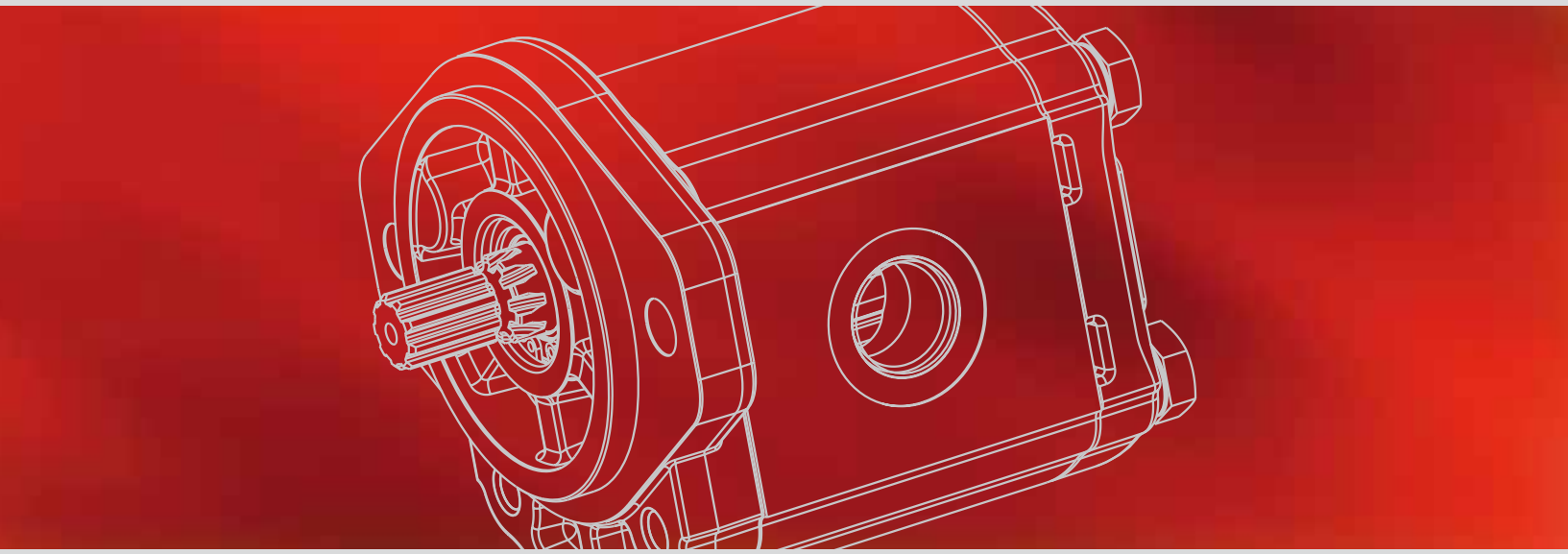
CASAPPA®
FLUID POWER DESIGN



HYDRAULIC GEAR PUMPS AND MOTORS

POLARIS®

INDEX

04/10.2020

o **Modification from former edition.**

INTRODUCTION

Replaces: 02/07.2006

"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 developement 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^3/rev (0.07 in^3/rev)
To 91,10 cm^3/rev (5.56 in^3/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)

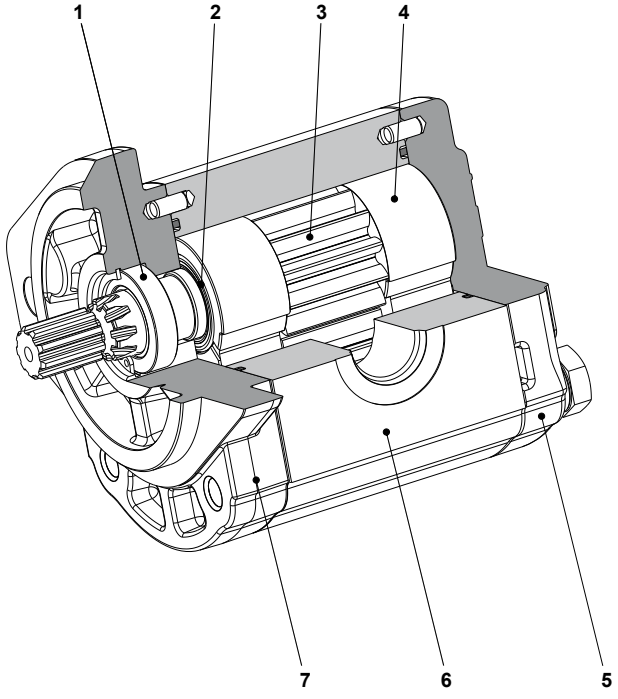
SPEED

Max. 4000 min^{-1}

- 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

o 04/10.2020

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:

IKRON® Fluid Filtration

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 (50 °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) Inlet pressure (motors)	≤ 50 bar (725 psi)
Max drain pressure / Max back pressure for single rotation motors	+ 50% of standard values
Speed	≤ 1500 min^{-1}
Minimum temperature	-40 °C (-40 °F)
Max oil viscosity	2000 mm^2/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.

Replaces: 02/07.2006

04/10.2020

FEATURES

Replaces: 02/07.2006

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

Tab. 1 O

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

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

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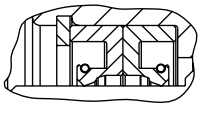
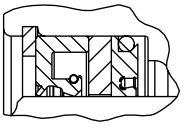
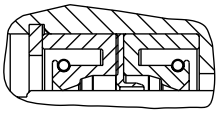
O	D (◆) shaft seals with wiper seal		C1 (◆) High pressure special shaft seal	
Single rotation pumps	Max drain line pressure: 0,5 bar (7 psi)		Max drain line pressure: 10 bar (145 psi) @ 350 min^{-1}	
Single rotation motors Reversible rotation pumps and motors	Max drain line pressure: 5 bar (73 psi) @ 350 min^{-1}			

FEATURES

Filtration

Tab. 2

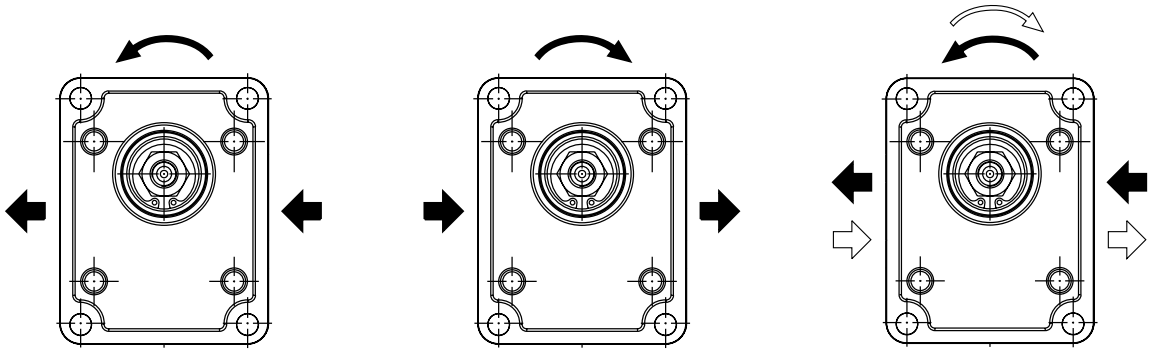
Working pressure bar (psi)	Δp < 140 (2030)	140 < Δp < 210 (2030) (3045)	Δp > 210 (3045)
Contamination class NAS 1638	10	9	8
Contamination class ISO 4406	21/19/16	20/18/15	19/17/14
Achieved with filter $ß_{10}$ (c) ≥ 75 according to ISO 16889	-	10 µm	10 µm
Achieved with filter $ß_{25}$ (c) ≥ 200 according to ISO 16889	25 µm	-	-

Casappa recommends to use its own production filters:

IKRON® Fluid Filtration

Replaces: 03/02.2012

DEFINITION OF ROTATION DIRECTION LOOKING AT THE DRIVE SHAFT

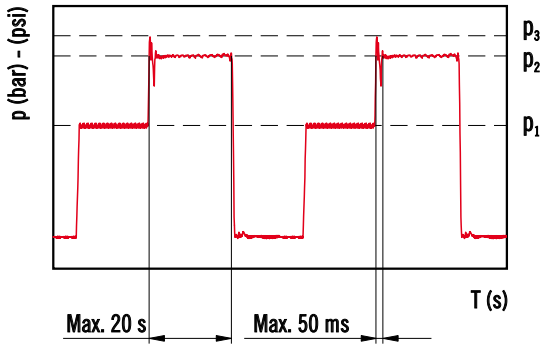


Anti-Clockwise rotation **Clockwise rotation** **Reversible rotation**

GENERAL NOTES

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

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.

For high frequency applications please consult our pre-sales department.

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FEATURES

Replaces: 01/10.2003

Series	Pump type PLP Motor type PLM	Displacement	Max. pressure			Max. speed	Min. speed
			p_1	p_2	p_3		
		cm^3/rev (in^3/rev)	bar (psi)			min^{-1}	
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)	3480 (240)	3000	500
	PL. 20•20	21,14 (1.29)	200 (2900)	220 (3190)	3480 (240)	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

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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. O
For different configurations and working conditions please consult our pre-sales department.

GENERAL DATA PUMPS AND MOTORS

Q	l/min (US gpm)	Flow
M	Nm (lbf in)	Torque
P	kW (HP)	Power
V	cm^3/rev (in^3/rev)	Displacement
n	min^{-1}	Speed
Δp	bar (psi)	Pressure

Efficiencies		Pumps	Motors
$\eta_v = \eta_v$ (V,Δp, n)	Volumetric efficiency	(≈ 0,97)	(≈ 0,96)
$\eta_{hm} = \eta_{hm}$ (V, Δp, n)	Hydro-mechanical efficiency	(≈ 0,88)	(≈ 0,85)
$\eta_t = \eta_v \bullet \eta_{hm}$	Overall efficiency	(≈ 0,85)	(≈ 0,82)

DESIGN CALCULATIONS FOR PUMP

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

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

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

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

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

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

DESIGN CALCULATIONS FOR MOTOR

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

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

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

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

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

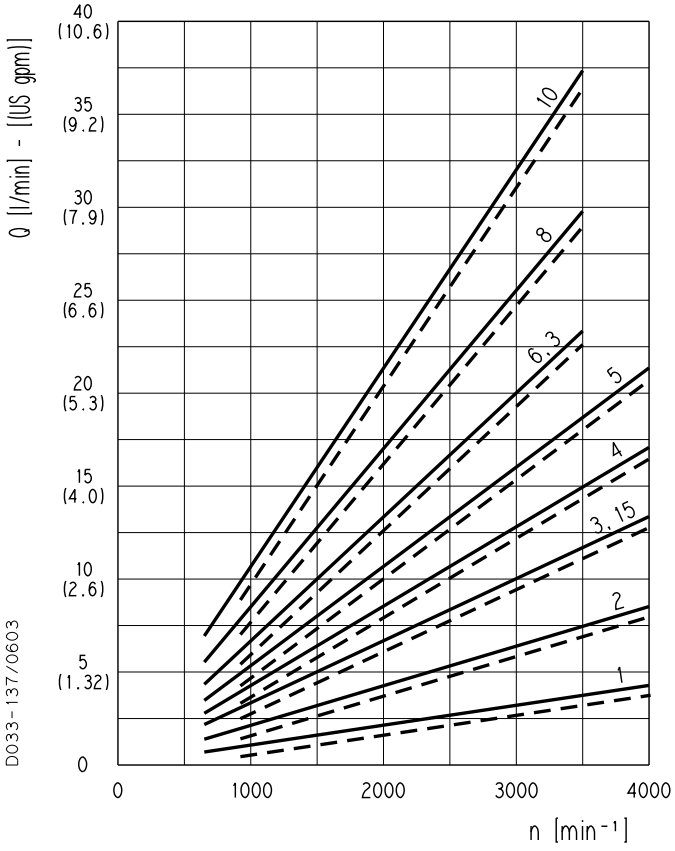
$$P_{OUT} = P_{IN} \bullet \eta_t \quad [kW]$$

03/02.2012

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

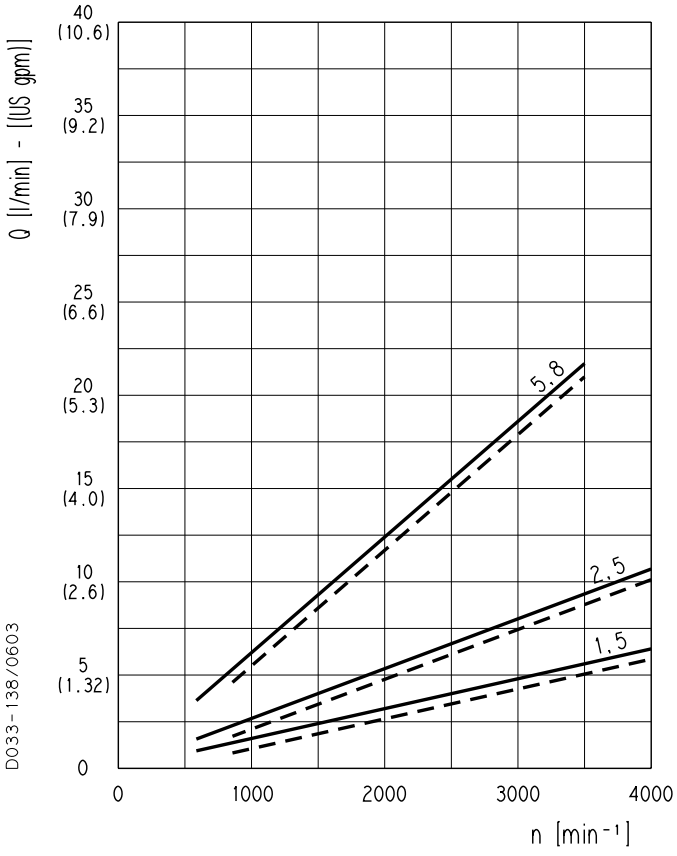
PLP 10 POLARIS 10 GEAR PUMPS PERFORMANCE CURVES

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.

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



PLP 10•1,5	———	20 bar (290 psi)
	– – –	260 bar (3770 psi)
PLP 10•2,5	———	20 bar (290 psi)
	– – –	260 bar (3770 psi)
PLP 10•5,8	———	20 bar (290 psi)
	– – –	230 bar (3335 psi)

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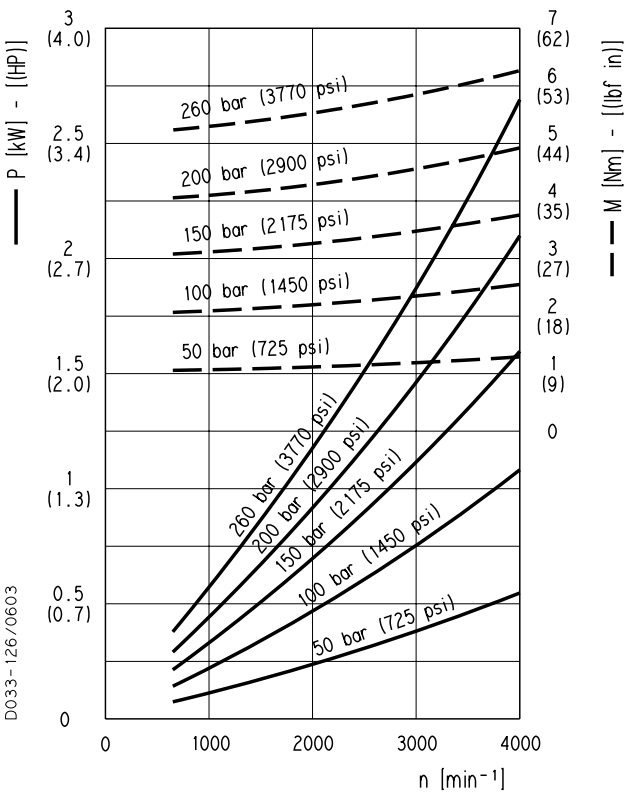
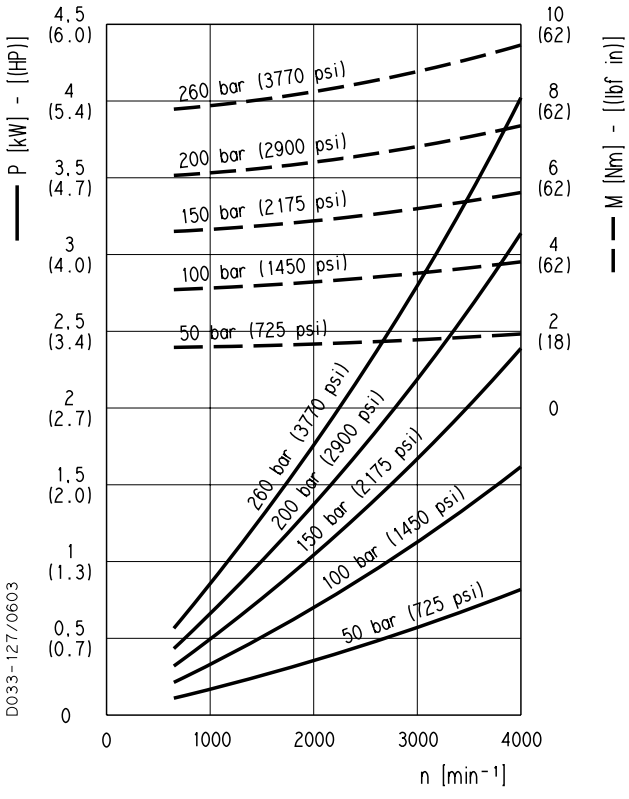
PLP 10 POLARIS 10 GEAR PUMPS PERFORMANCE CURVES

PLP 10•1



PLP 10•1,5



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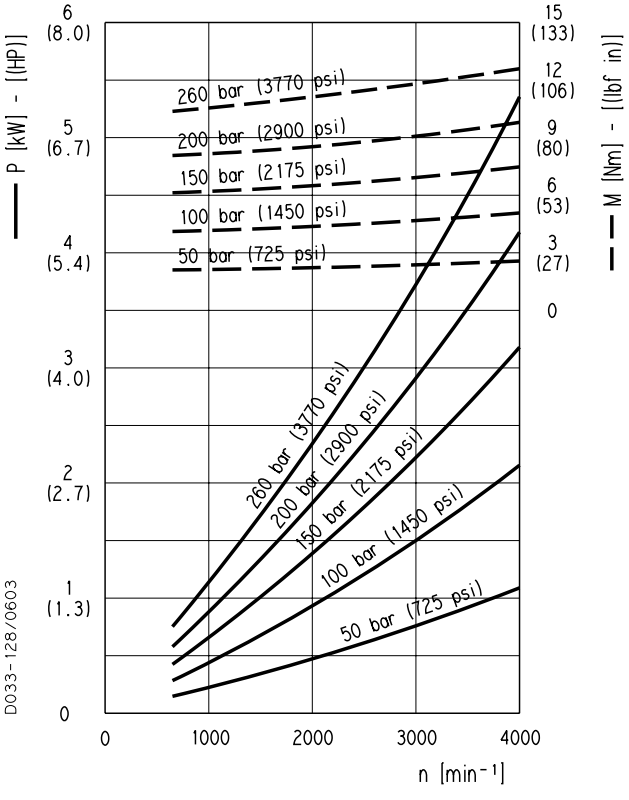
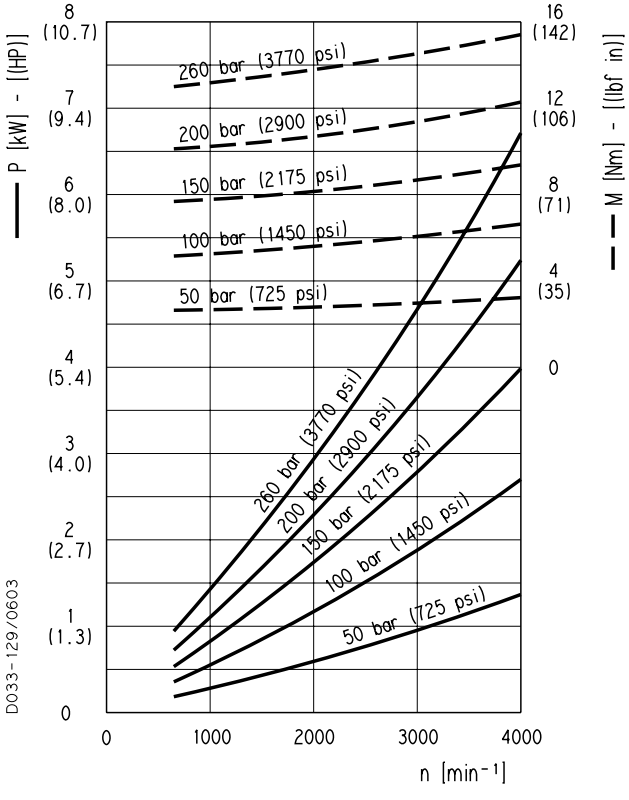


PLP 10•2,5



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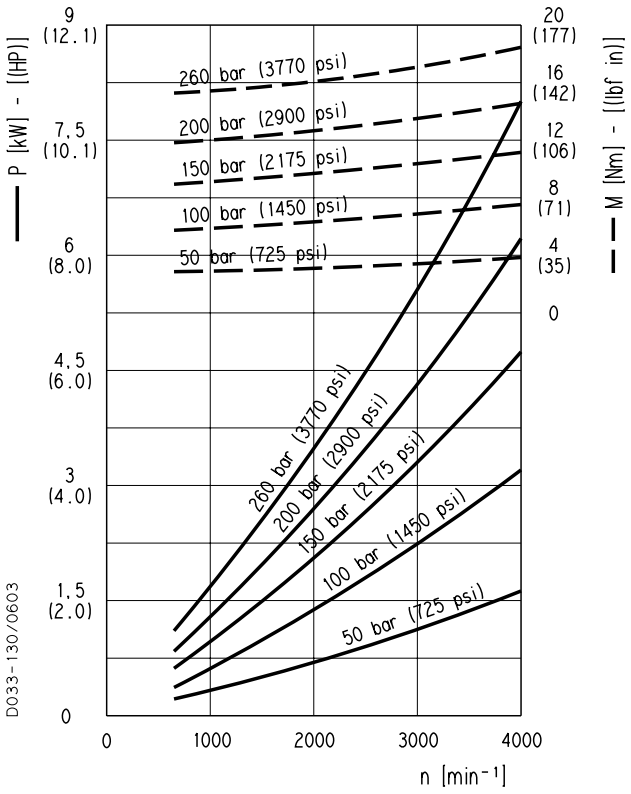
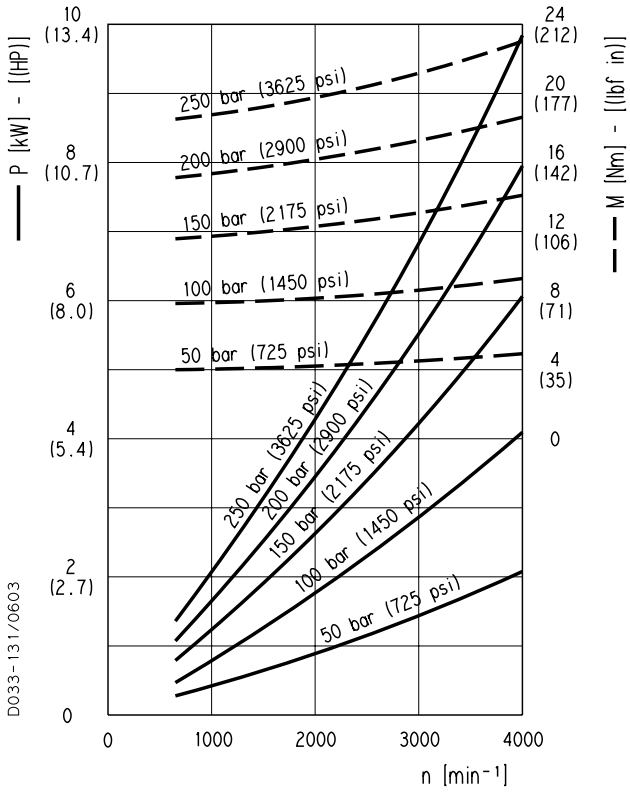
PLP 10 POLARIS 10 GEAR PUMPS PERFORMANCE CURVES

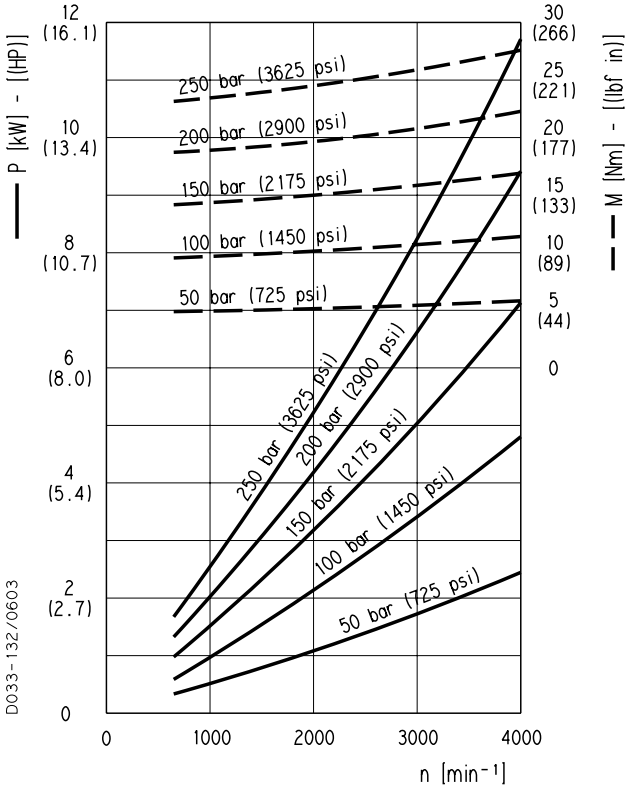
PLP 10•3,15



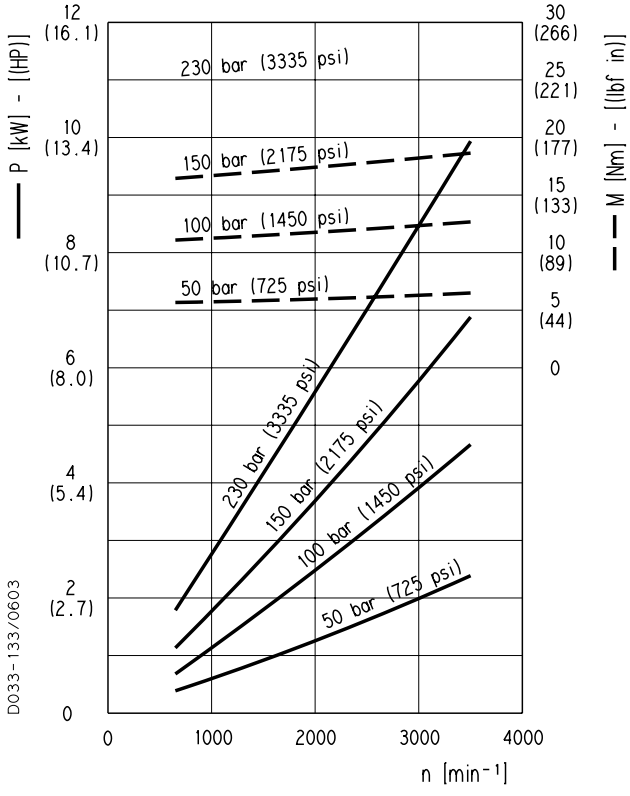
PLP 10•4



PLP 10•5



PLP 10•5,8



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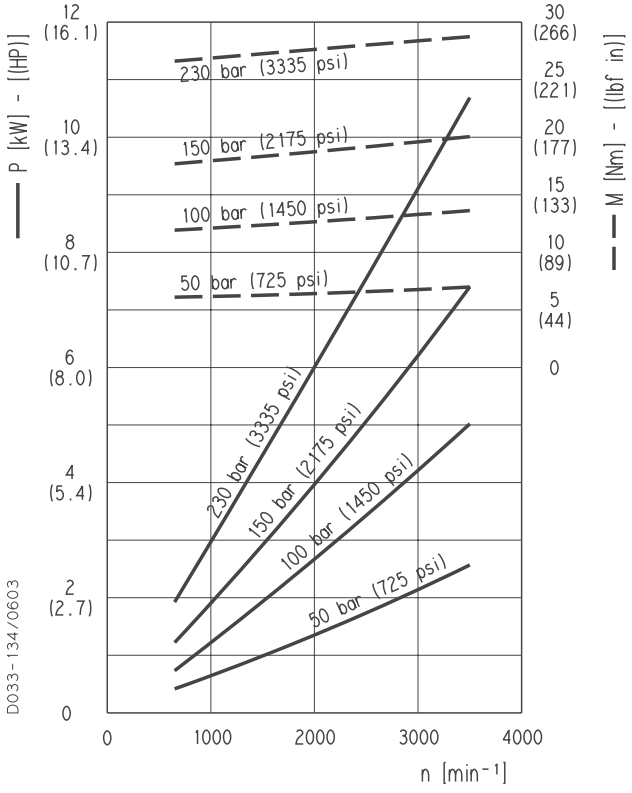
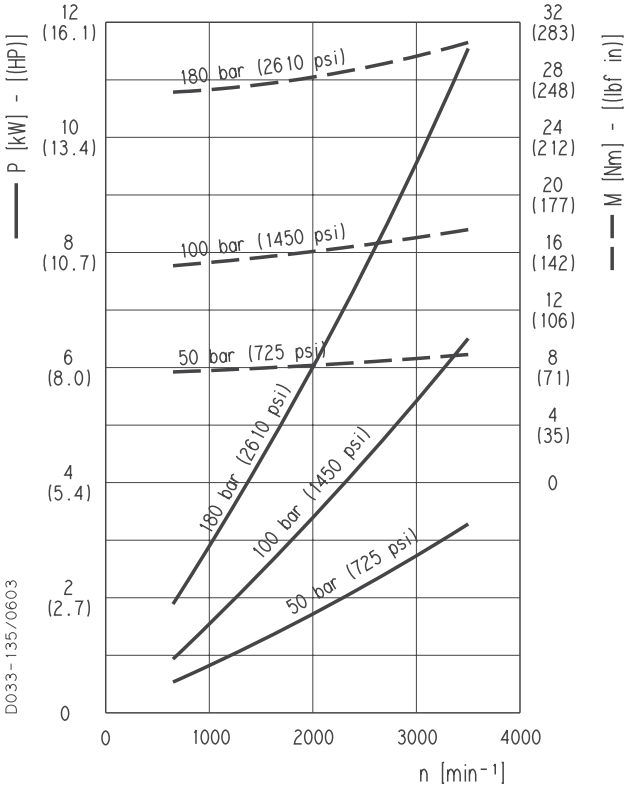
PLP 10 POLARIS 10 GEAR PUMPS PERFORMANCE CURVES

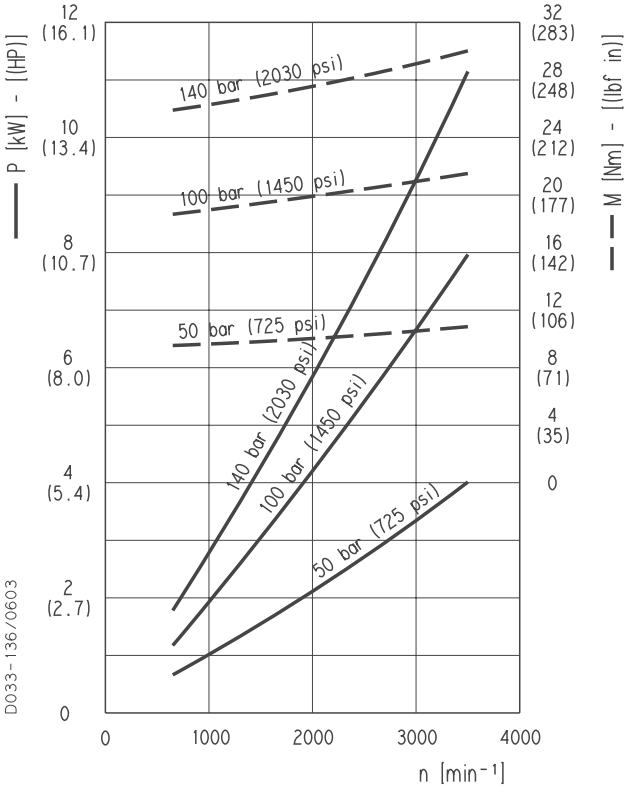
PLP 10•6,3



PLP 10•8



PLP 10•10



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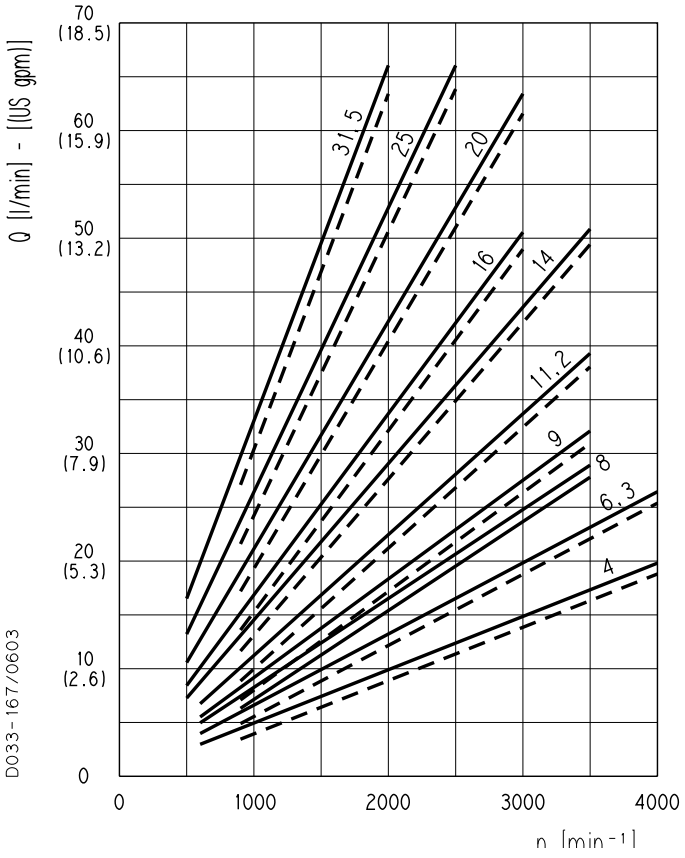
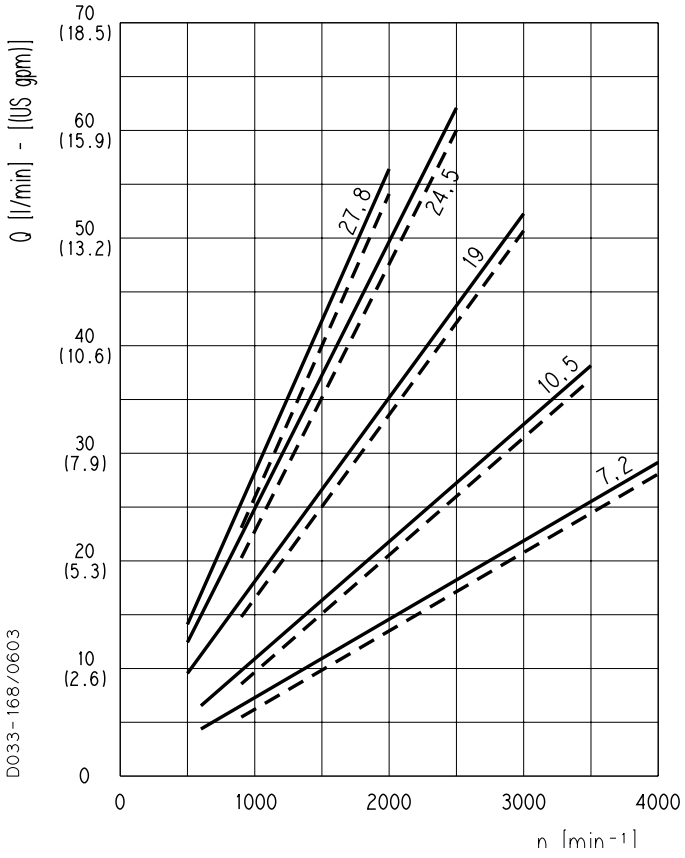
PLP 20 POLARIS 20 GEAR PUMPS PERFORMANCE CURVES

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.

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

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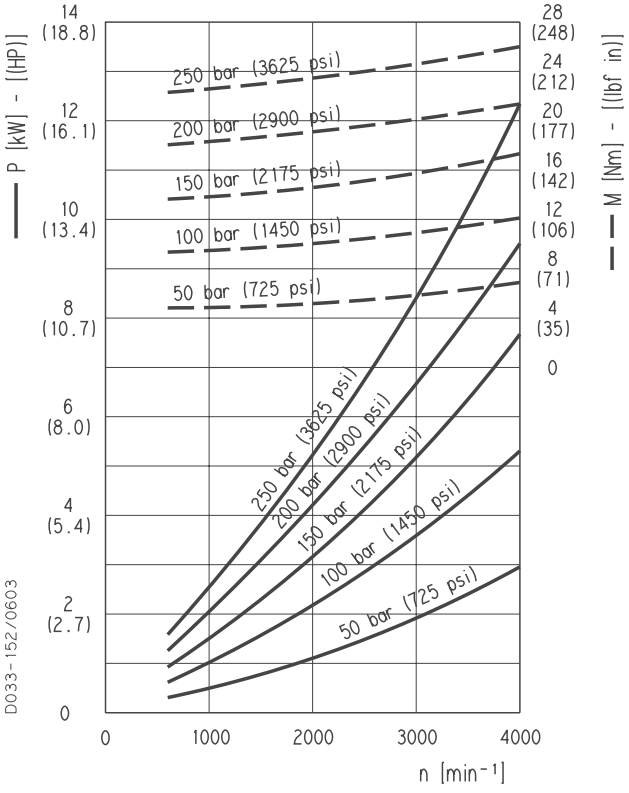
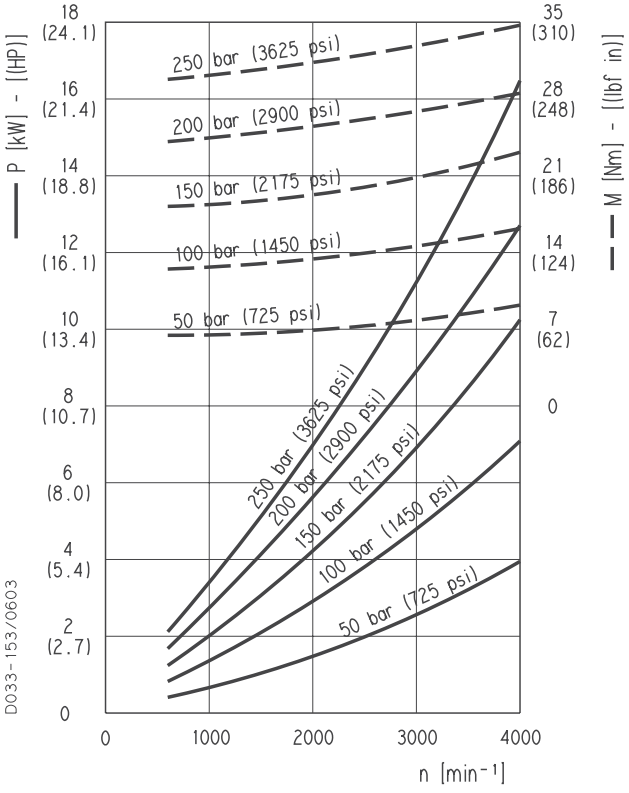
PLP 20 POLARIS 20 GEAR PUMPS PERFORMANCE CURVES

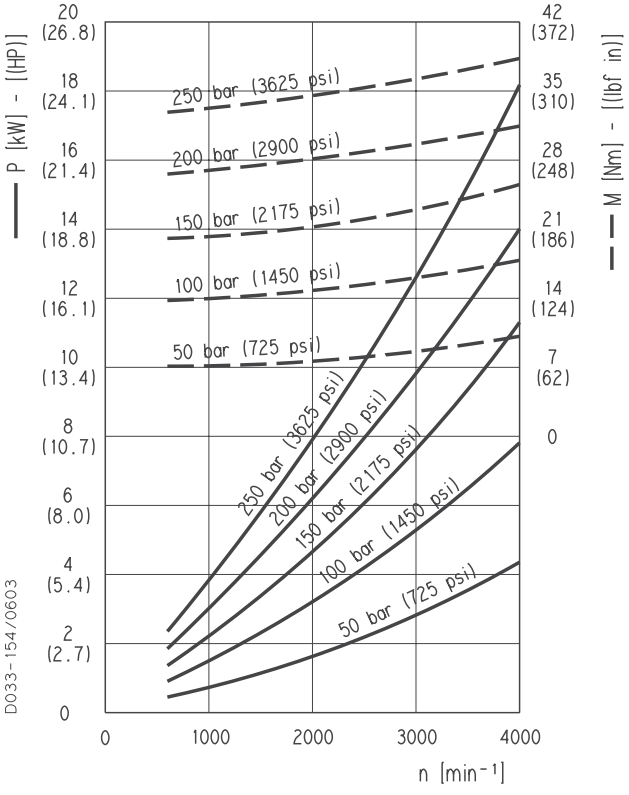
PLP 20•4



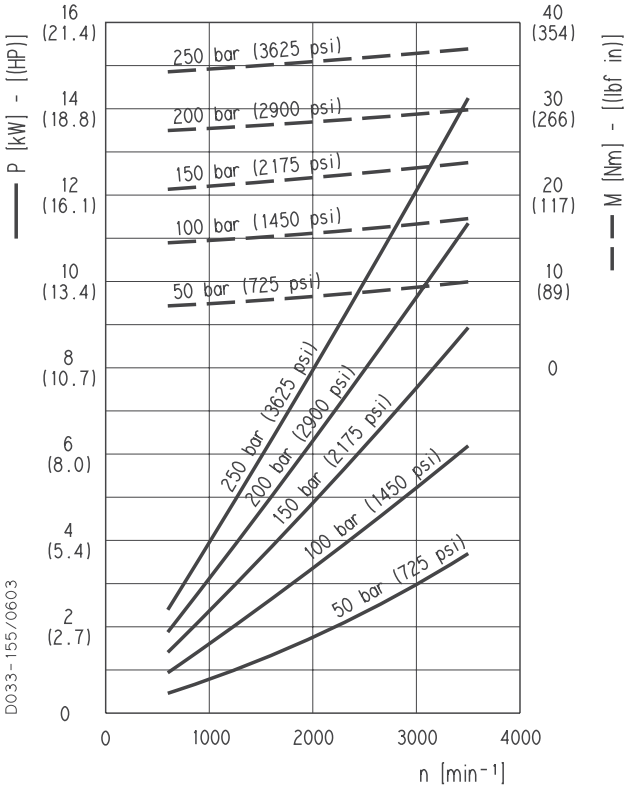
PLP 20•6,3



PLP 20•7,2



PLP 20•8



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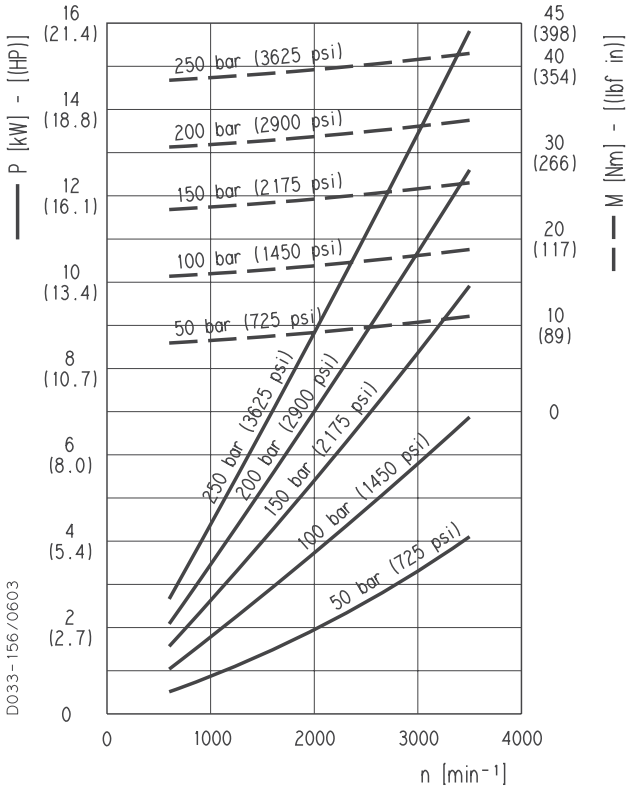
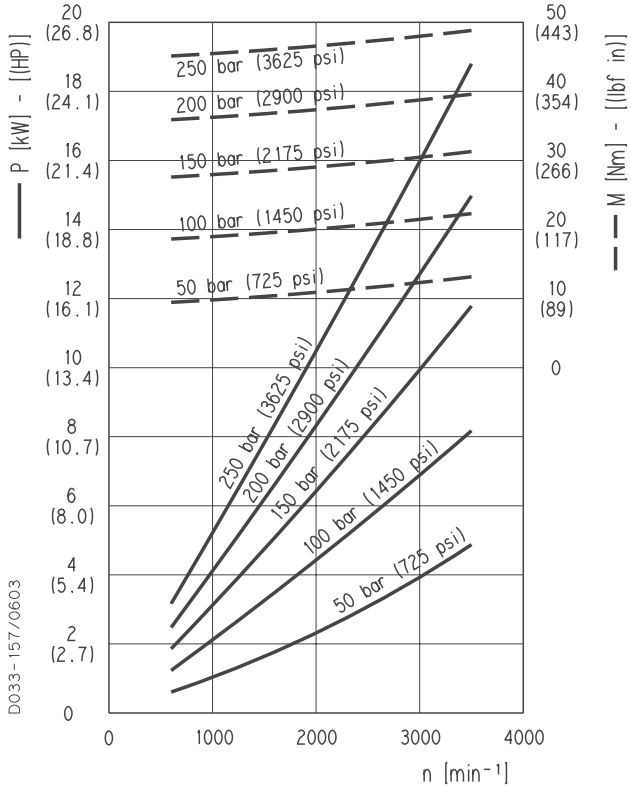
PLP 20 POLARIS 20 GEAR PUMPS PERFORMANCE CURVES

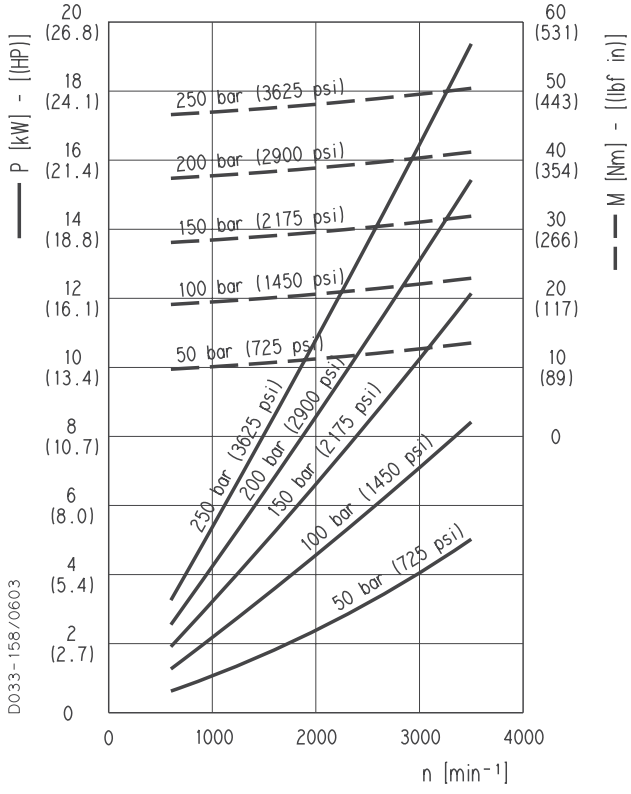
PLP 20•9



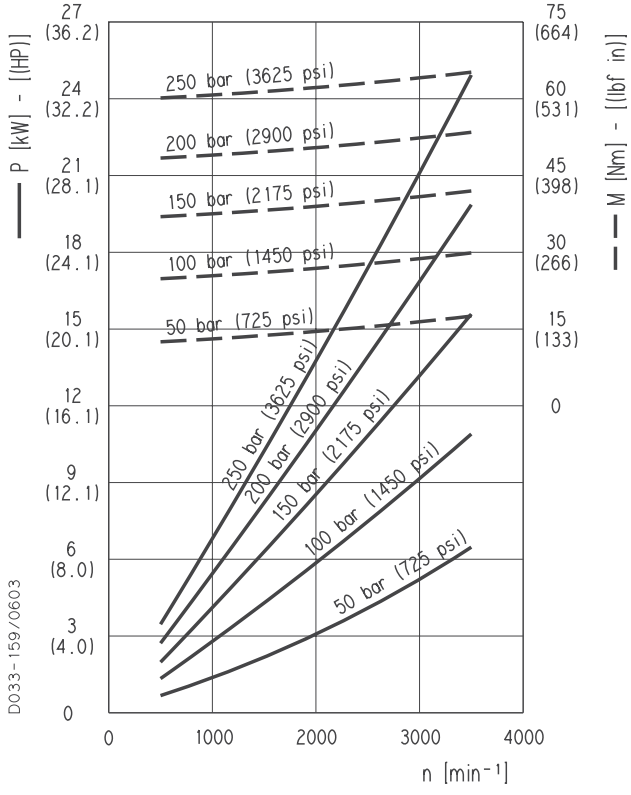
PLP 20•10,5



PLP 20•11,2



PLP 20•14



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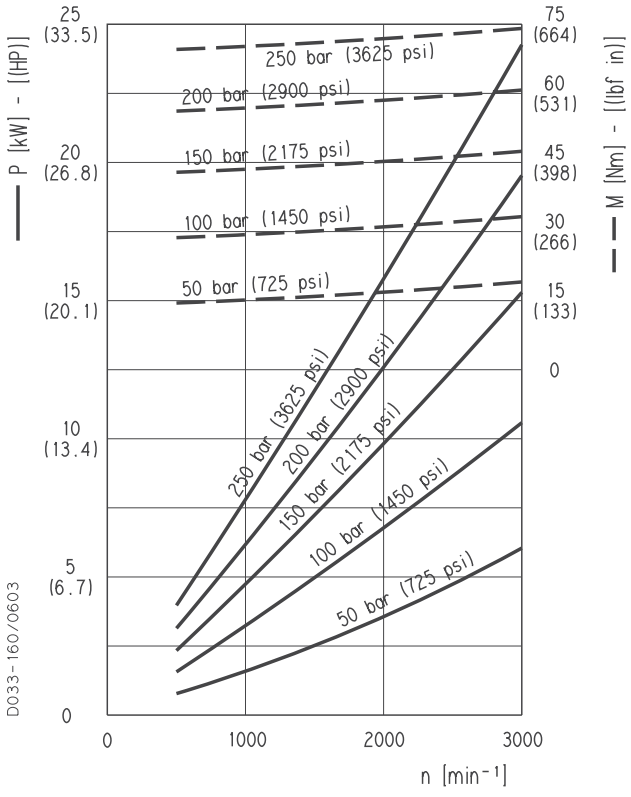
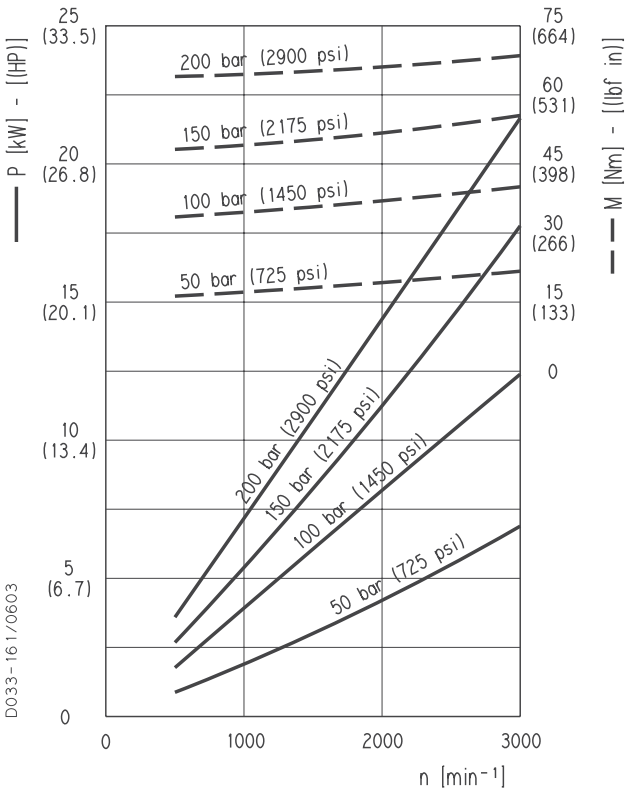
PLP 20 POLARIS 20 GEAR PUMPS PERFORMANCE CURVES

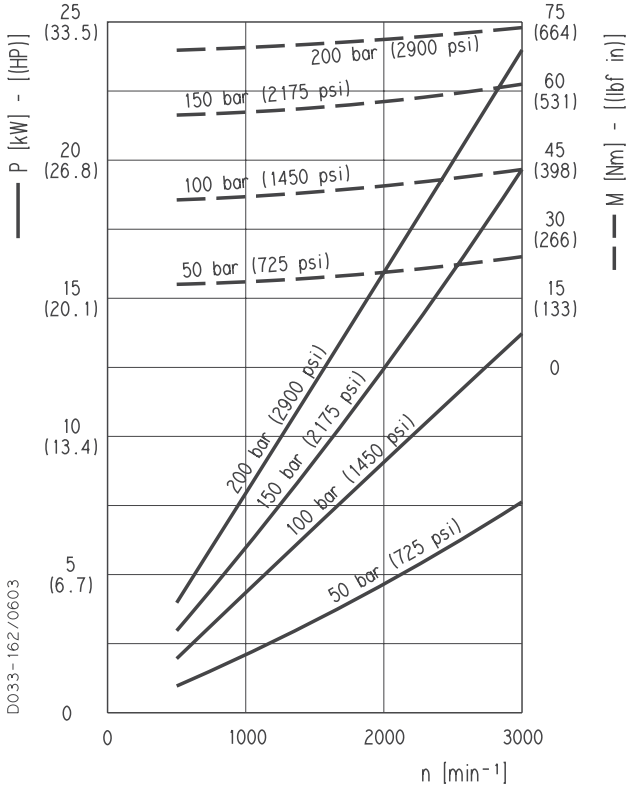
PLP 20•16



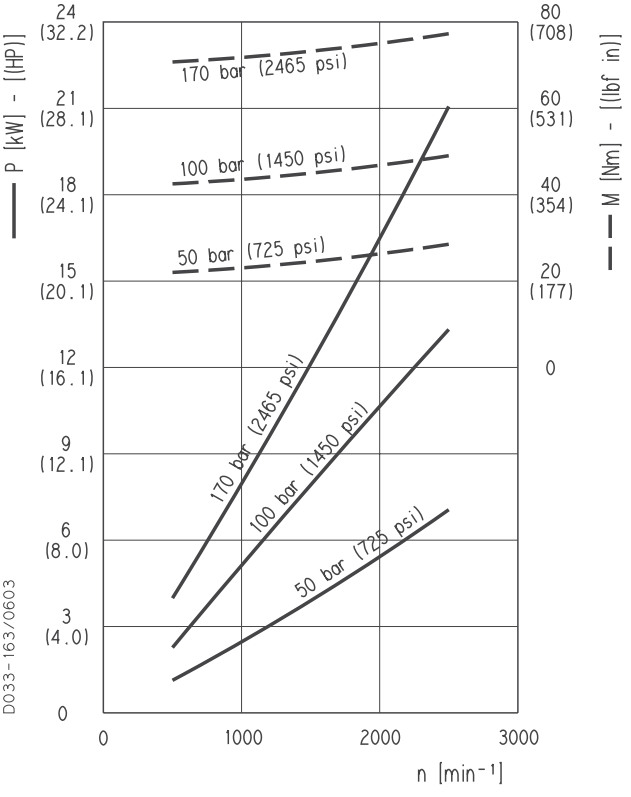
PLP 20•19



PLP 20•20



PLP 20•24,5



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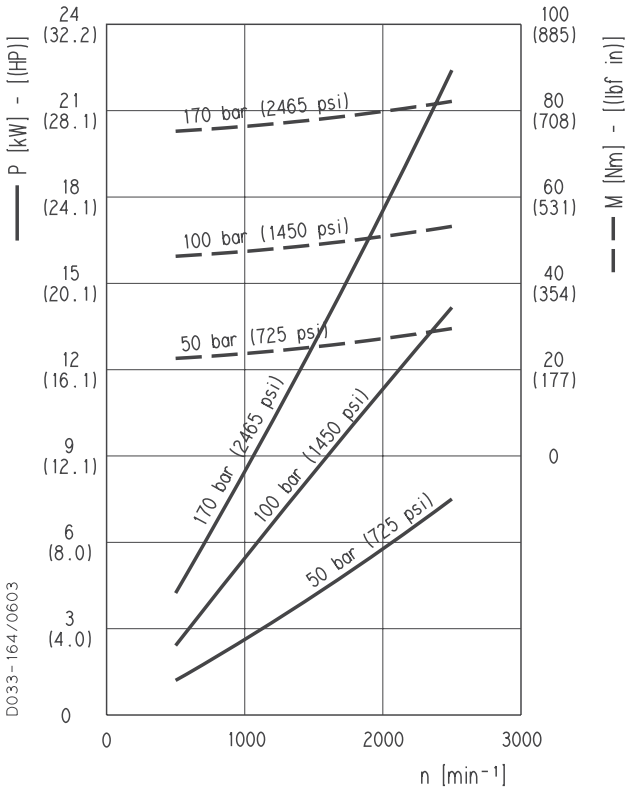
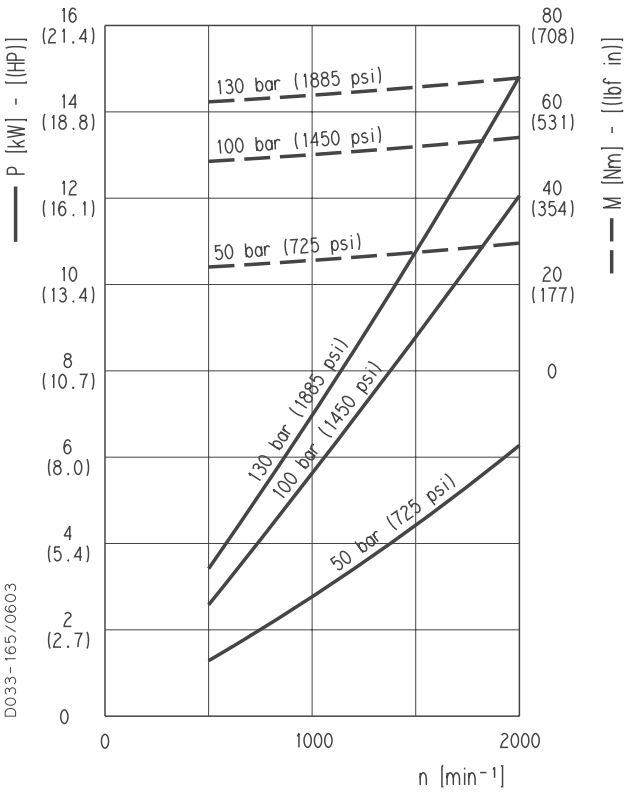
PLP 20 POLARIS 20 GEAR PUMPS PERFORMANCE CURVES

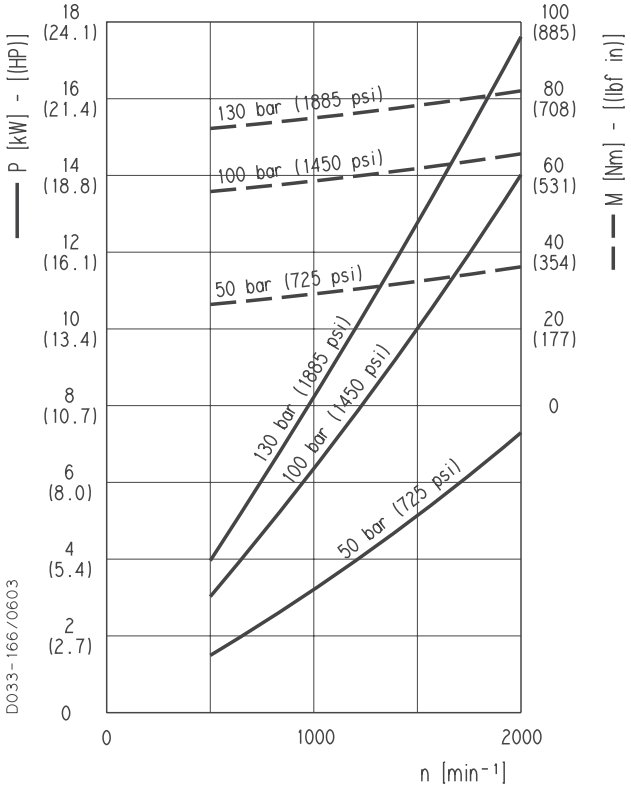
PLP 20•25



PLP 20•27,8



PLP 20•31,5



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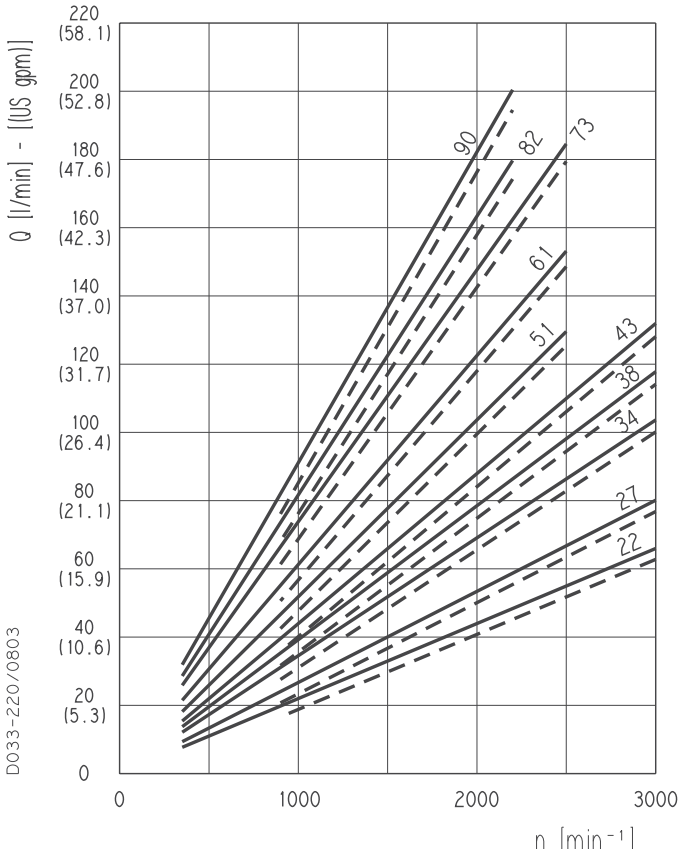
PLP 30 POLARIS 30 GEAR PUMPS PERFORMANCE CURVES

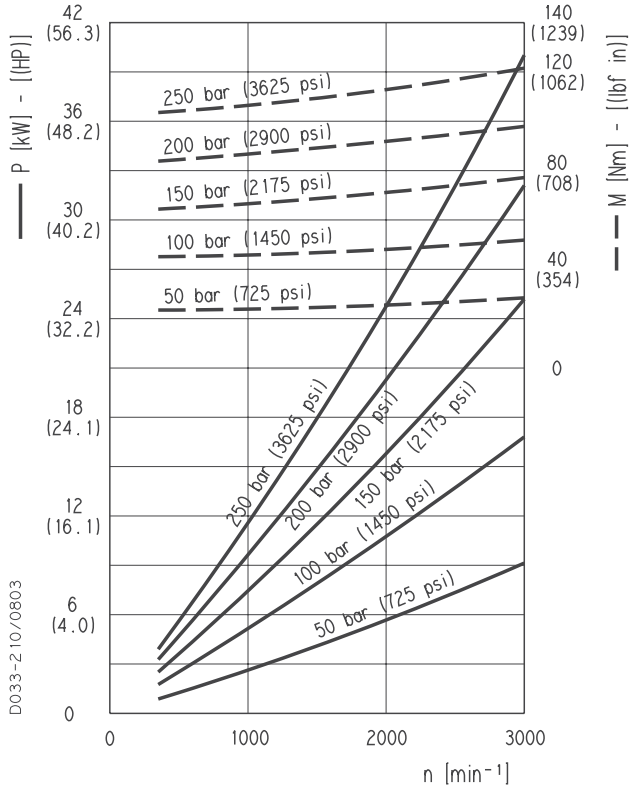
PLP 30



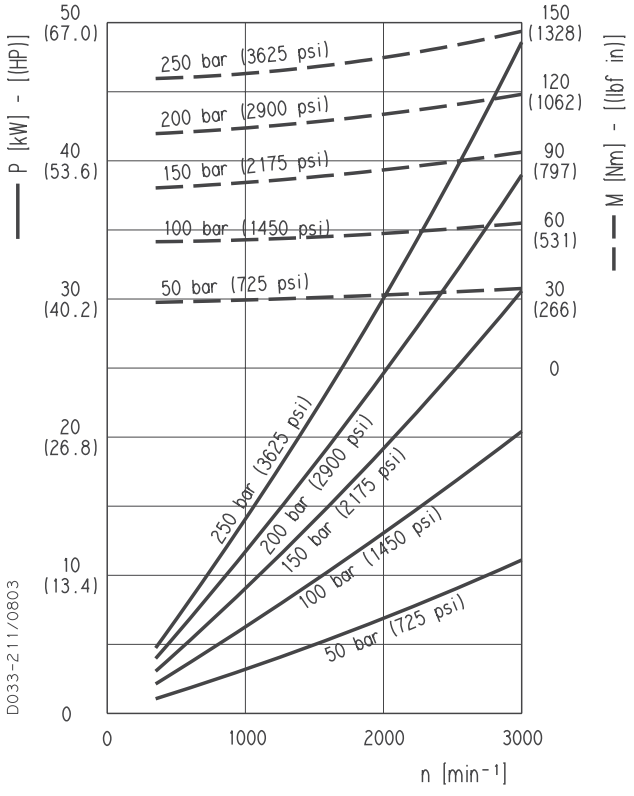
Each curve has been obtained at 50 °C (122 °F), using oil with viscosity 46 cSt (210 SSU) at 40 °C (104 °F) and at these pressures.

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

PLP 30•22



PLP 30•27



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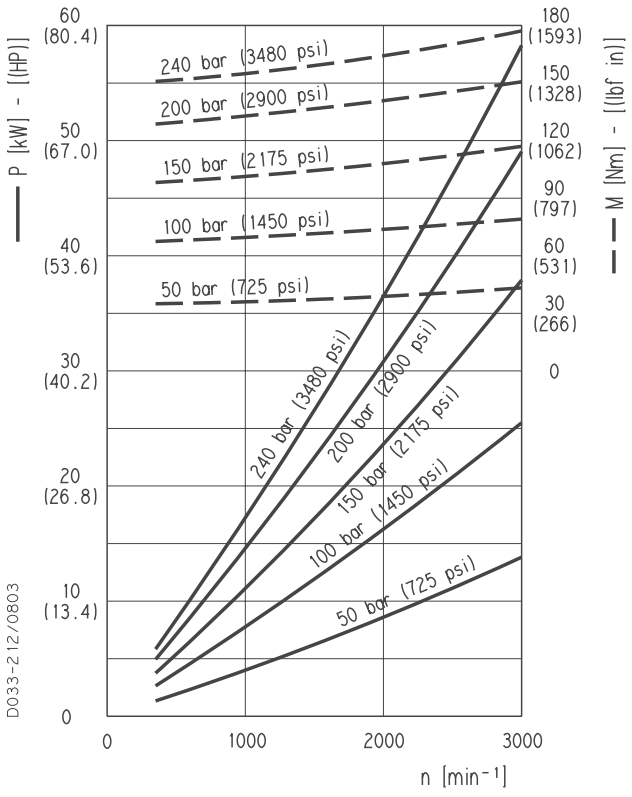
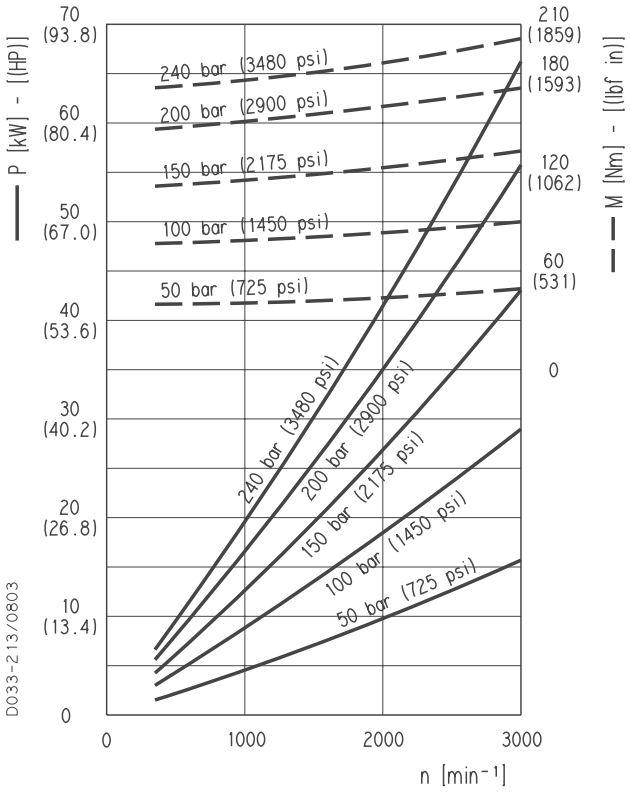
PLP 30 POLARIS 30 GEAR PUMPS PERFORMANCE CURVES

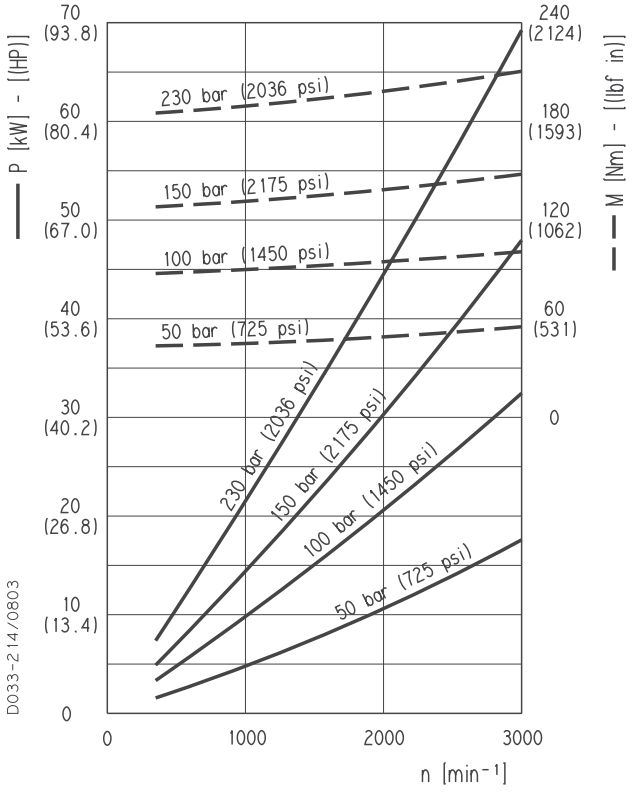
PLP 30•34



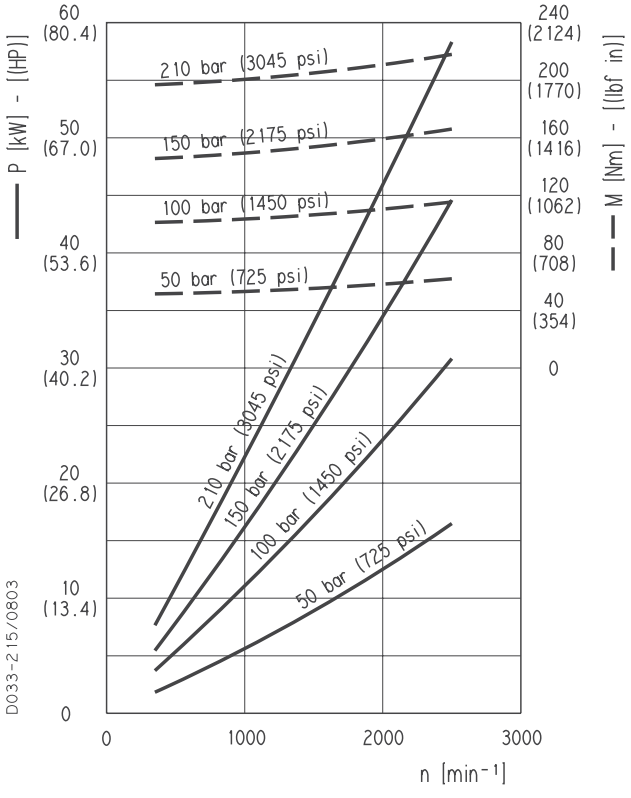
PLP 30•38



PLP 30•43



PLP 30•51



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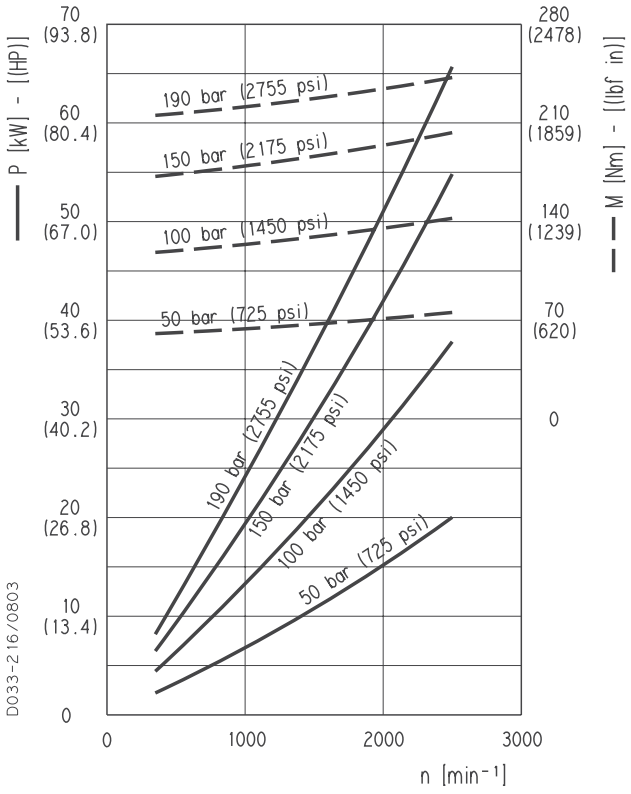
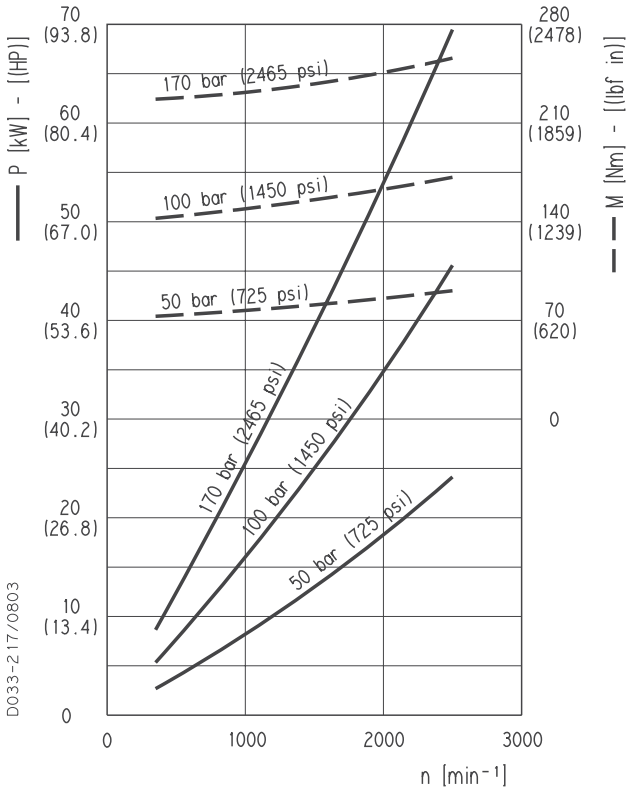
PLP 30 POLARIS 30 GEAR PUMPS PERFORMANCE CURVES

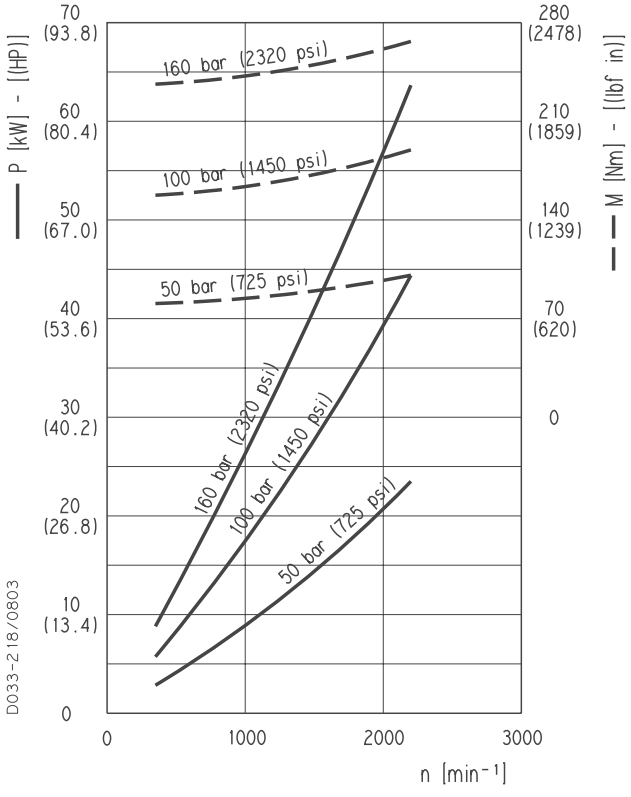
PLP 30•61



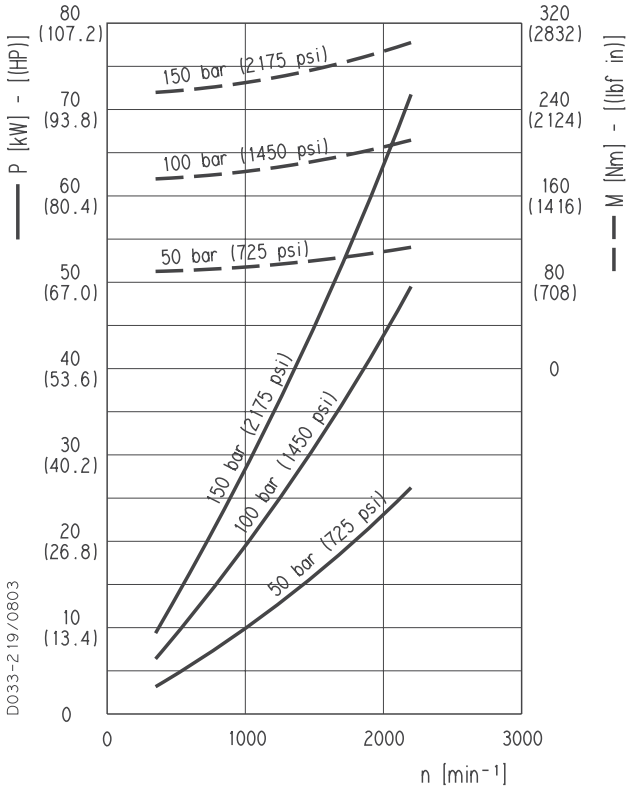
PLP 30•73



PLP 30•82



PLP 30•90



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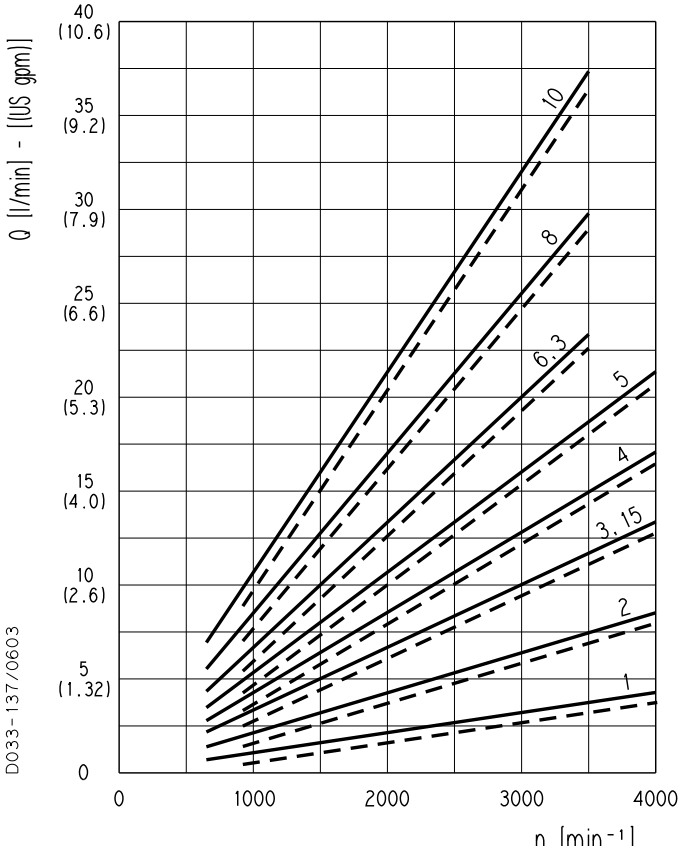
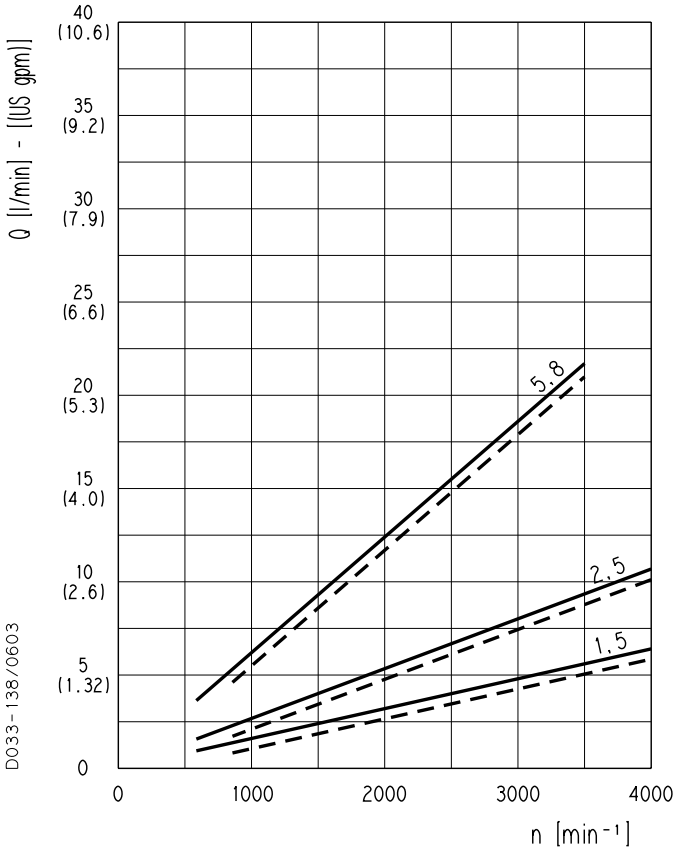
PLM 10 POLARIS 10 GEAR MOTORS PERFORMANCE CURVES

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.

PLM 10•1	———	20 bar (290 psi)
	– – –	260 bar (3770 psi)
PLM 10•2	———	20 bar (290 psi)
	– – –	260 bar (3770 psi)
PLM 10•3,15	———	20 bar (290 psi)
	– – –	260 bar (3770 psi)
PLPM 10•4	———	20 bar (290 psi)
	– – –	250 bar (3625 psi)
PLM 10•5	———	20 bar (290 psi)
	– – –	250 bar (3625 psi)
PLM 10•6,3	———	20 bar (290 psi)
	– – –	230 bar (3335 psi)
PLM 10•8	———	20 bar (290 psi)
	– – –	180 bar (2610 psi)
PLM 10•10	———	20 bar (290 psi)
	– – –	140 bar (2030 psi)



PLM 10•1,5	———	20 bar (290 psi)
	– – –	260 bar (3770 psi)
PLM 10•2,5	———	20 bar (290 psi)
	– – –	260 bar (3770 psi)
PLM 10•5,8	———	20 bar (290 psi)
	– – –	230 bar (3335 psi)

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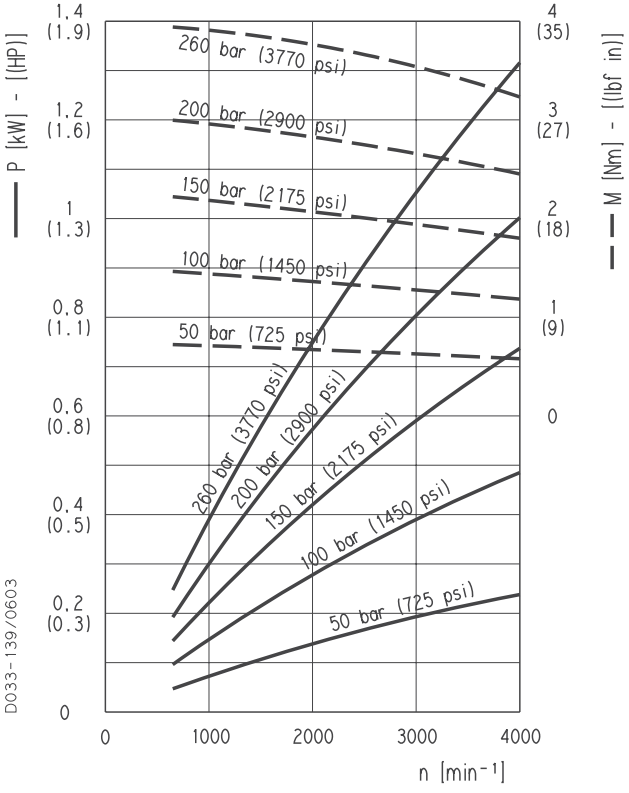
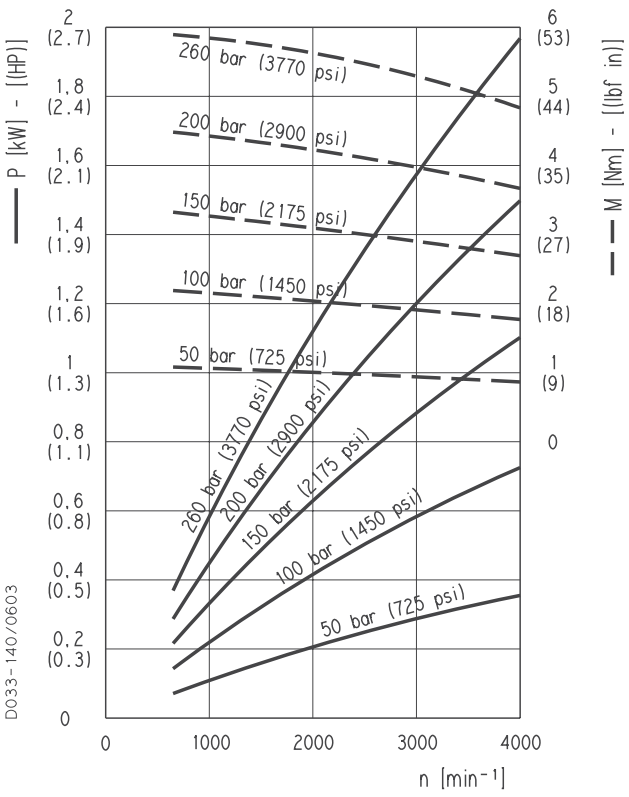
PLM 10 POLARIS 10 GEAR MOTORS PERFORMANCE CURVES

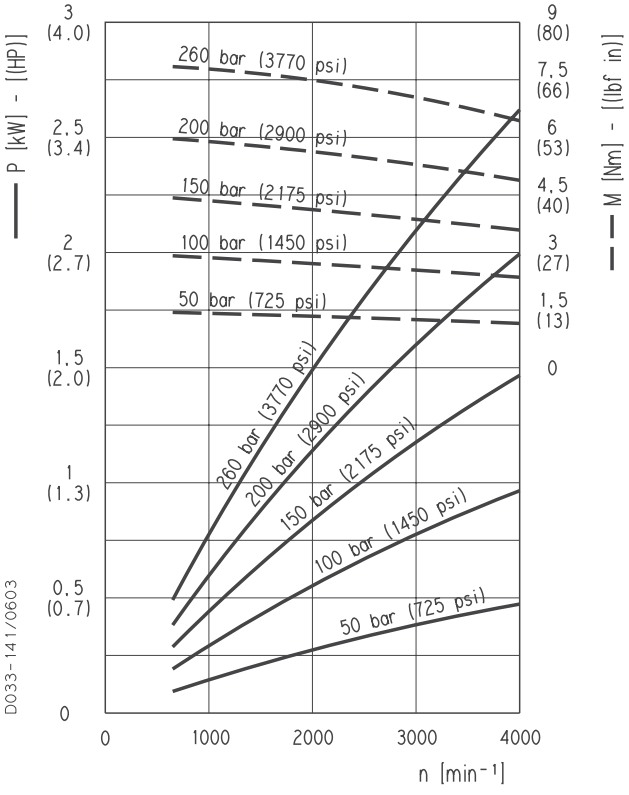
PLM 10•1



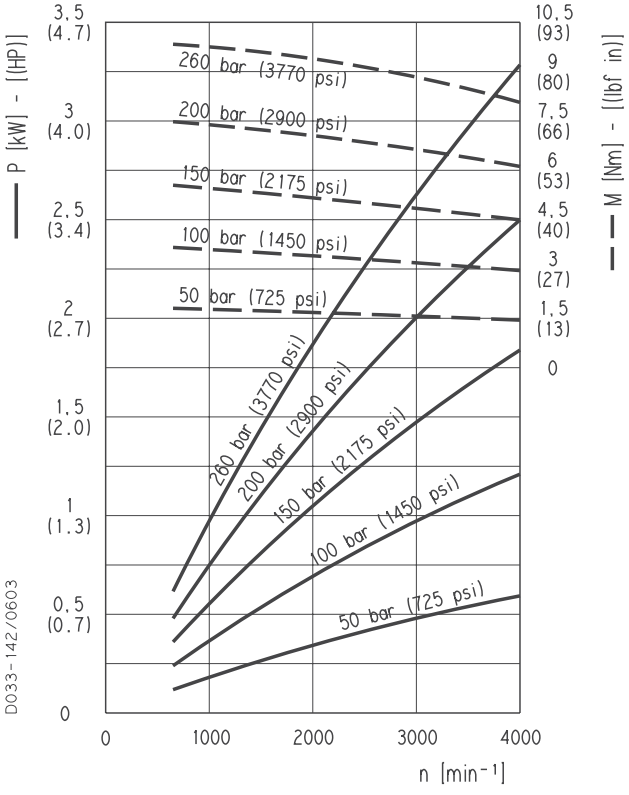
PLM 10•1,5



PLM 10•2



PLM 10•2,5



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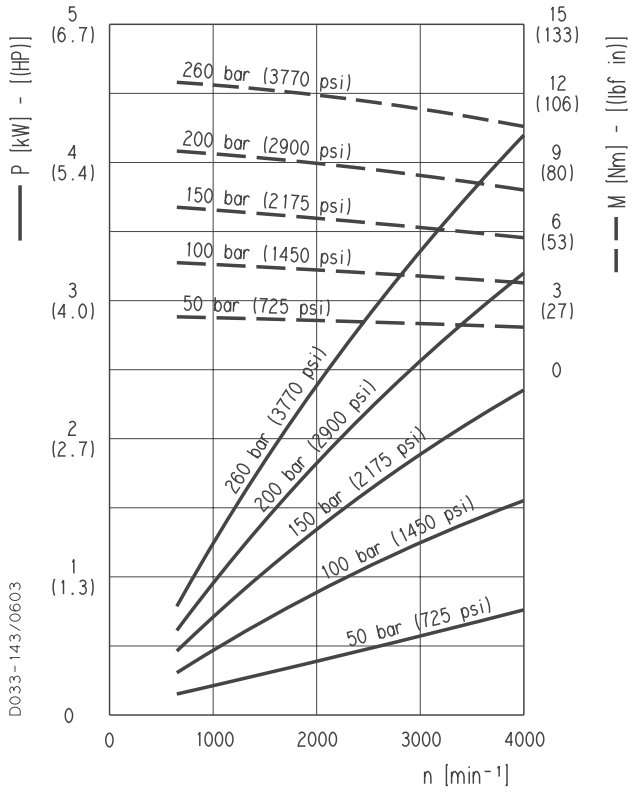
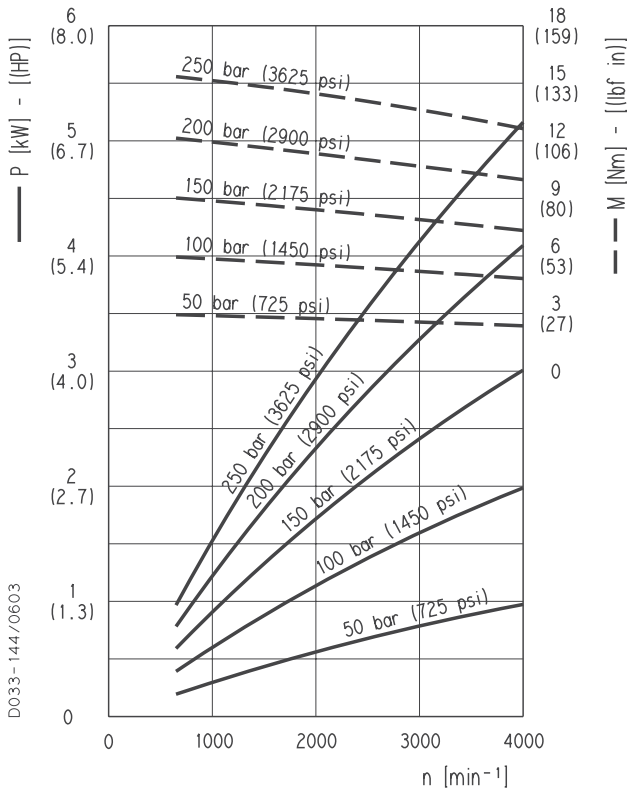
PLM 10 POLARIS 10 GEAR MOTORS PERFORMANCE CURVES

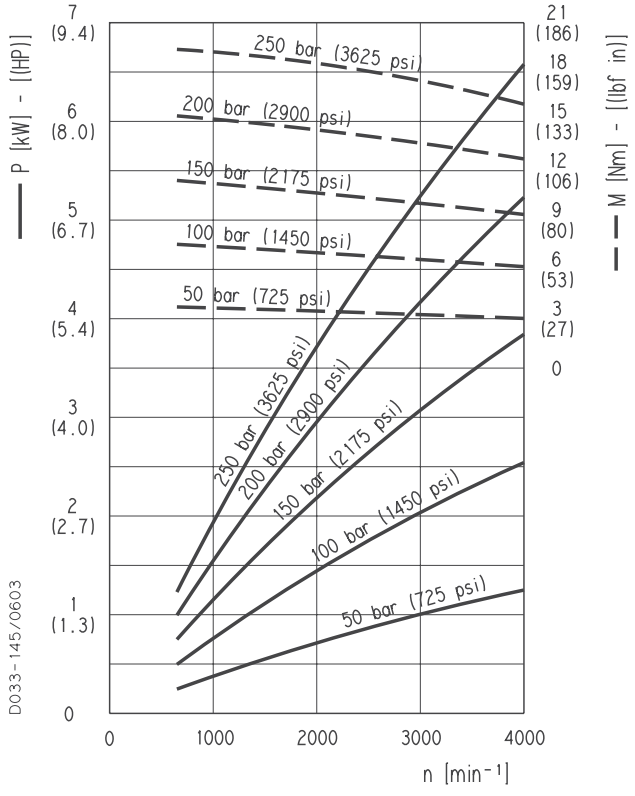
PLM 10•3,15



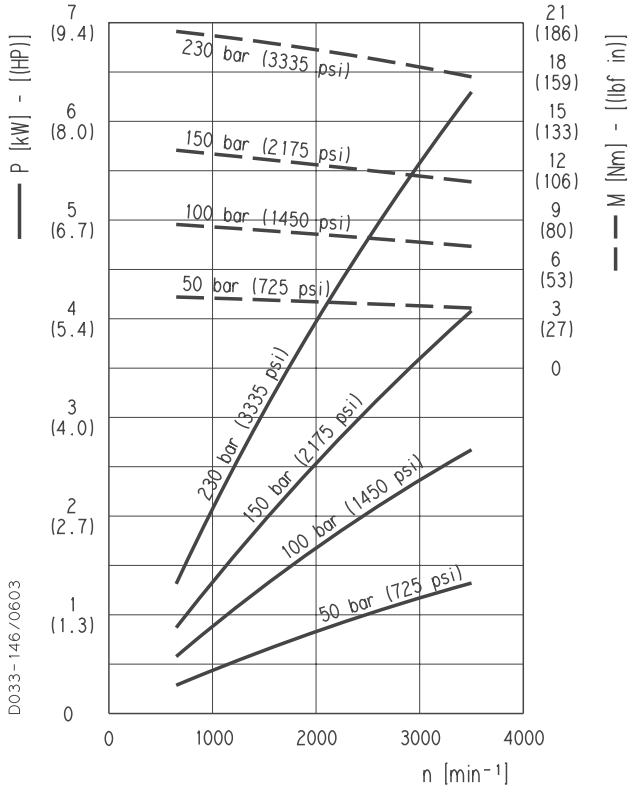
PLM 10•4



PLM 10•5



PLM 10•5,8



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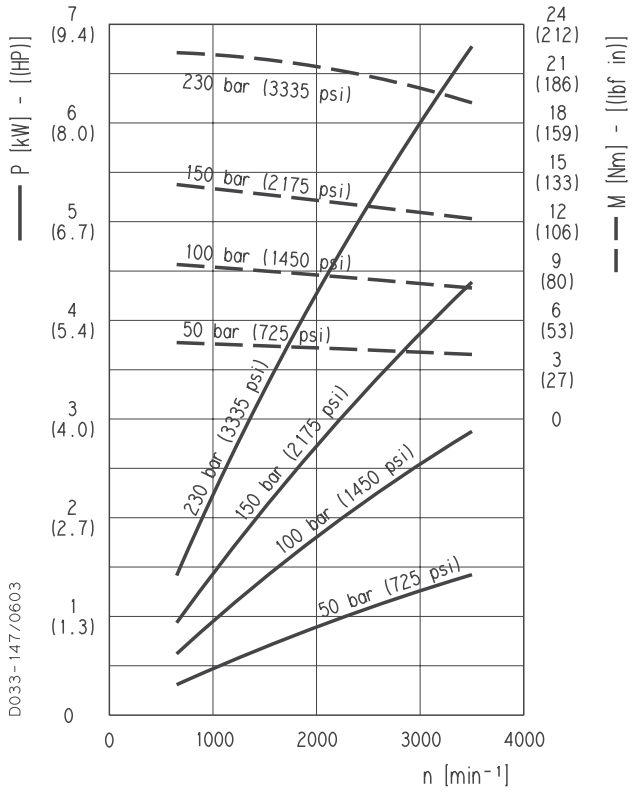
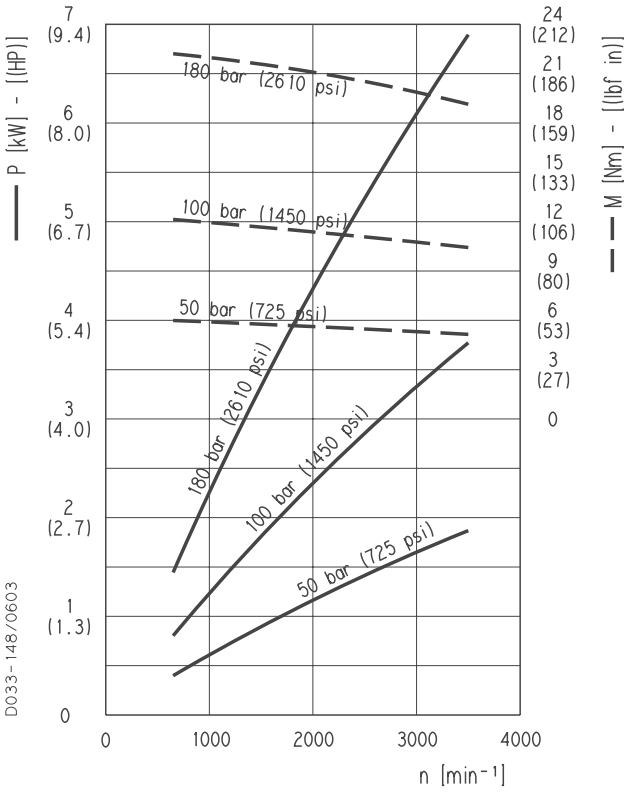
PLM 10 POLARIS 10 GEAR MOTORS PERFORMANCE CURVES

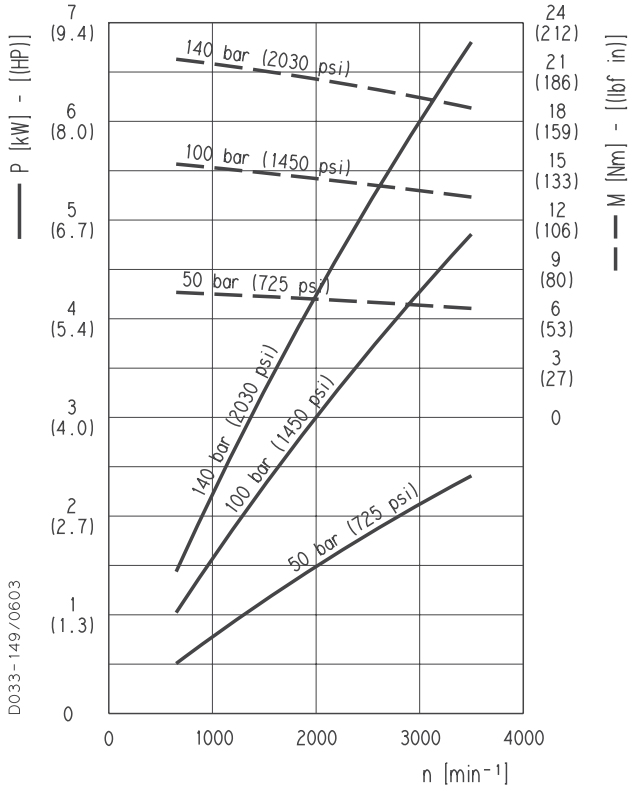
PLM 10•6,3



PLM 10•8



PLM 10•10



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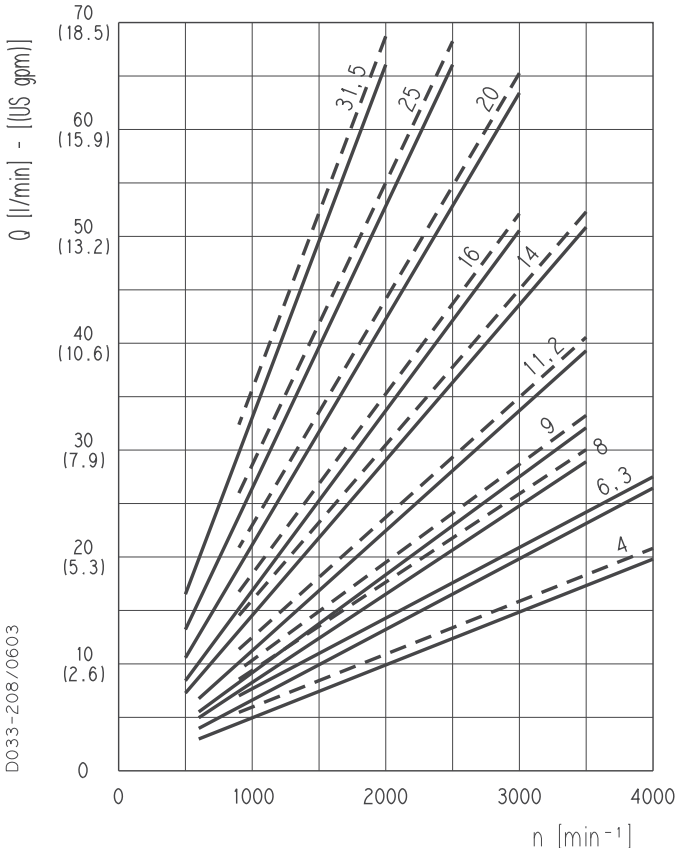
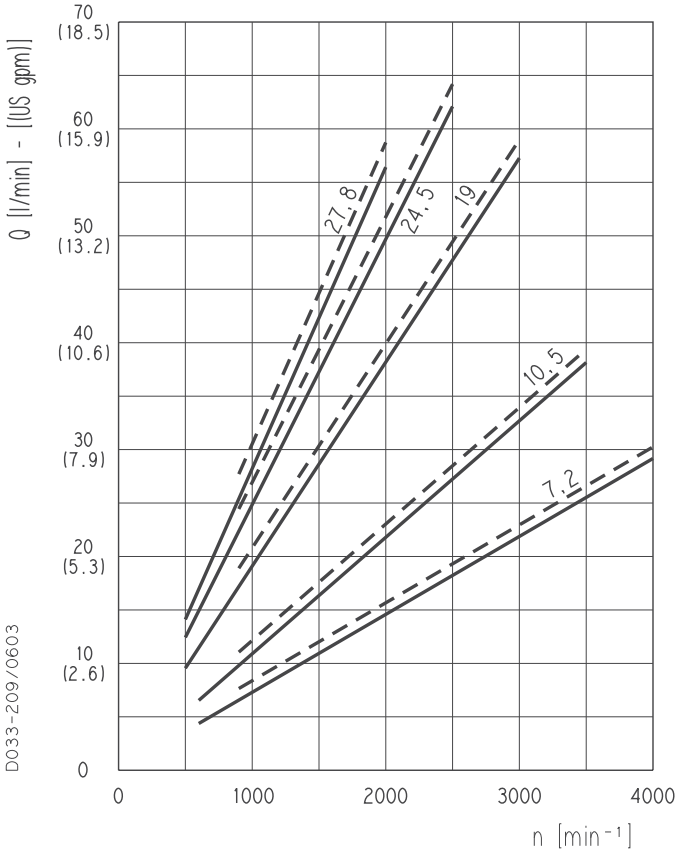
PLM 20 POLARIS 20 GEAR MOTORS PERFORMANCE CURVES

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.

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

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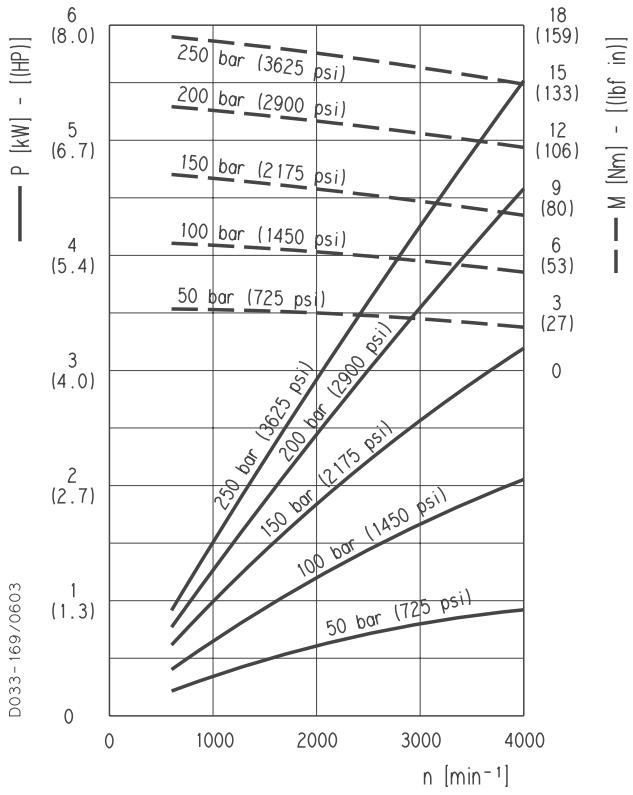
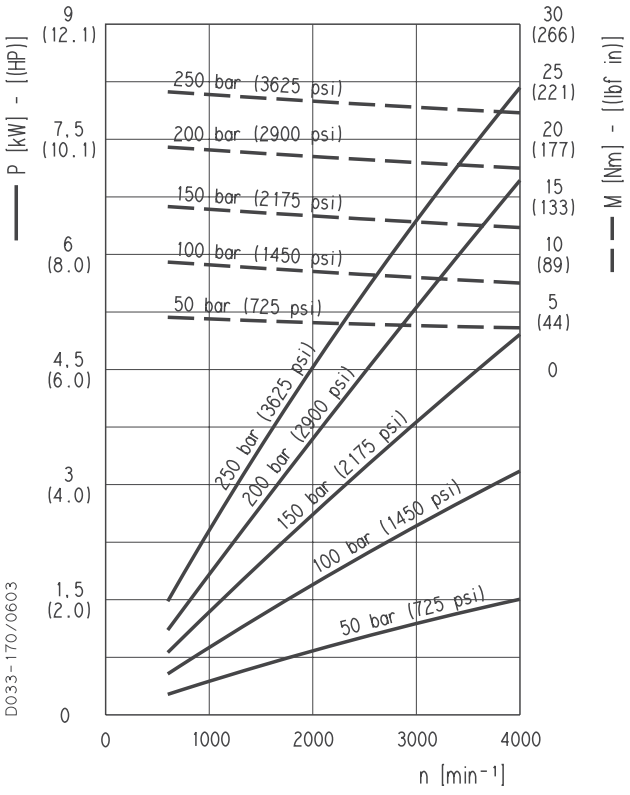
PLM 20 POLARIS 20 GEAR MOTORS PERFORMANCE CURVES

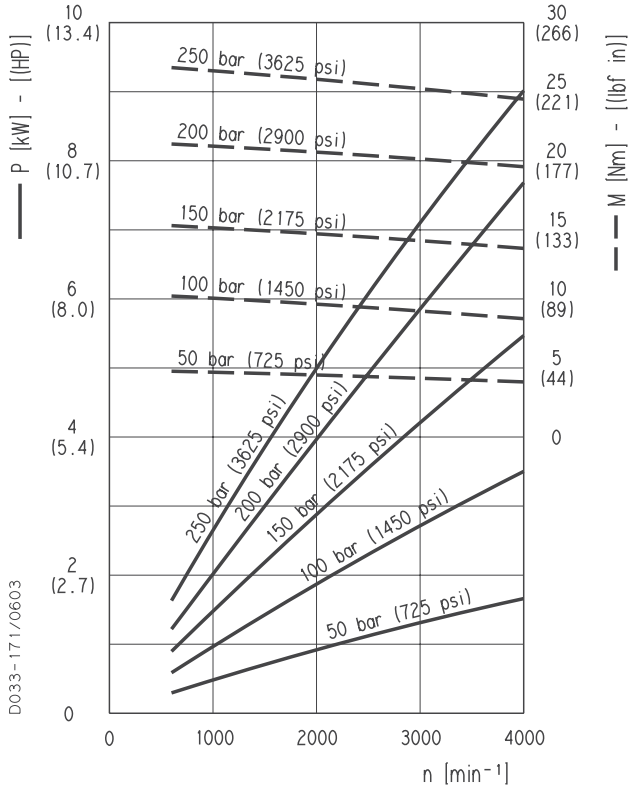
PLM 20•4



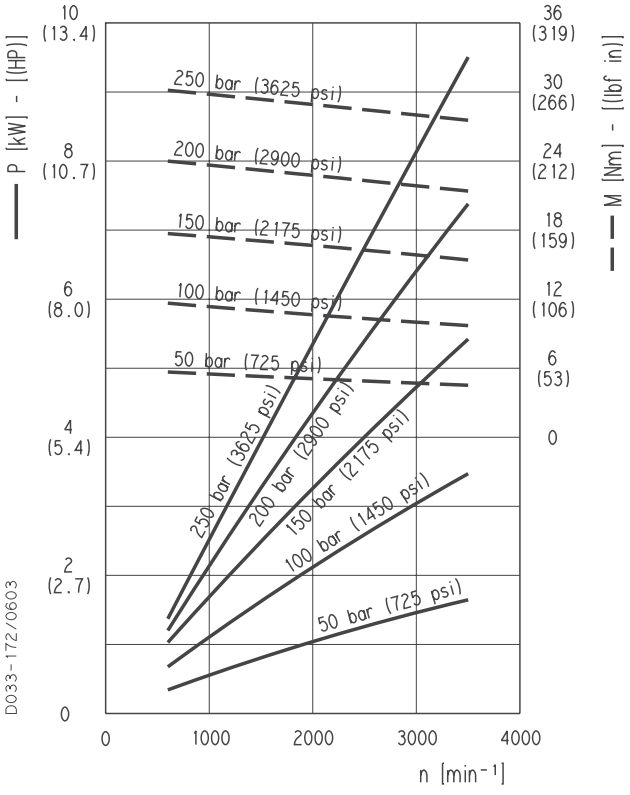
PLM 20•6,3



PLM 20•7,2



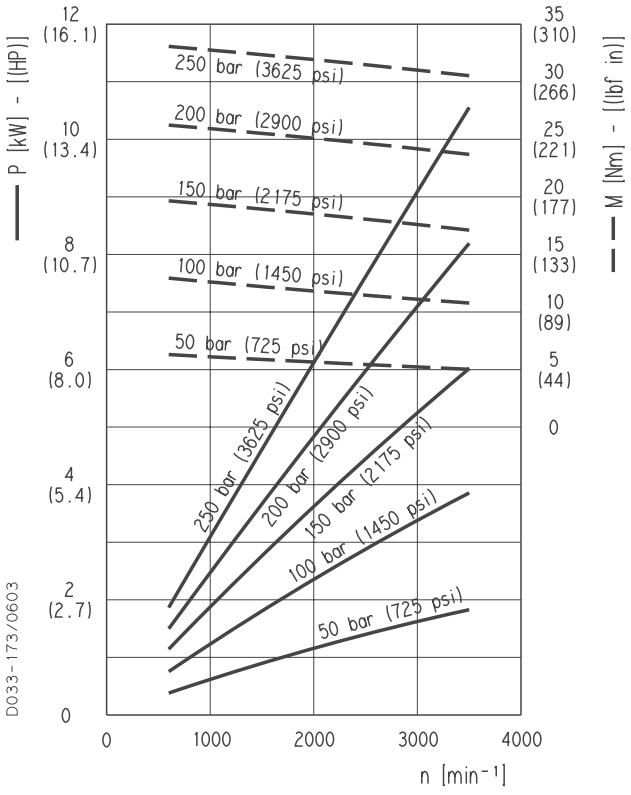
PLM 20•8



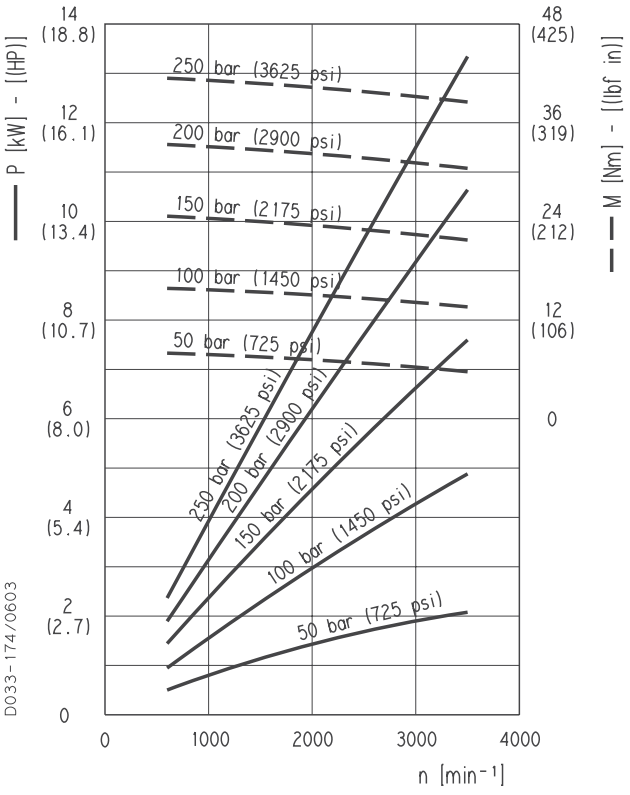
01/10.2003

PLM 20 POLARIS 20 GEAR MOTORS PERFORMANCE CURVES

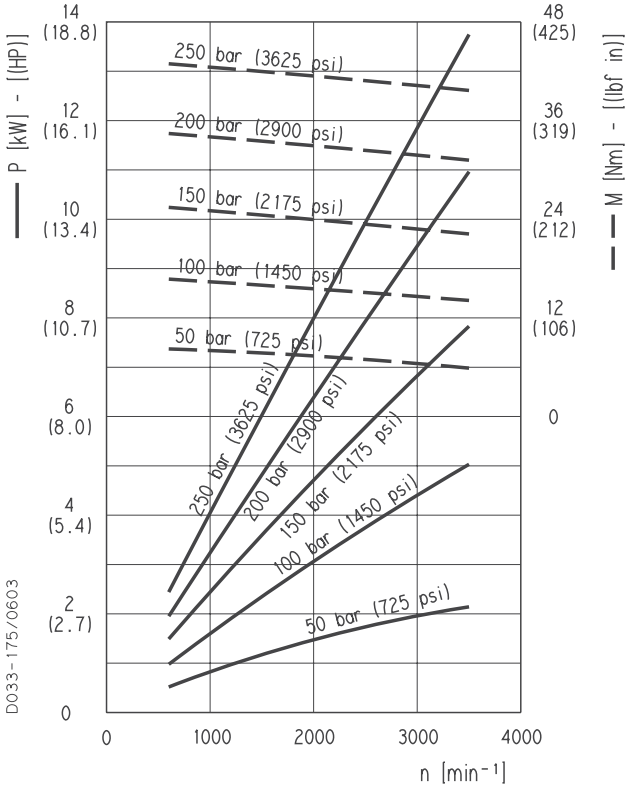
PLM 20•9



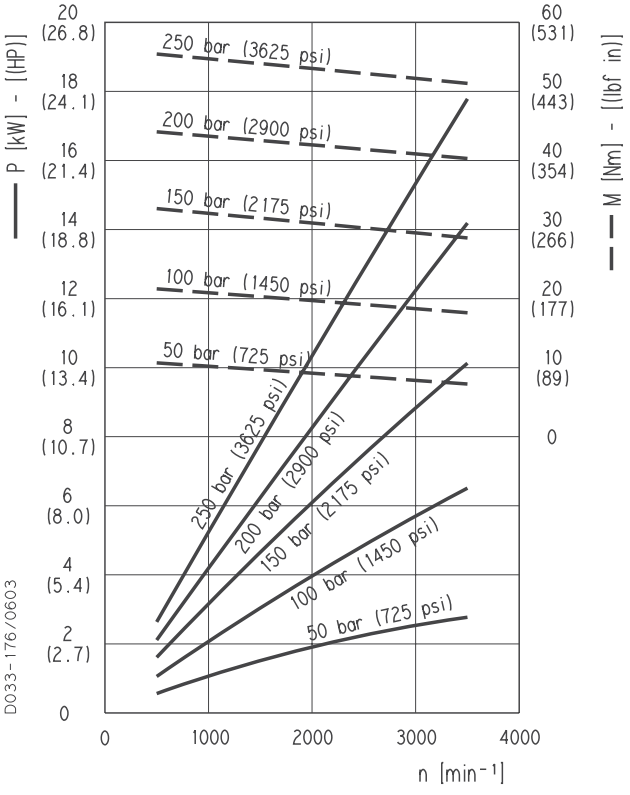
PLM 20•10,5



PLM 20•11,2



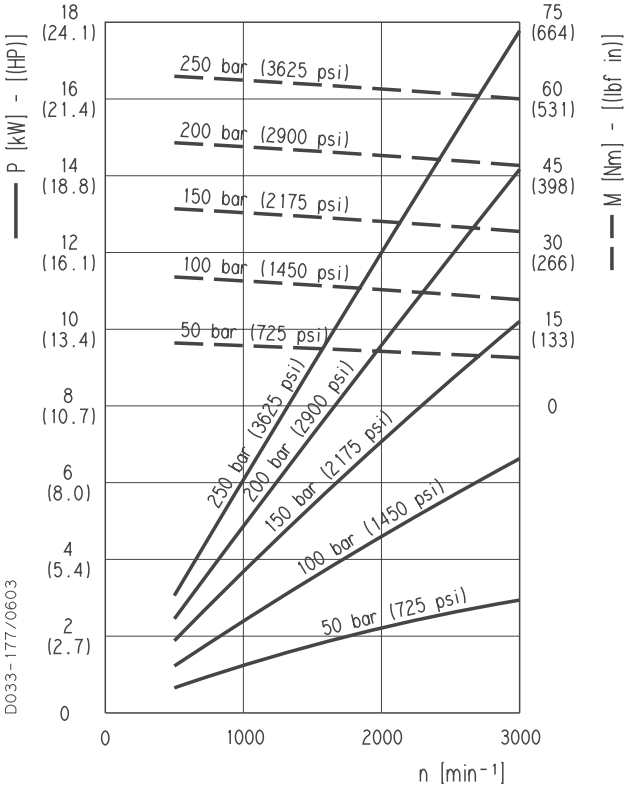
PLM 20•14



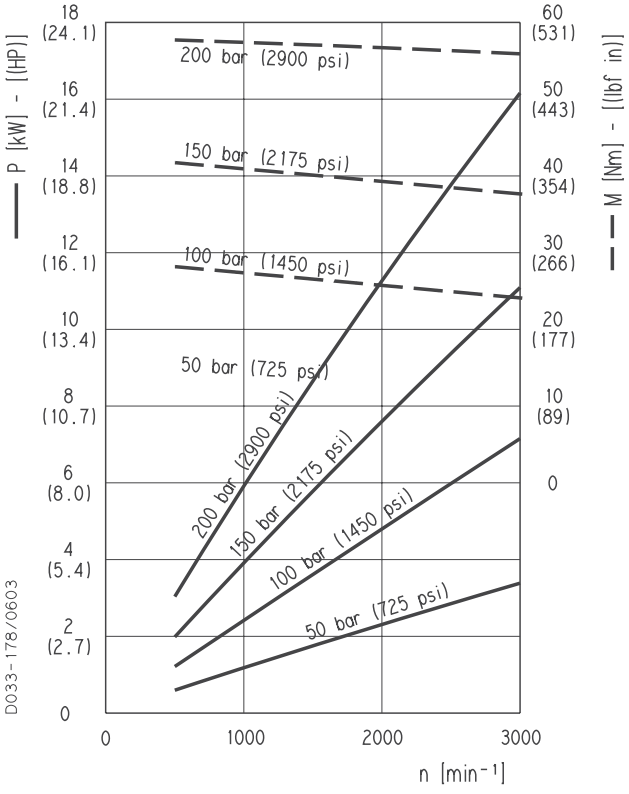
01/10.2003

PLM 20 POLARIS 20 GEAR MOTORS PERFORMANCE CURVES

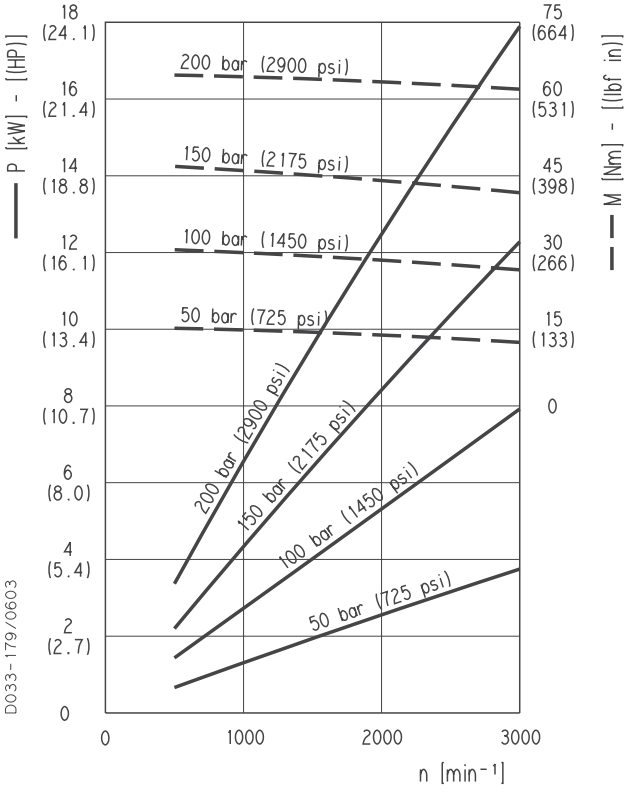
PLM 20•16



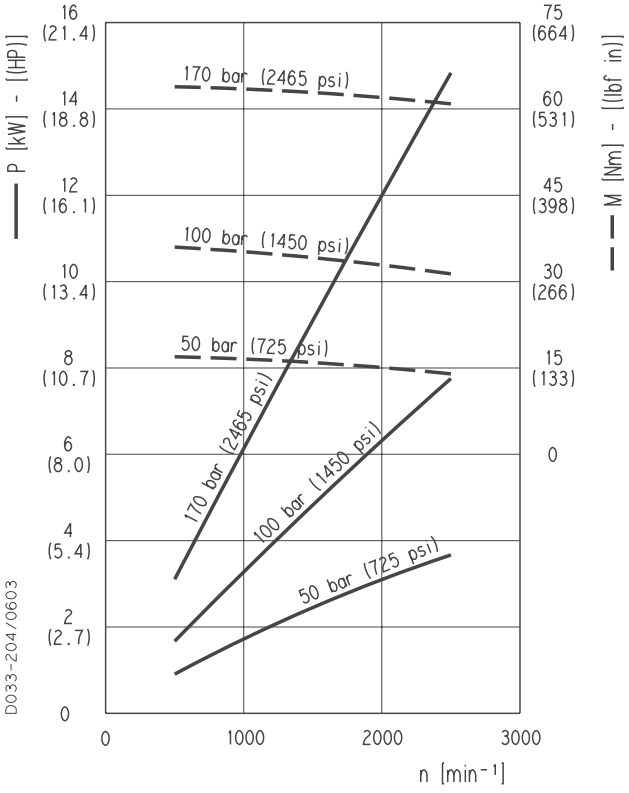
PLM 20•19



PLM 20•20



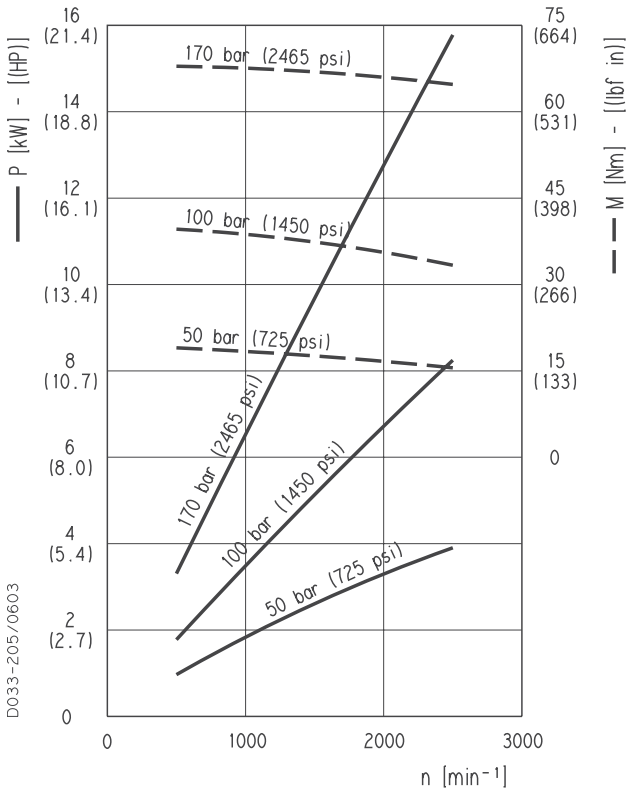
PLM 20•24,5



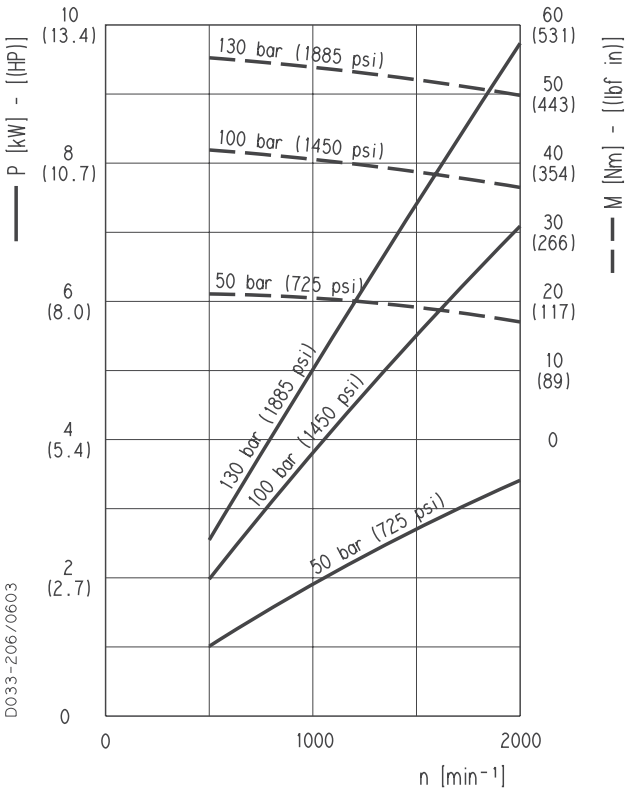
01/10.2003

PLM 20 POLARIS 20 GEAR MOTORS PERFORMANCE CURVES

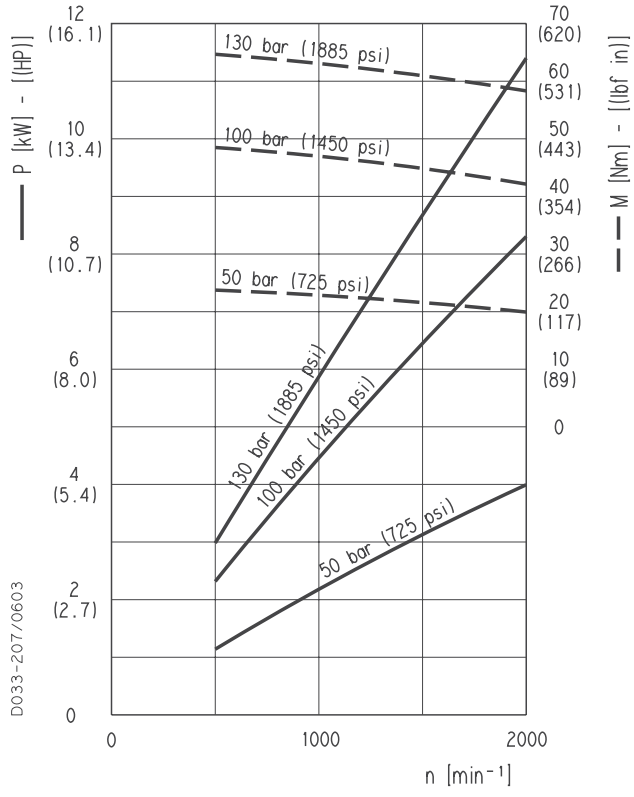
PLM 20•25



PLM 20•27,8



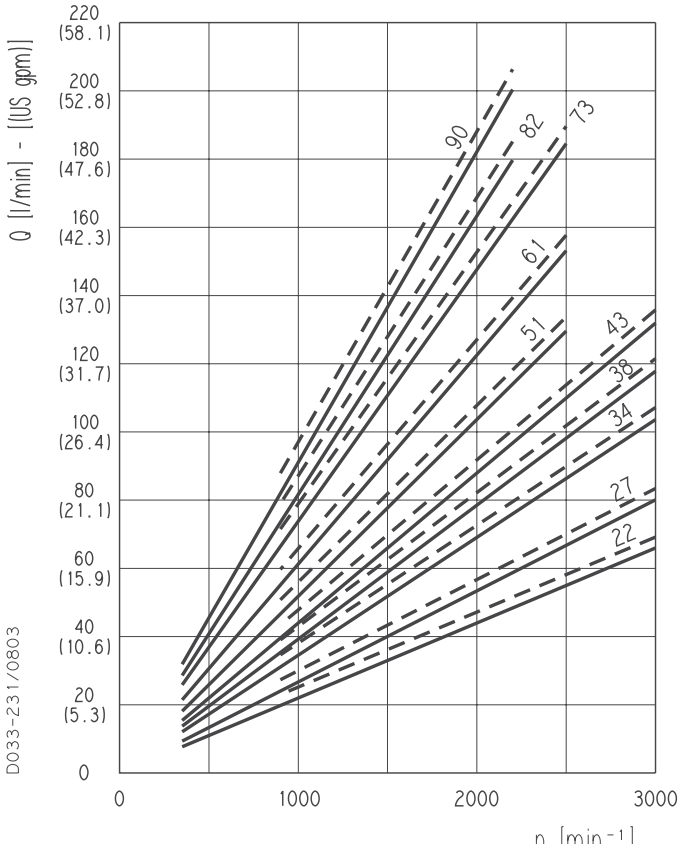
PLM 20•31,5



01/10.2003

PLM 30 POLARIS 30 GEAR MOTORS PERFORMANCE CURVES

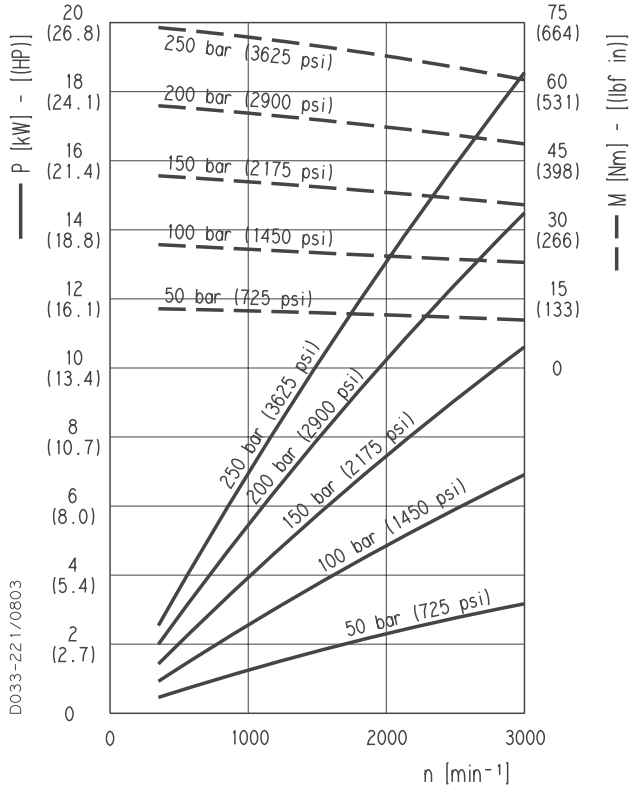
PLM 30



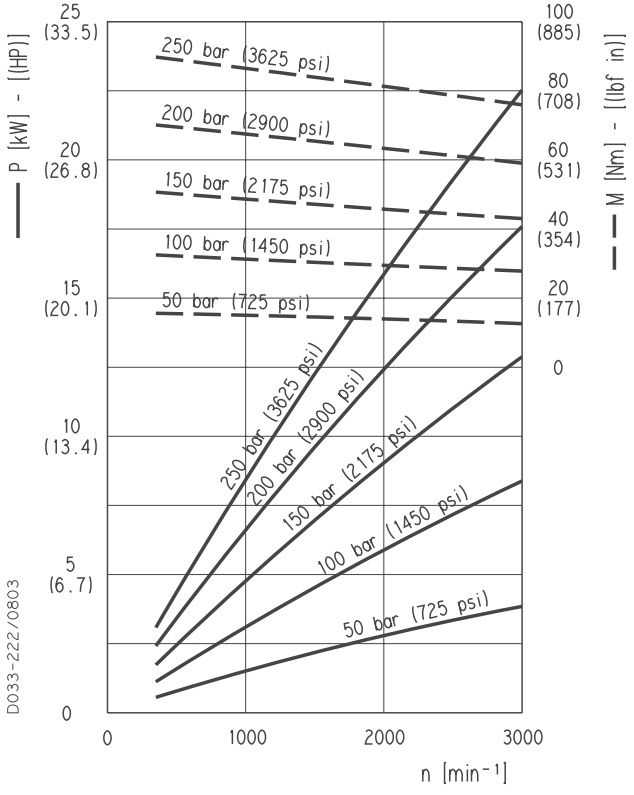
Each curve has been obtained at 50 °C (122 °F), using oil with viscosity 46 cSt (210 SSU) at 40 °C (104 °F) and at these pressures.

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

PLM 30•22



PLM 30•27



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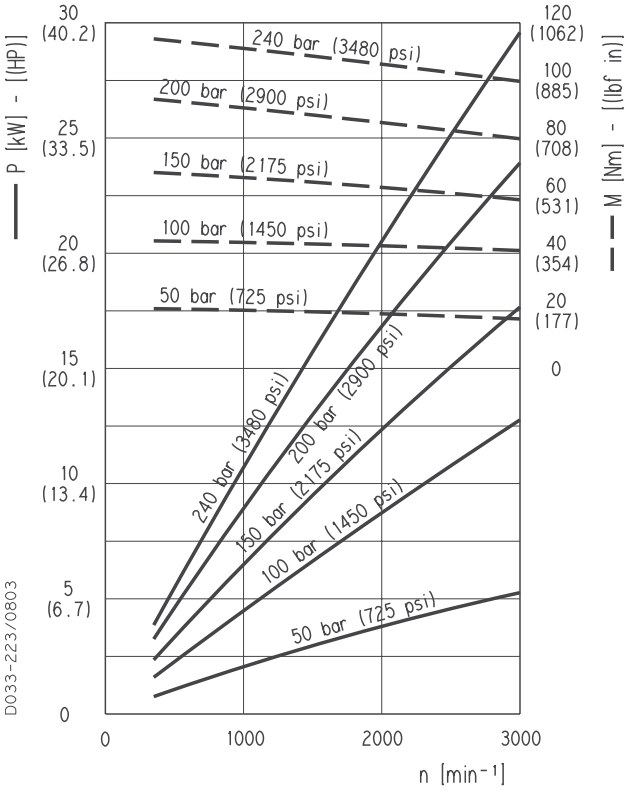
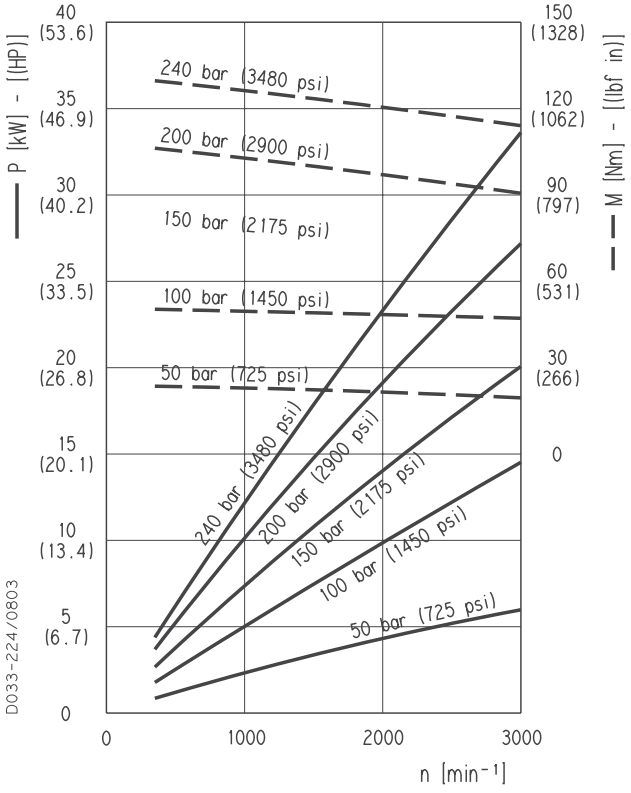
PLM 30 POLARIS 30 GEAR MOTORS PERFORMANCE CURVES

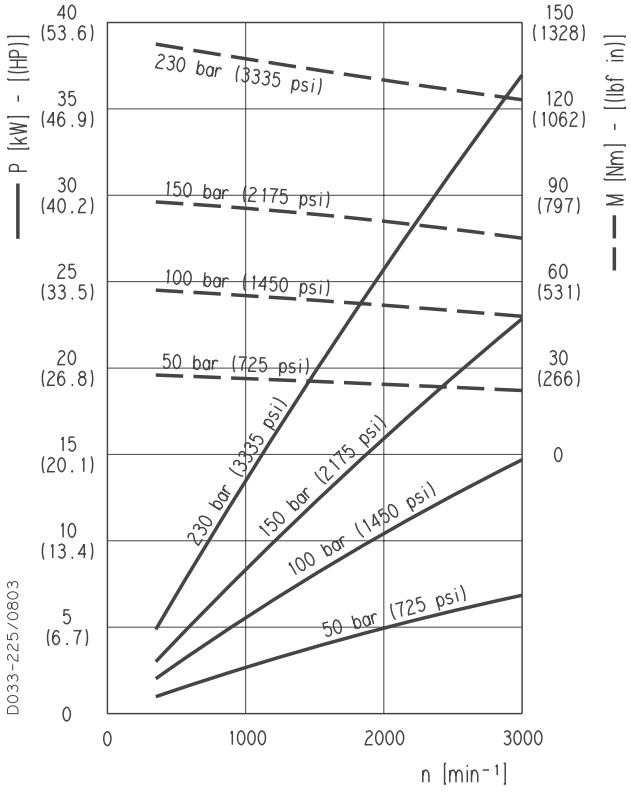
PLM 30•34



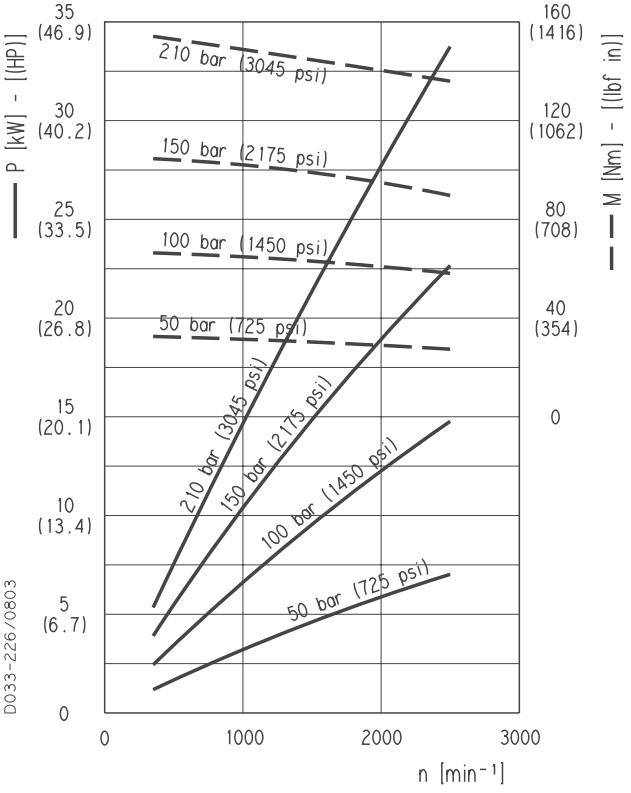
PLM 30•38



PLM 20•43



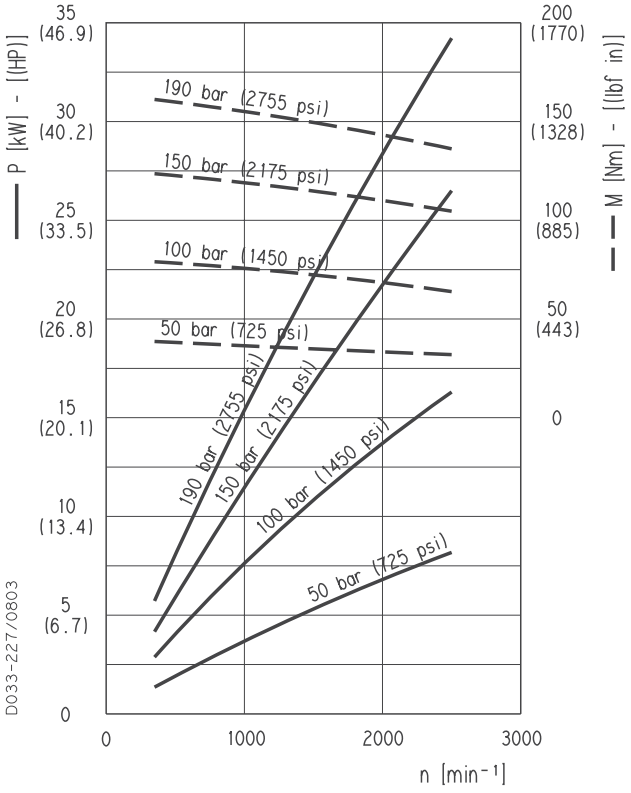
PLM 20•51



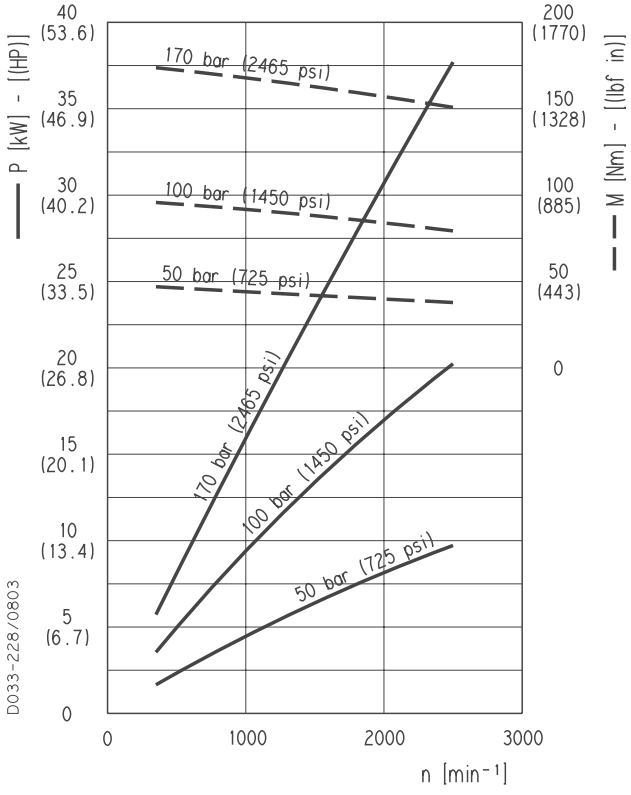
01/10.2003

PLM 30 POLARIS 30 GEAR MOTORS PERFORMANCE CURVES

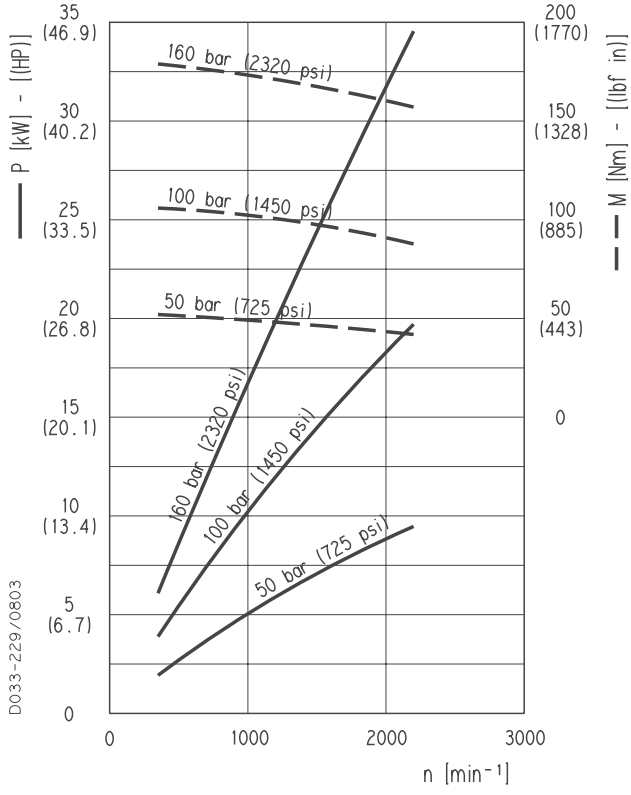
PLM 30•61



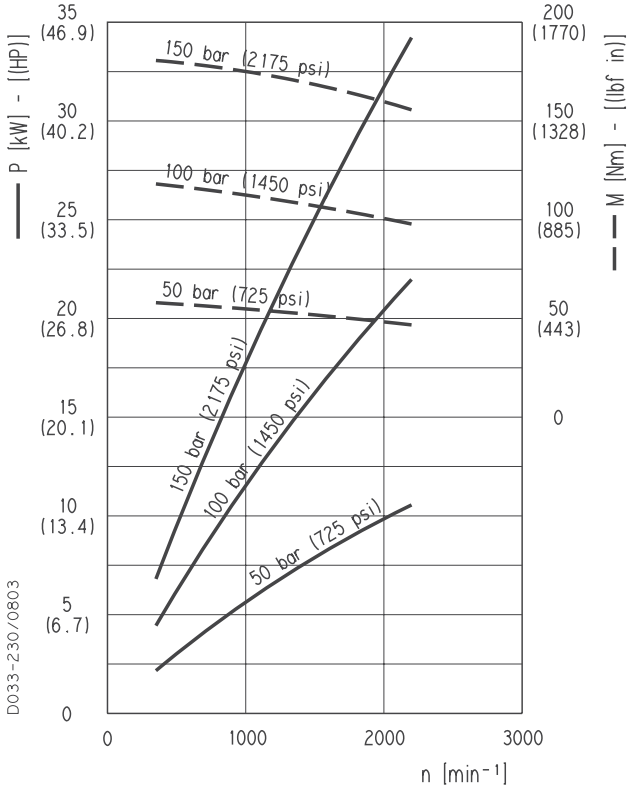
PLM 30•73



PLM 30•82



PLM 30•90



01/10.2003

NOTES

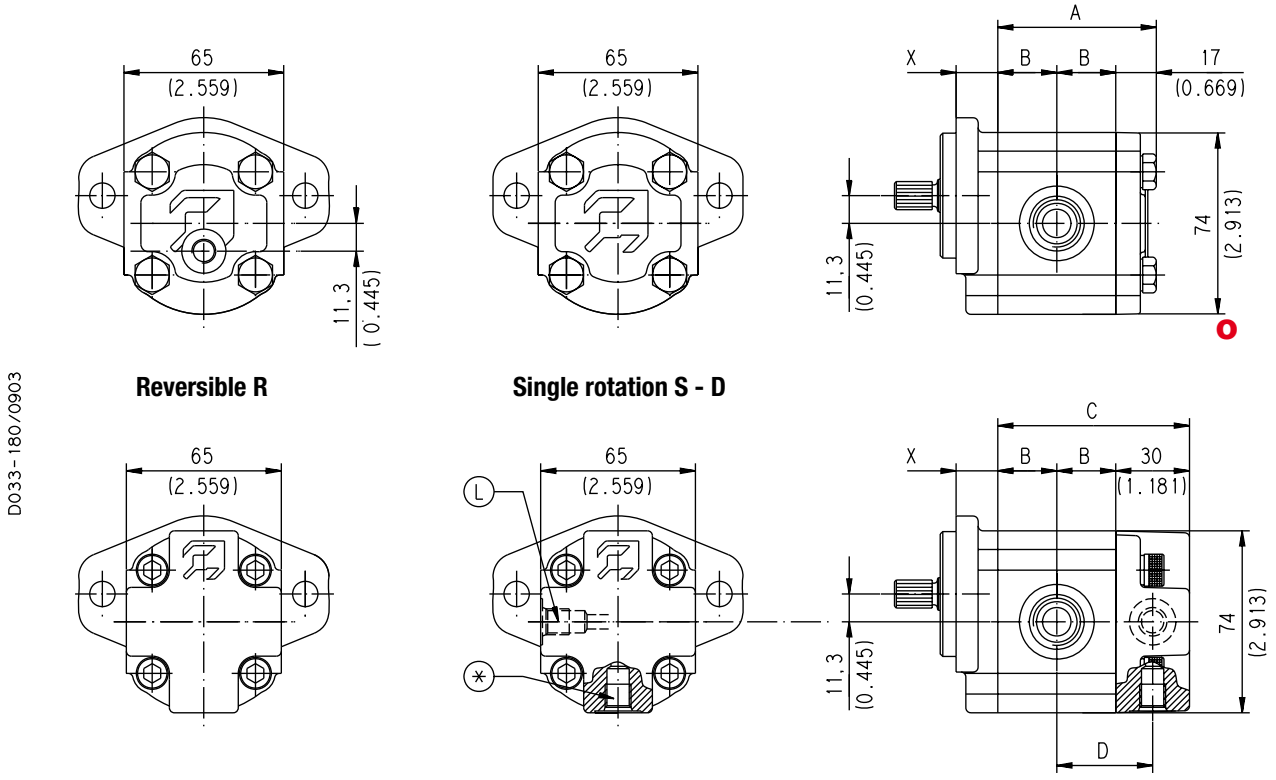
04/10.2020

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

Replaces: 02/07.2006



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

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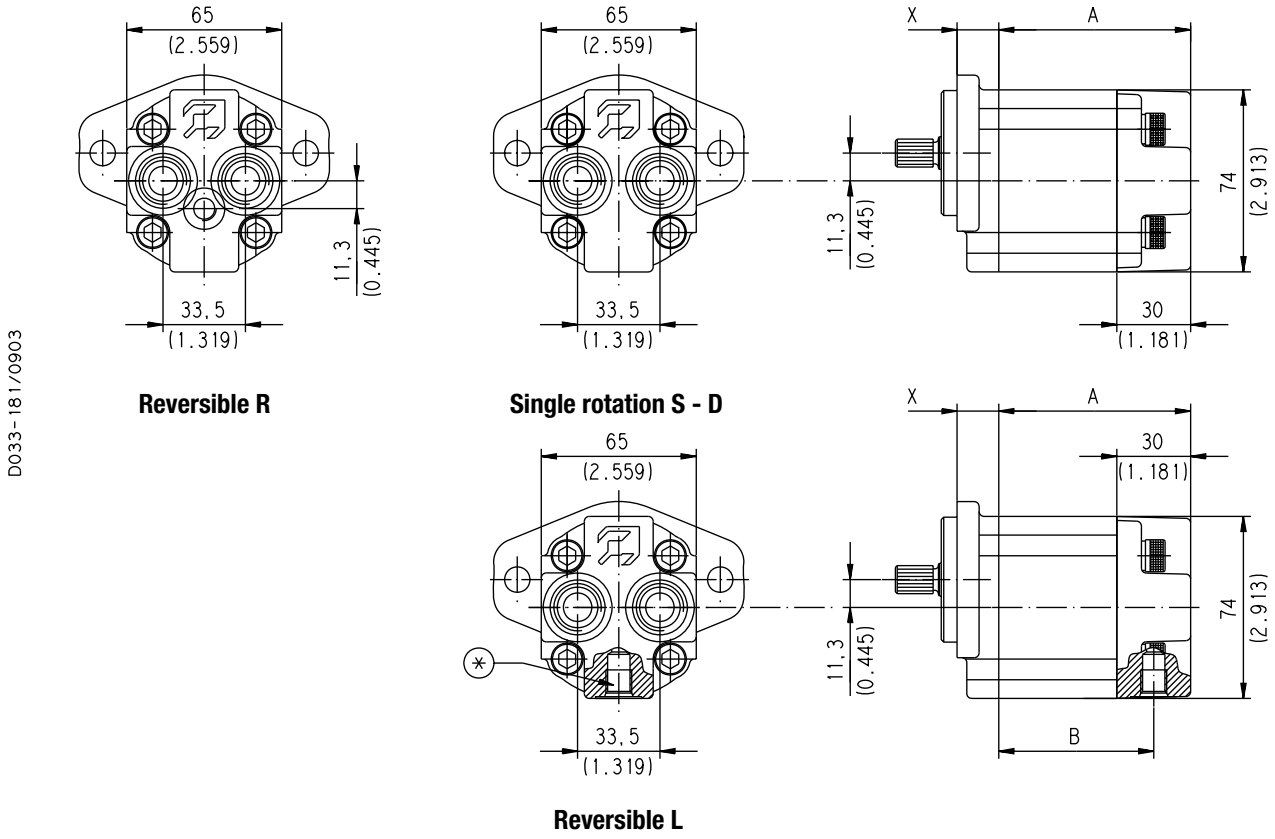
POLARIS 10 SINGLE UNITS DIMENSIONS - REAR PORTS P

Drive shafts: page 52
Mounting flange: for X dimension see page 58 ÷ 60

Ports availability: Gas, SAE
See page 70

Replaces: 02/07.2006

O



D033-181/0903

Reversible R

Single rotation S - D

Reversible L

Rear cover in aluminium only.

Reversible L drain port position:
*= Bottom

O 04/10.2020

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

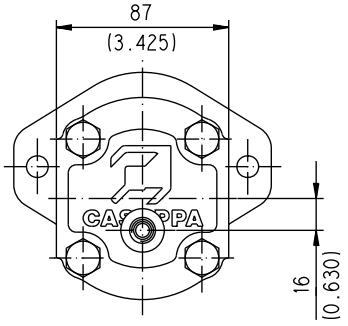
POLARIS 20 SINGLE UNITS DIMENSIONS - SIDE PORTS L

Drive shafts: page 53 ÷ 55
Mounting flange: for X dimension see page 61 ÷ 66

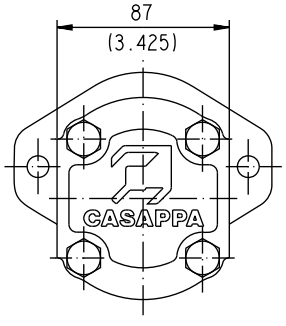
Ports availability: European, Split, Gas, SAE German. See page 70

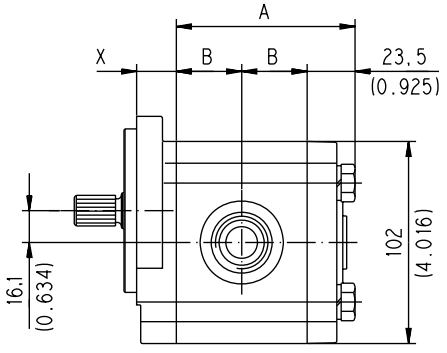
Replaces: 02/07.2006

D033-182/0903

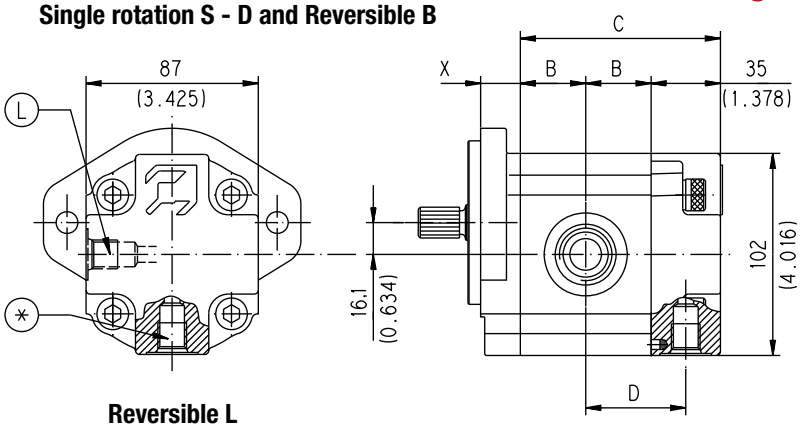


Reversible R





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

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POLARIS 20 SINGLE UNITS DIMENSIONS - REAR PORTS P

Drive shafts: page 53 ÷ 55
Mounting flange: for X dimension see page 61 ÷ 66

Ports availability: Gas, SAE.
See page 70

Replaces: 02/07.2006

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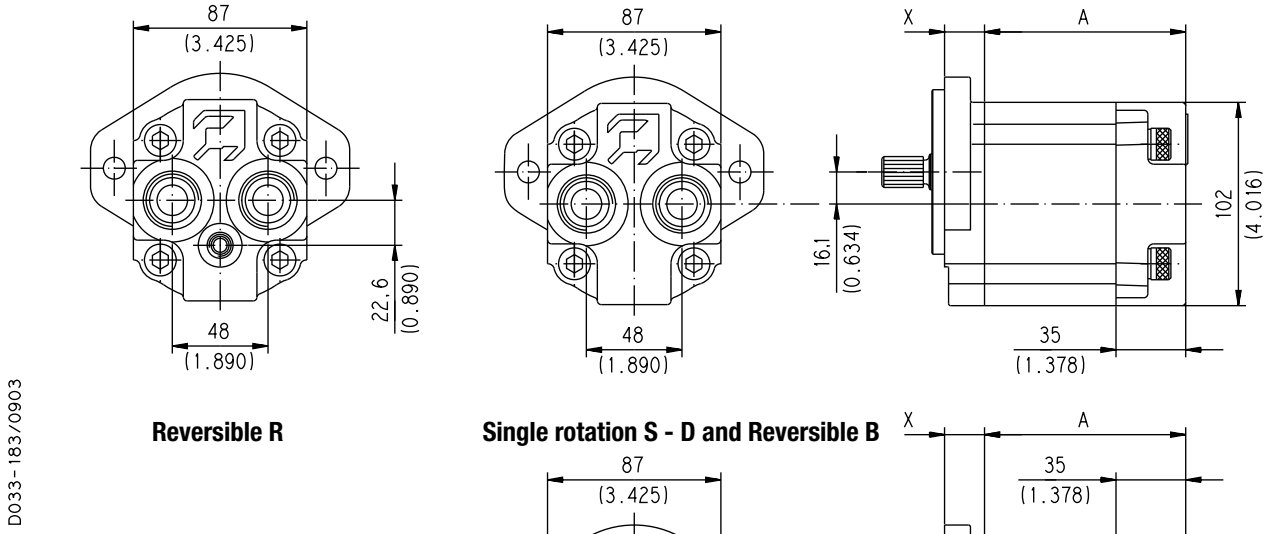
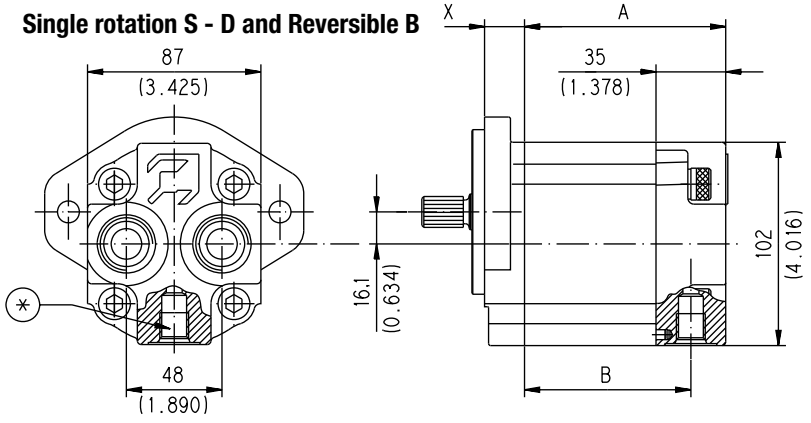


D033-183/0903

Reversible R

Single rotation S - D and Reversible B



Reversible L

Rear cover in aluminium only.

Reversible L drain port position:
*= Bottom

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

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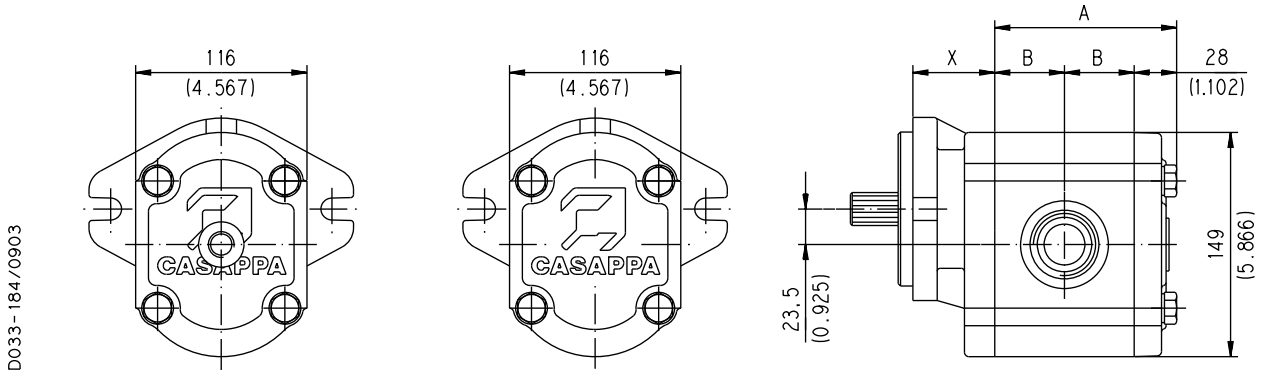
POLARIS 30 SINGLE UNITS DIMENSIONS - SIDE PORTS L

Drive shafts: page 56 ÷ 57
Mounting flange: for X dimension see page 67 ÷ 69

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

Replaces: 03/02.2012



Reversible R **Single rotation S - D**

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Rear cover in cast iron only.

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

O 04/10.2020

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. For more information please consult our pre-sales department.

M	Nm (lbf in)	Torque
V	cm^3/rev (in^3/rev)	Displacement
Δp	bar (psi)	Pressure
$\eta_{hm} = \eta_{hm}$ (V, Δp, n)	(≈ 0,88)	Hydro-mechanical efficiency

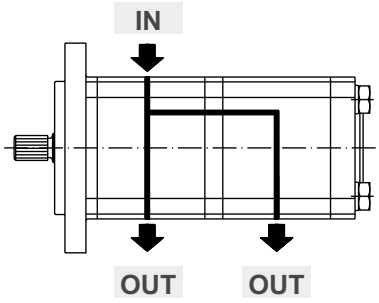
$$\mathbf{M} = \frac{M_{theor.}}{\eta_{hm}} \text{ [Nm]}$$

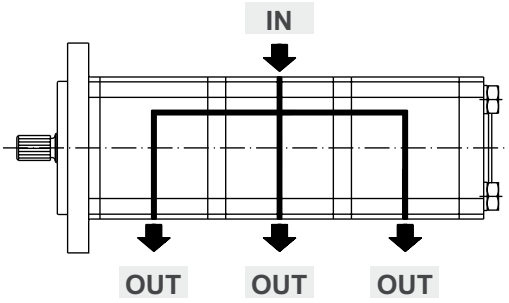
$$\mathbf{M_{theor.}} = \frac{\Delta p \text{ (bar)} \bullet V \text{ (cm}^3\text{/rev)}}{62{,}83} \text{ [Nm]}$$

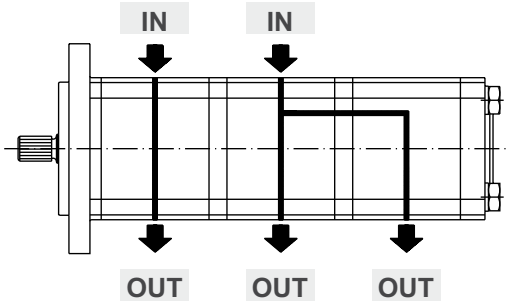
NOTE
The torque absorbed from the shaft of the first pump results from the sum of the torques of all the single stages. The achieved value must not exceed the maximum torque limit given for the shaft of the first pump.

03/02.2012

COMMON INLET - PORTS POSITION







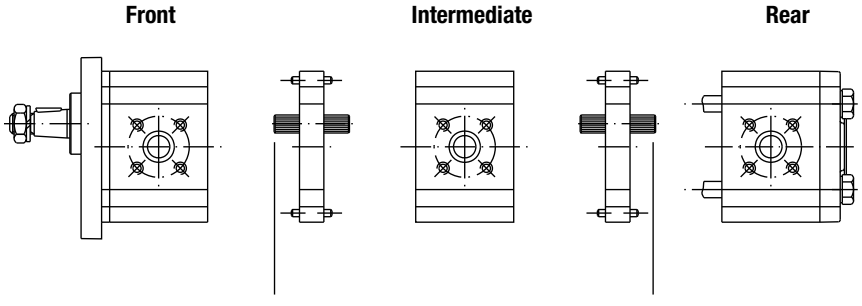
Reduced inlets provide overall systems savings by reducing the cost of redundant inlet hose and fittings.

For other combinations please consult our pre-sales department.

MULTIPLE PUMPS COMBINATION PL10

Polaris 10/10	**STANDARD VERSION**	**V6**
Polaris 10/10	**COMMON INLET VERSION**	**V7**

D033-112/0603



88 MAX 30 Nm (266 lbf in)

88 MAX 30 Nm (266 lbf in)

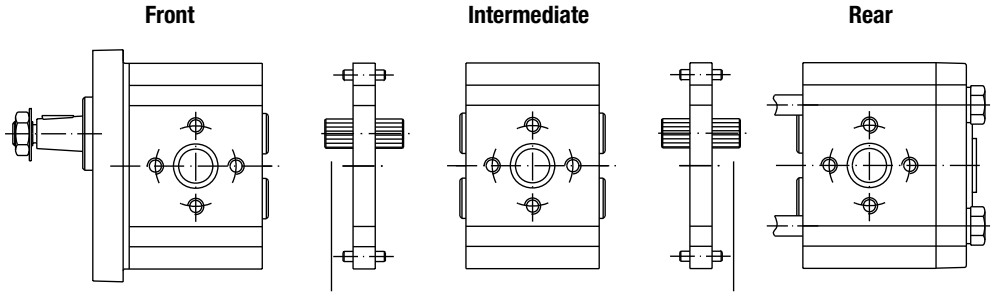
02/07.2006

MULTIPLE PUMPS COMBINATION PLP 20

Replaces: 02/07.2006

Polaris 20/20	**STANDARD VERSION**	**S6**
Polaris 20/20	**COMMON INLET VERSION**	**S7**

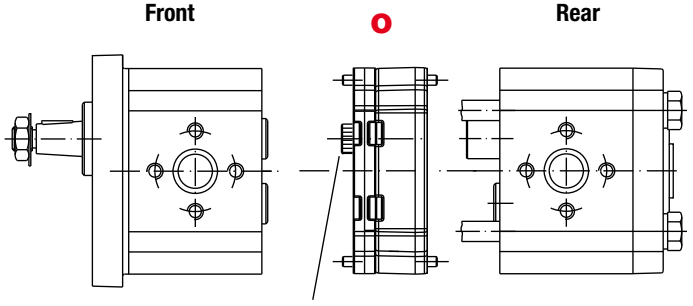
D033-106/0603



86 MAX 110 Nm (974 lbf in) **86** MAX 110 Nm (974 lbf in)

Polaris 20/20	**SEPARATED SRAGES VERSION**	**Z6**

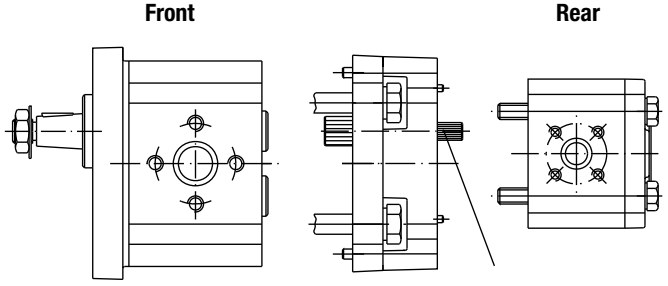
D033-110/0603



86 MAX 110 Nm (974 lbf in)

Polaris 20/10	**STANDARD VERSION**	**T6**
Polaris 20/10	**COMMON INLET VERSION**	**T7**

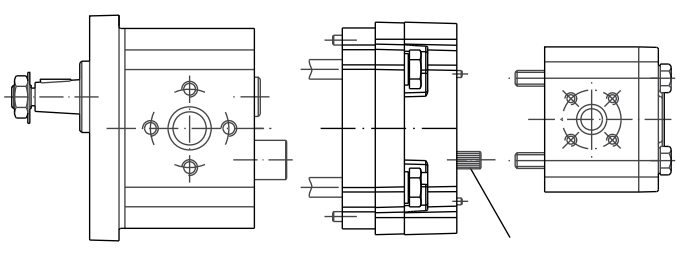
D033-107/0603



51 MAX 30 Nm (266 lbf in)

Polaris 20/10	**SEPARATED SRAGES VERSION**	**Z6**

D033-111/0603



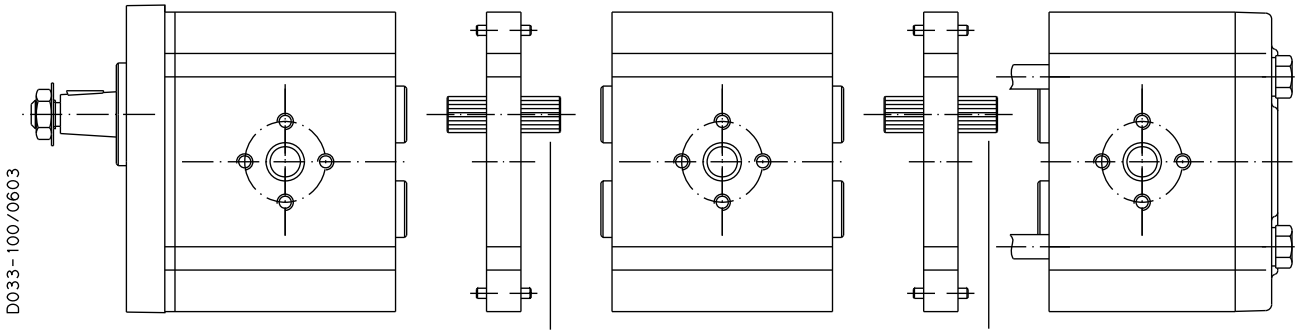
51 MAX 30 Nm (266 lbf in)

o 04/10.2020

MULTIPLE PUMPS COMBINATION PLP 30

Polaris 30/30	STANDARD VERSION	M6

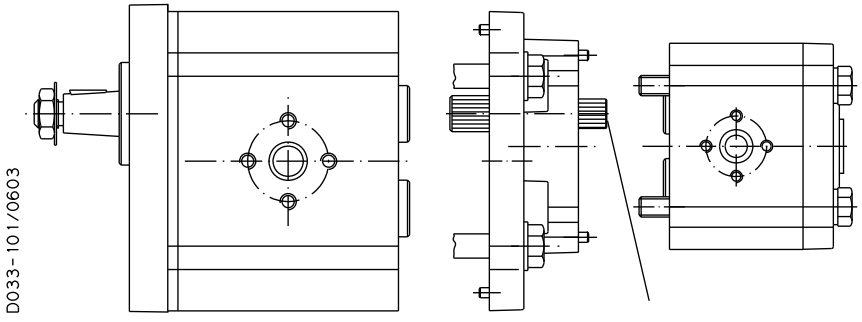
Front Intermediate Rear



65 MAX 170 Nm (1505 lbf in) O 65 MAX 170 Nm (1505 lbf in)

Polaris 30/20	STANDARD VERSION	N6
Polaris 30/20	COMMON INLET VERSION	N7

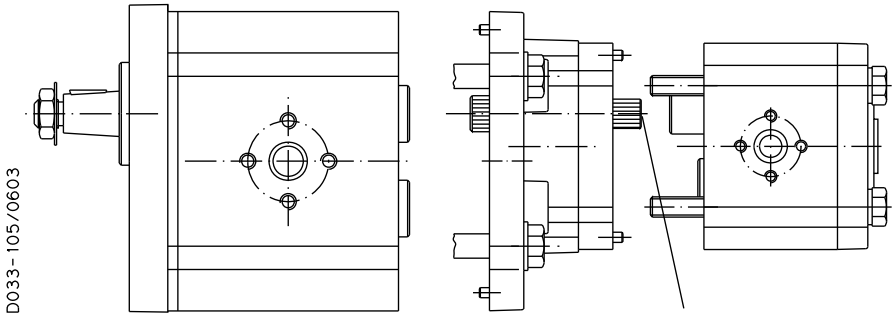
Front Rear



83 MAX 110 Nm (974 lbf in)

Polaris 30/20	SEPARATED SRAGES VERSION	Z6

Front Rear



83 MAX 110 Nm (974 lbf in)

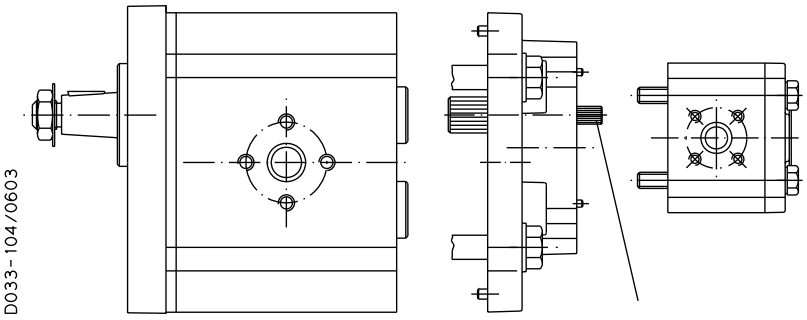
Replaces: 02/07.2006

O 04/10.2020

MULTIPLE PUMPS COMBINATION PLP 30

Polaris 30/20	**STANDARD VERSION**	**Q6**
Polaris 30/10	**COMMON INLET VERSION**	**Q7**

Front **Rear**



52 MAX 30 Nm (266 lbf in)

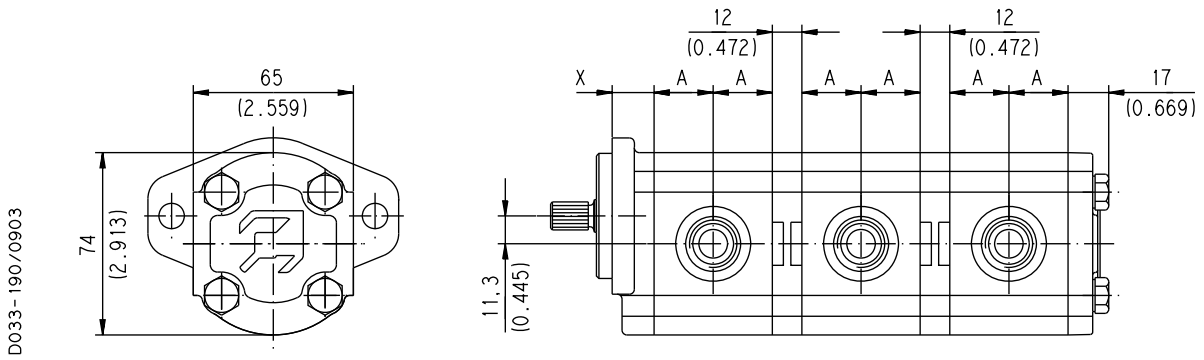
02/07.2006

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



Replaces: 02/07.2006

Rear cover available in cast iron and aluminium.

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

04/10.2020

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

Replaces: 02/07.2006

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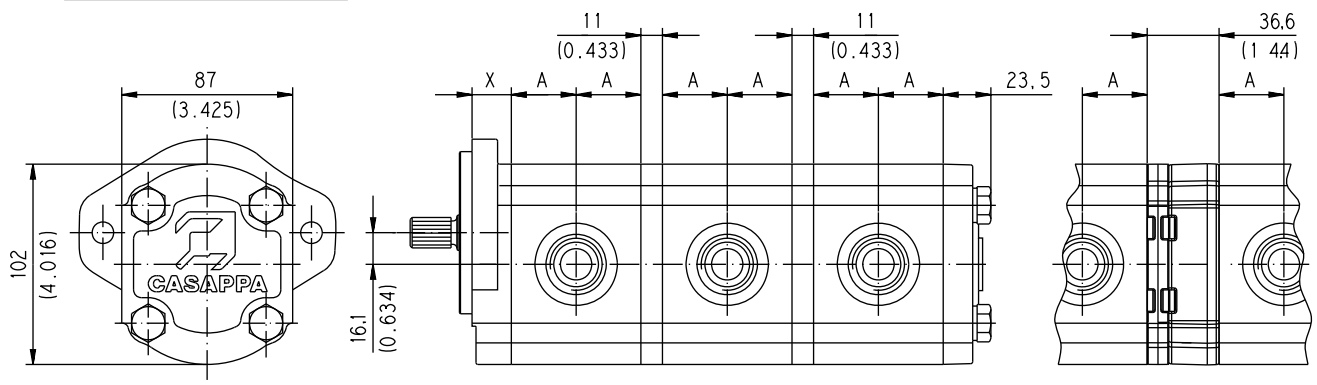
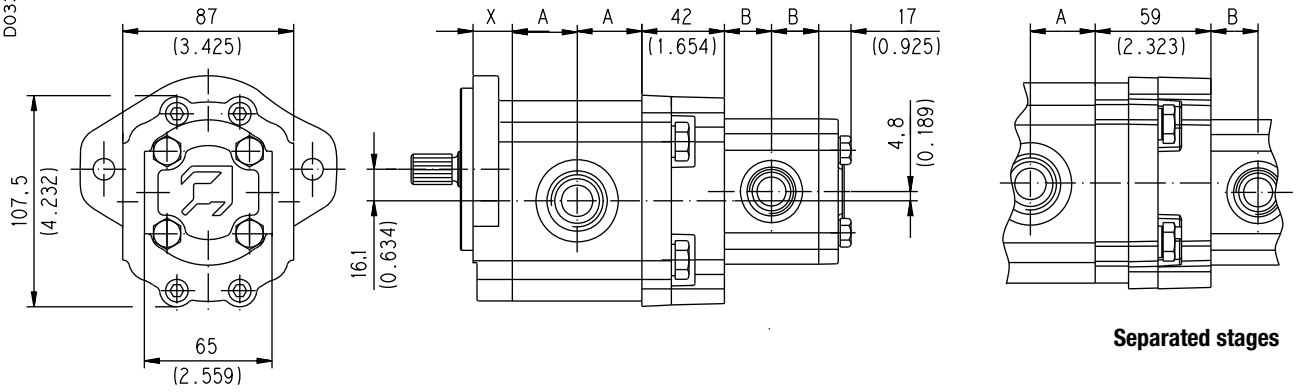
PLP 20/20



Separated stages

PLP 20/10



Separated stages

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

Rear cover available in cast iron and aluminium.

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

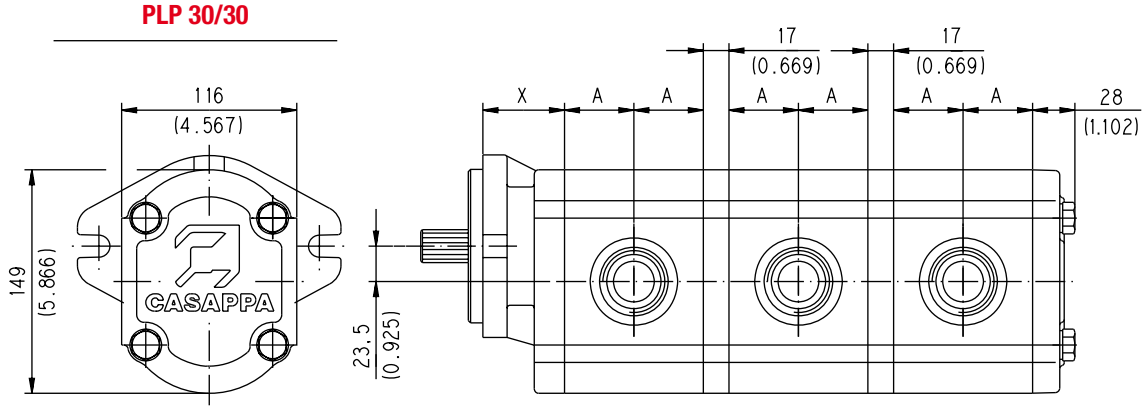
o 04/10.2020

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

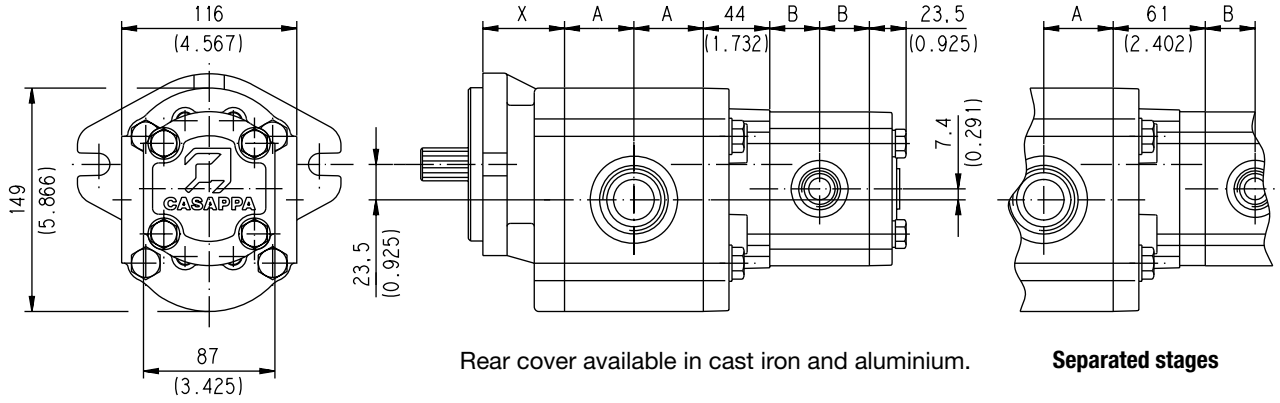
Replaces: 02/07.2008

PLP 30/30



Rear cover in cast iron only.

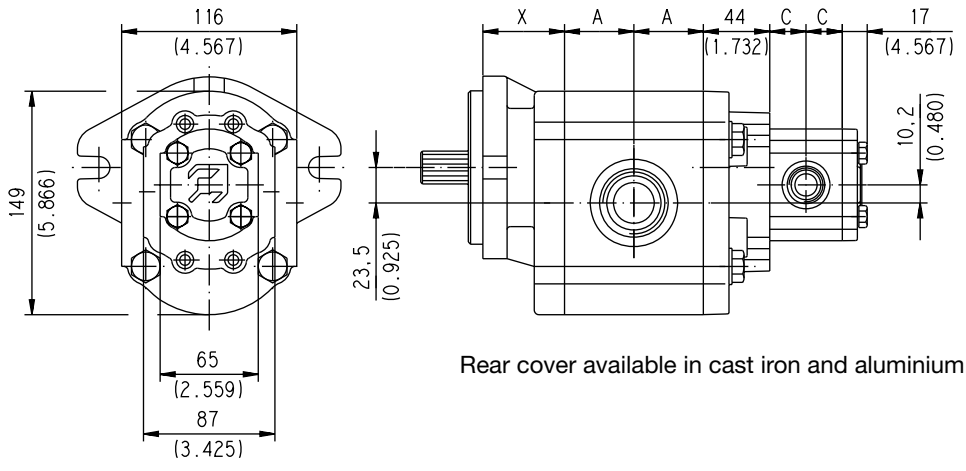
PLP 30/20



Rear cover available in cast iron and aluminium.

Separated stages

PLP 30/10



Rear cover available in cast iron and aluminium.

D033-260/0903
04/10.2020

POLARIS 30 — MULTIPLE PUMPS DIMENSIONS — PLP30

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

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

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

02/07.2006

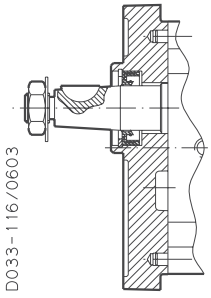
OUTBOARD BEARING OPTIONS

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.
For particular applications please consult our pre-sales department.

PLP 10 - 20 - 30

O

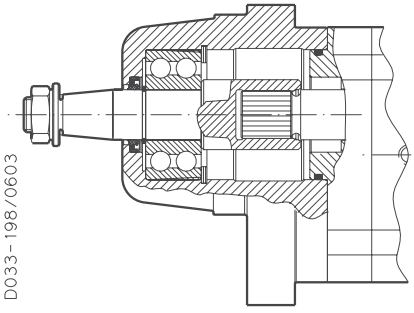
VERSION	0



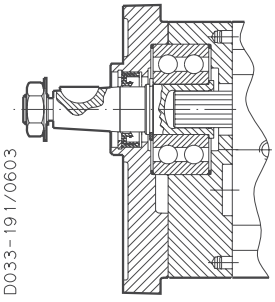
Version for applications without radial and axial load on the drive shaft.

PLP20 VERSION	W8

Only available in 55 W8

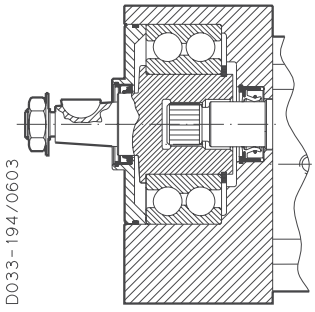


PLP20 VERSION	5



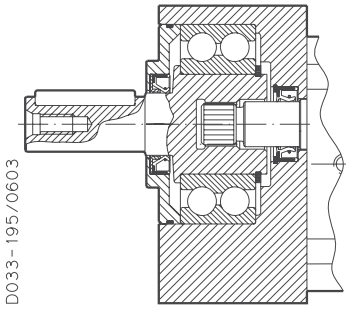
PLP20 VERSION	7

Only available in 82 E2



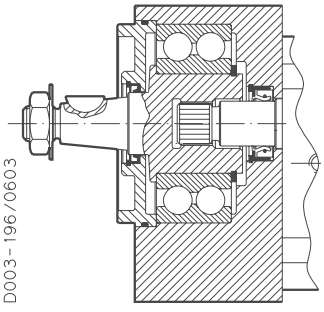
PLP20 VERSION	8

Only available in B1 E2



PLP20 VERSION	9

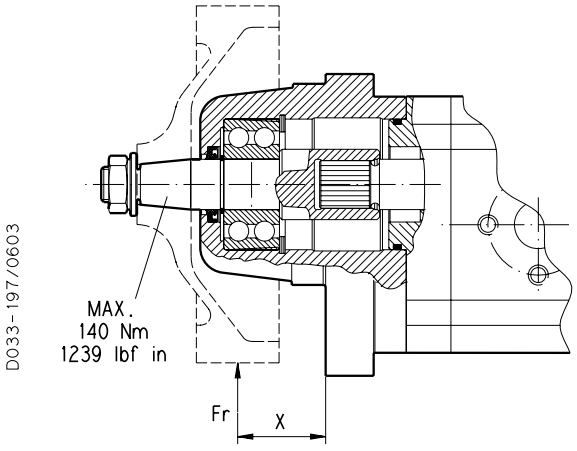
Only available in 55 B2



Replaces: 01/09.2019

O 04/10.2020

POLARIS 20 VERSION WITH OUTBOARD BEARING W8



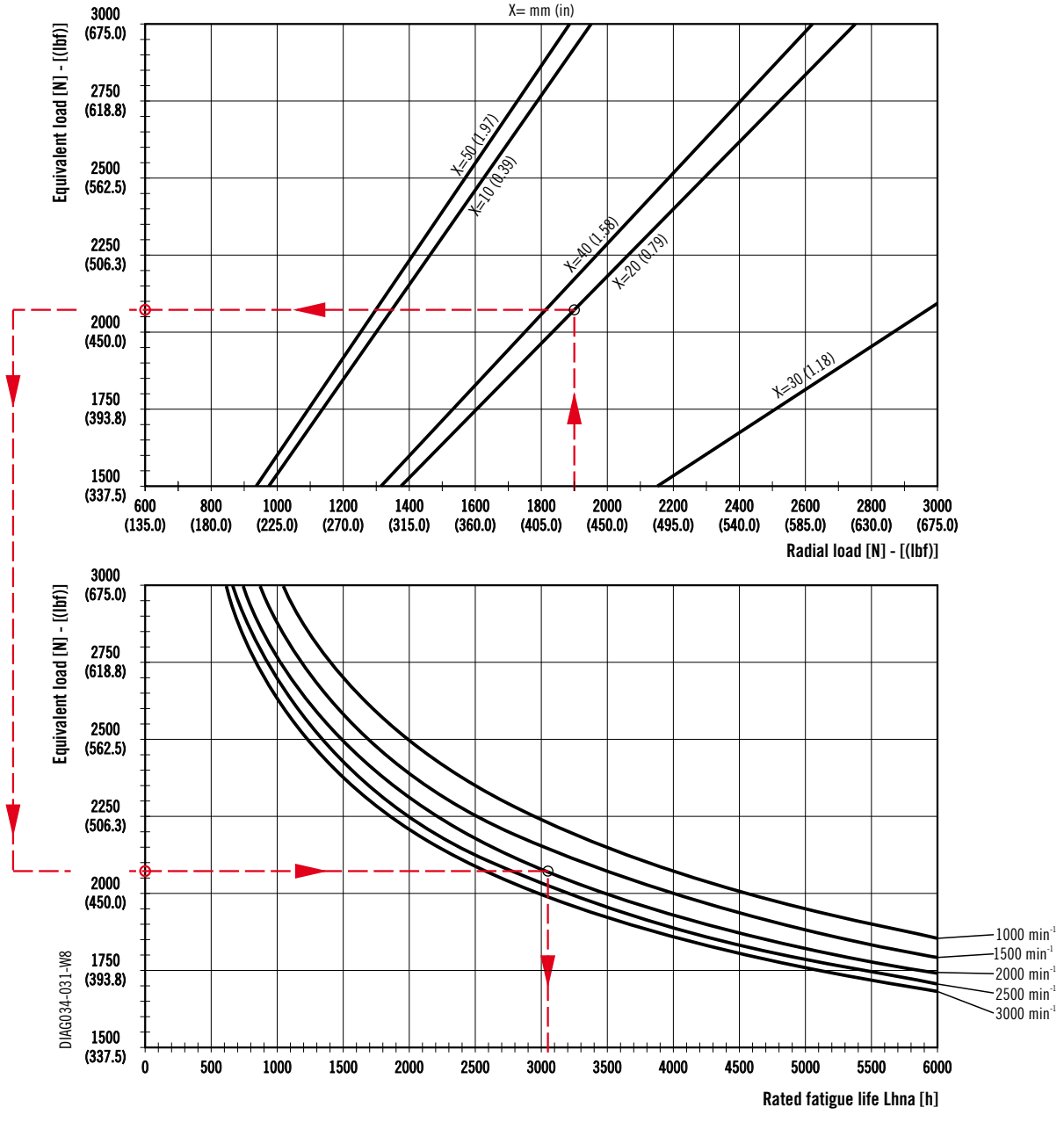
X = Distance of the radial load result from the mounting flange [mm (in)].

Each curve has been obtained at:

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

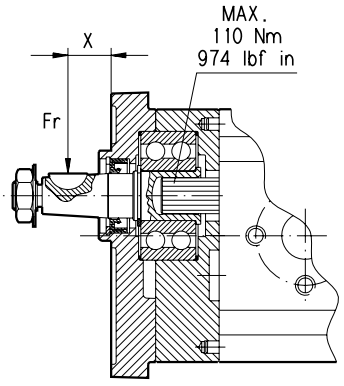
Example	
Fr Radial load	1900 N (427.5 lbf)
X	20 mm (0.79 in)
Speed	2000 min^{-1}
Rated fatigue life	≈ 3050 h

Values shown in the diagrams are indicative only. For more information please consult our pre-sales department.



02/07.2006

POLARIS 20 VERSION WITH OUTBOARD BEARING 5



D033-115/0603

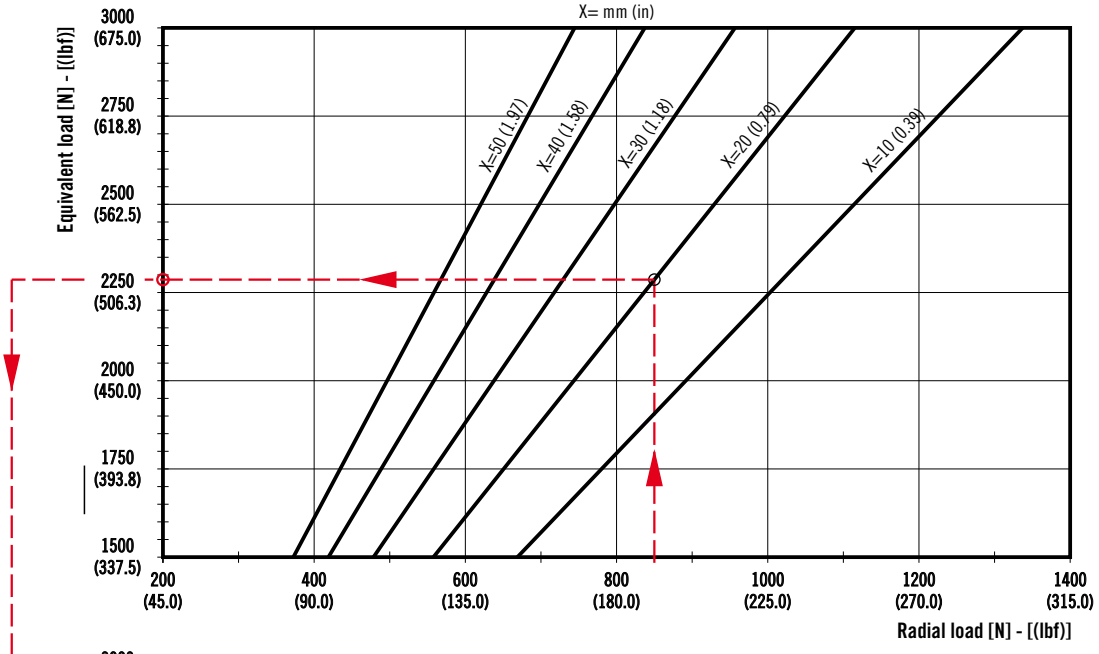
X = Distance of the radial load result from the mounting flange [mm (in)].

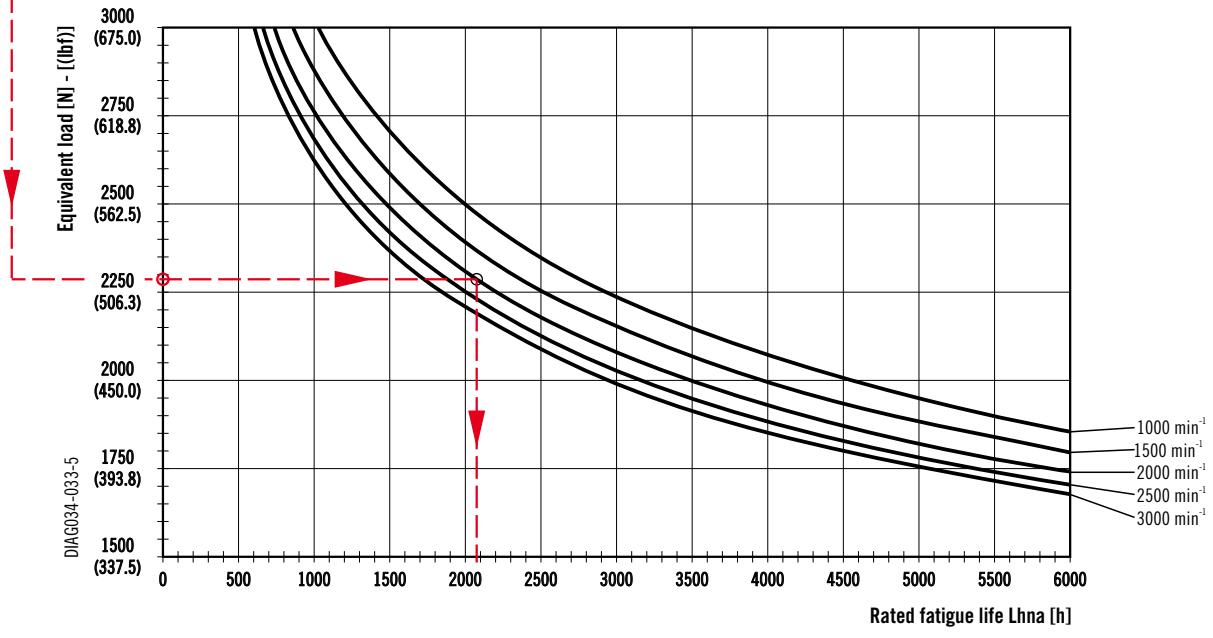
Each curve has been obtained at:

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

Example	
Fr Radial load	850 N (191.3 lbf)
X	20 mm (0.79 in)
Speed	2000 min^{-1}
Rated fatigue life	≈ 2100 h

Values shown in the diagrams are indicative only. For more information please consult our pre-sales department.





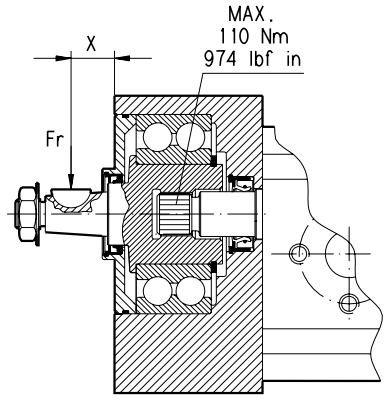
DIAG034-033-5

Replaces: 02/07.2008

04/10.2020

POLARIS 20 VERSION WITH OUTBOARD BEARING 7 - 8 - 9

Replaces: 02/07.2006



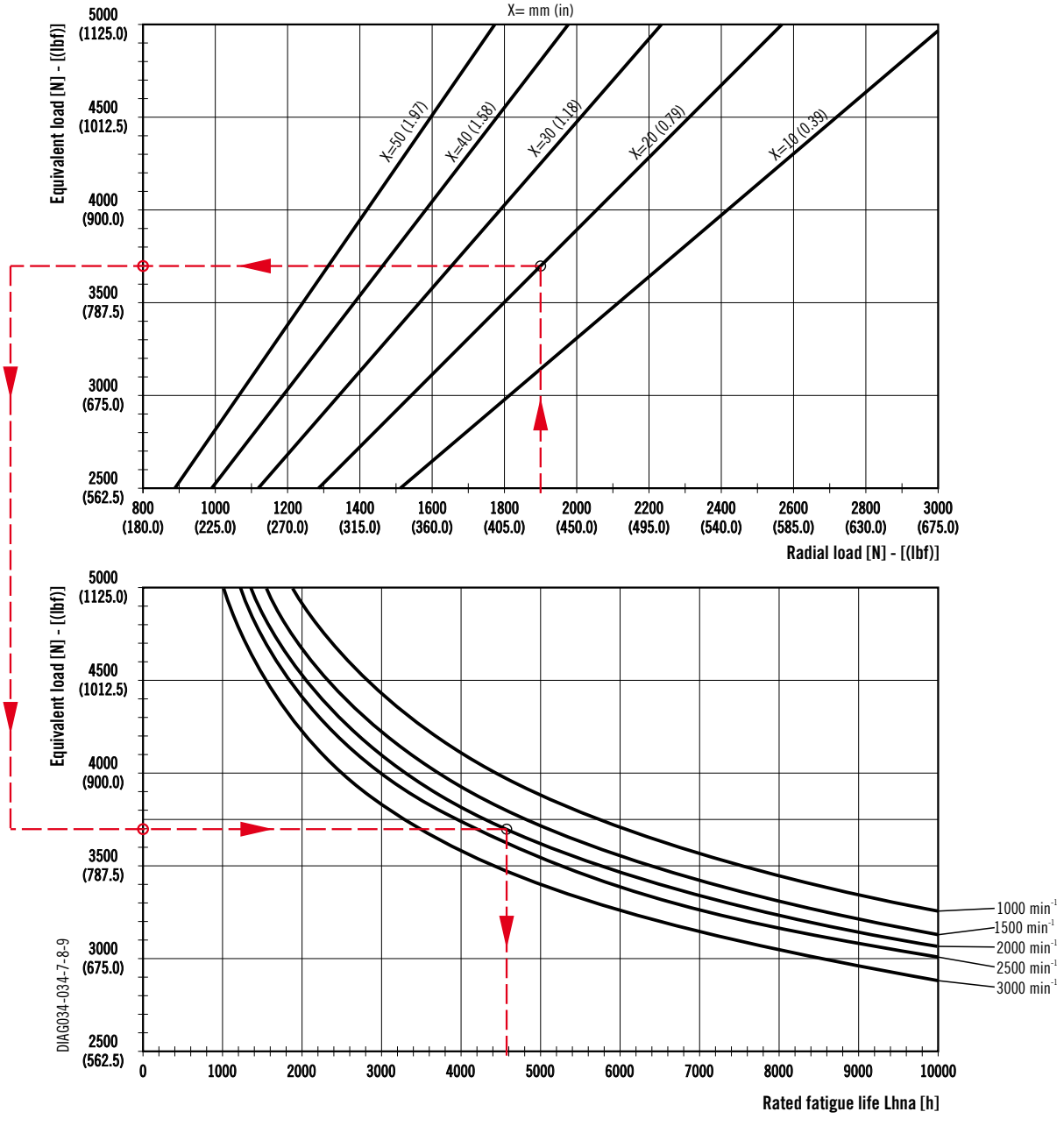
D033-118/0603

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: $ß_{12}(C) = 200$
- Reliability level of the calculation 90%

Example	
Fr Radial load	1900 N (427.5 lbf)
X	20 mm (0.79 in)
Speed	2000 min^{-1}
Rated fatigue life	≈ 4600 h

Values shown in the diagrams are indicative only. For more information please consult our pre-sales department.

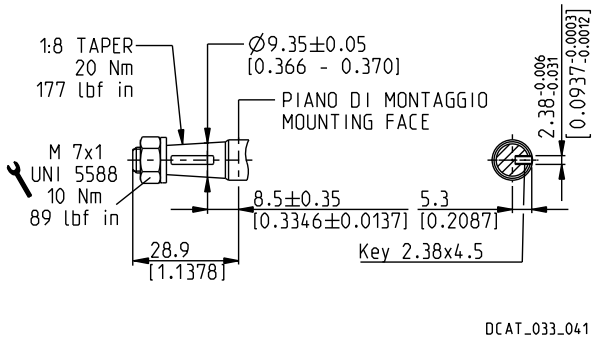


04/10.2020

POLARIS 10 DRIVE SHAFTS

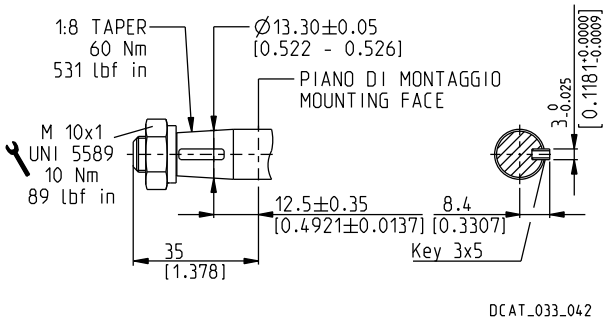
EUROPEAN TAPERED 1:8 — 81

Mounting face refer to flange code **E1**



EUROPEAN TAPERED 1:8 — 86

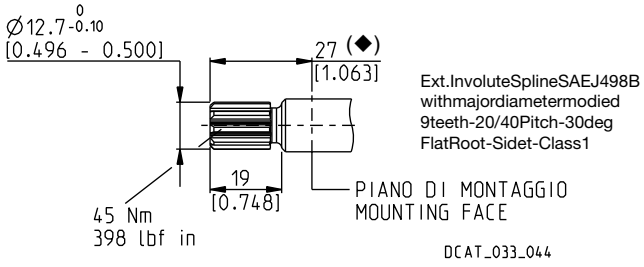
Mounting face refer to flange code **E7**



Replaces: 01/10.2003

SAE "AA" SPLINE — 02

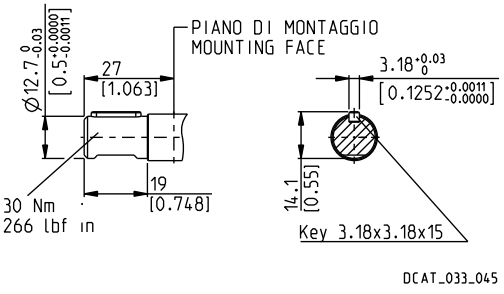
Mounting face refer to flange code **R9** O



(◆) 24 (0.9449) with flange code S0

SAE "AA" STRAIGHT — 30

Mounting face refer to flange code **S0** O

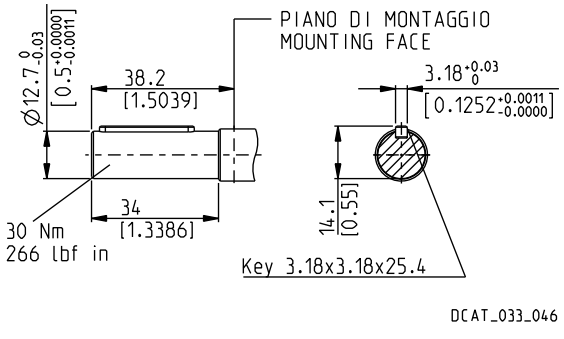


SAE STRAIGHT — 36

Not available with size:

10•1,5 **10•2,5**

Mounting face refer to flange code **R8**



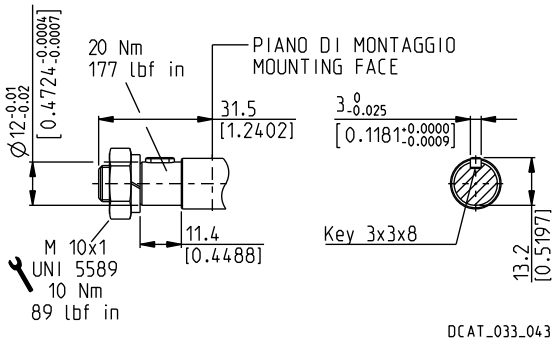
STRAIGHT — 29

Not available with size:

10•5,8

Mounting face refer to flange code **E8**

O



O 04/10.2020

POLARIS 20 DRIVE SHAFTS

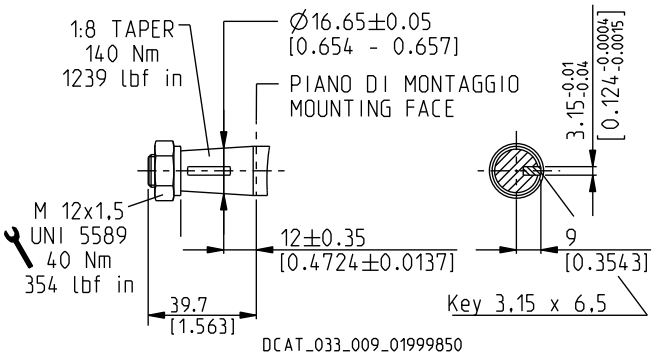
Replaces: 01/10.2003

EUROPEAN TAPERED 1:8 — 82

Not available with size:

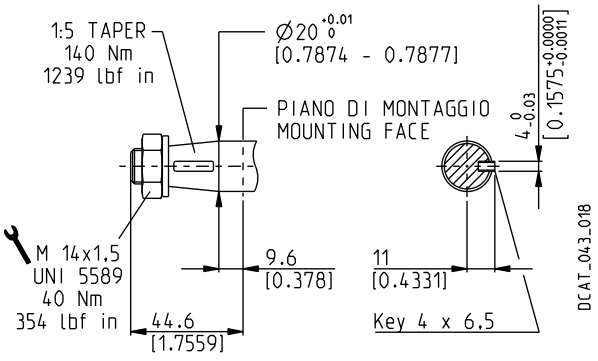
20•24,5

Mounting face refer to flange code **E2** O



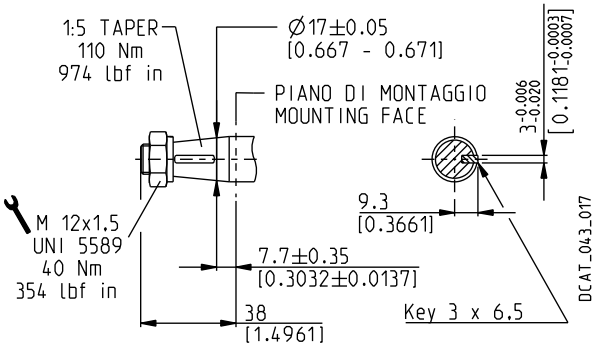
GERMAN TAPERED 1:5 — 55

Mounting face refer to flange code **B2** O



GERMAN TAPERED 1:5 — 54

Mounting face refer to flange code **B2** O

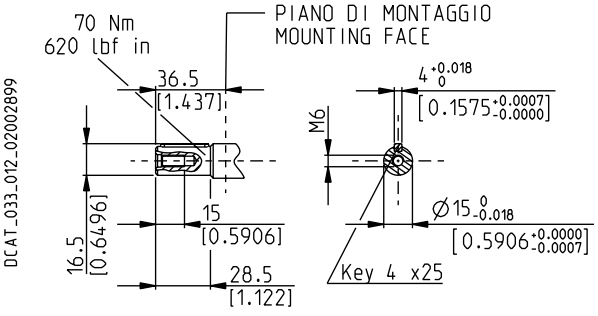


STRAIGHT — 46

Not available with size:

20•7,2 **20•19** **20•24,5** **20•27,8**

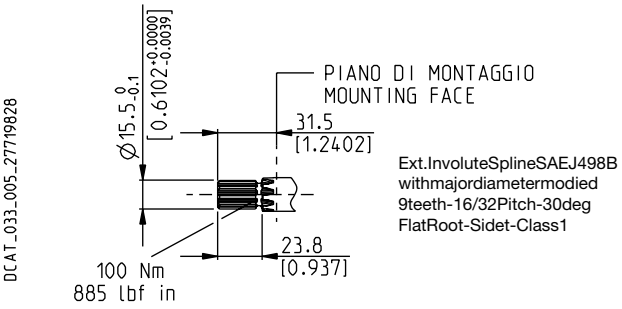
Mounting face refer to flange code **E2** O



O 04/10.2020

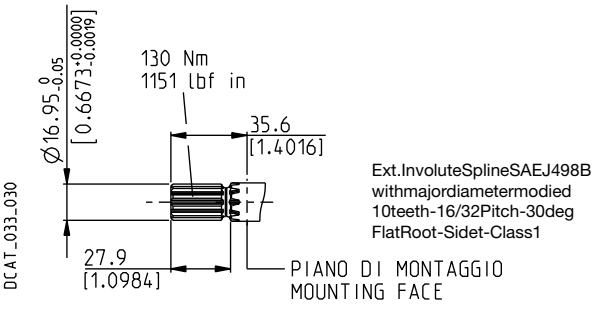
SAE “A” SPLINE — 03

Mounting face refer to flange code **S1** O



SPLINE — 01

Mounting face refer to flange code **S1** O

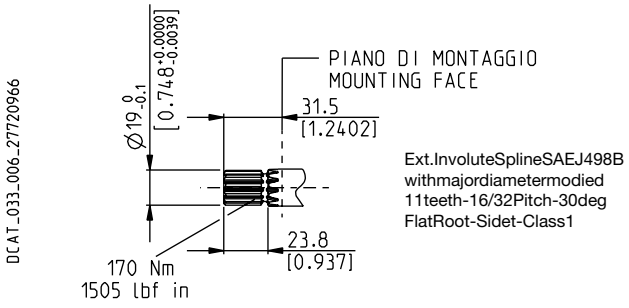


POLARIS 20 DRIVE SHAFTS

Replaces: 01/10.2003

SAE SPLINE 07

Mounting face refer to flange code **S1** O

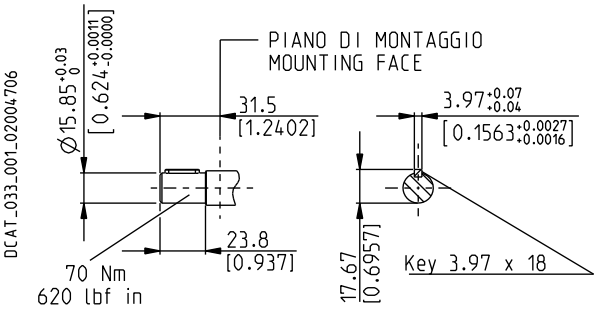


SAE "A" STRAIGHT 31

Not available with size: O

20•24,5 20•27,8

Mounting face refer to flange code **S1**

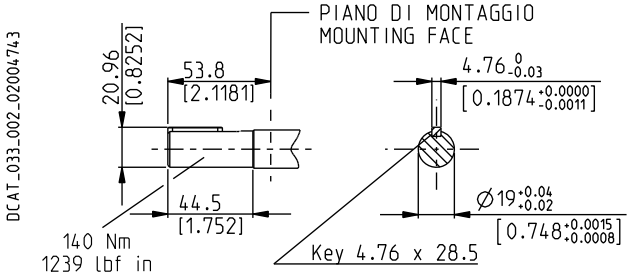


STRAIGHT 49

Not available with size:

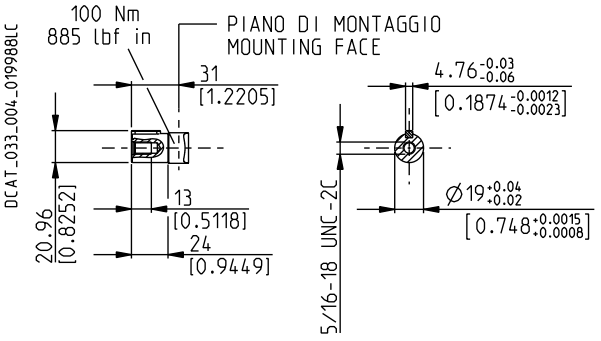
20•19 20•24,5

Mounting face refer to flange code **S1** O



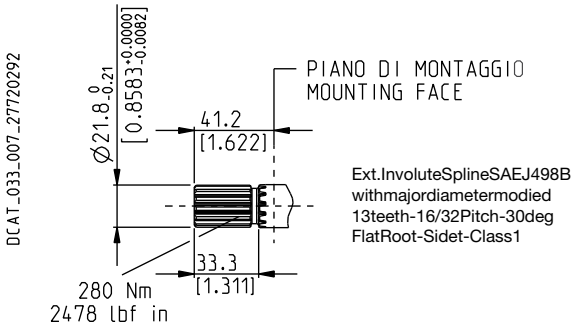
STRAIGHT 50

Mounting face refer to flange code **S1** O



SAE "B" SPLINE 04

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



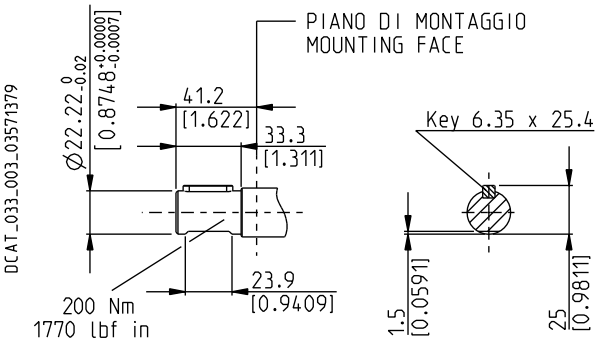
SAE "B" STRAIGHT 32

Not available with size:

20•24,5

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

O 04/10.2020

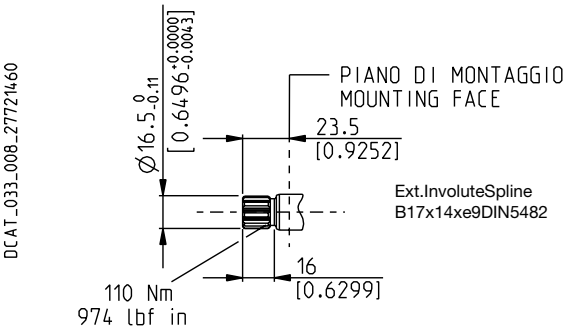


POLARIS 20 DRIVE SHAFTS

Replaces: 01/10.2003

DIN 5482 SPLINE 12

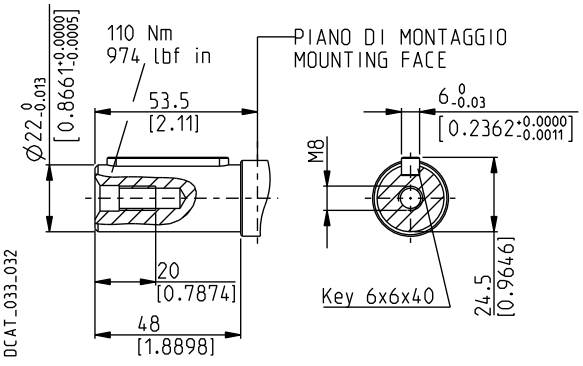
Mounting face refer to flange code **B2** O



STRAIGHT B1

Only for version 5 and 8 with outboard bearing

Mounting face refer to flange code **E2**



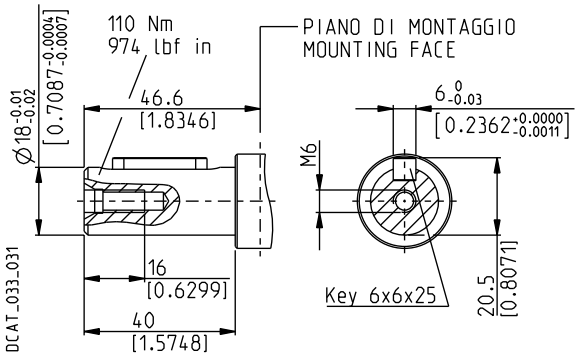
STRAIGHT 48

Only for version **5** with outboard bearing

Available in 0 version only with size:

20•20

Mounting face refer to flange code **E2**

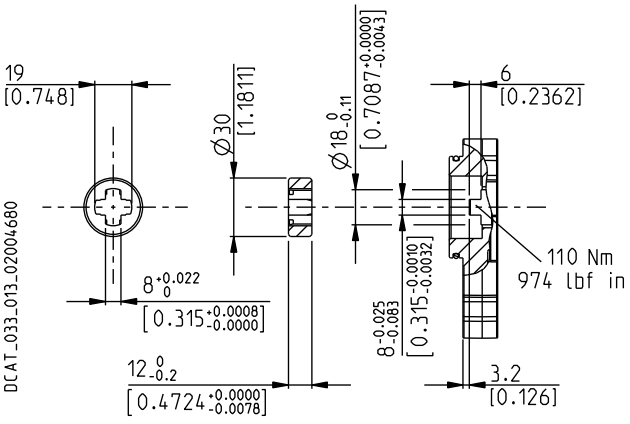


TANG 95

Not available with size:

20•19 **20•24,5**

Mounting face refer to flange code **B6** O



O 04/10.2020

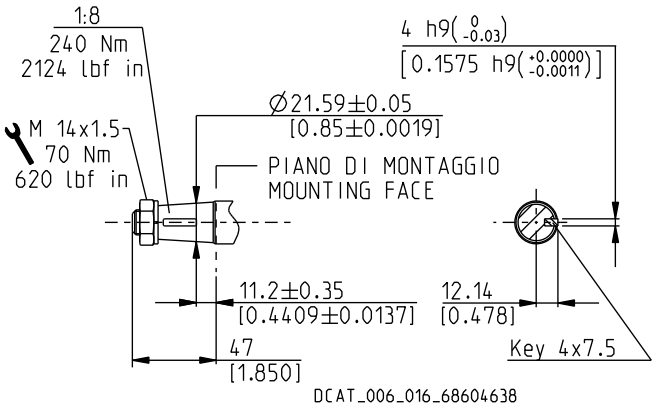
POLARIS 30 DRIVE SHAFTS

EUROPEAN TAPERED 1:8 — 83

Not available with size:

30•82 **30•90**

Mounting face refer to flange code **E3**



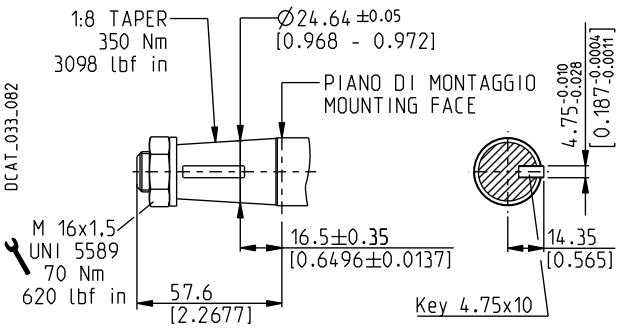
EUROPEAN TAPERED 1:8 — 84

Not available with size:

30•22 **30•34**

Mounting face refer to flange code **E4**

O

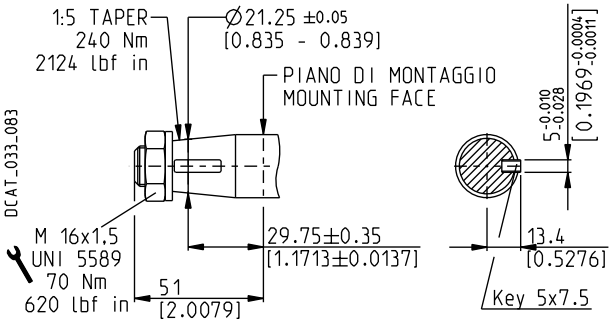


GERMAN TAPERED 1:5 — 56

Not available with size:

30•61 **30•73** **30•82** **30•90**

Mounting face refer to flange code **B3**



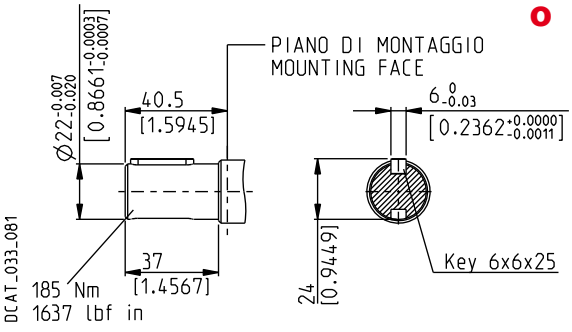
STRAIGHT — 41

Not available with size:

30•82 **30•90**

Mounting face refer to flange code **E3**

O

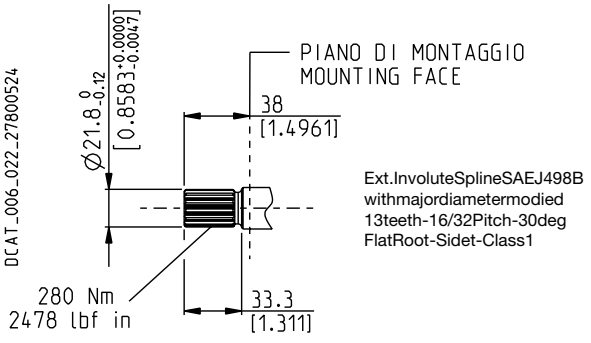


SAE "B" SPLINE — A8

Not available with size:

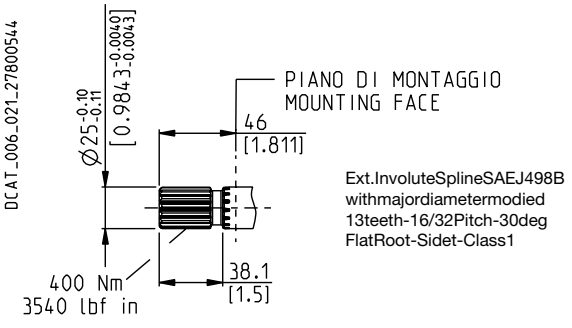
30•82 **30•90**

Mounting face refer to flange code **U3**



SAE "BB" SPLINE — A5

Mounting face refer to flange code **U3**



Replaces: 01/10.2003

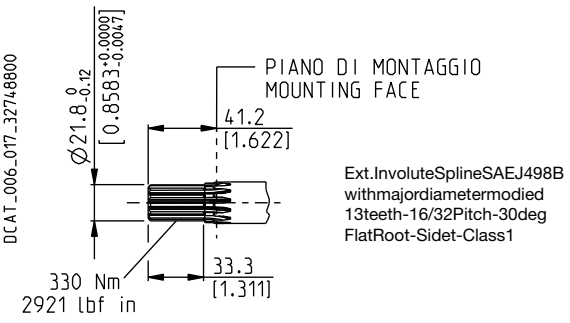
O 04/10.2020

POLARIS 30 DRIVE SHAFTS

Replaces: 01/10.2003

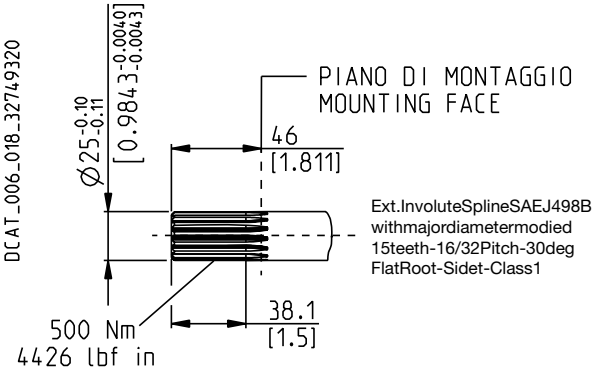
SAE “B” SPLINE 04

Mounting face refer to flange code **S5**



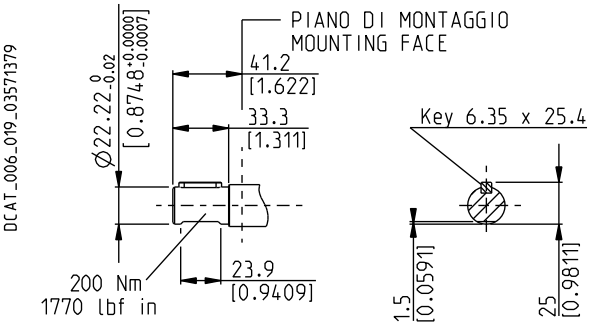
SAE “BB” SPLINE 05

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



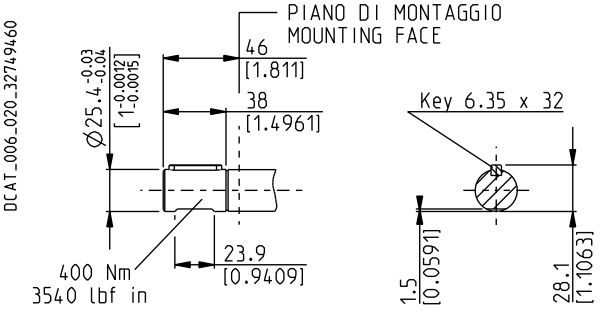
SAE “B” STRAIGHT 32

Mounting face refer to flange code **S5**



SAE “BB” STRAIGHT 33

Mounting face refer to flange code **S5**

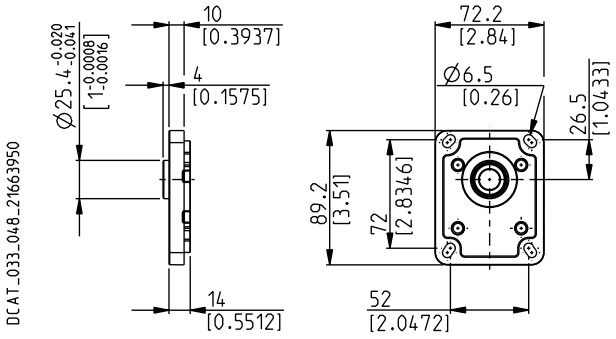


O 04/10.2020

POLARIS 10 MOUNTING FLANGES AND TABLE OF COMPATIBILITY

EUROPEAN E1

Material: cast iron and aluminium



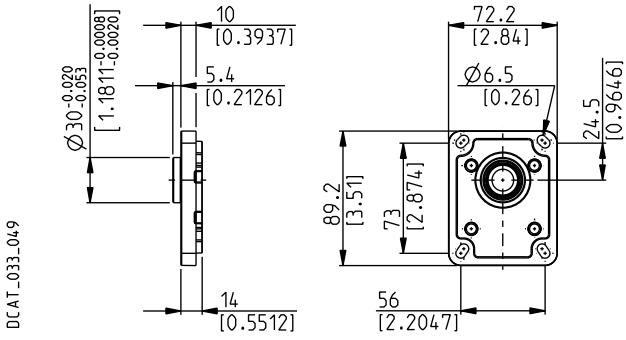
VERSIONS See page 48	DRIVE SHAFTS See page 52 81	02	29	86
0	#	x	x	x

Standard combination

x Available combination

EUROPEAN E7

Material: cast iron and aluminium



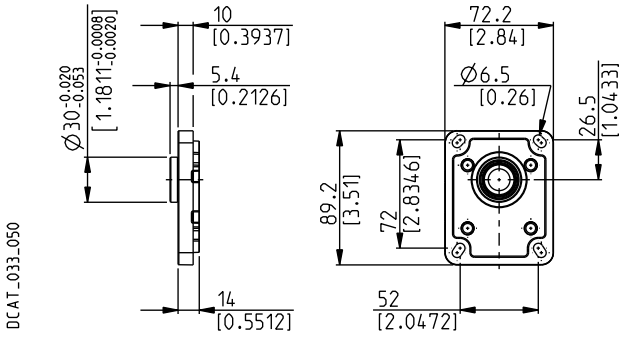
VERSIONS See page 48	DRIVE SHAFTS See page 52 86	29	30
0	#	x	x

Standard combination

x Available combination

EUROPEAN E8

Material: cast iron and aluminium



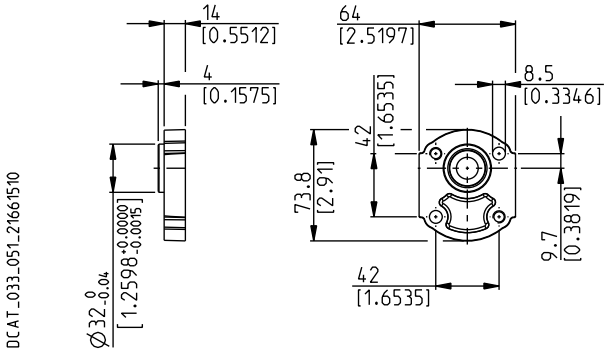
VERSIONS See page 48	DRIVE SHAFTS See page 52 29	02
0	#	x

Standard combination

x Available combination

GERMAN 2 BOLTS B1

Material: aluminium



VERSIONS See page 48	DRIVE SHAFTS See page 52 30	86
0	#	x

Standard combination

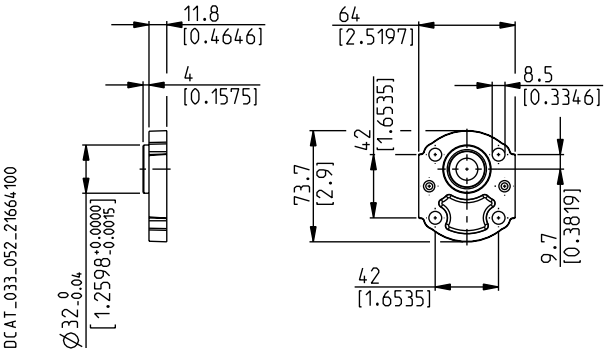
x Available combination

02/07.2006

POLARIS 10 MOUNTING FLANGES AND TABLE OF COMPATIBILITY

GERMAN 4 BOLTS K2

Material: aluminium



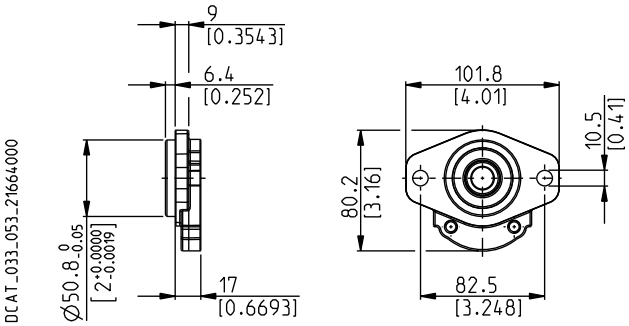
VERSIONS See page 48	DRIVE SHAFTS See page 52 02	30
0	x	x

Standard combination

x Available combination

SAE "A-A" 2 BOLTS S0

Material: cast iron and aluminium



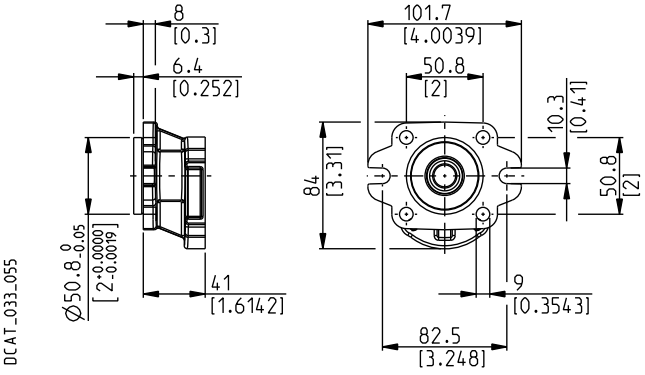
VERSIONS See page 48	DRIVE SHAFTS See page 52 30	02	86
0	#	x	x

Standard combination

x Available combination

SAE "A-A" 2-4 BOLTS R9

Material: cast iron



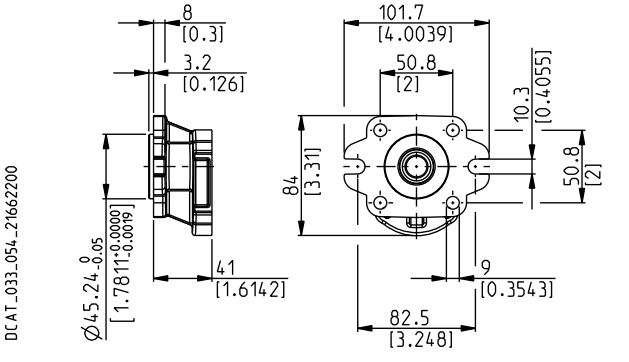
VERSIONS See page 48	DRIVE SHAFTS See page 52 02	30	36
0	#	x	#

Standard combination

x Available combination

SAE 2-4 BOLTS R8

Material: cast iron



VERSIONS See page 48	DRIVE SHAFTS See page 52 02	30	36
0	#	x	#

Standard combination

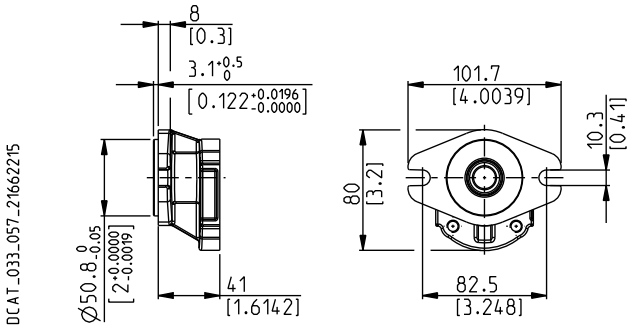
x Available combination

02/07.2006

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

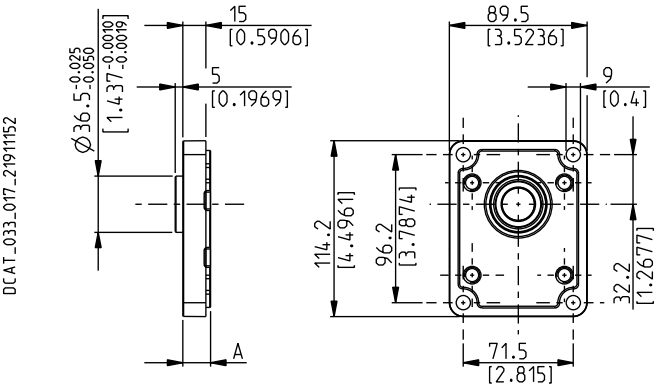
02/07.2006

POLARIS 20 MOUNTING FLANGES AND TABLE OF COMPATIBILITY

Replaces: 02/07.2006

EUROPEAN E2

Material: cast iron and aluminium



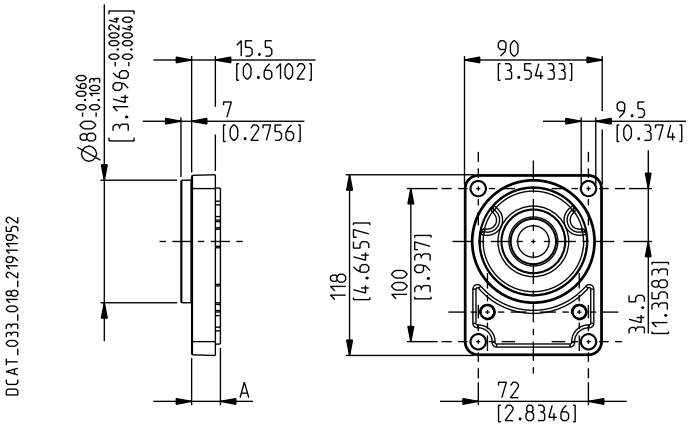
O		DRIVE SHAFTS See page 53 ÷ 55											
VERSIONS See page 48	A mm (in)	82	46	B1	03	04	07	12	31	48	49	50	54
0	18 (0.7087)	#	#		x	x	x	x	x	x	x	x	x
5	43,6 (1.7165)	#		x	x					#	x	x	x
7	59,4 (2.3386)	#											
8	59,4 (2.3386)			#									

Standard combination

x Available combination

GERMAN B2

Material: cast iron and aluminium



O 04/10.2020

		DRIVE SHAFTS See page 53 ÷ 55								
VERSIONS See page 48	A mm (in)	12	54	55	01	03	31	46	49	82
0	18,8 (0.7402)	#	#		x	x	x	x	x	x
5	44,4 (1.7480)		x	x		x			x	x
9	59,4 (1.7441)			x						

Standard combination

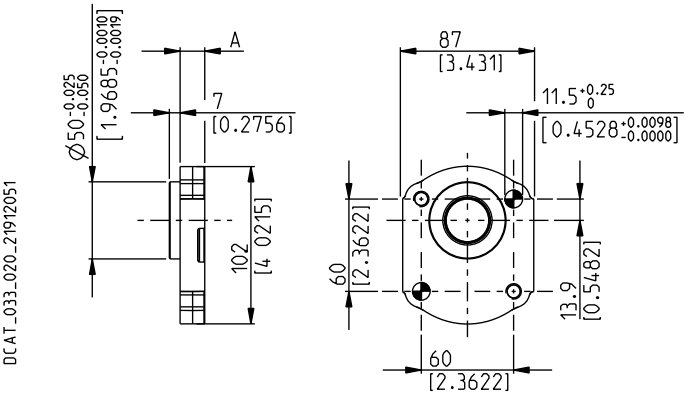
x Available combination

POLARIS 20 MOUNTING FLANGES AND TABLE OF COMPATIBILITY

GERMAN 2 BOLTS B4

Material: cast iron and aluminium

◔ Through hole



VERSIONS See page 48	A mm (in)	DRIVE SHAFTS See page 53 ÷ 55 54	03	12	31	49	82
0	16 (0.63)	#	x	x	x	x	x
5	41,6 (1.6378)	x	x			x	x

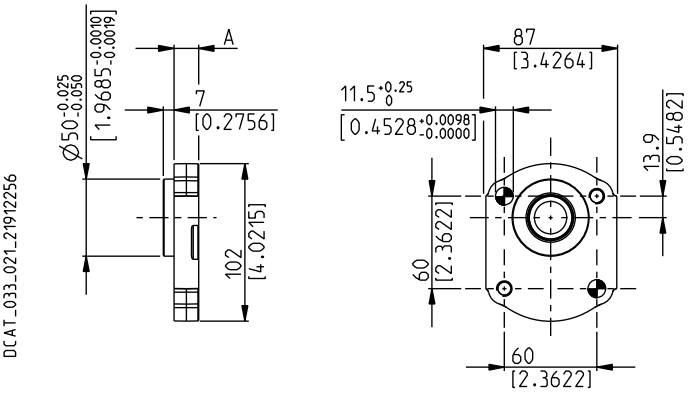
Standard combination

x Available combination

GERMAN 2 BOLTS B5

Material: cast iron and aluminium

◔ Through hole



VERSIONS See page 48	A mm (in)	DRIVE SHAFTS See page 53 ÷ 55 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

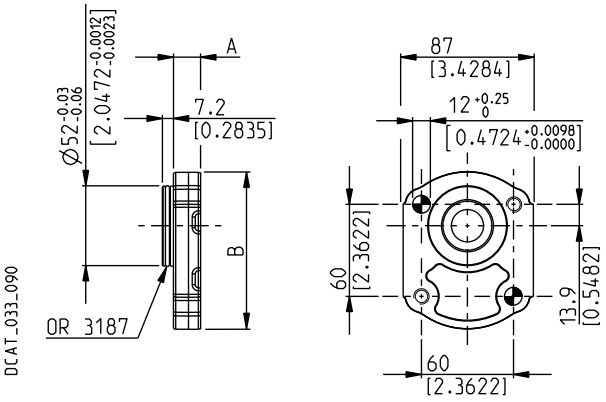
POLARIS 20 MOUNTING FLANGES AND TABLE OF COMPATIBILITY

Replaces: 02/07.2006

GERMAN 2 BOLTS — U2

Material: cast iron and aluminium — O

◓ Through hole



VERSIONS See page 48	A mm (in)	B mm (in)	DRIVE SHAFTS See page 54 ÷ 55 03	54	07
0	17,7 (0.6968)	(◆) 102 (4.0157) (●) 105 (4.1339)	#		x
5	43,3 (1.747)			x	

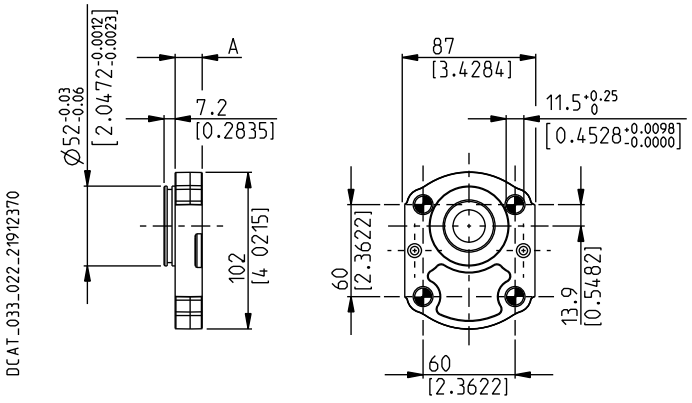
Standard combination (◆) Aluminium

x Available combination (●) Cast iron

GERMAN 4 BOLTS — B6

Material: cast iron and aluminium — O

◓ Through hole



O 04/10.2020

VERSIONS See page 48	A mm (in)	DRIVE SHAFTS See page 54 ÷ 55 95	07	12
0	17,7 (0.6968)	#	x	x
5	43,3 (1.747)	x		

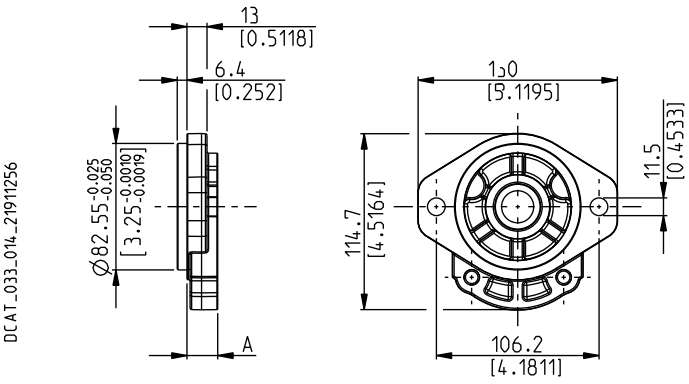
Standard combination

x Available combination

POLARIS 20 MOUNTING FLANGES AND TABLE OF COMPATIBILITY

SAE "A" 2 BOLTS S1

Material: cast iron and aluminium



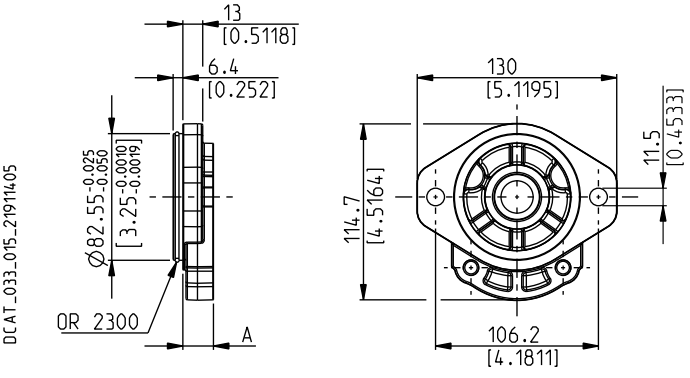
VERSIONS See page 48	A mm (in)	DRIVE SHAFTS See page 53 ÷ 55											
		01	03	04	07	12	31	32	46	49	50	54	82
0	20 (0.787)	#	#	x	#	x	#	x	x	#	x	x	x
5	45,6 (1.7953)		x							x	x	x	x

Standard combination

x Available combination

SAE "A" 2 BOLTS S2

Material: cast iron and aluminium



VERSIONS See page 48	A mm (in)	DRIVE SHAFTS See page 53 ÷ 55											
		01	03	04	07	12	31	32	46	49	50	54	82
0	20 (0.7874)	#	#	x	#	x	#	x	x	#	x	x	x
5	45,6 (1.7953)		x							x	x	x	x

Standard combination

x Available combination

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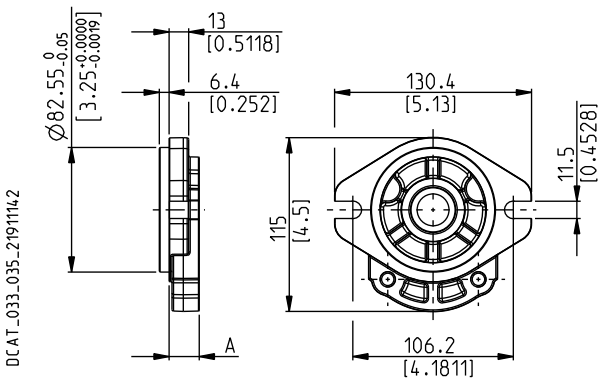
POLARIS 20 MOUNTING FLANGES AND TABLE OF COMPATIBILITY

SAE "A" 2 BOLTS S9

Material: cast iron and aluminium



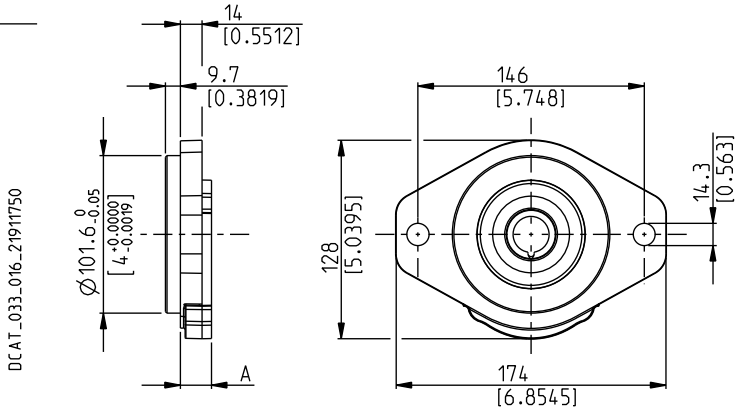
VERSIONS See page 48	A mm (in)	DRIVE SHAFTS See page 53 ÷ 55 01	03	04	07	12	31	32	46	49	50	54	82
0	20 (0.7874)	#	#	x	#	x	#	x	x	#	x	x	x
5	45,6 (1.7953)		x							x	x	x	x

Standard combination

x Available combination

SAE "B" 2 BOLTS S5

Material: cast iron



VERSIONS See page 48	A mm (in)	DRIVE SHAFTS See page 54 04	32	49
0	20 (0.7874)	#	#	x
5	45,6 (1.7953)			x

Standard combination

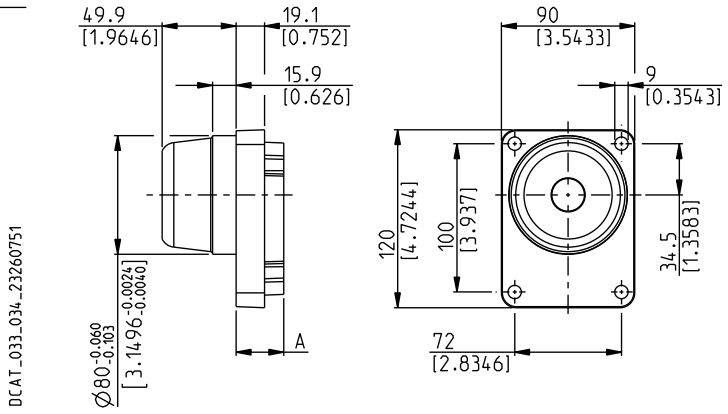
x Available combination

02/07.2006

POLARIS 20 MOUNTING FLANGES AND TABLE OF COMPATIBILITY

GERMAN **W8**

Material: cast iron



VERSIONS See page 48	A mm (in)	DRIVE SHAFTS See page 53 55
W8	32,1 (1.2638)	#

Standard combination

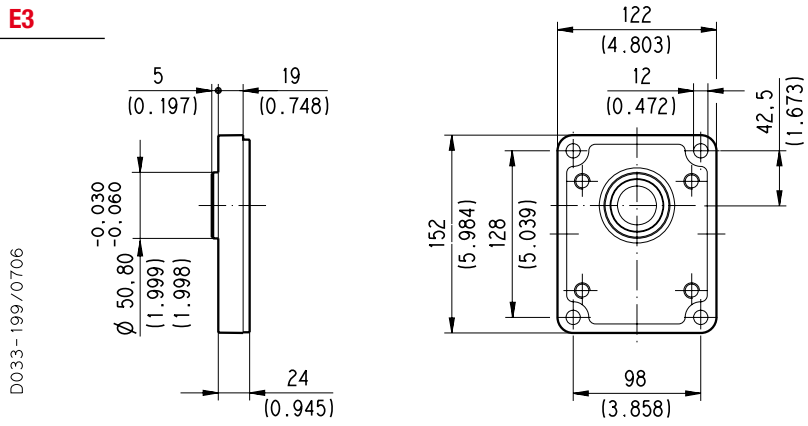
X Available combination

02/07.2006

POLARIS 30 MOUNTING FLANGES AND TABLE OF COMPATIBILITY

EUROPEAN E3

Material: cast iron



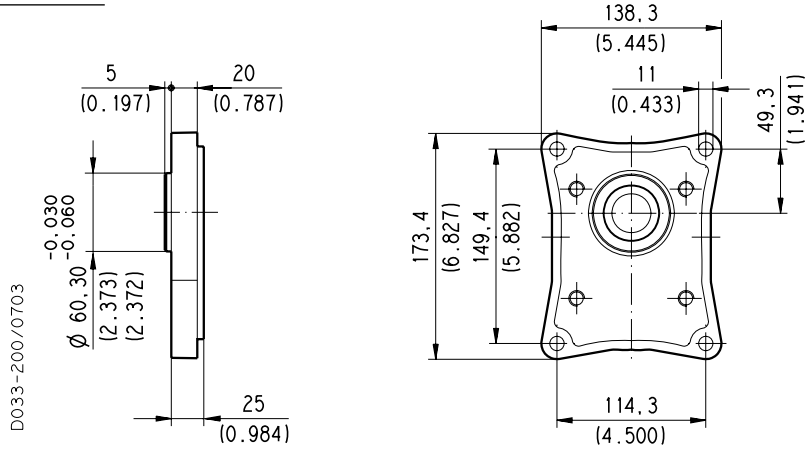
VERSIONS See page 48	DRIVE SHAFTS See page 56 ÷ 57							
	83	41	04	05	32	33	A5	A8
0	#	#	x	x	x	x	x	x

Standard combination

x Available combination

EUROPEAN E4

Material: cast iron



VERSIONS See page 48	DRIVE SHAFTS See page 56			
	84	41	A5	A8
0	#	x	x	x

Standard combination

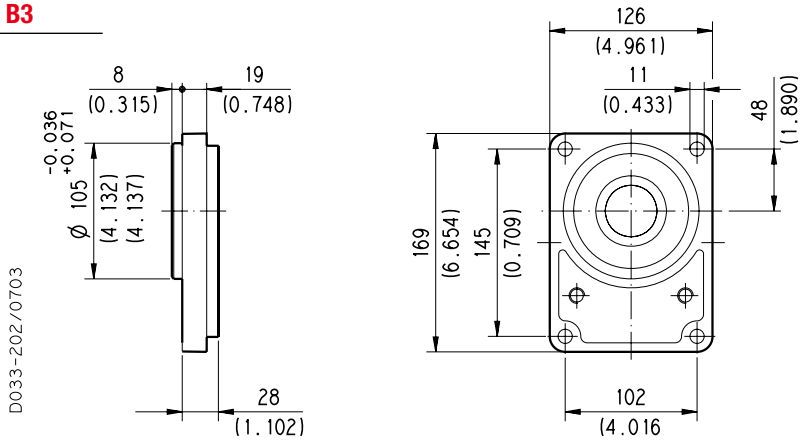
x Available combination

02/07.2006

POLARIS 30 MOUNTING FLANGES AND TABLE OF COMPATIBILITY

GERMAN — B3

Material: cast iron



DRIVE SHAFTS
See page 56

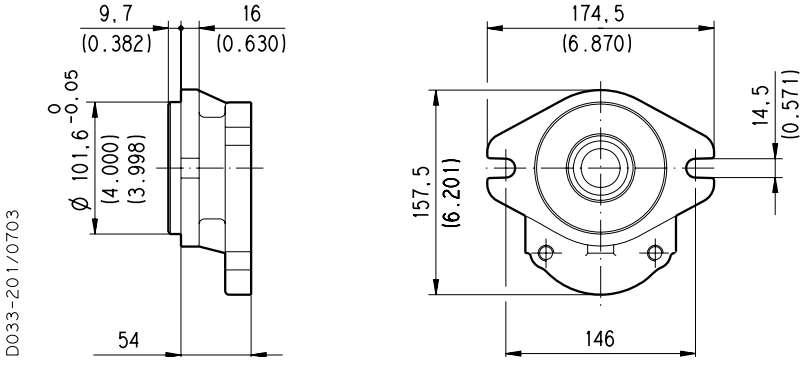
VERSIONS See page 48	56	83	A5	A8
0	#	x	x	x

Standard combination

x Available combination

SAE "B" 2 BOLTS — S5

Material: cast iron



DRIVE SHAFTS
See page 57

VERSIONS See page 48	04	05	32	33
0	#	#	#	#

Standard combination

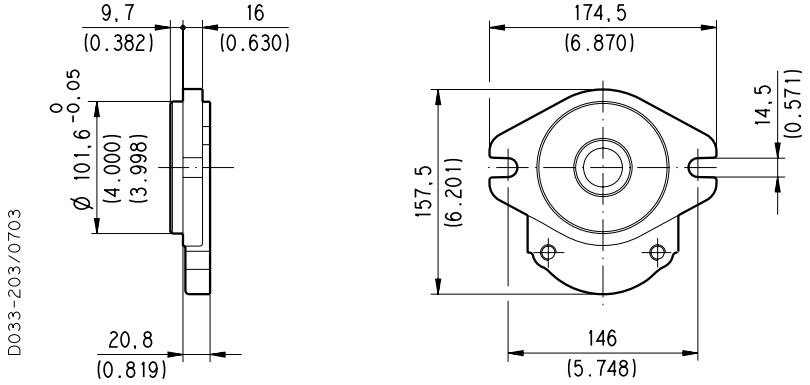
x Available combination

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 See page 48	**A5**	**A8**	**83**
0	**#**	**#**	**x**

Standard combination

x Available combination

02/07.2006

PORTS POSITION AND TYPE

	SIDE PORTS												REAR PORTS			
PORTS TYPE	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
PL. 10•1	BB	BA							GC	GC	OB	OA	GC	GC	OB	OA
PL. 10•1,5	BB	BA							GC	GC	OB	OA	GC	GC	OB	OA
PL. 10•2	BB	BA							GC	GC	OB	OA	GC	GC	OB	OA
PL. 10•2,5	BB	BA							GC	GC	OB	OA	GC	GC	OB	OA
PL. 10•3,15	BB	BA							GC	GC	OB	OA	GC	GC	OB	OA
PL. 10•4	BB	BA							GC	GC	OB	OA	GC	GC	OB	OA
PL. 10•5	BB	BA							GD	GD	OB	OA	GD	GD	OB	OA
PL. 10•5,8	BB	BA							GD	GD	OB	OA	GD	GD	OB	OA
PL. 10•6,3	BB	BA							GD	GD	OB	OA	GD	GD	OB	OA
PL. 10•8	BB	BA							GD	GD	OC	OB	GD	GD	OB	OB
PL. 10•10	BB	BA							GD	GD	OC	OB	GD	GD	OB	OB
PL. 20•4	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC
PL. 20•6,3	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC
PL. 20•7,2	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC
PL. 20•8	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC
PL. 20•9	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC
PL. 20•10,5	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC
PL. 20•11,2	BE	BC	EA	EA	MA	MA	SA	SA	GD	GD	OC	OC	GD	GD	OC	OC
PL. 20•14	BE	BC	EB	EA	MB	MA	SB	SA	GE	GD	OD	OC	GE	GD	OD	OC
PL. 20•16	BE	BC	EB	EA	MB	MA	SB	SA	GE	GD	OD	OC	GE	GD	OD	OC
PL. 20•19	BE	BC	EB	EA	MB	MA	SB	SA	GE	GD	OD	OC	GE	GD	OD	OC
PL. 20•20	BE	BC	EB	EA	MB	MA	SB	SA	GE	GD	OD	OC	GE	GD	OD	OC
PL. 20•24,5	BE	BC	EB	EA	MC	MB	SC	SB	GE	GD	OD	OC	GE	GD	OD	OC
PL. 20•25	BE	BC	EB	EA	MC	MB	SC	SB	GE	GD	OD	OC	GE	GD	OD	OC
PL. 20•27,8	BE	BC	EB	EA	MC	MB	SC	SB	GE	GD	OD	OC	GE	GD	OD	OC
PL. 20•31,5	BE	BC	EB	EA	MC	MB	SC	SB	GE	GD	OD	OC	GE	GD	OD	OC
PL. 30•22	BM	BL	ED	EB	MB	MA	SB	SA	GF	GF	OF	OD				
PL. 30•27	BM	BL	ED	EB	MC	MB	SC	SB	GF	GF	OF	OD				
PL. 30•34	BM	BL	ED	EB	MC	MB	SC	SB	GF	GF	OF	OD				
PL. 30•38	BM	BL	ED	EB	MD	MC	SD	SC	GF	GF	OG	OF				
PL. 30•43	BM	BL	ED	EB	MD	MC	SD	SC	GF	GF	OG	OF				
PL. 30•51	BM	BL	ED	EB	MD	MC	SD	SC	GF	GF	OG	OF				
PL. 30•61	BM	BL	ED	EB	ME	MD	SE	SD	GG	GF	OH	OG				
PL. 30•73	BM	BL	EF	ED	ME	MD	SE	SD	GG	GF	OH	OG				
PL. 30•82	BM	BL	EF	ED	ME	MD	SE	SD	GH	GG	OH	OG				
PL. 30•90	BM	BL	EF	ED	MF	ME	SF	SE	GH	GG	OH	OG				

01/10.2003

EXTERNAL DRAIN PORTS

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

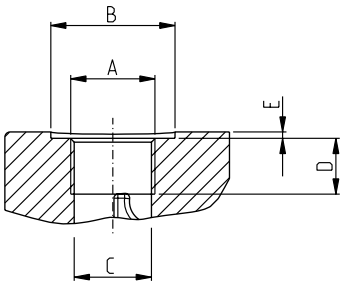
DRAIN PORTS SIZES

Tightening torque for low pressure side port

GAS STRAIGHT THREAD PORTS — BSPP

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

CODE	NOMINAL SIZE	A	Ø B	Ø C	D	E	
			mm (in)	mm (in)	mm (in)	mm (in)	Nm (lbf in)
GA	1/8”	G 1/8	16,5 (0.6496)	8,75 (0.3444)	12 (0.4724)	1 (0.0394)	5 $^{+0,25}$ (44 ÷ 46)
GB	1/4”	G 1/4	21,5 (0.8465)	12 (0.4724)	15 (0.5906)	1,5 (0.0591)	15 $^{+1}$ (133 ÷ 142)

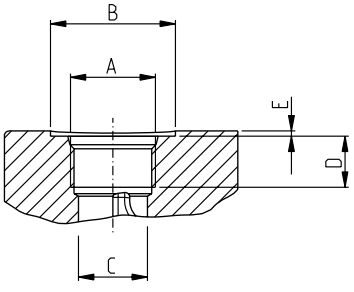


DCAT_006_026_21064779

METRIC STRAIGHT THREAD PORTS ISO 6149 — METRIC

Metric thread ISO 60° conforms to ISO/R 262

CODE	A	Ø B	Ø C	D	E	
		mm (in)	mm (in)	mm (in)	mm (in)	Nm (lbf in)
TA	M 10x1	22 (0.8661)	9 (0.3543)	13 (0.5118)	0,5 (0.0197)	10 $^{+0,5}$ (89 ÷ 93)



DCAT_006_027_21060524

SAE STRAIGHT THREAD PORTS J514 — ODT

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

CODE	A	Ø B	Ø C	D	E	
		mm (in)	mm (in)	mm (in)	mm (in)	Nm (lbf in)
03	7/16”-20 UNF-2B	21 (0.8267)	9,5 (0.3740)	14 (0.5512)	1 (0.0394)	12 $^{+1}$ (106 ÷ 115)

Other drain ports are shown on subsequent pages.

01/10.2003

PORTS SIZE

Tightening torque for low pressure side port

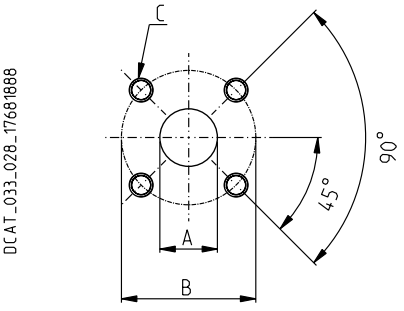
Tightening torque for high pressure side port [values obtained at 5075 psi (350 bar)]

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

GERMAN FLANGED PORTS - 4 Bolts — GERMAN

Metric thread ISO 60° conforms to ISO/R 262

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

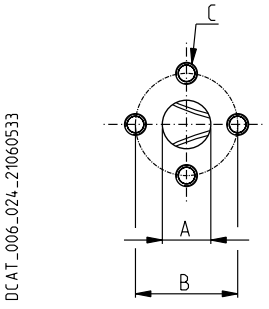


EUROPEAN FLANGED PORTS - 4 Bolts — EUROPEAN

Metric thread ISO 60° conforms to ISO/R 262

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

(◆) For POLARIS 30



01/10.2003

PORTS SIZES

Tightening torque for low pressure side port

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

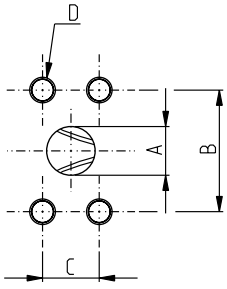
For reversible rotation, please consult only the tightening torque for high pressure side port

SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI — SSM

Metric thread ISO 60° to ISO/R 262

CODE	A mm (in)	B mm (in)	C mm (in)	D Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
MA	12,5 (0.4921)	38,1 (1.50)	17,5 (0.6890)	M 8 14 (0.5512)	15 +1 (133 ÷ 142)	15 +1 (133 ÷ 142)
				M 8 (◆) 22 (0.8661)	20 +1 (◆) (177 ÷ 186)	20 +1 (◆) (177 ÷ 186)
MB	19 (0.7480)	47,6 (1.8740)	22,2 (0.8740)	M 10 14 (0.5512)	20 +1 (177 ÷ 186)	25 +1 (266 ÷ 288)
				M 10 (◆) 22 (0.8661)	20 +1 (◆) (177 ÷ 186)	35 +2,5 (◆) (310 ÷ 332)
MC	25,4 (1.0000)	52,4 (2.0630)	26,2 (1.0315)	M 10 14 (0.5512)	20 +1 (177 ÷ 186)	25 +1 (266 ÷ 288)
				M 10 (◆) 22 (0.8661)	20 +1 (◆) (177 ÷ 186)	35 +2,5 (◆) (310 ÷ 332)
MD	30,5 (1.2008)	58,7 (2.3110)	30,2 (1.1890)	M 10 15 (0.5906)	20 +1 (177 ÷ 186)	30 +2,5 (266 ÷ 288)
				M 10 (◆) 22 (0.8661)	20 +1 (◆) (177 ÷ 186)	35 +2,5 (◆) (310 ÷ 332)
ME	39,3 (1.5472)	69,8 (2.7480)	35,7 (1.4055)	M 12 22 (0.8661)	30 +2,5 (266 ÷ 288)	60 +5 (531 ÷ 575)
MF	51 (2.0079)	77,8 (3.0630)	42,9 (1.6890)	M 12 22 (0.8661)	30 +2,5 (266 ÷ 288)	60 +5 (531 ÷ 575)

(◆) For POLARIS 30



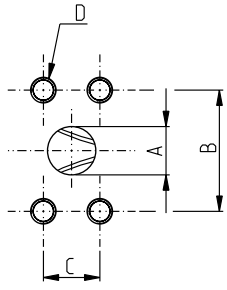
DCAT_006_025_21064252

SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI — SSS

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

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

(◆) For POLARIS 30



DCAT_006_028_21060740

01/10.2003

PORTS SIZE

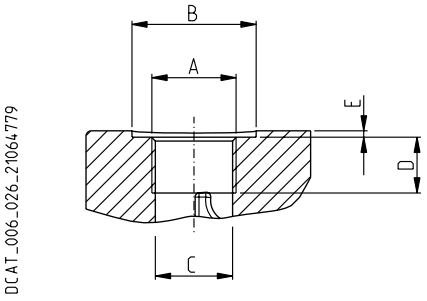
Tightening torque for low pressure side port

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

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

GAS STRAIGHT THREAD PORTS — BSPP

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



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

= Drain port

(◆) For POLARIS 20

02/07.2006

PORTS SIZES

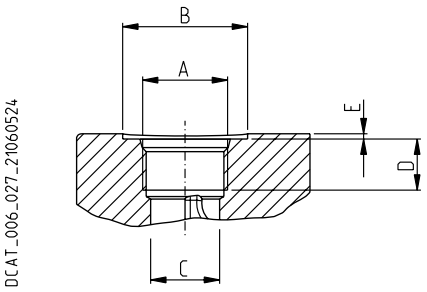
Tightening torque for low pressure side port

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

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

SAE STRAIGHT THREAD PORTS J514 — ODT

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



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

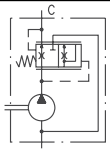
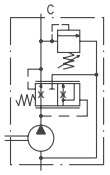
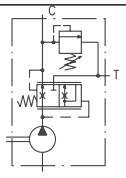
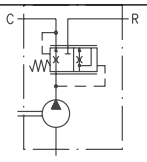
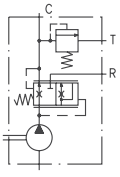
(#) = Drain port

(◆) For POLARIS 10

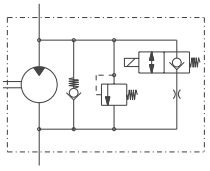
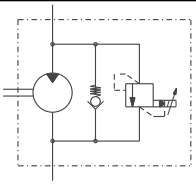
01/10.2003

VALVE OPTIONS

PRIORITY VALVE

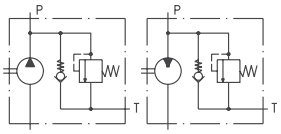
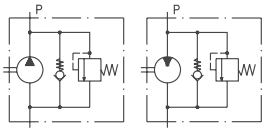
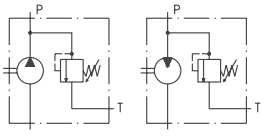
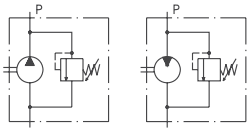
P1	Costant delivery and internal recirculation of excess flow.	
P2	Costant delivery at controlled pressure. Internal recirculation of excess flow and drain valve.	
P3	Costant delivery at controlled pressure. Excess flow and drain valve must be connected to tank.	
P4	Costant delivery and excess flow can 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 FOR MOTORS

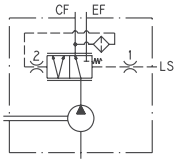
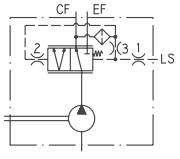
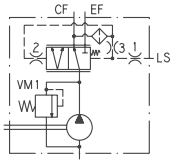
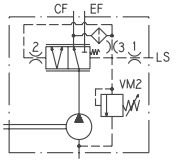
O **UNL**	By-pass valve normally closed with max. pressure relief valve and anti-cavitation valve.	
O **PRV**	Proportional relief valve and anti-cavitation valve.	

(◆) For more information please consult our built-in valves technical catalogue and our pre-sales department

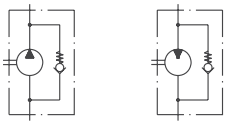
MAX PRESSURE RELIEF VALVE

VPEF..	Fixed setting with external drain.	
VPIF..	Fixed setting with internal drain.	
VPER..	Adjustable setting with external drain.	
VPIR..	Adjustable setting with internal drain.	

LOAD SENSING VALVE

...	Static.	
...	Dynamic.	
...	Dynamic with relief valve fitted on the main line.	
...	Dynamic with relief valve fitted on controlled line.	

CHECK VALVE

V8	Anti-cavitation valve.	

Replaces: 01/10.2003

O 04/10.2020

NOTES

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 cm³/rev (0.07 in³/rev)	PLP 10-1	PLM 10-1
1,60 cm³/rev (0.10 in³/rev)	PLP 10-1,5	PLM 10-1,5
2,13 cm³/rev (0.13 in³/rev)	PLP 10-2	PLM 10-2
2,67 cm³/rev (0.16 in³/rev)	PLP 10-2,5	PLM 10-2,5
3,34 cm³/rev (0.20 in³/rev)	PLP 10-3,15	PLM 10-3,15
4,27 cm³/rev (0.26 in³/rev)	PLP 10-4	PLM 10-4
5,34 cm³/rev (0.33 in³/rev)	PLP 10-5	PLM 10-5
6,20 cm³/rev (0.38 in³/rev)	PLP 10-5,8	PLM 10-5,8
6,67 cm³/rev (0.41 in³/rev)	PLP 10-6,3	PLM 10-6,3
8,51 cm³/rev (0.52 in³/rev)	PLP 10-8	PLM 10-8
10,67 cm³/rev (0.65 in³/rev)	PLP 10-10	PLP 10-10

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

4 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

5 Mounting flange	Code
European	E1
European	E7
European	E8
German 2 bolt	B1
German 4 bolt	K2
SAE “AA” 2 bolt	S0
SAE “AA” 2-4 bolt	R9
SAE 2-4 bolt	R8
SAE 2 bolt	W9

Code	6 Ports position
L	Side
P	Rear

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

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

Code	9 Cover options (b)
	Cast iron mounting flange and rear cover (standard - 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

Code	10 Shaft seal options ●
D	Standard seal with wiper seal
C1	High back pressure seal

Replaces: 02/07.2006

● 04/10.2020

HOW TO ORDER POLARIS 10 SINGLE UNITS

11	Drain port position - Rev. Rotation L	Code
Side drain with side port position		L
Side drain with bottom port position		*

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

13	Shaft arrangement	Code
Female spline		FS

(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

02/07.2006

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 O	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 O
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 O			
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	

Replaces: 01/10.2003

O 04/10.2020

HOW TO ORDER POLARIS 20 SINGLE UNITS

Replaces: 02/07.2006

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

8	O	Seals (a)	Code
Buna (standard)			N
Viton			V
Hydrogenated buna HNBR seals with Viton-FKM shaft seals			T-PV

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

10	O	Shaft seal options	Code
Standard seal with wiper seal			D
High back pressure seal			C1

O 04/10.2020

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

Code	Drain port		12
IN/OUT GERMAN FLANGED PORTS			
Side	Rear		Type
TA		PLP 20 / PLM 20	4-6,3-7,2-8-9-10,5-11,2 24,5-25-27,8-31,5
IN/OUT EUROPEAN FLANGED PORTS			
Side	Rear		Type
GB		PLP 20 / PLM 20	4-6,3-7,2-8-9-10,5-11,2 24,5-25-27,8-31,5
IN/OUT SAE FLANGED PORTS (SSM)			
Side	Rear		Type
GB		PLP 20 / PLM20	4-6,3-7,2-8-9-10,5-11,2 24,5-25-27,8-31,5
IN/OUT SAE FLANGED PORTS (SSS)			
Side	Rear		Type
03		PLP 20 / PLM 20	4-6,3-7,2-8-9-10,5-11,2 24,5-25-27,8-31,5
IN/OUT GAS STRAIGHT THREAD PORTS (BSPP)			
Side	Rear		Type
GB	GB	PLP 20 / PLM 20	4-6,3-7,2-8-9-10,5-11,2 24,5-25-27,8-31,5
IN/OUT SAE STRAIGHT THREAD PORTS (ODT)			
Side	Rear		Type
03	03	PLP 20 / PLM 20	4-6,3-7,2-8-9-10,5-11,2 24,5-25-27,8-31,5

Code	Shaft arrangement	13
FS	Female spline	

(a) Choose the seals according to the temperature shown on page 4.

(b) Mounting flange material on page 61 ÷ 66
Rear cover material on page 34 ÷ 35

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)	PLP 30-22	PLM 30-22
26,70 cm³/rev (1.63 in³/rev)	PLP 30-27	PLM 30-27
34,55 cm³/rev (2.11 in³/rev)	PLP 30-34	PLM 30-34
39,27 cm³/rev (2.40 in³/rev)	PLP 30-38	PLM 30-38
43,98 cm³/rev (2.68 in³/rev)	PLP 30-43	PLM 30-43
51,83 cm³/rev (3.16 in³/rev)	PLP 30-51	PLM 30-51
61,26 cm³/rev (3.74 in³/rev)	PLP 30-61	PLM 30-61
73,82 cm³/rev (4.50 in³/rev)	PLP 30-73	PLM 30-73
81,68 cm³/rev (4.98 in³/rev)	PLP 30-82	PLM 30-82
91,10 cm³/rev (5.56 in³/rev)	PLP 30-90	PLM 30-90

2 **Rotation**	Code
Left	S
Right	D
Reversible rear external drain	R

3 **Versions - Outboard bearing options**	Code
Without outboard bearing	0

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

5 **Mounting flange**	Code
European	E3
European	E4
German	B3
SAE “B” 2 bolt	S5
SAE “B” 2 bolt	U3

6 **Ports position**	Code
Side	L

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

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HOW TO ORDER POLARIS 30 SINGLE UNITS

Replaces: 01/10.2003

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

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

9	O	Shaft seal options	Code
Standard seal with wiper seal			D
High back pressure seal			C1

10	Shaft arrangement	Code
Female spline		FS

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

O 04/10.2020

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 in³/rev (1,07 cm³/rev)	PLP 10·1
1,60 cm³/rev (0.10 in³/rev)	PLP 10·1,5
2,13 cm³/rev (0.13 in³/rev)	PLP 10·2
2,67 cm³/rev 0.16 in³/rev)	PLP 10·2,5
3,34 cm³/rev (0.20 in³/rev)	PLP 10·3,15
4,27 cm³/rev 0.26 in³/rev)	PLP 10·4
5,34 cm³/rev (0.33 in³/rev)	PLP 10·5
6,20 cm³/rev (0.38 in³/rev)	PLP 10·5,8
6,67 cm³/rev (0.41 in³/rev)	PLP 10·6,3
8,51 cm³/rev (0.52 in³/rev)	PLP 10·8
10,67 cm³/rev (0.65 in³/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	5 Ports IN/OUT	
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	6 Combination type
V6	Standard
V7	Common inlet

Code	7 Rotation
S	Left
D	Right

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

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

Code	10 Cover options (b)
	Cast iron mounting flange and rear cover (standard - 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

11	O	Shaft seal options	Code
Standard seal with wiper seal			D
High back pressure seal			C1

12	Shaft arrangement	Code
Female spline		FS

(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

Replaces: 02/07.2006

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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											

Replaces: 01/10.2003

1 Type	Pump Type
4,95 cm³/rev (0.30 in³/rev)	PLP 20-4
6,61 cm³/rev (0.40 in³/rev)	PLP 20-6,3
7,29 cm³/rev (0.44 in³/rev)	PLP 20-7,2
8,26 cm³/rev (0.50 in³/rev)	PLP 20-8
9,17 cm³/rev (0.56 in³/rev)	PLP 20-9
10,9 cm³/rev (0.66 in³/rev)	PLP 20-10,5
11,23 cm³/rev (0.69 in³/rev)	PLP 20-11,2
14,53 cm³/rev (0.89 in³/rev)	PLP 20-14
16,85 cm³/rev (1.03 in³/rev)	PLP 20-16
19,09 cm³/rev (1.16 in³/rev)	PLP 20-19
21,14 cm³/rev (1.29 in³/rev)	PLP 20-20
24,84 cm³/rev (1.52 in³/rev)	PLP 20-24,5
26,42 cm³/rev (1.61 in³/rev)	PLP 20-25
28,21 cm³/rev (1.72 in³/rev)	PLP 20-27,8
33,03 cm³/rev (2.01 in³/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	3 Mounting flange
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	4 Ports position
L	Side

Code	5 Ports IN/OUT	
GERMAN FLANGED PORTS		
Side		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
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 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

Replaces: 02/07.2006

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

6	Combination type	Code
Standard		S6
Common inlet		S7
Separate stages		Z6

7	Rotation	Code
Left		S
Right		D

8	Versions - Outboard bearing options O	Code
Without outboard bearing (standard) no code		0
With outboard bearing		W8
With outboard bearing		5
With outboard bearing		7
With outboard bearing		8
With outboard bearing		9

Code	O Seals (a)	9
N	Buna (standard)	
V	Viton	
T-PV	Hydrogenated buna HNBR seals with Viton-FKM shaft seals	

Code	Cover options (b)	10
	Cast iron mounting flange and rear cover (standard - 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	

Code	O Shaft seal options	11
D	Standard shaft seals with wiper seal	
C1	High back pressure seal	

Code	Shaft arrangement	12
FS	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

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HOW TO ORDER POLARIS 30 MULTIPLE PUMPS

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

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

2 **Drive shaft**	Code
European tapered 1:8	83
European tapered 1:8	84
German tapered 1:5	56
Straight	41
SAE “B” spline	A8
SAE “BB” spline	A5
SAE “B” spline	04
SAE “BB” spline	05
SAE “B” straight	32
SAE “BB” straight	33

3 **Mounting flange**	Code
European	E3
European	E4
German	B3
SAE “B” 2 bolt	S5
SAE “B” 2 bolt	U3

4 **Ports position**	Code
Side	L

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

01/10.2003

HOW TO ORDER POLARIS 30 MULTIPLE PUMPS

6	**Combination type**	Code
Standard		**M6**

7	**Rotation**	Code
Left		**S**
Right		**D**

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

9	**Seals (a)**	Code
Buna (standard)		**N**
Viton		**V**

10	**Shaft seal options** **O**	Code
Standard seal with wiper seal		**D**
High back pressure seal		**C1**

11	**Shaft arrangement**	Code
Female spline		**FS**

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

Replaces: 01/10.2003

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HOW TO ORDER POLARIS DOUBLE PUMPS DIFFERENT GROUPS

1	2	3		4	5		6	7	8		9		10		11
PL 30-22	- 83	E3	-	L	ED/EB	/									
Front section															
20-4	-			L	EA/EA			S	0	/	FS	-	L	-	N
Rear section															

1	2	3		4	5		6	7	8		9		10		11
PLP 30-22	- 83	E3	-	L	ED/EB	- 52 /									
Front section															
10-1	-			L	BB/BA	-		S	0	/	FS	-	L	-	N
Rear section															

1	2	3		4	5		6	7	8		9		10		11
PLP 20-4	- 82	E2	-	L	EA/EA	- 51 /									
Front section															
10-1	-			L	BB/BA	-		S	0	/	FS	-	EL	-	N
Rear section															

1	**Type**	Pump Type
The same of multiple pumps		PLP

2	**Drive shaft**	Code
The same of multiple pumps		...

3	**Mounting flange**	Code
The same of multiple pumps		...

4	**Ports position**	Code
Side		L

5	**Ports IN/OUT**	Code
The same of multiple pumps		../..

6	**Combination type**	Code
PLP30/20 Standard - No code		N6
PLP30/20 Common inlet		N7
PLP30/20 Separate stages		Z6
PLP30/10 Standard - No code		Q6
PLP30/10 Common inlete		Q7
PLP20/10 Standard - No code		T6
PLP20/10 Common inlet		T7
PLP20/10 Separate stages		Z6

Code	**Rotation**	7
S	Left	
D	Right	

Code	**Versions - Outboard bearing options**	8
...	The same of multiple pumps	

Code	**Shaft arrangement**	9
FS	Female spline	

Code	**Cover options (a)**	10
	Cast iron mounting flange and rear cover (standard - no code)	
E	Aluminium mounting flange and cast iron rear cover (only for PLP20/10)	
L	Cast iron mounting flange and aluminium rear cover	
EL	Aluminium mounting flange and rear cover (only for PLP20/10)	

Code	**Seals**	11
	The same of multiple pumps	

(a) Mounting flange material:
PLP 20 on page 61 ÷ 66 - PLP 30 on page 67 ÷ 69
Rear cover material:
PLP 10 on page 44 - PLP 20 on page 45

02/07.2006

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

PL 04 T A Edition: 04/10.2020 Replaces: PL 03 T A

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