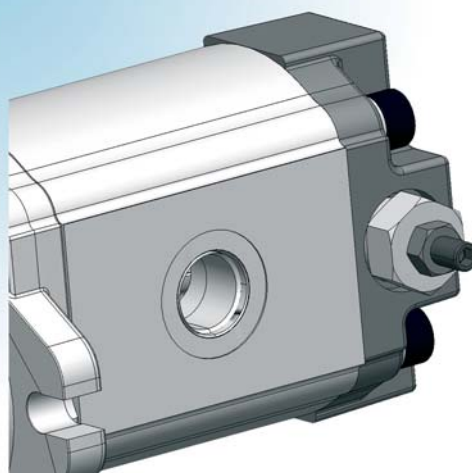
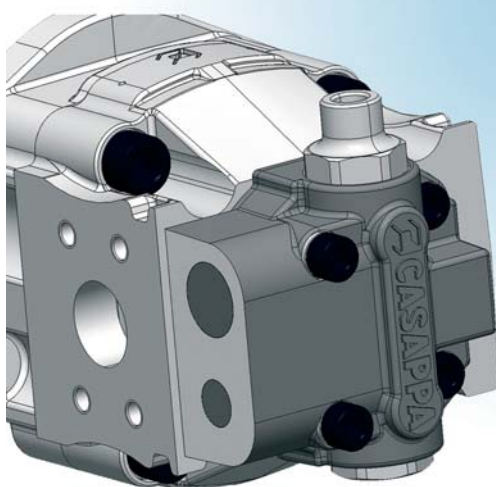
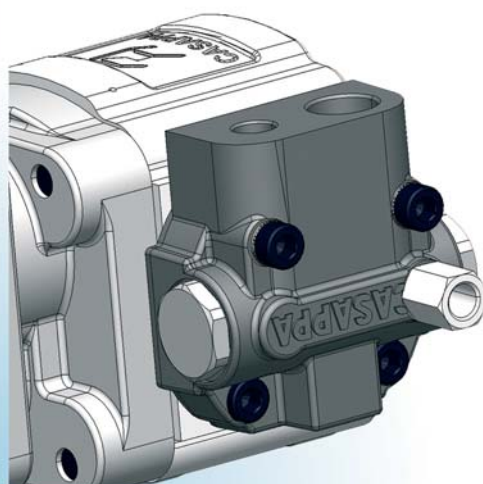
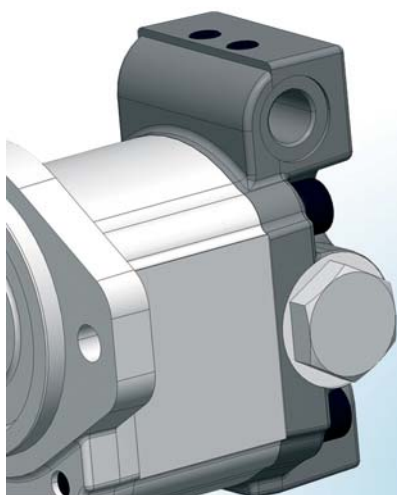


BUILT-IN VALVES

for hydraulic gear pumps and motors



- **Anti-cavitation valves**
- **Maximum pressure relief valves**
- **Priority valves**
- **"Load sensing" priority valves**

- Reduced overall dimensions
- Simplified plant design
- Wide choices of ports position

Edition: 01/01.2005



BUILT-IN VALVES

Anti-cavitation valves, maximum pressure relief valves, priority valves and "load sensing" priority valves built in the following series of gear pumps and motors:

POLARIS

WHISPER

KAPPA

New KAPPA Compact

For general data, dimensions, drive shafts, mounting flanges and ports, refer to the technical catalogues of each specific series.

POLARIS
Hydraulic gear pumps and motors
through bore aluminum body

DISPLACEMENTS
From: 0.07 m³/rev (1.07 in³/rev)
To: 5.56 m³/rev (81.10 in³/rev)

PRESSURE
Max. Continuous: 3770 psi (260 bar)
Max. intermittent: 4300 psi (300 bar)
Max. Peak: 4700 psi (330 bar)

MAX. SPEED
4000 rpm

• Group 1, 2 and 3 with displacements from 0.07 m³/rev (1.07 in³/rev) to 5.56 m³/rev (81.10 in³/rev).
• Drive shafts, mounting flanges and ports according to the international standards.
• Construction of multiple pumps in standard version, common inlet and separated outlets.
• Integrated outboard bearings for heavy duty application.
• Many types of built-in valves.

CASAPPA
FLUID POWER DESIGN

WHISPER 20 SERIES
Hydraulic Gear Pumps and Motors

PRESSURE
Max. continuous: 4300 psi (300 bar)
Max. intermittent: 4700 psi (330 bar)
Max. peak: 4900 psi (340 bar)

DISPLACEMENT
From: 0.20 m³/rev (3.07 in³/rev)
To: 1.96 m³/rev (30.1 in³/rev)

SPEED
Max. speed: 500 rpm
Max. speed: 4000 rpm

WHISPER results from a new and original technology, covered by international patents. This technology is incorporated in a new series of low noise gear pumps and motors. The WHISPER pumps and motors solve the noise problem without affecting size and performance. WHISPER 20 series meets a wide range of mobile and industrial applications. SAE and EUROPEAN mounting flanges are available. Exceptionally long bearings make possible the most complete range of drive shafts in spline, parallel forged, and tapered versions to meet all SAE, DIN, and EUROPEAN standards.

Model	Displacement (m³/rev)	Displacement (in³/rev)	Max. speed (rpm)	Max. pressure (psi)	Max. pressure (bar)	Weight (kg)	Weight (lb)
WSP 20-0.2	0.20	3.07	4000	4300	300	1.20	2.65
WSP 20-0.4	0.40	6.14	4000	4300	300	1.40	3.09
WSP 20-0.6	0.60	9.21	4000	4300	300	1.60	3.53
WSP 20-0.8	0.80	12.28	4000	4300	300	1.80	3.97
WSP 20-1.0	1.00	15.35	4000	4300	300	2.00	4.41
WSP 20-1.2	1.20	18.42	4000	4300	300	2.20	4.85
WSP 20-1.4	1.40	21.49	4000	4300	300	2.40	5.29
WSP 20-1.6	1.60	24.56	4000	4300	300	2.60	5.73
WSP 20-1.8	1.80	27.63	4000	4300	300	2.80	6.17
WSP 20-2.0	2.00	30.70	4000	4300	300	3.00	6.61
WSP 20-2.2	2.20	33.77	4000	4300	300	3.20	7.05
WSP 20-2.4	2.40	36.84	4000	4300	300	3.40	7.49
WSP 20-2.6	2.60	39.91	4000	4300	300	3.60	7.93
WSP 20-2.8	2.80	42.98	4000	4300	300	3.80	8.37
WSP 20-3.0	3.00	46.05	4000	4300	300	4.00	8.81
WSP 20-3.2	3.20	49.12	4000	4300	300	4.20	9.25
WSP 20-3.4	3.40	52.19	4000	4300	300	4.40	9.69
WSP 20-3.6	3.60	55.26	4000	4300	300	4.60	10.13
WSP 20-3.8	3.80	58.33	4000	4300	300	4.80	10.57
WSP 20-4.0	4.00	61.40	4000	4300	300	5.00	11.01
WSP 20-4.2	4.20	64.47	4000	4300	300	5.20	11.45
WSP 20-4.4	4.40	67.54	4000	4300	300	5.40	11.89
WSP 20-4.6	4.60	70.61	4000	4300	300	5.60	12.33
WSP 20-4.8	4.80	73.68	4000	4300	300	5.80	12.77
WSP 20-5.0	5.00	76.75	4000	4300	300	6.00	13.21

(1) Maximum speeds can be reduced. Maximum speeds can be increased. For specific operating conditions consult CASAPPA technical data. For recommendations and approvals.
(2) Maximum pressure is continuous pressure and average. Consult catalog or contact CASAPPA technical data.
(3) Flow control is maximum allowed for protection pump at rated pressure with 10 cc of oil at 100° F. Flow control can be used to calculate maximum flow rate by multiplying by the flow control factor.
(4) Integrated design is optimized to minimize the average mechanical efficiency.
(5) Weight is approximate. There is a weight reduction for aluminum cases.
Please contact your CASAPPA distributor for further assistance.

CASAPPA
FLUID POWER DESIGN

KAPPA
Hydraulic gear pumps
two pieces cast iron housing

DISPLACEMENTS
From: 0.20 m³/rev (3.07 in³/rev)
To: 15.85 m³/rev (245.5 in³/rev)

PRESSURE
Max. Continuous: 300 bar
Max. intermittent: 350 bar
Max. peak: 370 bar

MAX. SPEED
4000 rpm

• High operating pressures.
• High efficiency at high temperature.
• Exceptional working life expectancy.

CASAPPA
FLUID POWER DESIGN

New KAPPA Compact
Hydraulic gear pumps and motors
compact design

DISPLACEMENTS
From: 1.58 m³/rev (24.5 in³/rev)
To: 8.52 m³/rev (130.75 in³/rev)

PRESSURE
Max. Continuous: 4300 psi (300 bar)
Max. intermittent: 4700 psi (330 bar)
Max. Peak: 4770 psi (338 bar)

MAX. SPEED
3000 rpm

• High operating pressures.
• Low noise emission.
• Available with built-in valves.
• Exceptional working life expectancy.

From the KAPPA series, we now introduce the KAPPA "Compact" line. The main feature of this new line is a solid compact 2 piece construction. The new KAPPA "Compact" line allows you to include many functions in a reduced envelope (space). The new KAPPA "Compact" line is a direct result of feedback received from Casappa customers. This feedback has given Casappa the opportunity to understand the needs of our customers and implement the hydraulic knowledge gained into new and improved products. The "Compact" line provides exceptional quality and reliability thanks to its dimensional modeling, virtual simulation of the pump's behavior in the hydraulic system and testing on the machines. The reduced dimensions as well as a large variety of drive shafts, mounting flanges and ports ensure great flexibility in the "Compact" line.

CASAPPA
FLUID POWER DESIGN

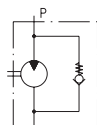
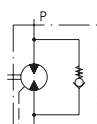
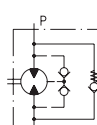
INDEX

Anti-cavitation valves	page 3
Maximum pressure relief valves	page 9
Priority valves	page 17
"Load sensing" priority valves	page 31

ANTI-CAVITATION VALVES - GENERAL DATA

Anti-cavitation valves are housed directly in the rear cover of gear motors. These valves are designed so that the oil circulates through the motor in only one direction, thus protecting against any possible anti-cavitation that may occur each time the system stops.

➤ Anti-cavitation valves

V8	Anti-cavitation valve in unidirectional motors.	
V8/◆	Anti-cavitation valve in reversible motors with rear or side external drain port.	
	Anti-cavitation valve in reversible motors with internal drain.	

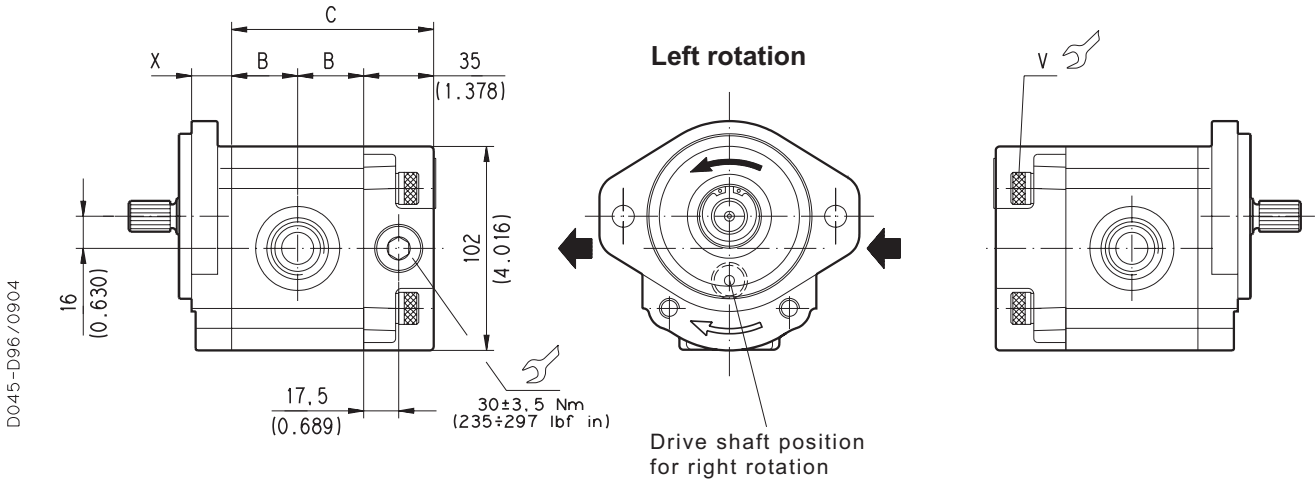
◆ In reversible motors, the anti-cavitation valve protects the motor only in one direction of rotation

V8/CRD	For right rotation
V8/CRS	For left rotation

ANTI-CAVITATION VALVES - DIMENSIONS

V8

POLARIS 20, WHISPER 20 - Unidirectional motors (S-D)

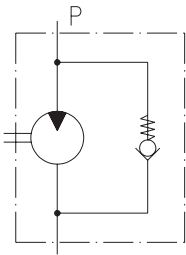


Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ±4,5	358 ÷ 438
Cast iron		

Order example

PLM20-4-S0-03 S1- L OC/OC- N-EL

V8



ANTI-CAVITATION VALVES - DIMENSIONS

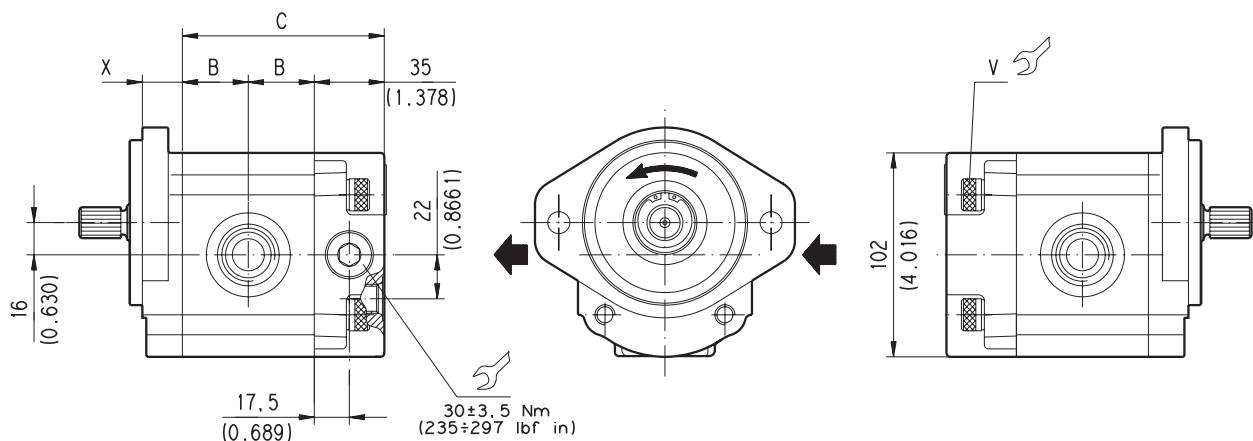
V8/...

POLARIS 20, WHISPER 20 - Reversible motors with rear external drain port (R)

FOR LEFT ROTATION

V8/CRS

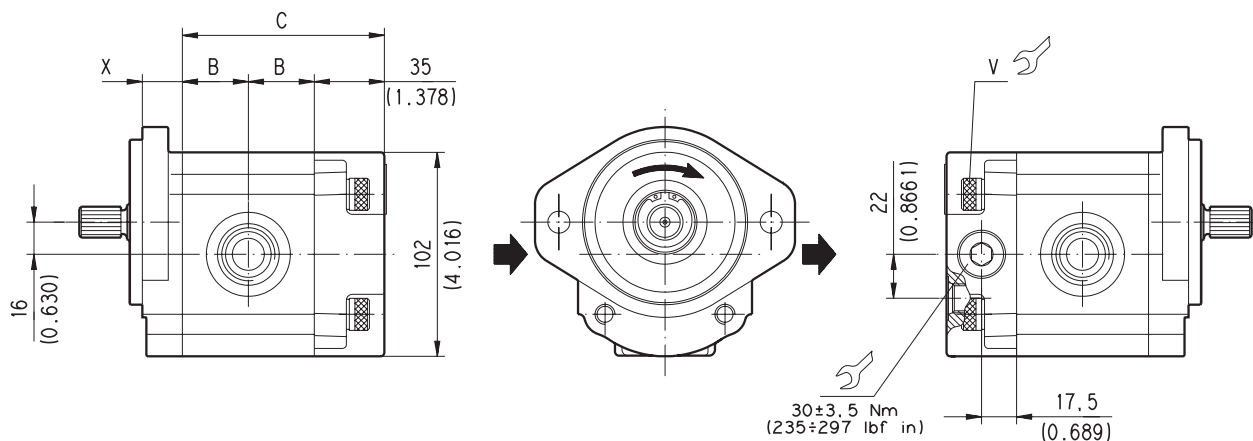
D045-114/1104



FOR RIGHT ROTATION

V8/CRD

D045-115/1104

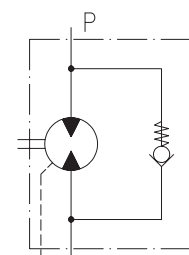


Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ±4,5	358 ÷ 438
Cast iron		

Order example

PLM20•4-R0-03 S1- L OC/OC- N-EL

V8/CRD



01/01.05

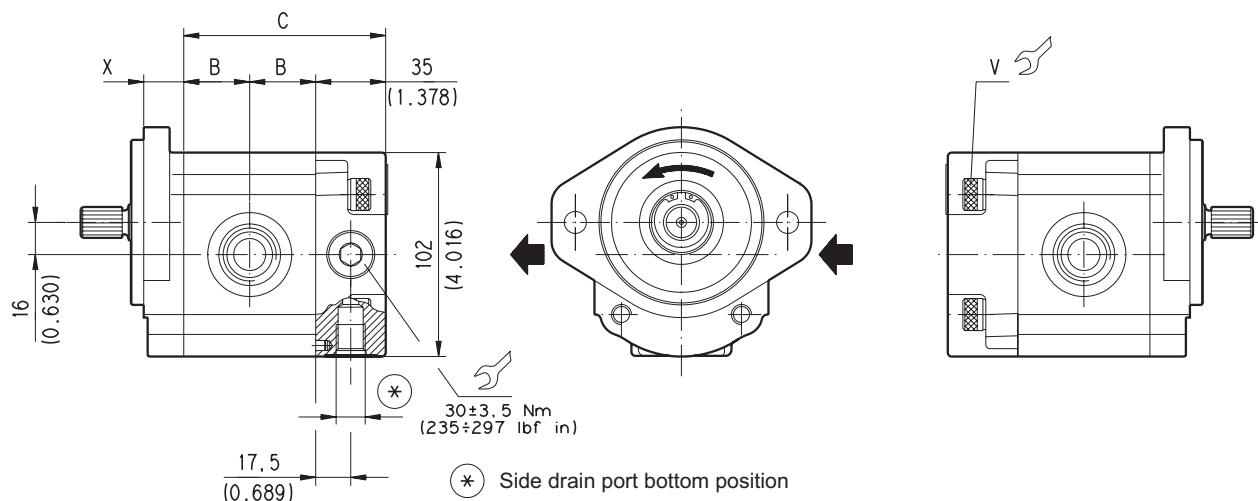
ANTI-CAVITATION VALVES - DIMENSIONS

V8/...

POLARIS 20, WHISPER 20 - Reversible motors with side external drain port (L)

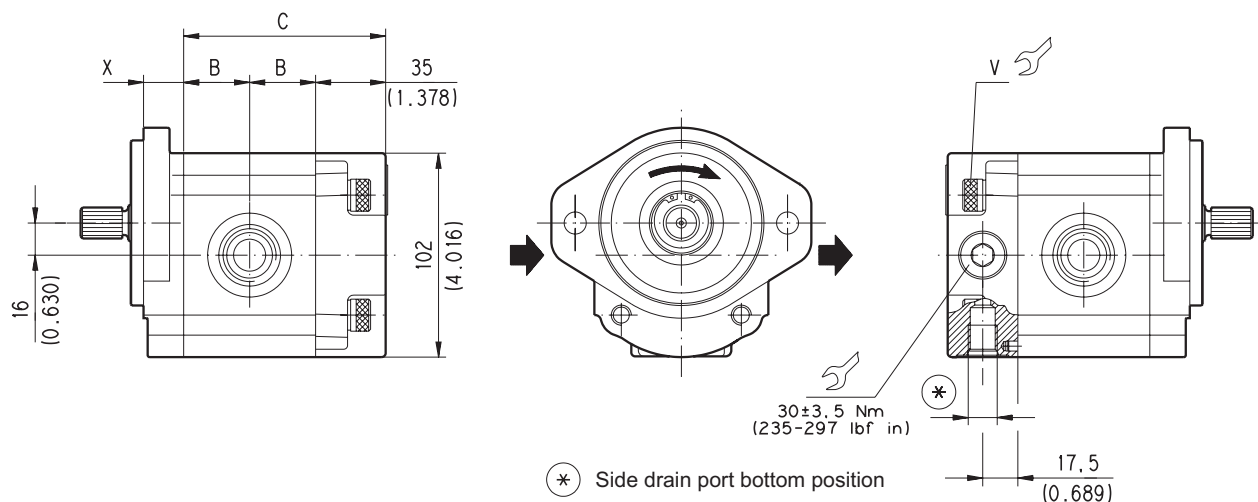
FOR LEFT ROTATION

V8/CRS



FOR RIGHT ROTATION

V8/CRD

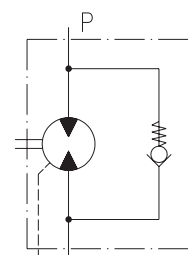


Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ± 4,5	358 ÷ 438
Cast iron		

Order example

PLM20-4-L0-03 S1- L OC/OC- N-EL- * 03

V8/CRD



01/01.05

ANTI-CAVITATION VALVES - DIMENSIONS

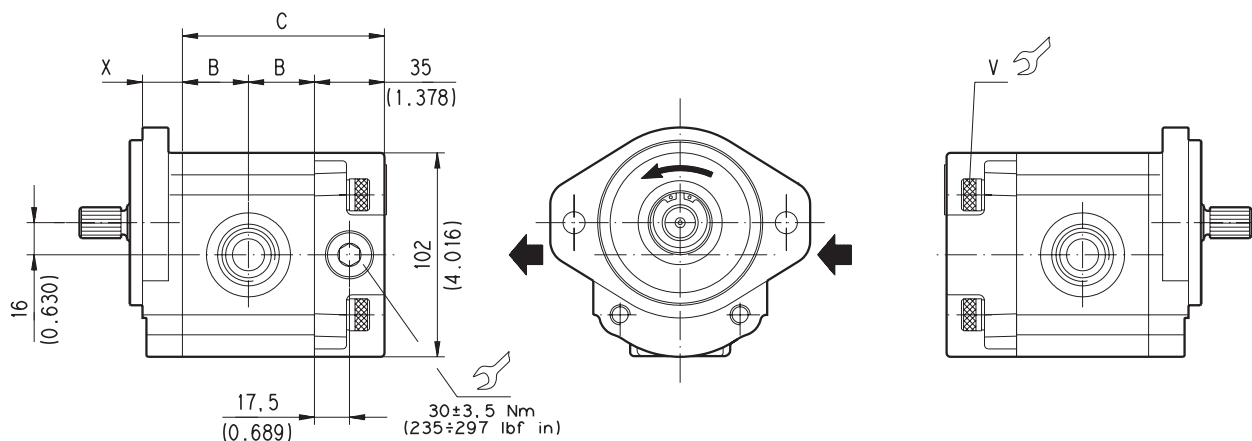
V8/...

POLARIS 20, WHISPER 20 - Reversible motors with internal drain (B)

FOR LEFT ROTATION

V8/CRS

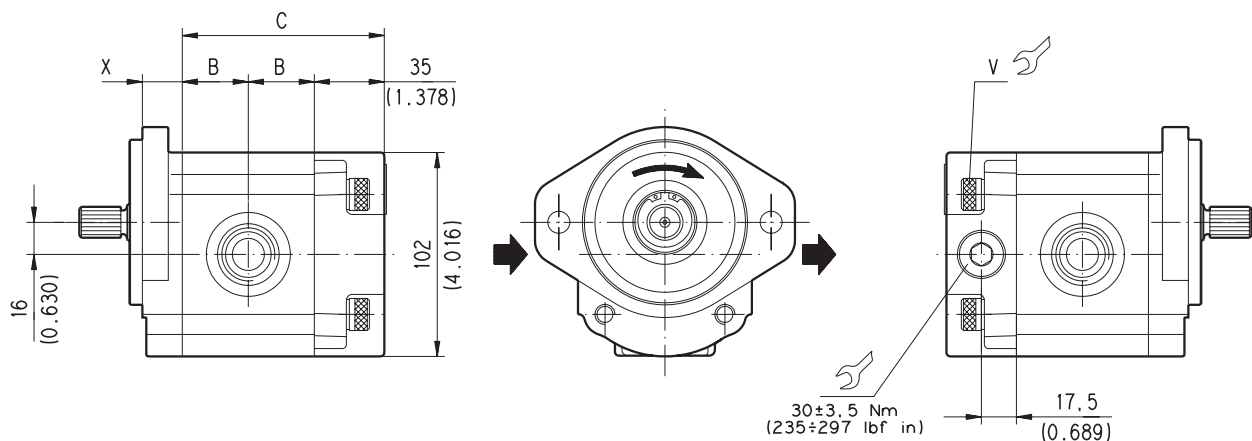
D045-121/1104



FOR RIGHT ROTATION

V8/CRD

D045-122/1104

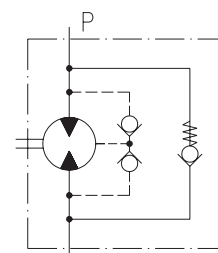


Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ±4,5	358 ÷ 438
Cast iron		

Order example

PLM20•4-B0-03 S1- L OC/OC- N-EL

V8/CRD



01/01.05

NOTES

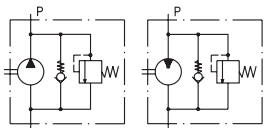
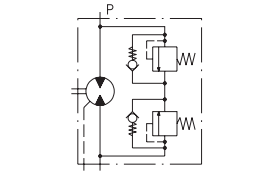
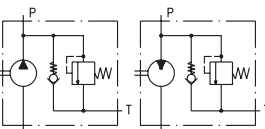
01/01.05

MAXIMUM PRESSURE RELIEF VALVES - GENERAL DATA

The maximum pressure relief valves are housed directly in the rear cover of gear pumps and motors. They are available with fixed or adjustable setting with internal or external drain. These valves are designed to keep the setting pressure constant while protecting the pump or motor against any peaks of pressure.

➤ Max. pressure relief valve fixed setting

Built-in anti-cavitation

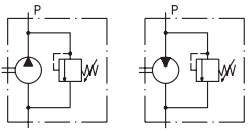
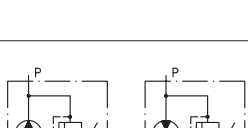
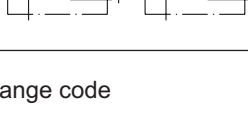
VPIF (●)		
V5 (●)	Internal drain.	
VPEF (●)	External drain to tank.	

(●) = Fixed setting pressure value in bar

Fixed setting pressure value

psi	(●) bar
508	35
580	40
725	50
870	60
1015	70
1160	80
1450	100
1740	120
1813	125
2030	140
2175	150
2320	160
2538	175
2610	180
2755	190
2987	206
3045	210
3335	230
3625	250
3770	260
4060	280
4350	300

➤ Max. pressure relief valve adjustable setting

VPIR / ♦ (1)	Internal drain.	
VMP5 / ♦		
VPER / ♦	External drain to tank.	

♦ = Adjustable setting pressure range code

(1) The seat of the valve is the same as the one for fixed setting valves.

Adjustable setting pressure range

♦ Code	psi	bar
TV	290 ÷ 1088	20 ÷ 75
TS	725 ÷ 3190	50 ÷ 220

Valves are sized to control a Q=10.57 US gpm (40 l/min) maximum flow rate.

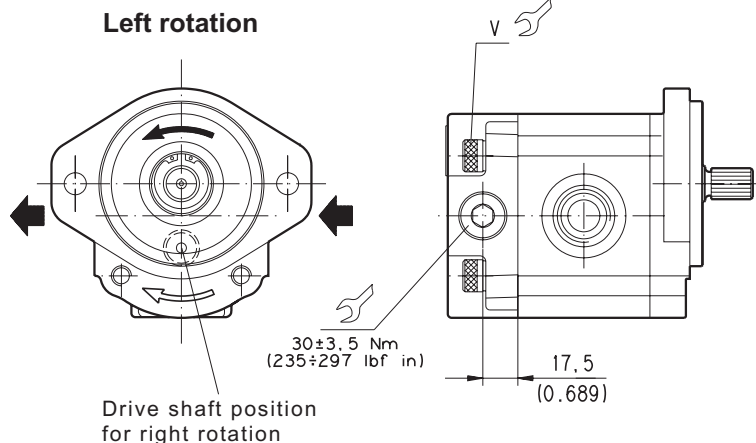
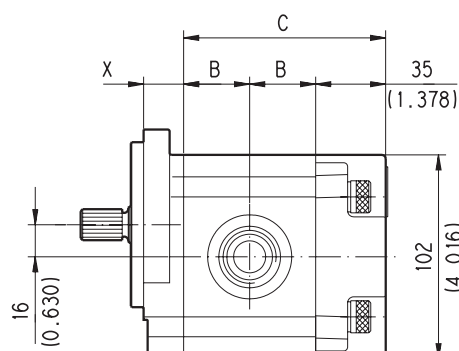
For different setting values, please consult our technical sales department.

INTERNAL DRAIN FIXED SETTING VALVES - DIMENSIONS

VPIF

POLARIS 20, WHISPER 20 - Unidirectional pumps (S-D)

D045-D95/0904

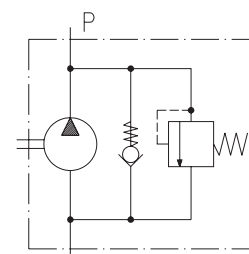


Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ±4,5	358 ÷ 438
Cast iron		

Order example

PLP20•4-S0-03 S1- L OC/OC- N-EL

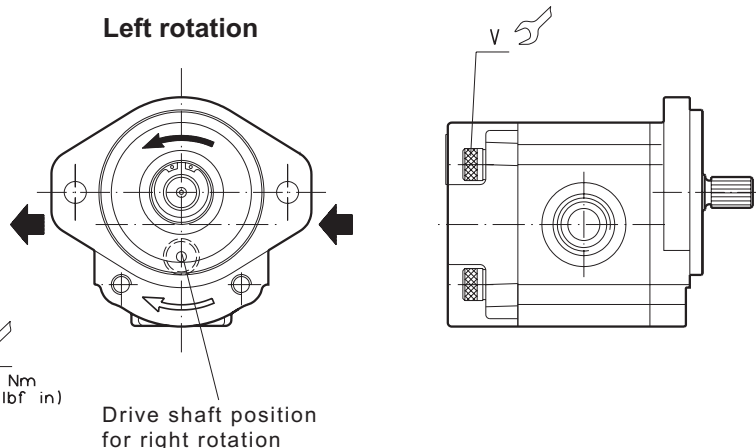
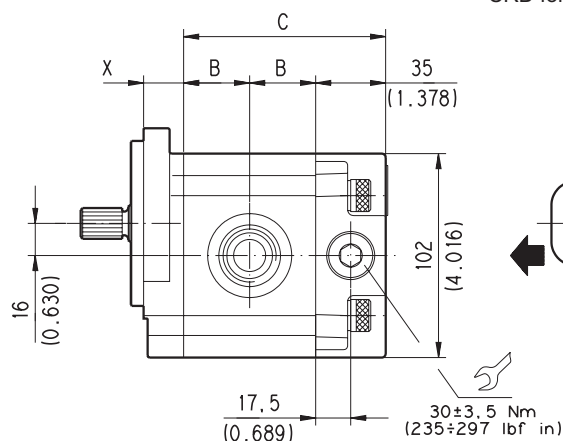
VPIF (180)



POLARIS 20, WHISPER 20 - Unidirectional motors (S-D)

The valve is available for reversible motors with rear (R) and side (L) external drain port to protect the motor in one direction of rotation (CRS for left rotation, CRD for right rotation)

D045-D96/0904

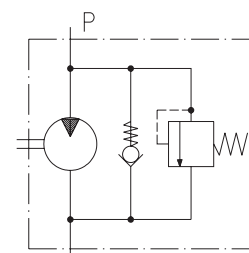


Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ±4,5	358 ÷ 438
Cast iron		

Order example

PLM20•4-S0-03 S1- L OC/OC- N-EL

VPIF (180)

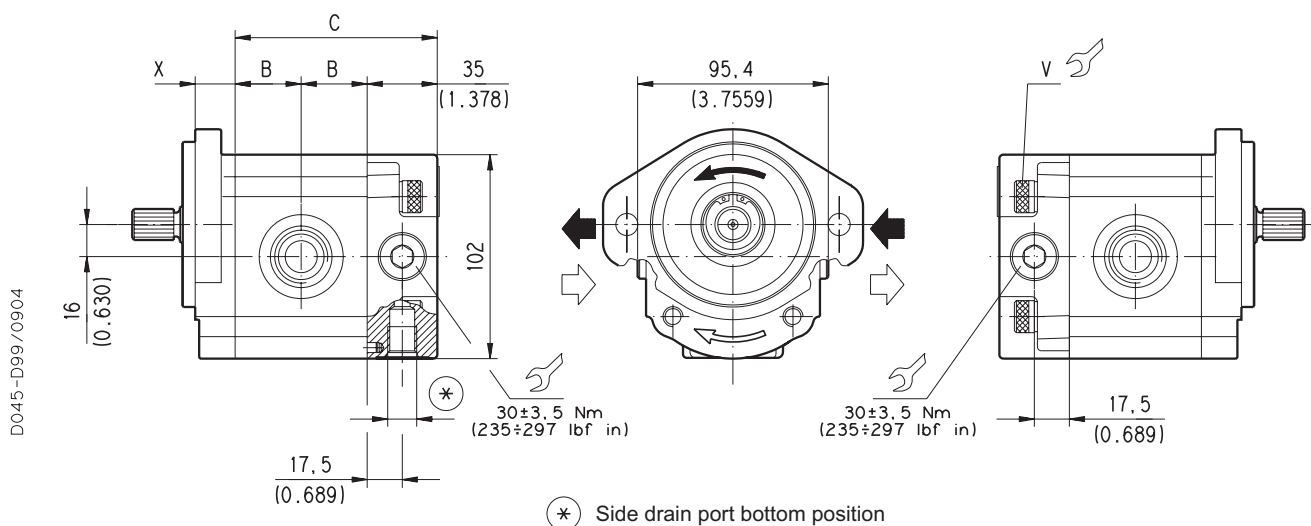


01/01.05

INTERNAL DRAIN FIXED SETTING VALVES - DIMENSIONS

V5

POLARIS 20, WHISPER 20 - Reversible motors with side external drain port (L)

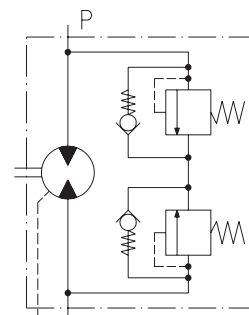


Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ± 4.5	358 ÷ 438
Cast iron		

Order example

PLM20•4-L0-03 S1- L OC/OC- N-EL- * 03

V5 (180-180)



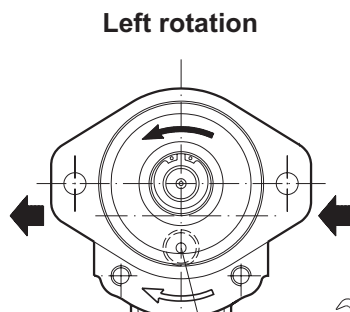
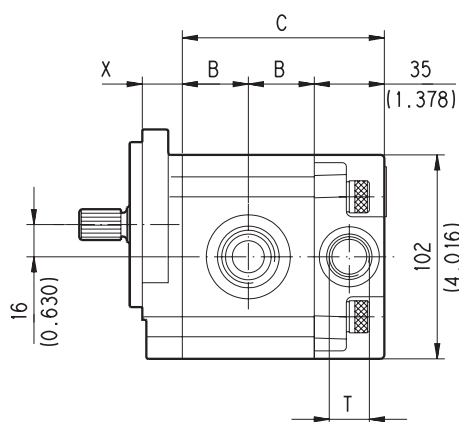
EXTERNAL DRAIN FIXED SETTING VALVES - DIMENSIONS

VPEF

POLARIS 20, WHISPER 20 - Unidirectional pumps (S-D)

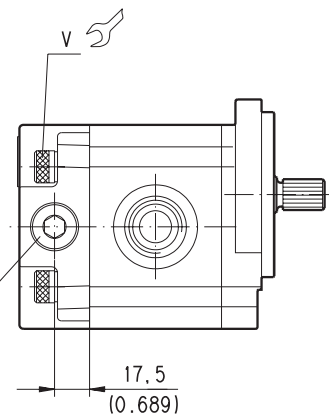
T drain port dimensions on page 16

D045-D97/0904



Drive shaft position
for right rotation

30±3.5 Nm
(235±297 lbf in)

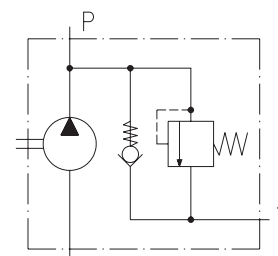


Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ±4,5	358 ÷ 438
Cast iron		

Order example

PLP20•4-S0-03 S1- L OC/OC- N-EL

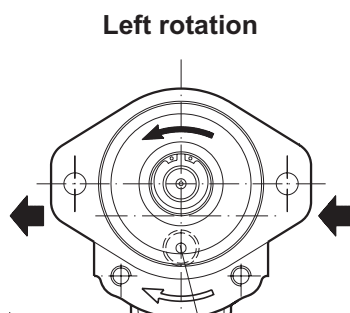
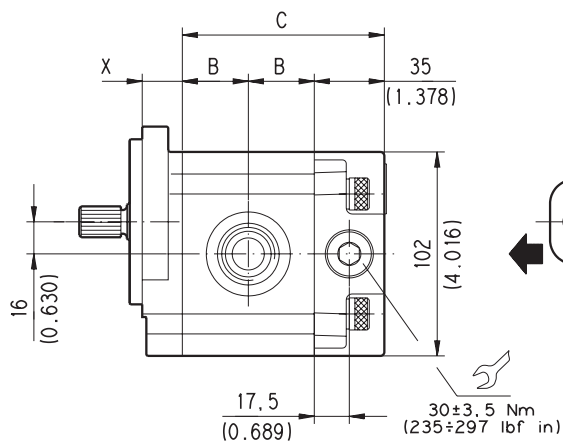
VPEF (180)



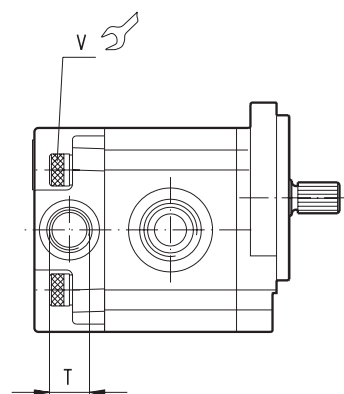
POLARIS 20, WHISPER 20 - Unidirectional motors (S-D)

T drain port dimensions on page 16

D045-D98/0904



Drive shaft position
for right rotation

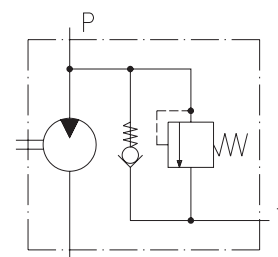


Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ±4,5	358 ÷ 438
Cast iron		

Order example

PLM20•4-S0-03 S1- L OC/OC- N-EL

VPEF (180)



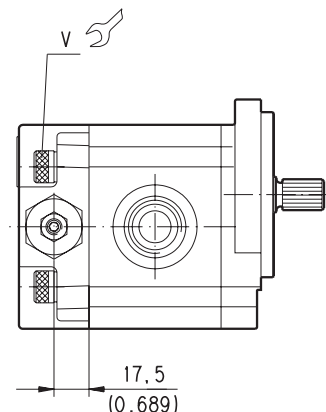
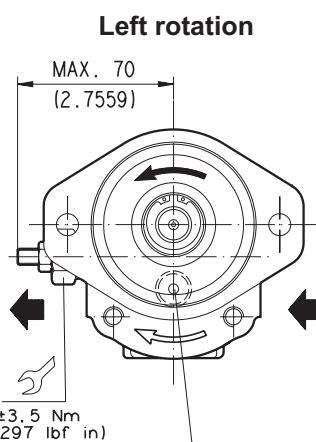
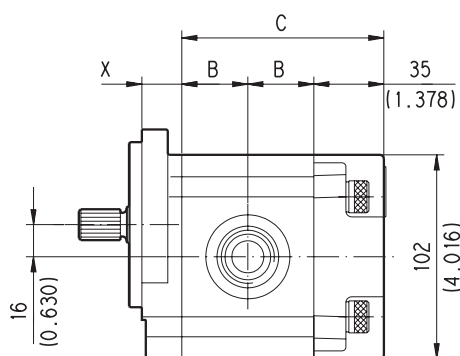
01/01.05

INTERNAL DRAIN ADJUSTABLE SETTING VALVES - DIMENSIONS

VPIR

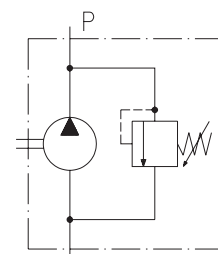
POLARIS 20, WHISPER 20 - Unidirectional pumps (S-D)

D045-109/0904



Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ±4,5	358 ÷ 438
Cast iron		

Drive shaft position for right rotation

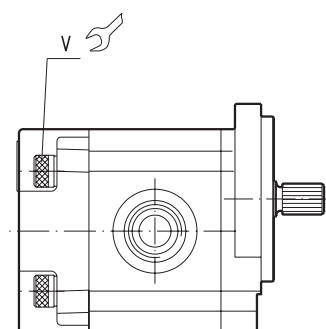
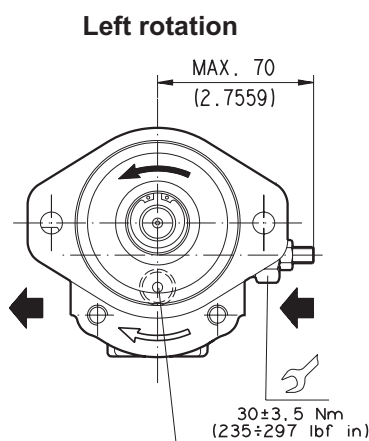
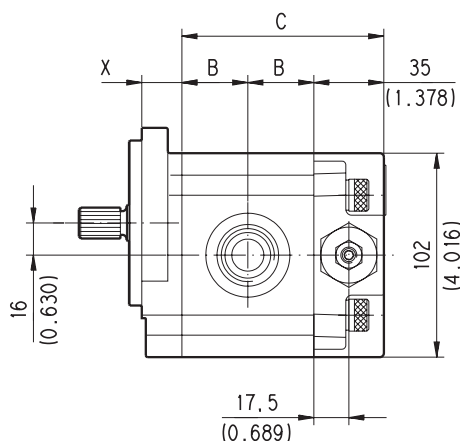


Order example

PLP20•4-S0-03 S1- L OC/OC- N-EL
VPIR / TS

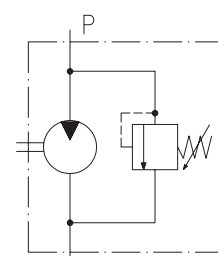
POLARIS 20, WHISPER 20 - Unidirectional motors (S-D)

D045-110/0904



Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ±4,5	358 ÷ 438
Cast iron		

Drive shaft position for right rotation



Order example

PLM20•4-S0-03 S1- L OC/OC- N-EL
VPIR / TS

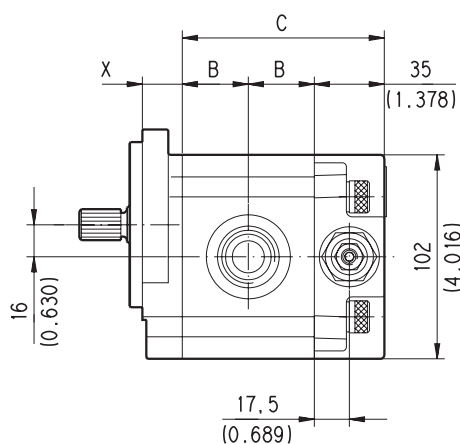
01/01.05

INTERNAL DRAIN ADJUSTABLE SETTING VALVES - DIMENSIONS

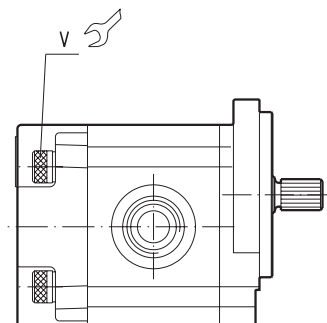
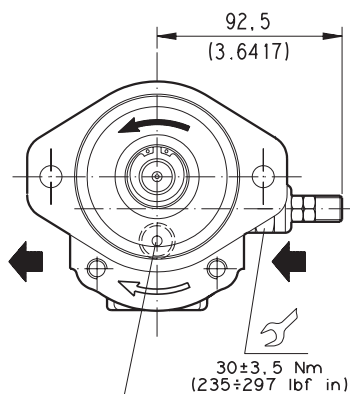
VMP5

POLARIS 20, WHISPER 20 - Unidirectional pumps (S-D)

D045-126/1104

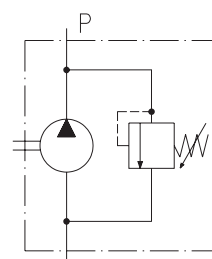


Left rotation



Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ±4,5	358 ÷ 438
Cast iron		

Drive shaft position for right rotation



Order example

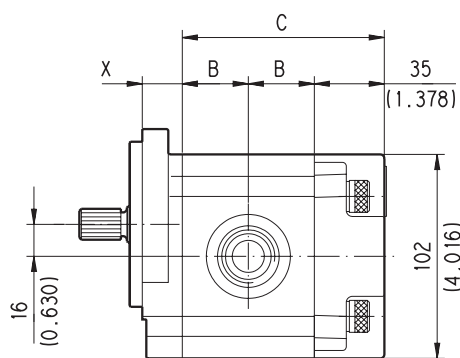
PLP20•4-S0-03 S1- L OC/OC- N-EL

VMP5 / TS

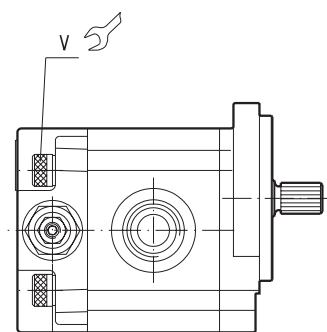
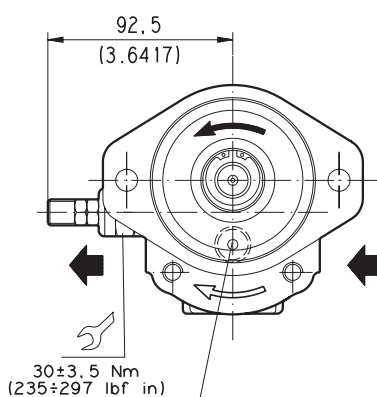
POLARIS 20, WHISPER 20 - Unidirectional motors (S-D)

The valve is available for reversible motors with rear (R) and side (L) external drain port to protect the motor in one direction of rotation (CRS for left rotation, CRD for right rotation)

D045-127/1104

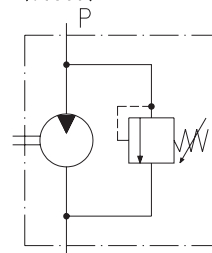


Left rotation



Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ±4,5	358 ÷ 438
Cast iron		

Drive shaft position for right rotation



Order example

PLM20•4-S0-03 S1- L OC/OC- N-EL

VMP5 / TS

01/01.05

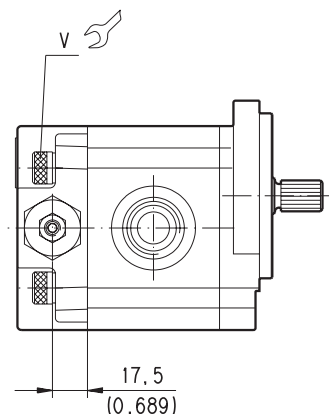
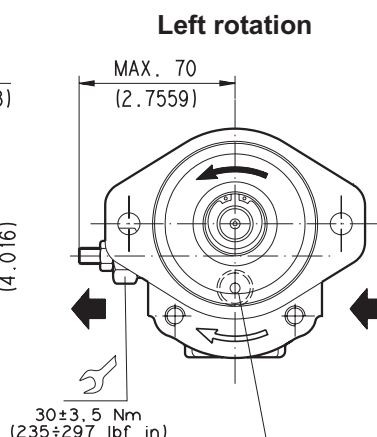
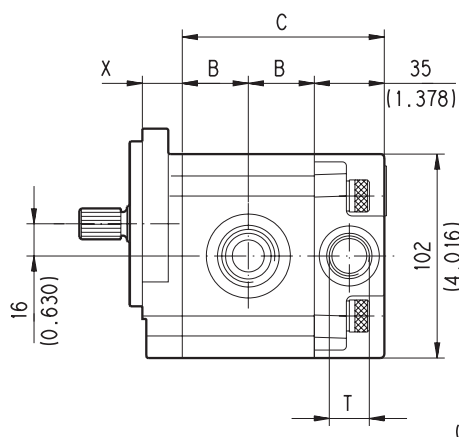
EXTERNAL DRAIN ADJUSTABLE SETTING VALVES - DIMENSIONS

VPER

POLARIS 20, WHISPER 20 - Unidirectional pumps (S-D)

T drain port dimensions on page 16

D045-111/0904

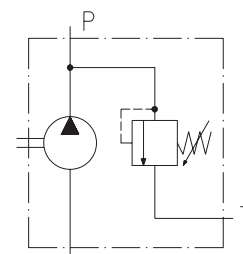


Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ±4,5	358 ÷ 438
Cast iron		

Order example

PLP20•4-S0-03 S1- L OC/OC- N-EL

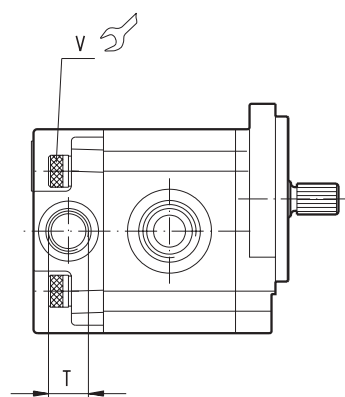
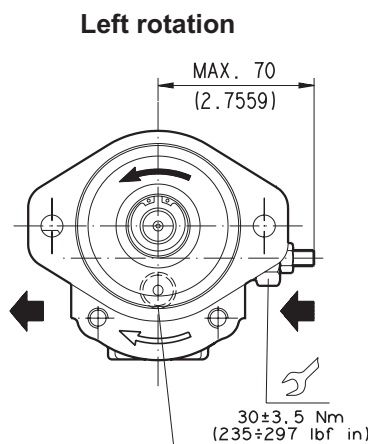
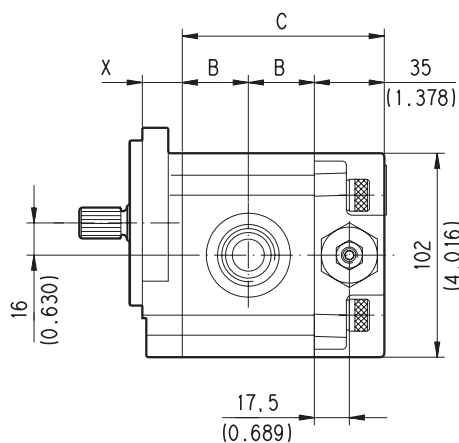
VPER / TS



POLARIS 20, WHISPER 20 - Unidirectional motors (S-D)

T drain port dimensions on page 16

D045-112/0904

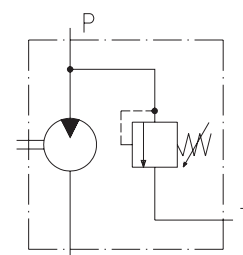


Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ±4,5	358 ÷ 438
Cast iron		

Order example

PLM20•4-S0-03 S1- L OC/OC- N-EL

VPER / TS



01/01.05

PORTS DIMENSIONS

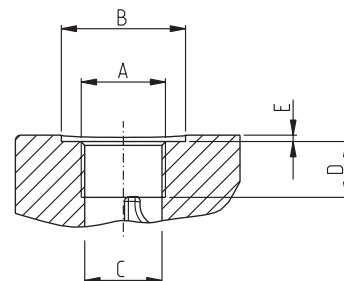
VALVE TYPE	T DRAIN PORT	
	Gas BSPP	SAE ODT
	GC	OC
VPEF ...		
VPER ...		

GAS STRAIGHT THREAD PORTS

BSPP

British standard pipe parallel (55°) conforms to UNI - ISO 228

DCAT_006_026_21064779



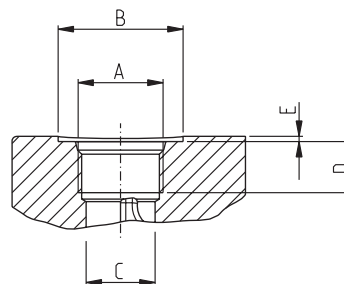
CODE	Nominal size	A	Ø B	Ø C	D	E	
			mm (in)	mm (in)	mm (in)	mm (in)	
GC	3/8"	G 3/8	30 (1.1811)	16 (0.6299)	17 (0.6693)	1 (0.0394)	15 ⁺¹ (133 ÷ 142)

SAE STRAIGHT THREAD PORTS SAE J514

ODT

American straight thread UNC-UNF 60° conforms to ANSI B 1.1

DCAT_006_027_21060524

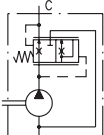
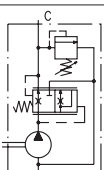
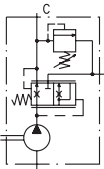
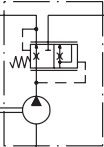
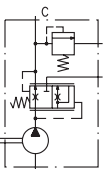
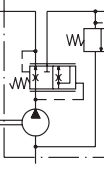
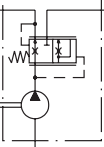
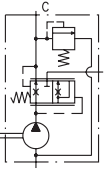


CODE	Nominal size	A	Ø B	Ø C	D	E	
			mm (in)	mm (in)	mm (in)	mm (in)	
OC	5/8"	7/8" - 14 UNF - 2B	35 (1.3780)	16 (0.6299)	17 (0.6693)	1,5 (0.0197)	30 ^{+2,5} (266 ÷ 288)

01/01.05

PRIORITY VALVES - GENERAL DATA

Casappa offers a wide range of priority valves. They are integrated in the rear cover of pumps to limit overall dimensions and to simplify the hydraulic system. The priority valves control the flow rate and guarantee constant flow (C) to the main circuit regardless of the pressure and pump operating speed. The constant flow rate value is regulated by an internal metering device while the exceeded flow, depending on the type of valve, can be recirculated to the inlet of the pump, to feed other circuits (R) or be sent to the tank (T). Other versions of the priority valves are available with pressure control at fixed or adjustable setting values.

P1	Constant flow rate and internal recirculation of excess flow.	
P2	Constant flow rate at controlled pressure. Internal recirculation of excess flow and drain valve.	
P3	Constant flow rate at controlled pressure. Excess flow and drain valve must be connected to tank.	
P4	Constant flow rate and excess flow can both be used under load.	
P5T	Constant flow rate at controlled pressure with drain valve connected to tank. Excess flow can be used under load.	
P7	Constant flow rate. Excess flow at controlled pressure can be used under load. Internal recirculation of drain valve. Rear ports.	
P8	Constant flow rate and excess flow can both be used under load. Rear ports.	
P9	Constant flow rate at controlled pressure. Internal recirculation of drain valve. Excess flow can be used under load.	

Constant flow rate (C)	
US gpm	l/min
0.3	1,2
0.5	2
1.2	4,5
1.6	6
2.1	8
2.9	11
3.7	14
4.2	16
5.3	20
6.3	24
8.1	30,5

P5T P7 P9

Controlled pressure at fixed setting [2.6 US gpm (10 l/min)]		Δp min. begin opening valve	
psi	bar	psi	bar
508	35	464	32
580	40	537	37
725	50	667	46
870	60	783	54
1015	70	957	66
1160	80	1102	76
1450	100	1392	96
1740	120	1682	116
1813	125	1740	120
2030	140	1958	135
2175	150	2103	145
2320	160	2248	155
2538	175	2465	170
2610	180	2523	174
2755	190	2668	184
2987	206	2886	199
3045	210	2944	203
3335	230	3219	222
3625	250	3509	242
3770	260	3654	252
4060	280	3930	271
4350	300	4220	291

P2 P3

Controlled pressure at adjustable setting	
psi	bar
290 ÷ 1160	20 ÷ 80
725 ÷ 3190	50 ÷ 220
2610 ÷ 4350	180 ÷ 300

Valves are sized to control a Q=10.57 US gpm (40 l/min) maximum flow rate.

PERFORMANCE CURVES

Controlled flow vs. inlet flow

Each curve has been obtained at:

Controlled flow $Q_c = 2.6$ US gpm (20 l/min)

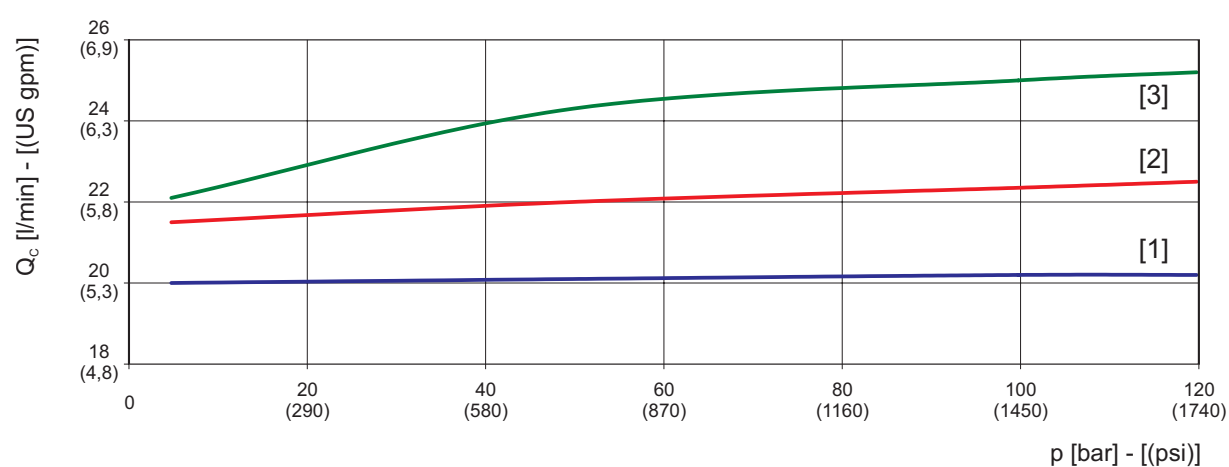
Hydraulic oil ISO VG 46

Temperature 122 °F (50 °C)

[1] Inlet flow = 6.6 US gpm (25 l/min)

[2] Inlet flow = 13.2 US gpm (50 l/min)

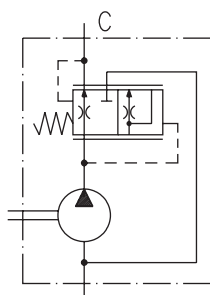
[3] Inlet flow = 19.8 US gpm (75 l/min)



01/01.05

PRIORITY VALVES

P1



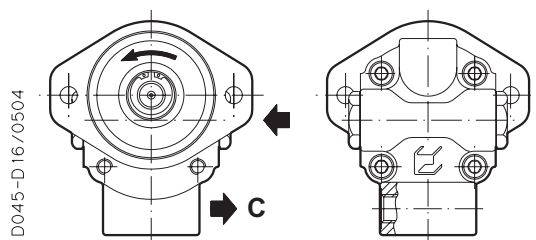
➤ **Constant flow (C)**

➤ **Excess flow**
Internally recirculated.

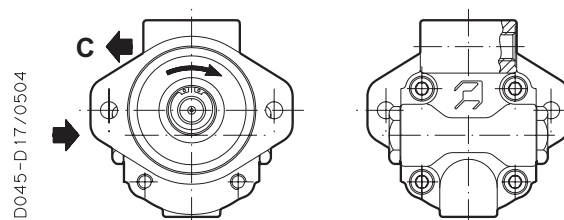
PORTS POSITIONS

VALVE WITH SIDE PORT

Left rotation

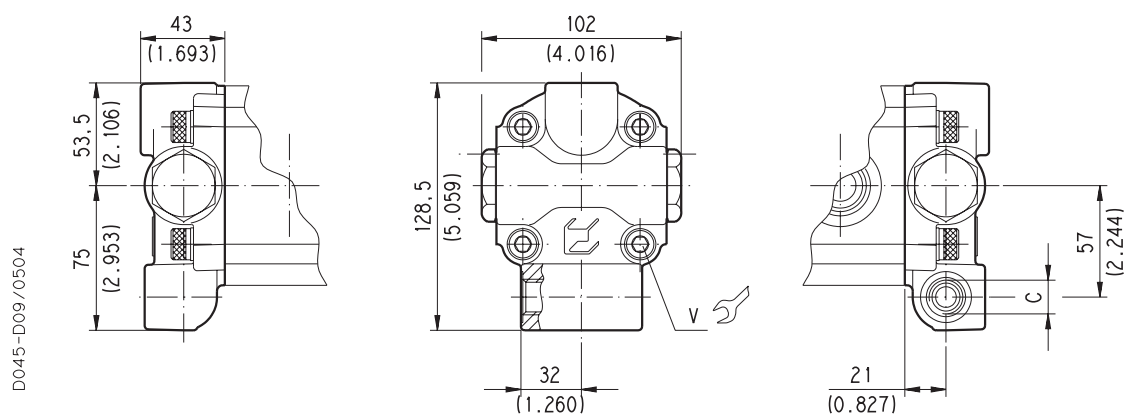


Right rotation



DIMENSIONS

Ports dimensions on page 28

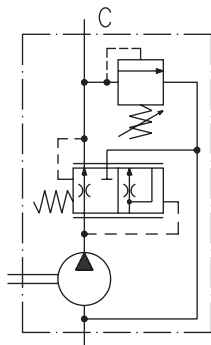


Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 $\pm 4,5$	358 ÷ 438
Cast iron	70 ± 7	558 ÷ 682

01/01.05

PRIORITY VALVES

P2



➤ **Constant flow (C) at controlled pressure**
Max. pressure relief valve adjustable setting with internal recirculation of the drain.

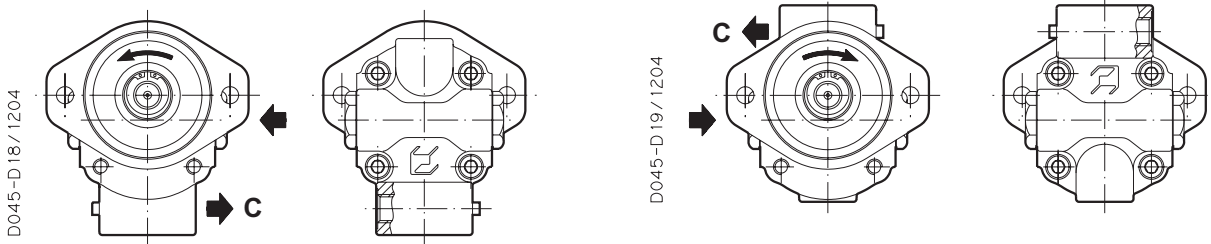
➤ **Excess flow**
Internally recirculated.

PORTS POSITIONS

VALVE WITH SIDE PORT

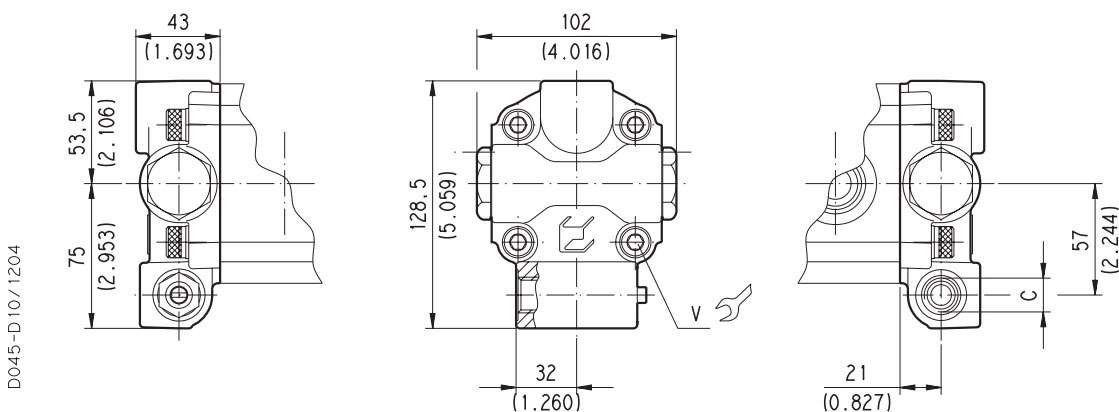
Left rotation

Right rotation



DIMENSIONS

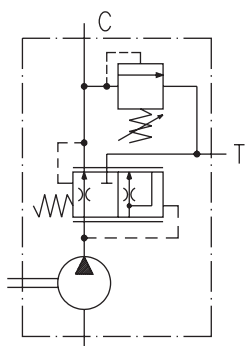
Ports dimensions on page 28



Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ±4,5	358 ÷ 438
Cast iron	70 ±7	558 ÷ 682

PRIORITY VALVES

P3



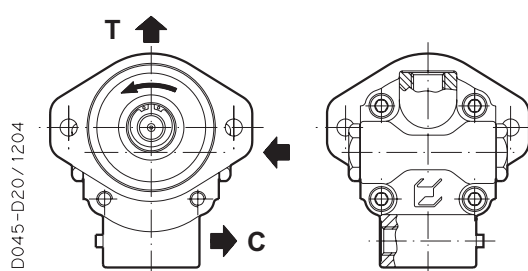
- **Constant flow (C) at controlled pressure**
Max. pressure relief valve adjustable setting with drain connected to tank (T).

- **Excess flow**
To tank (T).

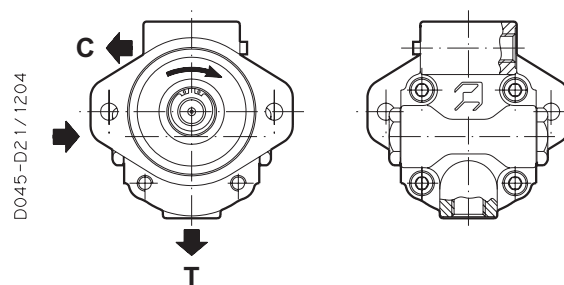
PORTS POSITIONS

VALVE WITH SIDE PORTS

Left rotation

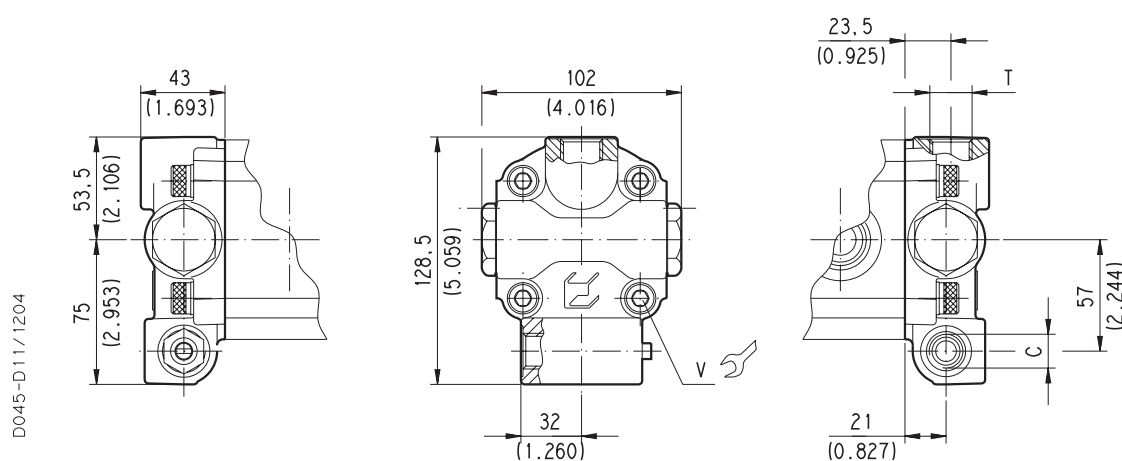


Right rotation



DIMENSIONS

Ports dimensions on page 28

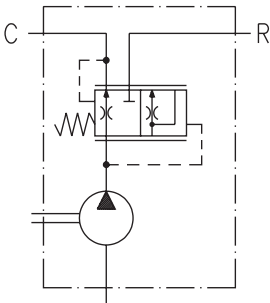


Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 $\pm 4,5$	358 ÷ 438
Cast iron	70 ± 7	558 ÷ 682

01/01.05

PRIORITY VALVES

P4



➤ **Constant flow (C)**

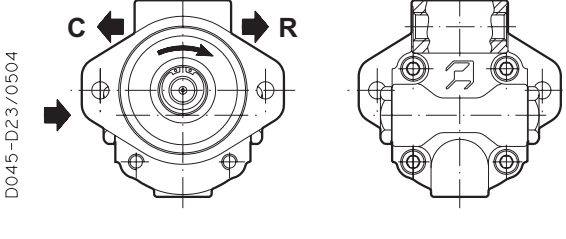
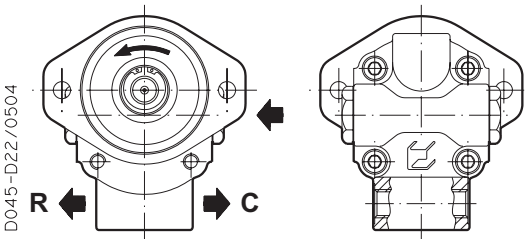
➤ **Excess flow**
To be used under load (R).

PORTS POSITIONS

VALVE WITH SIDE PORTS

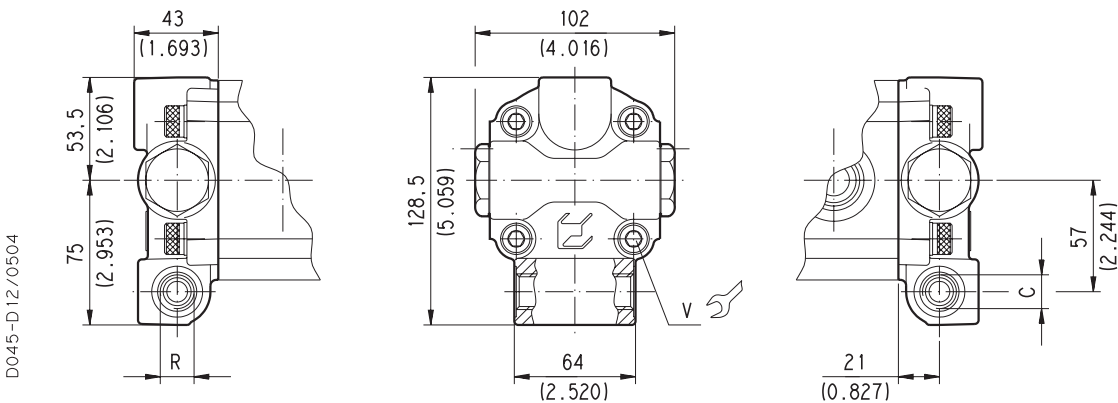
Left rotation

Right rotation



DIMENSIONS

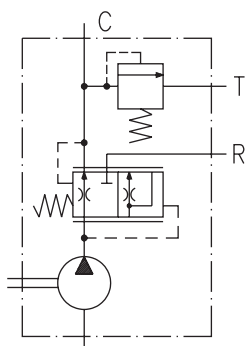
Ports dimensions on page 28



Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 ±4,5	358 ÷ 438
Cast iron	70 ±7	558 ÷ 682

PRIORITY VALVES

P5T



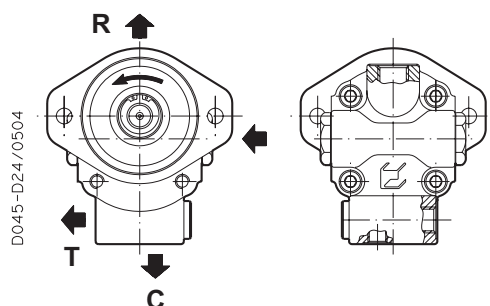
- **Constant flow (C) at controlled pressure**
Max. pressure relief valve fixed setting with drain connected to tank (T).

- **Excess flow**
To be used under load (R).

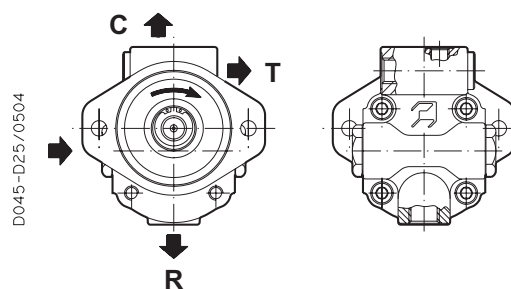
PORTS POSITIONS

VALVE WITH SIDE PORTS

Left rotation

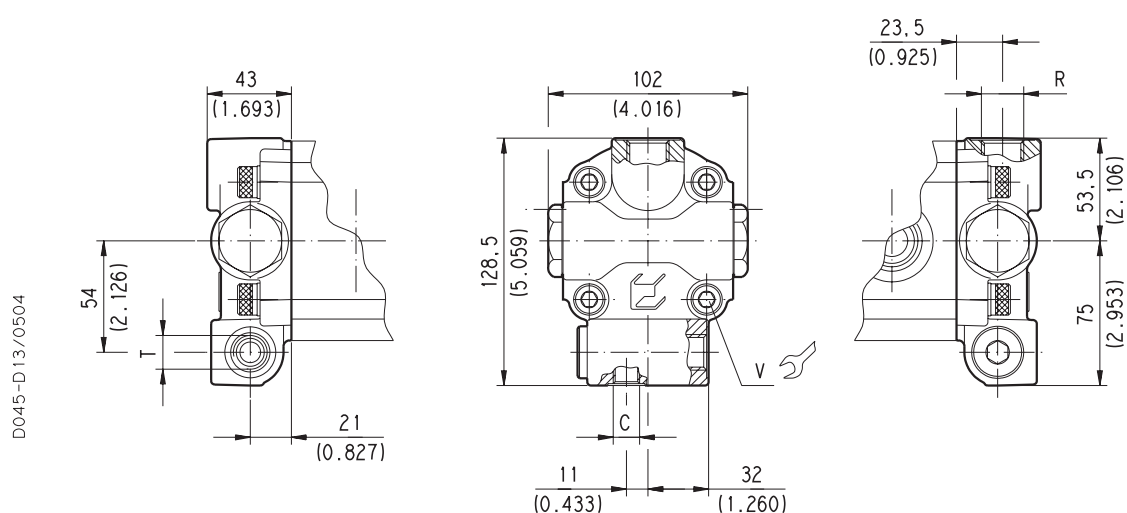


Right rotation



DIMENSIONS

Ports dimensions on page 28

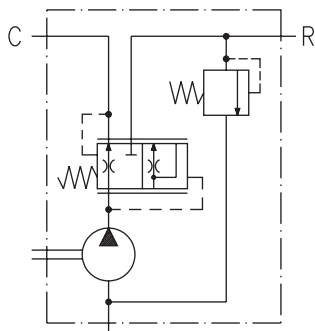


Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 $\pm 4,5$	358 ÷ 438
Cast iron	70 ± 7	558 ÷ 682

01/01.05

PRIORITY VALVES

P7



➤ **Constant flow (C)**

➤ **Excess flow at controlled pressure**

To be used under load (R).

Max. pressure relief valve fixed setting with internal recirculation of the drain.

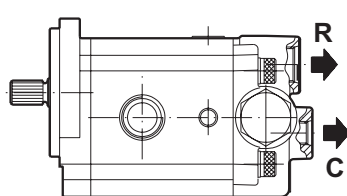
PORTS POSITIONS

VALVE WITH REAR PORTS

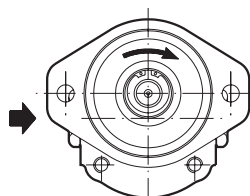
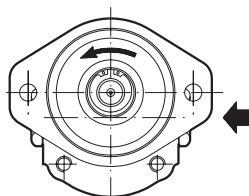
For side ports, please consult our technical sales department.

Left rotation

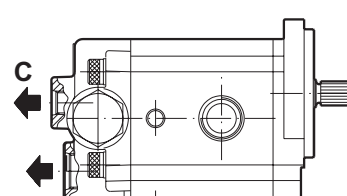
Right rotation



D045-D26/0504

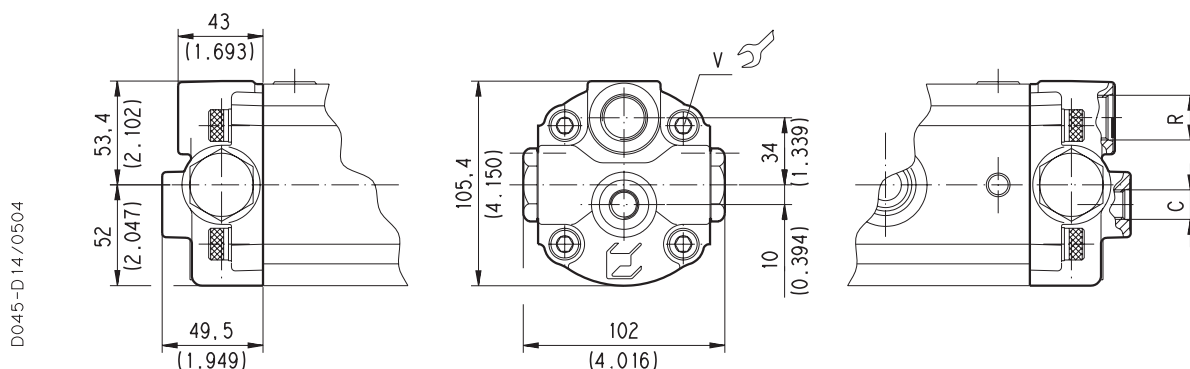


D045-D27/0504



DIMENSIONS (PUMP TYPE 2P)

Ports dimensions on page 28



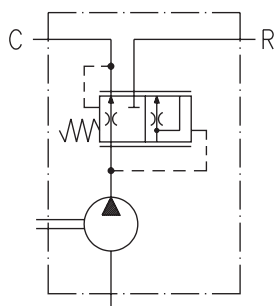
D045-D14/0504

Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 $\pm 4,5$	358 ÷ 438
Cast iron	70 ± 7	558 ÷ 682

01/01.05

PRIORITY VALVES

P8



➤ **Constant flow (C)**

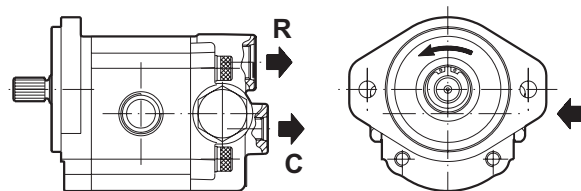
➤ **Excess flow**

To be used under load (R).

PORTS POSITIONS

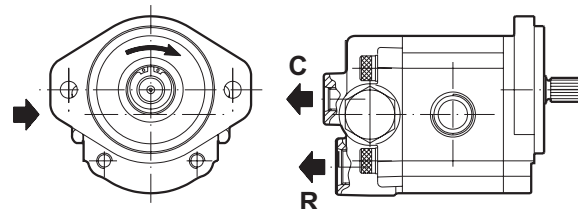
VALVE WITH REAR PORTS

Left rotation



D045-D28/0504

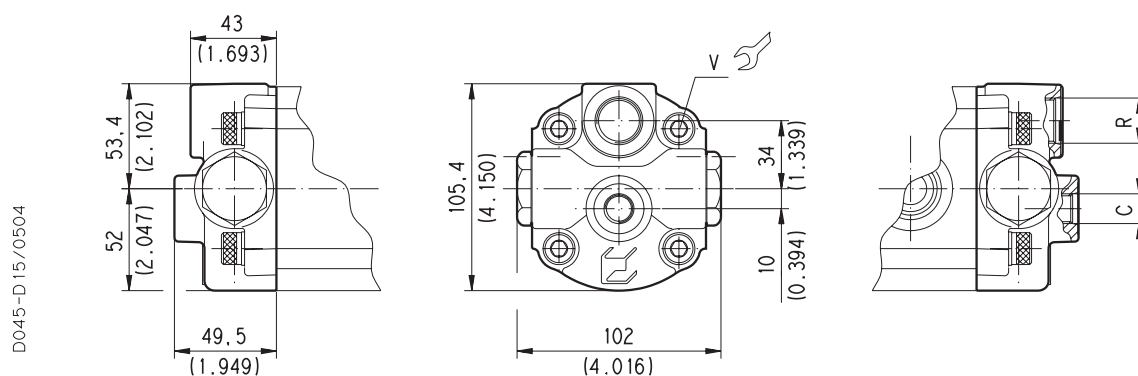
Right rotation



D045-D29/0504

DIMENSIONS

Ports dimensions on page 28

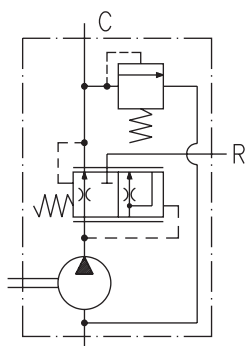


Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 $\pm 4,5$	358 ÷ 438
Cast iron	70 ± 7	558 ÷ 682

01/01.05

PRIORITY VALVES

P9



- **Constant flow (C) at controlled pressure**
Max. pressure relief valve fixed setting with internal recirculation of the drain.

- **Excess flow**
To be used under load (R).

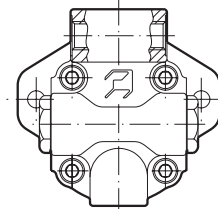
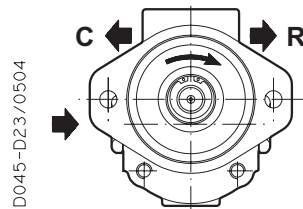
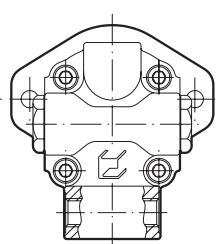
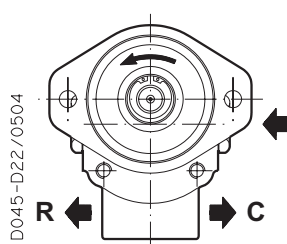
PORTS POSITIONS

VALVE WITH SIDE PORTS

For rear ports, please consult our technical sales department.

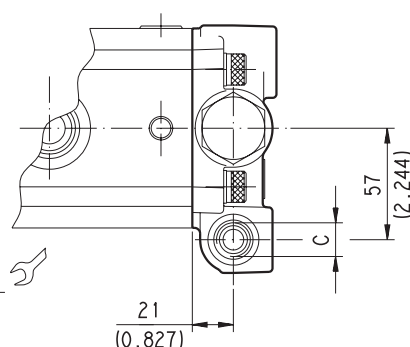
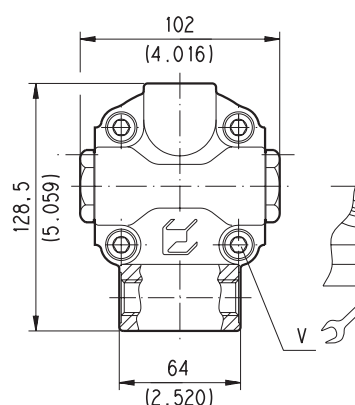
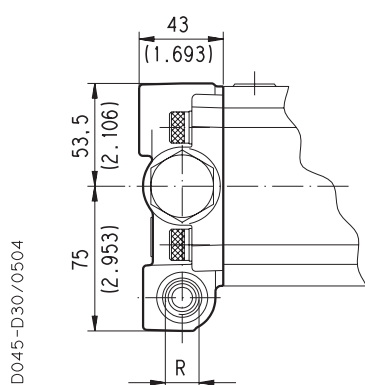
Left rotation

Right rotation



DIMENSIONS (PUMP TYPE 2P)

Ports dimensions on page 28



Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 $\pm 4,5$	358 ÷ 438
Cast iron	70 ± 7	558 ÷ 682

VALVES MOUNTING POSSIBILITY

➤ Valve

P1

P2

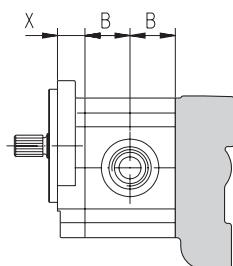
P3

P4

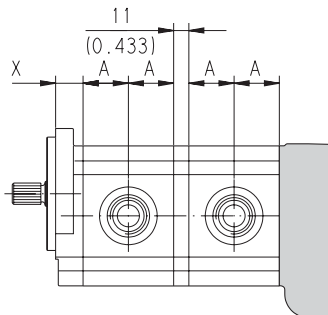
P5T

POLARIS 20 WHISPER 20

D045-D01/0504

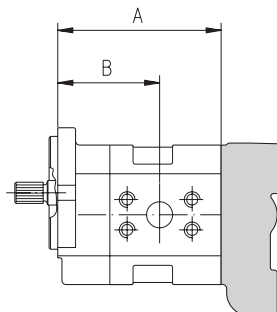


D045-D02/0504

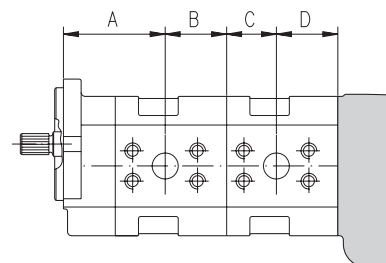


KAPPA 20

D045-D03/0504



D045-D04/0504



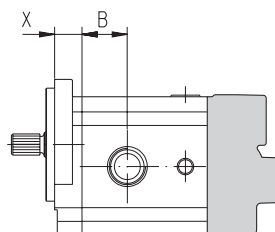
➤ Valve

P7

POLARIS 20 Version 2P

For dimensions
please consult our
technical sales
department

D045-D38/0504



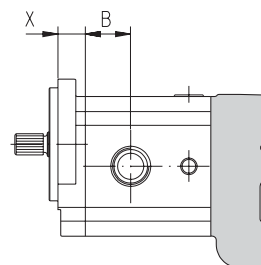
➤ Valve

P9

POLARIS 20 Version 2P

For dimensions
please consult our
technical sales
department

D045-D41/0504

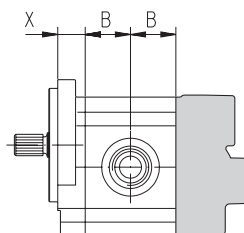


➤ Valve

P8

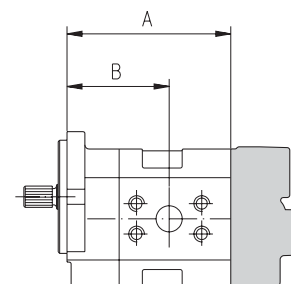
POLARIS 20 WHISPER 20

D045-D39/0504



KAPPA 20

D045-D40/0504



PORTS DIMENSIONS

VALVE TYPE	PORT TYPE	SIDE PORTS						REAR PORTS					
		Gas BSPP			SAE ODT			Gas BSPP			SAE ODT		
		C	R	T	C	R	T	C	R	T	C	R	T
	P1	GC	–	–	OA	–	–	GB	–	–			
	P2	GC	–	–	OA	–	–	GD	–	–			
	P3	GC	–	GD	OA	–	OB	GC	–	GD			
	P4	GC	GC	–	OA	OA	–	GC	GC	–			
	P5T	GB	GD	GB									
	P7										OA	OC	–
	P8							GC	GD	–	OA	OC	–
	P9	GC	GD	–				GC	GD	–			

GAS STRAIGHT THREAD PORTS

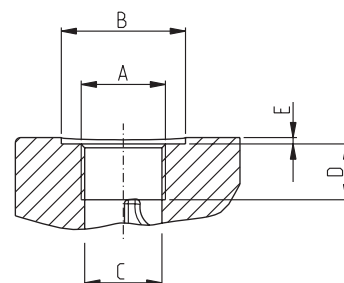
BSPP

British standard pipe parallel (55°) conforms to UNI - ISO 228

Tightening torque for low pressure side port

Tightening torque for high pressure side port
[(values obtained at 5075 psi (350 bar))]

DCAT_006_026_21064779



CODE	Nominal size	A	Ø B	Ø C	D	E		
			mm (in)	mm (in)	mm (in)	mm (in)	Nm (lbf in)	Nm (lbf in)
GB	1/4"	G 1/4	21,5 (0.8465)	8,75 (0.3444)	12 (0.4724)	1 (0.0394)	15 ⁺¹ (133 ÷ 142)	15 ⁺¹ (133 ÷ 142)
GC	1/2"	G 1/2	30 (1.1811)	19 (0.7480)	17 (0.6693)	1 (0.0394)	20 ⁺¹ (177 ÷ 186)	50 ^{+2,5} (443 ÷ 465)
GD	3/8"	G 3/8	25 (0.9843)	15 (0.5906)	14 (0.5512)	1 (0.0394)	15 ⁺¹ (133 ÷ 142)	25 ⁺¹ (221 ÷ 230)

SAE STRAIGHT THREAD PORTS SAE J514

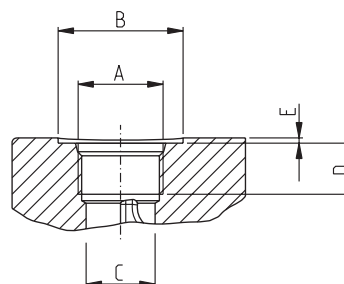
ODT

American straight thread UNC-UNF 60° conforms to ANSI B 1.1

Tightening torque for low pressure side port

Tightening torque for high pressure side port
[(values obtained at 5075 psi (350 bar))]

DCAT_006_027_21060524



CODE	Nominal size	A	Ø B	Ø C	D	E		
			mm (in)	mm (in)	mm (in)	mm (in)	Nm (lbf in)	Nm (lbf in)
OA	3/8"	9/16" - 12 UNF - 2B	26 (1.0236)	13 (0.5118)	15 (0.5906)	1 (0.03934)	15 ⁺¹ (133 ÷ 142)	25 ⁺¹ (221 ÷ 230)
OB	1/2"	3/4" - 16 UNF - 2B	32 (1.2598)	17,5 (0.690)	15 (0.5906)	1,5 (0.0591)	20 ⁺¹ (177 ÷ 186)	45 ^{+2,5} (398 ÷ 420)
OC	5/8"	7/8" - 14 UNF - 2B	35 (1.3780)	20,5 (0.8071)	17 (0.6693)	1,5 (0.0197)	30 ^{+2,5} (266 ÷ 288)	70 ⁺⁵ (620 ÷ 664)

01/01.05

HOW TO ORDER

									Valve type									
	1		2	3		2	4		2	5		6		7		8		9
...	- LEA	/	*	GC							-	P1	-	8			-	N
...	- LEA	/	*	GC							-	P2	-	8	-	150	-	N
...	- LEA	/	*	GC	/	*	GD				-	P3	-	8	-	150	-	N
...	- LEA	/	*	GC	/	*	GC				-	P4	-	8			-	N
...	- LEA	/	*	GB	/	*	GD	/	*	GB	-	P5T	-	8	-	150	-	N
...	- LEA	/	P	OA	/	P	OC	/			-	P7	-	11	-	150	-	N
...	- LEA	/	P	GC	/	P	GD	/			-	P8	-	11			-	N
...	- LEA	/	*	GC	/	*	GD	/			-	P9	-	11	-	150	-	N

1	Type	PUMP TYPE
	in ³ /rev (cm ³ /rev)	
Polaris 20 (a)		PLP20*...
Whisper 20 (a)		WSP20*...
Kappa 20 (a)		KP20*...

2	Ports position	CODE
Side		*
Rear		P

3	Port C	CODE
GAS STRAIGHT THREAD PORTS (BSPP)		
G 1/4		GB
G 1/2		GC
G 3/8		GD
SAE STRAIGHT THREAD PORTS (ODT)		
9/16" - 12 UNF - 2B		OA
3/4" - 16 UNF - 2B		OB
7/8" - 14 UNF - 2B		OC

4	Port R	CODE
GAS STRAIGHT THREAD PORTS (BSPP)		
G 1/2		GC
G 3/8		GD
SAE STRAIGHT THREAD PORTS (ODT)		
9/16" - 12 UNF - 2B		OA
3/4" - 16 UNF - 2B		OB
7/8" - 14 UNF - 2B		OC

CODE	Port T	5
GAS STRAIGHT THREAD PORTS (BSPP)		
GB	G 1/4	
GD	G 3/8	
SAE STRAIGHT THREAD PORTS (ODT)		
OB	3/4" - 16 UNF - 2B	

CODE	Priority valve type	6
P1	See page 19	
P2	See page 20	
P3	See page 21	
P4	See page 22	
P5T	See page 23	
P7	See page 24 - Only for Polaris 20 (2P)	
P8	See page 25	
P9	See page 26 - Only for Polaris 20 (2P)	

CODE	Controlled constant flow	7
...	Value in l/min - See page 17	

CODE	Controlled pressure setting	8
...	Value in bar - See page 17	

CODE	Seals	9
N	Buna (standard)	

(a) See the technical catalogues of each specific series.
How to order: until inlet port IN.

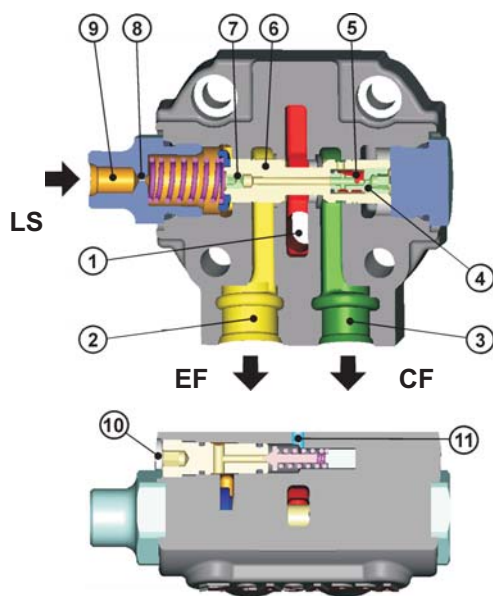
For multiple pumps ordering, please consult our technical sales department.

NOTES

01/01.05

LOAD SENSING PRIORITY VALVES - GENERAL DATA

- Energy savings – the valve delivers to the priority controlled circuit (Q_{CF}) the flow at the pressure required from the application, while the secondary circuit (Q_{EF}) receives the excess flow.
- Independent pressure on CF and EF
- The valve built into the pump simplifies the hydraulic system
- Flow rate control (Q_{CF}) reduces noise emissions in the hydraulic system



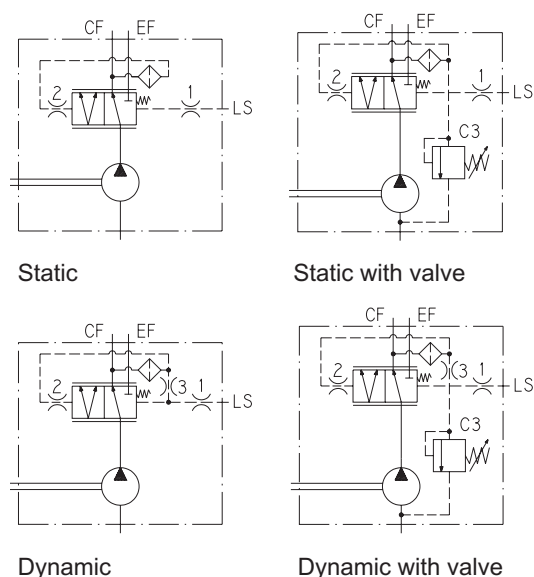
- | | |
|----|------------------------------------|
| 1 | Valve inlet flow rate (Q_{IN}) |
| 2 | Excess flow (Q_{EF}) |
| 3 | Controlled flow rate (Q_{CF}) |
| 4 | Orifice 2 |
| 5 | Filter |
| 6 | Load sensing valve spool |
| 7 | Orifice 3 |
| 8 | Orifice 1 |
| 9 | Load sensing signal (LS) |
| 10 | Max. pressure relief valve C3 |
| 11 | Drain valve C3 (■) |

(■) The drain of the valve is internal to return oil to the pump inlet. An additional port for an external drain to the tank is added only for a side mounting configuration.

The "load sensing" priority valves are built into gear pumps and divide the flow rate delivered by the pump (Q_{IN}) into two separate and variable flows ($Q_{CF} + Q_{EF}$). Q_{CF} varies in relation to the priority port demand, while the excess flow is conveyed to Q_{EF} . These valves are used mainly to feed mobile machinery steering systems equipped with a closed-centre steering unit. The CF port is connected to the steering unit inlet port, and the EF port is connected to the auxiliary hydraulic control system (hoist, shovel, etc.), while the LS port is connected to the respective LS of the steering unit. The valves are available as a static or dynamic version depending on the type of system to feed.

A version with a pressure relief valve (C3), in a static or dynamic configuration, is available to protect the controlled line (Q_{CF}), for the case in which the steering unit is not so equipped.

In the **static "load sensing"** when the steering unit is at rest (steering stopped), the LS signal has no flow. As soon as the steering wheel begins to move, the steering unit sends a signal, through the pilot line, to the pump "load sensing" valve that automatically regulates the flow rate and the pressure to the real levels demanded by the steering unit. In the **dynamic "load sensing"** even when the steering unit is at rest (steering stopped), the LS signal has a pilot flow. The static or dynamic "load sensing" function on the pump must be selected according to the type of system to feed, recalling that dynamic "load sensing" ensures shorter response times, more fluid movements and eliminates malfunctioning that may occur under low-temperature operating conditions.



LOAD SENSING PRIORITY VALVES - GENERAL DATA

9	Nominal flow	US gpm	l/min
	40	10.6	40
	80	21.1	80
	120	31.7	120

13	Max. pressure relief valve	Pressure setting range	
		psi	bar
	C3 (...)	290 ÷ 4060	20 ÷ 280

(...) = Requested setting value in bar

Stand-by pressure pending the type of orifices and springs

10	11	12	Nominal stand-by pressure	12	10		11
			Orifice 1	Orifice 2	Orifice 3	Spring setting	
			bar (psi)	mm (in)	mm (in)	mm (in)	bar (psi)
*	D	*	5 (73)	0,75 (0.0295)	0,8 (0.0315)	Closed (■)	4 (58)
E	D	*	7 (102)	0,75 (0.0295)	0,8 (0.0315)	0,5 (0.0197)	4 (58)
F	D	*	8 (116)	0,75 (0.0295)	0,8 (0.0315)	0,6 (0.0236)	4 (58)
G	D	*	9 (131)	0,75 (0.0295)	0,8 (0.0315)	0,7 (0.0276)	4 (58)
K	D	*	5 (73)	0,75 (0.0295)	1,3 (0.0512)	Closed (■)	4 (58)
R	D	*	7 (102)	0,75 (0.0295)	1,3 (0.0512)	0,5 (0.0197)	4 (58)
Y	D	*	8 (116)	0,75 (0.0295)	1,3 (0.0512)	0,6 (0.0236)	4 (58)
Z	D	*	9 (131)	0,75 (0.0295)	1,3 (0.0512)	0,7 (0.0276)	4 (58)
*	G	*	9 (131)	0,75 (0.0295)	0,8 (0.0315)	Closed (■)	7 (102)
E	G	*	13 (189)	0,75 (0.0295)	0,8 (0.0315)	0,5 (0.0197)	7 (102)
F	G	*	15 (218)	0,75 (0.0295)	0,8 (0.0315)	0,6 (0.0236)	7 (102)
G	G	*	17 (247)	0,75 (0.0295)	0,8 (0.0315)	0,7 (0.0276)	7 (102)
K	G	*	9 (131)	0,75 (0.0295)	1,3 (0.0512)	Closed (■)	7 (102)
R	G	*	13 (189)	0,75 (0.0295)	1,3 (0.0512)	0,5 (0.0197)	7 (102)
Y	G	*	15 (218)	0,75 (0.0295)	1,3 (0.0512)	0,6 (0.0236)	7 (102)
Z	G	*	17 (247)	0,75 (0.0295)	1,3 (0.0512)	0,7 (0.0276)	7 (102)
*	L	*	13 (189)	0,75 (0.0295)	0,8 (0.0315)	Closed (■)	10 (145)
E	L	*	15 (218)	0,75 (0.0295)	0,8 (0.0315)	0,5 (0.0197)	10 (145)
F	L	*	19 (276)	0,75 (0.0295)	0,8 (0.0315)	0,6 (0.0236)	10 (145)
G	L	*	24 (348)	0,75 (0.0295)	0,8 (0.0315)	0,7 (0.0276)	10 (145)
K	L	*	13 (189)	0,75 (0.0295)	1,3 (0.0512)	Closed (■)	10 (145)
R	L	*	15 (218)	0,75 (0.0295)	1,3 (0.0512)	0,5 (0.0197)	10 (145)
Y	L	*	19 (276)	0,75 (0.0295)	1,3 (0.0512)	0,6 (0.0236)	10 (145)
Z	L	*	24 (348)	0,75 (0.0295)	1,3 (0.0512)	0,7 (0.0276)	10 (145)

The values shown in the table were obtained at the following conditions:

Nominal flow = 21.1 US gpm (80 l/min)
Line CF = closed - Line EF = 0 psi (bar)

(■) = Static load sensing (orifice 3 closed)

■ = Standard combination

The **stand-by** pressure is the pressure on CF when the system is at rest.

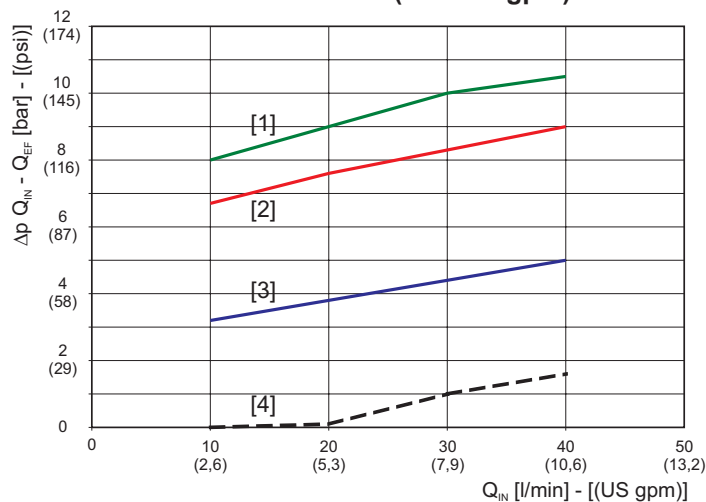
An increase in stand-by pressure increases the steering system's reactivity while, on the other hand, increases energy consumption.

Orifice 2 changes the response of the valve when Q_{CF} and Q_{EF} are both under pressure, while an increase in the diameter of orifice 3 increases the stand-by pressure.

LOAD SENSING PRIORITY VALVES - PERFORMANCE CURVES

Pressure drop between Q_{IN} and Q_{EF} at different inlet flow rate

Nominal flow = 40 l/min (10.6 US gpm)



Each curve has been obtained at:

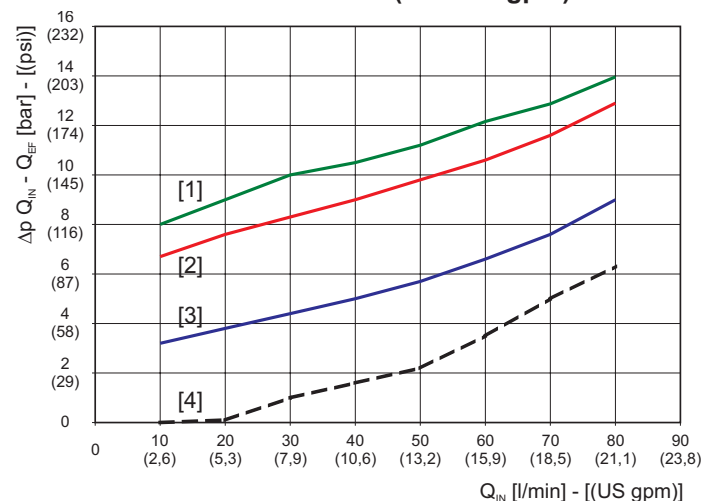
Load sensing valve connected to steering unit at rest (steering stopped).

Lubricant oil ISO VG 46

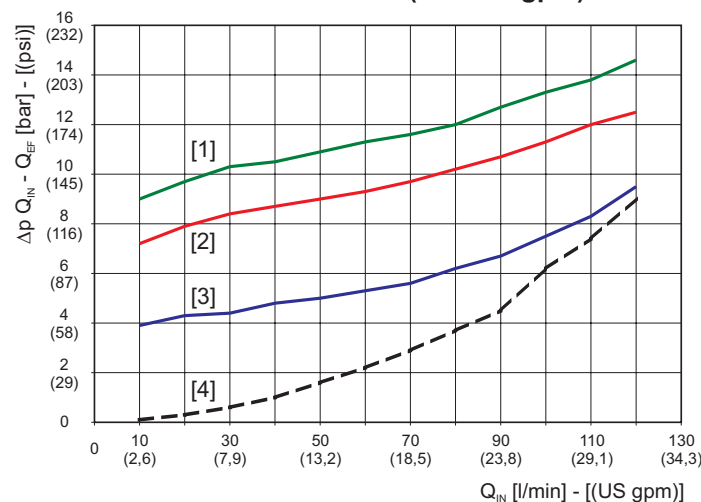
Temperature 122 °F (50 °C)

- [1] Δp spring 145 psi (10 bar) (pressure on EF= 0)
- [2] Δp spring 102 psi (7 bar) (pressure on EF= 0)
- [3] Δp spring 58 psi (4 bar) (pressure on EF= 0)
- [4] Δp min (pressure on EF > of the spring setting)

Nominal flow = 80 l/min (21.1 US gpm)



Nominal flow = 120 l/min (31.7 US gpm)



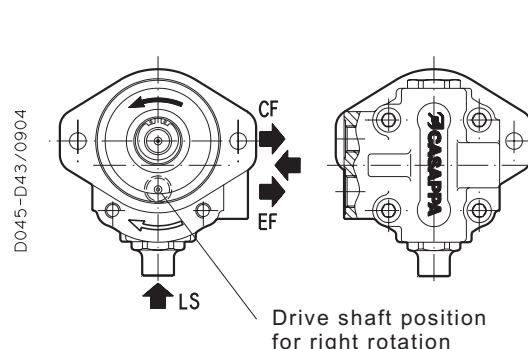
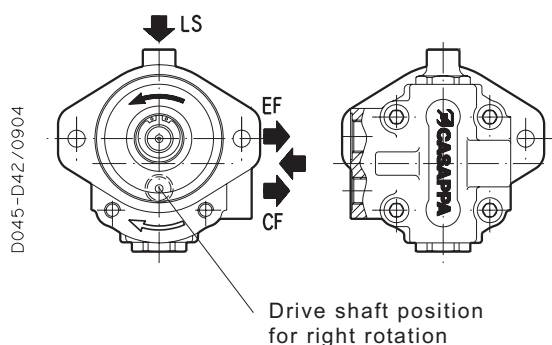
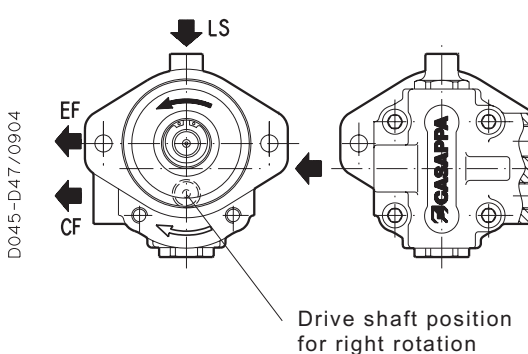
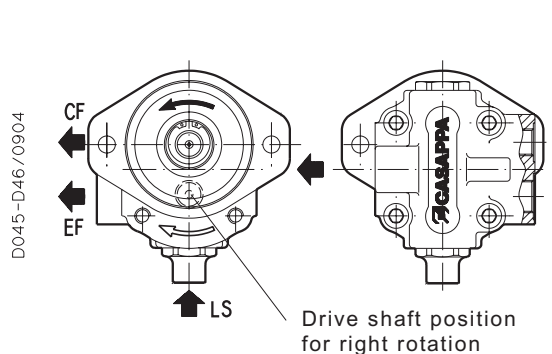
01/01.05

LOAD SENSING PRIORITY VALVES - MOUNTING OPTIONS

The main characteristic of the load sensing valve is its assembly versatility. To satisfy all systems in which reduced overall dimensions are a critical factor, this valve is available with different equipment options:

- **Valve version**
 - Version L (standard)
 - Version R
- **Ports CF/EF**
 - Side (mounting position valve: rear or side)
 - Rear (mounting position valve: rear)
- **Port LS**
 - On the plug
 - On the valve casing

CF/EF SIDE PORTS - REAR MOUNTING

VERSION (STANDARD)
L
7
VERSION
R
PORTS ON INLET SIDE
A
8
PORTS ON INLET SIDE
A
Left rotation
Left rotation

PORTS ON OUTLET SIDE
N
PORTS ON OUTLET SIDE
N
Left rotation
Left rotation


01/01.05

Mounting possibility: pumps series Polaris 20, Whisper 20, Kappa 20 and Kappa 30 (CSC - KSC).
The LS port can be on the plug or on the valve casing. Valve dimensions: version L on page 38 – version R on page 39.

CF/EF SIDE PORTS - SIDE MOUNTING

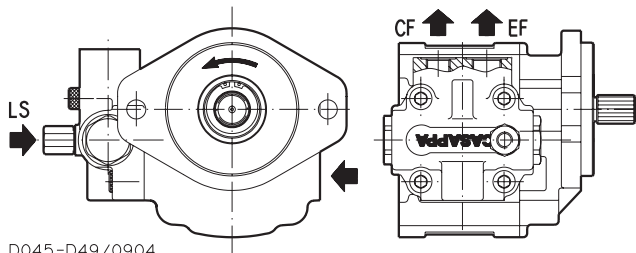
VERSION (STANDARD)

L

PORTS ON DRIVE GEAR

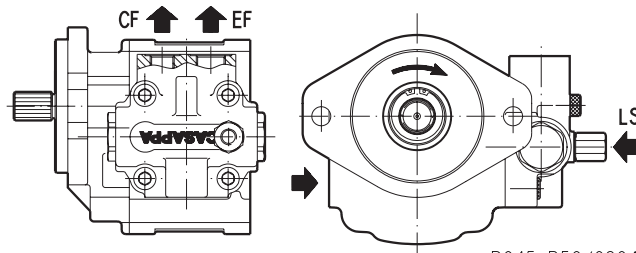
L

Left rotation



D045-D49/0904

Right rotation

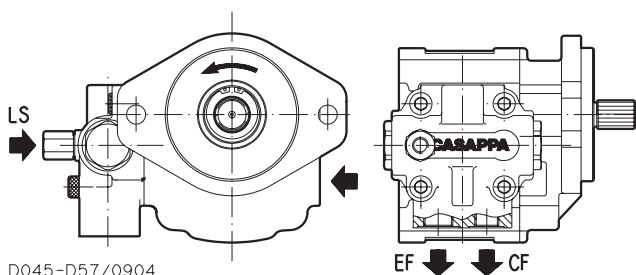


D045-D50/0904

PORTS ON DRIVEN GEAR

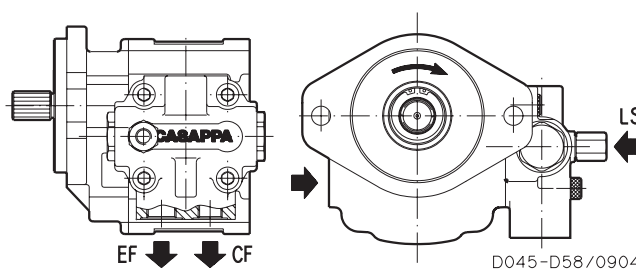
M

Left rotation



D045-D57/0904

Right rotation

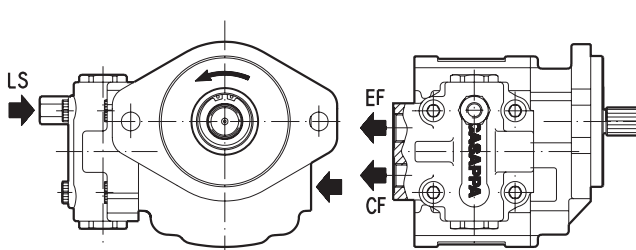


D045-D58/0904

PORTS ON THE BACK

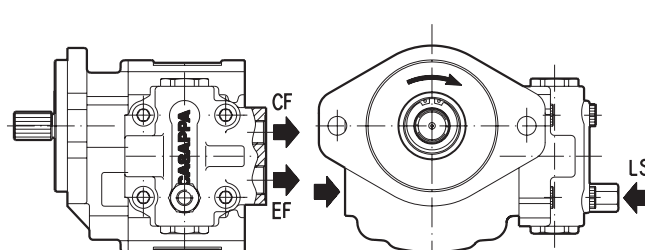
R

Left rotation



D045-D59/0904

Right rotation



D045-D60/0904

Mounting possibility: pumps series Kappa 30 (CSC - KSC). Valve dimensions: version L on page 38.
The LS port can be only on the valve casing. With C3 valve, an additional port for an external drain to the tank is added.

CF/EF SIDE PORTS - SIDE MOUNTING

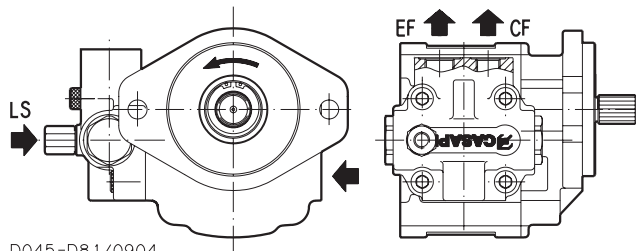
VERSION

R

PORTS ON DRIVE GEAR

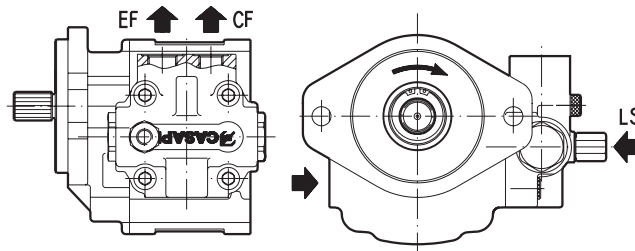
L

Left rotation



D045-D81/0904

Right rotation

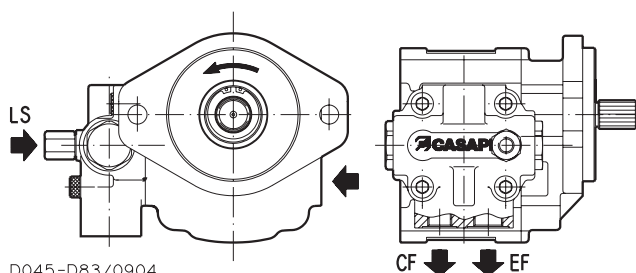


D045-D82/0904

PORTS ON DRIVEN GEAR

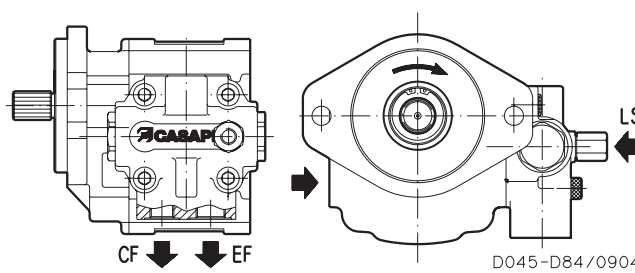
M

Left rotation



D045-D83/0904

Right rotation

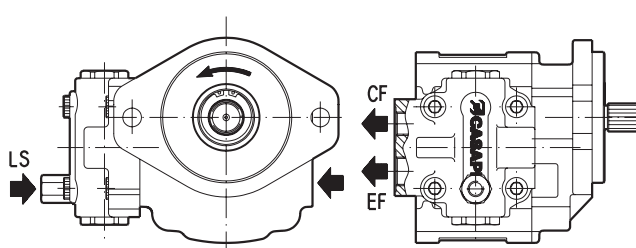


D045-D84/0904

PORTS ON THE BACK

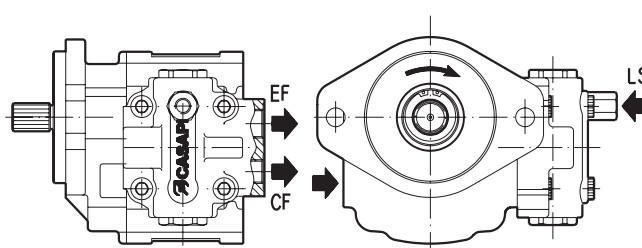
R

Left rotation



D045-D85/0904

Right rotation



D045-D86/0904

01/01.05

Mounting possibility: pumps series Kappa 30 (CSC - KSC). Valve dimensions: version L on page 39.
The LS port can be only on the valve casing. With C3 valve, an additional port for an external drain to the tank is added.

CF/EF REAR PORTS - REAR MOUNTING

VERSION (STANDARD)

L

VERSION

R

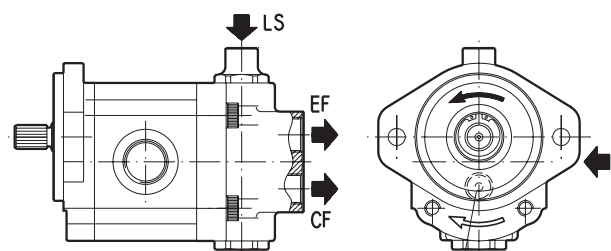
PORTS ON THE BACK

C

PORTS ON THE BACK

C

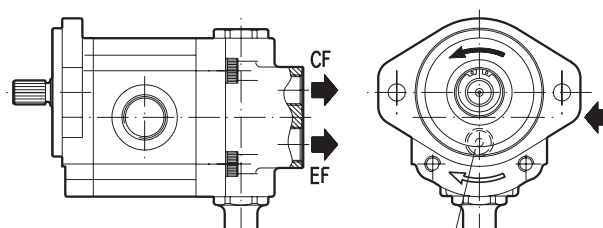
Left rotation



D045-D67/0904

Drive shaft position
for right rotation

Left rotation



D045-D68/0904

Drive shaft position
for right rotation

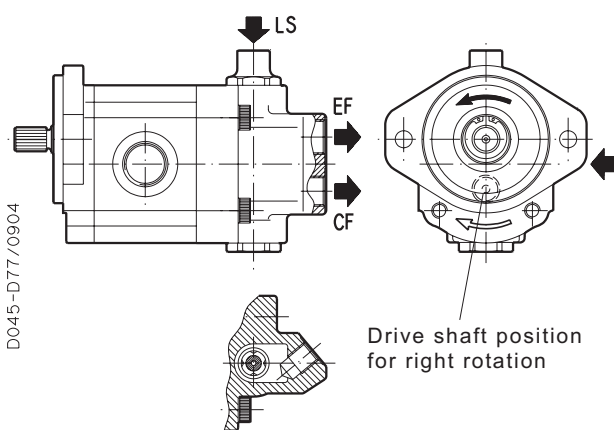
PORTS ON THE BACK 40° (●)

E

PORTS ON THE BACK 40° (●)

E

Left rotation

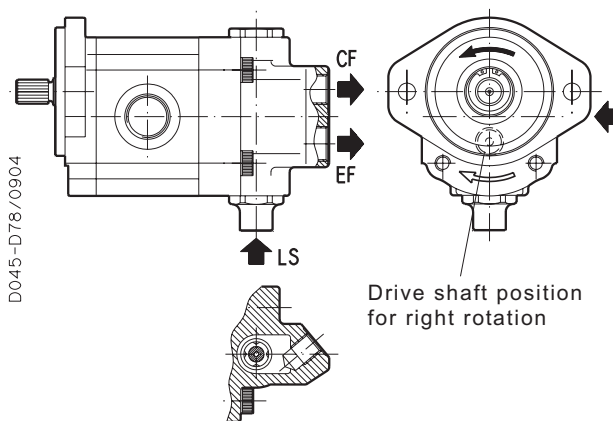


D045-D77/0904

Drive shaft position
for right rotation

(●) CF/EF ports 40° bent to the outlet

Left rotation



D045-D78/0904

Drive shaft position
for right rotation

(●) CF/EF ports 40° bent to the outlet

01/01.05

Mounting possibility: pumps series Polaris 20 and Whisper 20.

The LS port can be only on the valve casing. Valve dimensions: version L and version R on page 40 and page 41.

CF/EF SIDE PORTS - DIMENSIONS

L

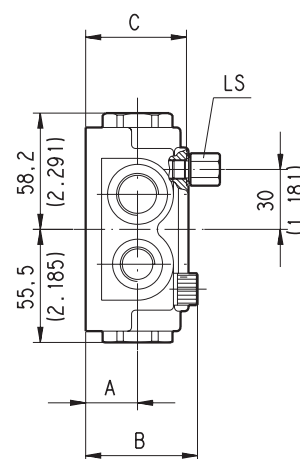
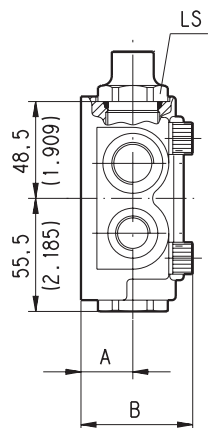
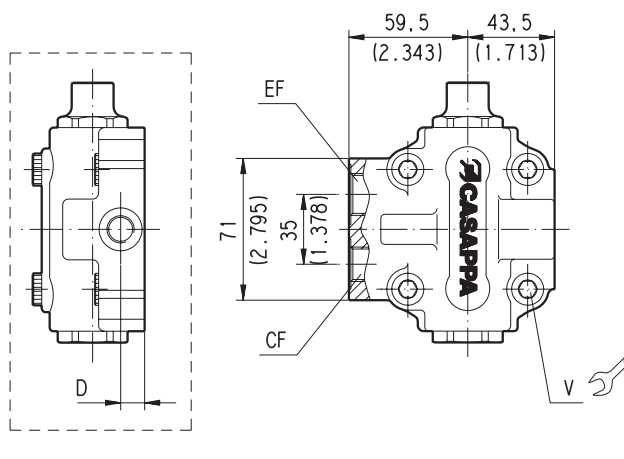
CF/EF standard flange

Ports on page 45 - LS ports on page 46 and page 47

LS on the plug

LS on the valve casing

D045-D44 / 0904



Dimensions	A	B	C	D (◆)
	mm (in)	mm (in)	mm (in)	mm (in)
Without valve	26 (1.0236)	55 (2.1654)	50,5 (1.9882)	—
With C3 valve	29 (1.1417)	58 (2.2835)	53,5 (2.1063)	12 (0.4724)

Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 $\pm 4,5$	358 $\div$ 438
Cast iron	70 ± 7	558 $\div$ 682

(◆) External port only for a side mounting configuration.

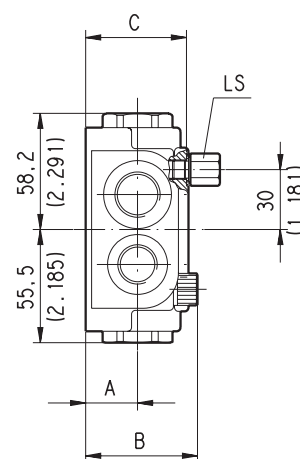
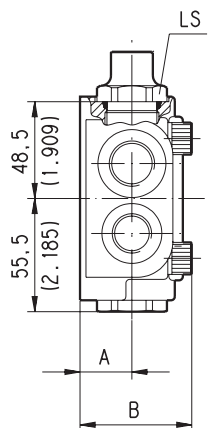
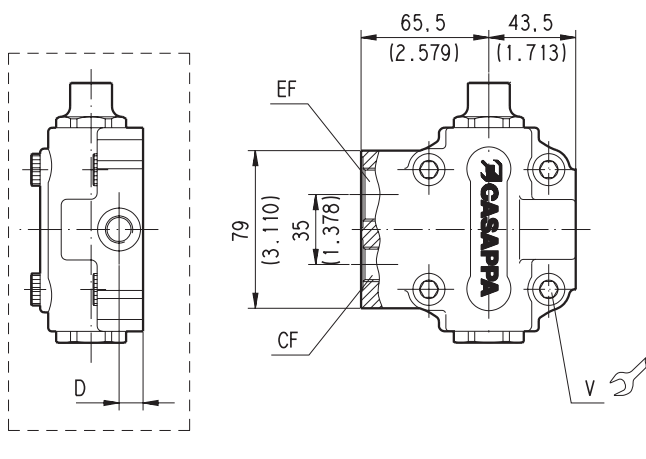
CF/EF enlarged flange

Ports on page 45 - LS ports on page 46 and page 47

LS on the plug

LS on the valve casing

D045-D45 / 0904



Dimensions	A	B	C	D (◆)
	mm (in)	mm (in)	mm (in)	mm (in)
Without valve	26 (1.0236)	55 (2.1654)	50,5 (1.9882)	—
With C3 valve	29 (1.1417)	58 (2.2835)	53,5 (2.1063)	12 (0.4724)

Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 $\pm 4,5$	358 $\div$ 438
Cast iron	70 ± 7	558 $\div$ 682

(◆) External port only for a side mounting configuration.

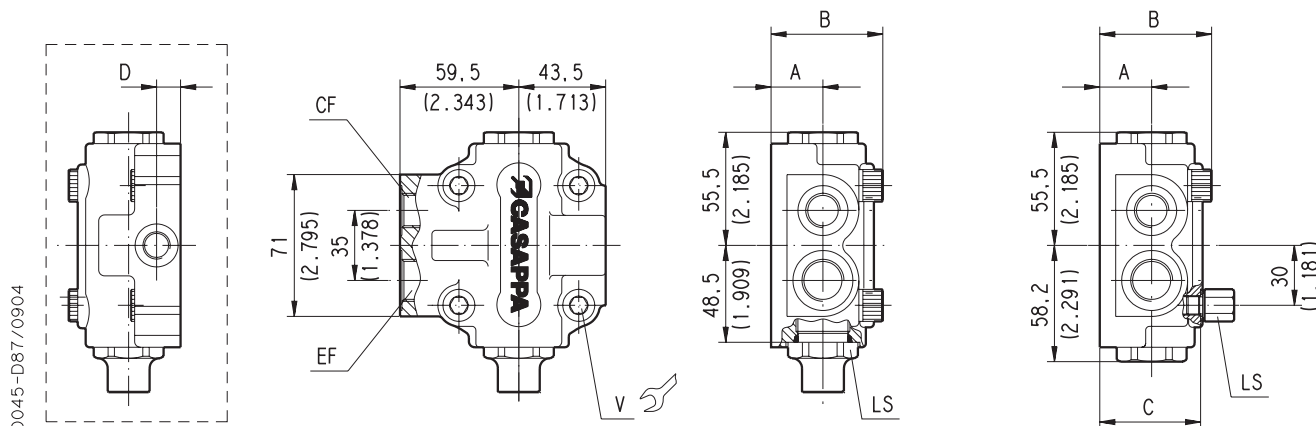
01/01.05

CF/EF SIDE PORTS - DIMENSIONS

R

CF/EF standard flange

Ports on page 45 - LS ports on page 46 and page 47



LS on the plug

LS on the valve casing

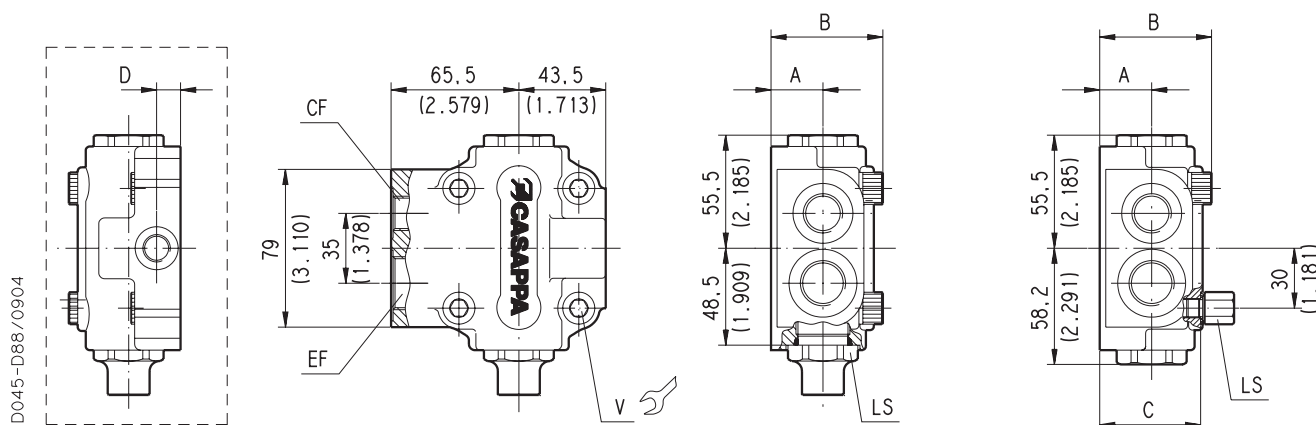
Dimensions	A	B	C	D (◆)
	mm (in)	mm (in)	mm (in)	mm (in)
Without valve	26 (1.0236)	55 (2.1654)	50,5 (1.9882)	—
With C3 valve	29 (1.1417)	58 (2.2835)	53,5 (2.1063)	12 (0.4724)

Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 $\pm 4,5$	358 $\div$ 438
Cast iron	70 ± 7	558 $\div$ 682

(◆) External port only for a side mounting configuration.

CF/EF enlarged flange

Ports on page 45 - LS ports on page 46 and page 47



LS on the plug

LS on the valve casing

Dimensions	A	B	C	D (◆)
	mm (in)	mm (in)	mm (in)	mm (in)
Without valve	26 (1.0236)	55 (2.1654)	50,5 (1.9882)	—
With C3 valve	29 (1.1417)	58 (2.2835)	53,5 (2.1063)	12 (0.4724)

Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 $\pm 4,5$	358 $\div$ 438
Cast iron	70 ± 7	558 $\div$ 682

(◆) External port only for a side mounting configuration.

01/01.05

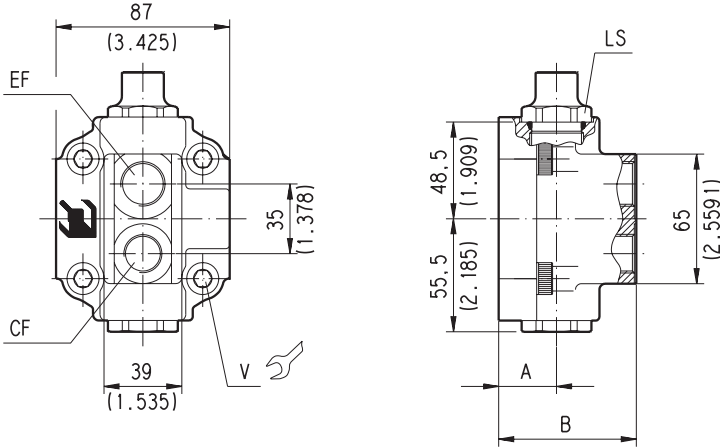
CF/EF REAR PORTS - DIMENSIONS

L

CF/EF standard flange

Ports on page 45 - LS ports on page 46

LS on the plugo



D045-D48/0504

Dimensions	A	B
	mm (inch)	mm (inch)
Without valve	26 (1.0236)	66 (2.5984)
With C3 valve	29 (1.1417)	69 (2.7165)

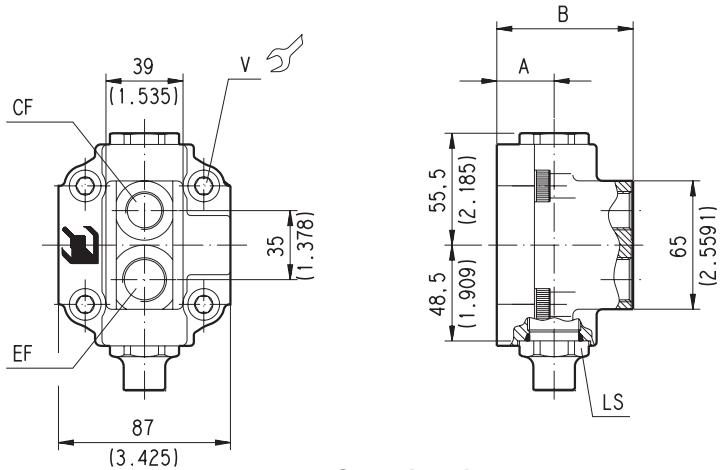
Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 $\pm 4,5$	358 ÷ 438
Cast iron	70 ± 7	558 ÷ 682

CF/EF REAR PORTS - DIMENSIONS

R

CF/EF standard flange

Ports on page 45 - LS ports on page 46



D045-D89/0904

LS on the plug

Dimensions	A	B
	mm (inch)	mm (inch)
Without valve	26 (1.0236)	66 (2.5984)
With C3 valve	29 (1.1417)	69 (2.7165)

Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 $\pm 4,5$	358 ÷ 438
Cast iron	70 ± 7	558 ÷ 682

01/01.05

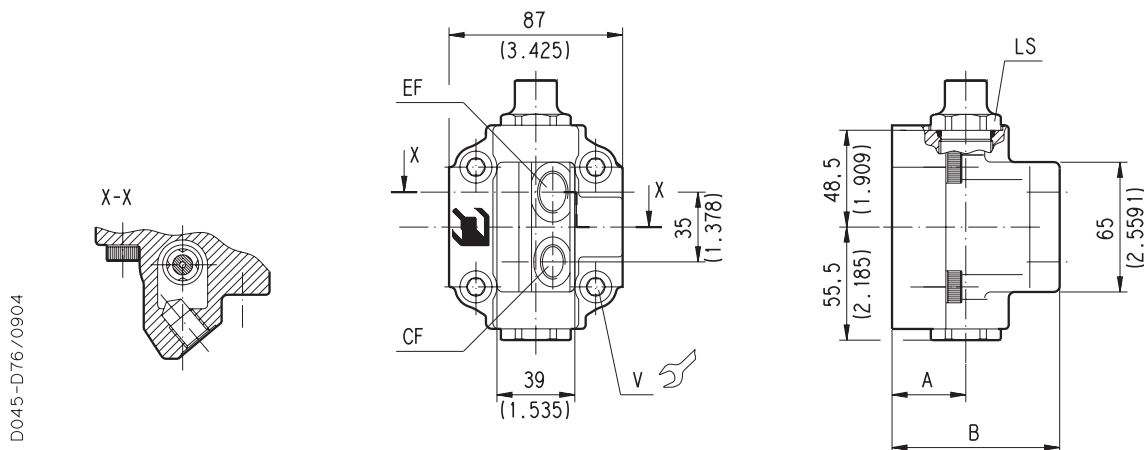
CF/EF REAR PORTS 40 ° BENT - DIMENSIONS

L

CF/EF standard flange

Ports on page 45 - LS ports on page 46 and page 47

LS on the plug



Dimensions	A	B
	mm (inch)	mm (inch)
Without valve	26 (1.0236)	66 (2.5984)
With C3 valve	29 (1.1417)	69 (2.7165)

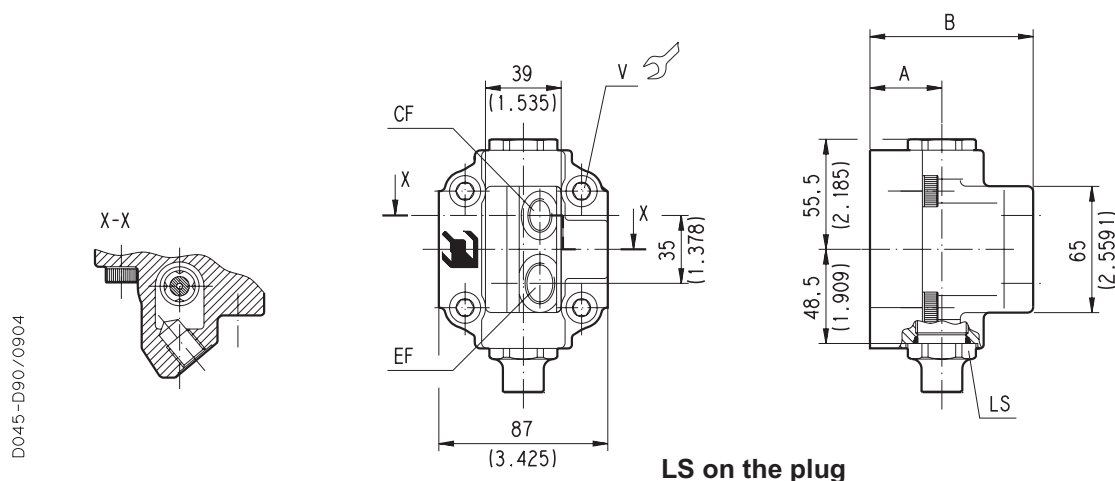
Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 $\pm 4,5$	358 $\div$ 438
Cast iron	70 ± 7	558 $\div$ 682

CF/EF REAR PORTS 40 ° BENT - DIMENSIONS

R

CF/EF standard flange

Ports on page 45 - LS ports on page 46



Dimensions	A	B
	mm (inch)	mm (inch)
Without valve	26 (1.0236)	66 (2.5984)
With C3 valve	29 (1.1417)	69 (2.7165)

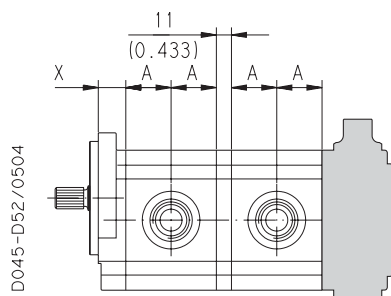
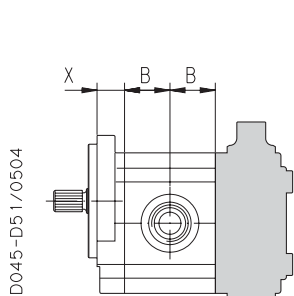
Bolts tightened on	V Bolts tightening torque	
	Nm	lbf in
Aluminum	45 $\pm 4,5$	358 $\div$ 438
Cast iron	70 ± 7	558 $\div$ 682

01/01.05

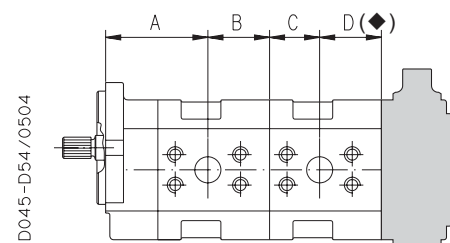
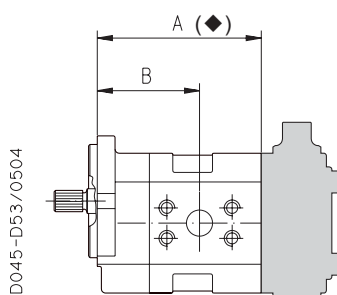
D045-D90/0904

MOUNTING POSSIBILITY - CF/EF SIDE PORTS - REAR MOUNTING

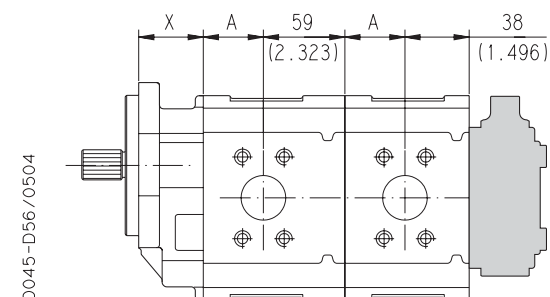
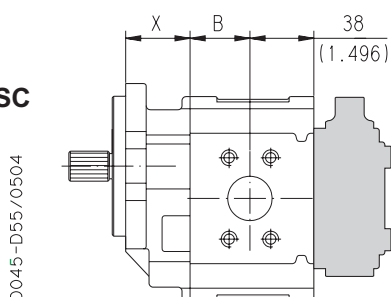
POLARIS 20 WHISPER 20



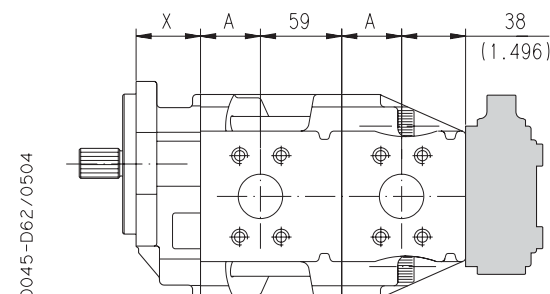
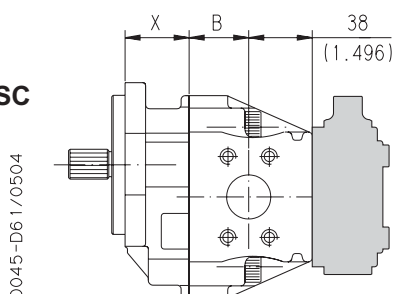
KAPPA 20



KAPPA 30 CSC



KAPPA 30 KSC

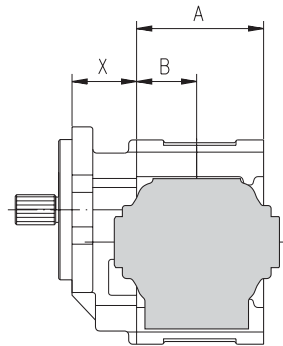


(◆): For Kappa 20•27,8 and Kappa 20•31,5 the overall dimensions are 16 mm shorter then dimensions shown on technical catalogue.

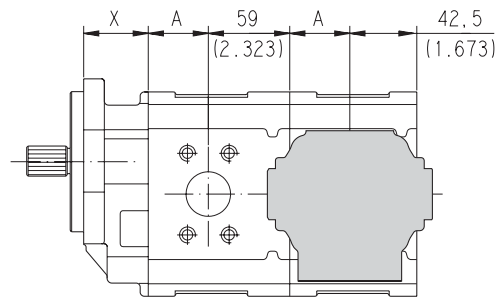
MOUNTING POSSIBILITY - CF/EF SIDE PORTS - SIDE MOUNTING

KAPPA 30 CSC

D045-D63/0504

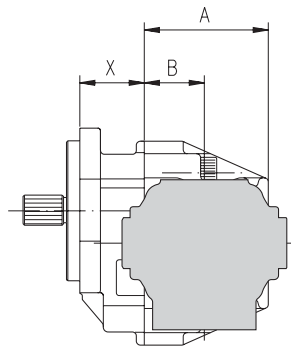


D045-D64/0504

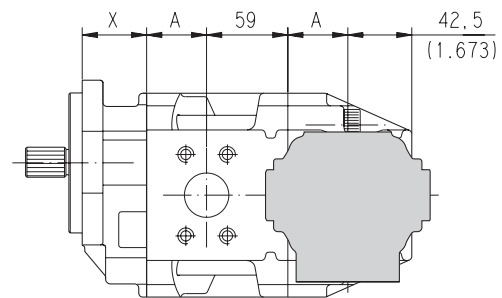


KAPPA 30 KSC

D045-D65/0504



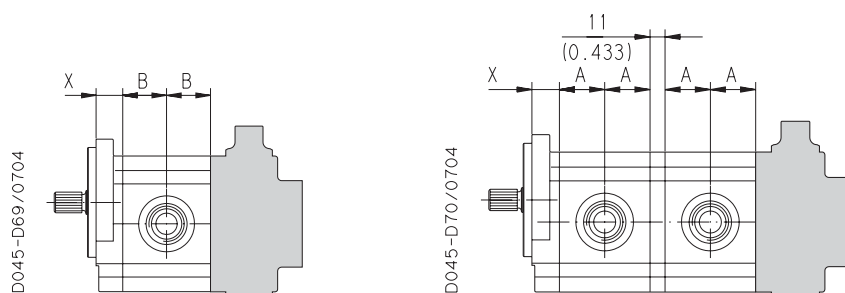
D045-D66/0504



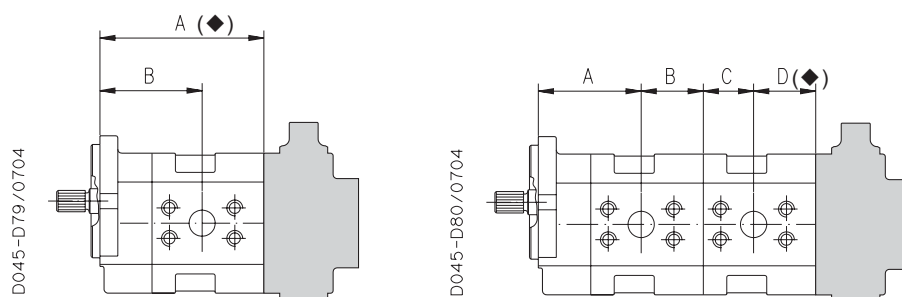
For multiple pumps the valve can be mounted on each section.

MOUNTING POSSIBILITY - CF/EF REAR PORTS - REAR MOUNTING

POLARIS 20 WHISPER 20



KAPPA 20



(◆): For Kappa 20•27,8 and Kappa 20•31,5 the overall dimensions are 16 mm shorter than dimensions shown on technical catalogue.

PORTS DIMENSIONS

Flange	CF/EF SIDE PORTS						CF/EF REAR PORTS			
	Gas BSPP			SAE ODT			Gas BSPP		SAE ODT	
	CF	EF	Drain (●)	CF	EF	Drain (●)	CF	EF	CF	EF
Standard	GC	GD	GB	OB	OC	03	GC	GD	OB	OC
Enlarged	GC	GE	GB	OB	OD	03				
	GD	GE	GB	OC	OD	03				

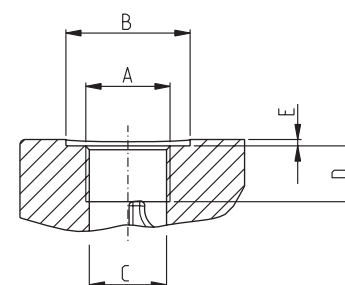
(●) External drain port added only for a side mounting configuration with C3 max. pressure relief valve.

GAS STRAIGHT THREAD PORTS

BSPP

British standard pipe parallel (55°) conforms to UNI - ISO 228

DCAT_006_026_21064779



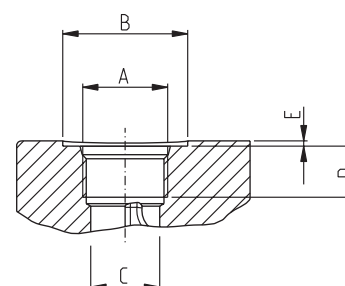
CODE	Nominal size	A	Ø B	Ø C	D	E	
			mm (in)	mm (in)	mm (in)	mm (in)	
GB (●)	1/4"	G 1/4	25 (0.9843)	15 (0.5906)	14 (0.5512)	1 (0.0394)	25 ⁺¹ (221 ÷ 230)
GC	3/8"	G 3/8	25 (0.9843)	15 (0.5906)	14 (0.5512)	1 (0.0394)	25 ⁺¹ (221 ÷ 230)
GD	1/2"	G 1/2	30 (1.1811)	19 (0.7480)	17 (0.6693)	1 (0.0394)	50 ^{+2,5} (443 ÷ 465)
GE	3/4"	G 3/4	39 (1.5354)	24,5 (0.9646)	20 (0.6693)	1 (0.0394)	90 ⁺⁵ (797 ÷ 841)

SAE STRAIGHT THREAD PORTS SAE J514

ODT

American straight thread UNC-UNF 60° conforms to ANSI B 1.1

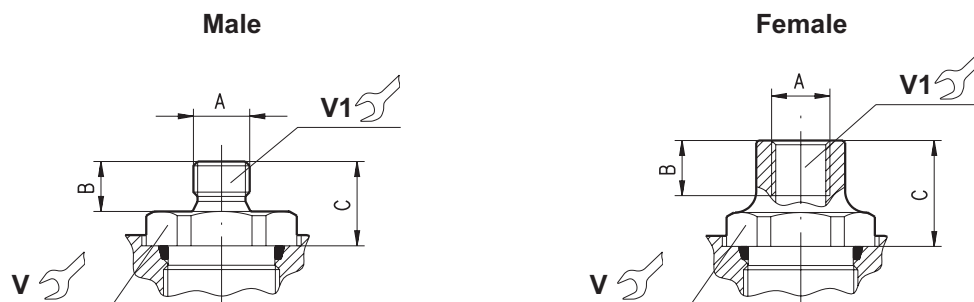
DCAT_006_027_21060524



CODE	Nominal size	A	Ø B	Ø C	D	E	
			mm (in)	mm (in)	mm (in)	mm (in)	
03 (●)	1/4"	7/16" - 20 UNF - 2B	21 (0.8267)	9,5 (0.3740)	14 (0.5512)	1 (0.0394)	12 ⁺¹ (106 ÷ 115)
OB	1/2"	3/4" - 16 UNF - 2B	32 (1.2598)	17,5 (0.690)	15 (0.5906)	1,5 (0.0591)	45 ^{+2,5} (398 ÷ 420)
OC	5/8"	7/8" - 14 UNF - 2B	35 (1.3780)	20,5 (0.8071)	17 (0.6693)	1,5 (0.0197)	70 ⁺⁵ (620 ÷ 664)
OD	3/4"	1 1/16" - 12 UNF - 2B	35 (1.3780)	20,5 (0.8071)	17 (0.6693)	1,5 (0.0197)	70 ⁺⁵ (620 ÷ 664)

01/01.05

LS PORT ON THE PLUG



GAS STRAIGHT THREAD PLUGS

BSPP

British standard pipe parallel (55°) conforms to UNI - ISO 228

CODE	Connection	Nominal size	A	B	C	V		V1
				mm (in)	mm (in)	Key	Nm (lbf in)	Nm (lbf in)
A	Male	1/4"	G 1/4	11,6 (0.4567)	22,3 (0.8780)	32	50 ^{±5} (398 ÷ 487)	15 ^{±1,5} (119 ÷ 146)
B	Female	1/4"	G 1/4	13 (0.5118)	27,5 (1.0827)	32	50 ^{±5} (398 ÷ 487)	15 ^{±1,5} (119 ÷ 146)

SAE STRAIGHT THREAD PLUGS SAE J514

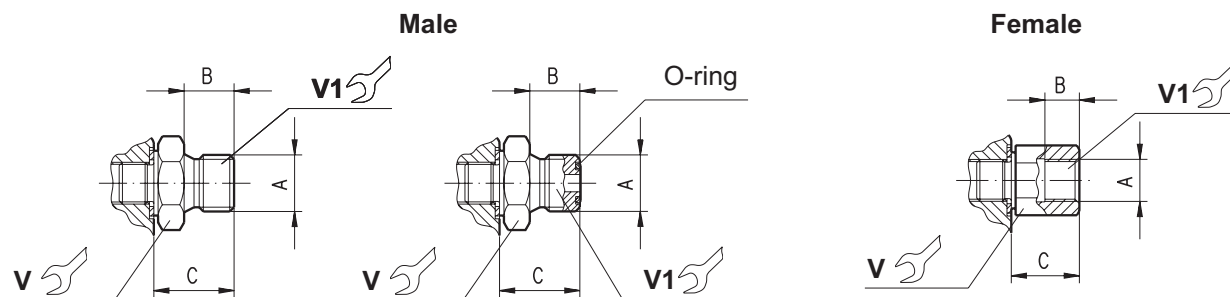
ODT

American straight thread UNC-UNF 60° conforms to ANSI B 1.1

CODE	Connection	Nominal size	A	B	C	V		V1
				mm (in)	mm (in)	Key	Nm (lbf in)	Nm (lbf in)
E	Female	1/4"	7/16"-20 UNF-2B	12 (0.4724)	27,5 (1.0827)	32	50 ^{±5} (398 ÷ 487)	12 ^{±1,2} (96 ÷ 117)
J	Female	3/8"	9/16"-18 UNF-2B	13 (0.5118)	27,5 (1.0827)	32	50 ^{±5} (398 ÷ 487)	25 ^{±2,5} (199 ÷ 243)

01/01.05

LS PORT ON THE VALVE CASING



GAS STRAIGHT THREAD CONNECTORS

BSPP

British standard pipe parallel (55°) conforms to UNI - ISO 228

CODE	Connection	Nominal size	A	B	C	V		V1
				mm (in)	mm (in)	Chiave	Nm (lbf in)	Nm (lbf in)
Z	Female	1/8"	G 1/8	8 (0.3150)	13 (0.5118)	15	20 ^{±2} (159 ÷ 195)	5 ^{±0,5} (49 ÷ 49)
Y	Male	1/4"	G 1/4	11,6 (0.4567)	18,6 (0.7323)	19	20 ^{±2} (159 ÷ 195)	15 ^{±1,5} (119 ÷ 146)
W	Female	1/4"	G 1/4	14 (0.5512)	22,5 (0.8858)	19	20 ^{±2} (159 ÷ 195)	15 ^{±1,5} (119 ÷ 146)

SAE STRAIGHT THREAD CONNECTORS SAE J514

ODT

American straight thread UNC-UNF 60° conforms to ANSI B 1.1

CODE	Connection	Nominal size	A	B	C	V		V1
				mm (in)	mm (in)	Chiave	Nm (lbf in)	Nm (lbf in)
X	Female	1/4"	7/16"-20 UNF-2B	13 (0.5118)	20 (0.7874)	15	20 ^{±2} (159 ÷ 195)	12 ^{±1,2} (96 ÷ 117)
K	Male with O-ring	3/8"	11/16"-16 UNF-2B	11,5 (0.4528)	18,5 (0.7283)	19	20 ^{±2} (159 ÷ 195)	20 ^{±2} (159 ÷ 195)

HOW TO ORDER

1	2	3	4	5	6	7	8	9	10	11	12	13	14										
... - LGD	/	GC	/	GD	/	A	-	N	-	E	-	R	N	-	80	F	-	G	*	-	C3 (...)	-	GB

1	Type	PUMP TYPE
	in ³ /rev (cm ³ /rev)	
Polaris 20 (a)		PLP20•...
Whisper 20 (a)		WSP20•...
Kappa 20 (a)		KP20•...
Kappa 30 (CSC - KSC) (a)		KP30•...

2	Port CF	CODE
GAS STRAIGHT THREAD PORTS (BSPP)		
G 3/8		GC
G 1/2 (b)		GD
SAE STRAIGHT THREAD PORTS (ODT)		
3/4" - 16 UNF - 2B		OB
7/8" - 14 UNF - 2B		OC

3	Port EF	CODE
GAS STRAIGHT THREAD PORTS (BSPP)		
G 1/2		GD
G 3/4		GE
SAE STRAIGHT THREAD PORTS (ODT)		
7/8" - 14 UNF - 2B		OC
1 1/16" - 12 UNF - 2B		OD

4	Port LS	CODE
GAS STRAIGHT THREAD (BSPP)		
G 1/4 - Male - on the plug		A
G 1/4 - Female - on the plug		B
G 1/8 - Female - valve casing		Z
G 1/4 - Male - valve casing		Y
G 1/4 - Female - valve casing		W
SAE STRAIGHT THREAD PORTS (ODT)		
7/16" - 20 UNF-2B - Female-on the plug		E
9/16" - 18 UNF-2B - Female-on the plug		J
7/16" - 20 UNF-2B - Female-valve casing		X
11/16" - 20 UNF-2B+OR-Male-valve casing		K

5	Seals	CODE
Buna (standard)		N
Viton		V

6	Front cover material	CODE
Aluminum		E
Cast iron (no code)		

7	Load sensing valve version	CODE
Version L (standard)		L
Version R		R

CODE	Mounting valve - CF/EF position	8
A	Rear mount. - side ports on inlet side	
N	Rear mount. - side ports on outlet side	
L	Side mount. - side ports on drive gear	
M	Side mount. - side ports on driven gear	
R	Side mount. - side ports on the back	
C	Rear mount. - rear ports on the back	
E	Rear mount. - rear ports 40° bent on outlet	

CODE	Nominal flow	9
40	10.6 US gpm (40 l/min)	
80	21.1 US gpm (80 l/min)	
120	31.7 US gpm (120 l/min)	

CODE	Orifices 2 and 3	10
*	(2) 0,8 - (3) closed - static load sensing	
E	(2) 0,8 - (3) 0,5	
F	(2) 0,8 - (3) 0,6	
G	(2) 0,8 - (3) 0,7 - (standard)	
K	(2) 1,3 - (3) closed - static load sensing	
R	(2) 1,3 - (3) 0,5	
Y	(2) 1,3 - (3) 0,6	
Z	(2) 1,3 - (3) 0,7	

CODE	LS setting spring	11
D	58 psi (4 bar)	
G	102 psi (7 bar)	
L	145 psi (10 bar)	

CODE	Orifice 1	12
*	0,75 (standard)	

CODE	Max. pressure relief valve C3	13
	Without valve (no code)	
C3 (...)	With valve (...)= Required press. value in bar Pressure setting range: 290 ÷ 4060 psi (20 ÷ 280 bar)	

CODE	Drain port C3 valve (b)	14
GAS STRAIGHT THREAD PORTS (BSPP)		
GB	G 1/4	
SAE STRAIGHT THREAD PORTS (ODT)		
03	7/16" - 20 UNF-2B	

(a) See the technical catalogues of each specific series.
How to order: until inlet port IN.

(b) Only for a side mounting configuration.

01/01.05

NOTES		

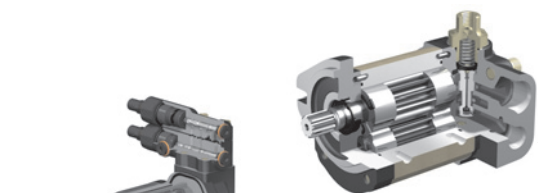
01/01.05

NOTES

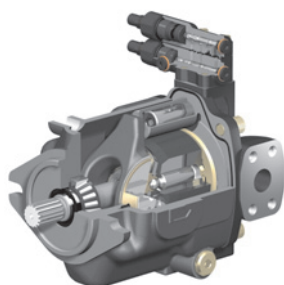
01/01.05

Our policy is one of continuous improvement in product. Specification of items may, therefore, be changed without notice.

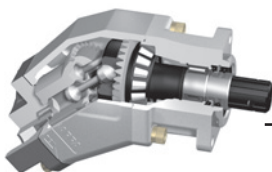
Casappa: Fluid Power Design at 360°



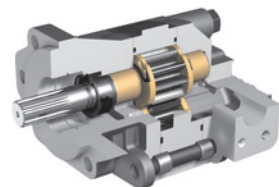
Gear pumps and motors.
High performance, low noise.



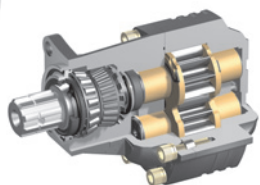
Variable displacement axial piston pumps,
for open circuit.



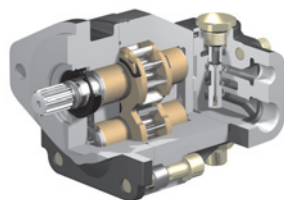
Fixed displacement bent axis piston pumps,
for truck applications.



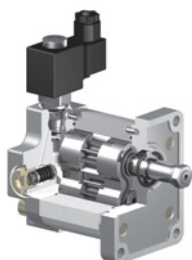
Cast iron gear pumps and
motors of three part construction.



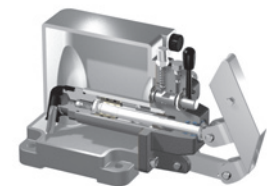
Cast iron gear pumps,
for truck applications.



Cast iron gear pumps and
motors of two part construction.



Gear pumps and
motors in aluminium.



Double acting hydraulic hand pumps
with or without reservoir.



Filters : suction filters, return filters, in line filters spin-on
type, for medium and high pressure filters.



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