

PL 01 T E

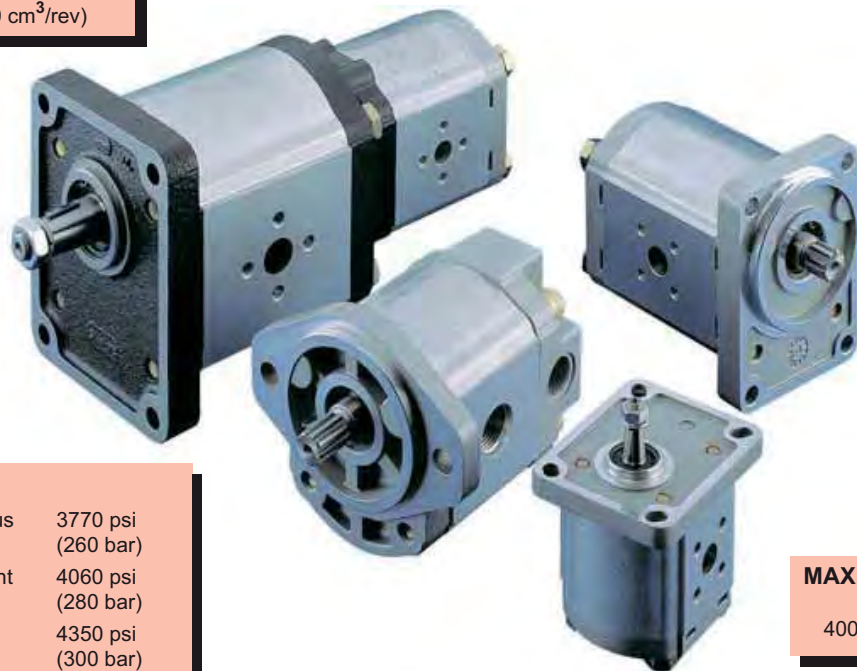
# POLARIS®

## Hydraulic gear pumps and motors

through bore aluminum body

### DISPLACEMENTS

From 0.07 in<sup>3</sup>/rev  
(1.07 cm<sup>3</sup>/rev)  
To 5.56 in<sup>3</sup>/rev  
(91.10 cm<sup>3</sup>/rev)



### PRESSURE

Max. Continuous 3770 psi  
(260 bar)  
Max. Intermittent 4060 psi  
(280 bar)  
Max. Peak 4350 psi  
(300 bar)

### MAX. SPEED

4000 min<sup>-1</sup>

- Group 1, 2 and 3 with displacements from 0.07 in<sup>3</sup>/rev (1,07 cm<sup>3</sup>/rev) to 5.56 in<sup>3</sup>/rev (91.10 cm<sup>3</sup>/rev).
- 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.

"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.

Edition: 01/10.2003



**CASAPPA**  
FLUID POWER DESIGN



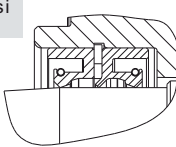
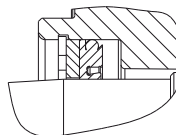
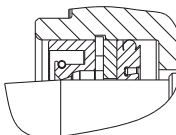
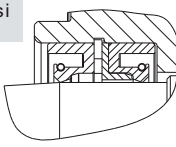
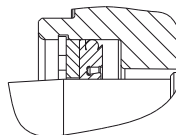
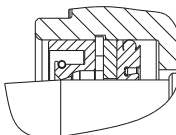
## FEATURES

Construction	External gear type pumps and motors
Mounting	EUROPEAN - SAE - GERMAN standard flanges
Line connection	Screw and flange
Direction of rotation (looking on drive shaft)	Anti-clock (S) - clockwise (D) - reversible external drain (L - R) reversible internal drain (B)
Inlet pressure range for pumps	10 ÷ 44 psi [0,7 ÷ 3 bar (abs.)]
Max back pressure for single rotation motors and reversible internal drain motors	$p_1$ (continuous) max 73 psi (5 bar)
	$p_2$ (for 20 s) max 116 psi (8 bar)
	$p_3$ (for 8 s) max 218 psi (15 bar)
Max drain line pressure on the reversible rotation motors	73 psi (5 bar)
Max back pressure on the series motors (reversible motors external drain)	$< p_1$ (max continuous pressure) $< 2175$ psi ( $< 150$ bar)
Fluid temperature range	See table (1)
Fluid	Mineral oil based hydraulic fluids to ISO/DIN. For other fluids please consult our technical sales department.
Viscosity range	From 60 to 456 SSU [12 to 100 mm <sup>2</sup> /s (cSt)] recommended
	Up to 3410 SSU [750 mm <sup>2</sup> /s (cSt)] permitted
Filtering requirement	See table (2) page 4

Tab. 1						
Type	Fluid composition	Max pressure psi - (bar)	Max speed [min <sup>-1</sup> ]	Temperature °F - (°C)	Seals (●)	Special shaft seals (◆)
ISO/DIN	Mineral oil based hydraulic fluid to ISO/DIN	See page 5	See page 5	-13 ÷ +176 (-25 ÷ +80)	N	D - H - C
				-13 ÷ +230 (-25 ÷ +110)	V	D

(●) N= Buna N (standard) - V= Viton

### (◆) Shaft seals max pressure and mounting scheme

	D	H	C
	Standard shaft seal with wiper seal	High pressure special shaft seal	High pressure special shaft seal with wiper seal
Single rotation pumps	Max 44 psi (3 bar) DCAT_033_037 	Max 363 psi (25 bar) # DCAT_033_039 	Max 363 psi (25 bar) # DCAT_033_036 
Single rotation motors Reversible rotation pumps and motors	Max 44 psi (3 bar) DCAT_033_038 	DCAT_033_039 	DCAT_033_036 

# Pressure could change in connection with shaft speed rotation.  
For more information please consult our technical sales department.

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## FEATURES

### Filtration

Tab. 2

Working pressure	$\Delta p > 2900 \text{ psi} - (200 \text{ bar})$	$\Delta p < 2900 \text{ psi} - (200 \text{ bar})$
Contamination class NAS 1638	8	10
Contamination class ISO 4406	19/17/14	21/19/16
Achieved with filter $\beta_{x \geq 75}$	10 $\mu\text{m}$	25 $\mu\text{m}$

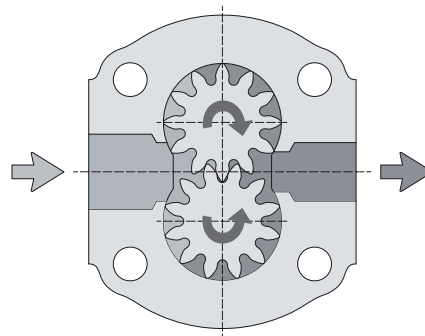
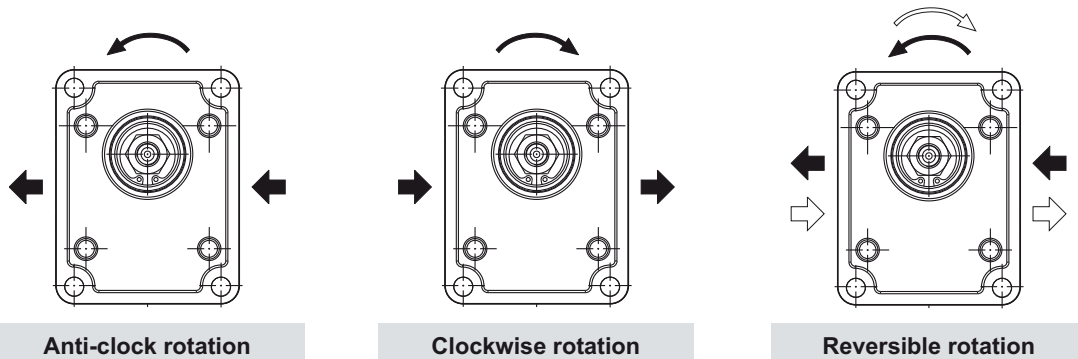
Casappa recommends to use its own production filters:



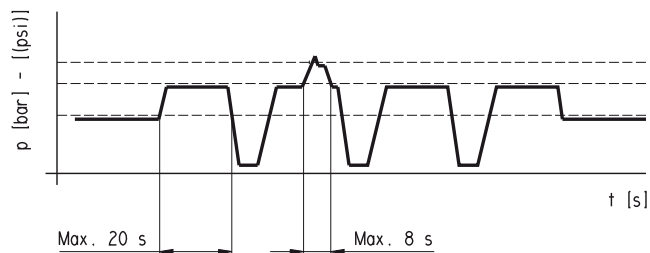
### General notes

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

### Definition of rotation direction looking on the drive shaft



### Pressure definition



$p_1$  Max. continuous pressure  
 $p_2$  Max. intermittent pressure  
 $p_3$  Max. peak pressure

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**GENERAL DATA PUMPS AND MOTORS**

Series	Pump type PLP Motor type PLM	Displacement in <sup>3</sup> /rev (cm <sup>3</sup> /rev)	Max. pressure			Max. speed	Min. speed
			p <sub>1</sub>	p <sub>2</sub>	p <sub>3</sub>		
			psi (bar)				
POLARIS 10	PL. 10•1	0.07 (1,07)	3770 (260)	4060 (280)	4205 (290)	4000	650
	PL. 10•1,5	0.10 (1,60)	3770 (260)	4060 (280)	4205 (290)	4000	650
	PL. 10•2	0.13 (2,13)	3770 (260)	4060 (280)	4205 (290)	4000	650
	PL. 10•2,5	0.16 (2,67)	3770 (260)	4060 (280)	4205 (290)	4000	650
	PL. 10•3,15	0.20 (3,34)	3770 (260)	4060 (280)	4205 (290)	4000	650
	PL. 10•4	0.26 (4,27)	3625 (250)	3915 (270)	4060 (280)	4000	650
	PL. 10•5	0.33 (5,34)	3625 (250)	3915 (270)	4060 (280)	4000	650
	PL. 10•5,8	0.38 (6,20)	3335 (230)	3625 (250)	3770 (260)	3500	650
	PL. 10•6,3	0.41 (6,67)	3335 (230)	3625 (250)	3770 (260)	3500	650
	PL. 10•8	0.52 (8,51)	2610 (180)	2900 (200)	3045 (210)	3500	650
	PL. 10•10	0.65 (10,67)	2030 (140)	2320 (160)	2465 (170)	3500	650
POLARIS 20	PL. 20•4	0.30 (4,95)	3625 (250)	4060 (280)	4350 (300)	4000	600
	PL. 20•6,3	0.40 (6,61)	3625 (250)	4060 (280)	4350 (300)	4000	600
	PL. 20•7,2	0.44 (7,29)	3625 (250)	4060 (280)	4350 (300)	4000	600
	PL. 20•8	0.50 (8,26)	3625 (250)	4060 (280)	4350 (300)	3500	600
	PL. 20•9	0.56 (9,17)	3625 (250)	4060 (280)	4350 (300)	3500	600
	PL. 20•10,5	0.66 (10,9)	3625 (250)	4060 (280)	4350 (300)	3500	600
	PL. 20•11,2	0.69 (11,23)	3625 (250)	4060 (280)	4350 (300)	3500	600
	PL. 20•14	0.89 (14,53)	3625 (250)	4060 (280)	4350 (300)	3500	500
	PL. 20•16	1.03 (16,85)	3625 (250)	4060 (280)	4350 (300)	3000	500
	PL. 20•19	1.16 (19,09)	2900 (200)	3190 (220)	3480 (240)	3000	500
	PL. 20•20	1.29 (21,14)	2900 (200)	3190 (220)	3480 (240)	3000	500
	PL. 20•24,5	1.52 (24,84)	2465 (170)	2755 (190)	3045 (210)	2500	500
	PL. 20•25	1.61 (26,42)	2465 (170)	2755 (190)	3045 (210)	2500	500
	PL. 20•27,8	1.72 (28,21)	1885 (130)	2175 (150)	2465 (170)	2000	500
PL. 20•31,5	2.01 (33,03)	1885 (130)	2175 (150)	2465 (170)	2000	500	
POLARIS 30	PL. 30•22	1.34 (21,99)	3625 (250)	3915 (270)	4060 (280)	3000	350
	PL. 30•27	1.63 (26,70)	3625 (250)	3915 (270)	4060 (280)	3000	350
	PL. 30•34	2.11 (34,55)	3480 (240)	3770 (260)	3915 (270)	3000	350
	PL. 30•38	2.40 (39,27)	3480 (240)	3770 (260)	3915 (270)	3000	350
	PL. 30•43	2.68 (43,98)	3335 (230)	3625 (250)	3770 (260)	3000	350
	PL. 30•51	3.16 (51,83)	3045 (210)	3335 (230)	3480 (240)	2500	350
	PL. 30•61	3.74 (61,26)	2755 (190)	3045 (210)	3190 (220)	2500	350
	PL. 30•73	4.50 (73,82)	2465 (170)	2755 (190)	2900 (200)	2500	350
	PL. 30•82	4.98 (81,68)	2320 (160)	2465 (170)	2610 (180)	2200	350
PL. 30•90	5.56 (91,10)	2175 (150)	2320 (160)	2465 (170)	2200	350	

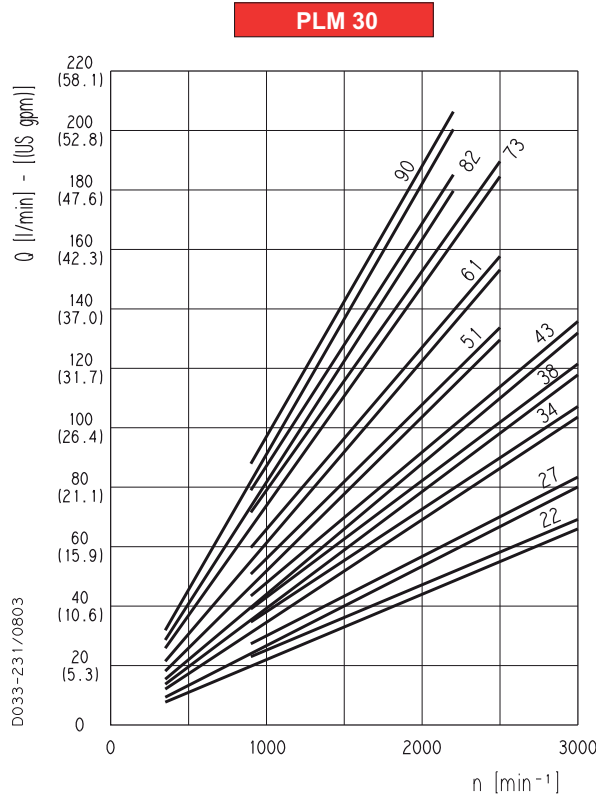
p<sub>1</sub>= Max. continuous pressure    p<sub>2</sub>= Max. intermittent pressure    p<sub>3</sub>= Max. peak pressure

The values in the table refer to unidirectional pumps and motors.  
Reversible pump and motors max pressures are 15% lower than those shown in table.  
For different working conditions please consult our sales department.

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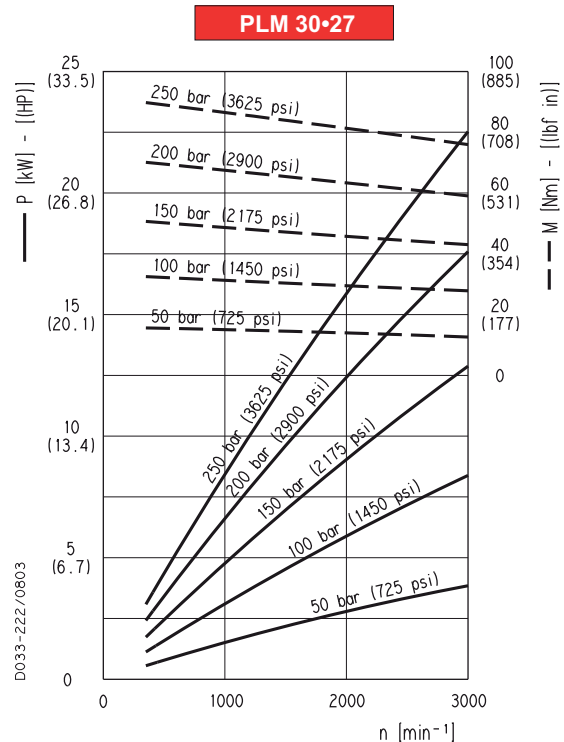
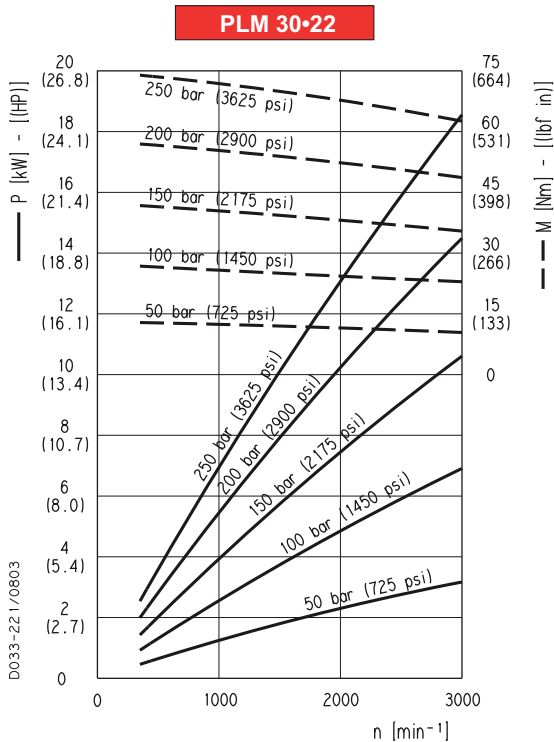
## POLARIS 30 GEAR MOTORS PERFORMANCE CURVES

**PLM 30**



Each curve has been obtained at 122 °F (50°C), using oil with viscosity 168 SSU (36 cSt) at 104 °F (40°C) and at these pressures.

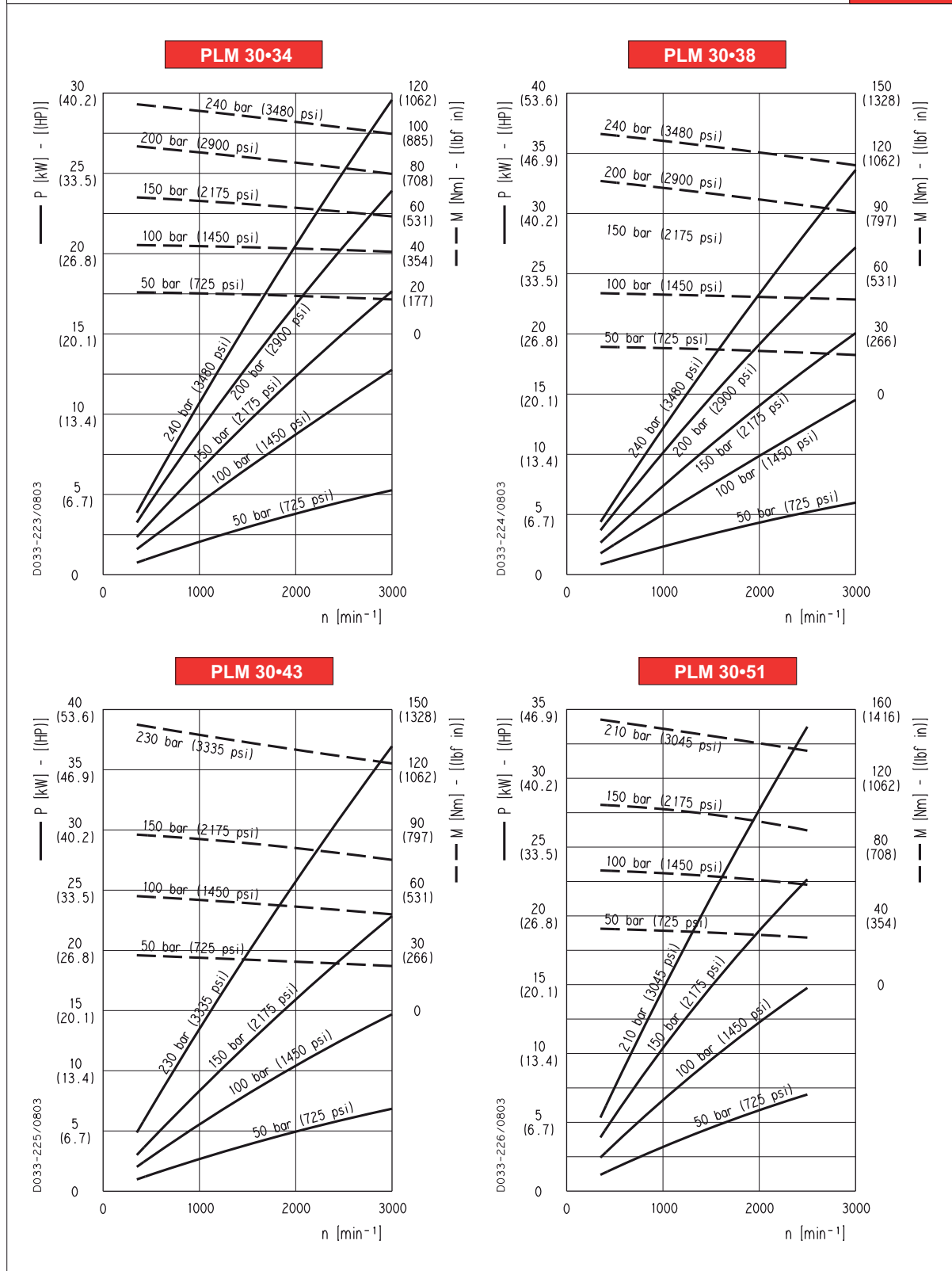
- PLM 30•22 . . . 290-3625 psi (20-250 bar)
- PLM 30•27 . . . 290-3625 psi (20-250 bar)
- PLM 30•34 . . . 290-3480 psi (20-240 bar)
- PLM 30•38 . . . 290-3480 psi (20-240 bar)
- PLM 30•43 . . . 290-3335 psi (20-230 bar)
- PLM 30•51 . . . 290-3045 psi (20-210 bar)
- PLM 30•61 . . . 290-2775 psi (20-190 bar)
- PLM 30•73 . . . 290-2465 psi (20-170 bar)
- PLM 30•82 . . . 290-2320 psi (20-160 bar)
- PLM 30•90 . . . 290-2175 psi (20-150 bar)



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**POLARIS 30 GEAR MOTORS PERFORMANCE CURVES**

**PLM 30**

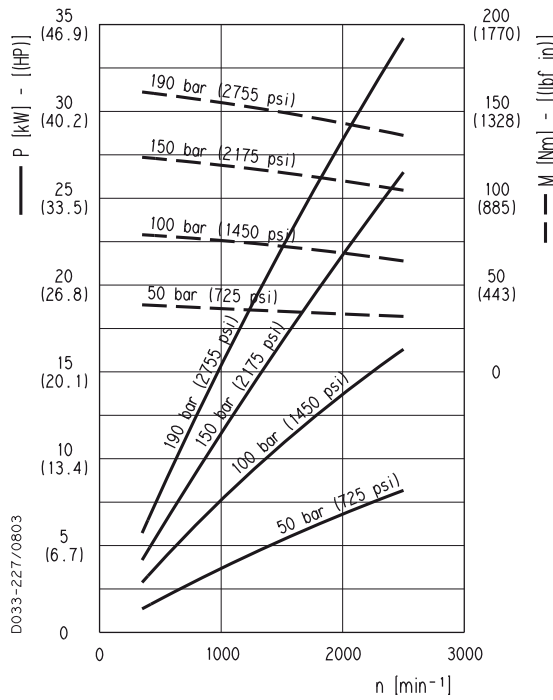


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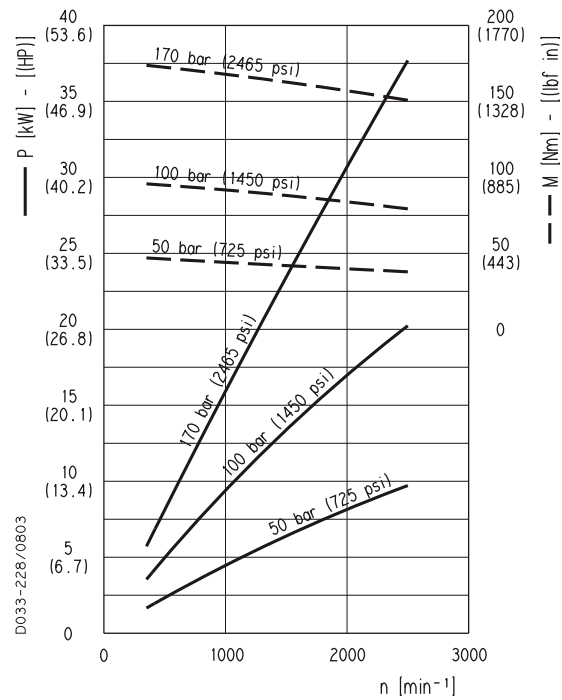
**POLARIS 30 GEAR MOTORS PERFORMANCE CURVES**

**PLM 30**

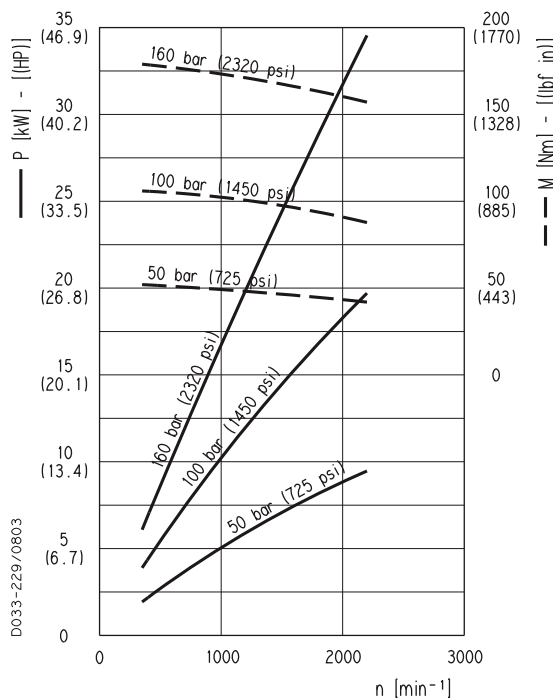
**PLM 30•61**



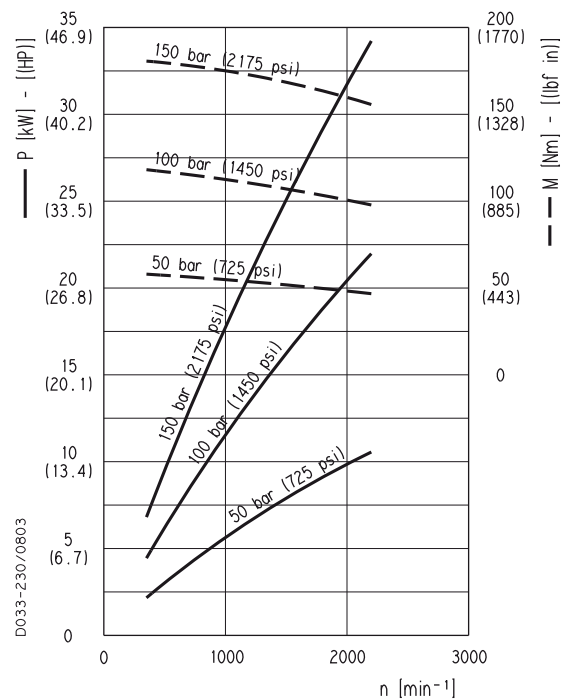
**PLM 30•73**



**PLM 30•82**



**PLM 30•90**



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## POLARIS 30

## DRIVE SHAFTS

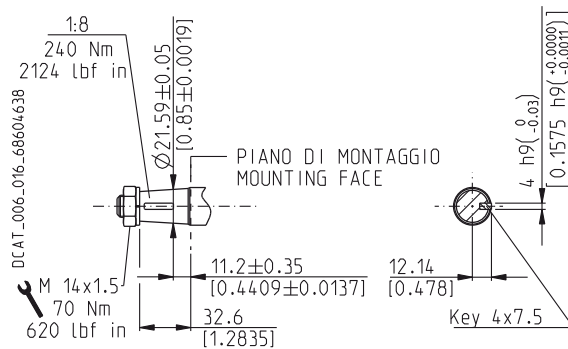
### EUROPEAN TAPERED 1:8

83

Not available with size:

30•82 - 30•90

Mounting face refer to flange code E3



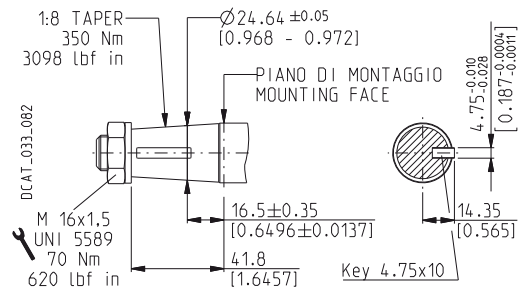
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84

Not available with size:

30•22 - 30•27 - 30•34 - 30•38

Mounting face refer to flange code E4



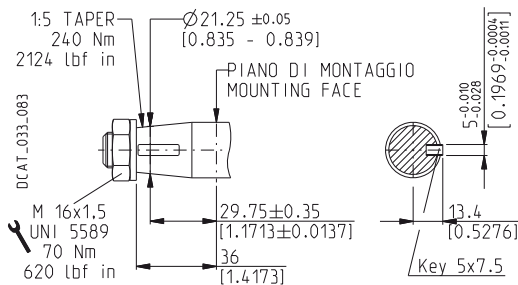
### GERMAN TAPERED 1:5

56

Not available with size:

30•61 - 30•73 - 30•82 - 30•90

Mounting face refer to flange code B3



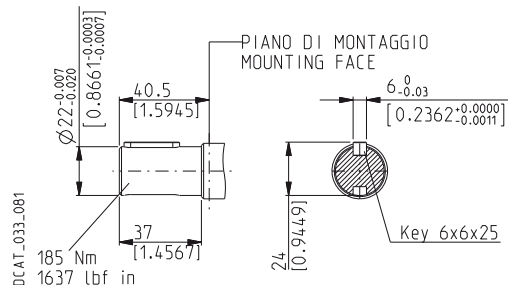
### STRAIGHT

41

Not available with size:

30•82 - 30•90

Mounting face refer to flange code E3



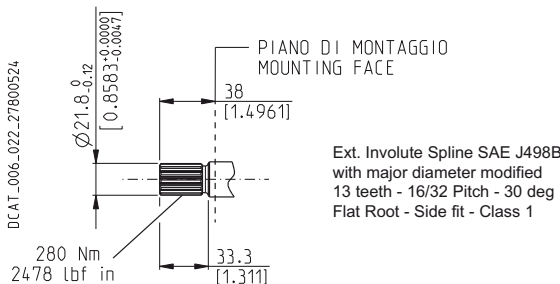
### SAE "B" SPLINE

A8

Not available with size:

30•82 - 30•90

Mounting face refer to flange code U3



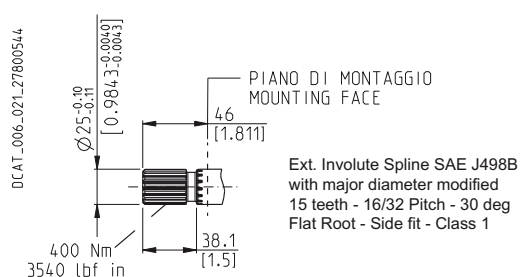
### SAE "BB" SPLINE

A5

Not available with size:

30•22 - 30•38 - 30•82 - 30•90

Mounting face refer to flange code U3



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<b>POLARIS 30</b>	<b>DRIVE SHAFTS</b>
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<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="margin: 0;"><b>SAE "B" STRAIGHT</b> <span style="float: right; background-color: #e67e22; color: white; padding: 2px 5px; font-weight: bold;">32</span></p> <p style="margin: 0;">Mounting face refer to flange code <b>S5</b></p> </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="margin: 0;"><b>SAE "BB" STRAIGHT</b> <span style="float: right; background-color: #e67e22; color: white; padding: 2px 5px; font-weight: bold;">33</span></p> <p style="margin: 0;">Mounting face refer to flange code <b>S5</b></p> </div>

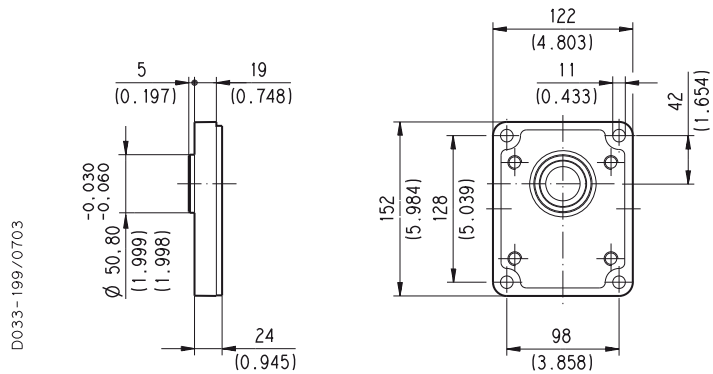
01/10.03

**POLARIS 30**

**MOUNTING FLANGES AND TABLE OF COMPATIBILITY**

EUROPEAN

**E3**



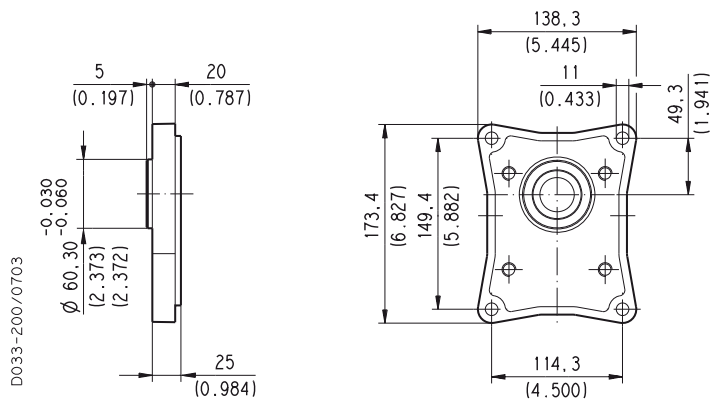
**DRIVE SHAFTS**  
See page 55 e 56

VERSIONS See page 46	83	41	04	05	32	33	A5	A8
<b>0</b>	#	#	x	x	x	x	x	x

# Standard combination  
x Available combination

EUROPEAN

**E4**

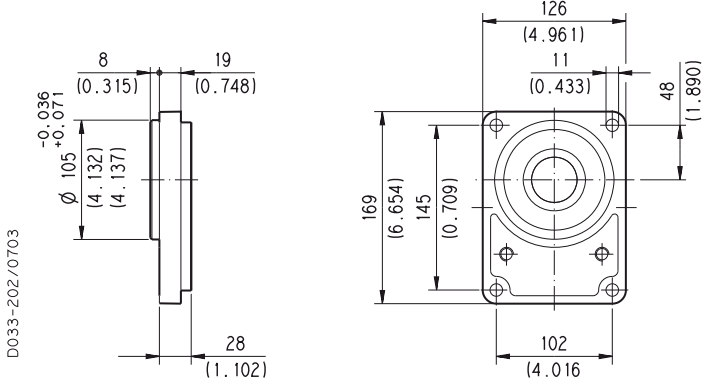
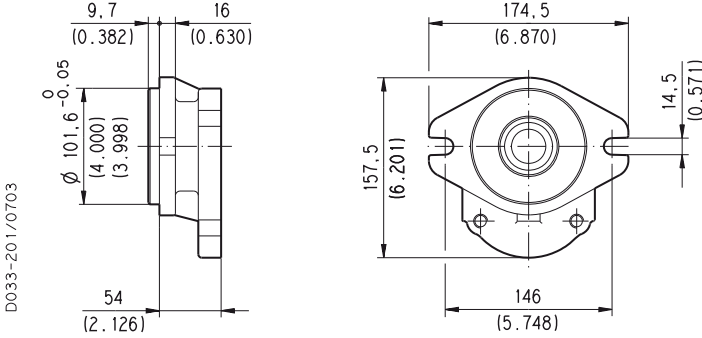


**DRIVE SHAFTS**  
See page 55 e 56

VERSIONS See page 46	84	41	A5	A8
<b>0</b>	#	x	x	x

# Standard combination  
x Available combination

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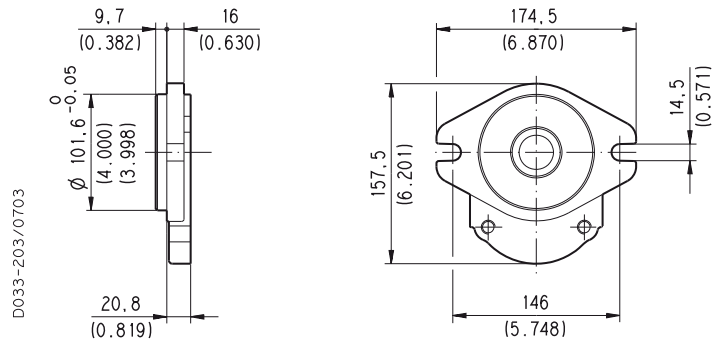
POLARIS 30	MOUNTING FLANGES AND TABLE OF COMPATIBILITY													
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GERMAN	B3													
<p><b>DRIVE SHAFTS</b> See page 55 e 56</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #d3d3d3;"> <th style="width: 15%;">VERSIONS See page 46</th> <th style="width: 15%;">56</th> <th style="width: 15%;">83</th> <th style="width: 15%;">A5</th> <th style="width: 15%;">A8</th> </tr> </thead> <tbody> <tr> <td style="font-weight: bold;">0</td> <td style="font-weight: bold;">#</td> <td style="font-weight: bold;">x</td> <td style="font-weight: bold;">x</td> <td style="font-weight: bold;">x</td> </tr> </tbody> </table> <p># Standard combination x Available combination</p>					VERSIONS See page 46	56	83	A5	A8	0	#	x	x	x
VERSIONS See page 46	56	83	A5	A8										
0	#	x	x	x										
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%; padding: 2px;">SAE "B" 2 BOLTS</td> <td style="width: 30%; padding: 2px; background-color: #f08080; text-align: center;">S5</td> </tr> </table>	SAE "B" 2 BOLTS	S5												
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<p><b>DRIVE SHAFTS</b> See page 55 e 56</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #d3d3d3;"> <th style="width: 15%;">VERSIONS See page 46</th> <th style="width: 15%;">04</th> <th style="width: 15%;">05</th> <th style="width: 15%;">32</th> <th style="width: 15%;">33</th> </tr> </thead> <tbody> <tr> <td style="font-weight: bold;">0</td> <td style="font-weight: bold;">#</td> <td style="font-weight: bold;">#</td> <td style="font-weight: bold;">#</td> <td style="font-weight: bold;">#</td> </tr> </tbody> </table> <p># Standard combination x Available combination</p>					VERSIONS See page 46	04	05	32	33	0	#	#	#	#
VERSIONS See page 46	04	05	32	33										
0	#	#	#	#										

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**POLARIS 30**

**MOUNTING FLANGES AND TABLE OF COMPATIBILITY**

SAE "B" 2 BOLTS **U3**



**DRIVE SHAFTS**

See page 55 e 56

VERSIONS See page 46	A5	A8	83
<b>0</b>	<b>#</b>	<b>#</b>	<b>x</b>

# Standard combination

x Available combination

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**IN/OUT PORTS TYPE**


PORTS TYPE	SIDE PORTS												REAR PORTS				
	German		European		Split SSM		Split SSS		Gas BSPP		SAE ODT		Gas BSPP		SAE ODT		
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	
Pump type																	
Motor type	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT		
<b>PL. 10•1</b>	BB	BA								GC	GC	OB	OA	GC	GC	OB	OA
<b>PL. 10•1,5</b>	BB	BA								GC	GC	OB	OA	GC	GC	OB	OA
<b>PL. 10•2</b>	BB	BA								GC	GC	OB	OA	GC	GC	OB	OA
<b>PL. 10•2,5</b>	BB	BA								GC	GC	OB	OA	GC	GC	OB	OA
<b>PL. 10•3,15</b>	BB	BA								GC	GC	OB	OA	GC	GC	OB	OA
<b>PL. 10•4</b>	BB	BA								GC	GC	OB	OA	GC	GC	OB	OA
<b>PL. 10•5</b>	BB	BA								GD	GD	OB	OA	GD	GD	OB	OA
<b>PL. 10•5,8</b>	BB	BA								GD	GD	OB	OA	GD	GD	OB	OA
<b>PL. 10•6,3</b>	BB	BA								GD	GD	OB	OA	GD	GD	OB	OA
<b>PL. 10•8</b>	BB	BA								GD	GD	OC	OB	GD	GD	OB	OB
<b>PL. 10•10</b>	BB	BA								GD	GD	OC	OB	GD	GD	OB	OB
<b>PL. 20•4</b>	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC	
<b>PL. 20•6,3</b>	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC	
<b>PL. 20•7,2</b>	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC	
<b>PL. 20•8</b>	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC	
<b>PL. 20•9</b>	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC	
<b>PL. 20•10,5</b>	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC	
<b>PL. 20•11,2</b>	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC	
<b>PL. 20•14</b>	BE	BC	EB	EA	MB	MA	SB	SA	GE	GD	OD	OC	GE	GD	OD	OC	
<b>PL. 20•16</b>	BE	BC	EB	EA	MB	MA	SB	SA	GE	GD	OD	OC	GE	GD	OD	OC	
<b>PL. 20•19</b>	BE	BC	EB	EA	MB	MA	SB	SA	GE	GD	OD	OC	GE	GD	OD	OC	
<b>PL. 20•20</b>	BE	BC	EB	EA	MB	MA	SB	SA	GE	GD	OD	OC	GE	GD	OD	OC	
<b>PL. 20•24,5</b>	BE	BC	EB	EA	MC	MB	SC	SB	GE	GD	OD	OC	GE	GD	OD	OC	
<b>PL. 20•25</b>	BE	BC	EB	EA	MC	MB	SC	SB	GE	GD	OD	OC	GE	GD	OD	OC	
<b>PL. 20•27,8</b>	BE	BC	EB	EA	MC	MB	SC	SB	GE	GD	OD	OC	GE	GD	OD	OC	
<b>PL. 20•31,5</b>	BE	BC	EB	EA	MC	MB	SC	SB	GE	GD	OD	OC	GE	GD	OD	OC	
<b>PL. 30•22</b>	BM	BL	ED	EB	MB	MA	SB	SA	GF	GF	OF	OD					
<b>PL. 30•27</b>	BM	BL	ED	EB	MC	MB	SC	SB	GF	GF	OF	OD					
<b>PL. 30•34</b>	BM	BL	ED	EB	MC	MB	SC	SB	GF	GF	OF	OD					
<b>PL. 30•38</b>	BM	BL	ED	EB	MD	MC	SD	SC	GF	GF	OG	OF					
<b>PL. 30•43</b>	BM	BL	ED	EB	MD	MC	SD	SC	GF	GF	OG	OF					
<b>PL. 30•46</b>	BM	BL	ED	EB	MD	MC	SD	SC	GF	GF	OG	OF					
<b>PL. 30•51</b>	BM	BL	ED	EB	MD	MC	SD	SC	GF	GF	OG	OF					
<b>PL. 30•61</b>	BM	BL	ED	EB	ME	MD	SE	SD	GG	GF	OH	OG					
<b>PL. 30•73</b>	BM	BL	EF	ED	ME	MD	SE	SD	GG	GF	OH	OG					
<b>PL. 30•82</b>	BM	BL	EF	ED	ME	MD	SE	SD	GH	GG	OH	OG					
<b>PL. 30•90</b>	BM	BL	EF	ED	MF	ME	SF	SE	GH	GG	OH	OG					


01/10.03

### EXTERNAL DRAIN PORTS

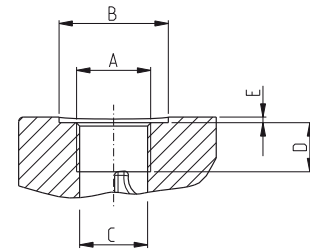
IN/OUT PORTS TYPE	SIDE PORTS						REAR PORTS	
	German	European	Split SSM	Split SSS	Gas BSPP	SAE ODT	Gas BSPP	SAE ODT
<b>PL. 10</b>	GA	–	–	–	GA	03	GA	03
<b>PL. 20</b>	TA	GB	GB	03	GB	03	GB	03
<b>PL. 30</b>	GC	GC	GC	OA	GC	OA	–	–


### DRAIN PORTS SIZES

 Tightening torque for low pressure side port.

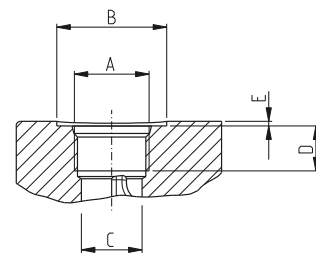
GAS STRAIGHT THREAD PORTS							BSPP
British standard pipe parallel (55°) conforms to UNI - ISO 228							
CODE	Nominal size	A	∅ B	∅ C	D	E	
			mm (in)	mm (in)	mm (in)	mm (in)	Nm (lbf in)
<b>GA</b>	1/8"	G 1/8	16,5 (0.6496)	8,75 (0.3444)	12 (0.4724)	1 (0.0394)	5 <sup>+0,25</sup> (44 ÷ 46)
<b>GB</b>	1/4"	G 1/4	21,5 (0.8465)	12 (0.4724)	15 (0.5906)	1,5 (0.0591)	15 <sup>+1</sup> (133 ÷ 142)


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METRIC STRAIGHT THREAD PORTS ISO 6149						METRIC
Metric thread ISO 60° conforms to ISO/R 262						
CODE	A	∅ B	∅ C	D	E	
		mm (in)	mm (in)	mm (in)	mm (in)	Nm (lbf in)
<b>TA</b>	M 10x1	22 (0.8661)	9 (0.3543)	13 (0.5118)	0,5 (0.0197)	10 <sup>+0,5</sup> (89 ÷ 93)

DCAT\_006\_027\_21060524





SAE STRAIGHT THREAD PORTS J514						ODT
American straight thread UNC-UNF 60° conforms to ANSI B 1.1						
CODE	A	∅ B	∅ C	D	E	
		mm (in)	mm (in)	mm (in)	mm (in)	Nm (lbf in)
<b>03</b>	7/16"-20 UNF-2B	21 (0.8267)	9,5 (0.3740)	14 (0.5512)	1 (0.0394)	12 <sup>+1</sup> (106 ÷ 115)

Other drain ports are shown on subsequent pages.

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**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.

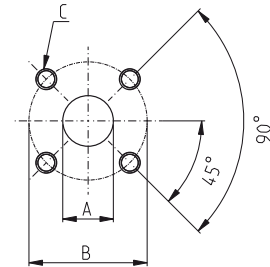
**GERMAN FLANGED PORTS - 4 Bolts**

**GERMAN**

Metric thread ISO 60° conforms to ISO/R 262

CODE	A	B	C		
	mm (in)	mm (in)	Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
<b>BA</b>	8 (0.3150)	30 (1.1811)	M6 12 (0.4724)	8 <sup>+0,5</sup> (71 ÷ 75)	8 <sup>+0,5</sup> (71 ÷ 75)
<b>BB</b>	13 (0.5118)	30 (1.1811)	M6 12 (0.4724)	8 <sup>+0,5</sup> (71 ÷ 75)	8 <sup>+0,5</sup> (71 ÷ 75)
<b>BC</b>	15 (0.5906)	35 (1.3780)	M 6 12 (0.4724)	8 <sup>+0,5</sup> (71 ÷ 75)	8 <sup>+0,5</sup> (71 ÷ 75)
<b>BE</b>	20 (0.7874)	40 (1.5748)	M 6 12 (0.4724)	15 <sup>+1</sup> (133 ÷ 142)	15 <sup>+1</sup> (133 ÷ 142)
<b>BL</b>	19 (0.7480)	55 (2.1654)	M8 18 (0.7087)	20 <sup>+1</sup> (177 ÷ 186)	20 <sup>+1</sup> (177 ÷ 186)
<b>BM</b>	27 (1.0630)	55 (2.1654)	M8 18 (0.7087)	15 <sup>+1</sup> (133 ÷ 142)	20 <sup>+1</sup> (177 ÷ 186)



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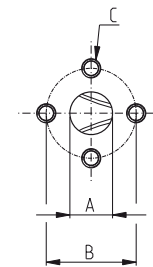
**EUROPEAN FLANGED PORTS - 4 Bolts**

**EUROPEAN**

Metric thread ISO 60° conforms to ISO/R 262

CODE	A	B	C		
	mm (in)	mm (in)	Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
<b>EA</b>	13 (0.5118)	30 (1.1811)	M 6 13 (0.5118)	8 <sup>+0,5</sup> (71 ÷ 75)	8 <sup>+0,5</sup> (71 ÷ 75)
<b>EB</b>	19 (0.7480)	40 (1.5748)	M 8 14 (0.5512)	15 <sup>+1</sup> (133 ÷ 142)	15 <sup>+1</sup> (133 ÷ 142)
			M 8 (◆) 18 (0.7087)	15 <sup>+1</sup> (◆) (133 ÷ 142)	15 <sup>+1</sup> (◆) (133 ÷ 142)
<b>ED</b>	27 (1.0630)	51 (2.0079)	M 10 18 (0.7087)	20 <sup>+1</sup> (177 ÷ 186)	30 <sup>+2,5</sup> (266 ÷ 288)
<b>EF</b>	33 (1.2992)	62 (2.4409)	M 12 18 (0.7087)	25 <sup>+1</sup> (221 ÷ 230)	50 <sup>+2,5</sup> (443 ÷ 465)


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(◆) For POLARIS 30

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**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.

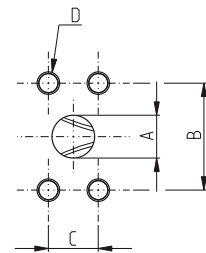
**SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI**

**SSM**

Metric thread ISO 60° conforms to ISO/R 262

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

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(◆) For POLARIS 30

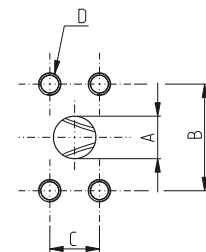
**SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI**

**SSS**

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

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

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(◆) For POLARIS 30

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**PORTS SIZES**

 Tightening torque for low pressure side port.

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

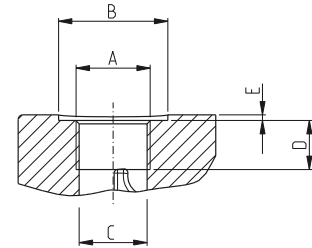
For reversible rotation, please consult only the tightening torque for high pressure side port.



**GAS STRAIGHT THREAD PORTS**

**BSPB**

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)	Nm (lbf in)	Nm (lbf in)
<b>GC</b>	3/8"	G 3/8	25 (0.9843)	15 (0.5906)	14 (0.5512)	2 (#) (0.0787)	15 <sup>+1</sup> (#) (133 ÷ 142)	–
			–				15 <sup>+1</sup> (133 ÷ 142)	25 <sup>+1</sup> (221 ÷ 230)
<b>GD</b>	1/2"	G 1/2	–	19 (0.7480)	14 (0.5512)	–	20 <sup>+1</sup> (177 ÷ 186)	50 <sup>+2,5</sup> (443 ÷ 465)
					17 (◆) (0.6693)	–	20 <sup>+1</sup> (◆) (177 ÷ 186)	50 <sup>+2,5</sup> (◆) (443 ÷ 465)
<b>GE</b>	3/4"	G 3/4	–	24,5 (0.9646)	18 (0.7087)	–	30 <sup>+2,5</sup> (266 ÷ 288)	90 <sup>+5</sup> (797 ÷ 841)
<b>GF</b>	1"	G 1	–	30,5 (1.2008)	18 (0.7086)	–	50 <sup>+2,5</sup> (443 ÷ 465)	130 <sup>+10</sup> (1151 ÷ 1239)
<b>GG</b>	1" 1/4	G 1 1/4	–	39 (1.5354)	22 (0.8661)	–	60 <sup>+5</sup> (531 ÷ 575)	170 <sup>+10</sup> (1505 ÷ 1593)
<b>GH</b>	1" 1/2	G 1 1/2	–	45 (1.7716)	24 (0.9448)	–	70 <sup>+5</sup> (620 ÷ 664)	210 <sup>+15</sup> (1859 ÷ 1992)

(#) Drain port  
(◆) For POLARIS 20

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**PORTS SIZES**



Tightening torque for low pressure side port.



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

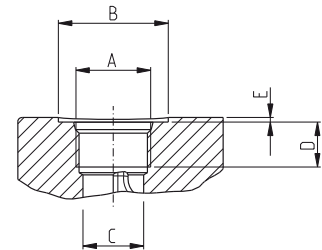
For reversible rotation, please consult only the tightening torque for high pressure side port.



**SAE STRAIGHT THREAD PORTS J514**

**ODT**

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

DLAT\_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 <sup>+1</sup> (133 ÷ 142)	25 <sup>+1</sup> (221 ÷ 230)
							2 (#) (0.0787)	15 <sup>+1</sup> (#) (133 ÷ 142)
OB	1/2"	3/4" - 16 UNF - 2B	32 (1.2598)	17,5 (0.690)	15 (0.5906)	-	20 <sup>+1</sup> (177 ÷ 186)	45 <sup>+2,5</sup> (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 <sup>+2,5</sup> (266 ÷ 288)	70 <sup>+5</sup> (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 <sup>+2,5</sup> (354 ÷ 376)	120 <sup>+10</sup> (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 <sup>+5</sup> (531 ÷ 575)	170 <sup>+10</sup> (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 <sup>+5</sup> (620 ÷ 664)	200 <sup>+10</sup> (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 <sup>+5</sup> (885 ÷ 929)	270 <sup>+15</sup> (2389 ÷ 2522)

(#) Drain port  
(◆) For POLARIS 10

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## VALVE OPTIONS (◆)

PRIORITY VALVE			MAX PRESSURE RELIEF VALVE		
<b>P1</b>	Constant delivery and internal recirculation of excess flow.		<b>VPEF..</b>	Fixed setting with external drain.	
<b>P2</b>	Constant delivery at controlled pressure. Internal recirculation of excess flow and drain valve.		<b>VPIF..</b>	Fixed setting with internal drain.	
<b>P3</b>	Constant delivery at controlled pressure. Excess flow and drain valve must be connected to tank.		<b>VPER..</b>	Adjustable setting with external drain.	
<b>P4</b>	Constant delivery and excess flow can both be used under load.		<b>VPIR..</b>	Adjustable setting with internal drain.	
<b>P5T</b>	Constant delivery at controlled pressure with drain valve connected to tank. Excess flow can be used under load.		<b>LOAD SENSING VALVE</b>		
<b>P7</b>	Constant delivery. Excess flow at controlled pressure can be used under load. Internal recirculation of drain valve.		<b>...</b>	Static.	
<b>P9</b>	Constant delivery at controlled pressure. Internal recirculation of valve drain. Excess flow can be used under load.		<b>...</b>	Dynamic.	
<b>ELECTRIC VALVE FOR MOTORS</b>			<b>...</b>	Dynamic with relief valve fitted on the main line.	
<b>EC08..</b>	By-pass valve normally closed with max. pressure relief valve and anti-cavitation valve.		<b>...</b>	Dynamic with relief valve fitted on controlled line.	
<b>DBVSA..</b>	Proportional relief valve and anti-cavitation valve.		<b>CHECK VALVE</b>		
<b>V8</b>			<b>V8</b>	Anti-cavitation valve.	

(◆) For more information please consult our technical sales department.

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**HOW TO ORDER POLARIS 30 SINGLE UNITS**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
PLP30•22	- R	0	83	E3	- L	- ED/EB	- N	- C	- FS

1	Type	PUMP TYPE	MOTOR TYPE
	in <sup>3</sup> /rev (cm <sup>3</sup> /rev)		
1.34 (21,99)		PLP 30•22	PLM 30•22
1.63 (26,70)		PLP 30•27	PLM 30•27
2.11 (34,55)		PLP 30•34	PLM 30•34
2.40 (39,27)		PLP 30•38	PLM 30•38
2.68 (43,98)		PLP 30•43	PLM 30•43
3.16 (51,83)		PLP 30•51	PLM 30•51
3.74 (61,26)		PLP 30•61	PLM 30•61
4.50 (73,82)		PLP 30•73	PLM 30•73
4.98 (81,68)		PLP 30•82	PLM 30•82
5.56 (91,10)		PLP 30•90	PLM 30•90

2	Rotation	CODE
Left		S
Right		D
Reversible rear external drain		R

3	Version	CODE
Without outboard bearing		0

4	Drive shaft	CODE
European tapered 1:8		83
European tapered 1:8		84
German tapered 1:5		56
Straight		41
SAE "B" spline		A8
SAE "BB" spline		A5
SAE "B" spline		04
SAE "BB" spline		05
SAE "B" straight		32
SAE "BB" straight		33

5	Mounting flange	CODE
European		E3
European		E4
German		B3
SAE "B" 2 bolt		S5
SAE "B" 2 bolt		U3

6	Ports position	CODE
Side		L

7	Ports IN/OUT	CODE
<b>GERMAN FLANGED PORTS</b>		
Type		Side
22-27-34-38-43	PLP30	BM/BL
46-51-61-73-82-90	PLM30	BL/BM
<b>EUROPEAN FLANGED PORTS</b>		
Type		Side
22-27-34-38-43	PLP30	ED/EB
46-51-61	PLM30	EB/ED
73-82-90	PLP30	EF/ED
	PLM30	ED/EF

CODE	Ports IN/OUT		7
<b>SAE FLANGED PORTS (SSM)</b>			
Side	Type		
MB/MA	PLP 30	22	
MA/MB	PLM 30		
MC/MB	PLP 30	27-34	
MB/MC	PLM 30		
MD/MC	PLP 30	38-43-46-51	
MC/MD	PLM 30		
ME/MD	PLP 30	61-73-82	
MD/ME	PLM 30		
MF/ME	PLP 30	90	
ME/MF	PLM 30		

<b>SAE FLANGED PORTS (SSS)</b>			
Side	Type		
SB/SA	PLP 30	22	
SA/SB	PLM 30		
SC/SB	PLP 30	27-34	
SB/SC	PLM 30		
SD/SC	PLP 30	38-43-46-51	
SC/SD	PLM 30		
SE/SD	PLP 30	61-73-82	
SD/SE	PLM 30		
SF/SE	PLP 30	90	
SE/SF	PLM 30		

<b>GAS STRAIGHT THREAD PORTS (BSPP)</b>			
Side	Type		
GF/GF	PLP 30	22-27-34-38-43-46-51	
	PLM 30		
GG/GF	PLP 30	61-73	
GF/GG	PLM 30		
GH/GG	PLP 30	82-90	
GG/GH	PLM 30		

<b>SAE STRAIGHT THREAD PORTS (ODT)</b>			
Side	Type		
OF/OD	PLP 30	22-27-34	
OD/OF	PLM 30		
OG/OF	PLP 30	38-43-46-51	
OF/OG	PLM 30		
OH/OG	PLP 30	61-73-82-90	
OG/OH	PLM 30		

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

CODE	Shaft seal options	9
C	High back pressure seal with wiper seal	
D	Standard seal with wiper seal	
H	High back pressure seal	

CODE	Shaft arrangement	10
FS	Female spline	

(a) Choose the seals according to the temperature shown on page 3.

01/10.03