

INTRODUCTION

“POLARIS” more than fifty years of Casappa experience in design and production of hydraulic components, characterized by large investments in research and development in order to propose new and personalized solutions to the market.

Our use of CAD 3D in the development of this generation permit us the 3D modelling and the virtual simulation of the behaviour of the components inserted in the hydraulic circuit. This means that the process will take less time and the quality of the products is better.

Polaris pumps and motors are basically composed of a gear housing in aluminium alloy, two gear wheels supported by sleeve bearings and two end plates, the front and the rear cover, either in aluminium or in cast iron with excellent mechanical characteristics.

Our success is based largely on the quality of our product. This guaranties the consistencies of the efficiencies and low level of noise emission during the life of our products.

DISPLACEMENTS

From 1,07 cm³/rev (0.07 in³/rev)

To 91,10 cm³/rev (5.56 in³/rev)

PRESSURE

Max. constant operating pressure 260 bar (3770 psi)

Max. system pressure (relief valve setting) 280 bar (4060 psi)

Max. peak of pressure 300 bar (4350 psi)

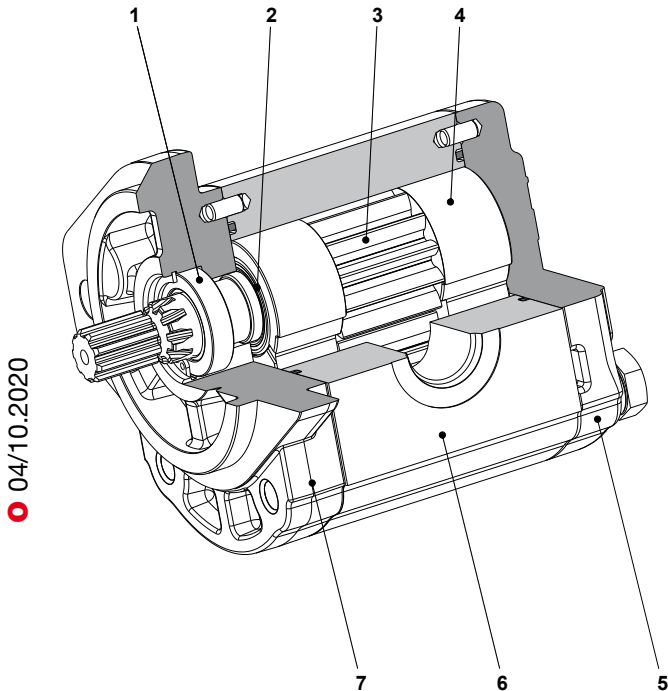
SPEED

Max. 4000 min⁻¹

- Available in groups 10, 20 and 30.
- Drive shafts, mounting flanges and ports according to the international standards.
- Combination of multiple pumps in standard version, common inlet and separated stages.
- Integrated outboard bearings for heavy duty application.
- Many types of built-in valves.

TYPICAL APPLICATIONS

- Building & Construction
- Material Handling
- Agriculture
- Forestry
- Turf care & Mowers
- Fan Drive



1	Shaft seal
2	Seal
3	Gear
4	Thrust plate
5	Rear cover
6	Body
7	Mounting flange

INSTRUCTIONS

INSTALLATION

Pump

The direction of rotation of single-rotation pumps must be the same as that of the drive shaft. Check that the coupling flange correctly aligns the transmission shaft and the pump shaft. Flexible couplings should be used (never rigid fittings) which will not generate an axial or radial load on the pump shaft.

Motor

The direction of rotation of single-rotation motors must match circuit connections. Check that the coupling flange correctly aligns the transmission shaft and the motor shaft. Flexible couplings should be used (never rigid fittings) which will not generate an axial or radial load on the motor shaft.

TANK

Tank capacity must be sufficient for the system's operating conditions (~ 3 times the amount of oil in circulation) to avoid overheating of the fluid. A heat exchanger should be installed if necessary. The intake and return lines in the tank must be spaced apart (by inserting a vertical divider) to prevent the return-line oil from being taken up again immediately.

LINES

The lines must have a major diameter which is at least as large as the diameter of pump or motor ports, and must be perfectly sealed. To reduce loss of power, the lines should be as short as possible, reducing the sources of hydraulic resistance (elbow, throttling, gate valves, etc.) to a minimum. A length of flexible tubing is recommended to reduce the transmission of vibrations. All return lines must end below the minimum oil level, to prevent foaming. Before connecting the lines, remove any plugs and make sure that the lines are perfectly clean.

HYDRAULIC FLUID

Use hydraulic fluid conforming to viscosity data as specified in the first pages of the catalogue. Avoid using mixtures of different oils which could result in decomposition and reduction of the oil's lubricating power.

FILTERS

We recommend filtering the entire system flow. Filters on suction and return line must be fitted in according to the contamination class as indicated in the first pages of the catalogue. Casappa recommends to use its own production filters:



STORAGE

The storage must be in a dry environment.

Max storage time in ideal conditions is 24 months.

The ideal storage temperature is between 5 °C (41 °F) and 20 °C (68 °F). No problem in case of temperature between -40 °C (-40 °F) and 50 °C (122 °F). Below -40 °C (-40 °F) please consult our pre-sales department.

STARTING UP

Check that all circuit connections are tight and that the entire system is completely clean. Insert the oil in the tank, using a filter. Bleed the circuit to assist in filling. Set the pressure relief valves to the lowest possible setting. Turn on the system for a few moments at minimum speed, then bleed the circuit again and check the level of oil in the tank.

If the difference between pump or motor temperature and fluid temperature exceeds 10 °C (50 °F), rapidly switch the system on and off to heat it up gradually. Then gradually increase the pressure and speed of rotation until the pre-set operating levels as specified in the catalogue are attained.

COLD START

Cold start is meant short term and low idle. During cold start of the machine the following limits can be applied:

Minimum inlet pressure	0,5 bar abs. (7 psi)
Outlet pressure (pumps) Inlet pressure (motors)	≤ 50 bar (725 psi)
Max drain pressure / Max back pressure for single rotation motors	+ 50% of standard values
Speed	≤ 1500 min ⁻¹
Minimum temperature	-40 °C (-40 °F)
Max oil viscosity	2000 mm ² /s (cSt) [9100 SSU]

If the ambient temperature is lower than -20 °C (-4 °F) the system speed and pressure must be limited until the hydraulic oil temperature exceeds -20 °C (-4 °F).

PERIODICAL CHECKS - MAINTENANCE

Keep the outside surface clean especially in the area of the drive shaft seal. In fact, abrasive powder can accelerate wear on the seal and cause leakage. Replace filters regularly to keep the fluid clean. The oil level must be checked and oil replaced periodically depending on the system's operating conditions.

Replaces: 02/07.2006

FEATURES

Construction	External gear pumps and motors 3-piece construction
Mounting	EUROPEAN - SAE - GERMAN standard flanges
Ports	Threaded or flanged
Direction of rotation (looking on drive shaft)	Anti-clockwise (S) - clockwise (D) - reversible external drain (R - L) reversible internal drain (B)
Inlet pressure range for pumps	0,7 ÷ 3 bar abs. (10 ÷ 44 psi) If p > 1,5 bar abs. (22 psi) specific shaft sealing have to be applied. Please consult our pre-sales department.
Max back pressure for single rotation motors	5 bar (73 psi) continuous @ min. speed 350 min ⁻¹ 1 bar (14.5 psi) continuous @ max. speed (see page 7)
Max drain line pressure on reversible rotation motors	5 bar (73 psi) continuous @ min. speed 350 min ⁻¹ 1 bar (14.5 psi) continuous @ max. speed (see page 7)
Max back pressure on in series motors	150 bar (2175 psi)
Fluid temperature range	See table (1)
Fluid	Mineral oil based hydraulic fluids to ISO/DIN. For other fluids please consult our pre-sales department
Viscosity range	From 12 to 100 mm ² /s (cSt) [60 to 456 SSU] recommended Up to 750 mm ² /s (cSt) [3410 SSU] permitted
Filtering requirement and recommended fluid contamination	See table (2) page 6

Tab. 1



Type	Fluid composition	Max pressure bar (psi)	Max speed min ⁻¹	Temperature - °C (°F)			Seals (●)	Shaft seals option (◆)
				Min	Max continuous	Max peak		
ISO/DIN	Mineral oil based hydraulic fluid to ISO/DIN	See page 7	See page 7	-25 (-13)	80 (176)	100 (212)	N	D C1
				-25 (-13)	110 (230)	125 (257)	V	
				-25 (-13)	110 (230)	125 (257)	T-PV	

(●) **N** = Buna NBR (standard) - **V** = Viton-FKM - **T-PV** = Hydrogenated buna HNBR seals with Viton-FKM shaft seals (only for PLP20)

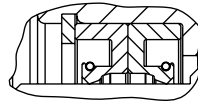


D (◆) shaft seals with wiper seal

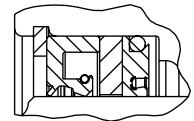
C1 (◆) High pressure special shaft seal

Single rotation pumps

Max drain
line pressure:
0,5 bar (7 psi)

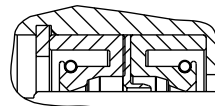


Max drain
line pressure:
10 bar (145 psi)
@ 350 min⁻¹



Single rotation motors
Reversible rotation pumps and motors

Max drain
line pressure:
5 bar (73 psi)
@ 350 min⁻¹



FEATURES

Filtration

Casappa recommends to use its own production filters:

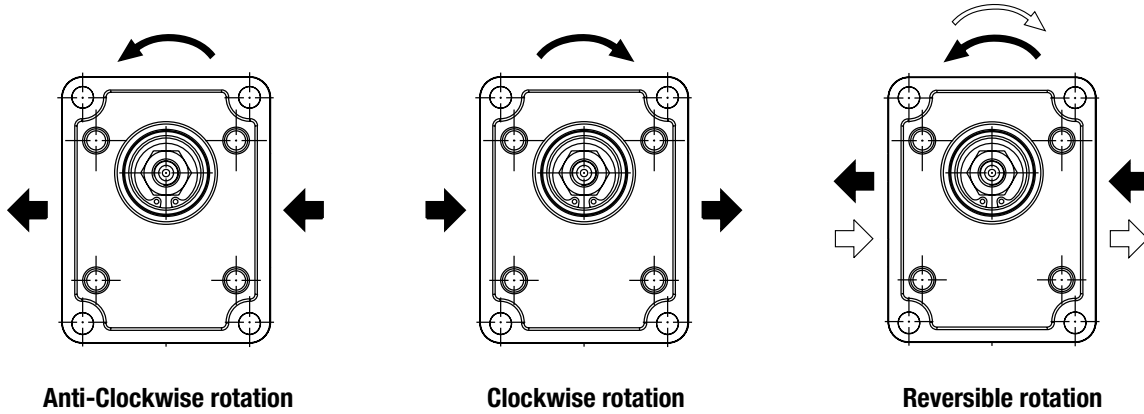
Tab. 2

Working pressure bar (psi)	$\Delta p < 140$ (2030)	$140 < \Delta p < 210$ (3045)	$\Delta p > 210$ (3045)
Contamination class NAS 1638	10	9	8
Contamination class ISO 4406	21/19/16	20/18/15	19/17/14
Achieved with filter $\beta_{10}(c) \geq 75$ according to ISO 16889	-	10 μm	10 μm
Achieved with filter $\beta_{25}(c) \geq 200$ according to ISO 16889	25 μm	-	-



Replaces: 03/02.2012

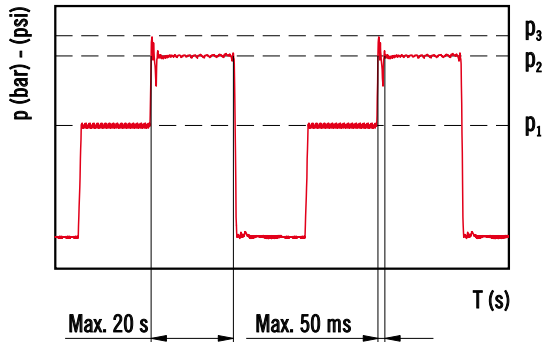
DEFINITION OF ROTATION DIRECTION LOOKING AT THE DRIVE SHAFT



GENERAL NOTES

Available with different inlet and outlet ports.
For more information please consult our pre-sales department.

PRESSURE DEFINITION



- p_1 Constant operating pressure
- p_2 System pressure (relief valve setting)
- p_3 Peak of pressure

The peak of pressure is the max pressure allowed and it corresponds to the overshoot of the relief valve.

Please note that both relief valve setting and overshoot must be lower than their limits.
If the relief setting is compliant but the overshoot is higher than the limit, the relief setting must be decreased until the overshoot is compliant to Casappa limit.

For high frequency applications please consult our pre-sales department.

04/10.2020

FEATURES

Replaces: 01/10.2003

POLARIS 10

Pump type PLP Motor type PLM	Displacement cm³/rev (in³/rev)	Max. pressure			Max. speed	Min. speed
		p ₁	p ₂	p ₃		
		bar (psi)				
PL 10•1	1,07 (0.07)	260 (3770)	280 (4060)	290 (4205)	4000	650
PL 10•1,5	1,60 (0.10)	260 (3770)	280 (4060)	290 (4205)	4000	650
PL 10•2	2,13 (0.13)	260 (3770)	280 (4060)	290 (4205)	4000	650
PL 10•2,5	2,67 (0.16)	260 (3770)	280 (4060)	290 (4205)	4000	650
PL 10•3,15	3,34 (0.20)	260 (3770)	280 (4060)	290 (4205)	4000	650
PL 10•4	4,27 (0.26)	250 (3625)	270 (3915)	280 (4060)	4000	650
PL 10•5	5,34 (0.33)	250 (3625)	270 (3915)	280 (4060)	4000	650
PL 10•5,8	6,20 (0.38)	230 (3335)	250 (3625)	260 (3770)	3500	650
PL 10•6,3	6,67 (0.41)	230 (3335)	250 (3625)	260 (3770)	3500	650
PL 10•8	8,51 (0.52)	180 (2610)	200 (2900)	210 (3045)	3500	650
PL 10•10	10,67 (0.65)	140 (2030)	160 (2320)	170 (2465)	3500	650

Pressure values in the table refer to side ports unidirectional pumps and motors.
 For reversible pumps and motors, max pressures are 250 bar (3600 psi) excepted those with lower pressure values.
 For different configurations and working conditions please consult our pre-sales department.

DCAT033-ID02

GENERAL DATA PUMPS AND MOTORS

Q	l/min (US gpm)	Flow
M	Nm (lbf in)	Torque
P	kW (HP)	Power
V	cm ³ /rev (in ³ /rev)	Displacement
n	min ⁻¹	Speed
Δp	bar (psi)	Pressure

Efficiencies		Pumps	Motors
$\eta_v = \eta_v(V, \Delta p, n)$	Volumetric efficiency	($\approx 0,97$)	($\approx 0,96$)
$\eta_{hm} = \eta_{hm}(V, \Delta p, n)$	Hydro-mechanical efficiency	($\approx 0,88$)	($\approx 0,85$)
$\eta_t = \eta_v \cdot \eta_{hm}$	Overall efficiency	($\approx 0,85$)	($\approx 0,82$)

DESIGN CALCULATIONS FOR PUMP

$$Q = Q_{theor.} \cdot \eta_v \quad [l/min]$$

$$Q_{theor.} = \frac{V \cdot n}{1000} \quad [l/min]$$

$$M = \frac{M_{theor.}}{\eta_{hm}} \quad [Nm]$$

$$M_{theor.} = \frac{\Delta p \cdot V}{62,83} \quad [Nm]$$

$$P_{IN} = \frac{P_{OUT}}{\eta_t} \quad [kW]$$

$$P_{OUT} = \frac{\Delta p \cdot Q}{600} \quad [kW]$$

DESIGN CALCULATIONS FOR MOTOR

$$Q = \frac{Q_{theor.}}{\eta_v} \quad [l/min]$$

$$Q_{theor.} = \frac{V \cdot n}{1000} \quad [l/min]$$

$$M = M_{theor.} \cdot \eta_{hm} \quad [Nm]$$

$$M_{theor.} = \frac{\Delta p \cdot V}{62,83} \quad [Nm]$$

$$P_{IN} = \frac{\Delta p \cdot Q}{600} \quad [kW]$$

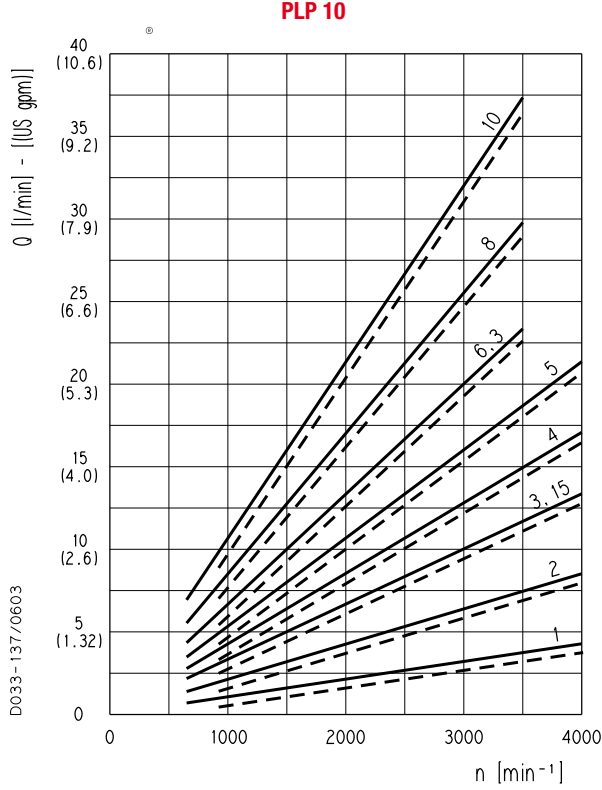
$$P_{OUT} = P_{IN} \cdot \eta_t \quad [kW]$$

NOTES

Diagrams providing approximate selection data will be found on subsequent pages.

PLP 10

PULARIS 10 GEAR PUMPS PERFORMANCE CURVES



Each curve has been obtained at 50 °C (122 °F), using oil with viscosity 46 cSt (210 SSU) at 40 °C (104 °F) and at these pressures.

PLP 10•1

—	20 bar (290 psi)
- - -	260 bar (3770 psi)

PLP 10•2

—	20 bar (290 psi)
- - -	260 bar (3770 psi)

PLP 10•3,15

—	20 bar (290 psi)
- - -	260 bar (3770 psi)

PLP 10•4

—	20 bar (290 psi)
- - -	250 bar (3625 psi)

PLP 10•5

—	20 bar (290 psi)
- - -	250 bar (3625 psi)

PLP 10•6,3

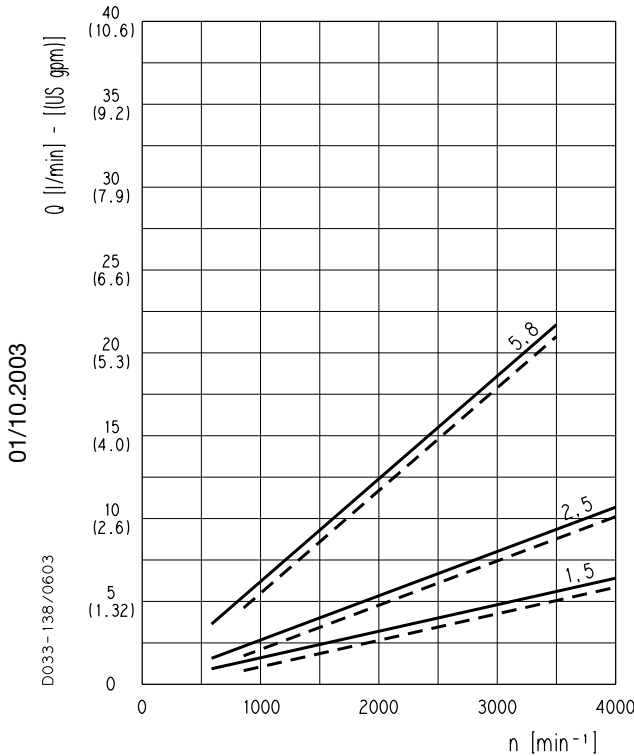
—	20 bar (290 psi)
- - -	230 bar (3335 psi)

PLP 10•8

—	20 bar (290 psi)
- - -	180 bar (2610 psi)

PLP 10•10

—	20 bar (290 psi)
- - -	140 bar (2030 psi)



PLP 10•1,5

—	20 bar (290 psi)
- - -	260 bar (3770 psi)

PLP 10•2,5

—	20 bar (290 psi)
- - -	260 bar (3770 psi)

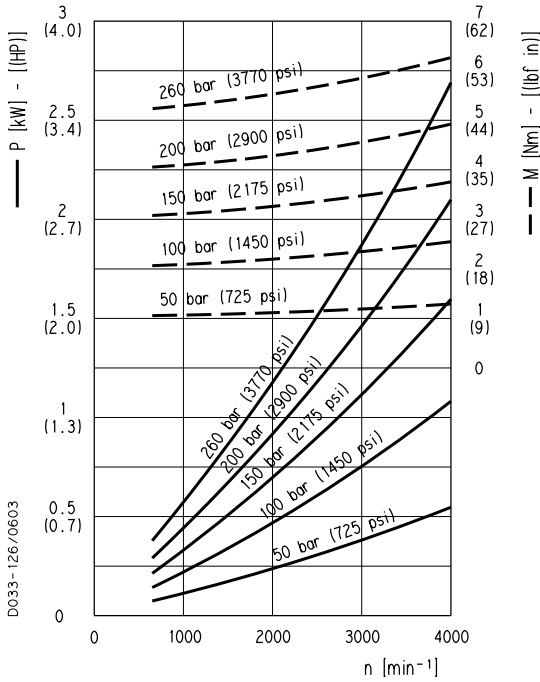
PLP 10•5,8

—	20 bar (290 psi)
- - -	230 bar (3335 psi)

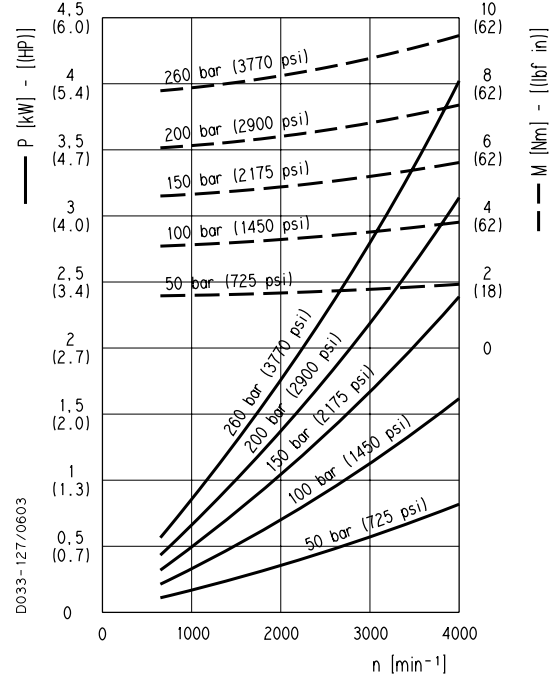
PLP 10

POLARIS 10 GEAR PUMPS PERFORMANCE CURVES

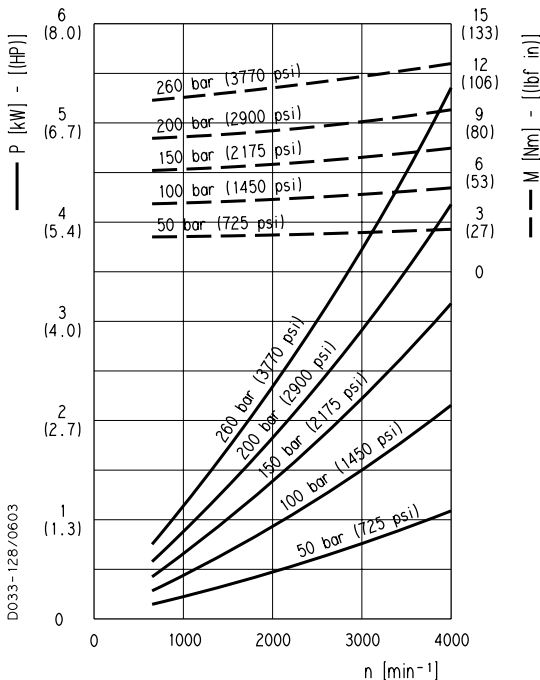
PLP 10•1



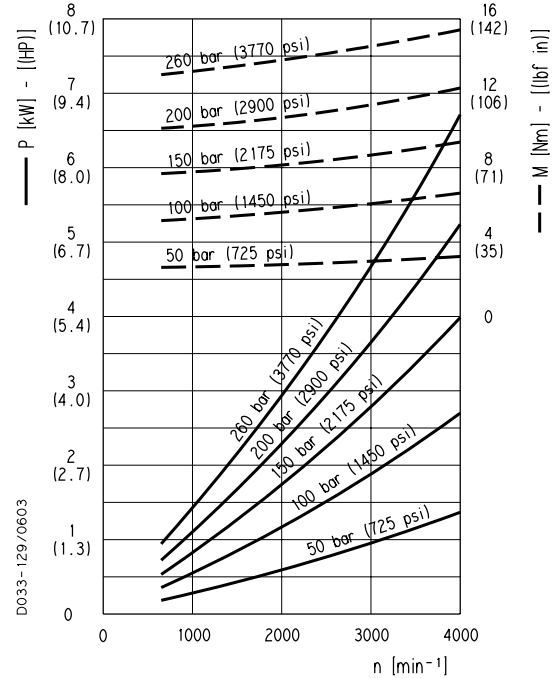
PLP 10•1,5



PLP 10•2



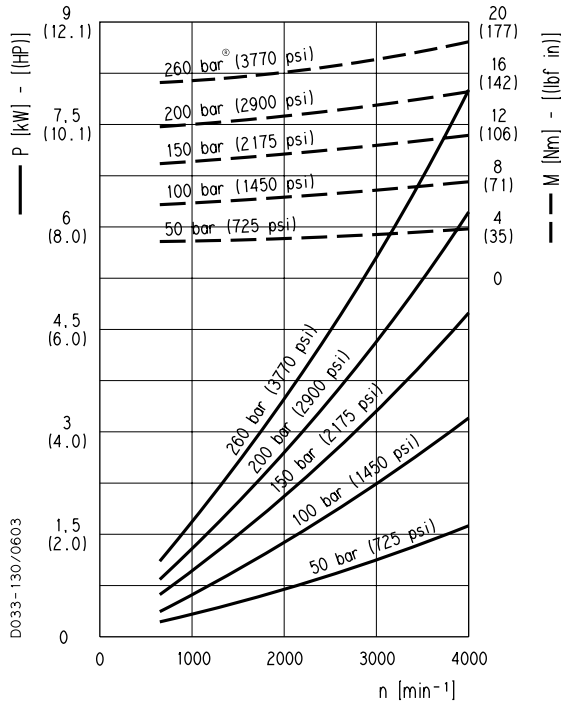
PLP 10•2,5



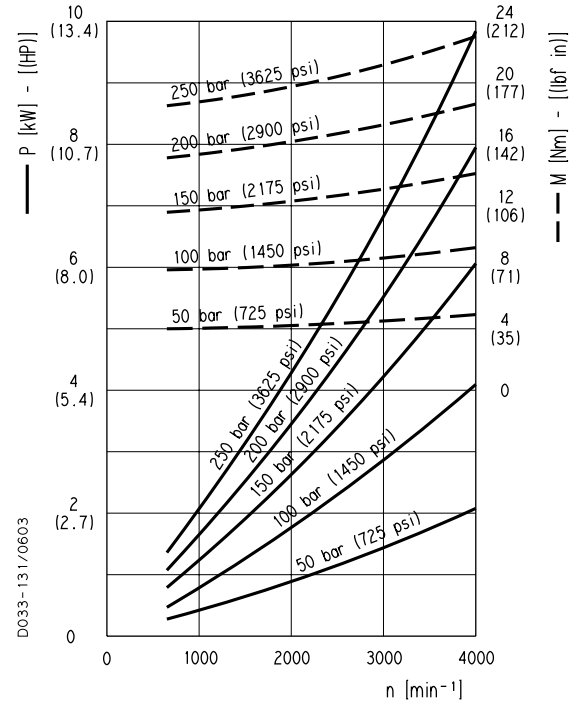
PLP 10

POLARIS 10 GEAR PUMPS PERFORMANCE CURVES

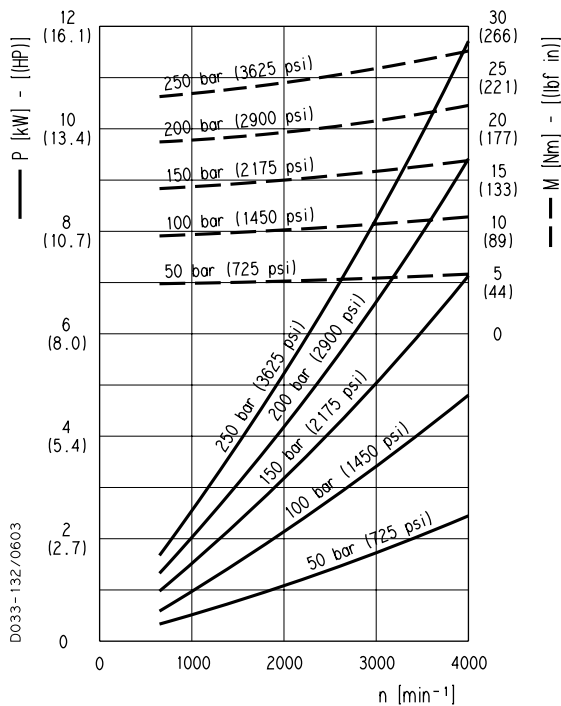
PLP 10•3,15



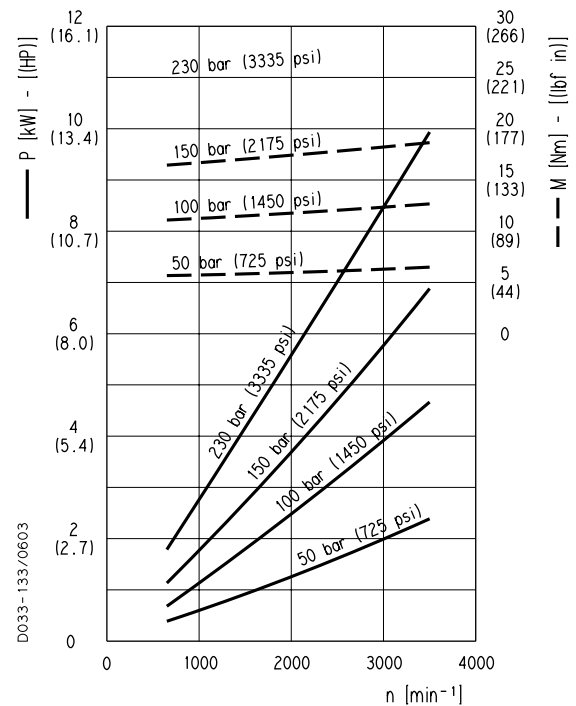
PLP 10•4



PLP 10•5



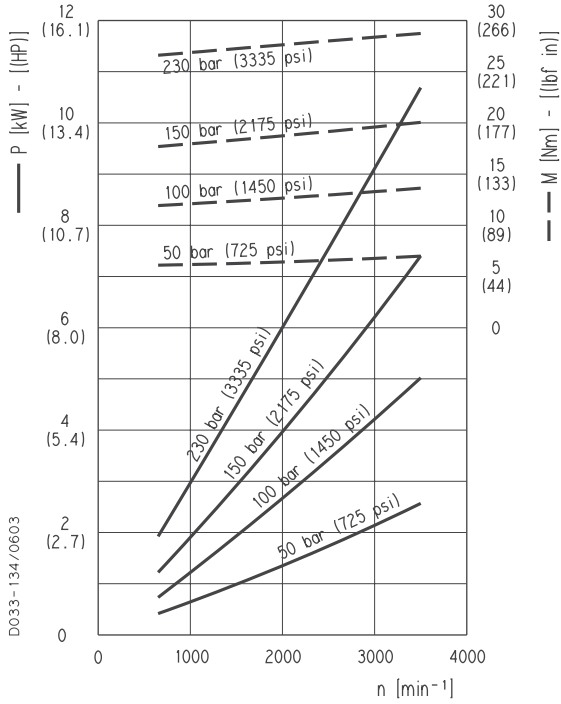
PLP 10•5,8



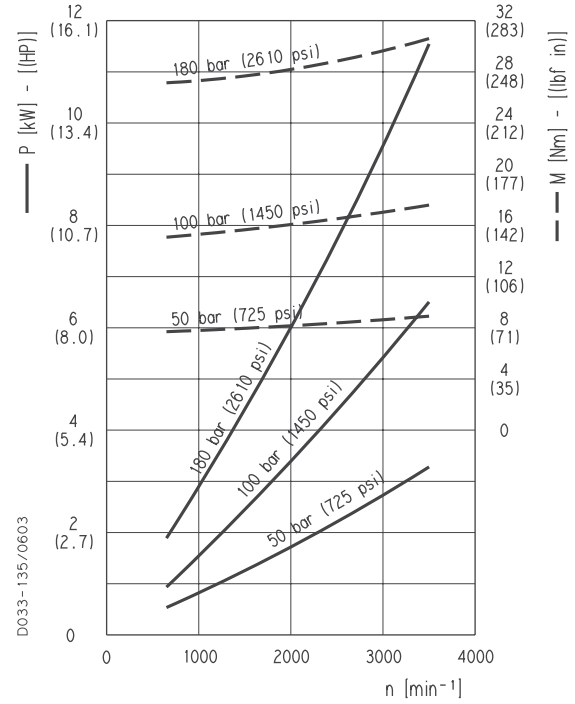
PLP 10

POLARIS 10 GEAR PUMPS PERFORMANCE CURVES

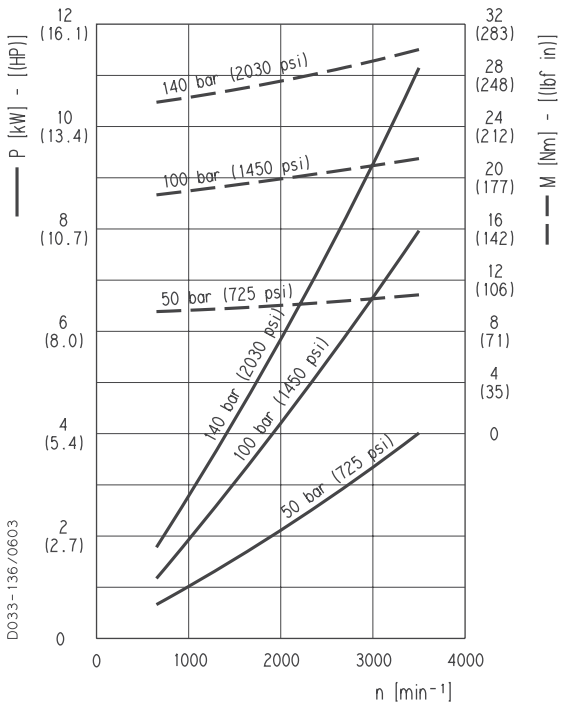
PLP 10•6,3



PLP 10•8



PLP 10•10



Yazım/Besim Hatelerinden Firmamız Sorumlu Değildir

POLARIS 10

SINGLE UNITS DIMENSIONS - SIDE PORTS

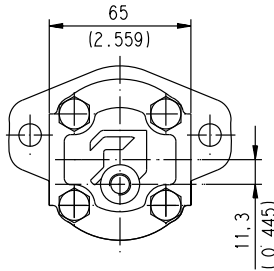
L

Drive shafts: page 52

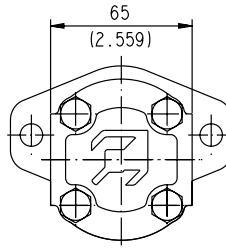
Mounting flange: for X dimension see
page 58 ÷ 60

Ports availability: Gas, SAE,
German. See page 70

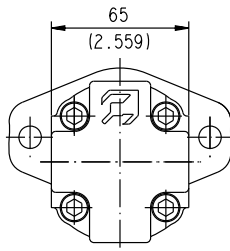
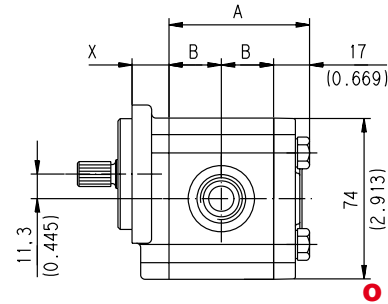
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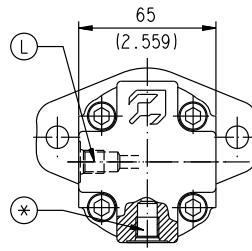
Reversible R



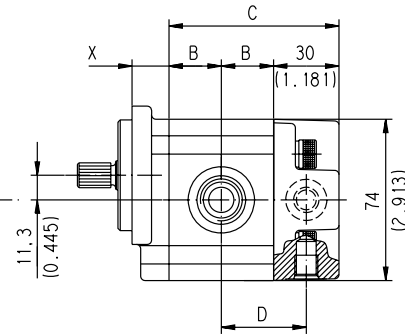
Single rotation S - D



Reversible B



Reversible L



Replaces: 02/07.2006

For single rotation S - D and reversible
rotation R the rear cover is available in
cast iron and aluminium.
For reversible rotation B and L the rear
cover is in aluminium only.

Reversible L drain port position:
L = Side
* = Bottom

Pump type	A	B	C	D
Motor type	mm (in)	mm (in)	mm (in)	mm (in)
PL 10•1	52,2 (2.0551)	17,6 (0.6929)	65,2 (2.5669)	32,6 (1.2835)
PL 10•1,5	53,8 (2.1181)	18,4 (0.7244)	66,8 (2.6299)	33,4 (1.3150)
PL 10•2	55,4 (2.1811)	19,2 (0.7559)	68,4 (2.6929)	34,2 (1.3465)
PL 10•2,5	57 (2.2441)	20 (0.7874)	70 (2.7559)	35 (1.3780)
PL 10•3,15	59 (2.3228)	21 (0.8268)	72 (2.8346)	36 (1.4173)
PL 10•4	61,8 (2.4331)	22,4 (0.8819)	74,8 (2.9449)	37,4 (1.4724)
PL 10•5	65 (2.5591)	24 (0.9449)	78 (3.0709)	39 (1.5354)
PL 10•5,8	67,6 (2.6614)	25,3 (0.9961)	80,6 (3.1732)	40,3 (1.5866)
PL 10•6,3	69 (2.7165)	26 (1.0236)	82 (3.2283)	41 (1.6142)
PL 10•8	74,5 (2.9331)	28,75 (1.1319)	87,5 (3.4449)	43,75 (1.7224)
PL 10•10	81 (3.1890)	32 (1.2598)	94 (3.7008)	47 (1.8504)

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POLARIS 10

SINGLE UNITS DIMENSIONS - REAR PORTS

P

Drive shafts: page 52

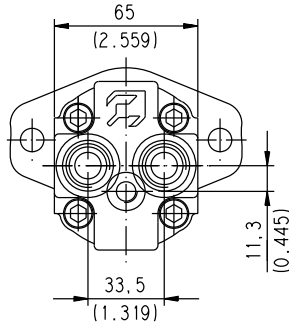
Mounting flange: for X dimension see
page 58 ÷ 60

Ports availability: Gas, SAE

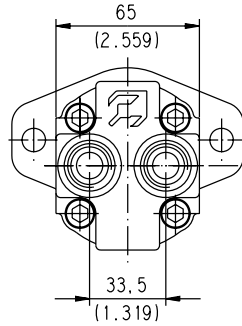
See page 70

Replaces: 02/07.2006

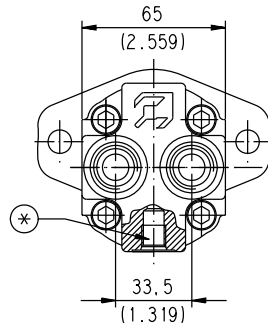
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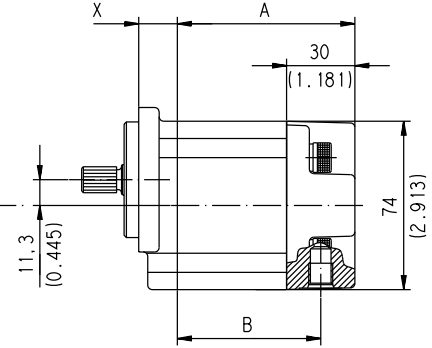
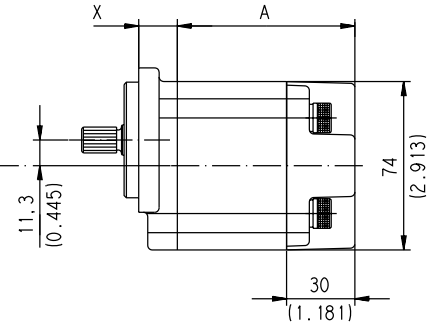
Reversible R



Single rotation S - D



Reversible L



Rear cover in aluminium only.

Reversible L drain port position:

* = Bottom

04/10.2020

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Pump type	A	B
Motor type	mm (in)	mm (in)
PL. 10•1	65,2 (2.5669)	50,2 (1.9764)
PL. 10•1,5	66,8 (2.6299)	51,8 (2.0394)
PL. 10•2	68,4 (2.6929)	53,4 (2.0124)
PL. 10•2,5	70 (2.7559)	55 (2.1654)
PL. 10•3,15	72 (2.8346)	57 (2.2441)
PL. 10•4	74,8 (2.9449)	59,8 (2.3543)
PL. 10•5	78 (3.0709)	63 (2.4803)
PL. 10•5,8	80,6 (3.1732)	65,6 (2.5827)
PL. 10•6,3	82 (3.2283)	67 (2.6378)
PL. 10•8	87,5 (3.4449)	72,5 (2.8543)
PL. 10•10	94 (3.7008)	79 (3.1102)

Yazım/Besim Hatolarından Firmamız Sorumludur

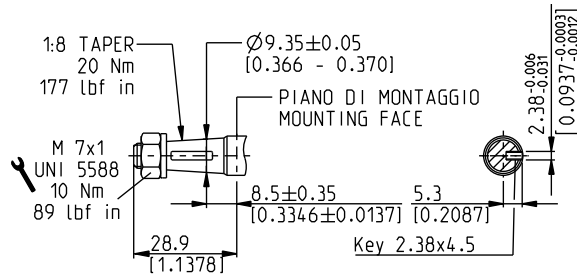
POLARIS 10

DRIVE SHAFTS

EUROPEAN TAPERED 1:8

81

Mounting face refer to flange code E1

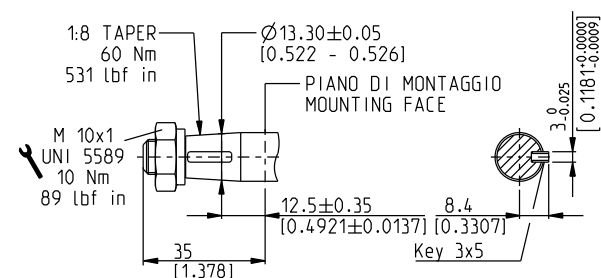


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EUROPEAN TAPERED 1:8

86

Mounting face refer to flange code E7



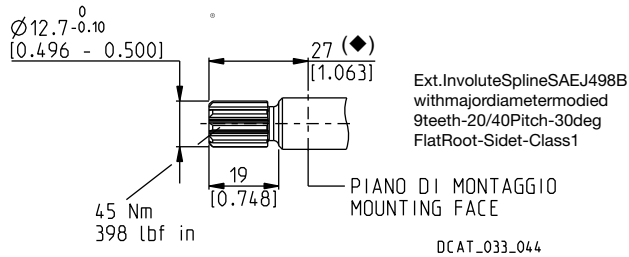
DCAT_033_042

Replaces: 01/10.2003

SAE "AA" SPLINE

02

Mounting face refer to flange code R9



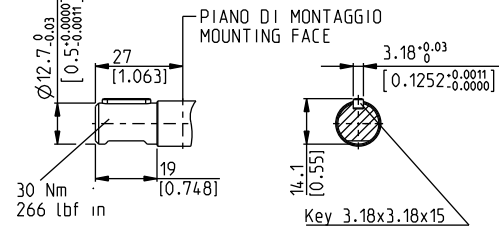
DCAT_033_044

(◆) 24 (0.9449) with flange code S0

SAE "AA" STRAIGHT

30

Mounting face refer to flange code S0



DCAT_033_045

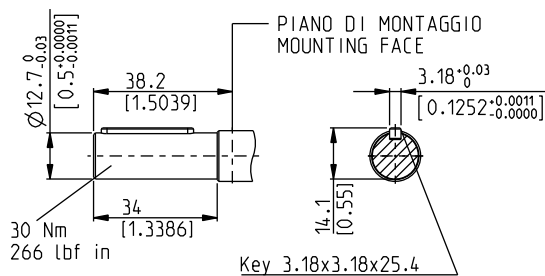
SAE STRAIGHT

36

Not available with size:

10•1,5 10•2,5

Mounting face refer to flange code R8



DCAT_033_046

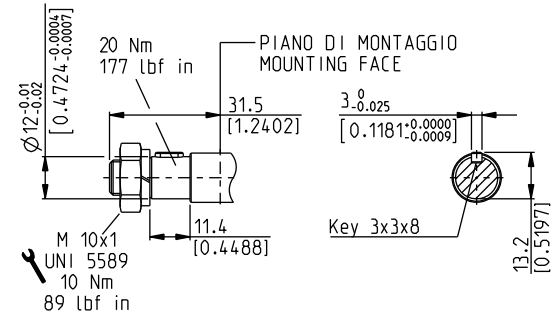
STRAIGHT

29

Not available with size:

10•5,8

Mounting face refer to flange code E8



DCAT_033_043

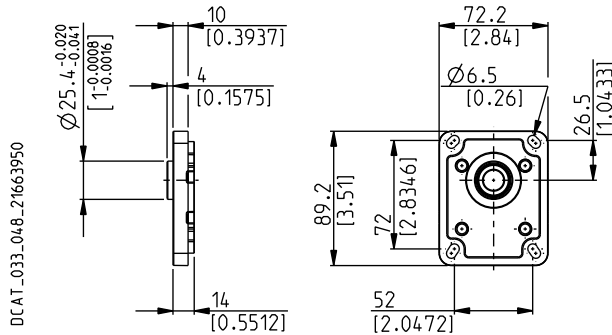
POLARIS 10

MOUNTING FLANGES AND TABLE OF COMPATIBILITY

EUROPEAN

E1

Material: cast iron and aluminium



DRIVE SHAFTS

See page 52

VERSIONS	81	02	29	86
See page 48				
0	#	x	x	x

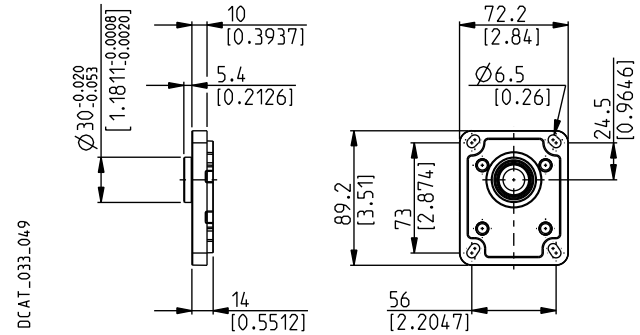
Standard combination

x Available combination

EUROPEAN

E7

Material: cast iron and aluminium



DRIVE SHAFTS

See page 52

VERSIONS	86	29	30
See page 48			
0	#	x	x

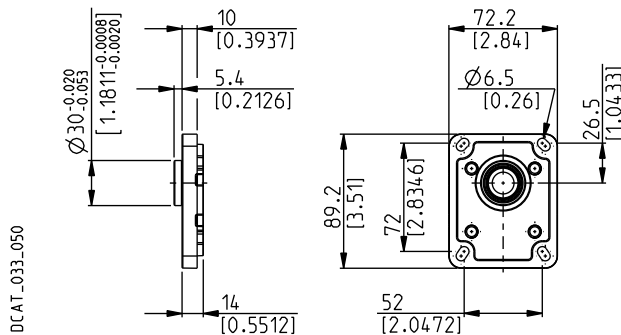
Standard combination

x Available combination

EUROPEAN

E8

Material: cast iron and aluminium



DRIVE SHAFTS

See page 52

VERSIONS	29	02
See page 48		
0	#	x

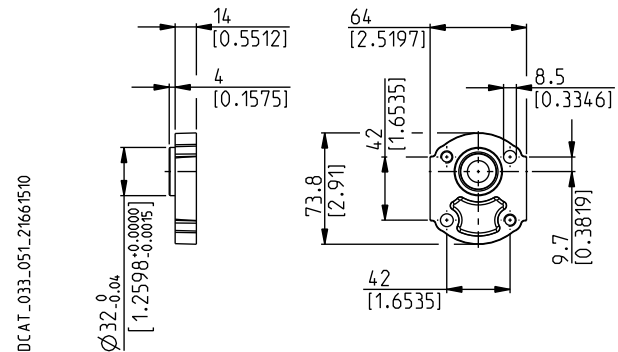
Standard combination

x Available combination

GERMAN 2 BOLTS

B1

Material: aluminium



DRIVE SHAFTS

See page 52

VERSIONS	30	86
See page 48		
0	#	x

Standard combination

x Available combination

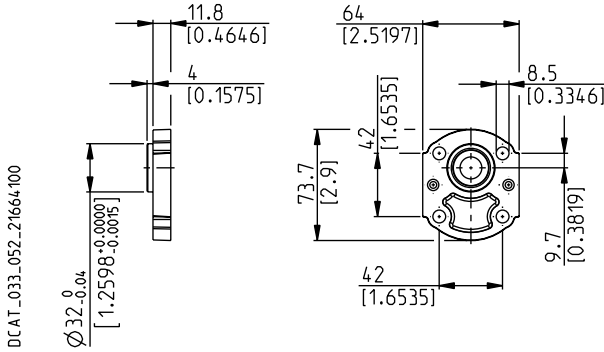
POLARIS 10

MOUNTING FLANGES AND TABLE OF COMPATIBILITY

GERMAN 4 BOLTS

K2

Material: aluminium



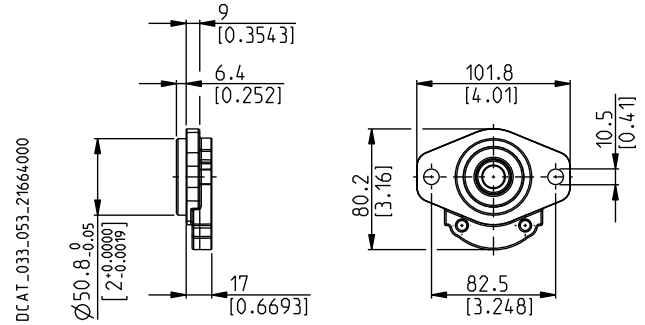
DRIVE SHAFTS
See page 52

VERSIONS See page 48	02	30
0	X	X
# Standard combination		
X Available combination		

SAE "A-A" 2 BOLTS

S0

Material: cast iron and aluminium



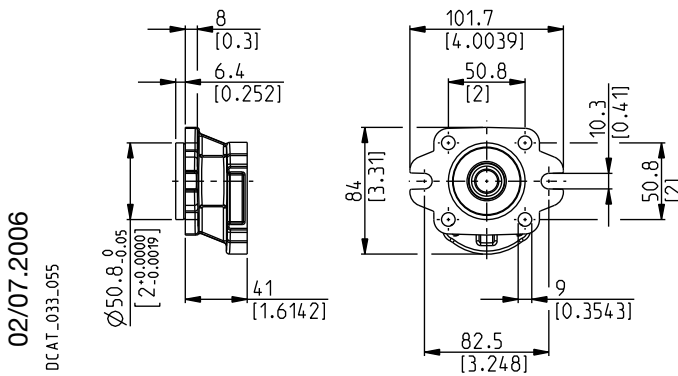
DRIVE SHAFTS
See page 52

VERSIONS See page 48	30	02	86
0	#	X	X
# Standard combination			
X Available combination			

SAE "A-A" 2-4 BOLTS

R9

Material: cast iron



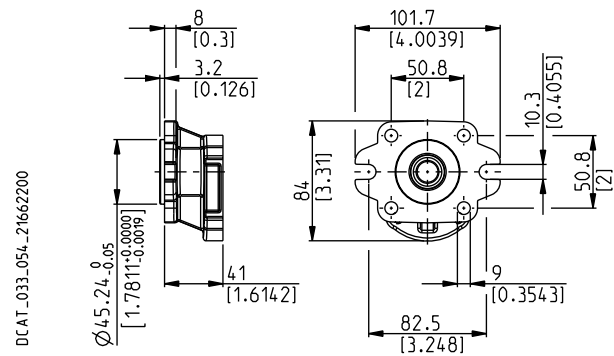
DRIVE SHAFTS
See page 52

VERSIONS See page 48	02	30	36
0	#	X	#
# Standard combination			
X Available combination			

SAE 2-4 BOLTS

R8

Material: cast iron



DRIVE SHAFTS
See page 52

VERSIONS See page 48	02	30	36
0	#	X	#
# Standard combination			
X Available combination			

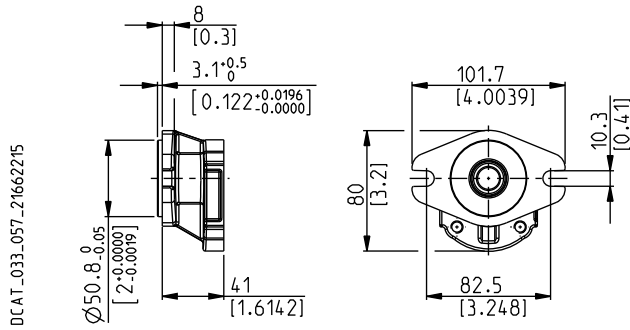
POLARIS 10

MOUNTING FLANGES AND TABLE OF COMPATIBILITY

SAE 2 BOLTS

W9

Material: cast iron



DRIVE SHAFTS

See page 52

VERSIONS

See page 48

36

0

#

Standard combination

X Available combination

PORTS POSITION AND TYPE

PORTS TYPE	SIDE PORTS												REAR PORTS			
	German		European		Split SSM		Spit SSS		Gas BSPP		SAE ODT		Gas BSPP		SAE ODT	
Pump type	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Motor type	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN
PL. 10•1	BB	BA							GC	GC	OB	OA	GC	GC	OB	OA
PL. 10•1,5	BB	BA							GC	GC	OB	OA	GC	GC	OB	OA
PL. 10•2	BB	BA							GC	GC	OB	OA	GC	GC	OB	OA
PL. 10•2,5	BB	BA							GC	GC	OB	OA	GC	GC	OB	OA
PL. 10•3,15	BB	BA							GC	GC	OB	OA	GC	GC	OB	OA
PL. 10•4	BB	BA							GC	GC	OB	OA	GC	GC	OB	OA
PL. 10•5	BB	BA							GD	GD	OB	OA	GD	GD	OB	OA
PL. 10•5,8	BB	BA							GD	GD	OB	OA	GD	GD	OB	OA
PL. 10•6,3	BB	BA							GD	GD	OB	OA	GD	GD	OB	OA
PL. 10•8	BB	BA							GD	GD	OC	OB	GD	GD	OB	OB
PL. 10•10	BB	BA							GD	GD	OC	OB	GD	GD	OB	OB

EXTERNAL DRAIN PORTS

IN/OUT PORTS TYPE	SIDE PORTS						REAR PORTS	
	German	European	Split SSM	Spit SSS	Gas BSPP	SAE ODT	Gas BSPP	SAE ODT
PL. 10	GA	-	-	-	GA	03	GA	03
PL. 20	TA	GB	GB	03	GB	03	GB	03
PL. 30	GC	GC	GC	OA	GC	OA	-	-

DRAIN PORTS SIZES



Tightening torque for low pressure side port

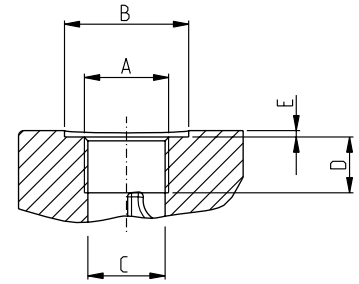
GAS STRAIGHT THREAD PORTS

BSPP

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

CODE	NOMINAL SIZE	A	Ø B	Ø C	D	E	Nm (lbf in)
			mm (in)	mm (in)	mm (in)	mm (in)	
GA	1/8"	G 1/8	16,5 (0.6496)	8,75 (0.3444)	12 (0.4724)	1 (0.0394)	5 ^{+0,25} (44 ÷ 46)
GB	1/4"	G 1/4	21,5 (0.8465)	12 (0.4724)	15 (0.5906)	1,5 (0.0591)	15 ⁺¹ (133 ÷ 142)

DCAT_006_026_21064779



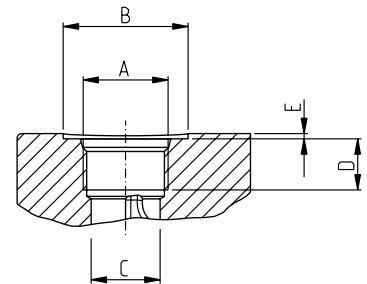
METRIC STRAIGHT THREAD PORTS ISO 6149

METRIC

Metric thread ISO 60° conforms to ISO/R 262

CODE	A	Ø B	Ø C	D	E	Nm (lbf in)
		mm (in)	mm (in)	mm (in)	mm (in)	
TA	M 10x1	22 (0.8661)	9 (0.3543)	13 (0.5118)	0,5 (0.0197)	10 ^{+0,5} (89 ÷ 93)

DCAT_006_027_21060524



SAE STRAIGHT THREAD PORTS J514

ODT

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

CODE	A	Ø B	Ø C	D	E	Nm (lbf in)
		mm (in)	mm (in)	mm (in)	mm (in)	
03	7/16"-20 UNF-2B	21 (0.8267)	9,5 (0.3740)	14 (0.5512)	1 (0.0394)	12 ⁺¹ (106 ÷ 115)

Other drain ports are shown on subsequent pages

Yazım/Besim Hatalarından Firmamız Sorumludur

PORTS SIZE



Tightening torque for low pressure side port



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

For reversible rotation, please consult only the tightening torque for high pressure side port

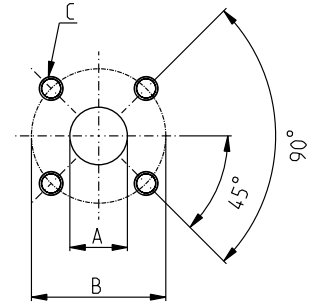
GERMAN FLANGED PORTS - 4 Bolts

GERMAN

Metric thread ISO 60° conforms to ISO/R 262

CODE	A mm (in)	B mm (in)	C Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
BA	8 (0.3150)	30 (1.1811)	M6 12 (0.4724)	8 ^{+0,5} (71 ÷ 75)	8 ^{+0,5} (71 ÷ 75)
BB	13 (0.5118)	30 (1.1811)	M6 12 (0.4724)	8 ^{+0,5} (71 ÷ 75)	8 ^{+0,5} (71 ÷ 75)
BC	15 (0.5906)	35 (1.3780)	M6 12 (0.4724)	8 ^{+0,5} (71 ÷ 75)	8 ^{+0,5} (71 ÷ 75)
BE	20 (0.7874)	40 (1.5748)	M6 12 (0.4724)	8 ^{+0,5} (71 ÷ 75)	8 ^{+0,5} (71 ÷ 75)
BL	19 (0.7480)	55 (2.1654)	M8 18 (0.7087)	15 ⁺¹ (133 ÷ 142)	20 ⁺¹ (177 ÷ 186)
BM	27 (1.0630)	55 (2.1654)	M8 18 (0.7087)	15 ⁺¹ (133 ÷ 142)	20 ⁺¹ (177 ÷ 186)

DCAT_033_028_17681868



EUROPEAN FLANGED PORTS - 4 Bolts

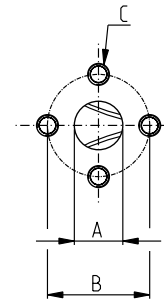
EUROPEAN

Metric thread ISO 60° conforms to ISO/R 262

CODE	A mm (in)	B mm (in)	C Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
EA	13 (0.5118)	30 (1.1811)	M 6 13 (0.5118)	8 ^{+0,5} (71 ÷ 75)	8 ^{+0,5} (71 ÷ 75)
EB	19 (0.7480)	40 (1.5748)	M 8 14 (0.5512)	15 ⁺¹ (133 ÷ 142)	15 ⁺¹ (133 ÷ 142)
			M 8 (◆) 18 (0.7087)	15 ⁺¹ (◆) (133 ÷ 142)	15 ⁺¹ (◆) (133 ÷ 142)
ED	27 (1.0630)	51 (2.0079)	M 10 18 (0.7087)	20 ⁺¹ (177 ÷ 186)	35 ^{+2,5} (310 ÷ 332)
EF	33 (1.2992)	62 (2.4409)	M 12 18 (0.7087)	25 ⁺¹ (221 ÷ 230)	50 ^{+2,5} (443 ÷ 465)

(◆) For POLARIS 30

DCAT_006_024_21060533



01/10.2003

PORTS SIZES



Tightening torque for low pressure side port



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

For reversible rotation, please consult only the tightening torque for high pressure side port

SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI

SSM

Metric thread ISO 60° to ISO/R 262

CODE	A mm (in)	B mm (in)	C mm (in)	D Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
MA	12,5 (0.4921)	38,1 (1.50)	17,5 (0.6890)	M 8	15 ⁺¹	15 ⁺¹
				14 (0.5512)	(133 ÷ 142)	(133 ÷ 142)
				M 8 (◆)	20 ⁺¹ (◆)	20 ⁺¹ (◆)
MB	19 (0.7480)	47,6 (1.8740)	22,2 (0.8740)	22 (0.8661)	(177 ÷ 186)	(177 ÷ 186)
				M 10	20 ⁺¹	25 ⁺¹
				14 (0.5512)	(177 ÷ 186)	(266 ÷ 288)
MC	25,4 (1.0000)	52,4 (2.0630)	26,2 (1.0315)	M 10 (◆)	20 ⁺¹ (◆)	35 ^{+2,5} (◆)
				22 (0.8661)	(177 ÷ 186)	(310 ÷ 332)
				M 10	20 ⁺¹	25 ⁺¹
MD	30,5 (1.2008)	58,7 (2.3110)	30,2 (1.1890)	14 (0.5512)	(177 ÷ 186)	(266 ÷ 288)
				M 10 (◆)	20 ⁺¹ (◆)	35 ^{+2,5} (◆)
				22 (0.8661)	(177 ÷ 186)	(310 ÷ 332)
ME	39,3 (1.5472)	69,8 (2.7480)	35,7 (1.4055)	M 12	30 ^{+2,5}	60 ⁺⁵
				22 (0.8661)	(266 ÷ 288)	(531 ÷ 575)
MF	51 (2.0079)	77,8 (3.0630)	42,9 (1.6890)	M 12	30 ^{+2,5}	60 ⁺⁵
				22 (0.8661)	(266 ÷ 288)	(531 ÷ 575)

(◆) For POLARIS 30

SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI

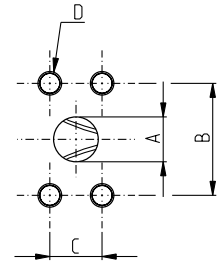
SSS

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

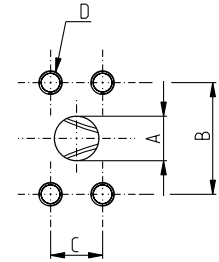
CODE	A mm (in)	B mm (in)	C mm (in)	D Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
SA	12,5 (0.4921)	38,1 (1.50)	17,5 (0.6890)	5/16-18 UNC-2B	15 ⁺¹	15 ⁺¹
				14 (0.5512)	(133 ÷ 142)	(133 ÷ 142)
				5/16-18 UNC-2B (◆)	20 ⁺¹ (◆)	20 ⁺¹ (◆)
SB	19 (0.7480)	47,6 (1.8740)	22,2 (0.8740)	22 (0.8661)	(177 ÷ 186)	(177 ÷ 186)
				3/8-16 UNC-2B	20 ⁺¹	20 ⁺¹
				14 (0.5512)	(177 ÷ 186)	(177 ÷ 186)
SC	25,4 (1.0000)	52,4 (2.0630)	26,2 (1.0315)	3/8-16 UNC-2B (◆)	30 ^{+2,5} (◆)	20 ⁺¹ (◆)
				22 (0.8661)	(266 ÷ 288)	(177 ÷ 186)
				3/8-16 UNC-2B	20 ⁺¹	25 ⁺¹
SD	30,5 (1.2008)	58,7 (2.3110)	30,2 (1.1890)	14 (0.5512)	(177 ÷ 186)	(221 ÷ 230)
				3/8-16 UNC-2B (◆)	20 ⁺¹ (◆)	30 ^{+2,5} (◆)
				22 (0.8661)	(177 ÷ 186)	(266 ÷ 288)
SE	39,3 (1.5472)	69,8 (2.7480)	35,7 (1.4055)	7/16-14 UNC-2B	20 ⁺¹	45 ^{+2,5}
				22 (0.8661)	(177 ÷ 186)	(398 ÷ 420)
SF	51 (2.0079)	77,8 (3.0630)	42,9 (1.6890)	1/2-13 UNC-2B	30 ^{+2,5}	70 ⁺⁵
				22 (0.8661)	(266 ÷ 288)	(620 ÷ 664)

(◆) For POLARIS 30

DCAT_006_025_21064252



DCAT_006_028_21060740



01/10.2003

PORTS SIZE



Tightening torque for low pressure side port



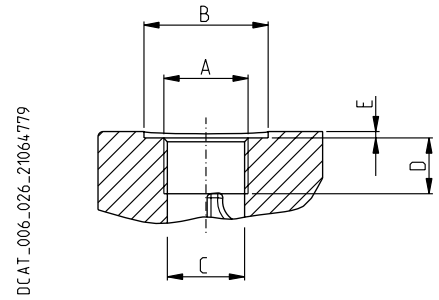
Tightening torque for high pressure side port [values obtained at 5075 psi (350 bar)]

For reversible rotation, please consult only the tightening torque for high pressure side port

GAS STRAIGHT THREAD PORTS

BSPP

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



CODE	Nominal size	A	Ø B	Ø C	D	E	Nm (lbf in)	Nm (lbf in)
			mm (in)	mm (in)	mm (in)	mm (in)		
GC	3/8"	G 3/8	30 (#) (1.1811)	15 (0.5906)	10 (#) (0.3937)	2 (#) (0.0787)	15 ⁺¹ (#) (133 ÷ 142)	—
			—		14 (0.5512)	—	15 ⁺¹ (133 ÷ 142)	25 ⁺¹ (221 ÷ 230)
GD	1/2"	G 1/2	—	19 (0.7480)	14 (0.5512)	—	20 ⁺¹ (177 ÷ 186)	50 ^{+2,5} (443 ÷ 465)
					17 (◆) (0.6693)			
GE	3/4"	G 3/4	—	24,5 (0.9646)	18 (0.7087)	—	30 ^{+2,5} (266 ÷ 288)	90 ⁺⁵ (797 ÷ 841)
GF	1"	G 1	—	30,5 (1.2008)	18 (0.7086)	—	50 ^{+2,5} (443 ÷ 465)	130 ⁺¹⁰ (1151 ÷ 1239)
GG	1" 1/4	G 1 1/4	—	39 (1.5354)	22 (0.8661)	—	60 ⁺⁵ (531 ÷ 575)	170 ⁺¹⁰ (1505 ÷ 1593)
GH	1" 1/2	G 1 1/2	—	45 (1.7716)	24 (0.9448)	—	70 ⁺⁵ (620 ÷ 664)	210 ⁺¹⁵ (1859 ÷ 1992)

= Drain port

(◆) For POLARIS 20

PORTS SIZES



Tightening torque for low pressure side port



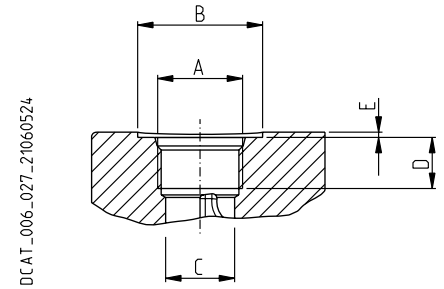
Tightening torque for high pressure side port [values obtained at 5075 psi (350 bar)]

For reversible rotation, please consult only the tightening torque for high pressure side port

SAE STRAIGHT THREAD PORTS J514

ODT

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



CODE	Nominal size	A	Ø B	Ø C	D	E	Nm (lbf in)	Nm (lbf in)
			mm (in)	mm (in)	mm (in)	mm (in)		
OA	3/8"	9/16" - 18 UNF - 2B	26 (1.0236)	13 (0.5118)	15 (0.5906)	1 (0.03934)	15 ⁺¹ (133 ÷ 142)	25 ⁺¹ (221 ÷ 230)
						2 (#) (0.0787)	15 ⁺¹ (#) (133 ÷ 142)	—
OB	1/2"	3/4" - 16 UNF - 2B	32 (1.2598)	17,5 (0.690)	15 (0.5906)	—	20 ⁺¹ (177 ÷ 186)	45 ^{+2,5} (398 ÷ 420)
OC	5/8"	7/8" - 14 UNF - 2B	35 (1.3780)	20,5 (0.8071)	15 (◆) (0.5906)	0,5 (0.0197)	30 ^{+2,5} (266 ÷ 288)	70 ⁺⁵ (620 ÷ 664)
					17 (0.6693)			
OD	3/4"	1 1/16" - 12 UNF - 2B	42 (1.6535)	24,8 (0.9764)	20 (0.7874)	0,5 (0.0197)	40 ^{+2,5} (354 ÷ 376)	120 ⁺¹⁰ (1062 ÷ 1151)
OF	1"	1 5/16" - 12 UNF - 2B	49 (1.9291)	30,5 (1.2008)	20 (0.7874)	0,5 (0.0197)	60 ⁺⁵ (531 ÷ 575)	170 ⁺¹⁰ (1505 ÷ 1593)
OG	1" 1/4	1 5/8" - 12 UNF - 2B	58 (2.2835)	39,1 (1.5394)	20 (0.7874)	0,5 (0.0197)	70 ⁺⁵ (620 ÷ 664)	200 ⁺¹⁵ (1770 ÷ 1858)
OH	1" 1/2	1 7/8" - 12 UNF - 2B	65 (2.5591)	45 (1.7717)	20 (0.7874)	0,5 (0.0197)	100 ⁺⁵ (885 ÷ 929)	270 ⁺¹⁵ (2389 ÷ 2522)

(#) = Drain port

(◆) For POLARIS 10

01/10.2003

HOW TO ORDER POLARIS 10 SINGLE UNITS

1	2	3	4	5	6	7	8	9	10	11	12	13							
PLP 10-1	L	0	-	81	E1	-	L	BB/BA	-	N	-	EL	-	C	-	L	GA	-	FS

1	Type	Pump type	Motor type
1,07 cm³/rev (0.07 in³/rev)		PLP 10-1	PLM 10-1
1,60 cm³/rev (0.10 in³/rev)		PLP 10-1,5	PLM 10-1,5
2,13 cm³/rev (0.13 in³/rev)		PLP 10-2	PLM 10-2
2,67 cm³/rev (0.16 in³/rev)		PLP 10-2,5	PLM 10-2,5
3,34 cm³/rev (0.20 in³/rev)		PLP 10-3,15	PLM 10-3,15
4,27 cm³/rev (0.26 in³/rev)		PLP 10-4	PLM 10-4
5,34 cm³/rev (0.33 in³/rev)		PLP 10-5	PLM 10-5
6,20 cm³/rev (0.38 in³/rev)		PLP 10-5,8	PLM 10-5,8
6,67 cm³/rev (0.41 in³/rev)		PLP 10-6,3	PLM 10-6,3
8,51 cm³/rev (0.52 in³/rev)		PLP 10-8	PLM 10-8
10,67 cm³/rev (0.65 in³/rev)		PLP 10-10	PLP 10-10

2	Rotation	Code
Left		S
Right		D
Reversible rear external drain		R
Reversible side external drain		L
Reversible internal drain		B

3	Versions - Outboard bearing options	Code
Without outboard bearing		0

4	Drive shaft	Code
European tapered 1:8		81
European tapered 1:8		86
SAE "AA" spline (9 teeth)		02
SAE "AA" straight		30
SAE straight		36
Straight		29

5	Mounting flange	Code
European		E1
European		E7
European		E8
German 2 bolt		B1
German 4 bolt		K2
SAE "AA" 2 bolt		S0
SAE "AA" 2-4 bolt		R9
SAE 2-4 bolt		R8
SAE 2 bolt		W9

Code	Ports position	6
L	Side	
P	Rear	

Code	Ports IN/OUT	7
GERMAN FLANGED PORTS		
Side	Rear	Type
BB/BA	PLP 10	1-1,5-2-2,5-3,15
BA/BB	PLM 10	4-5-5,8-6,3-8-10

GAS STRAIGHT THREAD PORTS (BSPP)			
Side	Rear	Type	
GC/GC	GC/GC	PLP 10	1-1,5-2-2,5-3,15-4
		PLM 10	
GD/GD	GD/GD	PLP 10	5-5,8-6,3-8-10
		PLM 10	

SAE STRAIGHT THREAD PORTS (ODT)			
Side	Rear	Type	
OB/OA	OB/OA	PLP 10	1-1,5-2-2,5-3,15-4
OA/OB	OA/OB	PLM 10	5-5,8-6,3
OC/OB	OB/OB	PLP 10	
OB/OC	OB/OB	PLM 10	8-10

Code	Seals (a)	8
N	Buna (standard)	
V	Viton	

Code	Cover options (b)	9
	Cast iron mounting flange and rear cover (standard - no code)	
E	Aluminium mounting flange and cast iron rear cover	
L	Cast iron mounting flange and aluminium rear cover	
EL	Aluminium mounting flange and rear cover	

Code	Shaft seal options	10
D	Standard seal with wiper seal	
C1	High back pressure seal	

Replaces: 02/07.2006

04/10.2020

HOW TO ORDER POLARIS 10 SINGLE UNITS

11	Drain port position - Rev. Rotation L	Code
	Side drain with side port position	L
	Side drain with bottom port position	*

12	Drain port	Code
IN/OUT GERMAN FLANGED PORTS		
Type		SideRear
1-1,5-2-2,5-3,15	PLP 10	GA
4-5-5,8-6,3-8-10	PLM 10	
IN/OUT GAS STRAIGHT THREAD PORTS (BSPP)		
Type		SideRear
1-1,5-2-2,5-3,15	PLP 10	GA
4-5-5,8-6,3-8-10	PLM 10	
IN/OUT SAE STRAIGHT THREAD PORTS (ODT)		
Type		SideRear
1-1,5-2-2,5-3,15	PLP 10	03
4-5-5,8-6,3-8-10	PLM 10	

13	Shaft arrangement	Code
	Female spline	FS

- (a) Choose the seals according to the temperature shown on page 5
- (b) Mounting flange material on page 58 ÷ 60
Rear cover material on page 34