

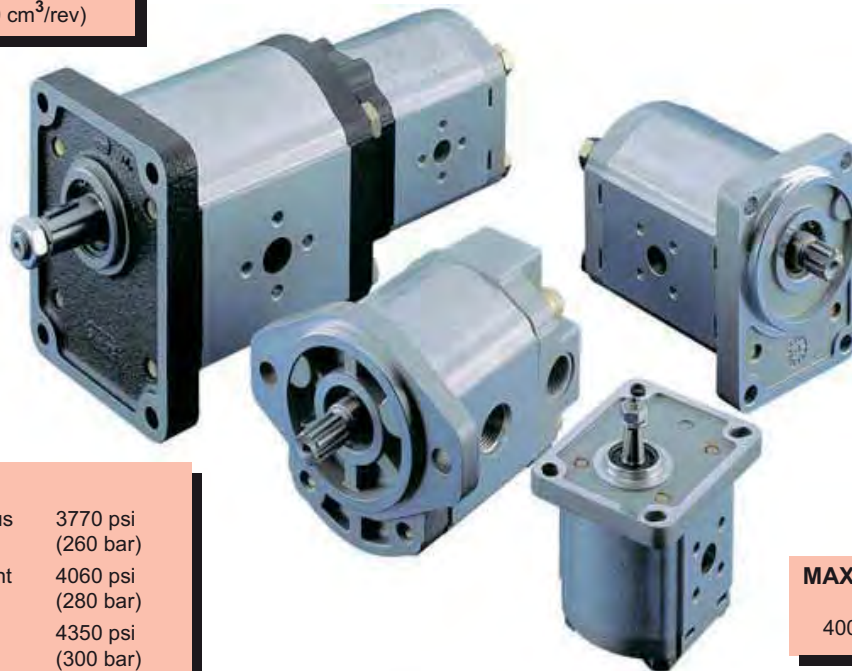
POLARIS®

Hydraulic gear pumps and motors

through bore aluminum body

DISPLACEMENTS

From 0.07 in³/rev
(1.07 cm³/rev)
To 5.56 in³/rev
(91.10 cm³/rev)



PRESSURE

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

MAX. SPEED

4000 min⁻¹

- Group 1, 2 and 3 with displacements from 0.07 in³/rev (1,07 cm³/rev) to 5.56 in³/rev (91.10 cm³/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



GENERAL DATA PUMPS AND MOTORS

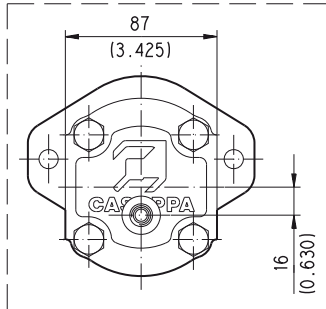
Series	Pump type PLP Motor type PLM	Displacement in ³ /rev (cm ³ /rev)	Max. pressure			Max. speed	Min. speed
			p ₁	p ₂	p ₃		
			psi (bar)				
POLARIS 10	PL. 10•1	0.07 (1,07)	3770 (260)	4060 (280)	4205 (290)	4000	650
	PL. 10•1,5	0.10 (1,60)	3770 (260)	4060 (280)	4205 (290)	4000	650
	PL. 10•2	0.13 (2,13)	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

01/10.03

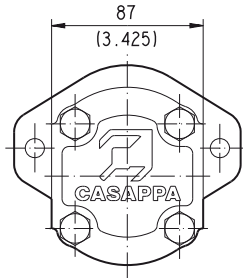
p₁= Max. continuous pressure p₂= Max. intermittent pressure p₃= Max. peak pressure

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.

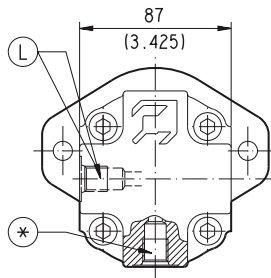
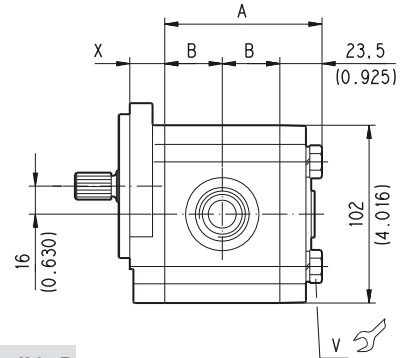
POLARIS 20 **SINGLE UNITS SIDE PORTS** **L**



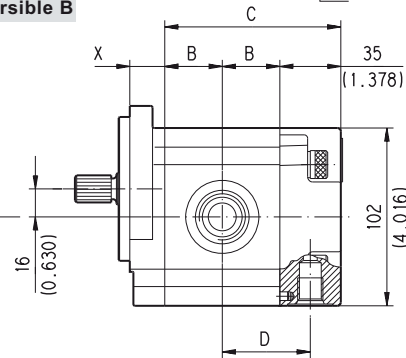
Reversible R



Single rotation S - D and Reversible B



Reversible L



D033-182/0903

Mounting flange type version 0	X	
	mm	(inch)
E2	18	(0.7087)
B2	18,8	(0.7402)
B4	16	(0.6299)
B5	16	(0.6299)
B6	17,7	(0.6969)
S1	20	(0.7874)
S2	20	(0.7874)
S9	20	(0.7874)
S5	20	(0.7874)
W8	32,1	(1.2638)

DRAIN PORT POSITION:

L = Side * = Bottom

DRIVE SHAFTS:

see page 52 ÷ 54

MOUNTING FLANGE:

see page 60 ÷ 64

Mounting flange material	V	
	Screws tightening torque Nm (lbf in)	
Aluminum	45 ⁺⁵	(398 ÷ 403)
Cast iron	70 ⁺⁵	(620 ÷ 664)

Pump type Motor type	A	B	C	D
	mm (inch)	mm (inch)	mm (inch)	mm (inch)
PL. 20•4	75 (2.9528)	25,75 (1.0138)	86,5 (3.4055)	43,25 (1.7028)
PL. 20•6,3	77,5 (3.0512)	27 (1.0630)	89 (3.5039)	44,5 (1.7520)
PL. 20•7,2	78,5 (3.0905)	27,5 (1.0826)	90 (3.5433)	45 (1.7716)
PL. 20•8	80 (3.1496)	28,25 (1.1122)	91,5 (3.6024)	45,75 (1.8012)
PL. 20•9	81,3 (3.2008)	28,9 (1.1378)	92,8 (3.6535)	46,4 (1.8268)
PL. 20•10,5	84 (3.3070)	30,25 (1.1909)	95,5 (3.7598)	47,75 (1.8799)
PL. 20•11,2	84,5 (3.3268)	30,5 (1.2008)	96 (3.7795)	48 (1.8898)
PL. 20•14	89,5 (3.5236)	33 (1.2992)	101 (3.9764)	50,5 (1.9882)
PL. 20•16	93 (3.6614)	34,75 (1.3681)	104,5 (4.1142)	52,25 (2.0571)
PL. 20•19	96,4 (3.7952)	36,45 (1.4350)	107,9 (4.2480)	53,45 (2.1043)
PL. 20•20	99,5 (3.9173)	38 (1.4961)	111 (4.3701)	55,5 (2.1850)
PL. 20•24,5	105,1 (4.1378)	40,8 (1.6063)	116,6 (4.5905)	58,3 (2.2953)
PL. 20•25	107,5 (4.2323)	42 (1.6535)	119 (4.6850)	59,5 (2.3425)
PL. 20•27,8	110,2 (4.3386)	43,35 (1.7067)	121,7 (4.7913)	60,85 (2.3957)
PL. 20•31,5	117,5 (4.6260)	47 (1.8504)	129 (5.0787)	64,5 (2.5394)

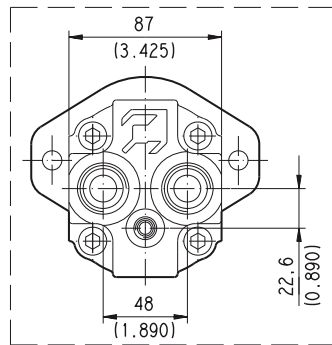
01/10.03

POLARIS 20

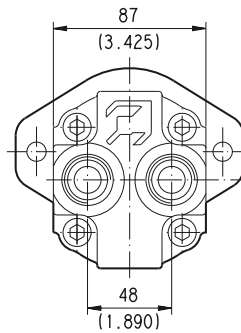
SINGLE UNITS REAR PORTS

P

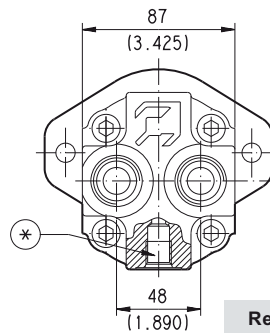
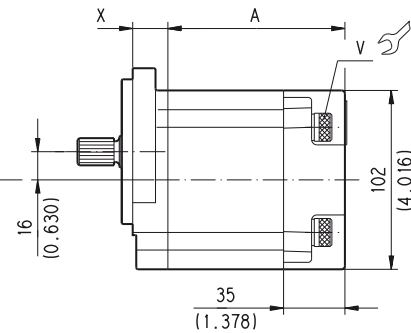
D033-183/0903



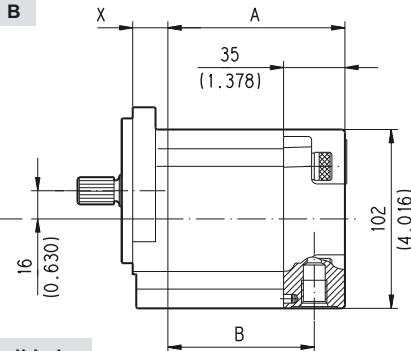
Reversible R



Single rotation S - D e Reversible B



Reversible L



Mounting flange type version 0	X	
	mm	(inch)
E2	18	(0.7087)
B2	18,8	(0.7402)
B4	16	(0.6299)
B5	16	(0.6299)
B6	17,7	(0.6969)
S1	20	(0.7874)
S2	20	(0.7874)
S9	20	(0.7874)
S5	20	(0.7874)
W8	32,1	(1.2638)

DRAIN PORT POSITION:

L = Side * = Bottom

DRIVE SHAFTS:

see page 52 ÷ 54

MOUNTING FLANGE:

see page 60 ÷ 64

Mounting flange material	V	
	Screws tightening torque Nm (lbf in)	
Aluminum	45	⁺⁵ (398 ÷ 403)
Cast iron	70	⁺⁵ (620 ÷ 664)

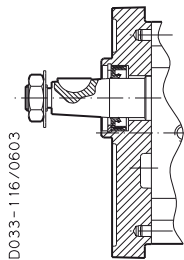
Pump type Motor type	A		B	
	mm	(inch)	mm	(inch)
PL. 20•4	86,5	(3.4055)	69	(2.71765)
PL. 20•6,3	89	(3.5039)	71,5	(2.8150)
PL. 20•7,2	90	(3.5433)	72,5	(2.8543)
PL. 20•8	91,5	(3.6024)	74	(2.9134)
PL. 20•9	92,8	(3.6535)	75,3	(2.9646)
PL. 20•10,5	95,5	(3.7598)	78	(3.0708)
PL. 20•11,2	96	(3.7795)	78,5	(3.0906)
PL. 20•14	101	(3.9764)	83,5	(3.2784)
PL. 20•16	104,5	(4.1142)	87	(3.4252)
PL. 20•19	107,9	(4.2480)	89,9	(3.5393)
PL. 20•20	111	(4.3701)	93,5	(3.6811)
PL. 20•24,5	116,6	(4.5905)	99,1	(3.9016)
PL. 20•25	119	(4.6850)	101,5	(3.9961)
PL. 20•27,8	121,7	(4.7913)	104,2	(4.1024)
PL. 20•31,5	129	(5.0787)	111,5	(4.3898)

01/10.03

VERSIONS

For each version, the possible combination between drive shafts and mounting flanges are shown on pages 57 ÷ 67.

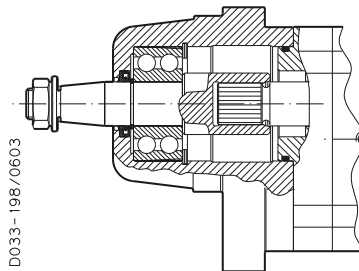
VERSION		0
Available for group:		
10	20	30



D033-116/0603

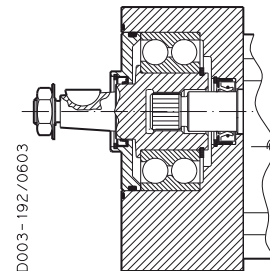
Version for applications without radial and axial load on the drive shaft.

VERSION		W8
Available for group:		
20		



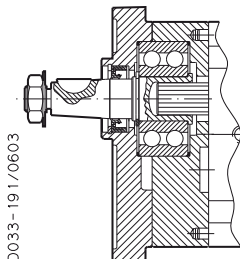
D033-198/0603

VERSION		4
Available for group:		
20		



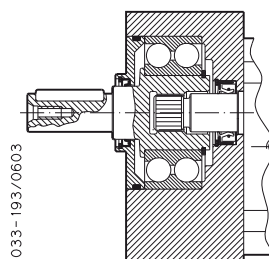
D003-192/0603

VERSION		5
Available for group:		
20		



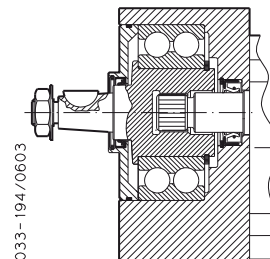
D033-191/0603

VERSION		6
Available for group:		
20		



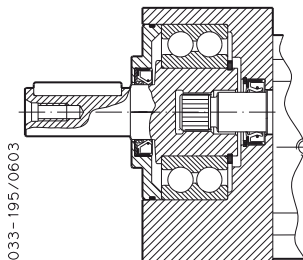
D033-193/0603

VERSION		7
Available for group:		
20		



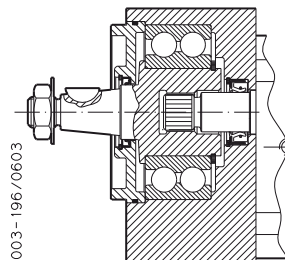
D033-194/0603

VERSION		8
Available for group:		
20		



D033-195/0603

VERSION		9
Available for group:		
20		



D003-196/0603

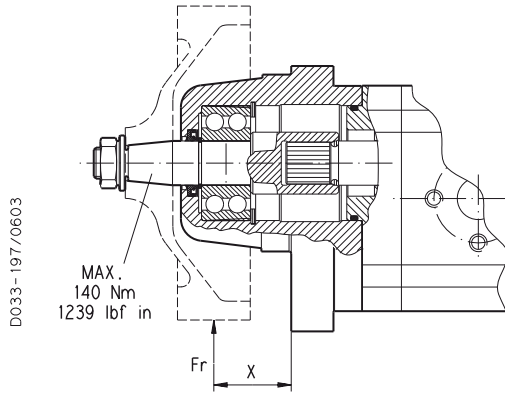
For the outboard bearing life expectancy, diagrams providing approximate selection data will be found on subsequent pages. For particular applications please consult our technical sales department.

01/10.03

POLARIS 20

VERSION WITH OUTBOARD BEARING

W8

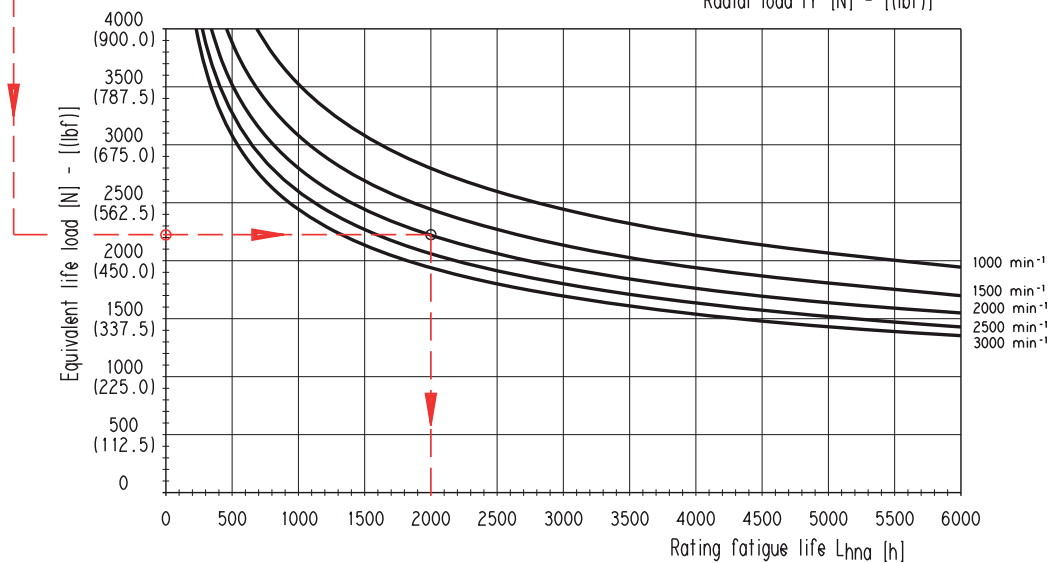
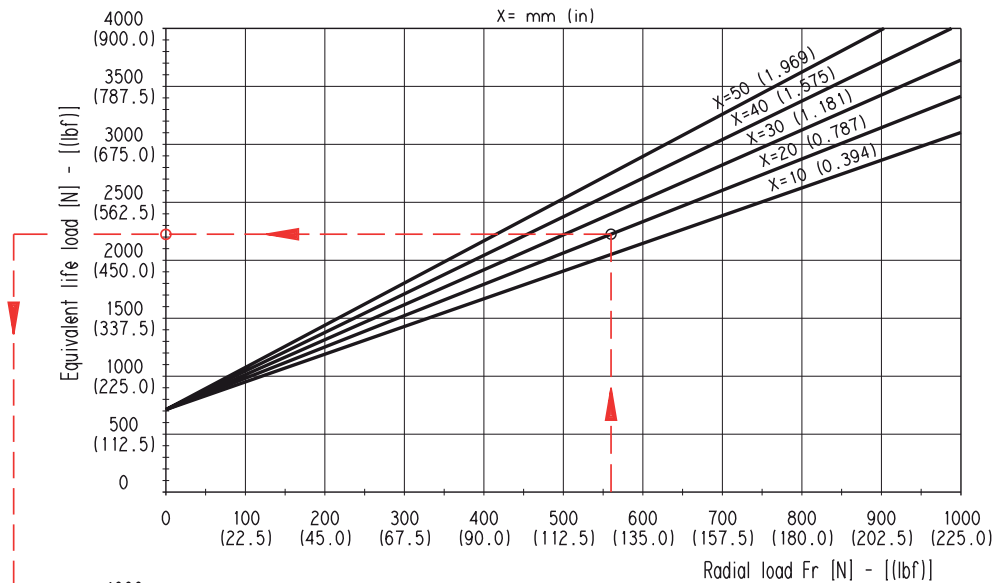


X= Distance of the radial load result from the mounting flange [mm (in)].

Each curve has been obtained at:
Lubricant oil ISO VG 46
Temperature 60 °C (140 °F)
Without or with very low axial load

Example

Fr Radial load	560 N (126.0 lbf)
X	20 mm (0.787 in)
Speed	2000 min ⁻¹
Rating fatigue life	≈ 2000 h



01/10.03

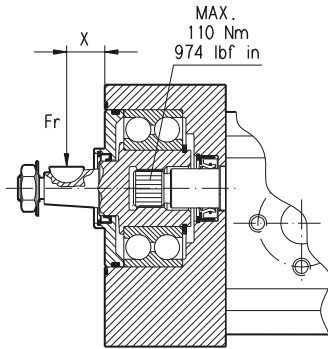
D033-262/1003

POLARIS 20

VERSION WITH OUTBOARD BEARING

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D003-114/0603

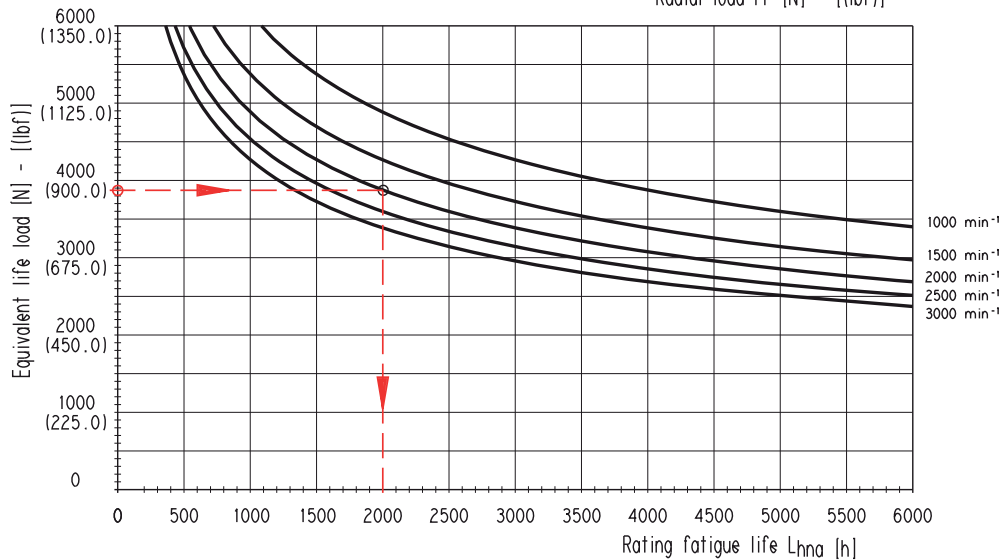
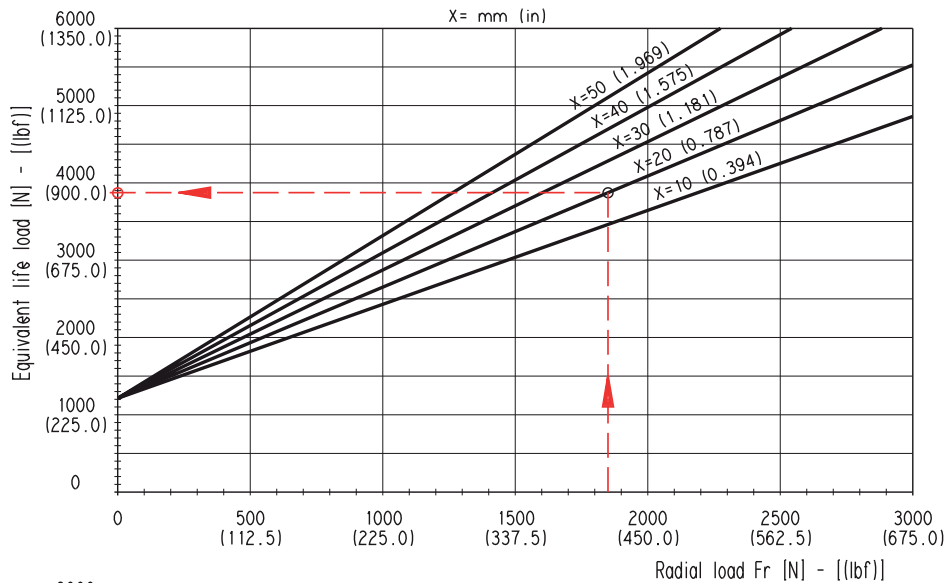


X= Distance of the radial load result from the mounting flange [mm (in)].

Each curve has been obtained at:
Lubricant oil ISO VG 46
Temperature 60 °C (140 °F)
Without or with very low axial load

Example

Fr Radial load	1850 N (416.25 lbf)
X	20 mm (0.787 in)
Speed	2000 min ⁻¹
Rating fatigue life	≈ 2000 h



D033-263/1003

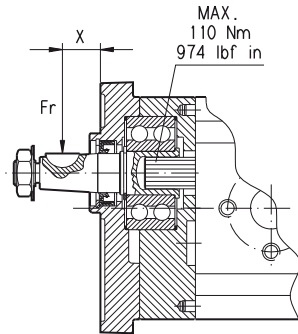
01/10.03

POLARIS 20

VERSION WITH OUTBOARD BEARING

5

D033-115/0603

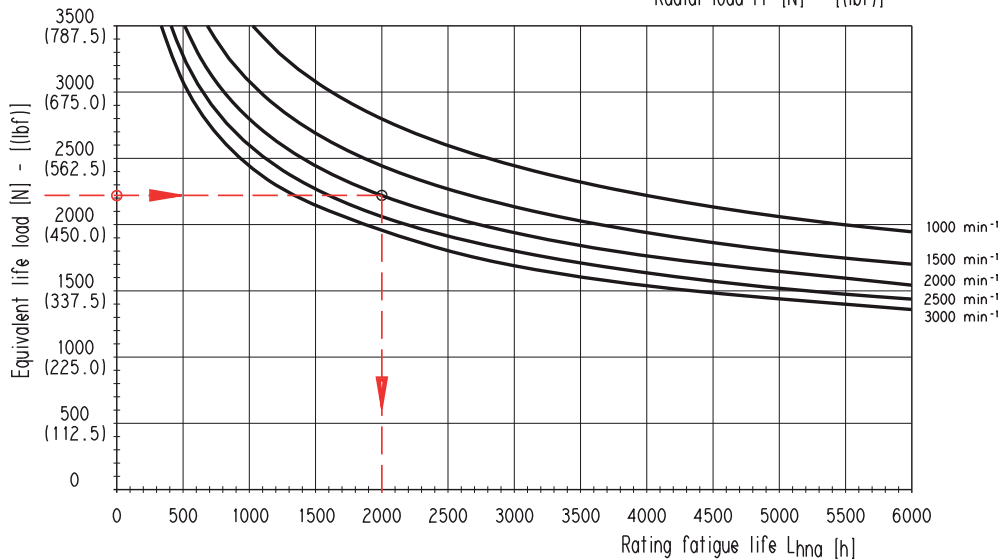
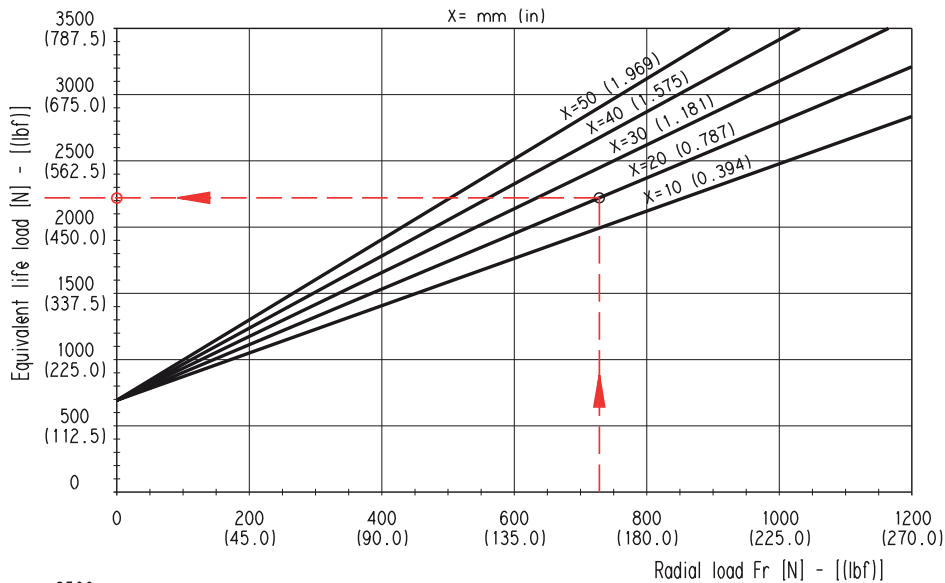


X= Distance of the radial load result from the mounting flange [mm (in)].

Each curve has been obtained at:
Lubricant oil ISO VG 46
Temperature 60 °C (140 °F)
Without or with very low axial load

Example

Fr Radial load	725 N (163.13 lbf)
X	20 mm (0.787 in)
Speed	2000 min ⁻¹
Rating fatigue life	≈ 2000 h



01/10.03

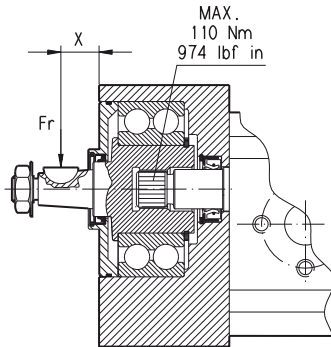
D033-264/1003

POLARIS 20

VERSION WITH OUTBOARD BEARING

7 - 8 - 9

D033-118/0603

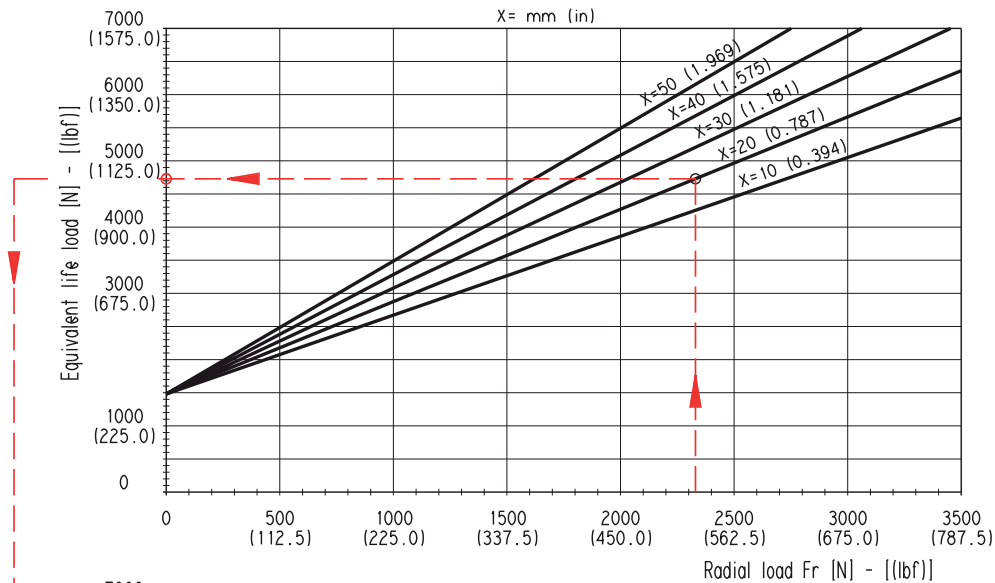


X= Distance of the radial load result from the mounting flange [mm (in)].

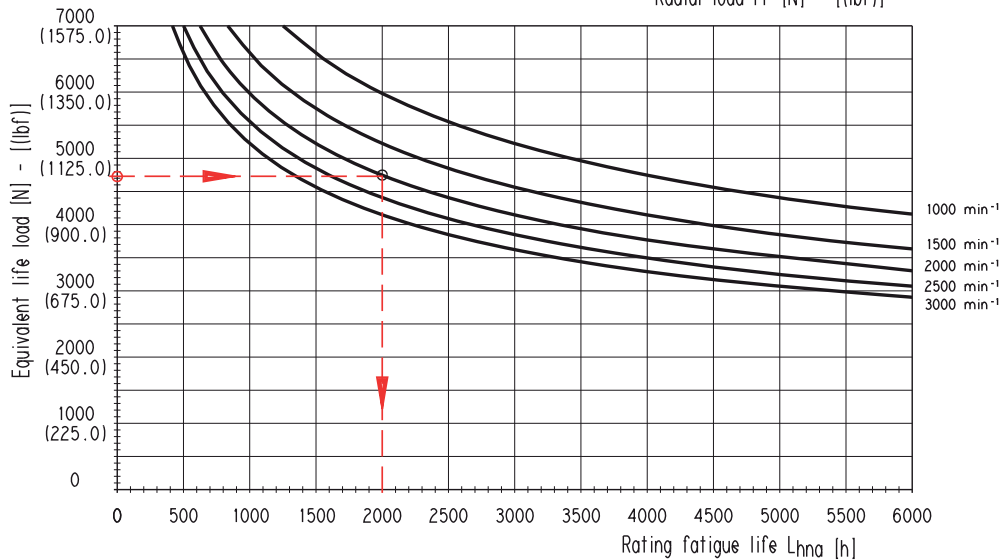
Each curve has been obtained at:
Lubricant oil ISO VG 46
Temperature 60 °C (140 °F)
Without or with very low axial load

Example

Fr Radial load	2330 N (524.25 lbf)
X	20 mm (0.787 in)
Speed	2000 min ⁻¹
Rating fatigue life	≈ 2000 h



D033-265/1003



01/10.03

POLARIS 20

DRIVE SHAFTS

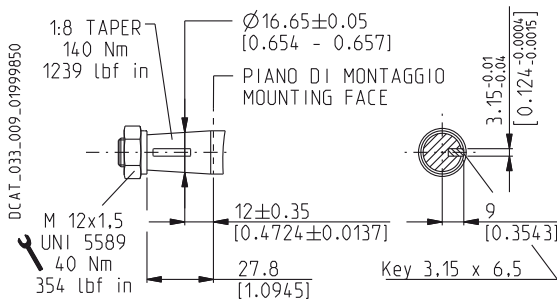
EUROPEAN TAPERED 1:8

82

Not available with size:

20•10,5 - 20•24,5 - 20•27,8

Mounting face refer to flange code **E2**



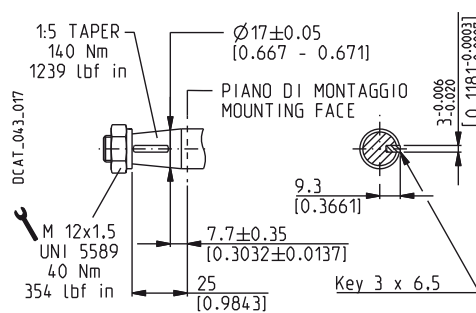
GERMAN TAPERED 1:5

54

Not available with size:

20•7,2 - 20•10,5 - 20•19 - 20•24,5 - 20•27,8 - 20•31,5

Mounting face refer to flanges code **B4** and **B5**

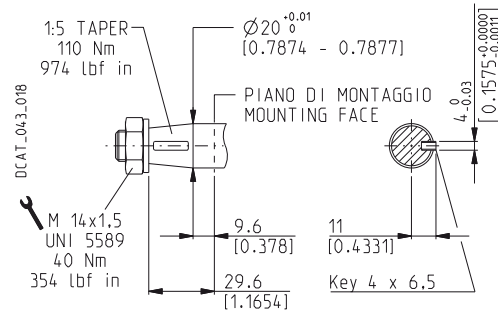


GERMAN TAPERED 1:5

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Only for version **5, 9** and **W8** with outboard bearing

Mounting face refer to flange code **B2**



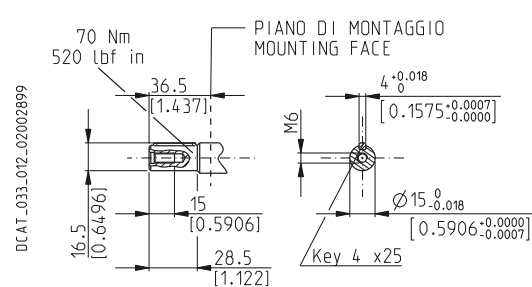
STRAIGHT

46

Not available with size:

20•7,2 - 20•10,5 - 20•19 - 20•24,5 - 20•25 - 20•27,8 - 20•31,5

Mounting face refer to flange code **E2**



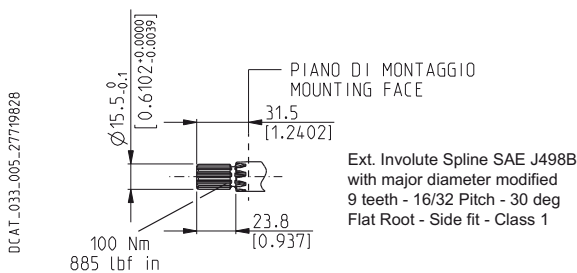
SAE "A" SPLINE

03

Not available with size:

20•24,5 - 20•27,8

Mounting face refer to flange code **S1**



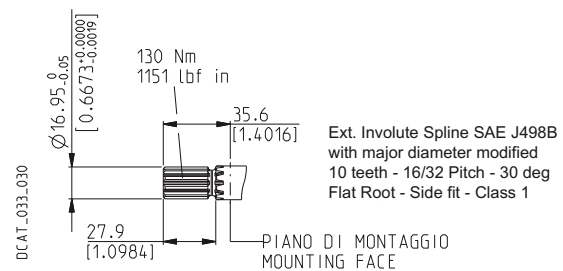
SPLINE

01

Not available with size:

20•6,3 - 20•9 - 20•10,5 - 20•19

Mounting face refer to flange code **S1**



Ext. Involute Spline SAE J498B with major diameter modified 10 teeth - 16/32 Pitch - 30 deg Flat Root - Side fit - Class 1

01/10.03

POLARIS 20

DRIVE SHAFTS

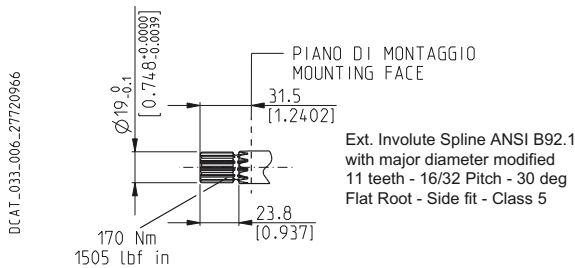
SAE SPLINE

07

Not available with size:

20•7,2 - 20•10,5 - 20•19 - 20•24,5 - 20•27,8

Mounting face refer to flange code S1



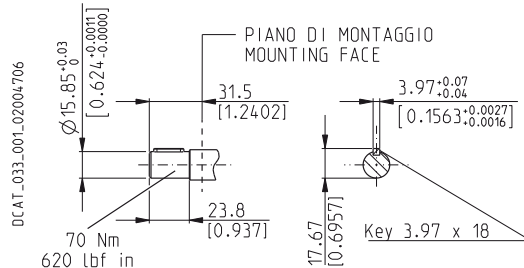
SAE "A" STRAIGHT

31

Not available with size:

20•10,5 - 20•19 - 20•24,5 - 20•27,8

Mounting face refer to flange code S1



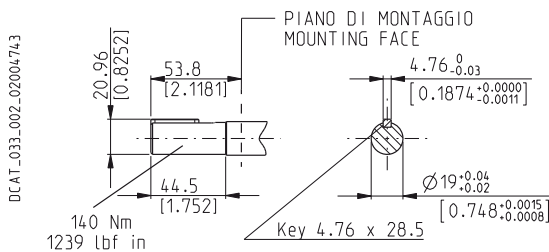
STRAIGHT

49

Not available with size:

20•7,2 - 20•19 - 20•24,5

Mounting face refer to flange code S1



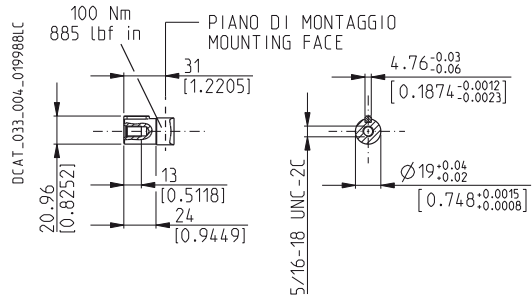
STRAIGHT

50

Not available with size:

20•7,2 - 20•10,5 - 20•19 - 20•24,5 - 20•27,8

Mounting face refer to flange code S1



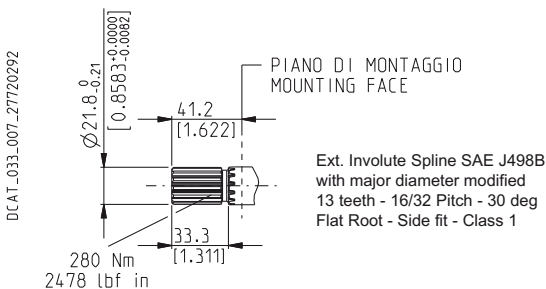
SAE "B" SPLINE

04

Not available with size:

20•4 - 20•7,2 - 20•10,5 - 20•24,5 - 20•27,8

Mounting face refer to flange code S5



SAE "B" STRAIGHT

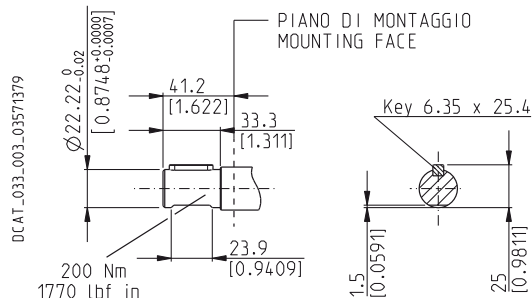
32

Not available with size:

20•4 - 20•7,2 - 20•8 - 20•10,5 - 20•11,2

20•19 - 20•24,5 - 20•27,8

Mounting face refer to flange code S5



01/10.03

POLARIS 20

DRIVE SHAFTS

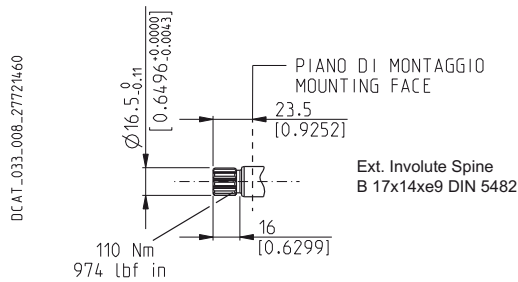
DIN 5482 SPLINE

12

Not available with size:

20•10,5 - 20•19 - 20•24,5 - 20•27,8

Mounting face refer to flange code **B2**



STRAIGHT

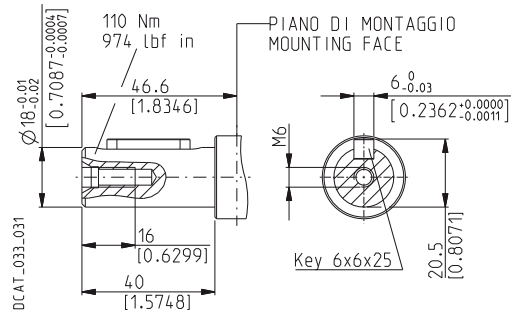
48

Only for version **6** with outboard bearing

Available in 0 version only with size:

20•20

Mounting face refer to flange code **E2**

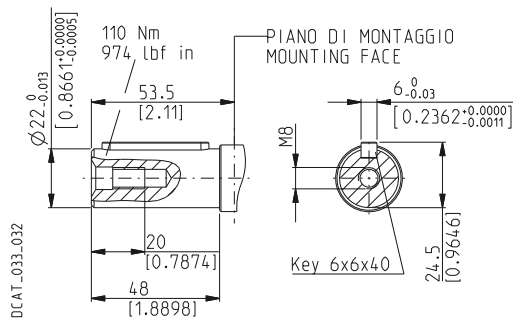


STRAIGHT

B1

Only for version **8** and **5** with outboard bearing

Mounting face refer to flange code **E2**



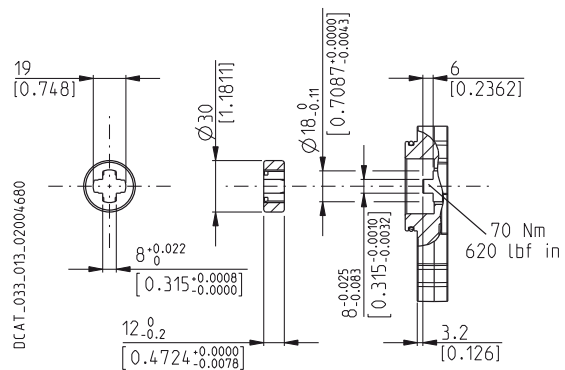
TANG

95

Not available with size:

20•7,2 - 20•10,5 - 20•19 - 20•24,5 - 20•27,8

Mounting face refer to flange code **B6**



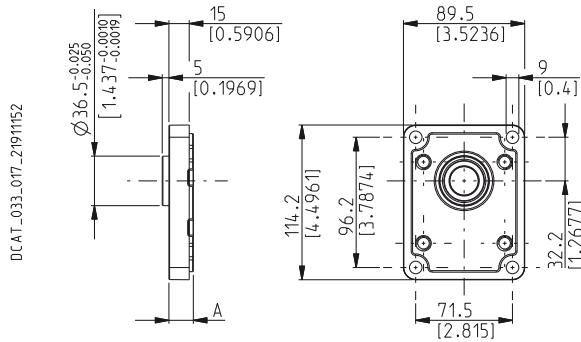
01/10.03

POLARIS 20

MOUNTING FLANGES AND TABLE OF COMPATIBILITY

EUROPEAN

E2

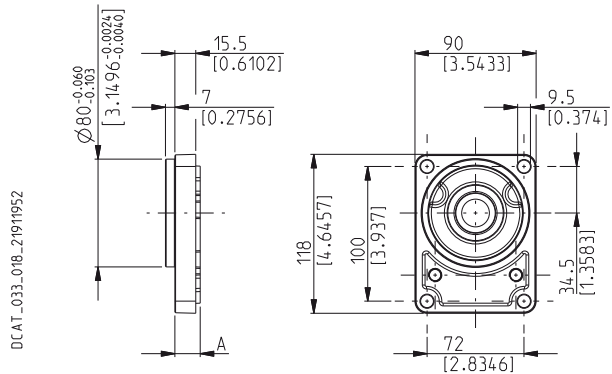


		DRIVE SHAFTS See page 52 ÷ 54											
VERSIONS See page 46	A mm (in)	82	46	B1	03	04	07	12	31	48	49	50	54
0	18 (0.7087)	#	#		x	x	x	x	x	x	x	x	x
4	55,4 (2.1811)	#											
5	43,6 (1.7165)	#		x	x						x	x	x
6	55,4 (2.1811)									#			
7	59,4 (2.3386)	#											
8	59,4 (2.3386)			#									

Standard combination
x Available combination

GERMAN

B2



		DRIVE SHAFTS See page 52 ÷ 54									
VERSIONS See page 46	A mm (in)	12	54	55	01	03	31	46	49	82	
0	18,8 (0.7402)	#	#		x	x	x	x	x	x	
5	44,4 (1.7480)		x	x		x			x	x	
9	59,4 (1.7441)			x							

Standard combination
x Available combination

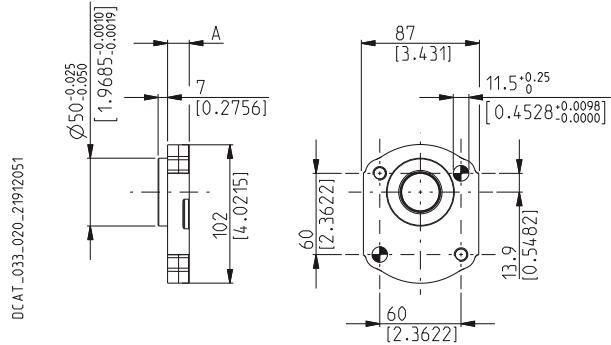
01/10.03

POLARIS 20

MOUNTING FLANGES AND TABLE OF COMPATIBILITY

GERMAN 2 BOLTS

B4



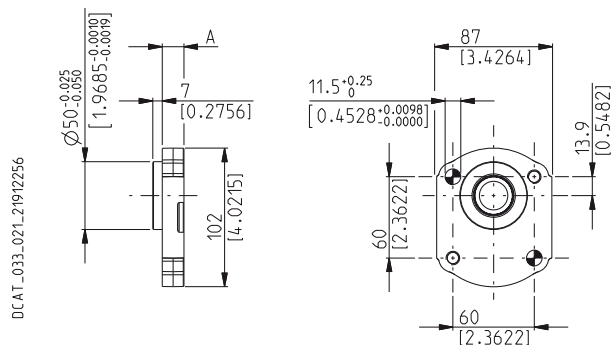
D/CAT_033_020_21912051

		DRIVE SHAFTS See page 52 ÷ 54						
VERSIONS See page 46	A mm (in)	54	03	12	31	49	54	82
0	16 (0.63)	#	x	x	x	x	x	x
5	41,6 (1.6378)	x	x			x	x	x

Standard combination
x Available combination

GERMAN 2 BOLTS

B5



D/CAT_033_021_21912256

		DRIVE SHAFTS See page 52 ÷ 54						
VERSIONS See page 46	A mm (in)	54	03	12	31	49	54	82
0	16 (0.63)	#	x	x	x	x	x	x
5	41,6 (1.6378)	x	x			x	x	x

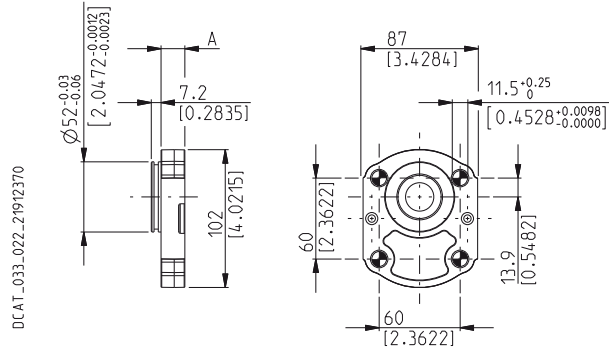
Standard combination
x Available combination

01/10.03

POLARIS 20 MOUNTING FLANGES AND TABLE OF COMPATIBILITY

GERMAN 4 BOLTS

B6



DRIVE SHAFTS

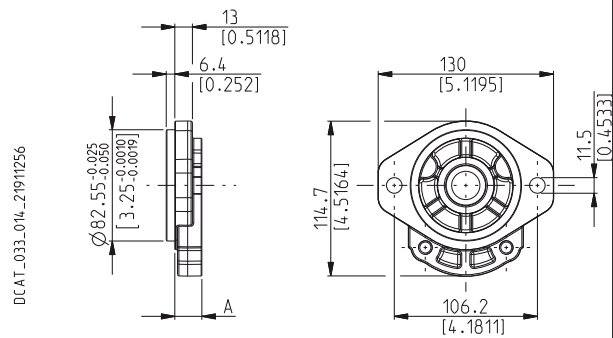
See page 52 ÷ 54

VERSIONS See page 46	A mm (in)	95	07	12
0	17,7 (0.6968)	#	x	x
5	43,3 (1.747)	x		

Standard combination
x Available combination

SAE "A" 2 BOLTS

S1



DRIVE SHAFTS

See page 52 ÷ 54

VERSIONS See page 46	A mm (in)	01	03	04	07	12	31	32	46	49	50	54	82
0	20 (0.787)	#	#	x	#	x	#	x	x	#	x	x	x
5	45,6 (1.7953)		x							x	x	x	x

Standard combination
x Available combination

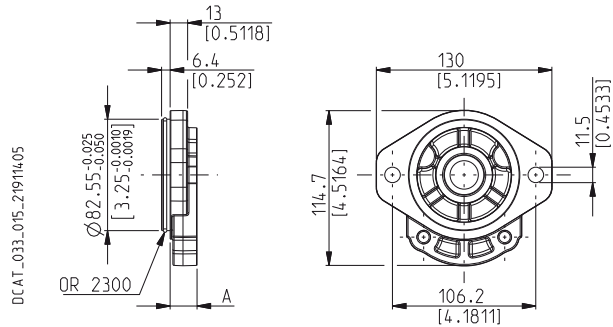
01/10.03

POLARIS 20

MOUNTING FLANGES AND TABLE OF COMPATIBILITY

SAE "A" 2 BOLTS

S2



DRIVE SHAFTS

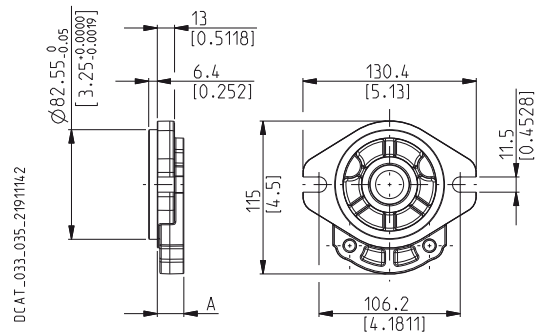
See page 52 ÷ 54

VERSIONS See page 46	A mm (in)	01	03	04	07	12	31	32	46	49	50	54	82
0	20 (0.7874)	#	#	x	#	x	#	x	x	#	x	x	x
5	45,6 (1.7953)		x							x	x	x	x

Standard combination
x Available combination

SAE "A" 2 BOLTS

S9



DRIVE SHAFTS

See page 52 ÷ 54

VERSIONS See page 46	A mm (in)	01	03	04	07	12	31	32	46	49	50	54	82
0	20 (0.7874)	#	#	x	#	x	#	x	x	#	x	x	x
5	45,6 (1.7953)		x							x	x	x	x

Standard combination
x Available combination

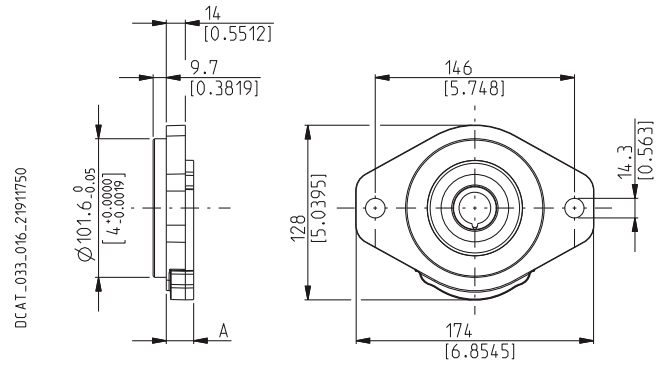
01/10.03

POLARIS 20

MOUNTING FLANGES AND TABLE OF COMPATIBILITY

SAE "B" 2 BOLTS

S5



DRIVE SHAFTS

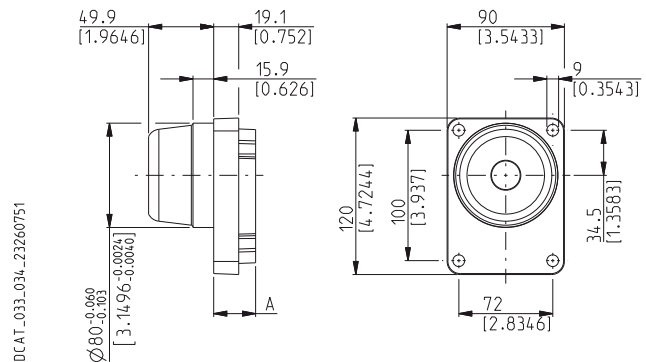
See page 52 ÷ 54

VERSIONS See page 46	A mm (in)	04	32	49
0	20 (0.7874)	#	#	x
5	45,6 (1.7953)			x

Standard combination
x Available combination

GERMAN

W8



DRIVE SHAFTS

See page 52 ÷ 54

VERSIONS See page 46	A mm (in)	55
W8	32,1 (1.2638)	#

Standard combination
x Available combination

01/10.03


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	IN	OUT
Pump type																		
Motor type	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	
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	
PL. 20•4	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC		
PL. 20•6,3	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC		
PL. 20•7,2	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC		
PL. 20•8	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC		
PL. 20•9	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC		
PL. 20•10,5	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC		
PL. 20•11,2	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC		
PL. 20•14	BE	BC	EB	EA	MB	MA	SB	SA	GE	GD	OD	OC	GE	GD	OD	OC		
PL. 20•16	BE	BC	EB	EA	MB	MA	SB	SA	GE	GD	OD	OC	GE	GD	OD	OC		
PL. 20•19	BE	BC	EB	EA	MB	MA	SB	SA	GE	GD	OD	OC	GE	GD	OD	OC		
PL. 20•20	BE	BC	EB	EA	MB	MA	SB	SA	GE	GD	OD	OC	GE	GD	OD	OC		
PL. 20•24,5	BE	BC	EB	EA	MC	MB	SC	SB	GE	GD	OD	OC	GE	GD	OD	OC		
PL. 20•25	BE	BC	EB	EA	MC	MB	SC	SB	GE	GD	OD	OC	GE	GD	OD	OC		
PL. 20•27,8	BE	BC	EB	EA	MC	MB	SC	SB	GE	GD	OD	OC	GE	GD	OD	OC		
PL. 20•31,5	BE	BC	EB	EA	MC	MB	SC	SB	GE	GD	OD	OC	GE	GD	OD	OC		
PL. 30•22	BM	BL	ED	EB	MB	MA	SB	SA	GF	GF	OF	OD						
PL. 30•27	BM	BL	ED	EB	MC	MB	SC	SB	GF	GF	OF	OD						
PL. 30•34	BM	BL	ED	EB	MC	MB	SC	SB	GF	GF	OF	OD						
PL. 30•38	BM	BL	ED	EB	MD	MC	SD	SC	GF	GF	OG	OF						
PL. 30•43	BM	BL	ED	EB	MD	MC	SD	SC	GF	GF	OG	OF						
PL. 30•46	BM	BL	ED	EB	MD	MC	SD	SC	GF	GF	OG	OF						
PL. 30•51	BM	BL	ED	EB	MD	MC	SD	SC	GF	GF	OG	OF						
PL. 30•61	BM	BL	ED	EB	ME	MD	SE	SD	GG	GF	OH	OG						
PL. 30•73	BM	BL	EF	ED	ME	MD	SE	SD	GG	GF	OH	OG						
PL. 30•82	BM	BL	EF	ED	ME	MD	SE	SD	GH	GG	OH	OG						
PL. 30•90	BM	BL	EF	ED	MF	ME	SF	SE	GH	GG	OH	OG						


01/10.03

EXTERNAL DRAIN PORTS

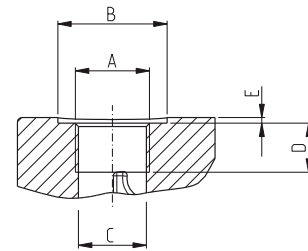
IN/OUT PORTS TYPE	SIDE PORTS						REAR PORTS	
	German	European	Split SSM	Split SSS	Gas BSPP	SAE ODT	Gas BSPP	SAE ODT
PL. 10	GA	–	–	–	GA	03	GA	03
PL. 20	TA	GB	GB	03	GB	03	GB	03
PL. 30	GC	GC	GC	OA	GC	OA	–	–


DRAIN PORTS SIZES

 Tightening torque for low pressure side port.

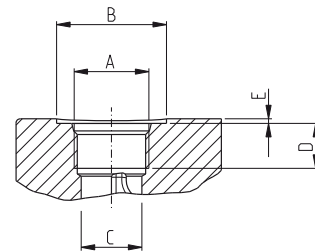
GAS STRAIGHT THREAD PORTS							BSPP
British standard pipe parallel (55°) conforms to UNI - ISO 228							
CODE	Nominal size	A	Ø B	Ø C	D	E	 Nm (lbf in)
GA	1/8"	G 1/8	16,5 (0.6496)	8,75 (0.3444)	12 (0.4724)	1 (0.0394)	5 ^{+0,25} (44 ÷ 46)
GB	1/4"	G 1/4	21,5 (0.8465)	12 (0.4724)	15 (0.5906)	1,5 (0.0591)	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)	
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 thread UNC-UNF 60° conforms to ANSI B 1.1							
CODE	A	Ø B	Ø C	D	E	 Nm (lbf 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.

01/10.03

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.

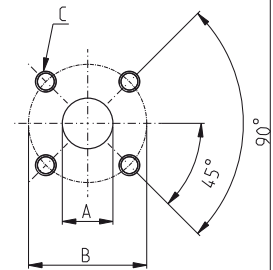
GERMAN FLANGED PORTS - 4 Bolts

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)
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)	M 6 12 (0.4724)	8 ^{+0,5} (71 ÷ 75)	8 ^{+0,5} (71 ÷ 75)
BE	20 (0.7874)	40 (1.5748)	M 6 12 (0.4724)	15 ⁺¹ (133 ÷ 142)	15 ⁺¹ (133 ÷ 142)
BL	19 (0.7480)	55 (2.1654)	M8 18 (0.7087)	20 ⁺¹ (177 ÷ 186)	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_17661888



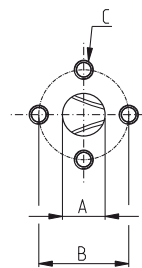
EUROPEAN FLANGED PORTS - 4 Bolts

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)
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)	30 ^{+2,5} (266 ÷ 288)
EF	33 (1.2992)	62 (2.4409)	M 12 18 (0.7087)	25 ⁺¹ (221 ÷ 230)	50 ^{+2,5} (443 ÷ 465)


DCAT_006_024_21060533




(◆) For POLARIS 30

01/10.03

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.

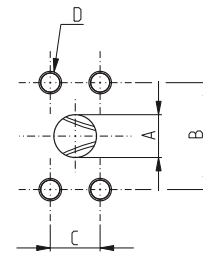
SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI

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)
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)
				M8 (◆)	20 ⁺¹ (◆)	20 ⁺¹ (◆)
MB	19 (0.7480)	47,6 (1.8740)	22,2 (0.8740)	M 10	20 ⁺¹	25 ⁺¹
				14 (0.5512)	(177 ÷ 186)	(266 ÷ 288)
				M 10 (◆)	20 ⁺¹ (◆)	35 ^{+2,5} (◆)
MC	25,4 (1.0000)	52,4 (2.0630)	26,2 (1.0315)	M 10	20 ⁺¹	25 ⁺¹
				14 (0.5512)	(177 ÷ 186)	(266 ÷ 288)
				M 10 (◆)	20 ⁺¹ (◆)	35 ^{+2,5} (◆)
MD	30,5 (1.2008)	58,7 (2.3110)	30,2 (1.1890)	M 10	20 ⁺¹	30 ^{+2,5}
				15 (0.5906)	(177 ÷ 186)	(266 ÷ 288)
				M 10 (◆)	20 ⁺¹ (◆)	35 ^{+2,5} (◆)
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)

DCAT_006_025_21064252





(◆) For POLARIS 30

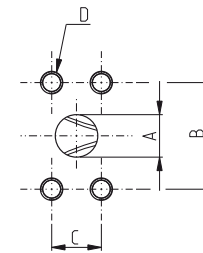
SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI

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)
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)	3/8 - 16 UNC-2B	20 ⁺¹	20 ⁺¹
				14 (0.5512)	(177 ÷ 186)	(177 ÷ 186)
				3/8 - 16 UNC-2B (◆)	30 ^{+2,5} (◆)	20 ⁺¹ (◆)
SC	25,4 (1.0000)	52,4 (2.0630)	26,2 (1.0315)	3/8 - 16 UNC-2B	20 ⁺¹	25 ⁺¹
				14 (0.5512)	(177 ÷ 186)	(221 ÷ 230)
				3/8 - 16 UNC-2B (◆)	20 ⁺¹ (◆)	30 ^{+2,5} (◆)
SD	30,5 (1.2008)	58,7 (2.3110)	30,2 (1.1890)	7/16 - 14 UNC-2B	20 ⁺¹	45 ^{+2,5}
				22 (0.8661)	(177 ÷ 186)	(398 ÷ 420)
SE	39,3 (1.5472)	69,8 (2.7480)	35,7 (1.4055)	1/2 - 13 UNC-2B	30 ^{+2,5}	70 ⁺⁵
				22 (0.8661)	(266 ÷ 288)	(620 ÷ 664)
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)


DCAT_006_028_21060740




(◆) For POLARIS 30

01/10.03

PORTS SIZES

 Tightening torque for low pressure side port.

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

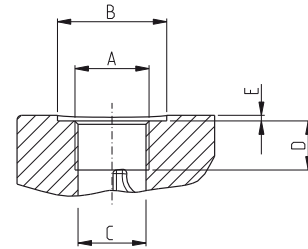
For reversible rotation, please consult only the tightening torque for high pressure side port.



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)
GC	3/8"	G 3/8	25 (0.9843)	15 (0.5906)	14 (0.5512)	2 (#) (0.0787)	15 ⁺¹ (#) (133 ÷ 142)	–
			–				20 ⁺¹ (177 ÷ 186)	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)	50 ^{+2,5} (◆) (443 ÷ 465)
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

01/10.03

PORTS SIZES

 Tightening torque for low pressure side port.

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

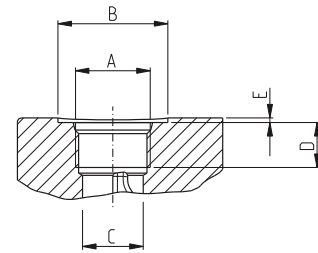
For reversible rotation, please consult only the tightening torque for high pressure side port.



SAE STRAIGHT THREAD PORTS J514

ODT

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

DCAT_006-027_21060524

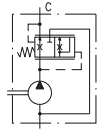
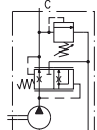
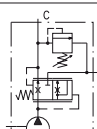
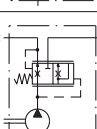
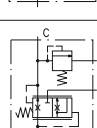
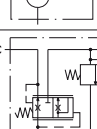
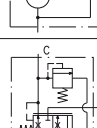
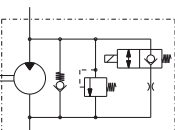
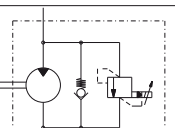
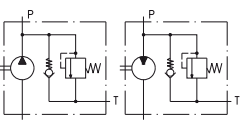
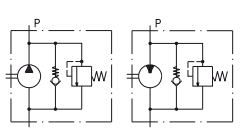
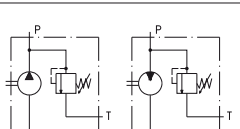
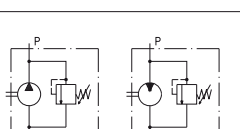
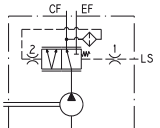
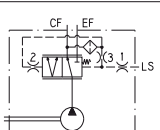
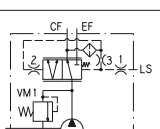
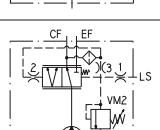
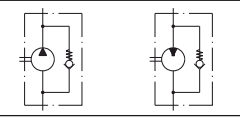


CODE	Nominal size	A	Ø B	Ø C	D	E		
			mm (in)	mm (in)	mm (in)	mm (in)	Nm (lbf in)	Nm (lbf in)
OA	3/8"	9/16" - 12 UNF - 2B	26 (1.0236)	13 (0.5118)	15 (0.5906)	1 (0.03934)	15 ⁺¹ (133 ÷ 142)	25 ⁺¹ (221 ÷ 230)
						2 (#) (0.0787)	15 ⁺¹ (#) (133 ÷ 142)	-
OB	1/2"	3/4" - 16 UNF - 2B	32 (1.2598)	17,5 (0.690)	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 ⁺¹⁰ (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

01/10.03

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

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

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HOW TO ORDER POLARIS 20 SINGLE UNITS

1 2 3 4 5 6 7 8 9 10 11 12 13

PLP20•4 - L 0 82 E2 - L - EA/EA - N EL C * - GB - FS

1	Type	PUMP TYPE	MOTOR TYPE
	in ³ /rev (cm ³ /rev)		
0.30 (4,95)		PLP 20•4	PLM 20•4
0.40 (6,61)		PLP 20•6,3	PLM 20•6,3
0.44 (7,29)		PLP 20•7,2	PLM 20•7,2
0.50 (8,26)		PLP 20•8	PLM 20•8
0.56 (9,17)		PLP 20•9	PLM 20•9
0.66 (10,9)		PLP 20•10,5	PLM 20•10,5
0.69 (11,23)		PLP 20•11,2	PLM 20•11,2
0.89 (14,53)		PLP 20•14	PLM 20•14
1.03 (16,85)		PLP 20•16	PLM 20•16
1.16 (19,09)		PLP 20•19	PLM 20•19
1.29 (21,14)		PLP 20•20	PLM 20•20
1.52 (24,84)		PLP 20•24,5	PLM 20•24,5
1.61 (26,42)		PLP 20•25	PLM 20•25
1.72 (28,21)		PLP 20•27,8	PLM 20•27,8
2.01 (33,03)		PLP 20•31,5	PLM 20•31,5

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

3	Version	CODE
	Without outboard bearing	0
	With outboard bearing	W8
	With outboard bearing	4
	With outboard bearing	5
	With outboard bearing	6
	With outboard bearing	7
	With outboard bearing	8
	With outboard bearing	9

4	Drive shaft	CODE
	European tapered 1:8	82
	German tapered 1:5	54
	German tapered 1:5	55
	Straight	46
	SAE "A" spline (9 teeth)	03
	SAE spline (10 teeth)	01
	SAE "A" spline (11 teeth)	07
	SAE "A" straight	31
	Straight	49
	Straight	50
	SAE "B" spline	04
	SAE "B" straight	32
	DIN 54 82 spline	12
	Straight (only for version 6)	48
	Straight (only for version 8)	B1
	Tang	95

CODE	Mounting flange	5
E2	European	
B2	German	
B4	German 2 bolt	
B5	German 2 bolt	
B6	German 4 bolt	
S1	SAE "A" 2 bolt	
S2	SAE "A" 2 bolt	
S9	SAE "A" 2 bolt	
S5	SAE "B" 2 bolt	
W8	German	

CODE	Ports position	6
L	Side	
P	Rear	

CODE	Ports IN/OUT	7
GERMAN FLANGED PORTS		
Side	Rear	Type
BE/BC		PLP 20 4-6,3-7,2-8-9-10,5-11,2 14-16-19-20-24,5-25 27,8-31,5
BC/BE		PLM 20
EUROPEAN FLANGED PORTS		
Side	Rear	Type
EA/EA		PLP 20 4-6,3-7,2-8-9-10,5-11,2 PLM 20
EB/EA		PLP 20 14-16-19-20-24,5-25 EA/EB PLM 20 27,8-31,5
SAE FLANGED PORTS (SSM)		
Side	Rear	Type
MA/MA		PLP 20 4-6,3-7,2-8-9-10,5-11,2 PLM 20
MB/MA		PLP 20 14-16-19-20
MA/MB		PLM 20
MC/MB		PLP 20 24,5-25-27,8-31,5
MB/MC		PLM 20
SAE FLANGED PORTS (SSS)		
Side	Rear	Type
SA/SA		PLP 20 4-6,3-7,2-8-9-10,5-11,2 PLM 20
SB/SA		PLP 20 14-16-19-20
SA/SB		PLM 20
SC/SB		PLP 20 24,5-25-27,8-31,5
SB/SC		PLM 20

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HOW TO ORDER POLARIS 20 SINGLE UNITS

7		Ports IN/OUT		CODE
GAS STRAIGHT THREAD PORTS (BSPP)				
Type		PLP 20	Side	Rear
4-6,3-7,2-8-9-10,5-11,2		PLM 20	GD/GD	GD/GD
14-16-19-20-24,5-25 27,8-31,5		PLP 20	GE/GD	GE/GD
		PLM 20	GD/GE	GD/GE
SAE STRAIGHT THREAD PORTS (ODT)				
Type		PLP 20	Side	Rear
4-6,3-7,2-8-9-10,5-11,2		PLM 20	OC/OC	OC/OC
14-16-19-20-24,5-25 27,8-31,5		PLP 20	OD/OC	OD/OC
		PLM 20	OC/OD	OC/OD

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

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

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

CODE		Drain port position - Rev. rotation L	11
L		Side drain with side port position	
*		Side drain with bottom port position	

CODE		Drain port		12
IN/OUT GERMAN FLANGED PORTS				
Side	Rear	Type		
TA		PLP 20	4-6,3-7,2-8-9-10,5-11,2	
		PLM 20	24,5-25-27,8-31,5	

CODE		Drain port		12
IN/OUT EUROPEAN FLANGED PORTS				
Side	Rear	Type		
GB		PLP 20	4-6,3-7,2-8-9-10,5-11,2	
		PLM 20	24,5-25-27,8-31,5	

CODE		Drain port		12
IN/OUT SAE FLANGED PORTS (SSM)				
Side	Rear	Type		
GB		PLP 20	4-6,3-7,2-8-9-10,5-11,2	
		PLM 20	24,5-25-27,8-31,5	

CODE		Drain port		12
IN/OUT SAE FLANGED PORTS (SSS)				
Side	Rear	Type		
03		PLP 20	4-6,3-7,2-8-9-10,5-11,2	
		PLM 20	24,5-25-27,8-31,5	

CODE		Drain port		12
IN/OUT GAS STRAIGHT THREAD PORTS (BSPP)				
Side	Rear	Type		
GB	GB	PLP 20	4-6,3-7,2-8-9-10,5-11,2	
		PLM 20	24,5-25-27,8-31,5	

CODE		Drain port		12
IN/OUT SAE STRAIGHT THREAD PORTS (ODT)				
Side	Rear	Type		
03	03	PLP 20	4-6,3-7,2-8-9-10,5-11,2	
		PLM 20	24,5-25-27,8-31,5	

CODE		Shaft arrangement	13
FS		Female spline	

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