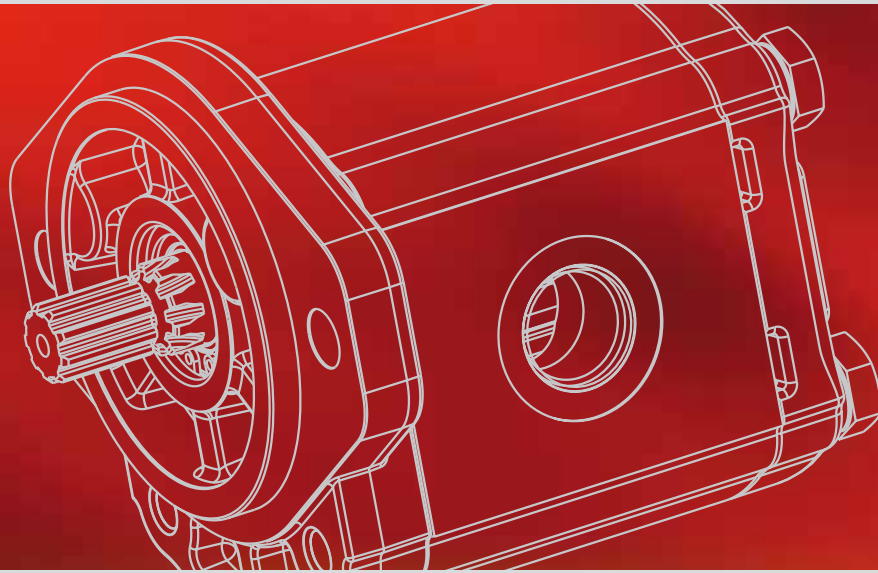




HYDRAULIC GEAR  
PUMPS AND  
MOTORS

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Replaces: 05/04.2023

06/02.2024



Modification from former edition.

## INTRODUCTION

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

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

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

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

### DISPLACEMENTS

From 1,07 cm<sup>3</sup>/rev (0.07 in<sup>3</sup>/rev)

To 91,10 cm<sup>3</sup>/rev (5.56 in<sup>3</sup>/rev)

### PRESSURE

Max. constant operating pressure 260 bar (3770 psi)

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

Max. peak of pressure 300 bar (4350 psi)

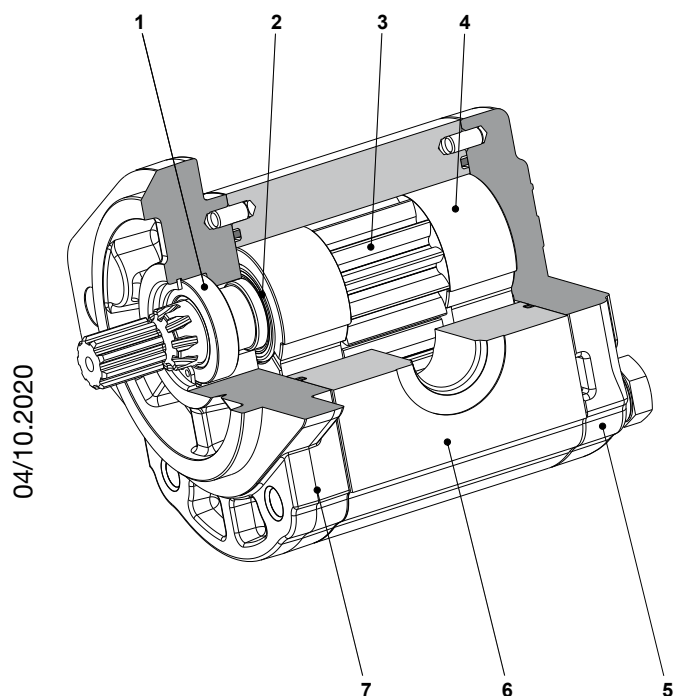
### SPEED

Max. 4000 min<sup>-1</sup>

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

### TYPICAL APPLICATIONS

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



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

## INSTRUCTIONS

### INSTALLATION

#### Pump

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

#### Motor

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

#### TANK

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

#### LINES

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

#### HYDRAULIC FLUID

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

#### FILTERS

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

### STORAGE

The storage must be in a dry environment.

Max storage time in ideal conditions is 24 months.

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

### STARTING UP

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

If the difference between pump or motor temperature and fluid temperature exceeds 10 °C (18 °F), rapidly switch the system on and off to heat it up gradually. Then gradually increase the pressure and speed of rotation until the pre-set operating levels as specified in the catalogue are attained.

### COLD START

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

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

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

### PERIODICAL CHECKS - MAINTENANCE

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



05/04.2023

## FEATURES

Replaces: 05/04.2023

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

**Tab. 1**

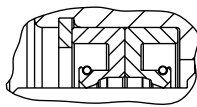
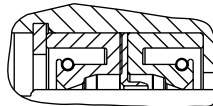
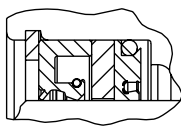
| Type    | Fluid composition                            | Max pressure<br>bar (psi) | Max speed<br>min <sup>-1</sup> | Temperature - °C (°F) |                |           | Seals<br>(●) | Shaft seals<br>option<br>(◆) |
|---------|----------------------------------------------|---------------------------|--------------------------------|-----------------------|--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

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

06/02.2024

**D (◆)** shaft seals with wiper seal

**C1 (◆)** High pressure special shaft seal

|                                                                |                                                                       |                                                                                     |                                                                          |                                                                                       |
|----------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Single rotation pumps                                          | Max drain line pressure:<br>0,5 bar (7 psi)                           |  |                                                                          |                                                                                       |
| Single rotation motors<br>Reversible rotation pumps and motors | Max drain line pressure:<br>5 bar (73 psi)<br>@ 350 min <sup>-1</sup> |  | Max drain line pressure:<br>10 bar (145 psi)<br>@ 2000 min <sup>-1</sup> |  |

## FEATURES

### Filtration

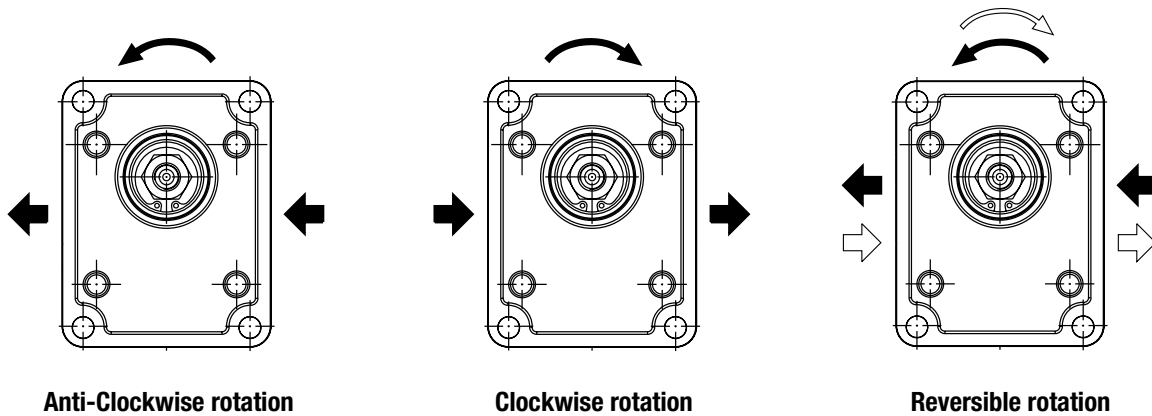
Tab. 2

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

Casappa recommends to use its own production filters:



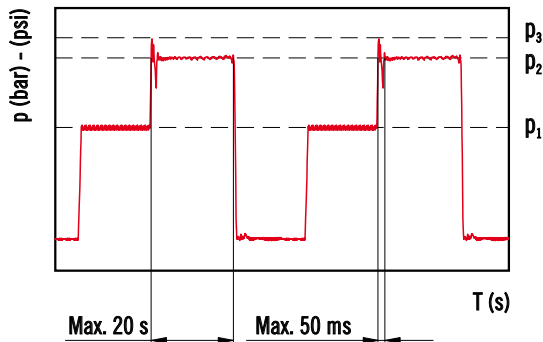
### DEFINITION OF ROTATION DIRECTION LOOKING AT THE DRIVE SHAFT



### GENERAL NOTES

Available with different inlet and outlet ports.  
Please contact us for more information.

### PRESSURE DEFINITION



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

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

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

Please contact us for high frequency applications.

04/10.2020

## FEATURES

| Series     | Pump type PLP<br>Motor type PLM | Displacement      | Max. pressure  |                |                | Max. speed        | Min. speed |
|------------|---------------------------------|-------------------|----------------|----------------|----------------|-------------------|------------|
|            |                                 |                   | p <sub>1</sub> | p <sub>2</sub> | p <sub>3</sub> |                   |            |
|            |                                 | cm³/rev (in³/rev) | bar (psi)      |                |                | min <sup>-1</sup> |            |
| POLARIS 10 | PL. 10•1                        | 1,07 (0.07)       | 260 (3770)     | 280 (4060)     | 290 (4205)     | 4000              | 650        |
|            | PL. 10•1,5                      | 1,60 (0.10)       | 260 (3770)     | 280 (4060)     | 290 (4205)     | 4000              | 650        |
|            | PL. 10•2                        | 2,13 (0.13)       | 260 (3770)     | 280 (4060)     | 290 (4205)     | 4000              | 650        |
|            | PL. 10•2,5                      | 2,67 (0.16)       | 260 (3770)     | 280 (4060)     | 290 (4205)     | 4000              | 650        |
|            | PL. 10•3,15                     | 3,34 (0.20)       | 260 (3770)     | 280 (4060)     | 290 (4205)     | 4000              | 650        |
|            | PL. 10•4                        | 4,27 (0.26)       | 250 (3625)     | 270 (3915)     | 280 (4060)     | 4000              | 650        |
|            | PL. 10•5                        | 5,34 (0.33)       | 250 (3625)     | 270 (3915)     | 280 (4060)     | 4000              | 650        |
|            | PL. 10•5,8                      | 6,20 (0.38)       | 230 (3335)     | 250 (3625)     | 260 (3770)     | 3500              | 650        |
|            | PL. 10•6,3                      | 6,67 (0.41)       | 230 (3335)     | 250 (3625)     | 260 (3770)     | 3500              | 650        |
|            | PL. 10•8                        | 8,51 (0.52)       | 180 (2610)     | 200 (2900)     | 210 (3045)     | 3500              | 650        |
|            | PL. 10•10                       | 10,67 (0.65)      | 140 (2030)     | 160 (2320)     | 170 (2465)     | 3500              | 650        |
| POLARIS 20 | PL. 20•4                        | 4,95 (0.30)       | 250 (3625)     | 280 (4060)     | 300 (4350)     | 4000              | 600        |
|            | PL. 20•6,3                      | 6,61 (0.40)       | 250 (3625)     | 280 (4060)     | 300 (4350)     | 4000              | 600        |
|            | PL. 20•7,2                      | 7,29 (0,44)       | 250 (3625)     | 280 (4060)     | 300 (4350)     | 4000              | 600        |
|            | PL. 20•8                        | 8,26 (0.50)       | 250 (3625)     | 280 (4060)     | 300 (4350)     | 3500              | 600        |
|            | PL. 20•9                        | 9,17 (0.56)       | 250 (3625)     | 280 (4060)     | 300 (4350)     | 3500              | 600        |
|            | PL. 20•10,5                     | 10,9 (0.66)       | 250 (3625)     | 280 (4060)     | 300 (4350)     | 3500              | 600        |
|            | PL. 20•11,2                     | 11,23 (0.69)      | 250 (3625)     | 280 (4060)     | 300 (4350)     | 3500              | 600        |
|            | PL. 20•14                       | 14,53 (0.89)      | 250 (3625)     | 280 (4060)     | 300 (4350)     | 3500              | 500        |
|            | PL. 20•16                       | 16,85 (1.03)      | 250 (3625)     | 280 (4060)     | 300 (4350)     | 3000              | 500        |
|            | PL. 20•19                       | 19,09 (1.16)      | 200 (2900)     | 220 (3190)     | 240 (3480)     | 3000              | 500        |
|            | PL. 20•20                       | 21,14 (1.29)      | 200 (2900)     | 220 (3190)     | 240 (3480)     | 3000              | 500        |
|            | PL. 20•24,5                     | 24,84 (1.52)      | 170 (2465)     | 190 (2755)     | 210 (3045)     | 2500              | 500        |
|            | PL. 20•25                       | 26,42 (1.61)      | 170 (2465)     | 190 (2755)     | 210 (3045)     | 2500              | 500        |
|            | PL. 20•27,8                     | 28,21 (1.72)      | 130 (1885)     | 150 (2175)     | 170 (2465)     | 2000              | 500        |
|            | PL. 20•31,5                     | 33,03 (2.01)      | 130 (1885)     | 150 (2175)     | 170 (2465)     | 2000              | 500        |
| POLARIS 30 | PL. 30•22                       | 21,99 (1.34)      | 250 (3625)     | 270 (3915)     | 280 (4060)     | 3000              | 350        |
|            | PL. 30•27                       | 26,70 (1.63)      | 250 (3625)     | 270 (3915)     | 280 (4060)     | 3000              | 350        |
|            | PL. 30•34                       | 34,55 (2.11)      | 240 (3480)     | 260 (3770)     | 270 (3915)     | 3000              | 350        |
|            | PL. 30•38                       | 39,27 (2.40)      | 240 (3480)     | 260 (3770)     | 270 (3915)     | 3000              | 350        |
|            | PL. 30•43                       | 43,98 (2.68)      | 230 (3335)     | 250 (3625)     | 260 (3770)     | 3000              | 350        |
|            | PL. 30•51                       | 51,83 (3.16)      | 210 (3045)     | 230 (3335)     | 240 (3480)     | 2500              | 350        |
|            | PL. 30•61                       | 61,26 (3.74)      | 190 (2755)     | 210 (3045)     | 220 (3190)     | 2500              | 350        |
|            | PL. 30•73                       | 73,82 (4.50)      | 170 (2465)     | 190 (2755)     | 200 (2900)     | 2500              | 350        |
|            | PL. 30•82                       | 81,68 (4.98)      | 160 (2320)     | 170 (2465)     | 180 (2610)     | 2200              | 350        |
|            | PL. 30•90                       | 91,10 (5.56)      | 150 (2175)     | 160 (2320)     | 170 (2465)     | 2200              | 350        |

Pressure values in the table refer to side ports unidirectional pumps and motors.  
 For reversible pumps and motors, max pressures are 250 bar (3600 psi) excepted those with lower pressure values.  
 Please contact us for different working conditions.

## GENERAL DATA PUMPS AND MOTORS

|                                         |                                             |                             |
|-----------------------------------------|---------------------------------------------|-----------------------------|
| <b>Q</b>                                | l/min (US gpm)                              | Flow                        |
| <b>M</b>                                | Nm (lbf in)                                 | Torque                      |
| <b>P</b>                                | kW (HP)                                     | Power                       |
| <b>V</b>                                | cm <sup>3</sup> /rev (in <sup>3</sup> /rev) | Displacement                |
| <b>n</b>                                | min <sup>-1</sup>                           | Speed                       |
| <b>Δp</b>                               | bar (psi)                                   | Pressure                    |
| $\eta_v = \eta_v(V, \Delta p, n)$       |                                             | Volumetric efficiency       |
| $\eta_{hm} = \eta_{hm}(V, \Delta p, n)$ |                                             | Hydro-mechanical efficiency |
| $\eta_t = \eta_v \cdot \eta_{hm}$       |                                             | Overall efficiency          |

### DESIGN CALCULATIONS FOR PUMP

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

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

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

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

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

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

### DESIGN CALCULATIONS FOR MOTOR

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

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

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

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

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

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

05/04.2023

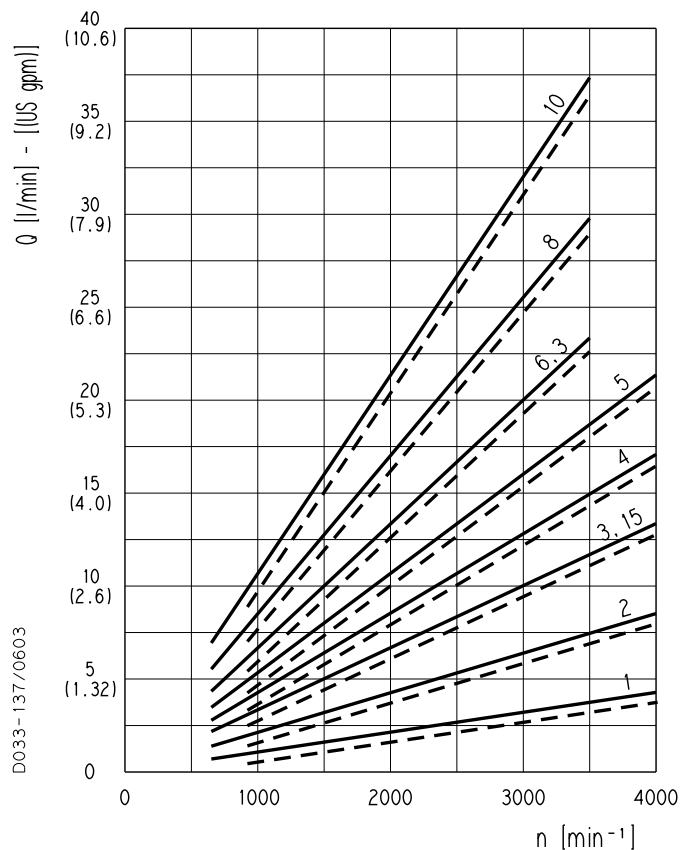
### NOTES

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

## PLP 10

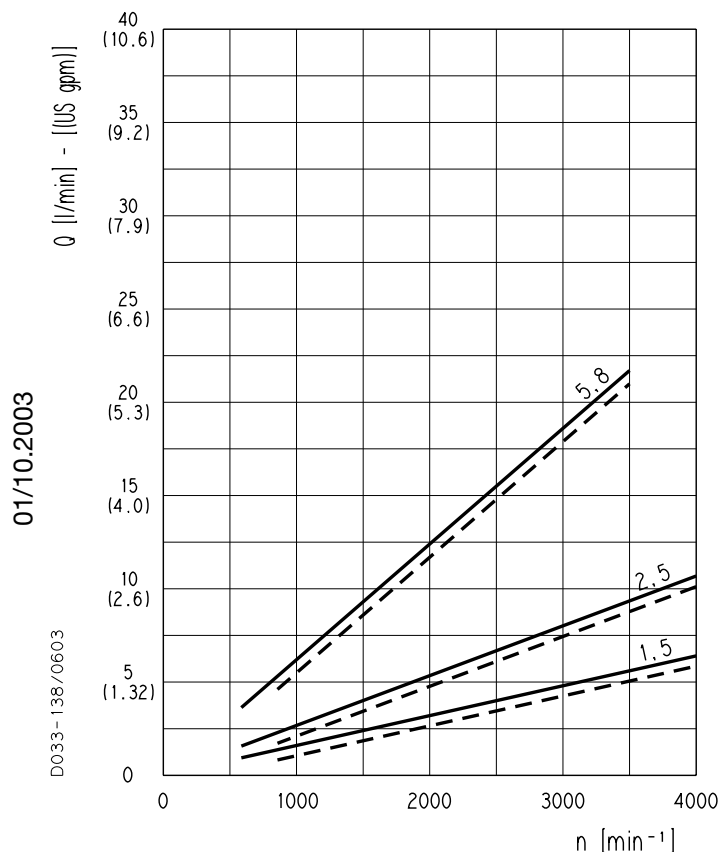
## POLARIS 10 GEAR PUMPS PERFORMANCE CURVES

### PLP 10



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

|                    |       |                    |
|--------------------|-------|--------------------|
| <b>PLP 10•1</b>    | —     | 20 bar (290 psi)   |
|                    | - - - | 260 bar (3770 psi) |
| <b>PLP 10•2</b>    | —     | 20 bar (290 psi)   |
|                    | - - - | 260 bar (3770 psi) |
| <b>PLP 10•3,15</b> | —     | 20 bar (290 psi)   |
|                    | - - - | 260 bar (3770 psi) |
| <b>PLP 10•4</b>    | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLP 10•5</b>    | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLP 10•6,3</b>  | —     | 20 bar (290 psi)   |
|                    | - - - | 230 bar (3335 psi) |
| <b>PLP 10•8</b>    | —     | 20 bar (290 psi)   |
|                    | - - - | 180 bar (2610 psi) |
| <b>PLP 10•10</b>   | —     | 20 bar (290 psi)   |
|                    | - - - | 140 bar (2030 psi) |

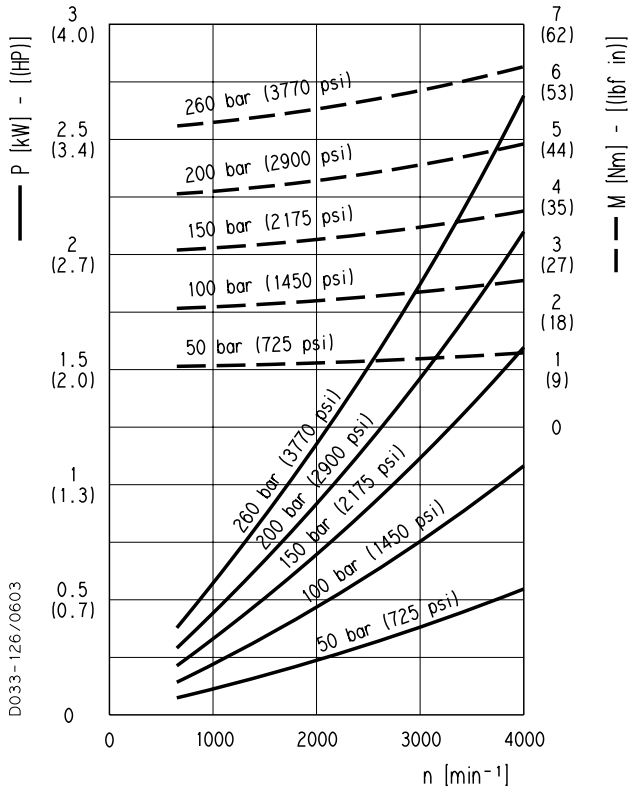


|                   |       |                    |
|-------------------|-------|--------------------|
| <b>PLP 10•1,5</b> | —     | 20 bar (290 psi)   |
|                   | - - - | 260 bar (3770 psi) |
| <b>PLP 10•2,5</b> | —     | 20 bar (290 psi)   |
|                   | - - - | 260 bar (3770 psi) |
| <b>PLP 10•5,8</b> | —     | 20 bar (290 psi)   |
|                   | - - - | 230 bar (3335 psi) |

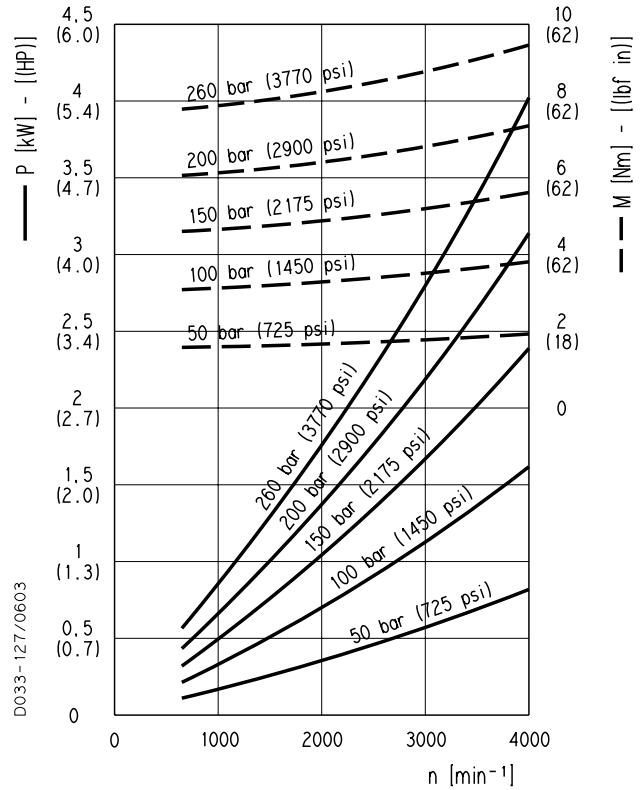
**PLP 10**

**POLARIS 10 GEAR PUMPS PERFORMANCE CURVES**

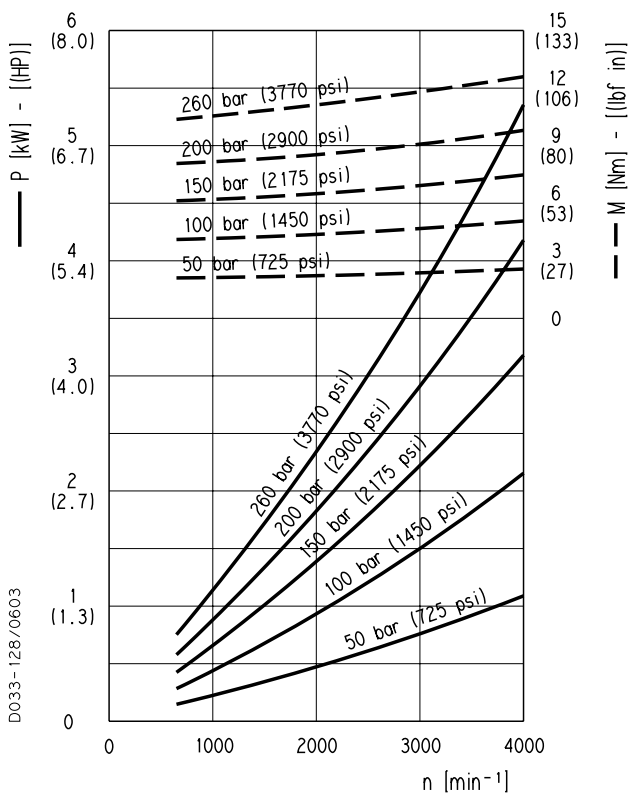
**PLP 10•1**



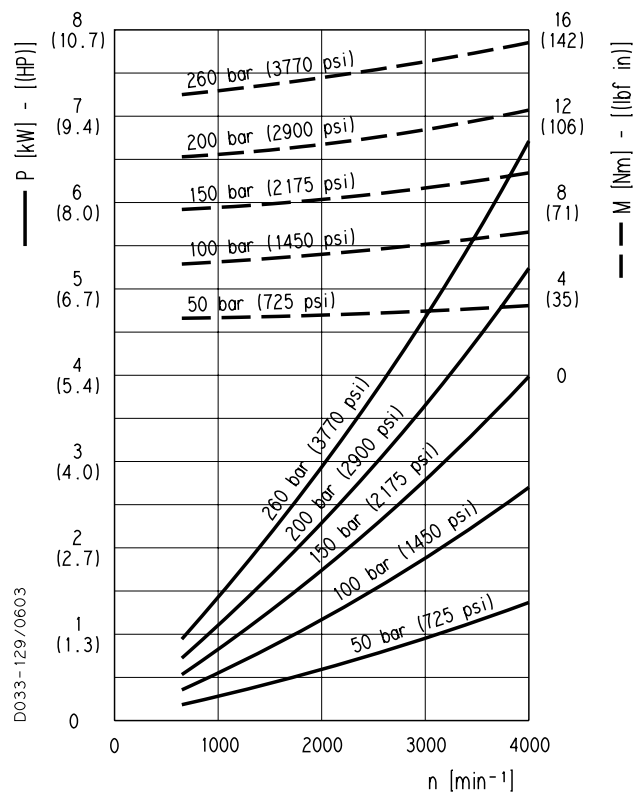
**PLP 10•1,5**



**PLP 10•2**



**PLP 10•2,5**

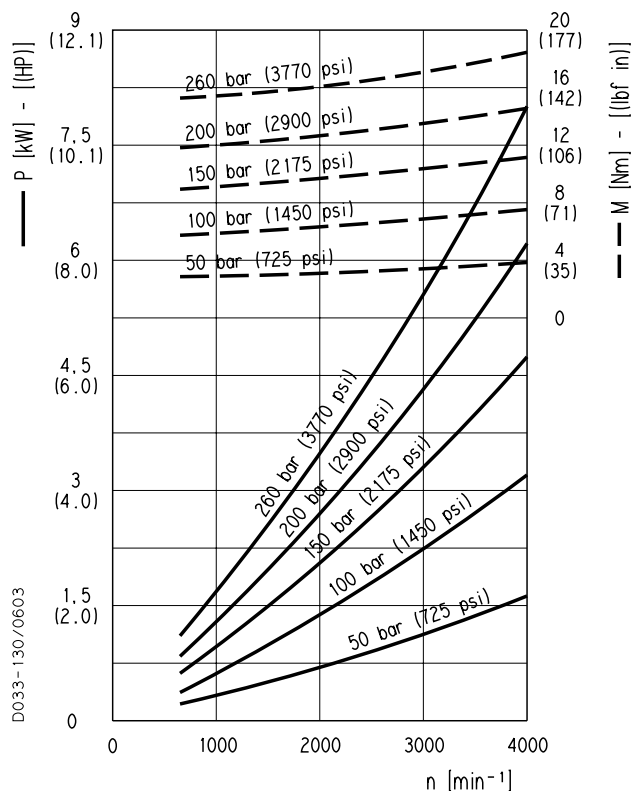


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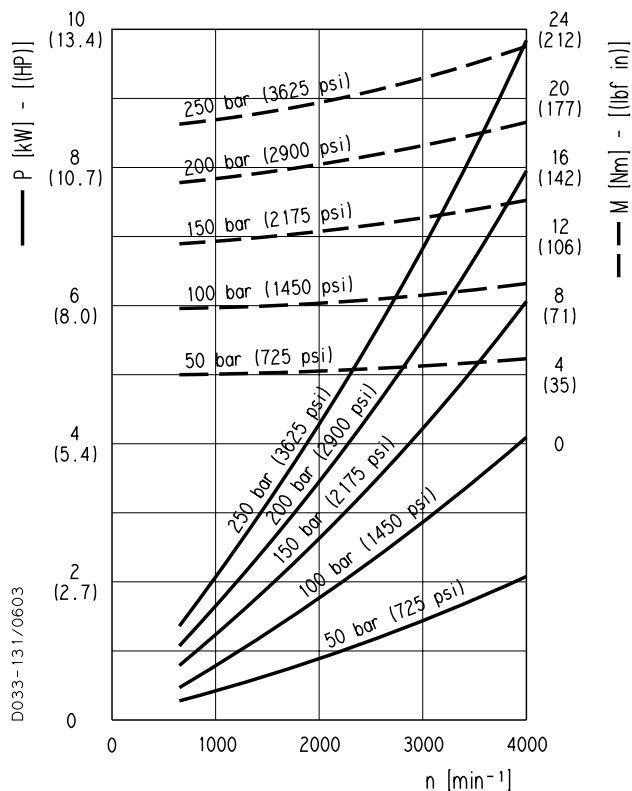
**PLP 10**

**POLARIS 10 GEAR PUMPS PERFORMANCE CURVES**

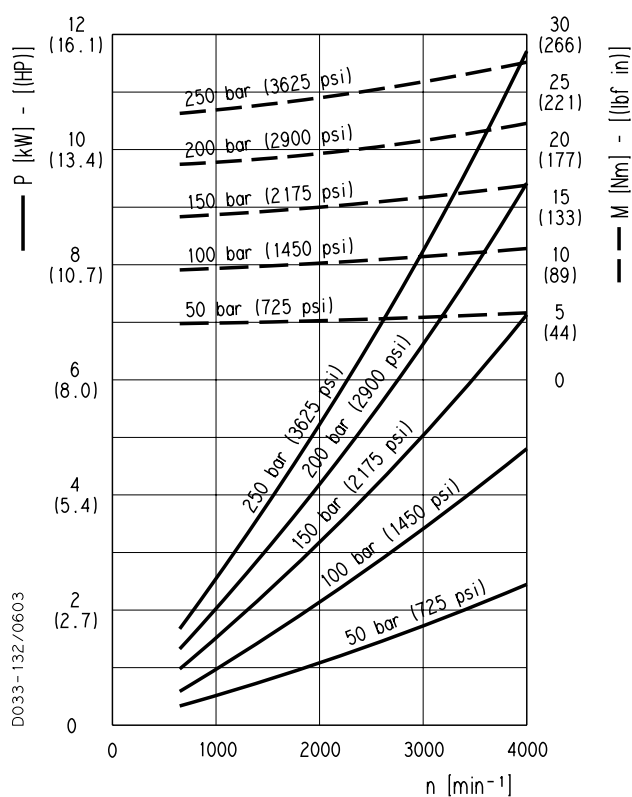
**PLP 10•3,15**



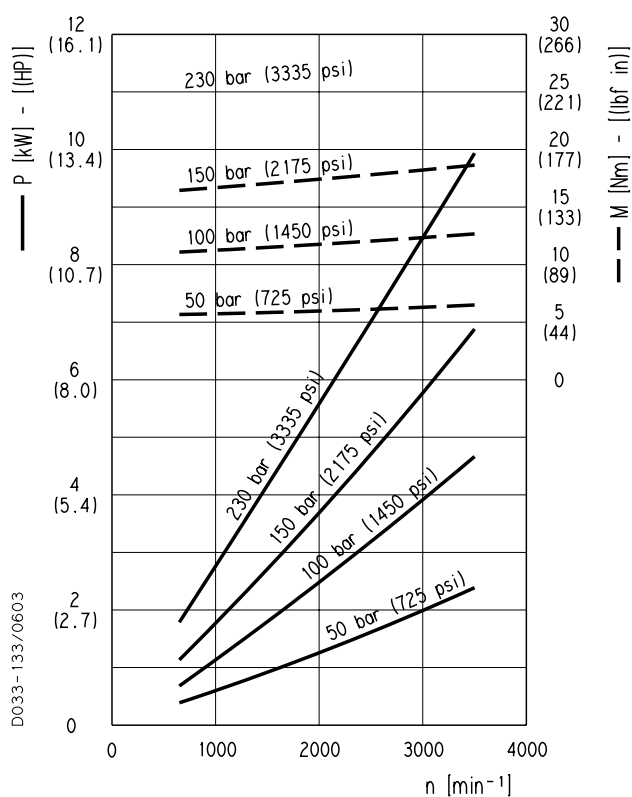
**PLP 10•4**



**PLP 10•5**



**PLP 10•5,8**

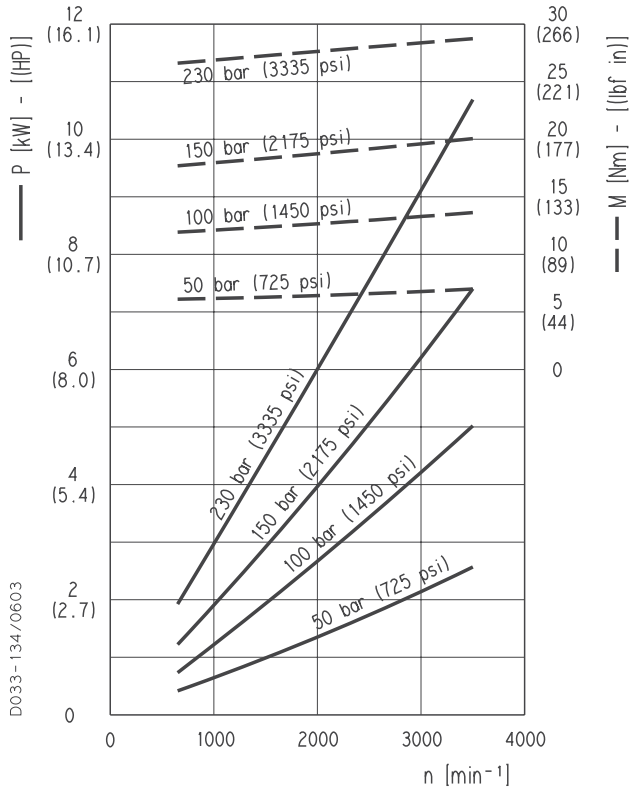


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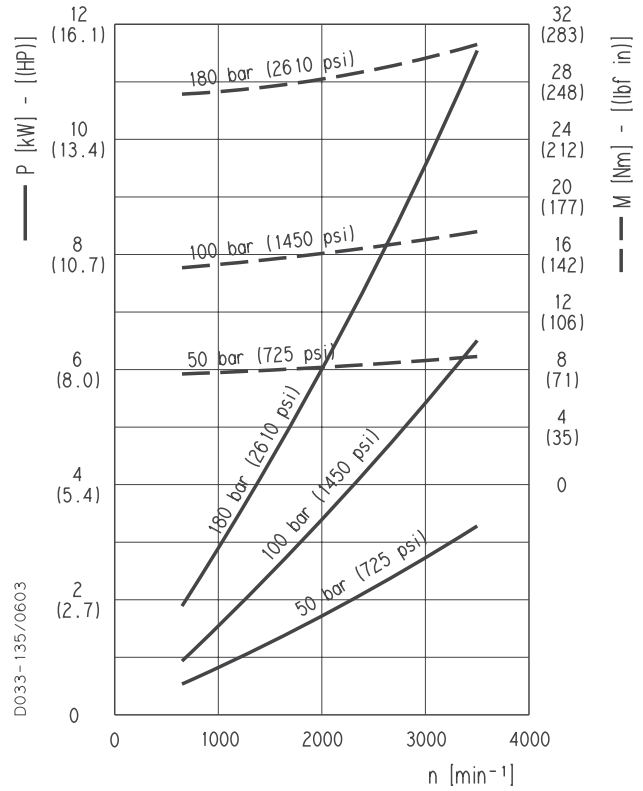
**PLP 10**

**POLARIS 10 GEAR PUMPS PERFORMANCE CURVES**

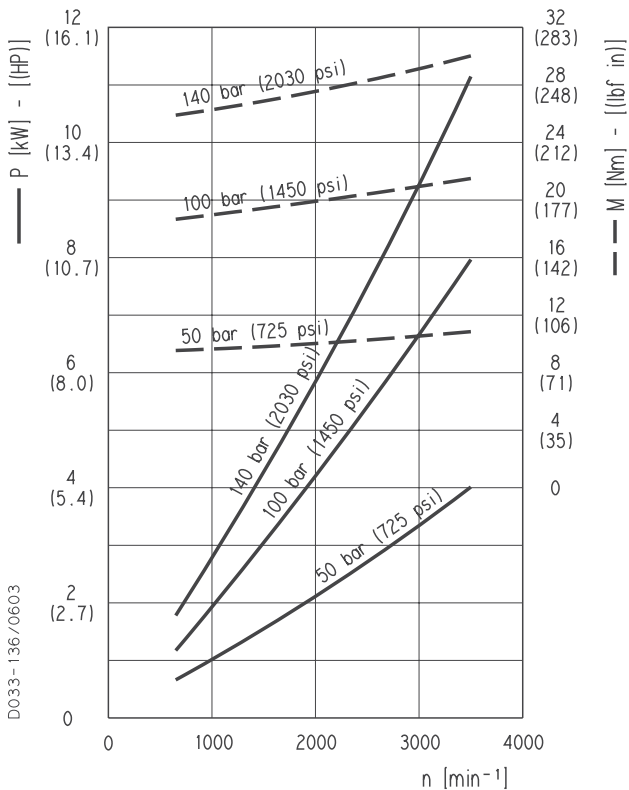
**PLP 10•6,3**



**PLP 10•8**



**PLP 10•10**

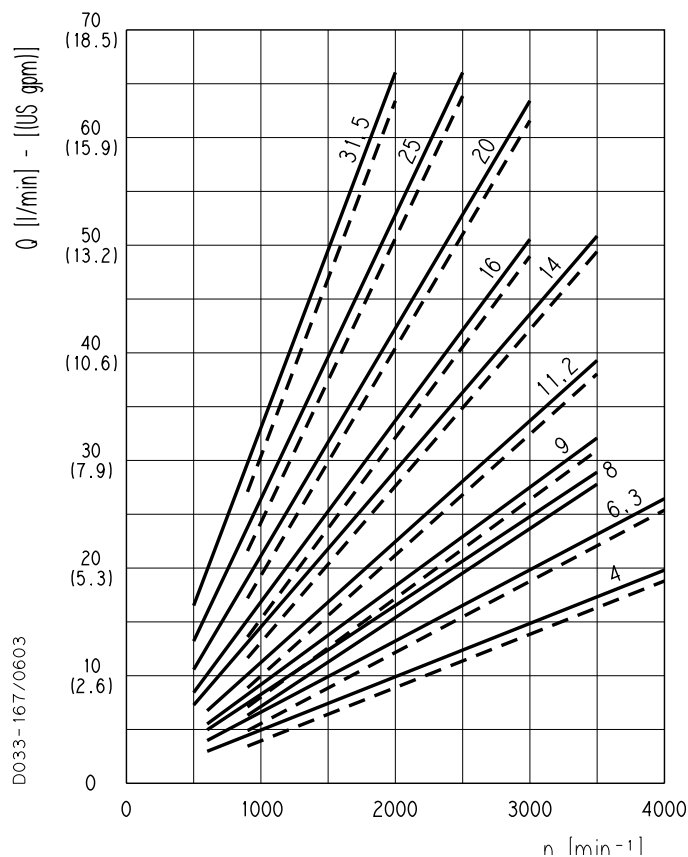


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# PLP 20

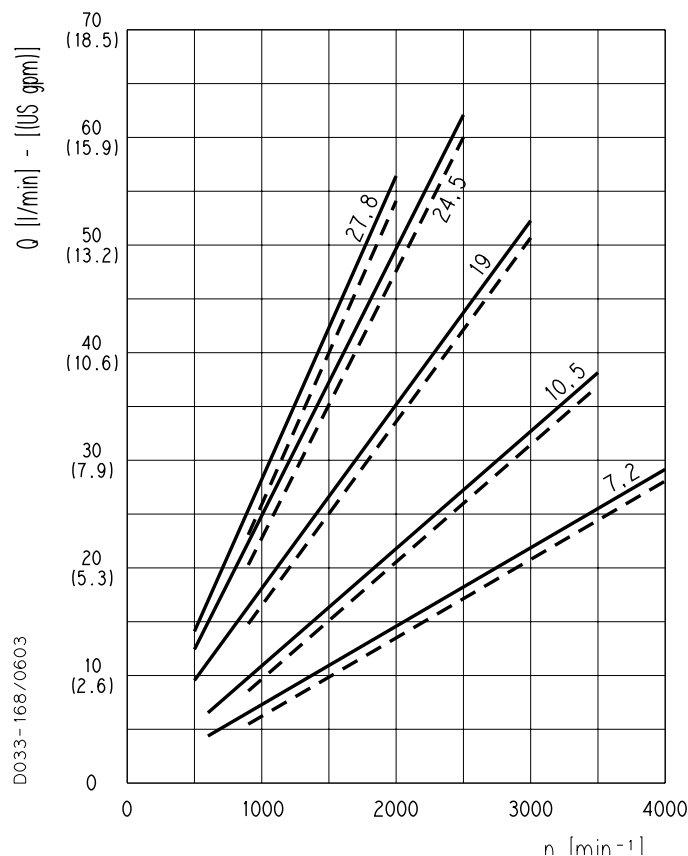
## POLARIS 20 GEAR PUMPS PERFORMANCE CURVES

### PLP 20



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

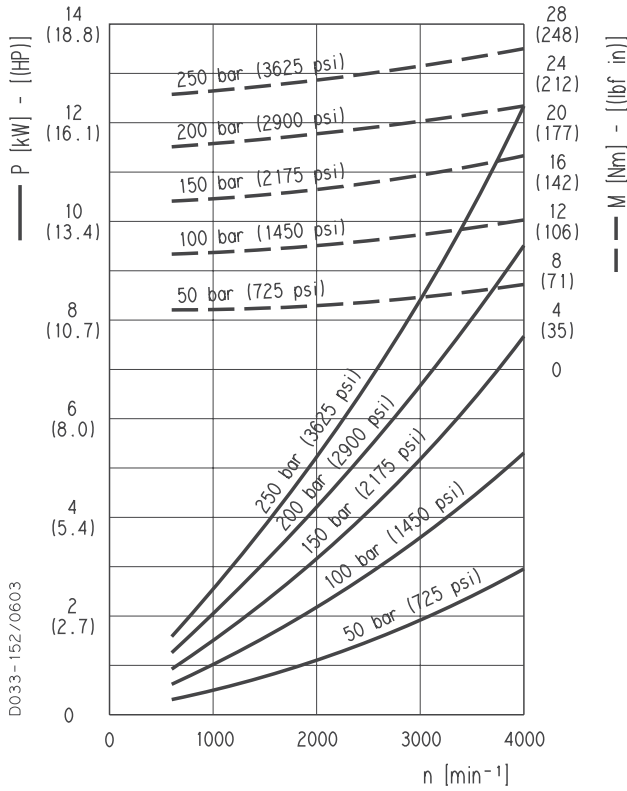
|                    |       |                    |
|--------------------|-------|--------------------|
| <b>PLP 20•4</b>    | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLP 20•6,3</b>  | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLP 20•8</b>    | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLP 20•9</b>    | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLP 20•11,2</b> | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLP 20•14</b>   | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLP 20•16</b>   | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLP 20•20</b>   | —     | 20 bar (290 psi)   |
|                    | - - - | 200 bar (2900 psi) |
| <b>PLP 20•25</b>   | —     | 20 bar (290 psi)   |
|                    | - - - | 170 bar (2465 psi) |
| <b>PLP 20•31,5</b> | —     | 20 bar (290 psi)   |
|                    | - - - | 130 bar (1885 psi) |
| <b>PLP 20•7,2</b>  | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLP 20•10,5</b> | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLP 20•19</b>   | —     | 20 bar (290 psi)   |
|                    | - - - | 200 bar (2900 psi) |
| <b>PLP 20•24,5</b> | —     | 20 bar (290 psi)   |
|                    | - - - | 270 bar (2465 psi) |
| <b>PLP 20•27,8</b> | —     | 20 bar (290 psi)   |
|                    | - - - | 130 bar (1885 psi) |



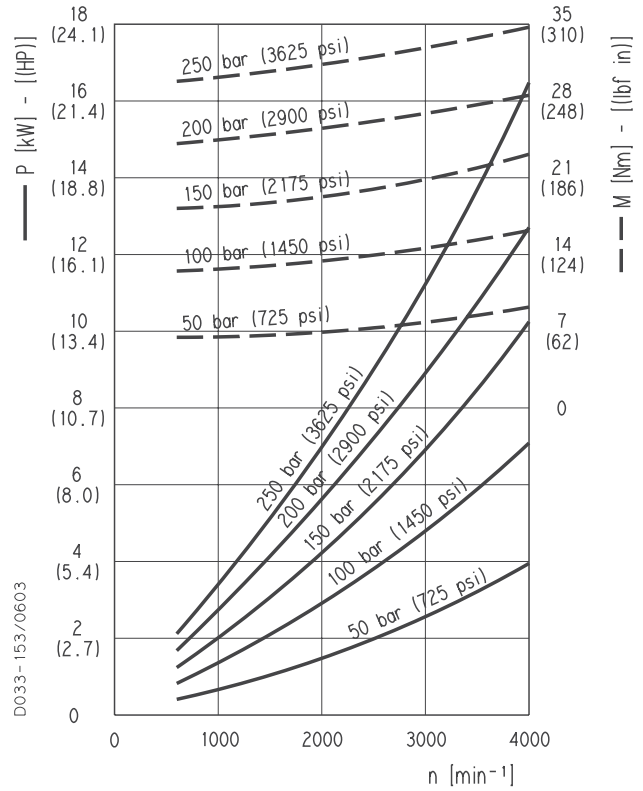
**PLP 20**

**POLARIS 20 GEAR PUMPS PERFORMANCE CURVES**

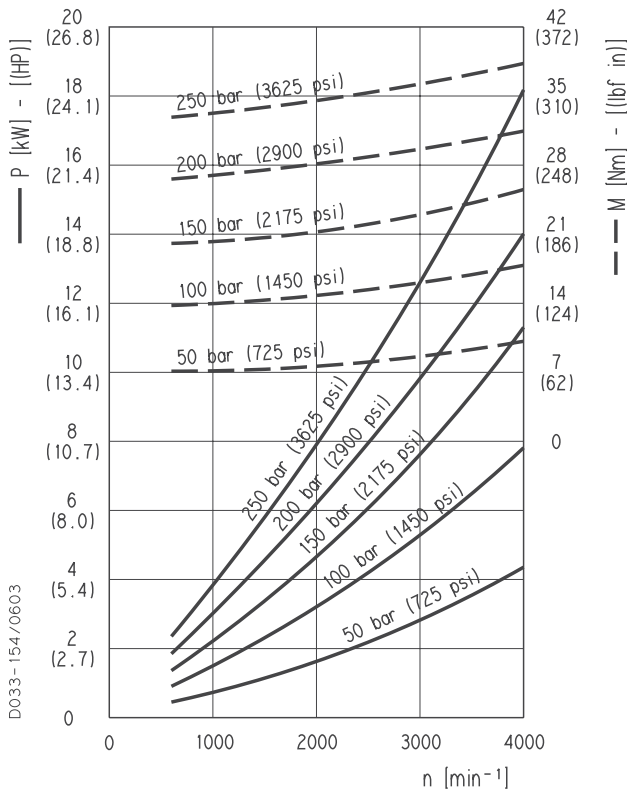
**PLP 20•4**



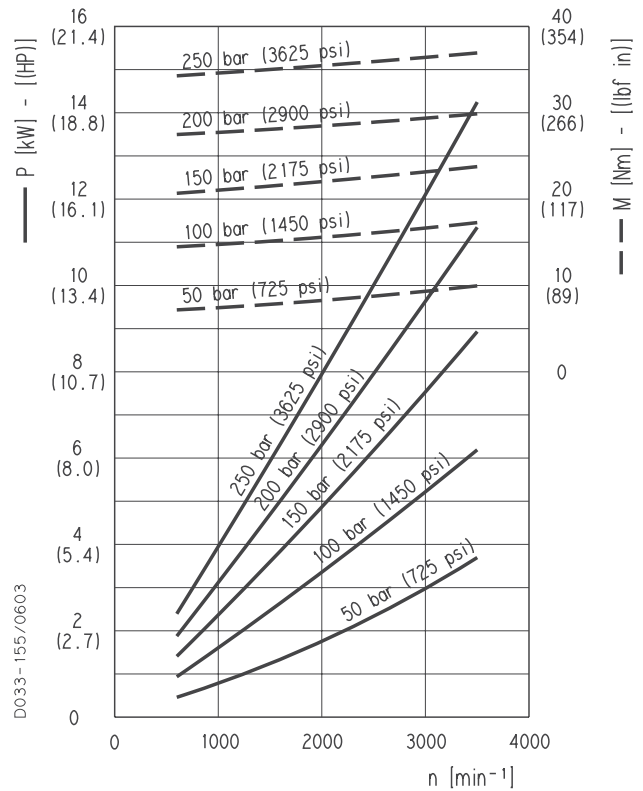
**PLP 20•6,3**



**PLP 20•7,2**



**PLP 20•8**

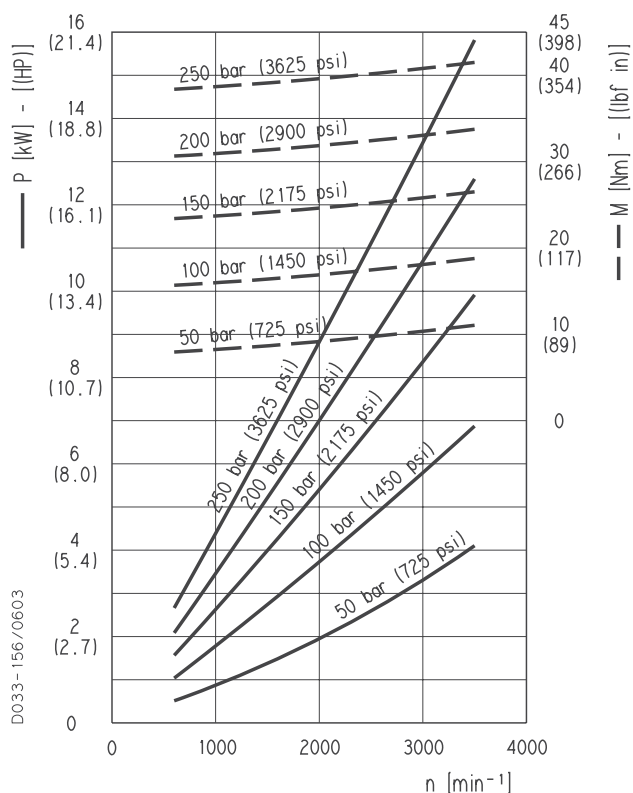


01/10.2003

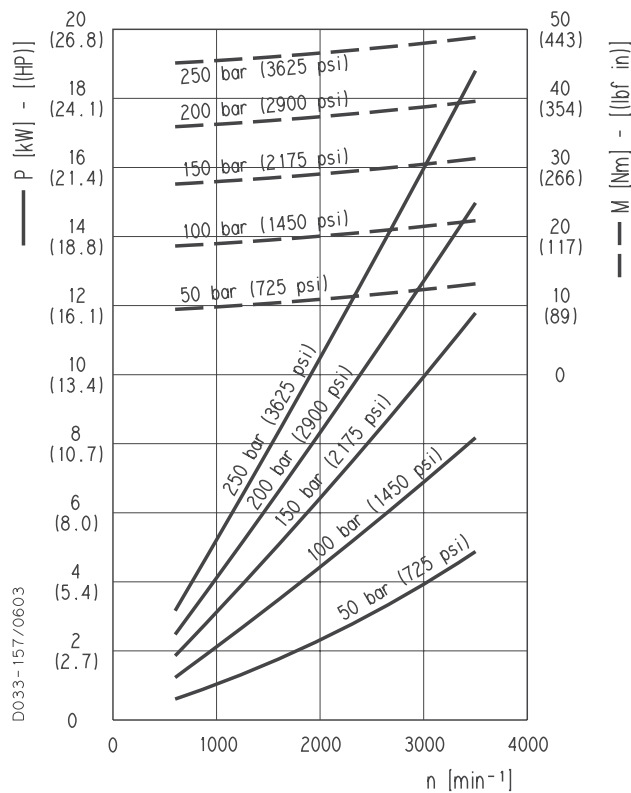
**PLP 20**

**POLARIS 20 GEAR PUMPS PERFORMANCE CURVES**

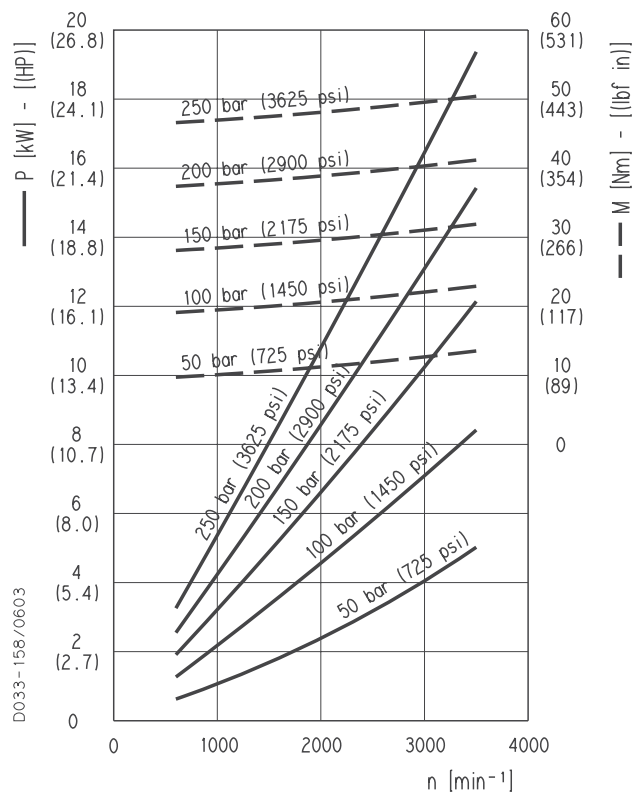
**PLP 20•9**



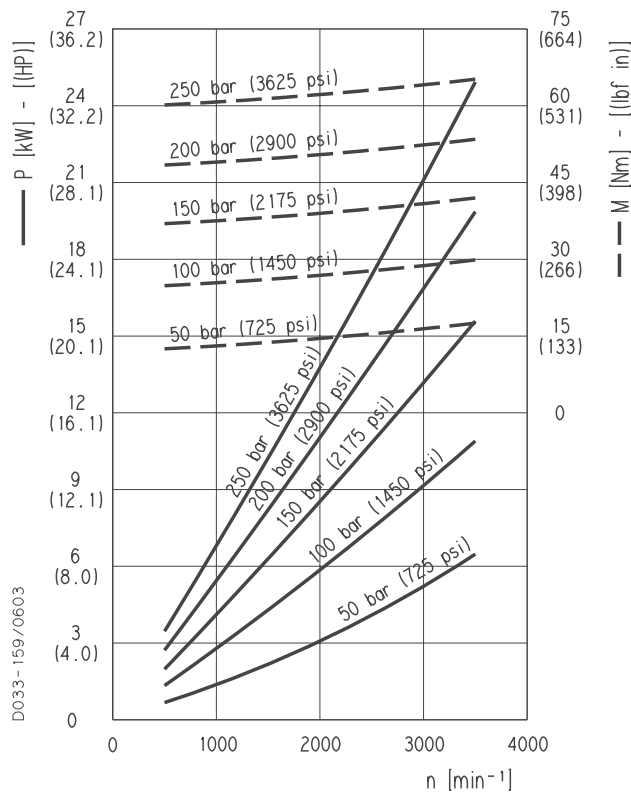
**PLP 20•10,5**



**PLP 20•11,2**



**PLP 20•14**

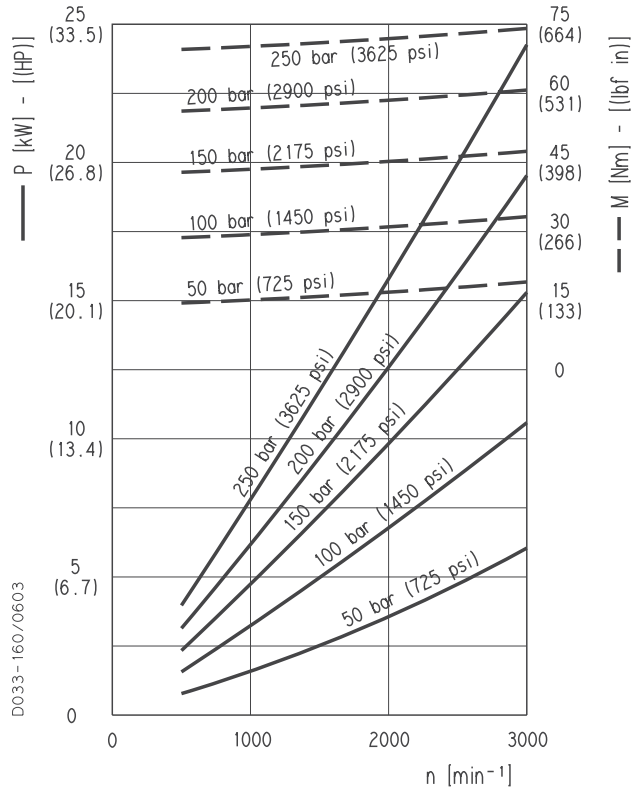


01/10.2003

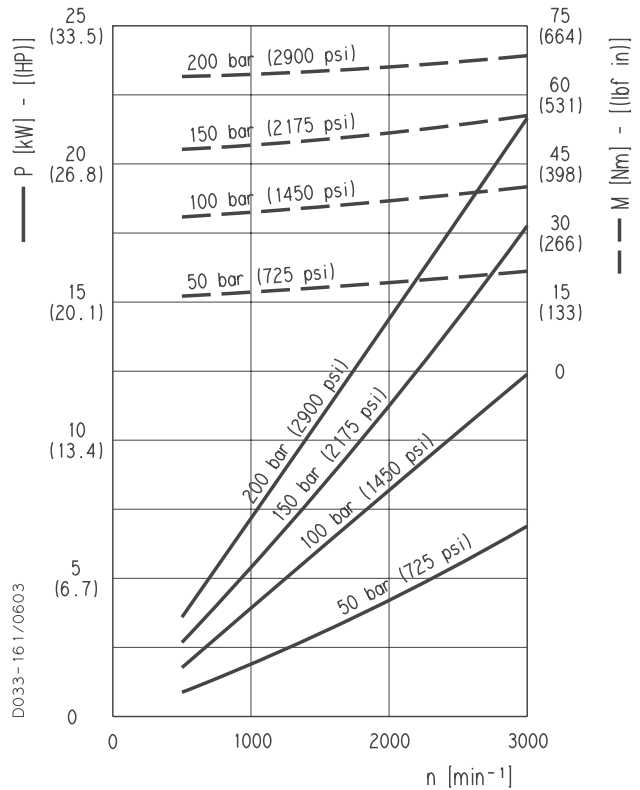
**PLP 20**

**POLARIS 20 GEAR PUMPS PERFORMANCE CURVES**

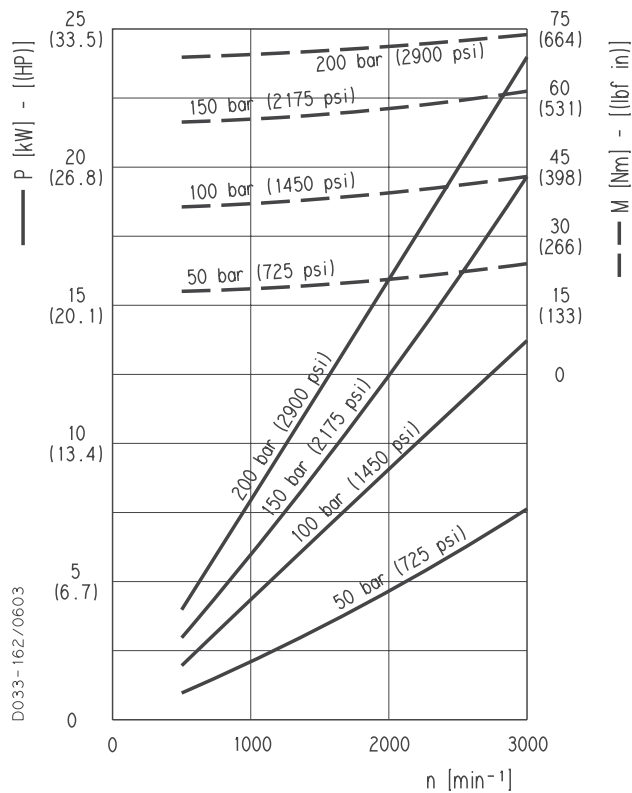
**PLP 20•16**



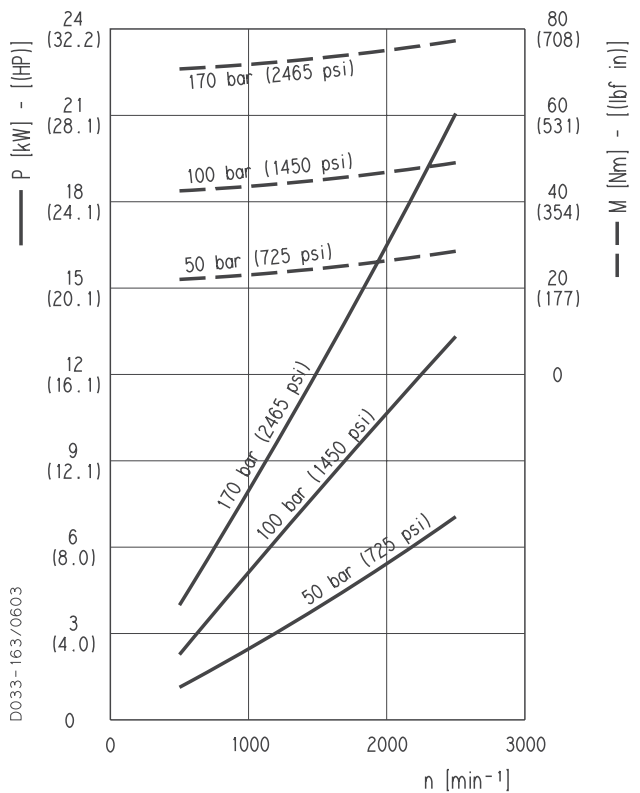
**PLP 20•19**



**PLP 20•20**



**PLP 20•24,5**

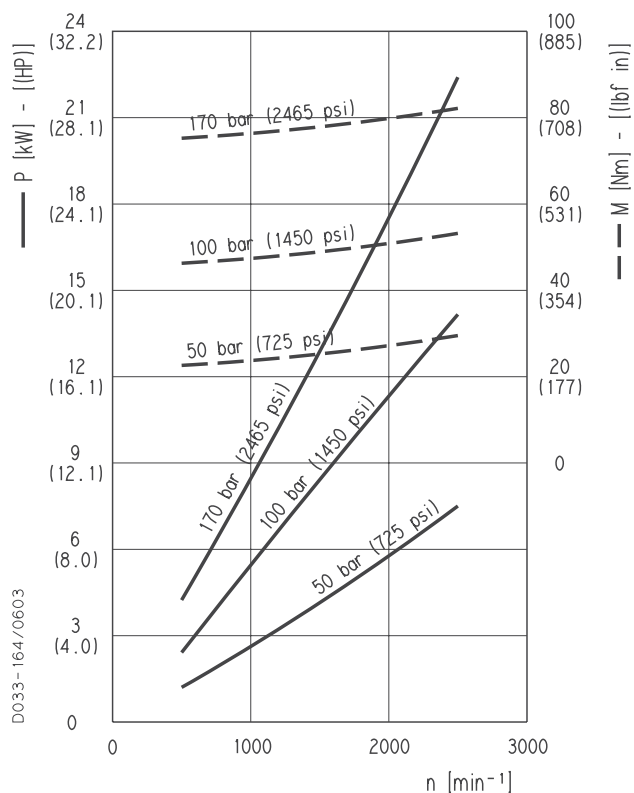


01/10.2003

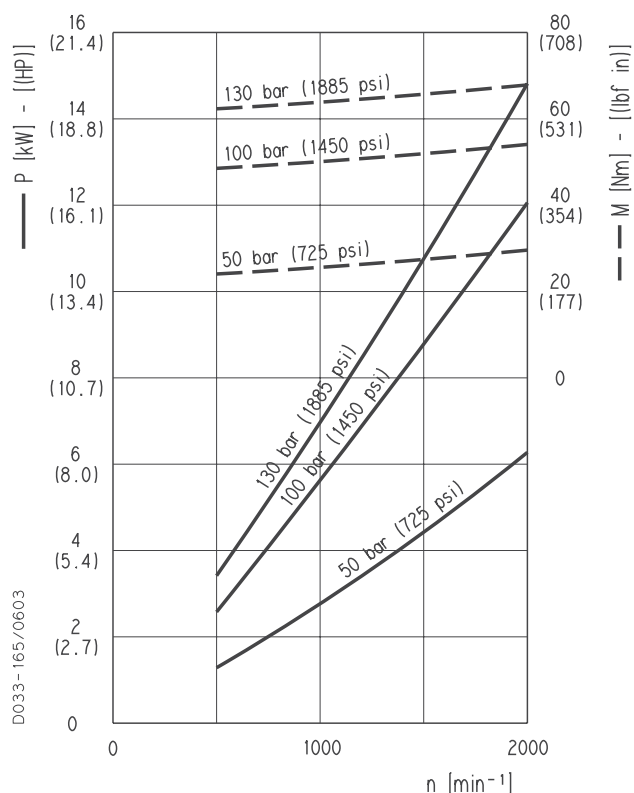
**PLP 20**

**POLARIS 20 GEAR PUMPS PERFORMANCE CURVES**

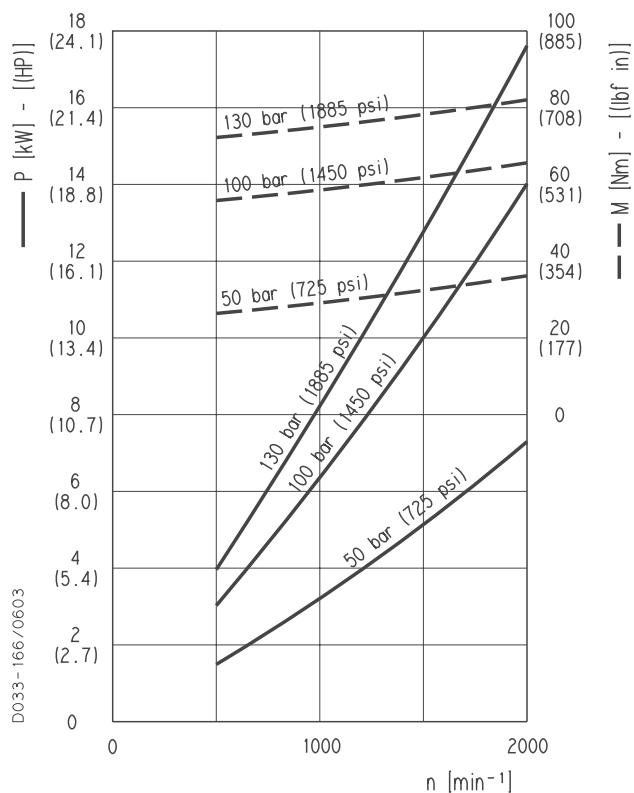
**PLP 20•25**



**PLP 20•27,8**

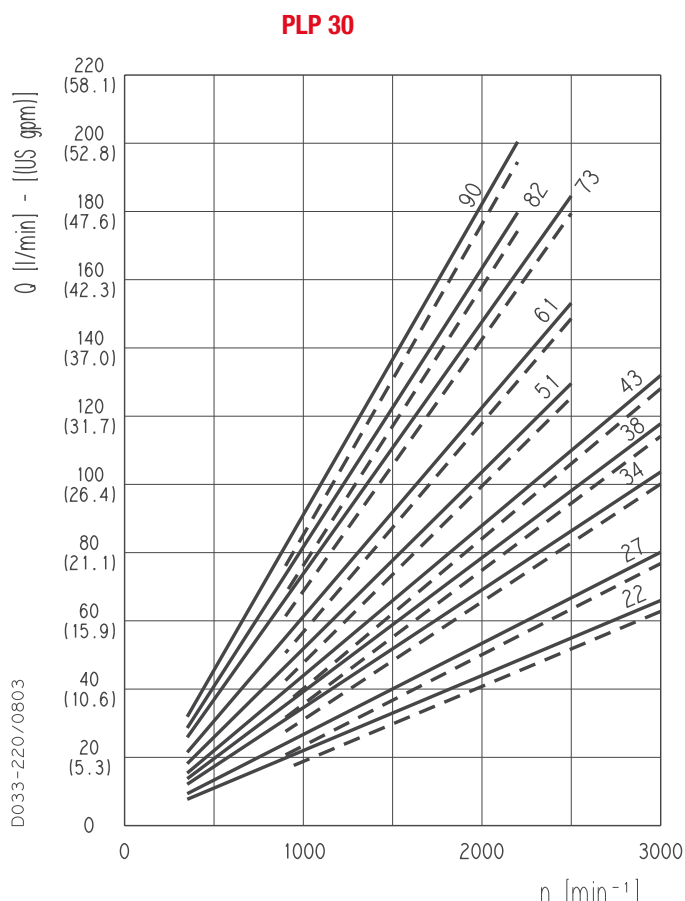


**PLP 20•31,5**



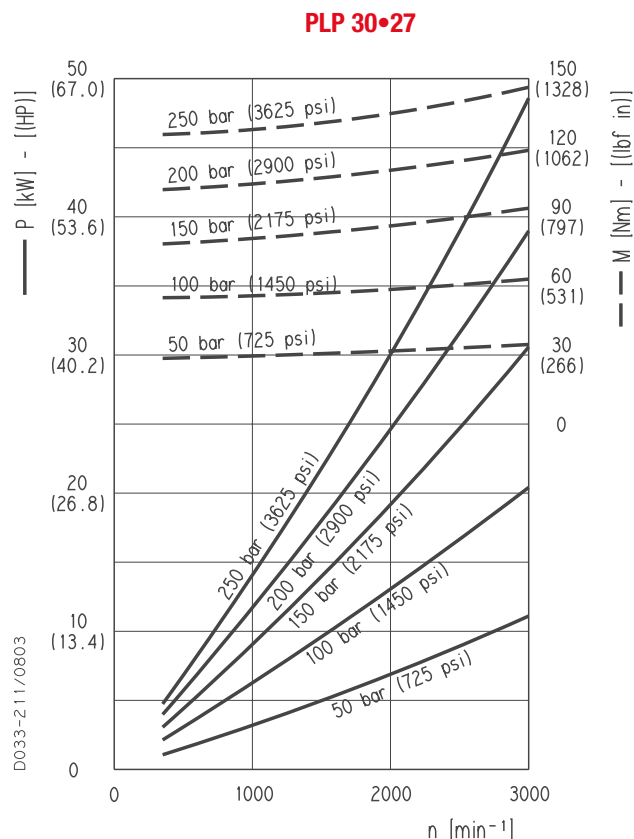
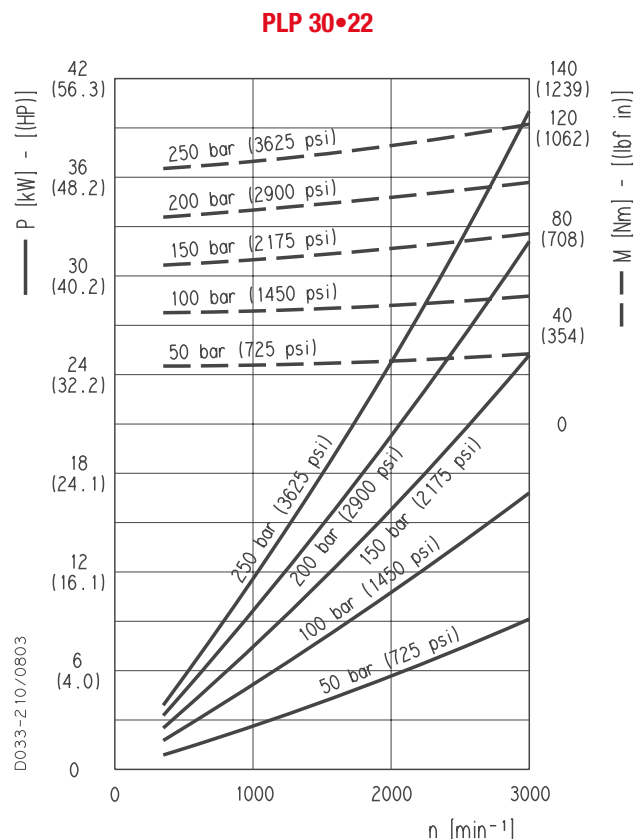
01/10.2003

## POLARIS 30 GEAR PUMPS PERFORMANCE CURVES



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

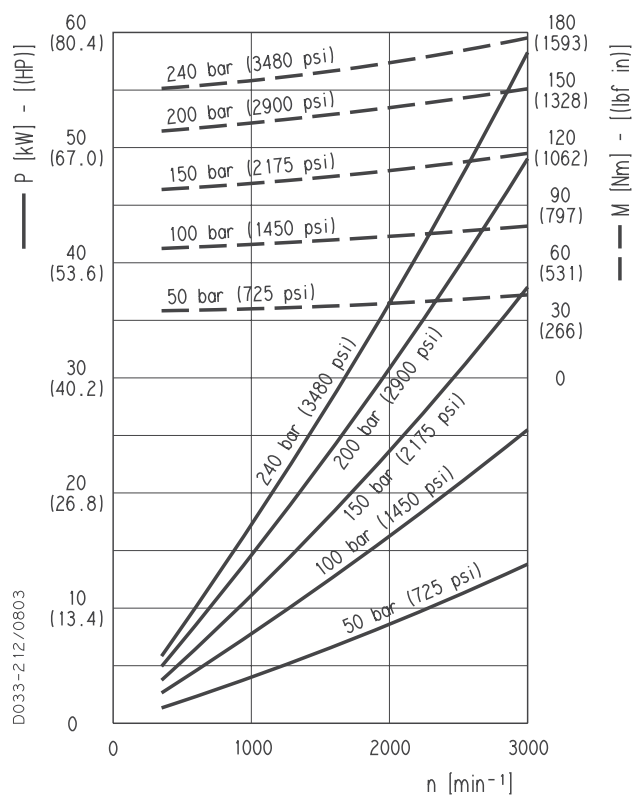
|                  |                                                                                       |                    |
|------------------|---------------------------------------------------------------------------------------|--------------------|
| <b>PLP 30•22</b> |    | 20 bar (290 psi)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



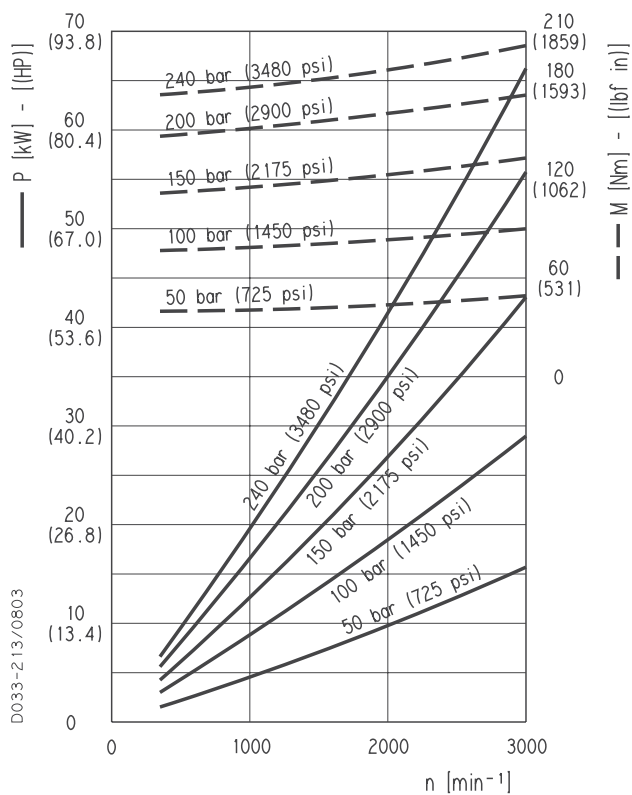
**PLP 30**

**POLARIS 30 GEAR PUMPS PERFORMANCE CURVES**

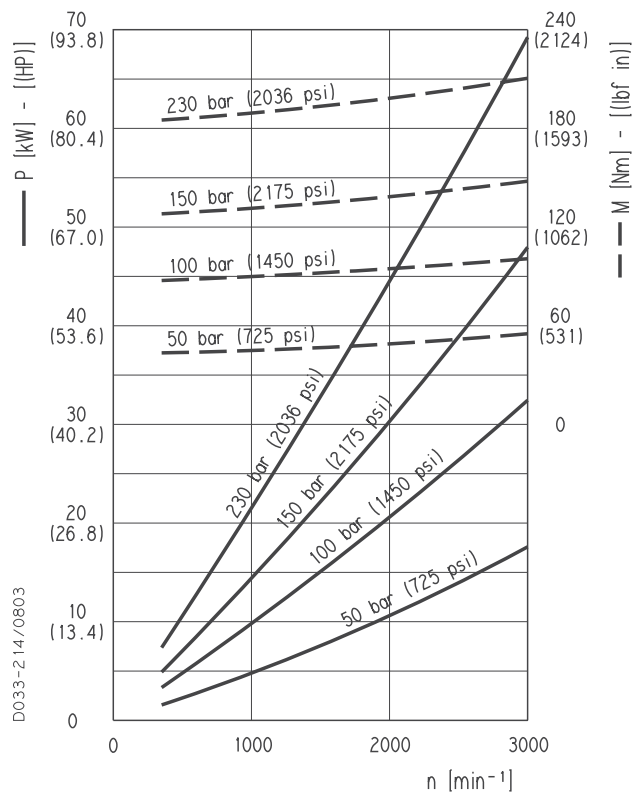
**PLP 30•34**



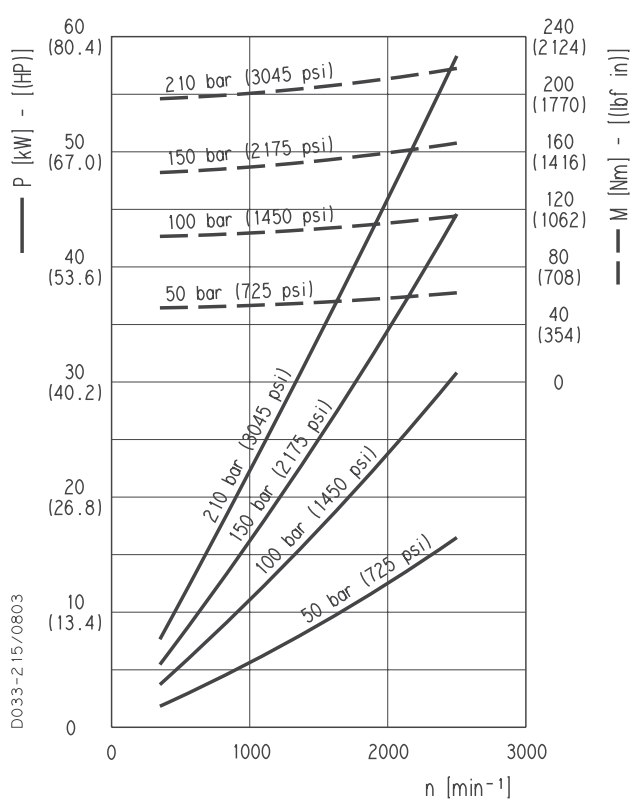
**PLP 30•38**



**PLP 30•43**



**PLP 30•51**

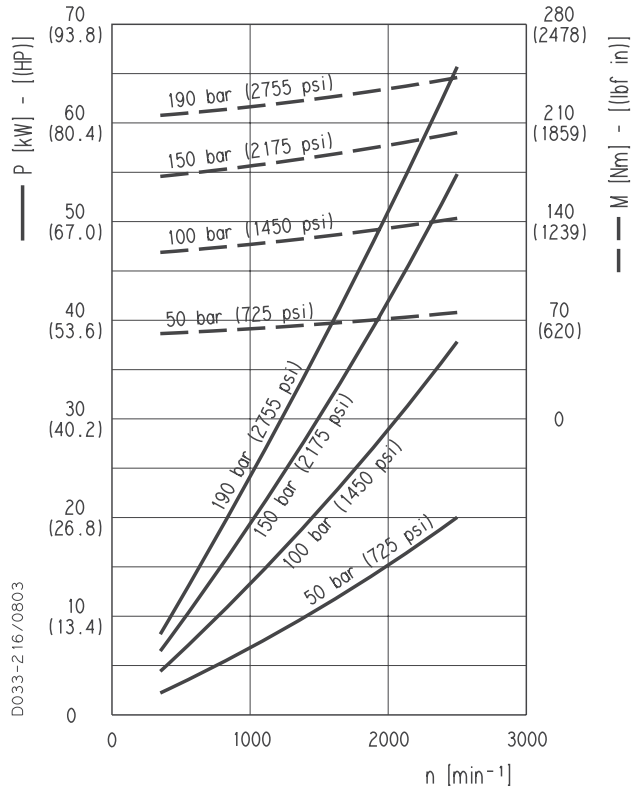


01/10.2003

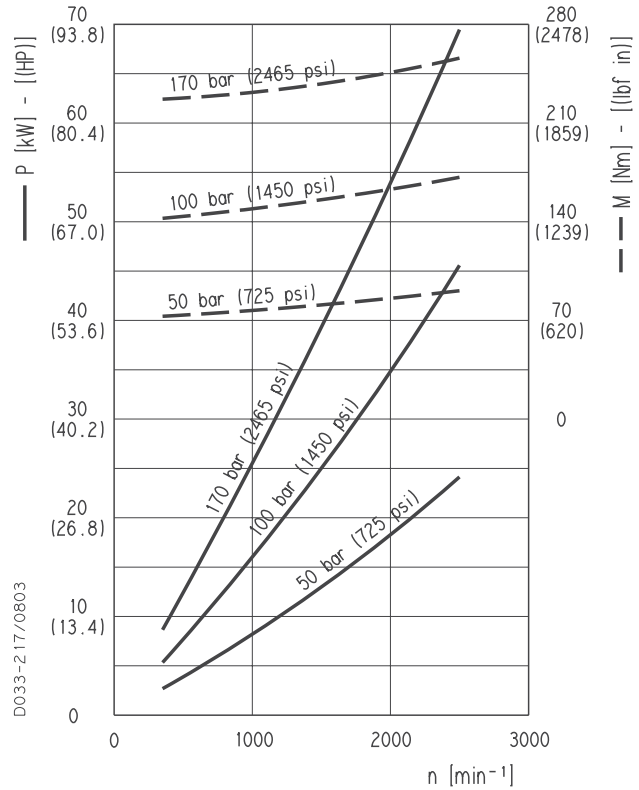
**PLP 30**

**POLARIS 30 GEAR PUMPS PERFORMANCE CURVES**

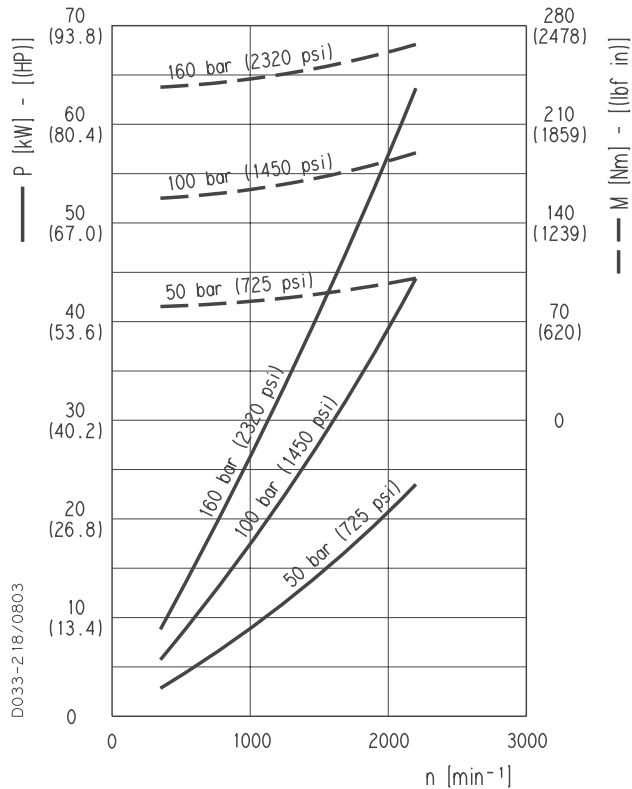
**PLP 30•61**



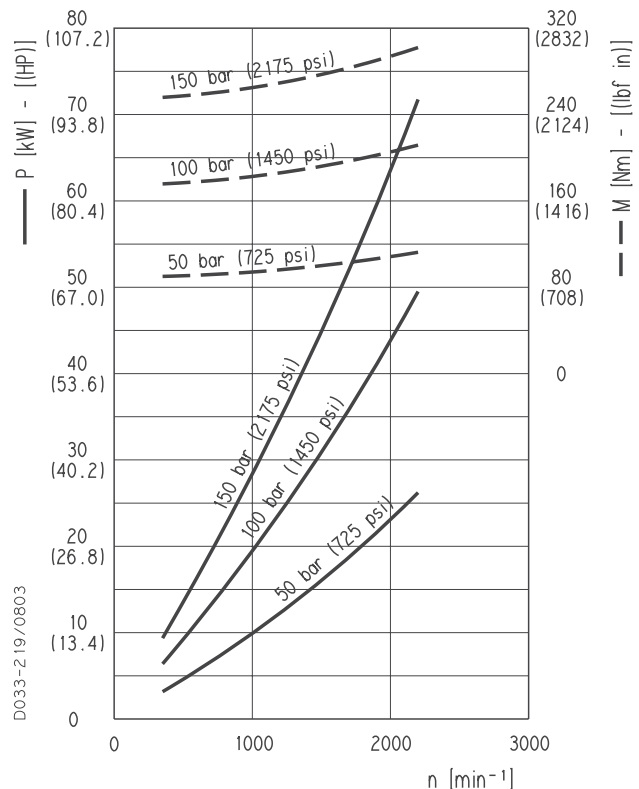
**PLP 30•73**



**PLP 30•82**



**PLP 30•90**

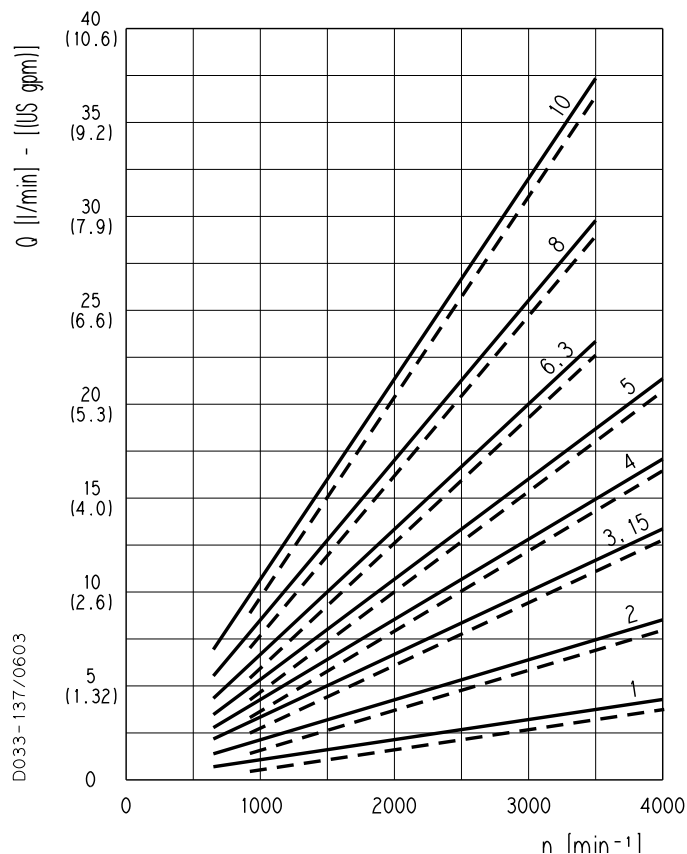


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## PLM 10

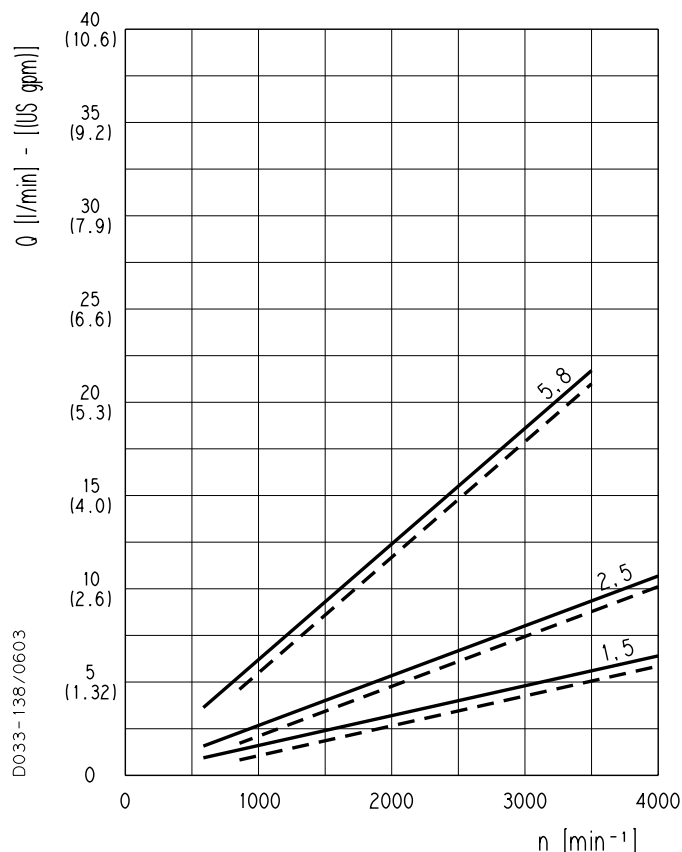
## POLARIS 10 GEAR MOTORS PERFORMANCE CURVES

### PLM 10



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

|                    |       |                    |
|--------------------|-------|--------------------|
| <b>PLM 10•1</b>    | —     | 20 bar (290 psi)   |
|                    | - - - | 260 bar (3770 psi) |
| <b>PLM 10•2</b>    | —     | 20 bar (290 psi)   |
|                    | - - - | 260 bar (3770 psi) |
| <b>PLM 10•3,15</b> | —     | 20 bar (290 psi)   |
|                    | - - - | 260 bar (3770 psi) |
| <b>PLM 10•4</b>    | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLM 10•5</b>    | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLM 10•6,3</b>  | —     | 20 bar (290 psi)   |
|                    | - - - | 230 bar (3335 psi) |
| <b>PLM 10•8</b>    | —     | 20 bar (290 psi)   |
|                    | - - - | 180 bar (2610 psi) |
| <b>PLM 10•10</b>   | —     | 20 bar (290 psi)   |
|                    | - - - | 140 bar (2030 psi) |

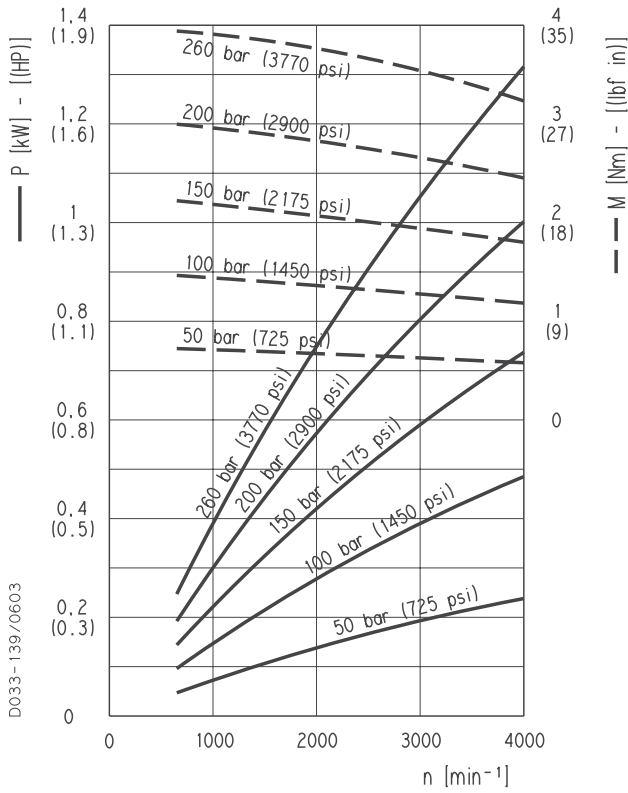


|                   |       |                    |
|-------------------|-------|--------------------|
| <b>PLM 10•1,5</b> | —     | 20 bar (290 psi)   |
|                   | - - - | 260 bar (3770 psi) |
| <b>PLM 10•2,5</b> | —     | 20 bar (290 psi)   |
|                   | - - - | 260 bar (3770 psi) |
| <b>PLM 10•5,8</b> | —     | 20 bar (290 psi)   |
|                   | - - - | 230 bar (3335 psi) |

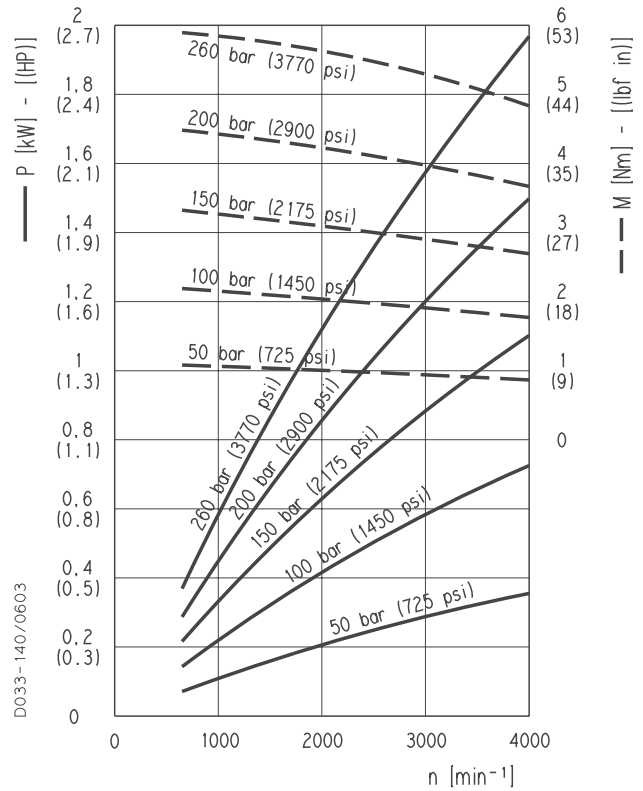
**PLM 10**

**POLARIS 10 GEAR MOTORS PERFORMANCE CURVES**

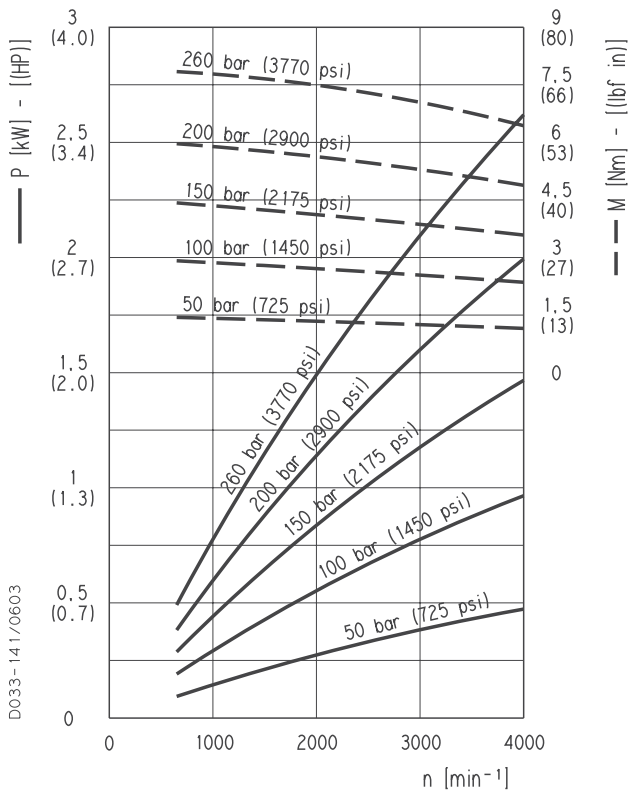
**PLM 10•1**



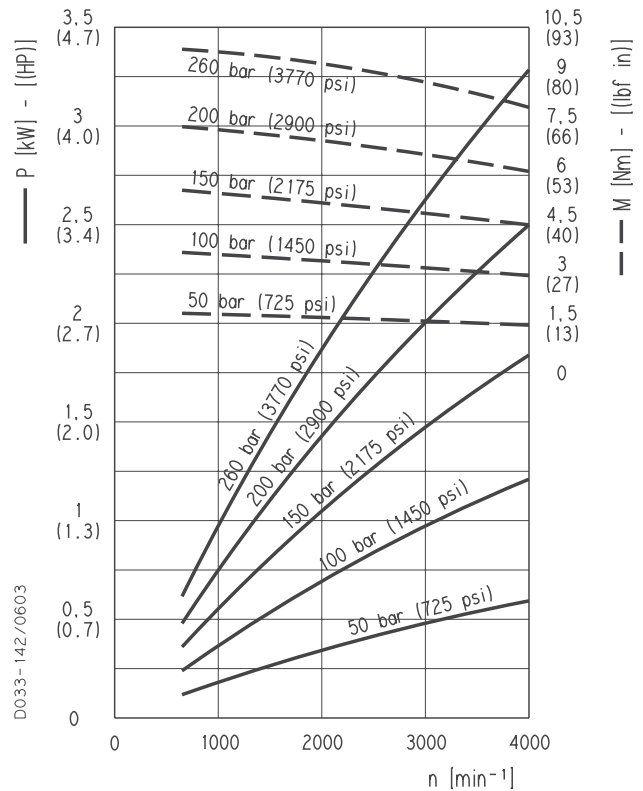
**PLM 10•1,5**



**PLM 10•2**



**PLM 10•2,5**

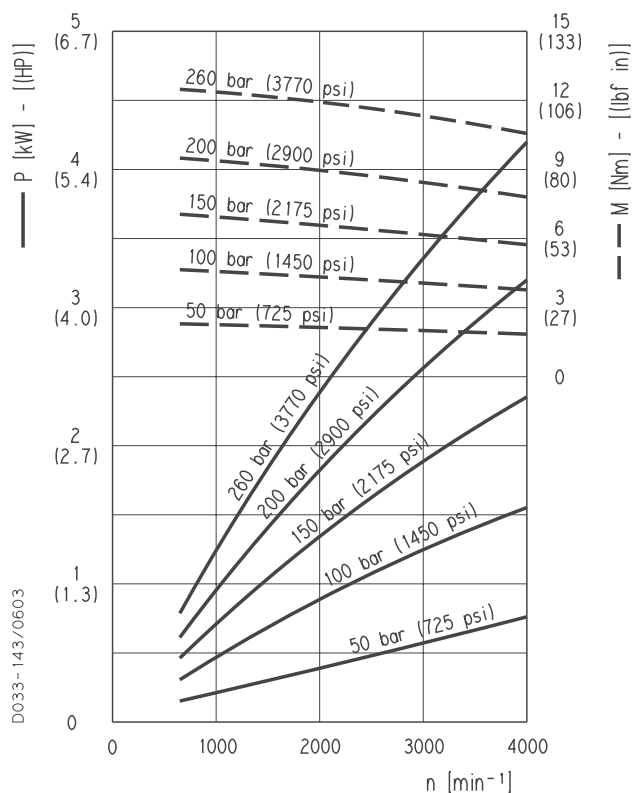


01/10.2003

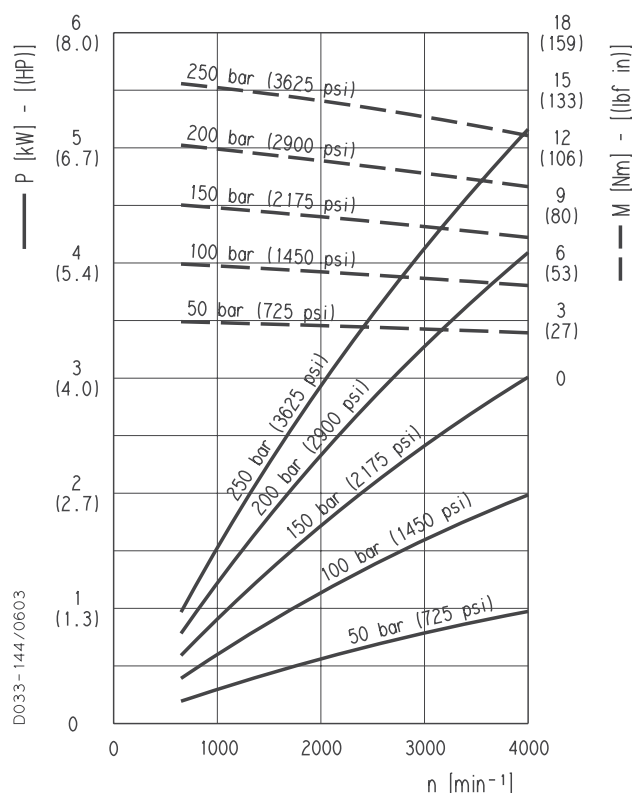
**PLM 10**

**POLARIS 10 GEAR MOTORS PERFORMANCE CURVES**

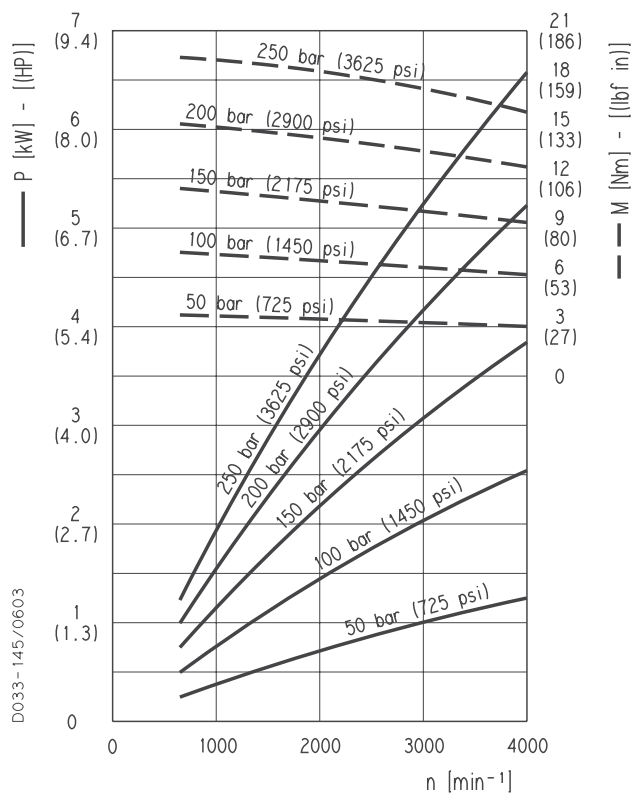
**PLM 10•3,15**



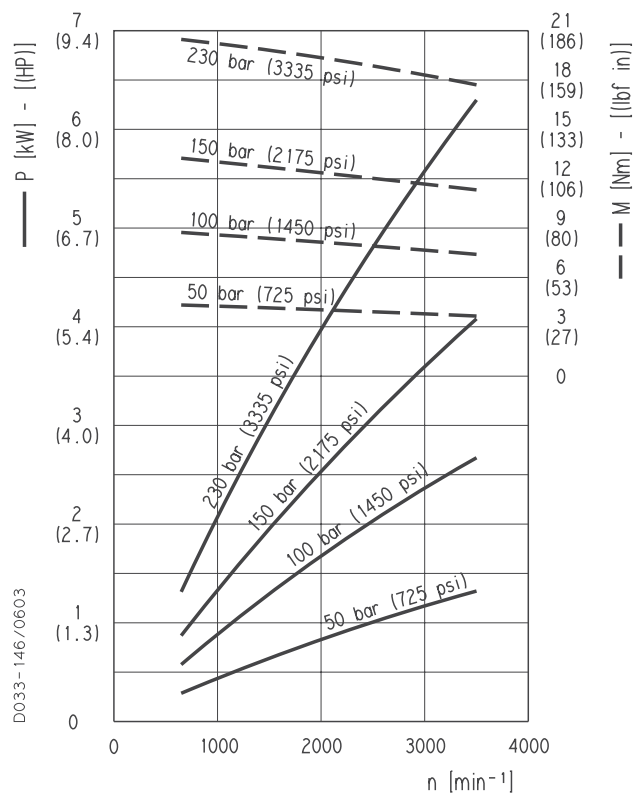
**PLM 10•4**



**PLM 10•5**



**PLM 10•5,8**

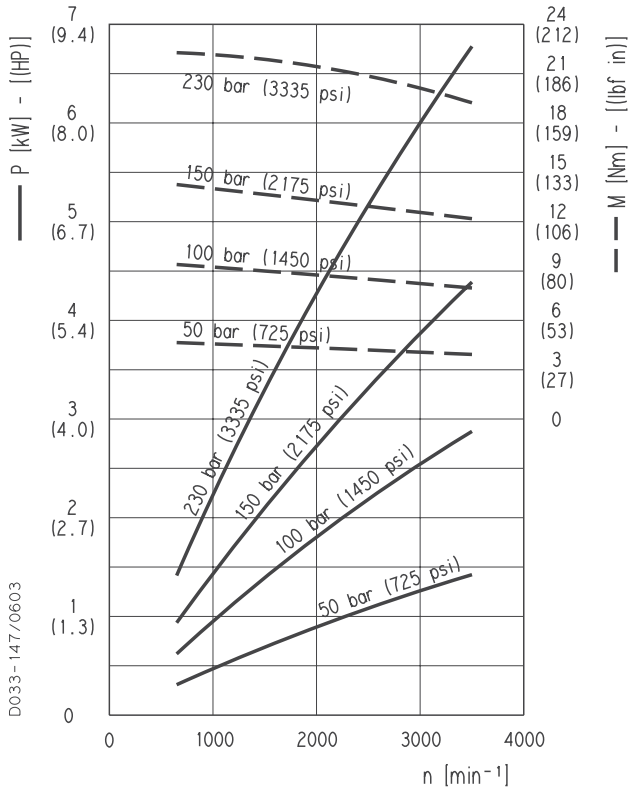


01/10.2003

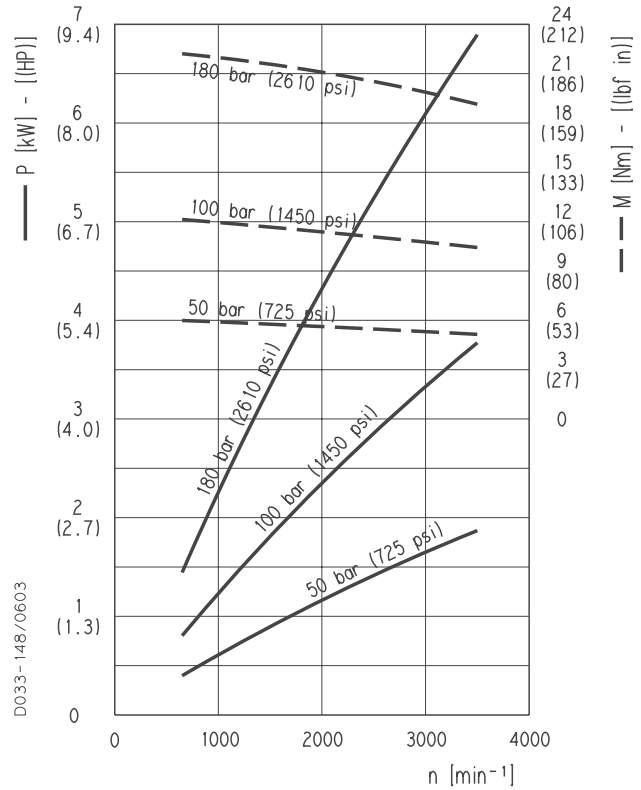
**PLM 10**

**POLARIS 10 GEAR MOTORS PERFORMANCE CURVES**

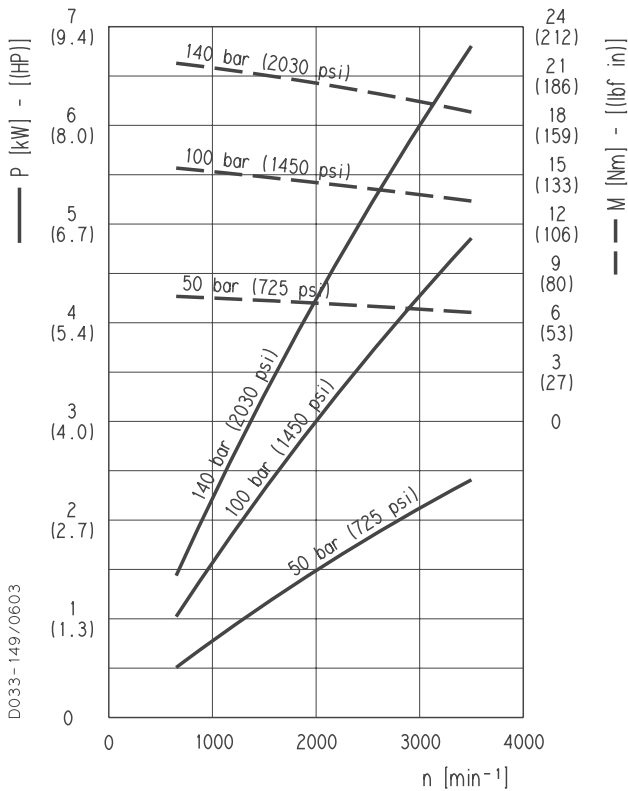
**PLM 10•6,3**



**PLM 10•8**



**PLM 10•10**

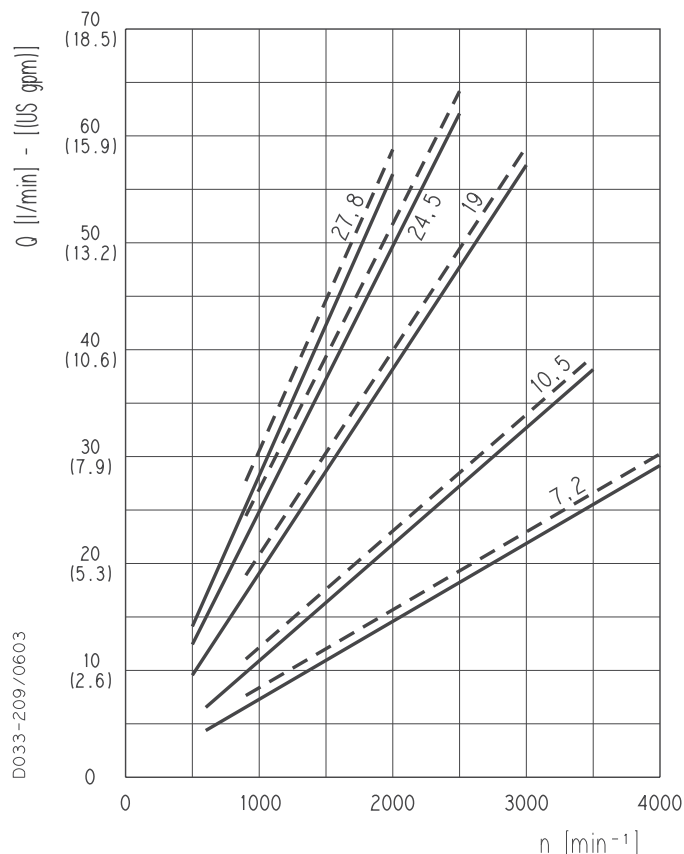
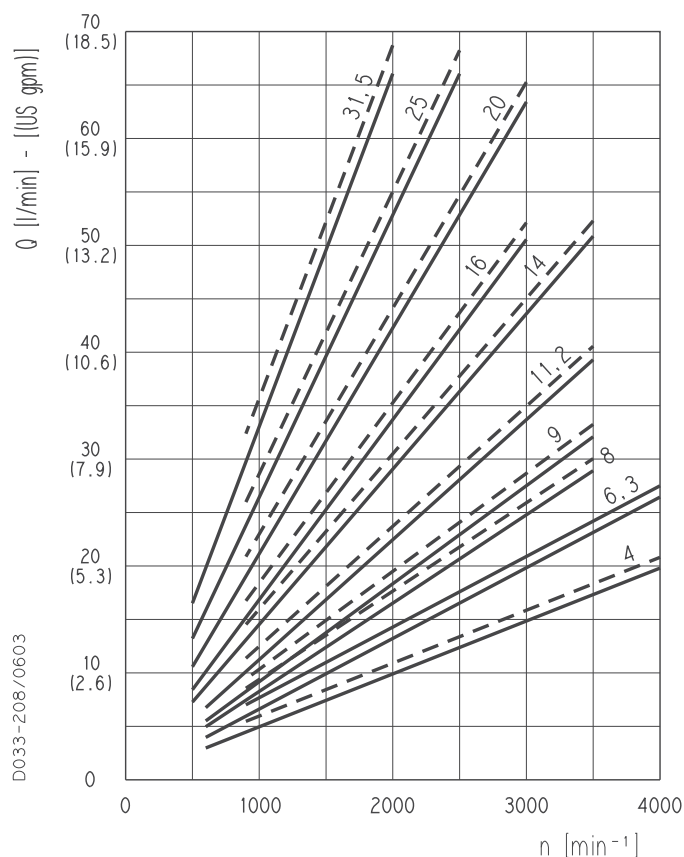


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# PLM 20

# POLARIS 20 GEAR MOTORS PERFORMANCE CURVES

## PLM 20



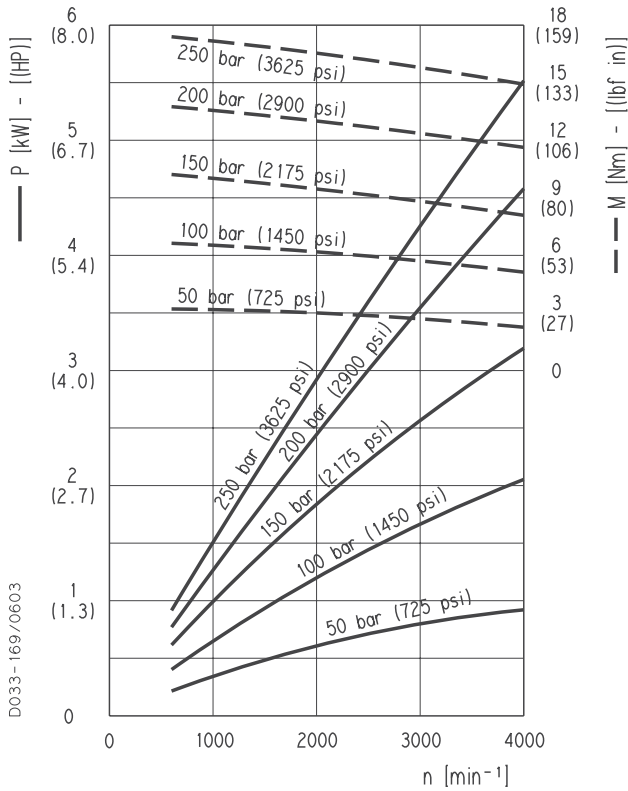
Each curve has been obtained at 50 °C (122 °F), using oil with viscosity 46 cSt (210 SSU) at 40 °C (104 °F) and at these pressures.

|                    |       |                    |
|--------------------|-------|--------------------|
| <b>PLM 20•4</b>    | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLM 20•6,3</b>  | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLM 20•8</b>    | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLM 20•9</b>    | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLM 20•11,2</b> | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLM 20•14</b>   | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLM 20•16</b>   | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLM 20•20</b>   | —     | 20 bar (290 psi)   |
|                    | - - - | 200 bar (2900 psi) |
| <b>PLM 20•25</b>   | —     | 20 bar (290 psi)   |
|                    | - - - | 170 bar (2465 psi) |
| <b>PLM 20•31,5</b> | —     | 20 bar (290 psi)   |
|                    | - - - | 130 bar (1885 psi) |
| <b>PLM 20•7,2</b>  | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLM 20•10,5</b> | —     | 20 bar (290 psi)   |
|                    | - - - | 250 bar (3625 psi) |
| <b>PLM 20•19</b>   | —     | 20 bar (290 psi)   |
|                    | - - - | 200 bar (2900 psi) |
| <b>PLM 20•24,5</b> | —     | 20 bar (290 psi)   |
|                    | - - - | 270 bar (2465 psi) |
| <b>PLM 20•27,8</b> | —     | 20 bar (290 psi)   |
|                    | - - - | 130 bar (1885 psi) |

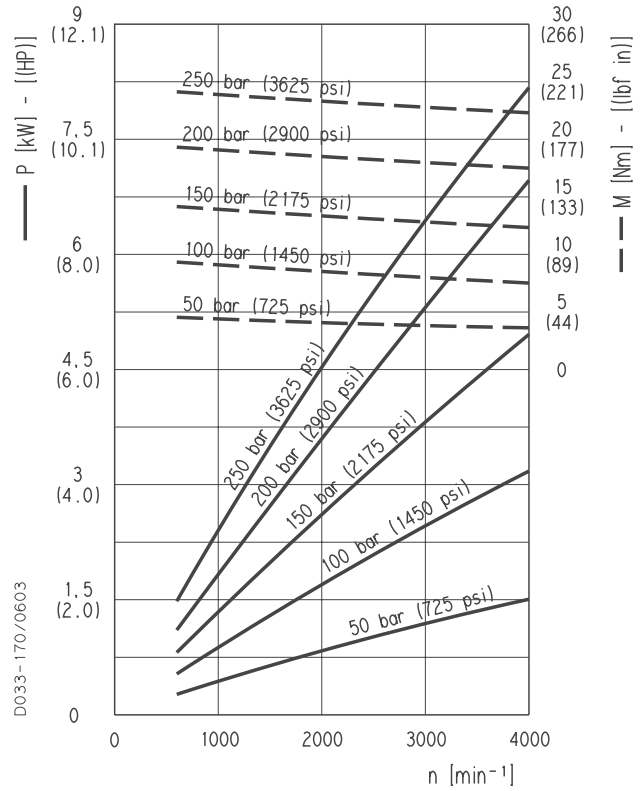
**PLM 20**

**POLARIS 20 GEAR MOTORS PERFORMANCE CURVES**

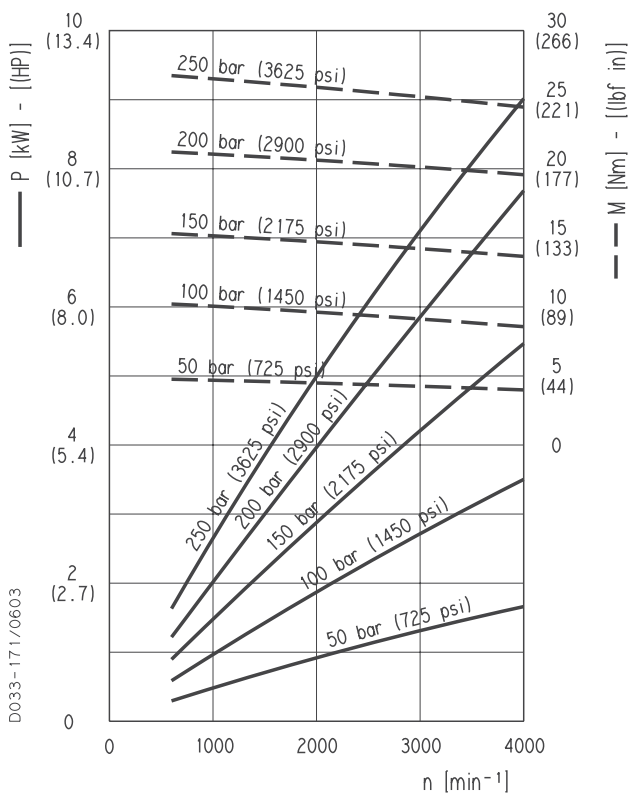
**PLM 20•4**



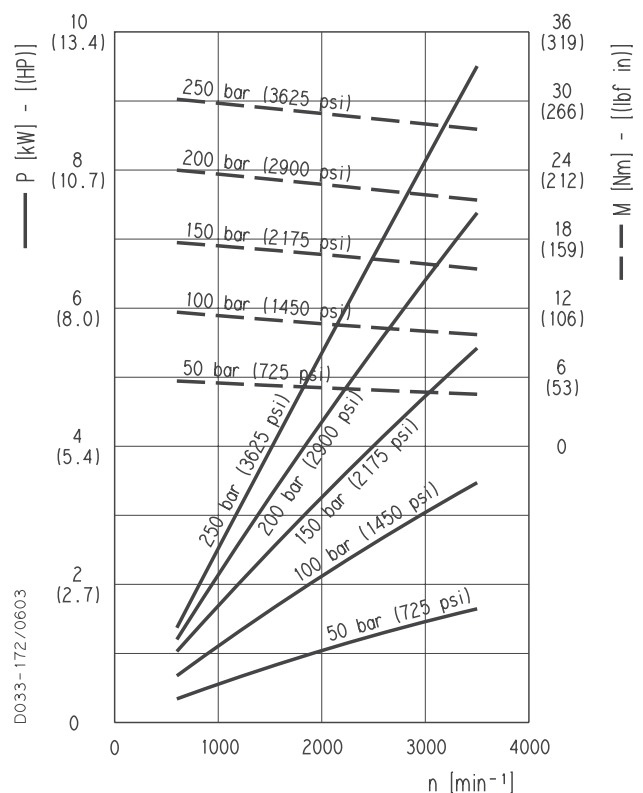
**PLM 20•6,3**



**PLM 20•7,2**



**PLM 20•8**

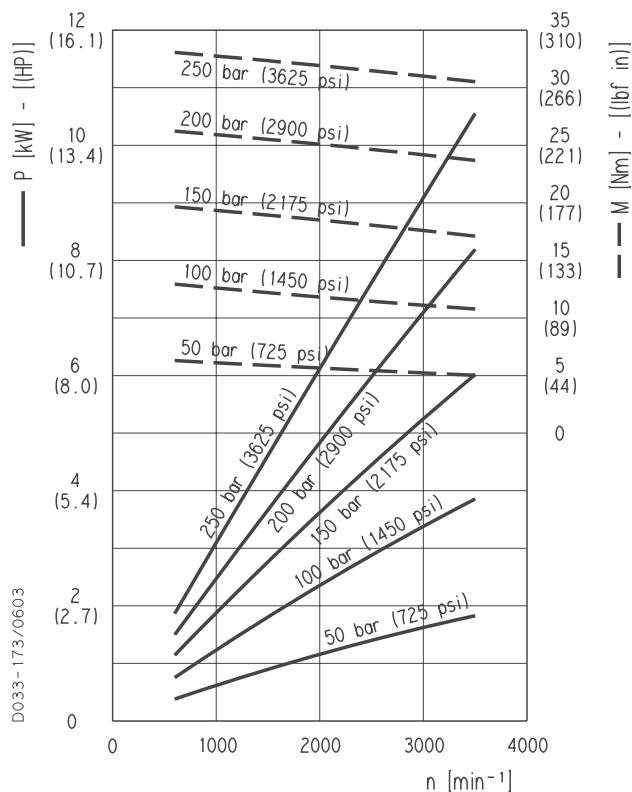


01/10.2003

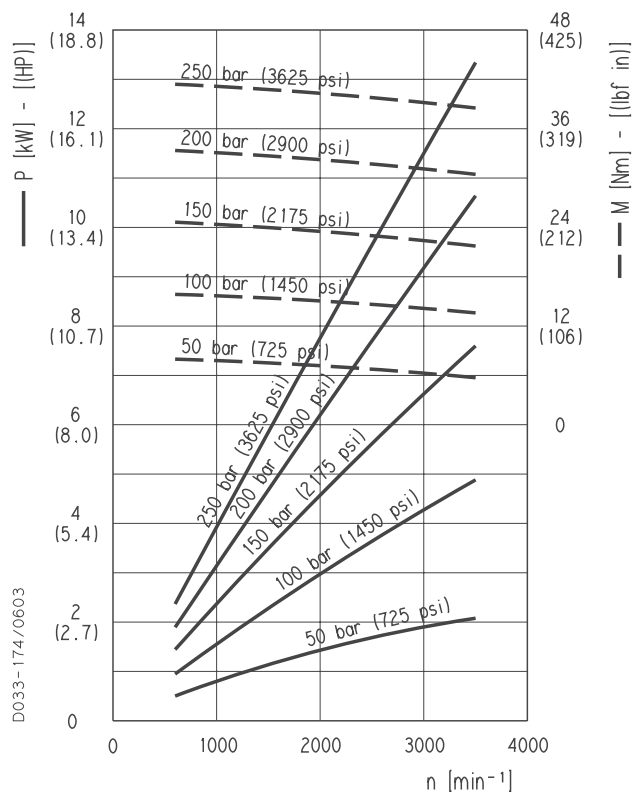
**PLM 20**

**POLARIS 20 GEAR MOTORS PERFORMANCE CURVES**

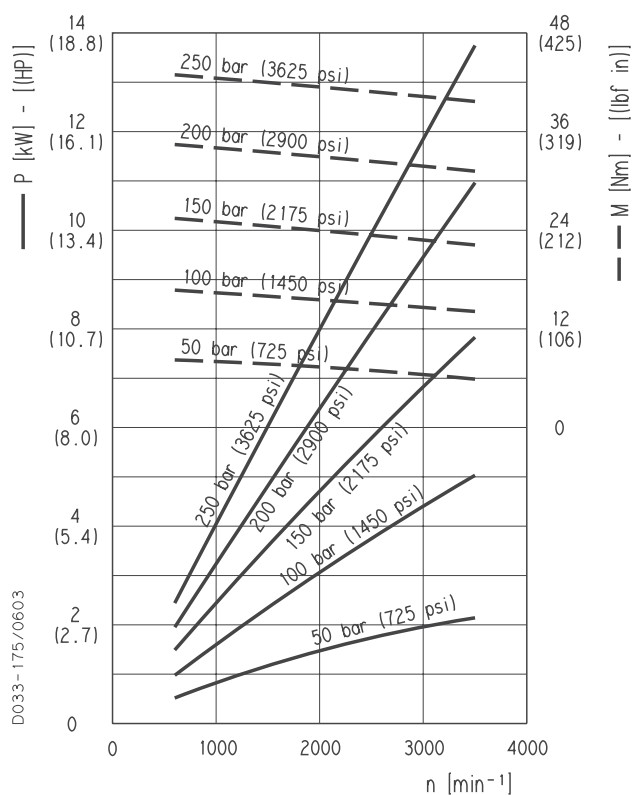
**PLM 20•9**



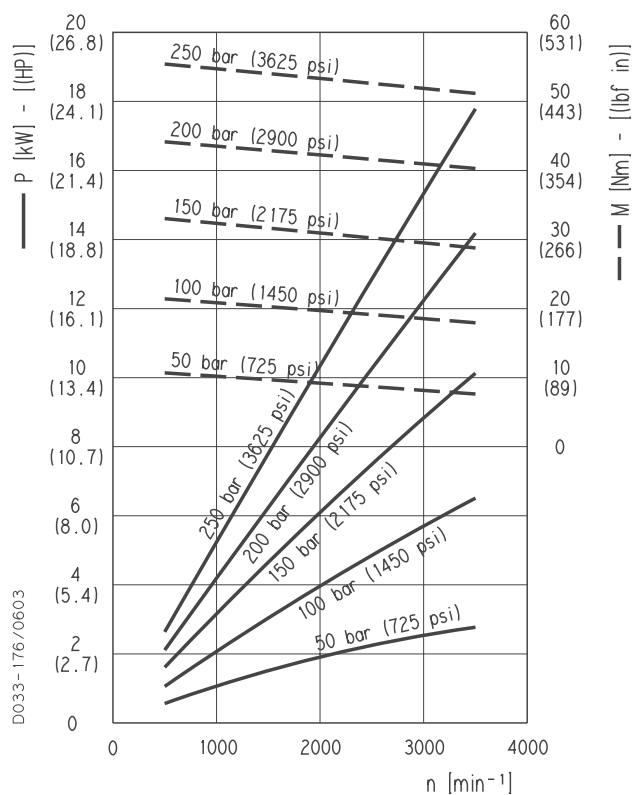
**PLM 20•10,5**



**PLM 20•11,2**



**PLM 20•14**

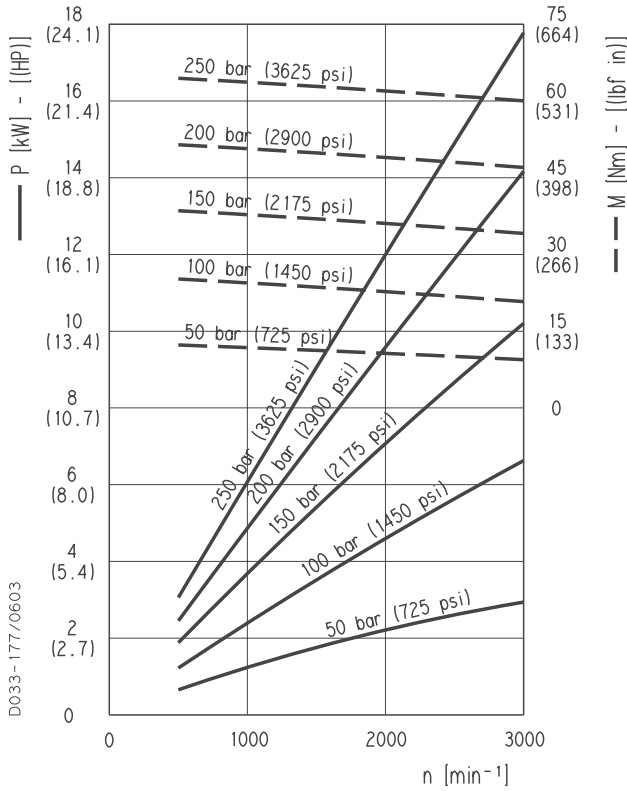


01/10.2003

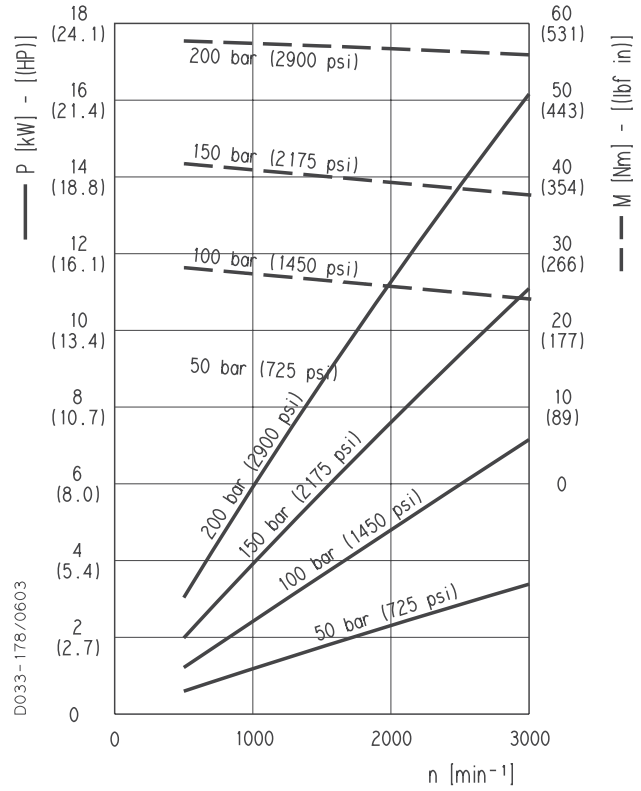
**PLM 20**

**POLARIS 20 GEAR MOTORS PERFORMANCE CURVES**

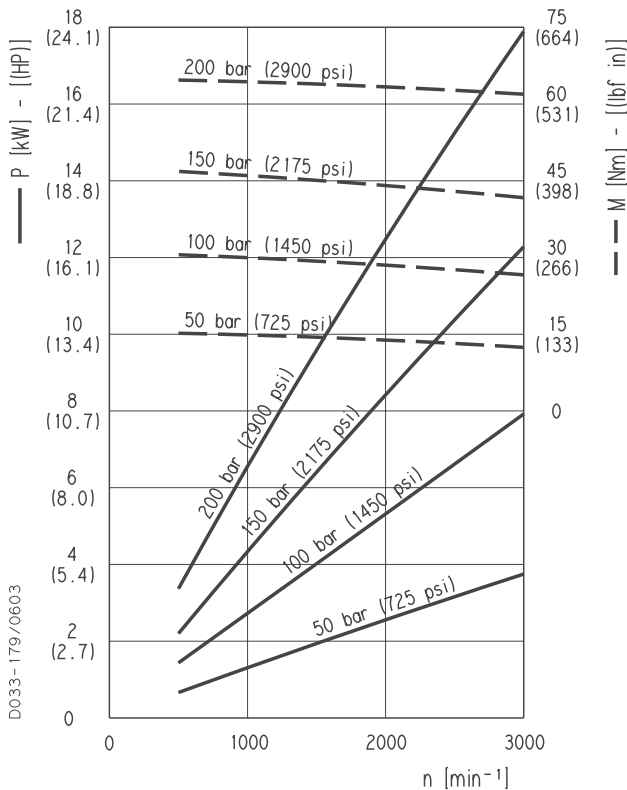
**PLM 20•16**



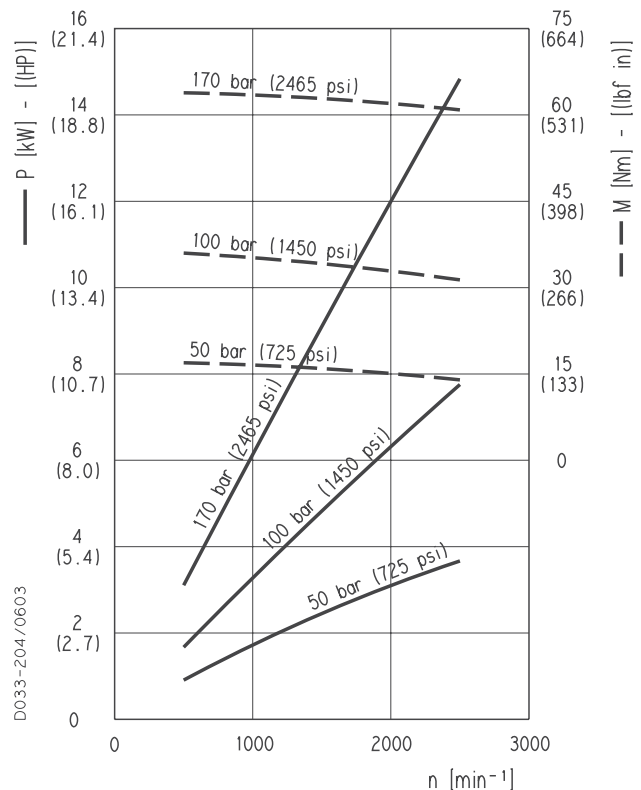
**PLM 20•19**



**PLM 20•20**



**PLM 20•24,5**

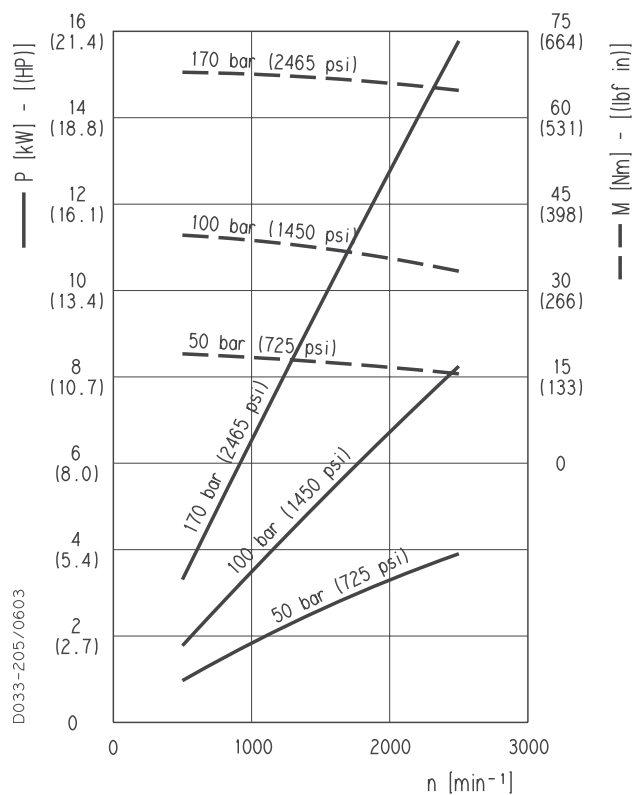


01/10.2003

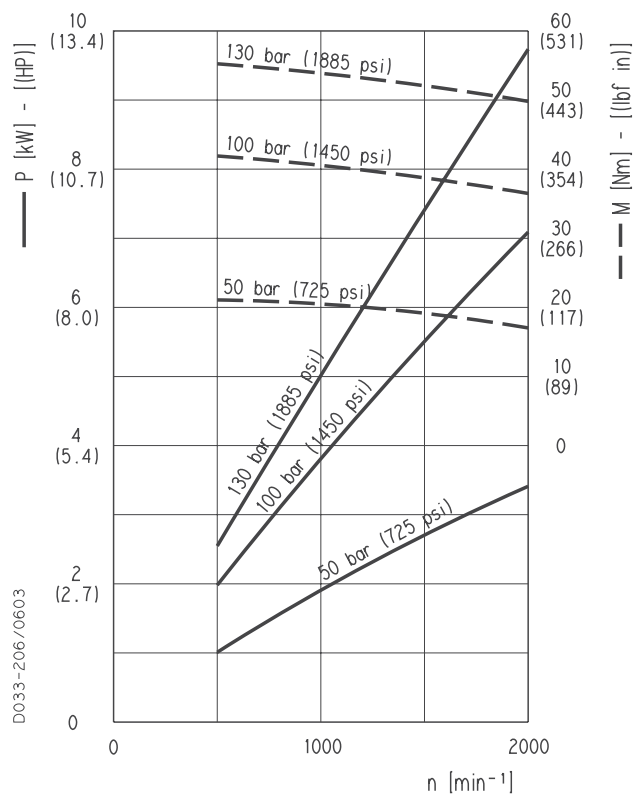
**PLM 20**

**POLARIS 20 GEAR MOTORS PERFORMANCE CURVES**

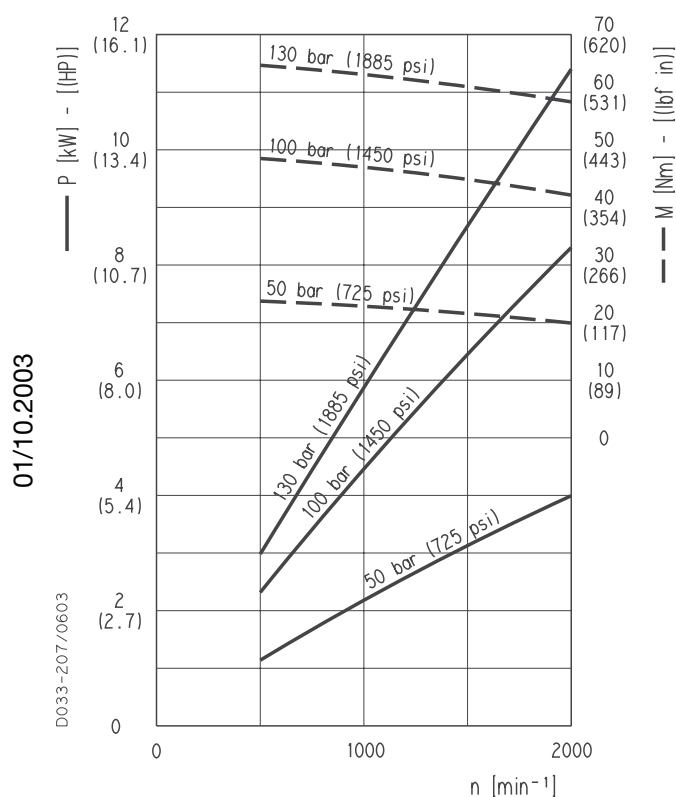
**PLM 20•25**



**PLM 20•27,8**



**PLM 20•31,5**



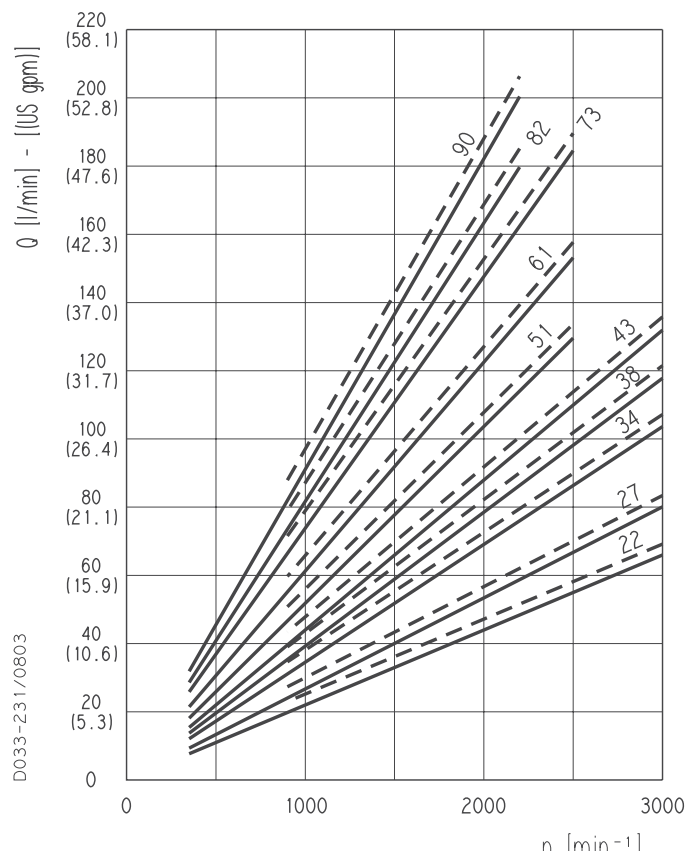
01/10.2003

## PLM 30

## POLARIS 30 GEAR MOTORS PERFORMANCE CURVES

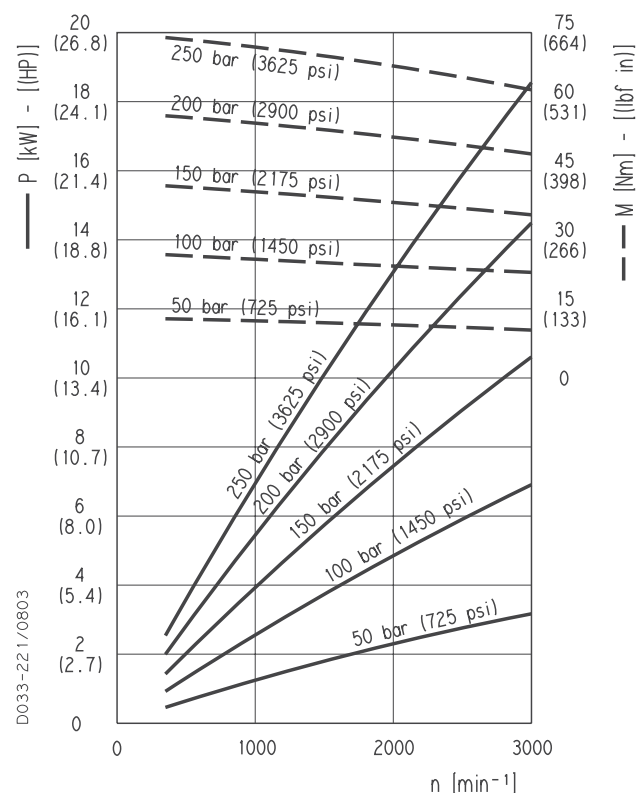
Each curve has been obtained at 50 °C (122 °F), using oil with viscosity 46 cSt (210 SSU) at 40 °C (104 °F) and at these pressures.

### PLM 30

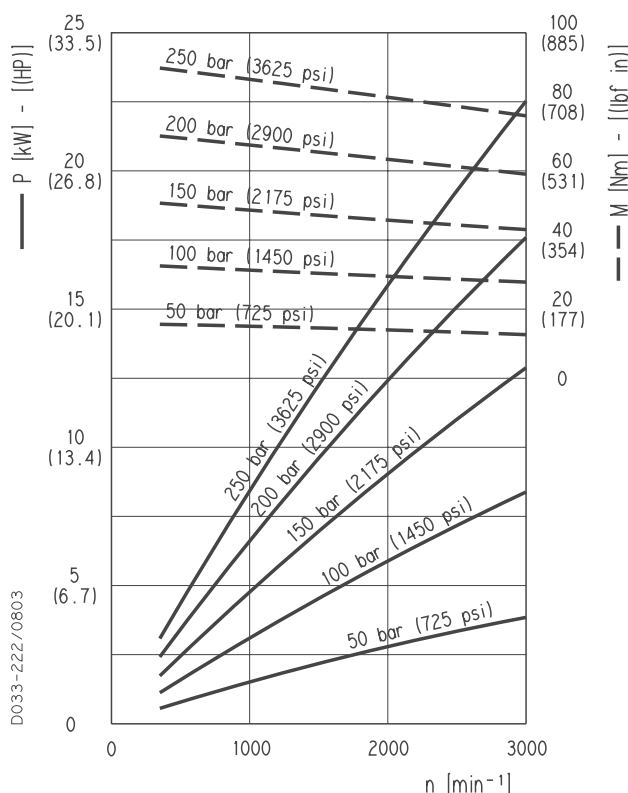


|                  |       |                    |
|------------------|-------|--------------------|
| <b>PLM 30•22</b> | —     | 20 bar (290 psi)   |
|                  | - - - | 250 bar (3625 psi) |
| <b>PLM 30•27</b> | —     | 20 bar (290 psi)   |
|                  | - - - | 250 bar (3625 psi) |
|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

### PLM 30•22



### PLM 30•27

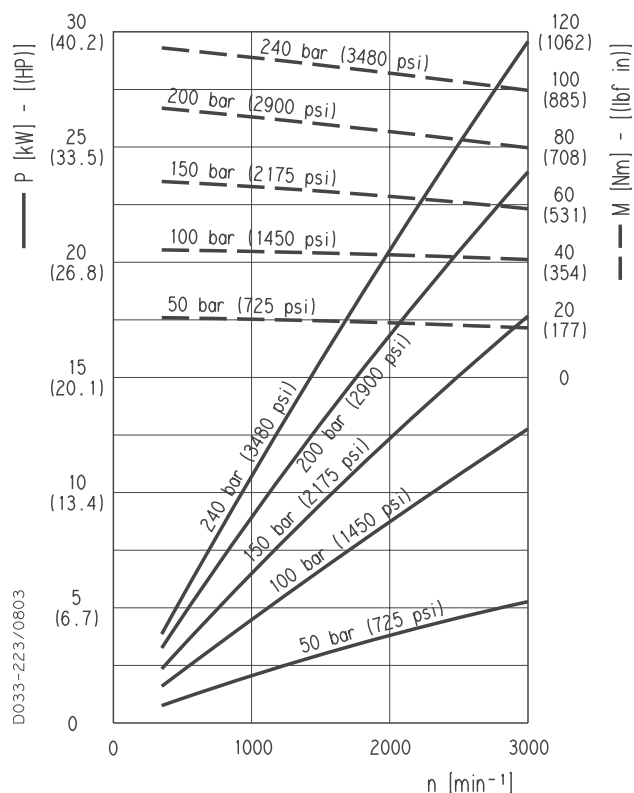


01/10.2003

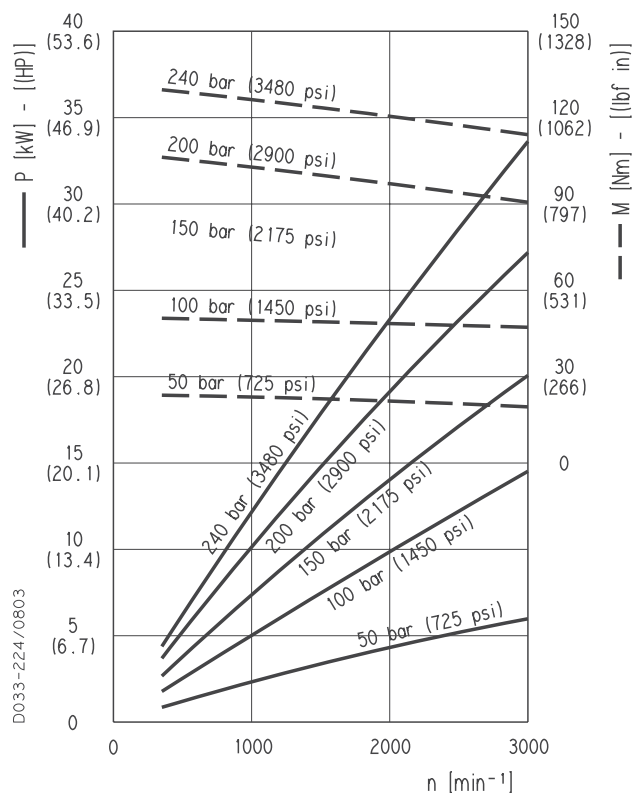
**PLM 30**

**POLARIS 30 GEAR MOTORS PERFORMANCE CURVES**

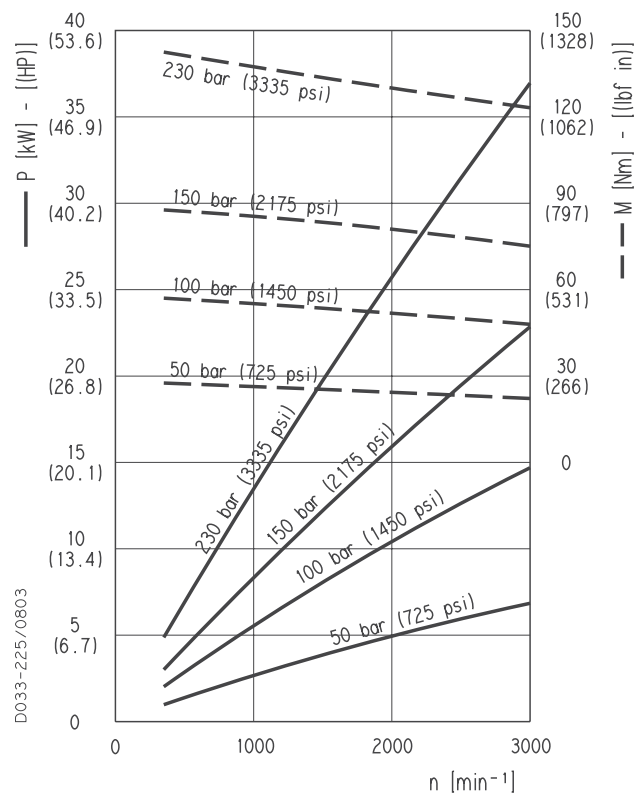
**PLM 30•34**



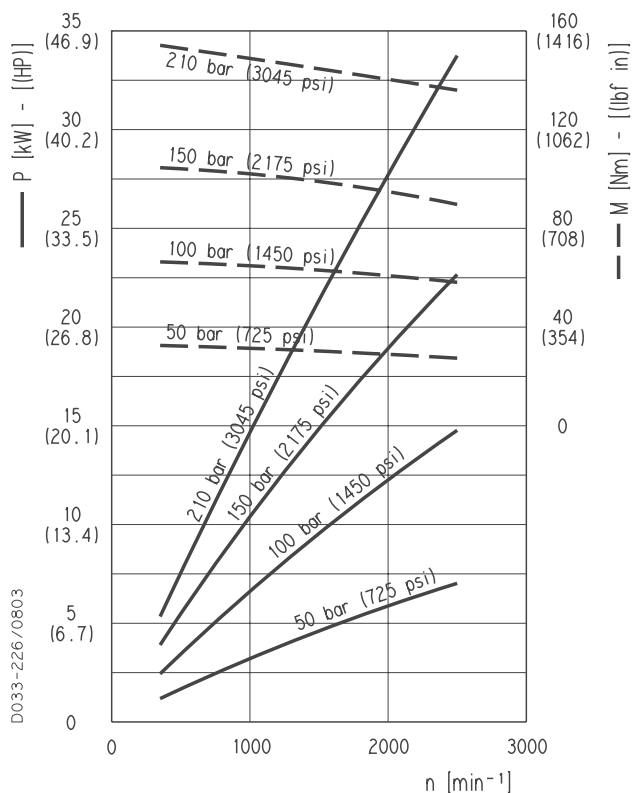
**PLM 30•38**



**PLM 20•43**



**PLM 20•51**

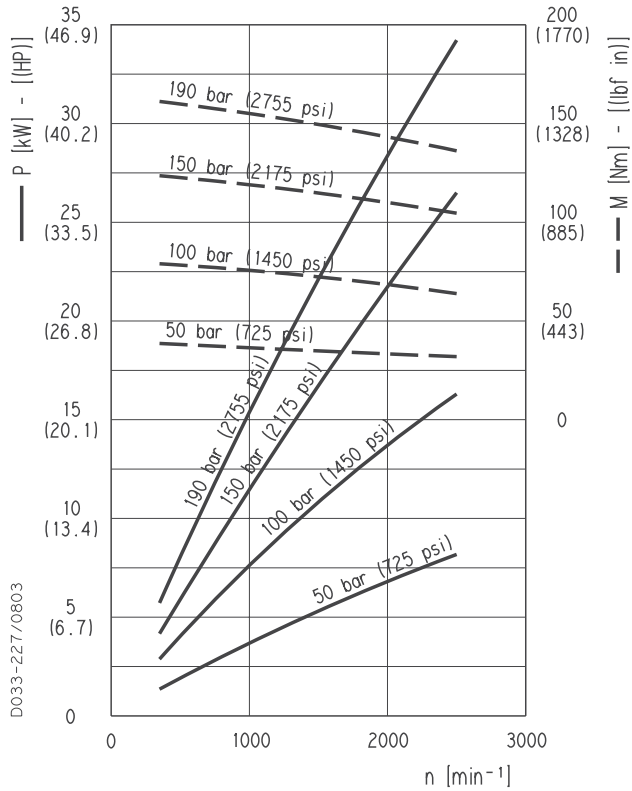


01/10.2003

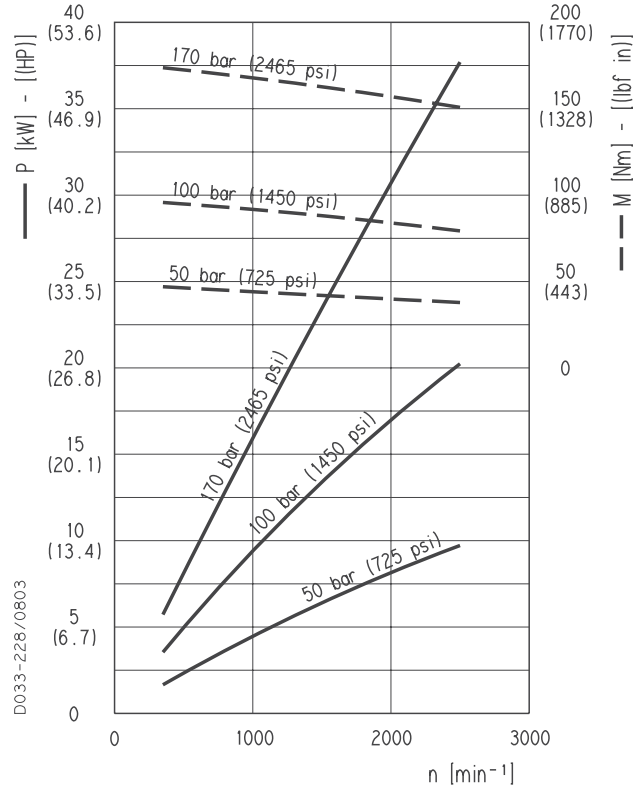
**PLM 30**

**POLARIS 30 GEAR MOTORS PERFORMANCE CURVES**

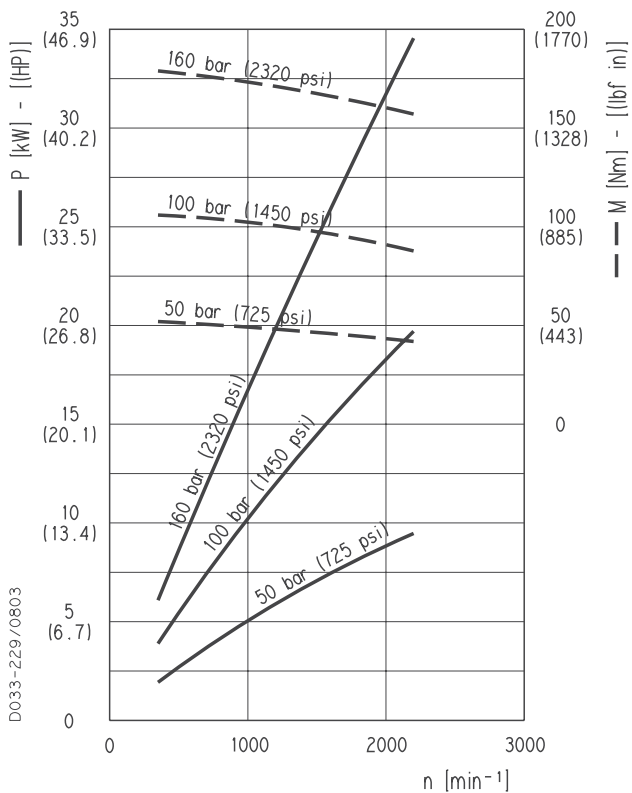
**PLM 30•61**



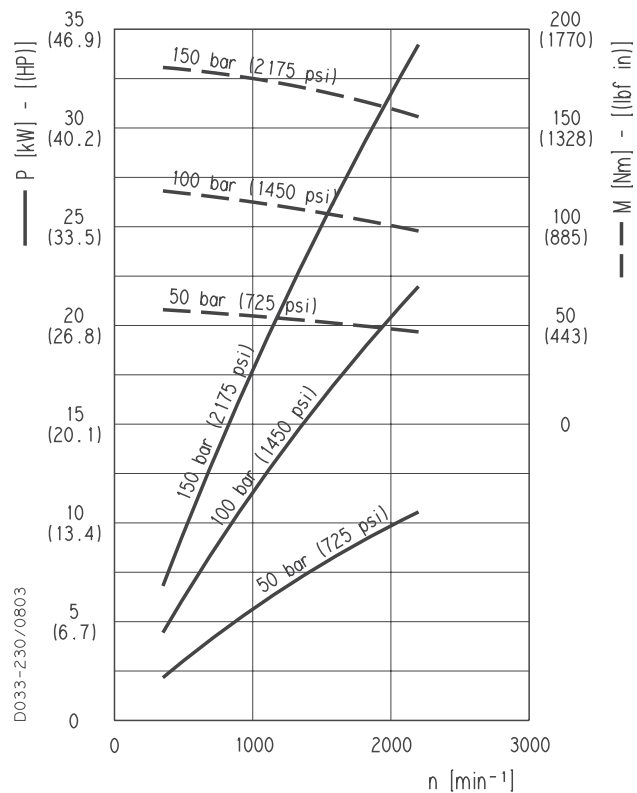
**PLM 30•73**



**PLM 30•82**



**PLM 30•90**



01/10.2003

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## NOTES

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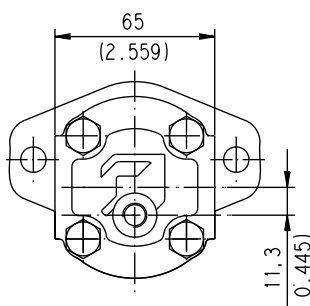
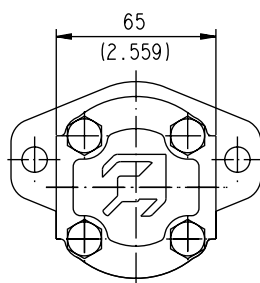
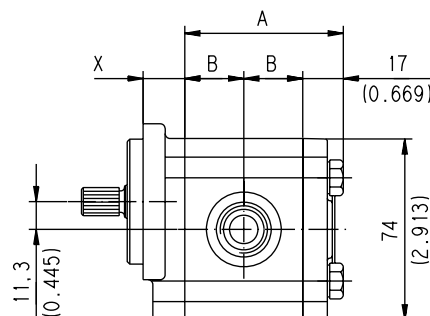
# POLARIS 10

# SINGLE UNITS DIMENSIONS - SIDE PORTS

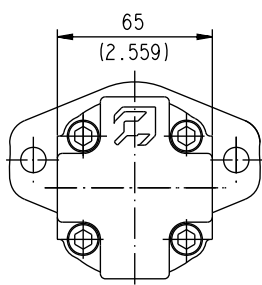
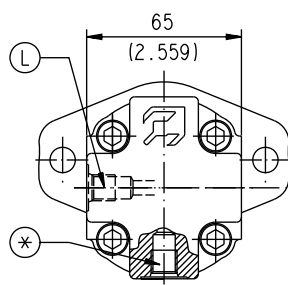
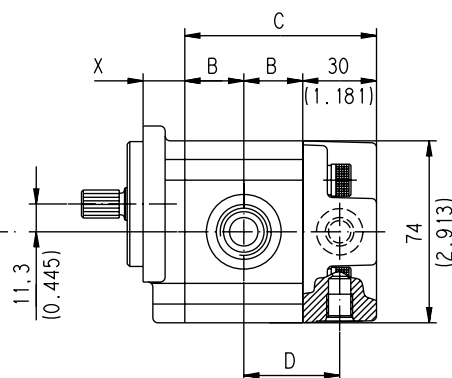
**L**

Drive shafts: page 52

 Mounting flange: for X dimension see  
 page 58 ÷ 60

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

**Reversible R**

**Single rotation S - D**


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**Reversible B**

**Reversible L**

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

 For reversible rotation B and L the rear  
 cover is in aluminium only.

Reversible L drain port position:

L = Side

\* = Bottom

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

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# POLARIS 10

# SINGLE UNITS DIMENSIONS - REAR PORTS

P

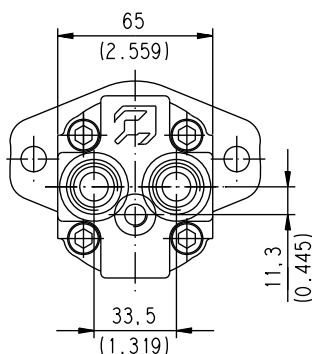
Drive shafts: page 52

Ports availability: Gas, SAE

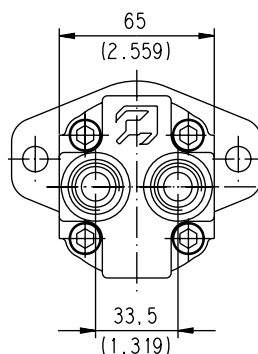
Mounting flange: for X dimension see  
page 58 ÷ 60

See page 70

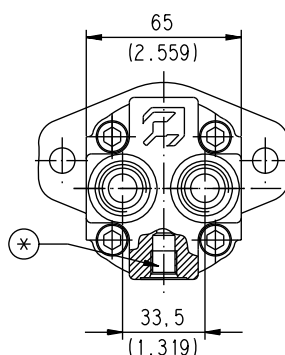
D033-181/0903



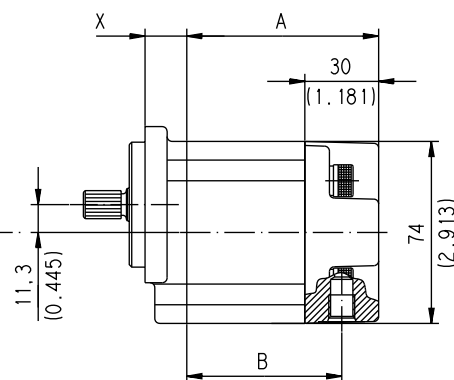
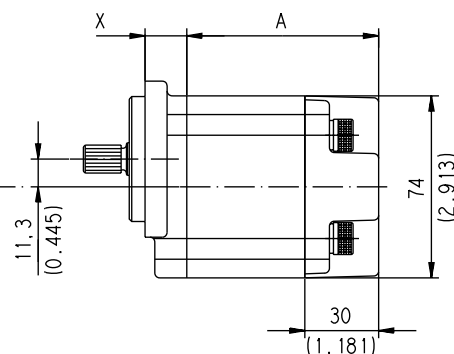
**Reversible R**



**Single rotation S - D**



**Reversible L**



Rear cover in aluminium only.

Reversible L drain port position:

\*= Bottom

04/10.2020

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

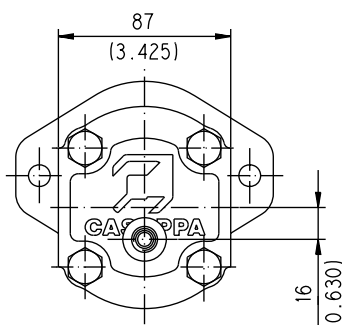
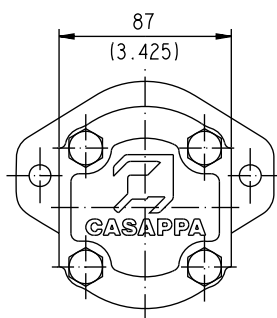
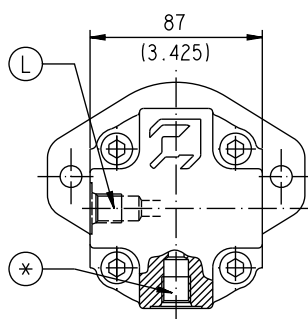
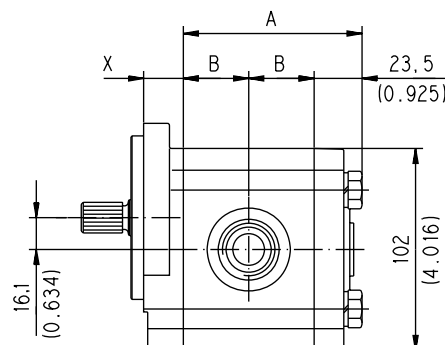
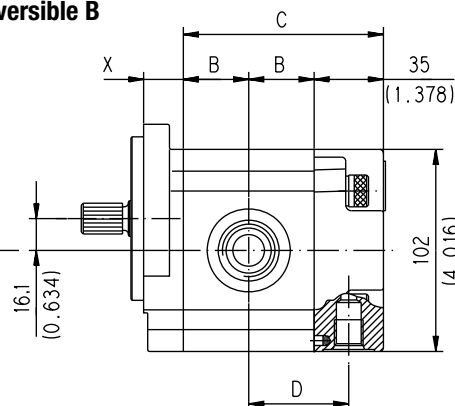
# POLARIS 20

# SINGLE UNITS DIMENSIONS - SIDE PORTS

**L**

Drive shafts: page 53 ÷ 55

 Mounting flange: for X dimension see  
 page 61 ÷ 66

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

**Reversible R**

**Single rotation S - D and Reversible B**

**Reversible L**


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

Reversible L drain port position:

L = Side

\* = Bottom

| Pump type          | A              | B              | C              | D              |
|--------------------|----------------|----------------|----------------|----------------|
| Motor type         | mm (in)        | mm (in)        | mm (in)        | mm (in)        |
| <b>PL. 20•4</b>    | 75 (2.9528)    | 25,75 (1.0138) | 86,5 (3.4055)  | 43,25 (1.7028) |
| <b>PL. 20•6,3</b>  | 77,5 (3.0512)  | 27 (1.0630)    | 89 (3.5039)    | 44,5 (1.7520)  |
| <b>PL. 20•7,2</b>  | 78,5 (3.0917)  | 27,5 (1.083)   | 90 (3.5445)    | 45 (1.7722)    |
| <b>PL. 20•8</b>    | 80 (3.1496)    | 28,25 (1.1122) | 91,5 (3.6024)  | 45,75 (1.8012) |
| <b>PL. 20•9</b>    | 81,3 (3.2008)  | 28,9 (1.1378)  | 92,8 (3.6535)  | 46,4 (1.8268)  |
| <b>PL. 20•10,5</b> | 84 (3.3070)    | 30,25 (1.1909) | 95,5 (3.7598)  | 47,75 (1.8799) |
| <b>PL. 20•11,2</b> | 84,5 (3.3268)  | 30,5 (1.2008)  | 96 (3.7795)    | 48 (1.8898)    |
| <b>PL. 20•14</b>   | 89,5 (3.5236)  | 33 (1.2992)    | 101 (3.9764)   | 50,5 (1.9882)  |
| <b>PL. 20•16</b>   | 93 (3.6614)    | 34,75 (1.3681) | 104,5 (4.1142) | 52,25 (2.0571) |
| <b>PL. 20•19</b>   | 96,4 (3.7952)  | 36,45 (1.4350) | 107,9 (4.2480) | 53,9 (2.12)    |
| <b>PL. 20•20</b>   | 99,5 (3.9173)  | 38 (1.4961)    | 111 (4.3701)   | 55,5 (2.1850)  |
| <b>PL. 20•24,5</b> | 105,1 (4.1378) | 40,8 (1.6063)  | 116,6 (4.5905) | 58,3 (2.2953)  |
| <b>PL. 20•25</b>   | 107,5 (4.2323) | 42 (1.6535)    | 119 (4.6850)   | 59,5 (2.3425)  |
| <b>PL. 20•27,8</b> | 110,2 (4.3386) | 43,35 (1.7067) | 121,7 (4.7913) | 60,85 (2.3957) |
| <b>PL. 20•31,5</b> | 117,5 (4.6260) | 47 (1.8504)    | 129 (5.0787)   | 64,5 (2.5394)  |

# **POLARIS 20**

# **SINGLE UNITS DIMENSIONS - REAR PORTS**

**P**

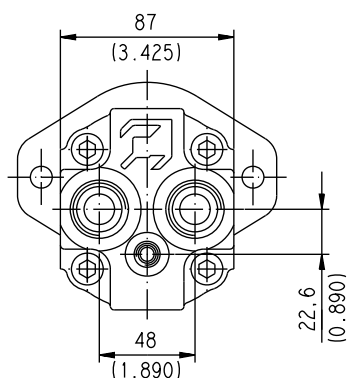
Drive shafts: page 53 ÷ 55

Ports availability: Gas, SAE.

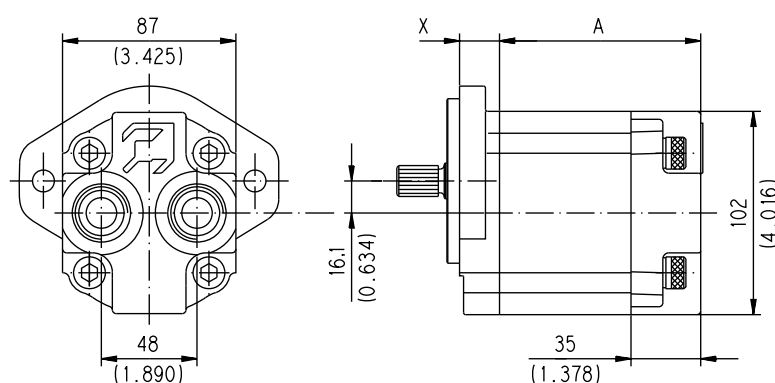
Mounting flange: for X dimension see  
page 61 ÷ 66

See page 70

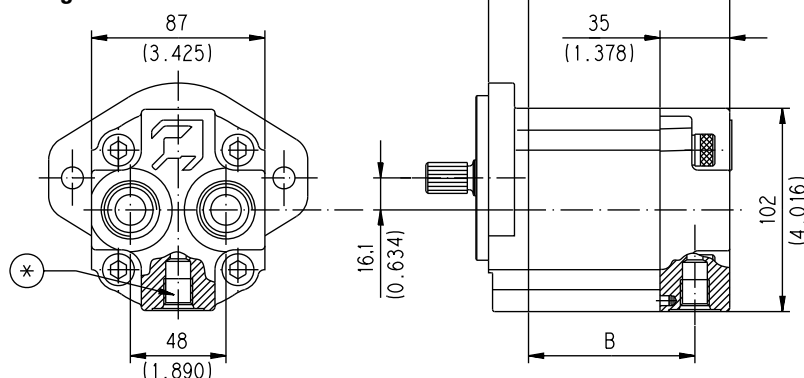
D033-183/0903



**Reversible R**



**Single rotation S - D and Reversible B**



**Reversible L**

Rear cover in aluminium only.

Reversible L drain port position:

\*= Bottom

| Pump type          | A              | B              |
|--------------------|----------------|----------------|
| Motor type         | mm (in)        | mm (in)        |
| <b>PL. 20•4</b>    | 86,5 (3.4055)  | 69 (2.7165)    |
| <b>PL. 20•6,3</b>  | 89 (3.5039)    | 71,5 (2.8150)  |
| <b>PL. 20•7,2</b>  | 90 (3.5445)    | 72,5 (2.8555)  |
| <b>PL. 20•8</b>    | 91,5 (3.6024)  | 74 (2.9134)    |
| <b>PL. 20•9</b>    | 92,8 (3.6535)  | 75,3 (2.9646)  |
| <b>PL. 20•10,5</b> | 95,5 (3.7598)  | 78 (3.0708)    |
| <b>PL. 20•11,2</b> | 96 (3.7795)    | 78,5 (3.0906)  |
| <b>PL. 20•14</b>   | 101 (3.9764)   | 83,5 (3.2874)  |
| <b>PL. 20•16</b>   | 104,5 (4.1142) | 87 (3.4252)    |
| <b>PL. 20•19</b>   | 107,9 (4.2480) | 90,4 (3.5591)  |
| <b>PL. 20•20</b>   | 111 (4.3701)   | 93,5 (3.6811)  |
| <b>PL. 20•24,5</b> | 116,6 (4.5905) | 99,1 (3.9016)  |
| <b>PL. 20•25</b>   | 119 (4.6850)   | 101,5 (3.9961) |
| <b>PL. 20•27,8</b> | 121,7 (4.7913) | 104,2 (4.1024) |
| <b>PL. 20•31,5</b> | 129 (5.0787)   | 111,5 (4.3898) |

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**POLARIS 30**

**SINGLE UNITS DIMENSIONS - SIDE PORTS**

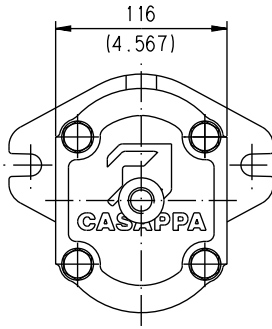
**L**

Drive shafts: page 56 ÷ 57

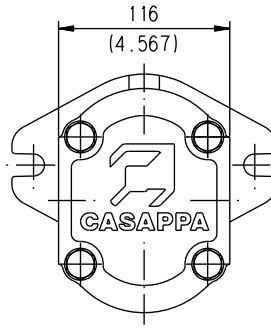
Mounting flange: for X dimension see  
page 67 ÷ 69

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

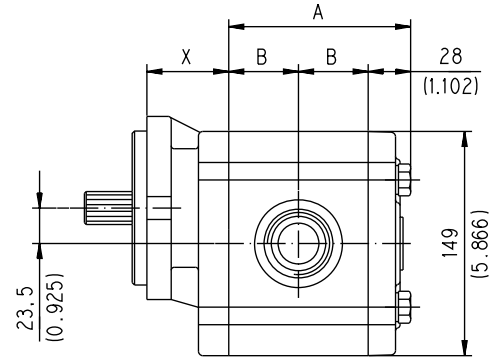
D033-184/0903



**Reversible R**



**Single rotation S - D**



Rear cover in cast iron only.

| Pump type<br>Motor type | A            | B             |
|-------------------------|--------------|---------------|
|                         | mm (in)      | mm (in)       |
| <b>PL. 30•22</b>        | 106 (4.1732) | 39 (1.5354)   |
| <b>PL. 30•27</b>        | 109 (4.2913) | 40,5 (1.5945) |
| <b>PL. 30•34</b>        | 114 (4.4882) | 43 (1.6929)   |
| <b>PL. 30•38</b>        | 117 (4.6063) | 44,5 (1.7520) |
| <b>PL. 30•43</b>        | 120 (4.7244) | 46 (1.8110)   |
| <b>PL. 30•51</b>        | 125 (4.9212) | 48,5 (1.9094) |
| <b>PL. 30•61</b>        | 131 (5.1575) | 51,5 (2.0276) |
| <b>PL. 30•73</b>        | 139 (5.4724) | 55,5 (2.1850) |
| <b>PL. 30•82</b>        | 144 (5.6693) | 58 (2.2835)   |
| <b>PL. 30•90</b>        | 150 (5.9055) | 61 (2.4016)   |

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## MULTIPLE PUMPS

POLARIS series pumps can be coupled together in combination. Where the input power requirements of each section varies, that with the greater requirement must be at the drive shaft end, and progressively smaller to the rear.

Features and performances are the same as the corresponding single pumps, but pressures must be limited by the transmissible torque of the drive and connecting shafts. To have appropriate data, use the formula below.

The maximum rotational speed is that of the lowest rated speed of the single units incorporated.

Available with common inlet and separated stages. Please contact us for more information.

|                                         |                                             |                             |
|-----------------------------------------|---------------------------------------------|-----------------------------|
| <b>M</b>                                | Nm (lbf in)                                 | Torque                      |
| <b>V</b>                                | cm <sup>3</sup> /rev (in <sup>3</sup> /rev) | Displacement                |
| <b>Δp</b>                               | bar (psi)                                   | Pressure                    |
| $\eta_{hm} = \eta_{hm}(V, \Delta p, n)$ |                                             | Hydro-mechanical efficiency |

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

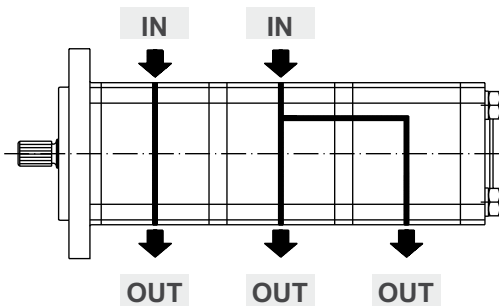
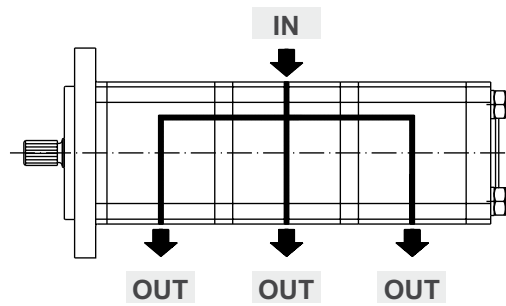
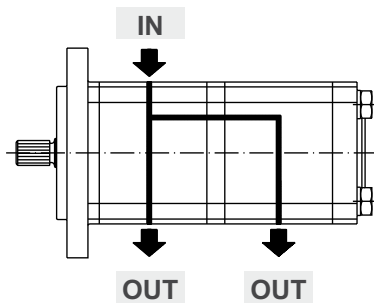
$$M_{theor.} = \frac{\Delta p \text{ (bar)} \cdot V \text{ (cm}^3\text{/rev)}}{62,83} \quad [Nm]$$

### NOTE

The torque absorbed from the shaft of the first pump results from the sum of the torques of all the single stages. The achieved value must not exceed the maximum torque limit given for the shaft of the first pump.

05/04.2023

## COMMON INLET - PORTS POSITION



Reduced inlets provide overall systems savings by reducing the cost of redundant inlet hose and fittings.

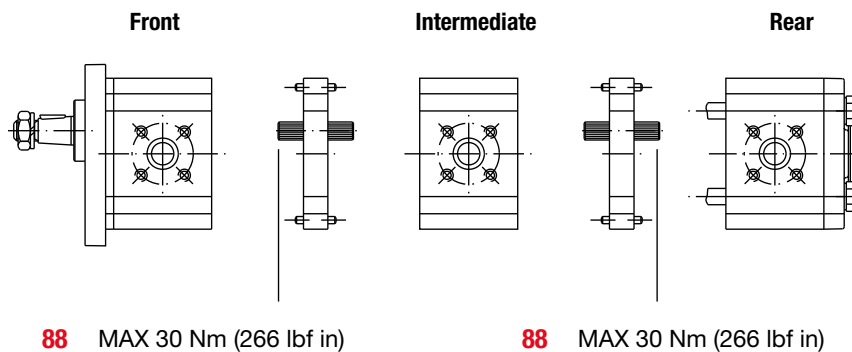
Please contact us for other combinations.

## MULTIPLE PUMPS COMBINATION

**PL10**

|               |                      |           |
|---------------|----------------------|-----------|
| Polaris 10/10 | STANDARD VERSION     | <b>V6</b> |
| Polaris 10/10 | COMMON INLET VERSION | <b>V7</b> |

D033-112/0603



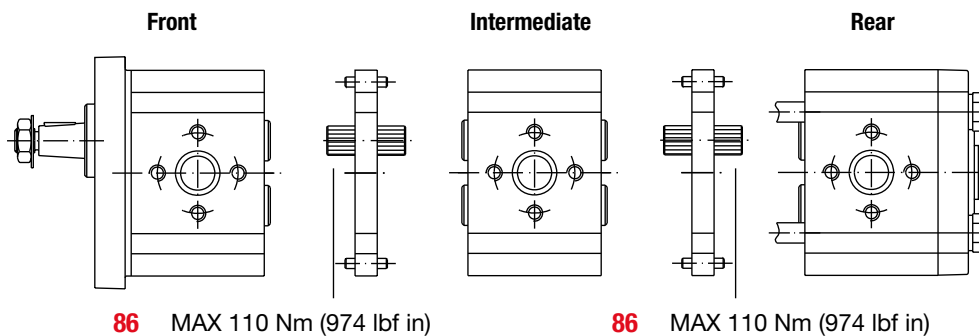
02/07.2006

## MULTIPLE PUMPS COMBINATION

**PLP 20**

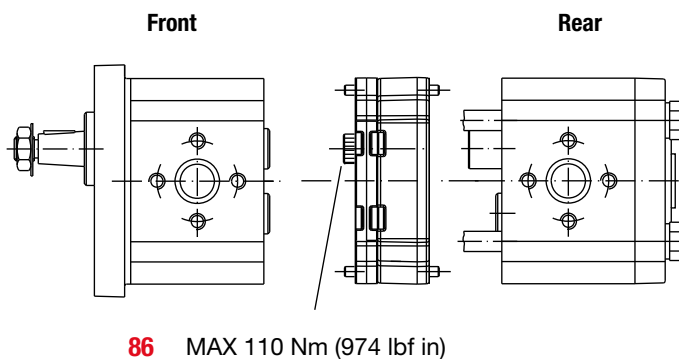
|               |                      |           |
|---------------|----------------------|-----------|
| Polaris 20/20 | STANDARD VERSION     | <b>S6</b> |
| Polaris 20/20 | COMMON INLET VERSION | <b>S7</b> |

D033-106/0603



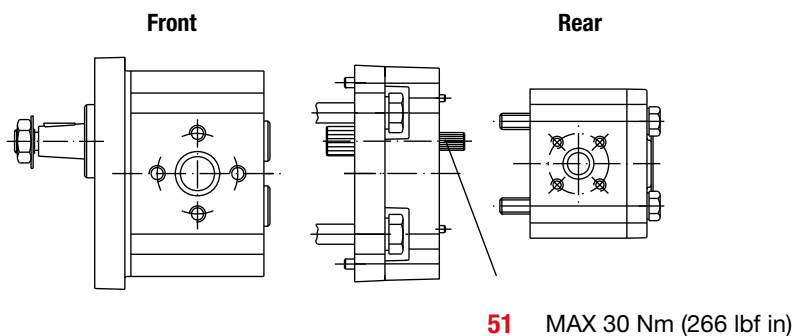
|               |                          |           |
|---------------|--------------------------|-----------|
| Polaris 20/20 | SEPARATED SRAGES VERSION | <b>Z6</b> |
|---------------|--------------------------|-----------|

D033-110/0603



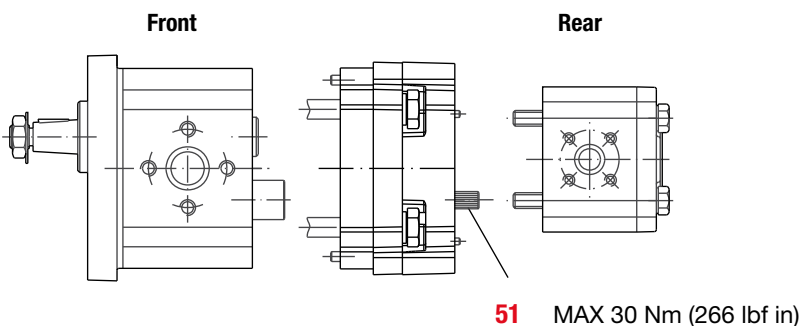
|               |                      |           |
|---------------|----------------------|-----------|
| Polaris 20/10 | STANDARD VERSION     | <b>T6</b> |
| Polaris 20/10 | COMMON INLET VERSION | <b>T7</b> |

D033-107/0603



|               |                          |           |
|---------------|--------------------------|-----------|
| Polaris 20/10 | SEPARATED SRAGES VERSION | <b>Z6</b> |
|---------------|--------------------------|-----------|

D033-111/0603



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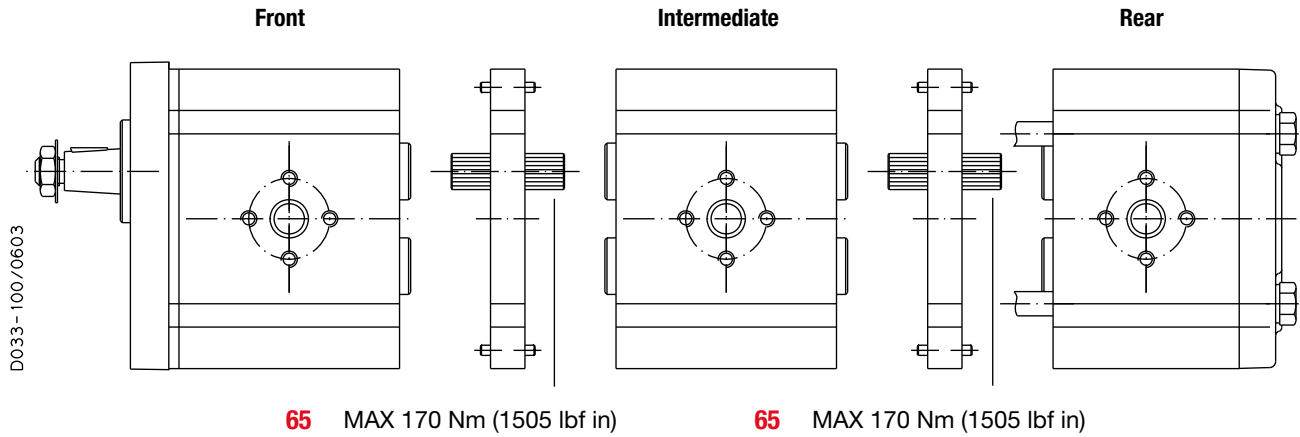
## MULTIPLE PUMPS COMBINATION

**PLP 30**

**Polaris 30/30**

**STANDARD VERSION**

**M6**



**Polaris 30/20**

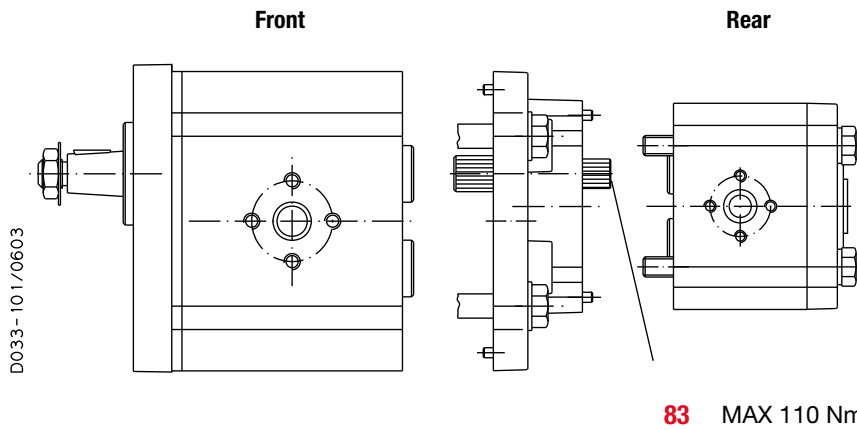
**STANDARD VERSION**

**N6**

**Polaris 30/20**

**COMMON INLET VERSION**

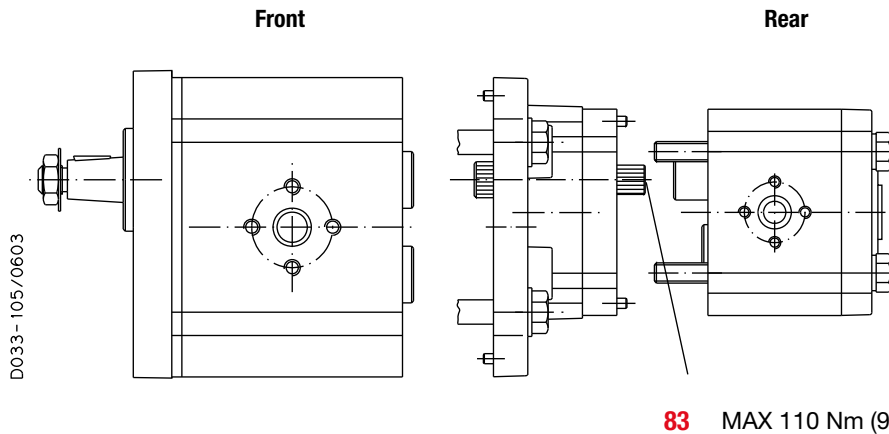
**N7**



**Polaris 30/20**

**SEPARATED SRAGES VERSION**

**Z6**

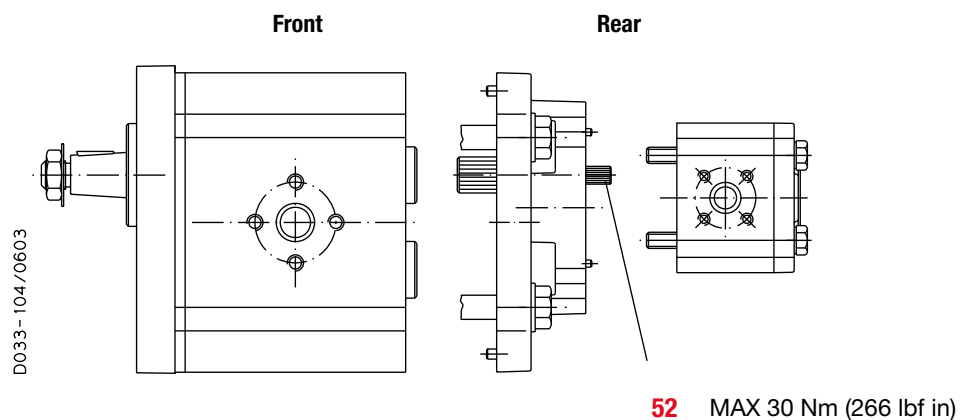


04/10.2020

## MULTIPLE PUMPS COMBINATION

**PLP 30**

|               |                      |           |
|---------------|----------------------|-----------|
| Polaris 30/20 | STANDARD VERSION     | <b>Q6</b> |
| Polaris 30/10 | COMMON INLET VERSION | <b>Q7</b> |



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## POLARIS 10

## MULTIPLE PUMPS DIMENSIONS

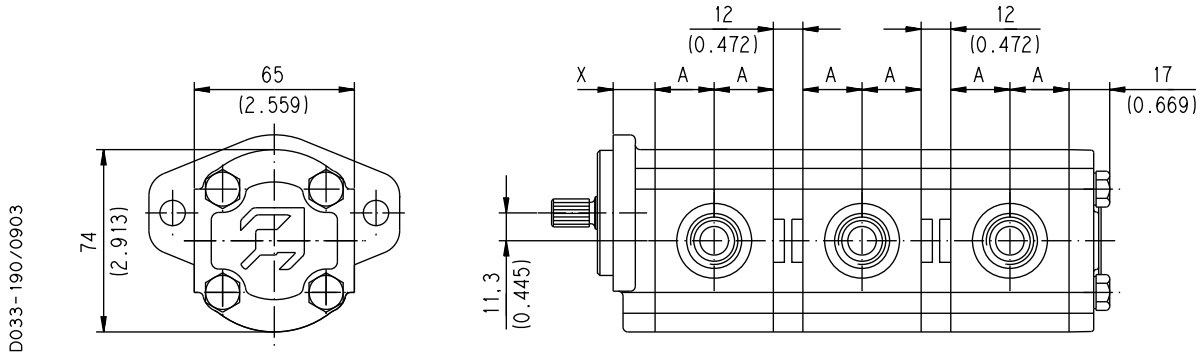
## PLP10

Drive shafts: page 52

Mounting flange: for X dimension see  
page 58 ÷ 60

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

### PLP 10/10



Rear cover available in cast iron and aluminium.

| Pump type           | A             |
|---------------------|---------------|
|                     | mm (in)       |
| <b>PLP. 10•1</b>    | 17,6 (0.6929) |
| <b>PLP. 10•1,5</b>  | 18,4 (0.7244) |
| <b>PLP. 10•2</b>    | 19,2 (0.7559) |
| <b>PLP. 10•2,5</b>  | 20 (0.7874)   |
| <b>PLP. 10•3,15</b> | 21 (0.8268)   |
| <b>PLP. 10•4</b>    | 22,4 (0.8819) |
| <b>PLP. 10•5</b>    | 24 (0.9449)   |
| <b>PLP. 10•5,8</b>  | 25,3 (0.9961) |
| <b>PLP. 10•6,3</b>  | 26 (1.0236)   |
| <b>PLP. 10•8</b>    | 28,7 (1.1319) |
| <b>PLP. 10•10</b>   | 32 (1.2598)   |

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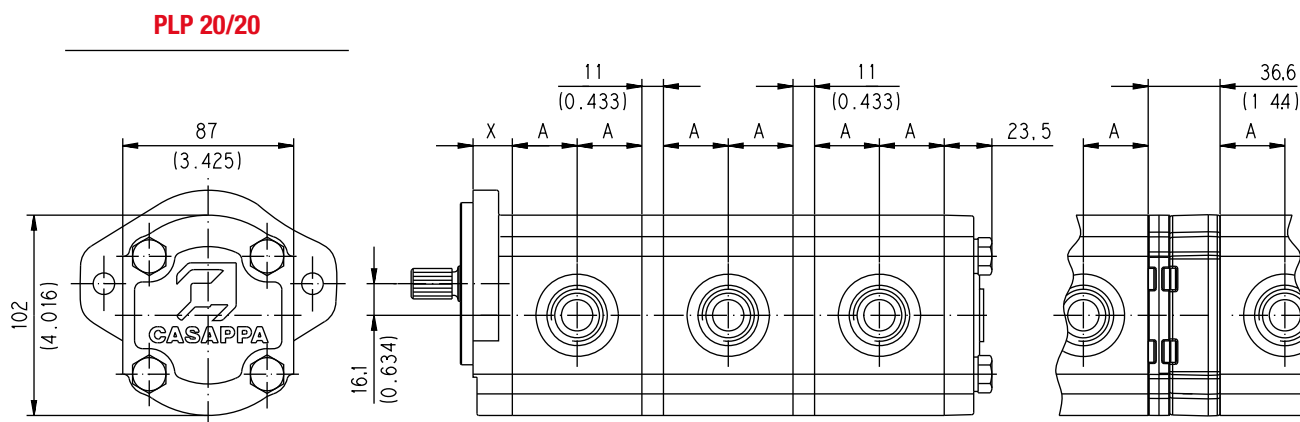
## POLARIS 20

## MULTIPLE PUMPS DIMENSIONS

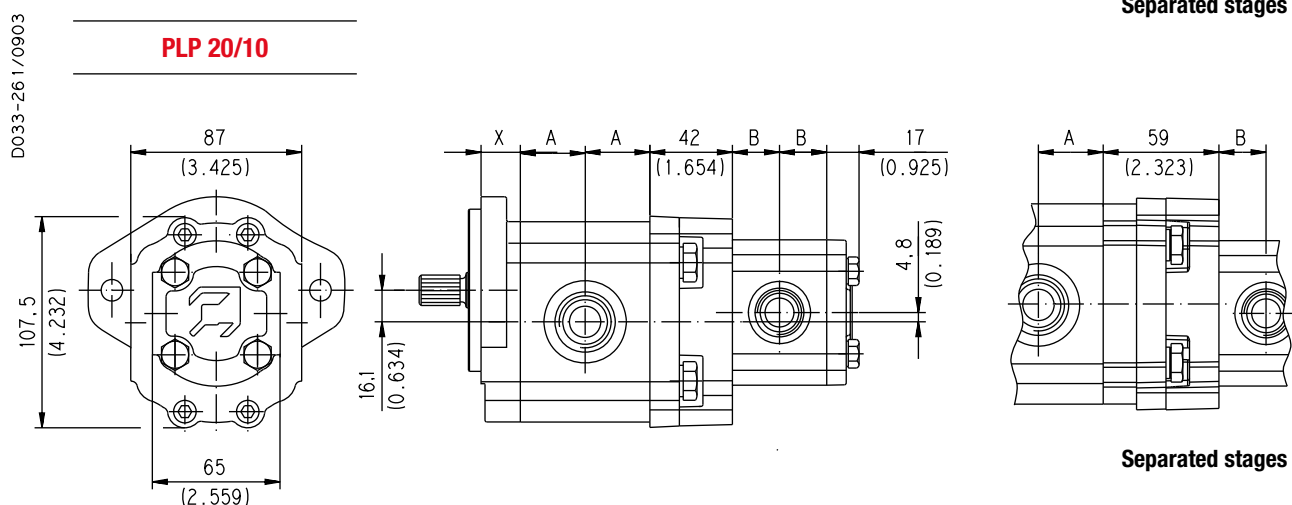
## PLP 20

Drive shafts: page 53 ÷ 55  
Mounting flange: for X dimension see  
page 61 ÷ 65

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



Separated stages



Separated stages

| Pump type          | A              |
|--------------------|----------------|
|                    | mm (in)        |
| <b>PLP 20•4</b>    | 25,75 (1.0138) |
| <b>PLP 20•6,3</b>  | 27 (1.0630)    |
| <b>PLP 20•7,2</b>  | 27,5 (1.0827)  |
| <b>PLP 20•8</b>    | 28,25 (1.1122) |
| <b>PLP 20•9</b>    | 28,9 (1.1378)  |
| <b>PLP 20•10,5</b> | 30,25 (1.1909) |
| <b>PLP 20•11,2</b> | 30,5 (1.2008)  |
| <b>PLP 20•14</b>   | 33 (1.2992)    |
| <b>PLP 20•16</b>   | 34,75 (1.3681) |
| <b>PLP 20•19</b>   | 36,45 (1.4350) |
| <b>PLP 20•20</b>   | 38 (1.4961)    |
| <b>PLP 20•24,5</b> | 40,8 (1.6063)  |
| <b>PLP 20•25</b>   | 42 (1.6535)    |
| <b>PLP 20•27,5</b> | 43,35 (1.7067) |
| <b>PLP 20•31,5</b> | 47 (1.8504)    |

Rear cover available in cast iron and aluminium.

| Pump type          | B              |
|--------------------|----------------|
|                    | mm (in)        |
| <b>PLP 10•1</b>    | 17,6 (0.6929)  |
| <b>PLP 10•1,5</b>  | 18,4 (0.7244)  |
| <b>PLP 10•2</b>    | 19,2 (0.7559)  |
| <b>PLP 10•2,5</b>  | 20 (0.7874)    |
| <b>PLP 10•3,15</b> | 21 (0.8268)    |
| <b>PLP 10•4</b>    | 22,4 (0.8819)  |
| <b>PLP 10•5</b>    | 24 (0.9449)    |
| <b>PLP 10•5,8</b>  | 25,3 (0.9961)  |
| <b>PLP 10•6,3</b>  | 26 (1.0236)    |
| <b>PLP 10•8</b>    | 28,75 (1.1319) |
| <b>PLP 10•10</b>   | 32 (1.2598)    |

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## POLARIS 30

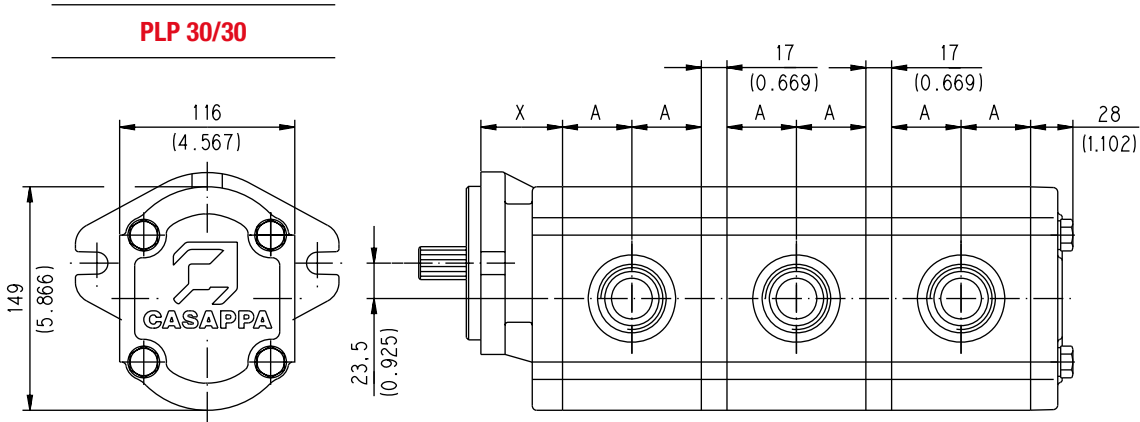
## MULTIPLE PUMPS DIMENSIONS

## PLP30

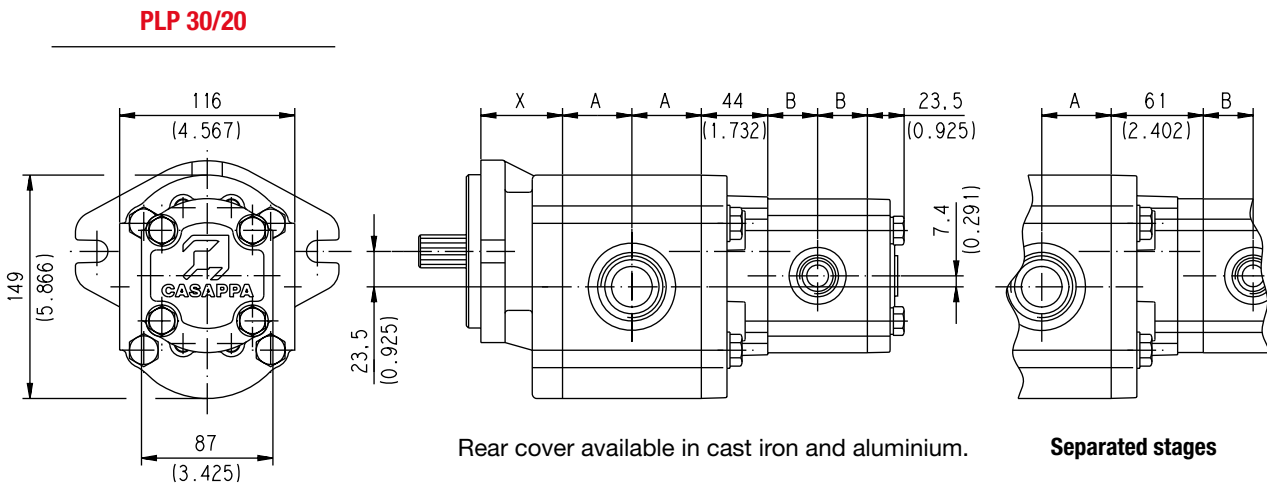
Drive shafts: page 56 ÷ 57

Mounting flange: for X dimension see  
page 67 ÷ 69

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

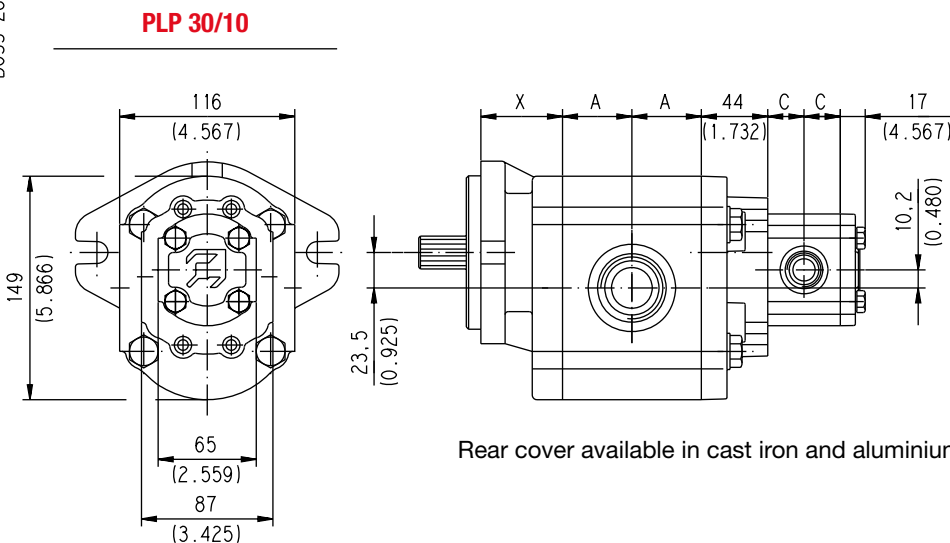


Rear cover in cast iron only.



Rear cover available in cast iron and aluminium.

Separated stages



Rear cover available in cast iron and aluminium.

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**POLARIS 30**
**MULTIPLE PUMPS DIMENSIONS**
**PLP30**

| Pump type        | <b>A</b>      |
|------------------|---------------|
|                  | mm (inch)     |
| <b>PLP 30•22</b> | 39 (1.5354)   |
| <b>PLP 30•27</b> | 40,5 (1.5945) |
| <b>PLP 30•34</b> | 43 (1.6929)   |
| <b>PLP 30•38</b> | 44,5 (1.7520) |
| <b>PLP 30•43</b> | 46 (1.8110)   |
| <b>PLP 30•51</b> | 48,5 (1.9094) |
| <b>PLP 30•61</b> | 51,5 (2.0276) |
| <b>PLP 30•73</b> | 55,5 (2.1850) |
| <b>PLP 30•82</b> | 58 (2.2835)   |
| <b>PLP 30•90</b> | 61 (2.4016)   |

| Pump type          | <b>B</b>       |
|--------------------|----------------|
|                    | mm (inch)      |
| <b>PLP 20•4</b>    | 25,75 (1.0138) |
| <b>PLP 20•6,3</b>  | 27 (1.0630)    |
| <b>PLP 20•7,2</b>  | 27,5 (1.0827)  |
| <b>PLP 20•8</b>    | 28,25 (1.1122) |
| <b>PLP 20•9</b>    | 28,9 (1.1378)  |
| <b>PLP 20•10,5</b> | 30,25 (1.1909) |
| <b>PLP 20•11,2</b> | 30,5 (1.2008)  |
| <b>PLP 20•14</b>   | 33 (1.2992)    |
| <b>PLP 20•16</b>   | 34,75 (1.3681) |
| <b>PLP 20•19</b>   | 36,45 (1.4350) |
| <b>PLP 20•20</b>   | 38 (1.4961)    |
| <b>PLP 20•24,5</b> | 40,8 (1.6063)  |
| <b>PLP 20•25</b>   | 42 (1.6535)    |
| <b>PLP 20•27,5</b> | 43,35 (1.7067) |
| <b>PLP 20•31,5</b> | 47 (1.8504)    |

| Pump type          | <b>C</b>       |
|--------------------|----------------|
|                    | mm (inch)      |
| <b>PLP 10•1</b>    | 17,6 (0.6929)  |
| <b>PLP 10•1,5</b>  | 18,4 (0.7244)  |
| <b>PLP 10•2</b>    | 19,2 (0.7559)  |
| <b>PLP 10•2,5</b>  | 20 (0.7874)    |
| <b>PLP 10•3,15</b> | 21 (0.8268)    |
| <b>PLP 10•4</b>    | 22,4 (0.8819)  |
| <b>PLP 10•5</b>    | 24 (0.9449)    |
| <b>PLP 10•5,8</b>  | 25,3 (0.9961)  |
| <b>PLP 10•6,3</b>  | 26 (1.0236)    |
| <b>PLP 10•8</b>    | 28,75 (1.1319) |
| <b>PLP 10•10</b>   | 32 (1.2598)    |

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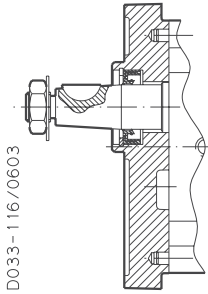
## OUTBOARD BEARING OPTIONS

For each version, the possible combination between drive shafts and mounting flanges are shown on pages 58 ÷ 69.  
For the outboard bearing life expectancy, diagrams providing approximate selection data will be found on subsequent pages.  
Please contact us for particular applications.

### PLP 10 - 20 - 30

#### VERSION

**0**

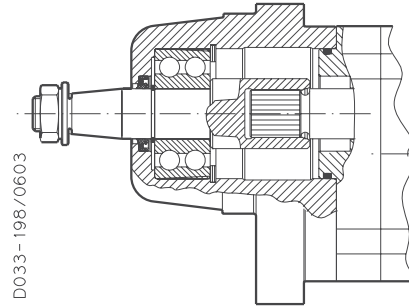


Version for applications without radial and axial load on the drive shaft.

#### PLP20 VERSION

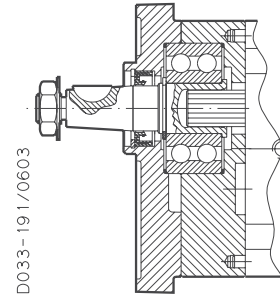
**W8**

Only available in 55 W8



#### PLP20 VERSION

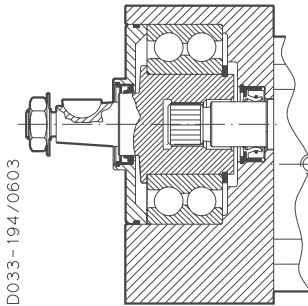
**5**



#### PLP20 VERSION

**7**

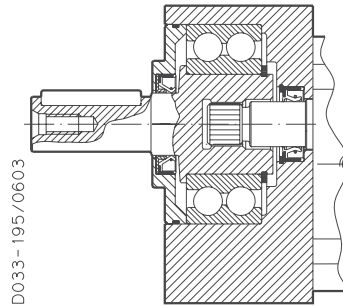
Only available in 82 E2



#### PLP20 VERSION

**8**

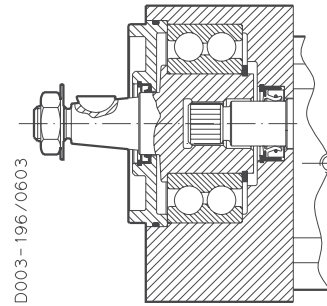
Only available in B1 E2



#### PLP20 VERSION

**9**

Only available in 55 B2

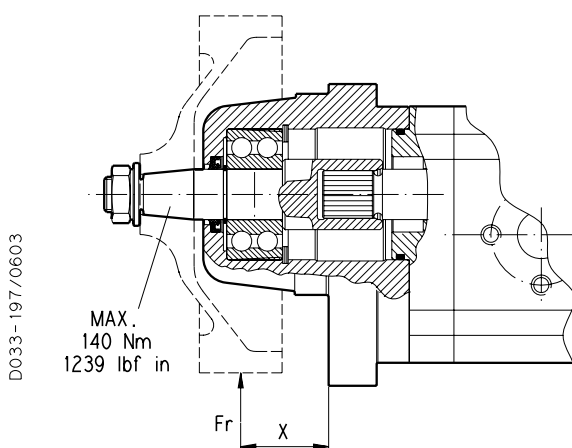


04/10.2020

# POLARIS 20

## VERSION WITH OUTBOARD BEARING

**W8**



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

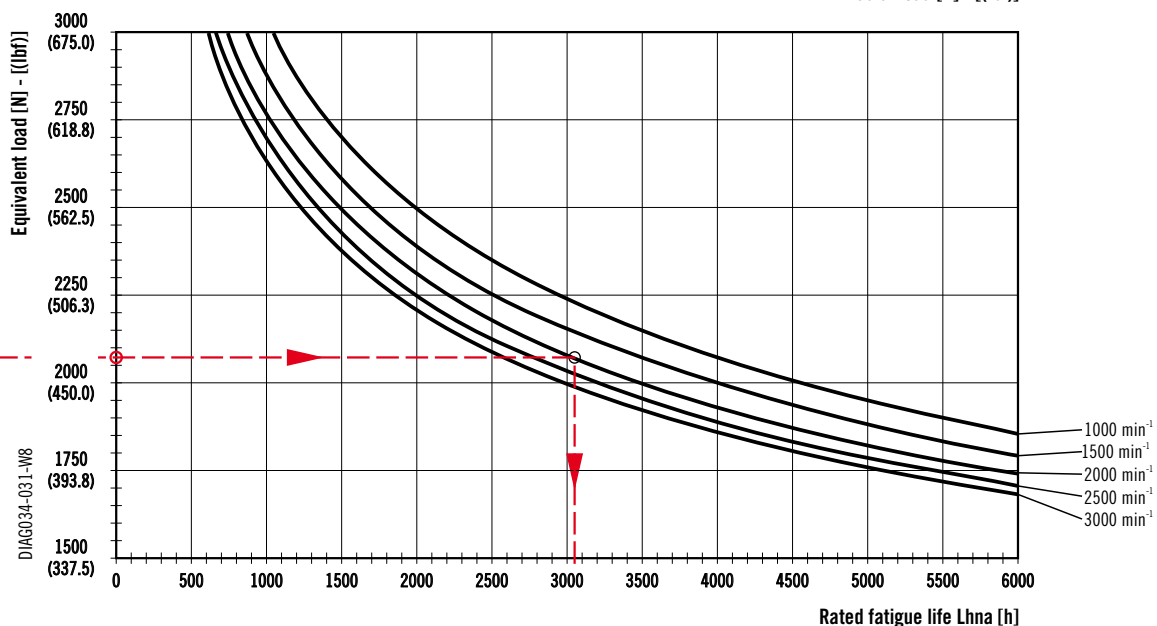
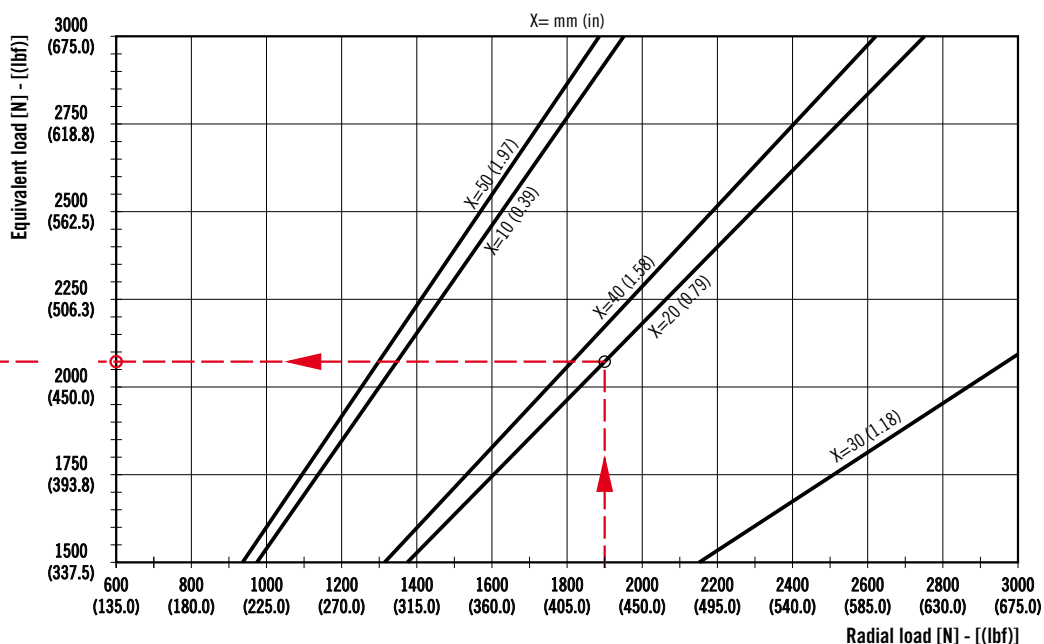
Each curve has been obtained at:

- Lubricant oil ISO VG 46
- Temperature 60 °C (140 °F)
- Without axial load
- Contamination level according ISO 281:  $\beta_{12}(C) = 200$
- Reliability level of the calculation 90%

### Example

|                    |                        |
|--------------------|------------------------|
| Fr Radial load     | 1900 N (427.5 lbf)     |
| X                  | 20 mm (0.79 in)        |
| Speed              | 2000 min <sup>-1</sup> |
| Rated fatigue life | ≈ 3050 h               |

Values shown in the diagrams are indicative only.  
Please contact us for more information.



02/07.2006

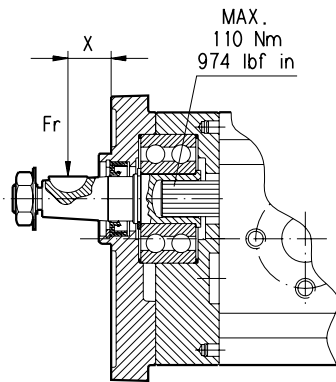
DIAG034-03-W8

**POLARIS 20**

**VERSION WITH OUTBOARD BEARING**

**5**

D033-115/0603



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

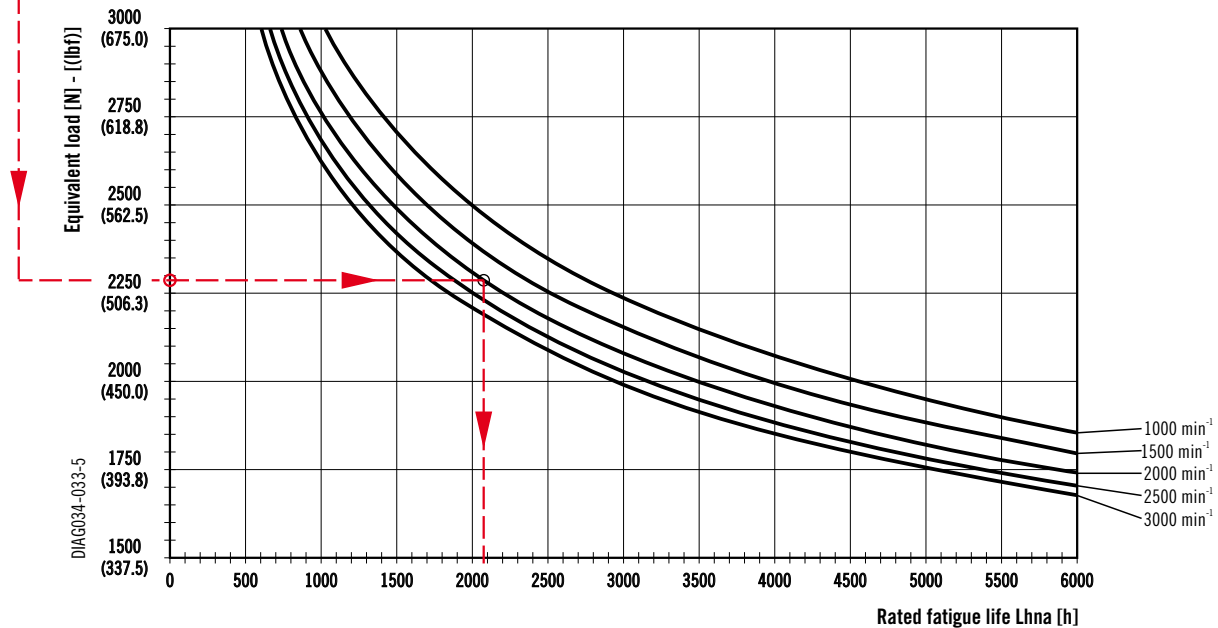
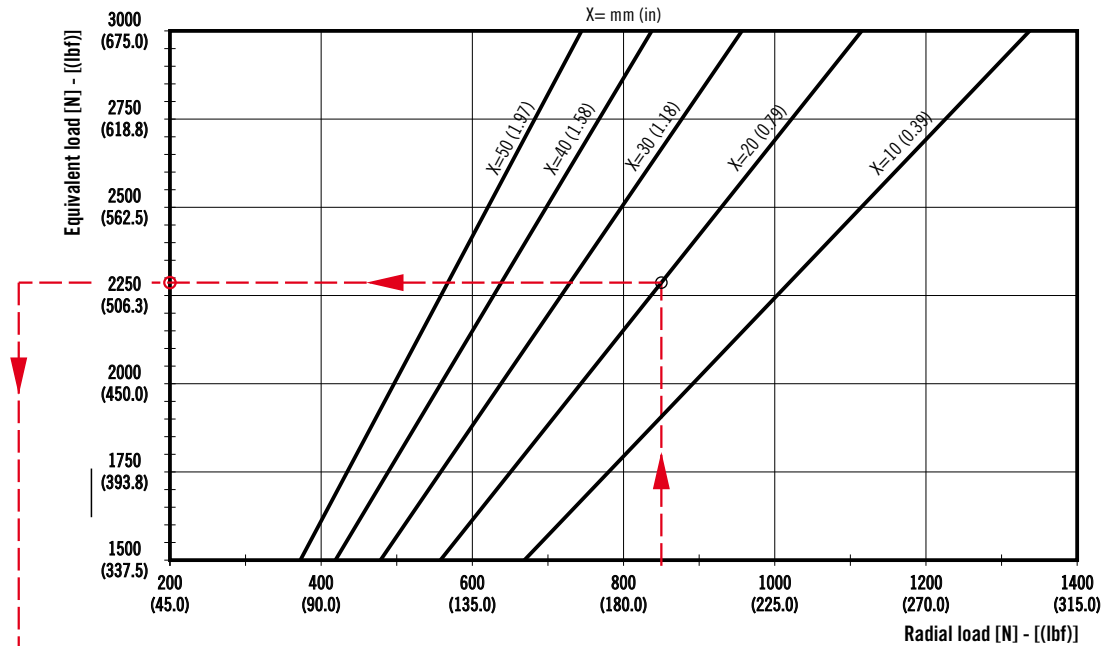
Each curve has been obtained at:

- Lubricant oil ISO VG 46
- Temperature 60 °C (140 °F)
- Without axial load
- Contamination level according ISO 281:  $\beta_{12}(C) = 200$
- Reliability level of the calculation 90%

**Example**

|                    |                        |
|--------------------|------------------------|
| Fr Radial load     | 850 N (191.3 lbf)      |
| X                  | 20 mm (0.79 in)        |
| Speed              | 2000 min <sup>-1</sup> |
| Rated fatigue life | ≈ 2100 h               |

Values shown in the diagrams are indicative only.  
Please contact us for more information.



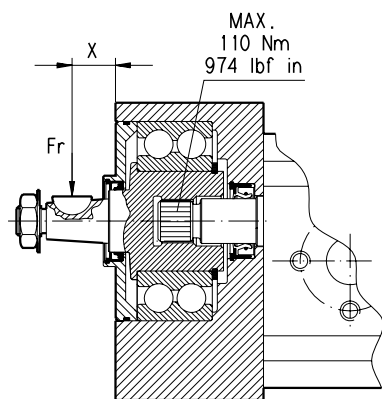
04/10.2020

# 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)].

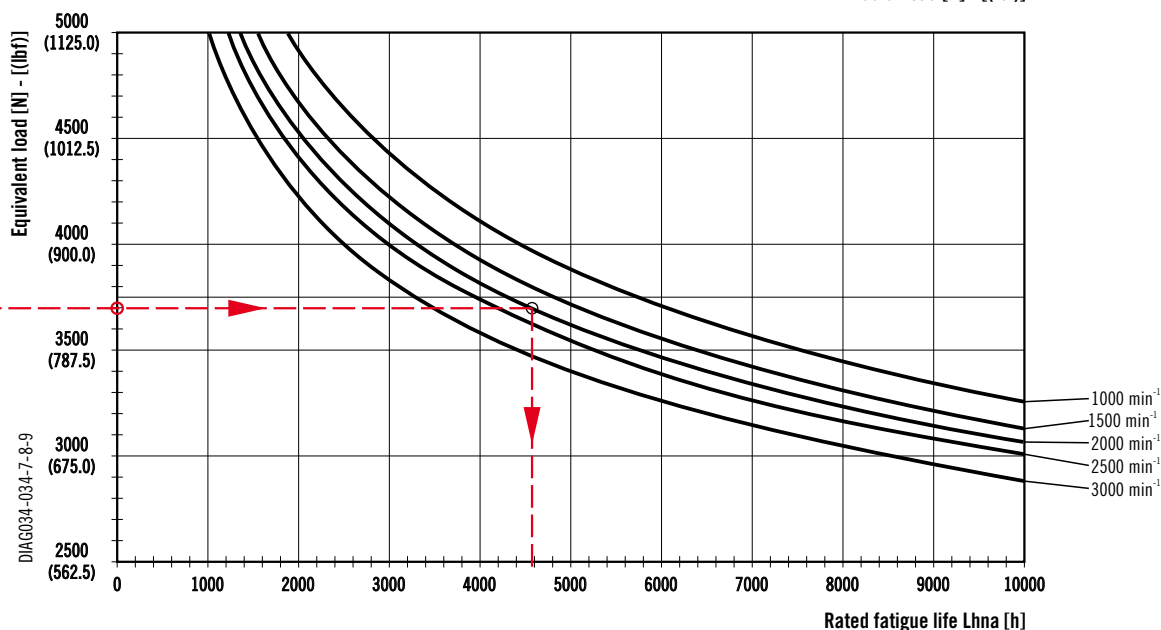
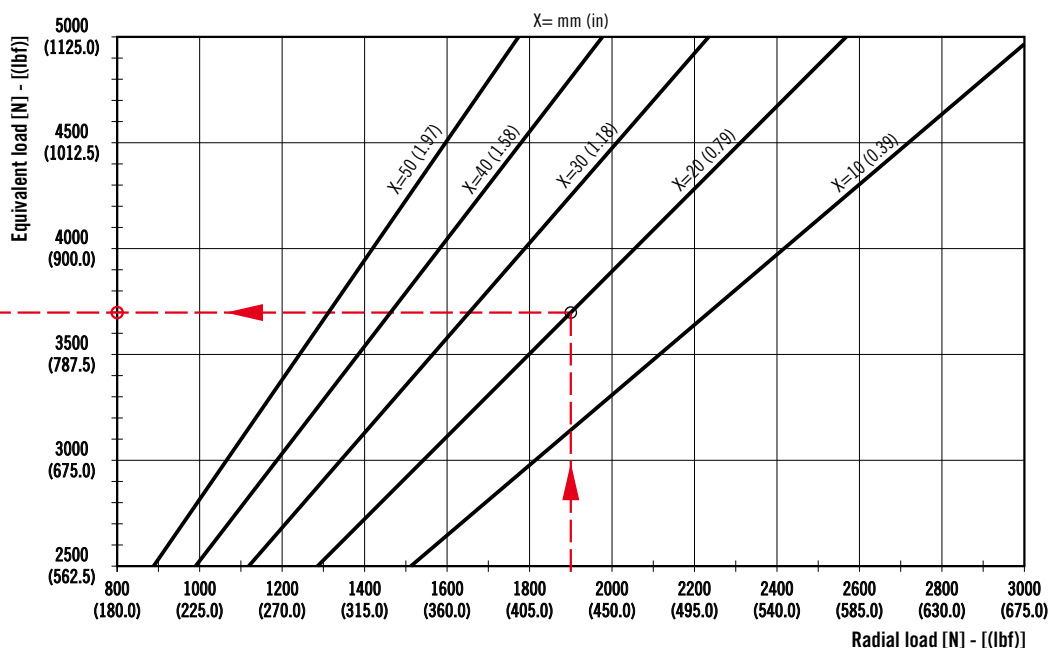
Each curve has been obtained at:

- Lubricant oil ISO VG 46
- Temperature 60 °C (140 °F)
- Without axial load
- Contamination level according ISO 281:  $\beta_{12}(C) = 200$
- Reliability level of the calculation 90%

### Example

|                    |                        |
|--------------------|------------------------|
| Fr Radial load     | 1900 N (427.5 lbf)     |
| X                  | 20 mm (0.79 in)        |
| Speed              | 2000 min <sup>-1</sup> |
| Rated fatigue life | ≈ 4600 h               |

Values shown in the diagrams are indicative only.  
Please contact us for more information.



04/10.2020

DIAG034-034-7-8-9

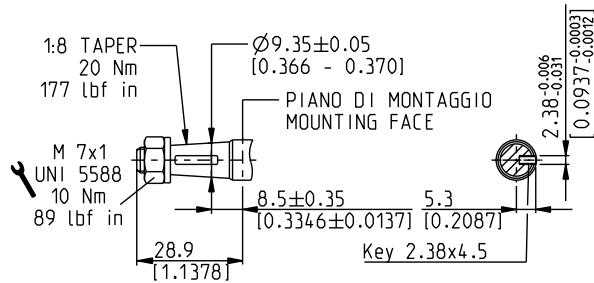
## POLARIS 10

## DRIVE SHAFTS

### EUROPEAN TAPERED 1:8

81

Mounting face refer to flange code **E1**

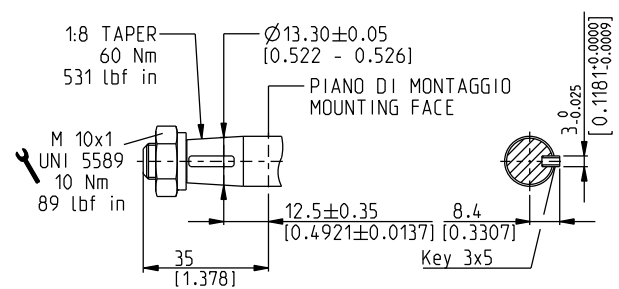


DCAT\_033\_041

### EUROPEAN TAPERED 1:8

86

Mounting face refer to flange code **E7**

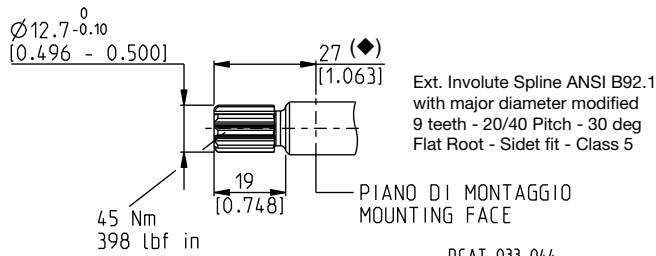


DCAT\_033\_042

### SAE "AA" SPLINE

02

Mounting face refer to flange code **R9**



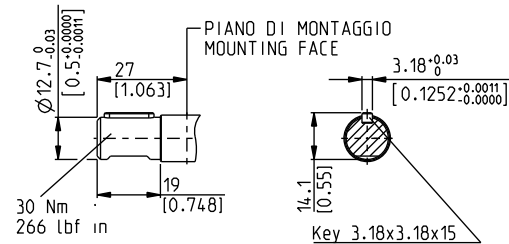
DCAT\_033\_044

(◆) 24 (0.9449) with flange code **S0**

### SAE "AA" STRAIGHT

30

Mounting face refer to flange code **S0**



DCAT\_033\_045

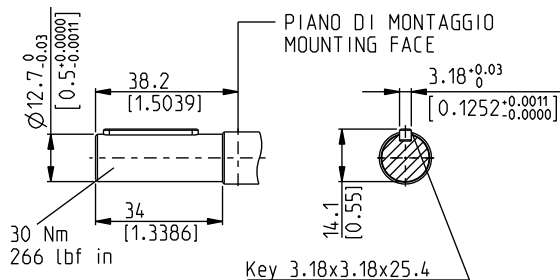
### SAE STRAIGHT

36

Not available with size:

10•1,5 10•2,5

Mounting face refer to flange code **R8**



DCAT\_033\_046

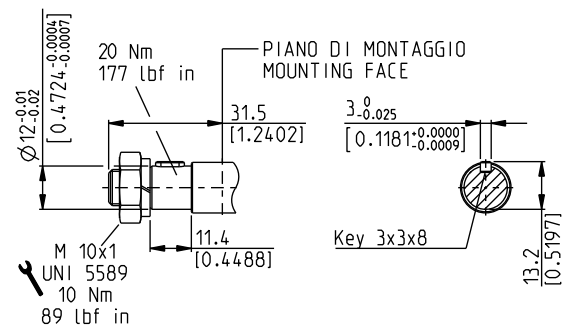
### STRAIGHT

29

Not available with size:

10•5,8

Mounting face refer to flange code **E8**



DCAT\_033\_043

04/10.2020

## POLARIS 20

## DRIVE SHAFTS

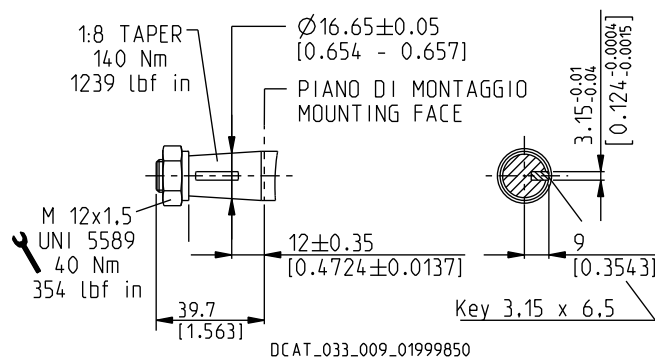
### EUROPEAN TAPERED 1:8

82

Not available with size:

20•24,5

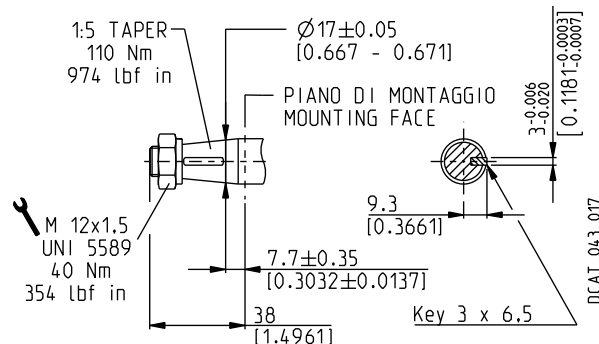
Mounting face refer to flange code **E2**



### GERMAN TAPERED 1:5

54

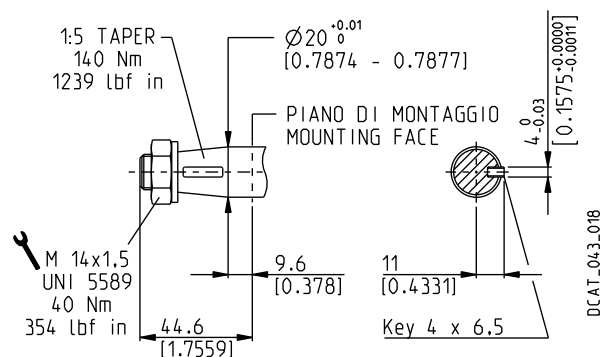
Mounting face refer to flange code **B2**



### GERMAN TAPERED 1:5

55

Mounting face refer to flange code **B2**



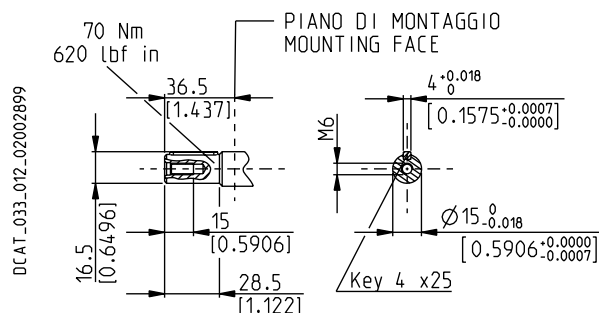
### STRAIGHT

46

Not available with size:

20•7,2 20•19 20•24,5 20•27,8

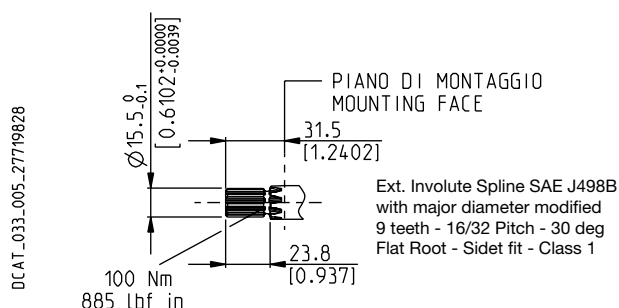
Mounting face refer to flange code **E2**



### SAE "A" SPLINE

03

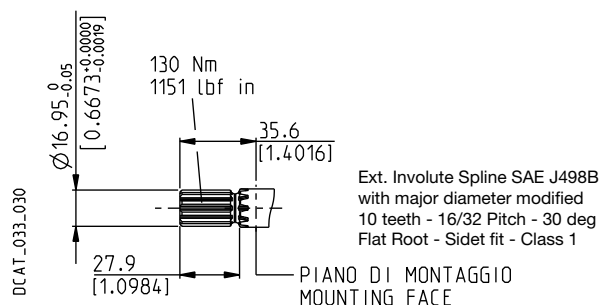
Mounting face refer to flange code **S1**



### SPLINE

01

Mounting face refer to flange code **S1**



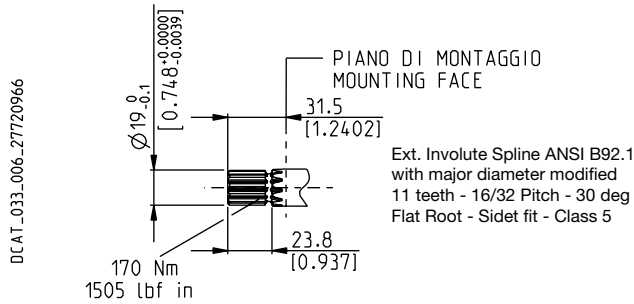
## POLARIS 20

## DRIVE SHAFTS

### SAE SPLINE

07

Mounting face refer to flange code **S1**



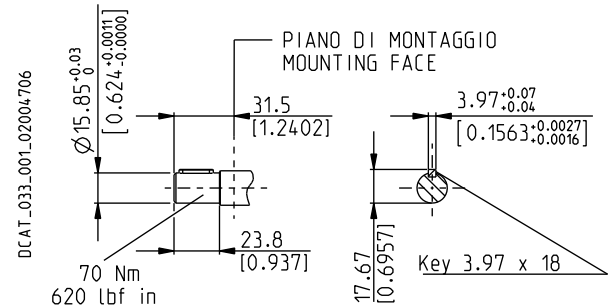
### SAE "A" STRAIGHT

31

Not available with size:

20•24,5 20•27,8

Mounting face refer to flange code **S1**



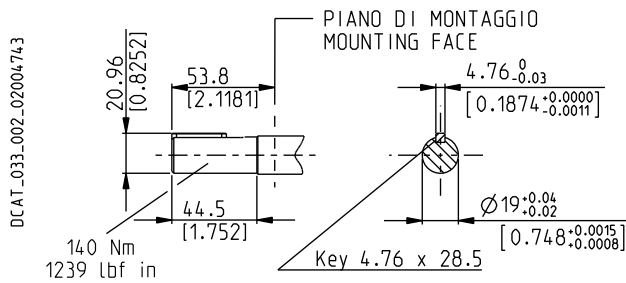
### STRAIGHT

49

Not available with size:

20•19 20•24,5

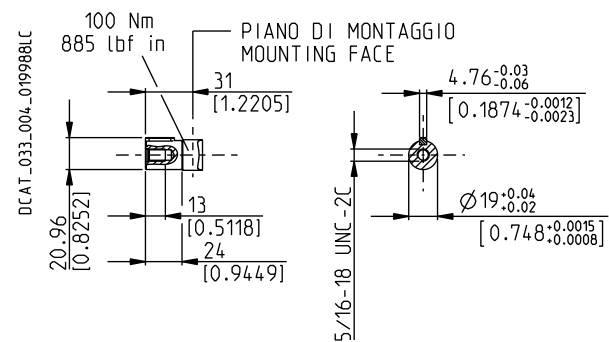
Mounting face refer to flange code **S1**



### STRAIGHT

50

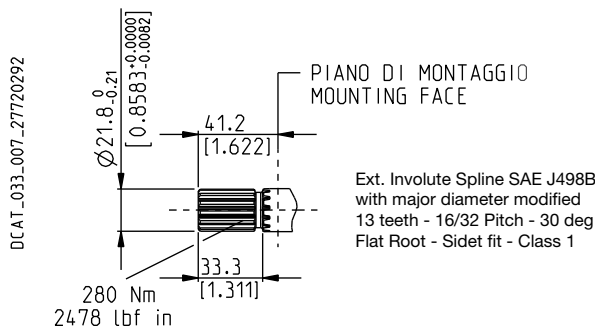
Mounting face refer to flange code **S1**



### SAE "B" SPLINE

04

Mounting face refer to flange code **S5**



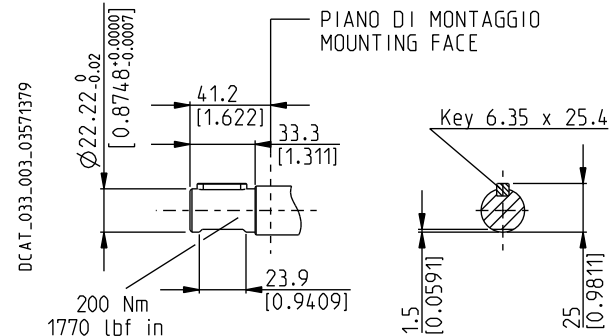
### SAE "B" STRAIGHT

32

Not available with size:

20•24,5

Mounting face refer to flange code **S5**



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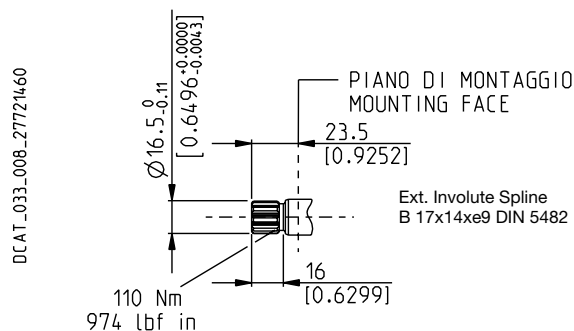
## POLARIS 20

## DRIVE SHAFTS

### DIN 5482 SPLINE

12

Mounting face refer to flange code **B2**



### STRAIGHT

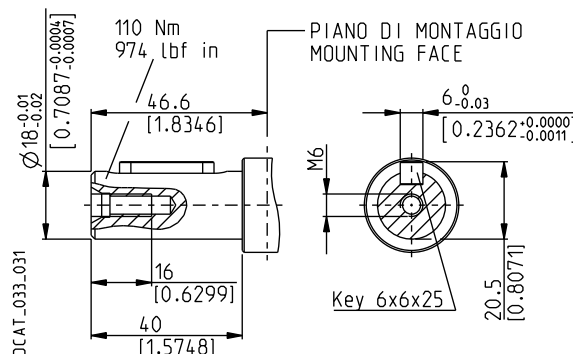
48

Only for version 5 with outboard bearing

Available in 0 version only with size:

20•20

Mounting face refer to flange code **E2**

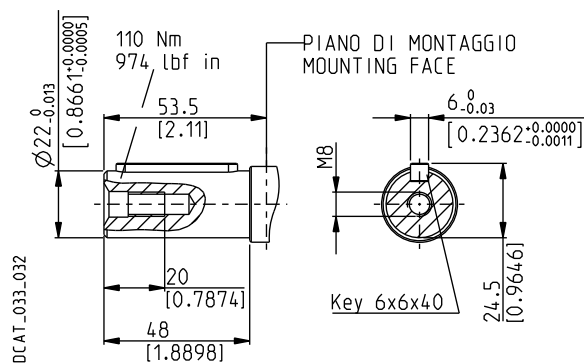


### STRAIGHT

B1

Only for version 5 and 8 with outboard bearing

Mounting face refer to flange code **E2**



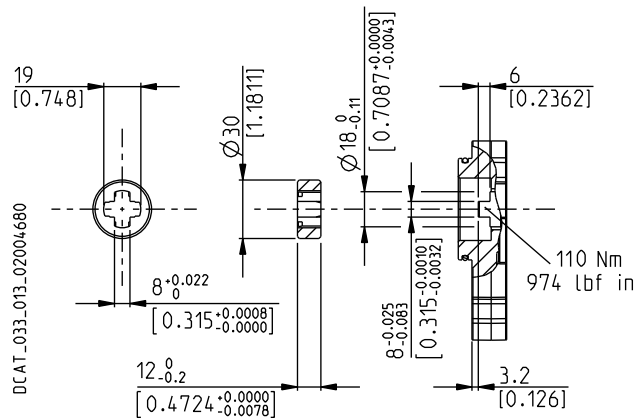
### TANG

95

Not available with size:

20•19 20•24,5

Mounting face refer to flange code **B6**



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## POLARIS 30

## DRIVE SHAFTS

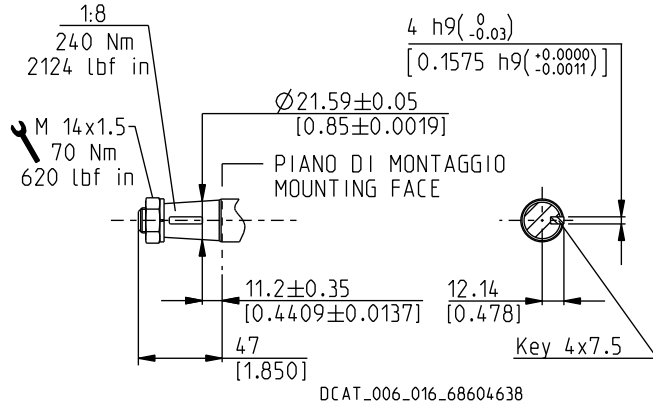
### EUROPEAN TAPERED 1:8

83

Not available with size:

30•82 30•90

Mounting face refer to flange code E3



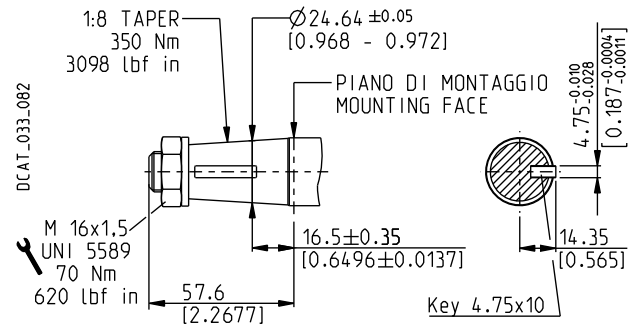
### EUROPEAN TAPERED 1:8

84

Not available with size:

30•22 30•34

Mounting face refer to flange code E4



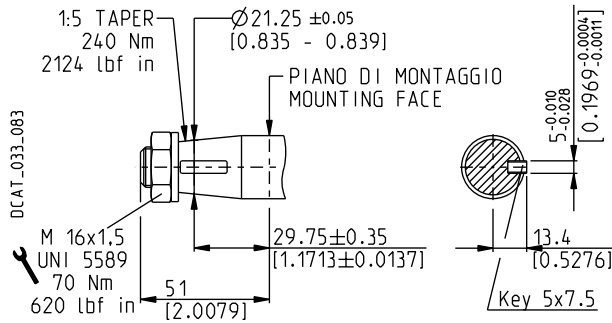
### GERMAN TAPERED 1:5

56

Not available with size:

30•61 30•73 30•82 30•90

Mounting face refer to flange code B3



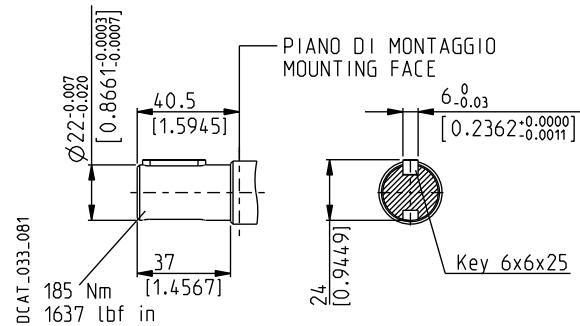
### STRAIGHT

41

Not available with size:

30•82 30•90

Mounting face refer to flange code E3



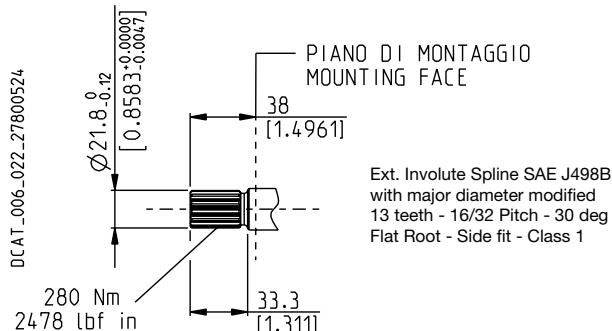
### SAE "B" SPLINE

A8

Not available with size:

30•82 30•90

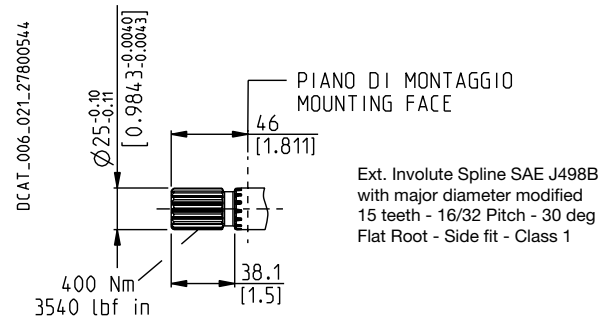
Mounting face refer to flange code U3



### SAE "BB" SPLINE

A5

Mounting face refer to flange code U3



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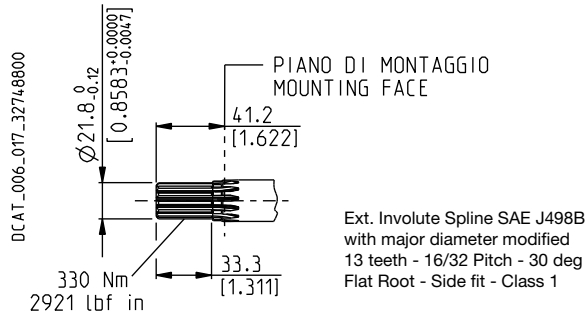
## POLARIS 30

## DRIVE SHAFTS

### SAE "B" SPLINE

04

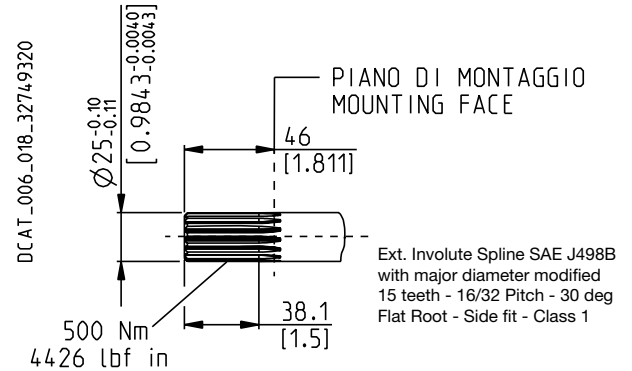
Mounting face refer to flange code **S5**



### SAE "BB" SPLINE

05

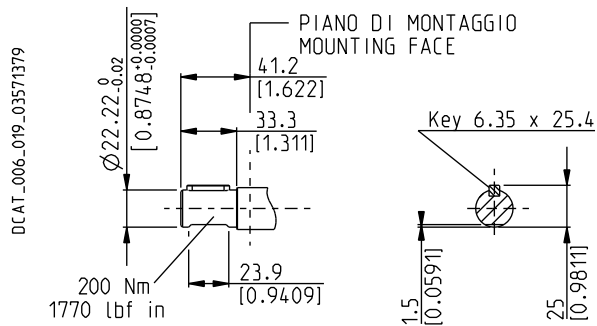
Mounting face refer to flange code **S5**



### SAE "B" STRAIGHT

32

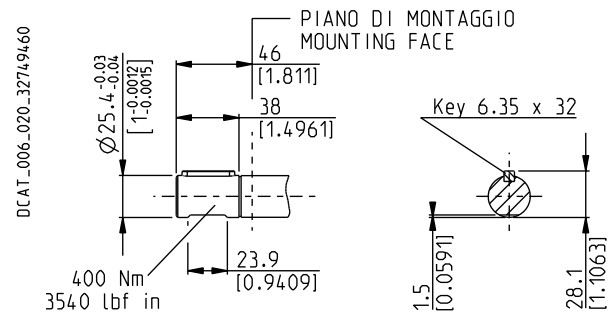
Mounting face refer to flange code **S5**



### SAE "BB" STRAIGHT

33

Mounting face refer to flange code **S5**



04/10.2020

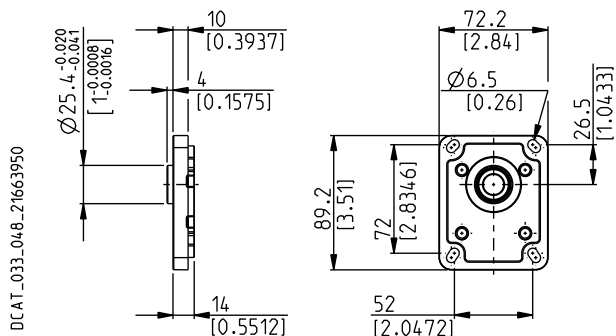
## POLARIS 10

## MOUNTING FLANGES AND TABLE OF COMPATIBILITY

### EUROPEAN

**E1**

Material: cast iron and aluminium



#### DRIVE SHAFTS

See page 52

| VERSIONS<br>See page 48 | 81 | 02 | 29 | 86 |
|-------------------------|----|----|----|----|
| 0                       | #  | X  | X  | X  |

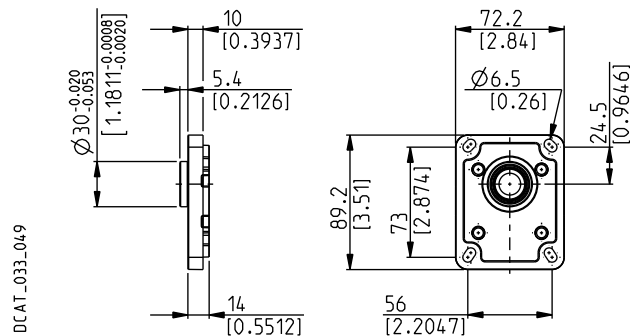
# Standard combination

X Available combination

### EUROPEAN

**E7**

Material: cast iron and aluminium



#### DRIVE SHAFTS

See page 52

| VERSIONS<br>See page 48 | 86 | 29 | 30 |
|-------------------------|----|----|----|
| 0                       | #  | X  | X  |

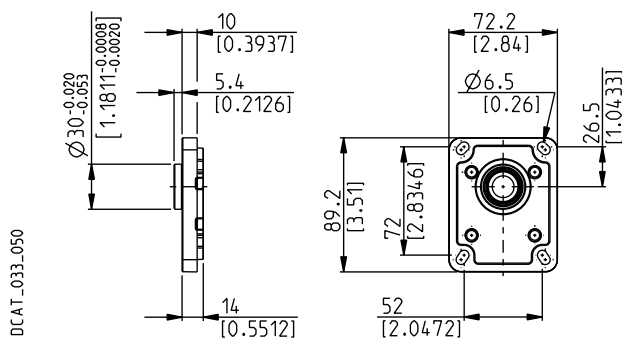
# Standard combination

X Available combination

### EUROPEAN

**E8**

Material: cast iron and aluminium



#### DRIVE SHAFTS

See page 52

| VERSIONS<br>See page 48 | 29 | 02 |
|-------------------------|----|----|
| 0                       | #  | X  |

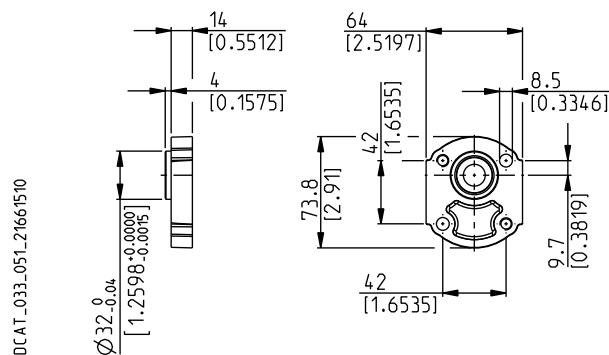
# Standard combination

X Available combination

### GERMAN 2 BOLTS

**B1**

Material: aluminium



#### DRIVE SHAFTS

See page 52

| VERSIONS<br>See page 48 | 30 | 86 |
|-------------------------|----|----|
| 0                       | #  | X  |

# Standard combination

X Available combination

02/07.2006

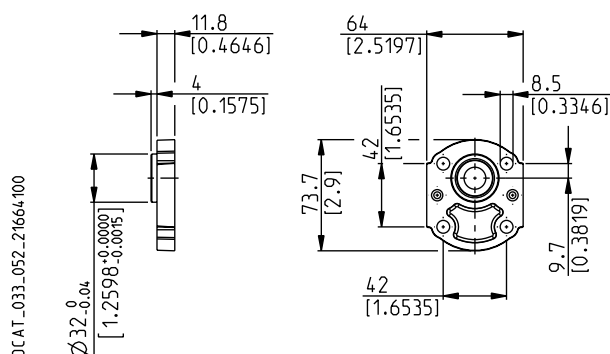
# POLARIS 10

# MOUNTING FLANGES AND TABLE OF COMPATIBILITY

## GERMAN 4 BOLTS

**K2**

Material: aluminium



### DRIVE SHAFTS

See page 52

| VERSIONS<br>See page 48 | 02 | 30 |
|-------------------------|----|----|
| 0                       | X  | X  |

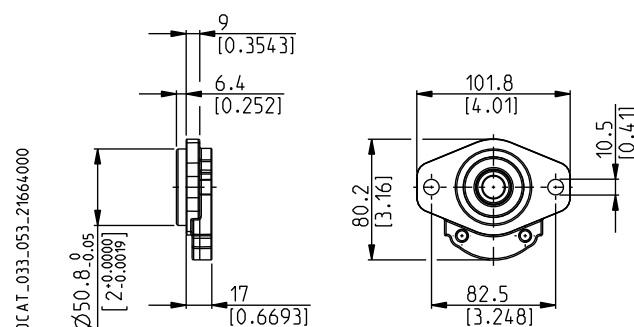
# Standard combination

X Available combination

## SAE "A-A" 2 BOLTS

**S0**

Material: cast iron and aluminium



### DRIVE SHAFTS

See page 52

| VERSIONS<br>See page 48 | 30 | 02 | 86 |
|-------------------------|----|----|----|
| 0                       | #  | X  | X  |

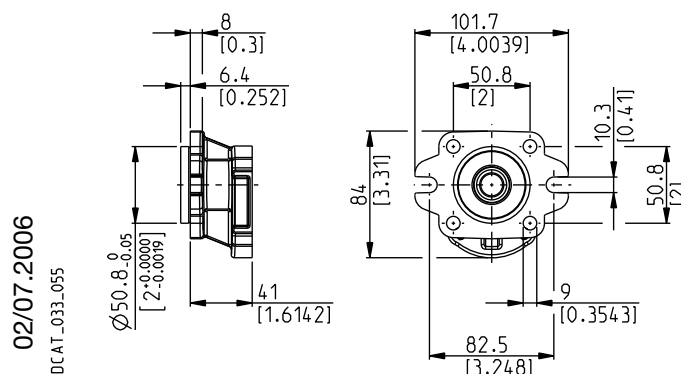
# Standard combination

X Available combination

## SAE "A-A" 2-4 BOLTS

**R9**

Material: cast iron



### DRIVE SHAFTS

See page 52

| VERSIONS<br>See page 48 | 02 | 30 | 36 |
|-------------------------|----|----|----|
| 0                       | #  | X  | #  |

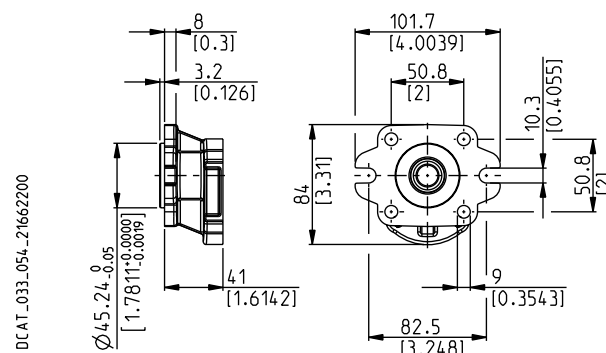
# Standard combination

X Available combination

## SAE 2-4 BOLTS

**R8**

Material: cast iron



### DRIVE SHAFTS

See page 52

| VERSIONS<br>See page 48 | 02 | 30 | 36 |
|-------------------------|----|----|----|
| 0                       | #  | X  | #  |

# Standard combination

X Available combination

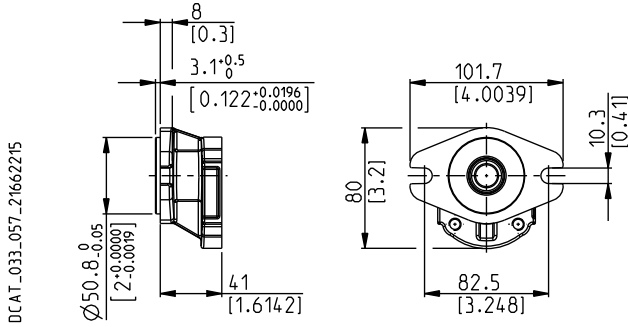
## POLARIS 10

## MOUNTING FLANGES AND TABLE OF COMPATIBILITY

### SAE 2 BOLTS

**W9**

Material: cast iron



### DRIVE SHAFTS

See page 52

### VERSIONS

See page 48

**36**

**0**

**#**

# Standard combination

X Available combination

02/07.2006

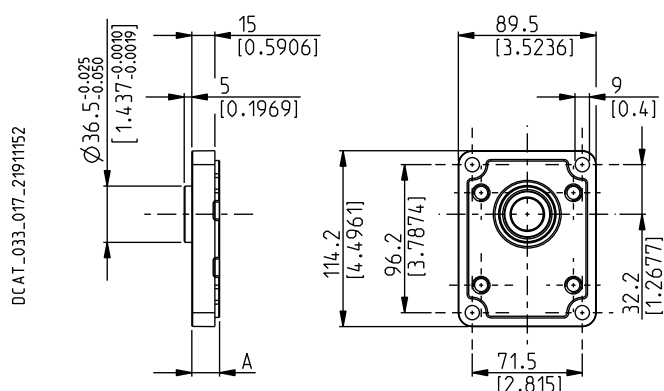
## POLARIS 20

## MOUNTING FLANGES AND TABLE OF COMPATIBILITY

### EUROPEAN

**E2**

Material: cast iron and aluminium



### DRIVE SHAFTS

See page 53 ÷ 55

| VERSIONS<br>See page 48 | A<br>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  |
| 5                       | 43,6 (1.7165) | #  |    | X  | X  |    |    |    |    | #  | X  | X  | X  |
| 7                       | 59,4 (2.3386) | #  |    |    |    |    |    |    |    |    |    |    |    |
| 8                       | 59,4 (2.3386) |    |    | #  |    |    |    |    |    |    |    |    |    |

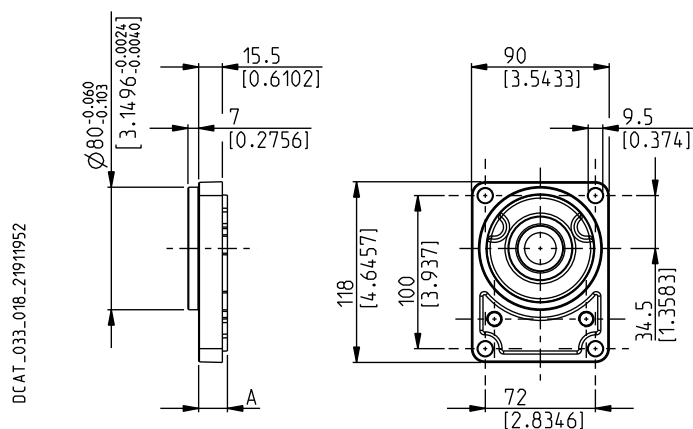
# Standard combination

X Available combination

### GERMAN

**B2**

Material: cast iron and aluminium



### DRIVE SHAFTS

See page 53 ÷ 55

| VERSIONS<br>See page 48 | A<br>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

04/10.2020

## POLARIS 20

## MOUNTING FLANGES AND TABLE OF COMPATIBILITY

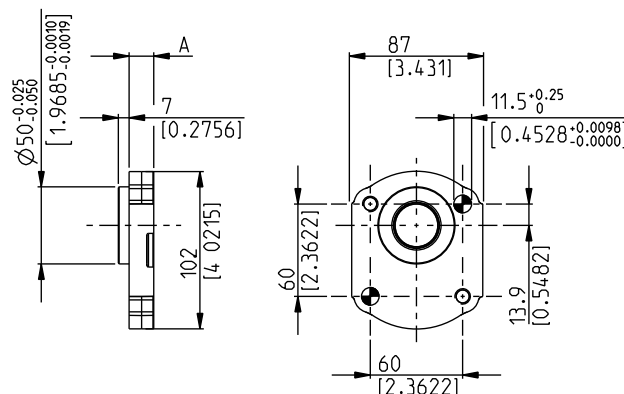
### GERMAN 2 BOLTS

**B4**

Material: cast iron and aluminium

⊕ Through hole

DCAT\_033\_020\_21912051



### DRIVE SHAFTS

See page 53 ÷ 55

| VERSIONS<br>See page 48 | A<br>mm (in)  | 54 | 03 | 12 | 31 | 49 | 82 |
|-------------------------|---------------|----|----|----|----|----|----|
| 0                       | 16 (0.63)     | #  | x  | x  | x  | x  | x  |
| 5                       | 41,6 (1.6378) | x  | x  |    |    | x  | x  |

# Standard combination

x Available combination

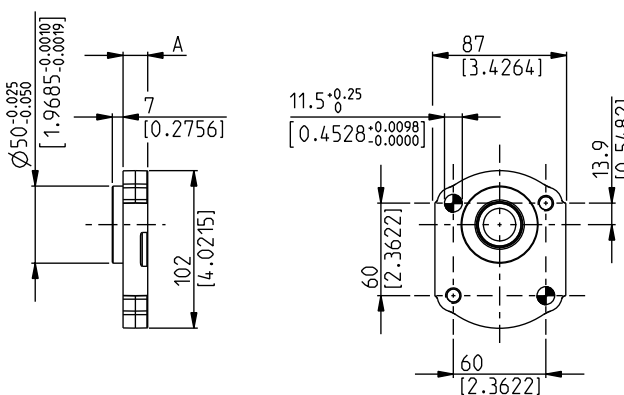
### GERMAN 2 BOLTS

**B5**

Material: cast iron and aluminium

⊕ Through hole

DCAT\_033\_021\_21912256



### DRIVE SHAFTS

See page 53 ÷ 55

| VERSIONS<br>See page 48 | A<br>mm (in)  | 54 | 03 | 12 | 31 | 49 | 82 |
|-------------------------|---------------|----|----|----|----|----|----|
| 0                       | 16 (0.63)     | #  | x  | x  | x  | x  | x  |
| 5                       | 41,6 (1.6378) | x  | x  |    |    | x  | x  |

# Standard combination

x Available combination

02/07.2006

## POLARIS 20

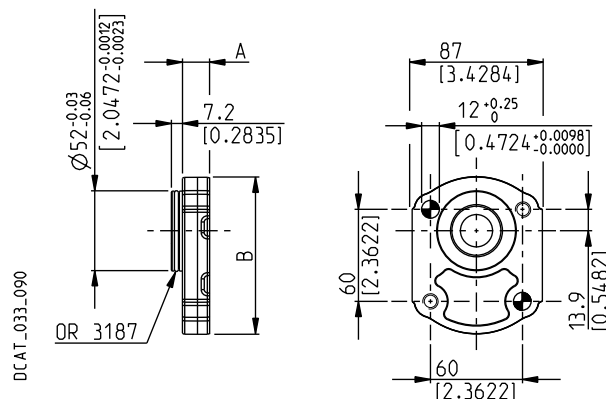
## MOUNTING FLANGES AND TABLE OF COMPATIBILITY

### GERMAN 2 BOLTS

**U2**

Material: cast iron and aluminium

⊕ Through hole



### DRIVE SHAFTS

See page 54 ÷ 55

| VERSIONS<br>See page 48 | A<br>mm (in)  | B<br>mm (in)     | 03 | 54 | 07 |
|-------------------------|---------------|------------------|----|----|----|
| <b>0</b>                | 17,7 (0.6968) | (◆) 102 (4.0157) | #  |    | X  |
| <b>5</b>                | 43,3 (1.747)  | (●) 105 (4.1339) |    | X  |    |

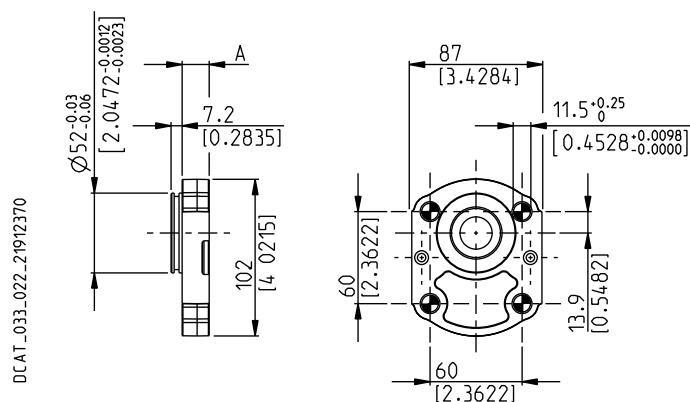
# Standard combination (◆) Aluminium  
X Available combination (●) Cast iron

### GERMAN 4 BOLTS

**B6**

Material: cast iron and aluminium

⊕ Through hole



### DRIVE SHAFTS

See page 54 ÷ 55

| VERSIONS<br>See page 48 | A<br>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

04/10.2020

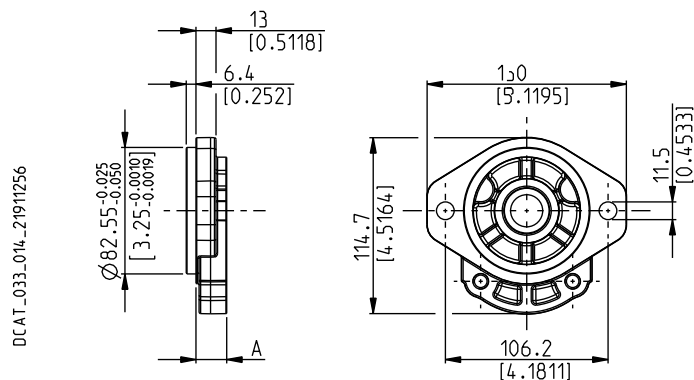
## POLARIS 20

## MOUNTING FLANGES AND TABLE OF COMPATIBILITY

### SAE "A" 2 BOLTS

**S1**

Material: cast iron and aluminium



#### DRIVE SHAFTS

See page 53 ÷ 55

| VERSIONS<br>See page 48 | A<br>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  |

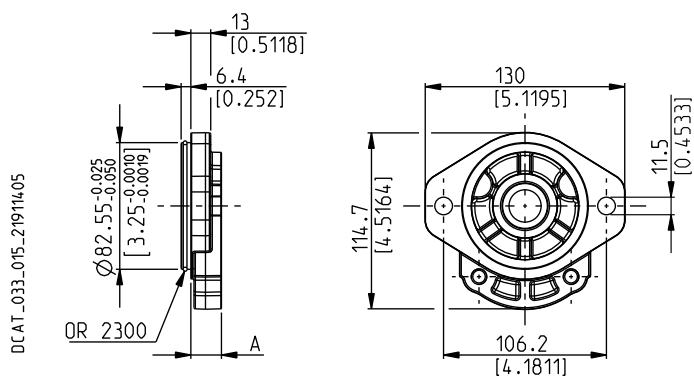
# Standard combination

x Available combination

### SAE "A" 2 BOLTS

**S2**

Material: cast iron and aluminium



#### DRIVE SHAFTS

See page 53 ÷ 55

| VERSIONS<br>See page 48 | A<br>mm (in)  | 01 | 03 | 04 | 07 | 12 | 31 | 32 | 46 | 49 | 50 | 54 | 82 |
|-------------------------|---------------|----|----|----|----|----|----|----|----|----|----|----|----|
| <b>0</b>                | 20 (0.7874)   | #  | #  | 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

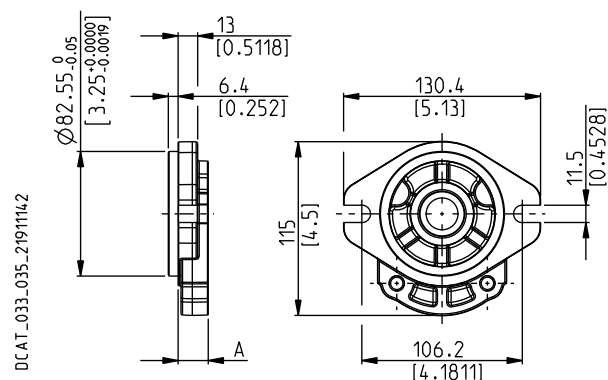
## POLARIS 20

## MOUNTING FLANGES AND TABLE OF COMPATIBILITY

### SAE "A" 2 BOLTS

**S9**

Material: cast iron and aluminium



#### DRIVE SHAFTS

See page 53 ÷ 55

| VERSIONS<br>See page 48 | A<br>mm (in)  | 01 | 03 | 04 | 07 | 12 | 31 | 32 | 46 | 49 | 50 | 54 | 82 |
|-------------------------|---------------|----|----|----|----|----|----|----|----|----|----|----|----|
| <b>0</b>                | 20 (0.7874)   | #  | #  | x  | #  | x  | #  | x  | x  | #  | x  | x  | x  |
| <b>5</b>                | 45,6 (1.7953) |    | x  |    |    |    |    |    |    | x  | x  | x  | x  |

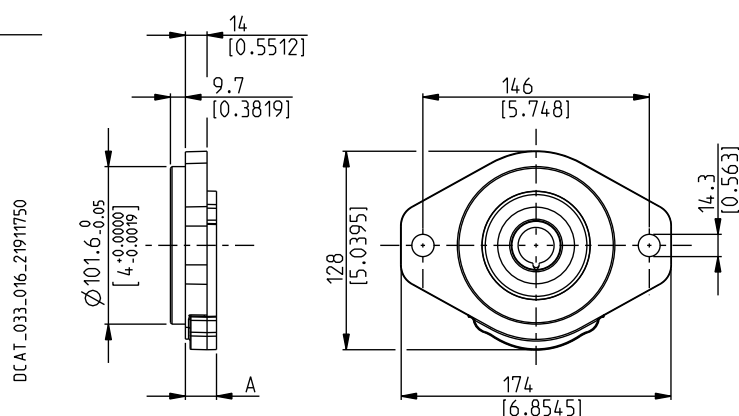
# Standard combination

x Available combination

### SAE "B" 2 BOLTS

**S5**

Material: cast iron



#### DRIVE SHAFTS

See page 54

| VERSIONS<br>See page 48 | A<br>mm (in)  | 04 | 32 | 49 |
|-------------------------|---------------|----|----|----|
| <b>0</b>                | 20 (0.7874)   | #  | #  | x  |
| <b>5</b>                | 45,6 (1.7953) |    |    | x  |

# Standard combination

x Available combination

02/07.2006

**POLARIS 20**

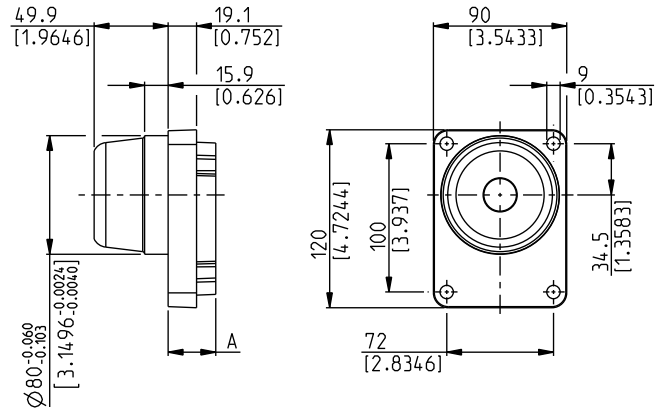
**MOUNTING FLANGES AND TABLE OF COMPATIBILITY**

**GERMAN**

**W8**

Material: cast iron

DCAT\_033\_034\_23260751



**DRIVE SHAFTS**

See page 53

**VERSIONS**

See page 48

**A**

mm (in)

**55**

**W8**

32,1 (1.2638)

**#**

# Standard combination

X Available combination

02/07.2006

## POLARIS 30

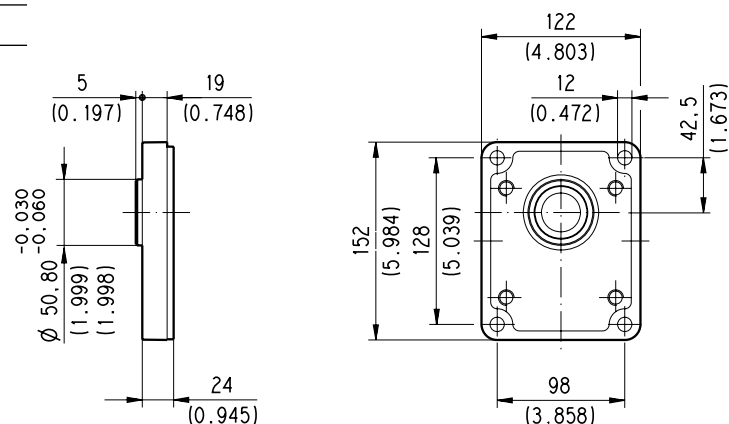
## MOUNTING FLANGES AND TABLE OF COMPATIBILITY

### EUROPEAN

**E3**

Material: cast iron

D033-199/0706



### DRIVE SHAFTS

See page 56 ÷ 57

| VERSIONS<br>See page 48 | 83 | 41 | 04 | 05 | 32 | 33 | A5 | A8 |
|-------------------------|----|----|----|----|----|----|----|----|
| 0                       | #  | #  | X  | X  | X  | X  | X  | X  |

# Standard combination

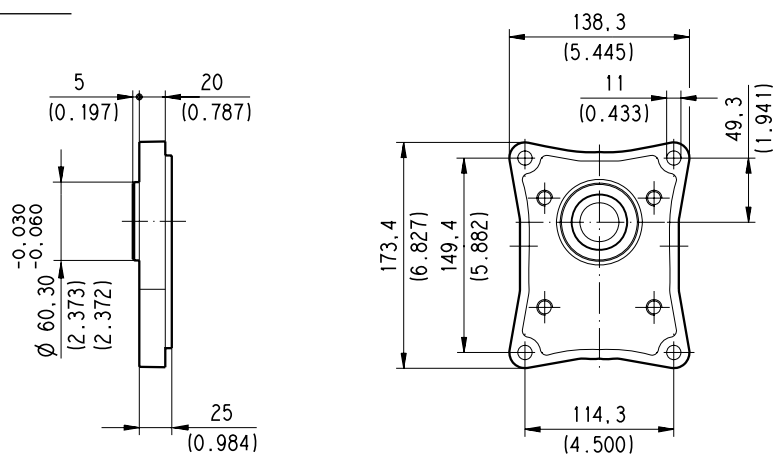
X Available combination

### EUROPEAN

**E4**

Material: cast iron

D033-200/0703



### DRIVE SHAFTS

See page 56

| VERSIONS<br>See page 48 | 84 | 41 | A5 | A8 |
|-------------------------|----|----|----|----|
| 0                       | #  | X  | X  | X  |

# Standard combination

X Available combination

02/07.2006

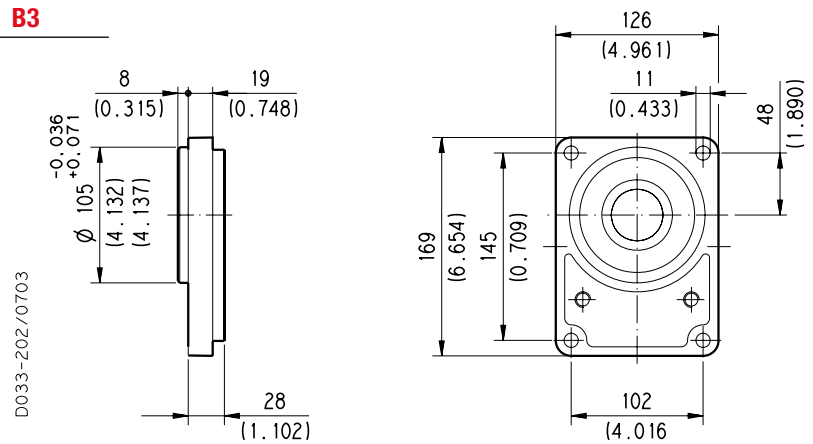
## POLARIS 30

## MOUNTING FLANGES AND TABLE OF COMPATIBILITY

### GERMAN

**B3**

Material: cast iron



**DRIVE SHAFTS**  
See page 56

| VERSIONS<br>See page 48 | 56 | 83 | A5 | A8 |
|-------------------------|----|----|----|----|
| <b>0</b>                | #  | X  | X  | X  |

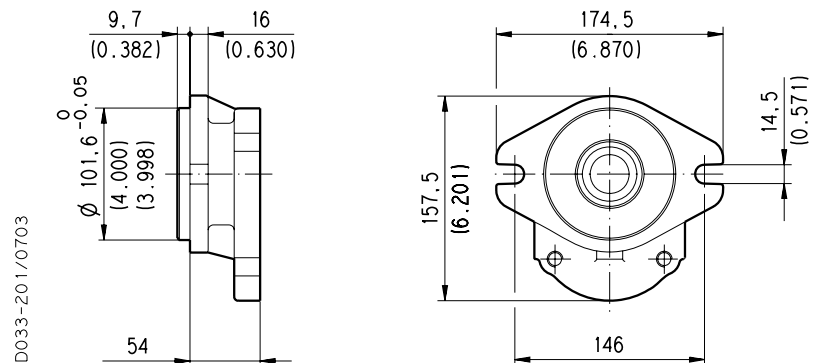
# Standard combination

X Available combination

### SAE "B" 2 BOLTS

**S5**

Material: cast iron



**DRIVE SHAFTS**  
See page 57

| VERSIONS<br>See page 48 | 04 | 05 | 32 | 33 |
|-------------------------|----|----|----|----|
| <b>0</b>                | #  | #  | #  | #  |

# Standard combination

X Available combination

02/07.2006

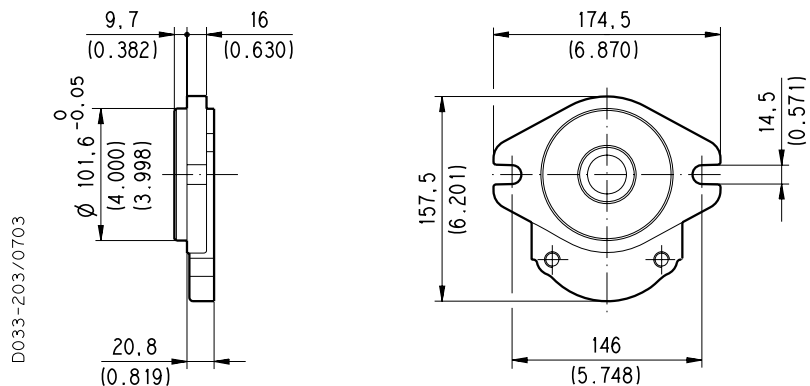
## POLARIS 30

## MOUNTING FLANGES AND TABLE OF COMPATIBILITY

### SAE "B" 2 BOLTS

**U3**

Material: cast iron



### DRIVE SHAFTS

See page 56

| VERSIONS<br>See page 48 | <b>A5</b> | <b>A8</b> | <b>83</b> |
|-------------------------|-----------|-----------|-----------|
| <b>0</b>                | #         | #         | x         |

# Standard combination

x Available combination

02/07.2006

## PORTS POSITION AND TYPE

| PORTS<br>TYPE      | SIDE PORTS |     |          |     |           |     |          |     |          |     |         |     | REAR PORTS |     |         |     |
|--------------------|------------|-----|----------|-----|-----------|-----|----------|-----|----------|-----|---------|-----|------------|-----|---------|-----|
|                    | German     |     | European |     | Split SSM |     | Spit SSS |     | Gas BSPP |     | SAE ODT |     | Gas BSPP   |     | SAE ODT |     |
| Pump type          | IN         | OUT | IN       | OUT | IN        | OUT | IN       | OUT | IN       | OUT | IN      | OUT | IN         | OUT | IN      | OUT |
| Motor type         | OUT        | IN  | OUT      | IN  | OUT       | IN  | OUT      | IN  | OUT      | IN  | OUT     | IN  | OUT        | IN  | OUT     | IN  |
| <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•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  |            |     |         |     |

01/10.2003

## EXTERNAL DRAIN PORTS

| IN/OUT<br>PORTS TYPE | SIDE PORTS |          |           |          |          |         | REAR PORTS |         |
|----------------------|------------|----------|-----------|----------|----------|---------|------------|---------|
|                      | German     | European | Split SSM | Spit 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

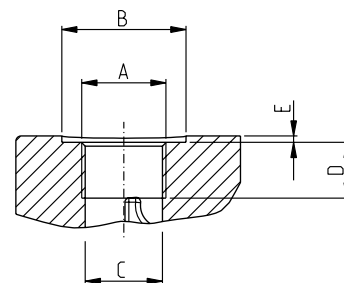
### GAS STRAIGHT THREAD PORTS

**BSPP**

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

| CODE      | NOMINAL<br>SIZE | A     | Ø B              | Ø C              | D              | E               |  |
|-----------|-----------------|-------|------------------|------------------|----------------|-----------------|-------------------------------------------------------------------------------------|
|           |                 |       | mm<br>(in)       | mm<br>(in)       | mm<br>(in)     | mm<br>(in)      |                                                                                     |
| <b>GA</b> | 1/8"            | G 1/8 | 16,5<br>(0.6496) | 8,75<br>(0.3444) | 12<br>(0.4724) | 1<br>(0.0394)   | 5 <sup>+0,25</sup><br>(44 ÷ 46)                                                     |
| <b>GB</b> | 1/4"            | G 1/4 | 21,5<br>(0.8465) | 12<br>(0.4724)   | 15<br>(0.5906) | 1,5<br>(0.0591) | 15 <sup>+1</sup><br>(133 ÷ 142)                                                     |

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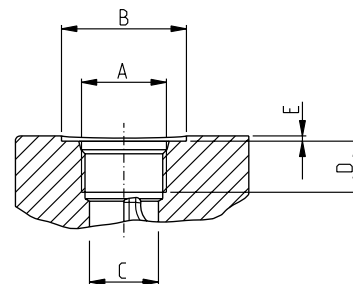
### METRIC STRAIGHT THREAD PORTS ISO 6149

**METRIC**

Metric thread ISO 60° conforms to ISO/R 262

| CODE      | A      | Ø B            | Ø C           | D              | E               |  |
|-----------|--------|----------------|---------------|----------------|-----------------|-------------------------------------------------------------------------------------|
|           |        | mm<br>(in)     | mm<br>(in)    | mm<br>(in)     | mm<br>(in)      |                                                                                     |
| <b>TA</b> | M 10x1 | 22<br>(0.8661) | 9<br>(0.3543) | 13<br>(0.5118) | 0,5<br>(0.0197) | 10 <sup>+0,5</sup><br>(89 ÷ 93)                                                     |

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### SAE STRAIGHT THREAD PORTS J514

**ODT**

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

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

Other drain ports are shown on subsequent pages.

## PORTS SIZE



Tightening torque for low pressure side port.



Tightening torque for high pressure side port.

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

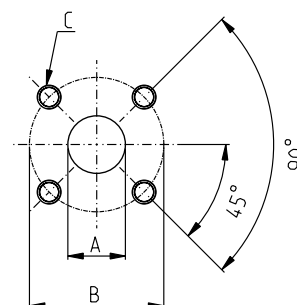
### GERMAN FLANGED PORTS - 4 Bolts

**GERMAN**

Metric thread ISO 60° conforms to ISO/R 262

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

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### EUROPEAN FLANGED PORTS - 4 Bolts

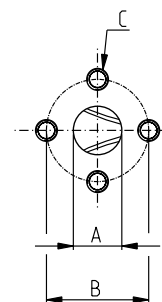
**EUROPEAN**

Metric thread ISO 60° conforms to ISO/R 262

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

(◆) For POLARIS 30

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01/10.2003

## PORTS SIZES



Tightening torque for low pressure side port.



Tightening torque for high pressure side port.

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

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

**SSM**

Metric thread ISO 60° to ISO/R 262

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

(◆) For POLARIS 30

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

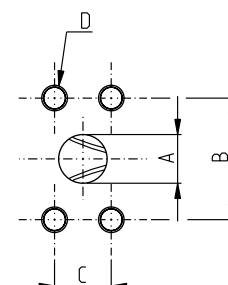
**SSS**

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

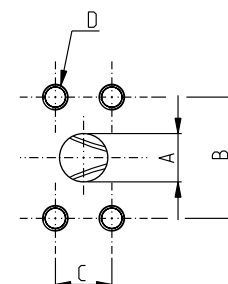
| CODE      | A                | B                | C                | D                       |  |  |
|-----------|------------------|------------------|------------------|-------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------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

(◆) For POLARIS 30

DCAT\_006\_025\_21064252



DCAT\_006\_028\_21060740



01/10.2003

## PORTS SIZE



Tightening torque for low pressure side port.



Tightening torque for high pressure side port.

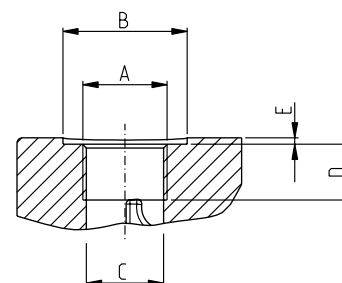
For reversible rotation, please consult only the tightening torque for high pressure side port.

### GAS STRAIGHT THREAD PORTS

**BSPP**

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

DCAT\_006\_026\_21064779



| CODE      | Nominal size | A       | Ø B                | Ø C              | D                  | E                 |  |  |
|-----------|--------------|---------|--------------------|------------------|--------------------|-------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|           |              |         | mm<br>(in)         | mm<br>(in)       | mm<br>(in)         | mm<br>(in)        | Nm<br>(lbf in)                                                                      | Nm<br>(lbf in)                                                                      |
| <b>GC</b> | 3/8"         | G 3/8   | 30 (#)<br>(1.1811) | 15<br>(0.5906)   | 10 (#)<br>(0.3937) | 2 (#)<br>(0.0787) | 15 <sup>+1</sup> (#)<br>(133 ÷ 142)                                                 | —                                                                                   |
|           |              |         | —                  |                  | 14<br>(0.5512)     | —                 | 15 <sup>+1</sup><br>(133 ÷ 142)                                                     | 25 <sup>+1</sup><br>(221 ÷ 230)                                                     |
| <b>GD</b> | 1/2"         | G 1/2   | —                  | 19<br>(0.7480)   | 14<br>(0.5512)     | —                 | 20 <sup>+1</sup><br>(177 ÷ 186)                                                     | 50 <sup>+2.5</sup><br>(443 ÷ 465)                                                   |
|           |              |         |                    |                  | 17 (◆)<br>(0.6693) |                   |                                                                                     |                                                                                     |
| <b>GE</b> | 3/4"         | G 3/4   | —                  | 24,5<br>(0.9646) | 18<br>(0.7087)     | —                 | 30 <sup>+2.5</sup><br>(266 ÷ 288)                                                   | 90 <sup>+5</sup><br>(797 ÷ 841)                                                     |
| <b>GF</b> | 1"           | G 1     | —                  | 30,5<br>(1.2008) | 18<br>(0.7086)     | —                 | 50 <sup>+2.5</sup><br>(443 ÷ 465)                                                   | 130 <sup>+10</sup><br>(1151 ÷ 1239)                                                 |
| <b>GG</b> | 1" 1/4       | G 1 1/4 | —                  | 39<br>(1.5354)   | 22<br>(0.8661)     | —                 | 60 <sup>+5</sup><br>(531 ÷ 575)                                                     | 170 <sup>+10</sup><br>(1505 ÷ 1593)                                                 |
| <b>GH</b> | 1" 1/2       | G 1 1/2 | —                  | 45<br>(1.7716)   | 24<br>(0.9448)     | —                 | 70 <sup>+5</sup><br>(620 ÷ 664)                                                     | 210 <sup>+15</sup><br>(1859 ÷ 1992)                                                 |

(#) = Drain port

(◆) For POLARIS 20

02/07.2006

## PORTS SIZES



Tightening torque for low pressure side port.



Tightening torque for high pressure side port.

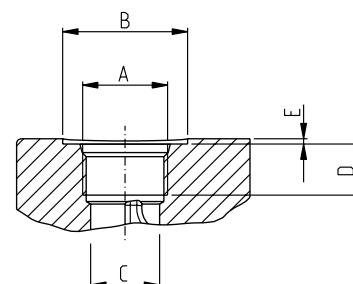
For reversible rotation, please consult only the tightening torque for high pressure side port.

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

(#) = Drain port

(◆) For POLARIS 10

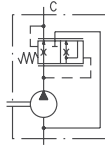
01/10.2003

## VALVE OPTIONS

### PRIORITY VALVE

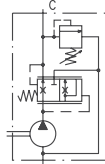
**P1**

Costant delivery and internal recirculation of excess flow.



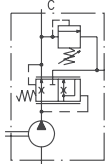
**P2**

Costant delivery at controlled pressure. Internal recirculation of excess flow and drain valve.



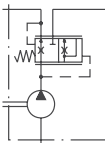
**P3**

Costant delivery at controlled pressure. Excess flow and drain valve must be connected to tank.



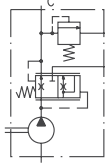
**P4**

Costant delivery and excess flow can both be used under load.



**P5T**

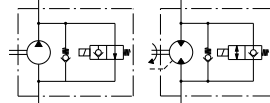
Costant delivery at controlled pressure with drain valve connected to tank. Excess flow can be used under load.



### ELECTRIC VALVE

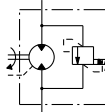
**UNL...**

By-pass valve with anti-cavitation valve.



**PRV...**

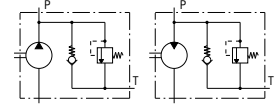
Proportional relief valve.



### MAX PRESSURE RELIEF VALVE

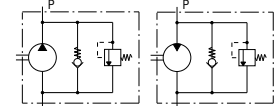
**VPEF...**

Fixed setting with external drain.



**VPIF...**

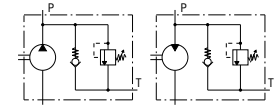
Fixed setting with internal drain.



**O**

**VPER...**

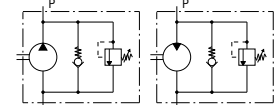
Adjustable setting with external drain.



**O**

**VPIR...**

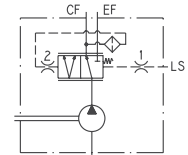
Adjustable setting with internal drain.



### LOAD SENSING VALVE

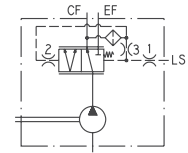
...

Static.



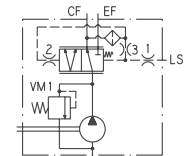
...

Dynamic.



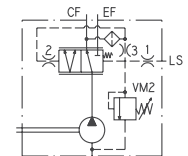
...

Dynamic with relief valve fitted on the main line.



...

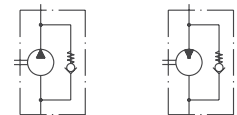
Dynamic with relief valve fitted on controlled line.



### CHECK VALVE

**V8**

Anti-cavitation valve.



Replaces: 05/04.2023

06/02.2024

Please refer to our built-in valves and fan drive technical catalogues for more information.

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## NOTES

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04/10.2020

## HOW TO ORDER POLARIS 10 SINGLE UNITS

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

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

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

| 3                        | Versions - Outboard bearing options | Code     |
|--------------------------|-------------------------------------|----------|
| Without outboard bearing |                                     | <b>0</b> |

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

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

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

| Code                                    | Ports IN/OUT | 7                         |
|-----------------------------------------|--------------|---------------------------|
| <b>GERMAN FLANGED PORTS</b>             |              |                           |
| Side                                    | Rear         | Type                      |
| <b>BB/BA</b>                            | PLP 10       | 1-1,5-2-2,5-3,15          |
| <b>BA/BB</b>                            | PLM 10       | 4-5-5,8-6,3-8-10          |
| <b>GAS STRAIGHT THREAD PORTS (BSPP)</b> |              |                           |
| Side                                    | Rear         | Type                      |
| <b>GC/GC</b>                            | <b>GC/GC</b> | PLP 10 1-1,5-2-2,5-3,15-4 |
|                                         |              | PLM 10                    |
| <b>GD/GD</b>                            | <b>GD/GD</b> | PLP 10 5-5,8-6,3-8-10     |
|                                         |              | PLM 10                    |
| <b>SAE STRAIGHT THREAD PORTS (ODT)</b>  |              |                           |
| Side                                    | Rear         | Type                      |
| <b>OB/OA</b>                            | <b>OB/OA</b> | PLP 10 1-1,5-2-2,5-3,15-4 |
| <b>OA/OB</b>                            | <b>OA/OB</b> | PLM 10 5-5,8-6,3          |
| <b>OC/OB</b>                            | <b>OB/OB</b> | PLP 10 8-10               |
| <b>OB/OC</b>                            | <b>OB/OB</b> | PLM 10                    |

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

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

| Code      | Shaft seal options            | 10 |
|-----------|-------------------------------|----|
| <b>D</b>  | Standard seal with wiper seal |    |
| <b>C1</b> | High back pressure seal       |    |

04/10.2020

## HOW TO ORDER POLARIS 10 SINGLE UNITS

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

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

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

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

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## HOW TO ORDER POLARIS 20 SINGLE UNITS

|          |   |   |   |    |    |   |   |       |    |    |    |    |   |   |   |   |    |   |    |
|----------|---|---|---|----|----|---|---|-------|----|----|----|----|---|---|---|---|----|---|----|
| 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  |
|------------------------------|------|-------------|-------------|
| 4,95 cm³/rev (0.30 in³/rev)  |      | PLP 20-4    | PLM 20-4    |
| 6,61 cm³/rev (0.40 in³/rev)  |      | PLP 20-6,3  | PLM 20-6,3  |
| 7,29 cm³/rev (0.44 in³/rev)  |      | PLP 20-7,2  | PLM 20-7,2  |
| 8,26 cm³/rev 0.50 in³/rev)   |      | PLP 20-8    | PLM 20-8    |
| 9,17 cm³/rev 0.56 in³/rev)   |      | PLP 20-9    | PLM 20-9    |
| 10,9 cm³/rev (0.66 in³/rev)  |      | PLP 20-10,5 | PLM 20-10,5 |
| 11,23 cm³/rev (0.69 in³/rev) |      | PLP 20-11,2 | PLM 20-11,2 |
| 14,53 cm³/rev (0.89 in³/rev) |      | PLP 20-14   | PLM 20-14   |
| 16,85 cm³/rev (1.03 in³/rev) |      | PLP 20-16   | PLM 20-16   |
| 19,09 cm³/rev (1.16 in³/rev) |      | PLP 20-19   | PLM 20-19   |
| 21,14 cm³/rev (1.29 in³/rev) |      | PLP 20-20   | PLM 20-20   |
| 24,84 cm³/rev 1.52 in³/rev)  |      | PLP 20-24,5 | PLM 20-24,5 |
| 26,42 cm³/rev (1.61 in³/rev) |      | PLP 20-25   | PLM 20-25   |
| 28,21 cm³/rev (1.72 in³/rev) |      | PLP 20-27,8 | PLM 20-27,8 |
| 33,03 cm³/rev (2.01 in³/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                        | Versions - Outboard bearing options | Code |
|--------------------------|-------------------------------------|------|
| Without outboard bearing |                                     | 0    |
| With outboard bearing    |                                     | W8   |
| With outboard bearing    |                                     | 5    |
| With outboard bearing    |                                     | 6    |
| With outboard bearing    |                                     | 7    |
| 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 (for version 5 and 8) |   |
| 95   | Tang                           |   |

| Code | Mounting flange | 5 |
|------|-----------------|---|
| E2   | European        |   |
| B2   | German          |   |
| B4   | German 2 bolt   |   |
| B5   | German 2 bolt   |   |
| B6   | German 4 bolt   |   |
| U2   | German 2 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       | 14-16-19-20-24,5-25-27,8-31,5                         |
| EA/EB                  | PLM 20       |                                                       |

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## HOW TO ORDER POLARIS 20 SINGLE UNITS

| 7                                | Ports IN/OUT |       | Code  |
|----------------------------------|--------------|-------|-------|
| SAE FLANGED PORTS (SSM)          |              |       |       |
| Type                             |              | Side  | Rear  |
| 4-6,3-7,2-8-9-10,5-11,2          | PLP 20       | MA/MA |       |
|                                  | PLM 20       |       |       |
| 14-16-19-20                      | PLP 20       | MB/MA |       |
|                                  | PLM 20       |       | MA/MB |
| 24,5-25-27,8-31,5                | PLP 20       | MC/MB |       |
|                                  | PLM 20       |       | MB/MC |
| SAE FLANGED PORTS (SSS)          |              |       |       |
| Type                             |              | Side  | Rear  |
| 4-6,3-7,2-8-9-10,5-11,2          | PLP 20       | SA/SA |       |
|                                  | PLM 20       |       |       |
| 14-16-19-20                      | PLP 20       | SB/SA |       |
|                                  | PLM 20       |       | SA/SB |
| 24,5-25-27,8-31,5                | PLP 20       | SC/SB |       |
|                                  | PLM 20       |       | SB/SC |
| GAS STRAIGHT THREAD PORTS (BSPP) |              |       |       |
| Type                             |              | Side  | Rear  |
| 4-6,3-7,2-8-9-10,5-11,2          | PLP 20       | GD/GD | GD/GD |
|                                  | PLM 20       |       |       |
| 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                             |              | Side  | Rear  |
| 4-6,3-7,2-8-9-10,5-11,2          | PLP 20       | OC/OC | OC/OC |
|                                  | PLM 20       |       |       |
| 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)                                         | <b>N</b>    |
|   | Viton                                                   | <b>V</b>    |
|   | Hydrogenated buna HNBR seals with Viton-FKM shaft seals | <b>T-PV</b> |

| 9 | Cover options (b)                                  | Code      |
|---|----------------------------------------------------|-----------|
|   | Cast iron mounting flange and rear cover (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      |
|----|-------------------------------|-----------|
|    | Standard seal with wiper seal | <b>D</b>  |
|    | High back pressure seal       | <b>C1</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     | 4-6,3-7,2-8-9-10,5-11,2-24,5-25-27,8-31,5 |
|                                    | PLM 20     |                                           |

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

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

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

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

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

| 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 ÷ 66  
Rear cover material on page 34 ÷ 35

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## HOW TO ORDER POLARIS 30 SINGLE UNITS

|           |   |   |   |    |    |   |   |       |    |   |   |   |   |    |
|-----------|---|---|---|----|----|---|---|-------|----|---|---|---|---|----|
| 1         | 2 | 3 | 4 | 5  | 6  | 7 | 8 | 9     | 10 |   |   |   |   |    |
| PLP 30-22 | R | 0 | - | 83 | E3 | - | L | ED/EB | -  | N | - | C | - | FS |

| 1                            | Type | Pump type        | Motor type       |
|------------------------------|------|------------------|------------------|
| 21,99 cm³/rev (1.34 in³/rev) |      | <b>PLP 30-22</b> | <b>PLM 30-22</b> |
| 26,70 cm³/rev (1.63 in³/rev) |      | <b>PLP 30-27</b> | <b>PLM 30-27</b> |
| 34,55 cm³/rev (2.11 in³/rev) |      | <b>PLP 30-34</b> | <b>PLM 30-34</b> |
| 39,27 cm³/rev (2.40 in³/rev) |      | <b>PLP 30-38</b> | <b>PLM 30-38</b> |
| 43,98 cm³/rev (2.68 in³/rev) |      | <b>PLP 30-43</b> | <b>PLM 30-43</b> |
| 51,83 cm³/rev (3.16 in³/rev) |      | <b>PLP 30-51</b> | <b>PLM 30-51</b> |
| 61,26 cm³/rev (3.74 in³/rev) |      | <b>PLP 30-61</b> | <b>PLM 30-61</b> |
| 73,82 cm³/rev (4.50 in³/rev) |      | <b>PLP 30-73</b> | <b>PLM 30-73</b> |
| 81,68 cm³/rev (4.98 in³/rev) |      | <b>PLP 30-82</b> | <b>PLM 30-82</b> |
| 91,10 cm³/rev (5.56 in³/rev) |      | <b>PLP 30-90</b> | <b>PLM 30-90</b> |

| 2                              | Rotation | Code     |
|--------------------------------|----------|----------|
| Left                           |          | <b>S</b> |
| Right                          |          | <b>D</b> |
| Reversible rear external drain |          | <b>R</b> |

| 3                        | Versions - Outboard bearing options | Code     |
|--------------------------|-------------------------------------|----------|
| Without outboard bearing |                                     | <b>0</b> |

| 4                    | Drive shaft | Code      |
|----------------------|-------------|-----------|
| European tapered 1:8 |             | <b>83</b> |
| European tapered 1:8 |             | <b>84</b> |
| German tapered 1:5   |             | <b>56</b> |
| Straight             |             | <b>41</b> |
| SAE "B" spline       |             | <b>A8</b> |
| SAE "BB" spline      |             | <b>A5</b> |
| SAE "B" spline       |             | <b>04</b> |
| SAE "BB" spline      |             | <b>05</b> |
| SAE "B" straight     |             | <b>32</b> |
| SAE "BB" straight    |             | <b>33</b> |

| 5              | Mounting flange | Code      |
|----------------|-----------------|-----------|
| European       |                 | <b>E3</b> |
| European       |                 | <b>E4</b> |
| German         |                 | <b>B3</b> |
| SAE "B" 2 bolt |                 | <b>S5</b> |
| SAE "B" 2 bolt |                 | <b>U3</b> |

| 6    | Ports position | Code     |
|------|----------------|----------|
| Side |                | <b>L</b> |

| Code                                    | Ports IN/OUT         | 7 |
|-----------------------------------------|----------------------|---|
| <b>GERMAN FLANGED PORTS</b>             |                      |   |
| Side                                    | Type                 |   |
| <b>BM/BL</b> PLP 30                     | 22-27-34-38-43       |   |
| <b>BL/BM</b> PLM 30                     | 46-51-61-73-82-90    |   |
| <b>EUROPEAN FLANGED PORTS</b>           |                      |   |
| Side                                    | Type                 |   |
| <b>ED/EB</b> PLP 30                     | 22-27-34-38-43       |   |
| <b>EB/ED</b> PLM 30                     | 46-51-61             |   |
| <b>EF/ED</b> PLP 30                     | 73-82-90             |   |
| <b>ED/EF</b> PLM 30                     |                      |   |
| <b>SAE FLANGED PORTS (SSM)</b>          |                      |   |
| Side                                    | Type                 |   |
| <b>MB/MA</b> PLP 30                     | 22                   |   |
| <b>MA/MB</b> PLM 30                     |                      |   |
| <b>MC/MB</b> PLP 30                     | 27-34                |   |
| <b>MB/MC</b> PLM 30                     |                      |   |
| <b>MD/MC</b> PLP 30                     | 38-43-46-51          |   |
| <b>MC/MD</b> PLM 30                     |                      |   |
| <b>ME/MD</b> PLP 30                     | 61-73-82             |   |
| <b>MD/ME</b> PLM 30                     |                      |   |
| <b>MF/ME</b> PLP 30                     | 90                   |   |
| <b>ME/MF</b> PLM 30                     |                      |   |
| <b>SAE FLANGED PORTS (SSS)</b>          |                      |   |
| Side                                    | Type                 |   |
| <b>SB/SA</b> PLP 30                     | 22                   |   |
| <b>SA/SB</b> PLM 30                     |                      |   |
| <b>SC/SB</b> PLP 30                     | 27-34                |   |
| <b>SB/SC</b> PLM 30                     |                      |   |
| <b>SD/SC</b> PLP 30                     | 38-43-46-51          |   |
| <b>SC/SB</b> PLM 30                     |                      |   |
| <b>SE/SD</b> PLP 30                     | 61-73-82             |   |
| <b>SD/SE</b> PLM 30                     |                      |   |
| <b>SF/SE</b> PLP 30                     | 90                   |   |
| <b>SE/SF</b> PLM 30                     |                      |   |
| <b>GAS STRAIGHT THREAD PORTS (BSPP)</b> |                      |   |
| Side                                    | Type                 |   |
| <b>GF/GF</b> PLP 30                     | 22-27-34-38-43-46-51 |   |
| <b>GF/GF</b> PLM 30                     |                      |   |
| <b>GG/GF</b> PLP 30                     | 61-73                |   |
| <b>GF/GG</b> PLM 30                     |                      |   |
| <b>GH/GG</b> PLP 30                     | 82-90                |   |
| <b>GG/GH</b> PLM 30                     |                      |   |

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## HOW TO ORDER POLARIS 30 SINGLE UNITS

| 7                                      | Ports IN/OUT | Code         |
|----------------------------------------|--------------|--------------|
| <b>SAE STRAIGHT THREAD PORTS (ODT)</b> |              |              |
|                                        | Type         | Rear         |
| 22-27-34                               | PLP 30       | <b>OF/OD</b> |
|                                        | PLM 30       | <b>OD/OF</b> |
| 38-43-46-51                            | PLP 30       | <b>OG/OF</b> |
|                                        | PLM 30       | <b>OF/OG</b> |
| 61-73-82-90                            | PLP 30       | <b>OH/OG</b> |
|                                        | PLM 30       | <b>OG/OH</b> |

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

| 9 | Shaft seal options            | Code      |
|---|-------------------------------|-----------|
|   | Standard seal with wiper seal | <b>D</b>  |
|   | High back pressure seal       | <b>C1</b> |

| 10 | Shaft arrangement | Code      |
|----|-------------------|-----------|
|    | Female spline     | <b>FS</b> |

- (a) Choose the seals according to the temperature shown on page 5.

## HOW TO ORDER POLARIS 10 MULTIPLE PUMPS

|                      |   |    |    |       |       |       |   |   |    |    |                 |
|----------------------|---|----|----|-------|-------|-------|---|---|----|----|-----------------|
| 1                    | 2 | 3  | 4  | 5     | 6     | 7     | 8 | 9 | 10 | 11 | 12              |
| PLP 10-1             | - | 81 | E1 | -     | L     | BA/BA | / |   |    |    |                 |
| Front section        |   |    |    |       |       |       |   |   |    |    |                 |
| 10-1                 | - |    |    | L     | BA/BA | /     |   |   |    |    |                 |
| Intermediate section |   |    |    |       |       |       |   |   |    |    |                 |
| 10-1                 | - |    | L  | **/BA | -     | V7    | - | S | 0  | -  | N - EL - C / FS |
| Rear section         |   |    |    |       |       |       |   |   |    |    |                 |

| 1                                                      | Type | Pump type   |
|--------------------------------------------------------|------|-------------|
| 0.07 in <sup>3</sup> /rev (1,07 cm <sup>3</sup> /rev)  |      | PLP 10-1    |
| 1,60 cm <sup>3</sup> /rev (0.10 in <sup>3</sup> /rev)  |      | PLP 10-1,5  |
| 2,13 cm <sup>3</sup> /rev (0.13 in <sup>3</sup> /rev)  |      | PLP 10-2    |
| 2,67 cm <sup>3</sup> /rev 0.16 in <sup>3</sup> /rev)   |      | PLP 10-2,5  |
| 3,34 cm <sup>3</sup> /rev (0.20 in <sup>3</sup> /rev)  |      | PLP 10-3,15 |
| 4,27 cm <sup>3</sup> /rev 0.26 in <sup>3</sup> /rev)   |      | PLP 10-4    |
| 5,34 cm <sup>3</sup> /rev (0.33 in <sup>3</sup> /rev)  |      | PLP 10-5    |
| 6,20 cm <sup>3</sup> /rev (0.38 in <sup>3</sup> /rev)  |      | PLP 10-5,8  |
| 6,67 cm <sup>3</sup> /rev (0.41 in <sup>3</sup> /rev)  |      | PLP 10-6,3  |
| 8,51 cm <sup>3</sup> /rev (0.52 in <sup>3</sup> /rev)  |      | PLP 10-8    |
| 10,67 cm <sup>3</sup> /rev (0.65 in <sup>3</sup> /rev) |      | PLP 10-10   |

| 2                         | Drive shaft | Code |
|---------------------------|-------------|------|
| European tapered 1:8      |             | 81   |
| European tapered 1:8      |             | 86   |
| SAE "AA" spline (9 teeth) |             | 02   |
| SAE "AA" straight         |             | 30   |
| SAE straight              |             | 36   |
| Straight                  |             | 29   |

| 3                 | Mounting flange | Code |
|-------------------|-----------------|------|
| European          |                 | E1   |
| European          |                 | E7   |
| European          |                 | E8   |
| German 2 bolts    |                 | B1   |
| German 4 bolts    |                 | K2   |
| SAE "AA" 2 bolt   |                 | S0   |
| SAE "AA" 2-4 bolt |                 | R9   |
| SAE 2-4 bolt      |                 | R8   |
| SAE 2 bolt        |                 | W9   |

| 4    | Ports position | Code |
|------|----------------|------|
| Side |                | L    |

| Code                             | Ports IN/OUT | 5                                 |
|----------------------------------|--------------|-----------------------------------|
| GERMAN FLANGED PORTS             |              |                                   |
| Side                             | Type         |                                   |
| BB/BA                            | PLP 10       | 1-1,5-2-2,5-3,15-4-5-5,8-6,3-8-10 |
| GAS STRAIGHT THREAD PORTS (BSPP) |              |                                   |
| Side                             | Type         |                                   |
| GC/GC                            | PLP 10       | 1-1,5-2-2,5-3,15-4                |
| GD/GD                            | PLP 10       | 5-5,8-6,3-8-10                    |
| SAE STRAIGHT THREAD PORTS (ODT)  |              |                                   |
| Side                             | Type         |                                   |
| OB/OA                            | PLP 10       | 1-1,5-2-2,5-3,15-4-5-5,8-6,3      |
| OC/OB                            | PLP 10       | 8-10                              |

| Code | Combination type | 6 |
|------|------------------|---|
| V6   | Standard         |   |
| V7   | Common inlet     |   |

| Code | Rotation | 7 |
|------|----------|---|
| S    | Left     |   |
| D    | Right    |   |

| Code | Versions - Outboard bearing options         | 8 |
|------|---------------------------------------------|---|
| 0    | Without outboard bearing (standard) no code |   |

| Code | Seals (a)         | 9 |
|------|-------------------|---|
| N    | Buna N (standard) |   |
| V    | Viton             |   |

| Code | Cover options (b)                                  | 10 |
|------|----------------------------------------------------|----|
|      | Cast iron mounting flange and rear cover (no code) |    |
| E    | Aluminium mounting flange and cast iron rear cover |    |
| L    | Cast iron mounting flange and aluminium rear cover |    |
| EL   | Aluminium mounting flange and rear cover           |    |

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## HOW TO ORDER POLARIS 10 MULTIPLE PUMPS

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| 11 | Shaft seal options            | Code      |
|----|-------------------------------|-----------|
|    | Standard seal with wiper seal | <b>D</b>  |
|    | High back pressure seal       | <b>C1</b> |

| 12 | Shaft arrangement | Code      |
|----|-------------------|-----------|
|    | Female spline     | <b>FS</b> |

- (a) Choose the seals according to the temperature shown on page 5.
- (b) Mounting flange material on page 58 ÷ 60  
Rear cover material on page 44

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## HOW TO ORDER POLARIS 20 MULTIPLE PUMPS

|                      |   |    |    |       |       |       |   |   |    |    |                 |
|----------------------|---|----|----|-------|-------|-------|---|---|----|----|-----------------|
| 1                    | 2 | 3  | 4  | 5     | 6     | 7     | 8 | 9 | 10 | 11 | 12              |
| PLP 20-4             | - | 82 | E2 | -     | L     | EA/EA | / |   |    |    |                 |
| Front section        |   |    |    |       |       |       |   |   |    |    |                 |
| 20-4                 | - |    |    | L     | EA/EA | /     |   |   |    |    |                 |
| Intermediate section |   |    |    |       |       |       |   |   |    |    |                 |
| 20-4                 | - |    | L  | **/EA | -     | S7    | - | S | 0  | -  | N - EL - C / FS |
| Rear section         |   |    |    |       |       |       |   |   |    |    |                 |

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

| 2                             | 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 | 3 |
|------|-----------------|---|
| E2   | European        |   |
| B2   | German          |   |
| B4   | German 2 bolt   |   |
| B5   | German 2 bolt   |   |
| B6   | German 4 bolt   |   |
| U2   | German 2 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 | 4 |
|------|----------------|---|
| L    | Side           |   |

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

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## HOW TO ORDER POLARIS 20 MULTIPLE PUMPS

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

| 6               | Combination type | Code      |
|-----------------|------------------|-----------|
| Standard        |                  | <b>S6</b> |
| Common inlet    |                  | <b>S7</b> |
| Separate stages |                  | <b>Z6</b> |

| 7     | Rotation | Code     |
|-------|----------|----------|
| Left  |          | <b>S</b> |
| Right |          | <b>D</b> |

| 8                                           | Versions - Outboard bearing options | Code      |
|---------------------------------------------|-------------------------------------|-----------|
| Without outboard bearing (standard) no code |                                     | <b>0</b>  |
| With outboard bearing                       |                                     | <b>W8</b> |
| With outboard bearing                       |                                     | <b>5</b>  |
| With outboard bearing                       |                                     | <b>7</b>  |
| With outboard bearing                       |                                     | <b>8</b>  |
| With outboard bearing                       |                                     | <b>9</b>  |

| Code        | Seals (a)                                               | 9 |
|-------------|---------------------------------------------------------|---|
| <b>N</b>    | Buna (standard)                                         |   |
| <b>V</b>    | Viton                                                   |   |
| <b>T-PV</b> | Hydrogenated buna HNBR seals with Viton-FKM shaft seals |   |

| Code      | Cover options (b)                                  | 10 |
|-----------|----------------------------------------------------|----|
|           | Cast iron mounting flange and rear cover (no code) |    |
| <b>E</b>  | Aluminium mounting flange and cast iron rear cover |    |
| <b>L</b>  | Cast iron mounting flange and aluminium rear cover |    |
| <b>EL</b> | Aluminium mounting flange and rear cover           |    |

| Code      | Shaft seal options                   | 11 |
|-----------|--------------------------------------|----|
| <b>D</b>  | Standard shaft seals with wiper seal |    |
| <b>C1</b> | High back pressure seal              |    |

| Code      | Shaft arrangement | 12 |
|-----------|-------------------|----|
| <b>FS</b> | Female spline     |    |

- (a) Choose the seals according to the temperature shown on page 5.
- (b) Mounting flange material on page 61 ÷ 66  
Rear cover material on page 45

## HOW TO ORDER POLARIS 30 MULTIPLE PUMPS

|                             |   |           |           |          |              |              |           |   |          |                       |
|-----------------------------|---|-----------|-----------|----------|--------------|--------------|-----------|---|----------|-----------------------|
| 1                           | 2 | 3         | 4         | 5        | 6            | 7            | 8         | 9 | 10       | 11                    |
| <b>PLP 30-22</b>            | - | <b>83</b> | <b>E3</b> | -        | <b>L</b>     | <b>ED/EB</b> | /         |   |          |                       |
| <b>Front section</b>        |   |           |           |          |              |              |           |   |          |                       |
| <b>30-22</b>                | - |           |           | <b>L</b> | <b>ED/EB</b> | /            |           |   |          |                       |
| <b>Intermediate section</b> |   |           |           |          |              |              |           |   |          |                       |
| <b>30-22</b>                | - |           |           | <b>L</b> | <b>ED/EB</b> | -            | <b>M6</b> | - | <b>S</b> | <b>0 - N - C / FS</b> |
| <b>Rear section</b>         |   |           |           |          |              |              |           |   |          |                       |

| 1                            | Type | Pump Type        |
|------------------------------|------|------------------|
| 21,99 cm³/rev (1.34 in³/rev) |      | <b>PLP 30-22</b> |
| 26,70 cm³/rev (1.63 in³/rev) |      | <b>PLP 30-27</b> |
| 34,55 cm³/rev (2.11 in³/rev) |      | <b>PLP 30-34</b> |
| 39,27 cm³/rev (2.40 in³/rev) |      | <b>PLP 30-38</b> |
| 43,98 cm³/rev (2.68 in³/rev) |      | <b>PLP 30-43</b> |
| 51,83 cm³/rev (3.16 in³/rev) |      | <b>PLP 30-51</b> |
| 61,26 cm³/rev (3.74 in³/rev) |      | <b>PLP 30-61</b> |
| 73,82 cm³/rev (4.50 in³/rev) |      | <b>PLP 30-73</b> |
| 81,68 cm³/rev (4.98 in³/rev) |      | <b>PLP 30-82</b> |
| 91,10 cm³/rev (5.56 in³/rev) |      | <b>PLP 30-90</b> |

| 2                    | Drive shaft | Code      |
|----------------------|-------------|-----------|
| European tapered 1:8 |             | <b>83</b> |
| European tapered 1:8 |             | <b>84</b> |
| German tapered 1:5   |             | <b>56</b> |
| Straight             |             | <b>41</b> |
| SAE "B" spline       |             | <b>A8</b> |
| SAE "BB" spline      |             | <b>A5</b> |
| SAE "B" spline       |             | <b>04</b> |
| SAE "BB" spline      |             | <b>05</b> |
| SAE "B" straight     |             | <b>32</b> |
| SAE "BB" straight    |             | <b>33</b> |

| 3              | Mounting flange | Code      |
|----------------|-----------------|-----------|
| European       |                 | <b>E3</b> |
| European       |                 | <b>E4</b> |
| German         |                 | <b>B3</b> |
| SAE "B" 2 bolt |                 | <b>S5</b> |
| SAE "B" 2 bolt |                 | <b>U3</b> |

| 4    | Ports position | Code     |
|------|----------------|----------|
| Side |                | <b>L</b> |

| Code                                    | Ports IN/OUT | 5                                   |
|-----------------------------------------|--------------|-------------------------------------|
| <b>GERMAN FLANGED PORTS</b>             |              |                                     |
| Side                                    | Type         |                                     |
| <b>BM/BL</b>                            | PLP 30       | 22-27-34-38-43<br>46-51-61-73-82-90 |
| <b>EUROPEAN FLANGED PORTS</b>           |              |                                     |
| Side                                    | Type         |                                     |
| <b>ED/EB</b>                            | PLP 30       | 22-27-34-38-43<br>46-51-61          |
| <b>EF/ED</b>                            | PLP 30       | 73-82-90                            |
| <b>SAE FLANGED PORTS (SSM)</b>          |              |                                     |
| Side                                    | Type         |                                     |
| <b>MB/MA</b>                            | PLP 30       | 22                                  |
| <b>MC/MB</b>                            | PLP 30       | 27-34                               |
| <b>MD/MC</b>                            | PLP 30       | 38-43-46-51                         |
| <b>ME/MD</b>                            | PLP 30       | 61-73-82                            |
| <b>MF/ME</b>                            | PLP 30       | 90                                  |
| <b>SAE FLANGED PORTS (SSS)</b>          |              |                                     |
| Side                                    | Type         |                                     |
| <b>SB/SA</b>                            | PLP 30       | 22                                  |
| <b>SC/SB</b>                            | PLP 30       | 27-34                               |
| <b>SD/SC</b>                            | PLP 30       | 38-43-46-51                         |
| <b>SE/SD</b>                            | PLP 30       | 61-73-82                            |
| <b>SF/SE</b>                            | PLP 30       | 90                                  |
| <b>GAS STRAIGHT THREAD PORTS (BSPP)</b> |              |                                     |
| Side                                    | Type         |                                     |
| <b>GF/GF</b>                            | PLP 30       | 22-27-34-38-43-46-51                |
| <b>GG/GF</b>                            | PLP 30       | 61-73                               |
| <b>GH/GG</b>                            | PLP 30       | 82-90                               |
| <b>SAE STRAIGHT THREAD PORTS (ODT)</b>  |              |                                     |
| Side                                    | Type         |                                     |
| <b>OF/OD</b>                            | PLP 30       | 22-27-34                            |
| <b>OG/OF</b>                            | PLP 30       | 38-43-46-51                         |
| <b>OH/OG</b>                            | PLP 30       | 61-73-82-90                         |

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## HOW TO ORDER POLARIS 30 MULTIPLE PUMPS

| 6 | Combination type | Code      |
|---|------------------|-----------|
|   | Standard         | <b>M6</b> |

| 7 | Rotation | Code     |
|---|----------|----------|
|   | Left     | <b>S</b> |
|   | Right    | <b>D</b> |

| 8 | Versions - Outboard bearing options         | Code     |
|---|---------------------------------------------|----------|
|   | Without outboard bearing (standard) no code | <b>0</b> |

| 9 | Seals (a)       | Code     |
|---|-----------------|----------|
|   | Buna (standard) | <b>N</b> |
|   | Viton           | <b>V</b> |

| 10 | Shaft seal options            | Code      |
|----|-------------------------------|-----------|
|    | Standard seal with wiper seal | <b>D</b>  |
|    | High back pressure seal       | <b>C1</b> |

| 11 | Shaft arrangement | Code      |
|----|-------------------|-----------|
|    | Female spline     | <b>FS</b> |

- (a) Choose the seals according to the temperature shown on page 5.

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|           |                                                                        |    |
|-----------|------------------------------------------------------------------------|----|
| Code      | <b>Rotation</b>                                                        | 7  |
| <b>S</b>  | Left                                                                   |    |
| <b>D</b>  | Right                                                                  |    |
| Code      | <b>Versions - Outboard bearing options</b>                             | 8  |
| ...       | The same of multiple pumps                                             |    |
| Code      | <b>Shaft arrangement</b>                                               | 9  |
| <b>FS</b> | Female spline                                                          |    |
| Code      | <b>Cover options (a)</b>                                               | 10 |
|           | Cast iron mounting flange and rear cover (no code)                     |    |
| <b>E</b>  | Aluminium mounting flange and cast iron rear cover (only for PLP20/10) |    |
| <b>L</b>  | Cast iron mounting flange and aluminium rear cover                     |    |
| <b>EL</b> | Aluminium mounting flange and rear cover (only for PLP20/10)           |    |
| Code      | <b>Seals</b>                                                           | 11 |
|           | The same of multiple pumps                                             |    |

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Our policy is one of continuous improvement in product. Specification of items may, therefore, be changed without notice.

**PL 06 T A**

Edition: 06/02.2024

Replaces: PL 05 T A



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