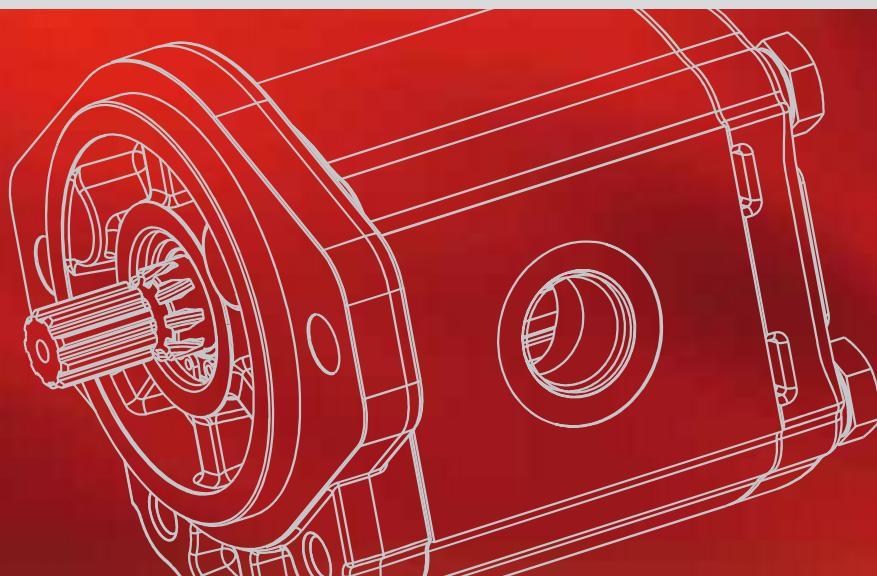


 **CASAPPA**<sup>®</sup>  
FLUID POWER DESIGN



HYDRAULIC GEAR  
PUMPS AND  
MOTORS

**POLARIS**<sup>®</sup>

## HOW TO ORDER POLARIS 20 SINGLE UNITS

PLM20.16	R	0	-	54	B2	-	L	BC/BE	-	N	-	EL	-	-	GB	
1	2	3		4	5		6	7		8		9	10	11	12	13
<span style="border: 1px dashed red; padding: 2px;"> <b>PLP 20-4</b> - <b>L</b> - <b>0</b> - <b>82</b> - <b>E2</b> - <b>L</b> - <b>EA/EA</b> - <b>N</b> - <b>EL</b> - <b>C</b> - <b>GB</b> - <b>FS</b> </span>																

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

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

3	Version	Code
	<b>Without outboard bearing</b>	<b>0</b>
	With outboard bearing	<b>W8</b>
	With outboard bearing	<b>4</b>
	With outboard bearing	<b>5</b>
	With outboard bearing	<b>6</b>
	With outboard bearing	<b>7</b>
	With outboard bearing	<b>8</b>
	With outboard bearing	<b>9</b>

4	Drive shaft	Code
	European tapered 1:8	<b>82</b>
	<b>German tapered 1:5</b>	<b>54</b>
	German tapered 1:5	<b>55</b>
	Straight	<b>46</b>
	SAE "A" spline (9 teeth)	<b>03</b>
	SAE spline (10 teeth)	<b>01</b>
	SAE "A" spline (11 teeth)	<b>07</b>
	SAE "A" straight	<b>31</b>

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

Code	Mounting flange	5
<b>E2</b>	European	
<b>B2</b>	<b>German</b>	
<b>B4</b>	German 2 bolt	
<b>B5</b>	German 2 bolt	
<b>B6</b>	German 4 bolt	
<b>S1</b>	SAE "A" 2 bolt	
<b>S2</b>	SAE "A" 2 bolt	
<b>S9</b>	SAE "A" 2 bolt	
<b>S5</b>	SAE "B" 2 bolt	
<b>W8</b>	German	

Code	Ports position	6
<b>L</b>	<b>Side</b>	
<b>P</b>	Rear	

Code	Ports IN/OUT	7
<b>GERMAN FLANGED PORTS</b>		
Side	Rear	Type
<b>BE/BC</b>	PLP 20	4-6,3-7,2-8-9-10,5-11,2
<b>BC/BE</b>	<b>PLM 20</b>	<b>14</b> -16-19-20-24,5-25 27,8-31,5
<b>EUROPEAN FLANGED PORTS</b>		
Side	Rear	Type
<b>EA/EA</b>	PLP 20	4-6,3-7,2-8-9-10,5-11,2
	PLM 20	
<b>EB/EA</b>	PLP 20	14-16-19-20-24,5-25
<b>EA/EB</b>	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		
14-16-19-20	PLP 20	<b>MB/MA</b>	
	PLM 20		
24,5-25-27,8-31,5	PLP 20	<b>MC/MB</b>	
	PLM 20		
<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		
14-16-19-20	PLP 20	<b>SB/SA</b>	
	PLM 20		
24,5-25-27,8-31,5	PLP 20	<b>SC/SB</b>	
	PLM 20		
<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>	<b>GD/GD</b>
	PLM 20		
14-16-19-20-24,5-25 27,8-31,5	PLP 20	<b>GE/GD</b>	<b>GE/GD</b>
	PLM 20		
<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>	<b>OC/OC</b>
	PLM 20		
14-16-19-20-24,5-25 27,8-31,5	PLP 20	<b>OD/OC</b>	<b>OD/OC</b>
	PLM 20		

8	Seals (a)	Code	
	<b>Buna (standard)</b>	<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>	
	<b>Aluminium mounting flange and rear cover</b>	<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	Code	11
<b>L</b>	Side drain with side port position		
<b>*</b>	Side drain with bottom port position		

Code	Drain port	Code	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	

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

<b>IN/OUT SAE FLANGED PORTS (SSM)</b>			
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	

<b>IN/OUT SAE FLANGED PORTS (SSS)</b>			
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	

<b>IN/OUT GAS STRAIGHT THREAD PORTS (BSPP)</b>			
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	

<b>IN/OUT SAE STRAIGHT THREAD PORTS (ODT)</b>			
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	Code	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

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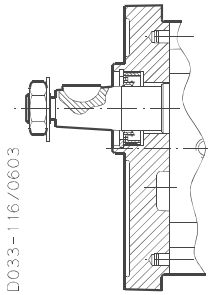
## VERSIONS

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

**VERSION 0**

Available for group:

**10      20      30**

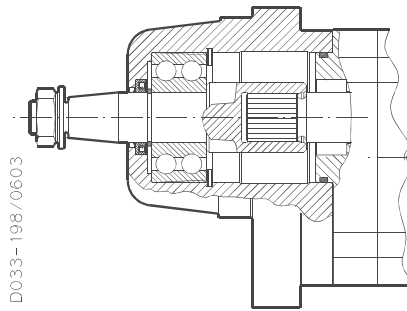


Version for applications without radial and axial load on the drive shaft.

**VERSION W8**

Available for group:

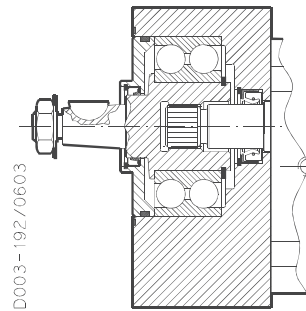
**20**



**VERSION 4**

Available for group:

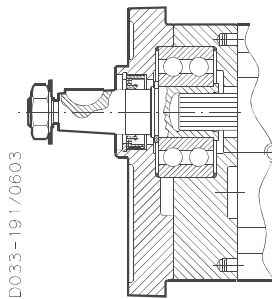
**20**



**VERSION 5**

Available for group:

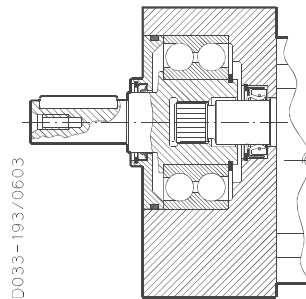
**20**



**VERSION 6**

Available for group:

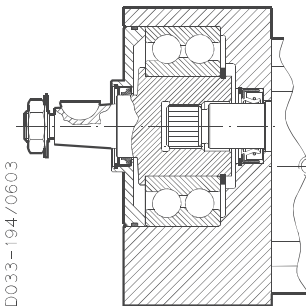
**20**



**VERSION 7**

Available for group:

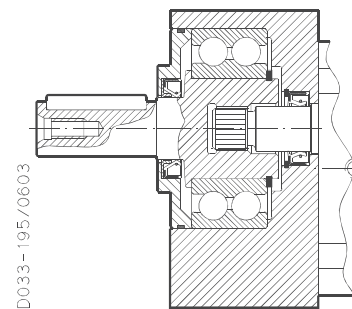
**20**



**VERSION 8**

Available for group:

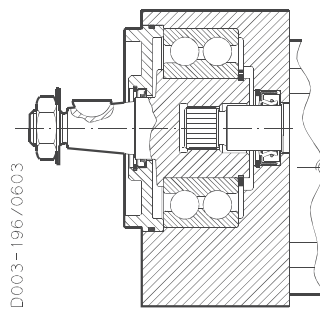
**20**



**VERSION 9**

Available for group:

**20**



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**

**DRIVE SHAFTS**

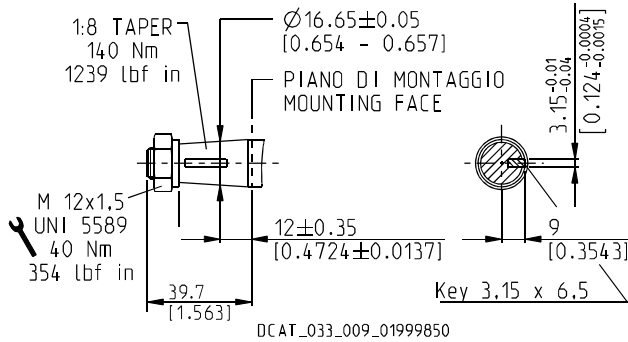
**EUROPEAN TAPERED 1:8**

**82**

Not available with size:

**20•10,5    20•24,5    20•27,8**

Mounting face refer to flange code **E2**



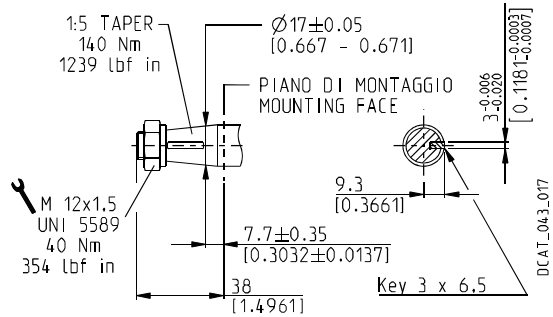
**GERMAN TAPERED 1:5**

**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**

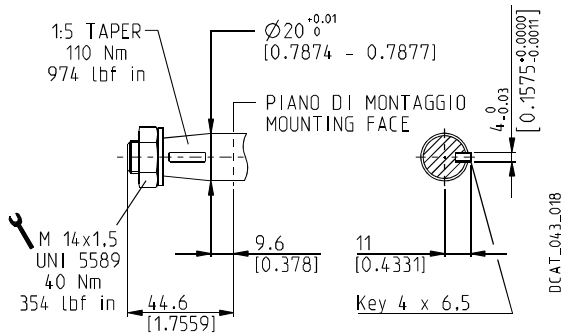


**GERMAN TAPERED 1:5**

**55**

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

Mounting face refer to flange code **B2**



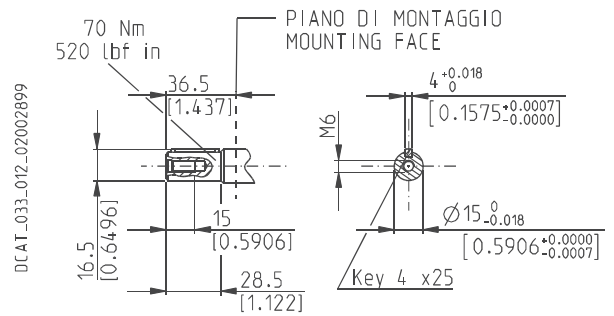
**STRAIGHT**

**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**



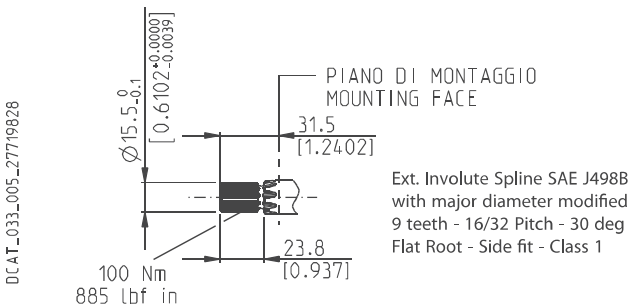
**SAE "A" SPLINE**

**03**

Not available with size:

**20•24,5    20•27,8**

Mounting face refer to flange code **S1**



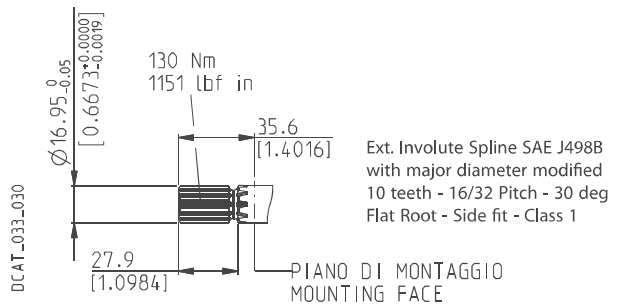
**SPLINE**

**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**

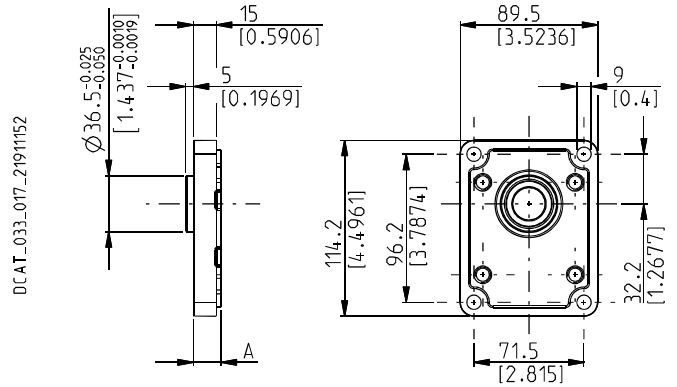
**MOUNTING FLANGES AND TABLE OF COMPATIBILITY**

Replaces: 01/10.03

**EUROPEAN**

**E2**

Material: cast iron and aluminium



**DRIVE SHAFTS**

See page 53 ÷ 55

VERSIONS See page 47	A mm (in)	82	46	B1	03	04	07	12	31	48	49	50	54
<b>0</b>	18 (0.7087)	#	#		X	X	X	X	X	X	X	X	X
<b>4</b>	55,4 (2.1811)	#											
<b>5</b>	43,6 (1.7165)	#		X	X						X	X	X
<b>6</b>	55,4 (2.1811)									#			
<b>7</b>	59,4 (2.3386)	#											
<b>8</b>	59,4 (2.3386)			#									

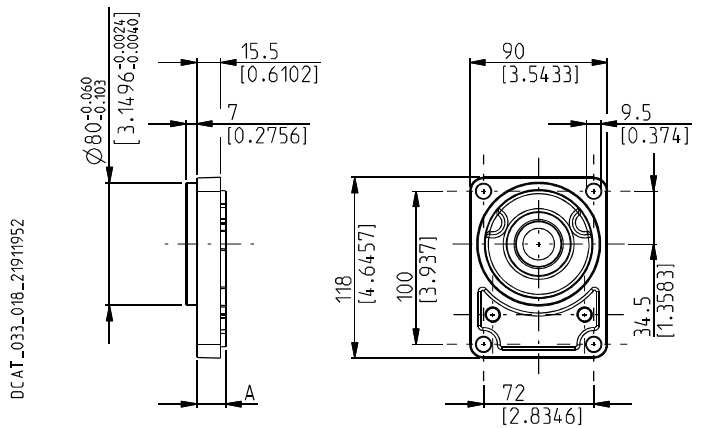
# Standard combination

X Available combination

**GERMAN**

**B2**

Material: cast iron and aluminium



**DRIVE SHAFTS**

See page 53 ÷ 55

VERSIONS See page 47	A mm (in)	12	54	55	01	03	31	46	49	82
<b>0</b>	18,8 (0.7402)	#	#		X	X	X	X	X	X
<b>5</b>	44,4 (1.7480)		X	X		X			X	X
<b>9</b>	59,4 (1.7441)			X						

# Standard combination

X Available combination

02/07.2006

## PORTS SIZE



Tightening torque for low pressure side port



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

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

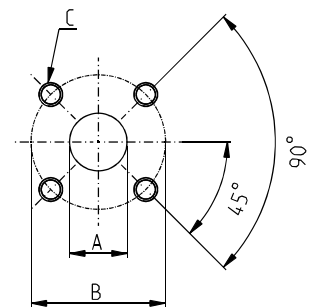
### GERMAN FLANGED PORTS - 4 Bolts

**GERMAN**

Metric thread ISO 60° conforms to ISO/R 262

CODE	A	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)	M6 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)	M6 12 (0.4724)	8 <sup>+0.5</sup> (71 ÷ 75)	8 <sup>+0.5</sup> (71 ÷ 75)
<b>BL</b>	19 (0.7480)	55 (2.1654)	M8 18 (0.7087)	15 <sup>+1</sup> (133 ÷ 142)	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

01/10.03

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)

(◆) For POLARIS 30

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