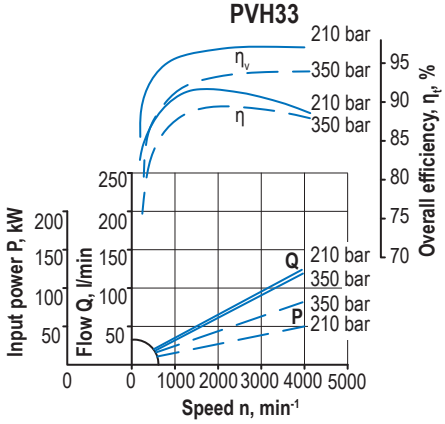
1) Control valve with electro control is not supplied

Notes: ● Standard; ○ Optional; - Not available.

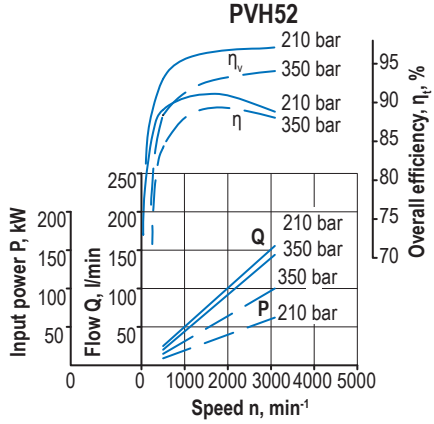
NOMINAL SIZES

Efficiency, flow and input power vs. speed (at maximum swashplate angle)

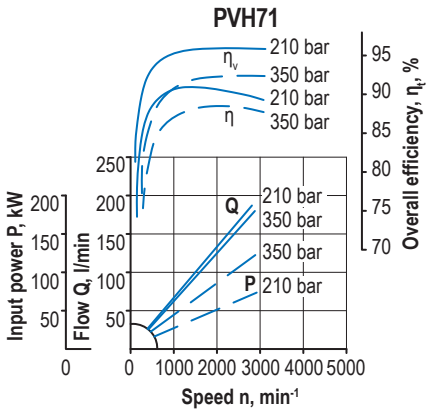
PVH33



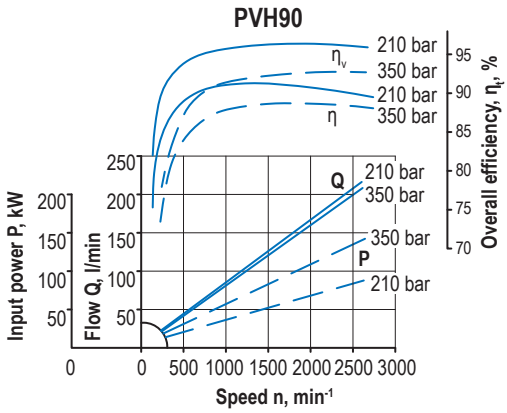
PVH52



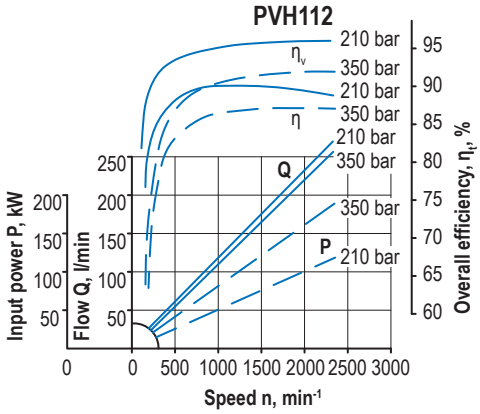
PVH71



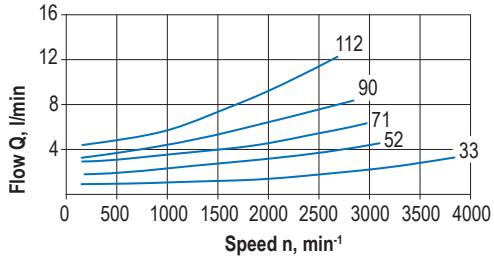
PVH90



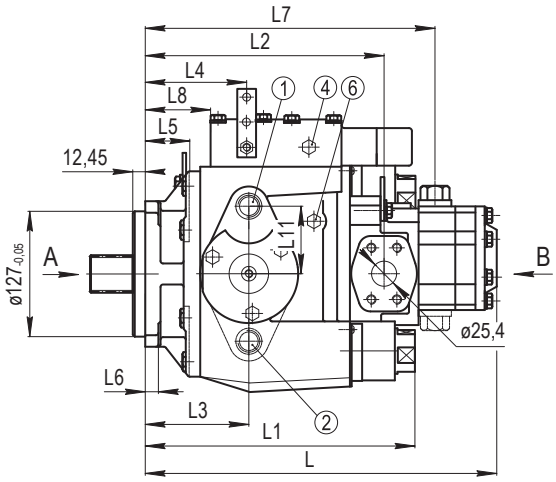
PVH112

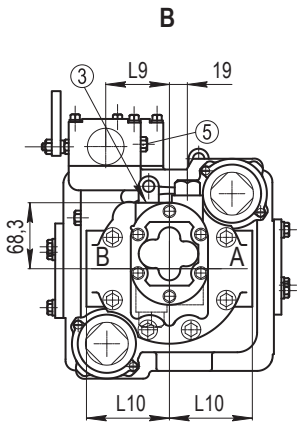


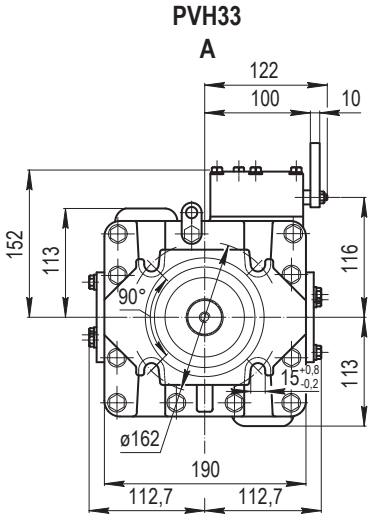
Drain leakage vs. speed

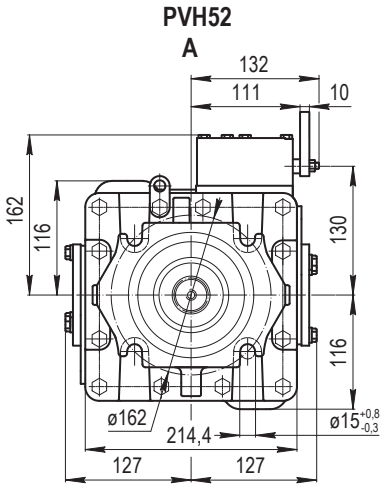


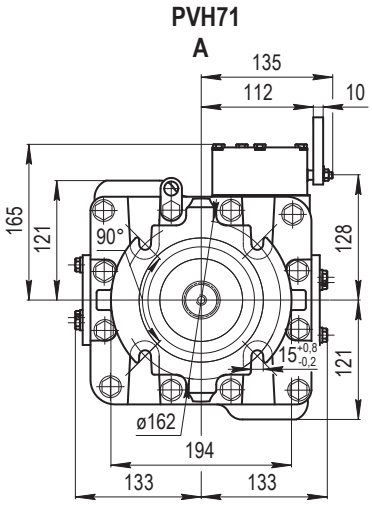
PUMPS WITH HYDROMECHANICAL CONTROL SYSTEM

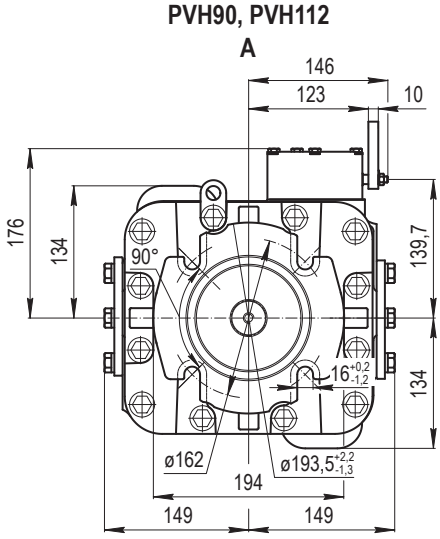










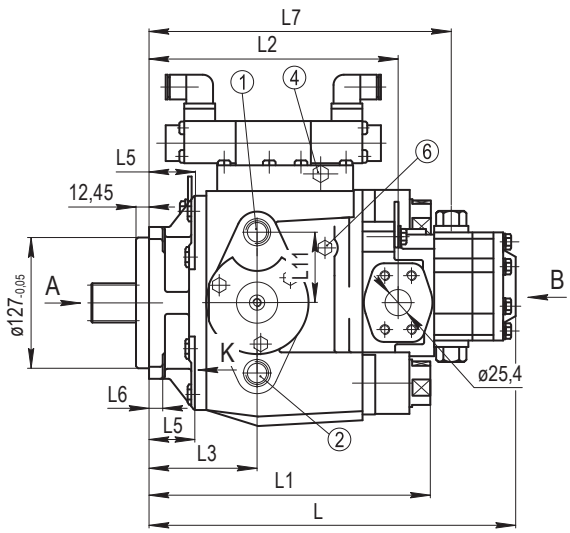


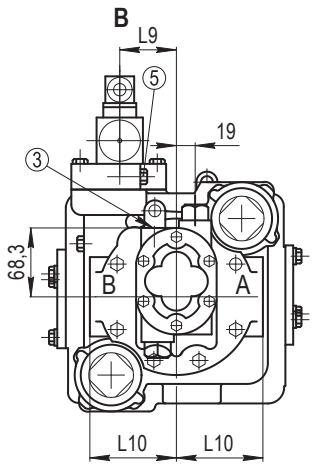
Clockwise rotation — Counterclockwise rotation

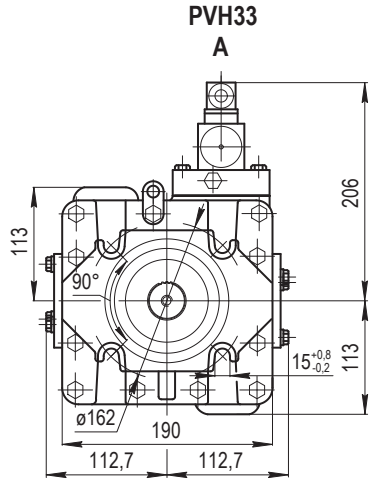
OVERALL DIMENSIONS

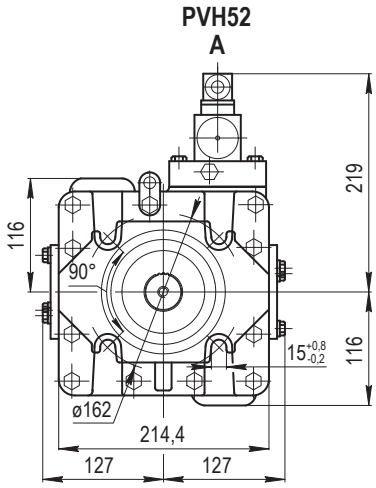
Frame size	Dimensions [mm]											
	L	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}
PVH33	340	270	224	100	93,7	47,6	16	284	58	55,6	81	62
PVH52	364	276	244	106	105	48		300	71	65,5	87,3	68,07
PVH71	381	311	259	111	119			314	83	68	85,8	71,4
PVH90	394	320	270	118	127	49	17,5	327	91	77,8	95,25	77,8
PVH112												

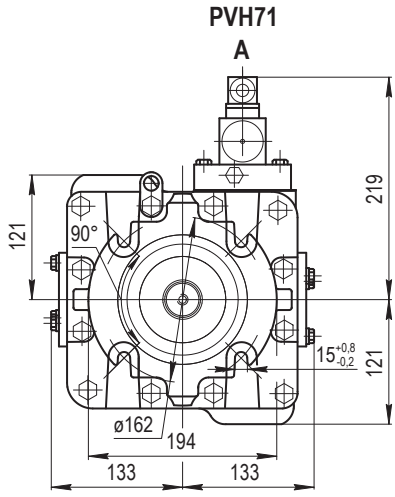
PUMPS WITH ELECTRIC 3 POSITIONED CONTROL SYSTEM

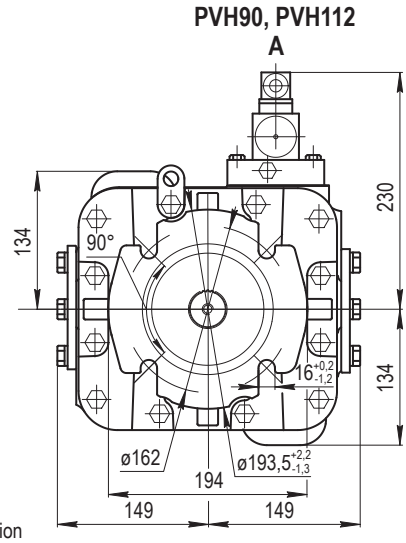












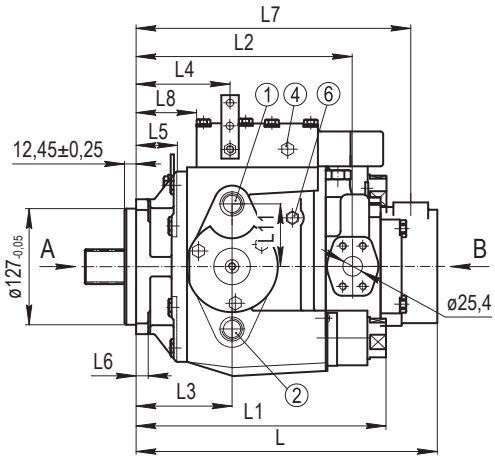
Clockwise rotation — Counterclockwise rotation

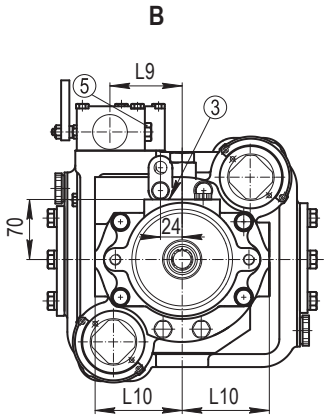
OVERALL DIMENSIONS

Frame size	Dimensions [mm]											
	L	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}
PVH33	340	270	224	100	-	47,6	16	284	-	55,6	81	62
PVH52	364	276	244	106	-	48		300	-	65,5	87,3	68,07
PVH71	381	311	259	111	-			314	-	68	85,8	71,4
PVH90	394	320	270	118	-	49	17,5	327	-	77,8	95,25	77,8
PVH112												

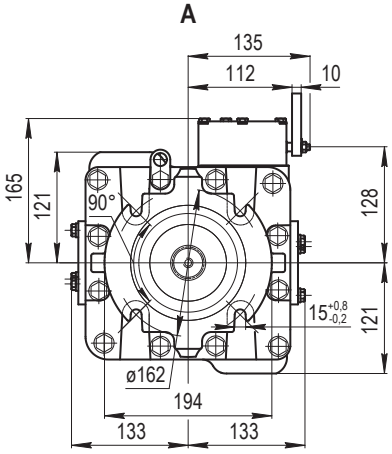
PUMPS WITH GEROTOR TYPE CHARGE PUMP FOR TANDEM WITH GEAR PUMPS

PUMPS WITH HYDRO-MECHANICAL CONTROL SYSTEM

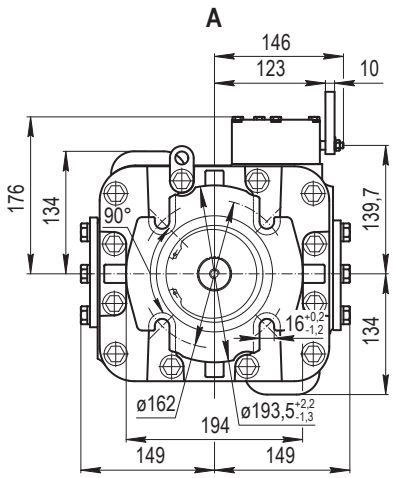




PVH71



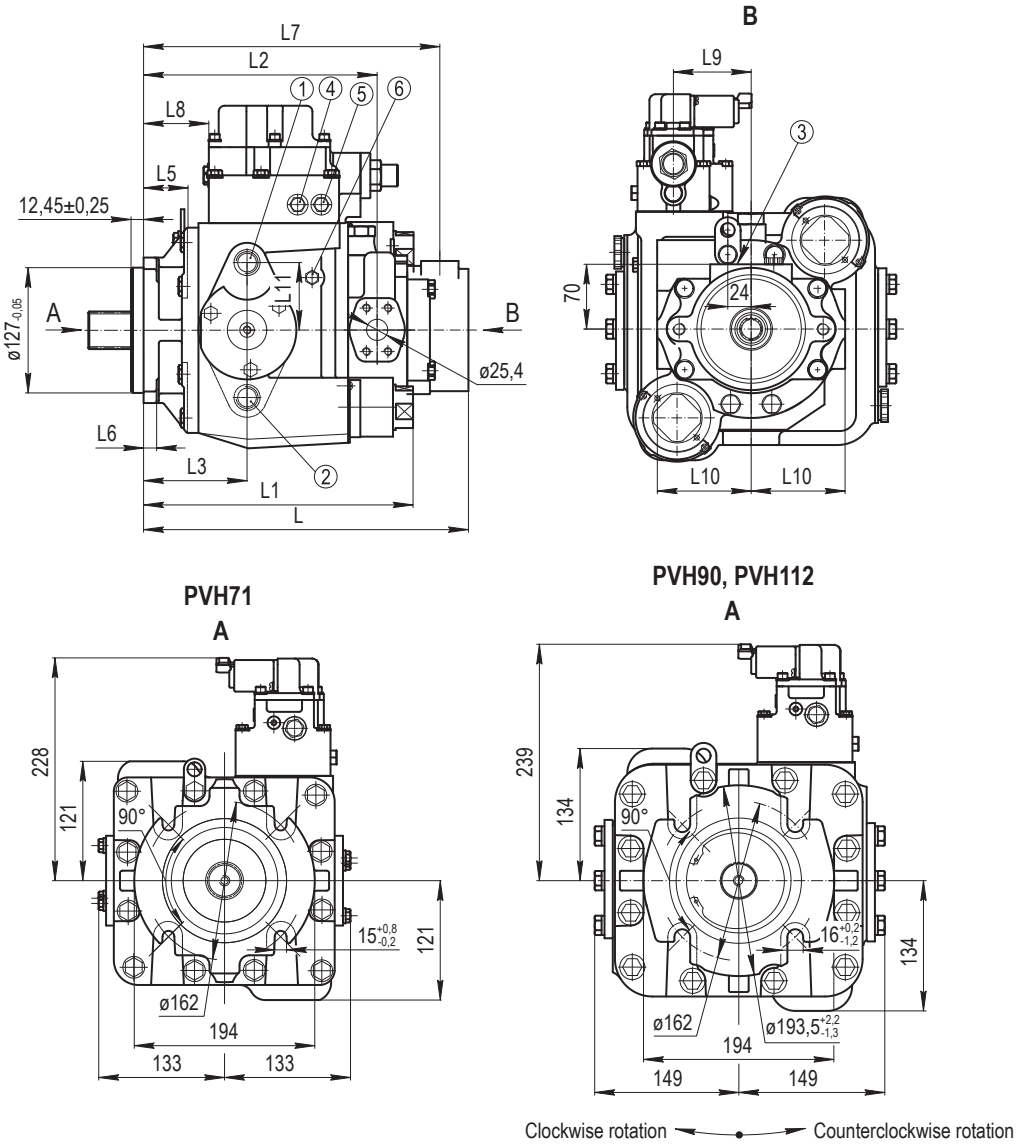
PVH90, PVH112



OVERALL DIMENSIONS

Frame size	Dimensions [mm]											
	L	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}
PVH71	356	311	259	111	119	48	16	327	83	68	85,8	71,4
PVH90	364	320	270	118	127	49	17,5	335	91	77,8	95,25	77,8
PVH112												

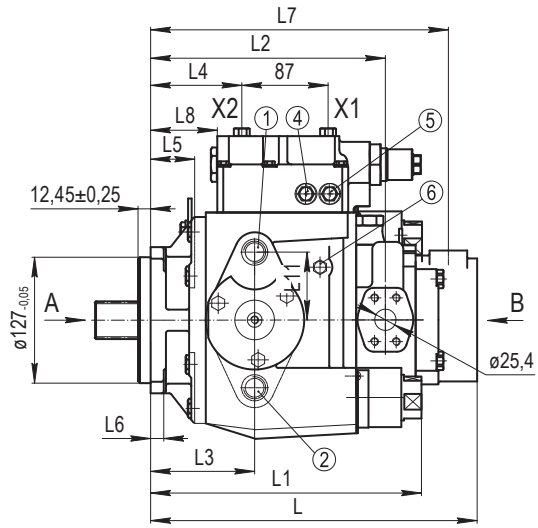
PUMPS WITH ELECTROPROPORTIONAL CONTROL SYSTEM



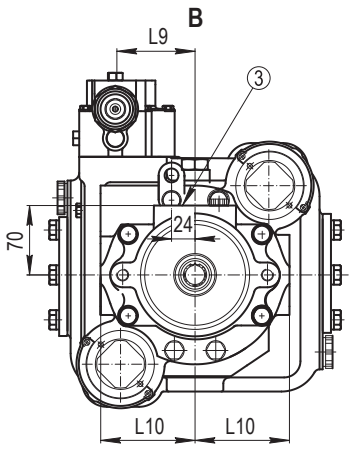
OVERALL DIMENSIONS

Frame size	Dimensions [mm]											
	L	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}
PVH71	356	311	259	111	-	48	16	327	83	68	85,8	71,4
PVH90	364	320	270	118	-	49	17,5	335	91	77,8	95,25	77,8
PVH112												

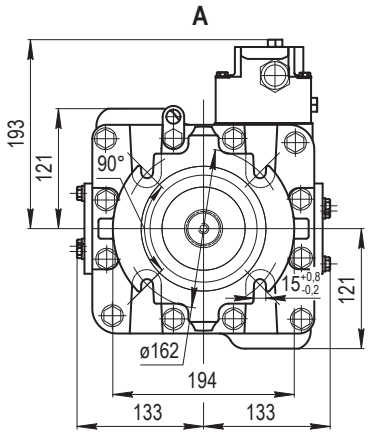
PUMPS WITH HYDRAULIC PROPORTIONAL CONTROL SYSTEM

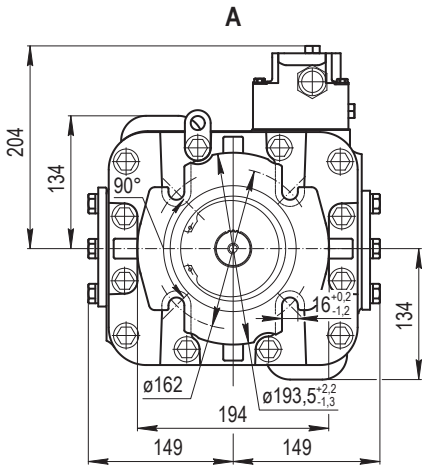


PVH71



PVH90, PVH112



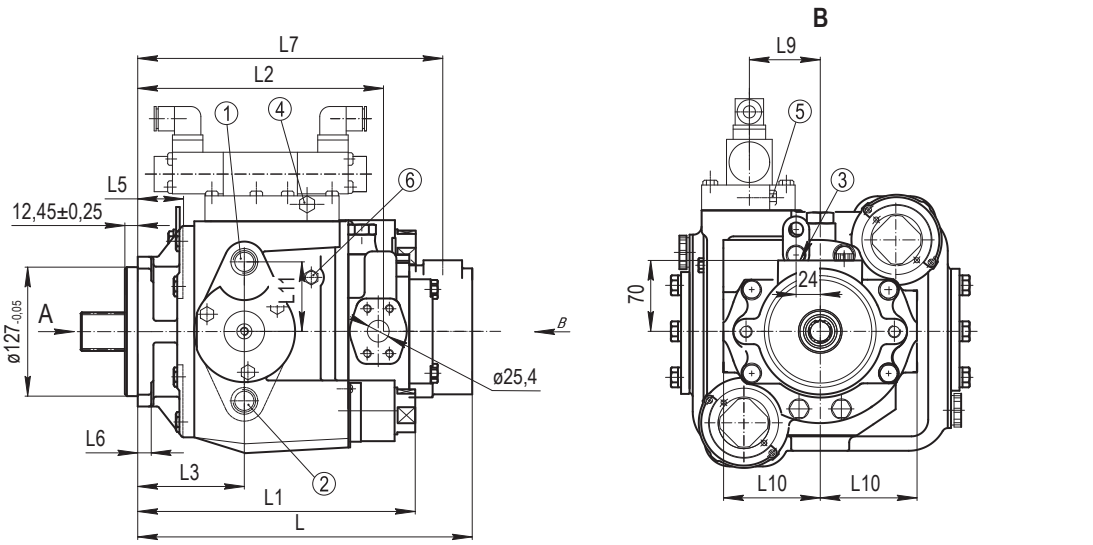


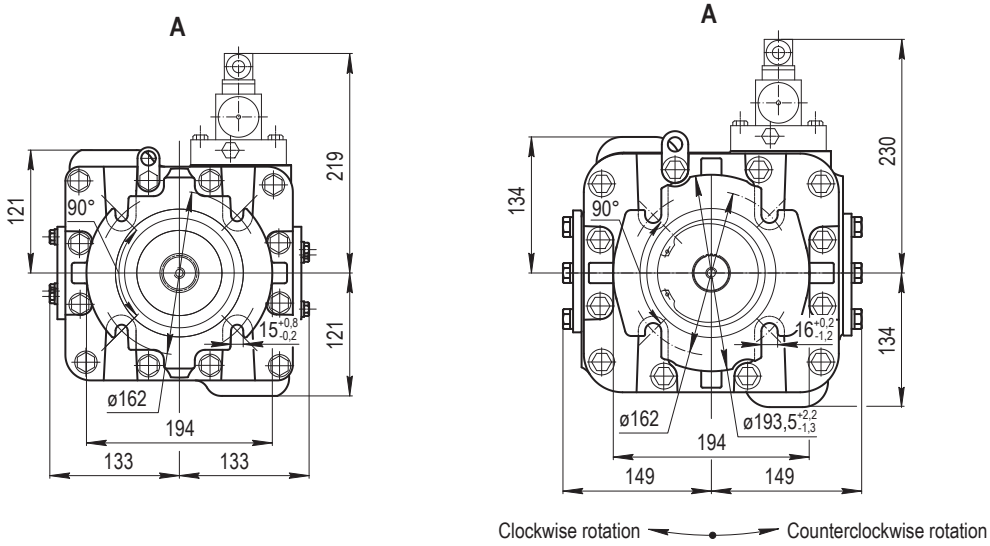
Clockwise rotation — Counterclockwise rotation

OVERALL DIMENSIONS

Frame size	Dimensions [mm]											
	L	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}
PVH71	356	311	259	111	119	48	16	327	83	68	85,8	71,4
PVH90	364	320	270	118	127	49	17,5	335	91	77,8	95,25	77,8
PVH112												

PUMPS WITH ELECTRIC 3 POSITIONED CONTROL SYSTEM



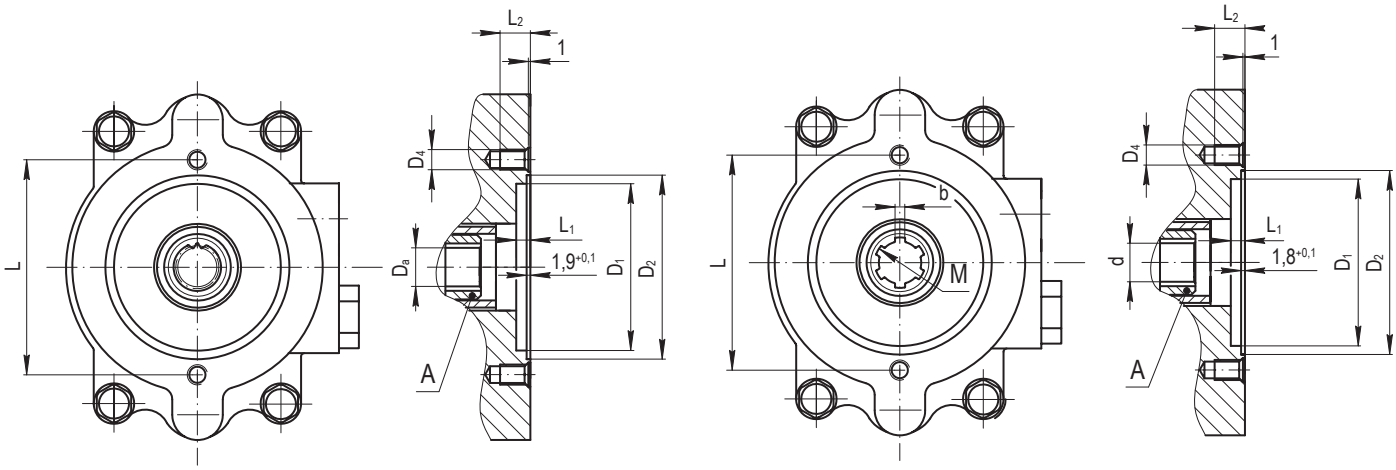


OVERALL DIMENSIONS

Frame size	Dimensions [mm]											
	L	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}
PVH71	356	311	259	111	-	48	16	327	-	68	85,8	71,4
PVH90	364	320	270	118	-	49	17,5	335	-	77,8	95,25	77,8
PVH112												

MOUNTING DIMENSIONS FOR TANDEM WITH GEAR PUMPS

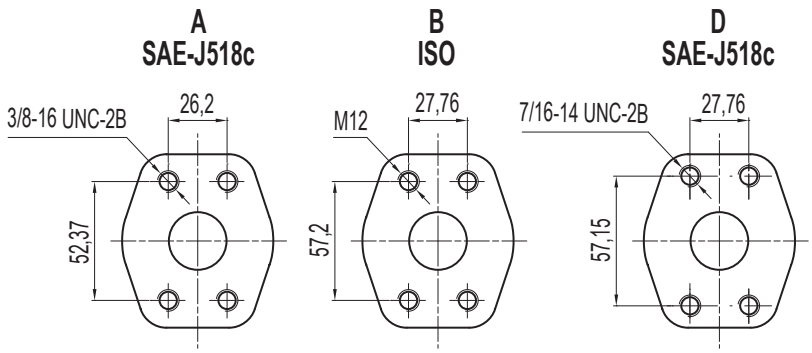
Code	Z	Dimensions [mm]									
		D_a	M	d	b	D_1, SAE J744c	D_2	L	L_1	D_4	L_2
1	9	$12{,}926^{+0{,}11}$	-	-	-	$82{,}57^{+0{,}04}$	$91^{+0{,}22}$	106,4	7,5	M10-7H	15 min
2	11	$16{,}017^{+0{,}11}$									
3	-	-	D-6×13×16H9×3,5D10	$13^{+0{,}11}$	$3{,}5^{+0{,}078}_{+0{,}030}$						
4	13	$19{,}133^{+0{,}11}$	-	-	-	$101{,}62^{+0{,}04}$	$110^{+0{,}22}$	146,1	10	M12-7H	25 min
5	14	$28^{+0{,}13}$									
6	-	-	D-6×18×22H9×5D9	$18^{+0{,}11}$	$5^{+0{,}078}_{+0{,}030}$						



DRAIN PORTS SIZES

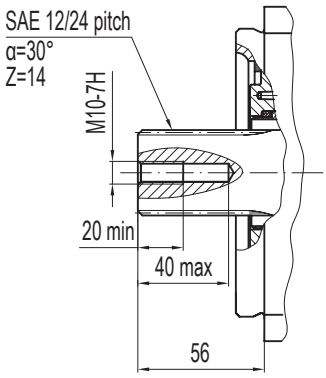
Frame size	«1»; «2»	«3»
PVH33	7/8-14 UNF-2B	1 5/16-12UN-2B
PVH52		
PVH71		
PVH90		
PVH112		
Frame size	**«4»; «5»; «6»**	
PVH33	7/16-20 UNF-2B	
PVH52		
PVH71		
PVH90		
PVH112		

PORT OPTIONS 'A' & 'B'

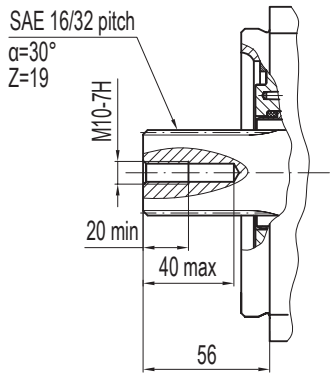


SHAFT OPTIONS

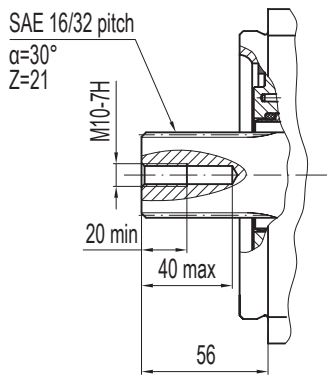
A



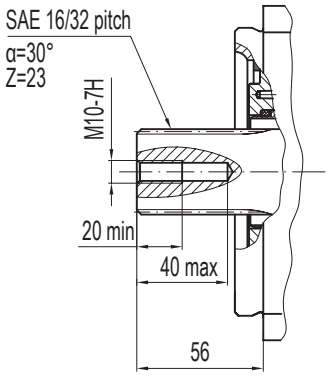
B



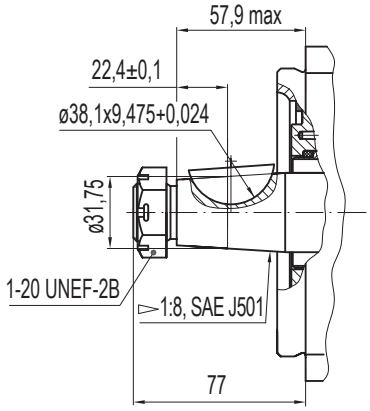
C



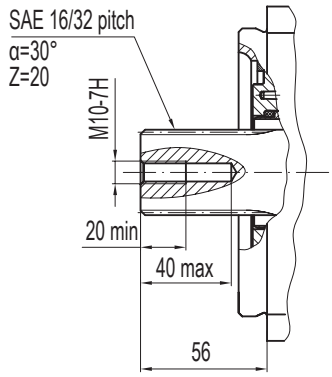
D



E



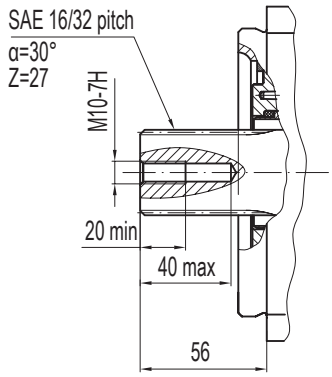
F



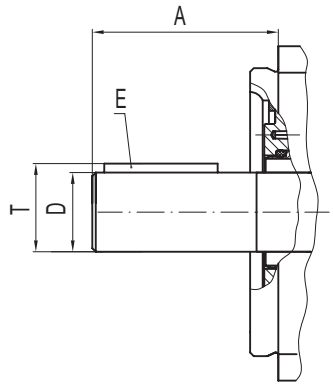
CYLINDRICAL SHAFTS, 'K' DESIGN

Frame Size	A	D
PVH33/52/71	77 max	34,93
PVH90/112	77 max	44,45
Frame Size	**T**	**E**
PVH33/52/71	38,47	7,976x7,976x50
PVH90/112	48,8	9,576x9,576x50

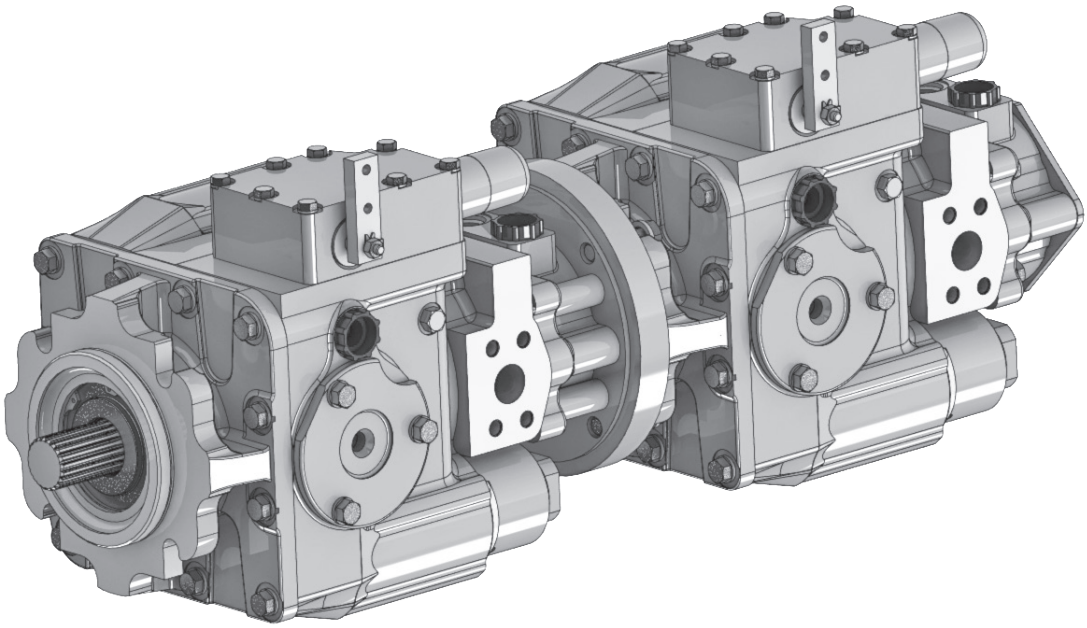
G



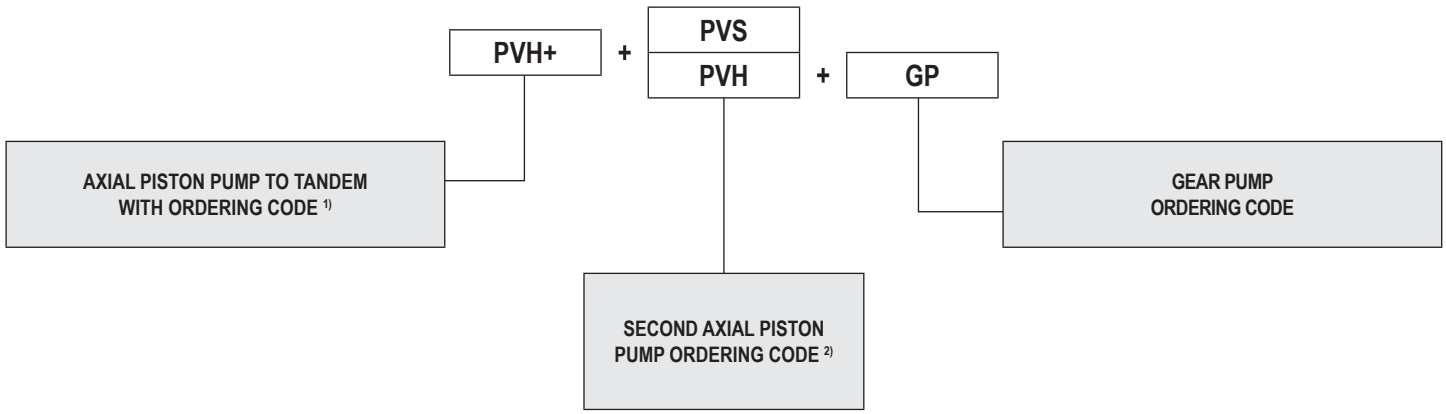
K



PUMPS WITH GEROTOR TYPE CHARGE PUMP FOR TANDEM WITH AXIAL PISTON PUMP

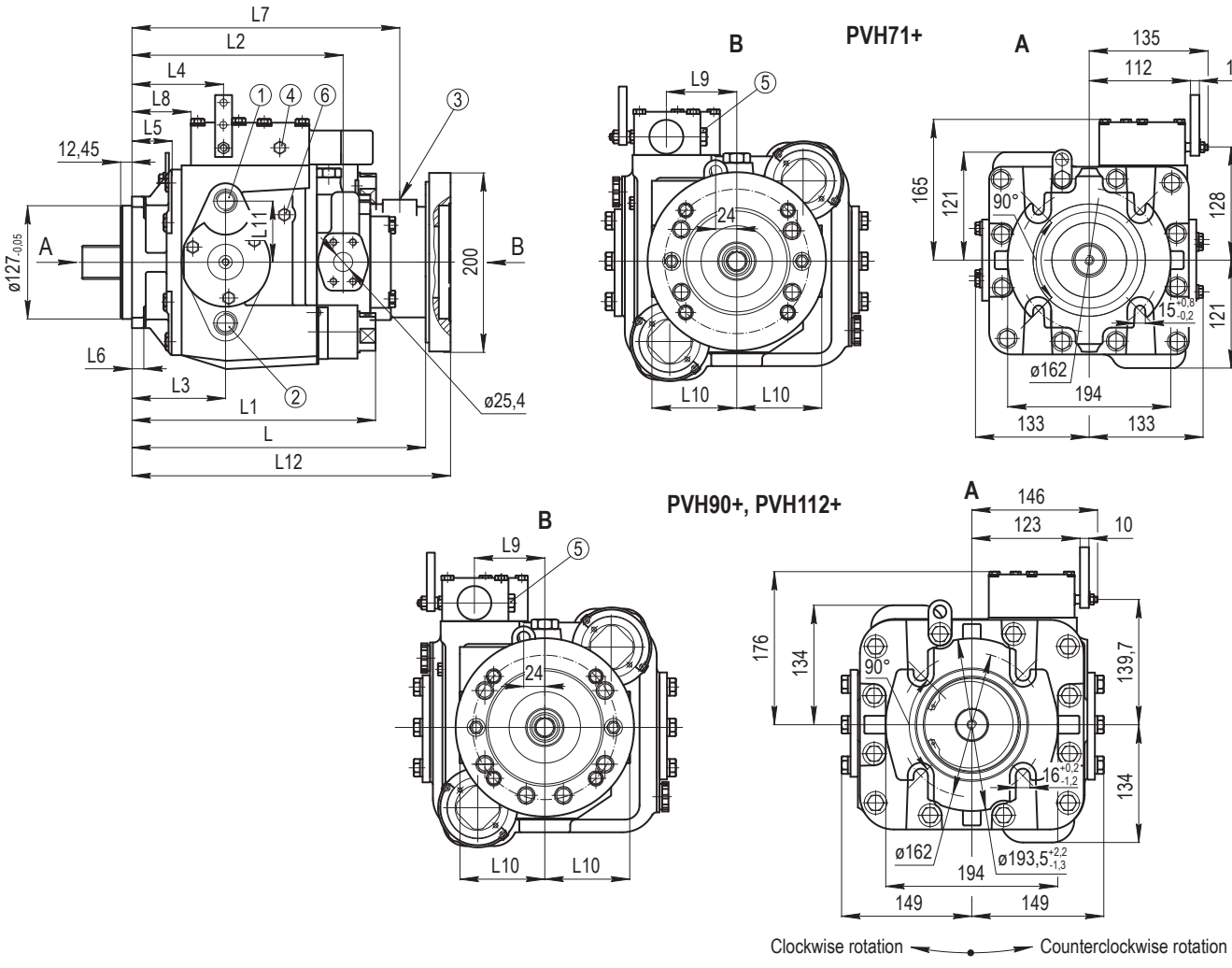


TANDEM PUMP ORDER CODE SYSTEM



1) First axial piston ordering code take from page 16-17.
2) Second axial piston pump ordering code take from page 16-17 (for H-series pump) or on page 8 (for S-series pump).

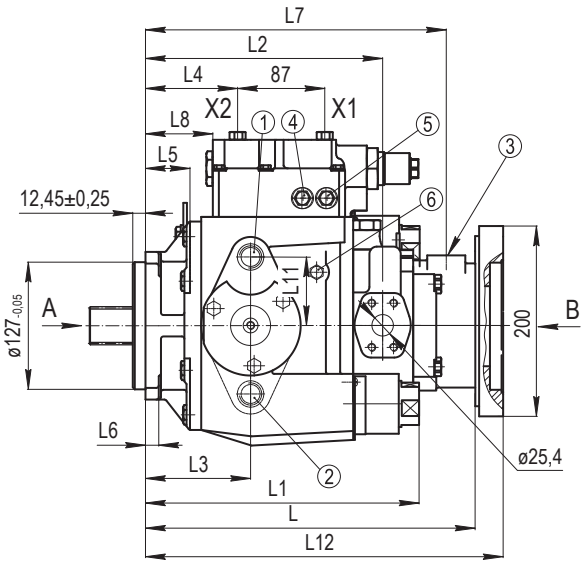
PUMPS WITH HYDROMECHANICAL CONTROL SYSTEM



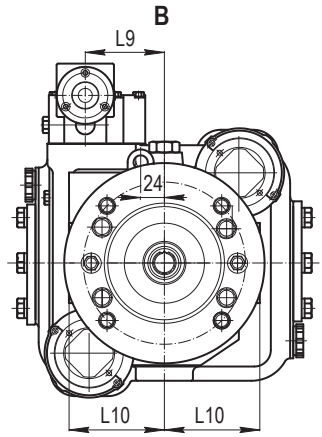
OVERALL DIMENSIONS

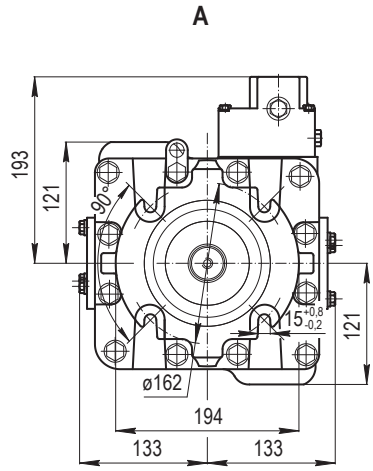
Frame size	Dimensions [mm]												
	L	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}	L_{12}
PVH71+	356	311	259	111	119	48	16	327	83	68	85,8	71,4	384
PVH90+	364	320	270	118	127	49	17,5	335	91	77,8	95,25	77,8	392
PVH112+													

PUMPS WITH HYDRAULIC PROPORTIONAL CONTROL SYSTEM

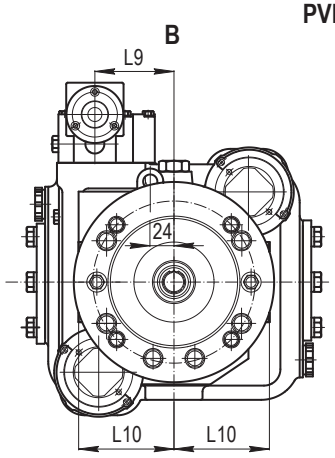


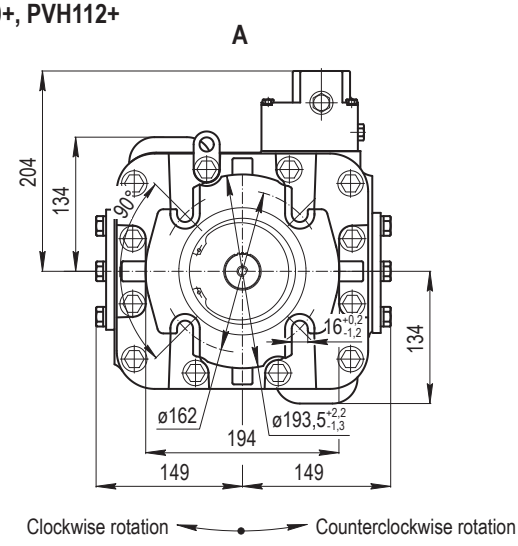
PVH71+





PVH90+, PVH112+





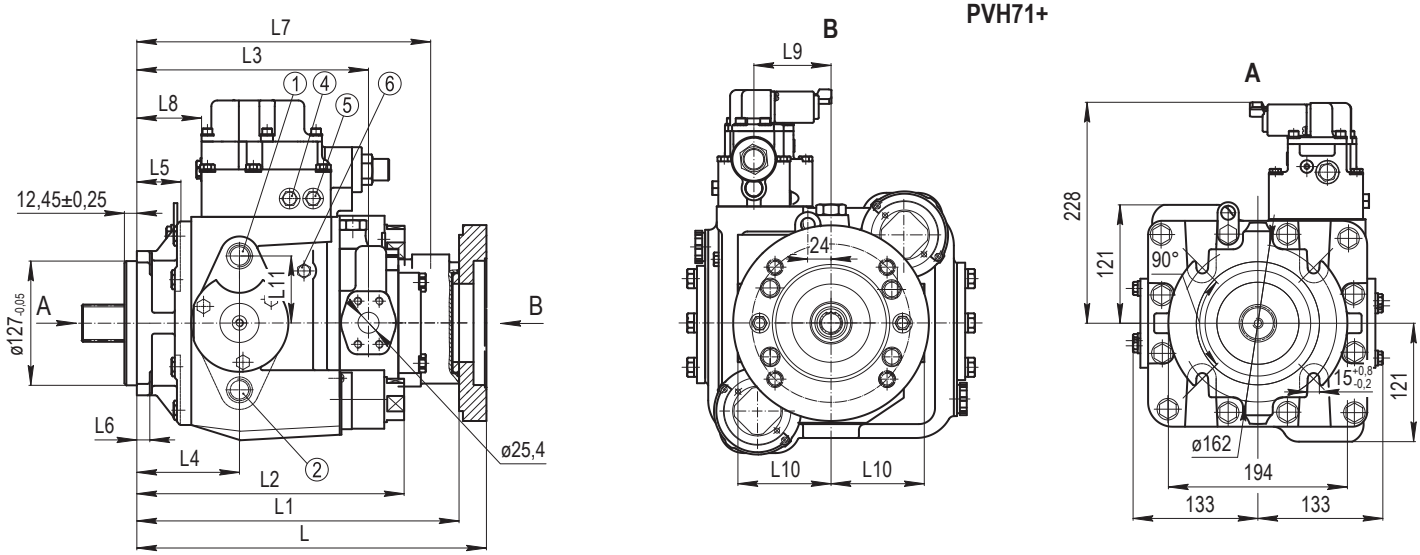
Clockwise rotation — Counterclockwise rotation

OVERALL DIMENSIONS

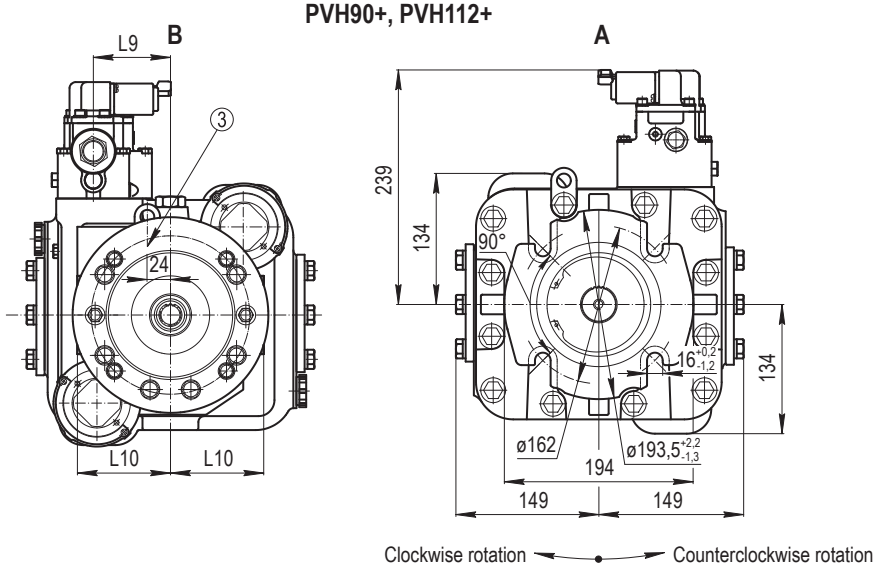
Frame size	Dimensions [mm]												
	L	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}	L_{12}
PVH71+	356	311	259	111	107	48	16	327	83	69,4	85,8	71,4	384
PVH90+	364	320	270	118	115	49	17,5	335	91	79,2	95,25	77,8	392
PVH112+													

PUMPS WITH ELECTROPROPORTIONAL CONTROL SYSTEM

PVH71+



PVH90+, PVH112+

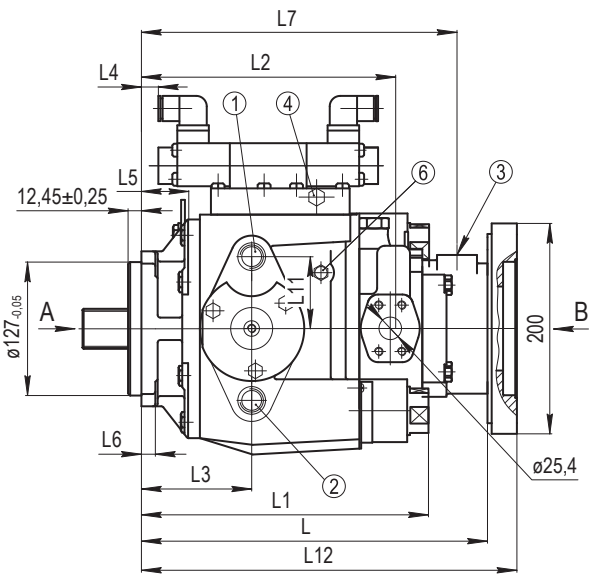


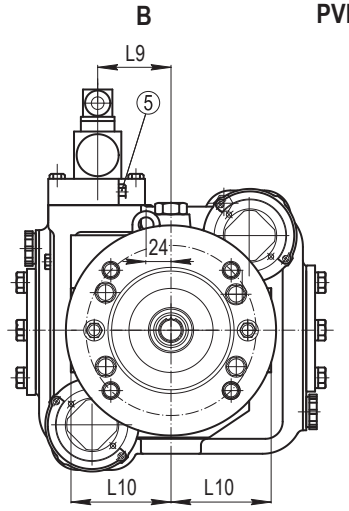
Clockwise rotation ⟷ Counterclockwise rotation

OVERALL DIMENSIONS

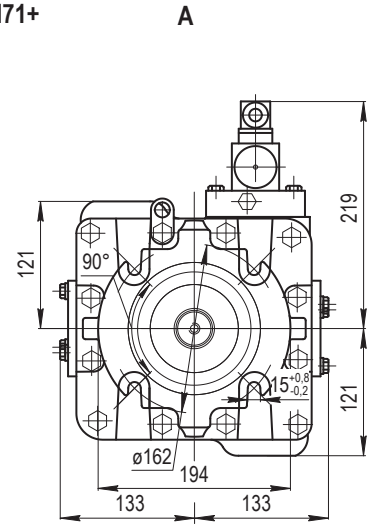
Frame size	Dimensions [mm]												
	L	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}	L_{12}
PVH71+	356	311	259	111	-	48	16	327	83	69,4	85,8	71,4	384
PVH90+	364	320	270	118	-	49	17,5	335	91	79,2	95,25	77,8	392
PVH112+													

PUMPS WITH ELECTRIC 3 POSITIONED CONTROL SYSTEM

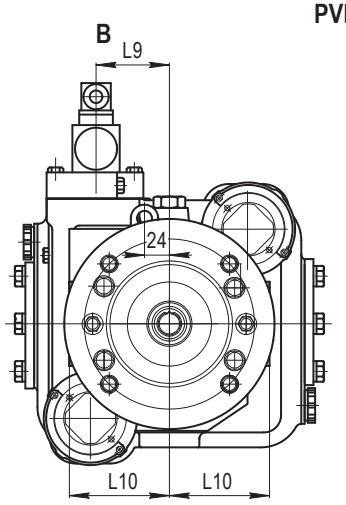


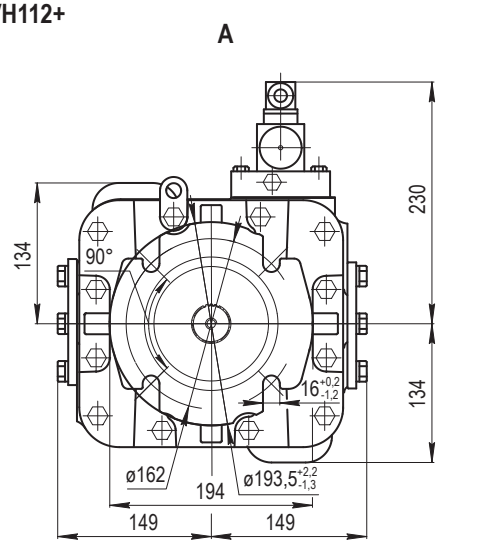


PVH71+



PVH90+, PVH112+





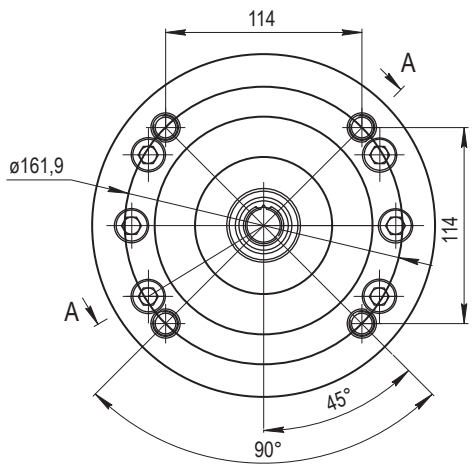
Clockwise rotation ⟷ Counterclockwise rotation

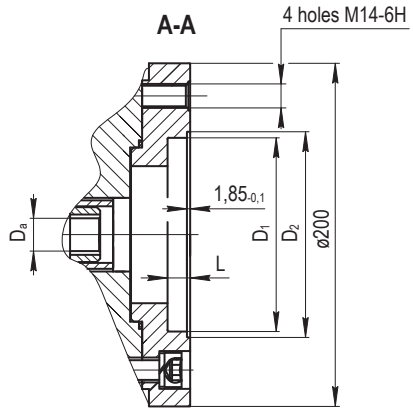
OVERALL DIMENSIONS

Frame size	Dimensions [mm]												
	L	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}	L_{12}
PVH71+	356	311	259	111	-	48	16	327	-	55	85,8	71,4	384
PVH90+	364	320	270	118	-	49	17,5	335	-	63	95,25	77,8	392
PVH112+													

MOUNTING DIMENSIONS FOR TANDEM WITH AXIAL PISTON PUMPS

Frame size	z	m	Dimensions [mm]			
			D_a	D_1	D_2	L
PVH71	14	2,1166	$28^{+0,13}$	$113^{+0,10}_{+0,05}$	$120^{+0,25}$	13,2±0.24
PVH90				$127^{+0,10}_{+0,05}$	$131,8^{+0,25}$	
PVH112						

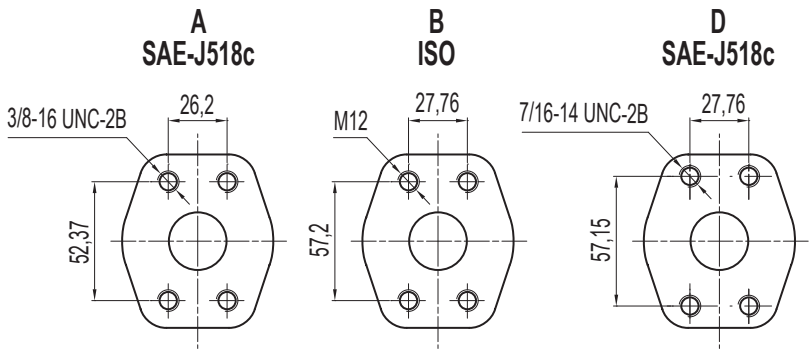




DRAIN PORTS SIZES

Frame size	«1»; «2»	«3»
PVH33	7/8-14 UNF-2B	1 5/16-12UN-2B
PVH52		
PVH71		
PVH90		
PVH112		
Frame size	**«4»; «5»; «6»**	
PVH33	7/16-20 UNF-2B	
PVH52		
PVH71		
PVH90		
PVH112		

PORT OPTIONS 'A' & 'B'

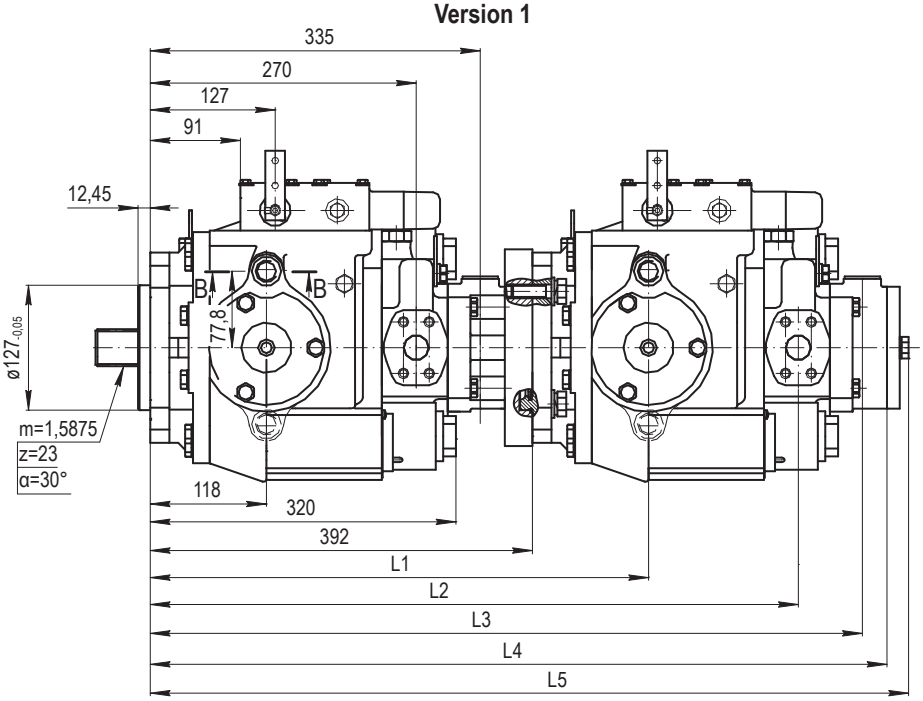


ORDERING CODES FOR TANDEM PUMPS

Order code	Front axial piston pump of the tandem unit	Rear axial piston pump of the tandem unit	Tandem mounted GP	Version
C0	PVH112+: control systems MH; ER; HD; EP	PVH112: control systems MH; ER; HD; EP	Available	Version 1
C1		PVH112: control systems MH; ER; HD; EP		Version 2
C2	PVH112+: control systems MH; ER; HD; EP	PVH90: control systems MH; ER; HD; EP	Available	Version 1
C3		PVH90: control systems MH; ER; HD; EP		Version 2
C4		PVS90: control systems MH; ER; HD; EP		
C5	PVH112+: control systems MH; ER; HD; EP	PVH71: control systems MH; ER; HD; EP	Available	Version 1
C6		PVH71: control systems MH; ER; HD; EP		Version 2
C7		PVS71: control systems MH; ER; HD; EP		
C8	PVH112+: control systems MH; ER; HD; EP	PVH52: control systems MH; ER		
C9		PVS52: control systems MH; ER		
C10	PVH112+: control systems MH; ER; HD; EP	PVH33: control systems MH; ER		
C11		PVS33: control systems MH; ER		
D0	PVH90+: control systems MH; ER; HD; EP	PVH90: control systems MH; ER; HD; EP	Available	Version 1
D1		PVH90: control systems MH; ER; HD; EP		Version 2
D2		PVS90: control systems MH; ER; HD; EP		
D3	PVH90+: control systems MH; ER; HD; EP	PVH71: control systems MH; ER; HD; EP	Available	Version 1
D4		PVH71: control systems MH; ER; HD; EP		Version 2
D5		PVS71: control systems MH; ER; HD; EP		
D6	PVH90+: control systems MH; ER; HD; EP	PVH52: control systems MH; ER		Version 2
D7		PVS52: control systems MH; ER		
D8		PVH33: control systems MH; ER		
D9		PVS33: control systems MH; ER		
F0	PVH71+: control systems MH; ER; HD; EP	PVH71: control systems MH; ER; HD; EP	Available	Version 1
F1		PVH71: control systems MH; ER; HD; EP		Version 2
F2		PVS71: control systems MH; ER; HD; EP		
F3	PVH71+: control systems MH; ER; HD; EP	PVH52: control systems MH; ER		
F4		PVS52: control systems MH; ER		
F5	PVH71+: control systems MH; ER; HD; EP	PVH33: control systems MH; ER		
F6		PVS33: control systems MH; ER		

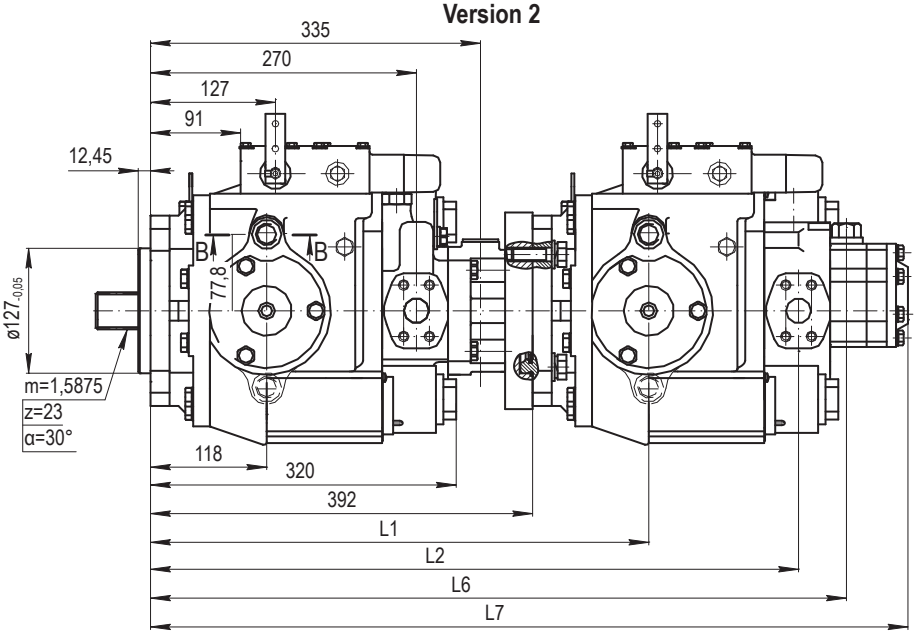
Design of the front and rear axial piston pumps of the tandem unit choose acc. to order code. See: PVS - page 8, PVH - page 16-17.

Version 1



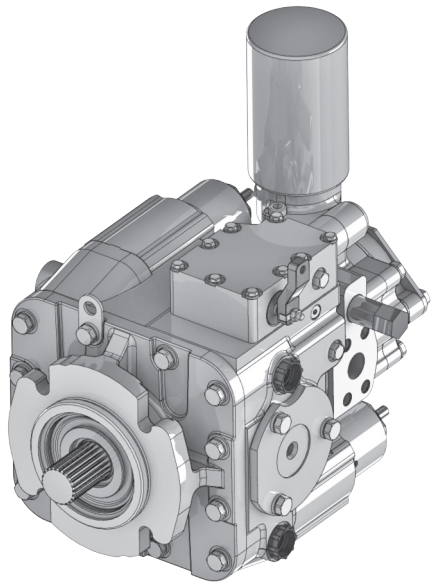
Version	Frame size	Dimensions [mm]						
		L1	L2	L3	L4	L5	L6	L7
Version 1	PVH71+ PVH71	494	641	710	737	755	-	-
	PVH90+ PVH90	510	662	727	754	768	-	-
	PVH90+ PVH71	503	649	717	745	760	-	-
	PVH112+ PVH112	510	662	727	754	768	-	-
	PVH112+ PVH90							
	PVH112+ PVH71	503	649	717	745	760	-	-

Version 2



Version	Frame size	Dimensions [mm]						
		L1	L2	L3	L4	L5	L6	L7
Version 2	PVH71+ PVH71	494	641	-	-	-	692	763
	PVH71+ PVS71							
	PVH71+ PVH52	489	628	-	-	-	679	747
	PVH71+ PVS52							
	PVH71+ PVH33	482	607	-	-	-	661	715
	PVH71+ PVS33							
	PVH90+ PVH90	510	662	-	-	-	719	786
	PVH90+ PVS90							
	PVH90+ PVH71	503	651	-	-	-	706	773
	PVH90+ PVS71							
	PVH90+ PVH52	498	636	-	-	-	692	756
	PVH90+ PVS52							
	PVH90+ PVH33	492	616	-	-	-	676	733
	PVH90+ PVS33							
	PVH112+ PVH112	510	662	-	-	-	719	786
	PVH112+ PVH90							
	PVH112+ PVS90							
	PVH112+ PVH71	503	651	-	-	-	706	773
	PVH112+ PVS71							
	PVH112+ PVH52	498	636	-	-	-	692	756
	PVH112+ PVS52							
	PVH112+ PVH33	492	616	-	-	-	676	733
	PVH112+ PVS33							

GENERAL INFORMATION



Variable displacement axial piston pumps in swashplate design for closed circuits. They are used in hydrostatic transmissions, that consist of a pump and hydraulic motor. The proven design, based on the Sauer 20 Series, is reliable and durable in the field. Modernization of the PVH series has improved the technical and performance characteristics of the units and retained the famous reliability and durability. These pumps meet the requirements of heavy duty applications. Tandem pumps available.
Flow direction changes due to the turning of the swashplate in opposite directions relative to its neutral position.

Control systems:
MH – hydromechanical proportional control system. Allows to keep the swashplate in position given by the control lever, maintaining the pump flow at a set level.
ER – electrical 3 positioned control system. Used for on - off - on operating scheme. Maximum displacement setting optional.
HD – hydraulic proportional control system. Allows to keep the swashplate in position by an hydraulic control signal.
EP – electrical proportional control system. Provides a stepless change in the pump displacement by an electrical signal.

Design features:
- Swashplate design.
- Build-in charge pump.
- Smooth flow direction change.
- High pressure relief valve.
- Bimetallic bearing plate has a high wear resistant.
- Lightweight plunger provides reliability in operation at high speeds.
- Tapered roller bearings allow the pump shaft to withstand high radial and axial loads.
- Shaft seals (face seal or lip seal) provide reliable external tightness.
- Mounting flanges according to SAE.
- Through drive according to SAE.
- Charge pump pressure filter.

TECHNICAL CHARACTERISTICS

Displacement code		75	90	112
Displacement max	ccm	75,0	89,0	110,8
Maximum flow	l/min	171,2	202,9	252,6
Maximum pressure in high pressure line	bar	480		
Rated pressure in high pressure line	bar	420		
Maximum drain pressure	bar	2,5		
Maximum speed	min^{-1}	4150	3720	
Minimum speed	min^{-1}	500		
Rated speed	min^{-1}	3300		
Maximum swashplate angle	Degr	± 18		
Rated power	kW	143,2	169,9	211,5
Weight (without fluid)	kg	69	85	85

ORDERING EXAMPLE

PV H2 . 90 / MH 1 R 2 D 2 A A1 3 B B N 3

PV - variable displacement axial piston pump

H2 - Series H2

90 - displacement 89 ccm

MH - control system (hydromechanical)

1 - controls (no pressure limit)

R - rotation: clockwise

2 - shaft seal (lip seal)

D - shaft option (23 teeth, 16/32 pitch, (37,68mm))

2 - charge pump relief valve setting 22,5 bar to 28,0 bar

A - main ports A&B (M12 GOST 9150-2002 (ISO68-1:1998))

A1 - charge pump 19 ccm - gerotor type

3 - tandem option (SAE J744c A (82,55 D-6x13x16H9x3,5D10))

B - filtration (FP filter in pressure line of charge pump)

B - orifice diameter (ø0,76 mm)

N - climatic version

3 - special features

ORDERING INSTRUCTIONS

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS	PV

SERIES	H2

DISPLACEMENT, CCM	CODE
75,0	75
89,0	90
110,8	112

CONTROL SYSTEM	75	90	112	CODE
Hydromechanical	●	●	●	MH
Hydraulic proportional	●	●	●	HD
Electric for 3 positions [1]	●	●	●	ER
Electronic proportional	●	●	●	EP

CONTROLS	75	90	112	CODE
No pressure limit	●	●	●	1
With pressure limit	●	●	●	2

VOLTAGE (EP ONLY)	75	90	112	CODE
12V	●	●	●	1
24V	●	●	●	2

ROTATION	CODE
Clockwise	R
Counterclockwise	L

SHAFT SEAL	75	90	112	CODE
Face seal	●	●	●	1
Lip seal	●	●	●	2

DRIVE SHAFT	75	90	112	CODE
14 tooth, 12/24 pitch, (31,22 mm)	●	●	●	A
19 tooth, 16/32 pitch, (31,73 mm)	●	●	●	B
21 tooth, 16/32 pitch, (34,5 mm)	●	●	●	C
23 tooth, 16/32 pitch, (37,68 mm)	●	●	●	D
Cone 1:8, SAE J501, (35 mm)	●	●	●	E
20 tooth, 16/32 pitch, (33 mm)	●	●	●	F
27 tooth, 16/32 pitch, (44,03 mm)	-	●	●	G
Straight (ø34,93 mm)	●	-	-	K
Straight (ø44,45 mm)	-	●	●	L

1) Control valve with electro control is not supplied

Notes: ● Standard; ○ Optional; **-** Not available.

SPECIAL FEATURES*	CODE
Zero position indicator	1
Built-in bypass valve	2
Displacement limit	3
Shaft outlet 76.2 mm	4

CLIMATIC VERSION	CODE
Temperate	N
Tropical	T

CONTROL ORIFICE	75-112	CODE
No orifice	●	A
ø0,76 mm	●	B
ø1,05 mm	●	D
ø1,6 mm	●	E

FILTRATION	75	90	112	CODE
FS filter in suction line of charge pump	●	●	●	A
FP filter in pressure line of charge pump	●	●	●	B

TANDEM MOUNTING	75	90	112	CODE
SAE J744c A (ø82,55 mm, 9 tooth) m=1,5875	●	●	●	1
SAE J744c AA (ø82,55 mm, 11 tooth) m=1,5875	●	●	●	2
SAE J744c A (ø82,55 mm, D-6x13x16H9x3,5D10)	●	●	●	3
SAE J744c B (ø101,6 mm, 13 tooth) m=1,5875	●	●	●	4
SAE J744c B (ø101,6 mm, 14 tooth) m=2	●	●	●	5
SAE J744c B (ø101,6 mm, D-6x18x22H9x5D9)	●	●	●	6
(ø60 mm, 13 tooth) m=2	●	●	●	7

CHARGE PUMP CPG	75	90	112	CODE
Gerotor type 19,0 ccm - standard	●	●	●	A1
Gerotor type 19,0 ccm - with adjustable relief valve	●	●	●	A2
Gerotor type 22,0 ccm - standard	○	○	○	B1
Gerotor type 22,0 ccm - with adjustable relief valve	○	○	○	B2

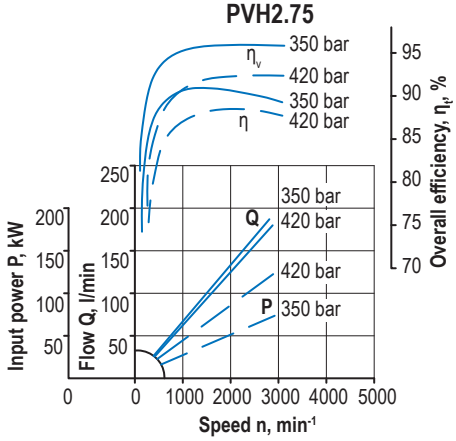
MAIN PORTS 'A' & 'B'	75	90	112	CODE
M12 GOST 9150-2002 (ISO 68-1:1998)	●	●	●	A
SAE J518c 7/16 inches	●	●	●	B

CHARGE PUMP RELIEF VALVE SETTING	75	90	112	CODE
13,2 bar - 14,4 bar	●	●	●	0
17,6 bar - 19,6 bar	●	●	●	1
22,5 bar - 24,5 bar	●	●	●	2

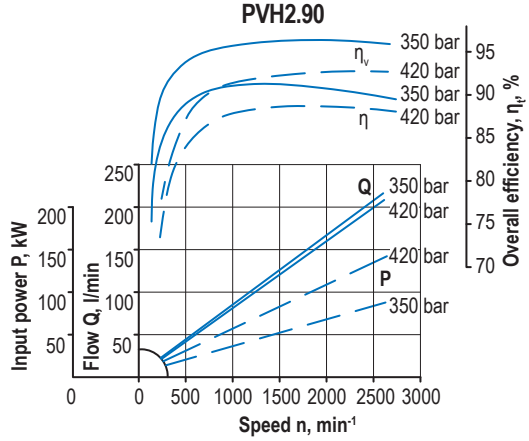
NOMINAL SIZES

Efficiency, flow and input power vs. speed (at maximum swashplate angle)

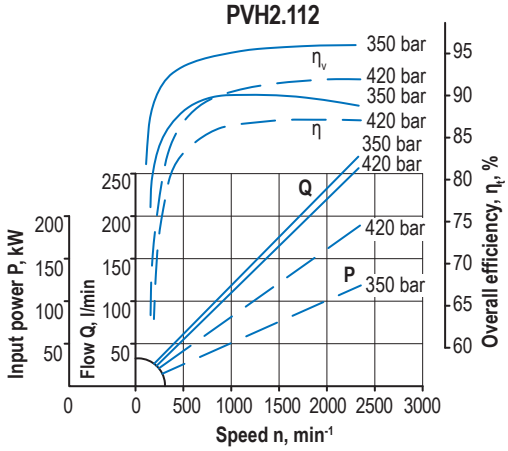
PVH2.75



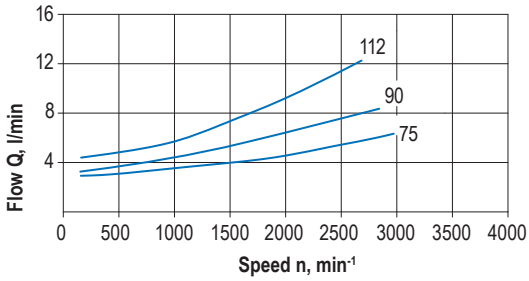
PVH2.90



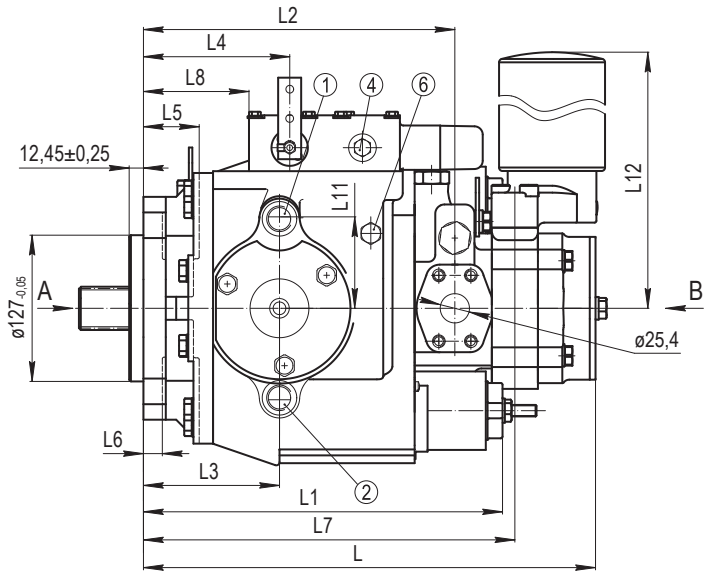
PVH2.112



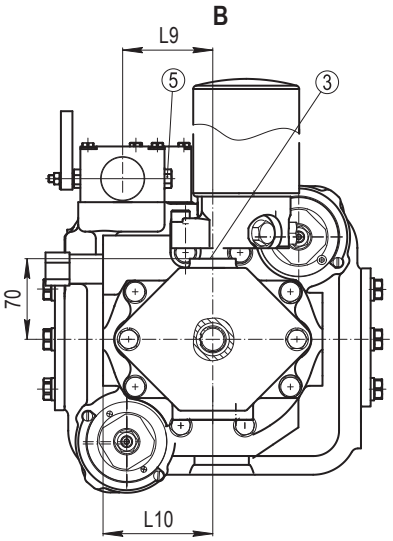
Drain leakage vs. speed



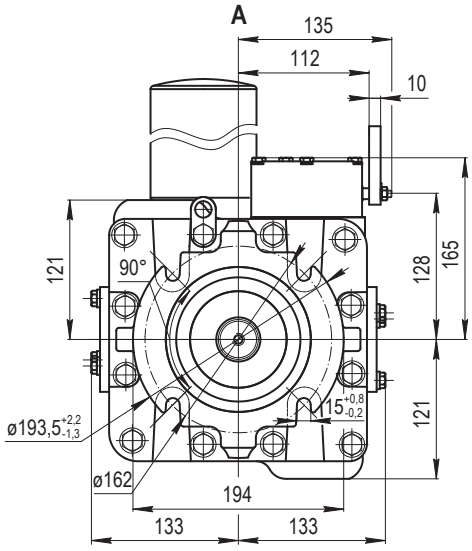
PUMPS WITH HYDROMECHANICAL CONTROL SYSTEM

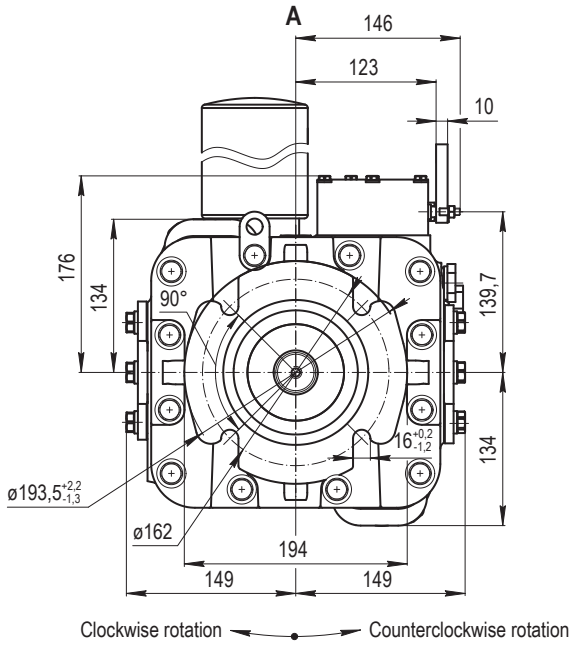


PVH2.75



PVH2.90, PVH2.112



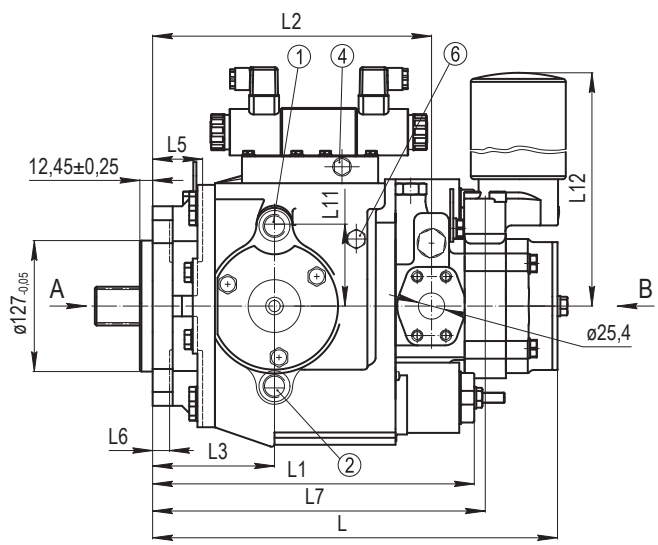


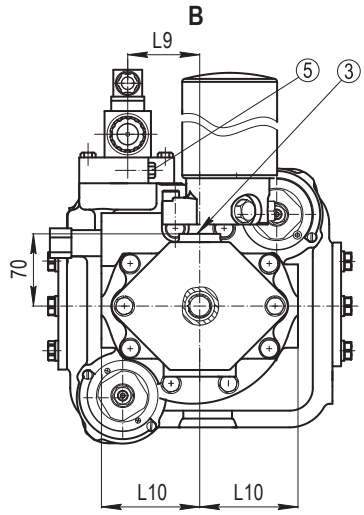
Clockwise rotation — Counterclockwise rotation

OVERALL DIMENSIONS

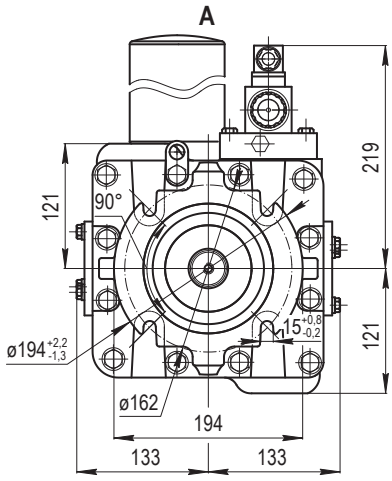
Frame size	Dimensions [mm]												
	L	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}	L_{12}
PVH2.75	383	304	259	111	119	48	16	313	83	68	90	71,37	279
PVH2.90 PVH2.112	392	311	270	118	127	49	17,5	322	91	78	95,25	92,5	279

PUMPS WITH ELECTRIC 3 POSITIONED CONTROL SYSTEM

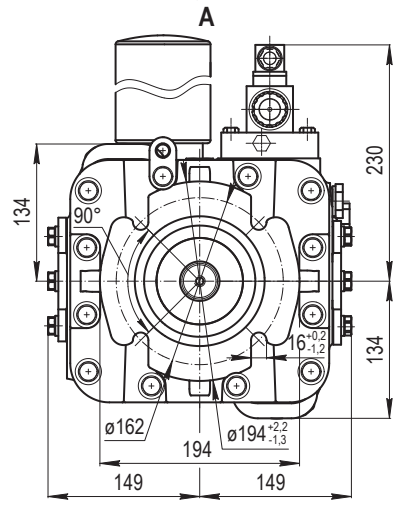




PVH2.75



PVH2.90, PVH2.112

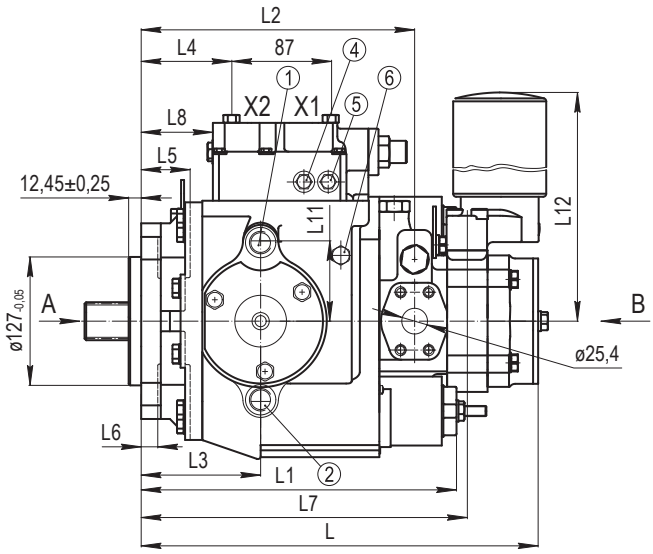


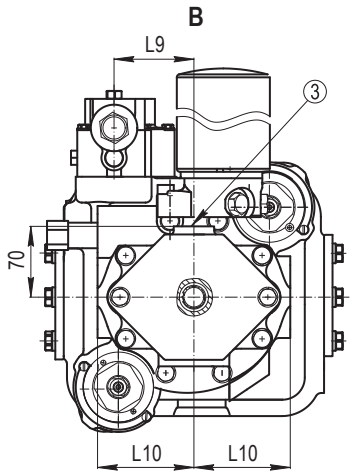
Clockwise rotation ⟷ Counterclockwise rotation

OVERALL DIMENSIONS

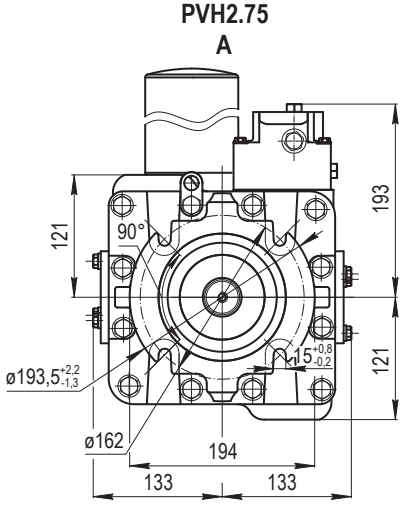
Frame size	Dimensions [mm]												
	L	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}	L_{12}
PVH2.75	383	304	259	111	-	48	16	313	-	68	90	71,37	279
PVH2.90	311	311	270	118	-	49	17,5	322	-	78	95,25	92,5	279
PVH2.112													

PUMPS WITH HYDRAULIC PROPORTIONAL CONTROL SYSTEM

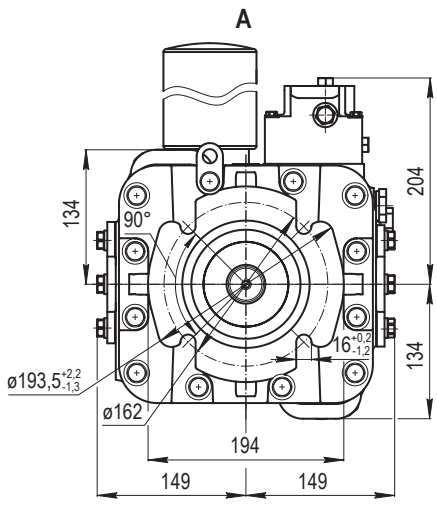




PVH2.75



PVH2.90, PVH2.112

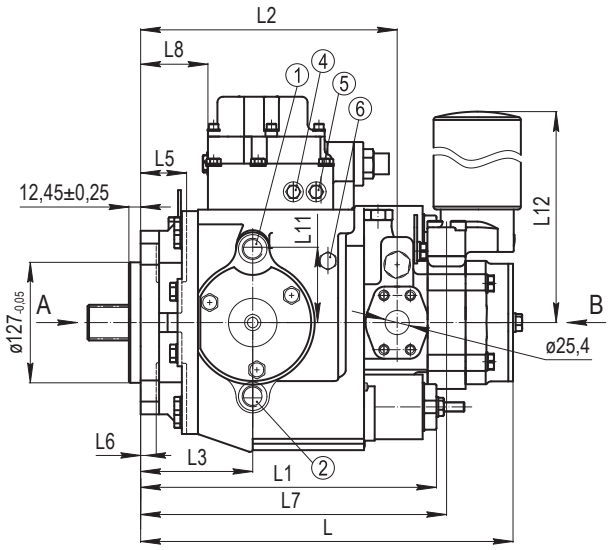


Clockwise rotation ⟷ Counterclockwise rotation

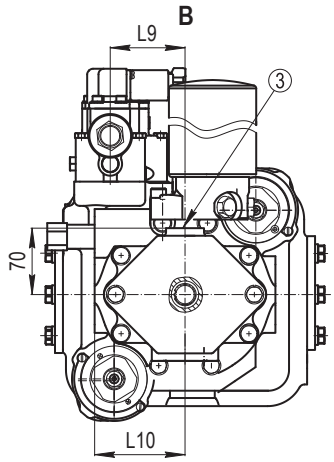
OVERALL DIMENSIONS

Frame size	Dimensions [mm]												
	L	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}	L_{12}
PVH2.75	383	304	259	111	107	48	16	313	83	68	90	71,37	279
PVH2.90	392	311	270	118	115	49	17,5	322	91	78	95,25	92,5	279
PVH2.112													

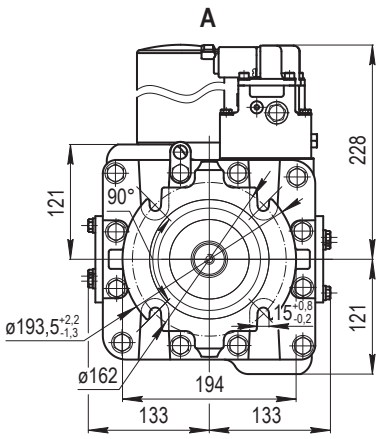
PUMPS WITH ELECTROPROPORTIONAL CONTROL SYSTEM

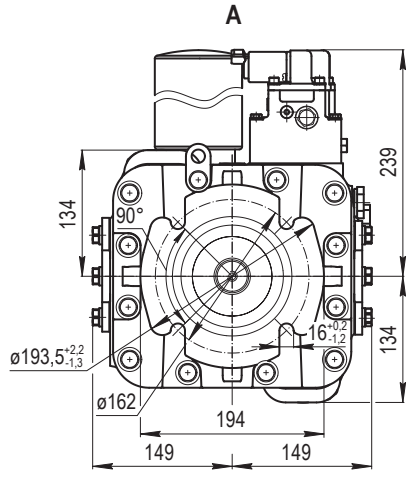


PVH2.75



PVH2.90, PVH2.112





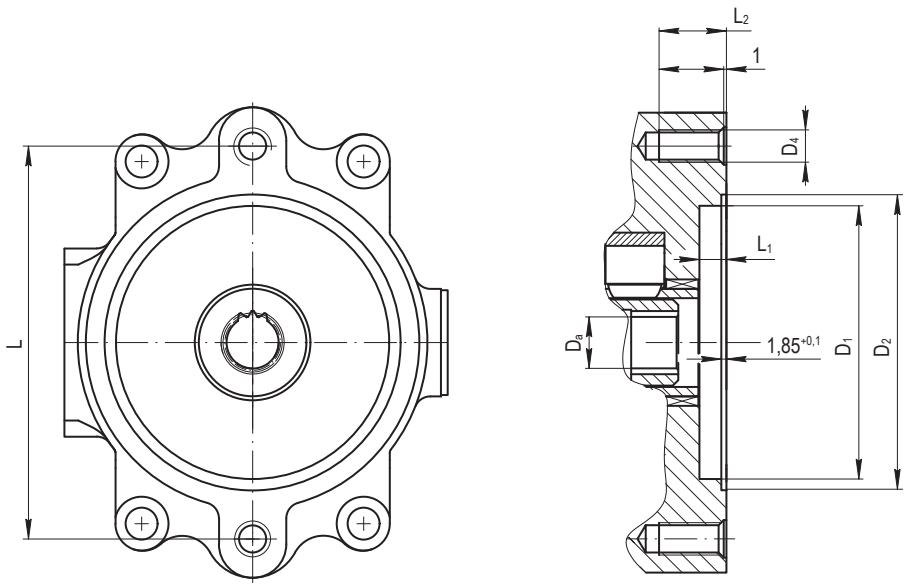
Clockwise rotation — Counterclockwise rotation

OVERALL DIMENSIONS

Frame size	Dimensions [mm]												
	L	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}	L_{12}
PVH2.75	383	304	259	111	-	48	16	313	83	68	90	71,37	279
PVH2.90	392	311	270	118	-	49	17,5	322	91	78,2	95,25	92,5	279
PVH2.112													

MOUNTING DIMENSIONS FOR TANDEM WITH GEAR PUMPS

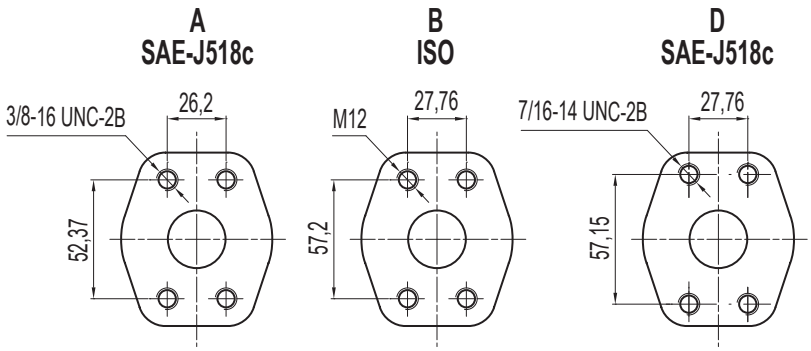
Z	Dimensions [mm]						
	D_a	D_1, SAE J744c	D_2	L	L_1	D_4	L_2
9	$12{,}926^{+0{,}11}$	$82{,}57^{+0{,}04}$	$91^{+0{,}22}$	106,4	7,5	M10-7H	15 min
13	$19{,}133^{+0{,}11}$	$101{,}62^{+0{,}04}$	$110^{+0{,}22}$	146,1	10	M12-7H	25 min



DRAIN PORTS SIZES

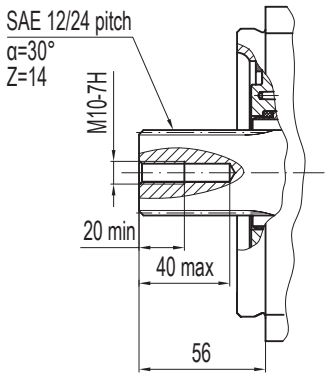
Frame size	«1»; «2»	«3»
PVH2.75	1 1/16-12UN-2B	1 5/16-12UN-2B
PVH2.90		
PVH2.112		
Frame size	**«4»; «5»; «6»**	
PVH2.75	7/16-20 UNF-2B	
PVH2.90		
PVH2.112		

PORT OPTIONS 'A' & 'B'

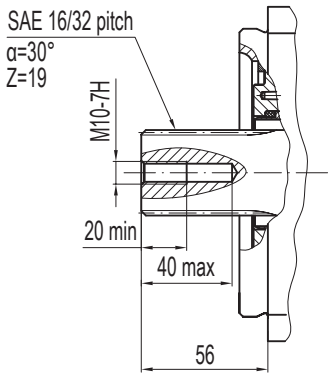


SHAFT OPTIONS

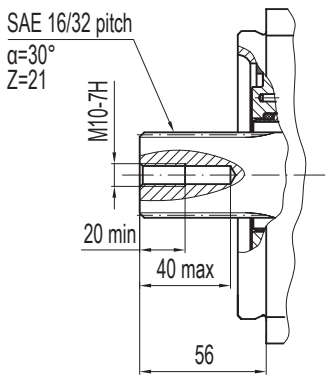
A



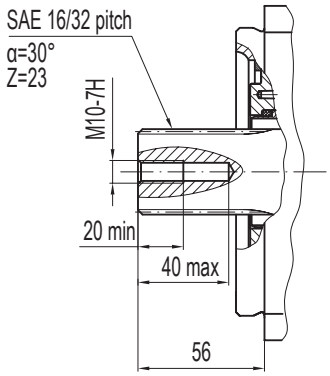
B



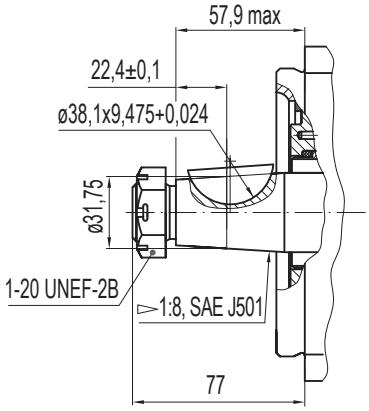
C



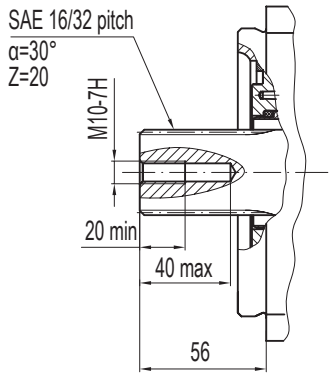
D



E



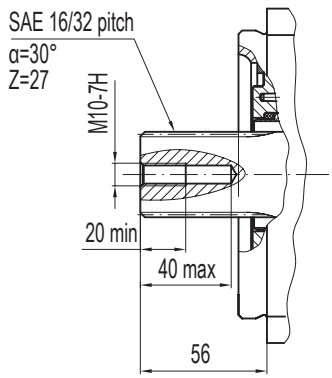
F



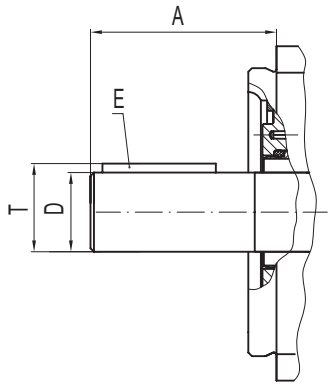
CYLINDRICAL SHAFTS, 'K' DESIGN

Frame size	A	D
PVH2.75	77 max	34,93
PVH2.90/112	77 max	44,45
Frame size	**T**	**E**
PVH2.75	38,47	7,976x7,976x50
PVH2.90/112	48,8	9,576x9,576x50

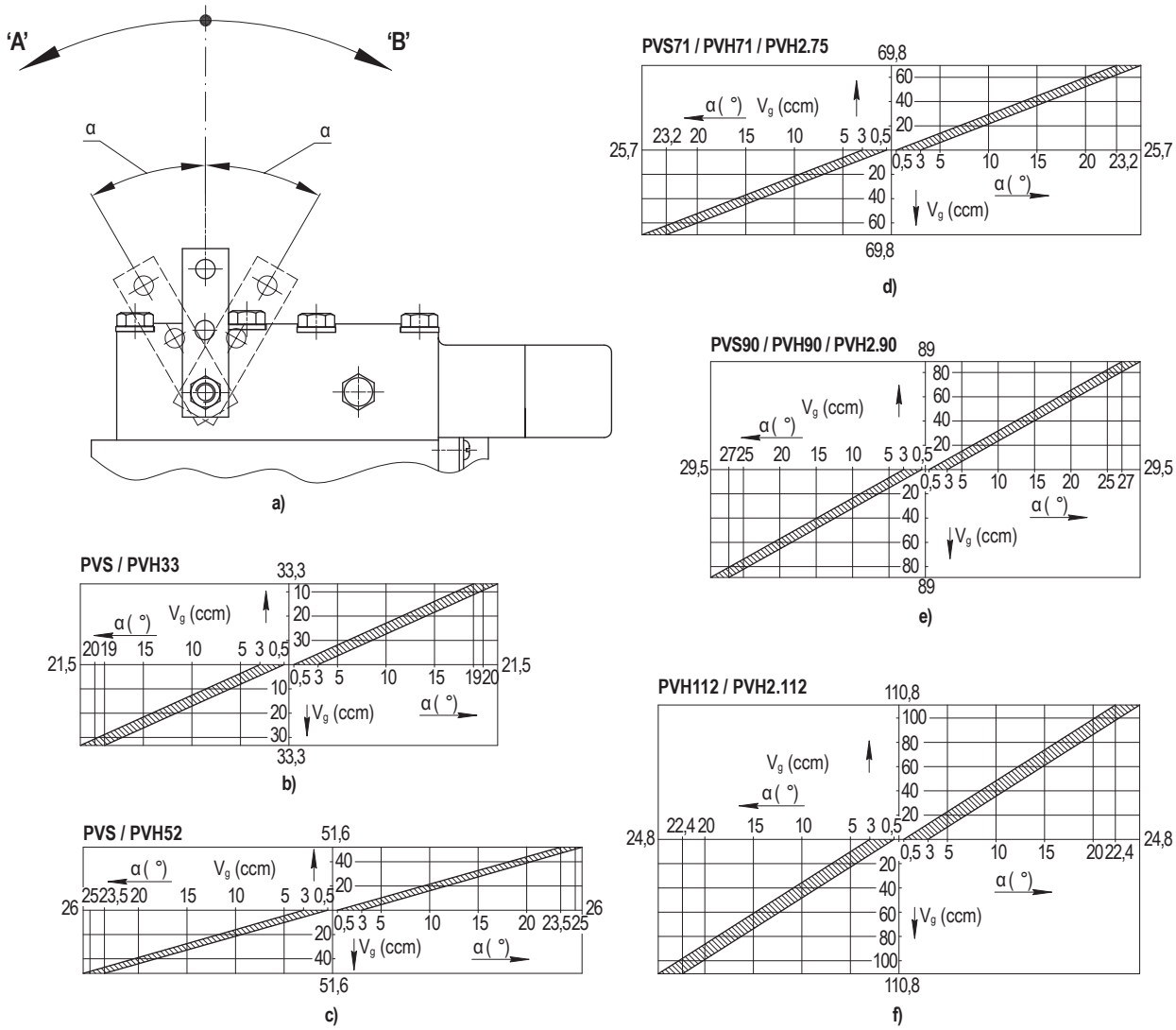
G



K



MH - HYDROMECHANICAL CONTROL SYSTEM

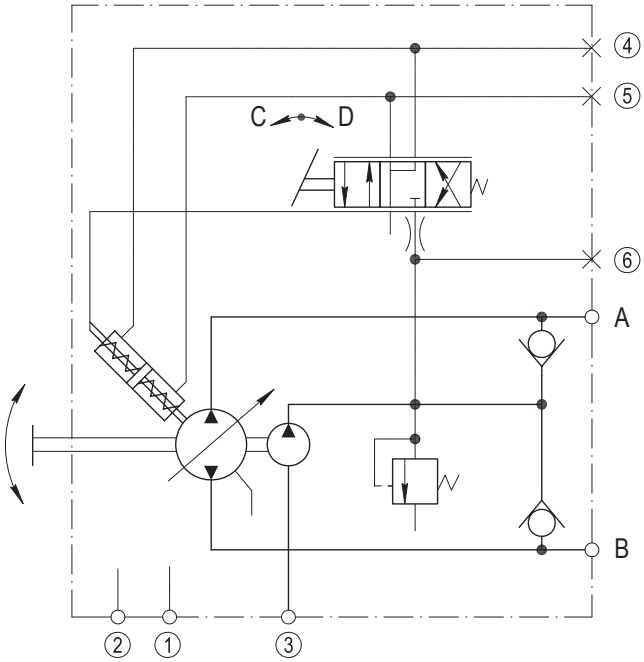


α - angle of handle rotation (°); V_g - displacement (ccm)

Due to the servo control, with a small movement of the control handle the swashplate tilts through an angular rotation of ±18° (Fig. a). With the control handle held in any position, pump displacement varies within predetermined limits (Fig. b-f).

Moving the handle of the control valve one of the servopistons is activated. The swashplate tilts and this way the displacement of the pump is changed steplessly. Each control line corresponds to flow direction.

Angle of handle rotation α:
- Moving starts at α = 3°
- Moving ends at α no less than 21.5° for PVS33/PVH33 and to 29.5° for PVS90/PVH90/PVH2.90.

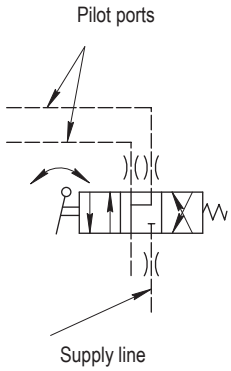


ROTATION - CONTROL - FLOW DIRECTION

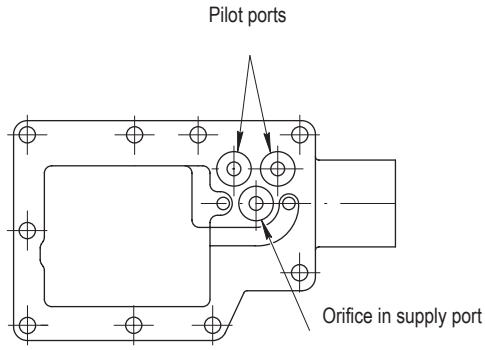
Rotation	Pump	Handle direction	Flow direction
clockwise	PVS/PVH/PVH2	C	B to A
		D	A to B
counterclockwise		C	A to B
		D	B to A

RESPONSE TIME

The time required for reversing flow direction depends on the orifice size in the control valve.



Control valve with orifice



Orifice placing

The time required for moving the control handle between its extreme positions is less than the response time.

SETTINGS

Displacement	210 bar
Cylinder Block Speed	1450 min^{-1}
Fluid viscosity	35 mm^2/sec

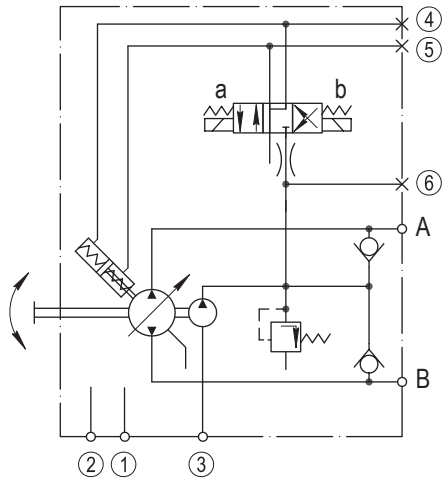
RESPONSE TIME VS ORIFICE DIAMETER IN THE CONTOL LINE

Frame size	Orifice diameter, mm	Response time, sec
PVS/PVH33	0,76	3,78
	1,05	2,16
	1,6	1,14
	No orifice	0,60
PVS/PVH52	0,76	4,14
	1,05	2,34
	1,6	1,20
	No orifice	0,66
PVS71/PVH71/PVH2.75	0,76	6,06
	1,05	3,42
	1,6	1,74
	No orifice	0,96
PVS90/PVH90/PVH2.90	0,76	6,24
	1,05	3,54
	1,6	1,80
	No orifice	1,02
PVH112/PVH2.112	0,76	10,20
	1,05	5,82
	1,6	2,88
	No orifice	1,68

ER - ELECTRIC 3-POSITIONED CONTROL SYSTEM

Depending on which magnet delivered the voltage the spool changes its position and the respond pressure is delivered to move the relevant servopiston. The swashplate tilts and this way the displacement of the pump is changed steplessly. Each control line corresponds to flow direction.

There is no electro control valve in the package. The adjustment place is jointed blindly.
Technical characteristics:
1. Nominal bore - 6 mm;
2. Working fluid distribution;
3. Kind of control - electromagnet;
4. Reverse to neutral - spring;
5. Voltage - 12V, 24V.



ROTATION - CONTROL - FLOW DIRECTION

Rotation	Pump	Control voltage supply	Flow direction
clockwise	PVS/PVH/PVH2	a	B to A
		b	A to B
counterclockwise		a	A to B
		b	B to A

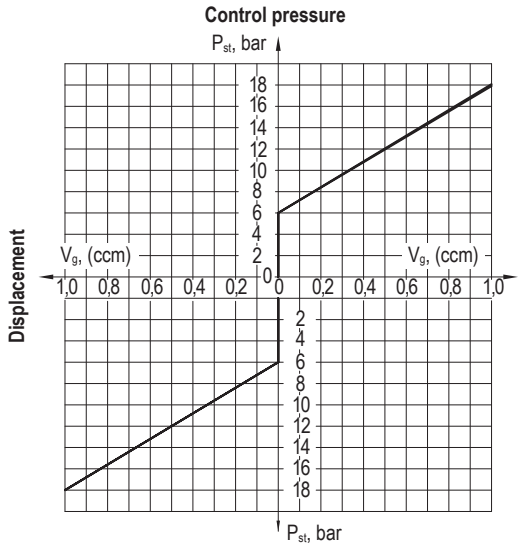
HD - HYDRAULIC PROPORTIONAL CONTROL SYSTEM

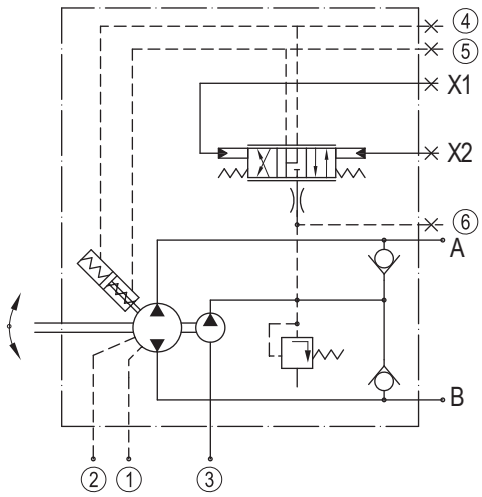
Depending on pressure drop Pst in control lines, the respond pressure is delivered through the control block HD to move the relevant servopistons. The swashplate tilts and this way the displacement of the pump is changed steplessly. Each control line corresponds to flow direction.

Control pressure

Pst = 6-18 bar

Swashplate tilts at pressure 6 bar and maximum displacement is reached at 18 bar in the control line.





ROTATION - CONTROL - FLOW DIRECTION

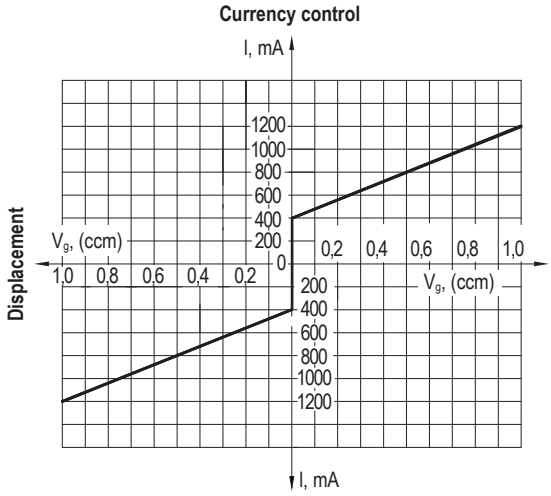
Rotation	Pump	Control flow supply	Flow direction
clockwise	PVH/PVH2	X_1	A to B
		X_2	B to A
counterclockwise		X_1	B to A
		X_2	A to B

EP - ELECTRIC PROPORTIONAL CONTROL SYSTEM

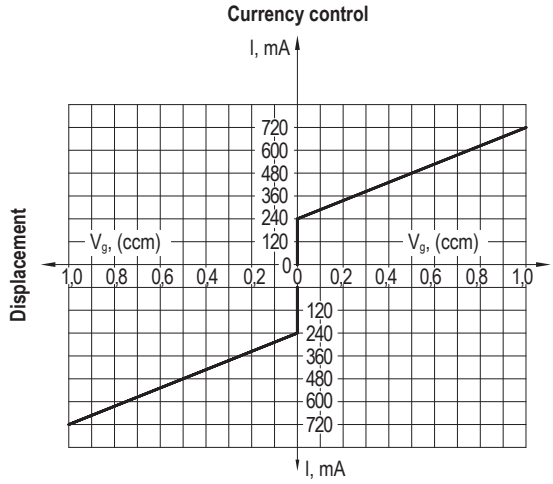
Depending on current intensity at two proportional magnets (a & b) from the control block EP the pressure is delivered to move one of the servopistons. The swashplate tilts and this way the displacement of the pump is changed steplessly. Each control line corresponds to flow direction.

TECHNICAL CHARACTERISTICS

Name	Options	
Voltage	12V(±20%)	24V(±20%)
Currency control moving start moving finish	 400 mA 1200 mA	 300 mA 650 mA
Limiting current	1,54 A	0,75 A
Nominal resistance	5,5 Ω	21,2 Ω
Oscilation frequency	100Hz	100 Hz
Powering durability	100%	100%



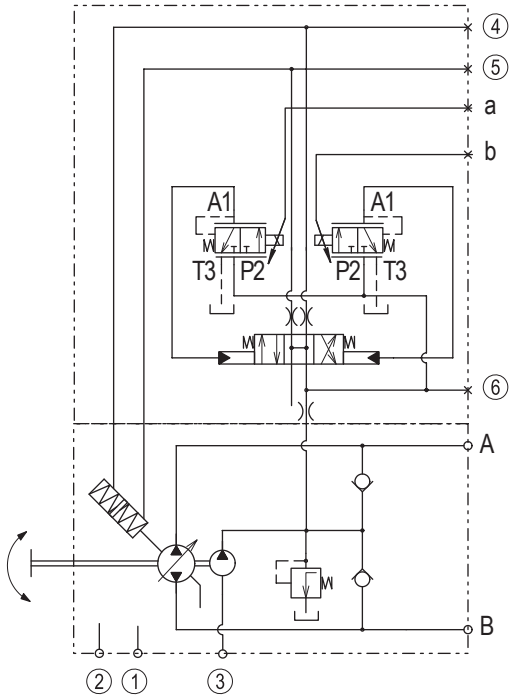
12V dependency graph



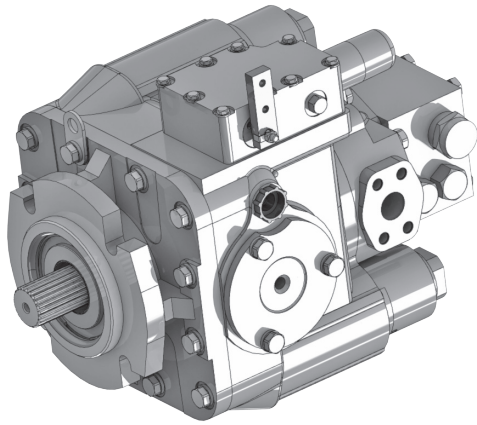
24V dependency graph

ROTATION - CONTROL - FLOW DIRECTION

Rotation	Pump	Control current supply	Flow direction
clockwise	PVH/PVH2	a	A to B
		b	B to A
counterclockwise		a	B to A
		b	A to B



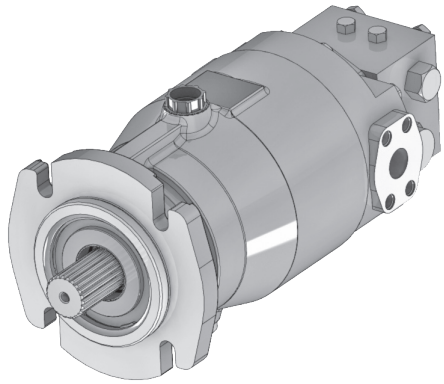
MVH



Variable displacement axial piston motors for closed circuits. Rated pressure up to 420 bar.
Displacement 90 and 112 ccm.

- Swashplate design.
- Maximum pressure 450 bar.
- High hydromechanical efficiency.
- Low noise level.
- Mounting flanges according to SAE.
- Hydromechanical, hydraulic proportional, electrical 3-position and electronic proportional control systems.
- Built-in hydraulic equipment optional.

MFS



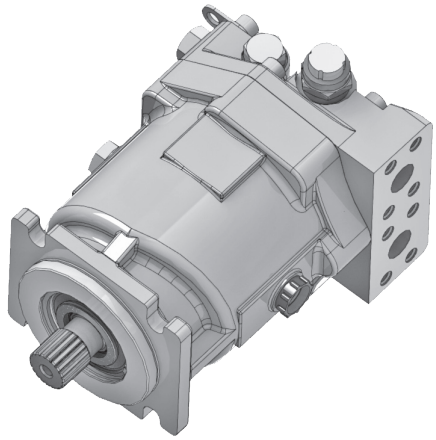
Fixed displacement axial piston motors are used for hydrostatic transmissions.
Rated pressure up to 350 bar. Displacement 33…90 ccm.

- Swashplate design.
- Maximum pressure 420 bar.
- High hydromechanical efficiency.
- Low noise level.
- Mounting flanges according to SAE.
- Built-in hydraulic equipment optional.

MFH

Fixed displacement axial piston motors are used for hydrostatic transmissions.
Rated pressure up to 420 bar. Displacement 33...112 ccm.

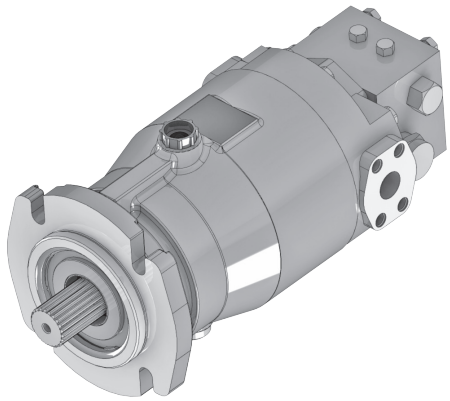
- Swashplate design.
- Maximum pressure 450 bar.
- High hydromechanical efficiency.
- Low noise level.
- Mounting flanges according to SAE.
- Built-in hydraulic equipment optional
- Compact version for limited space.



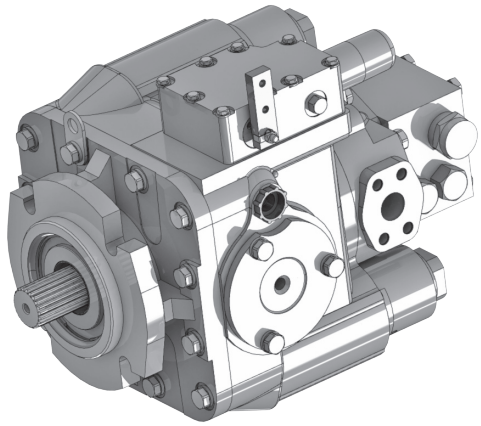
MFH2

Fixed displacement axial piston motors are used for hydrostatic transmissions.
Rated pressure up to 420 bar. Displacement 75...112 ccm.

- Swashplate design.
- Maximum pressure 480 bar.
- High hydromechanical efficiency.
- Low noise level.
- Mounting flanges according to SAE.
- Built-in hydraulic equipment option



GENERAL INFORMATION



Variable displacement axial piston motors in swashplate design for hydrostatic transmissions. They are used in hydrostatic transmissions, that consist of a pump and hydraulic motor. The proven design, based on the Sauer 20 Series, is reliable and durable in the field. The wide regulation range provides high shaft speed and high torque.

Control systems:

MH – hydromechanical proportional control system. Allows to keep the swashplate in position given by the control lever.

ER – electrical 3 positioned control system. Used for on - off - on operating scheme.

HD – hydraulic proportional control system. Allows to keep the swashplate in position by an hydraulic control signal.

EP – electrical proportional control system. Provides a stepless change in the motor displacement by an electrical signal.

Design features:

- Swashplate design.
- Bimetallic bearing plate has a high wear resistant.
- Lightweight plunger provides reliability in operation at high speeds.
- Tapered roller bearings allow the motor shaft to withstand high radial and axial loads.
- Shaft seals (face seal or lip seal) provide reliable external tightness.
- Mounting flanges according to SAE.
- Built-in hydraulic equipment optional.

TECHNICAL CHARACTERISTICS

Displacement code		90	112
- nominal	ccm	89	110,8
- minimum with the swashplate angle:			
7°	ccm	33,6	41,8
9°		43,4	53,9
10°		48,3	60,05
11°		53,2	66,2
13°		63,3	78,7
Maximum pressure	bar	450	
Rated pressure	bar	420	
Maximum drain pressure	bar	2,5	
Maximum rotating torque	Nm	542	675
Pressure control:			
- minimum	bar	17,6	
- maximum	bar	24,5	
Maximum speed at minimum swashplate angle	min^{-1}	3720	
Minimum speed	min^{-1}	500	
Rated speed	min^{-1}	2500	
Rated power	kW	125,6	156,4
Weight (without fluid):			
- with manifold valve and control valve	kg	82,5	
- without manifold valve		77,8	
- with manifold valve and hydroproportional control system		82,5	
- with manifold valve and electrohydraulic control valve		83,5	
- with manifold and electroproportional control system		85	

ORDERING EXAMPLE

MV H 90 / V 07 MH 1 D 0 C 1 35 35 B N ⎵

MV - variable displacement axial piston motor

H - series H

90 - displacement 89 ccm

V - relief valves option (manifold block)

07 - minimun swashplate angle 7°

MH - control system (hydromechanical)

1 - shaft seal (lip seal)

D - shaft option (23 teeth, 16/32 pitch, (37,68mm))

0 - purge relief valve setting (10,3 bar - 11,8 bar)

C - main ports A&B (SAE J518c 3/8 inches for 350 bar)

1 - control valve (standard)

35 - relief valve setting B side (350 bar)

35 - relief valve setting B side (350 bar)

B - orifice diameter (ø0,76 mm)

N - climatic version

⎵ - special features

FORMULAS

Flow $$q_v = \frac{V_g \cdot n \cdot \eta_v}{1000} \text{ [l/min]}$$

Input torque $$T = \frac{V_g \cdot \Delta p}{20 \cdot \pi \cdot \eta_{mh}} \text{ [N·m]}$$

Input power $$P = \frac{2 \cdot \pi \cdot T \cdot n}{60000} = \frac{q_v \cdot \Delta p \cdot \eta_t}{600} \text{ [kW]}$$

V_g - displacement (ccm)

Δp - pressure drop (bar)

n - speed (min^{-1})

η_v - volumetric efficiency

η_{min} - mechanical-hydraulic efficiency

η_t - overall efficiency

ORDERING INSTRUCTIONS

MV	H		/					

VARIABLE DISPLACEMENT AXIAL PISTON MOTOR	MV

SERIES	H

DISPLACEMENT, CCM	CODE
89,0	90
110,8	112

RELIEF VALVES	90	112	CODE
No manifold block	●	●	N
With manifold block	●	●	V

MINIMUM SWASHPLATE ANGLE (% OF MAX. DISPACEMENT AT MIN. SWASHPLATE ANGLE)	90-112	CODE
7° (37,7)	●	07
9° (48,7)	●	09
10° (54,2)	●	10
11° (59,8)	●	11
13° (71,1)	●	13

CONTROL SYSTEM	90	112	CODE
Hydromechanical	●	●	MH
Hydraulic proportional	●	●	HD
Electric for 3 positions [1)]	●	●	ER
Electronic proportional, voltage 12V	●	●	EP12
Electronic proportional, voltage 24V	●	●	EP24

SHAFT SEAL	90	112	CODE
Face seal	●	●	1
Lip seal	●	●	2

DRIVE SHAFT	90	112	CODE
14 tooth, 12/24 pitch, (31,22 mm)	●	●	A
19 tooth, 16/32 pitch, (31,73 mm)	●	●	B
21 tooth, 16/32 pitch, (34,5 mm)	●	●	C
23 tooth, 16/32 pitch, (37,68 mm)	●	●	D
Cone 1:8, SAE J501, (35 mm)	●	●	E
20 tooth, 16/32 pitch, (33 mm)	●	●	F
27 tooth, 16/32 pitch, (44,03 mm)	●	●	G
Straight (ø44,45 mm)	●	●	K

1) Control valve with electro control is not supplied

Notes: ● Standard; ○ Optional; - Not available.

SPECIAL FEATURES*	CODE
Neutral lockout switch	1
Built-in bypass valve	2
Pressure limiter	3

CLIMATIC VERSION	CODE
Temperate	N
Tropical	T

CONTROL ORIFICE	90-112	CODE
No orifice	●	A
ø0,76 mm	●	B
ø1,05 mm	●	D
ø1,6 mm	●	E

HIGH PRESSURE RELIEF VALVE SETTING - PORT 'A'	90	112	CODE
No manifold block	●	●	N
110 bar - 420 bar	●	●	11 - 42
450 bar	●	●	V

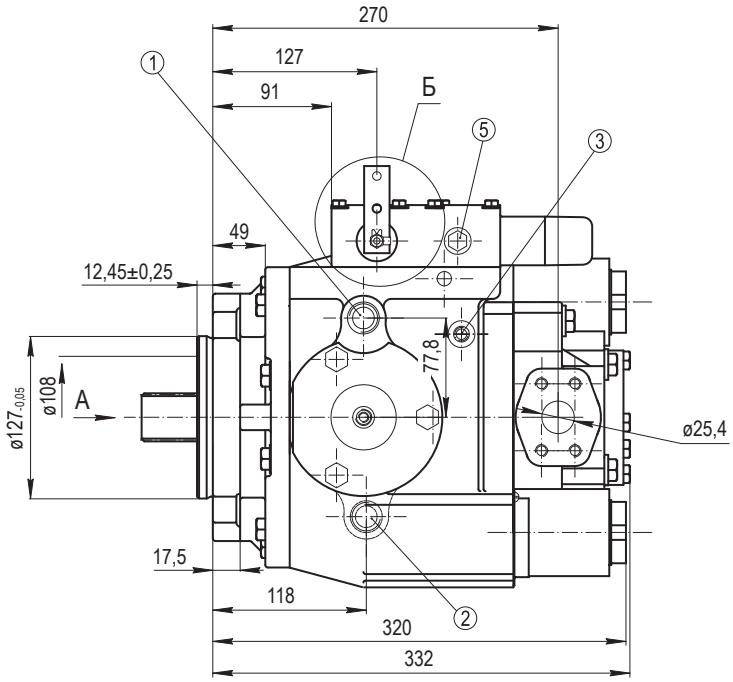
HIGH PRESSURE RELIEF VALVE SETTING - PORT 'B'	90	112	CODE
No manifold block	●	●	N
110 bar - 420 bar	●	●	11 - 42
450 bar	●	●	V

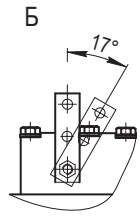
CONTROL VALVE	90	112	CODE
Standart	●	●	1
Low noise	●	●	2

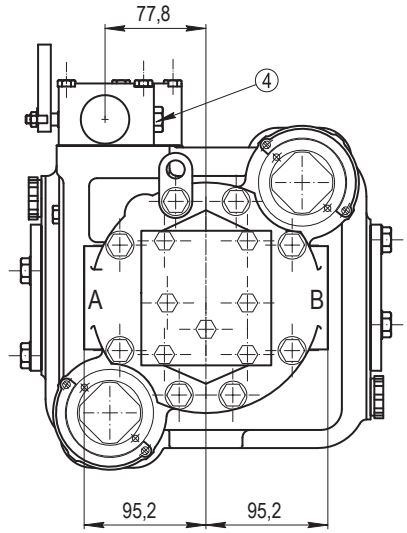
MAIN PORTS 'A' & 'B'	90	112	CODE
M12 for 420...450 bar	●	●	A
SAE J518c 7/16 inches for 350 bar	●	●	B
SAE J518c 3/8 inches for 350 bar	●	●	C

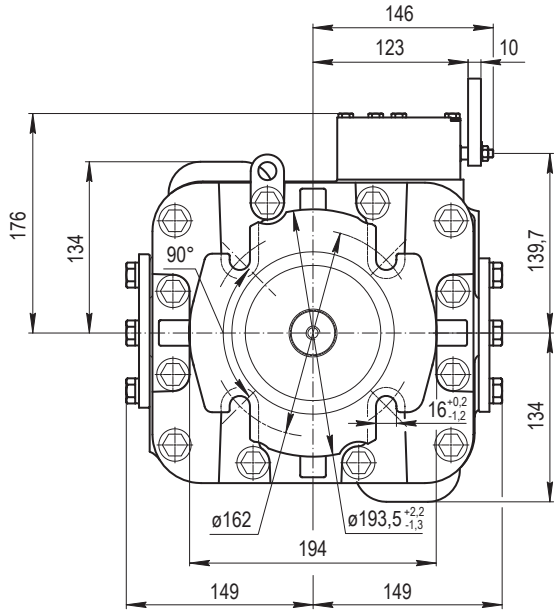
PURGE RELIEF VALVE SETTING	90	112	CODE
10,2 bar - 11,8 bar	●	●	0
15 bar - 16,4 bar	●	●	1
20,5 bar - 22,5 bar	●	●	2

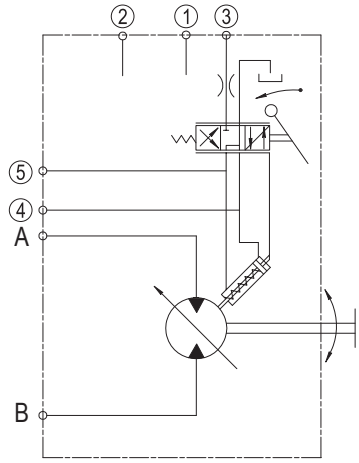
VARIABLE DISPLACEMENT AXIAL PISTON MOTORS WITHOUT MANIFORD VALVE AND WITH HYDROMECHANICAL CONTROL SYSTEM





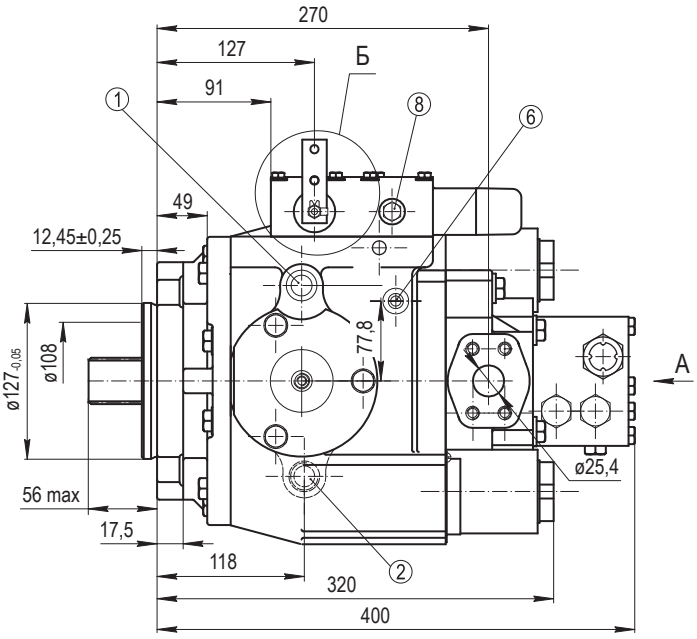


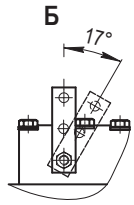


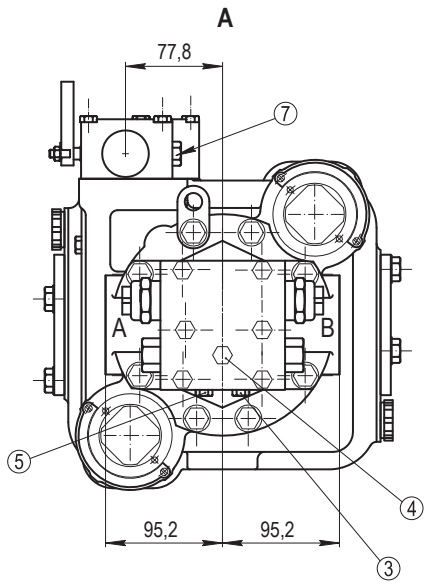


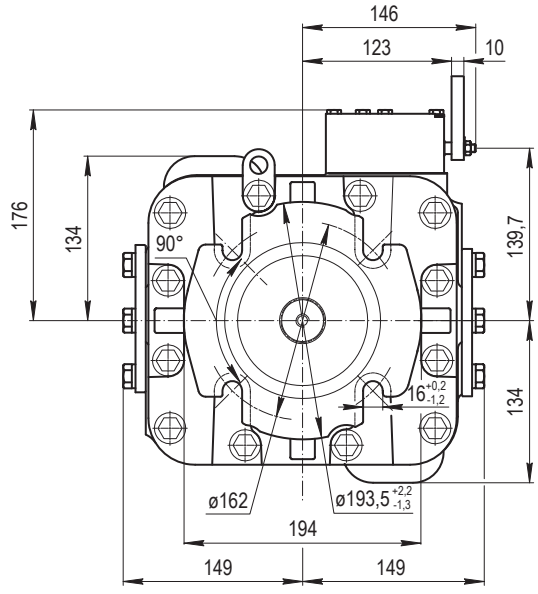
Clockwise rotation ⟵ ⟶ Counterclockwise rotation

VARIABLE DISPLACEMENT AXIAL PISTON MOTORS WITH MANIFORD VALVE AND WITH HYDROMECHANICAL CONTROL SYSTEM

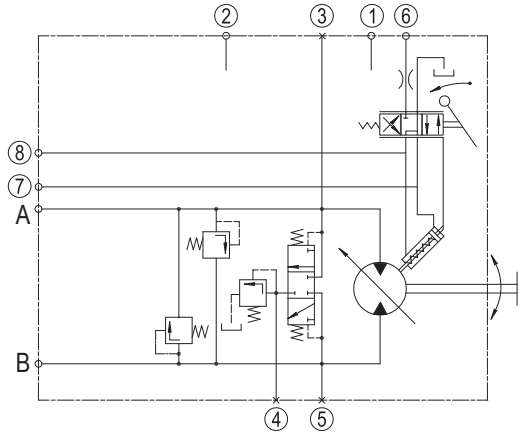




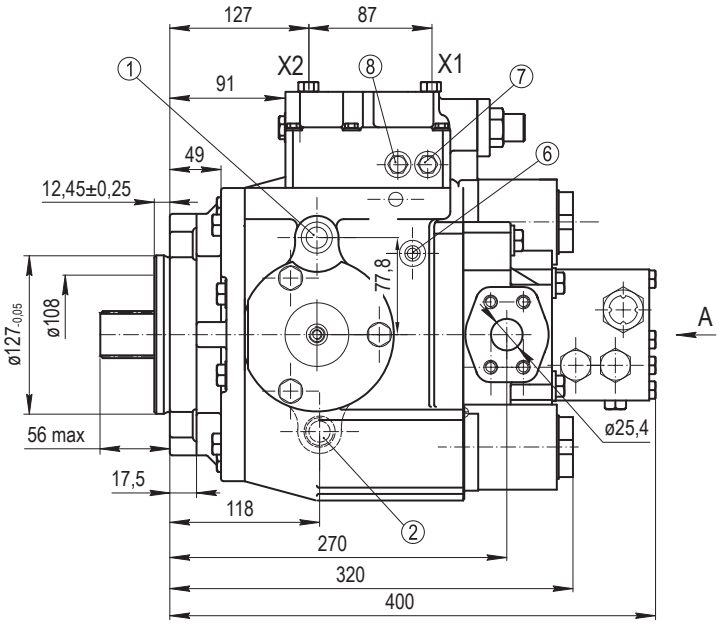


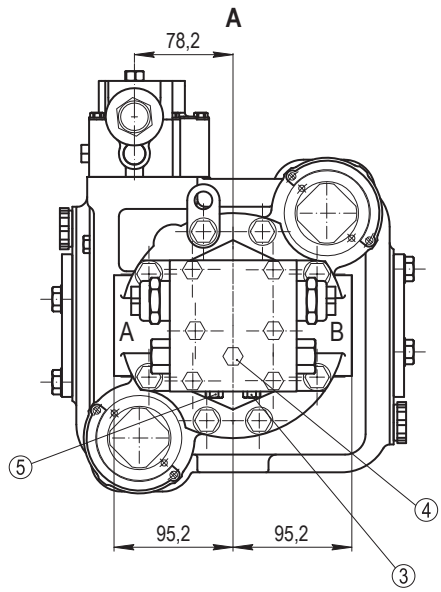


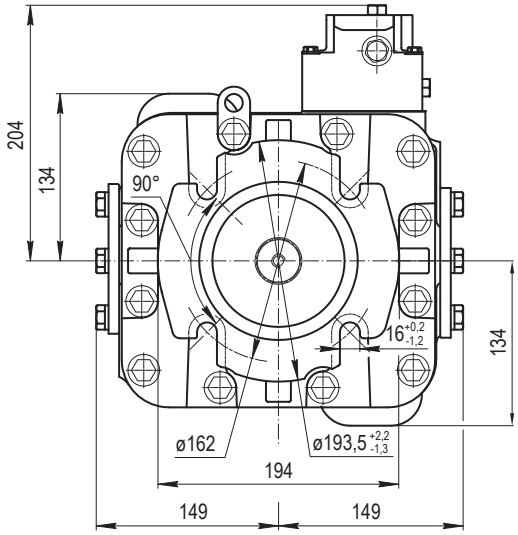
Clockwise rotation — Counterclockwise rotation

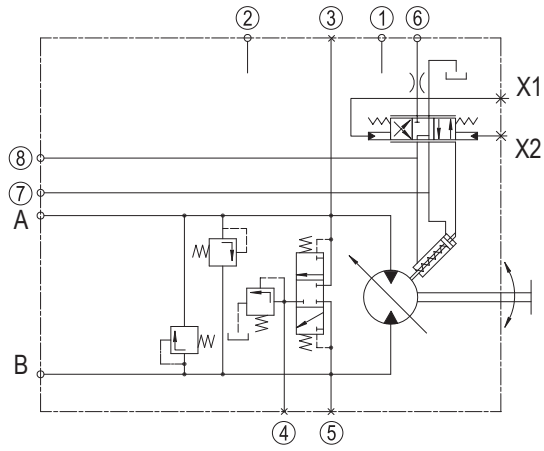


VARIABLE DISPLACEMENT AXIAL PISTON MOTORS WITH MANIFORD VALVE AND WITH HYDROPROPORTIONAL CONTROL SYSTEM



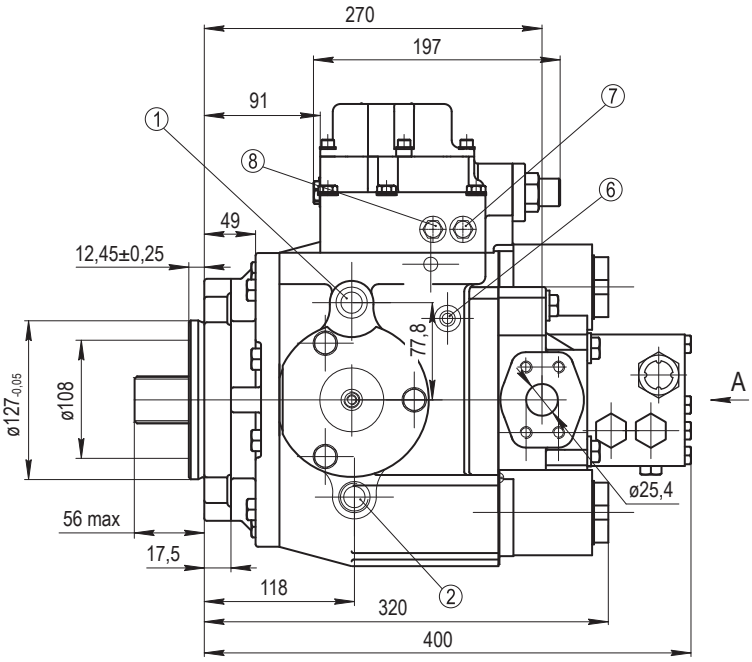


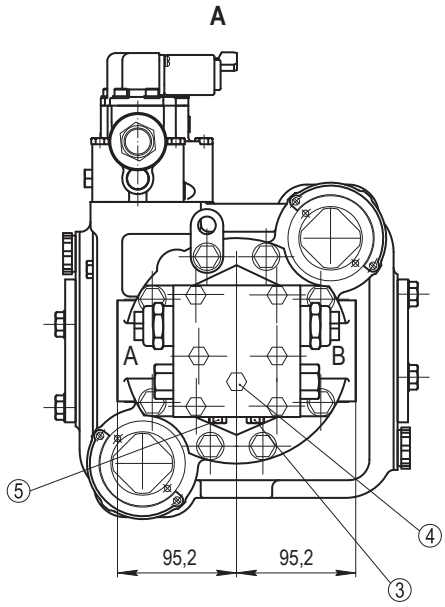


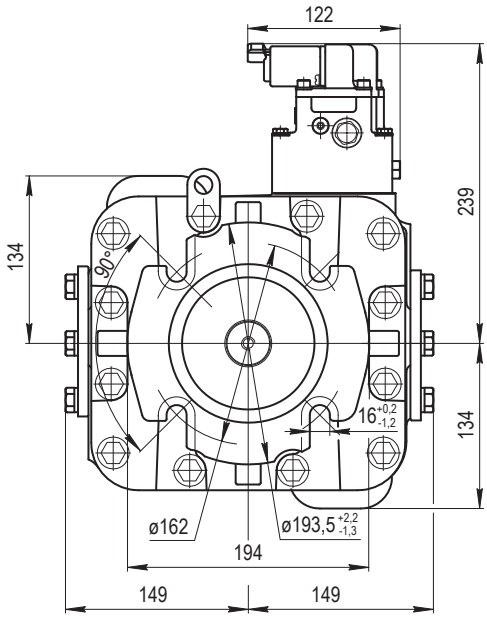


Clockwise rotation ⟵ ⟶ Counterclockwise rotation

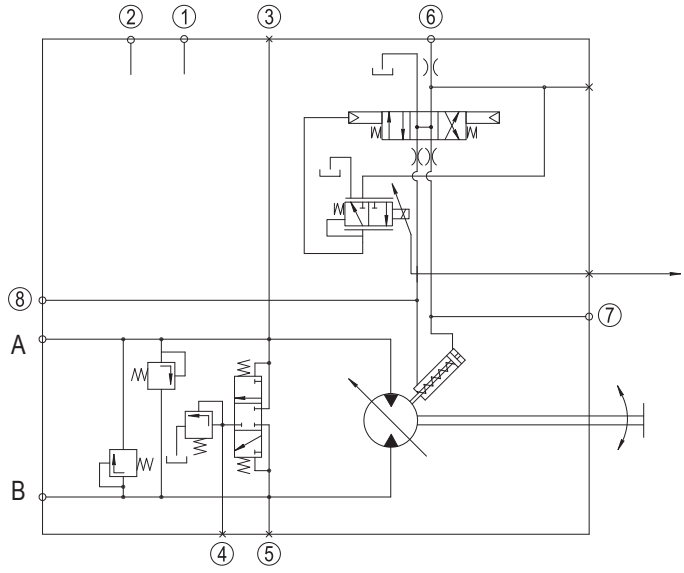
VARIABLE DISPLACEMENT AXIAL PISTON MOTORS WITH MANIFORD VALVE AND WITH ELECTRONIC PROPORTIONAL CONTROL SYSTEM



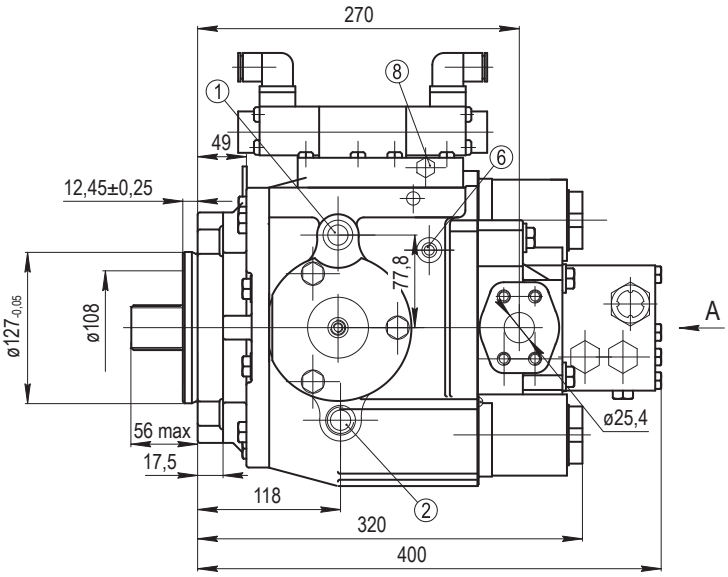


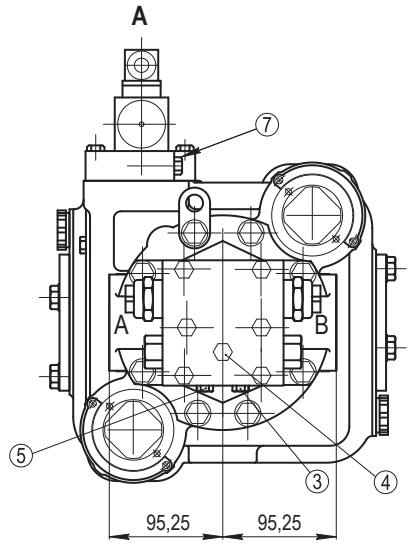


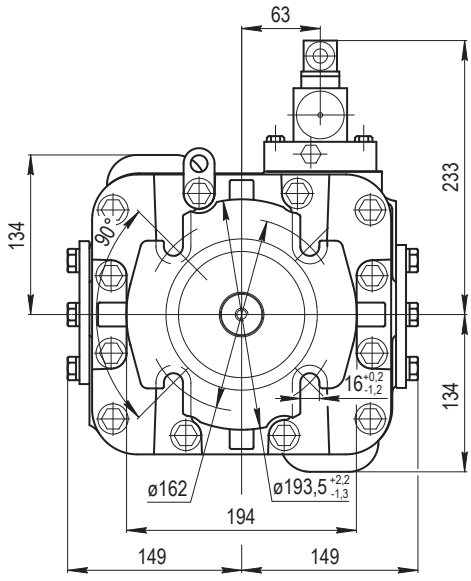
Clockwise rotation ⟵●⟶ Counterclockwise rotation

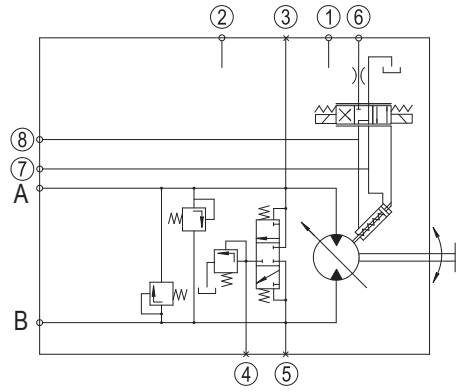


VARIABLE DISPLACEMENT AXIAL PISTON MOTORS WITH MANIFORD VALVE AND WITH ELECTRIC 3 POSITIONED CONTROL SYSTEM







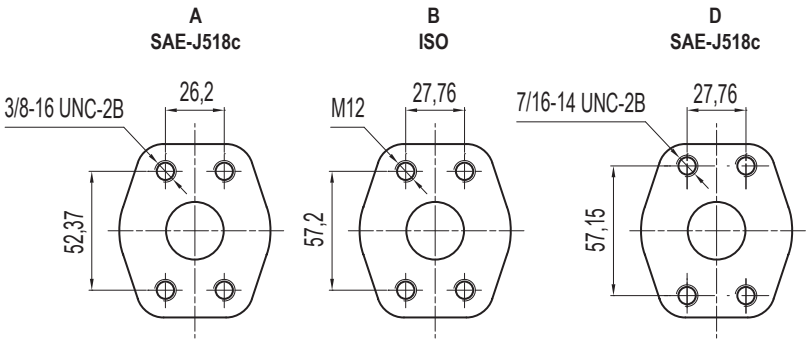


Clockwise rotation — Counterclockwise rotation

DRAIN PORTS SIZES

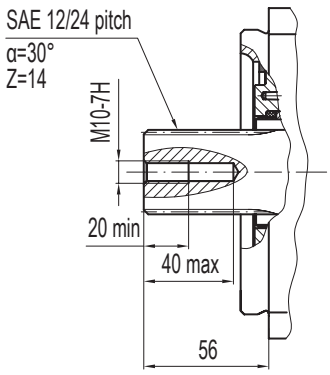
Frame size	Ports	
	«1»; «2»	«3»; «4»; «5»; «6»
MVH90	7/8-14 UNF-2B	7/16-20 UNF-2B
MVH112		

PORT OPTIONS 'A' & 'B'

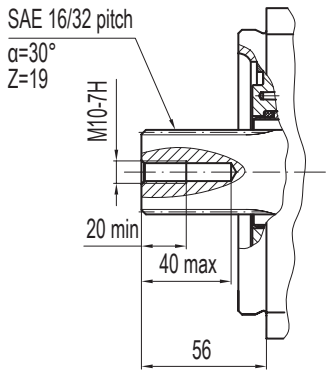


SHAFT OPTIONS

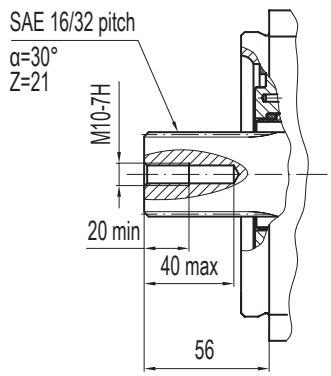
A



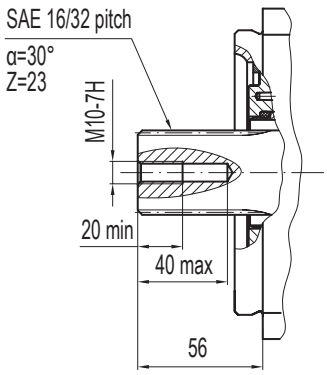
B



C



D



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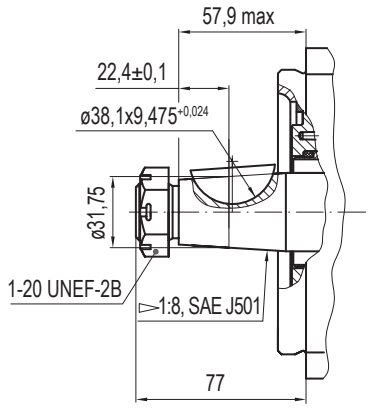
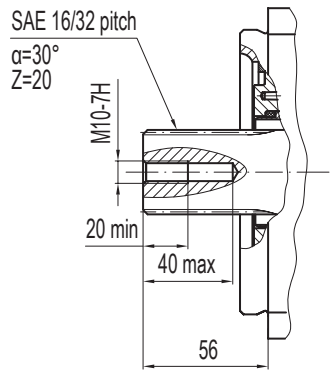
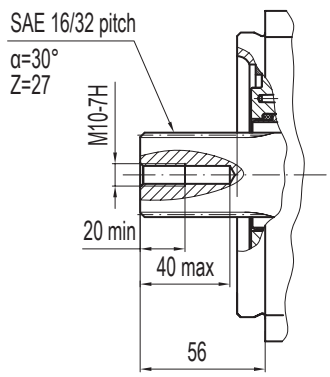


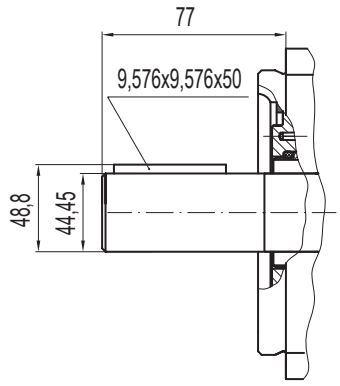
F



G



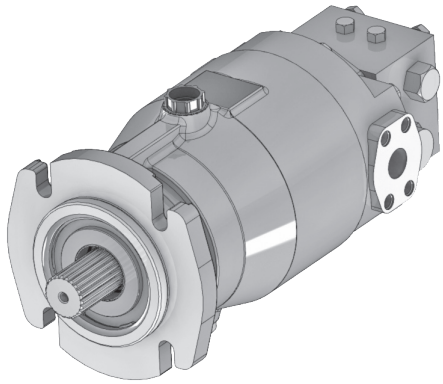
K



CYLINDRICAL SHAFTS, 'K' DESIGN

Frame size	A	D
MVH90/112	77 max	44,45
Frame size	**T**	**E**
MVH90/112	48,8	9,576x9,576x50

GENERAL INFORMATION



Fixed displacement axial piston motors in swashplate design for closed and open circuits. They are used in hydrostatic transmissions, that consist of a pump and hydraulic motor. The proven design, based on the Sauer 20 Series, is reliable and durable in the field. Built-in hydraulic equipment optional.

Design features:

- Swashplate design.
- Bimetallic bearing plate has a high wear resistant.
- Lightweight plunger provides reliability in operation at high speeds.
- Tapered roller bearings allow the motor shaft to withstand high radial and axial loads.
- Shaft seals (face seal or lip seal) provide reliable external tightness.
- Mounting flanges according to SAE.
- Built-in hydraulic equipment optional.

TECHNICAL CHARACTERISTICS

Displacement code		**33**	**52**	**71**	**90**
Displacement max	ccm	33,3	51,6	69,8	89
Maximum pressure in high pressure line	bar	420			
Rated pressure in high pressure line	bar	350			
Maximum drain pressure	bar	2,5			
Maximum speed	min^{-1}	3590	3100	2800	2600
Minimum speed	min^{-1}	50			
Rated speed	min^{-1}	1500			
Rated power	kW	14,5	22,4	30,4	48,9
Weight (without fluid)	kg	30	35	40	47

ORDERING EXAMPLE

MF S 90 / D 1 A 35 N ⎵

MF - fixed displacement axial piston motor

S - series S (Sauer series 20)

90 - displacement 89 ccm

D - shaft option (23 teeth, 16/32 pitch, (37,68mm))

1 - purge relief valve setting (10,3 bar - 11,8 bar)

A - pain ports A&B (SAE J518c 3/8 inches for 350 bar)

35 - relief valve setting A&B side (350 bar)

N - climatic version

⎵ - special features

ORDERING INSTRUCTIONS

MF	S		/								

FIXED DISPLACEMENT AXIAL PISTON MOTOR	MF

SERIES	S

DISPLACEMENT, CCM	CODE
33,3	33
51,6	52
69,8	71
89,0	90

DRIVE SHAFT	33	52	71	90	CODE
14 tooth, 12/24 pitch, (31,22 mm)	●	●	●	●	A
19 tooth, 16/32 pitch, (31,73 mm)	●	●	●	●	B
21 tooth, 16/32 pitch, (34,5 mm)	●	●	●	●	C
23 tooth, 16/32 pitch, (37,68 mm)	-	-	-	●	D
Cone 1:8, SAE J501, (35 mm)	●	●	●	●	E
20 tooth, 16/32 pitch, (33 mm)	●	●	●	●	F
27 tooth, 16/32 pitch, (44,03 mm)	-	-	-	●	G
Straight (ø34,93 mm)	●	●	●	-	K
Straight (ø44,45 mm)	-	-	-	●	L

SPECIAL FEATURES*	CODE

CLIMATIC VERSION	CODE
Temperate	N
Tropical	T

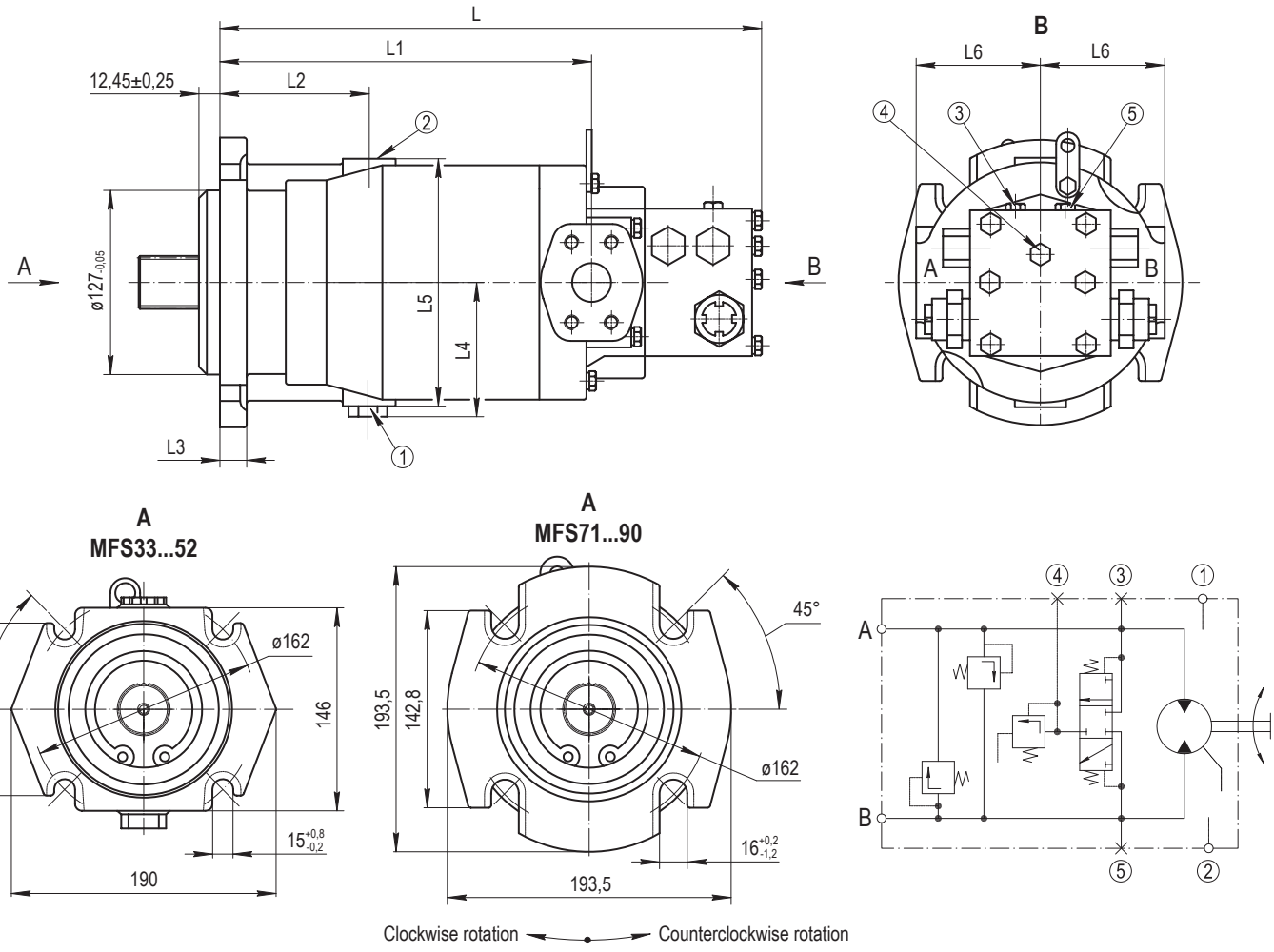
HIGH PRESSURE RELIEF VALVE SETTING - PORT 'A' AND 'B'	33	52	71	90	CODE
No manifold block	●	●	●	●	00
110 bar - 340 bar	●	●	●	●	11-34
350 bar	●	●	●	●	35

MAIN PORTS 'A' & 'B'	33	52	71	90	CODE
SAE J518c 3/8 inches for 350 bar	●	●	●	●	A
SAE J518c 7/16 inches for 350 bar	-	-	●	●	B

PURGE RELIEF VALVE SETTING	33	52	71	90	CODE
10,3 bar - 11,8 bar	●	●	●	●	1
15 bar - 16,4 bar	●	●	●	●	2

Notes: ● Standard; ○ Optional; **-** Not available.

OVERALL DIMENSIONS

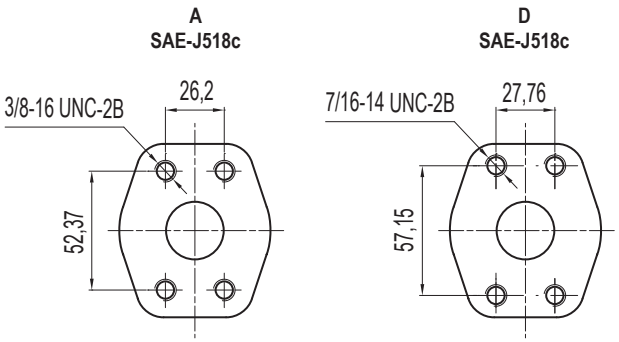


Frame size	Dimensions [mm]						
	L	L_1	L_2	L_3	L_4	L_5	L_6
MFS33	340	216	90	16	82	140	81
MFS52	360	235	96		87	152,7	85,8
MFS71	378	255,6	97		98	174	
MFS90	391	270	117,5	17,5	107	192	95,25

DRAIN PORTS SIZES

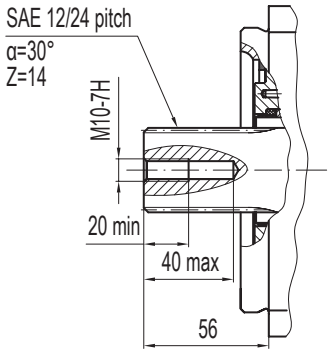
Frame size	Ports	
	«1»; «2»	«3»; «4»; «5»
MFS33	7/8-14 UNF-2B	7/16-20 UNF-2B
MFS52		
MFS71		
MFS90		

PORT OPTIONS 'A' & 'B'

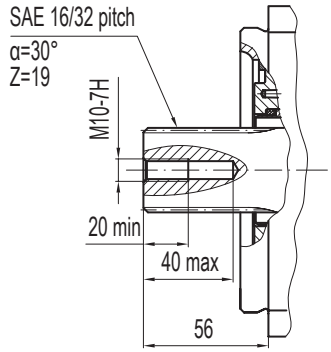


SHAFT OPTIONS

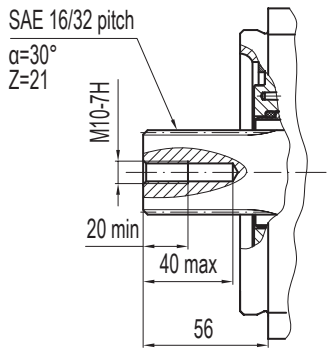
A



B



C



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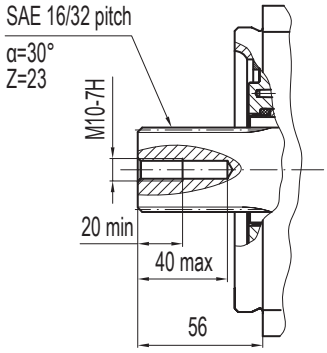

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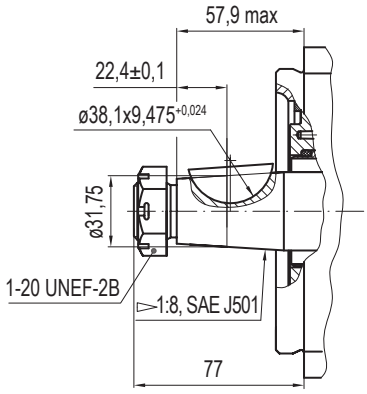

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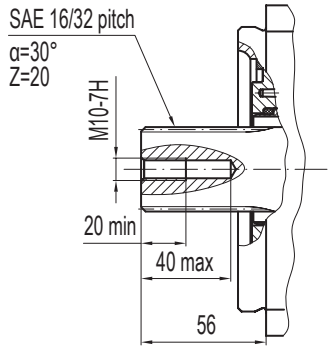
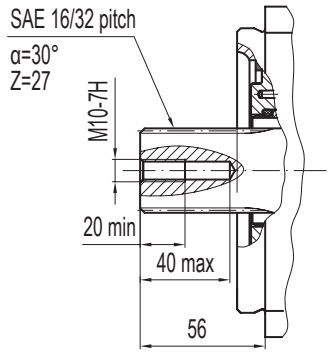


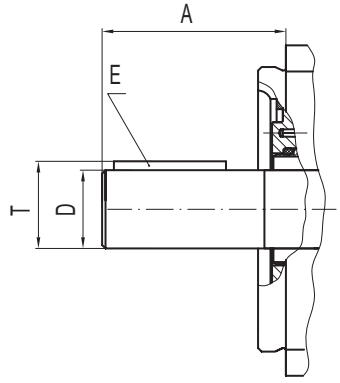
CYLINDRICAL SHAFTS, 'K' DESIGN

Frame size	A	D
MFS71	77 max	34,93
MFS90		44,45
Frame size	**T**	**E**
MFS71	38,47	7,976x7,976x50
MFS90	48,8	9,576x9,576x50

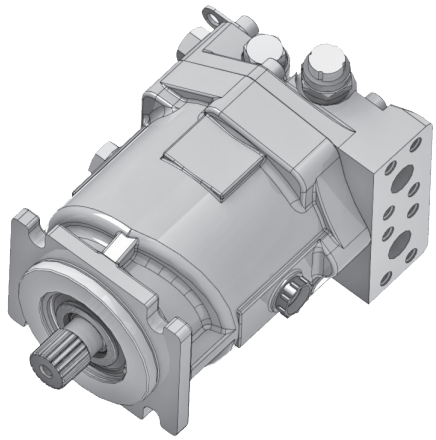
G



K



GENERAL INFORMATION



Fixed displacement axial piston motors in swashplate design for closed and open circuits. They are used in hydrostatic transmissions, that consist of a pump and hydraulic motor. The design is based on the Sauer 20 series. Modernization of the MFS series has significantly improved the technical and performance characteristics of the units and retained the famous reliability and durability. These motors meet the requirements of heavy duty applications. Built-in hydraulic equipment optional. The compact version of the motor with integrated valves expands the application range.

Design features:

- Swashplate design.
- Bimetallic bearing plate has a high wear resistant.
- Lightweight plunger provides reliability in operation at high speeds.
- Tapered roller bearings allow the motor shaft to withstand high radial and axial loads.
- Shaft seals (face seal or lip seal) provide reliable external tightness.
- Mounting flanges according to SAE.
- Built-in hydraulic equipment optional.
- Compact version for limited space.

TECHNICAL CHARACTERISTICS

Displacement code		With manifold block					With valves built-in to the end cap		
		33	52	71	90	112	71	90	112
Displacement max	ccm	33,3	51,6	69,8	89	110,8	69,8	89	110,8
Maximum pressure in high pressure line	bar	450							
Rated pressure in high pressure line	bar	420							
Maximum drain pressure	bar	2,5							
Maximum rotating torque	Nm	203	314	425	542	675	425	542	675
Maximum speed	min^{-1}	3590	4160		3720		2900		
Minimum speed	min^{-1}	50							
Rated speed	min^{-1}	2500							
Rated power	kW	46	71,3	96	125,6	156,4	96	125,6	156,4
Weight (without fluid)	kg	30	35	40	47	50	35		35,5

ORDERING EXAMPLE

MF H 90 / 1 D 1 0 C 1 C 35 N ⎵

MF - fixed displacement axial piston motor

H - series H

90 - displacement 89 ccm

1 - shaft seal (lip seal)

D - shaft option (23 teeth, 16/32 pitch, (37,68mm))

1 - purge valve option (manifold block)

0 - purge relief valve setting (10,3 bar - 11,8 bar)

C - relief valve setting on the side 'A'&'B' (350 bar)

1 - working ports (opposite side flange ports)

C - relief valve option (manifold block)

35 - relief valve setting A&B side (350 bar)

N - climatic version

⎵ - special features

ORDER CODE SYSTEM

MF	H		/				

FIXED DISPLACEMENT AXIAL PISTON MOTOR	MF

SERIES	H

DISPLACEMENT, CCM	CODE
33,3	33
51,6	52
69,8	71
89,0	90
110,8	112

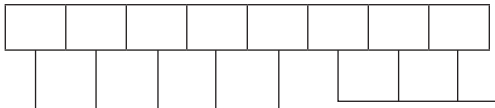
SHAFT SEAL	33	52	71	90	112	CODE
Face seal	●	●	●	●	●	1
Lip seal	○	○	●	●	●	2

DRIVE SHAFT	33	52	71	90	112	CODE
14 tooth, 12/24 pitch, (31,22 mm)	●	●	●	●	●	A
19 tooth, 16/32 pitch, (31,73 mm)	●	●	●	●	●	B
21 tooth, 16/32 pitch, (34,5 mm)	●	●	●	●	●	C
23 tooth, 16/32 pitch, (37,68 mm)	-	-	●	●	●	D
Cone 1:8, SAE J501, (ø35 mm)	●	●	●	●	●	E
20 tooth, 16/32 pitch, (33 mm)	●	●	●	●	●	F
27 tooth, 16/32 pitch, (44,03 mm)	-	-	-	●	●	G
Straight (ø34,93 mm)	●	●	●	-	-	K
Straight (ø44,45 mm)	-	-	-	●	●	L

PURGE RELIEF VALVE LOCATION	33	52	71	90	112	CODE
In manifold block	●	●	●	●	●	1
In end cap	-	-	○	●	●	2

PURGE RELIEF VALVE SETTING	33	52	71	90	112	CODE
10,3 bar - 11,8 bar	●	●	●	●	●	0
15 bar - 16,4 bar	●	●	●	●	●	1
20,5 bar - 22,5 bar	-	-	○	●	●	2

Notes: ● Standard; ○ Optional; **–** Not available.



SPECIAL FEATURES*	CODE
Drain port size 1 1/16-12UN-2B	1

CLIMATIC VERSION	CODE
Temperate	N
Tropical	T

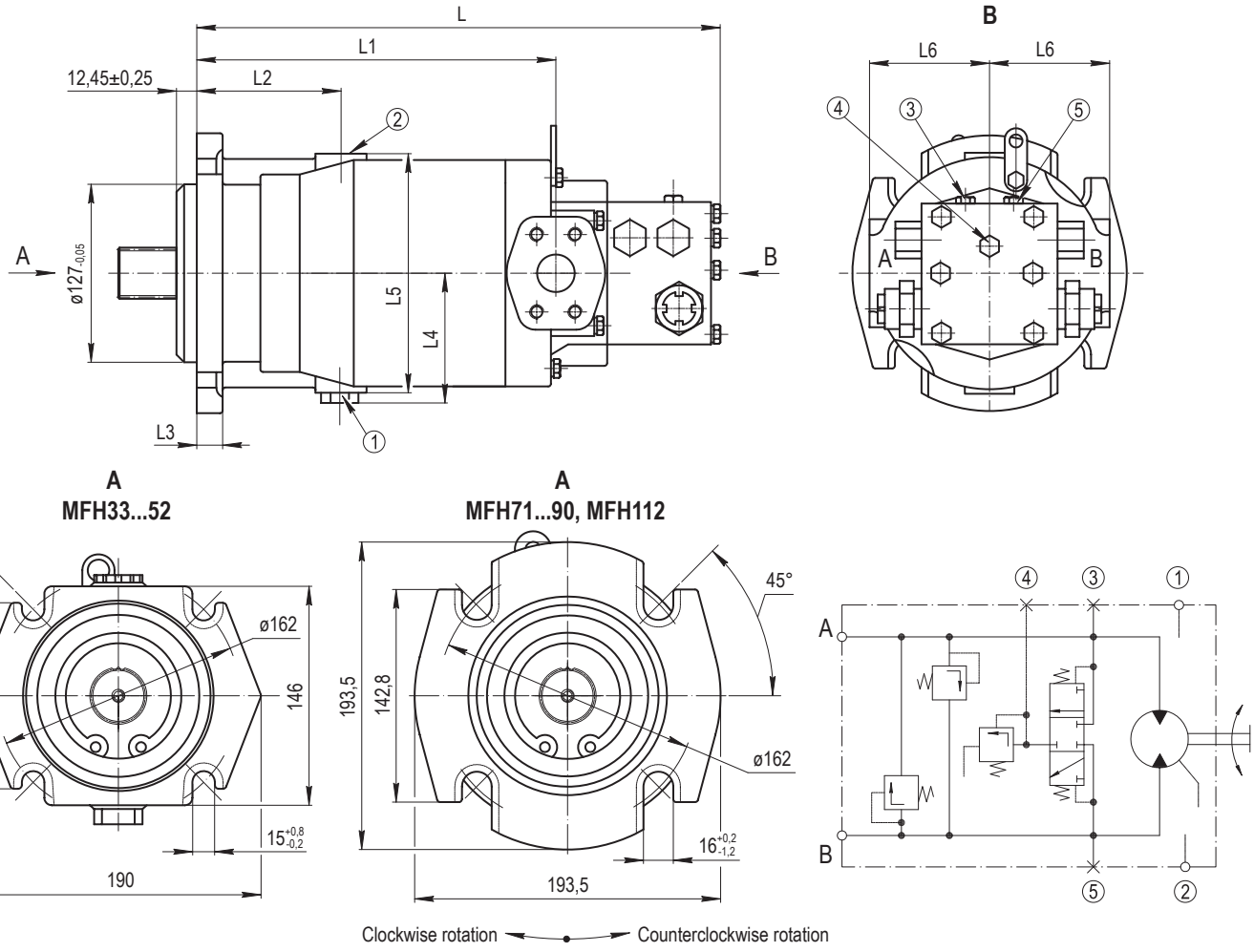
HIGH PRESSURE RELIEF VALVE SETTING - PORT 'A' AND 'B'	33	52	71	90	112	CODE
No manifold block	●	●	●	●	●	00
110 bar - 420 bar	●	●	●	●	●	11-42
450 bar	●	●	●	●	●	45

HIGH PRESSURE RELIEF VALVES	33	52	71	90	112	CODE
in end cap						
No valves	●	●	●	●	●	A
Purge relief valve			●	●	●	B
Purge relief valve and pressure relief valve			●	●	●	C
Purge relief valve, check valve and pressure relief valve			●	●	●	D
in manifold block						
No valves (without manifold block)	●	●	●	●	●	G
Purge relief valve	-	-	-	-	-	E
Purge relief valve and pressure relief valve	●	●	●	●	●	H
Purge relief valve, check valve and pressure relief valve	-	-	-	-	-	F

MAIN PORTS LOCATION	33	52	71	90	112	CODE
Opposite side	●	●	●	●	●	1
One side	-	○	○	●	●	2
Rear	○	○	○	○	○	3

MAIN PORTS 'A' & 'B'	33	52	71	90	112	CODE
M12 for 420...450 bar	●	●	●	●	●	A
SAE J518c 7/16 inches	●	●	●	●	●	B
SAE J518c 3/8 inches	●	●	●	●	●	C

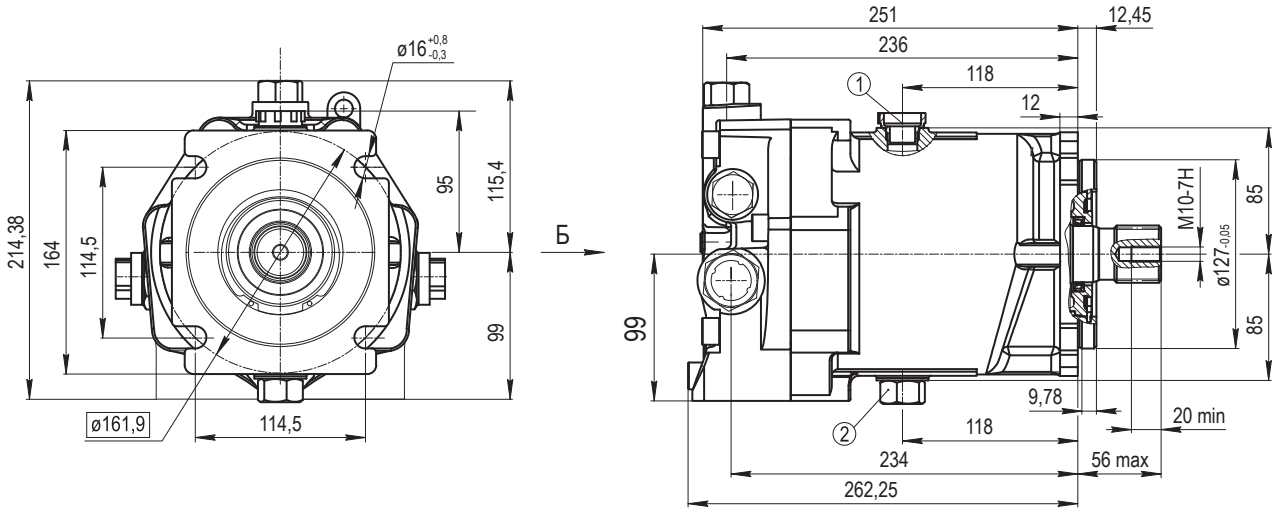
MOTOR WITH HIGH PRESSURE RELIEF VALVES IN MANIFOLD BLOCK



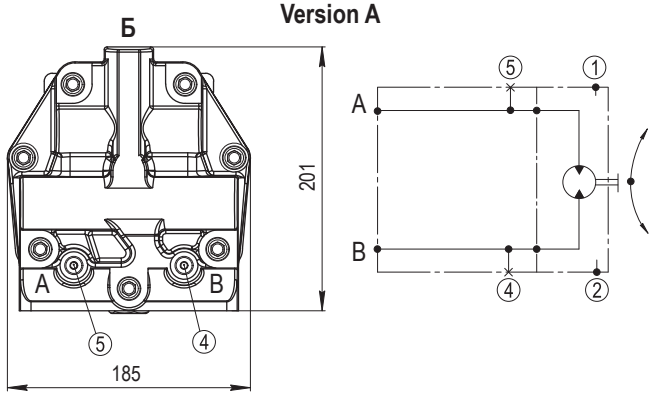
OVERALL DIMENSIONS

Frame size	Dimensions [mm]						
	L	L_1	L_2	L_3	L_4	L_5	L_6
MFH33	340	216	90	16	82	140	81
MFH52	360	235	96		87	152,7	85,8
MFH71	378	255,6	97		98	174	
MFH90	391	270	117,5	17,5	107	192	95,25
MFH112							

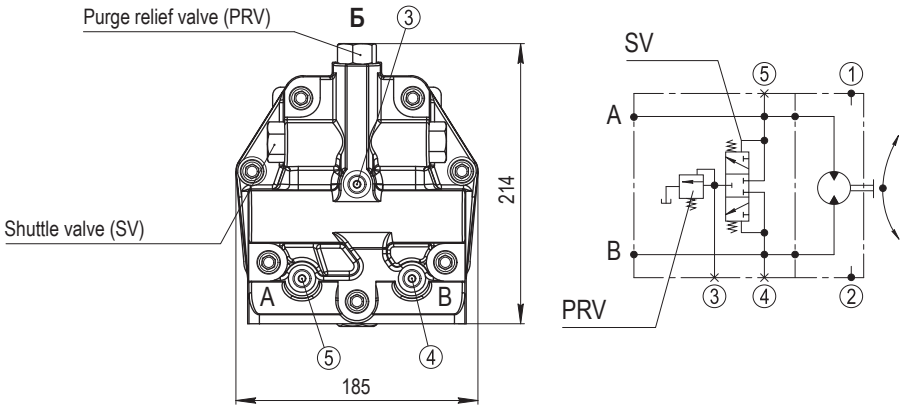
MOTOR WITH HIGH PRESSURE RELIEF VALVES BUILD-IN TO END CAP



Version A

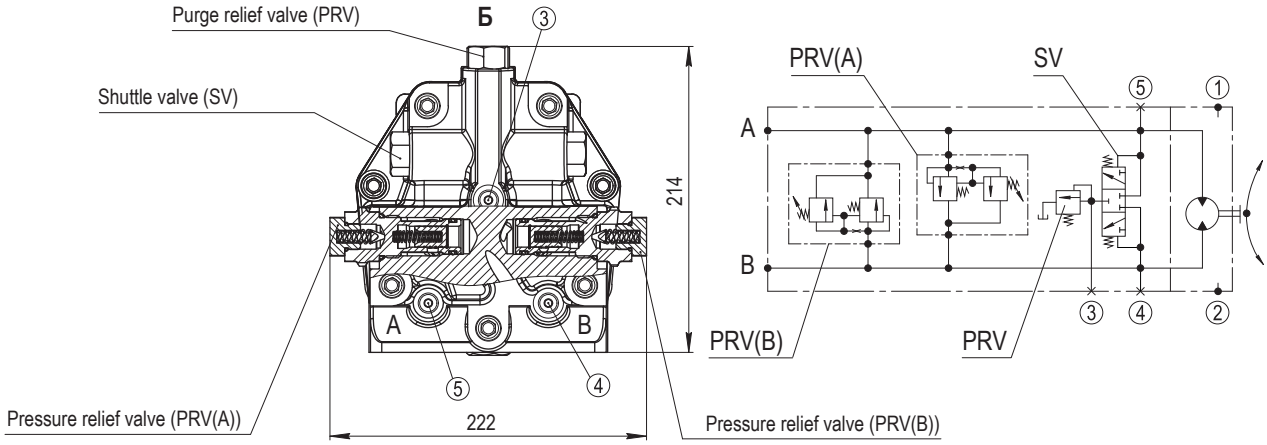


Version B

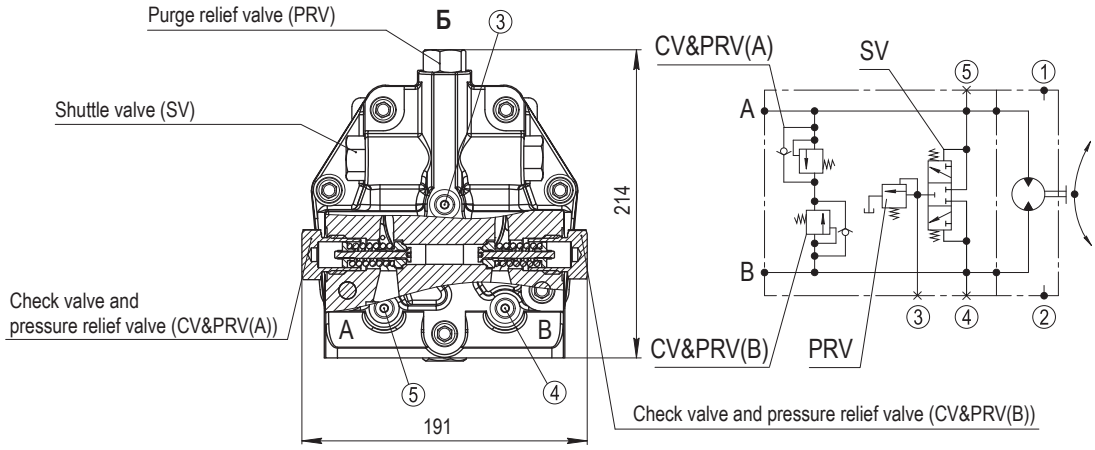


MOTOR WITH HIGH PRESSURE RELIEF VALVES BUILD-IN TO END CAP

Version C



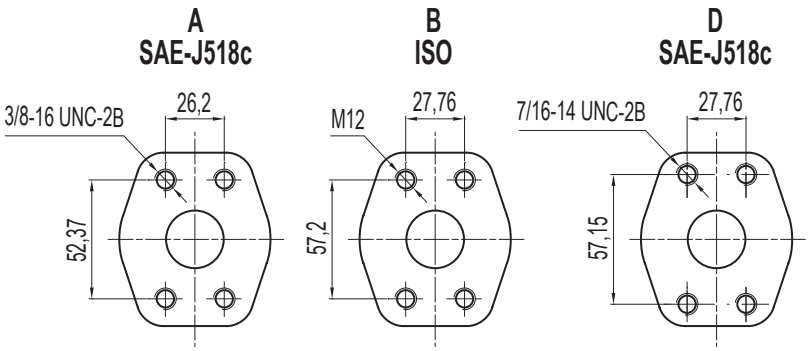
Version D



DRAIN PORTS SIZES

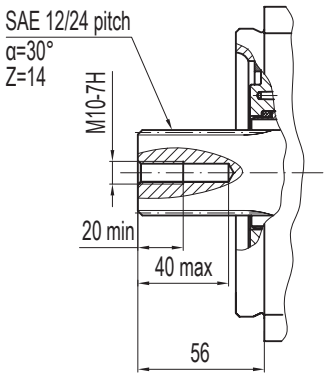
Frame size	Ports	
	«1»; «2»	«3»; «4»; «5»
MFH33	7/8-14 UNF-2B	7/16-20 UNF-2B
MFH52		
MFH71		
MFH90		
MFH112		

PORT OPTIONS 'A' & 'B'

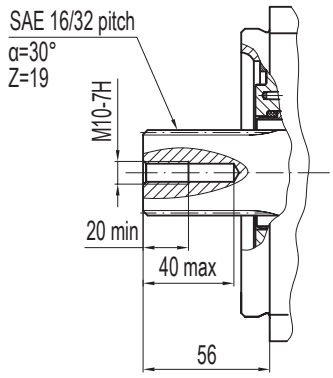


SHAFT OPTIONS

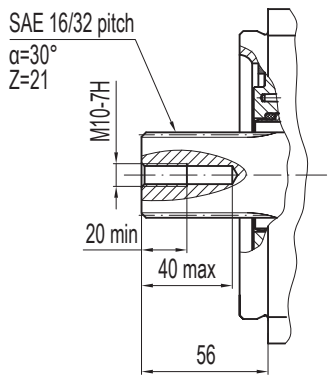
A



B



C



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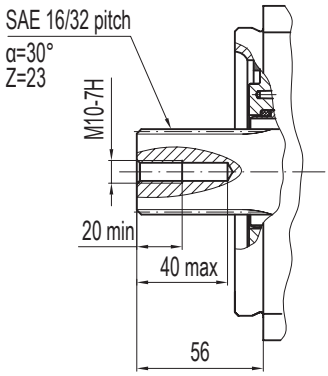
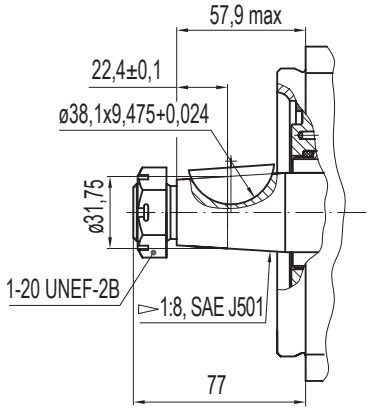


E



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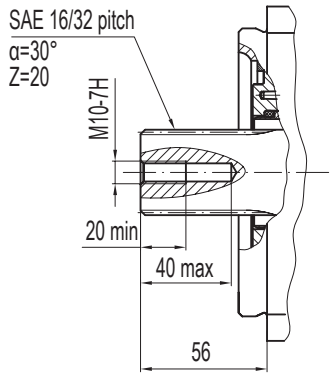
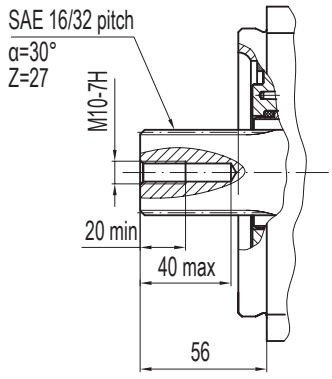


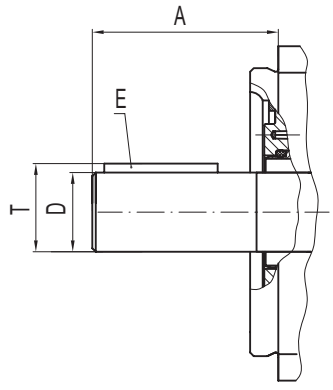
CYLINDRICAL SHAFTS, 'K' DESIGN

Frame size	A	D
MFH33/52/71	77 max	34,93
MFH90/112	77 max	44,45
Frame size	**T**	**E**
MFH33/52/71	38,47	7,976x7,976x50
MFH90/112	48,8	9,576x9,576x50

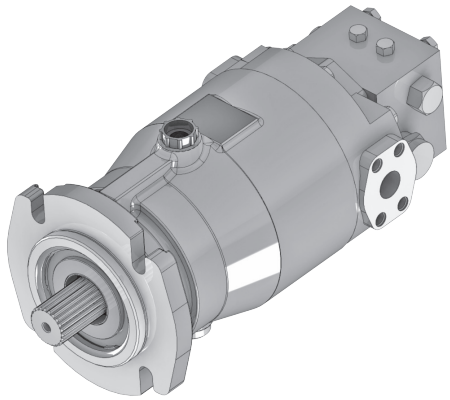
G



K



GENERAL INFORMATION



Fixed displacement axial piston motors in swashplate design for closed and open circuits. They are used in hydrostatic transmissions, that consist of a pump and hydraulic motor. The design is based on the Sauer 20 series. Modernization of the MFH series has improved the technical and performance characteristics of the units and retained the famous reliability and durability. These motors meet the requirements of heavy duty applications. Built-in hydraulic equipment optional.

Design features:

- Swashplate design.
- Bimetallic bearing plate has a high wear resistant.
- Lightweight plunger provides reliability in operation at high speeds.
- Tapered roller bearings allow the motor shaft to withstand high radial and axial loads.
- Shaft seals (face seal or lip seal) provide reliable external tightness.
- Mounting flanges according to SAE.
- Built-in hydraulic equipment optional.

TECHNICAL CHARACTERISTICS

Displacement code		75	90	112
Displacement max	ccm	75,0	89,0	110,8
Maximum pressure in high pressure line	bar	480		
Rated pressure in high pressure line	bar	420		
Maximum drain pressure	bar	2,5		
Maximum rotating torque	Nm	441,0	524,0	652,0
Maximum speed	min^{-1}	4150	3720	
Minimum speed	min^{-1}	500		
Rated speed	min^{-1}	3300		
Rated power	kW	107,1	130,1	161,9
Weight (without fluid)	kg	40	48	50

EXAMPLE OF SPECIFICATION

MF H2 90 / 1 D 1 0 C 1 C 35 N ⌴

MF - fixed displacement axial piston motor
H2 - series H2
90 - displacement 89 ccm
1 - shaft seal (lip seal)
D - shaft option (23 teeth, 16/32 pitch, (37,68mm))
1 - purge valve option (manifold block)
0 - purge relief valve setting (10,3 bar - 11,8 bar)
C - relief valve setting on the side 'A'&'B' (350 bar)
1 - working ports (opposite side flange ports)
C - relief valve option (manifold block)
35 - relief valve setting A&B side (350 bar)
N - climatic version
⌴ - special features

ORDERING INSTRUCTIONS

MF	H2	.		/									

FIXED DISPLACEMENT AXIAL PISTON MOTOR	MF

SERIES	H2

DISPLACEMENT, CCM	CODE
75,0	75
89,0	90
110,8	112

SHAFT SEAL	75	90	112	CODE
Face seal	●	●	●	1
Lip seal	●	●	●	2

DRIVE SHAFT	75	90	112	CODE
14 tooth, 12/24 pitch, (31,22 mm)	●	●	●	A
19 tooth, 16/32 pitch, (31,73 mm)	●	●	●	B
21 tooth, 16/32 pitch, (34,5 mm)	●	●	●	C
23 tooth, 16/32 pitch, (37,68 mm)	●	●	●	D
Cone 1:8, SAE J501, (35 mm)	●	●	●	E
20 tooth, 16/32 pitch, (33 mm)	●	●	●	F
27 tooth, 16/32 pitch, (44,03 mm)	-	●	●	G
Straight (ø34,93 mm)	●	-	-	K
Straight (ø44,45 mm)	-	●	●	L

SPECIAL FEATURES*	CODE

CLIMATIC VERSION	CODE
Temperate	N
Tropical	T

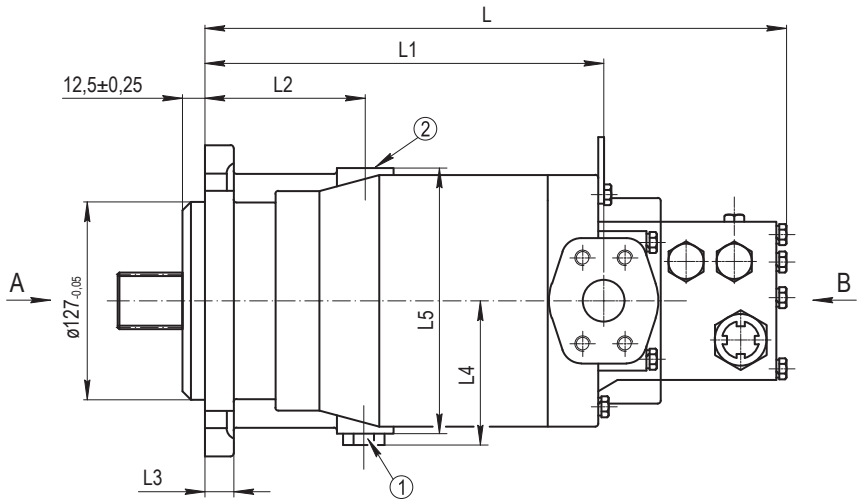
HIGH PRESSURE RELIEF VALVE SETTING - PORT 'A' AND 'B'	75	90	112	CODE
No manifold block	●	●	●	00
110 bar - 420 bar	●	●	●	11-42
450 bar	●	●	●	45

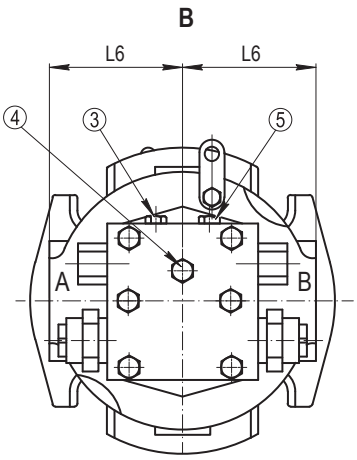
MAIN PORTS 'A' & 'B'	75	90	112	CODE
M12 GOST 9150-2002 (ISO68-1:1998)	●	●	●	A
SAE J518c 7/16 inches	●	●	●	B

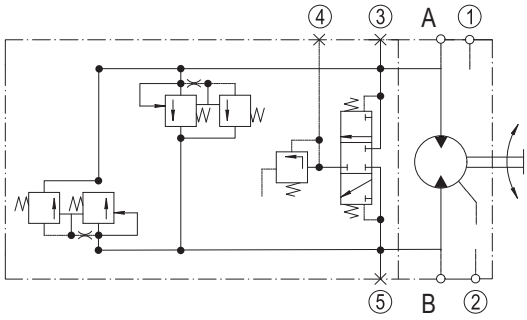
PURGE RELIEF VALVE SETTING	75	90	112	CODE
10,3 bar - 11,8 bar	●	●	●	0
15 bar - 16,4 bar	●	●	●	1
20,5 bar - 22,5 bar	●	●	●	2

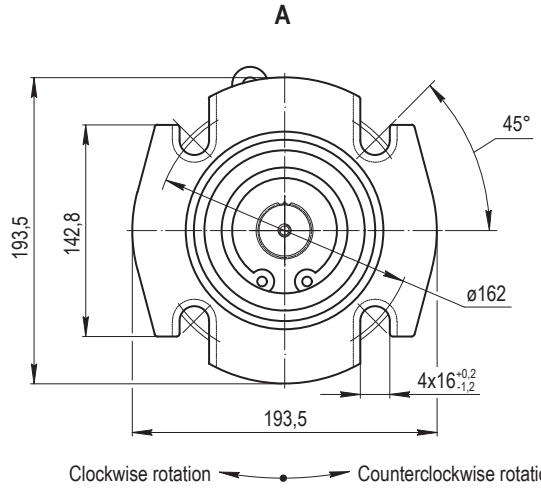
Notes: ● Standard; ○ Optional; **-** Not available.

OVERALL DIMENSIONS









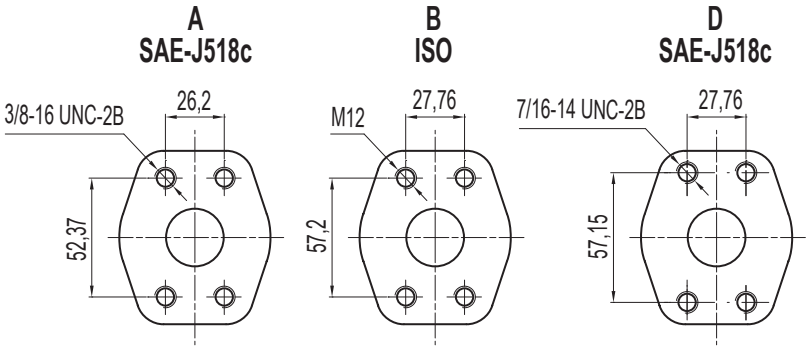
Clockwise rotation — Counterclockwise rotation

Frame size	Dimensions [mm]						
	L	L_1	L_2	L_3	L_4	L_5	L_6
MFH2.75	378	255,6	97	17,5	98	174	85,8
MFH2.90	391	270	117,5	17,5	107	192	95,25
MFH2.112							

DRAIN PORTS SIZES

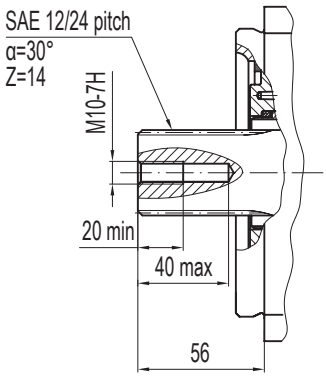
Frame size	Ports	
	«1»; «2»	«3»; «4»; «5»
MFH2.75	1 1/16-12UN-2B	7/16-20 UNF-2B
MFH2.90		
MFH2.112		

PORT OPTIONS 'A' & 'B'



SHAFT OPTIONS

A



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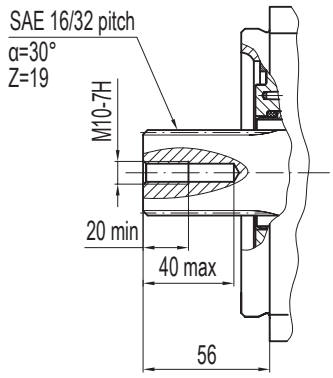

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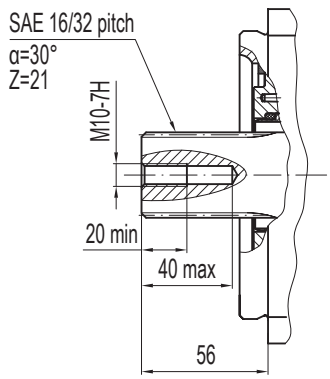

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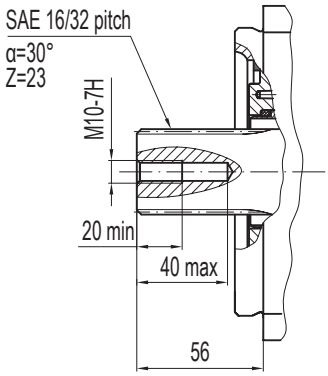

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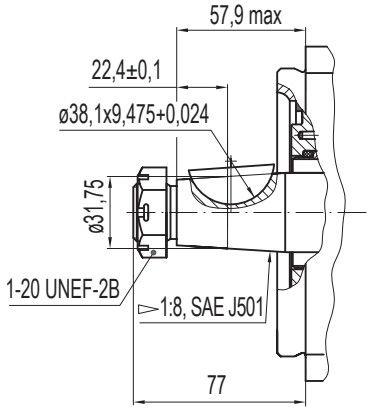

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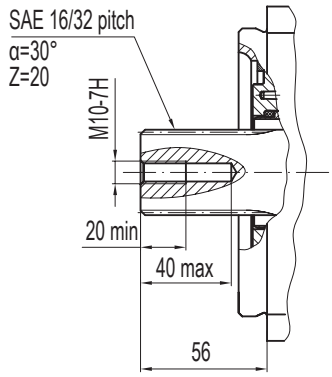
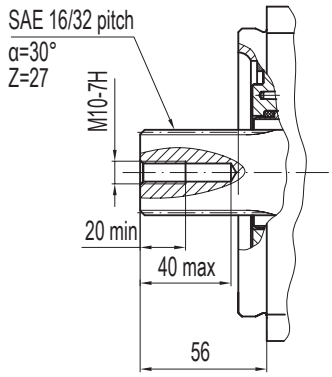


CYLINDRICAL SHAFTS, 'K' DESIGN

Frame size	A	D
MFH2.75	77 max	34,93
MFH2.90/112	77 max	44,45
Frame size	**T**	**E**
MFH2.75	38,47	7,976x7,976x50
MFH2.90/112	48,8	9,576x9,576x50

G



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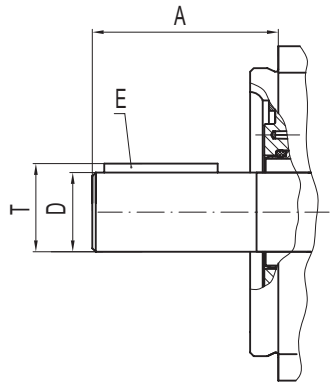


MANIFOLD BLOCK

GENERAL INFORMATION

Manifold block consists of control elements providing pressure limiting within the closed hydrostatic circuit and porting heated fluid from the circuit into the reservoir for exchange.
The manifild block can be mounted on variable axial piston motors MVH series and on fixed displacement hydraulic motors MFS, MFH, MFH2 series.

ORDERING INSTRUCTIONS

MFS90	-		/		.		.		.			

MANIFOLD BLOCK MFS90

EXECUTION	CODE
Manifold block	02
Manifold block with rotary bypass valve	05

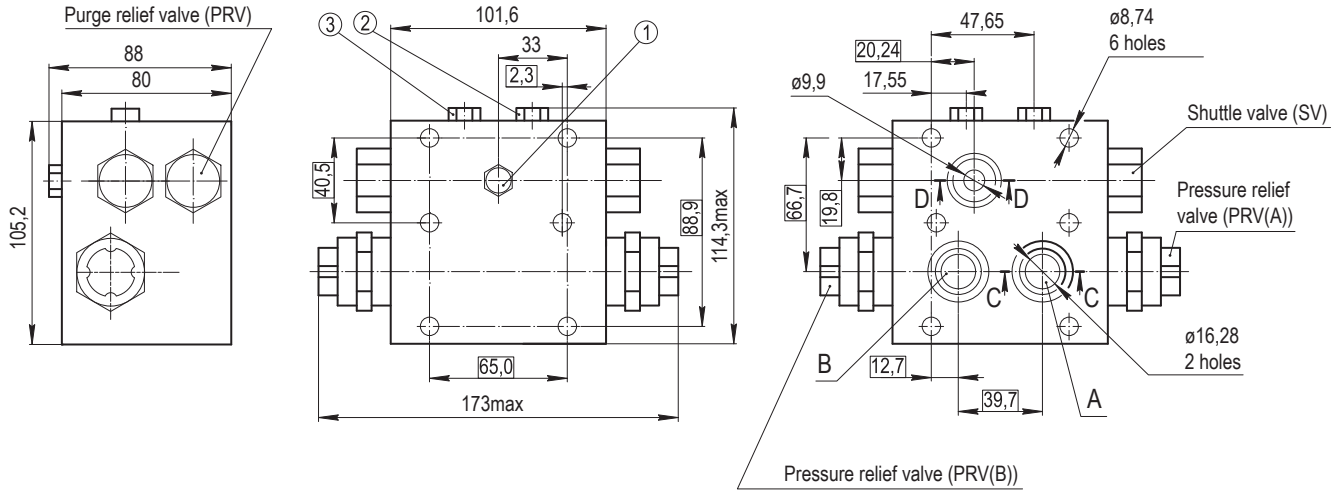
PURGE RELIEF VALVE SETTING	CODE
10,3 bar - 11,8 bar	0
15 bar - 16,4 bar	1
20,5 bar - 22,5 bar	2

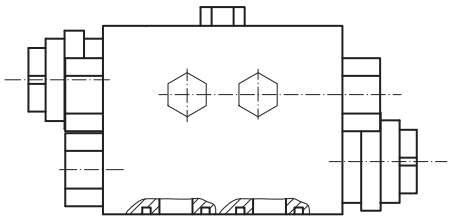
SPECIAL FEATURES	CODE
В комплекте с РТИ	1

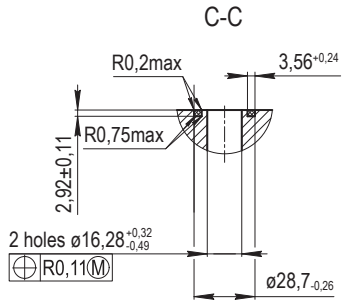
CLIMATIC VERSION	CODE
Temperate	N
Tropical	T

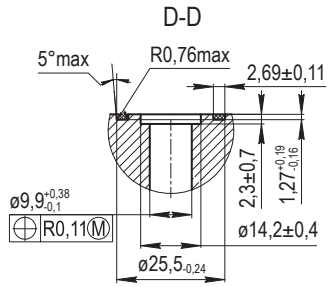
HIGH PRESSURE RELIEF VALVE SETTING PORT 'A' AND 'B'	CODE
110 bar - 420 bar	11-42
450 bar	45

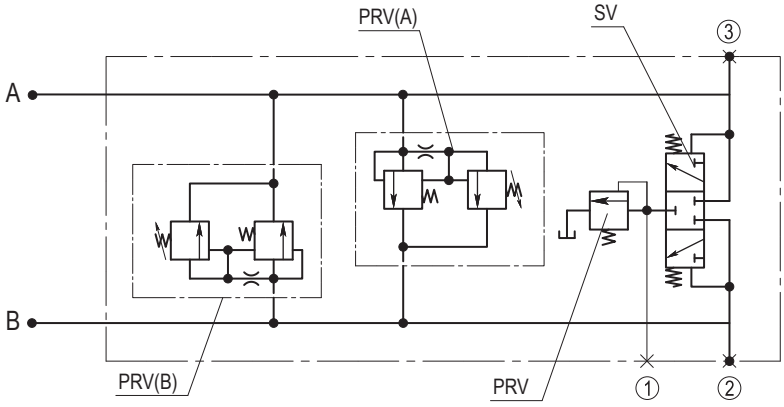
OVERALL DIMENSIONS







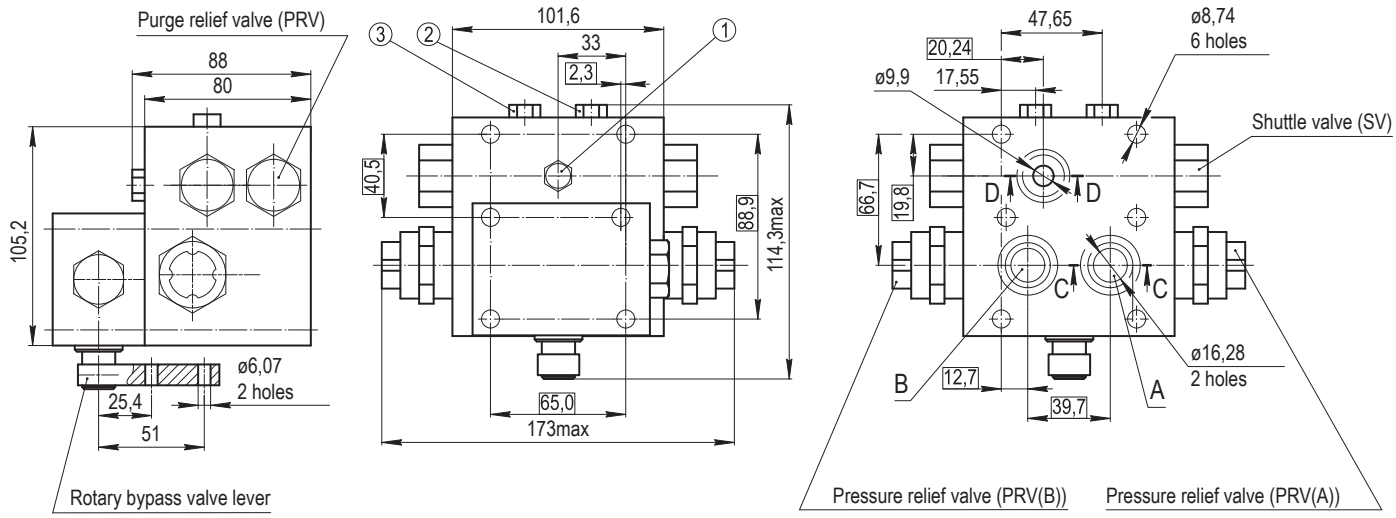


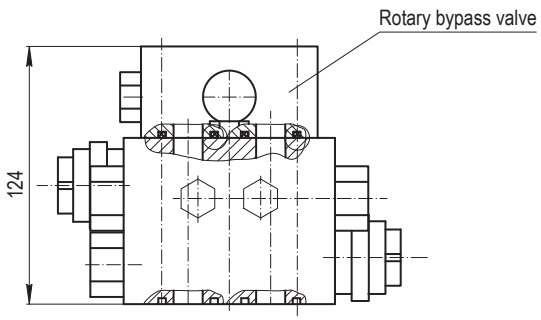


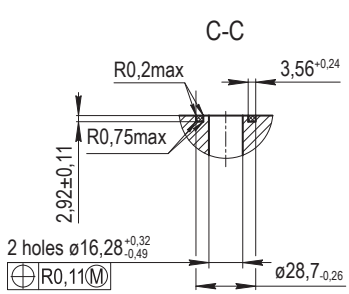
MANIFOLD BLOCK WITH ROTARY BYPASS VALVE

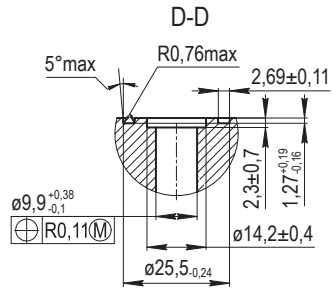
Rotary bypass valve designed to connect the working circuits A and B in the manifold block.

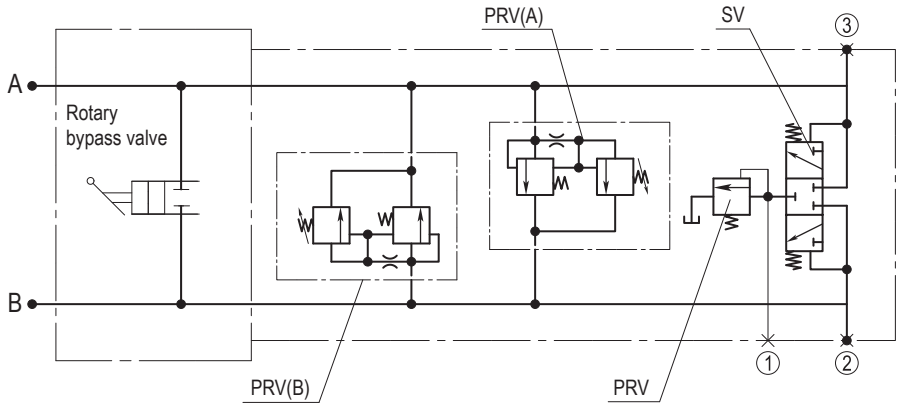
OVERALL DIMENSIONS











HYDRAULIC FLUID

All parameters and characteristics of hydraulic units suggest that hydraulic system uses high quality hydraulic fluids and additives. They should have a number of properties: anticorrosive, antioxidant, anti-foam, and others. These fluids are high-quality turbine oils, API CD SAE J183 engine oil, automatic transmission fluids (ATF) and some specialty fluids.
Never mix different fluids.

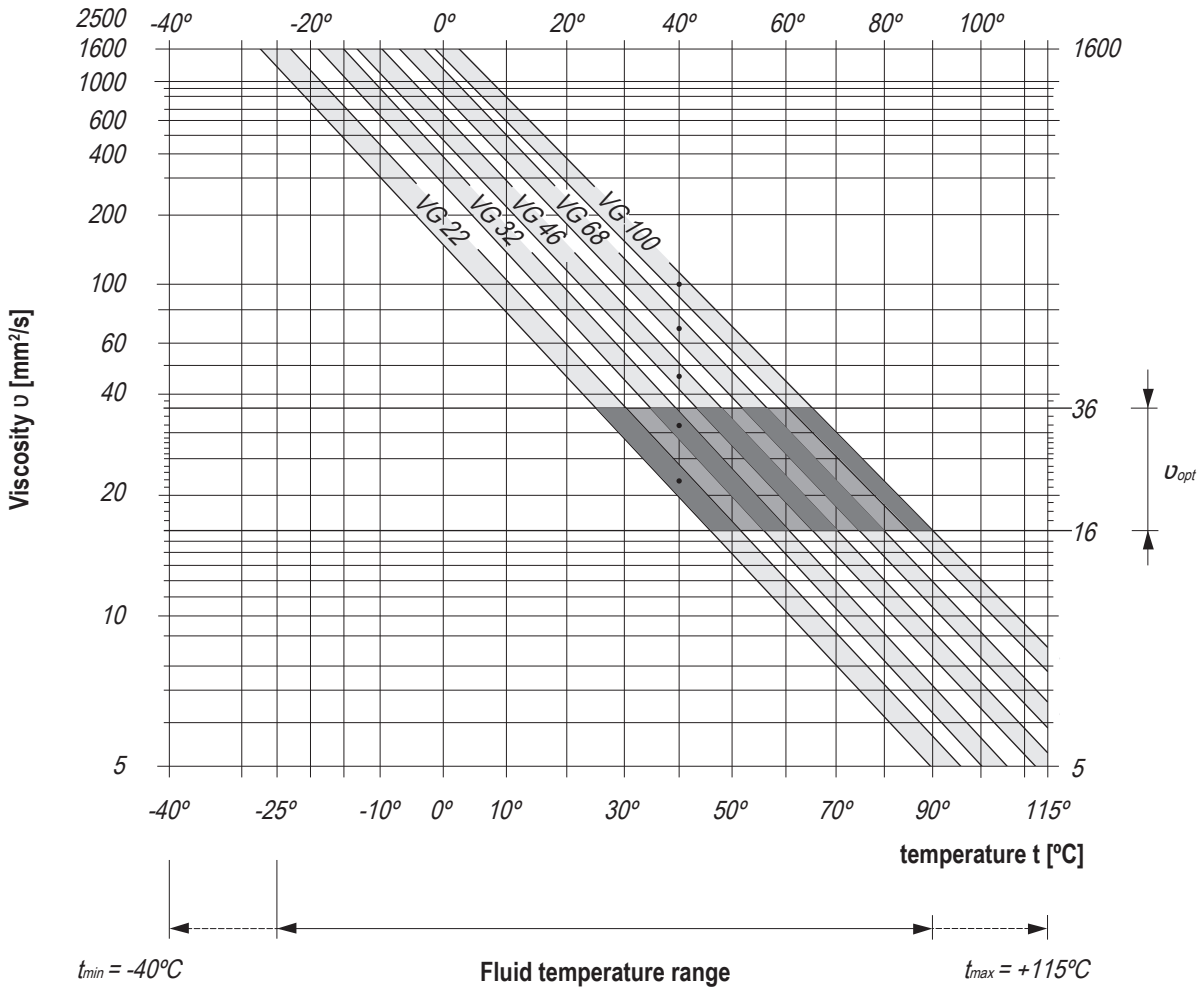
HYDRAULIC FLUID CHOICE

For the correct choice you need to know the working temperature of the fluid in the hydraulic tank (depending on the ambient temperature) and the viscosity of the fluid. The fluid must be selected so that the viscosity be within the allowable range (V_{opt}) at any temperature (t_{min}-t_{max}), (see diagram). It is recommended to select a higher temperature class of the working fluid.

EXAMPLE.

At an ambient temperature of X°C, an operating temperature of 60°C is set. In the optimum working range of (V_{opt}) viscosity, this corresponds to classes VG 46 and VG 68. The right choise is VG 68. The temperature of fluid in the drain channel is always higher than the temperature in the tank. At any point in the hydraulic system fluid temperature should not exceed 90°C.
If it is not possible to comply with temperature conditions, consult for advice.

SELECTION DIAGRAM



HYDRAULIC FLUID FILTRATION

The better filtration provides the higher purity class of the working fluid, which in turn increases the axial piston unit lifetime. To ensure reliable operation of the axial piston unit, it is necessary to determine the working fluid purity according to ISO 4406. At very high temperatures of the working fluid (from 90°C to a maximum of 115°C), a purity class at least 19/17/14 according to ISO 4406 is required. If it is impossible to comply with the purity class, please consult.

VISCOSITY AND TEMPERATURE OF WORKING FLUID

CONDITIONS	VISCOSITY	TEMPERATURE	NOTES
Storage and transportation		$T_{min} \geq -40°C$ $T_{opt} = +5°C…+20°C$	Storage at the factory: Standard - up to 12 months; Long-term - up to 24 months
Cold start	$\upsilon_{max} \leq 1600$ mm²/s	$T \geq -40°C$	$t \leq 3$ min, $n \leq 1000$ min^{-1}, no load $P \leq 50$ bar
Permissible temperature drop		$T \leq 25°C$	The temperature difference between the axial piston pump and the working fluid in the system
Warm-up period	υ = 1600...400 mm²/s	T = -40°C…-25°C	at $P \leq 0.7 \cdot P_{nom}$, $n \leq 0.5 \cdot n_{nom}$ $t \leq 15$ min
Continuous operating mode	υ = 400...10 mm²/s		In case of VG 46 corresponds to a temperature range of + 5°C to + 85°C
		$\Delta T = 12°C$ T = -25°C…+103°C	The temperature difference between the cuff, bearing and drainage Temperature in drain line
	υ_{opt} = 36...16 mm²/s		Optimal viscosity range in operating mode
Short-term operating	$\upsilon_{min} \geq 7$ mm²/s	T = +103°C	$t < 3$ min, $p < 0.3 \cdot P_{nom}$

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