

## HOW TO ORDER POLARIS 20 SINGLE UNITS

PLM20.16 B 5 - 61 S1 - L OC/OC -N - L - C

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

---PLP-20-4---L---0---82---E2---L---EA/EA---N---EL---C---GB---FS---

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

Code	Drive shaft	4
49	Straight	
50	Straight	
04	SAE "B" spline	
32	SAE "B" straight	
12	DIN 54 82	
48	Straight (only for version 6)	
B1	Straight (only for version 8)	
95	Tang	

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
<b>GERMAN FLANGED PORTS</b>		
Side	Rear	Type
BE/BC	PLP 20	4-6,3-7,2-8-9-10,5-11,2
BC/BE	PLM 20	14-16-19-20-24,5-25 27,8-31,5
<b>EUROPEAN FLANGED PORTS</b>		
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

01/10.03

## HOW TO ORDER POLARIS 20 SINGLE UNITS

Replaces: 01/10.03

7	Ports IN/OUT	Code
<b>SAE FLANGED PORTS (SSM)</b>		
Type	Side	Rear
4-6,3-7,2-8-9-10,5-11,2	PLP 20	<b>MA/MA</b>
	PLM 20	<b>MA/MA</b>
14-16-19-20	PLP 20	<b>MB/MA</b>
	PLM 20	<b>MA/MB</b>
24,5-25-27,8-31,5	PLP 20	<b>MC/MB</b>
	PLM 20	<b>MB/MC</b>
<b>SAE FLANGED PORTS (SSS)</b>		
Type	Side	Rear
4-6,3-7,2-8-9-10,5-11,2	PLP 20	<b>SA/SA</b>
	PLM 20	<b>SA/SA</b>
14-16-19-20	PLP 20	<b>SB/SA</b>
	PLM 20	<b>SA/SB</b>
24,5-25-27,8-31,5	PLP 20	<b>SC/SB</b>
	PLM 20	<b>SB/SC</b>
<b>GAS STRAIGHT THREAD PORTS (BSPP)</b>		
Type	Side	Rear
4-6,3-7,2-8-9 10,5-11,2	PLP 20	<b>GD/GD</b>
	PLM 20	<b>GD/GD</b>
14-16-19-20-24,5-25 27,8-31,5	PLP 20	<b>GE/GD</b>
	PLM 20	<b>GD/GE</b>
<b>SAE STRAIGHT THREAD PORTS (ODT)</b>		
Type	Side	Rear
4-6,3-7,2-8-9-10,5-11,2	PLP 20	<b>OC/OC</b>
	PLM 20	<b>OC/OC</b>
14-16-19-20-24,5-25 27,8-31,5	PLP 20	<b>OD/OC</b>
	PLM 20	<b>OC/OD</b>

8	Seals (a)	Code
	Buna (standard)	<b>N</b>
	Viton	<b>V</b>

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

10	Shaft seal options	Code
	High back pressure seal with wiper seal	<b>C</b>
	Standard seal with wiper seal	<b>D</b>
	High back pressure seal	<b>H</b>

Code	Drain port position - Rev. rotation L	11
<b>L</b>	Side drain with side port position	
<b>*</b>	Side drain with bottom port position	

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

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

IN/OUT SAE FLANGED PORTS (SSM)		
Side	Rear	Type
<b>GB</b>	PLP 20	4-6,3-7,2-8-9-10,5-11,2
	PLM20	24,5-25-27,8-31,5

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

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

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

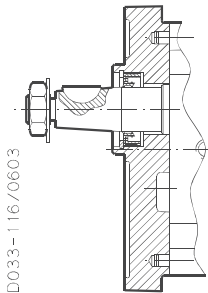
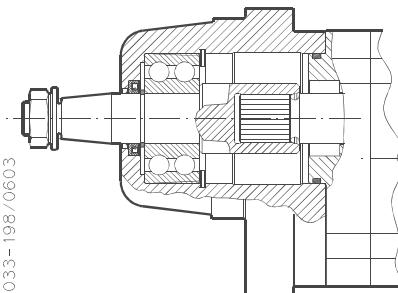
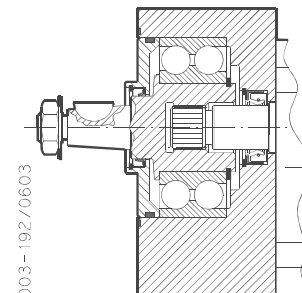
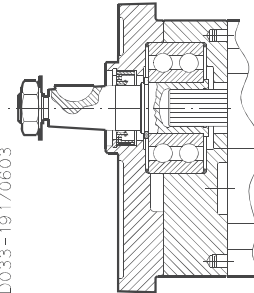
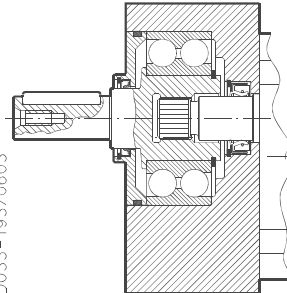
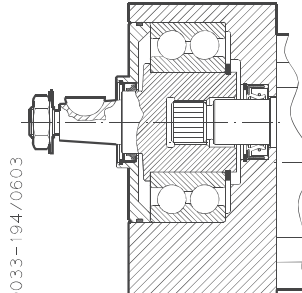
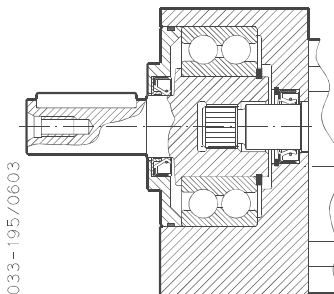
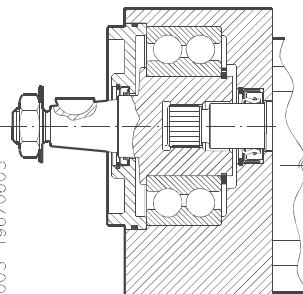
Code	Shaft arrangement	13
<b>FS</b>	Female spline	

- (a) Choose the seals according to the temperature shown on page 4.
- (b) Mounting flange material on page 61 ÷ 65  
Rear cover material on page 34 ÷ 35

02/07.2006

## VERSIONS

For each version, the possible combination between drive shafts and mounting flanges are shown on pages 58 ÷ 68.

<p><b>VERSION 0</b></p> <p>Available for group:</p> <p><b>10 20 30</b></p>	<p><b>VERSION W8</b></p> <p>Available for group:</p> <p><b>20</b></p>	<p><b>VERSION 4</b></p> <p>Available for group:</p> <p><b>20</b></p>
 <p>D033-116/0603</p> <p>Version for applications without radial and axial load on the drive shaft.</p>	 <p>D033-198/0603</p>	 <p>D033-192/0603</p>
<p><b>VERSION 5</b></p> <p>Available for group:</p> <p><b>20</b></p>	<p><b>VERSION 6</b></p> <p>Available for group:</p> <p><b>20</b></p>	<p><b>VERSION 7</b></p> <p>Available for group:</p> <p><b>20</b></p>
 <p>D033-191/0603</p>	 <p>D033-193/0603</p>	 <p>D033-194/0603</p>
<p><b>VERSION 8</b></p> <p>Available for group:</p> <p><b>20</b></p>	<p><b>VERSION 9</b></p> <p>Available for group:</p> <p><b>20</b></p>	
 <p>D033-195/0603</p>	 <p>D033-196/0603</p>	

01/10.03

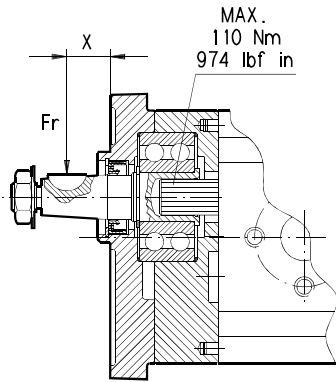
For the outboard bearing life expectancy, diagrams providing approximate selection data will be found on subsequent pages. For particular applications please consult our technical sales department.

**POLARIS 20**

**VERSION WITH OUTBOARD BEARINGS**

**5**

D033-115/0603



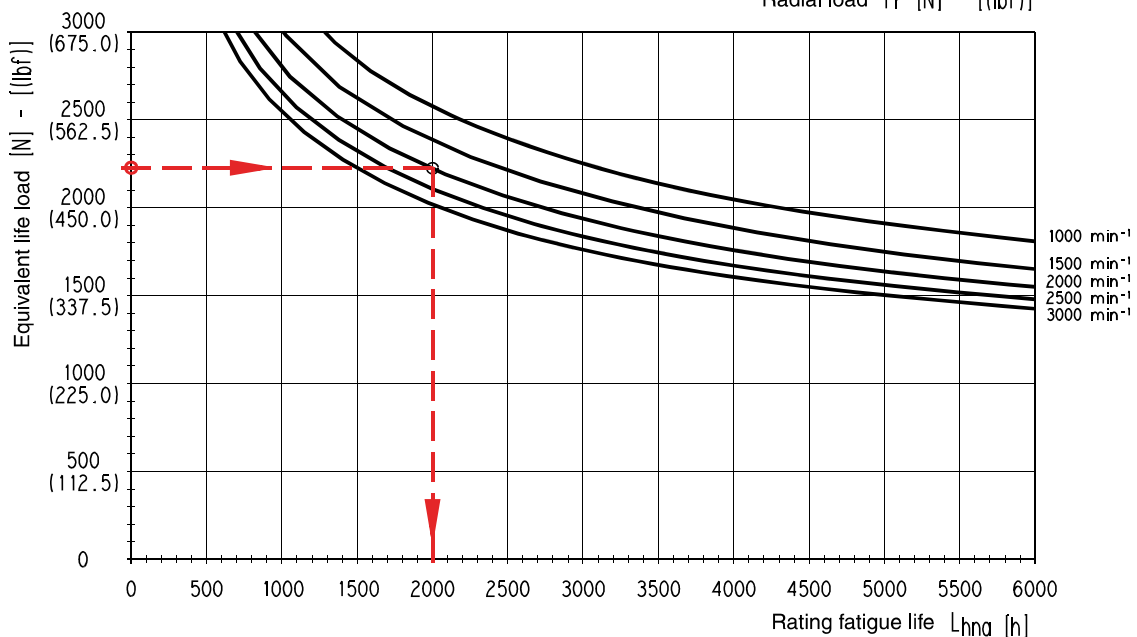
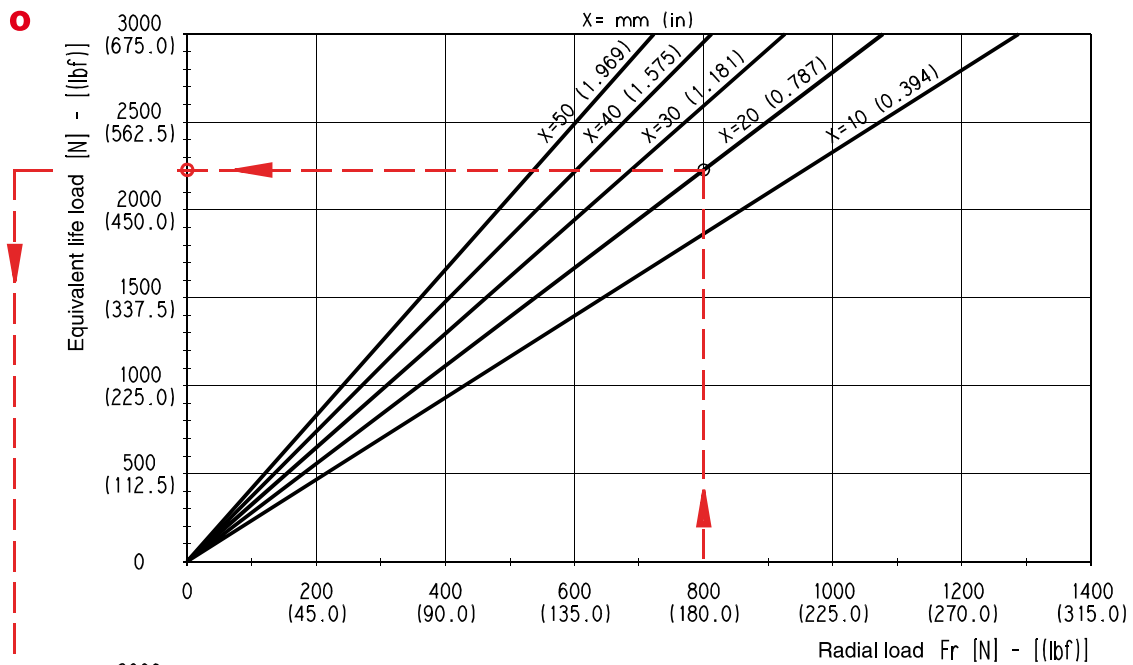
**X** = Distance of the radial load result from the mounting flange [mm (in)].

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	800 N (180 lbf)
X	20 mm (0.7874 in)
Speed	2000 min <sup>-1</sup>
Rating fatigue life	≈ 2000 h

Replaces: 01/10.03



D033-121/0606

02/07.2006

**POLARIS 20**

**DRIVE SHAFTS**

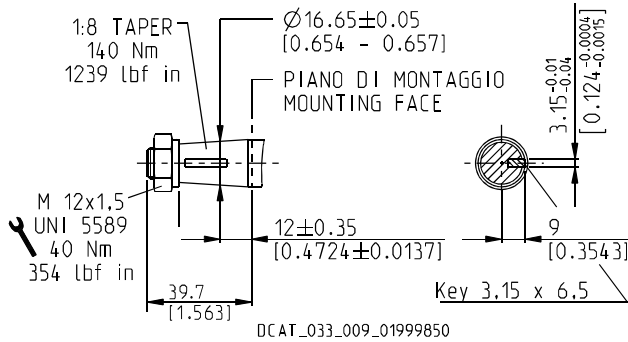
**EUROPEAN TAPERED 1:8**

**82**

Not available with size:

**20•10,5    20•24,5    20•27,8**

Mounting face refer to flange code **E2**



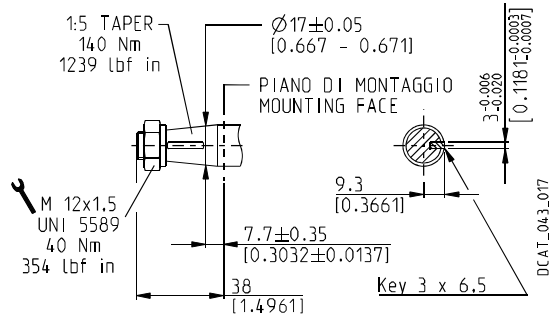
**GERMAN TAPERED 1:5**

**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 flange code **B2**

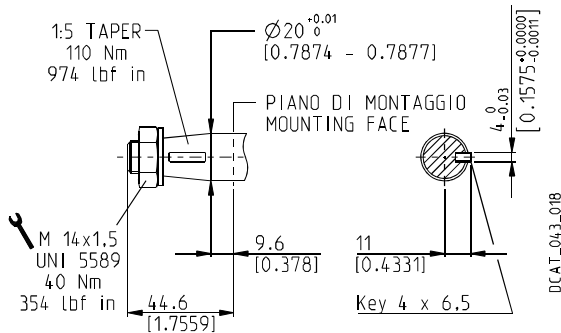


**GERMAN TAPERED 1:5**

**55**

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

Mounting face refer to flange code **B2**



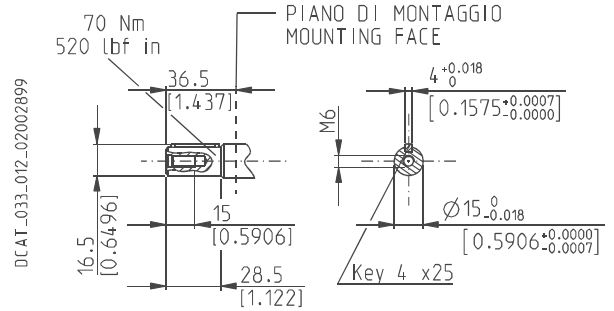
**STRAIGHT**

**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**



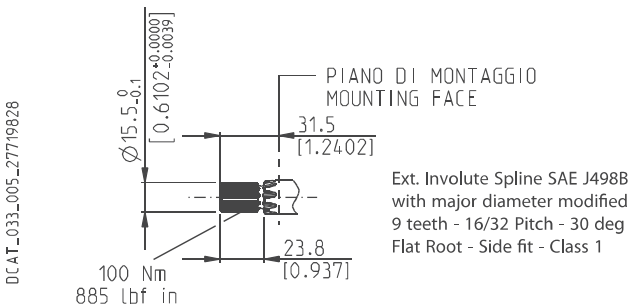
**SAE "A" SPLINE**

**03**

Not available with size:

**20•24,5    20•27,8**

Mounting face refer to flange code **S1**



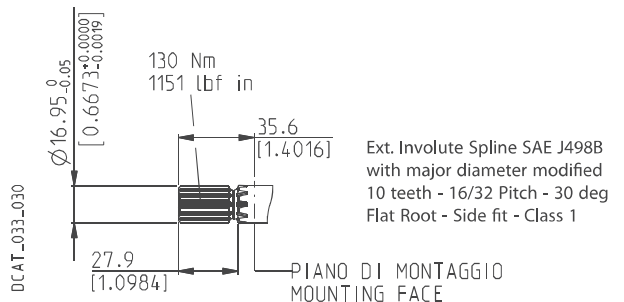
**SPLINE**

**01**

Not available with size:

**20•6,3    20•9    20•10,5    20•19**

Mounting face refer to flange code **S1**



01/10.03

**POLARIS 20**

**DRIVE SHAFTS**

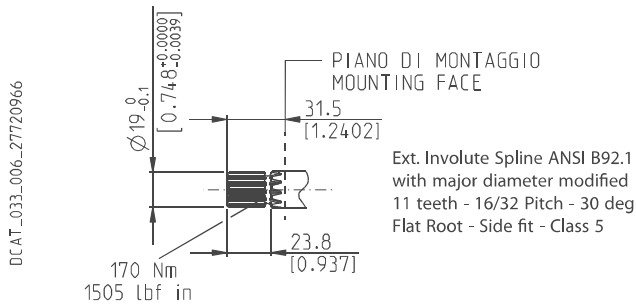
**SAE SPLINE**

**07**

Not available with size:

20•7,2	20•10,5	20•19	20•24,5	20•27,8
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Mounting face refer to flange code **S1**



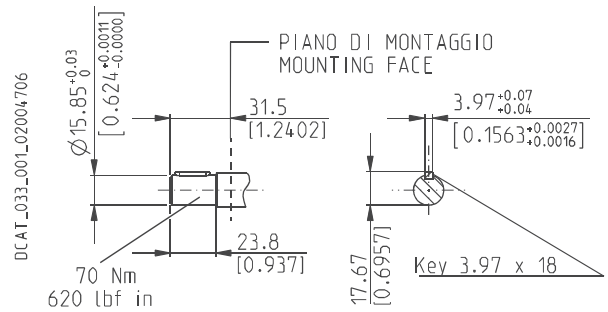
**SAE "A" STRAIGHT**

**31**

Not available with size:

20•10,5	20•19	20•24,5	20•27,8
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Mounting face refer to flange code **S1**



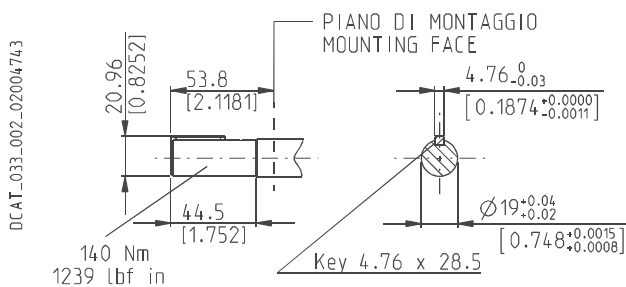
**STRAIGHT**

**49**

Not available with size:

20•7,2	20•19	20•24,5
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Mounting face refer to flange code **S1**



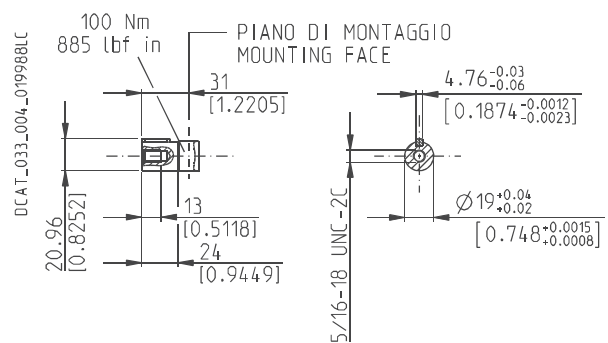
**STRAIGHT**

**50**

Not available with size:

20•7,2	20•10,5	20•19	20•24,5	20•27,8
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Mounting face refer to flange code **S1**



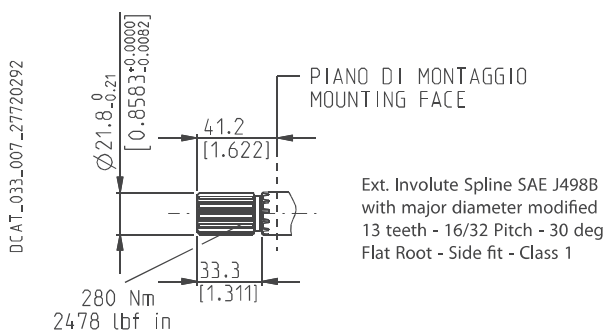
**SAE "B" SPLINE**

**04**

Not available with size:

20•4	20•7,2	20•10,5	20•24,5	20•27,8
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Mounting face refer to flange code **S5**



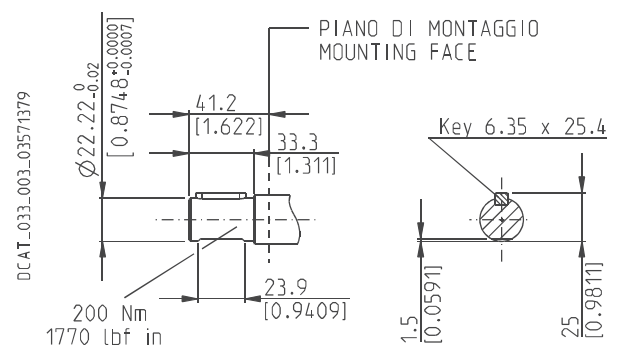
**SAE "B" STRAIGHT**

**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
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Mounting face refer to flange code **S5**



01/10.03

**POLARIS 20**

**DRIVE SHAFTS**

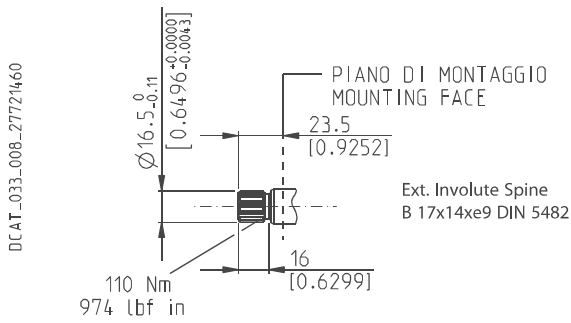
**DIN 5482 SPLINE**

**12**

Not available with size:

**20•10,5    20•19    20•24,5    20•27,8**

Mounting face refer to flange code **B2**



**STRAIGHT**

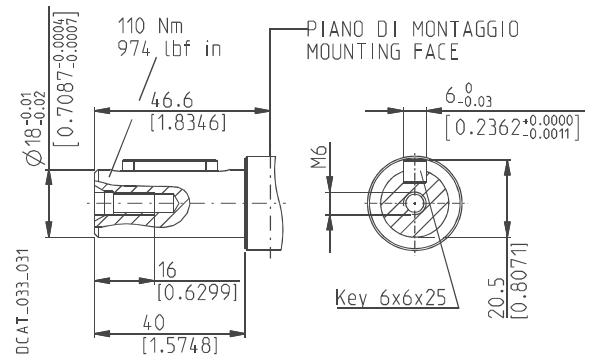
**48**

Only for version **6** with outboard bearing

Available in 0 version only with size:

**20•20**

Mounting face refer to flange code **E2**

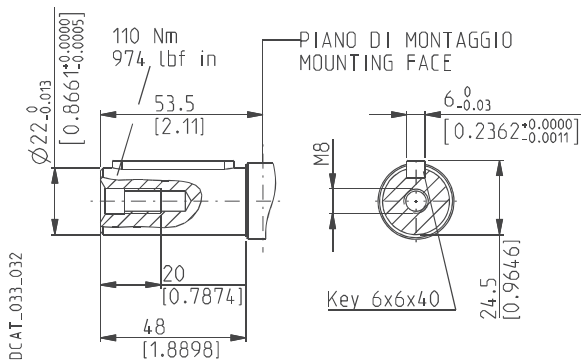


**STRAIGHT**

**B1**

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

Mounting face refer to flange code **E2**



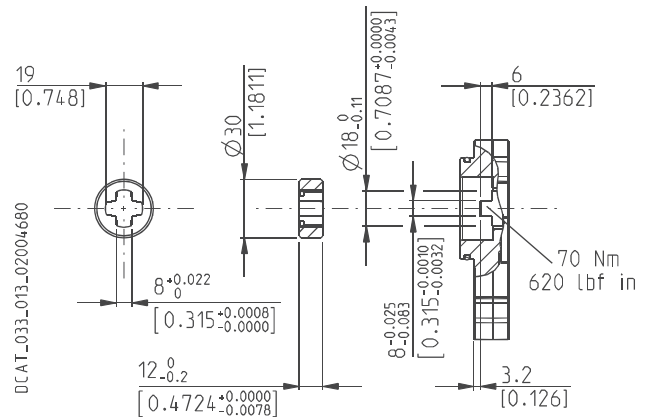
**TANG**

**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**

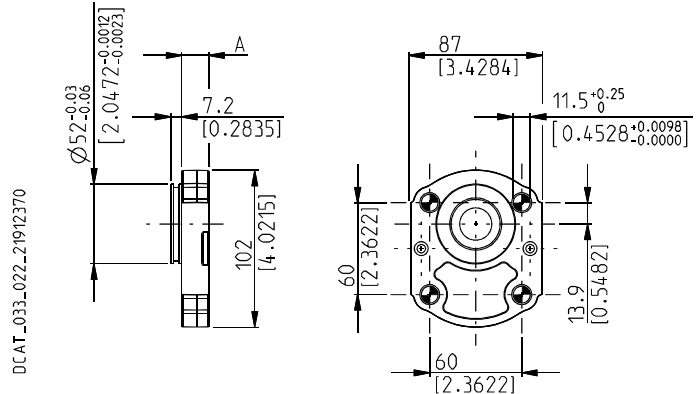
**MOUNTING FLANGES AND TABLE OF COMPATIBILITY**

Replaces: 01/10.03

**GERMAN 4 BOLTS**

**B6**

Material: cast iron and aluminium



DCAT\_033\_022\_21912370

**DRIVE SHAFTS**

See page 53 ÷ 55

VERSIONS See page 47	A mm (in)	95	07	12
<b>0</b>	17,7 (0.6968)	#	X	X
<b>5</b>	43,3 (1.747)	X		

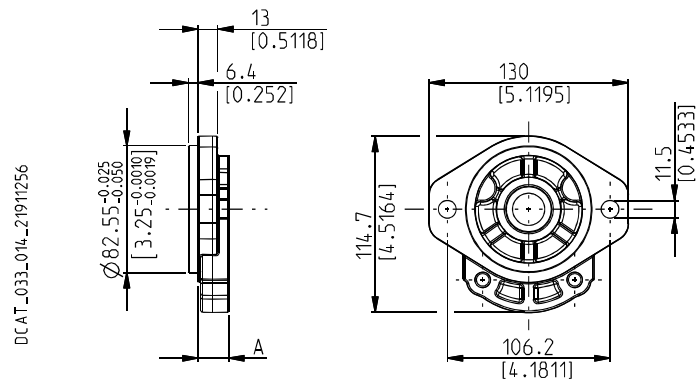
# Standard combination

X Available combination

**SAE "A" 2 BOLTS**

**S1**

Material: cast iron and aluminium



DCAT\_033\_014\_21911256

**DRIVE SHAFTS**

See page 53 ÷ 55

VERSIONS See page 47	A mm (in)	01	03	04	07	12	31	32	46	49	50	54	82
<b>0</b>	20 (0.787)	#	#	X	#	X	#	X	X	#	X	X	X
<b>5</b>	45,6 (1.7953)		X							X	X	X	X


# Standard combination


X Available combination

02/07.2006



## PORTS SIZES

 Tightening torque for low pressure side port

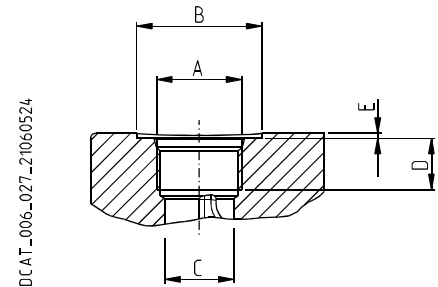
 Tightening torque for high pressure side port [values obtained at 5075 psi (350 bar)]



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		
			mm (in)	mm (in)	mm (in)	mm (in)	Nm (lbf in)	Nm (lbf in)
<b>OA</b>	3/8"	9/16" - 18 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)	—
<b>OB</b>	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)
<b>OC</b>	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)			
<b>OD</b>	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)
<b>OF</b>	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)
<b>OG</b>	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>+15</sup> (1770 ÷ 1858)
<b>OH</b>	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

01/10.03