

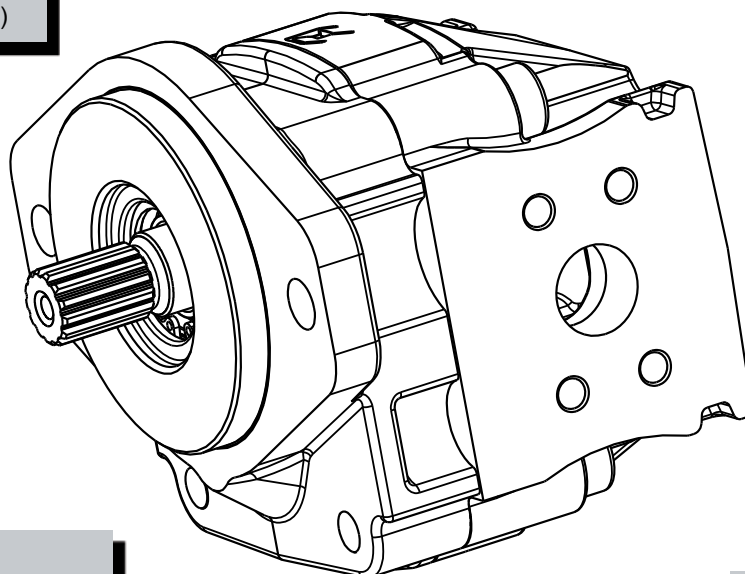
New

Hydraulic gear pumps and motors

compact design

DISPLACEMENTS

From	1.34 in ³ /rev (21,99 cm ³ /rev)
To	9.20 in ³ /rev (150,79 cm ³ /rev)

**PRESSURE**

Max. continuous	4350 psi (300 bar)
Max. intermittent	4568 psi (315 bar)
Max. peak	4713 psi (325 bar)

MAX. SPEED3000 min⁻¹

- High operating pressures
- Low noise emission
- Available with built-in valves
- Exceptional working life expectancy

From the KAPPA series, we now introduce the KAPPA "Compact" line. The main feature of this new line is a solid, compact 2- piece construction. The new Kappa "Compact" line allows you to include many functions in a reduced envelope (space). The new KAPPA "Compact" line is a direct result of feedback received from Casappa customers. This feedback has given Casappa the opportunity to understand the needs of our customers and implement the hydraulic knowledge gained into new and improved products. The "Compact" line provides exceptional quality and reliability thanks to tri-dimensional modeling, virtual simulation of the pump's behavior in the hydraulic system and testing on the machines. The reduced dimensions as well as a large variety of drive shafts, mounting flanges and ports ensure great flexibility in the "Compact" line.



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Replaces: 02/11.2004

03/07.2005



Modification from former edition.

FEATURES

Construction	External gear type pumps and motors
Mounting	EUROPEAN - SAE - standard flanges
Line connections	Screw and flange
Direction of rotation (looking at the drive shaft)	Anti-clock (S) - clockwise (D) - reversible external drain (R) reversible internal drain (B)
Inlet pressure range for pumps	10 ÷ 44 psi - [0,7 ÷ 3 bar (abs.)]
Max back pressure for single rotation motors	p ₁ (continuous) max 73 psi (5 bar)
	p ₂ (for 20 s) max 116 psi (8 bar)
	p ₃ (for 8 s) max 218 psi (15 bar)
Max drain line pressure on reversible rotation motors	73 psi (5 bar)
Max back pressure on the series motors	2175 psi (150 bar)
Fluid temperature range	See table (1)
Fluid	Mineral oil based hydraulic fluids to ISO/DIN and fire resistant fluids [see table (1)]. For other fluids please consult our technical sales department.
Viscosity range	From 60 to 456 SSU [12 to 100 mm ² /s (cSt)] recommended
	Up to 3410 SSU [750 mm ² /s (cSt)] permitted
Filtering requirement	See table (2)

Replaces: 03/07.2005

Tab. 1							
Type	Fluid composition	Max pressure psi - (bar)	Max speed min ⁻¹	Temperature °F - (°C)			Seals (◆)
				Min	Max continuous	Max peak	
ISO/DIN	Mineral oil based hydraulic fluid to ISO/DIN	See page 3	See page 3	-13 (-25)	176 (80)	212 (100)	N
				-13 (-25)	230 (110)	257 (125)	N-H
HFA	Oil emulsion in water 5 ÷ 15% of oil	725 (50)	1500	36 (2)	131 (55)	–	V
HFB	Water emulsion in oil 40 % of water	1740 (120)	1500	36 (2)	140 (60)	–	N
HFC	Water - glycol	1450 (100)	1500	-4 (-20)	140 (60)	–	N Bz
HFD	Phosphate ester	2175 (150)	1500	14 (-10)	176 (80)	–	V Bz

◆ N= Buna N (standard) - N-H= Buna N and high back pressure shaft seals - V= Viton
N Bz= Buna N and Bronze thrust plates - V Bz= Viton and Bronze thrust plates

Casappa recommends to
use its own production
filters:

Tab. 2			
Working pressure psi (bar)	Δp<2030 (140)	2030<Δp<3045 (140) (210)	Δp>3045 (210)
Contamination class NAS 1638	10	9	8
Contamination class ISO 4406:1999	21/19/16	20/18/15	19/17/14
Achieved with filter β ₁₀ (c) ≥75 according to ISO 16889	–	10 μm	10 μm
Achieved with filter β ₂₅ (c) ≥75 according to ISO 16889	25 μm	–	–



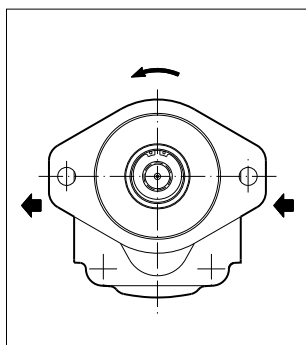
General Notes

Available with different inlet and outlet ports. If you use fire resistant fluids, specify the fluid type when ordering. For

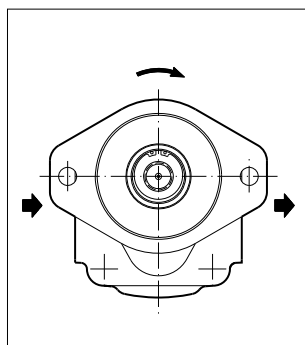
04/07.2008

FEATURES

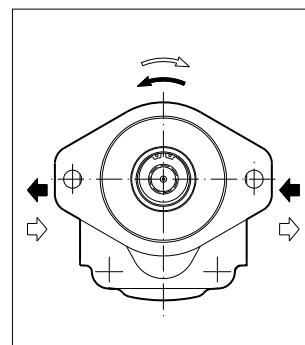
DEFINITION OF ROTATION DIRECTION LOOKING AT THE DRIVE SHAFT



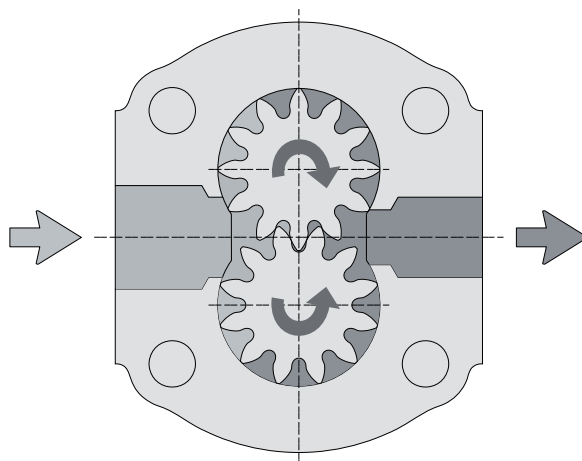
Anti-clock rotation



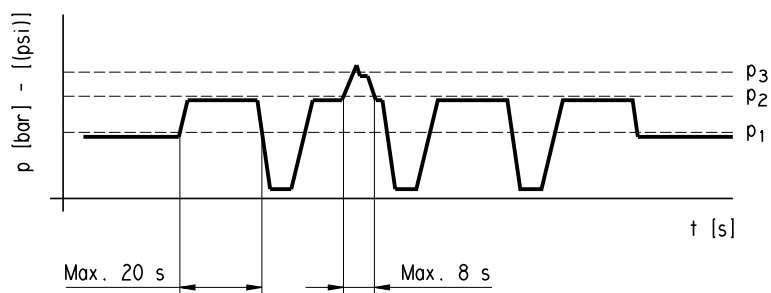
Clockwise rotation



Reversible rotation



PRESSURE DEFINITION



p_1 Max. continuous pressure

p_2 Max. intermittent pressure

p_3 Max. peak pressure

01/05.2002

GENERAL DATA

Pump type Motor type	Displacement	Max. pressure			Max. speed	Min. speed
		p ₁	p ₂	p ₃		
	in³/rev (cm³/rev)	psi (bar)			min ⁻¹	
K. 30•22	1.34 (21,99)	4060 (280)	4350 (300)	4495 (310)	3000	350
K. 30•27	1.63 (26,7)	4060 (280)	4350 (300)	4495 (310)	3000	350
K. 30•31	1.87 (30,63)	3770 (260)	4060 (280)	4350 (300)	3000	350
K. 30•34	2.11 (34,56)	3770 (260)	4060 (280)	4350 (300)	3000	350
K. 30•38	2.40 (39,27)	3770 (260)	4060 (280)	4350 (300)	3000	350
K. 30•41	2.54 (41,62)	3625 (250)	3915 (270)	4205 (290)	3000	350
K. 30•43	2.68 (43,98)	3625 (250)	3915 (270)	4205 (290)	3000	350
K. 30•46	2.83 (46,34)	3625 (250)	3915 (270)	4205 (290)	3000	350
K. 30•51	3.16 (51,83)	3335 (230)	3625 (250)	3915 (270)	2500	350
K. 30•56	3.45 (56,54)	3118 (215)	3408 (235)	3698 (255)	2500	350
K. 30•61	3.74 (61,26)	2900 (200)	3190 (220)	3480 (240)	2500	350
K. 30•73	4.50 (73,82)	2610 (180)	2900 (200)	3190 (220)	2500	350
K. 40•63	3.75 (61,43)	4350 (300)	4568 (315)	4713 (325)	2800	300
K. 40•73	4.43 (72,6)	4350 (300)	4568 (315)	4713 (325)	2800	300
K. 40•87	5.28 (86,56)	4060 (280)	4278 (295)	4423 (305)	2800	300
K. 40•109	6.64 (108,9)	3625 (250)	3843 (265)	3988 (275)	2800	300
K. 40•121	7.43 (121,8)	3335 (230)	3553 (245)	3698 (255)	2500	300
K. 40•133	8.18 (134,03)	3190 (220)	3408 (235)	3553 (245)	2500	300
K. 40•151	9.20 (150,79)	2900 (200)	3118 (215)	3263 (225)	2500	300

p₁= Max. continuous pressure

p₂= Max. intermittent pressure

p₃= Max. peak pressure

The values in the table refer to unidirectional pumps and motors

Reversible pumps and motors max pressures are 15% lower than those shown in table.

For different working conditions please consult our sales department.

GENERAL DATA PUMPS AND MOTORS

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

Replaces: 01/05.2002

Efficiencies

		Pumps	Motors
$\eta_v = \eta_v(V, \Delta p, n)$	Volumetric efficiency	($\approx 0,98$)	($\approx 0,97$)
$\eta_m = \eta_m(V, \Delta p, n)$	Mechanical efficiency	($\approx 0,90$)	($\approx 0,88$)
$\eta_t = \eta_v \cdot \eta_m$	Overall efficiency	($\approx 0,88$)	($\approx 0,85$)

DESIGN CALCULATIONS FOR PUMP

$$Q = V \text{ (cm}^3\text{/rev)} \cdot \eta_v \cdot n \cdot 10^{-3} \quad [\text{l/min}]$$

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

$$P = \frac{\Delta p \text{ (bar)} \cdot V \text{ (cm}^3\text{/rev)} \cdot n}{600 \cdot 1000 \cdot \eta_t} \quad [\text{kW}]$$

DESIGN CALCULATIONS FOR MOTOR

$$Q = \frac{V \text{ (cm}^3\text{/rev)} \cdot n \cdot 10^{-3}}{\eta_v} \quad [\text{Nm}]$$

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

$$P = \frac{\Delta p \text{ (bar)} \cdot V \text{ (cm}^3\text{/rev)} \cdot n \cdot \eta_t}{600 \cdot 1000} \quad [\text{kW}]$$

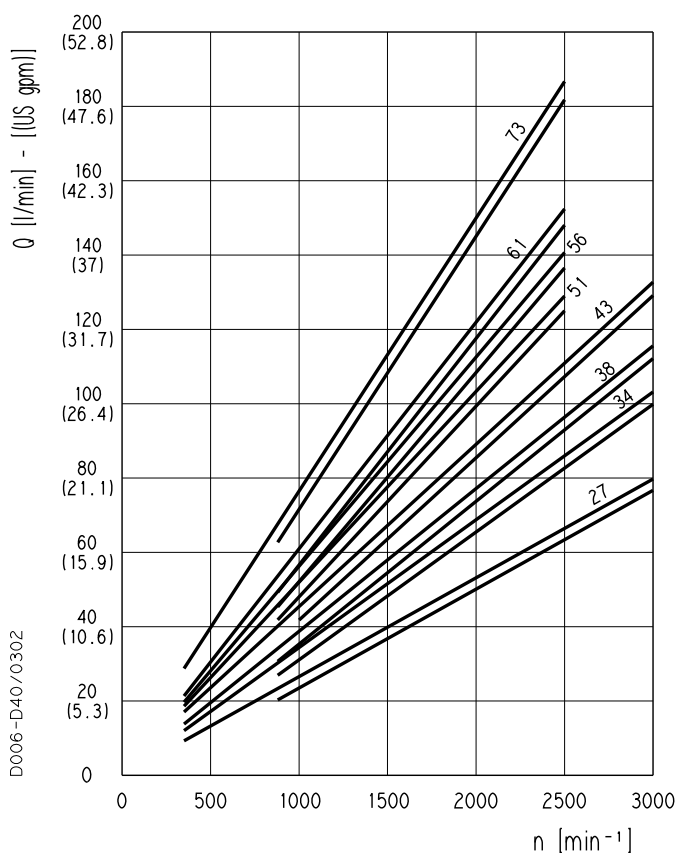
03/07.2005

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

KAPPA 30 GEAR PUMPS PERFORMANCE CURVES

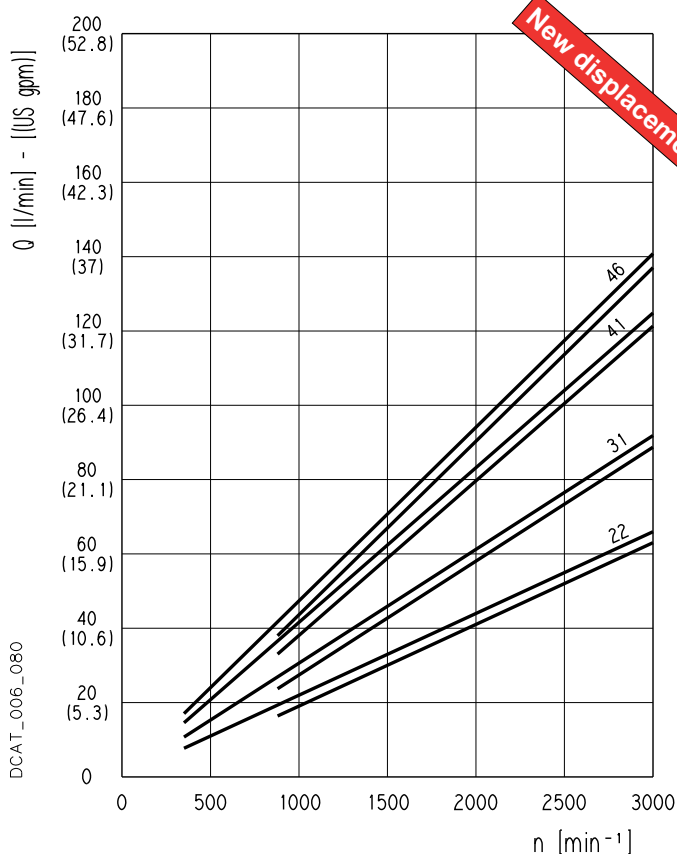
KP 30

KP 30



Each curve has been obtained at 122 °F (50 °C), using oil with viscosity 168 SSU (36 cSt) at 104 °F (40 °C) and at these pressures:

KP 30•27.	290-4060 psi (20-280 bar)
KP 30•34.	290-3770 psi (20-260 bar)
KP 30•38.	290-3770 psi (20-260 bar)
KP 30•43.	290-3625 psi (20-250 bar)
KP 30•51.	290-3335 psi (20-230 bar)
KP 30•56.	290-3118 psi (20-215 bar)
KP 30•61.	290-2900 psi (20-200 bar)
KP 30•73.	290-2610 psi (20-180 bar)



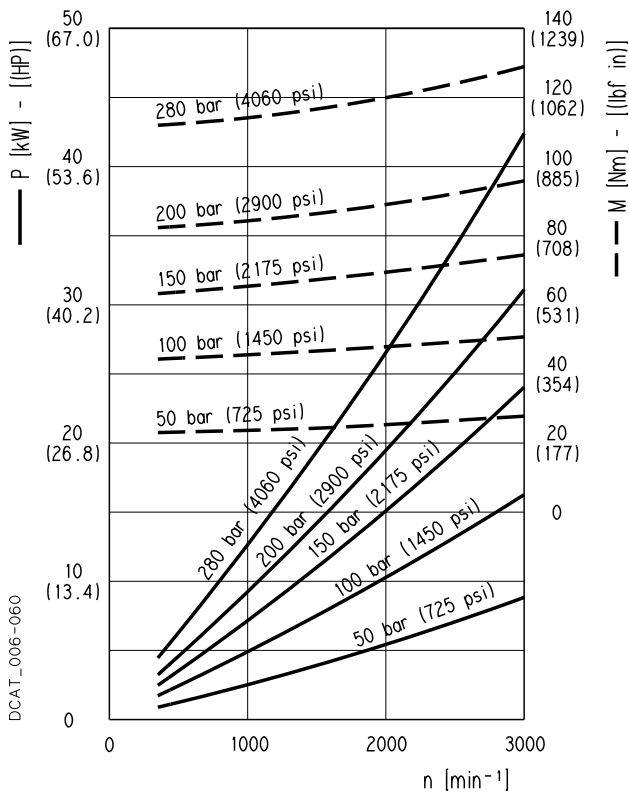
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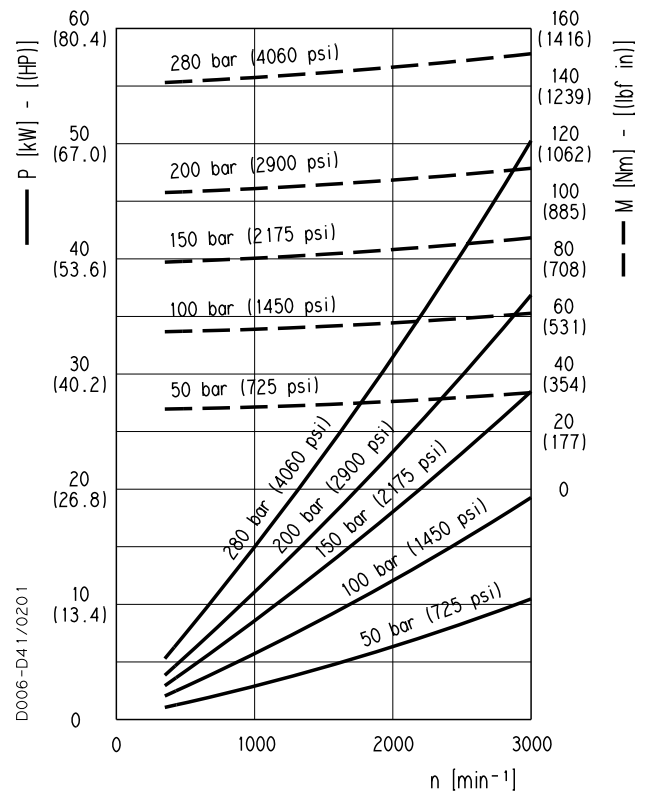
KAPPA 30 GEAR PUMPS PERFORMANCE CURVES

KP 30

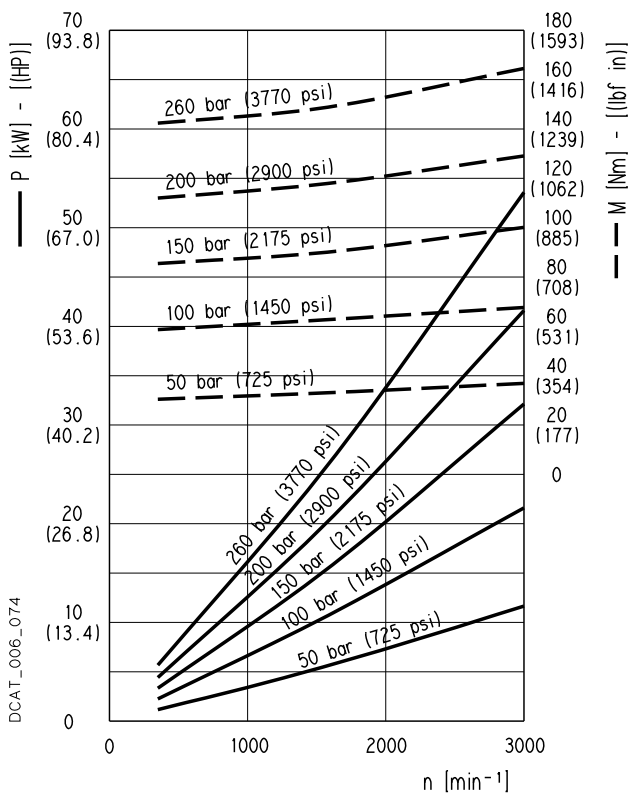
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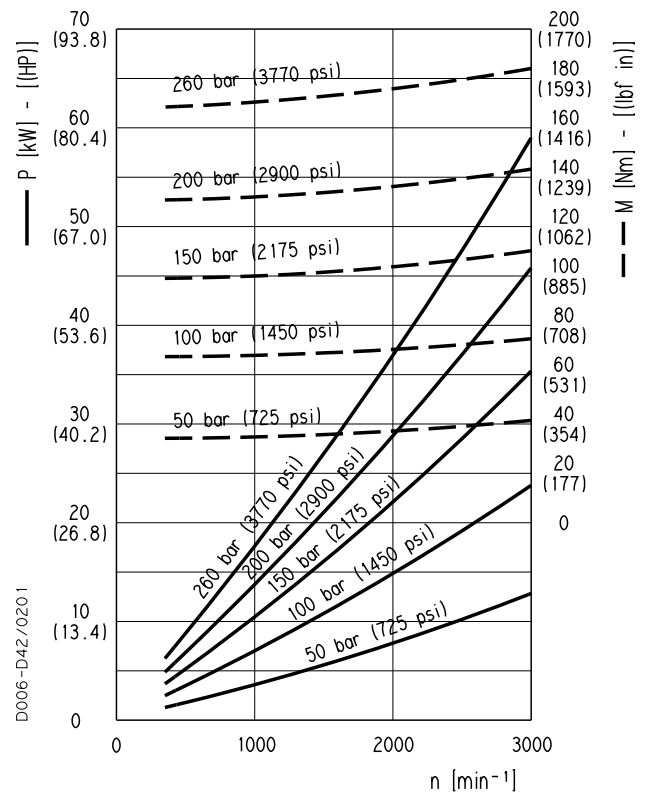
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KP 30•31



KP 30•34

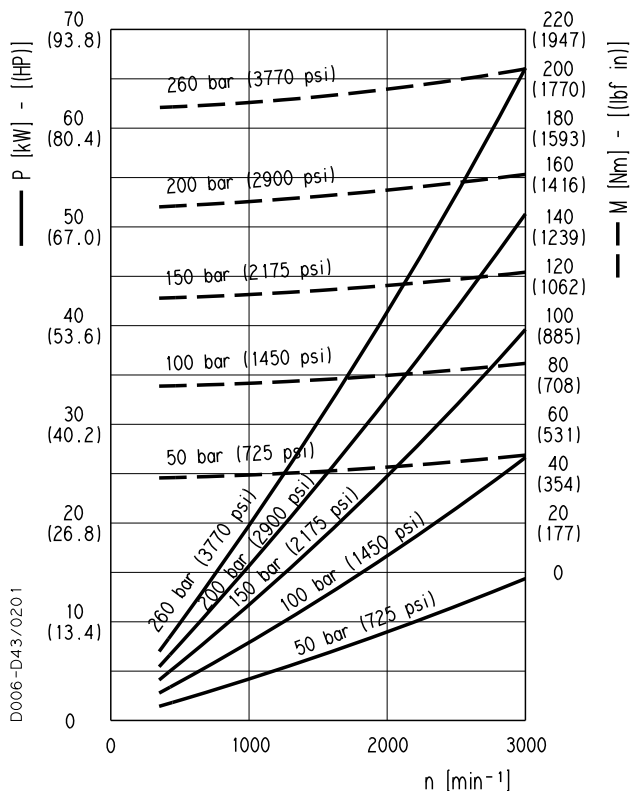


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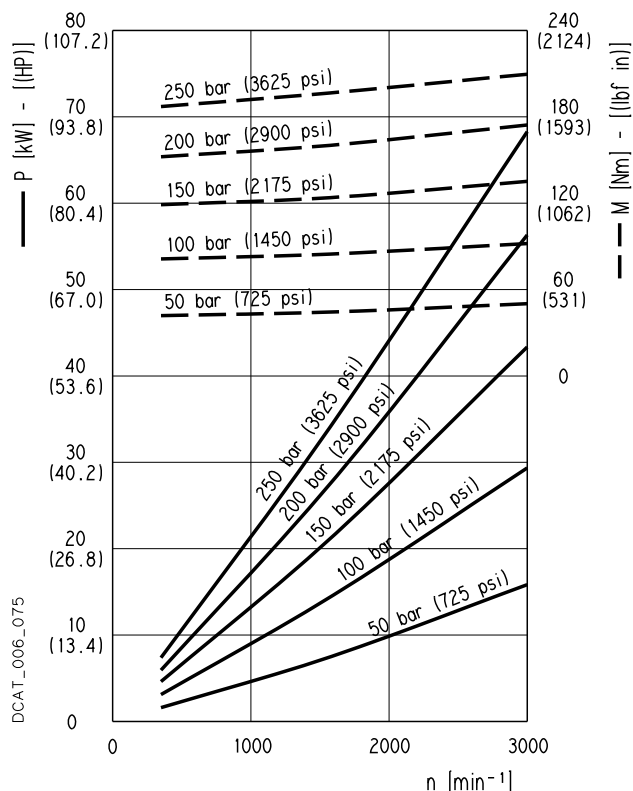
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KP 30

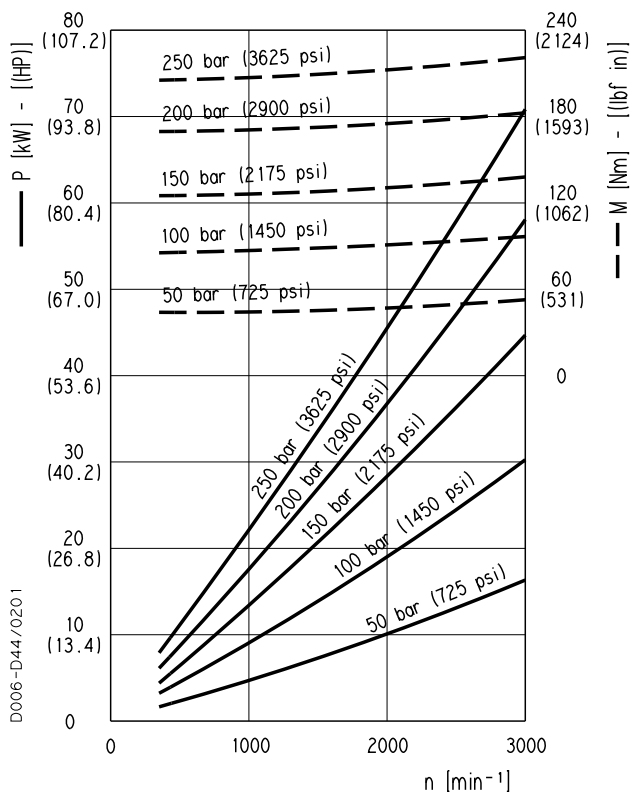
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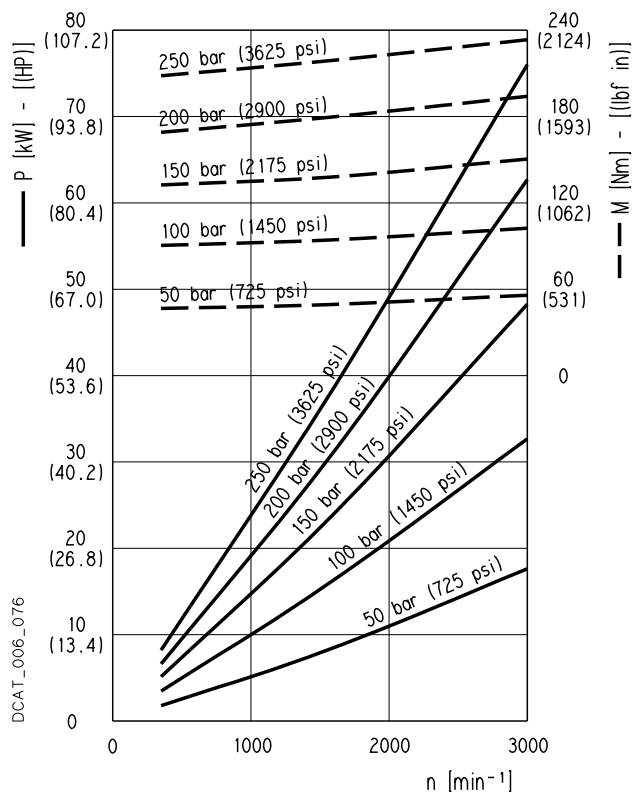
KP 30•41



KP 30•43



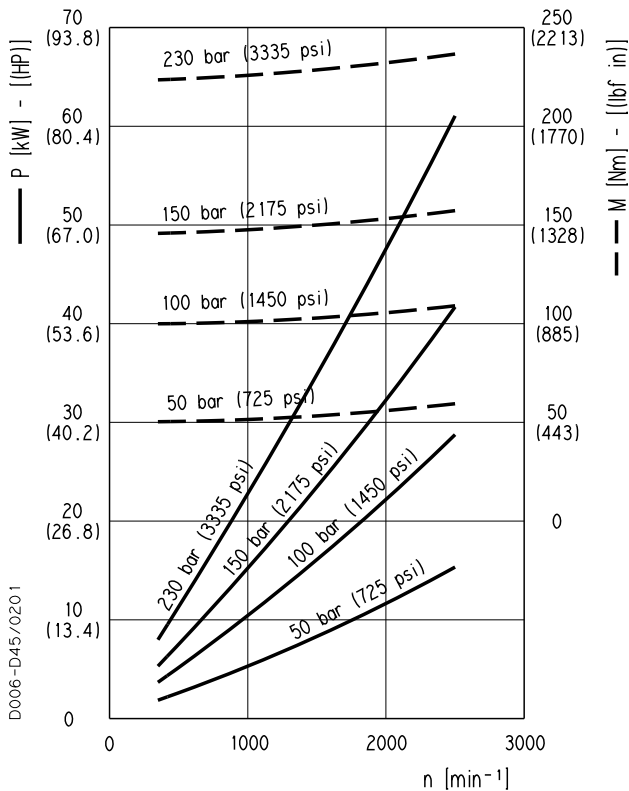
KP 30•46



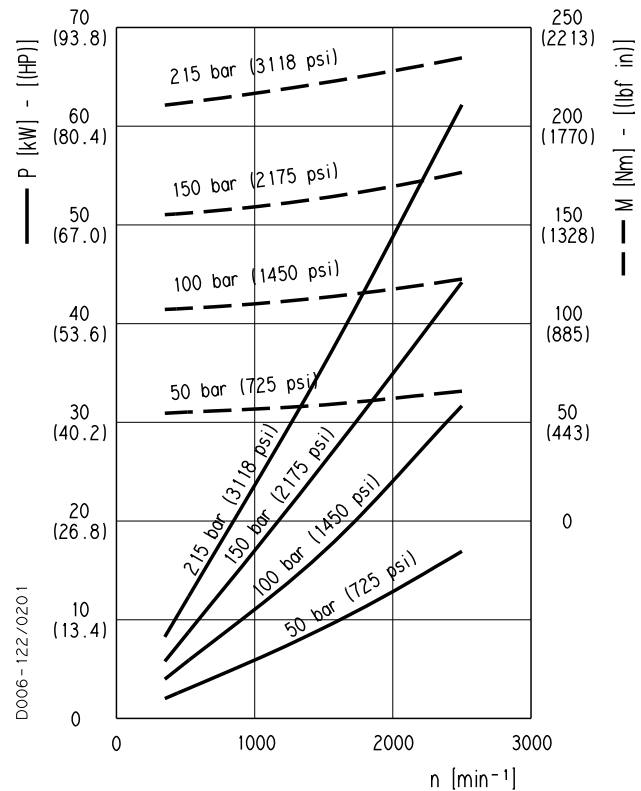
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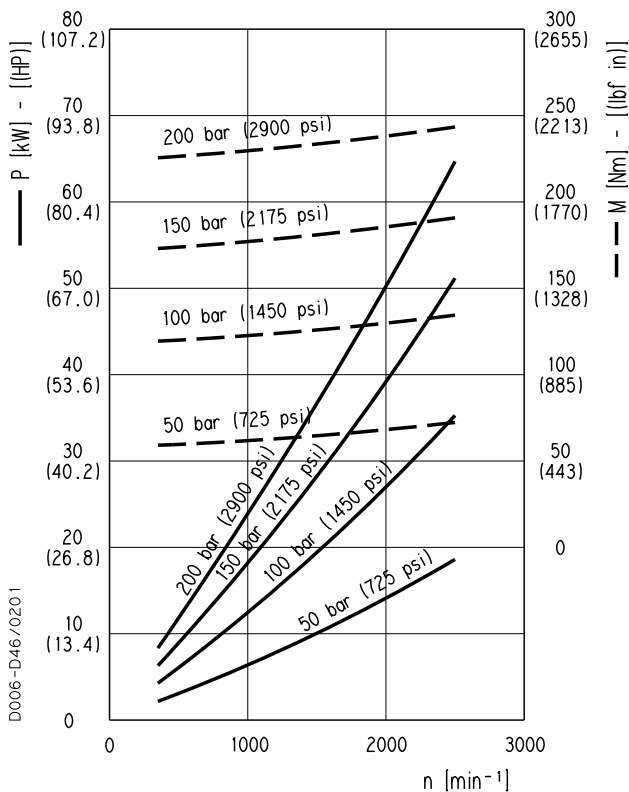
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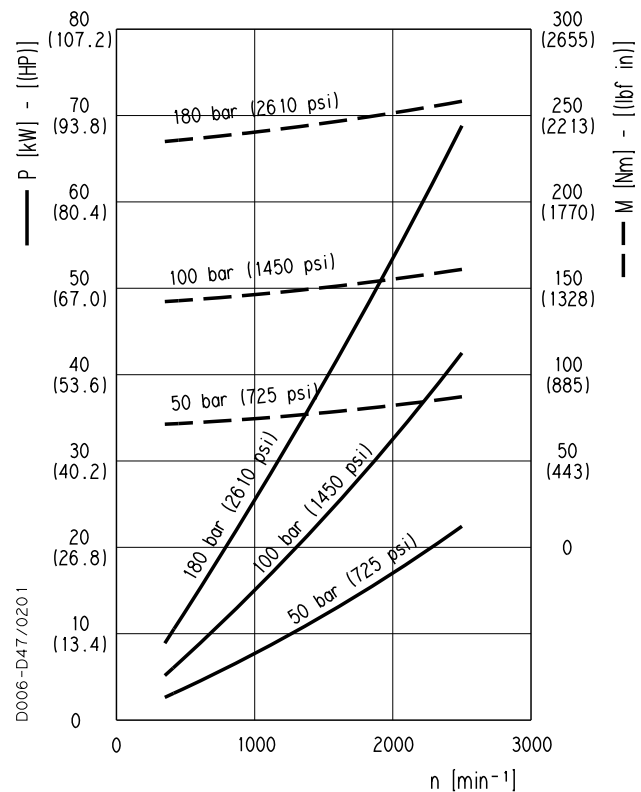
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KP 30•61



KP 30•73

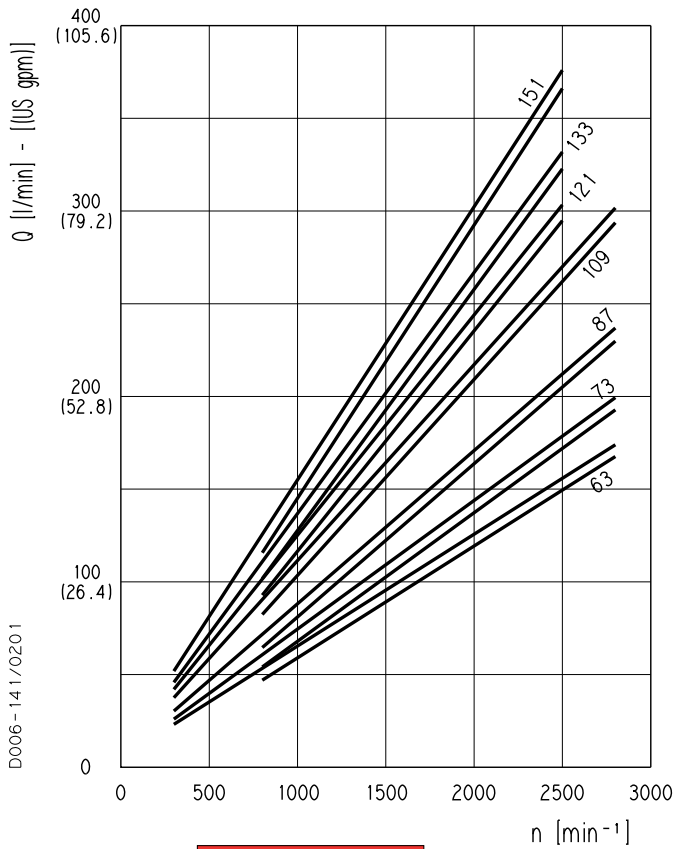


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KAPPA 40 GEAR PUMPS PERFORMANCE CURVES

KP 40

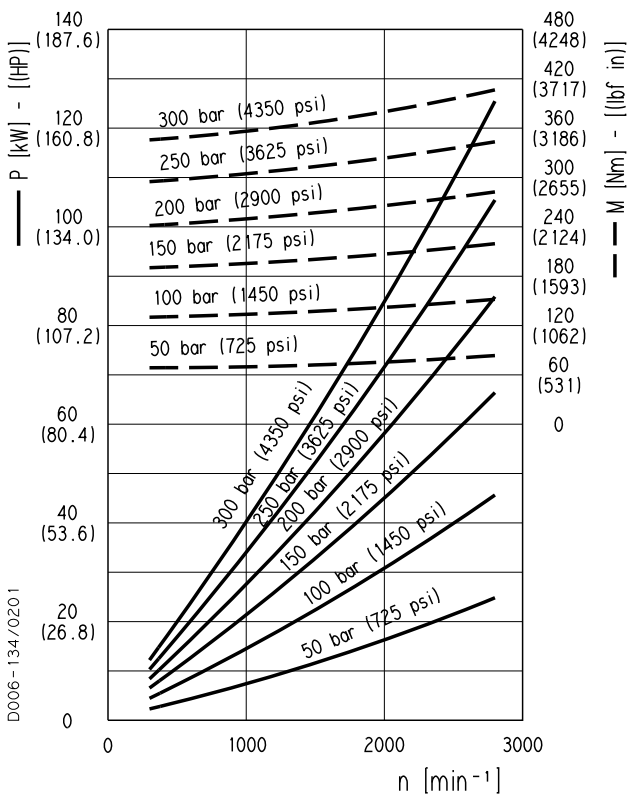
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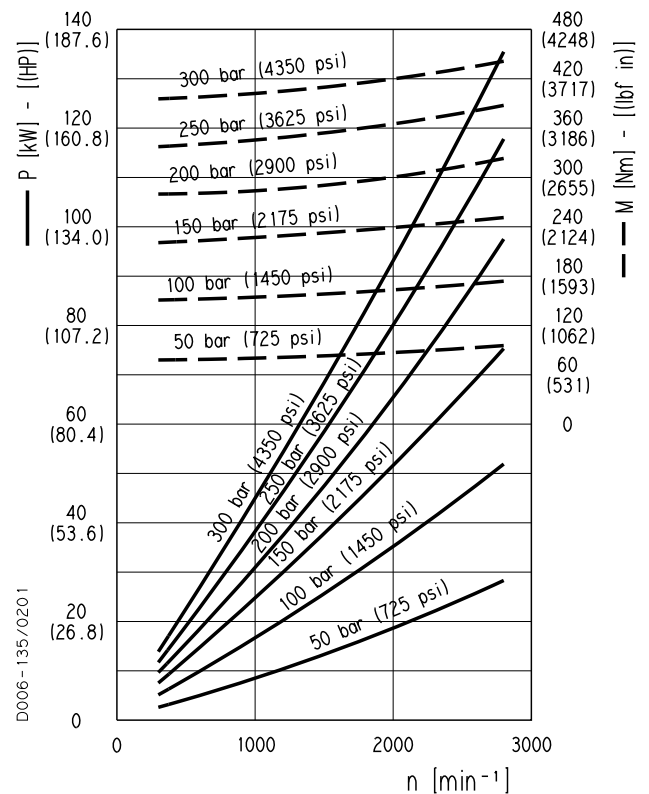
Each curve has been obtained at 122 °F (50 °C), using oil with viscosity 168 SSU (36 cSt) at 104 °F (40 °C) and at these pressures:

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- KP 40•121. 290-3335 psi (20-230 bar)
- KP 40•133. 290-3190 psi (20-220 bar)
- KP 40•151. 290-2900 psi (20-200 bar)

KP 40•63

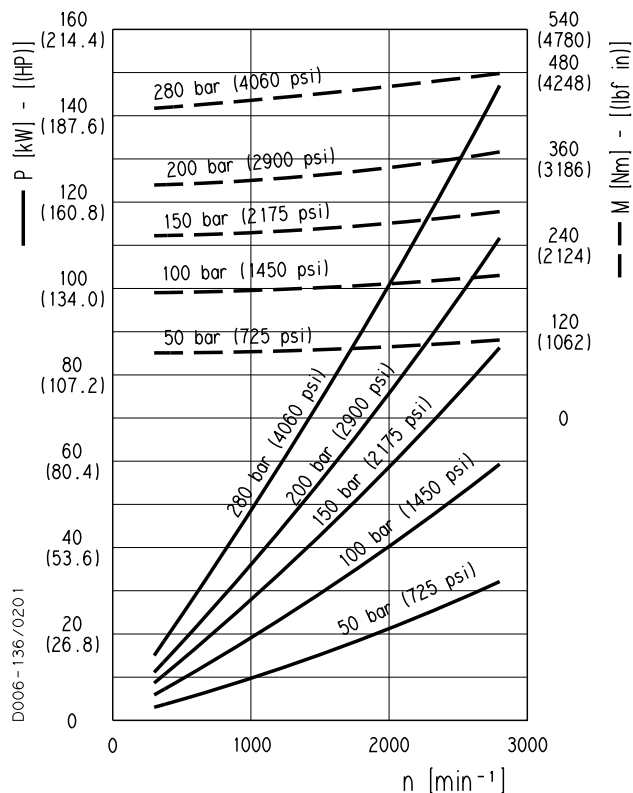
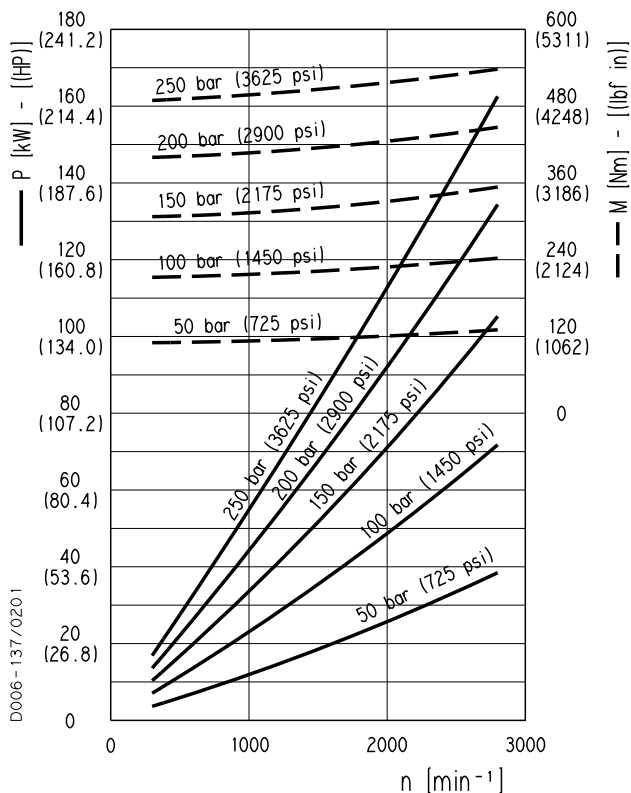
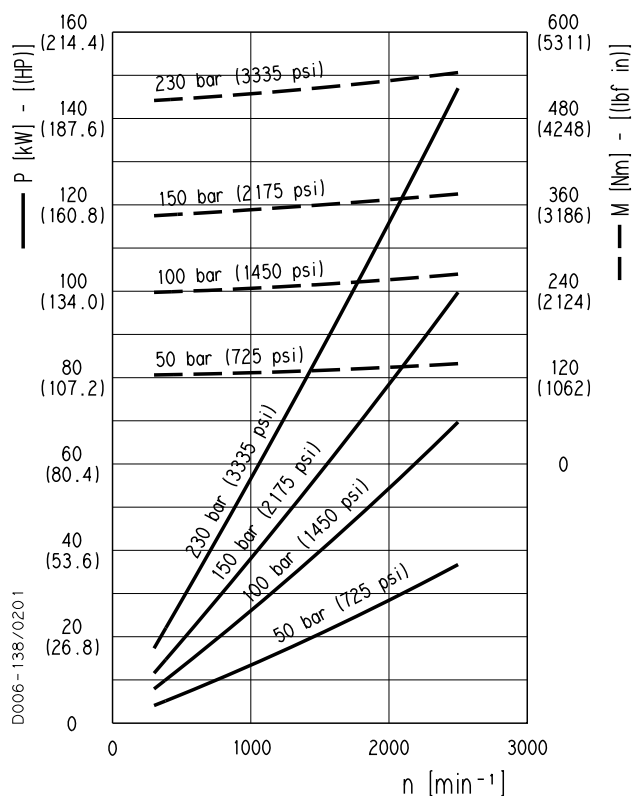
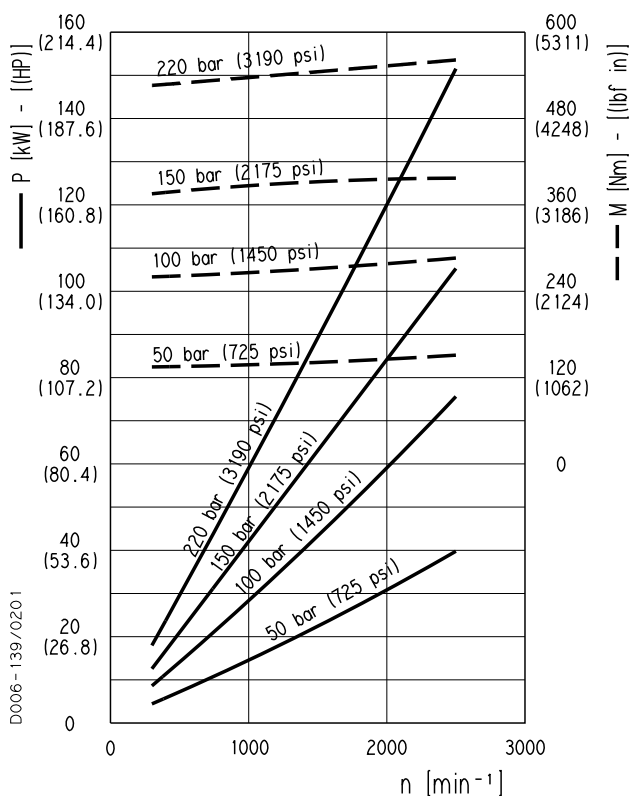


KP 40•73



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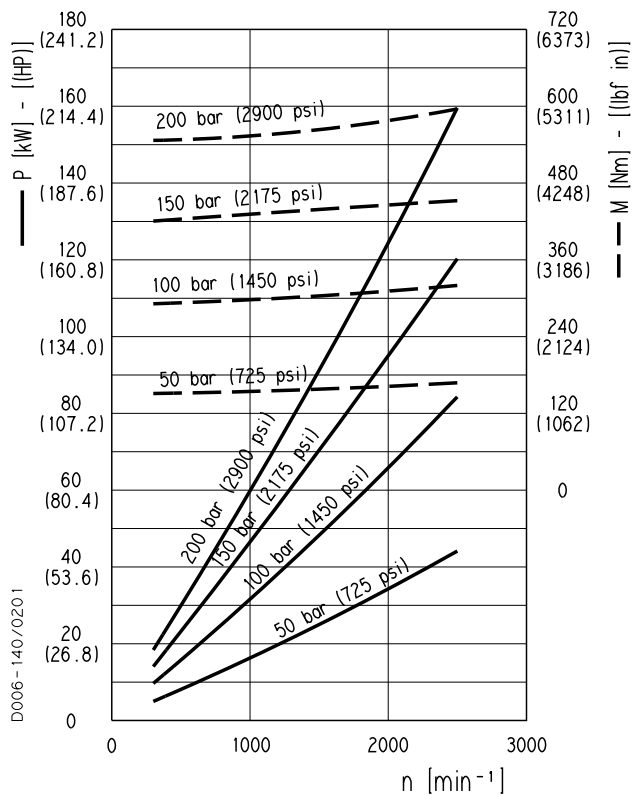
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KP 40•109

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KP 40•133


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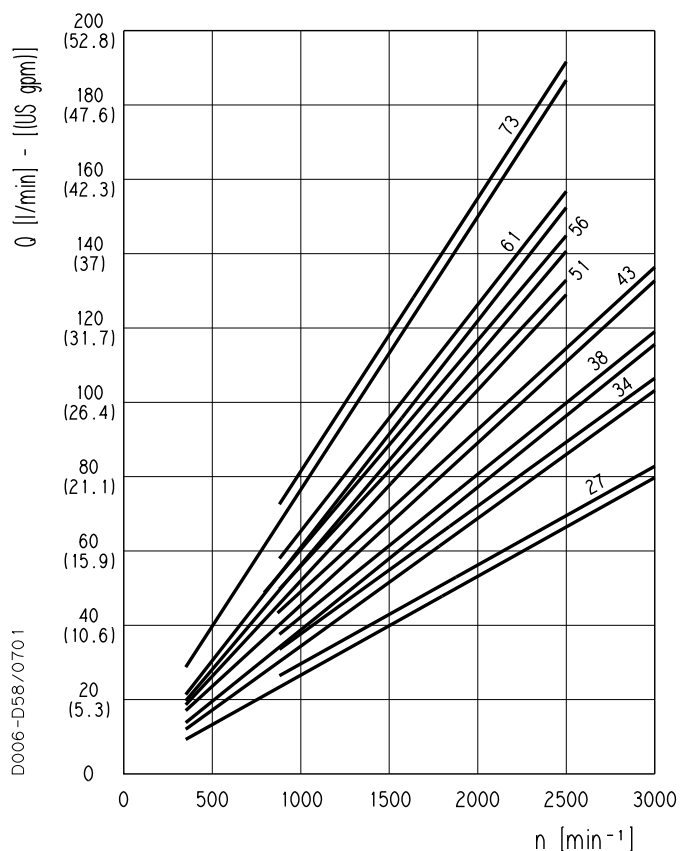
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KP 40•151



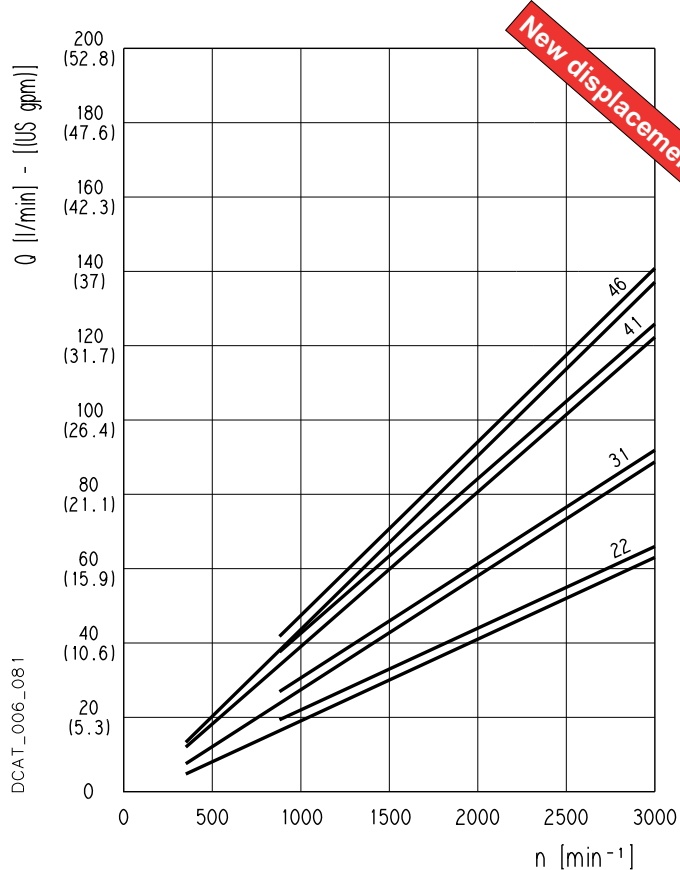
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KAPPA 30 GEAR MOTORS PERFORMANCE CURVES

KM 30
KM 30


Each curve has been obtained at 122 °F (50 °C), using oil with viscosity 168 SSU (36 cSt) at 104 °F (40 °C) and at these pressures:

KM 30•27	290-4060 psi (20-280 bar)
KM 30•34	290-3770 psi (20-260 bar)
KM 30•38	290-3770 psi (20-260 bar)
KM 30•43	290-3625 psi (20-250 bar)
KM 30•51	290-3335 psi (20-230 bar)
KM 30•56	290-3118 psi (20-215 bar)
KM 30•61	290-2900 psi (20-200 bar)
KM 30•73	290-2610 psi (20-180 bar)



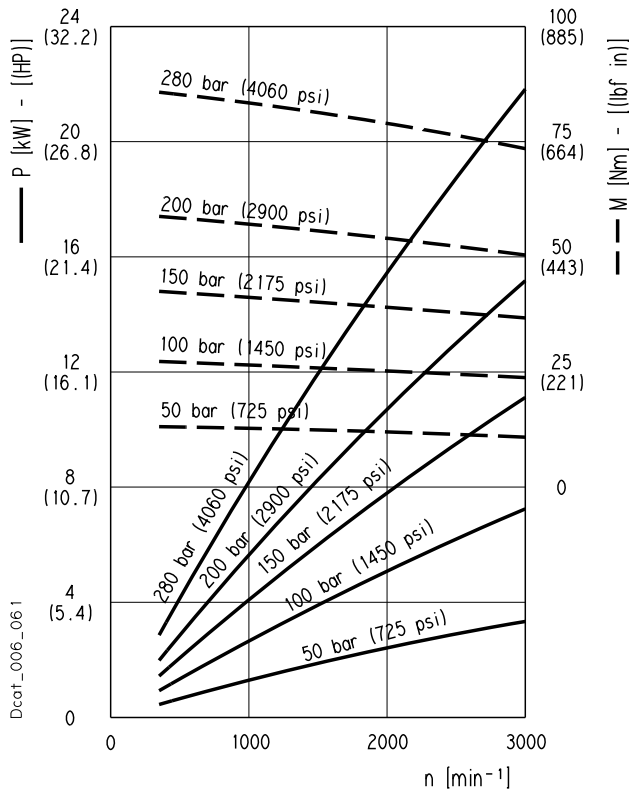
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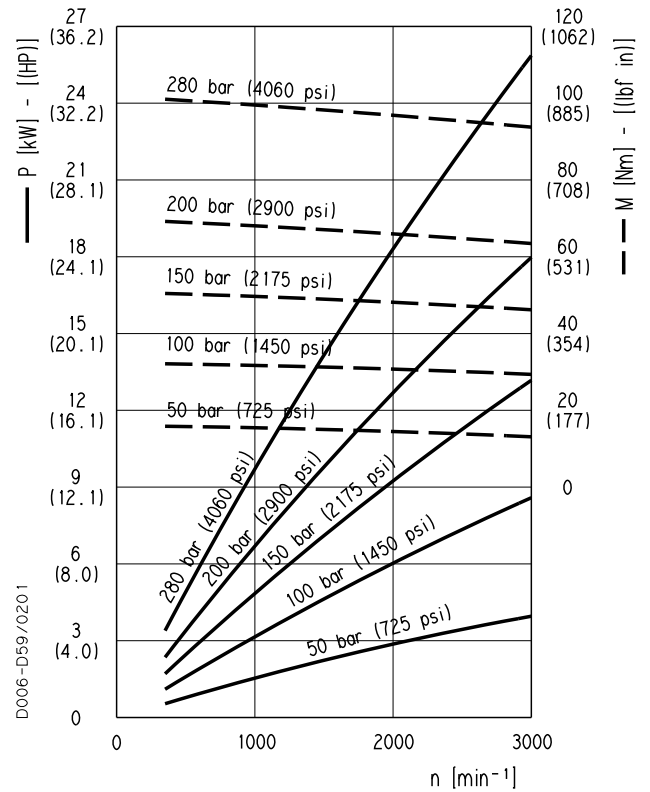
KAPPA 30 GEAR MOTORS PERFORMANCE CURVES

KM 30

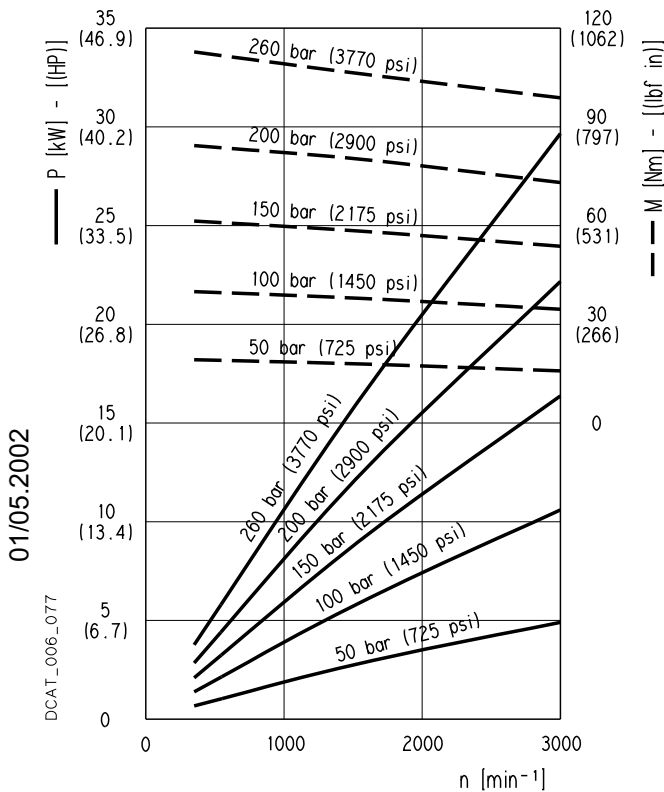
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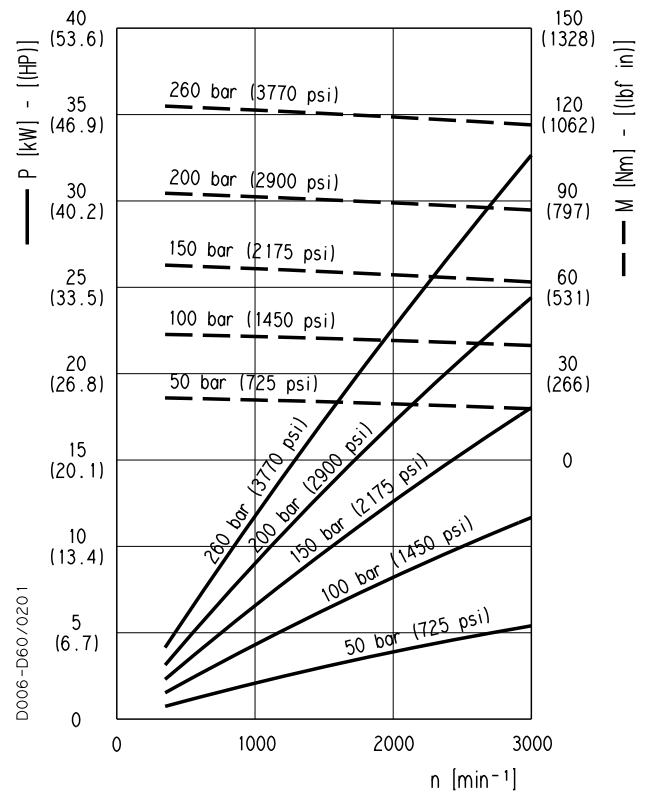
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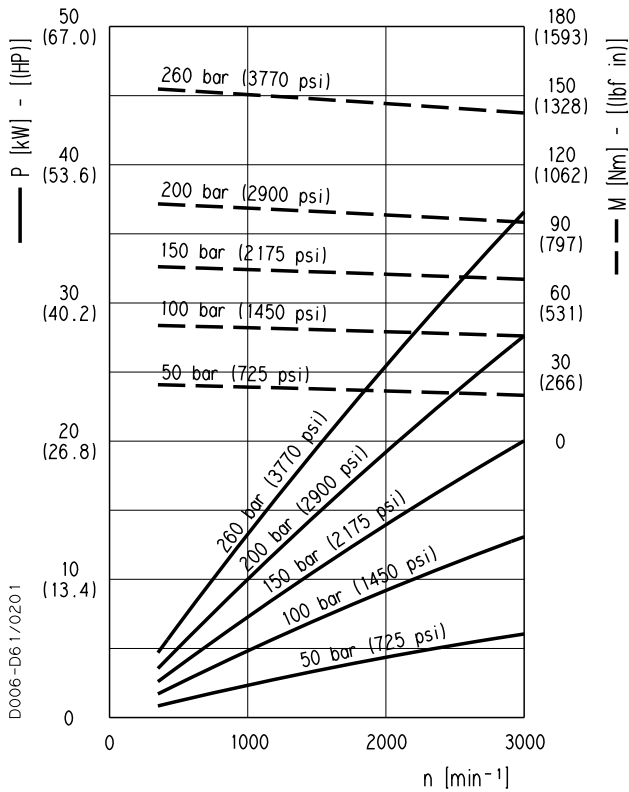
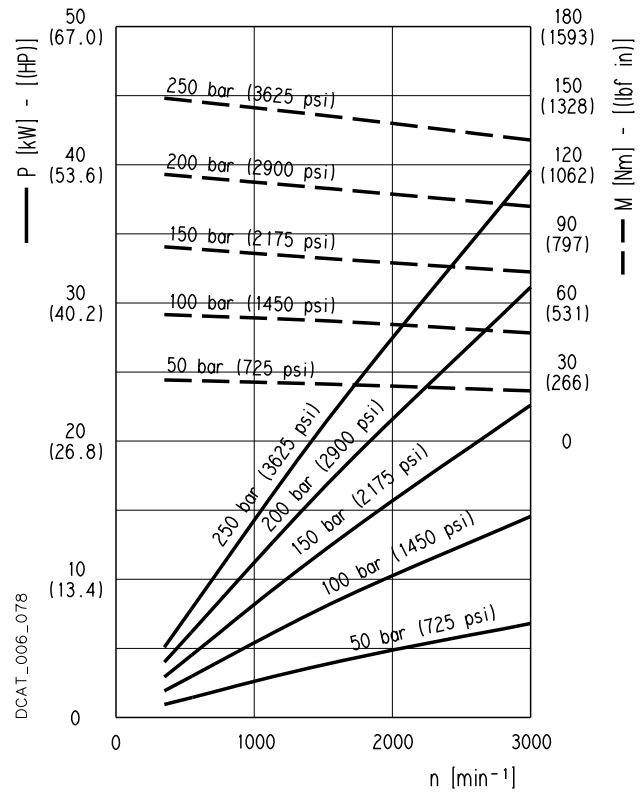
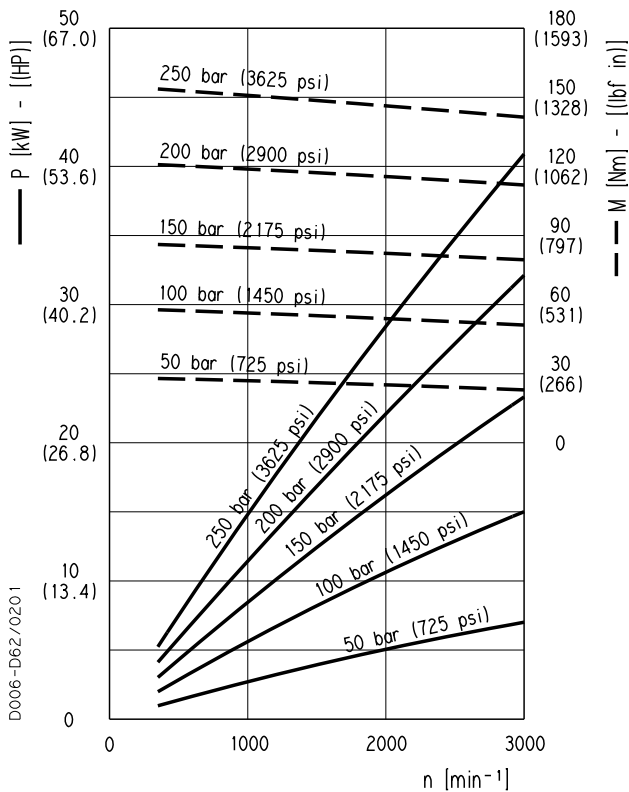
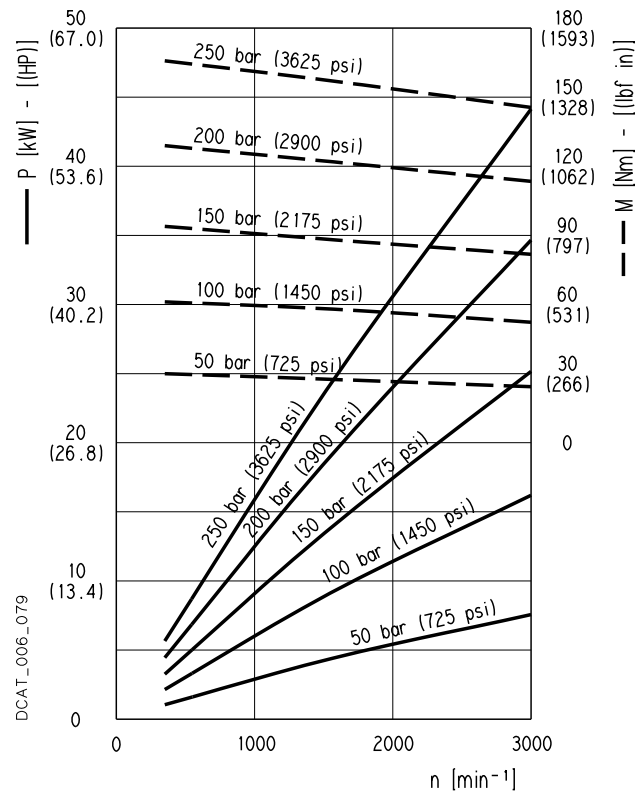
KM 30-31



KM 30-34

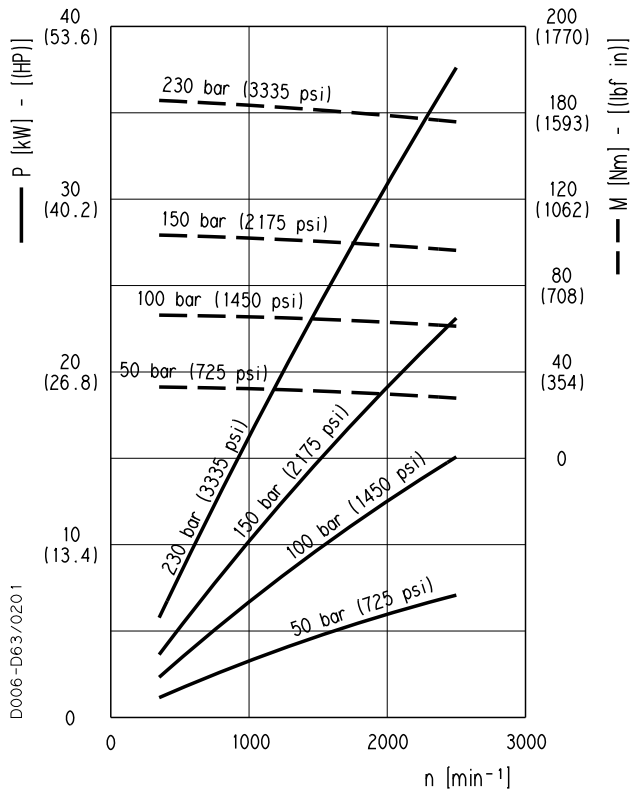
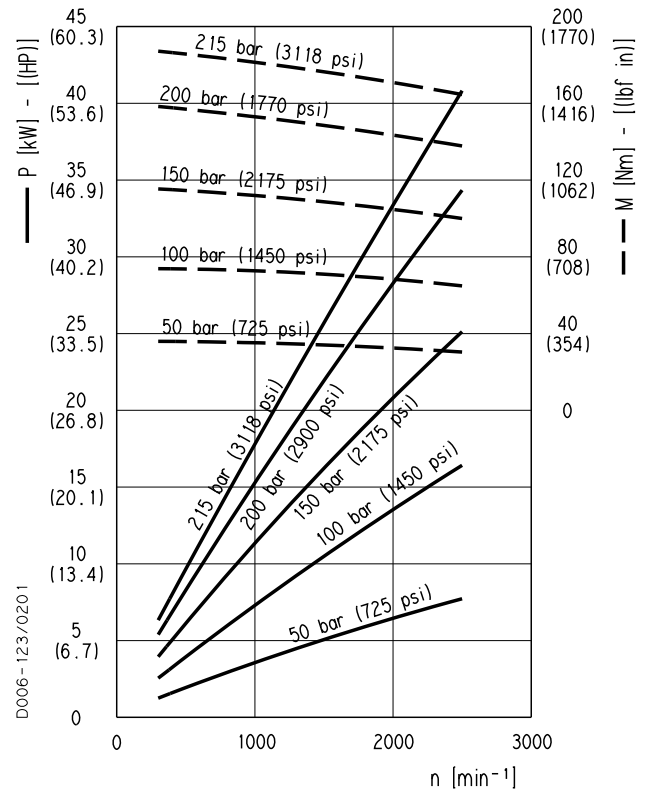
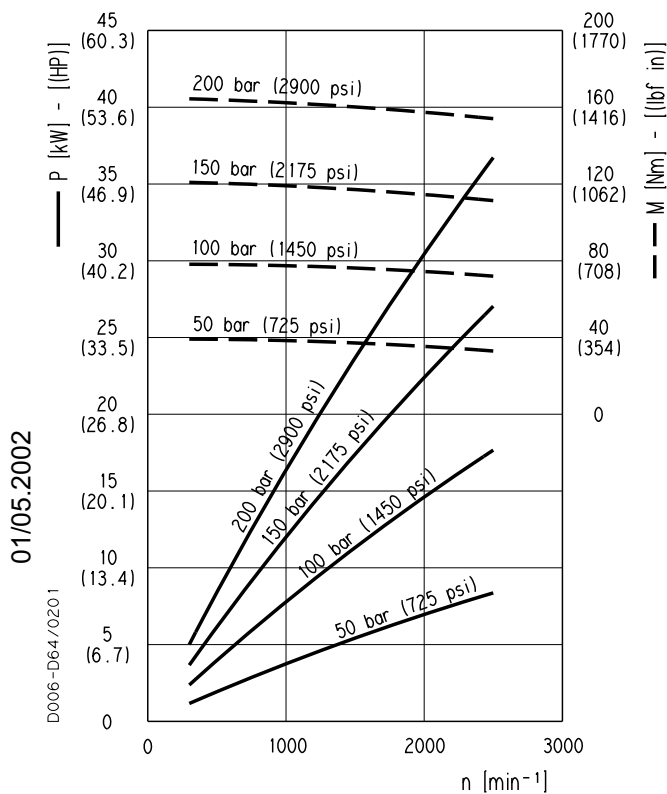
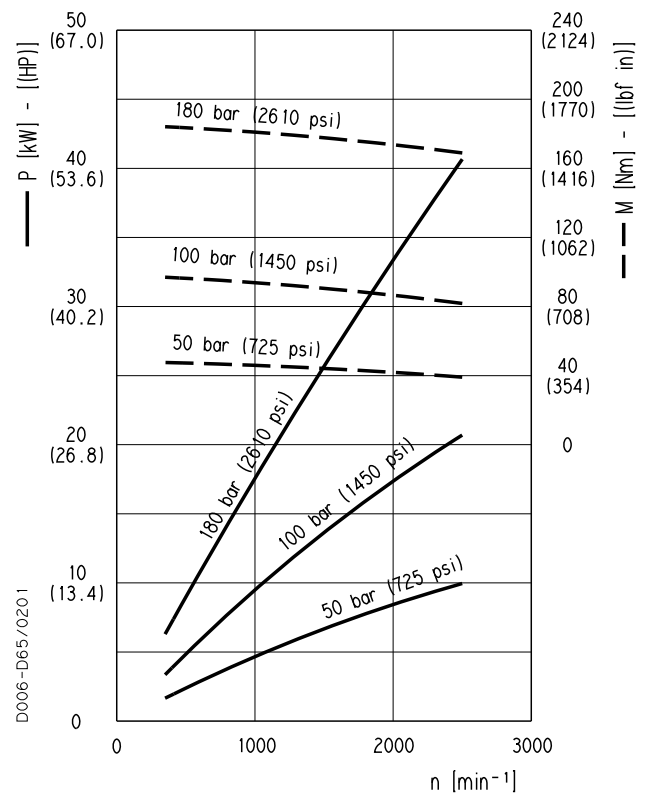


KAPPA 30 GEAR MOTORS PERFORMANCE CURVES

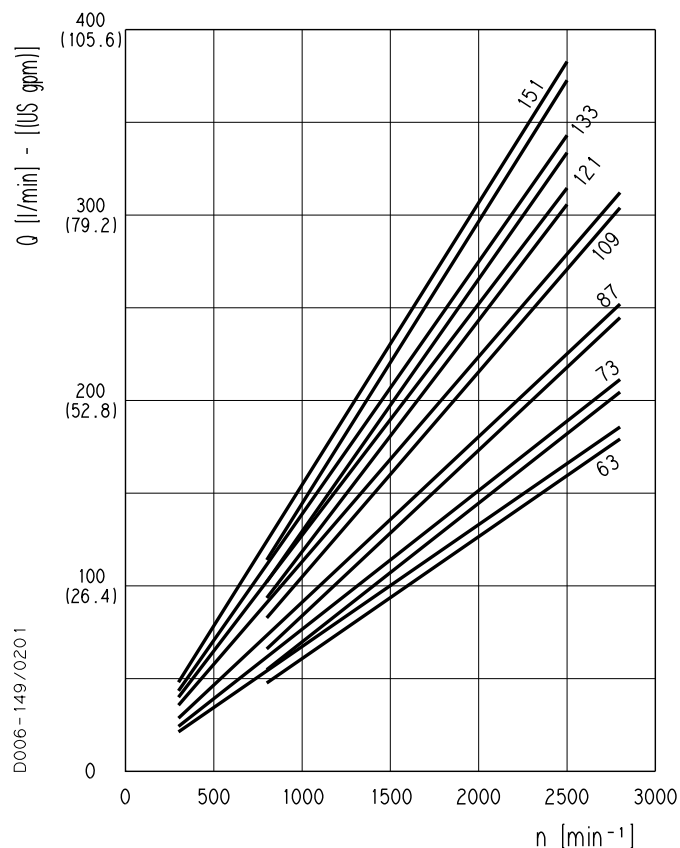
KM 30
KM 30-38

KM 30-41

KM 30-43

KM 30-46


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KAPPA 30 GEAR MOTORS PERFORMANCE CURVES

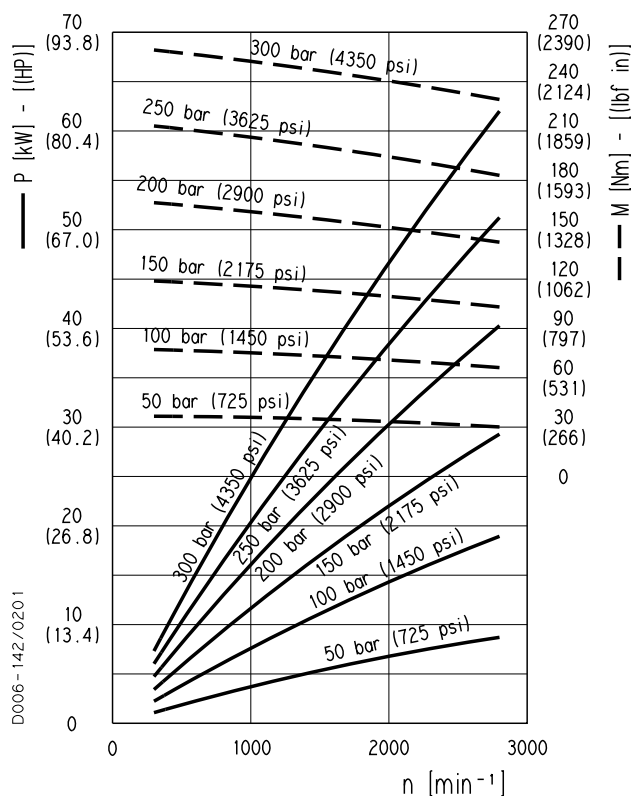
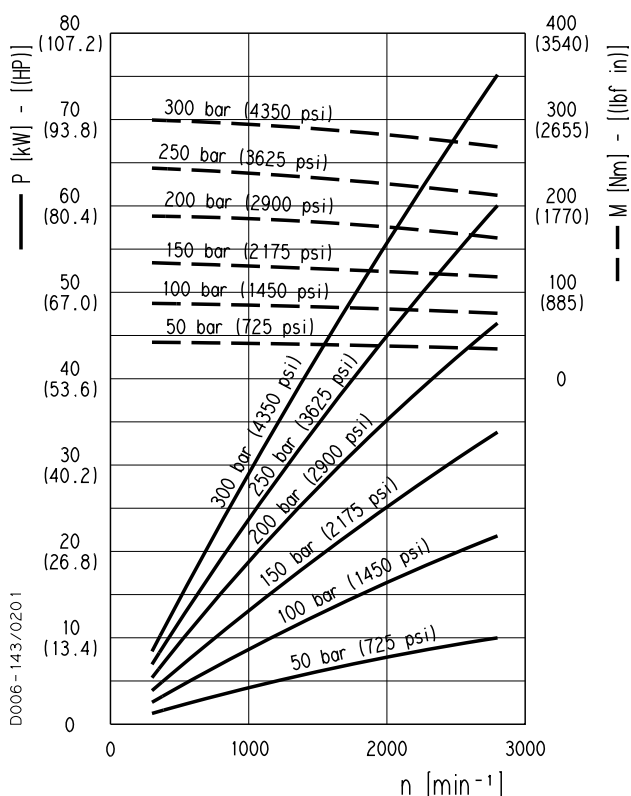
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KM 30•56

KM 30•61

KM 30•73


KAPPA 40 GEAR MOTORS PERFORMANCE CURVES

KM 40
KM 40


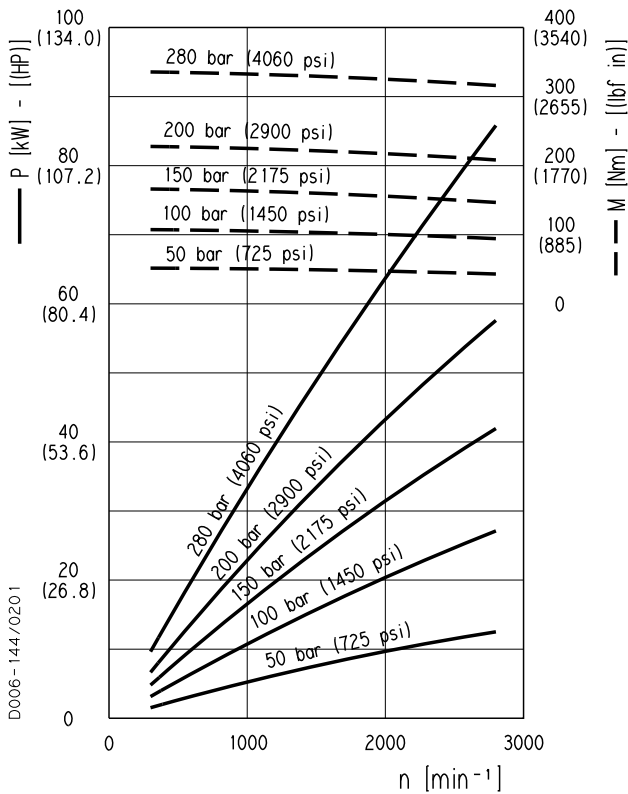
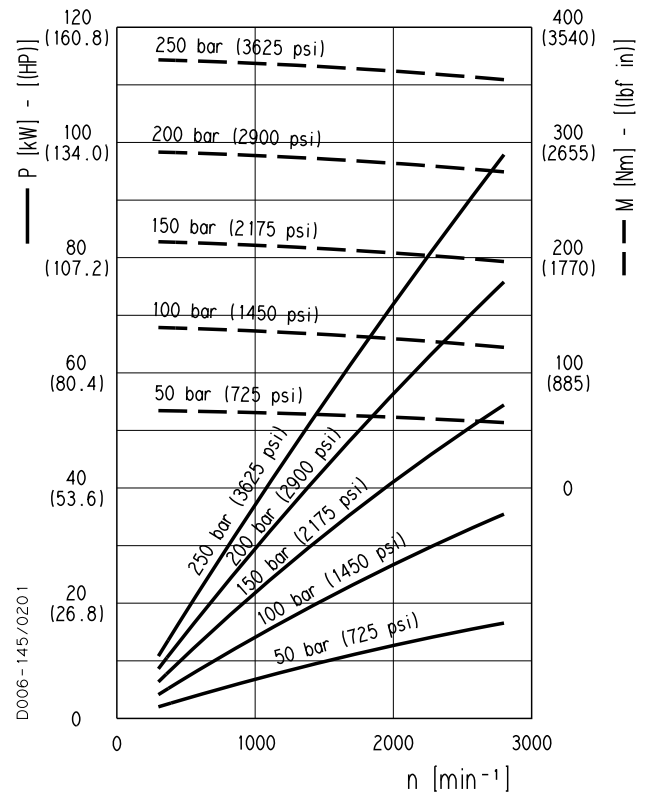
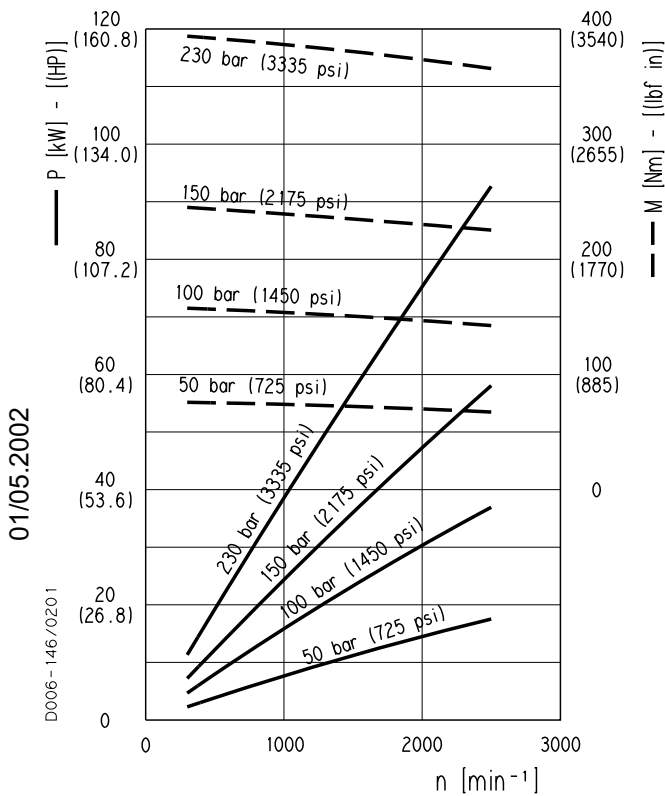
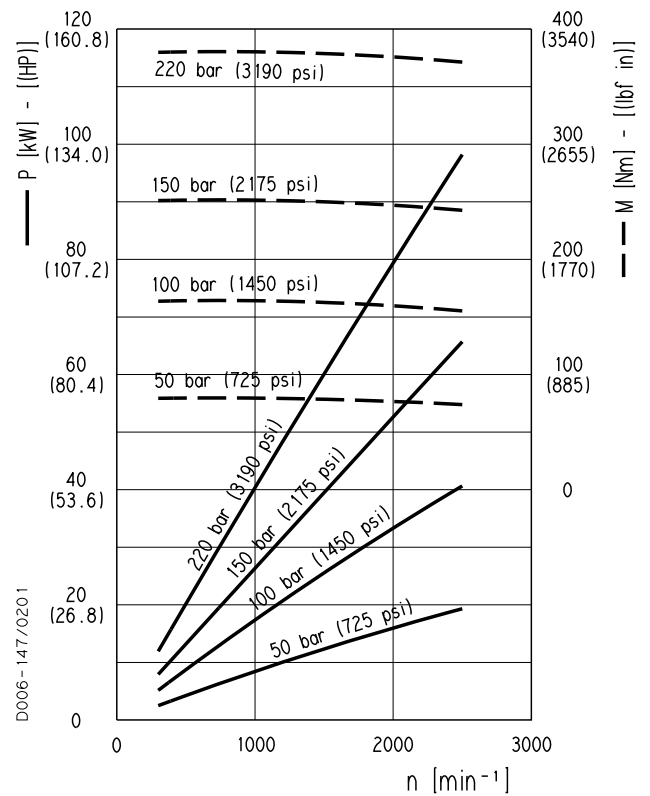
Each curve has been obtained at 122 °F (50 °C), using oil with viscosity 168 SSU (36 cSt) at 104 °F (40 °C) and at these pressures:

- KM 40•63 290-4350 psi (20-300 bar)
- KM 40•73 290-4350 psi (20-300 bar)
- KM 40•87 290-4060 psi (20-280 bar)
- KM 40•109 290-3625 psi (20-250 bar)
- KM 40•121 290-3335 psi (20-230 bar)
- KM 40•133 290-3190 psi (20-220 bar)
- KM 40•151 290-2900 psi (20-200 bar)

KM 40-63

KM 40-73


01/05.2002

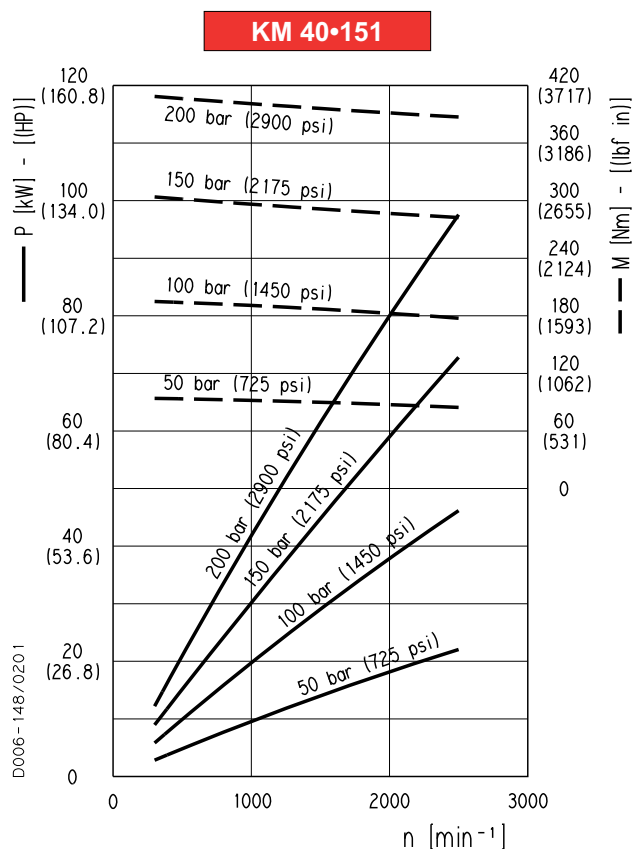
KAPPA 40 GEAR MOTORS PERFORMANCE CURVES

KM 40
KM 40•87

KM 40•109

KM 40•121

KM 40•133


01/05.2002

KAPPA 40 GEAR MOTORS PERFORMANCE CURVES

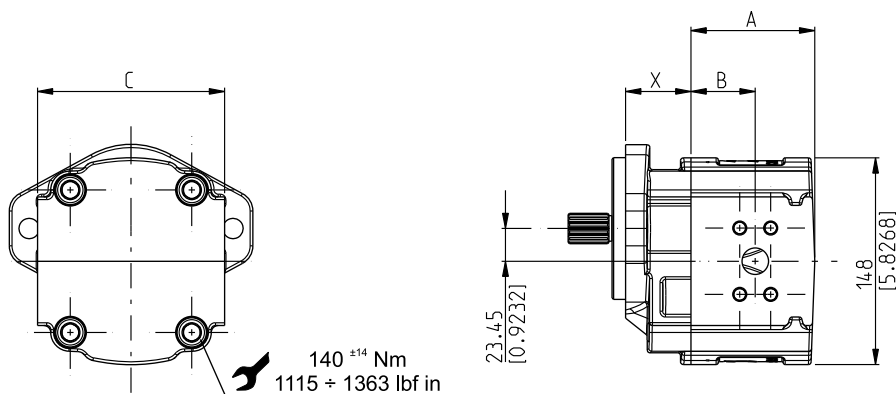
KM 40



01/05.2002

Replaces: 01/05.2002

DCAT_006_007_03571388



Ports type (see availability on page 47)			
European	Split (SSM) / (SSS)	Gas (BSPP)	SAE (ODT)

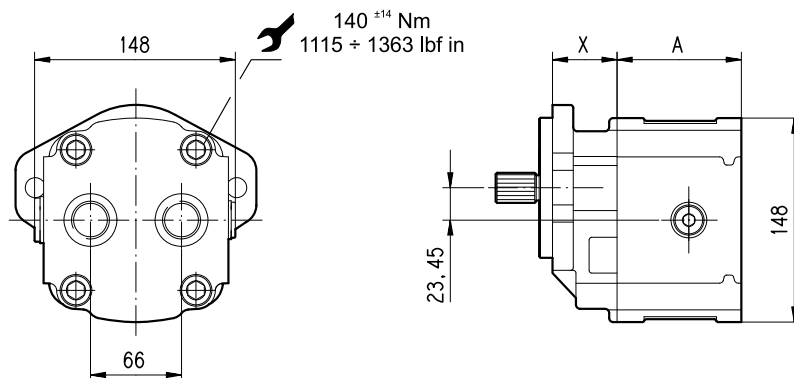
DRIVE SHAFTS:
see page 38 and page 39

MOUNTING FLANGE:
for X dimension see page 41 + 45

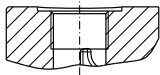
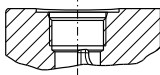
Pump type Motor type	A	B	C	
			European ports Split ports (SSM) / (SSS)	Gas ports (BSPP) SAE ports (ODT)
	mm (inch)	mm (inch)	mm (inch)	mm (inch)
K. 30-22	80,5 (3.1693)	38 (1.4961)	134 (5.2756)	142,3 (5.6024)
K. 30-27	83,5 (3.2874)	41 (1.6142)	134 (5.2756)	142,3 (5.6024)
K. 30-31	86 (3.3858)	43,5 (1.7126)	134 (5.2756)	142,3 (5.6024)
K. 30-34	88,5 (3.4843)	46 (1.8110)	134 (5.2756)	142,3 (5.6024)
K. 30-38	91,5 (3.6024)	49 (1.9291)	134 (5.2756)	142,3 (5.6024)
K. 30-41	93 (3.6614)	50,5 (1.9882)	134 (5.2756)	142,3 (5.6024)
K. 30-43	94,5 (3.7205)	52 (2.0472)	134 (5.2756)	142,3 (5.6024)
K. 30-46	96 (3.7795)	53,5 (2.1063)	134 (5.2756)	142,3 (5.6024)
K. 30-51	99,5 (3.9173)	57 (2.2441)	134 (5.2756)	142,3 (5.6024)
K. 30-56	102,5 (4.0354)	60 (2.3622)	134 (5.2756)	142,3 (5.6024)
K. 30-61	105,5 (4.1535)	63 (2.4803)	134 (5.2756)	142,3 (5.6024)
K. 30-73	113,5 (4.4685)	71 (2.7953)	134 (5.2756)	142,3 (5.6024)

03/07.2005

DCAT_006_008



Replaces: 01/05.2002

Ports type (see availability on page 47)	
Gas (BSPP)	SAE (ODT)
	

DRIVE SHAFTS:
see page 38 and page 39

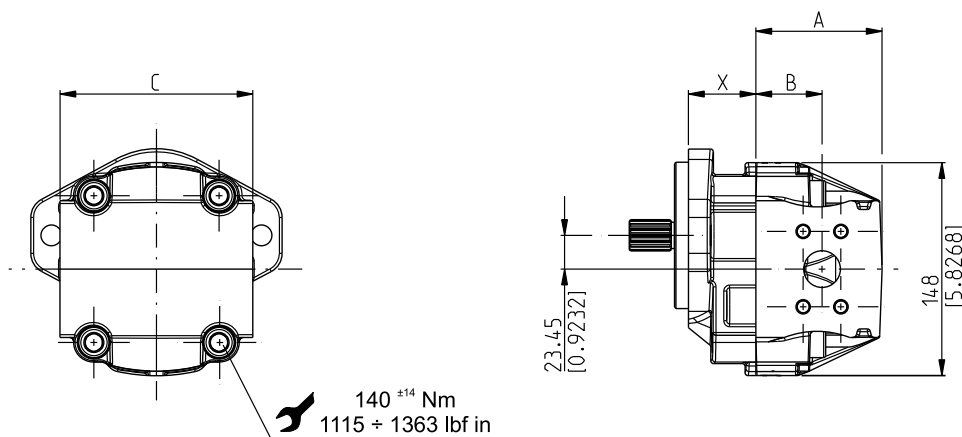
MOUNTING FLANGE:
for **X** dimension see page 41 + 45

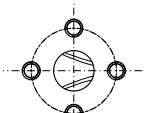
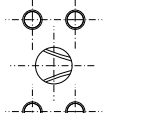
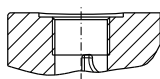
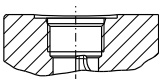
Pump type Motor type	A
	mm (inch)
K. 30•22	76 (2.9921)
K. 30•27	79 (3.1102)
K. 30•31	81,5 (3.2087)
K. 30•34	84 (3.3071)
K. 30•38	87 (3.4252)
K. 30•41	88,5 (3.4843)
K. 30•43	90 (3.5433)
K. 30•46	91,5 (3.6024)
K. 30•51	95 (3.7401)
K. 30•56	98 (3.8583)
K. 30•61	101 (3.9764)
K. 30•73	109 (4.2913)

03/07.2005

Replaces: 01/05.2002

DCAT_006_006_PRT01137



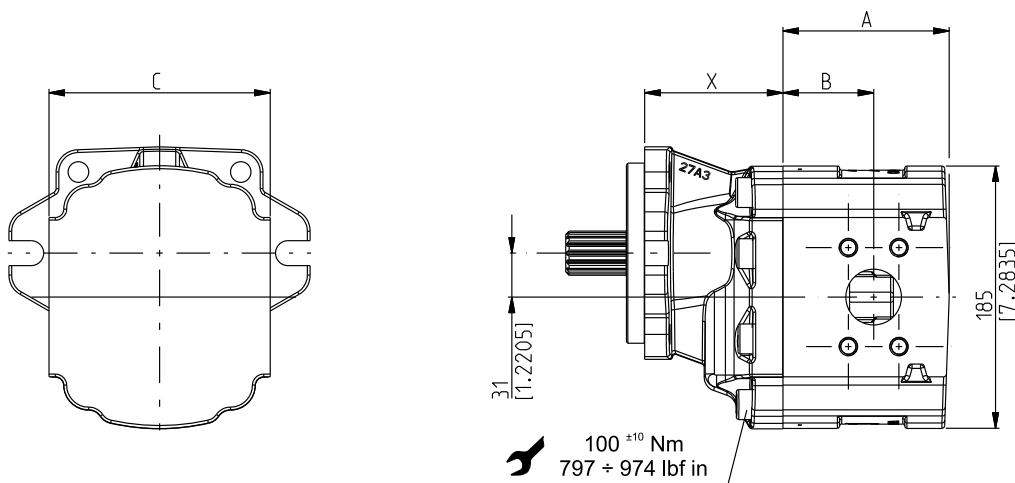
Ports type (see availability on page 47)			
European	Split (SSM) / (SSS)	Gas (BSPP)	SAE (ODT)
			

DRIVE SHAFTS:
see page 38 and page 39

MOUNTING FLANGE:
for X dimension see page 41 + 45

Pump type Motor type	A	B	C	
			European ports Split ports (SSM) / (SSS)	Gas ports (BSPP) SAE ports (ODT)
	mm (inch)	mm (inch)	mm (inch)	mm (inch)
K. 30-22	80,5 (3.1693)	38 (1.4961)	134 (5.2756)	142 (5.5906)
K. 30-27	83,5 (3.2874)	41 (1.6142)	134 (5.2756)	142 (5.5906)
K. 30-31	86 (3.3858)	43,5 (1.7126)	134 (5.2756)	142 (5.5906)
K. 30-34	88,5 (3.4843)	46 (1.8110)	134 (5.2756)	142 (5.5906)
K. 30-38	88,5 (3.4843)	46 (1.8110)	134 (5.2756)	142 (5.5906)

DCAT_006_050_40_CSC



Replaces: 01/05.2002

Ports type (see availability on page 47)			
European	Split (SSM) / (SSS)	Gas (BSPP)	SAE (ODT)

DRIVE SHAFTS:
see page 40

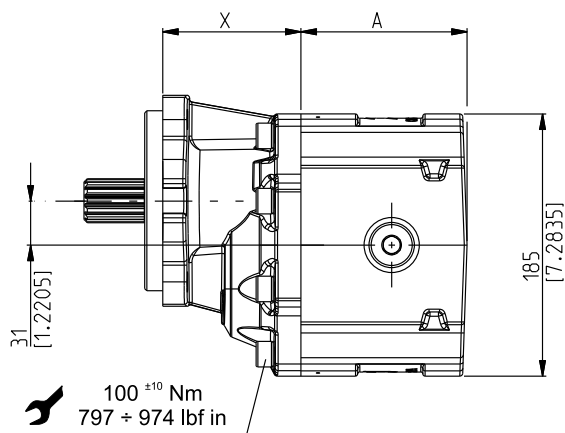
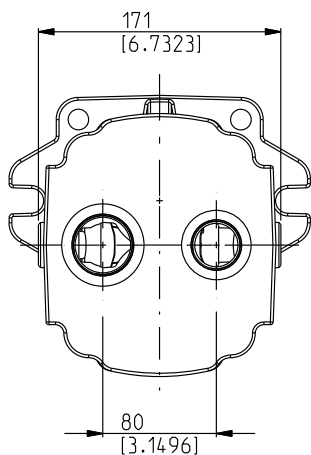
MOUNTING FLANGE:
for X dimension see page 46

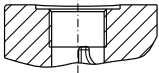
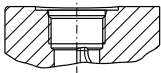
Pump type Motor type	A	B	C	
			European ports Split ports (SSM) / (SSS)	Gas ports (BSPP) SAE ports (ODT)
	mm (inch)	mm (inch)	mm (inch)	mm (inch)
K. 40•63	108 (4.2610)	55 (2.1653)	156 (6.1417)	164 (6.4567)
K. 40•73	112 (4.4185)	59 (2.3228)	156 (6.1417)	164 (6.4567)
K. 40•87	117 (4.4094)	64 (2.5197)	156 (6.1417)	164 (6.4567)
K. 40•109	125 (4.9303)	63 (2.4403)	156 (6.1417)	164 (6.4567)
K. 40•121	130 (5.1272)	68 (2.6772)	156 (6.1417)	164 (6.4567)
K. 40•133	134 (5.2846)	72 (2.8346)	156 (6.1417)	164 (6.4567)
K. 40•151	140 (5.5209)	78 (3.0709)	156 (6.1417)	164 (6.4567)

03/07.2005

KAPPA 40
SINGLE UNITS - REAR PORTS
CS.

DCAT_006_084_036300M6



Ports type (see availability on page 47)	
Gas (BSPP)	SAE (ODT)
	

DRIVE SHAFTS:
see page 40

MOUNTING FLANGE:
for X dimension see page 46

03/07.2005

Pump type Motor type	A	
	For rotation S - D - B (short body CSC)	For rotation R (long body CSL)
	mm (inch)	mm (inch)
K. 40•63	108 (4.2610)	124 (4.8819)
K. 40•73	112 (4.4185)	128 (5.0394)
K. 40•87	117 (4.4094)	133 (5.2362)
K. 40•109	125 (4.9303)	141 (5.5512)
K. 40•121	130 (5.1272)	146 (5.7480)
K. 40•133	134 (5.2846)	150 (5.9055)
K. 40•151	140 (5.5209)	156 (6.1417)

MULTIPLE PUMPS

KAPPA series pumps can be coupled together in combination. In applications where the input power requirement of each section varies, the section 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. For more information please consult our technical sales department.

Replaces: 01/05.2002

M	lbf in (Nm)	Torque
V	in ³ /rev (cm ³ /rev)	Displacement
Δp	psi (bar)	Pressure
P	HP (kW)	Power
n	min ⁻¹	Speed
$\eta_m = \eta_m(V, \Delta p, n) \quad (\approx 0,90)$		Mechanical efficiency

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

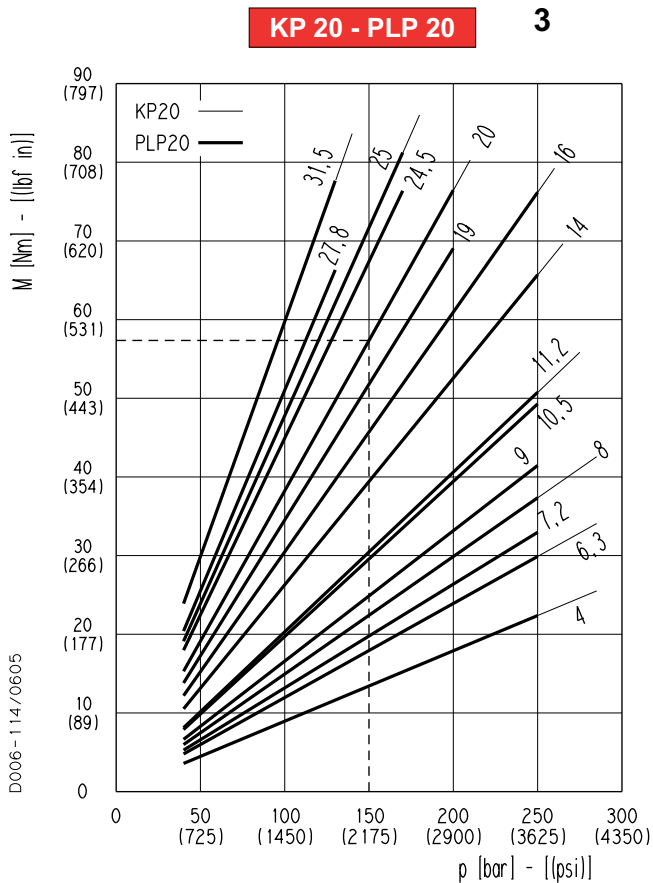
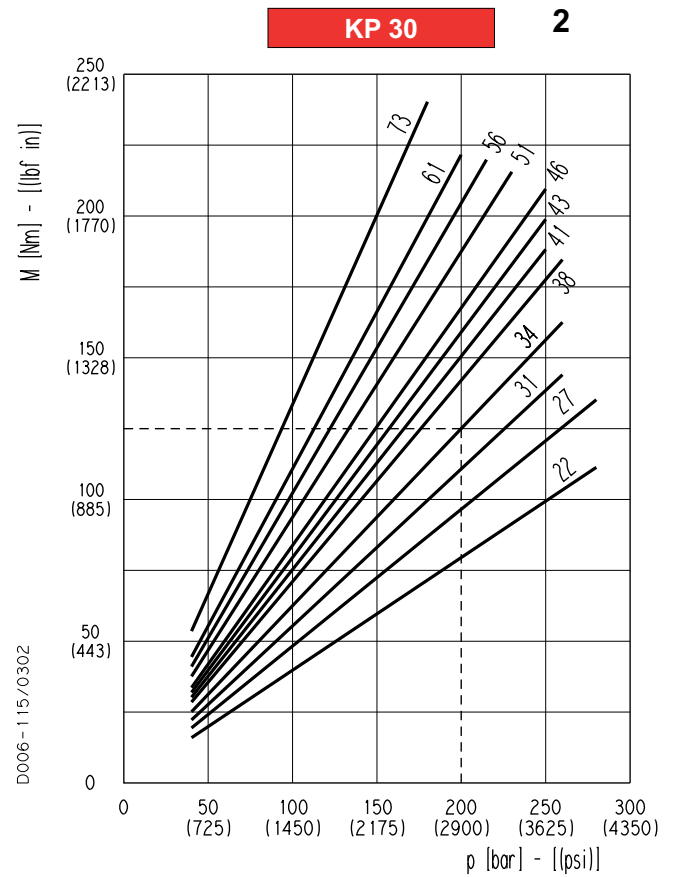
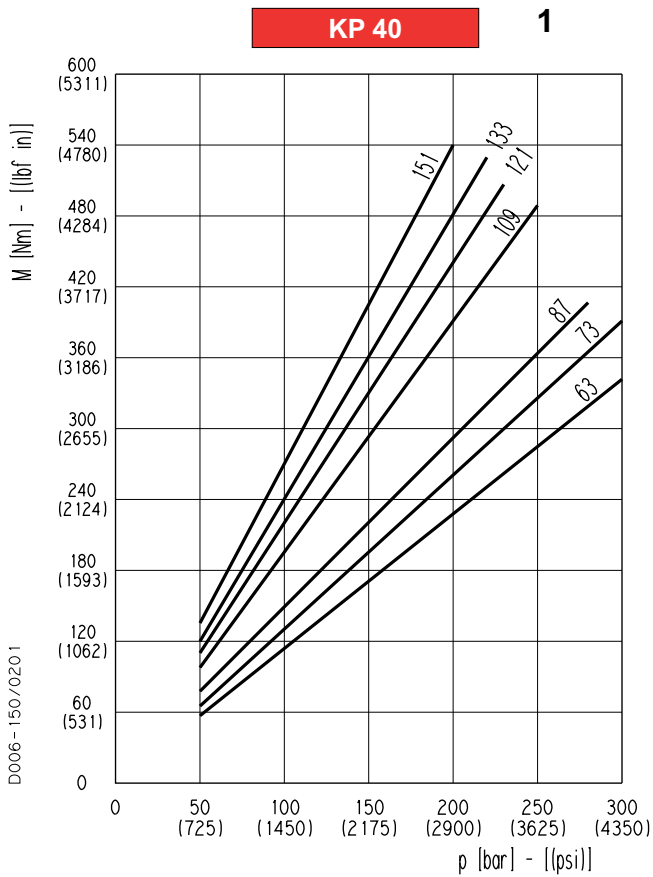
$$M = \frac{P \text{ (HP)} \cdot 5252}{n \text{ (min}^{-1}) \cdot \eta_m} \quad [\text{lbf in}]$$

03/07.2005

Note: The torque absorbed from the shaft of the first pump results from the sum of the torques due to all single stages. The achieved value must not exceed the maximum torque limit given for the shaft of the first pump. Diagrams providing approximate selection data will be found on page 25.

ABSORBED TORQUE

Replaces: 01/05.2002

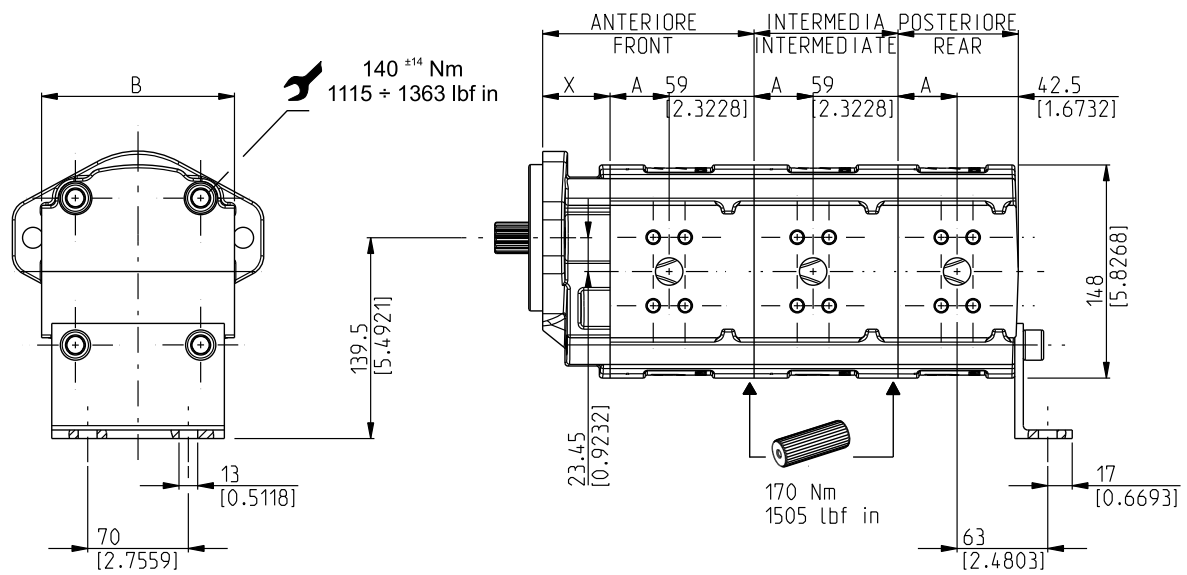


DRIVE SHAFT SELECTION

Let us consider a double pump KP30•34+ PL20•20. If we suppose that we have to work with the first pump at a pressure of 2900 psi (200 bar) and the second pump at a pressure of 2175 psi (150 bar), the graph 2 shows that the torque absorbed by KP30•34 is 1106 lbf in (125 Nm) and the graph 3 shows that the torque absorbed by KP20•20 is 487 lbf in (55 Nm) acceptable value because it doesn't exceed the maximum drive shaft torque that is 974 lbf in (110 Nm), see page 30. The torque to be transmitted by the first drive shaft will thus be 1106+487=1593 lbf in (125+55= 180 Nm), this value must not exceed the shaft's maximum rated value.

03/07.2005

DCAT_006_031_51080



Replaces: 01/05.2002

Ports type (see availability on page 47)

European	Split (SSM) / (SSS)	Gas (BSPP)	SAE (ODT)

DRIVE SHAFTS:

see page 38 and page 39

MOUNTING FLANGE:

for X dimension see page 41 + 45

FRONT:
CSL (long body)

INTERMEDIATE:
CSL (long body)

REAR:
CSC (short body)

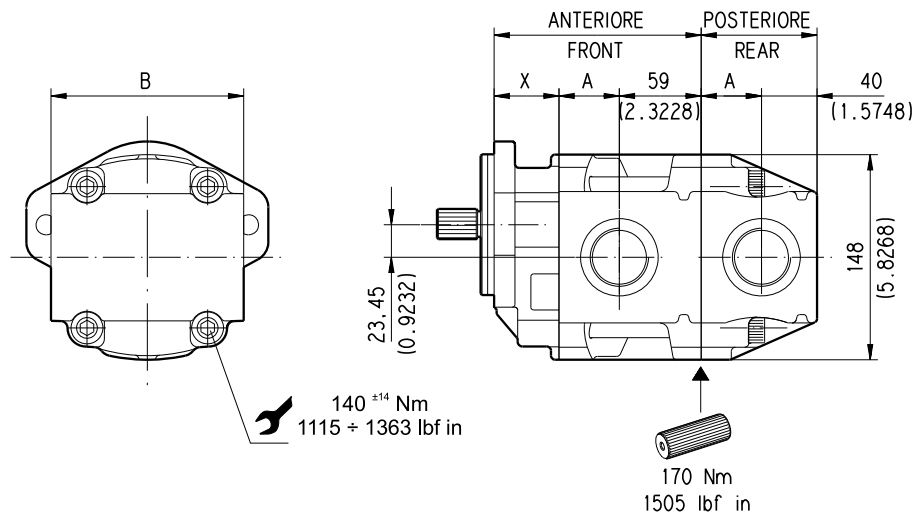
(all multiple pumps with more than two sections are available with bracket).

Pump type	A	B	
		European ports Split ports (SSM/SSS)	Gas ports (BSPP) SAE ports (ODT)
	mm (inch)	mm (inch)	mm (inch)
KP 30•22	38 (1.4961)	134 (5.2756)	142,3 (5.6024)
KP 30•27	41 (1.6142)	134 (5.2756)	142,3 (5.6024)
KP 30•31	43,5 (1.7126)	134 (5.2756)	142,3 (5.6024)
KP 30•34	46 (1.8110)	134 (5.2756)	142,3 (5.6024)
KP 30•38	49 (1.9291)	134 (5.2756)	142,3 (5.6024)
KP 30•41	50,5 (1.9882)	134 (5.2756)	142,3 (5.6024)
KP 30•43	52 (2.0472)	134 (5.2756)	142,3 (5.6024)
KP 30•46	53,5 (2.1063)	134 (5.2756)	142,3 (5.6024)
KP 30•51	57 (2.2441)	134 (5.2756)	142,3 (5.6024)
KP 30•56	60 (2.3622)	134 (5.2756)	142,3 (5.6024)
KP 30•61	63 (2.4803)	134 (5.2756)	142,3 (5.6024)
KP 30•73	71 (2.7953)	134 (5.2756)	142,3 (5.6024)

03/07.2005

Replaces: 01/05.2002

DCAT_006_034_R1179



Ports type (see availability on page 47)			
European	Split (SSM) / (SSS)	Gas (BSPP)	SAE (ODT)

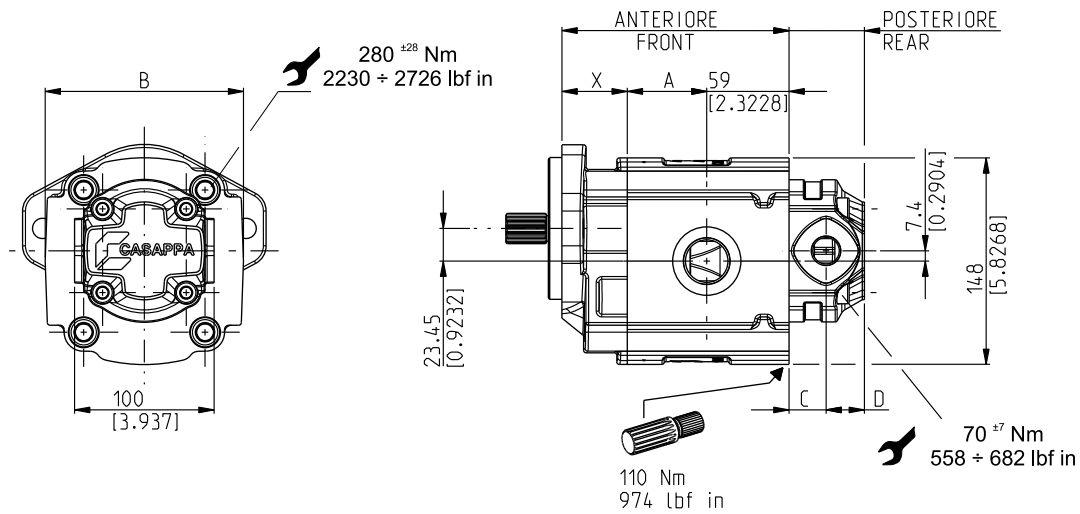
DRIVE SHAFTS:
see page 38 and page 39

MOUNTING FLANGE:
for X dimension see page 41 ÷ 45

FRONT: **KSL** (long shaped body)
REAR: **KSC** (short shaped body)

03/07.2005

Pump type	A	B	
		European ports Split ports (SSM) / (SSS)	Gas ports (BSPP) SAE ports (ODT)
	mm (inch)	mm (inch)	mm (inch)
KP 30•22	38 (1.4961)	134 (5.2756)	142,3 (5.6024)
KP 30•27	41 (1.6142)	134 (5.2756)	142,3 (5.6024)
KP 30•31	43,5 (1.7126)	134 (5.2756)	142,3 (5.6024)
KP 30•34	46 (1.8110)	134 (5.2756)	142,3 (5.6024)
KP 30•38	46 (1.8110)	134 (5.2756)	142,3 (5.6024)



DCAT_006_032_S1081

Replaces: 01/05.2002

Ports type (see availability on page 47)			
European	Split (SSM) / (SSS)	Gas (BSPP)	SAE (ODT)

DRIVE SHAFTS:
see page 38 and page 39

MOUNTING FLANGE:
for X dimension see page 41 + 45

FRONT: **CSL** (long body)
REAR: Kappa 20 Series (for features please consult the proper technical catalog)

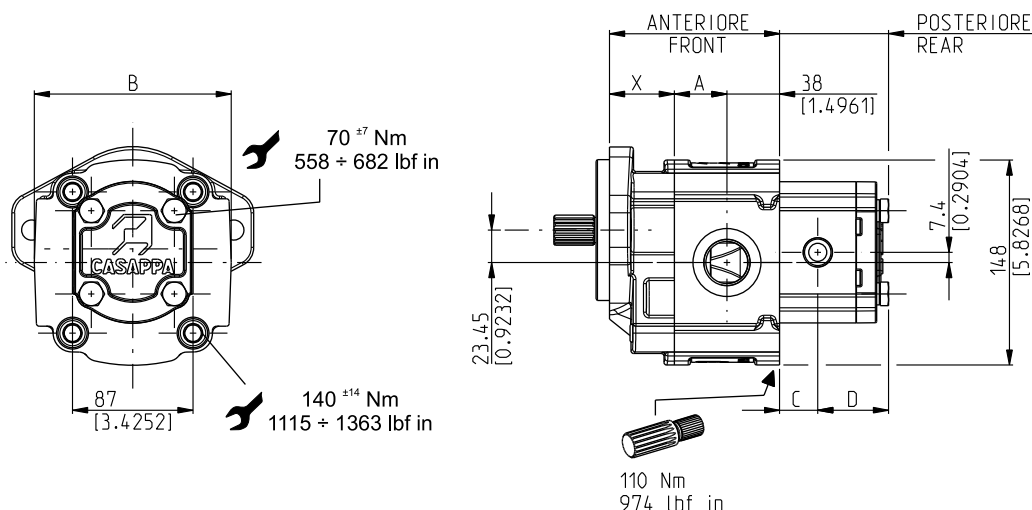
Pump type	A	B	
		European ports Split ports (SSM) / (SSS)	Gas ports (BSPP) SAE ports (ODT)
	mm (inch)	mm (inch)	mm (inch)
KP 30•22	38 (1.4961)	134 (5.2756)	142 (5.5906)
KP 30•27	41 (1.6142)	134 (5.2756)	142 (5.5906)
KP 30•31	43,5 (1.7126)	134 (5.2756)	142 (5.5906)
KP 30•34	46 (1.8110)	134 (5.2756)	142 (5.5906)
KP 30•38	49 (1.9291)	134 (5.2756)	142 (5.5906)
KP 30•41	50,5 (1.9882)	134 (5.2756)	142 (5.5906)
KP 30•43	52 (2.0472)	134 (5.2756)	142 (5.5906)
KP 30•46	53,5 (2.1063)	134 (5.2756)	142 (5.5906)
KP 30•51	57 (2.2441)	134 (5.2756)	142 (5.5906)
KP 30•56	60 (2.3622)	134 (5.2756)	142 (5.5906)
KP 30•61	63 (2.4803)	134 (5.2756)	142 (5.5906)
KP 30•73	71 (2.7953)	134 (5.2756)	142 (5.5906)

Pump type	C	D
	mm (inch)	mm (inch)
KP 20•4	24 (0.9449)	27,5 (1.0827)
KP 20•6,3	26,5 (1.0433)	27,5 (1.0827)
KP 20•8	29 (1.1417)	27,5 (1.0827)
KP 20•11,2	32,5 (1.2795)	27,5 (1.0827)
KP 20•14	31 (1.2205)	33 (1.2992)
KP 20•20	36,5 (1.4370)	33 (1.2992)
KP 20•16	43 (1.6929)	33 (1.2992)
KP 20•25	36 (1.4173)	48 (1.8898)
KP 20•31,5	46 (1.8110)	48 (1.8898)

03/07.2005

Replaces: 01/05.2002

DCAT_006_033_S1082


Ports type (see availability on page 47)

European	Split (SSM) / (SSS)	Gas (BSPP)	SAE (ODT)

DRIVE SHAFTS:
see page 38 and page 39

MOUNTING FLANGE:
for **X** dimension see page 41 + 45

FRONT: **CSC** (short body)
REAR: Polaris 20 Series (for features please consult the proper technical catalog)

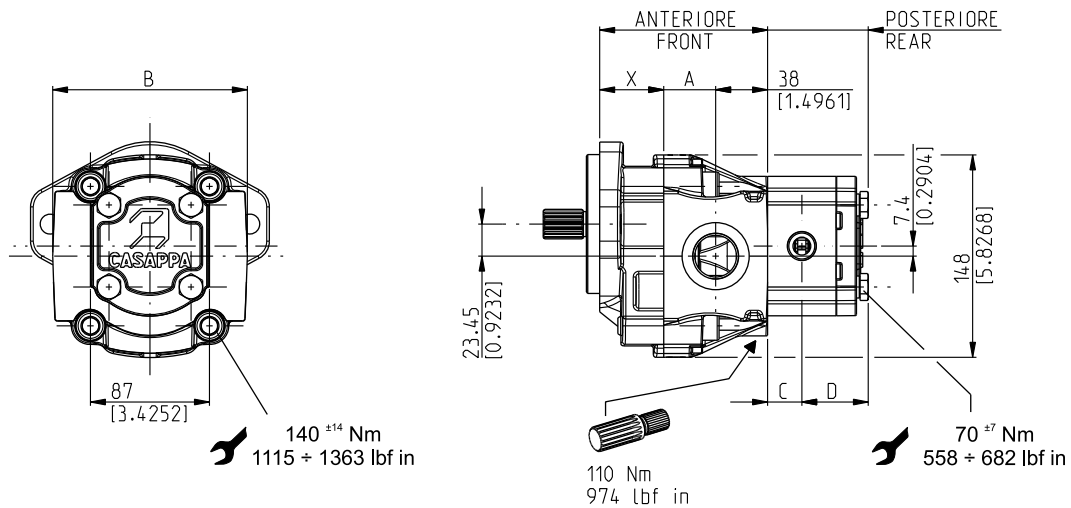
Pump type	A	B	
		European ports Split ports (SSM) / (SSS)	Gas ports (BSPP) SAE ports (ODT)
	mm (inch)	mm (inch)	mm (inch)
KP 30•22	38 (1.4961)	134 (5.2756)	142 (5.5906)
KP 30•27	41 (1.6142)	134 (5.2756)	142 (5.5906)
KP 30•31	43,5 (1.7126)	134 (5.2756)	142 (5.5906)
KP 30•34	46 (1.8110)	134 (5.2756)	142 (5.5906)
KP 30•38	49 (1.9291)	134 (5.2756)	142 (5.5906)
KP 30•41	50,5 (1.9882)	134 (5.2756)	142 (5.5906)
KP 30•43	52 (2.0472)	134 (5.2756)	142 (5.5906)
KP 30•46	53,5 (2.1063)	134 (5.2756)	142 (5.5906)
KP 30•51	57 (2.2441)	134 (5.2756)	142 (5.5906)
KP 30•56	60 (2.3622)	134 (5.2756)	142 (5.5906)
KP 30•61	63 (2.4803)	134 (5.2756)	142 (5.5906)
KP 30•73	71 (2.7953)	134 (5.2756)	142 (5.5906)

Pump type	B	C
	mm (inch)	mm (inch)
PLP 20•4	25,8 (1.0157)	49,3 (1.9409)
PLP 20•6,3	27 (1.0630)	50,5 (1.9882)
PLP 20•7,2	27,5 (1.0826)	51 (2.0079)
PLP 20•8	28,3 (1.1142)	51,8 (2.0394)
PLP 20•9	28,9 (1.1378)	52,4 (2.0630)
PLP 20•10,5	30,3 (1.1929)	53,8 (2.1181)
PLP 20•11,2	30,5 (1.2008)	54 (2.1260)
PLP 20•14	33 (1.2992)	56,5 (2.2244)
PLP 20•16	34,8 (1.3701)	58,3 (2.2953)
PLP 20•19	36,5 (1.4370)	60 (2.3622)
PLP 20•20	38 (1.4961)	61,5 (2.4213)
PLP 20•24,5	40,8 (1.6063)	64,3 (2.5315)
PLP 20•25	42 (1.6535)	65,5 (2.5787)
PLP 20•27,5	43,4 (1.7087)	66,9 (2.6339)
PLP 20•31,5	47 (1.8504)	70,5 (2.7756)

03/07.2005

KAPPA 30
DOUBLE PUMPS KP30/PL20 SHORT SHAPED BODY
HSC

DCAT_006_059_N16-2



Replaces: 01/05.2002

Ports type (see availability on page 47)

European	Split (SSM) / (SSS)	Gas (BSPP)	SAE (ODT)

DRIVE SHAFTS:
see page 38 and page 39

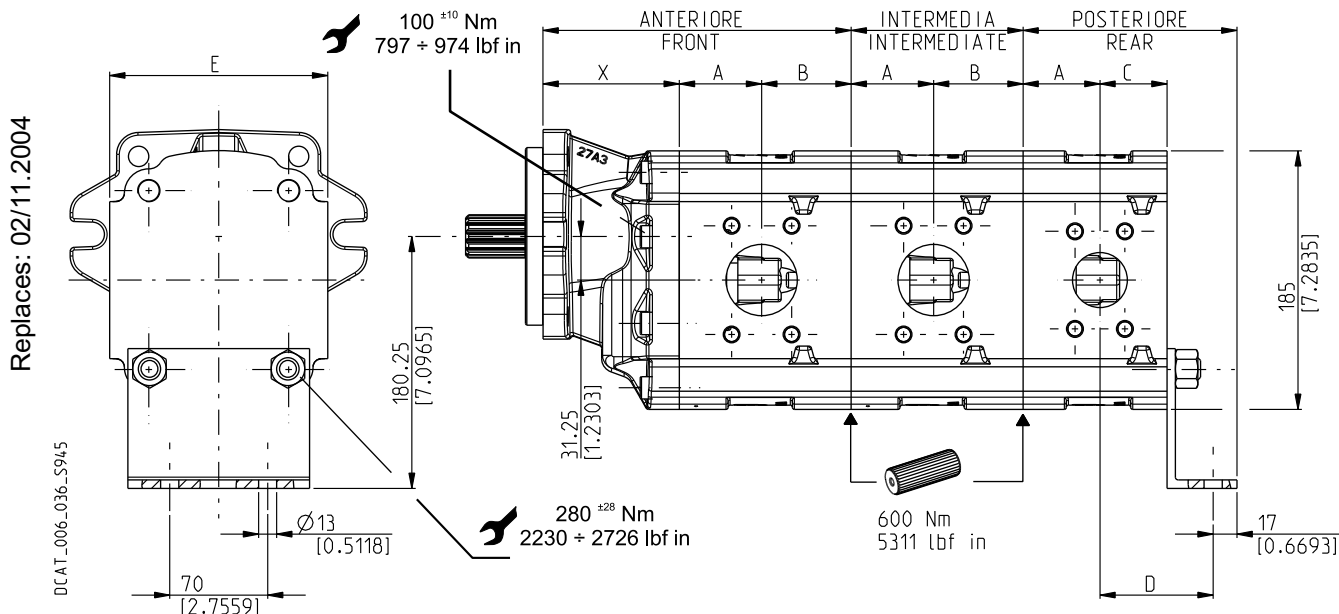
MOUNTING FLANGE:
for X dimension see page 41 ÷ 45

FRONT: **HSC** (short shaped body)
REAR: Polaris 20 Series (for features please consult the proper technical catalog)

Pump type	A	B	
		European ports Split ports (SSM) / (SSS)	Gas ports (BSPP) SAE ports (ODT)
	mm (inch)	mm (inch)	mm (inch)
KP 30•22	38 (1.4961)	134 (5.2756)	142,3 (5.6024)
KP 30•27	41 (1.6142)	134 (5.2756)	142,3 (5.6024)
KP 30•31	43,5 (1.7126)	134 (5.2756)	142,3 (5.6024)
KP 30•34	46 (1.8110)	134 (5.2756)	142,3 (5.6024)
KP 30•38	46 (1.8110)	134 (5.2756)	142,3 (5.6024)

Pump type	B	C
	mm (inch)	mm (inch)
PLP 20•4	25,8 (1.0157)	49,3 (1.9409)
PLP 20•6,3	27 (1.0630)	50,5 (1.9882)
PLP 20•7,2	27,5 (1.0826)	51 (2.0079)
PLP 20•8	28,3 (1.1142)	51,8 (2.0394)
PLP 20•9	28,9 (1.1378)	52,4 (2.0630)
PLP 20•10,5	30,3 (1.1929)	53,8 (2.1181)
PLP 20•11,2	30,5 (1.2008)	54 (2.1260)
PLP 20•14	33 (1.2992)	56,5 (2.2244)
PLP 20•16	34,8 (1.3701)	58,3 (2.2953)
PLP 20•19	36,5 (1.4370)	60 (2.3622)
PLP 20•20	38 (1.4961)	61,5 (2.4213)
PLP 20•24,5	40,8 (1.6063)	64,3 (2.5315)
PLP 20•25	42 (1.6535)	65,5 (2.5787)
PLP 20•27,5	43,4 (1.7087)	66,9 (2.6339)
PLP 20•31,5	47 (1.8504)	70,5 (2.7756)

03/07.2005



Ports type (see availability on page 47)

European	Split (SSM) / (SSS)	Gas (BSPP)	SAE (ODT)

DRIVE SHAFTS:
see page 40

MOUNTING FLANGE:
for X dimension see page 46

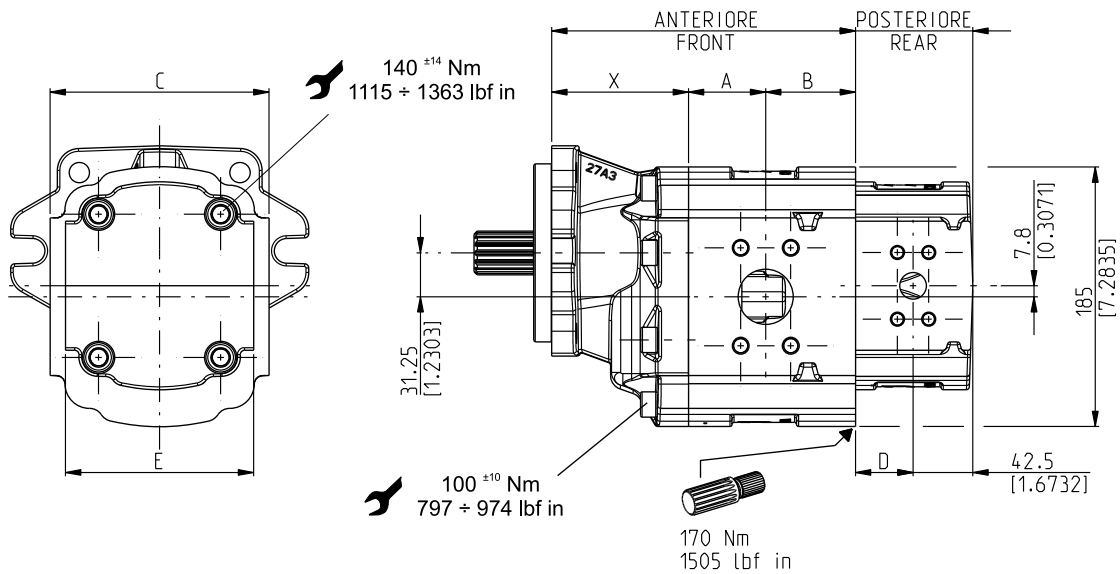
FRONT: **CSL** (long body)
INTERMEDIATE: **CSL** (long body)
REAR: **CSC** (short body)
 (all multiple pumps with more than two sections are available with bracket).

03/07.2005

Pump type	A	B	C	D	E	
					European ports Split ports (SSM) / (SSS)	Gas ports (BSPP) SAE ports (ODT)
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
KP 40•63	55 (2.1653)	64 (2.5197)	48 (1.8897)	81 (3.1890)	156 (6.1417)	164 (6.4567)
KP 40•73	59 (2.3228)	64 (2.5197)	48 (1.8897)	81 (3.1890)	156 (6.1417)	164 (6.4567)
KP 40•87	64 (2.5197)	64 (2.5197)	48 (1.8897)	81 (3.1890)	156 (6.1417)	164 (6.4567)
KP 40•109	63 (2.4803)	73 (2.8740)	57 (2.2440)	90 (3.5433)	156 (6.1417)	164 (6.4567)
KP 40•121	68 (2.6772)	73 (2.8740)	57 (2.2440)	92 (3.6220)	156 (6.1417)	164 (6.4567)
KP 40•133	72 (2.8346)	73 (2.8740)	57 (2.2440)	92 (3.6220)	156 (6.1417)	164 (6.4567)

KAPPA 40
DOUBLE PUMPS KP40/KP30
CS.

DCAT_006_044_40_30



Replaces: 01/05.2002

Ports type (see availability on page 47)

European	Split (SSM) / (SSS)	Gas (BSPP)	SAE (ODT)

DRIVE SHAFTS:
see page 40

MOUNTING FLANGE:
for X dimension see page 46

FRONT: **CSL** (long body)
REAR: **KAPPA 30 series CSC** (short body)

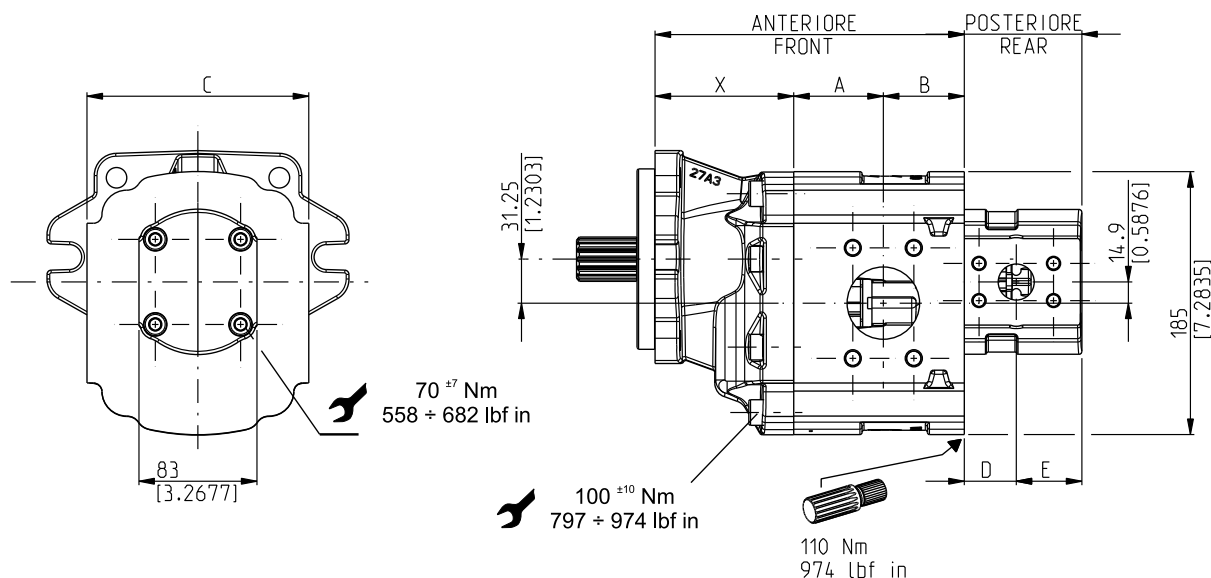
Pump type	A	B	C	
			Eur. ports Split ports	Gas ports SAE ports
	mm (inch)	mm (inch)	mm (inch)	mm (inch)
KP 40•63	55 (2.1653)	64 (2.5197)	156 (6.1417)	164 (6.4567)
KP 40•73	59 (2.3228)	64 (2.5197)	156 (6.1417)	164 (6.4567)
KP 40•87	64 (2.5197)	64 (2.5197)	156 (6.1417)	164 (6.4567)
KP 40•109	63 (2.4803)	73 (2.8740)	156 (6.1417)	164 (6.4567)
KP 40•121	68 (2.6772)	73 (2.8740)	156 (6.1417)	164 (6.4567)
KP 40•133	72 (2.8346)	73 (2.8740)	156 (6.1417)	164 (6.4567)

Pump type	D	E	
		Eur. ports Split ports	Gas ports SAE ports
	mm (inch)	mm (inch)	mm (inch)
KP 30•22	38 (1.4961)	134 (5.2756)	142 (5.5906)
KP 30•27	41 (1.6142)	134 (5.2756)	142 (5.5906)
KP 30•31	43,5 (1.7126)	134 (5.2756)	142 (5.5906)
KP 30•34	46 (1.8110)	134 (5.2756)	142 (5.5906)
KP 30•38	49 (1.9291)	134 (5.2756)	142 (5.5906)
KP 30•41	50,5 (1.9882)	134 (5.2756)	142 (5.5906)
KP 30•43	52 (2.0472)	134 (5.2756)	142 (5.5906)
KP 30•46	53,5 (2.1063)	134 (5.2756)	142 (5.5906)
KP 30•51	57 (2.2441)	134 (5.2756)	142 (5.5906)
KP 30•56	60 (2.3622)	134 (5.2756)	142 (5.5906)
KP 30•61	63 (2.4803)	134 (5.2756)	142 (5.5906)
KP 30•73	71 (2.7953)	134 (5.2756)	142 (5.5906)

03/07.2005

Replaces: 02/11.2004

DCAT_006_051_PRT02003



Ports type (see availability on page 47)			
European	Split (SSM) / (SSS)	Gas (BSPP)	SAE (ODT)

DRIVE SHAFTS:
see page 40

MOUNTING FLANGE:
for X dimension see page 46

FRONT: **CSC** (long body)
REAR: Kappa 20 Series (for features please consult the proper technical catalog)

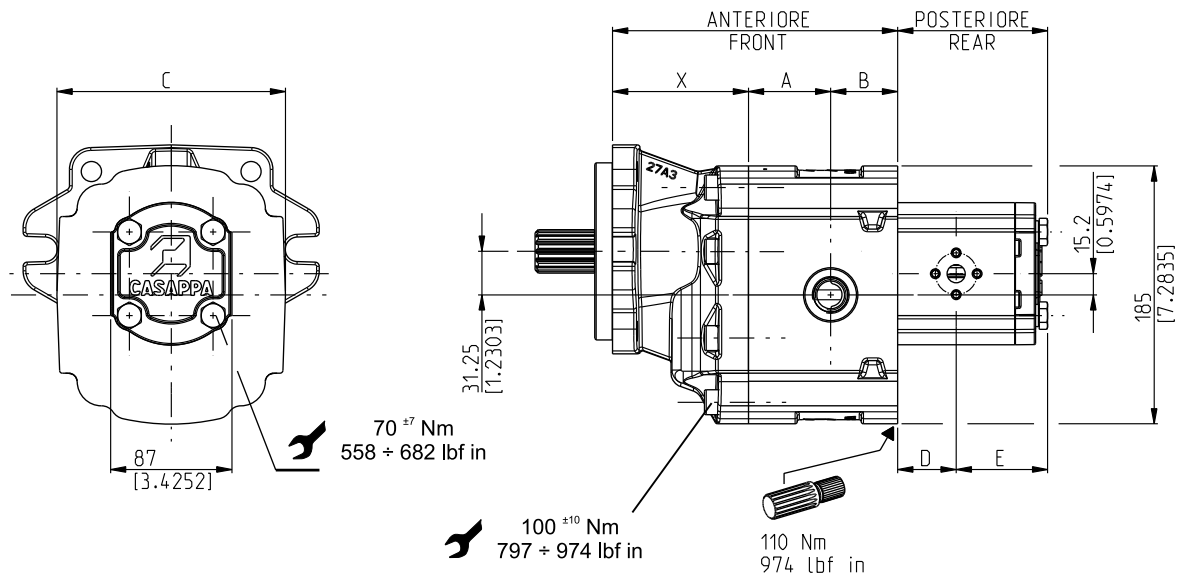
03/07.2005

Pump type	A	B	C	
			Eur. ports Split ports	Gas ports SAE ports
	mm (inch)	mm (inch)	mm (inch)	mm (inch)
KP 40•63	55 (2.1653)	48 (1.8897)	156 (6.1417)	164 (6.4567)
KP 40•73	59 (2.3228)	48 (1.8897)	156 (6.1417)	164 (6.4567)
KP 40•87	64 (2.5197)	48 (1.8897)	156 (6.1417)	164 (6.4567)
KP 40•109	63 (2.4803)	57 (2.2440)	156 (6.1417)	164 (6.4567)
KP 40•121	68 (2.6772)	57 (2.2440)	156 (6.1417)	164 (6.4567)
KP 40•133	72 (2.8346)	57 (2.2440)	156 (6.1417)	164 (6.4567)

Pump type	C	D
	mm (inch)	mm (inch)
KP 20•4	24 (0.9449)	39,5 (1.5551)
KP 20•6,3	26,5 (1.0433)	39,5 (1.5551)
KP 20•8	29 (1.1417)	39,5 (1.5551)
KP 20•11,2	32,5 (1.2795)	40,5 (1.5945)
KP 20•14	31 (1.2205)	47 (1.8504)
KP 20•20	36,5 (1.4370)	45 (1.7717)
KP 20•16	43 (1.6929)	45 (1.7717)
KP 20•25	36 (1.4173)	60 (2.3622)
KP 20•31,5	46 (1.8110)	60 (2.3622)

KAPPA 40
DOUBLE PUMPS KP40/PL20 SHORT BODY
CSC

DCAT_006_052_80030242



Replaces: 02/11.2004

DRIVE SHAFTS:
see page 40

MOUNTING FLANGE:
for X dimension see page 46

FRONT: **CSC** (short body)
REAR: Polaris 20 Series (for features please consult the proper technical catalog)

Ports type (see availability on page 47)			
European	Split (SSM) / (SSS)	Gas (BSPP)	SAE (ODT)

Pump type	A	B	C	
			Eur. ports Split ports	Gas ports SAE ports
	mm (inch)	mm (inch)	mm (inch)	mm (inch)
KP 40•63	55 (2.1653)	48 (1.8897)	156 (6.1417)	164 (6.4567)
KP 40•73	59 (2.3228)	48 (1.8897)	156 (6.1417)	164 (6.4567)
KP 40•87	64 (2.5197)	48 (1.8897)	156 (6.1417)	164 (6.4567)
KP 40•109	63 (2.4803)	57 (2.2440)	156 (6.1417)	164 (6.4567)
KP 40•121	68 (2.6772)	57 (2.2440)	156 (6.1417)	164 (6.4567)
KP 40•133	72 (2.8346)	57 (2.2440)	156 (6.1417)	164 (6.4567)

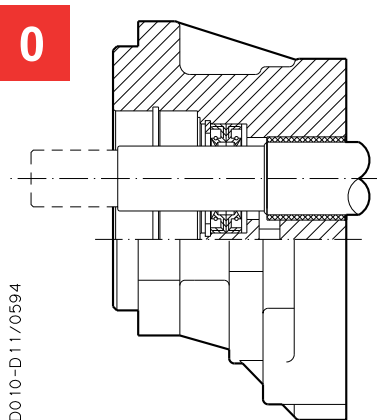
Pump type	B	C
	mm (inch)	mm (inch)
PLP 20•4	25,8 (1.0157)	49,3 (1.9409)
PLP 20•6,3	27 (1.0630)	50,5 (1.9882)
PLP 20•7,2	27,5 (1.0826)	51 (2.0079)
PLP 20•8	28,3 (1.1142)	51,8 (2.0394)
PLP 20•9	28,9 (1.1378)	52,4 (2.0630)
PLP 20•10,5	30,3 (1.1929)	53,8 (2.1181)
PLP 20•11,2	30,5 (1.2008)	54 (2.1260)
PLP 20•14	33 (1.2992)	56,5 (2.2244)
PLP 20•16	34,8 (1.3701)	58,3 (2.2953)
PLP 20•19	36,5 (1.4370)	60 (2.3622)
PLP 20•20	38 (1.4961)	61,5 (2.4213)
PLP 20•24,5	40,8 (1.6063)	64,3 (2.5315)
PLP 20•25	42 (1.6535)	65,5 (2.5787)
PLP 20•27,5	43,4 (1.7087)	66,9 (2.6339)
PLP 20•31,5	47 (1.8504)	70,5 (2.7756)

03/07.2005

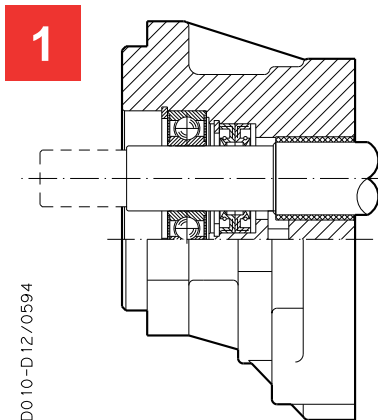
KAPPA 30 SAE VERSIONS

For each version, the possible combination between drive shafts and mounting flanges are shown on pages 41 ÷ 46.

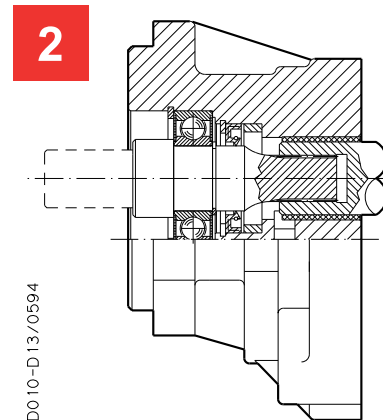
Replaces: 01/05.2002



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

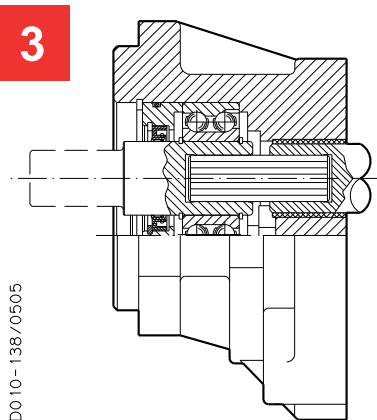


Version for applications with low radial load and without axial load on the drive shaft.



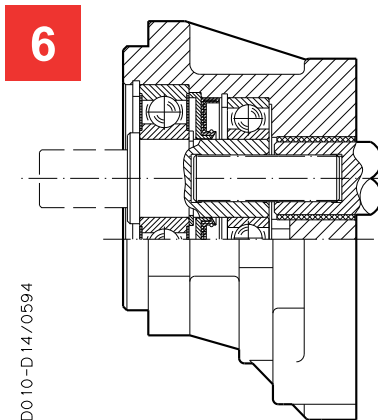
Special version with independent shaft for applications with low radial load and without axial load on the drive shaft.

Max. torque version 2:
KAPPA30: 170Nm(1505 lbf in)
KAPPA40: 600Nm(5311 lbf in)



Version for applications with radial and axial load on the drive shaft.

Max. torque version 3:
KAPPA30: 170Nm(1505 lbf in)

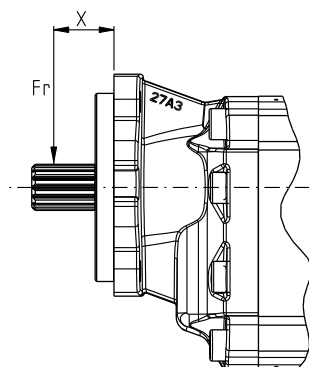


Version for applications with radial and axial load on the drive shaft.

Max. torque version 6:
KAPPA30: 170Nm(1505 lbf in)
KAPPA40: 600Nm(5311 lbf in)

03/07.2005

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



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 140 °F (60 °C)

Without or with very low axial load

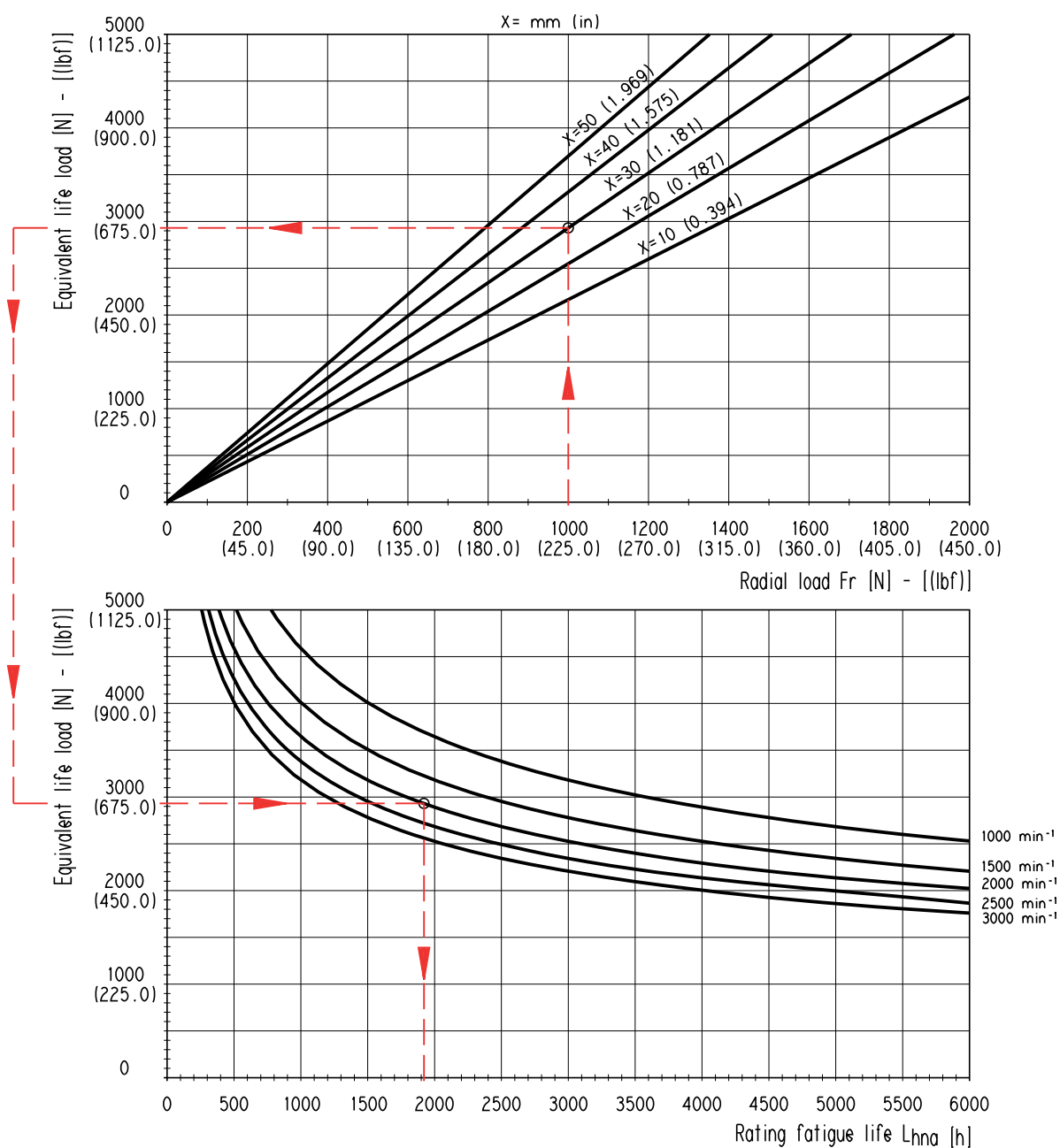
Example

Fr Radial load 1000 N (225.0 lbf)

X 30 mm (1.1811 in)

Speed 2000 min⁻¹

Rating fatigue life ≈ 1915 h



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 140 °F (60 °C)

Without or with very low axial load

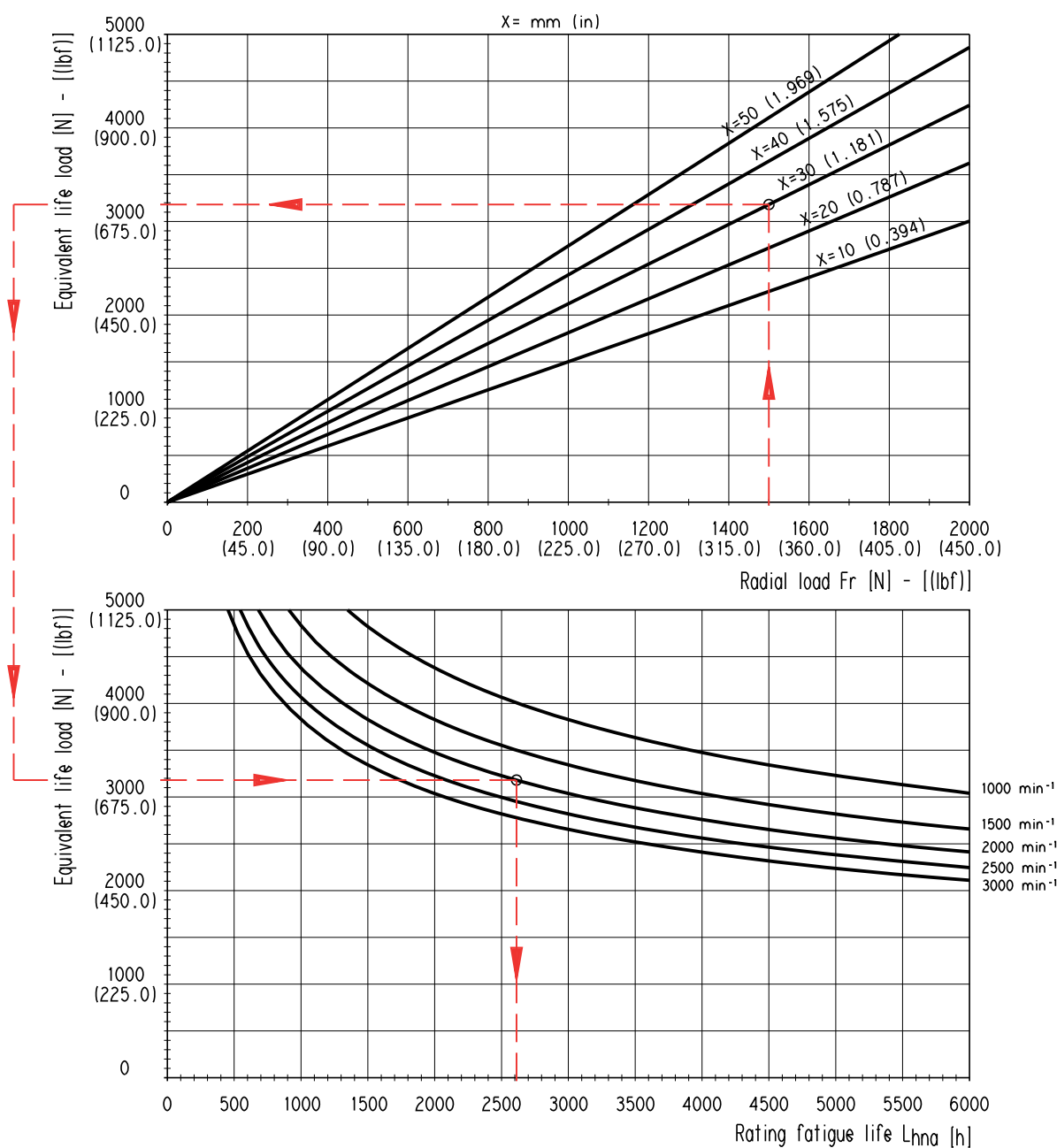
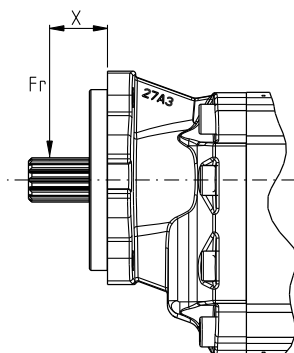
Example

Fr Radial load 1500 N (337.5 lbf)

X 30 mm (1.1811 in)

Speed 2000 min⁻¹

Rating fatigue life ≈ 2613 h



03/07.2005

D010-149/0605

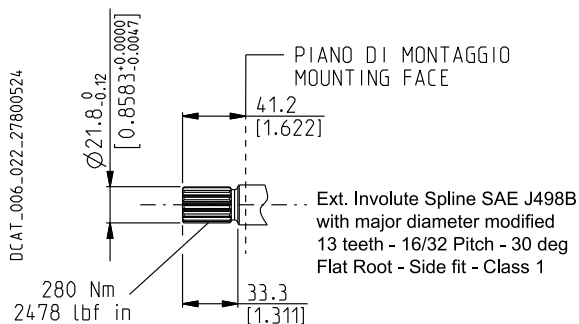
KAPPA 30

DRIVE SHAFTS

SAE "B" SPLINE

A8

Mounting face refer to flange code K9



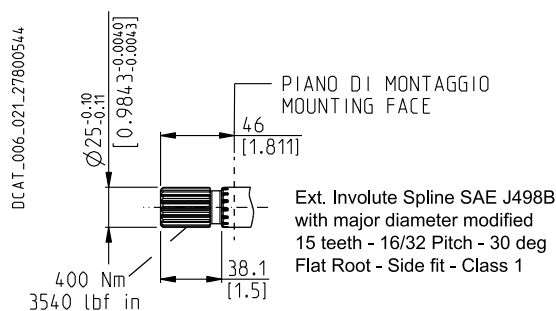
SAE "BB" SPLINE

A5

Not available with size:

30•31	30•41	30•46		
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Mounting face refer to flange code K9



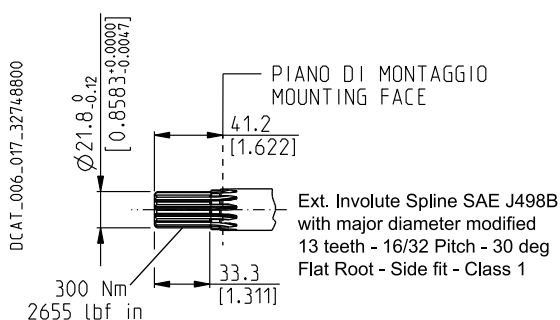
SAE "B" SPLINE

04

Not available with size:

30•41	30•46			
-------	-------	--	--	--

Mounting face refer to flange code S3



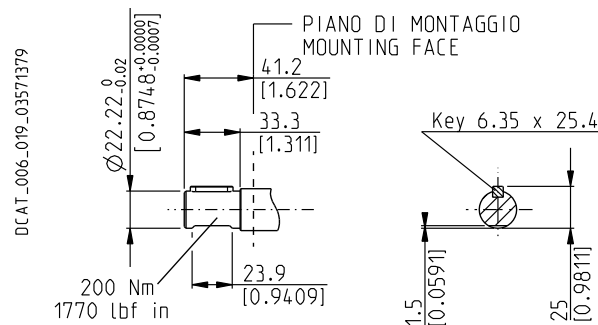
SAE "B" STRAIGHT

32

Not available with size:

30•31	30•41	30•46		
-------	-------	-------	--	--

Mounting face refer to flange code S3



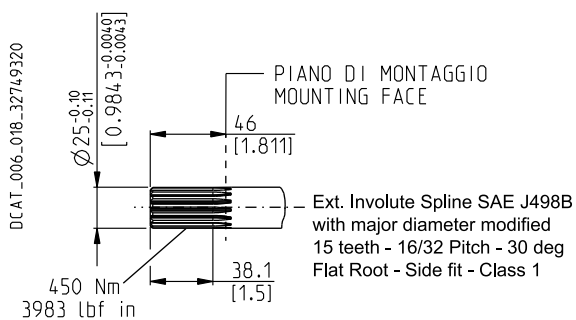
SAE "BB" SPLINE

05

Not available with size:

30•22	30•31	30•41	30•46	
-------	-------	-------	-------	--

Mounting face refer to flange code S3



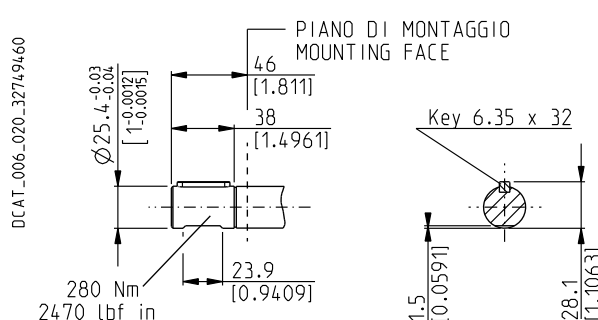
SAE "BB" STRAIGHT

33

Not available with size:

30•22	30•31	30•41	30•46	30•56
-------	-------	-------	-------	-------

Mounting face refer to flange code S3



02/11.2004

KAPPA 30

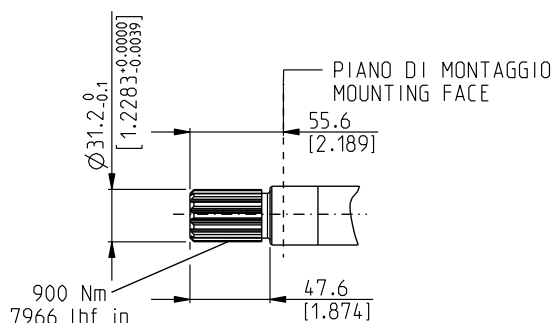
DRIVE SHAFTS

SAE "C" SPLINE

06

Not available with size:

30•22	30•31	30•41	30•46	30•56
-------	-------	-------	-------	-------

Mounting face refer to flange code **S8**

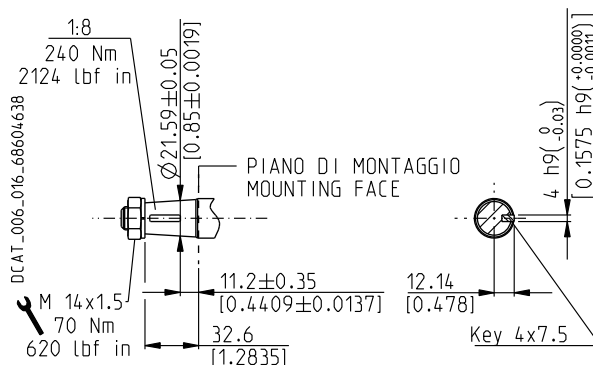
Ext. Involute Spline SAE J498B
with major diameter modified
14 teeth - 12/24 Pitch - 30 deg
Flat Root - Side fit - Class 1

EUROPEAN TAPERED 1:8

83

Not available with size:

30•31	30•41	30•46	30•56
-------	-------	-------	-------

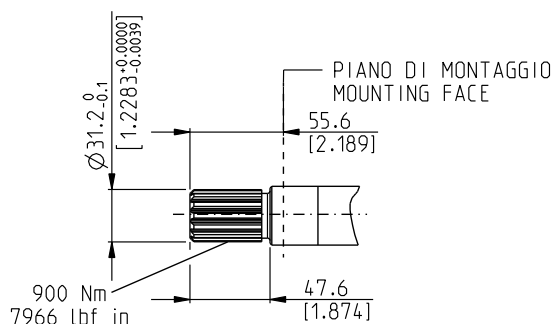
Mounting face refer to flange code **E3**

SAE "C" SPLINE - SHORT TYPE

A6

Available only with size:

30•56	30•73			
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Mounting face refer to flange code **Q3**

Ext. Involute Spline SAE J498B
with major diameter modified
14 teeth - 12/24 Pitch - 30 deg
Flat Root - Side fit - Class 1

KAPPA 40

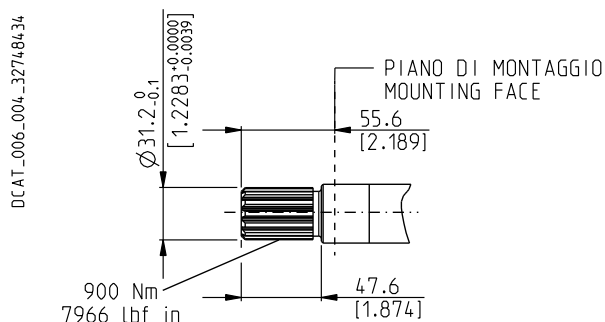
DRIVE SHAFTS

SAE "C" SPLINE

06

Not available with size:

40•121

Mounting face refer to flange code **S8**


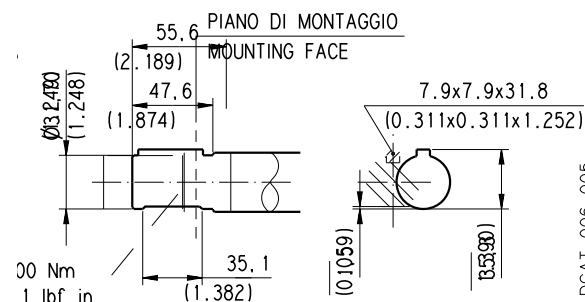
Ext. Involute Spline SAE J498B
with major diameter modified
14 teeth - 12/24 Pitch - 30 deg
Flat Root - Side fit - Class 1

SAE "C" STRAIGHT

34

Not available with size:

40•121

Mounting face refer to flange code **S8**


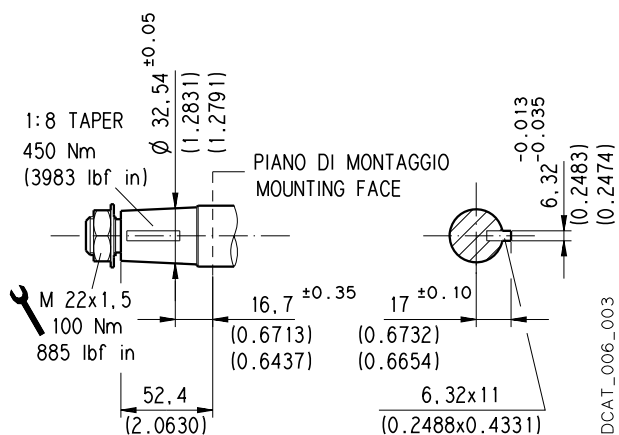
EUROPEAN TAPERED 1:8

85

Not available with size:

40•63

40•151

Mounting face refer to flange code **E5**


02/11.2004

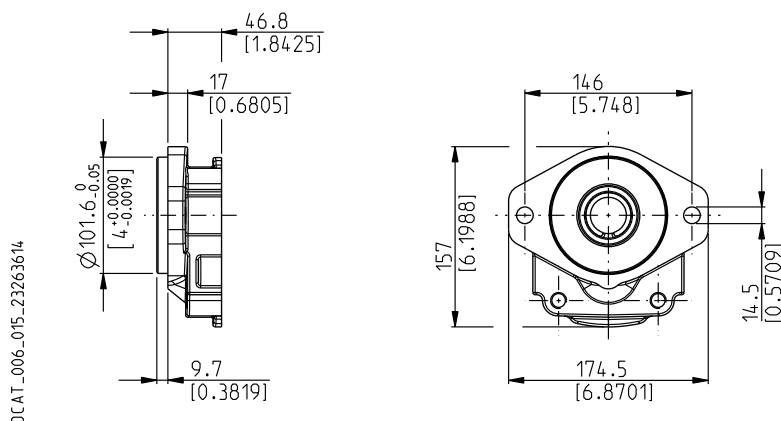
KAPPA 30

MOUNTING FLANGES AND TABLE OF COMPATIBILITY

SAE "B" 2 HOLES

K9

Conforms to SAE J744



DRIVE SHAFTS

See page 38

VERSIONS See page 35	A8	A5
0	■	•

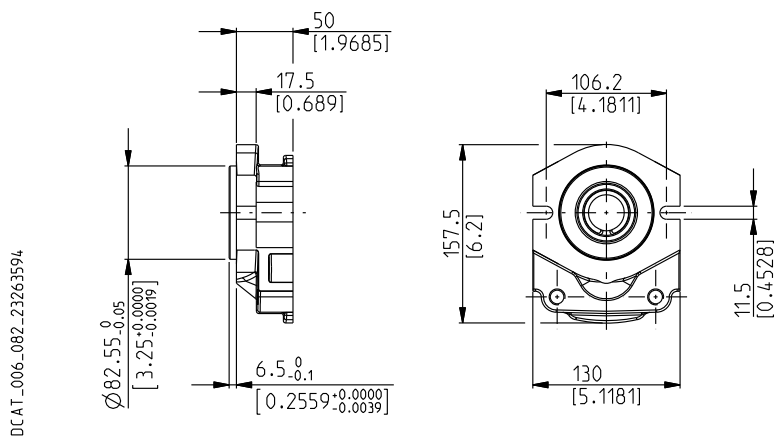
- Standard combination
- Available combination

Note: For the mounting with flanged ports bodies, we recommend to use studs.

SAE "A" 2 HOLES

S9

Conforms to SAE J744



DRIVE SHAFTS

See page 38

VERSIONS See page 35	A8
0	■

- Standard combination
- Available combination

03/07.2005

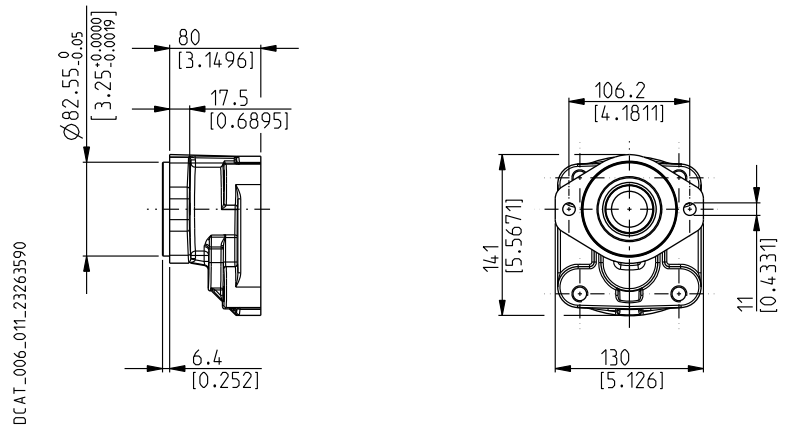
KAPPA 30

MOUNTING FLANGES AND TABLE OF COMPATIBILITY

SAE "A" 2 HOLES

S1

Conforms to SAE J744



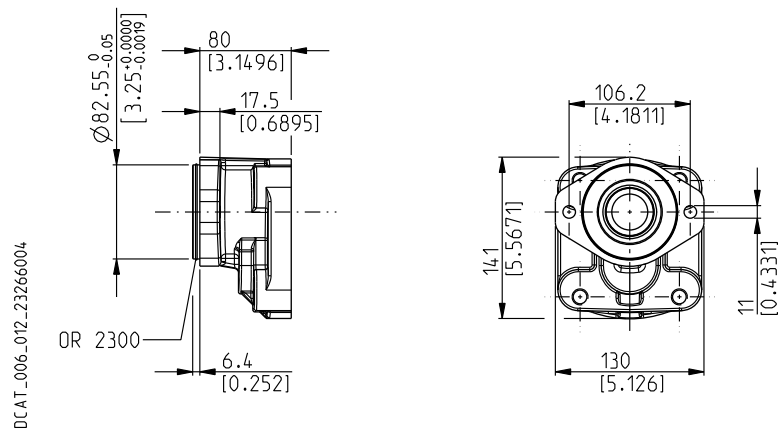
VERSIONS See page 35	DRIVE SHAFTS See page 38			
	04	32	05	33
0	■	•	•	•
1	■	•	•	•
2	■	•	•	•

- Standard combination
- Available combination

SAE "A" 2 HOLES

S2

Conforms to SAE J744



VERSIONS See page 35	DRIVE SHAFTS See page 38			
	04	32	05	33
0	■	•	•	•
1	■	•	•	•
2	■	•	•	•

- Standard combination
- Available combination

01/05.2002

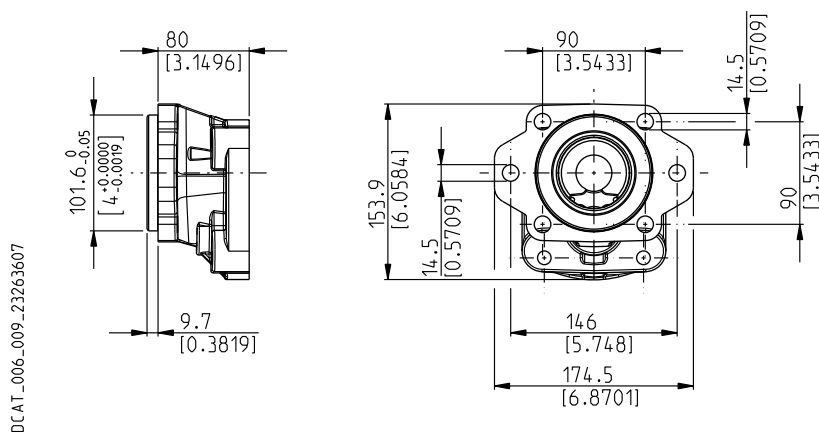
KAPPA 30

MOUNTING FLANGES AND TABLE OF COMPATIBILITY

SAE "B" 2-4 HOLES

S3

Conforms to SAE J744



DCAT_006_009_23263607

DRIVE SHAFTS

See page 38

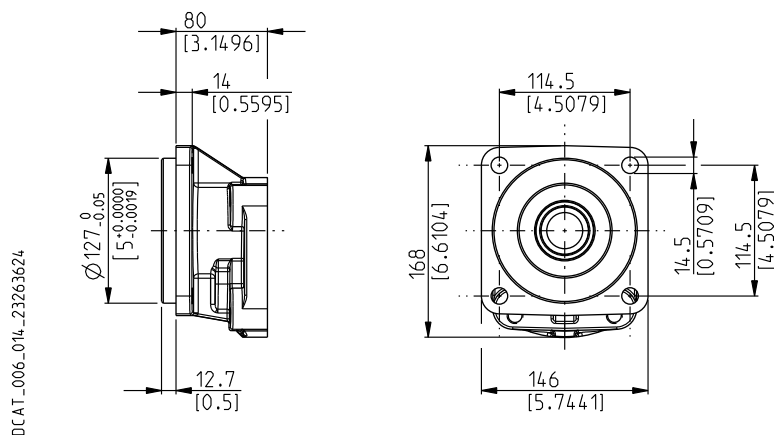
VERSIONS See page 35	04	32	05	33
0	■	•	•	•
1	■	•	•	•
2	■	•	•	•
3	■	•	•	•
6	■	•	•	•

- Standard combination
- Available combination

SAE "C" 4 HOLES

S6

Conforms to SAE J744



DCAT_006_014_23263624

DRIVE SHAFTS

See page 38 and 39

VERSIONS See page 35	06	05
0	■	•
1	■	•
2	■	•
3	■	•
6	■	•

- Standard combination
- Available combination

01/05.2002

KAPPA 30

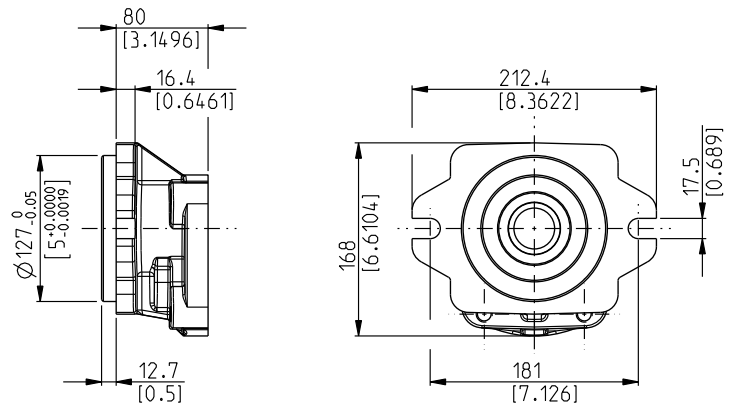
MOUNTING FLANGES AND TABLE OF COMPATIBILITY

SAE "C" 2 HOLES

S8

Conforms to SAE J744

DCAT_006_053_23263625



VERSIONS See page 35	DRIVE SHAFTS See page 38 and 39	
	06	05
0	■	•
1	■	•
2	■	•
3	■	•
6	■	•

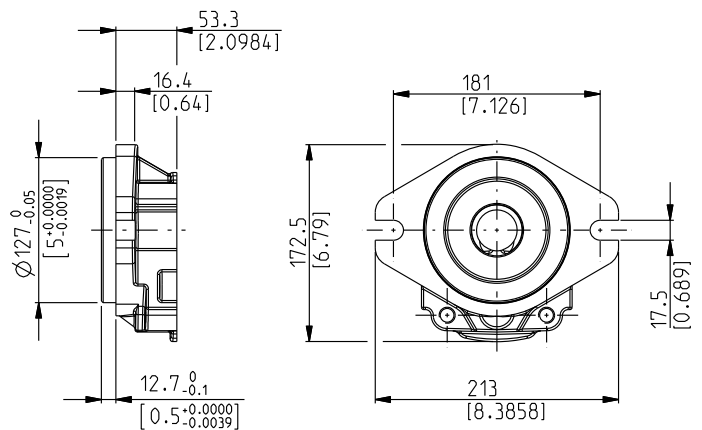
- Standard combination
- Available combination

SAE "C" 2 HOLES

Q3

Conforms to SAE J744

DCAT_006_083_23263633



VERSIONS See page 35	DRIVE SHAFTS See page 39	
	A6	
0	■	

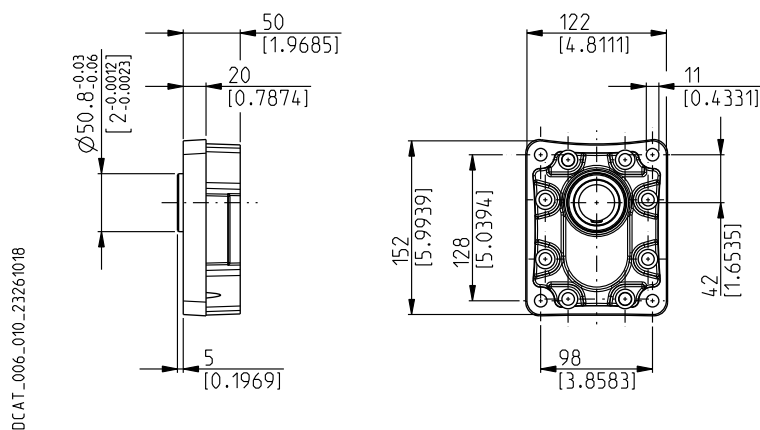
- Standard combination
- Available combination

03/07.2005

KAPPA 30

MOUNTING FLANGES AND TABLE OF COMPATIBILITY

EUROPEAN

E3

Special version. For more information please consult our technical sales department.

VERSIONS See page 35	DRIVE SHAFTS See page 38 and 39		
	83	A8	A5
0	■	•	•

- Standard combination
- Available combination

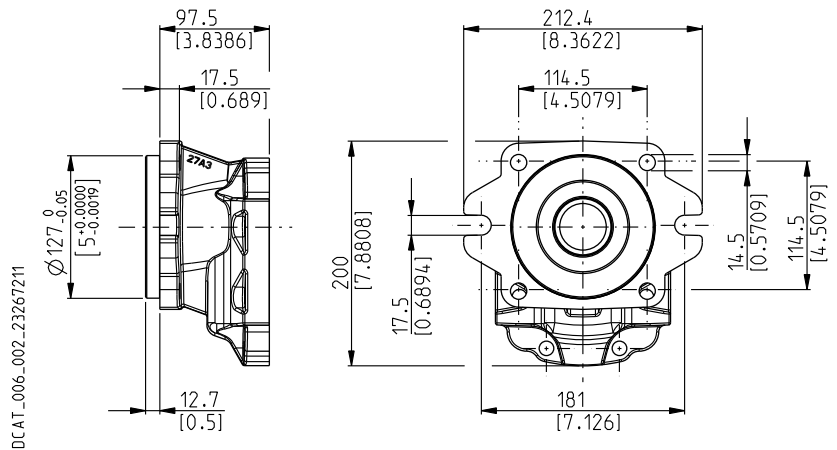
KAPPA 40

MOUNTING FLANGES AND TABLE OF COMPATIBILITY

SAE "C" 2-4 HOLES

S8

Conforms to SAE J744

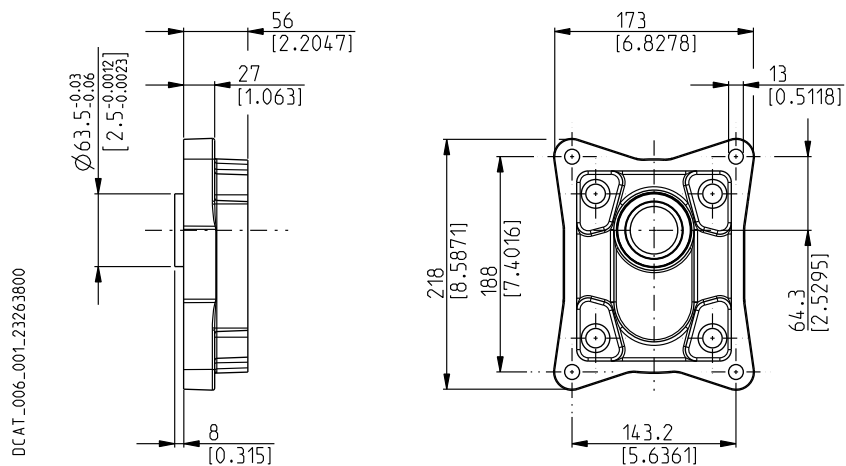


VERSIONS See page 35	DRIVE SHAFTS See page 40	
	06	34
0	■	■
1	■	■
2	■	■

- Standard combination
- Available combination

EUROPEAN

E5

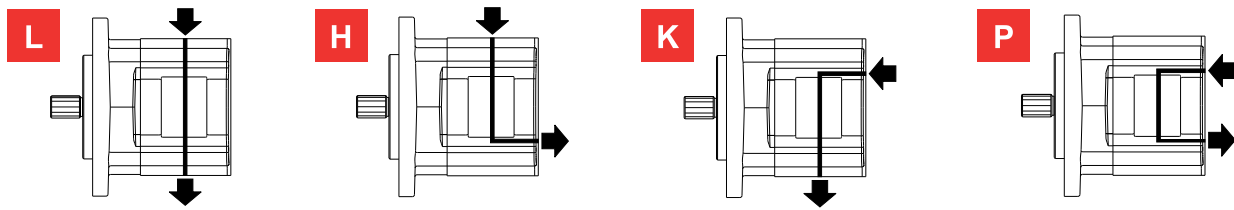


VERSIONS See page 35	DRIVE SHAFTS See page 40	
	85	
0	■	

- Standard combination
- Available combination

01/05.2002

PORTS TYPE



Replaces: 02/11.2004

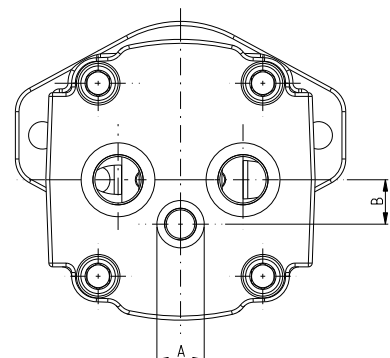
	SIDE PORTS										REAR PORTS			
PORTS TYPE	European		Split SSM		Split SSS		Gas BSPP		SAE ODT		Gas BSPP		SAE ODT	
Pump type	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Motor type	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN
K. 30•22	ED	EB	MC	MB	SC	SB	GF	GE	OF	OD	GF	GE	OF	OD
K. 30•27	ED	EB	MC	MB	SC	SB	GF	GE	OF	OD	GF	GE	OF	OD
K. 30•31	ED	EB	MC	MB	SC	SB	GF	GE	OF	OD	GF	GE	OF	OD
K. 30•34	ED	EB	MC	MB	SC	SB	GF	GE	OF	OD	GF	GE	OF	OD
K. 30•38	ED	EB	MC	MB	SC	SB	GF	GE	OF	OD	GF	GE	OF	OD
K. 30•41	ED	EB	MD	MC	SD	SC	GG	GF	OG	OF	GG	GF	OG	OF
K. 30•43	ED	EB	MD	MC	SD	SC	GG	GF	OG	OF	GG	GF	OG	OF
K. 30•46	ED	EB	MD	MC	SD	SC	GG	GF	OG	OF	GG	GF	OG	OF
K. 30•51	ED	EB	MD	MC	SD	SC	GG	GF	OG	OF	GG	GF	OG	OF
K. 30•56	ED	EB	ME	MD	SE	SD	GG	GF	OG	OF	GG	GF	OG	OF
K. 30•61	ED	EB	ME	MD	SE	SD	GG	GF	OG	OF	GG	GF	OG	OF
K. 30•73	EF	ED	ME	MD	SE	SD	GG	GF	OG	OF	GG	GF	OG	OF
K. 40•63	EG	ED	ME	MD	SE	SD	GG	GF	OG	OF	GF	GE	OF	OD
K. 40•73	EG	ED	ME	MD	SE	SD	GG	GF	OG	OF	GF	GE	OF	OD
K. 40•87	EG	ED	MF	ME	SF	SE	GG	GF	OG	OF	GG	GF	OG	OF
K. 40•109	EG	ED	MF	ME	SF	SE	GG	GF	OG	OF	GG	GF	OG	OF
K. 40•121	EG	EF	MF	ME	SF	SE	GH	GF	OH	OF	GH	GF	OH	OF
K. 40•133	EG	EF	MF	ME	SF	SE	GH	GF	OH	OF	GH	GF	OH	OF
K. 40•151	EG	EF	MF	ME	SF	SE	GH	GF	OH	OF	GH	GF	OH	OF

03/07.2005

EXTERNAL DRAIN PORTS

	Gas BSPP		SAE ODT	
Pump type	A	B	A	B
Motor type		mm (inch)		mm (inch)
K. 30	GC	23,45 (0.9232)	OA	23,45 (0.9232)
K. 40	GC	31 (1.2205)	OA	31 (1.2205)

DCAT_006_029_21064838



PORT 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

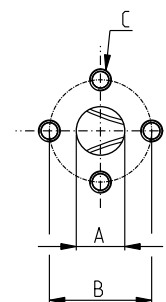
EUROPEAN FLANGED PORTS - 4 Bolts

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)
EB	19 (0.7480)	40 (1.5748)	M8 18 (0.7087)	15 ⁺¹ (133 ÷ 142)	15 ⁺¹ (133 ÷ 142)
ED	27 (1.0630)	51 (2.0079)	M10 15 (0.5906)	20 ⁺¹ (177 ÷ 186)	30 ^{+2,5} (266 ÷ 288)
			M10 (◆) 13 (0.5118)		25 ⁺¹ () (221 ÷ 230)
EF	33 (1.2992)	62 (2.4409)	M12 17 (0.6693)	25 ⁺¹ (221 ÷ 230)	50 ^{+2,5} (443 ÷ 465)
			M12 (◆) 18 (0.7087)		
EG	38 (1.4961)	72 (2.8346)	M12 (◆) 18 (0.7087)	30 ^{+2,5} (◆) (266 ÷ 288)	—

DCAT_006_024_21060533



(◆) For KAPPA 40

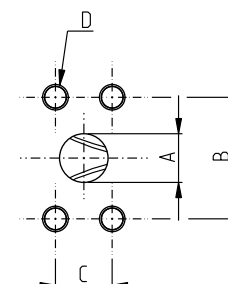
SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI

SSM

Metric thread ISO 60° conforms to ISO/R 262

CODE	A	B	C	D		
	mm (in)	mm (in)	mm (in)	Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
MB	19 (0.7480)	47,6 (1.8740)	22,2 (0.8740)	M 10 17 (0.6693)	20 ⁺¹ (177 ÷ 186)	30 ^{+2,5} (266 ÷ 288)
MC	25,4 (1.0000)	52,4 (2.0630)	26,2 (1.0315)	M 10 17 (0.6693)	20 ⁺¹ (177 ÷ 186)	30 ^{+2,5} (266 ÷ 288)
MD	30,5 (1.2008)	58,7 (2.3110)	30,2 (1.1890)	M 10 17 (0.6693)	20 ⁺¹ (177 ÷ 186)	35 ^{+2,5} (310 ÷ 332)
				M 10 (◆) 22 (0.8661)		
ME	39,3 (1.5472)	69,8 (2.7480)	35,7 (1.4055)	M 12 17 (0.6693)	30 ^{+2,5} (266 ÷ 288)	60 ⁺⁵ (531 ÷ 575)
				M 12 (◆) 27 (1.0630)		
MF	51 (2.0079)	77,8 (3.0630)	42,9 (1.6890)	M 12 (◆) 27 (1.0630)	25 ⁺¹ (◆) (221 ÷ 230)	—

DCAT_006_025_21064252



02/11.2004

(◆) For KAPPA 40

PORT 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

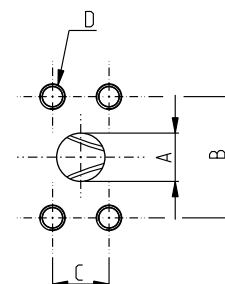
SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI

SSS

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

CODE	A	B	C	D		
	mm (in)	mm (in)	mm (in)	Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
SB	19 (0.7480)	47,6 (1.8740)	22,2 (0.8740)	3/8 - 16 UNC-2B 17 (0.6693)	20 ⁺¹ (177 ÷ 186)	25 ⁺¹ (221 ÷ 230)
SC	25,4 (1.0000)	52,4 (2.0630)	26,2 (1.0315)	3/8 - 16 UNC-2B 17 (0.6693)	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 17 (0.6693)	20 ⁺¹ (177 ÷ 186)	45 ^{+2,5} (398 ÷ 420)
				7/16 - 14 UNC-2B 28 (1.1024) (◆)		
SE	39,3 (1.5472)	69,8 (2.7480)	35,7 (1.4055)	1/2 - 13 UNC-2B 17 (0.6693)	30 ^{+2,5} (266 ÷ 288)	70 ⁺⁵ (620 ÷ 664)
				1/2 - 13 UNC-2B 27 (1.0630) (◆)		
SF	51 (2.0079)	77,8 (3.0630)	42,9 (1.6890)	1/2 - 13 UNC-2B 27 (1.0630) (◆)	30 ^{+2,5} (◆) (266 ÷ 288)	—

DCAT_006_028_21060740



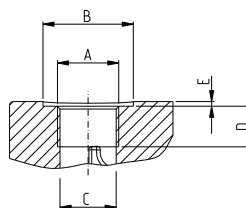
(◆) For KAPPA 40

GAS STRAIGHT THREAD PORTS

BSPP

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

DCAT_006_026_21064779



CODE	Nominal size	A	Ø B	Ø C	D	E		
			mm (in)	mm (in)	mm (in)	mm (in)	Nm (lbf in)	Nm (lbf in)
GC (◆)	3/8"	G 3/8	25 (0.9843)	15 (0.5906)	14 (0.5512)	2 (0.0787)	15 ⁺¹ (133 ÷ 142)	—
GE	3/4"	G 3/4	39 (1.5354)	24,5 (0.9646)	18 (0.7087)	2,5 (0.0984)	30 ^{+2,5} (266 ÷ 288)	90 ⁺⁵ (797 ÷ 841)
GF	1"	G 1	49 (1.9291)	30,5 (1.2008)	22 (0.8661)	2,5 (0.0984)	50 ^{+2,5} (443 ÷ 465)	130 ⁺¹⁰ (1151 ÷ 1239)
GG	1" 1/4	G 1 1/4	56 (2.2047)	39 (1.5354)	24 (0.9449)	2,5 (0.0984)	60 ⁺⁵ (531 ÷ 575)	170 ⁺¹⁰ (1505 ÷ 1593)
GH	1" 1/2	G 1 1/2	72 (2.8346)	45 (1.7717)	26 (1.0236)	2,5 (0.0984)	70 ⁺⁵ (620 ÷ 664)	—

(◆) = Drain port

PORT SIZES



Tightening torque for low pressure side port



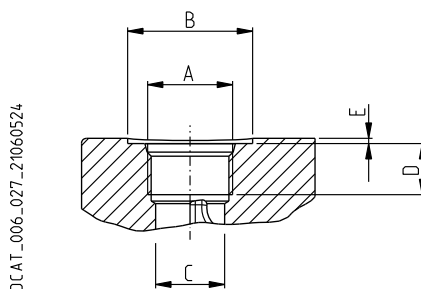
Tightening torque for high pressure side port [values obtained at 5075 psi (350 bar)]

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

SAE STRAIGHT THREAD PORTS J514

ODT

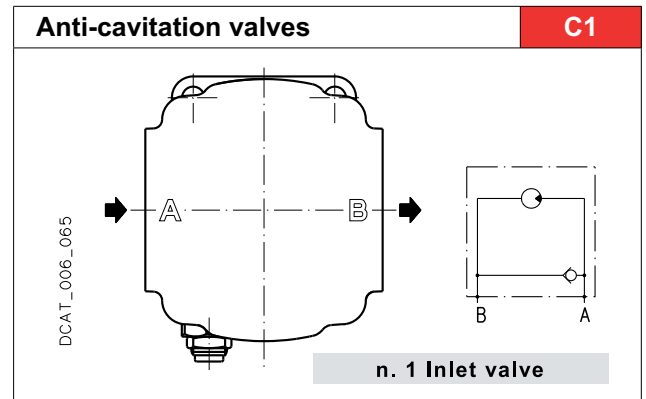
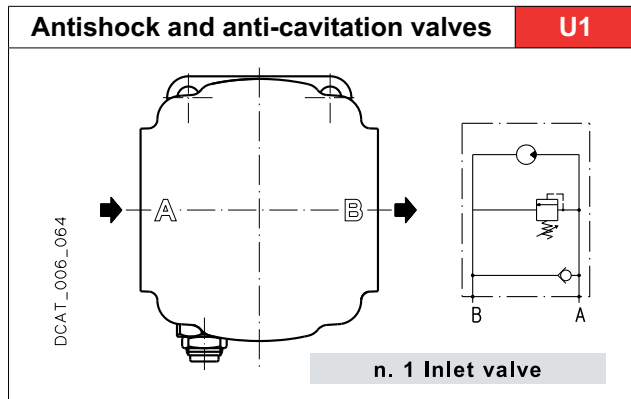
American straight thread UNC-UNF 60° conforms to ANSI B 1.1



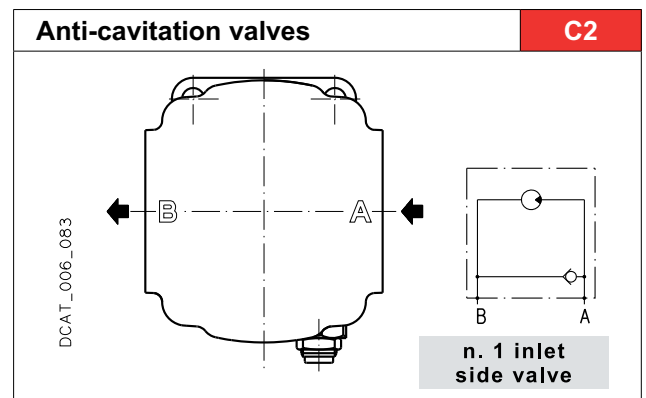
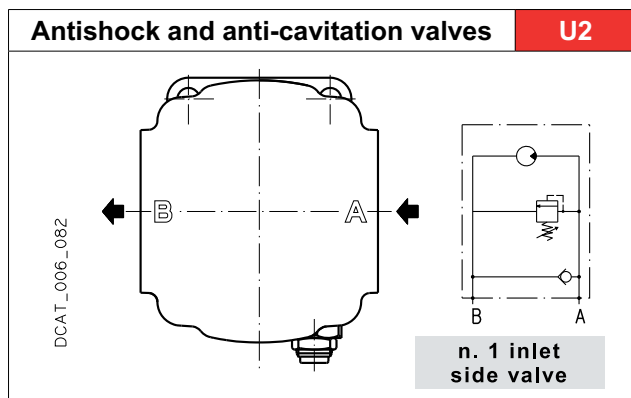
CODE	Nominal size	A	Ø B	Ø C	D	E		
			mm (in)	mm (in)	mm (in)	mm (in)		
OA (◆)	3/8"	9/16" -12 UNF -2B	26 (1.0236)	13 (0.5118)	15 (0.5906)	2 (0.0787)	15 ⁺¹ (133 ÷ 142)	—
OD	3/4"	1 1/16" -12 UNF -2B	42 (1.6535)	24,8 (0.9764)	20 (0.7874)	2 (0.0787)	40 ^{+2,5} (354 ÷ 376)	120 ⁺¹⁰ (1062 ÷ 1151)
OF	1"	1 5/16" -12 UNF -2B	49 (1.9291)	30,5 (1.2008)	20 (0.7874)	2 (0.0787)	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)	2 (0.0787)	70 ⁺⁵ (620 ÷ 664)	—
OH	1" 1/2	1 7/8" -12 UNF -2B	65 (2.5591)	45 (1.7717)	20 (0.7874)	2 (0.0787)	100 ⁺⁵ (885 ÷ 929)	—

(◆) = Drain port

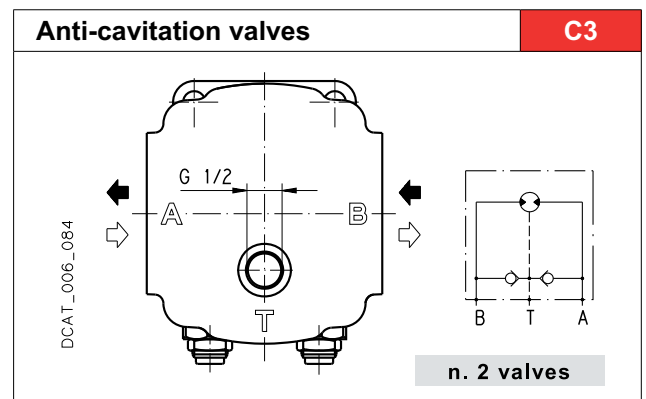
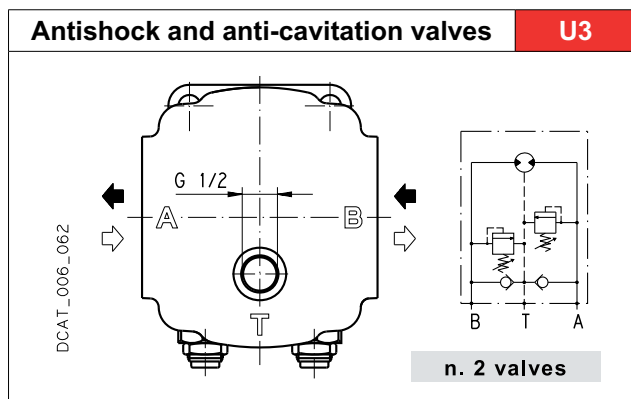
Unidirectional motors - Anti-clock rotation (S)



Unidirectional motors - Clockwise rotation (D)



Reversible motors external drain (R)



01/05.2002

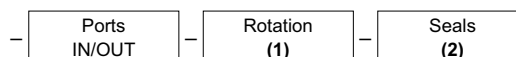
KAPPA 30
MOTORS WITH BUILT-IN VALVES
83 E3

Spring type	Antishock and anti-cavitation valves setting range (U..)
	psi (bar)
G3	725 ÷ 3190 (50 ÷ 220)
G4	2654 ÷ *** (p ₃) (180 ÷ *** [(p ₃)])

*** : G4 spring maximum setting range, see KM30 p3 peak pressure on page 3

For more information please consult our technical sales department.

HOW TO ORDER


KM30•38 D0-83 E3-L EB/ED-N
–
U2
(G3 - 200)
– CSC

ORDER EXAMPLE

Clockwise motor with antishock and anti-cavitation valve
Setting pressure 2900 psi (200 bar)

KM30•38 D0-83 E3-L EB/ED-N-U2 (G3-200)-CSC

Reversible motor R with anti-cavitation valve

KM30•27 R0-83 E3-L ED/EB-N-C3-CSC

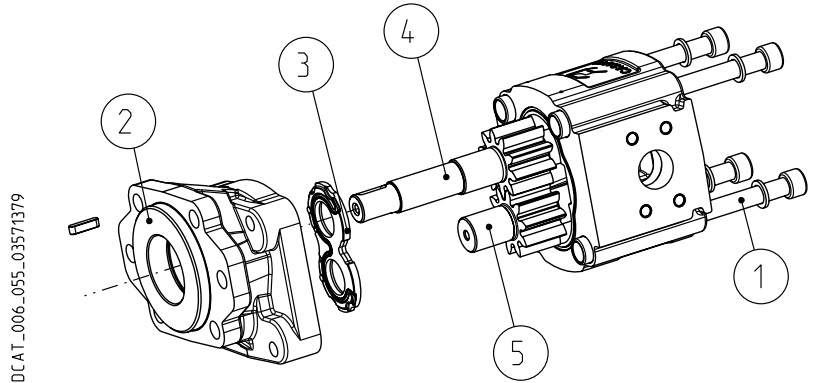
01/05.2002

CHANGING ROTATION

Example of changing rotation: from KP30 pump counterclockwise to clockwise

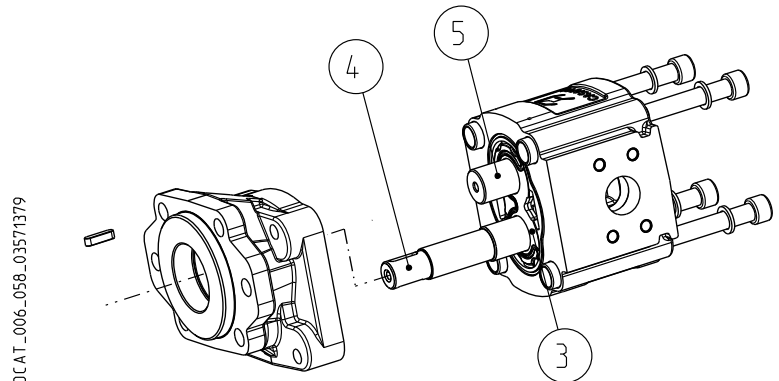
To change rotation of unidirectional pumps and motors is necessary to operate in the following way:

- 1 - Clean the pump externally with care.
- 2 - Loosen, and remove, the clamp bolts (1).
- 3 - Coat the sharp edges of the drive shaft (4) with adhesive tape and smear a layer of clean grease on the shaft end extension to avoid damaging the lip of the shaft seal when removing the mounting flange.
- 4 - Remove the mounting flange (2), taking care to keep the flange as straight as possible during removal. If the flange is stuck, tap around the edge with a fibre or rubber mallet in order to break away from the body. Ensure that while removing the front mounting flange, the drive shaft and other components remain position.
- 5 - Ease the drive gear (4) up to facilitate removal the front plate (3), taking care that the precision ground surfaces do not become damaged, and remove the drive gear.
- 6 - Remove the driven gear (5) without overturning. The rear plate has not to be removed



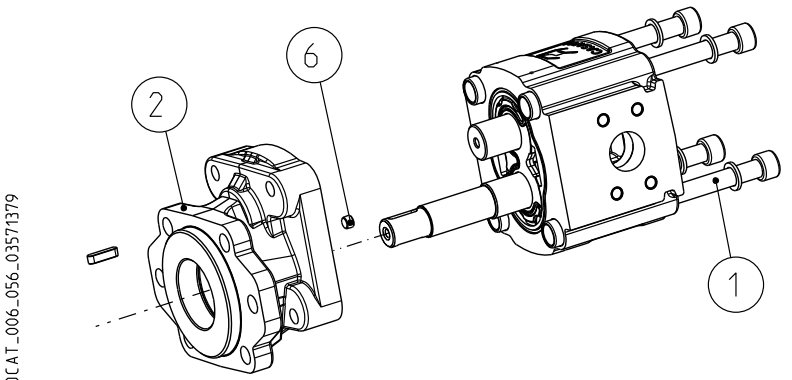
DCAT_006_055_03571379

- 7 - Re-locate the driven gear (5) in the position previously occupied by the drive gear (4)
- 8 - Re-locate the drive gear (4) in the position previously occupied by the driven gear (5).
- 9 - Replace the front plate (3) in its original position.



DCAT_006_058_03571379

- 10 - Remove the grub screw (6) from the mounting flange (2) and re-locate it in the other threaded hole in the same flange.
- 11 - Gently wipe the machined surface of the mounting flange (2) and the body with a flat hand stone.
- 12 - Refit the front mounting flange (2) turned 180° from its original position.
- 13 - Refit the clamp bolts (1) with the washers and tighten in a crisscross pattern to a torque value of $1115 \div 1363$ lbf in (140 ± 14 Nm)
- 14 - Check that the pump rotates freely when the drive shaft (4) is turned by hand. If not a pressure plate seal may be pinched.
- 15 - The pump is ready for installation with the original rotation reversed.



DCAT_006_056_03571379

Replaces: 01/05.2002

03/07.2005

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.

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:



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.

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. In the difference between pump or motor temperature and fluid temperature exceeds 50 °F (10 °C), 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.

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: 01/05.2002

03/07.2005

HOW TO ORDER KAPPA 30 SINGLE PUMPS

1

2

3

4

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6

7

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9

Pump type Motor type	Rotation	Version	–	Drive shaft	Mounting flange	–	Ports position	Ports IN/OUT	–	Seals	–	Body type
-------------------------	----------	---------	---	-------------	--------------------	---	-------------------	-----------------	---	-------	---	--------------

KP 30•27 S 0 – 04 S3 – L OF/OD – N – CSC

Replaces: 01/05.2002

1	Type	PUMP TYPE	MOTOR TYPE
	in ³ /rev (cm ³ /rev)		
	1.34 (21,99)	KP 30•22	KM 30•22
	1.63 (26,7)	KP 30•27	KM 30•27
	1.87 (30,63)	KP 30•31	KM 30•31
	2.11 (34,56)	KP 30•34	KM 30•34
	2.40 (39,27)	KP 30•38	KM 30•38
	2.54 (41,62)	KP 30•41	KM 30•41
	2.68 (43,98)	KP 30•43	KM 30•43
	2.83 (46,34)	KP 30•46	KM 30•46
	3.16 (51,83)	KP 30•51	KM 30•51
	3.45 (56,54)	KP 30•56	KM 30•56
	3.74 (61,26)	KP 30•61	KM 30•61
	4.50 (73,82)	KP 30•73	KM 30•73

2	Rotation	CODE
	Left	S
	Right	D
	Reversible	R
	Reversible with internal drain	B

3	Version	CODE
	Without outboard bearing	0
	With outboard bearing	1
	With outboard bearing and indep. shaft	2
	With outboard bearing	3
	With outboard bearing	6

4	Drive shaft	CODE
	European tapered 1:8	83
	SAE "B" spline (13 teeth)	04
	SAE "B" straight	32
	SAE "BB" spline (15 teeth)	05
	SAE "BB" straight	33
	SAE "B" spline (13 teeth) for K9	A8
	SAE "BB" spline (15 teeth) for K9	A5
	SAE "C" spline (14 teeth)	06
	SAE "C" spline short type (14 teeth)	A6

5	Mounting flange	CODE
	European	E3
	SAE "A" 2 holes	S1
	SAE "A" 2 holes with O-ring	S2
	SAE "A" 2 holes short type	S9
	SAE "B" 2-4 holes	S3
	SAE "B" 2 holes	K9
	SAE "C" 4 holes	S6
	SAE "C" 2 holes	S8
	SAE "C" 2 holes short type	Q3

6	Ports position	CODE
	IN/OUT side	L
	IN side / OUT rear	H
	IN rear / OUT side	K
	IN/OUT rear	P

CODE		Ports IN/OUT		7
EUROPEAN FLANGED PORTS				
Side	Rear	Type		
ED/EB		KP30	22-27-31-34-38	
EB/ED		KM30	41-43-46-51-56-61	
EF/ED		KP30	73	
ED/EF		KM30		
SAE FLANGED PORTS (SSM)				
Side	Rear	Type		
MC/MB		KP30	22-27-31-34-38	
MB/MC		KM30		
MD/MC		KP30	41-43-46-51	
MC/MD		KM30		
ME/MD		KP30	56-61-73	
MD/ME		KM30		
SAE FLANGED PORTS (SSS)				
Side	Rear	Type		
SC/SB		KP30	22-27-31-34-38	
SB/SC		KM30		
SD/SC		KP30	41-43-46-51	
SC/SD		KM30		
SE/SD		KP30	56-61-73	
SAE STRAIGHT THREAD PORTS (ODT)				
Side	Rear	Type		
OF/OD	OF/OD	KP30	22-27-31-34-38	
OD/OF	OD/OF	KM30		
OG/OF	OG/OF	KP30	41-43-46-51	
OF/OG	OF/OG	KM30	56-61-73	
GAS STRAIGHT THREAD PORTS (BSPP)				
Side	Rear	Type		
GF/GE	GF/GE	KP30	22-27-31-34-38	
GF/GE	GF/GE	KM30		
GG/GF	GG/GF	KP30	41-43-46-51	
GF/GG	GG/GF	KM30	56-61-73	

CODE	Seals (a)	8
N	Buna N (standard)	
N-H	Buna with high back pressure shaft seals	
V	Viton	
N Bz	Buna N and Bronze thrust plates	
V Bz	Viton and Bronze thrust plates	

CODE	Body type	9
CSC	Short body	
KSC (b)	Short shaped body	

(a) Choose the seals according to the temperature shown on page 1.

(b) Available only with 22-27-31-34-38 displacements.

03/07.2005

HOW TO ORDER KAPPA 30 MULTIPLE PUMPS SAME GROUPS

1	2	3	4	5	6	7	8	9	10
Pump type	Drive shaft	Mounting flange	Ports position	Ports IN/OUT	Common inlet	Body type	Version	Rotation	Seals

KP 30•51 – A8 K9 – L MD/MC – – CSL /

Front section

30•51 – L MD/MC – – CSL /

Intermediate section

30•51 – L MD/MC – – CSC – S –

Rear section

1	Type	PUMP TYPE
in ³ /rev (cm ³ /rev)		
1.34 (21,99)		KP 30•22
1.63 (26,7)		KP 30•27
1.87 (30,63)		KP 30•31
2.11 (34,56)		KP 30•34
2.40 (39,27)		KP 30•38
2.54 (41,62)		KP 30•41
2.68 (43,98)		KP 30•43
2.83 (46,34)		KP 30•46
3.16 (51,83)		KP 30•51
3.45 (56,54)		KP 30•56
3.74 (61,26)		KP 30•61
4.50 (73,82)		KP 30•73

2	Drive shaft	CODE
European tapered 1:8		83
SAE "B" spline (13 teeth)		04
SAE "B" straight		32
SAE "BB" spline (15 teeth)		05
SAE "BB" straight		33
SAE "B" spline (13 teeth) for K9		A8
SAE "BB" spline (15 teeth) for K9		A5
SAE "C" spline (14 teeth)		06
SAE "C" spline short type (14 teeth)		A6

3	Mounting flange	CODE
European		E3
SAE "A" 2 holes		S1
SAE "A" 2 holes with O-ring		S2
SAE "A" 2 holes short type		S9
SAE "B" 2-4 holes		S3
SAE "B" 2 holes		K9
SAE "C" 4 holes		S6
SAE "C" 2 holes		S8
SAE "C" 2 holes short type		Q3

4	Ports position	CODE
Side		L

5	Ports IN/OUT	CODE
EUROPEAN FLANGED PORTS		
Type		Side
22-27-31-34-38-41-43-46-51-56-61	KP30	ED/EB
73	KP30	EF/ED

(a) Please write this code only for common inlet pump. (see page 61).

(b) Available only with 22-27-31-34-38 displacements.

CODE	Ports IN/OUT	5
SAE FLANGED PORTS (SSM)		
Side	Type	
MC/MB	KP30	22-27-31-34-38
MD/MC	KP30	41-43-46-51
ME/MD	KP30	56-61-73

SAE FLANGED PORTS (SSS)		
Side	Type	
SC/SB	KP30	22-27-31-34-38
SD/SC	KP30	41-43-46-51
SE/SD	KP30	56-61-73

SAE STRAIGHT THREAD PORTS (ODT)		
Side	Type	
OF/OD	KP30	22-27-31-34-38
OG/OF	KP30	41-43-46-51-56-61-73

GAS STRAIGHT THREAD PORTS (BSPP)		
Side	Type	
GF/GE	KP30	22-27-31-34-38
GG/GF	KP30	41-43-46-51-56-61-73

CODE	Body for common inlet (a)	6
M5	Combination KP30/KP30	

CODE	Body type	7
CSL	Long body	
CSC	Short body - Only for rear sections	
KSL	long shaped body (b)	
KSC	Short shaped body (b) - Only for rear sect.	

CODE	Rotation	8
S	Left	
D	Right	

CODE	Version	9
0	Without outboard bear. (standard) no code	
1	With outboard bearing	
2	With outboard bearing and indep. shaft	
3	With outboard bearing	
6	With outboard bearing	

CODE	Seals (a)	10
N	Buna N (standard) - no code	
N-H	Buna with high back pressure shaft seals	
V	Viton	
N Bz	Buna N and Bronze thrust plates	
V Bz	Viton and Bronze thrust plates	

(c) Choose the seals according to the temperature shown on page 1. Buna N no code.

Replaces: 01/05.2002

03/07.2005

HOW TO ORDER KAPPA 30 DOUBLE PUMPS DIFFERENT GROUPS

KP30/KP20

1	2	3	4	5	6	7	8	10	11	12
Pump type	Drive shaft	Mounting flange	Ports position	Ports IN/OUT	Connect. shaft	Common inlet	Body type	Rotation	Version	Seals
KP 30-51	A8	K9	L	MD/MC	55	-	CSL	/		
Front section										
KP 20-14	-		L	MB/MA	-	-	-	S	-	
Rear section										

KP30/PLP20

1	2	3	4	5	6	7	8	9	10	11	12
Pump type	Drive shaft	Mount. flange	Ports position	Ports IN/OUT	Conn. shaft	Comm. inlet	Body type	Rear cover	Rotation	Version	Seals
KP 30-51	A8	K9	L	MD/MC	45	-	CSC	/			
Front section											
PLP 20-14	-		L	MB/MA	-		-	L	S	/	FS -
Rear section											

1	Type	PUMP TYPE
	in ³ /rev (cm ³ /rev)	
	The same of multiple pumps on page 56	KP 30-...
2	Drive shaft	CODE
	The same of multiple pumps on page 56	...
3	Mounting flange	CODE
	The same of multiple pumps on page 56	...
4	Ports position	CODE
	Side	L
5	Ports IN/OUT	CODE
	The same of multiple pumps on page 56	.../...
6	Connecting shaft	CODE
	Combination KP30/KP20	55
	Combination KP30/PLP20	45
7	Body for common inlet (a)	CODE
	Combination KP30/KP20	N5
	Combination KP30/PLP20	N7

(a) Please write this code only for common inlet pump.
(see page 61).

CODE	Body type	8
CSL	Long body (KP30/KP20)	
CSC	Short body (KP30/PLP20)	
HSC	Short shaped body (KP30/PLP20)	
CODE	Rear cover (only PLP 20)	9
	Cast iron (standard) no code	
L	Aluminum	
2P	Without cover	
CODE	Rotation	10
S	Left	
D	Right	
CODE	Version	11
...	The same of multiple pumps on page 56	
CODE	Seals	12
	The same of multiple pumps on page 56	

02/11.2004

HOW TO ORDER KAPPA 40 SINGLE PUMPS

1	2	3	4	5	6	7	8	9				
Pump type Motor type	Rotation	Version	–	Drive shaft	Mounting flange	–	Ports positon	Ports IN/OUT	–	Seals	–	Body type

KP 40•63 S 0 – 06 S8 – L OG/OF – N –

1	Type	PUMP TYPE	MOTOR TYPE
in³/rev (cm³/rev)			
3.75 (61,43)		KP 40•63	KM 40•63
4.43 (72,6)		KP 40•73	KM 40•73
5.28 (86,56)		KP 40•87	KM 40•87
6.64 (108,9)		KP 40•109	KM 40•109
7.43 (121,8)		KP 40•121	KM 40•121
8.18 (134,03)		KP 40•133	KM 40•133
9.20 (150,79)		KP 40•151	KM 40•151

2	Rotation	CODE
Left		S
Right		D
Reversible		R
Reversible internal drain		B

3	Version	CODE
Without outboard bearing		0
With outboard bearing		1
With outboard bearing and indep. shaft		2

4	Drive shaft	CODE
European tapered 1:8		85
SAE "C" spline (14 teeth)		06
SAE "C" straight		34

5	Mounting flange	CODE
European		E3
SAE "C" 2-4 holes		S8

6	Ports position	CODE
Side		L
Rear		P

CODE	Ports IN/OUT		7
EUROPEAN FLANGED PORTS			
Side	Rear	Type	
EG/ED		KP40	63-73-87-109
ED/EG		KM40	
EG/EF		KP40	121-133-151
EF/EG		KM40	
SAE FLANGED PORTS (SSM)			
Side	Rear	Type	
ME/MD		KP40	63-73
MD/ME		KM40	
MF/ME		KP40	87-109-121
ME/MF		KM40	
SAE FLANGED PORTS (SSS)			
Side	Rear	Type	
SE/SD		KP40	63-73
SD/SE		KM40	
SF/SE		KP40	87-109-121
SE/SF		KM40	
SAE STRAIGHT THREAD PORTS (ODT)			
Side	Rear	Type	
OG/OF	OG/OF	KP40	63-73
OF/OG	OF/OG	KM40	
OG/OF	OG/OF	KP40	87-109
OF/OG	OF/OG	KM40	
OH/OF	OH/OF	KP40	121-133-151
OF/OH	OF/OH	KM40	
GAS STRAIGHT THREAD PORTS (BSPP)			
Side	Rear	Type	
GG/GF	GG/GF	KP40	63-73
GF/GG	GF/GG	KM40	
GG/GF	GG/GF	KP40	87-109
GF/GG	GF/GG	KM40	
GH/GF	GH/GF	KP40	121-133-151
GF/GH	GF/GH	KM40	

CODE	Seals (a)	8
N	Buna N (standard) - no code	
N-H	Buna with high back pressure shaft seals	
V	Viton	
N Bz	Buna N and Bronze thrust plates	
V Bz	Viton and Bronze thrust plates	

CODE	Body type (b)	9
CSL	Long body	

(a) Choose the seals according to the temperature shown on page 1

(b) Please write this code only for pump with rear ports

Replaces: 01/05.2002

03/07.2005

HOW TO ORDER KAPPA 40 MULTIPLE PUMPS SAME GROUPS

1	2	3	4	5	6	7	8	9	10
Pump type	Drive shaft	Mounting flange	Ports position	Ports IN/OUT	Common inlet	Body type	Version	Rotation	Seals

KP 40-63 – 06 S8 – L OG/OF – – CSL /

Front section

40-63 – L OG/OF – – CSL /

Intermediate section

40-63 – L OG/OF – – CSC – S –

Rear section

1	Type	PUMP TYPE
in ³ /rev (cm ³ /rev)		
3.75 (61,43)		KM 40-63
4.43 (72,6)		KM 40-73
5.28 (86,56)		KM 40-87
6.64 (108,9)		KM 40-109
7.43 (121,8)		KM 40-121
8.18 (134,03)		KM 40-133
9.20 (150,79)		KM 40-151

2	Drive shaft	CODE
European tapered 1:8		85
SAE "C" spline (14 teeth)		06
SAE "C" spline short type (14 teeth)		34

3	Mounting flange	CODE
European		E3
SAE "C" 2 holes		S8

4	Ports position	CODE
Side		L

5	Ports IN/OUT	CODE
EUROPEAN FLANGED PORTS		
Type		Side
63-73-87-109	KP40	ED/EB
121-133-151	KP40	EF/ED
SAE FLANGED PORTS (SSM)		
Type		Side
63-73	KP40	ME/MD
87-109-121-133-151	KP40	MF/ME
SAE FLANGED PORTS (SSS)		
Type		Side
63-73	KP40	SE/SD
87-109-121-133-151	KP40	SF/SE

CODE	Ports IN/OUT	5
SAE STRAIGHT THREAD PORTS (ODT)		
Side	Type	
OG/OF	KP40	63-73-87-109
OH/OF	KP40	121-133-151
GAS STRAIGHT THREAD PORTS (BSPP)		
Side	Type	
GG/GF	KP40	63-73-87-109
GH/GF	KP40	121-133-151

CODE	Body for common inlet (a)	6
A5	Combination KP40/KP40	

CODE	Body type (b)	7
CSL	Long body	
CSC	Short body	

CODE	Rotation	8
S	Left	
D	Right	

CODE	Version	9
0	Without outboard bear. (standard) no code	
1	With outboard bearing	
2	With outboard bearing and indep. shaft	

CODE	Seals (a)	10
N	Buna N (standard) - no code	
N-H	Buna with high back pressure shaft seals	
V	Viton	
N Bz	Buna N and bronze thrust plate	
V Bz	Viton and bronze thrust plate	

(a) Please write this code only for common inlet pump. (see page 61).

(b) Short body CSC type only for rear section.

(c) Choose the seals according to the temperature shown on page 1. Buna N no code.

HOW TO ORDER KAPPA 40 DOUBLE PUMPS DIFFERENT GROUPS

KP40/KP30

1	2	3	4	5	6	7	8	10	11	12
Pump type	Drive shaft	Mounting flange	Ports position	Ports IN/OUT	Connect. shaft	Common inlet	Body type	Rotation	Version	Seals
KP 40•63	06	S8	L	ME/MD	43	-	CSL	/		
Front section										

KP 30•51	-	L	MD/MC	-	-	-	CSC	S	-	
Rear section										

KP40/KP20

1	2	3	4	5	6	7	8	10	11	12
Pump type	Drive shaft	Mounting flange	Ports position	Ports IN/OUT	Connect. shaft	Common inlet	Body type	Rotation	Version	Seals
KP 40•63	06	S8	L	ME/MD	42	-	CSL	/		
Front section										

KP 20•14	-	L	MB/MA	-	-	-		S	-	
Rear section										

KP40/PLP20

1	2	3	4	5	6	7	8	9	10	11	12
Pump type	Drive shaft	Mount. flange	Ports position	Ports IN/OUT	Conn. shaft	Comm. inlet	Body type	Rear cover	Rotation	Version	Seals
KP 40•63	06	S8	L	ME/MD	41	-	CSC	/			
Front section											

PLP 20•14	-	L	MB/MA	-	-	-	L	S	/	FS	-
Rear section											

1	Type	PUMP TYPE
	in ³ /rev (cm ³ /rev)	
	The same of multiple pumps on page 59	KP 40•...
2	Drive shaft	CODE
	The same of multiple pumps on page 59	...
3	Mounting flange	CODE
	The same of multiple pumps on page 59	...
4	Ports position	CODE
	Side	L
5	Ports IN/OUT	CODE
	The same of multiple pumps on page 59	.../...
6	Connecting shaft	CODE
	Combination KP40/KP30	43
	Combination KP40/KP20	42
	Combination KP40/PLP20	41

(a) Please write this code only for common inlet pump.
(see page 61).

CODE	Body for common inlet (a)	7
C5	Combination KP40/KP30	
D5	Combination KP40/KP20	
D7	Combination KP40/PLP20	

CODE	Body type	8
CSL	Long body (KP30/KP20)	
CSC	Short body (KP30/PLP20)	

CODE	Rear cover (only PLP 20)	9
	Cast iron (standard) no code	
L	Aluminum	
2P	Without cover	

CODE	Rotation	10
...	The same of multiple pumps on page 59	

CODE	Version	11
...	The same of multiple pumps on page 59	

CODE	Seals	12
	The same of multiple pumps on page 59	

01/05.2002

COMMON INLET

Ordering Instructions:

Depending on the required version, the common inlet codes must be used only for the section which has the common suction. For pumps with common inlet for all sections, the code must be used only for the last section. For the sections with only an outlet port, the code of the inlet port must be omitted.

Front pump	Identification code of common inlet body	Rear pump
KP 40	A5	KP 40
KP 40	C5	KP 30
KP 40	D5	KP 20
KP 40	D7	PL20
KP 30	M5	KP 30
KP 30	N5	KP 20
KP 30	N7	PL 20

Order example

Triple pump Kappa 40+Kappa 30+ Kappa 20.
Common inlet intermediate pump and rear pump.

KP 40•63-06 S8-L ME/MD-43-CSL /

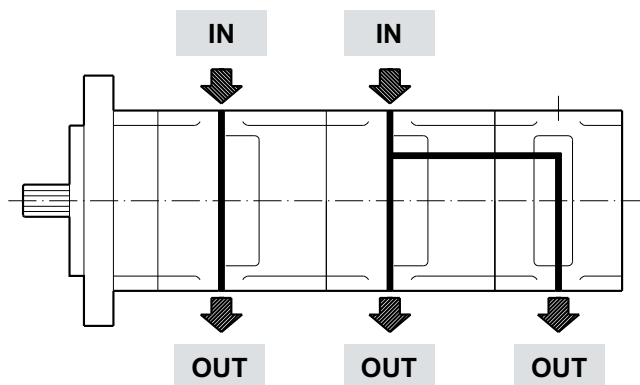
Front pump

KP 30•51-L MD/MC-55-N5-CSL /

Intermediate pump

KP 20•14-L /MA-S

Rear pump



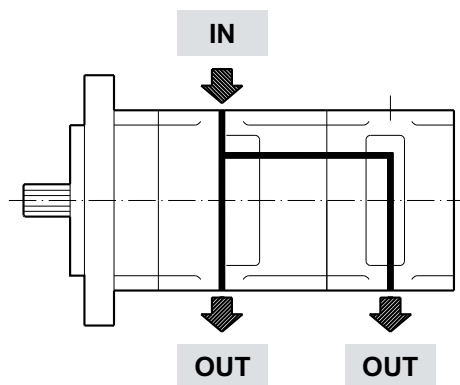
Double pump Kappa 30+Kappa 30.
Common inlet all pumps.

KP 30•51-A8 K9-L MD/MC-CSL /

Front pump

30•51-L /MC-M5-CSC-S /

Rear pump



Triple pump Kappa 40+Kappa 40+ Kappa 30
Common inlet all pumps.

KP 40•63-06 S8-L /MD-CSL /

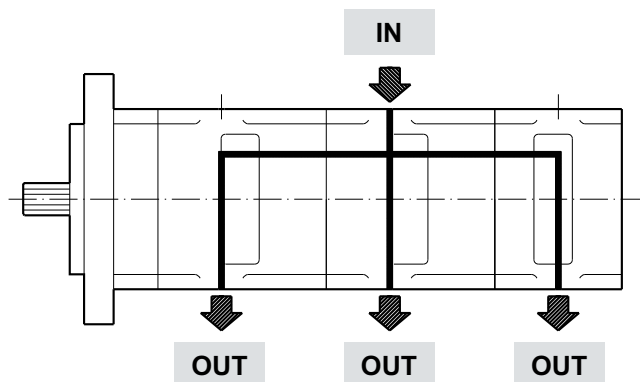
Front pump

40•63-L ME/MD-43-CSL /

Intermediate pump

30•51-L /MC-C5-CSC-S

Rear pump



Casappa: Fluid Power Design at 360°



Gear pumps.
High performance, low noise.



Variable displacement axial piston pumps,
for open circuit.



Fixed displacement bent axis piston pumps,
for truck applications.



Cast iron gear pumps and
motors of three part construction.



Cast iron gear pumps,
for truck applications.



Cast iron gear pumps and
motors of two part construction.



Gear pumps and
motors in aluminium.



Double acting hydraulic hand pumps
with or without reservoir.



Filters : suction filters, return filters, in line filters spin-on
type, for medium and high pressure filters.



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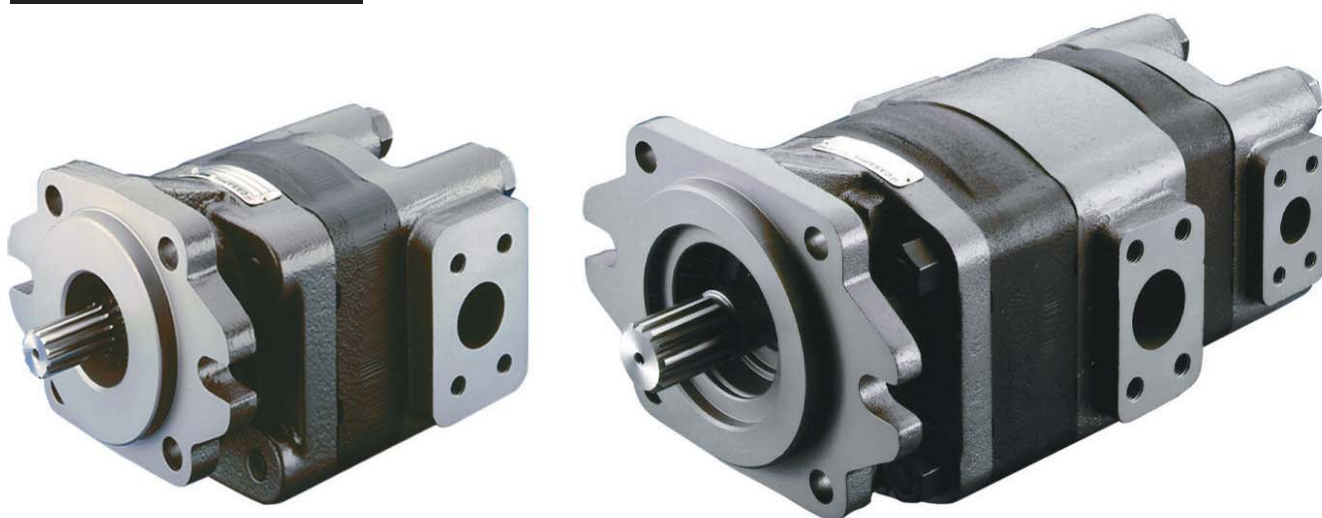


Hydraulic gear pumps and motors

three piece cast iron housing

DISPLACEMENTS

From	1.05 in ³ /rev (17,28 cm ³ /rev)
To	7.66 in ³ /rev (125,63 cm ³ /rev)



PRESSURE

Max. Continuous	4060 psi (280 bar)
Max. Intermittent	4350 psi (300 bar)
Max. Peak	4640 psi (320 bar)

- Wide range of drive shafts and mounting flanges in SAE version
- More choices of port locations
- Integrated outboard bearing for heavy duty applications
- Multiple units available in standard version, common inlet and separated stages
- Exceptional working life expectancy

MAX. SPEED

3000 min⁻¹

Modular design and versatility are the main features of "MAGNUM" series gear pumps and motors. Mounting flange, body and rear cover can be easily assembled to obtain multiple pumps of same or different groups available in standard version, common inlet or separated stages. Wide selection of drive shafts and mounting flanges in SAE version with the possibility of integrated outboard bearing to suit all the applications with axial and radial load on the drive shaft. Port locations available in side or rear locations, and combination of side and rear locations. The low level of noise emission with the high volumetric and overall efficiencies ensure reliability and long working life in heavy duty applications.



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FEATURES

Construction	External gear type pumps and motors
Mounting	SAE flanges
Line connections	Screw and flange
Direction of rotation (looking at the drive shaft)	Anti-clock (S) - clockwise (D) - reversible external drain (R) reversible internal drain (B)
Inlet pressure range for pumps	10 ÷ 44 psi - [0,7 ÷ 3 bar (abs.)]
Max back pressure for single rotation motors	p ₁ (continuous) max 73 psi (5 bar)
	p ₂ (for 20 s) max 116 psi (8 bar)
	p ₃ (for 8 s) max 218 psi (15 bar)
Max drain line pressure on reversible rotation motors	73 psi (5 bar)
Max back pressure on the series motors	2175 psi (150 bar)
Fluid temperature range	See table (1)
Fluid	Mineral oil based hydraulic fluids to ISO/DIN and fire resistant fluids [see table (1)]. For other fluids please consult our technical sales department.
Viscosity range	From 60 to 456 SSU [12 to 100 mm ² /s (cSt)] recommended
	Up to 3410 SSU [750 mm ² /s (cSt)] permitted
Filtering requirement	See table (2)

Tab. 1

Type	Fluid composition	Max pressure psi - (bar)	Max speed min ⁻¹	Temperature °F - (°C)			Seals (◆)
				Min	Max continuous	Max peak	
ISO/DIN	Mineral oil based hydraulic fluid to ISO/DIN	See page 3	See page 3	-13 (-25)	176 (80)	212 (100)	N
				-13 (-25)	230 (110)	257 (125)	N-H
HFA	Oil emulsion in water 5 ÷ 15% of oil	725 (50)	1500	36 (2)	131 (55)		V
HFB	Water emulsion in oil 40 % of water	1740 (120)	1500	36 (2)	140 (60)		N
HFC	Water - glycol	1450 (100)	1500	-4 (-20)	140 (60)		N Bz
HFD	Phosphate ester	2175 (150)	1500	14 (-10)	176 (80)		V Bz

(◆) N= Buna N (standard) - N-H= Buna N and high back pressure shaft seals - V= Viton

N Bz= Buna N and Bronze thrust plates - V Bz= Viton and Bronze thrust plates

Tab. 2

Working pressure	Δp > 2900 psi - (200 bar)	Δp < 2900 psi - (200 bar)
Contamination class NAS 1638	8	10
Contamination class ISO 4406	19/17/14	21/19/16
Achieved with filter β _x ≥75	10 μm	25 μm

Casappa recommends to use its own production filters:

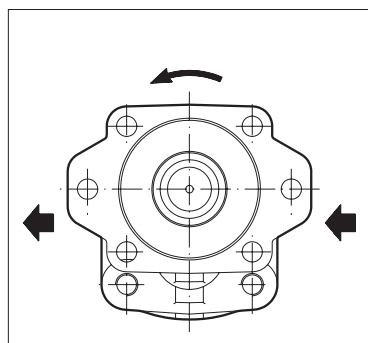


GENERAL NOTES

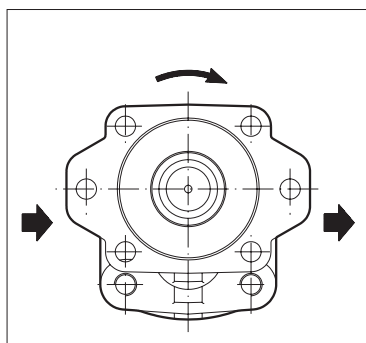
Available with different inlet and outlet ports. If you use fire resistant fluids, specify the fluid type when ordering.
For more information please consult our technical sales department.

FEATURES

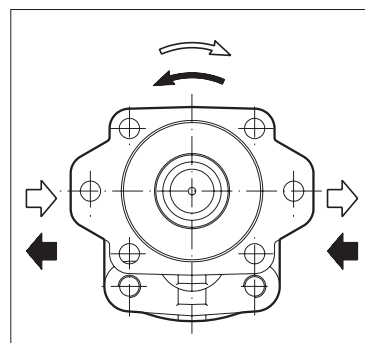
DEFINITION OF ROTATION DIRECTION LOOKING AT THE DRIVE SHAFT



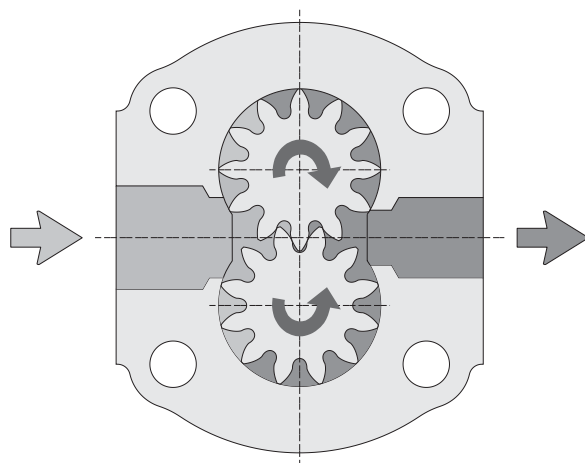
Anti-clock rotation



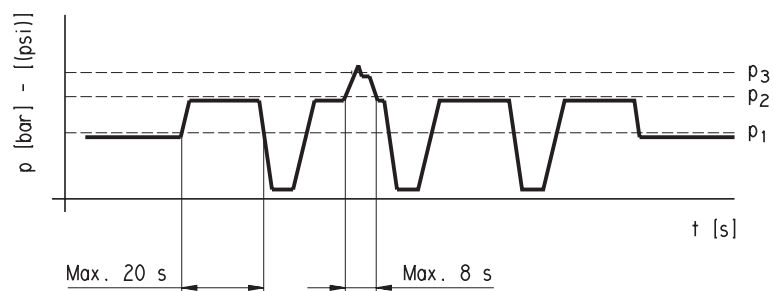
Clockwise rotation



Reversible rotation



PRESSURE DEFINITION



p_1 Max. continuous pressure
 p_2 Max. intermittent pressure
 p_3 Max. peak pressure

GENERAL DATA PUMPS AND MOTORS

Pump type HDP Motor type HDM	Displacement	Max. pressure			Max. speed	Min. speed
		p ₁	p ₂	p ₃		
	in ³ /rev (cm ³ /rev)	psi (bar)			min ⁻¹	
HD. 30•17	1.05 (17,28)	4060 (280)	4350 (300)	4640 (320)	3000	400
HD. 30•22	1.34 (21,99)	4060 (280)	4350 (300)	4640 (320)	3000	400
HD. 30•24	1.47 (24,03)	4060 (280)	4350 (300)	4640 (320)	3000	400
HD. 30•27	1.63 (26,70)	4060 (280)	4350 (300)	4640 (320)	3000	400
HD. 30•34	2.11 (34,56)	3915 (270)	4205 (290)	4495 (310)	3000	400
HD. 30•38	2.40 (39,27)	3915 (270)	4205 (290)	4495 (310)	3000	400
HD. 30•43	2.68 (43,98)	3770 (260)	4060 (280)	4350 (300)	3000	400
HD. 30•51	3.16 (51,83)	3335 (230)	3770 (260)	4060 (280)	2500	300
HD. 30•56	3.45 (56,55)	3118 (215)	3553 (245)	3843 (265)	2500	300
HD. 30•61	3.74 (61,26)	2900 (200)	3335 (230)	3625 (250)	2000	250
HD. 30•73	4.50 (73,82)	2755 (190)	3045 (210)	3335 (230)	1700	250
HD. 30•82	4.98 (81,68)	2465 (170)	2755 (190)	3045 (210)	1500	250
HD. 35•40	2.47 (40,46)	3915 (270)	4060 (280)	4495 (310)	3000	400
HD. 35•50	3.12 (51,10)	3915 (270)	4060 (280)	4495 (310)	3000	400
HD. 35•63	3.90 (63,88)	3915 (270)	4060 (280)	4495 (310)	3000	400
HD. 35•71	4.42 (72,40)	3625 (250)	4060 (280)	4350 (300)	3000	400
HD. 35•80	4.94 (80,91)	3625 (250)	4060 (280)	4350 (300)	3000	400
HD. 35•90	5.59 (91,56)	3335 (230)	3770 (260)	4060 (280)	2700	400
HD. 35•100	6.10 (100,08)	3045 (210)	3480 (240)	3770 (260)	2700	400
HD. 35•112	6.88 (112,85)	2755 (190)	3190 (220)	3480 (240)	2700	400
HD. 35•125	7.66 (125,63)	2465 (170)	2900 (200)	3190 (220)	2500	250

p₁= Max. continuous pressure

p₂= Max. intermittent pressure

p₃= Max. peak pressure

The values in the table refer to unidirectional pumps and motors.

Reversible pump and motors max pressures are 15% lower than those shown in table.

For different working conditions please consult our sales department.

GENERAL DATA PUMPS AND MOTORS

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

Efficiencies

		Pumps	Motor
$\eta_v = \eta_v(V, \Delta p, n)$	Volumetric efficiency	($\approx 0,98$)	($\approx 0,97$)
$\eta_m = \eta_m(V, \Delta p, n)$	Mechanical efficiency	($\approx 0,90$)	($\approx 0,88$)
$\eta_t = \eta_v \cdot \eta_m$	Overall efficiency	($\approx 0,88$)	($\approx 0,85$)

DESIGN CALCULATIONS FOR PUMP

$$Q = \frac{V(\text{cm}^3/\text{rev}) \cdot \eta_v \cdot n \cdot 10^{-3}}{60} \quad [\text{l/min}]$$

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

$$P = \frac{\Delta p (\text{bar}) \cdot V (\text{cm}^3/\text{rev}) \cdot n}{600 \cdot 1000 \cdot \eta_t} \quad [\text{kW}]$$

DESIGN CALCULATIONS FOR MOTOR

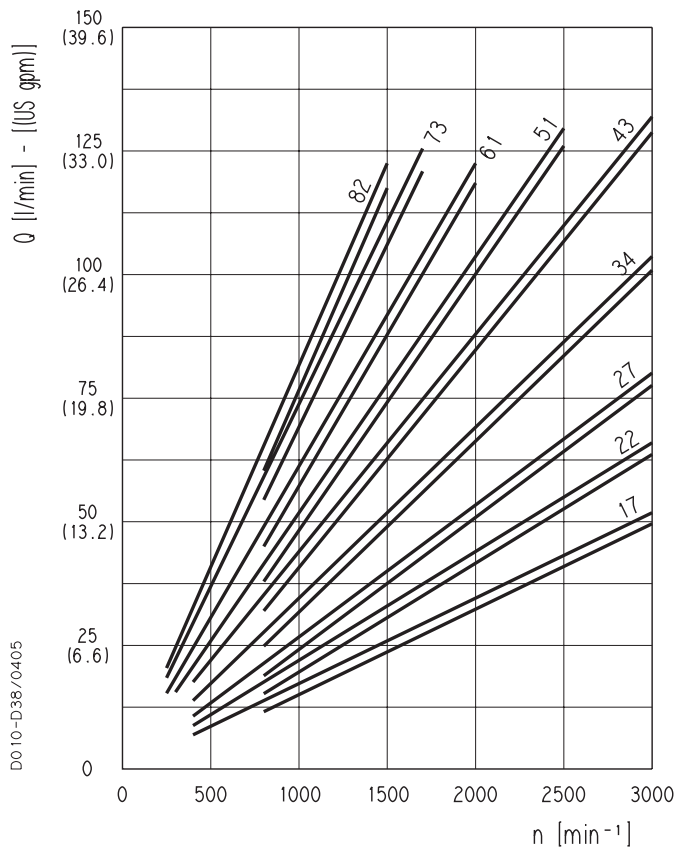
$$Q = \frac{V (\text{cm}^3/\text{rev}) \cdot n \cdot 10^{-3}}{\eta_v} \quad [\text{l/min}]$$

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

$$P = \frac{\Delta p (\text{bar}) \cdot V (\text{cm}^3/\text{rev}) \cdot n \cdot \eta_t}{600 \cdot 1000} \quad [\text{kW}]$$

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

MAGNUM 30 GEAR PUMPS PERFORMANCE CURVES

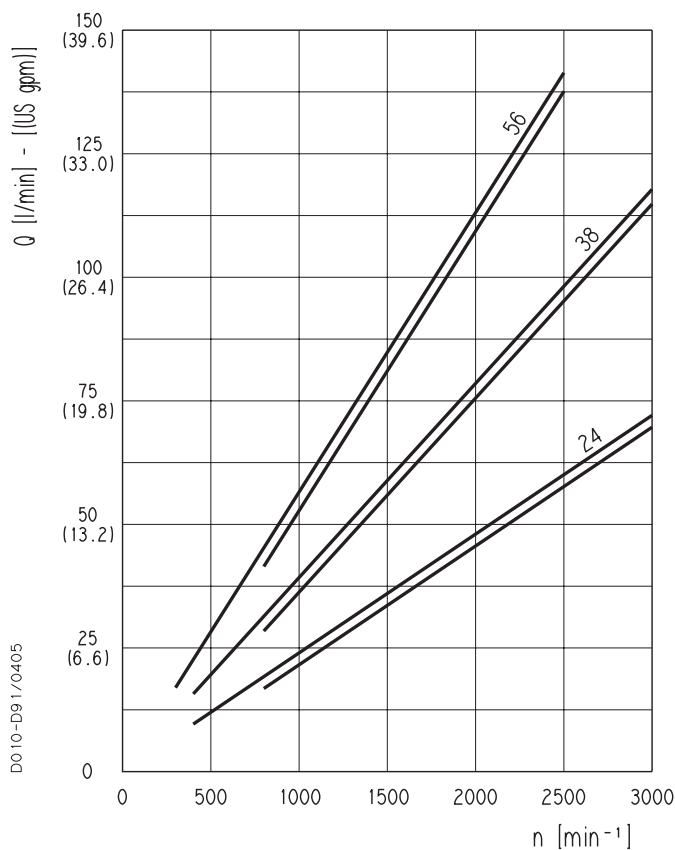
HDP 30
HDP 30


Each curve has been obtained at 122 °F (50°C), using oil with viscosity 168 SSU (36 cSt) at 104 °F (40°C) and at these pressures:

- HDP 30•17 . . . 290-4060 psi (20-280 bar)
- HDP 30•22 . . . 290-4060 psi (20-280 bar)
- HDP 30•27 . . . 290-4060 psi (20-280 bar)
- HDP 30•34 . . . 290-3915 psi (20-270 bar)
- HDP 30•43 . . . 290-3770 psi (20-260 bar)
- HDP 30•51 . . . 290-3335 psi (20-230 bar)
- HDP 30•61 . . . 290-2900 psi (20-200 bar)
- HDP 30•73 . . . 290-2755 psi (20-190 bar)
- HDP 30•82 . . . 290-2465 psi (20-170 bar)

New displacements

- HDP 30•24 . . . 290-4060 psi (20-280 bar)
- HDP 30•38 . . . 290-3915 psi (20-270 bar)
- HDP 30•56 . . . 290-3118 psi (20-215 bar)

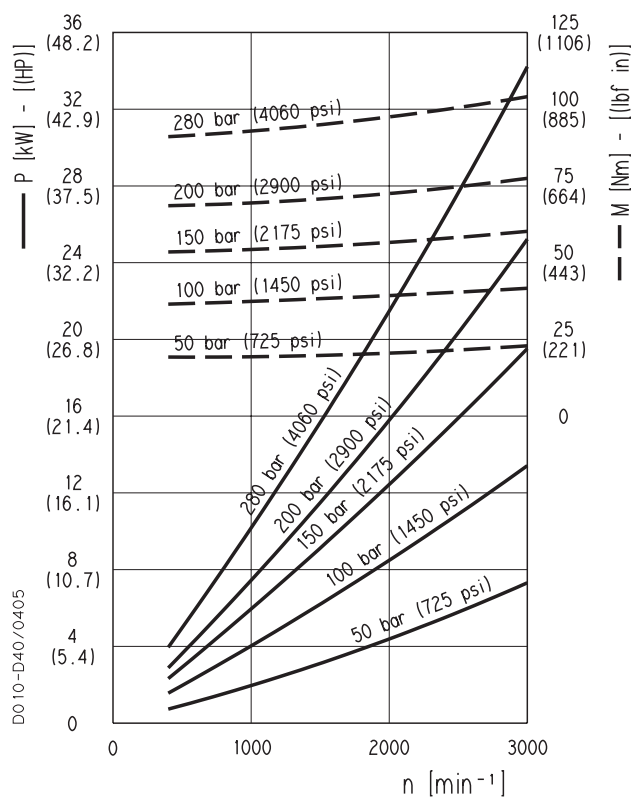


01/07.05

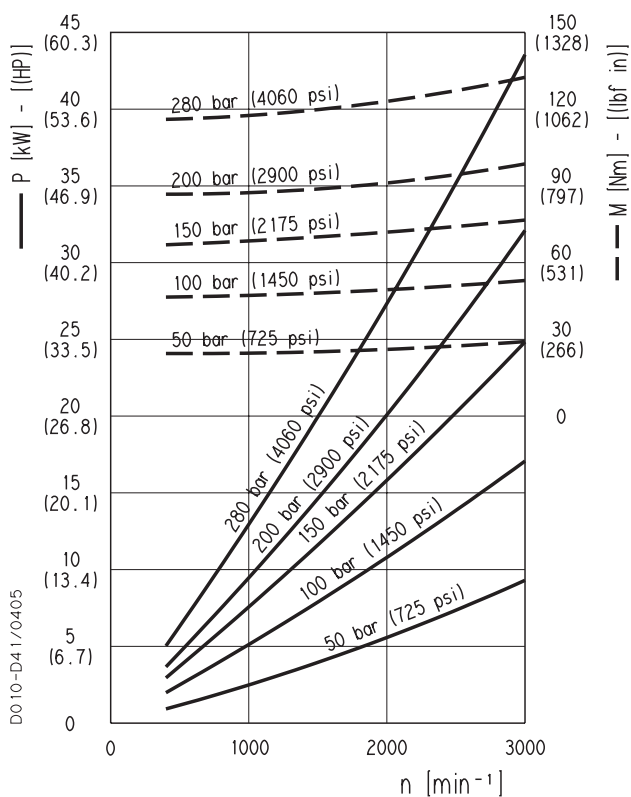
MAGNUM 30 GEAR PUMPS PERFORMANCE CURVES

HDP 30

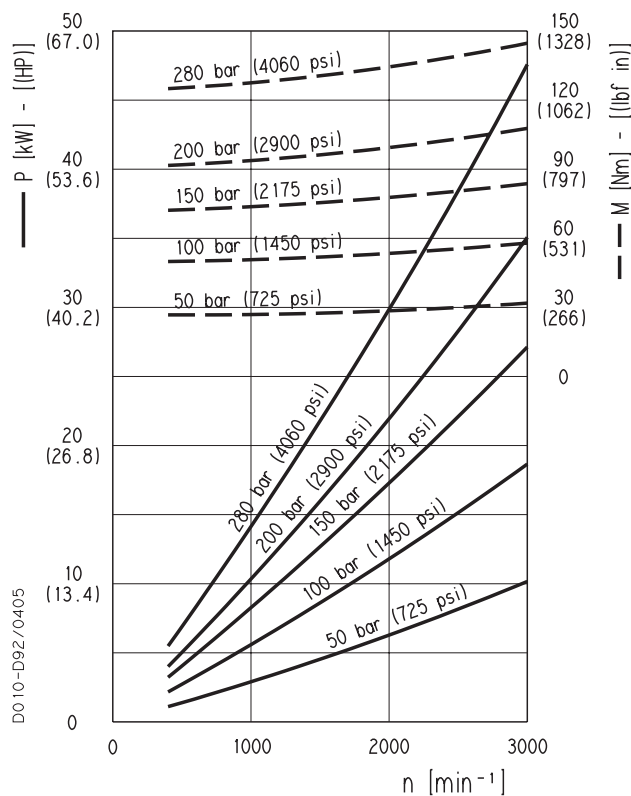
HDP 30-17



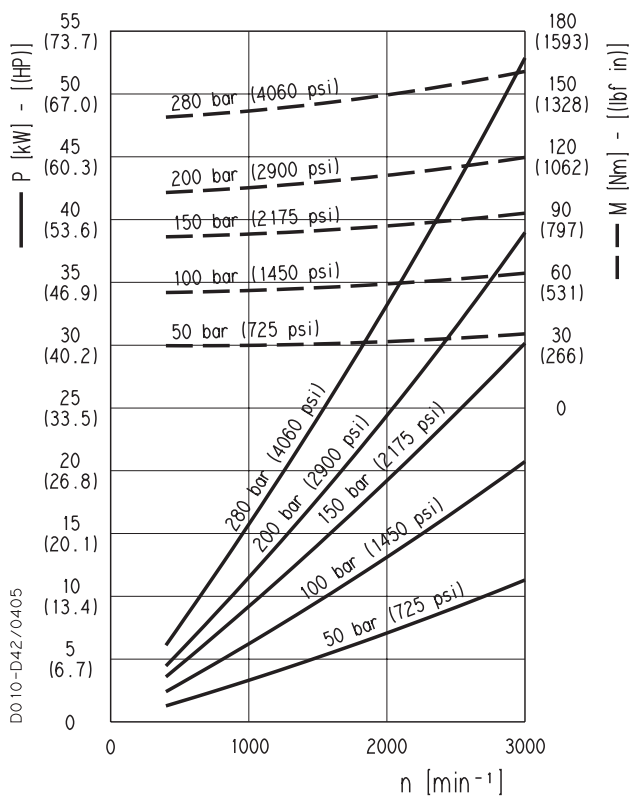
HDP 30-22



HDP 30-24



HDP 30-27

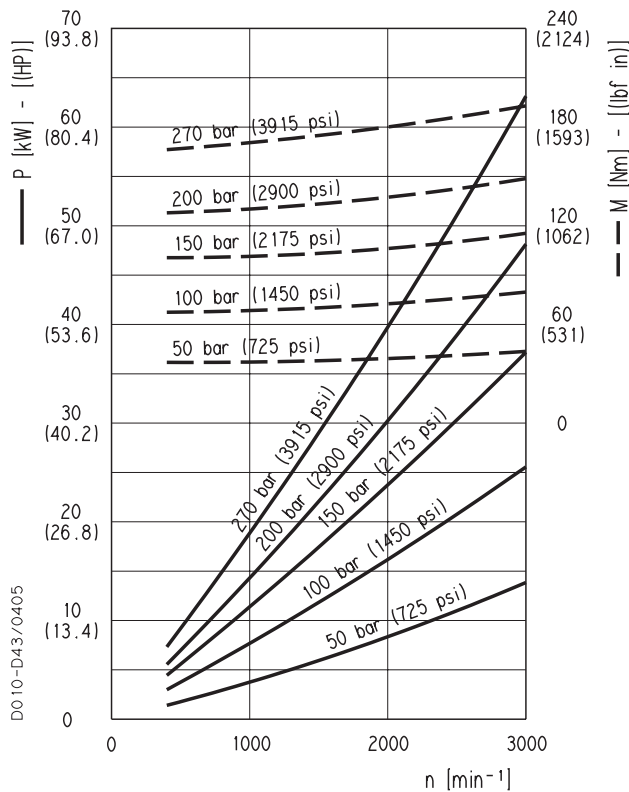


01/07.05

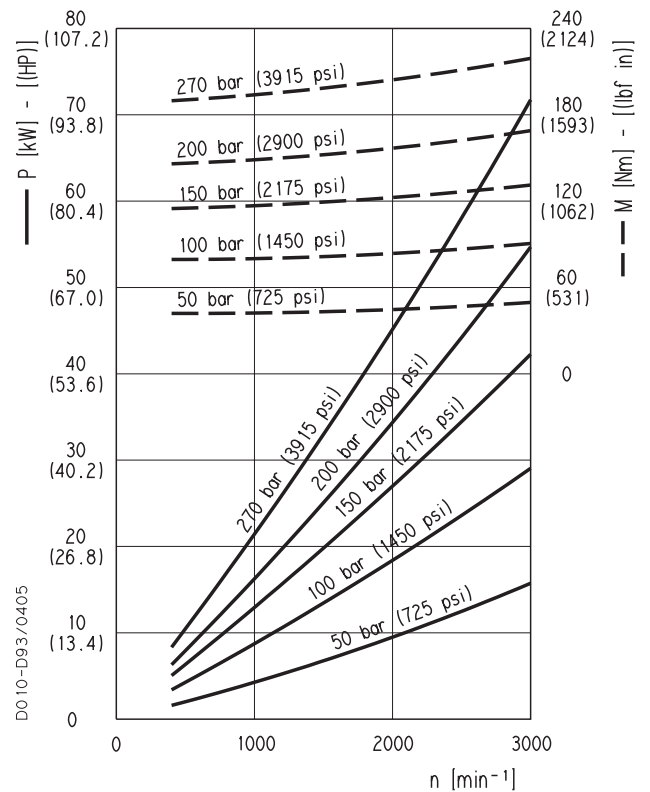
MAGNUM 30 GEAR PUMPS PERFORMANCE CURVES

HDP 30

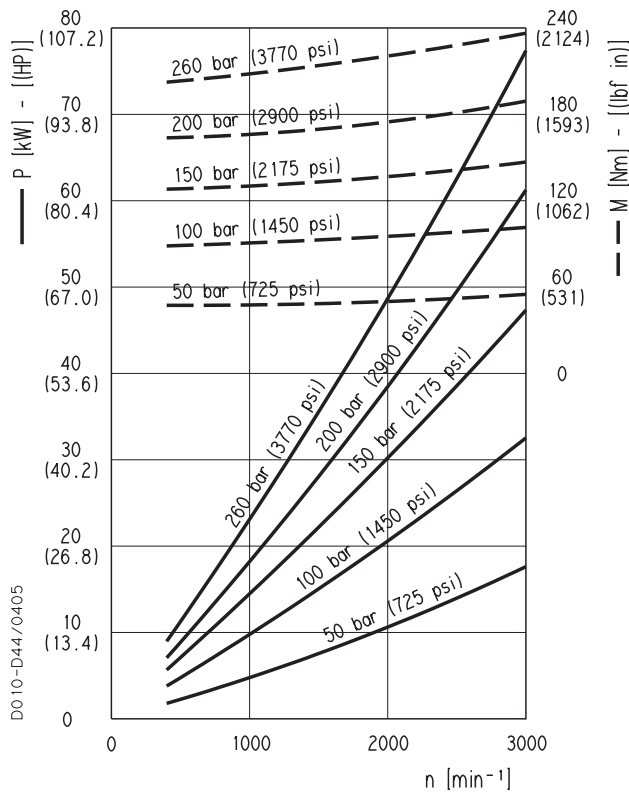
HDP 30-34



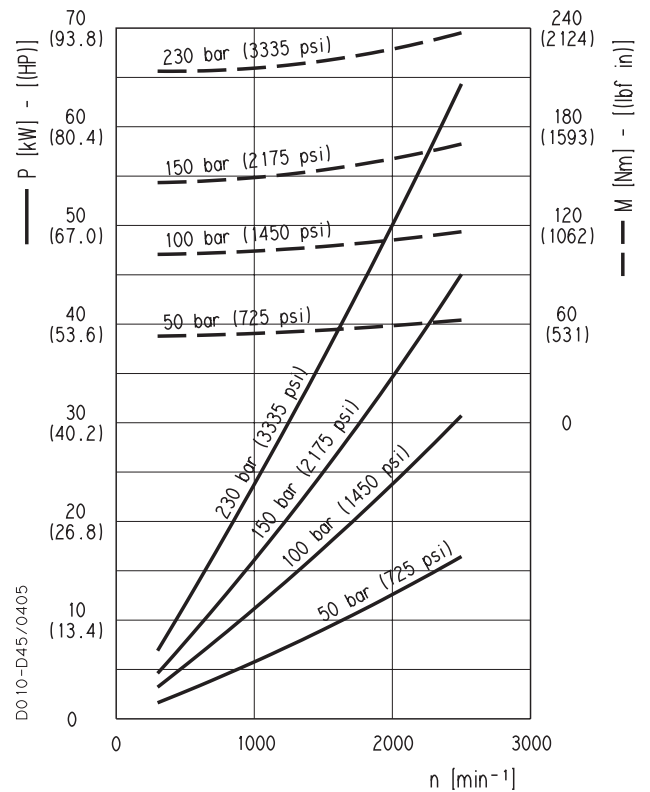
HDP 30-38



HDP 30-43



HDP 30-51

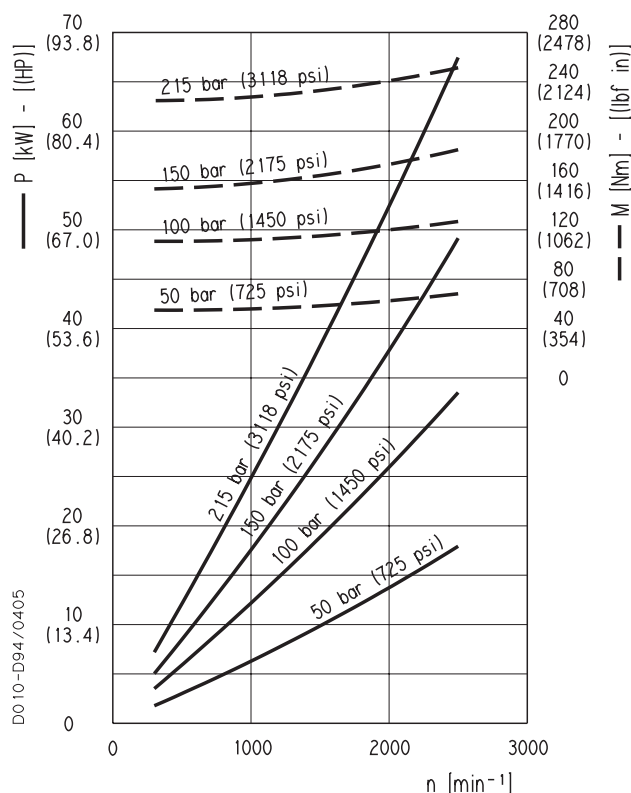


01/07.05

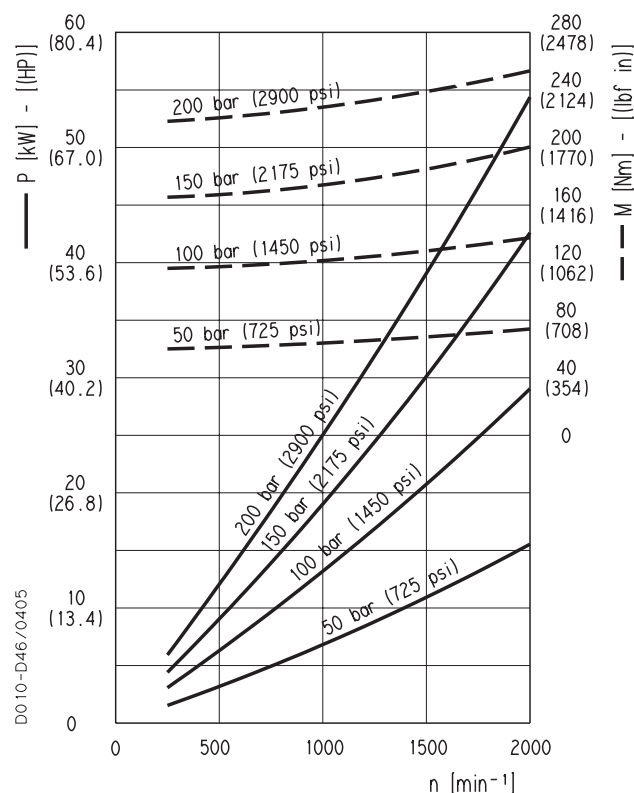
MAGNUM 30 GEAR PUMPS PERFORMANCE CURVES

HDP 30

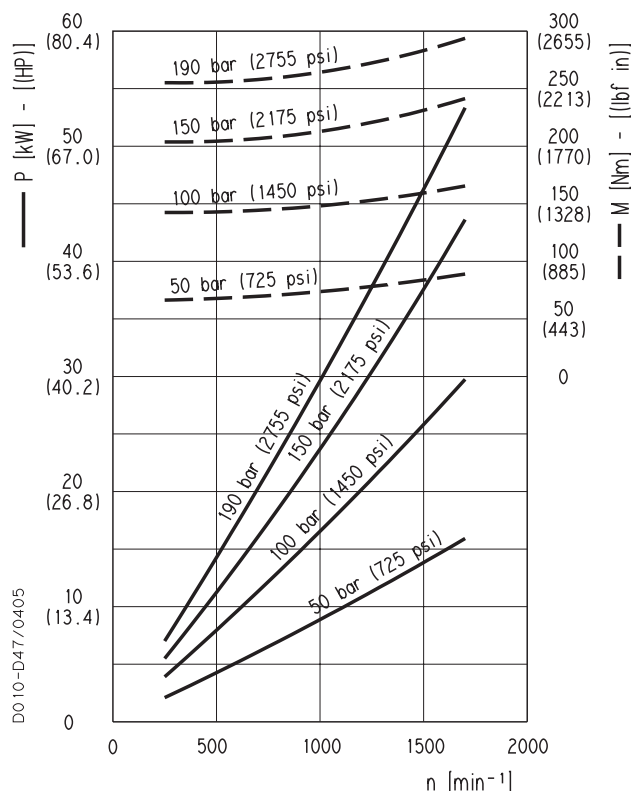
HDP 30-56



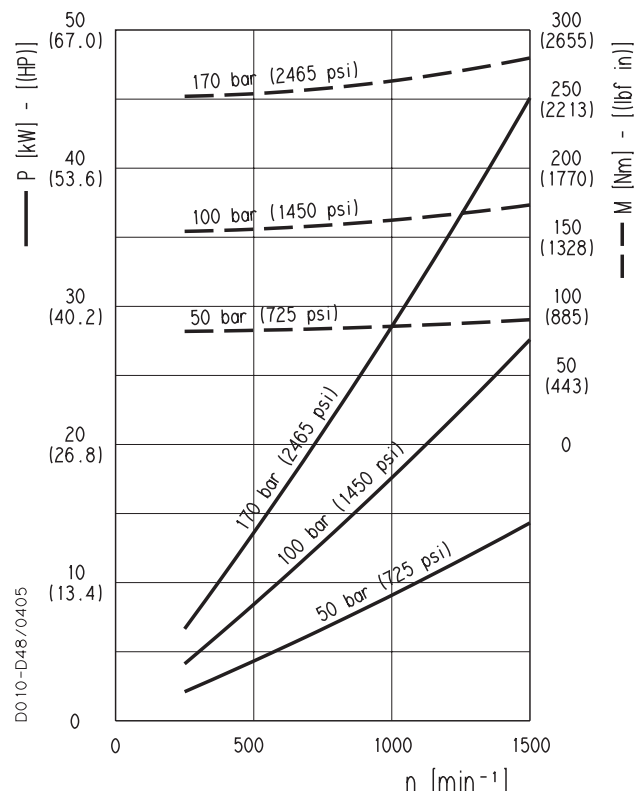
HDP 30-61



HDP 30-73



HDP 30-82

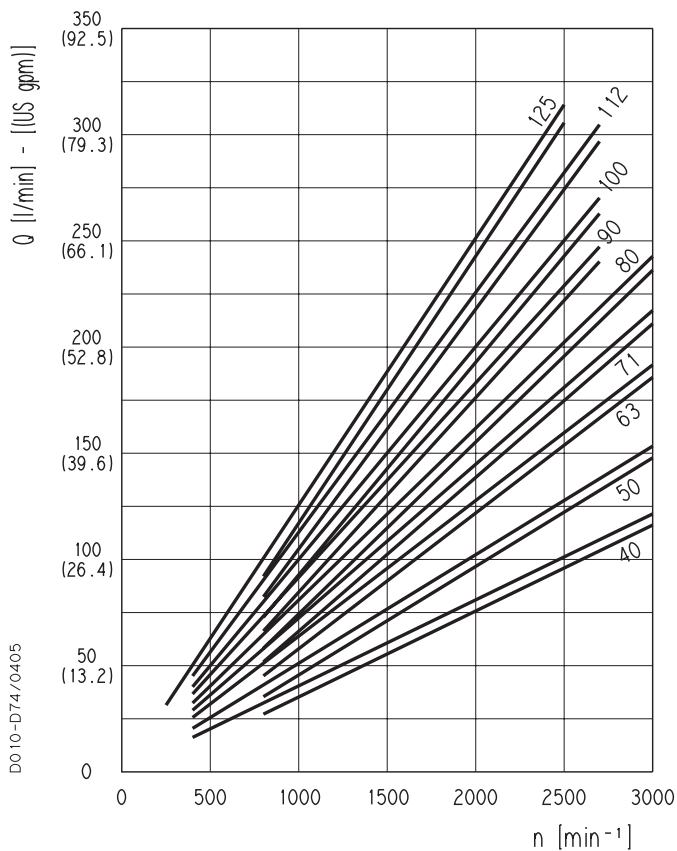


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MAGNUM 35 GEAR PUMPS PERFORMANCE CURVES

HDP 35

HDP 35



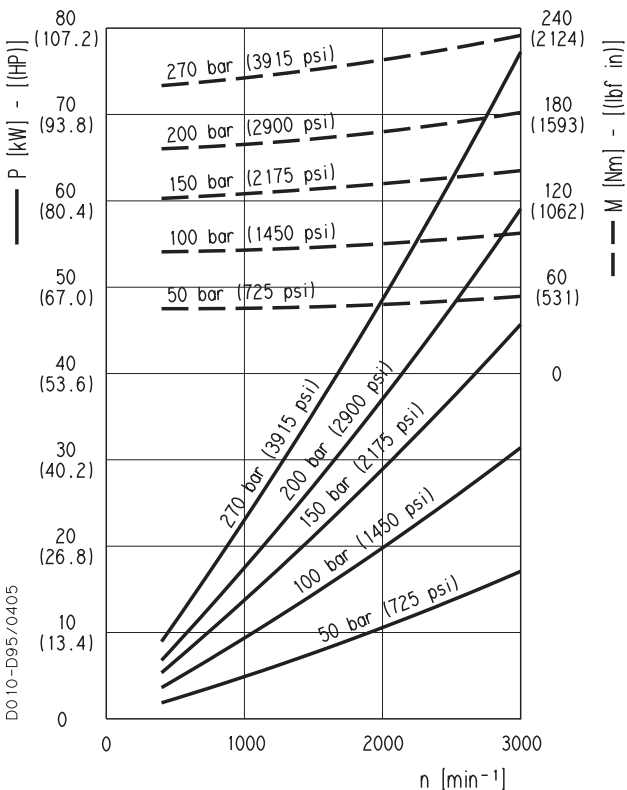
Each curve has been obtained at 122 °F (50°C), using oil with viscosity 168 SSU (36 cSt) at 104 °F (40°C) and at these pressures:

- HDP 35•50 . . . 290-3915 psi (20-270 bar)
- HDP 35•63 . . . 290-3915 psi (20-270 bar)
- HDP 35•71 . . . 290-3625 psi (20-250 bar)
- HDP 35•80 . . . 290-3625 psi (20-250 bar)
- HDP 35•90 . . . 290-3335 psi (20-230 bar)
- HDP 35•100 . . . 290-3045 psi (20-210 bar)
- HDP 35•112 . . . 290-2755 psi (20-190 bar)
- HDP 35•125 . . . 290-2465 psi (20-170 bar)

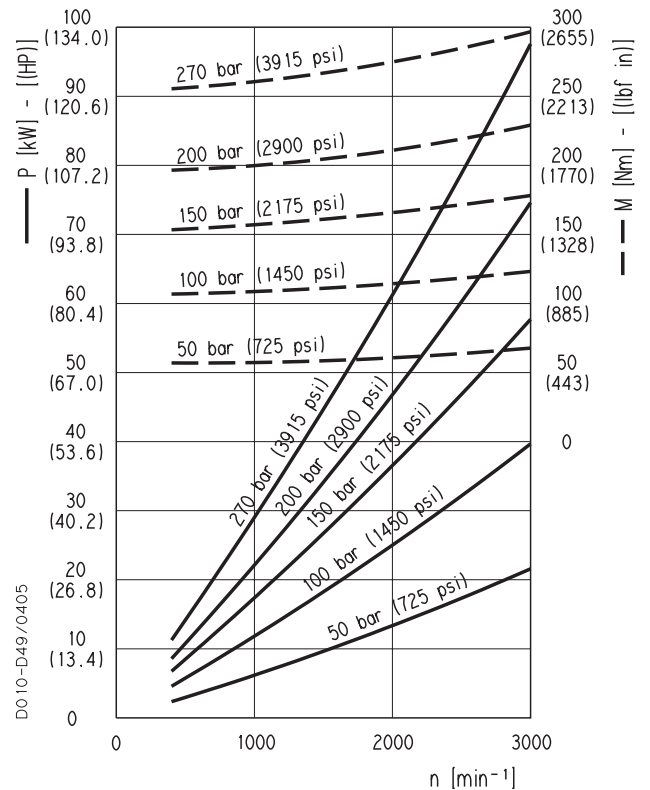
New displacements

- HDP 35•40 . . . 290-3045 psi (20-210 bar)

HDP 35•40



HDP 35•50

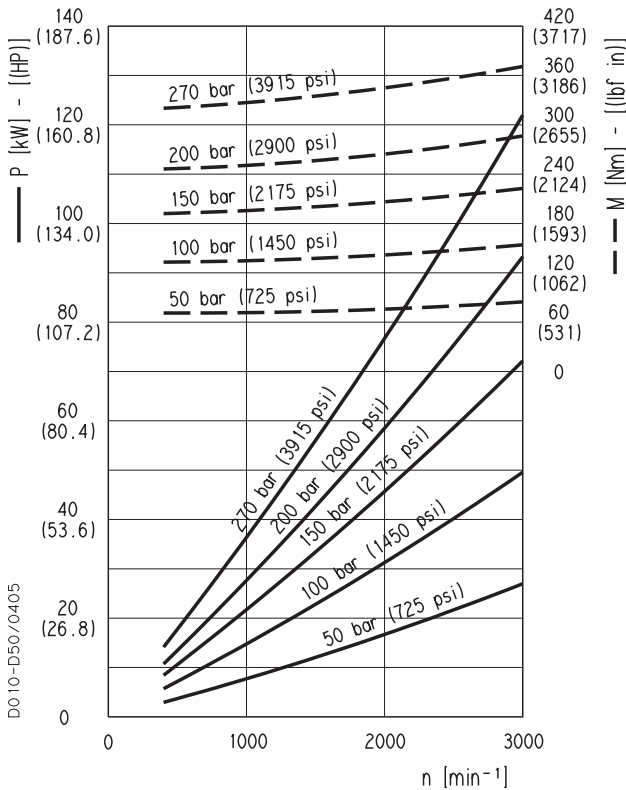


01/07.05

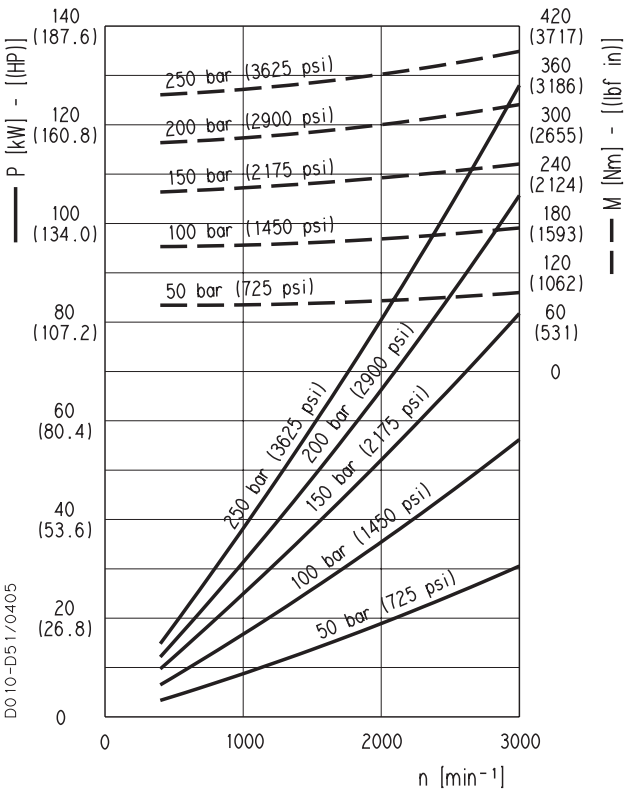
MAGNUM 35 GEAR PUMPS PERFORMANCE CURVES

HDP 35

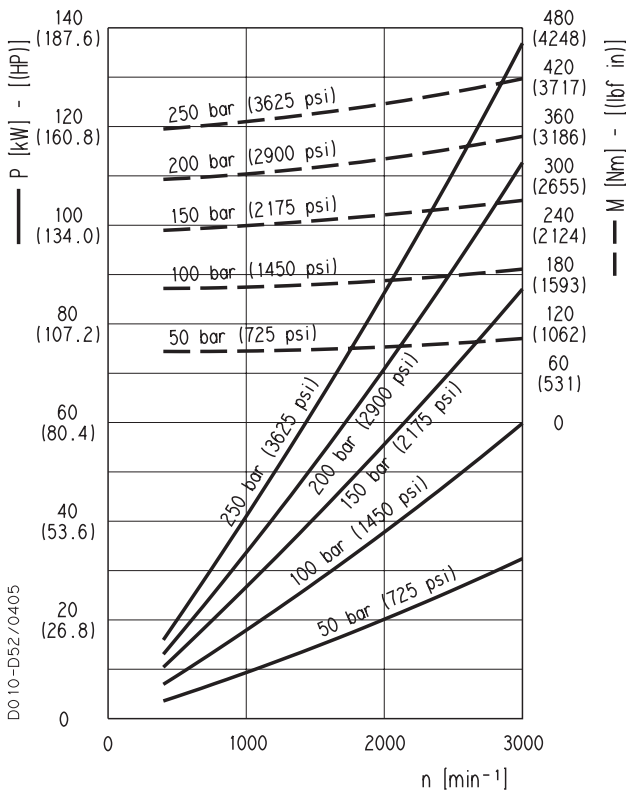
HDP 35-63



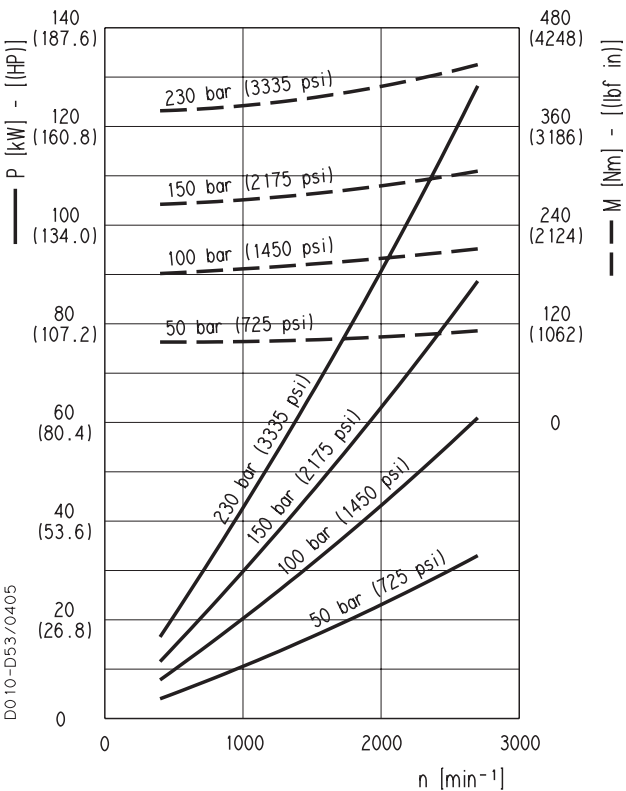
HDP 35-71



HDP 35-80



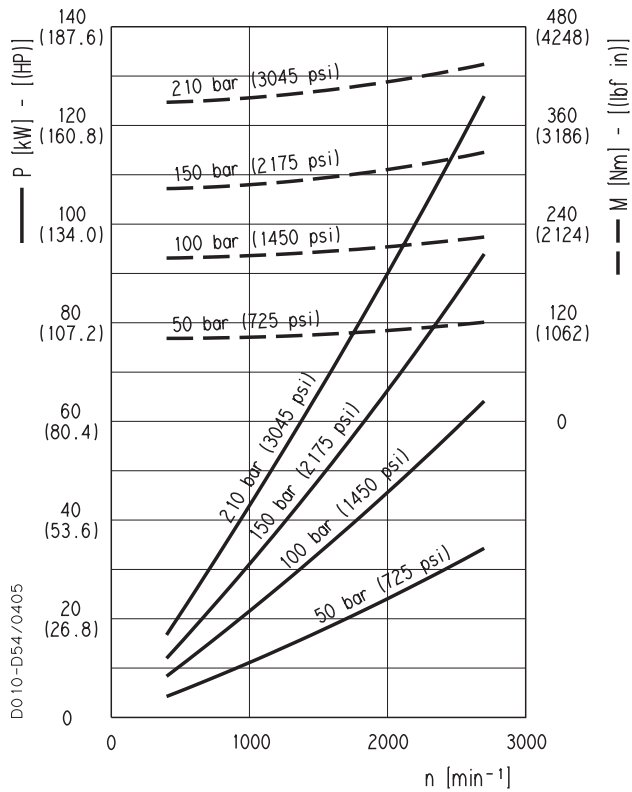
HDP 35-90



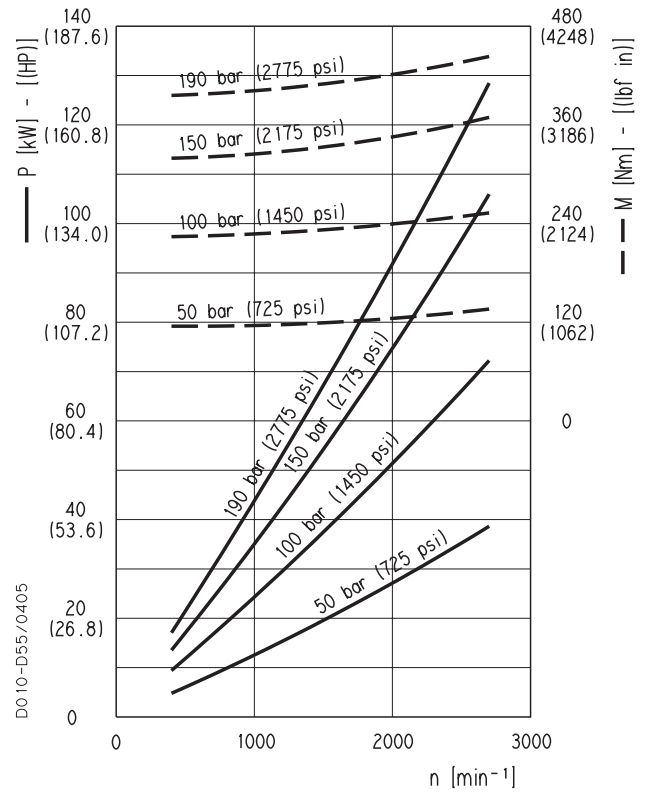
MAGNUM 35 GEAR PUMPS PERFORMANCE CURVES

HDP 35

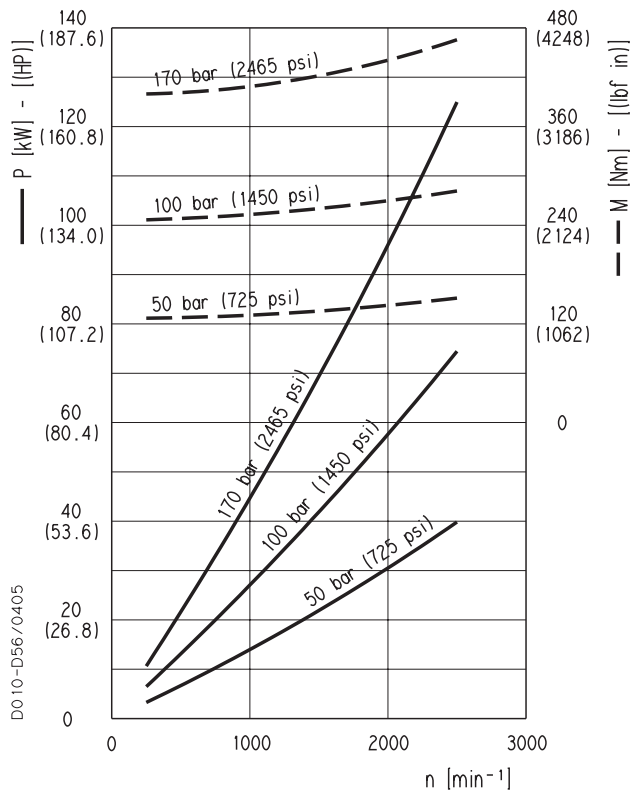
HDP 35•100



HDP 35•112



HDP 35•125

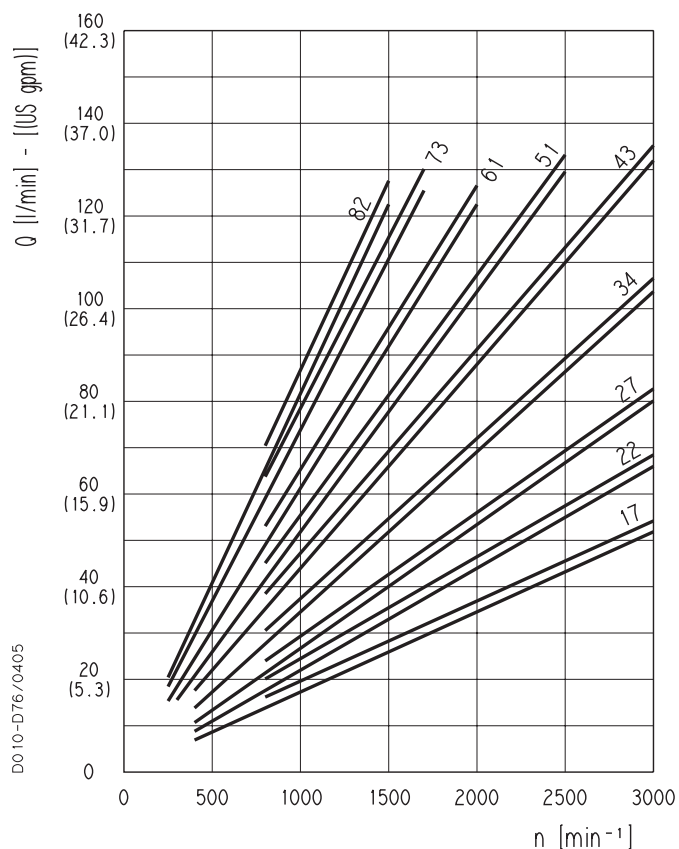


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MAGNUM 30 GEAR MOTORS PERFORMANCE CURVES

HDM 30

HDM 30

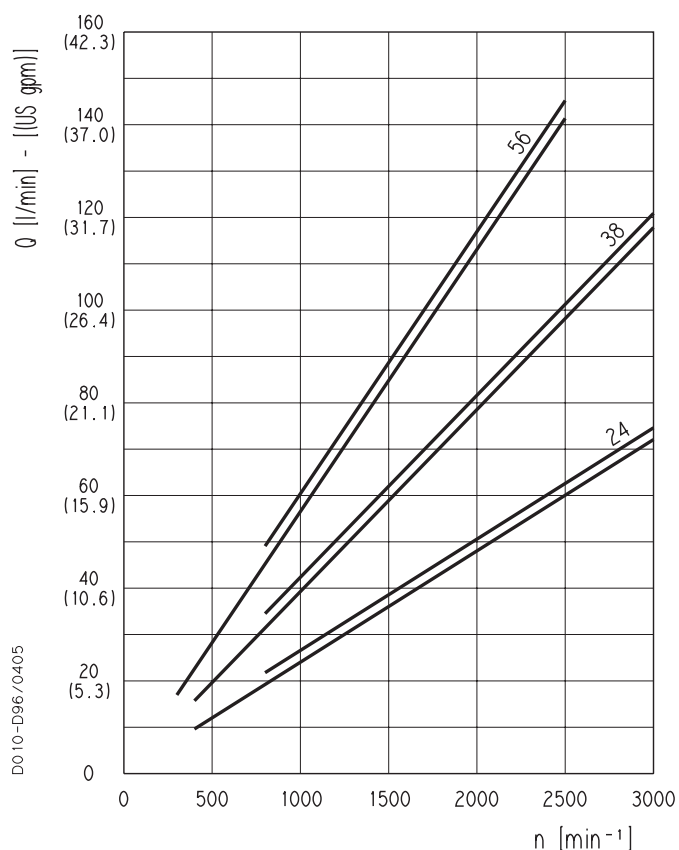


Each curve has been obtained at 122 °F (50°C), using oil with viscosity 168 SSU (36 cSt) at 104 °F (40°C) and at these pressures:

- HDM 30•17 . . . 290-4060 psi (20-280 bar)
- HDM 30•22 . . . 290-4060 psi (20-280 bar)
- HDM 30•27 . . . 290-4060 psi (20-280 bar)
- HDM 30•34 . . . 290-3915 psi (20-270 bar)
- HDM 30•43 . . . 290-3770 psi (20-260 bar)
- HDM 30•51 . . . 290-3335 psi (20-230 bar)
- HDM 30•61 . . . 290-2900 psi (20-200 bar)
- HDM 30•73 . . . 290-2755 psi (20-190 bar)
- HDM 30•82 . . . 290-2465 psi (20-170 bar)

New displacements

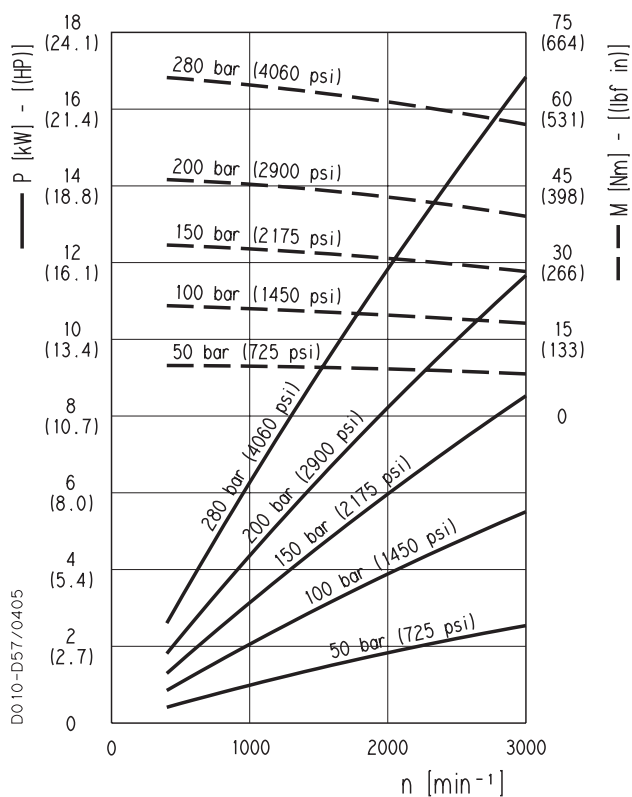
- HDM 30•24 . . . 290-4060 psi (20-280 bar)
- HDM 30•38 . . . 290-3915 psi (20-270 bar)
- HDM 30•56 . . . 290-3118 psi (20-215 bar)



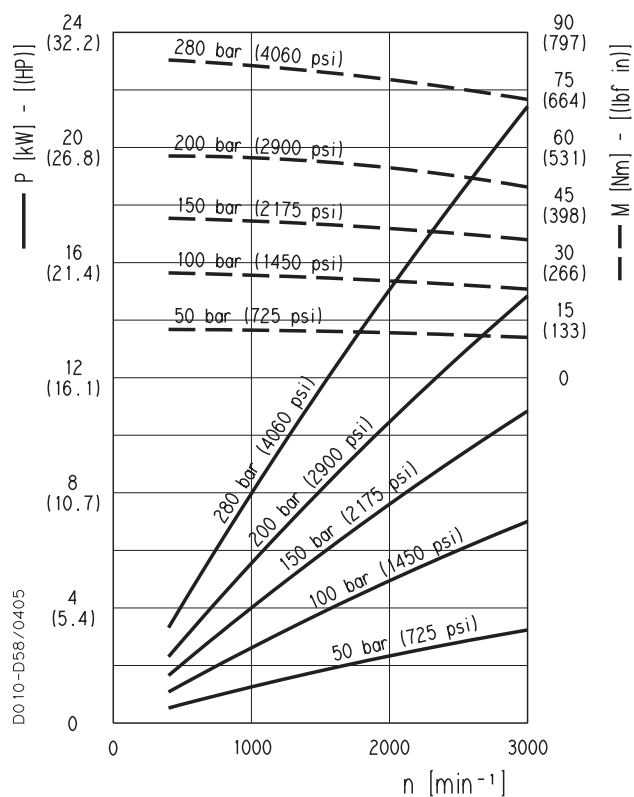
MAGNUM 30 GEAR MOTORS PERFORMANCE CURVES

HDM 30

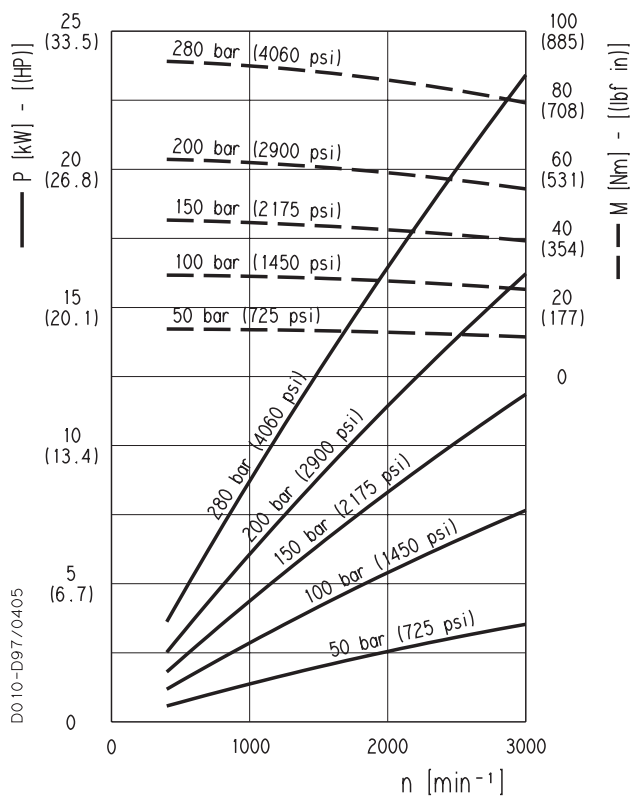
HDM 30-17



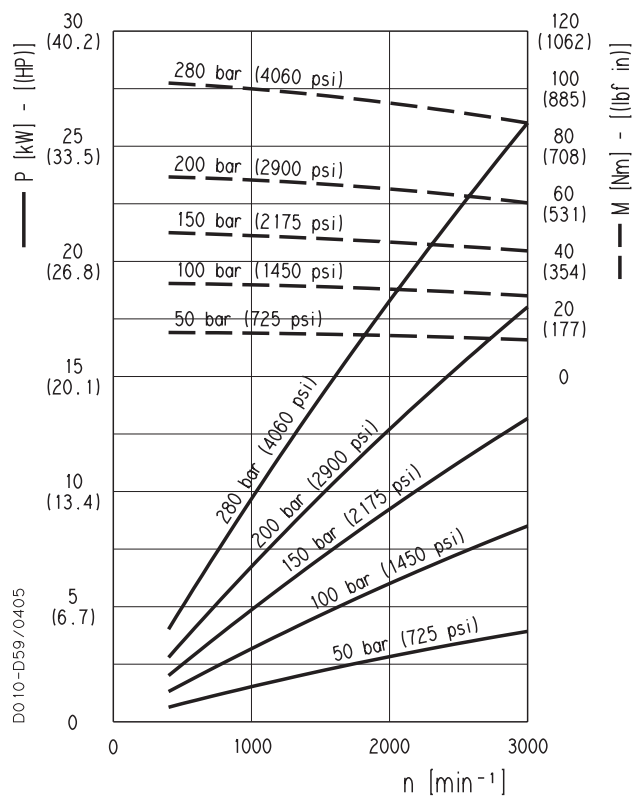
HDM 30-22



HDM 30-24

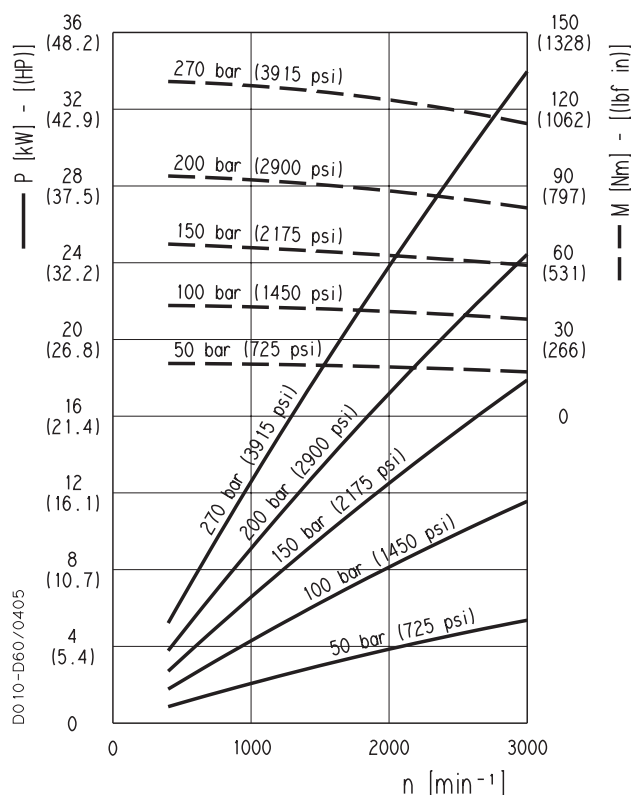
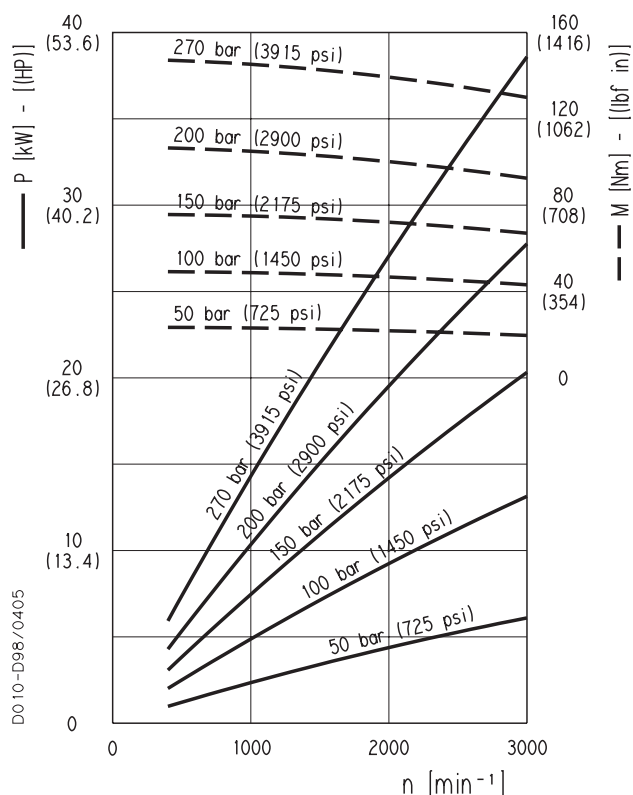
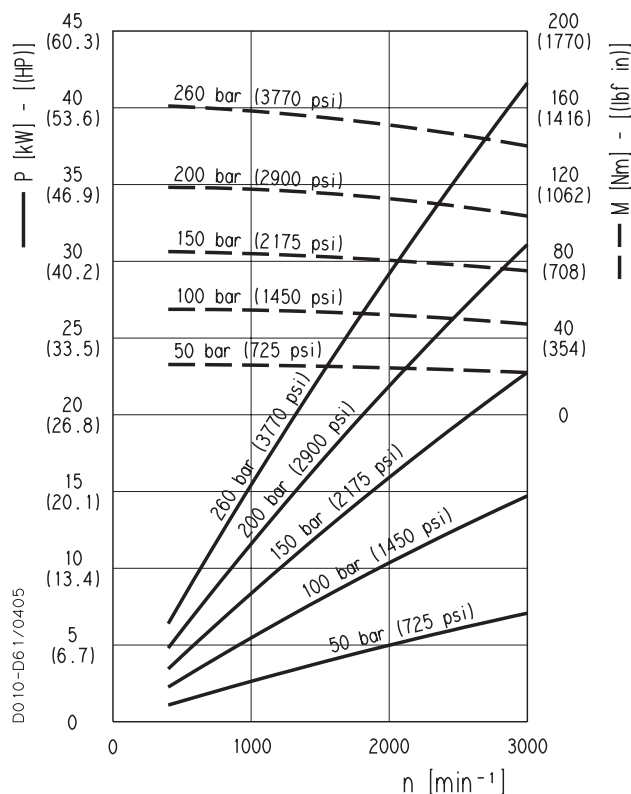
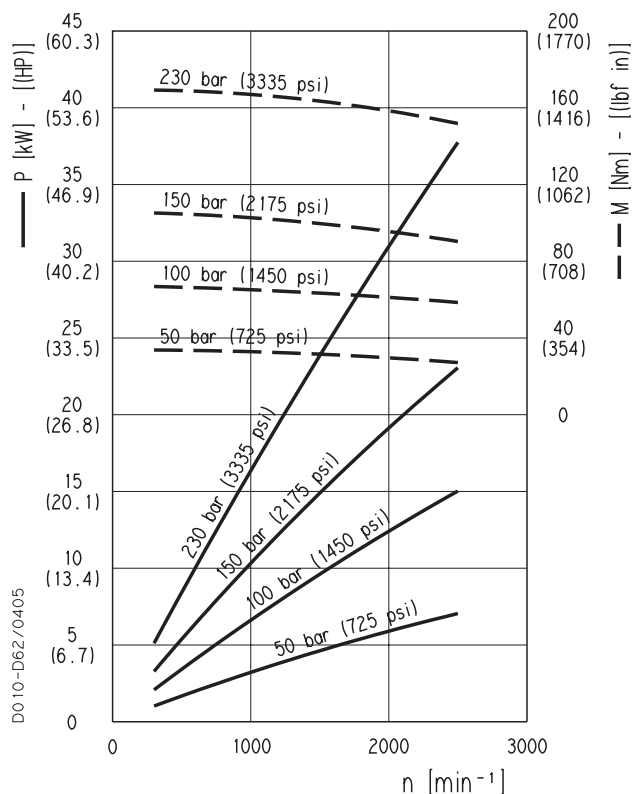


HDM 30-27



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MAGNUM 30 GEAR MOTORS PERFORMANCE CURVES

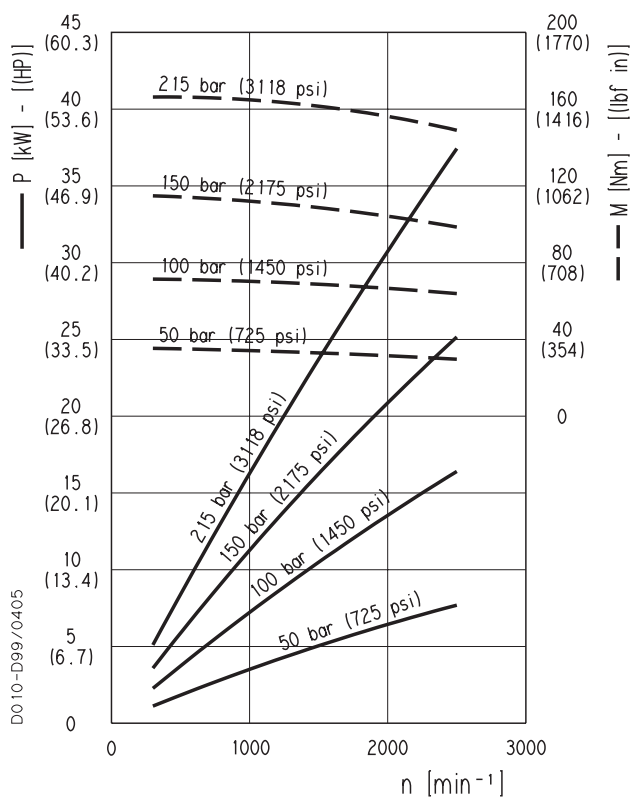
HDM 30
HDM 30-34

HDM 30-38

HDM 30-43

HDM 30-51


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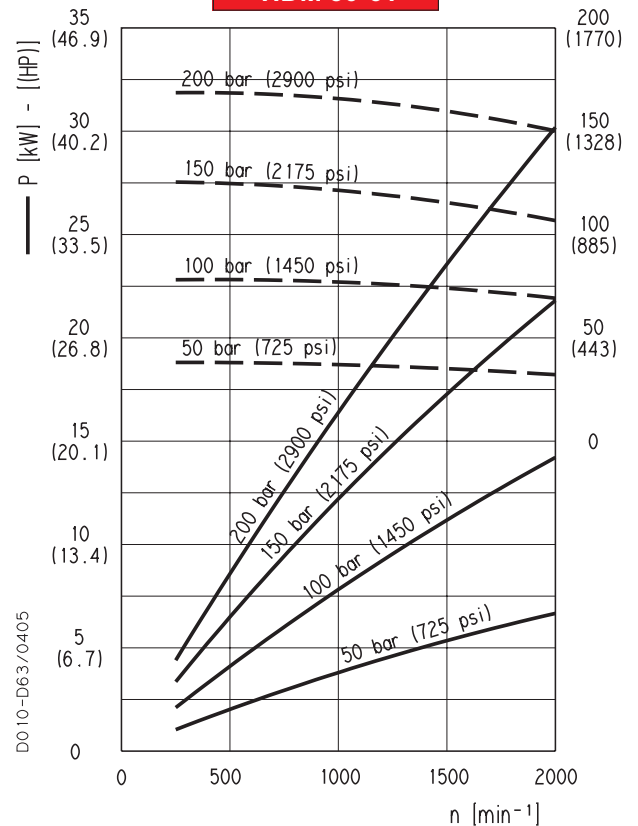
MAGNUM 30 GEAR MOTORS PERFORMANCE CURVES

HDM 30

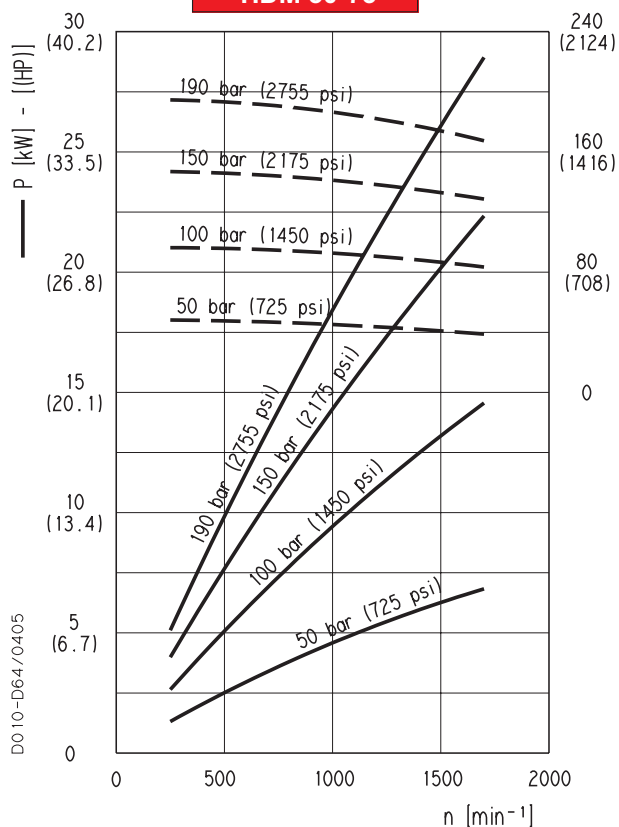
HDM 30-56



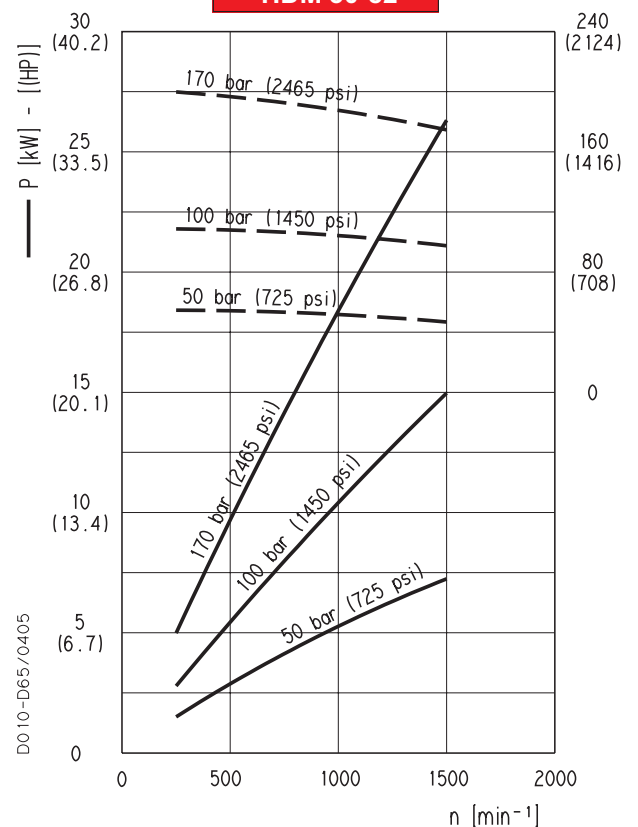
HDM 30-61



HDM 30-73



HDM 30-82

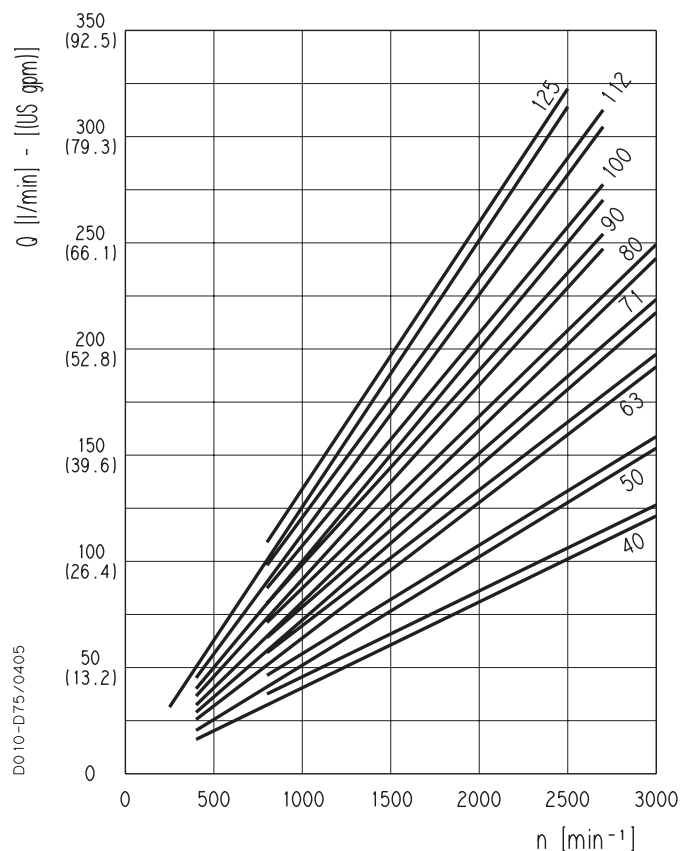


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MAGNUM 35 GEAR MOTORS PERFORMANCE CURVES

HDM 35

HDM 35



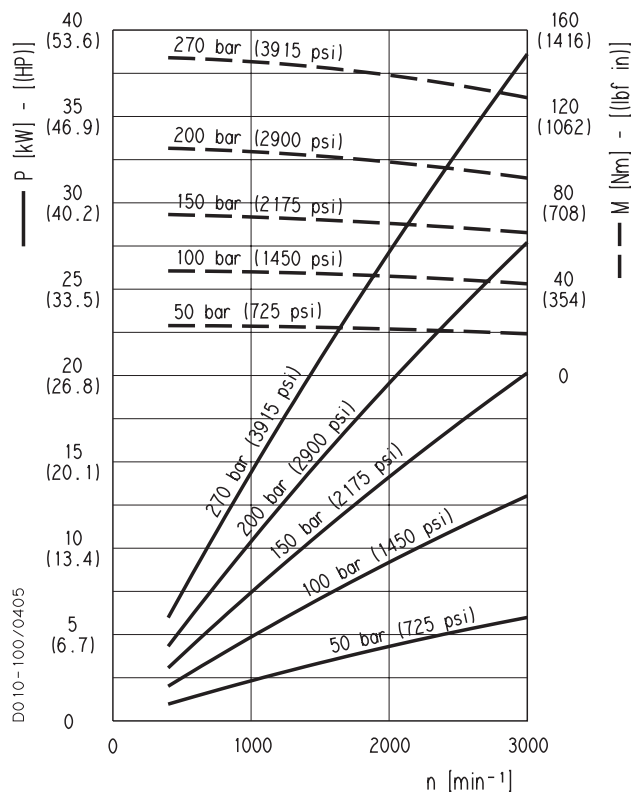
Each curve has been obtained at 122 °F (50°C), using oil with viscosity 168 SSU (36 cSt) at 104 °F (40°C) and at these pressures:

- HDM 35•50 . . . 290-3915 psi (20-270 bar)
- HDM 35•63 . . . 290-3915 psi (20-270 bar)
- HDM 35•71 . . . 290-3625 psi (20-250 bar)
- HDM 35•80 . . . 290-3625 psi (20-250 bar)
- HDM 35•90 . . . 290-3335 psi (20-230 bar)
- HDM 35•100 . . . 290-3045 psi (20-210 bar)
- HDM 35•112 . . . 290-2755 psi (20-190 bar)
- HDM 35•125 . . . 290-2465 psi (20-170 bar)

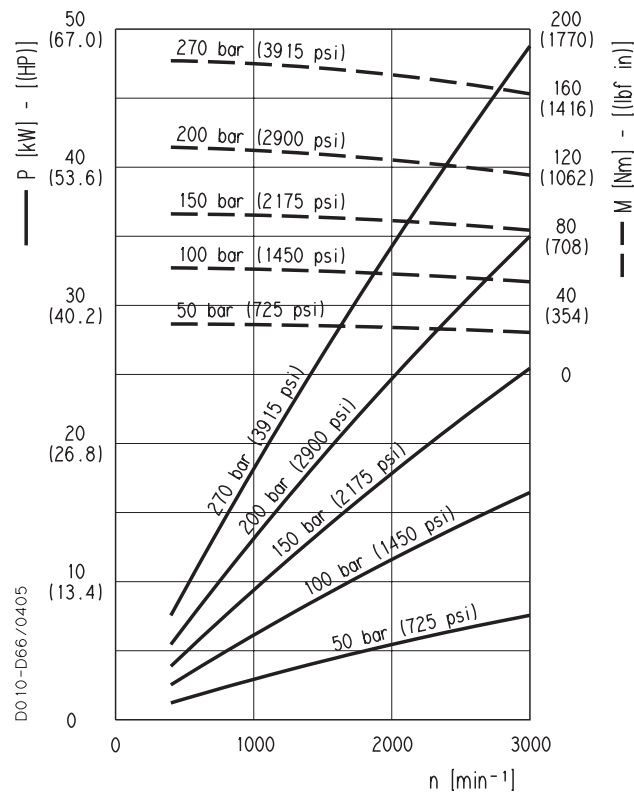
New displacements

- HDM 35•40 . . . 290-3915 psi (20-270 bar)

HDM 35•40



HDM 35•50

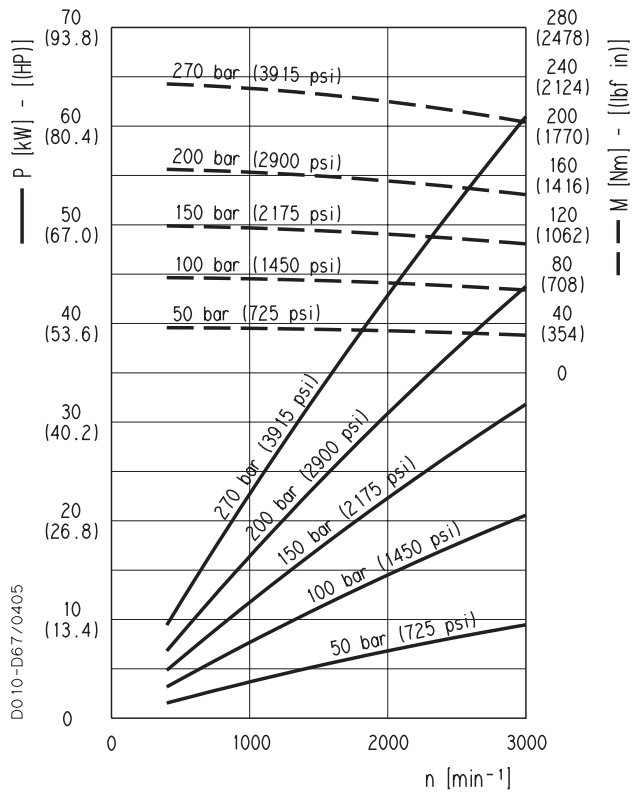


01/07.05

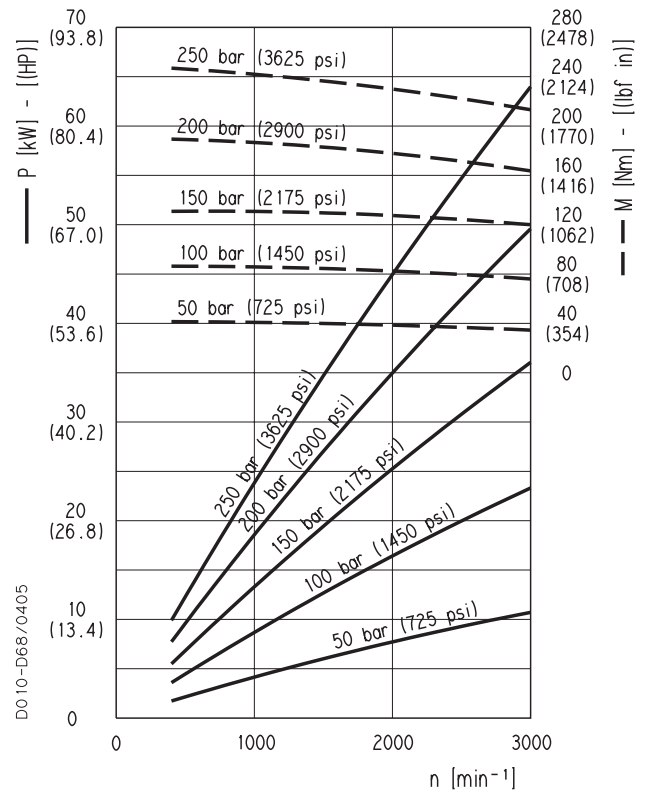
MAGNUM 35 GEAR MOTORS PERFORMANCE CURVES

HDM 35

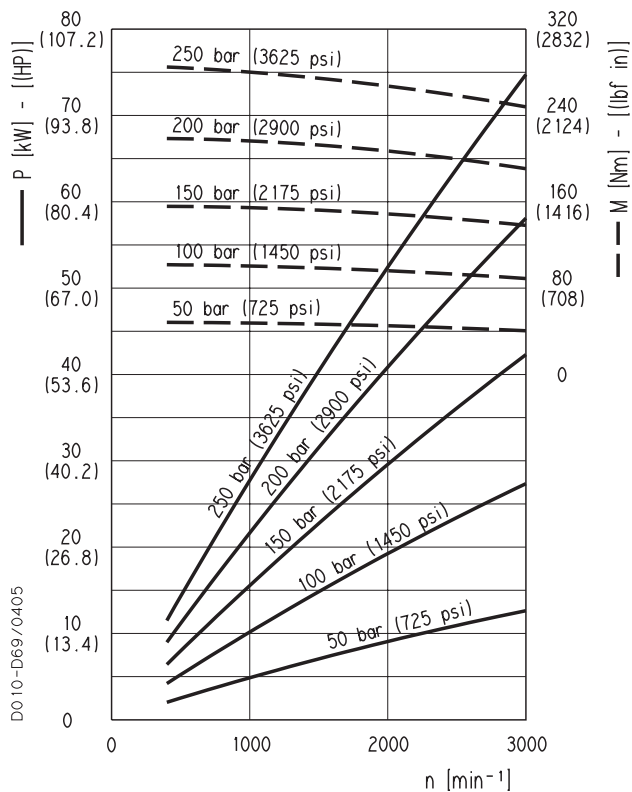
HDM 35-63



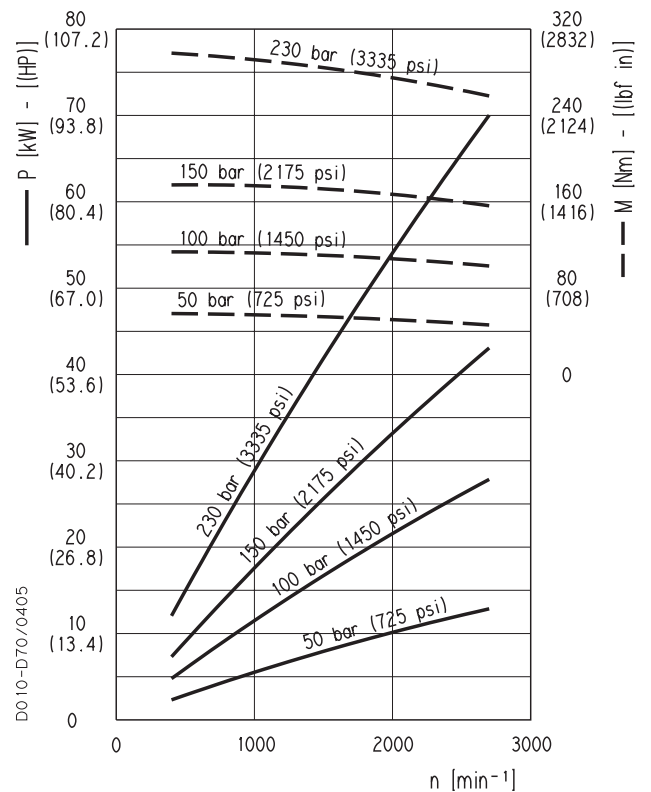
HDM 35-71



HDM 35-80



HDM 35-90

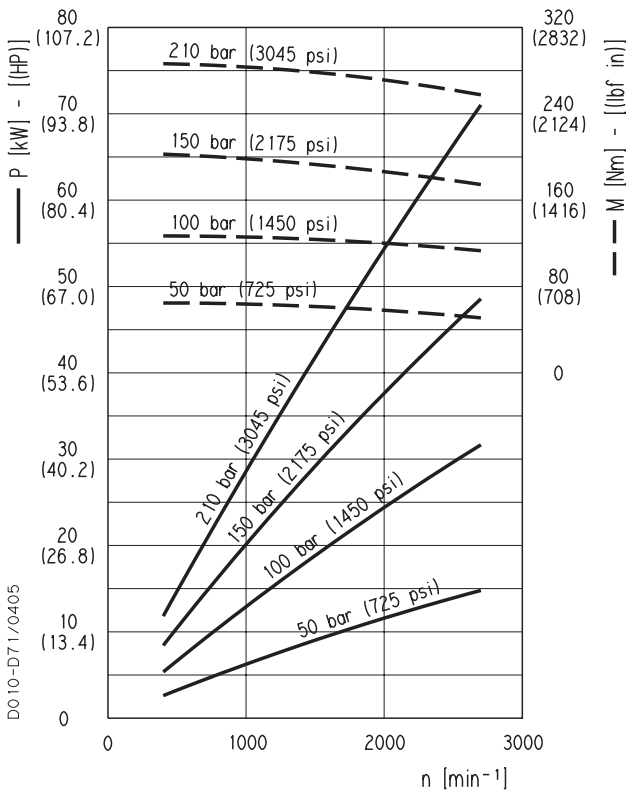


01/07.05

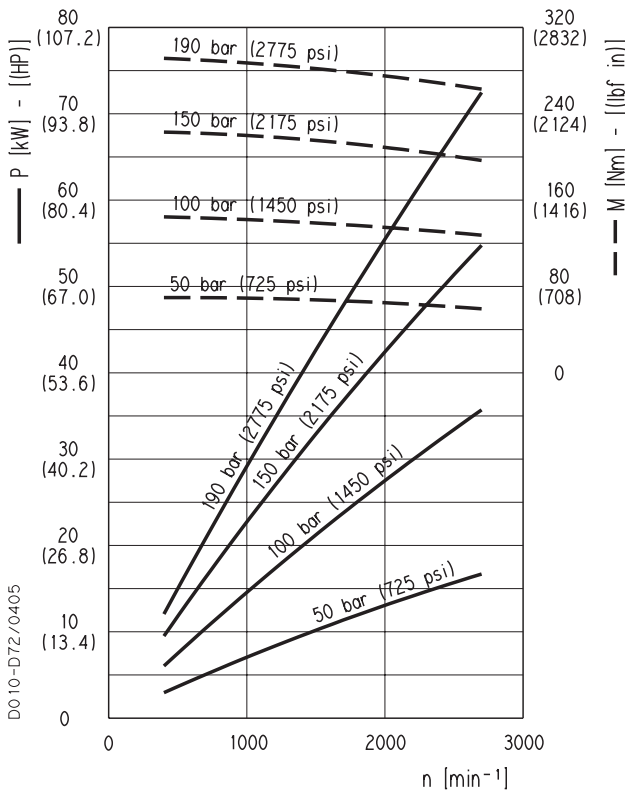
MAGNUM 35 GEAR MOTORS PERFORMANCE CURVES

HDM 35

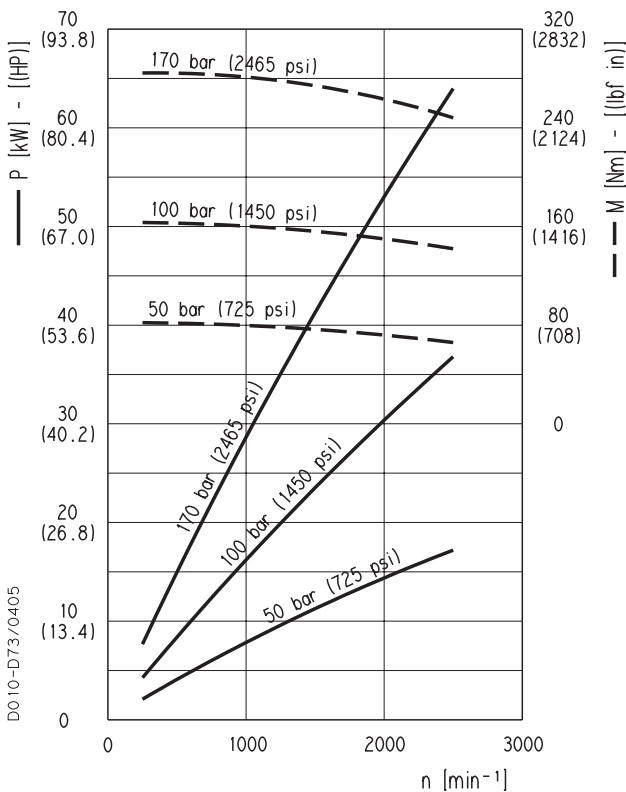
HDM 35•100



HDM 35•112



HDM 35•125

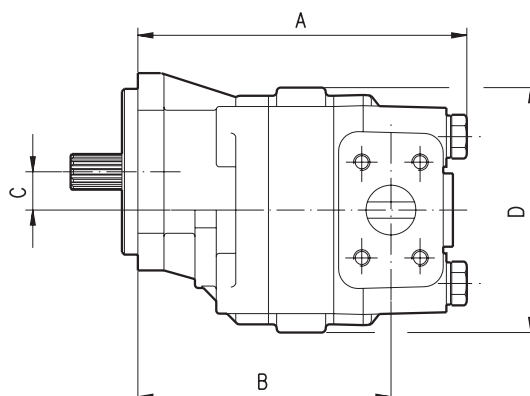
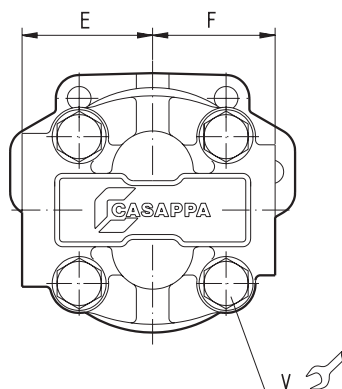


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SINGLE UNITS SIDE PORTS

L

D010-D01/0405



Tightening torque Nm (lbf in)
V
280 ± 28 (2230 $\div$ 2726)

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 $\div$ 48

PORTS:
see page 49

The drawing shows a single unit with left rotation.

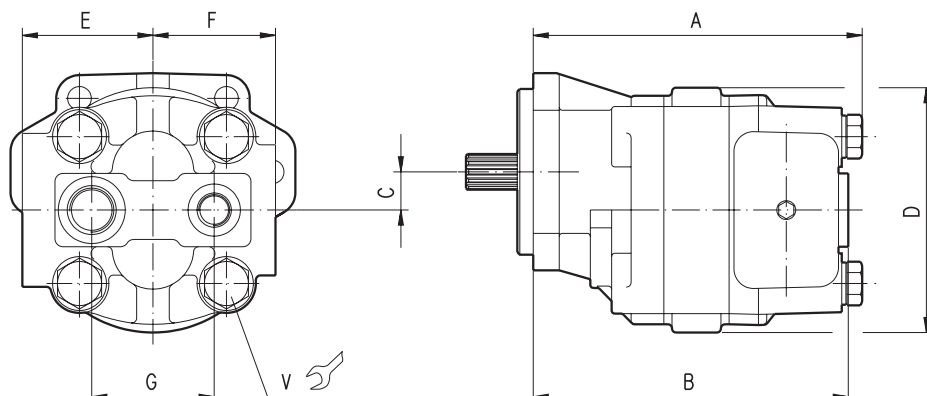
Pump type Motor type	A	B	C	D	E (IN)	F (OUT)
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
HD. 30•17	184,5 (7.2638)	138 (5.4331)	23,45 (0.9232)	150 (5.9055)	80 (3.1496)	75 (2.9528)
HD. 30•22	187,5 (7.3819)	141 (5.5512)				
HD. 30•24	188,8 (7.4331)	142,3 (5.6024)				
HD. 30•27	190,5 (7.5000)	144 (5.6693)				
HD. 30•34	195,5 (7.6969)	149 (5.8661)				
HD. 30•38	198,5 (7.8150)	152 (5.9843)				
HD. 30•43	201,5 (7.9331)	155 (6.1024)				
HD. 30•51	206,5 (8.1299)	160 (6.2992)				
HD. 30•56	209,5 (8.2480)	163 (6.4173)				
HD. 30•61	212,5 (8.3661)	166 (6.5354)				
HD. 30•73	220,5 (8.6811)	174 (6.8504)				
HD. 30•82	225,5 (8.8780)	179 (7.0472)				
HD. 35•40	224,5 (8.8386)	172 (6.7717)	27,35 (1.0768)	172 (6.7717)	90 (3.5433)	85 (3.3465)
HD. 35•50	229,5 (9.0354)	177 (6.9685)				
HD. 35•63	235,5 (9.2717)	183 (7.2047)				
HD. 35•71	239,5 (9.4291)	187 (7.3622)				
HD. 35•80	243,5 (9.5866)	191 (7.5197)				
HD. 35•90	248,5 (9.7835)	196 (7.7165)				
HD. 35•100	252,5 (9.9409)	200 (7.8740)				
HD. 35•112	258,5 (10.1772)	206 (8.1102)				
HD. 35•125	264,5 (10.4134)	212 (8.3465)				

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SINGLE UNITS REAR PORTS

P

D010-D81/0405


Tightening torque
Nm (lbf in)

V

280 ± 28 (2230 $\div$ 2726)

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 $\div$ 48

PORTS:
see page 49

The drawing shows a single unit with left rotation.

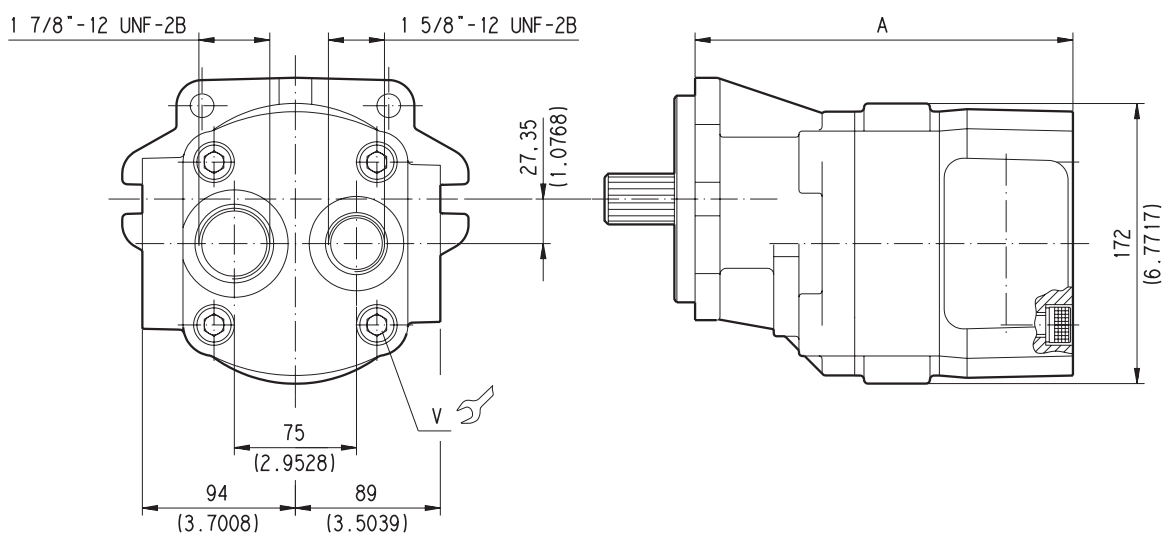
Pump type Motor type	A	B	C	D	E	F	G
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
HD. 30•17	184,5 (7.2638)	173 (6.8110)	23,45 (0.9232)	150 (5.9055)	80 (3.1496)	75 (2.9528)	75 (2.9528)
HD. 30•22	187,5 (7.3819)	176 (6.9291)					
HD. 30•24	188,8 (7.4331)	177,3 (6.9803)					
HD. 30•27	190,5 (7.5000)	179 (7.0472)					
HD. 30•34	195,5 (7.6969)	184 (7.2441)					
HD. 30•38	198,5 (7.8150)	187 (7.3622)					
HD. 30•43	201,5 (7.9331)	190 (7.4803)					
HD. 30•51	206,5 (8.1299)	195 (7.6772)					
HD. 30•56	209,5 (8.2480)	198 (7.7953)					
HD. 30•61	212,5 (8.3661)	201 (7.9134)					
HD. 30•73	220,5 (8.6811)	209 (8.2283)					
HD. 30•82	225,5 (8.8780)	214 (8.4252)					
HD. 35•40	224,5 (8.8386)	213 (8.3858)	27,35 (1.0768)	172 (6.7717)	90 (3.5433)	85 (3.3465)	89 (3.5039)
HD. 35•50	229,5 (9.0354)	218 (8.5827)					
HD. 35•63	235,5 (9.2717)	224 (8.8189)					
HD. 35•71	239,5 (9.4291)	228 (8.9764)					
HD. 35•80	243,5 (9.5866)	232 (9.1339)					
HD. 35•90	248,5 (9.7835)	237 (9.3307)					
HD. 35•100	252,5 (9.9409)	241 (9.4882)					
HD. 35•112	258,5 (10.1772)	247 (9.7244)					
HD. 35•125	264,5 (10.4134)	253 (9.9606)					

01/07.05

MAGNUM 35 SINGLE PUMPS WITH LARGER REAR PORTS

P

D010-123/0405



Tightening torque Nm (lbf in)
V
280 ± 28 (2230 ÷ 2726)

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 ÷ 48

PORTS:
see page 53

The drawing shows a single unit with left rotation.

Pump type	A	Ports code (ODT)	
	mm (inch)	IN	OUT
HDP 35•40	213 (8.3858)	OH (1 7/8" - 12 UNF - 2B)	OG (1 5/8" - 12 UNF - 2B)
HDP 35•50	218 (8.5827)		
HDP 35•63	224 (8.8190)		
HDP 35•71	228 (8.9764)		
HDP 35•80	232 (9.1339)		

01/07.05

NOTES

01/07.05

MULTIPLE PUMPS

MAGNUM series pumps can be coupled together in combination. Where input power requirement of each element 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 separated inlet, common inlet and separated stages.

Combination MAGNUM + KAPPA 20 series and MAGNUM + POLARIS 20 series are available with standard version and EM version with reduced dimensions for O.E.M.s.

For more information please consult our technical sales department.

For KAPPA 20 and POLARIS 20 series general data please consult the proper technical catalogues.

M	lbf in (Nm)	Torque
V	in ³ /rev (cm ³ /rev)	Displacement
Δp	psi (bar)	Pressure
$\eta_m = \eta_m (V, \Delta p, n) \quad (\approx 0,90)$		Mechanical efficiency

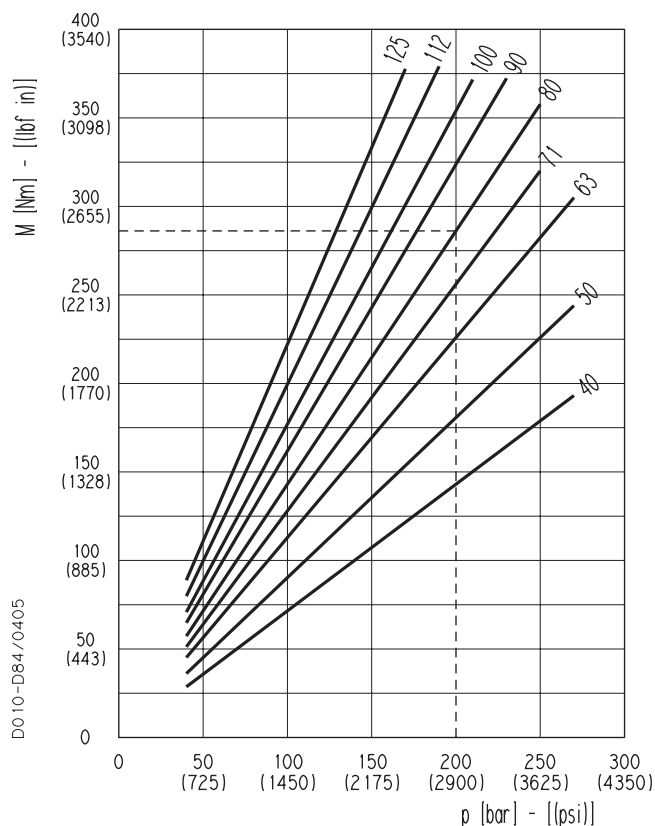
$$M = \frac{\Delta p \text{ (bar)} \cdot V \text{ (cm}^3\text{/rev)}}{62,83 \cdot \eta_m} \quad [\text{Nm}]$$

Note: The torque absorbed from the shaft of the first pump results from the sum of the torques due to all single stages. The achieved value must not exceed the maximum torque limit given for the shaft of the first pump. Diagrams providing approximate selection data will be found on page 24.

ABSORBED TORQUE

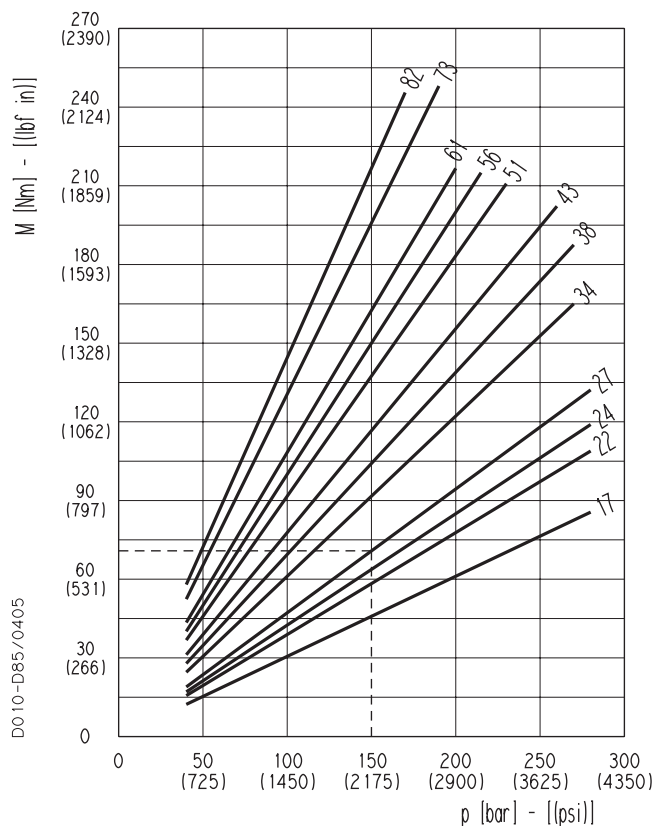
HDP 35

1



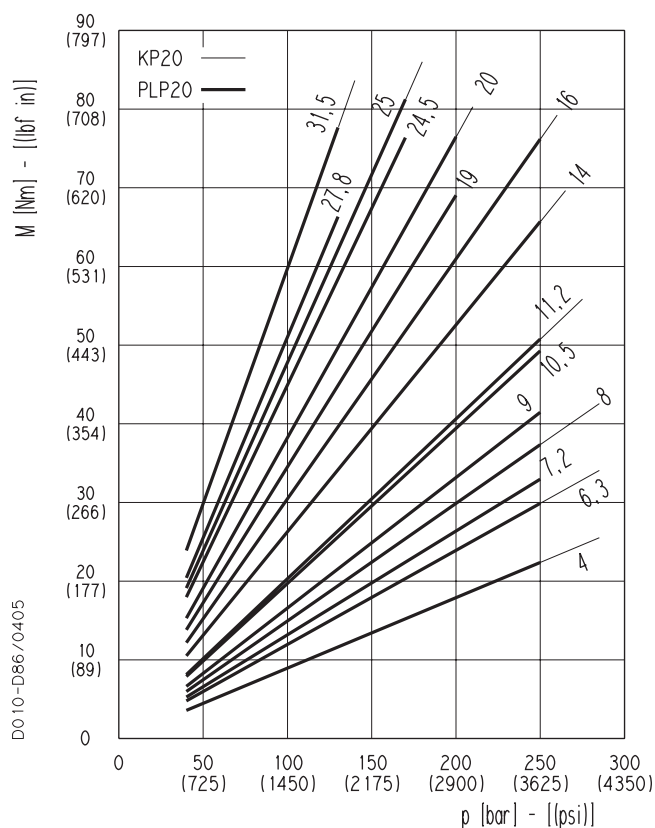
HDP 30

2



KP 20 - PLP 20

3



DRIVE SHAFT SELECTION

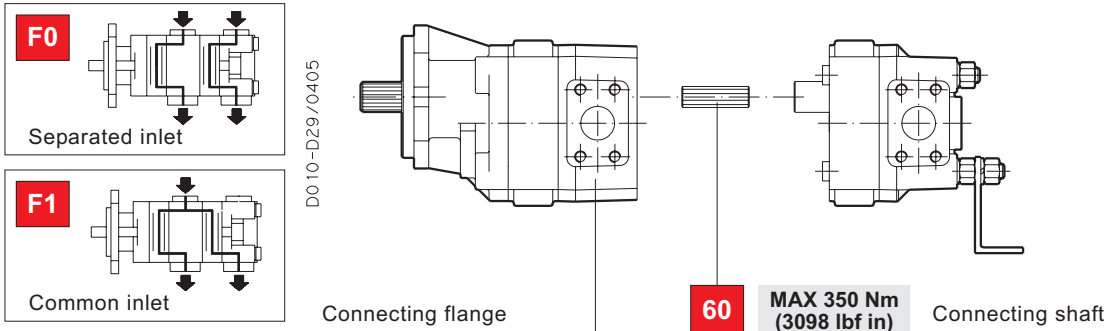
Let us consider a double pump HDP35•80 + HDP30•27. If we suppose that we have to work with the first pump at a pressure of 2900 psi (200 bar) and the second pump at a pressure of 2175 psi (150 bar), the graph 1 shows that the torque absorbed by HDP35•80 is 2523 lbf in (285 Nm) and the graph 2 shows that the torque absorbed by HDP30•27 is 620 lbf in (70 Nm) [acceptable value because it doesn't exceed the maximum connecting shaft torque that is 1505 lbf in (170 Nm), see page 25]. The torque to be transmitted by the first drive shaft will thus be 2523+620= 3143 lbf in (285+70= 355 Nm), this value must not exceed the shaft's maximum rated value.

01/07.05

MULTIPLE PUMPS HDP.. / HDP..

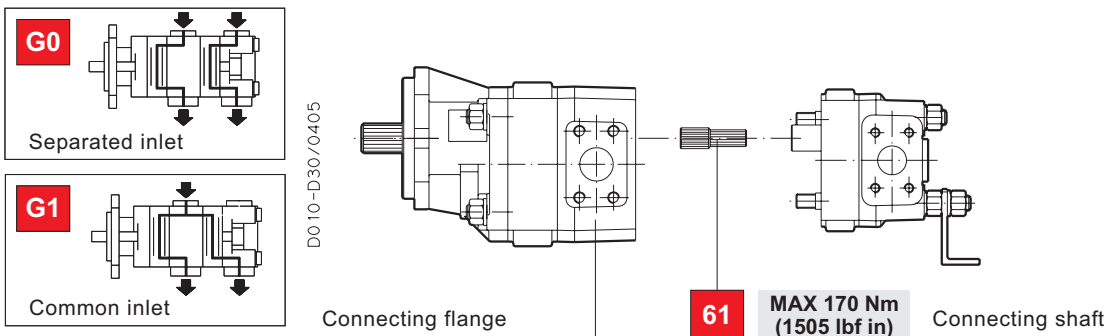
STANDARD VERSION

HDP 35/35



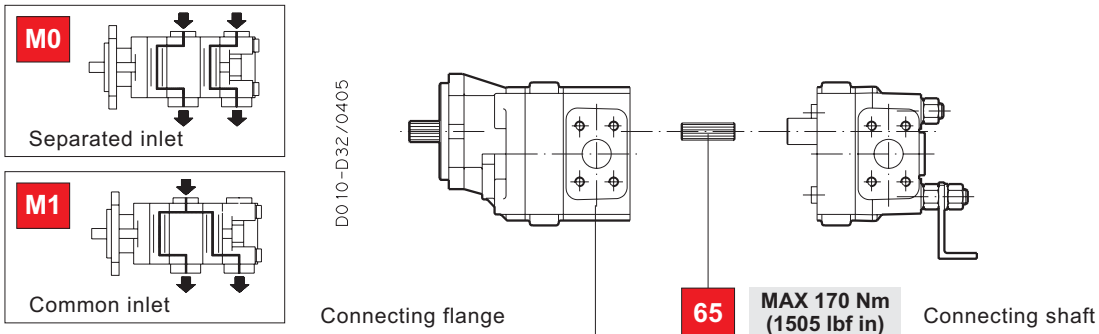
STANDARD VERSION

HDP 35/30



STANDARD VERSION

HDP 30/30



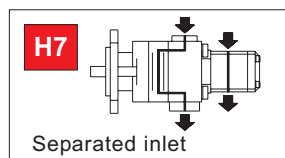
REAR COVER VERSION

All multiple pumps with more than two sections are available with bracket.

Separated inlet		Common inlet	
Without bracket	With bracket	Without bracket	With bracket
0	9	1	8

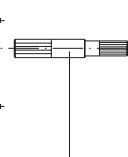
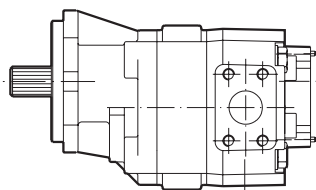
DOUBLE PUMPS HDP 35 / KP 20

STANDARD VERSION



D010-D31/0405

Connecting flange

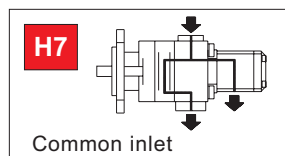


98

MAX 110 Nm
(974 lbf in)

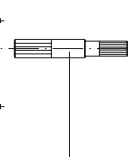
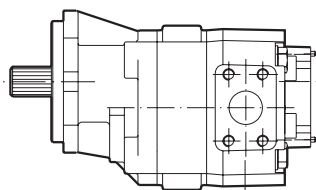
Connecting shaft

KP20•.... - **N6**



D010-111/0405

Connecting flange

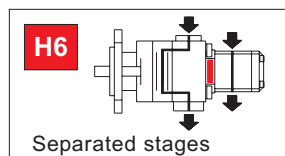


98

MAX 110 Nm
(974 lbf in)

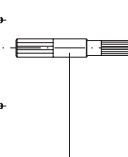
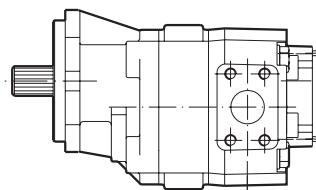
Connecting shaft

KP20•.... - **N7**



D010-112/0405

Connecting flange



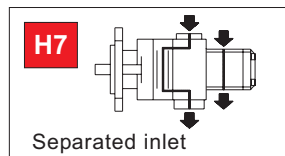
98

MAX 110 Nm
(974 lbf in)

Connecting shaft

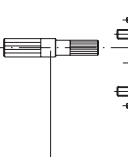
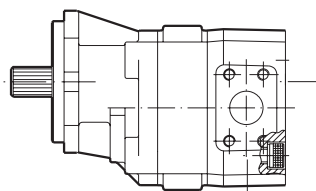
KP20•.... - **W4**

EM VERSION



D010-108/0405

Connecting flange

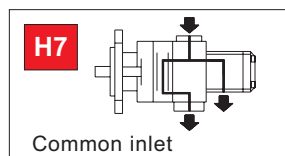


96

MAX 110 Nm
(974 lbf in)

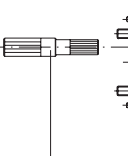
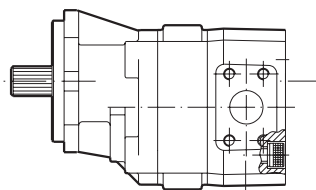
Connecting shaft

KP20•.... - **N6 / EM**



D010-113/0405

Connecting flange



96

MAX 110 Nm
(974 lbf in)

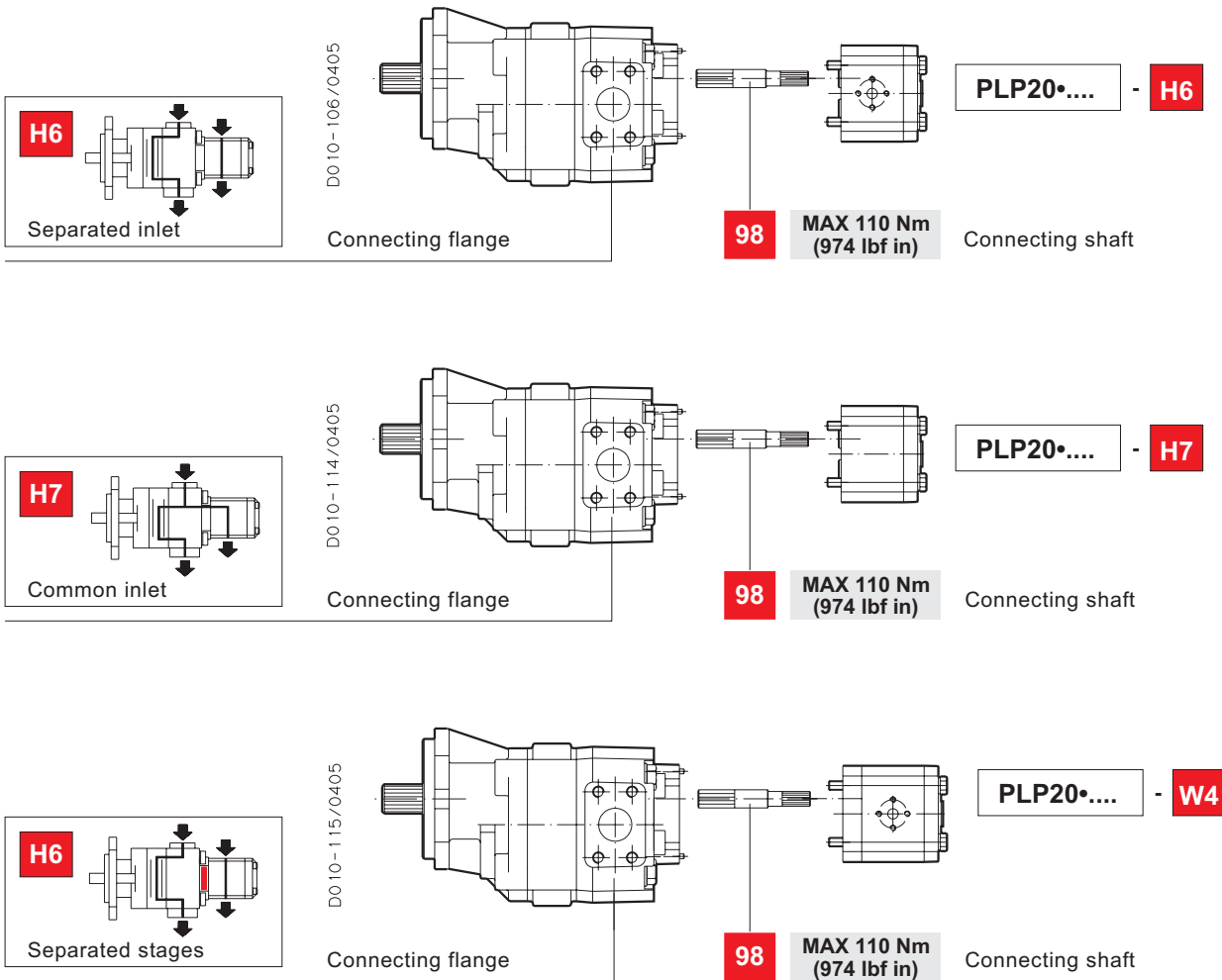
Connecting shaft

KP20•.... - **N7 / EM**

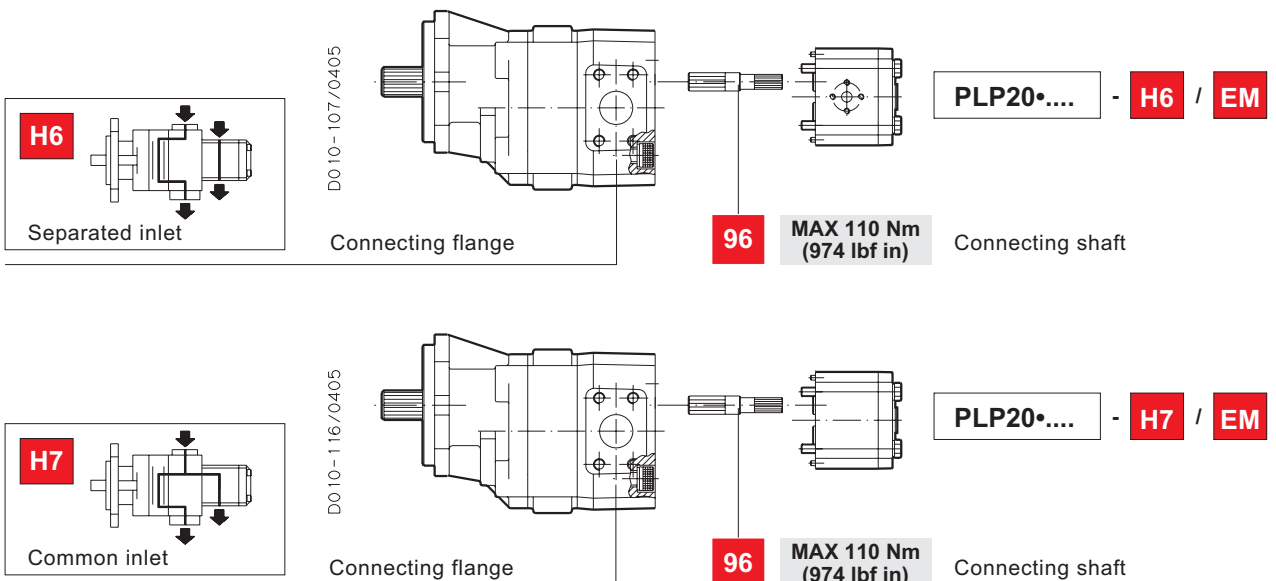
01/07.05

DOUBLE PUMPS HDP 35 / PLP 20

STANDARD VERSION



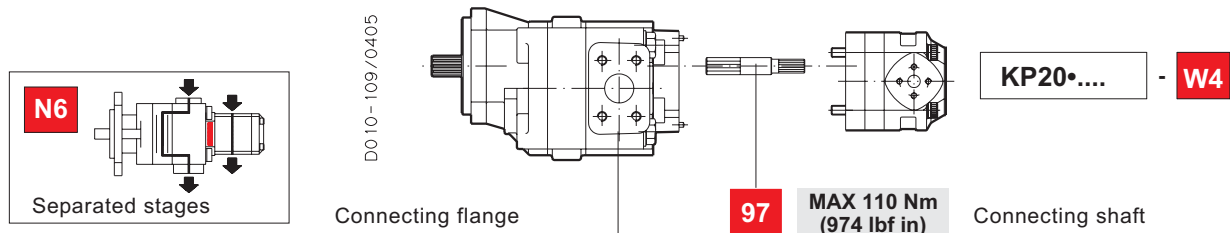
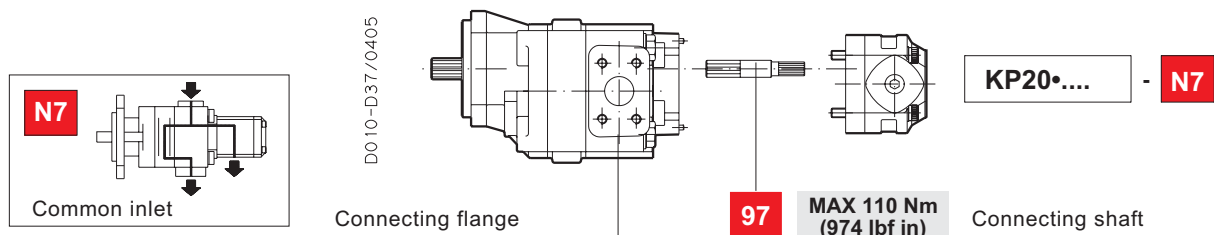
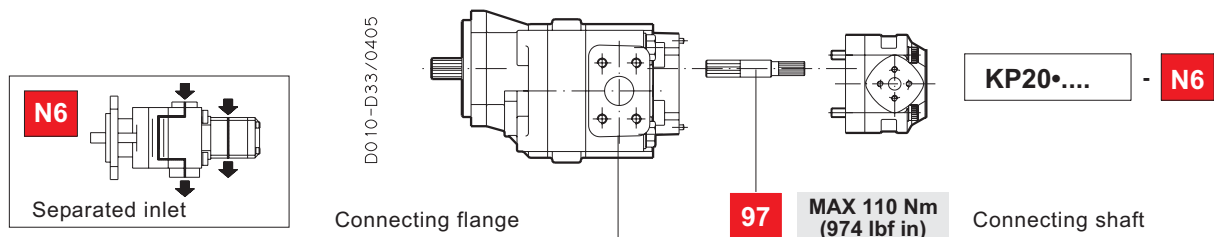
EM VERSION



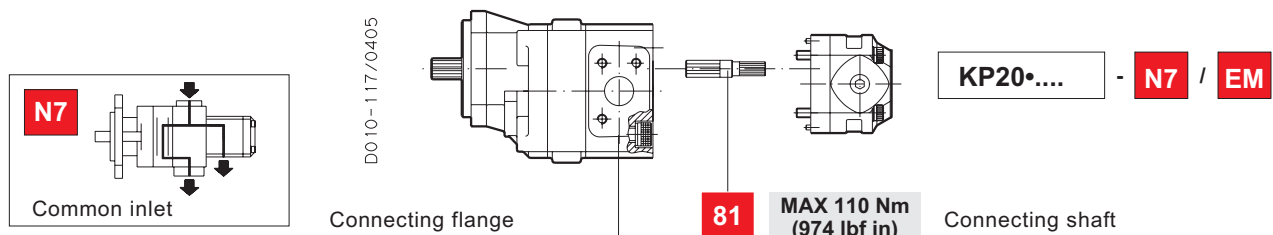
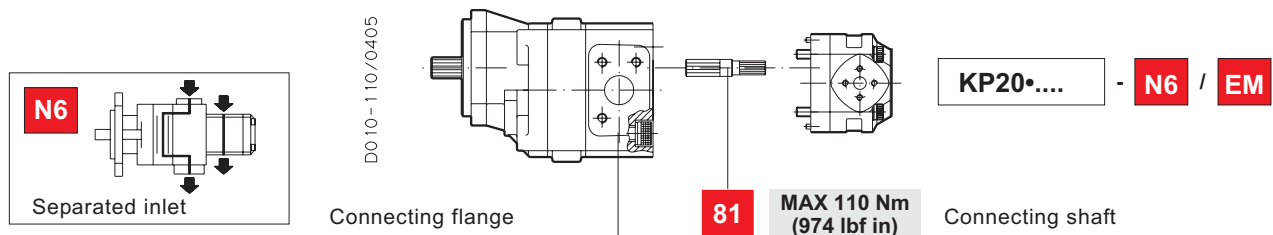
01/07.05

DOUBLE PUMPS HDP 30 / KP 20

STANDARD VERSION



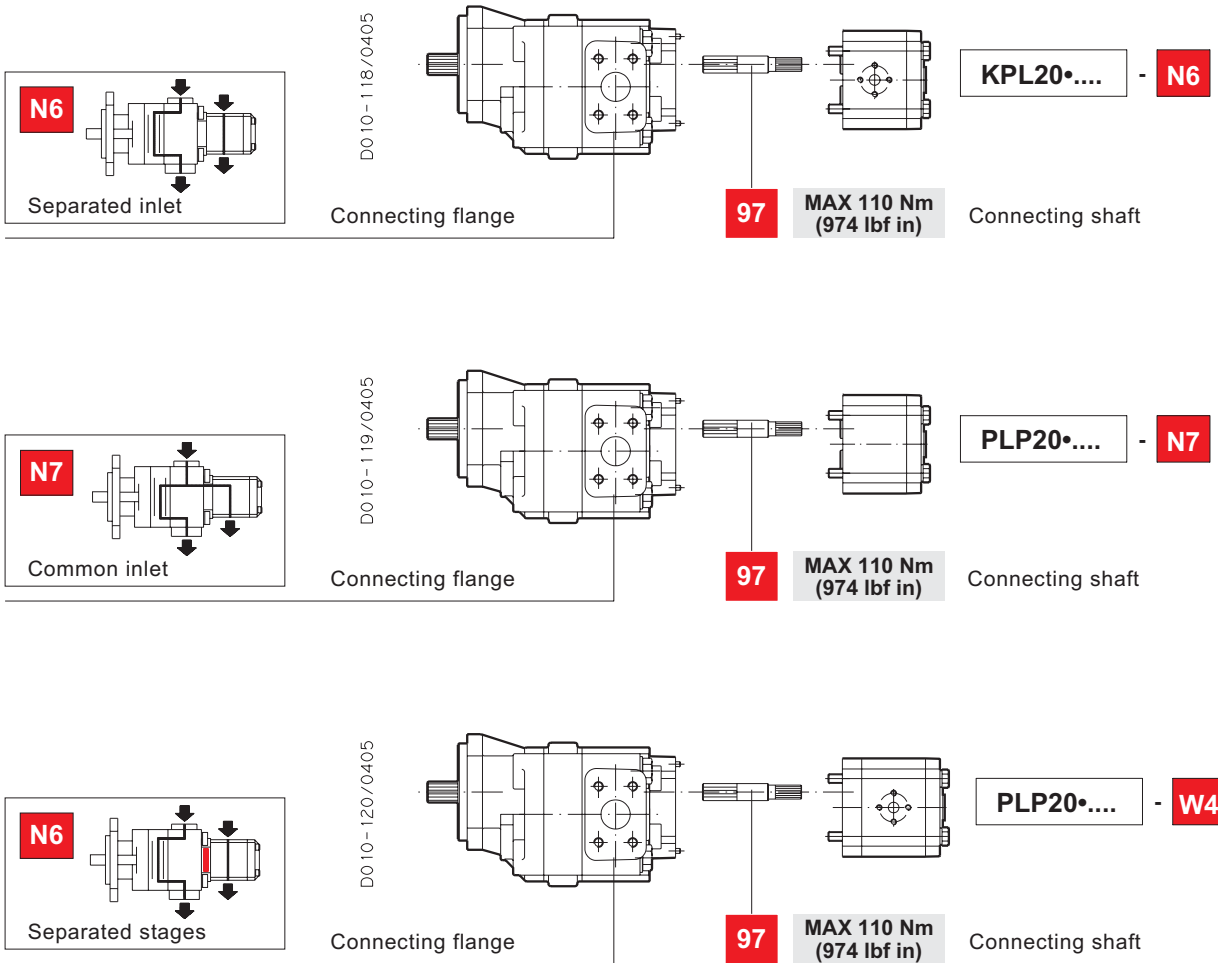
EM VERSION



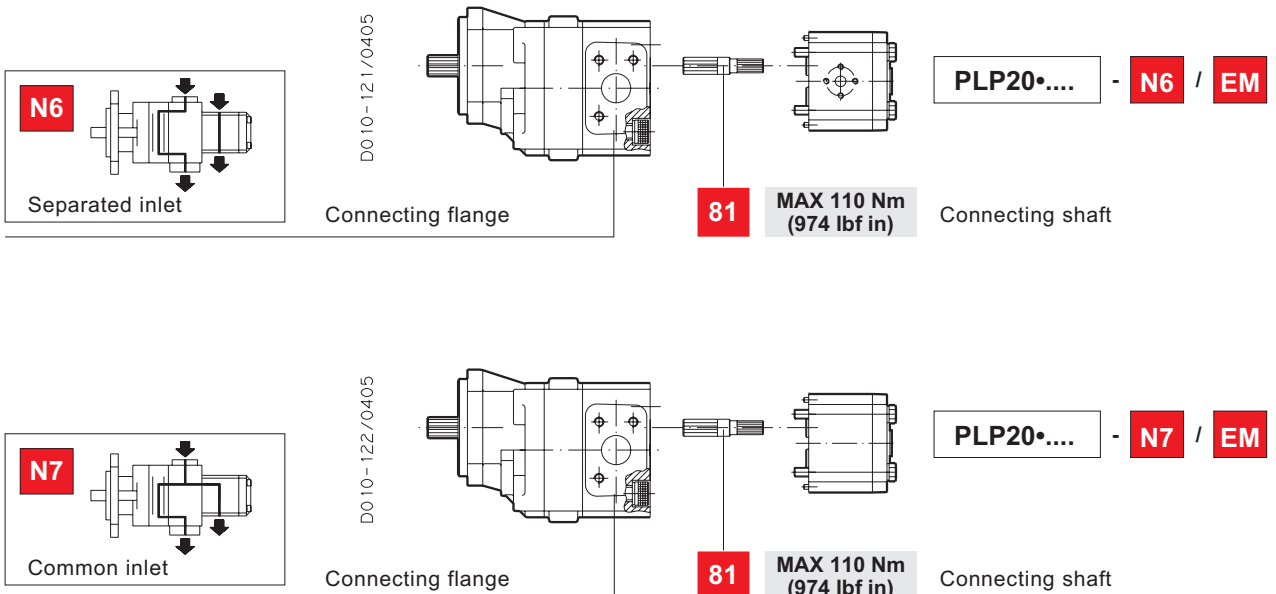
01/07.05

DOUBLE PUMPS HDP 30 / PLP 20

STANDARD VERSION

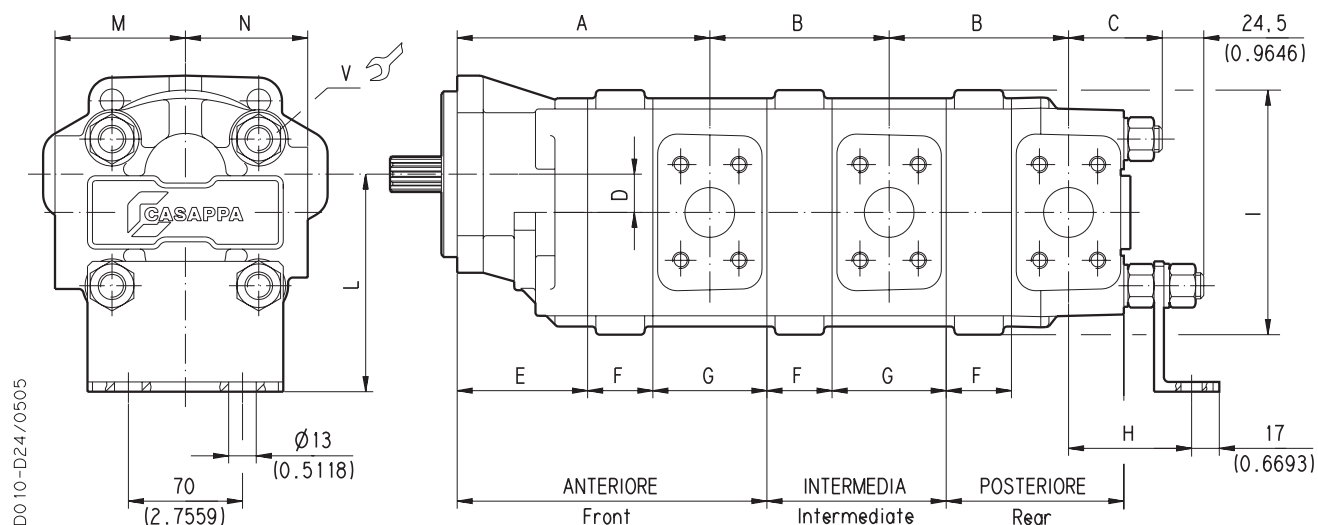


EM VERSION



01/07.05

MULTIPLE PUMPS SAME GROUPS



D010-D24/0505

Tightening torque Nm (lbf in)
V
280 ± 28 (2230 $\div$ 2726)

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 $\div$ 48

PORTS:
see page 49

The drawing shows a pump with left rotation.

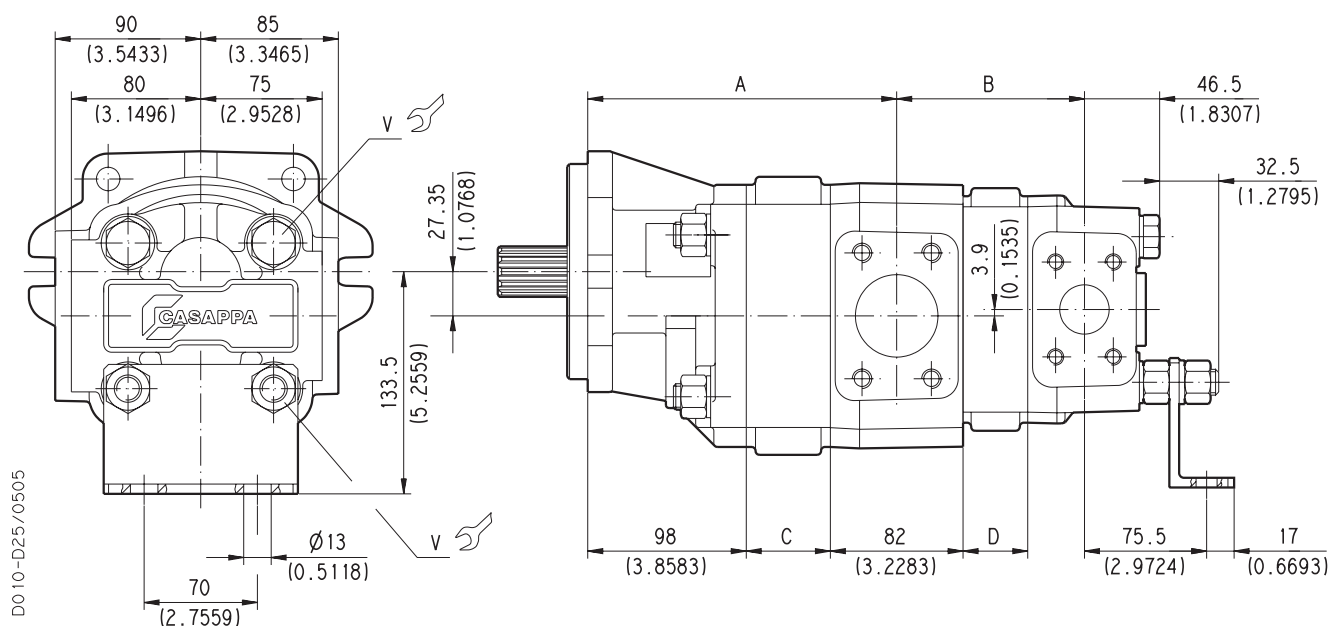
Pump type	A	B	C	D	E	G	H	I	L	M (IN)	N (OUT)
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
HDP35/35	139+F (5.4724+F)	82+F (3.2283+F)	60,5 (2.3819)	27,35 (1.0807)	98 (3.8583)	82 (3.2283)	91,5 (3.6024)	172 (6.7717)	162,4 (6.3937)	90 (3.5433)	85 (3.3465)
HDP30/30	115+F (4.5276+F)	70+F (2.7559+F)	54,5 (2.1457)	23,45 (0.9232)	80 (3.1496)	70 (2.7559)	75,5 (2.9724)	150 (5.9055)	133,5 (5.2559)	80 (3.1496)	75 (2.9528)

Pump type	F
	mm (inch)
HDP 35•40	33 (1.2992)
HDP 35•50	38 (1.4961)
HDP 35•63	44 (1.7323)
HDP 35•71	48 (1.8898)
HDP 35•80	52 (2.0472)
HDP 35•90	57 (2.2441)
HDP 35•100	61 (2.4016)
HDP 35•112	67 (2.6378)
HDP 35•125	73 (2.8740)

Pump type	F
	mm (inch)
HDP 30•17	23 (0.9055)
HDP 30•22	26 (1.0236)
HDP 30•24	27,3 (1.0748)
HDP 30•27	29 (1.1417)
HDP 30•34	34 (1.3386)
HDP 30•38	37 (1.4567)
HDP 30•43	40 (1.5748)
HD. 30•51	45 (1.7717)
HDP 30•56	48 (1.8898)
HDP 30•61	51 (2.0079)
HDP 30•73	59 (2.3228)
HDP 30•82	64 (2.5197)

01/07.05

MULTIPLE PUMPS HDP35 / HDP30



Tightening torque Nm (lbf in)
V
280 ± 28 (2230 $\div$ 2726)

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 $\div$ 48

PORTS:
see page 49

The drawing shows a pump with left rotation.

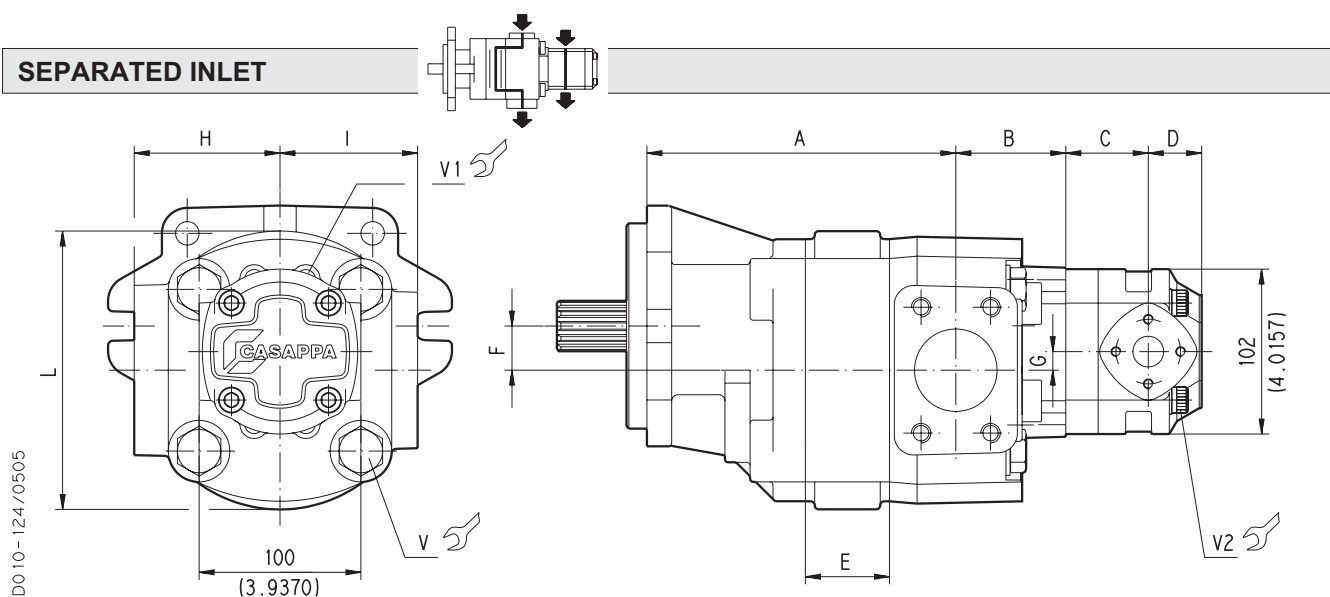
Pump type	A	B
	mm (inch)	mm (inch)
HDP 35/30	139+C (5.4724+C)	76+D (2.9921+D)

Pump type	C
	mm (inch)
HDP 35•40	33 (1.2992)
HDP 35•50	38 (1.4961)
HDP 35•63	44 (1.7323)
HDP 35•71	48 (1.8898)
HDP 35•80	52 (2.0472)
HDP 35•90	57 (2.2441)
HDP 35•100	61 (2.4016)
HDP 35•112	67 (2.6378)
HDP 35•125	73 (2.8740)

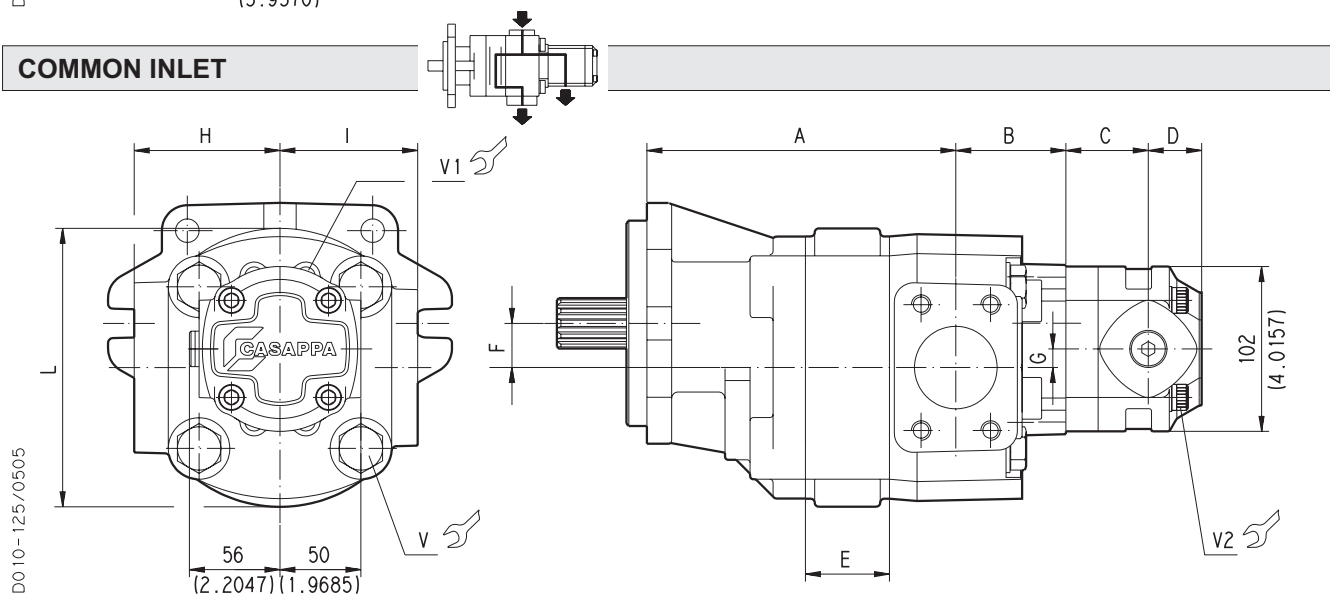
Pump type	D
	mm (inch)
HDP 30•17	23 (0.9055)
HDP 30•22	26 (1.0236)
HDP 30•24	27,3 (1.0748)
HDP 30•27	29 (1.1417)
HDP 30•34	34 (1.3386)
HDP 30•38	37 (1.4567)
HDP 30•43	40 (1.5748)
HD. 30•51	45 (1.7717)
HDP 30•56	48 (1.8898)
HDP 30•61	51 (2.0079)
HDP 30•73	59 (2.3228)
HDP 30•82	64 (2.5197)

DOUBLE PUMPS HDP.. / KP20 STANDARD VERSION

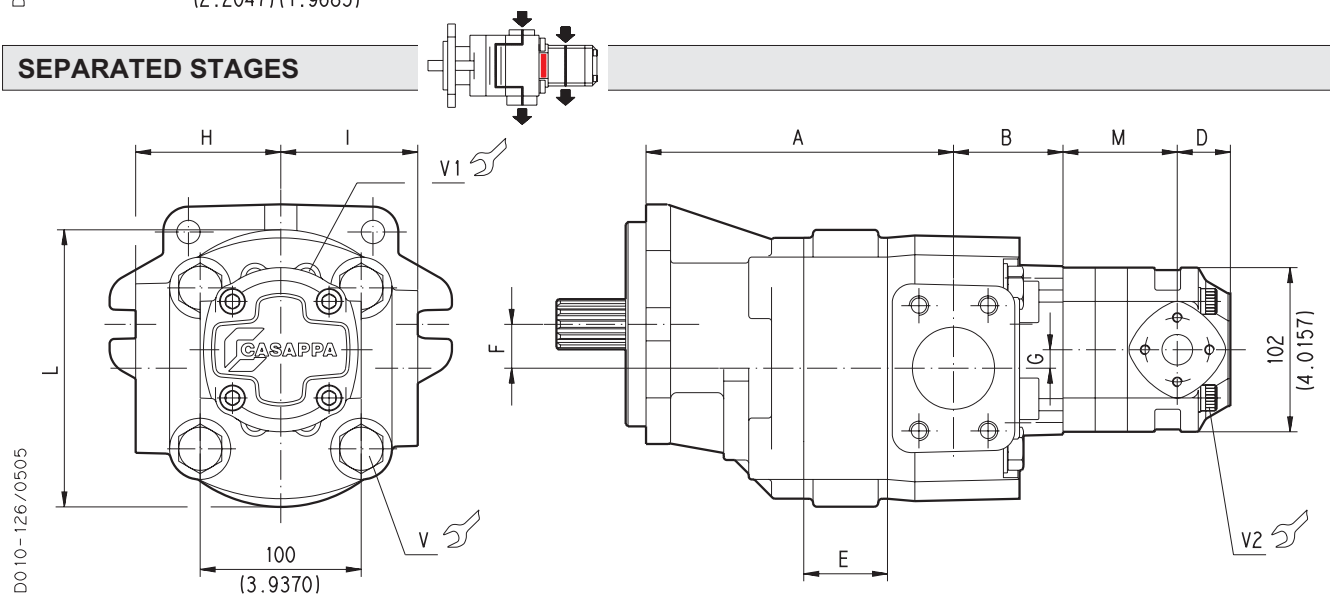
SEPARATED INLET



COMMON INLET



SEPARATED STAGES



01/07.05

DOUBLE PUMPS HDP.. / KP20 STANDARD VERSION

Tightening torque Nm (lbf in)		
V	V1	V2
280 ^{±28} (2230 ÷ 2726)	25 ^{±2,5} (199 ÷ 243)	70 ^{±7} (558 ÷ 682)

Drawings show pumps with left rotation.

Pump type	A	B	F	G	H (IN)	I (OUT)	L
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
HDP35/KP20	139+E (5.4724+E)	68 (2.6772)	27,35 (1.0807)	11,27 (0.4437)	90 (3.5433)	85 (3.3465)	172 (6.7717)
HDP30/KP20	115+E (4.5276+E)	62 (2.4409)	23,45 (0.9232)	7,45 (0.2933)	80 (3.1496)	75 (2.9528)	150 (5.9055)

Pump type	E
	mm (inch)
HDP 35•40	33 (1.2992)
HDP 35•50	38 (1.4961)
HDP 35•63	44 (1.7323)
HDP 35•71	48 (1.8898)
HDP 35•80	52 (2.0472)
HDP 35•90	57 (2.2441)
HDP 35•100	61 (2.4016)
HDP 35•112	67 (2.6378)
HDP 35•125	73 (2.8740)

Pump type	E
	mm (inch)
HDP 30•17	23 (0.9055)
HDP 30•22	26 1.0236)
HDP 30•24	27,3 (1.0748)
HDP 30•27	29 (1.1417)
HDP 30•34	34 (1.3386)
HDP 30•38	37 (1.4567)
HDP 30•43	40 (1.5748)
HD. 30•51	45 (1.7717)
HDP 30•56	48 (1.8898)
HDP 30•61	51 (2.0079)
HDP 30•73	59 (2.3228)
HDP 30•82	64 (2.5197)

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 ÷ 48

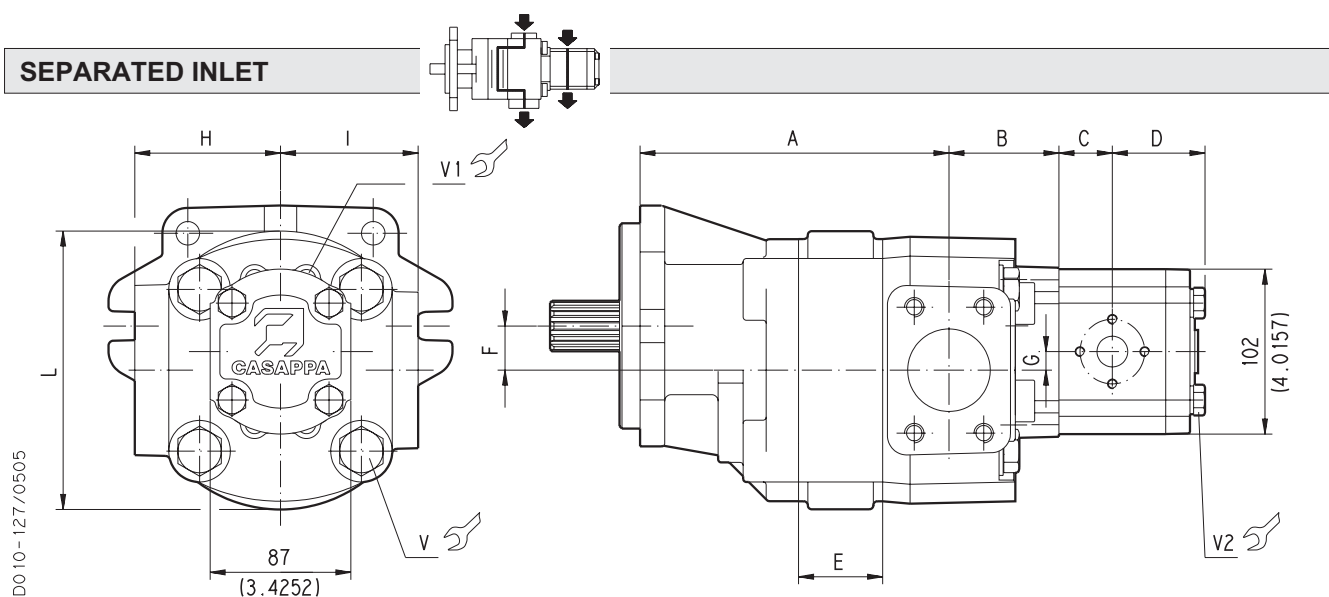
PORTS:
see page 49

Pump type	C	D	M
	mm (inch)	mm (inch)	mm (inch)
KP 20•4	44,5 (1.7520)	27,5 (1.0827)	61,5 (2.4213)
KP 20•6,3	47 (1.8504)	27,5 (1.0827)	64 (2.5197)
KP 20•8	49,5 (1.9488)	27,5 (1.0827)	66,5 (2.6181)
KP 20•11,2	53 (2.0866)	27,5 (1.0827)	70 (2.7559)
KP 20•14	51,5 (2.0276)	33 (1.2992)	68,5 (2.6969)
KP 20•16	57 (2.2441)	33 (1.2992)	74 (2.9134)
KP 20•20	63,5 (2.5000)	33 (1.2992)	80,5 (3.1693)
KP 20•25	56,5 (2.2244)	48 (1.8898)	73,5 (2.8937)
KP 20•31,5	66,5 (2.6181)	48 (1.8898)	83,5 (3.2874)

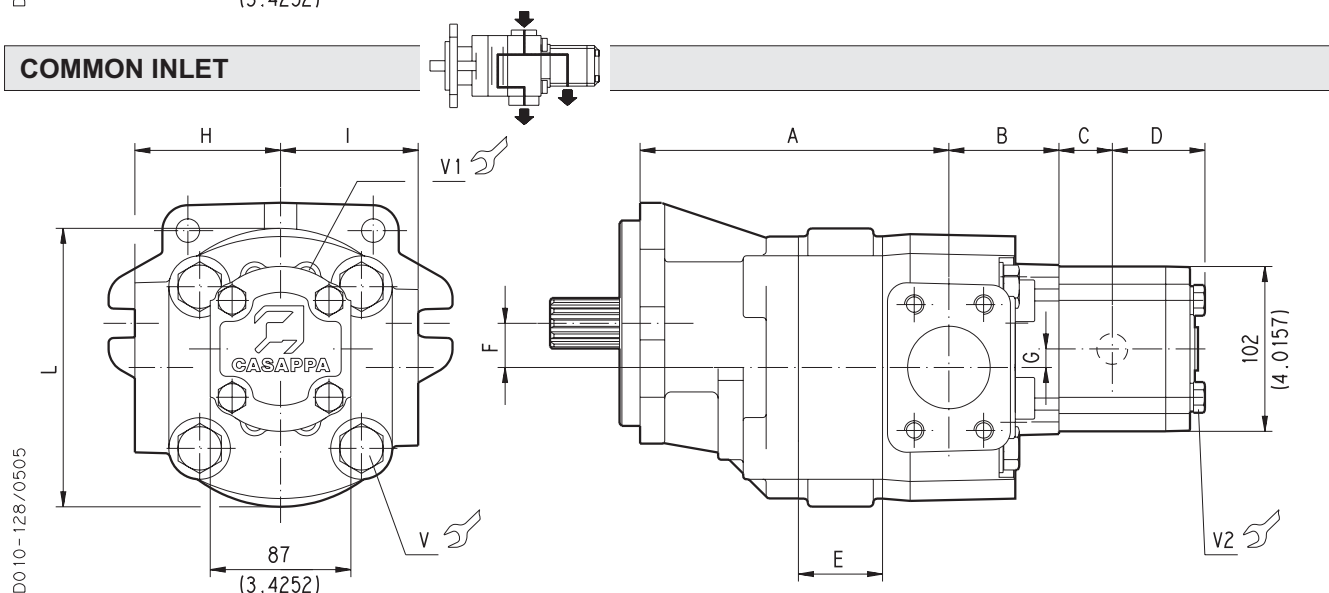
01/07.05

DOUBLE PUMPS HDP.. / PLP 20 STANDARD VERSION

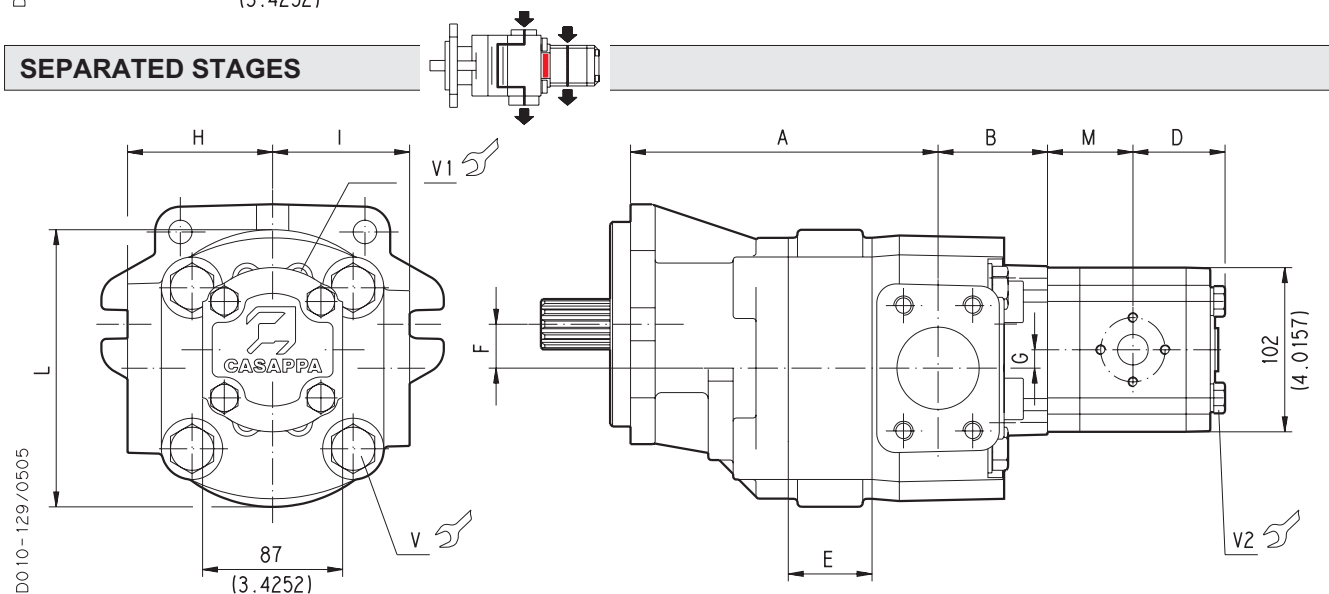
SEPARATED INLET



COMMON INLET



SEPARATED STAGES



01/07.05

DOUBLE PUMPS HDP.. / PLP 20 STANDARD VERSION

Tightening torque Nm (lbf in)		
V	V1	V2
280 ± 28 (2230 $\div$ 2726)	25 $\pm 2,5$ (199 $\div$ 243)	70 ± 7 (558 $\div$ 682)

Drawings show pumps with left rotation.

Pump type	A	B	F	G	H (IN)	I (OUT)	L
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
HDP35/PLP20	139+E (5.4724+E)	68 (2.6772)	27,35 (1.0807)	11,27 (0.4437)	90 (3.5433)	85 (3.3465)	172 (6.7717)
HDP30/PLP20	115+E (4.5276+E)	62 (2.4409)	23,45 (0.9232)	7,45 (0.2933)	80 (3.1496)	75 (2.9528)	150 (5.9055)

Pump type	E
	mm (inch)
HDP 35•40	33 (1.2992)
HDP 35•50	38 (1.4961)
HDP 35•63	44 (1.7323)
HDP 35•71	48 (1.8898)
HDP 35•80	52 (2.0472)
HDP 35•90	57 (2.2441)
HDP 35•100	61 (2.4016)
HDP 35•112	67 (2.6378)
HDP 35•125	73 (2.8740)

Pump type	E
	mm (inch)
HDP 30•17	23 (0.9055)
HDP 30•22	26 (1.0236)
HDP 30•24	27,3 (1.0748)
HDP 30•27	29 (1.1417)
HDP 30•34	34 (1.3386)
HDP 30•38	37 (1.4567)
HDP 30•43	40 (1.5748)
HD. 30•51	45 (1.7717)
HDP 30•56	48 (1.8898)
HDP 30•61	51 (2.0079)
HDP 30•73	59 (2.3228)
HDP 30•82	64 (2.5197)

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 $\div$ 48

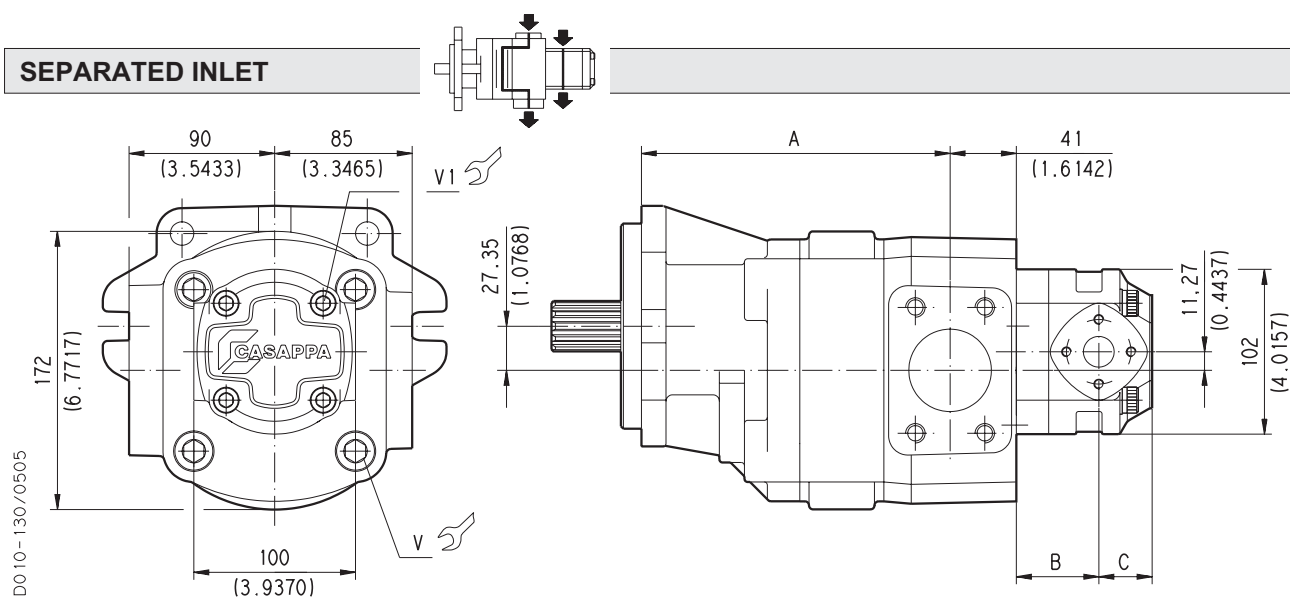
PORTS:
see page 49

Pump type	C	D	M
	mm (inch)	mm (inch)	mm (inch)
PLP 20•4	25,75 (1.0138)	49,25 (1.9390)	42,75 (1.6831)
PLP 20•6,3	27 (1.0630)	50,5 (1.9882)	44 (1.7323)
PLP 20•7,2	27,5 (1.0826)	51 (2.0079)	44,5 (1.7520)
PLP 20•8	28,25 (1.1122)	51,75 (2.0374)	45,25 (1.7815)
PLP 20•9	28,9 (1.1378)	52,4 (2.0630)	45,9 (1.8071)
PLP 20•10,5	30,25 (1.1909)	53,75 (2.1161)	47,25 (1.8602)
PLP 20•11,2	30,5 (1.2008)	54 (2.1260)	47,5 (1.8701)
PLP 20•14	33 (1.2992)	56,5 (2.2244)	50 (1.9685)
PLP 20•16	34,75 (1.3681)	58,25 (2.2933)	51,75 (2.0374)
PLP 20•19	36,45 (1.4350)	59,95 (2.3602)	53,45 (2.1043)
PLP 20•20	38 (1.4961)	61,5 (2.4213)	55 (2.1654)
PLP 20•24,5	40,8 (1.6063)	64,3 (2.5315)	57,8 (2.2756)
PLP 20•25	42 (1.6535)	65,5 (2.5787)	59 (2.3228)
PLP 20•27,5	43,35 (1.7067)	66,85 (2.6319)	60,35 (2.3760)
PLP 20•31,5	47 (1.8504)	70,5 (2.7756)	64 (2.5197)

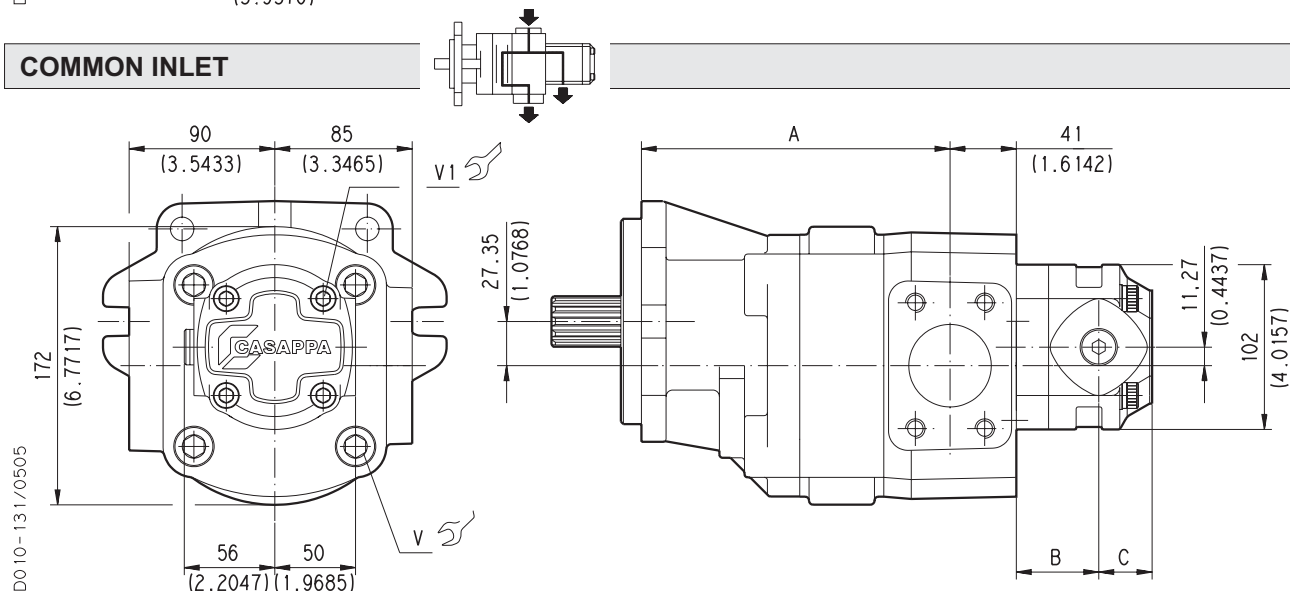
01/07.05

DOUBLE PUMPS HDP35 / KP20 EM VERSION

SEPARATED INLET



COMMON INLET



Tightening torque Nm (lbf in)

V	V1
280 ± 28 (2230 $\div$ 2726)	70 ± 7 (558 $\div$ 682)

Drawings show pumps with left rotation.

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 $\div$ 48

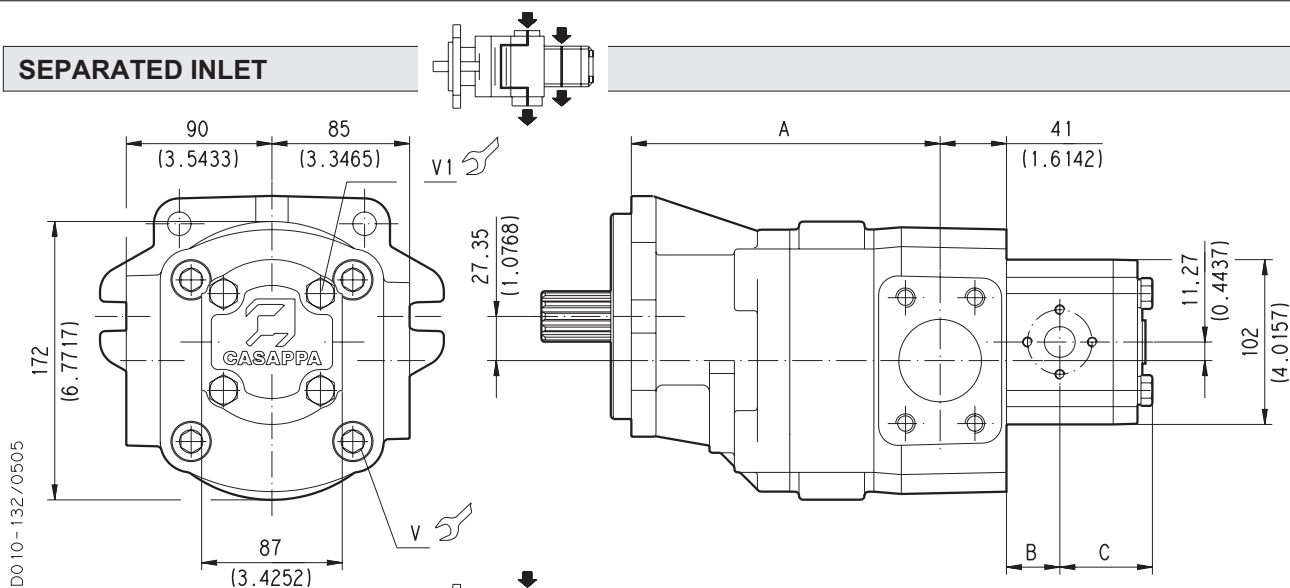
PORTS:
see page 49

Pump type	A
	mm (inch)
HDP 35•40	172 (6.7717)
HDP 35•50	177 (6.9685)
HDP 35•63	183 (7.2047)
HDP 35•71	187 (7.3622)
HDP 35•80	191 (7.5197)
HDP 35•90	196 (7.7165)
HDP 35•100	200 (7.8740)
HDP 35•112	206 (8.1102)
HDP 35•125	212 (8.3465)

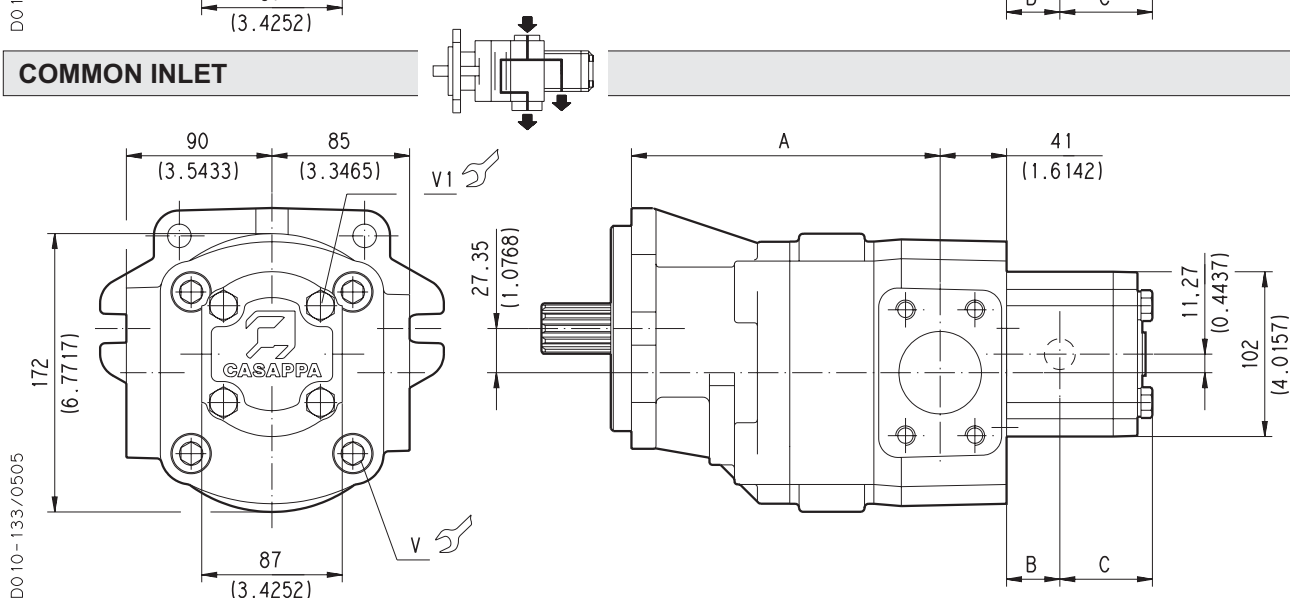
Pump type	B	C
	mm (inch)	mm (inch)
KP 20•4	44,5 (1.7520)	27,5 (1.0827)
KP 20•6,3	47 (1.8504)	27,5 (1.0827)
KP 20•8	49,5 (1.9488)	27,5 (1.0827)
KP 20•11,2	53 (2.0866)	27,5 (1.0827)
KP 20•14	51,5 (2.0276)	33 (1.2992)
KP 20•16	57 (2.2441)	33 (1.2992)
KP 20•20	63,5 (2.5000)	33 (1.2992)
KP 20•25	56,5 (2.2244)	48 (1.8898)
KP 20•31,5	66,5 (2.6181)	48 (1.8898)

DOUBLE PUMPS HDP35 / PL20 EM VERSION

SEPARATED INLET



COMMON INLET



Drawings show pumps with left rotation..

Tightening torque Nm (lbf in)	
V	V1
280 ± 28 (2230 $\div$ 2726)	70 ± 7 (558 $\div$ 682)

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 $\div$ 48

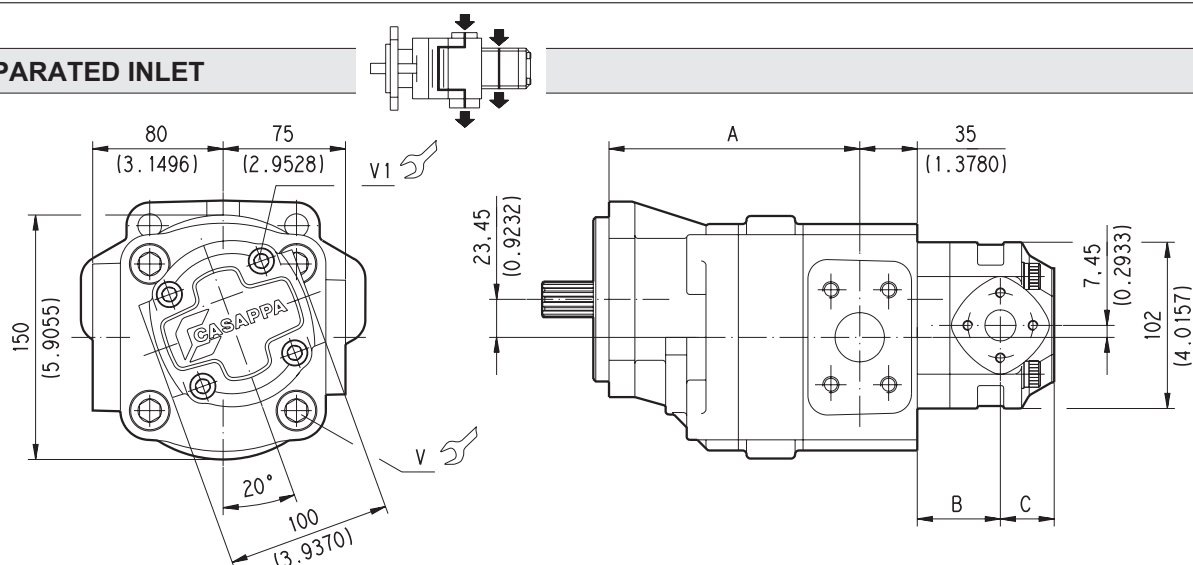
PORTS:
see page 49

Pump type	A
	mm (inch)
HDP 35•40	172 (6.7717)
HDP 35•50	177 (6.9685)
HDP 35•63	183 (7.2047)
HDP 35•71	187 (7.3622)
HDP 35•80	191 (7.5197)
HDP 35•90	196 (7.7165)
HDP 35•100	200 (7.8740)
HDP 35•112	206 (8.1102)
HDP 35•125	212 (8.3465)

Pump type	B	C
	mm (inch)	mm (inch)
PLP 20•4	25,75 (1.0138)	49,25 (1.9390)
PLP 20•6,3	27 (1.0630)	50,5 (1.9882)
PLP 20•7,2	27,5 (1.0826)	51 (2.0079)
PLP 20•8	28,25 (1.1122)	51,75 (2.0374)
PLP 20•9	28,9 (1.1378)	52,4 (2.0630)
PLP 20•10,5	30,25 (1.1909)	53,75 (2.1161)
PLP 20•11,2	30,5 (1.2008)	54 (2.1260)
PLP 20•14	33 (1.2992)	56,5 (2.2244)
PLP 20•16	34,75 (1.3681)	58,25 (2.2933)
PLP 20•19	36,45 (1.4350)	59,95 (2.3602)
PLP 20•20	38 (1.4961)	61,5 (2.4213)
PLP 20•24,5	40,8 (1.6063)	64,3 (2.5315)
PLP 20•25	42 (1.6535)	65,5 (2.5787)
PLP 20•27,5	43,35 (1.7067)	66,85 (2.6319)
PLP 20•31,5	47 (1.8504)	70,5 (2.7756)

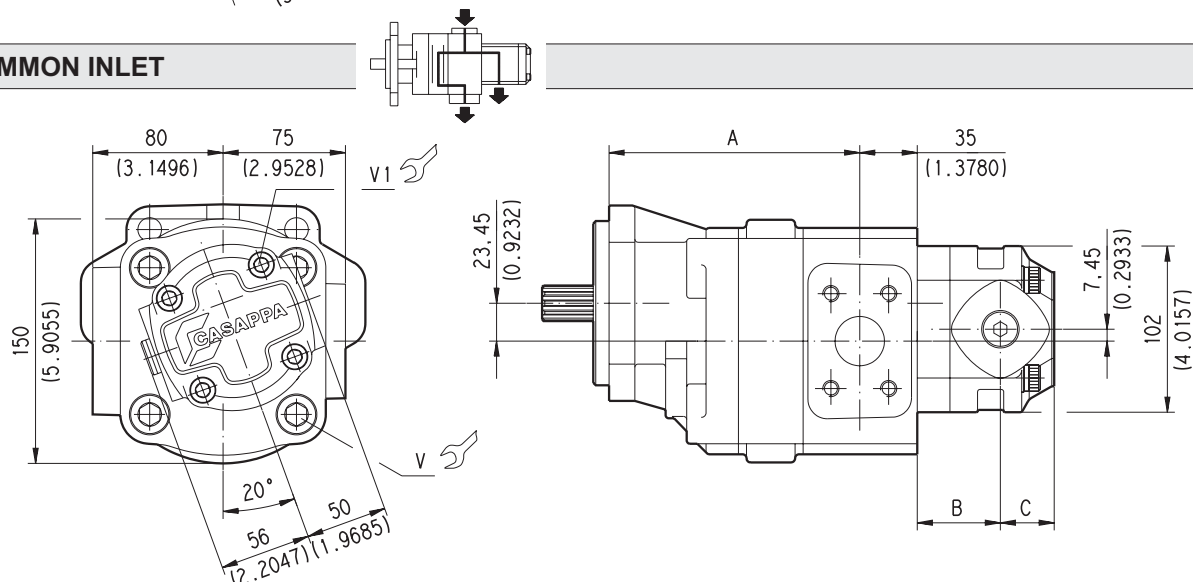
DOUBLE PUMPS HDP30 / KP20 EM VERSION

SEPARATED INLET



D010-134/0505

COMMON INLET



D010-135/0505

Drawings show pumps with left rotation.

Tightening torque Nm (lbf in)	
V	V1
280 ± 28 (2230 $\div$ 2726)	70 ± 7 (558 $\div$ 682)

Pump type	B	C
	mm (inch)	mm (inch)
KP 20•4	44,5 (1.7520)	27,5 (1.0827)
KP 20•6,3	47 (1.8504)	27,5 (1.0827)
KP 20•8	49,5 (1.9488)	27,5 (1.0827)
KP 20•11,2	53 (2.0866)	27,5 (1.0827)
KP 20•14	51,5 (2.0276)	33 (1.2992)
KP 20•16	57 (2.2441)	33 (1.2992)
KP 20•20	63,5 (2.5000)	33 (1.2992)
KP 20•25	56,5 (2.2244)	48 (1.8898)
KP 20•31,5	66,5 (2.6181)	48 (1.8898)

Pump type	A
	mm (inch)
HDP 30•17	138 (5.4331)
HDP 30•22	141 (5.5512)
HDP 30•24	142,3 (5.6024)
HDP 30•27	144 (5.6693)
HDP 30•34	149 (5.8661)
HDP 30•38	152 (5.9843)
HDP 30•43	155 (6.1024)
HD. 30•51	160 (6.2992)
HDP 30•56	163 (6.4173)
HDP 30•61	166 (6.5354)
HDP 30•73	174 (6.8504)
HDP 30•82	179 (7.0472)

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 $\div$ 48

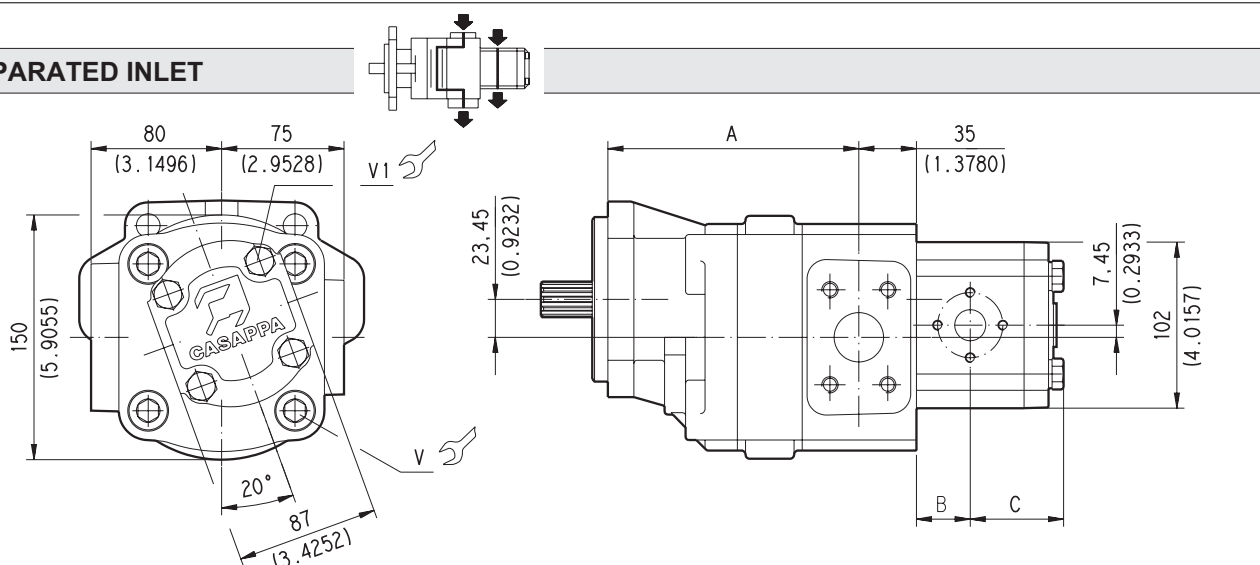
PORTS:
see page 49

01/07.05

DOUBLE PUMPS HDP30 / PLP20 EM VERSION

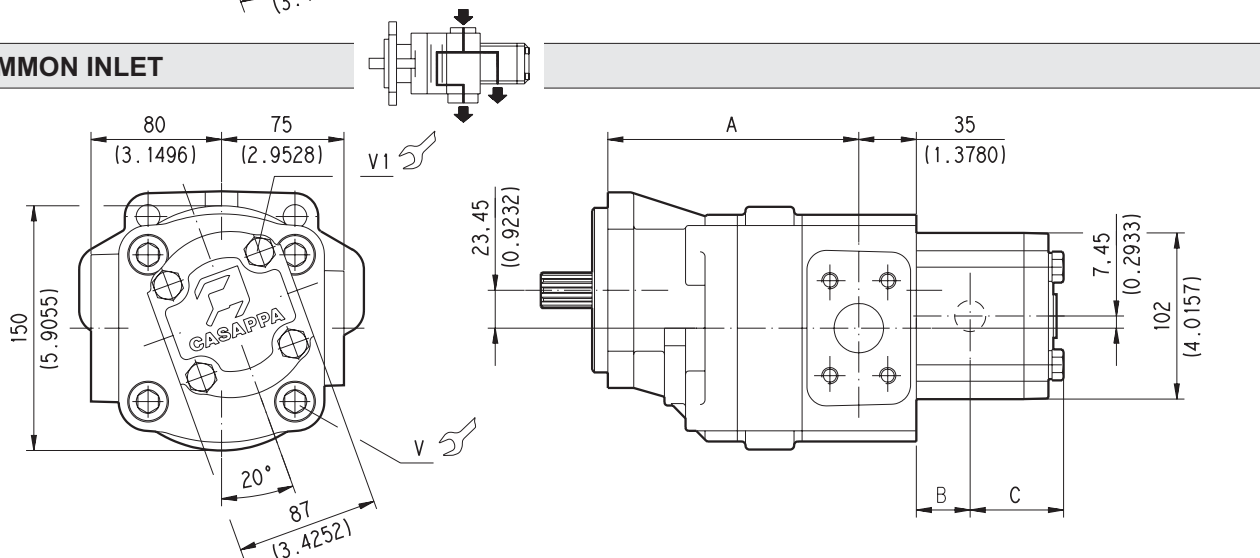
SEPARATED INLET

D010-136/0505



COMMON INLET

D010-137/0505



Drawings show pumps with left rotation.

Tightening torque Nm (lbf in)

V	V1
280 ± 28 (2230 $\div$ 2726)	70 ± 7 (558 $\div$ 682)

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 $\div$ 48

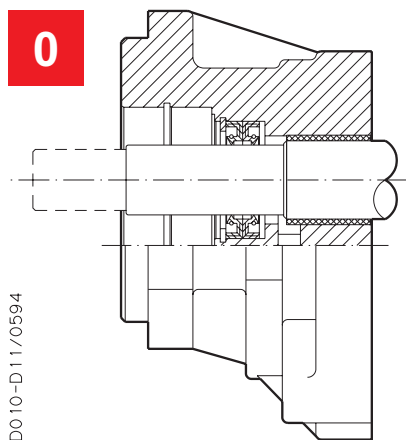
PORTS:
see page 49

Pump type	A
	mm (inch)
HDP 30•17	138 (5.4331)
HDP 30•22	141 (5.5512)
HDP 30•24	142,3 (5.6024)
HDP 30•27	144 (5.6693)
HDP 30•34	149 (5.8661)
HDP 30•38	152 (5.9843)
HDP 30•43	155 (6.1024)
HD. 30•51	160 (6.2992)
HDP 30•56	163 (6.4173)
HDP 30•61	166 (6.5354)
HDP 30•73	174 (6.8504)
HDP 30•82	179 (7.0472)

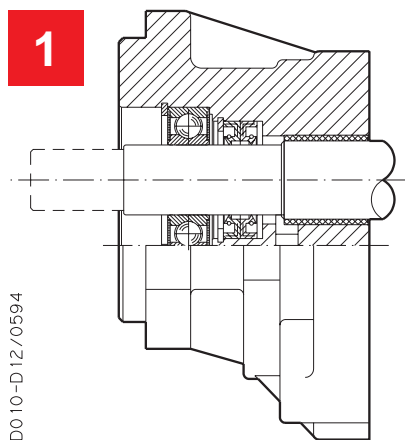
Pump type	B	C
	mm (inch)	mm (inch)
PLP 20•4	25,75 (1.0138)	49,25 (1.9390)
PLP 20•6,3	27 (1.0630)	50,5 (1.9882)
PLP 20•7,2	27,5 (1.0826)	51 (2.0079)
PLP 20•8	28,25 (1.1122)	51,75 (2.0374)
PLP 20•9	28,9 (1.1378)	52,4 (2.0630)
PLP 20•10,5	30,25 (1.1909)	53,75 (2.1161)
PLP 20•11,2	30,5 (1.2008)	54 (2.1260)
PLP 20•14	33 (1.2992)	56,5 (2.2244)
PLP 20•16	34,75 (1.3681)	58,25 (2.2933)
PLP 20•19	36,45 (1.4350)	59,95 (2.3602)
PLP 20•20	38 (1.4961)	61,5 (2.4213)
PLP 20•24,5	40,8 (1.6063)	64,3 (2.5315)
PLP 20•25	42 (1.6535)	65,5 (2.5787)
PLP 20•27,5	43,35 (1.7067)	66,85 (2.6319)
PLP 20•31,5	47 (1.8504)	70,5 (2.7756)

VERSIONS

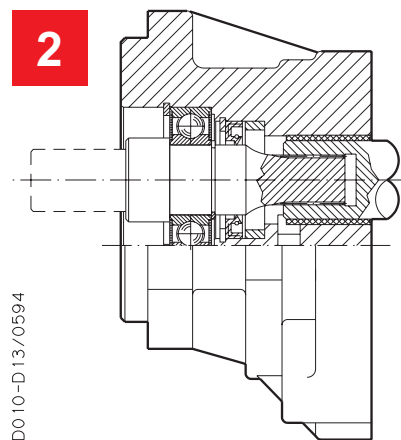
For each version, the possible combination between drive shafts and mounting flanges are shown on pages 46 ÷ 48.



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

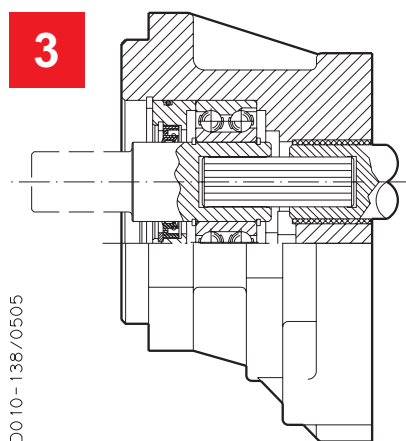


Version for applications with low radial load and without axial load on the drive shaft.



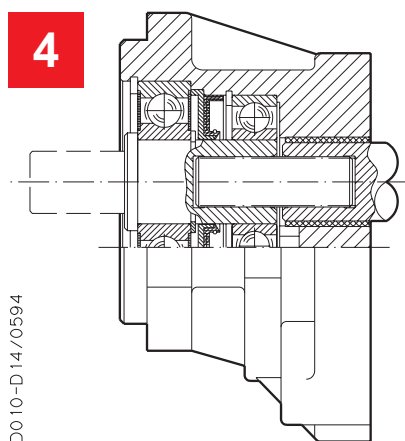
Special version with independent shaft for applications with low radial load and without axial load on the drive shaft.

Max. torque version 2:
HD. 30: 170 Nm (1505 lbf in)
HD. 35: 350 Nm (3098 lbf in)



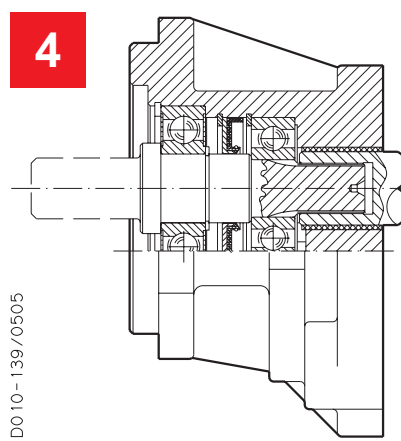
Version for applications with radial and axial load on the drive shaft.

Max. torque version 3:
HD. 30: 170 Nm (1505 lbf in)
HD. 35: 350 Nm (3098 lbf in)



Version for applications with radial and axial load on the drive shaft.

Max. torque version 4:
HD. 30: 170 Nm (1505 lbf in)



Version for applications with radial and axial load on the drive shaft.

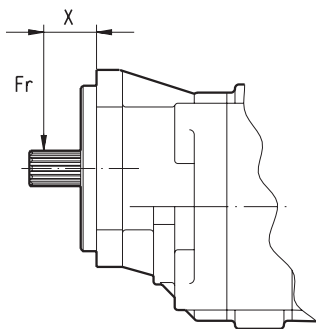
Max. torque version 4:
HD. 35: 350 Nm (3098 lbf in)

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

VERSION WITH OUTBOARD BEARINGS MAGNUM 30

3

D010-143/0405

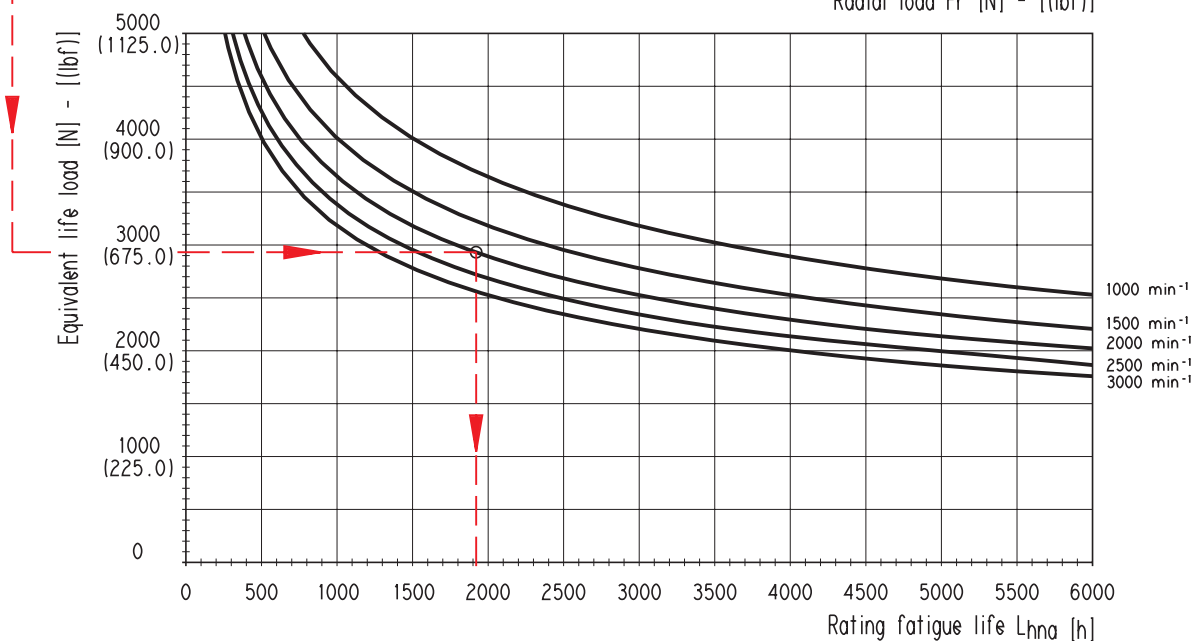
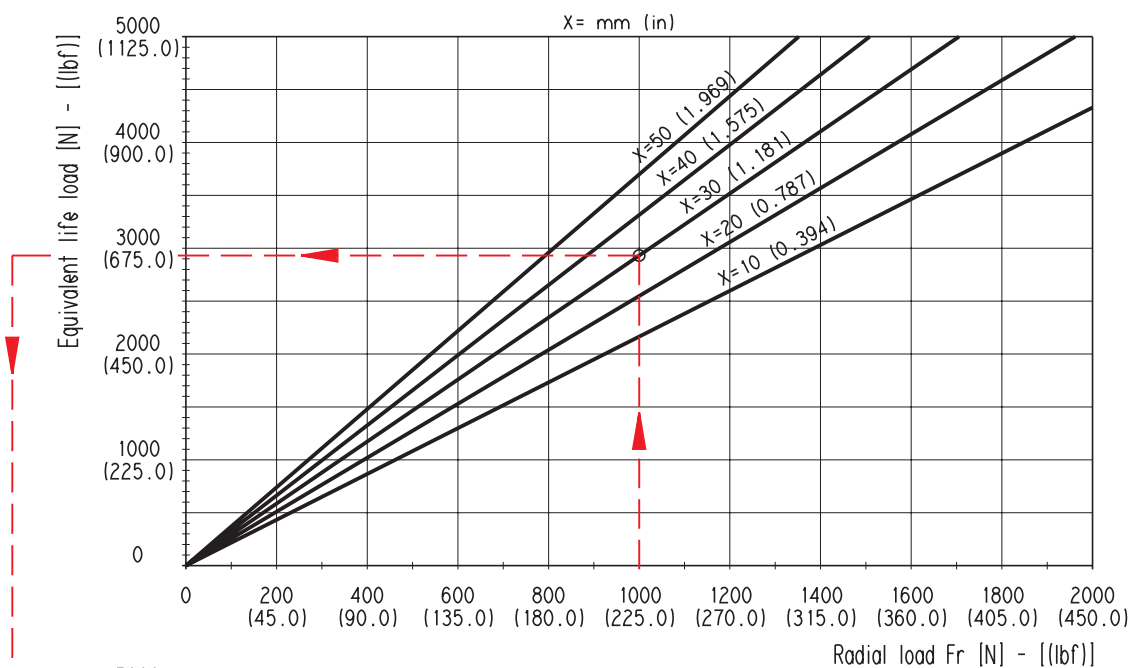


X = Distance of the radial load result from the mounting flange [mm (in)].

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

Example

Fr Radial load	1000 N (225.0 lbf)
X	30 mm (1.1811 in)
Speed	2000 min ⁻¹
Rating fatigue life	≈ 1915 h

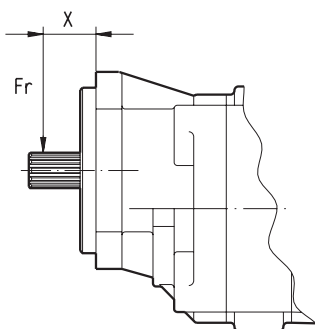


01/07.05

D010-147/0605

VERSION WITH OUTBOARD BEARINGS MAGNUM 35

3



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

Each curve has been obtained at:

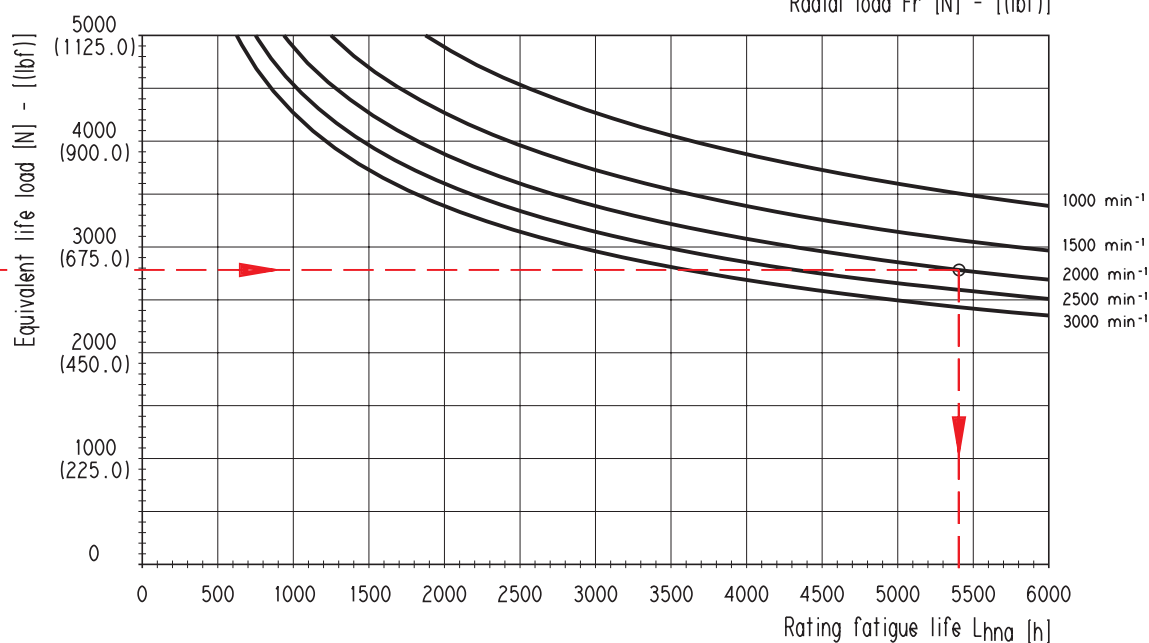
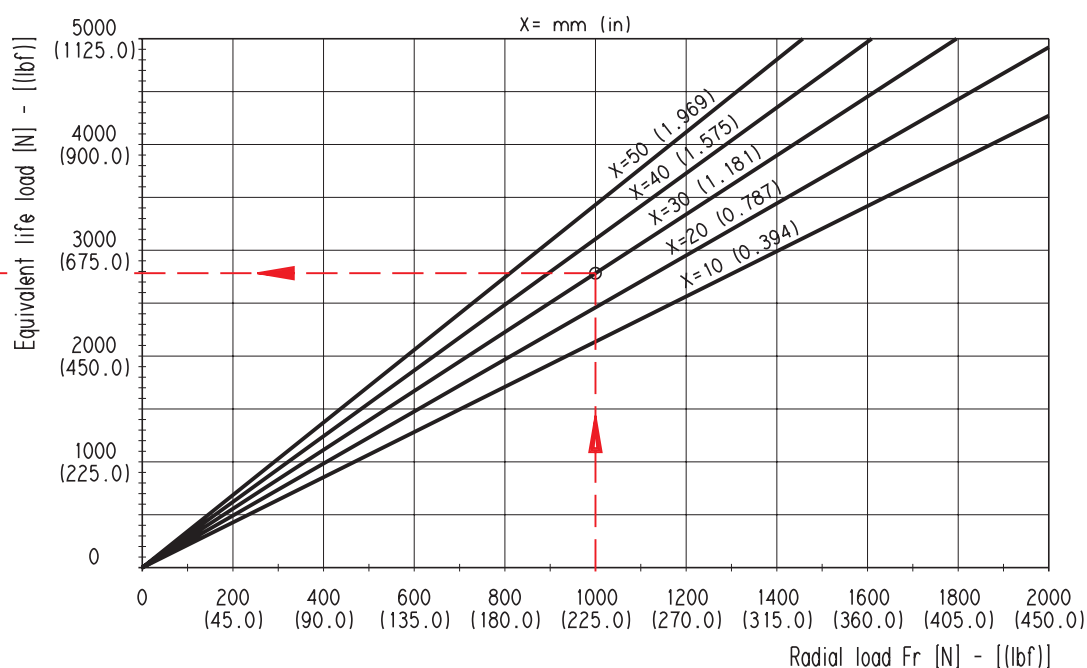
Lubricant oil ISO VG 46

Temperature 60 °C (140 °F)

Without or with very low axial load

Example

Fr Radial load	1000 N (225.0 lbf)
X	30 mm (1.1811 in)
Speed	2000 min ⁻¹
Rating fatigue life	≈ 5400 h



D010-143/0405

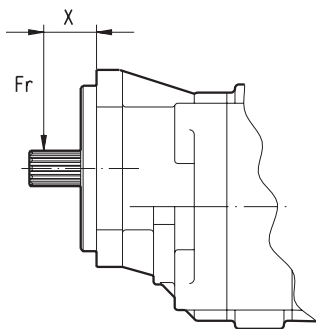
D033-148/0605

01/07.05

VERSION WITH OUTBOARD BEARINGS MAGNUM 30

4

D010-143/0405

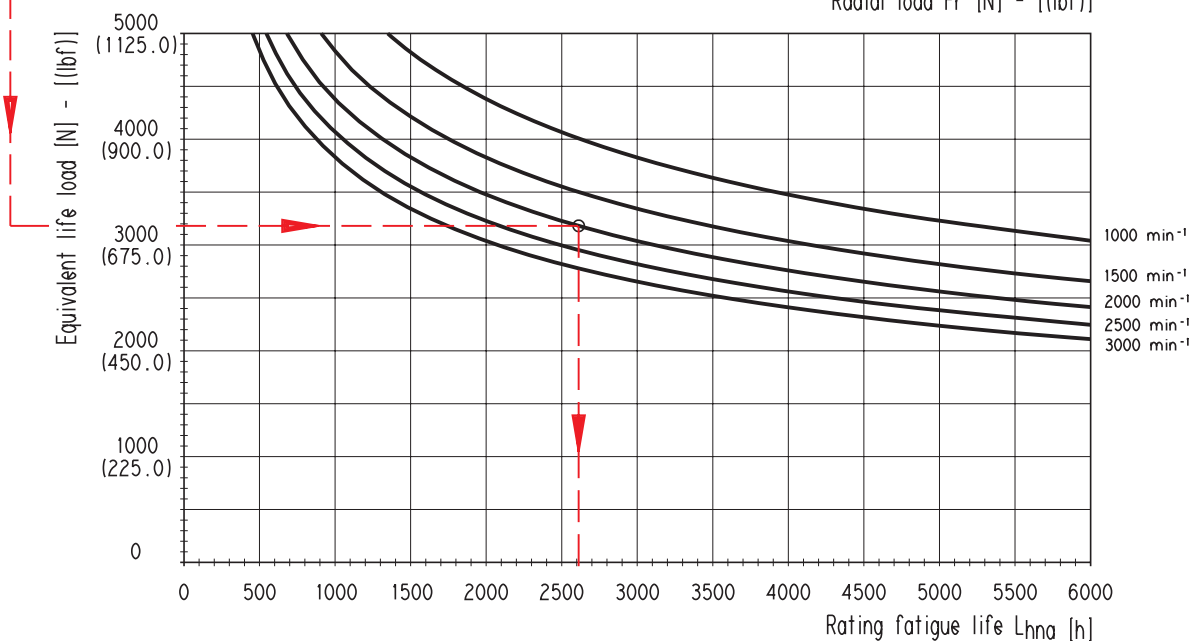
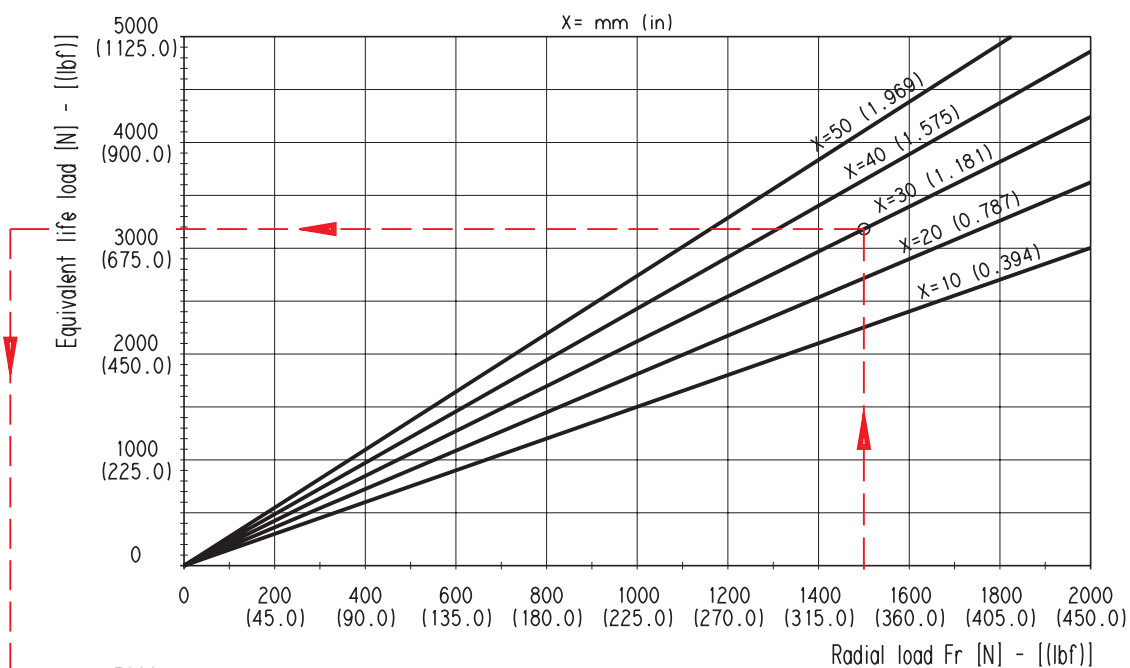


X = Distance of the radial load result from the mounting flange [mm (in)].

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

Example

Fr Radial load	1500 N (337.5 lbf)
X	30 mm (1.1811 in)
Speed	2000 min ⁻¹
Rating fatigue life	≈ 2613 h

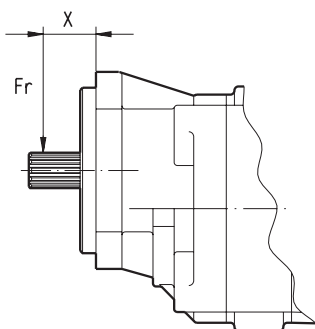


01/07.05

D010-149/0605

VERSION WITH OUTBOARD BEARINGS MAGNUM 35

4

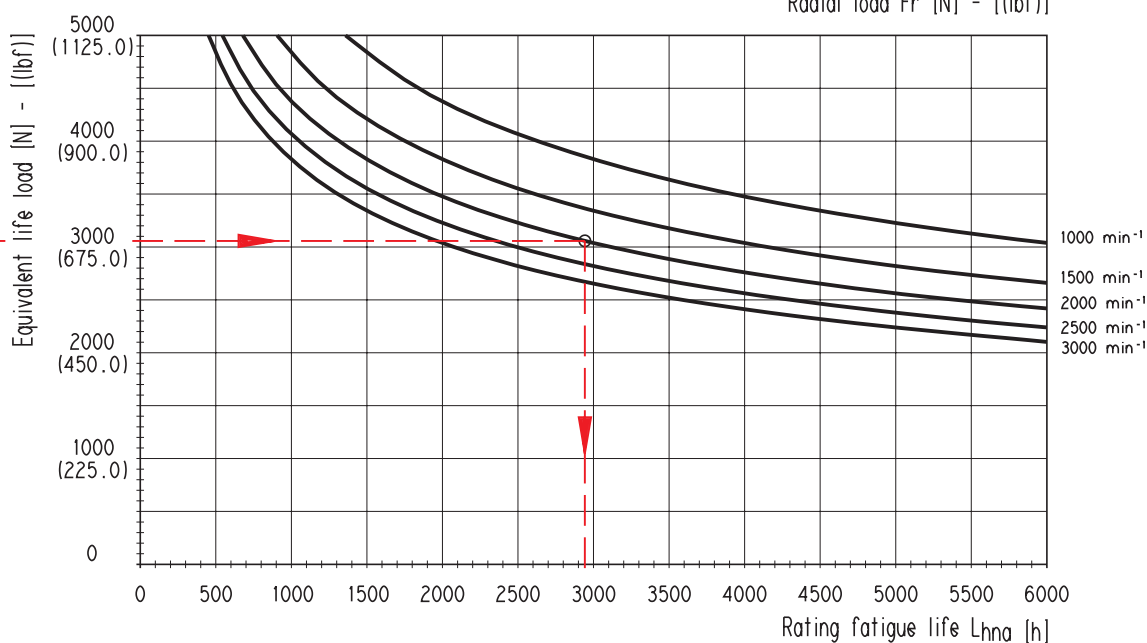
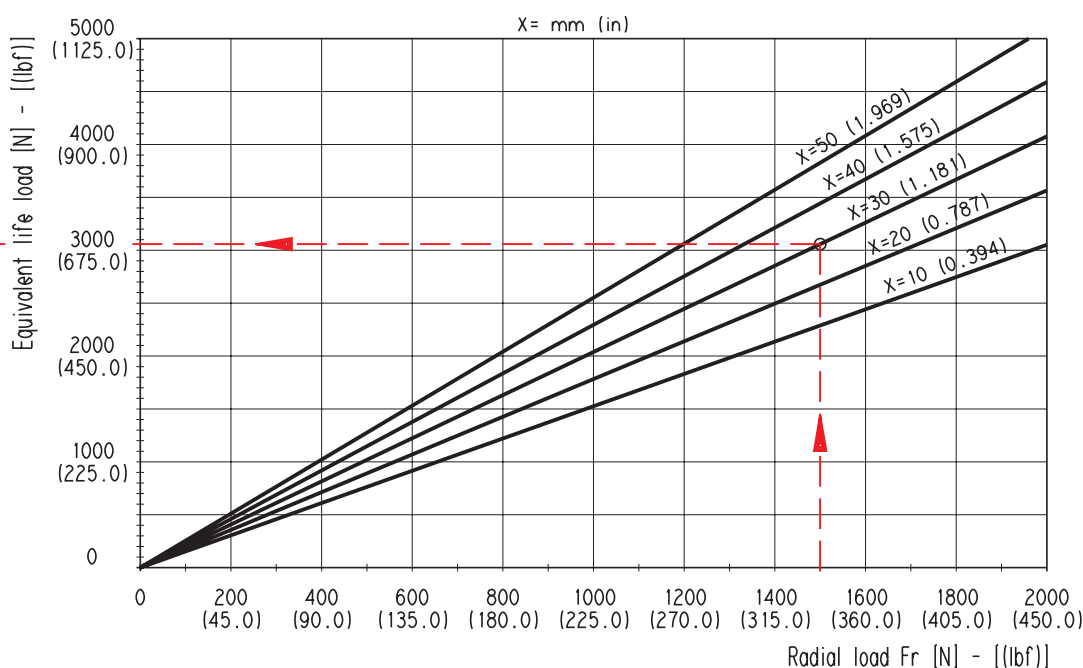


X= Distance of the radial load result from the mounting flange [mm (in)].

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

Example

Fr Radial load 1500 N (337.5 lbf)
X 30 mm (1.1811 in)
Speed 2000 min⁻¹
Rating fatigue life ≈ 2943 h



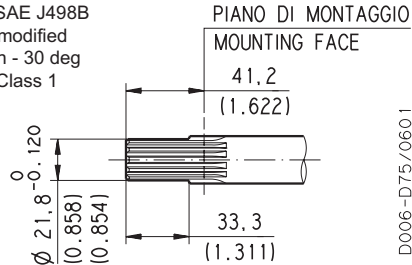
DRIVE SHAFTS

SAE "B" SPLINE

04

Mounting face refer to flange code **S3**

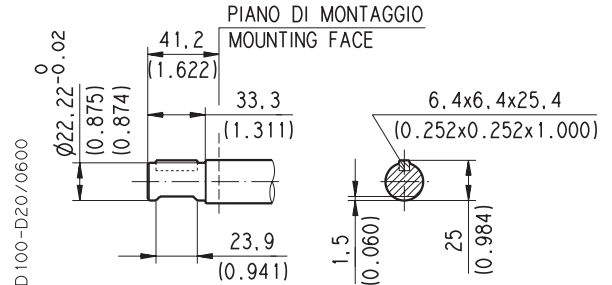
Ext. Involute Spline SAE J498B
with major diameter modified
13 teeth - 16/32 Pitch - 30 deg
Flat Root - Side fit - Class 1


HD. 30 **MAX 330 Nm (2921 lbf in) ◆**

HD. 35 **MAX 300 Nm (2655 lbf in) ◆**

SAE "B" STRAIGHT

32

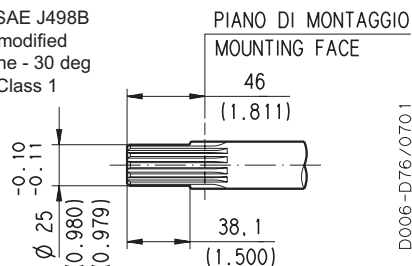
Mounting face refer to flange code **S3**

MAX 200 Nm (1770 lbf in) ◆

SAE "BB" SPLINE

05

Mounting face refer to flange code **S3**

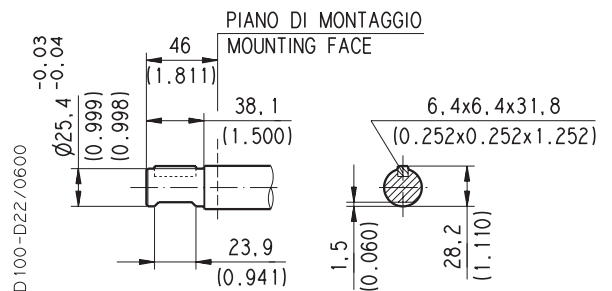
Ext. Involute Spline SAE J498B
with major diameter modified
15 teeth - 16/32 Spline - 30 deg
Flat Root - Side fit - Class 1


HD. 30 **MAX 500 Nm (4426 lbf in) ◆**

HD. 35 **MAX 450 Nm (3983 lbf in) ◆**

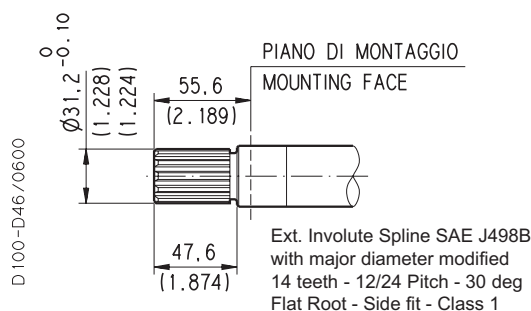
SAE "BB" STRAIGHT

33

Mounting face refer to flange code **S3**

MAX 280 Nm (2478 lbf in) ◆

SAE "C" SPLINE

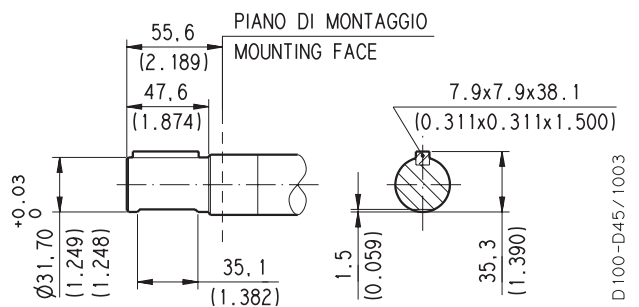
06

Mounting face refer to flange code **S8**

HD. 30 **MAX 170 Nm (1505 lbf in) ◆**

HD. 35 **MAX 900 Nm (7966 lbf in) ◆**

SAE "C" STRAIGHT

34

Mounting face refer to flange code **S8**

MAX 600 Nm (5311 lbf in) ◆

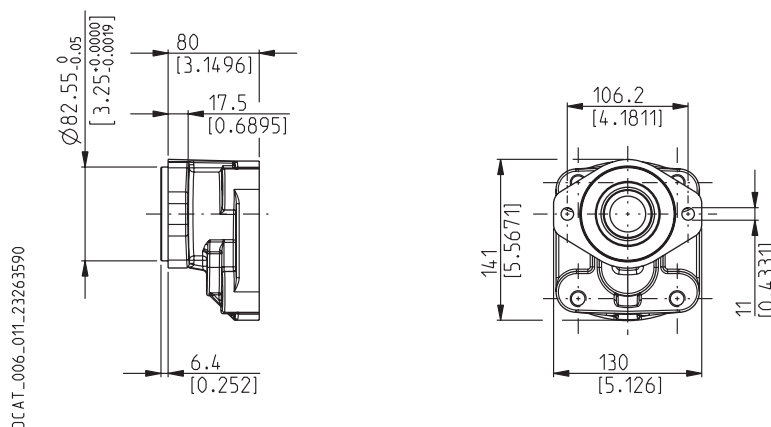
◆ For "2", "3" and "4" version whichever end shaft, the max torque applicable is:
HD. 30 MAX 170 Nm (1505 lbf in) - HD. 35 MAX 350 Nm (3098 lbf in)

MOUNTING FLANGES AND TABLE OF COMPATIBILITY

SAE "A" 2 HOLES

S1

Conforms to SAE J744



DRIVE SHAFTS See page 45

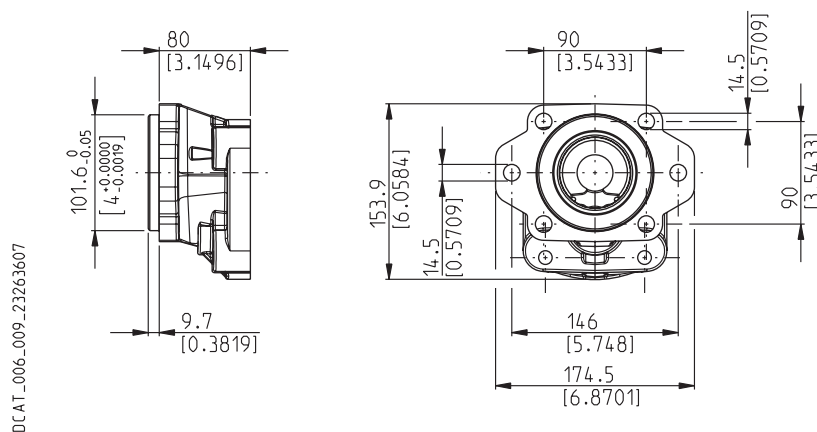
GROUP	VERSIONS See page 40	04	32	05	33	06	34
HD. 30	0	X	X	X	X		
	1	X	X	X	X		
	2	X	X	X	X	X	X

X Available combination

SAE "B" 2-4 HOLES

S3

Conforms to SAE J744



DRIVE SHAFTS See page 45

GROUP	VERSIONS See page 40	04	32	05	33	06	34
HD. 30	0	X	X	X	X		
	1	X	X	X	X		
	2	X	X	X	X	X	X
	3	X	X	X		X	X
	4	X	X		X	X	X

X Available combination

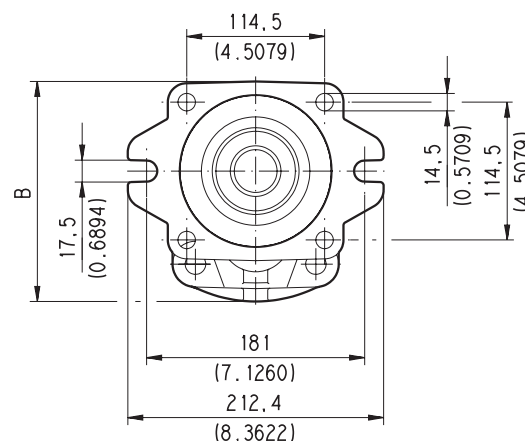
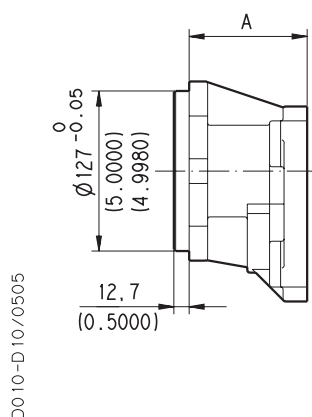
01/07.05

MOUNTING FLANGES AND TABLE OF COMPATIBILITY

SAE "C" 2-4 HOLES

S8

Conforms to SAE J744



GROUP	A	B
	mm (inch)	mm (inch)
HD. 30	80 (3.1496)	167,9 (6.6102)
HD. 35	90 (3.5433)	182,8 (7.1969)

		DRIVE SHAFTS See page 45					
GROUP	VERSIONS See page 40	04	32	05	33	06	34
HD. 30	0	X	X	X	X	X	X
	1	X	X	X		X	X
	2	X	X	X	X	X	X
	3	X	X	X		X	X
	4	X	X		X	X	X
HD. 35	0					X	X
	1					X	X
	2	X	X	X	X	X	X
	3					X	X
	4	X				X	X

X Available combination

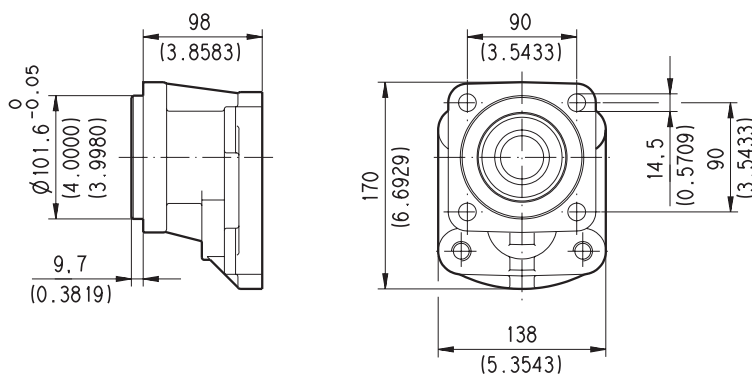
MOUNTING FLANGES AND TABLE OF COMPATIBILITY

SAE "B" 4 HOLES

S4

Conforms to SAE J744

D010-D09/0505



GROUP	VERSIONS See page 40	DRIVE SHAFTS See page 45					
		04	32	05	33	06	34
HD. 35	0					X	X
	1					X	X
	2	X	X			X	X
	3					X	X
	4	X				X	X

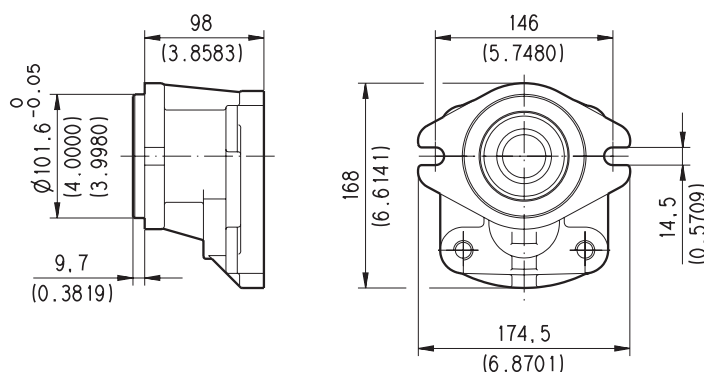
X Available combination

SAE "B" 2 HOLES

S5

Conforms to SAE J744

D010-D90/0505

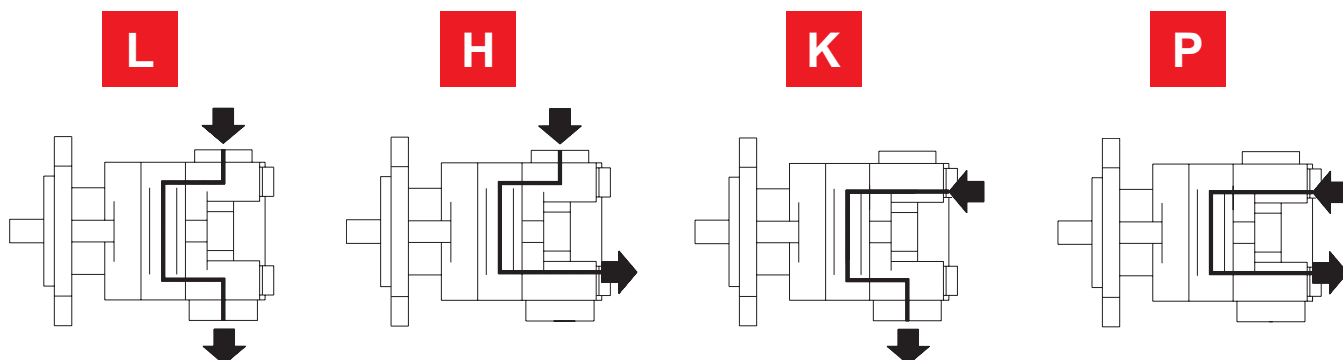


GROUP	VERSIONS See page 40	DRIVE SHAFTS See page 45					
		04	32	05	33	06	34
HD. 35	0					X	X
	1					X	X
	2	X	X	X	X	X	X
	3					X	X
	4	X				X	X

X Available combination

01/07.05

PORTS TYPE

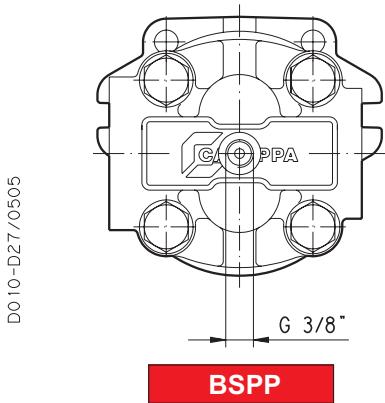


	SIDE PORTS								REAR PORTS			
PORTS TYPE	Split SSM		Split SSS		Gas BSPP		SAE ODT		Gas BSPP		SAE ODT	
Pump type	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Motor type	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN
HD. 30-17	MC	MB	SC	SB	GF	GE	OF	OD	GE	GE	OD	OD
HD. 30-22												
HD. 30-24												
HD. 30-27												
HD. 30-34												
HD. 30-38												
HD. 30-43	MD	MC	SD	SC	GG	GF	OG	OF	GF (●)	GE		
HD. 30-51												
HD. 30-56												
HD. 30-61	ME	MD	SE	SD								
HD. 30-73												
HD. 30-82												
HD. 35-40	ME	MD	SE	SD	GH	GG	OG	OF	GG (●)	GF	OF OH (◆)	OD OG (◆)
HD. 35-50												
HD. 35-63												
HD. 35-71												
HD. 35-80	MF	ME	SF	SE	GL	GH	OH	OG				
HD. 35-90												
HD. 35-100												
HD. 35-112												
HD. 35-125												

(●) Not available for reversible pumps and motors with external drain.

(◆) Available only for single pumps with larger ports.

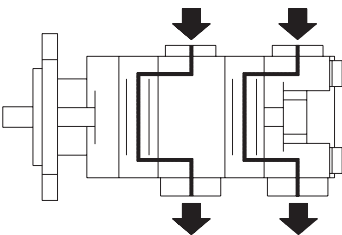
EXTERNAL DRAIN PORTS HD. 30 E HD. 35



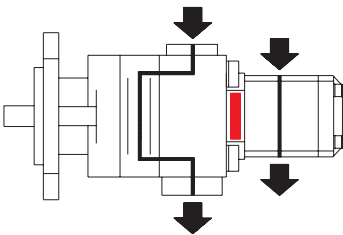
Rear port for reversible pumps and motors with external drain (R).
For dimensions see page 52.

PORTS FOR MULTIPLE PUMPS

SEPARATED INLET

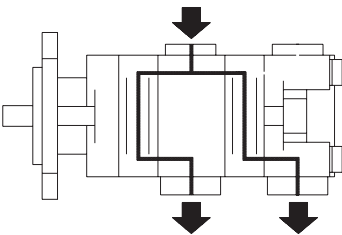


SEPARATED STAGES



Inlet and outlet ports are the same as side ports of single pumps (see page 49).

COMMON INLET



Inlet ports are larger than side inlet ports of single pumps (see table below).
Outlet ports are the same as side outlet ports of single pumps (see page 49).

SIDE PORTS				
PORTS TYPE	Split SSM	Split SSS	Gas BSPP	SAE ODT
Pump type	IN	IN	IN	IN
HDP 30	ME	SE	GG	OG
HDP 35	MF	SF	GL	OH

PORTS SIZES



Tightening torque for low pressure side port



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

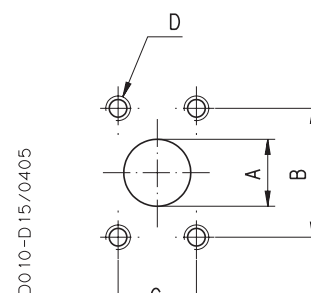
For reversible rotation, please consult only the tightening torque for high pressure side port

SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI

SSM

Metric thread ISO 60° conforms to ISO/R 262

CODE	A	B	C	D		
	mm (in)	mm (in)	mm (in)	Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
MB	19 (0.7480)	47,6 (1.8740)	22,2 (0.8740)	M 10 22 (0.8661)	20 ⁺¹ (177 ÷ 186)	35 ^{+2,5} (310 ÷ 332)
MC	24,5 (0.9646)	52,4 (2.0630)	26,2 (1.0315)	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 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 27 (1.0630)	30 ^{+2,5} (266 ÷ 288)	65 ⁺⁵ (575 ÷ 620)
MF	51 (2.0079)	77,8 (3.0630)	42,9 (1.6890)	M 12 27 (1.0630)	30 ^{+2,5} (266 ÷ 288)	—



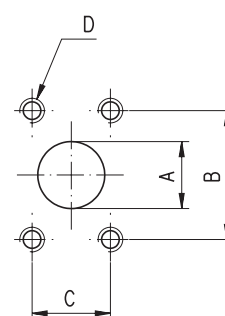
D010-D15/0405

SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI

SSS

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

CODE	A	B	C	D		
	mm (in)	mm (in)	mm (in)	Thread Depth mm (in)	Nm (lbf in)	Nm (lbf in)
SB	19 (0.7480)	47,6 (1.8740)	22,2 (0.8740)	3/8 - 16 UNC-2B 22 (0.8661)	20 ⁺¹ (177 ÷ 186)	30 ^{+2,5} (266 ÷ 288)
SC	24,5 (0.9646)	52,4 (2.0630)	26,2 (1.0315)	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 28,5 (1.1220)	25 ⁺¹ (221 ÷ 230)	55 ⁺⁵ (487 ÷ 531)
				7/16 - 14 UNC-2B 27 (1.0630) (◆)		
SE	39,3 (1.5472)	69,8 (2.7480)	35,7 (1.4055)	1/2 - 13 UNC-2B 27 (1.0630)	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 27 (1.0630)	30 ^{+2,5} (266 ÷ 288)	—



D010-D15/0405

(◆) For MAGNUM 35

01/07.05

PORTS SIZES



Tightening torque for low pressure side port



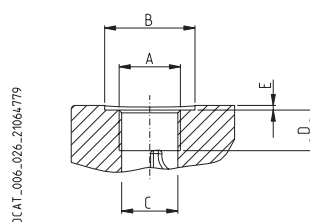
Tightening torque for high pressure side port [values obtained at 5075 psi (350 bar)]

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

GAS STRAIGHT THREAD PORTS

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	25 (0.9843)	15 (0.5906)	14 (0.5512)	4 (0.1575)	15 ⁺¹ (133 ÷ 142)	—
GE	3/4"	G 3/4	—	24,5 (0.9646)	22 (0.8661)	—	30 ^{+2,5} (266 ÷ 288)	90 ⁺⁵ (797 ÷ 841)
GF	1"	G 1	—	30,5 (1.2008)	25 (0.9843)	—	50 ^{+2,5} (443 ÷ 465)	130 ⁺¹⁰ (1151 ÷ 1239)
GG	1" 1/4	G 1 1/4	—	39 (1.5354)	26 (1.0236)	—	60 ⁺⁵ (531 ÷ 575)	170 ⁺¹⁰ (1505 ÷ 1593)
GH	1" 1/2	G 1 1/2	—	45 (1.5354)	28 (1.1024)	—	70 ⁺⁵ (620 ÷ 664)	210 ⁺¹⁰ (1859 ÷ 1947)
GL	2"	G 2	—	57 (2.2441)	32 (1.2598)	—	150 ⁺¹⁰ (1328 ÷ 1416)	—

(◆) = Drain port

PORTS SIZES



Tightening torque for low pressure side port



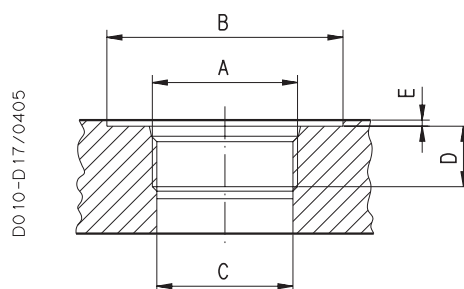
Tightening torque for high pressure side port [values obtained at 5075 psi (350 bar)]

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)
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	50 (1.9685)	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	45 (◆) (1.7717)	39,1 (1.5394)	20 (0.7874)	0,5 (0.0197)	70 ⁺⁵ (620 ÷ 664)	—
			58 (◆) (2.2835)					200 ⁺¹⁰ (1770 ÷ 1859)
OH	1" 1/2	1 7/8" - 12 UNF - 2B	65 (2.5591)	45,2 (1.7795)	20 (0.7874)	0,5 (0.0197)	100 ⁺⁵ (885 ÷ 929)	—

(◆) = For MAGNUM 35

CHANGING ROTATION

Example of changing rotation: from HDP30 pump counterclockwise to clockwise

To change rotation of unidirectional pumps and motors is necessary to operate in the following way

- 1 - Clean the pump externally with care.
- 2 - Loosen, and remove, the clamp bolts (1).
- 3 - Coat the sharp edges of the drive shaft (4) with adhesive tape and smear a layer of clean grease on the shaft end extension to avoid damaging the lip of the shaft seal when removing the mounting flange.

- 4 - Remove the mounting flange (2), taking care to keep the flange as straight as possible during removal. If the flange is stuck, tap around the edge with a fibre or rubber mallet in order to break away from the body. Ensure that while removing the front mounting flange, the drive shaft and other components remain position.

- 5 - Ease the drive gear (4) up to facilitate removal the front plate (3), taking care that the precision ground surfaces do not become damaged, and remove the drive gear.

- 6 - Remove the driven gear (5) without overturning. The rear plate has not to be removed.

- 7 - Re-locate the driven gear (5) in the position previously occupied by the drive gear (4).

- 8 - Re-locate the drive gear (4) in the position previously occupied by the driven gear (5).

- 9 - Replace the front plate (3) in its original position.

- 10 - Remove the grub screw (6) from the mounting flange (2) and re-locate it in the other threaded hole in the same flange.

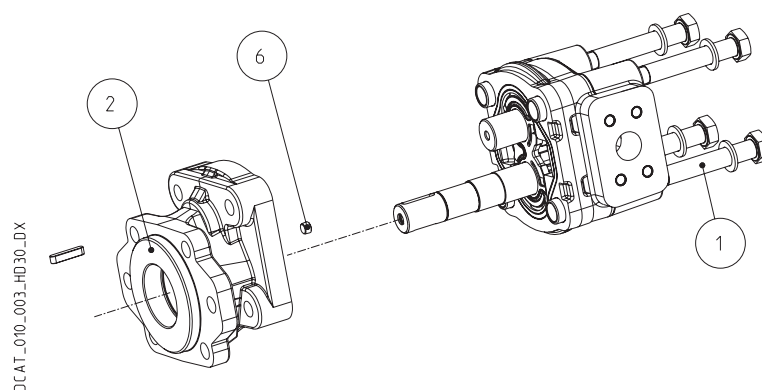
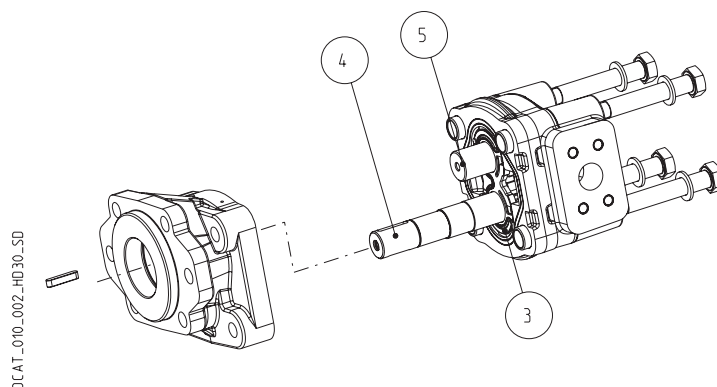
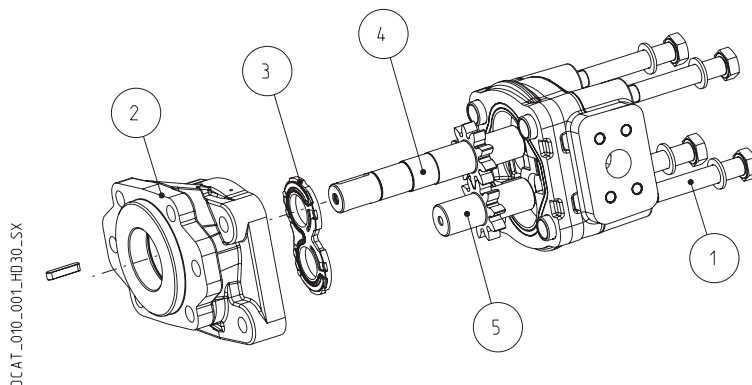
- 11 - Gently wipe the machined surface of the mounting flange (2) and the body with a flat hand stone.

- 12 - Refit the front mounting flange (2) turned 180° from its original position.

- 13 - Refit the clamp bolts (1) with the washers and tighten in a crisscross pattern to a torque value of $2230 \div 2726$ lbf in (280 ± 28 Nm).

- 14 - Check that the pump rotates freely when the drive shaft (4) is turned by hand. If not a pressure plate seal may be pinched.

- 15 - The pump is ready for installation with the original rotation reversed.



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.

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:



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.

STARTING UP

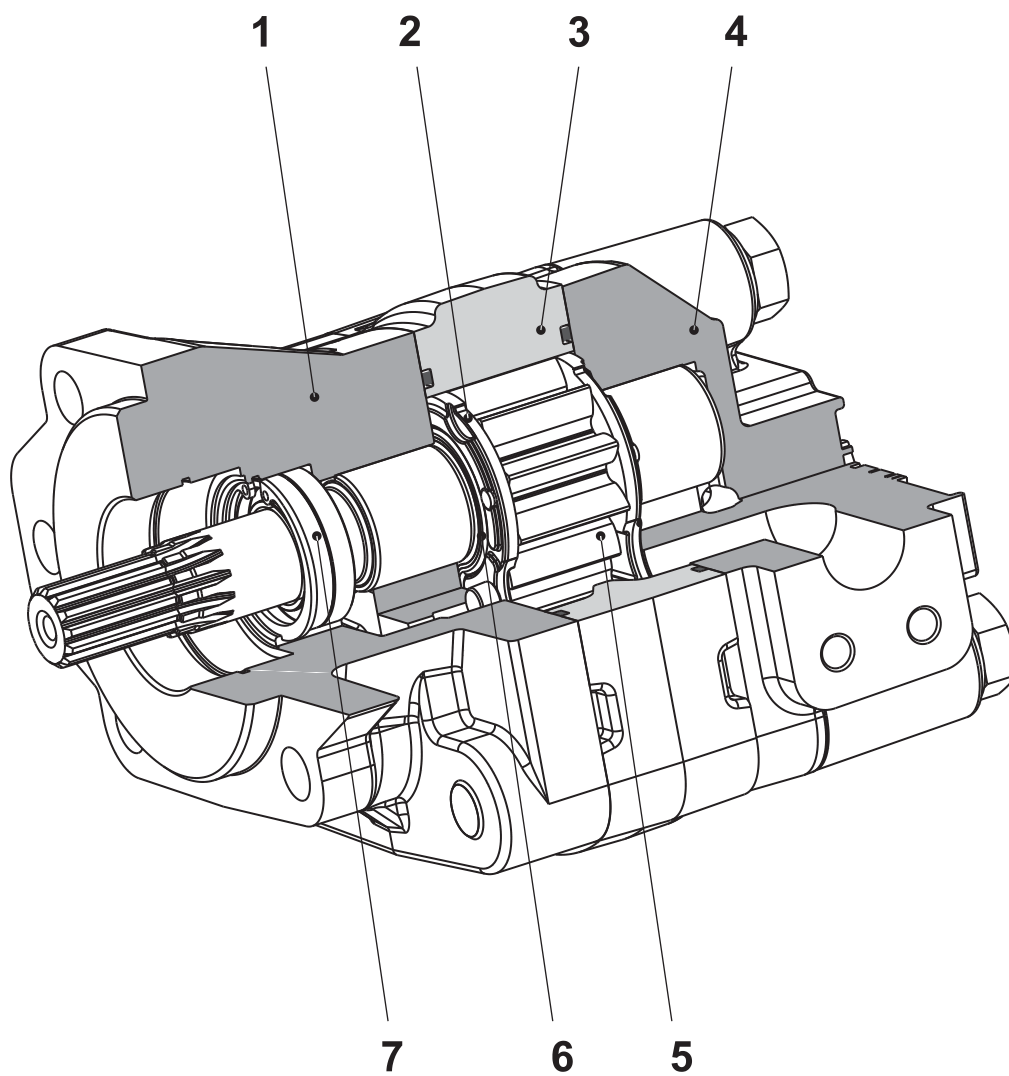
Check that all circuit connections are tight and that the entire system is completely clean. Insert the oil in the tank, using a filter. Bleed the circuit to assist in filling. Set the pressure relief valves to the lowest possible setting. Turn on the system for a few moments at minimum speed, then bleed the circuit again and check the level of oil in the tank. In the difference between pump or motor temperature and fluid temperature exceeds 50 °F (10 °C), 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.

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.

NOTES

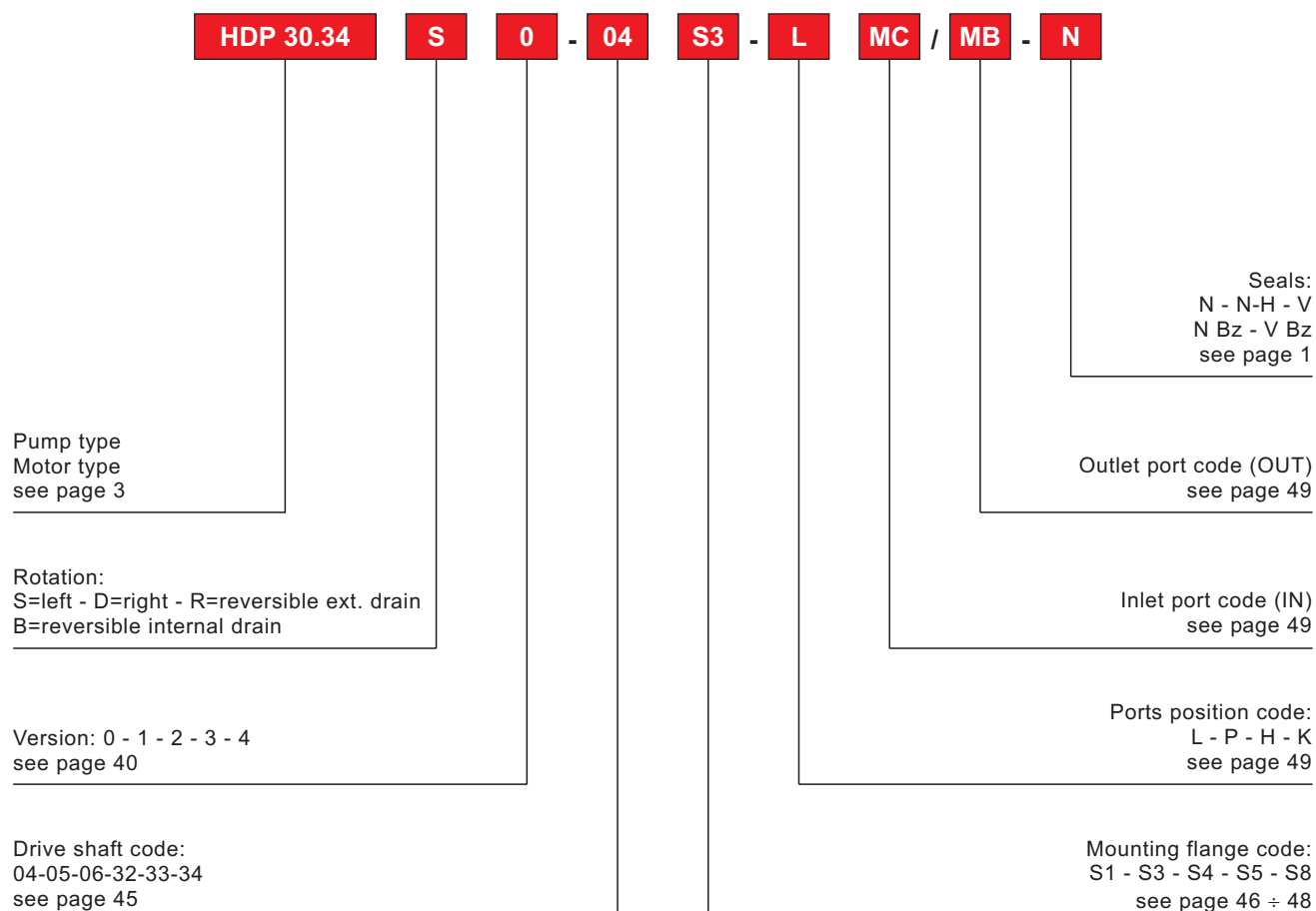
01/07.05



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

HOW TO ORDER SINGLE UNITS

Before ordering consult shaft, flange and version table compatibility at pages 46 ÷ 48.



ORDER EXAMPLE

Triple pump HDP 35 / 30 / 30 with common inlet between front and intermediate section.

HOW TO ORDER SEPARATED SECTIONS

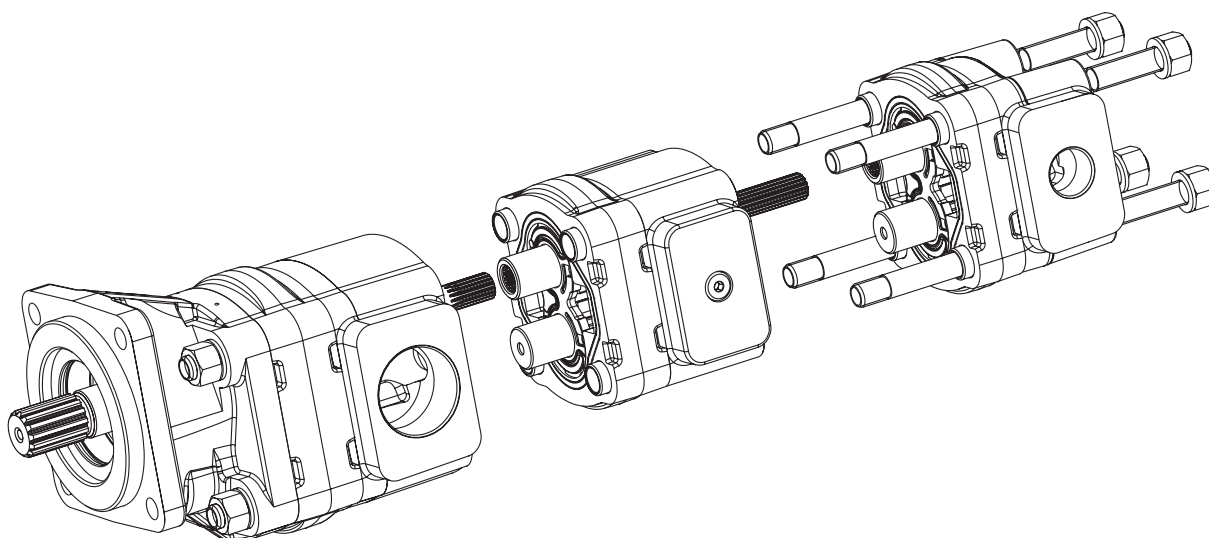
Front section **HDP35•71 S0 - 06 S6 - L GL/GG - 61 G1 - N - A**

Intermediate section **HDP30•43 S - L /GF- 65 M0 - N - I**

Rear section **HDP30•34 S - L GF/GE- M0 - N - P**

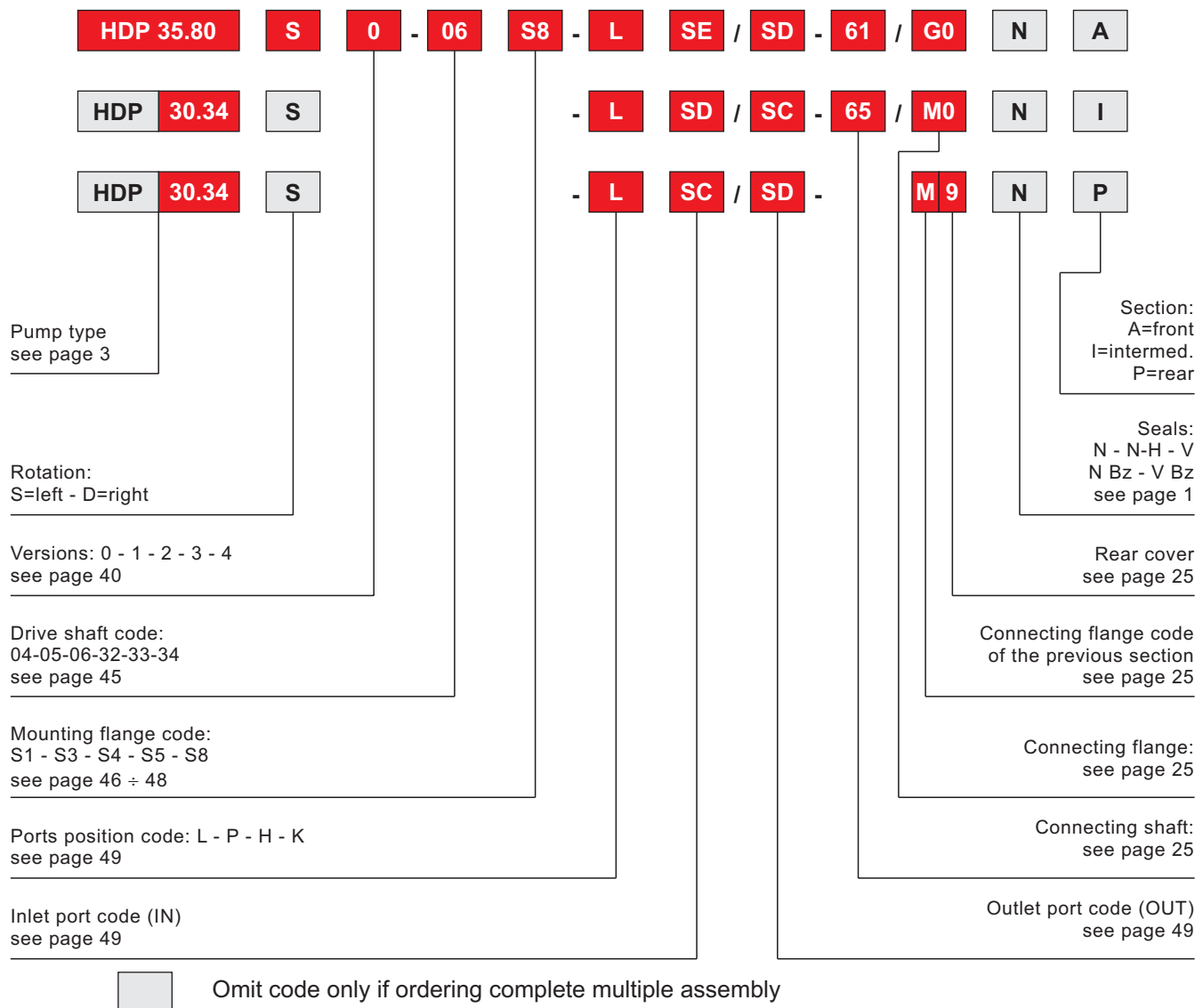
HOW TO ORDER AN ASSEMBLED TRIPLE PUMP

HDP35•71 - 06 S6 - L GL/GG / 30•43 - L /GF-G1 / 30•34 - L GF/GE- S

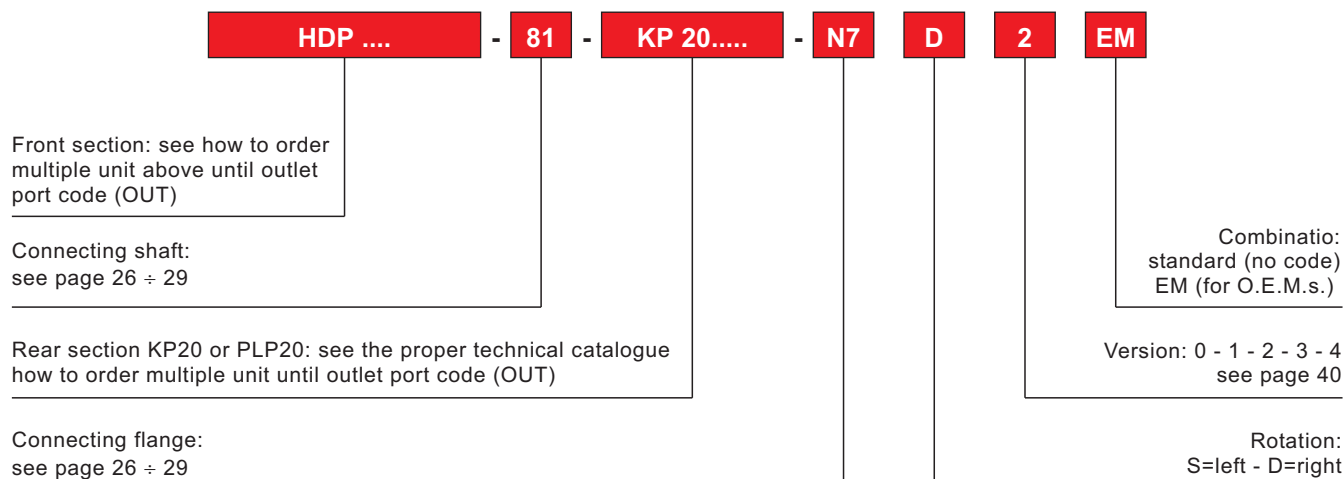


HOW TO ORDER MULTIPLE UNITS HDP... / HDP...

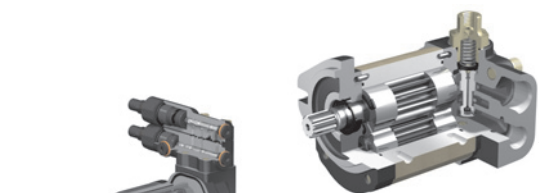
Before ordering consult shaft, flange and version table compatibility at pages 46 ÷ 48.



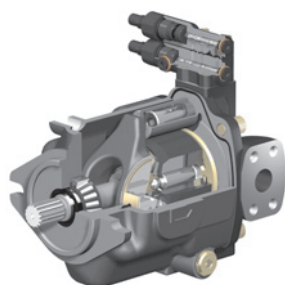
HOW TO ORDER DOUBLE PUMPS HDP.. / KP 20 or PLP 20



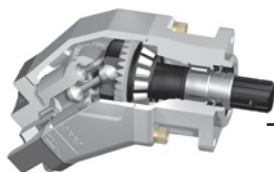
Casappa: Fluid Power Design at 360°



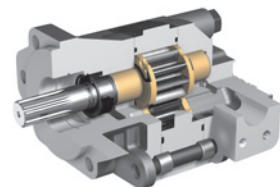
Gear pumps and motors.
High performance, low noise.



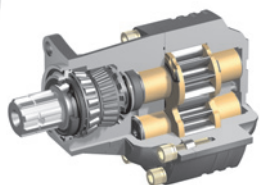
Variable displacement axial piston pumps,
for open circuit.



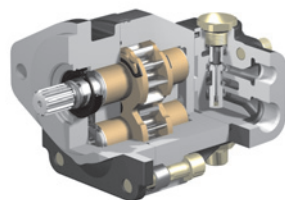
Fixed displacement bent axis piston pumps,
for truck applications.



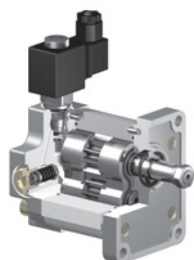
Cast iron gear pumps and
motors of three part construction.



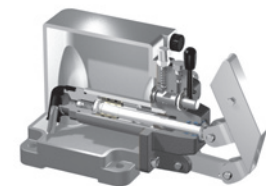
Cast iron gear pumps,
for truck applications.



Cast iron gear pumps and
motors of two part construction.



Gear pumps and
motors in aluminium.



Double acting hydraulic hand pumps
with or without reservoir.



Filters : suction filters, return filters, in line filters spin-on
type, for medium and high pressure filters.



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www.casappa.com
e-mail: info@casappa.com



Hydraulic gear pumps

two piece cast iron housing

Replaces: F 02 T E

DISPLACEMENTS

From 0.50 in³/rev
(8,26 cm³/rev)

To 9.20 in³/rev
(150,79 cm³/rev)

MAX. SPEED

3000 min⁻¹



PRESSURE

Max. Continuous	4205 psi (290 bar)
Max. Intermittent	4568 psi (315 bar)
Max. Peak	4713 psi (325 bar)

- Two piece cast iron housing
- High performance at very low speed
- Ideal for truck applications

FORMULA designates a CASAPPA gear pump range specifically designed for applications requiring high pressure levels also at low speed; applications such as truck-mounted cranes, tripper trucks and lift-trucks etc. Special design features and an exclusive CASAPPA patent have perfected a sophisticated mechanism which makes FORMULA a highly reliable unit, proven by years of service in the specific field of use. The versatility offered by the range of Italian (triangular) European (ISO) and American (SAE) mounting flanges allows to the FORMULA pumps to be used in several applications.



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Modification from former edition.

01/08.05

FEATURES

GUARANTEE

CASAPPA provides a two years guarantee for FORMULA pumps on industrial vehicles if used in accordance with the applications and conditions indicated in this technical catalogue.

WARNING !

Failure or improper use of the product can cause damage at the same product or system.
Make sure that this is the last issue.

Construction	External gear type pumps
Mounting	ISO (ZF), ITALIAN (triangular) and SAE flanges
Line connections	Screw
Direction of rotation (looking at the drive shaft)	Anti-clock (S) - clockwise (D) - reversible (R or B)
Inlet pressure range for pumps	10 ÷ 44 psi - [0,7 ÷ 3 bar (abs.)]
Fluid temperature range	See table (1)
Fluid	Mineral oil based hydraulic fluids to ISO/DIN and fire resistant fluids [see table (1)]. For other fluids please consult our technical sales department.
Viscosity range	From 60 to 456 SSU [12 to 100 mm ² /s (cSt)] recommended Up to 3410 SSU [750 mm ² /s (cSt)] permitted
Filtering requirement	See table (2)

Tab. 1

Type	Fluid composition	Max pressure psi - (bar)	Max speed min ⁻¹	Temperature °F - (°C) 			Seals (◆)
				Min	Max continuous	Max peak	
ISO/DIN	Mineral oil based hydraulic fluid to ISO/DIN	See page 3	See page 3	-13 (-25)	176 (80)	212 (100)	N
				-13 (-25)	230 (110)	257 (125)	V
HFA	Oil emulsion in water 5 ÷ 15% of oil	725 (50)	1500	36 (2)	131 (55)		N
HFB	Water emulsion in oil 40 % of water	1740 (120)	1500	36 (2)	140 (60)		N
HFC	Water - glycol	1450 (100)	1500	-4 (-20)	140 (60)		N Bz
HFD	Phosphate ester	2175 (150)	1500	14 (-10)	176 (80)		V Bz

(◆) N= Buna N (standard) - V= Viton - N Bz= Buna N and Bronze thrust plates - V Bz= Viton and Bronze thrust plates.

(●) For skydrol phosphate esters please consult our technical sales department.

Tab. 2

Working pressure	Δp > 2900 psi - (200 bar)	Δp < 2900 psi - (200 bar)
Contamination class NAS 1638	8	10
Contamination class ISO 4406	19/17/14	21/19/16
Achieved with filter β _x ≥75	10 μm	25 μm

Casappa recommends to use its own production filters:

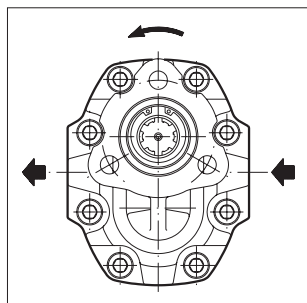


GENERAL NOTES

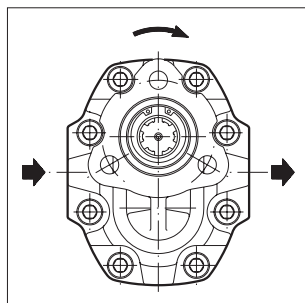
Available with different inlet and outlet ports. Standard pumps are equipped with BUNA N (N) seals, for particular operating conditions (V) VITON seals and BUNA or VITON seals with bronze thrust plates (N Bz), (V Bz) are available. If you use fire resistant fluids specify the type of them at the order. For more information please consult our technical sales department.

FEATURES

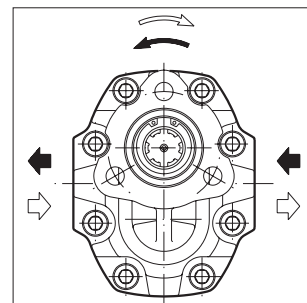
DEFINITION OF ROTATION DIRECTION LOOKING AT THE DRIVE SHAFT



Anti-clock rotation

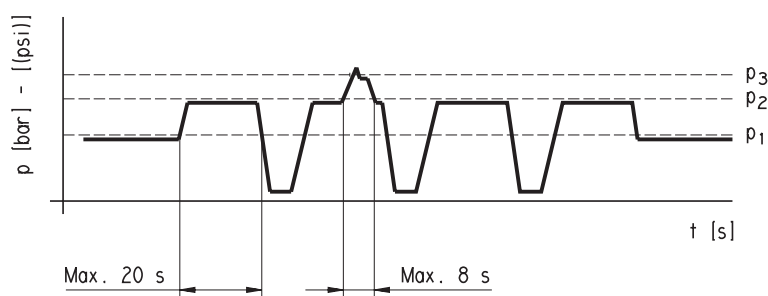


Clockwise rotation



Reversible rotation

PRESSURE DEFINITION



p_1 Max. continuous pressure

p_2 Max. intermittent pressure

p_3 Max. peak pressure

FORMULA 20 GENERAL DATA PUMPS
FP 20

Pump type	Displacement	Max. pressure			Intermittent max. speed		Min. speed
		p ₁	p ₂	p ₃	At p ₂ press.	Without load	At p ₂ press.
	in ³ /rev (cm ³ /rev)	psi (bar)			min ⁻¹		
FP 20•8 (•)	0.50 (8,26)	4060 (280)	4495 (310)	4713 (325)	2000	4200	300
FP 20•11,2 (•)	0.69 (11,23)	4060 (280)	4495 (310)	4713 (325)	2000	4200	300
FP 20•16	1.03 (16,85)	4060 (280)	4495 (310)	4713 (325)	2000	4200	300
FP 20•20	1.29 (21,14)	3770 (260)	4060 (280)	4205 (290)	2000	4200	300
FP 20•25	1.61 (26,42)	3190 (220)	3625 (250)	3770 (260)	2000	4200	300
FP 20•31,5	2.01 (33,03)	2755 (190)	3045 (210)	3190 (220)	1800	4000	300
FP 20•36 (•)	2.19 (35,94)	2465 (170)	2755 (190)	2900 (200)	1800	4000	300
FP 20•40	2.42 (39,64)	2320 (160)	2610 (180)	2755 (190)	1800	4000	300

(•): Only available in ISO 16 Z0 and ITALIAN 13 T1 version.

p₁= Max. continuous pressure

p₂= Max. intermittent pressure

p₃= Max. peak pressure

The values in the table refer to unidirectional and reversible pumps.

FORMULA 30 GENERAL DATA PUMPS
FP 30

Pump type	Displacement	Max. pressure			Intermittent max. speed		Min. speed
		p ₁	p ₂	p ₃	At p ₂ press.	Without load	At p ₂ press.
	in ³ /rev (cm ³ /rev)	psi (bar)			min ⁻¹		
FP 30•17	1.05 (17,28)	4205 (290)	4568 (315)	4713 (325)	3000	4000	300
FP 30•27	1.63 (26,70)	4205 (290)	4568 (315)	4713 (325)	3000	4000	300
FP 30•34	2.11 (34,56)	4060 (280)	4350 (300)	4495 (310)	2800	4200	300
FP 30•38	2.40 (39,27)	4060 (280)	4350 (300)	4495 (310)	2800	3500	300
FP 30•43	2.68 (43,98)	3915 (270)	4205 (290)	4350 (300)	2500	3500	300
FP 30•51	3.16 (51,83)	3480 (240)	3770 (260)	4060 (280)	2500	3500	300
FP 30•61	3.74 (61,26)	3190 (220)	3480 (240)	3625 (250)	2000	3500	300
FP 30•73	4.50 (73,82)	2900 (200)	3190 (220)	3335 (230)	1800	3500	300
FP 30•82	4.98 (81,68)	2755 (190)	3045 (210)	3190 (220)	1800	3500	300
FP 30•100	6.16 (100,52)	2610 (180)	2900 (200)	3190 (220)	1800	3500	300
FP 30•125	7.67 (125,66)	2320 (160)	2610 (180)	2900 (200)	1800	3500	300

p₁= Max. continuous pressure

p₂= Max. intermittent pressure

p₃= Max. peak pressure

The values in the table refer to unidirectional pumps.

Reversible pump max pressures are 15% lower than those shown in table.

For different working conditions please consult our sales department.

T2 type double shaft flange allow the pumps to work in clockwise or anticlockwise rotation obtaining the reversible advantages and maintaining the general data of unidirectional pumps.

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FORMULA 40 GENERAL DATA PUMPS
FP 40

Pump type	Displacement	Max. pressure			Intermittent max. speed		Min. speed
		p ₁	p ₂	p ₃	At p ₂ press.	Without load	At p ₂ press.
	in ³ /rev (cm ³ /rev)	psi (bar)			min ⁻¹		
FP 40•63	3.75 (61,43)	4205 (290)	4568 (315)	4713 (325)	2700	4200	300
FP 40•73	4.43 (72,60)	4060 (280)	4350 (300)	4568 (315)	2700	4200	300
FP 40•87	5.28 (86,56)	3770 (260)	4060 (280)	4205 (290)	2700	4000	300
FP 40•109	6.64 (108,90)	3480 (240)	3770 (260)	4060 (280)	2700	4000	300
FP 40•133	8.18 (134,03)	3190 (220)	3625 (250)	3770 (260)	2500	4000	300
FP 40•151	9.20 (150,79)	2610 (180)	3045 (210)	3190 (220)	2500	4000	300

p₁= Max. continuous pressure

p₂= Max. intermittent pressure

p₃= Max. peak pressure

The values in the table refer to unidirectional pumps.

Reversible pump max pressures are 15% lower than those shown in table.

For different working conditions please consult our sales department.

T2 type double shaft flange allow the pumps to work in clockwise or anticlockwise rotation obtaining the reversible advantages and maintaining the general data of unidirectional pumps.

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DESIGN CALCULATIONS FOR PUMPS

Q	US gpm (l/min)	Flow
M	lbf in (Nm)	Torque
P	HP (kW)	Power
V	in ³ /rev (cm ³ /rev)	Displacement
n	min ⁻¹	Speed
Δp	psi (bar)	Pressure
$\eta_v = \eta_v (V, \Delta p, n) \quad (\approx 0,98)$		Volumetric efficiency
$\eta_m = \eta_m (V, \Delta p, n) \quad (\approx 0,90)$		Mechanical efficiency
$\eta_t = \eta_v \cdot \eta_m \quad (\approx 0,88)$		Overall efficiency

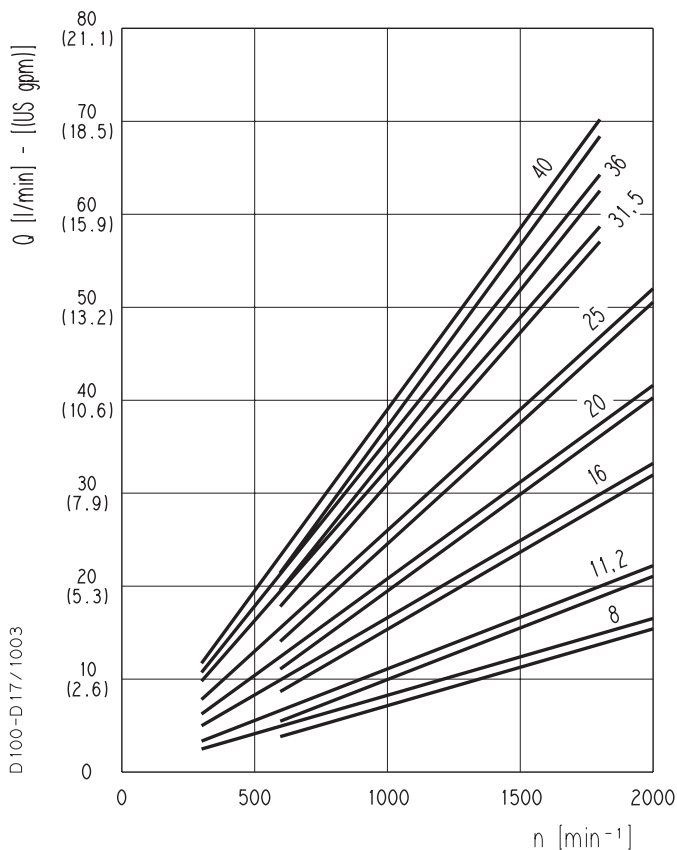
$$Q = V \text{ (cm}^3\text{/rev)} \cdot \eta_v \cdot n \cdot 10^{-3} \quad (\text{l/min})$$

$$M = \frac{\Delta p \text{ (bar)} \cdot V \text{ (cm}^3\text{/rev)}}{62,83 \cdot \eta_m} \quad (\text{Nm})$$

$$P = \frac{\Delta p \text{ (bar)} \cdot V \text{ (cm}^3\text{/rev)} \cdot n}{600 \cdot 1000 \cdot \eta_t} \quad (\text{kW})$$

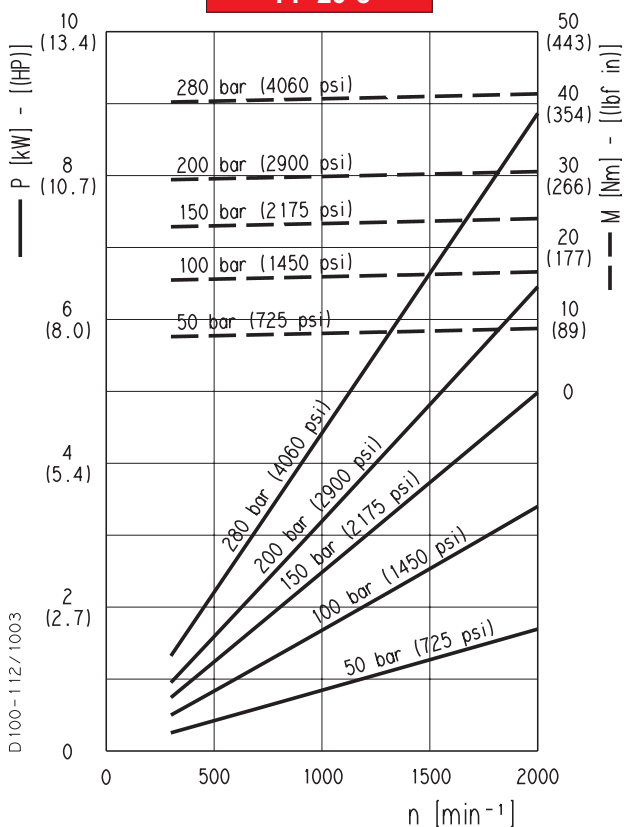
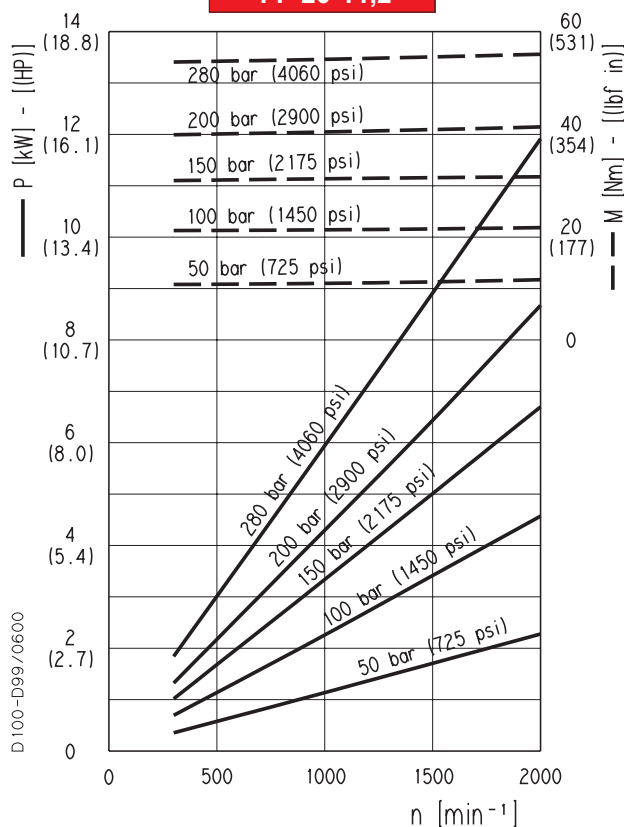
Note: Diagrams providing approximate selection data will be found on subsequent pages.

FORMULA 20 GEAR PUMPS PERFORMANCE CURVES

FP 20
FP 20


Each curve has been obtained at 122 °F (50°C), using oil with viscosity 168 SSU (36 cSt) at 104 °F (40°C) and at these pressures:

- FP 20•8 290-4060 psi (20-280 bar)
- FP 20•11,2 . . . 290-4060 psi (20-280 bar)
- FP 20•16 290-4060 psi (20-280 bar)
- FP 20•20 290-3770 psi (20-260 bar)
- FP 20•25 290-3190 psi (20-220 bar)
- FP 20•31,5 . . . 290-2755 psi (20-190 bar)
- FP 20•36 290-2465 psi (20-170 bar)
- FP 20•40 290-2320 psi (20-160 bar)

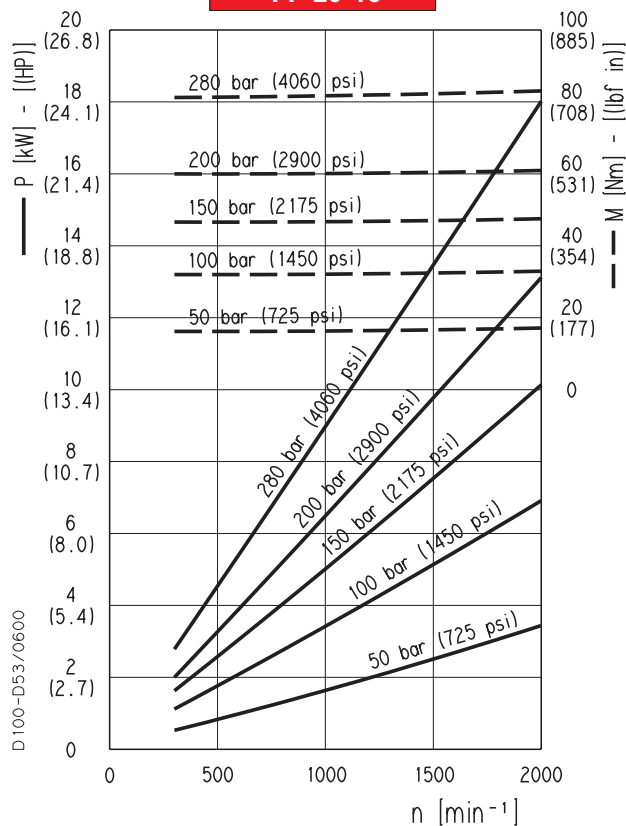
FP 20•8

FP 20•11,2


01/08.05

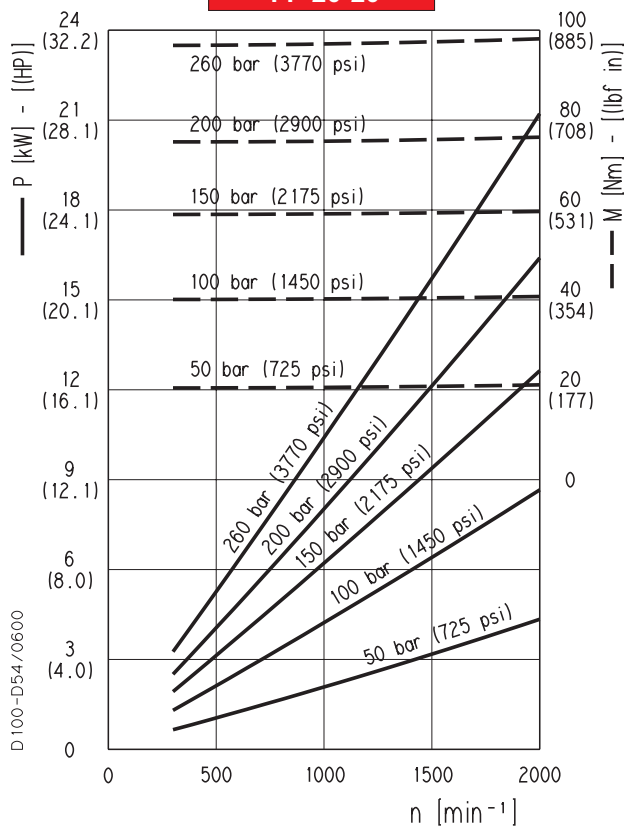
FORMULA 20 GEAR PUMPS PERFORMANCE CURVES

FP 20

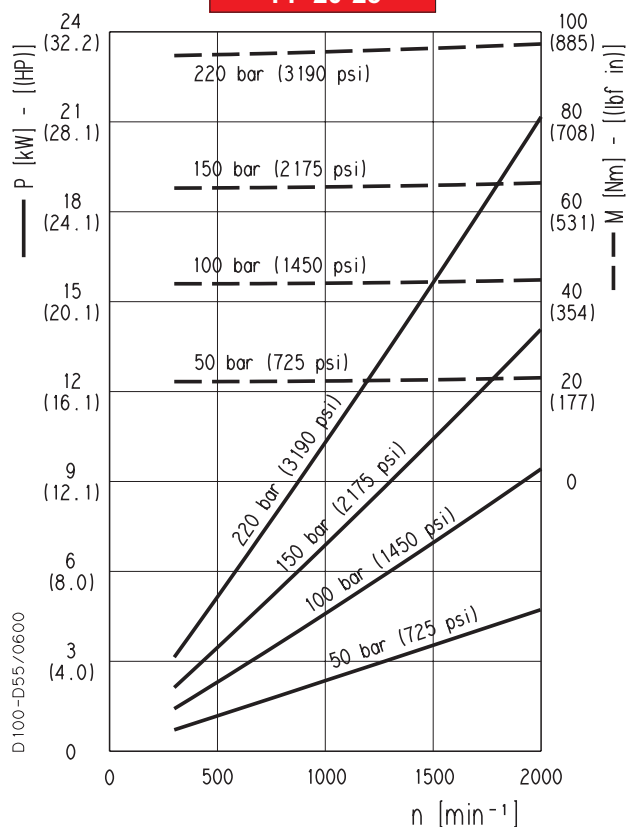
FP 20-16



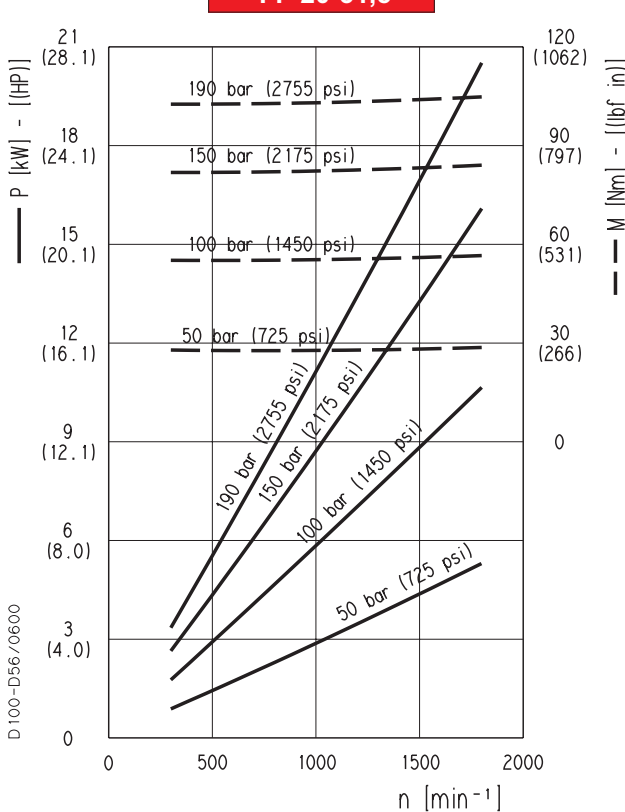
FP 20-20



FP 20-25



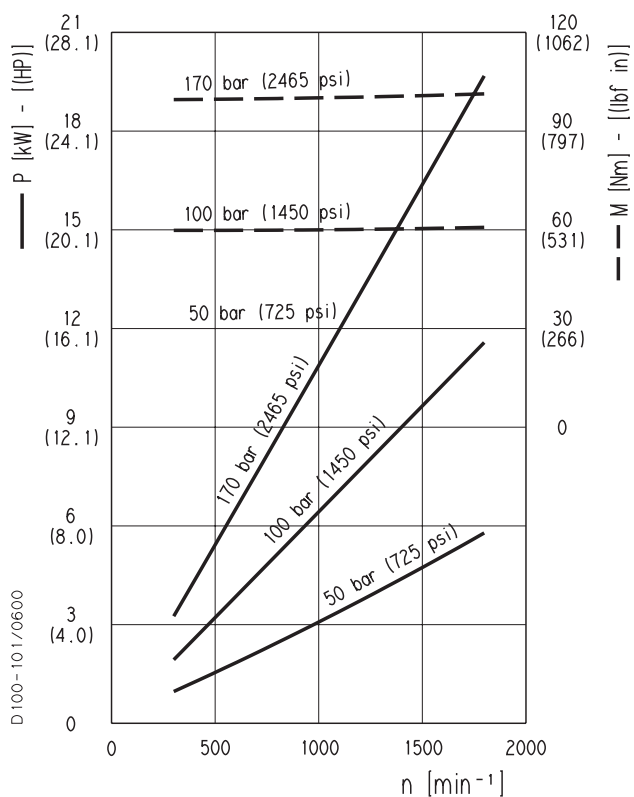
FP 20-31,5



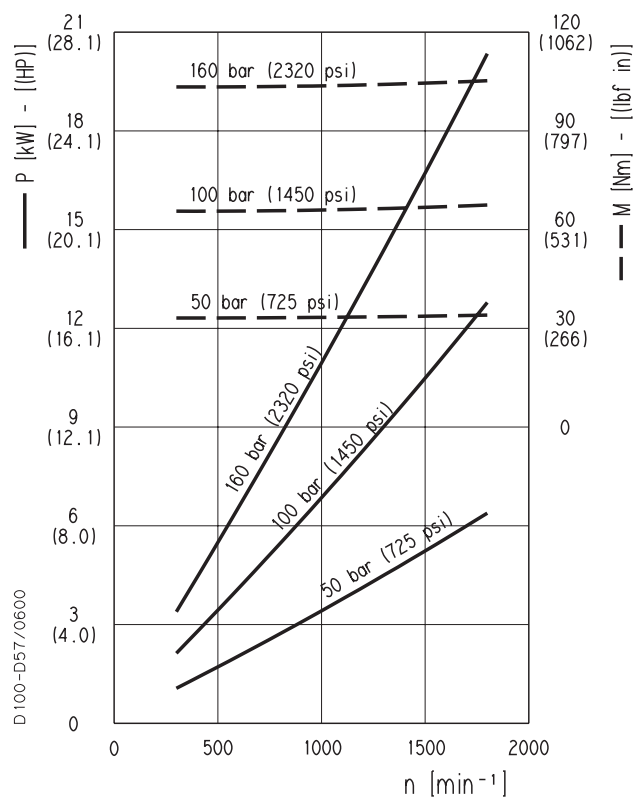
FORMULA 20 GEAR PUMPS PERFORMANCE CURVES

FP 20

FP 20•36



FP 20•40

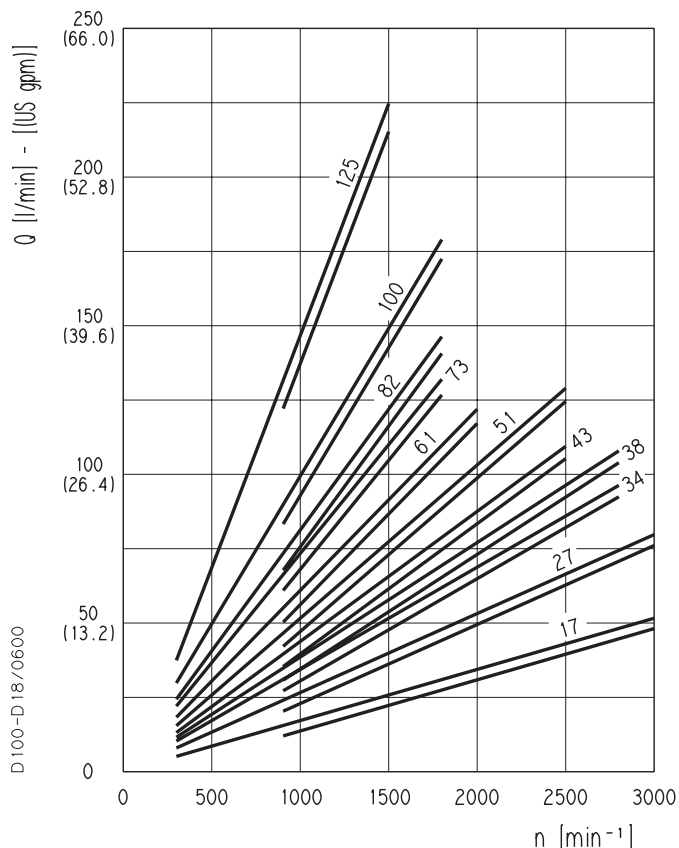


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FORMULA 30 GEAR PUMPS PERFORMANCE CURVES

FP 30

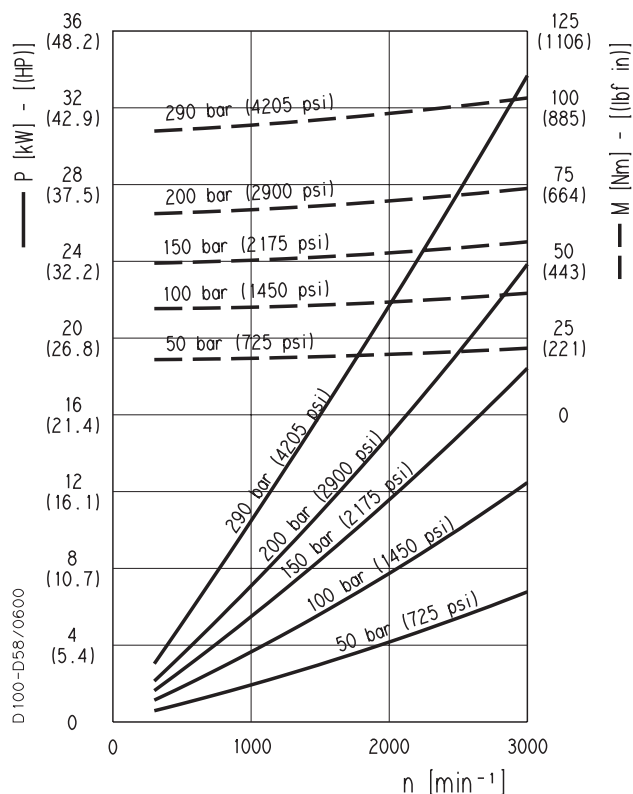
FP 30



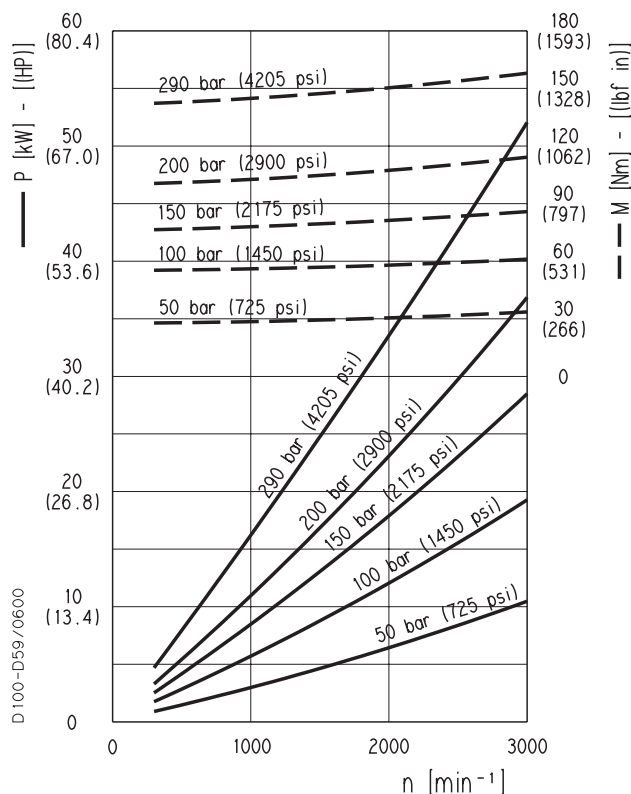
Each curve has been obtained at 122 °F (50°C), using oil with viscosity 168 SSU (36 cSt) at 104 °F (40°C) and at these pressures:

- FP 30•17 290-4205 psi (20-290 bar)
- FP 30•27 290-4205 psi (20-290 bar)
- FP 30•34 290-4060 psi (20-280 bar)
- FP 30•38 290-4060 psi (20-280 bar)
- FP 30•43 290-3915 psi (20-270 bar)
- FP 30•51 290-3480 psi (20-240 bar)
- FP 30•61 290-3190 psi (20-220 bar)
- FP 30•73 290-2900 psi (20-200 bar)
- FP 30•82 290-2755 psi (20-190 bar)
- FP 30•100 290-2610 psi (20-180 bar)
- FP 30•125 290-2320 psi (20-160 bar)

FP 30•17



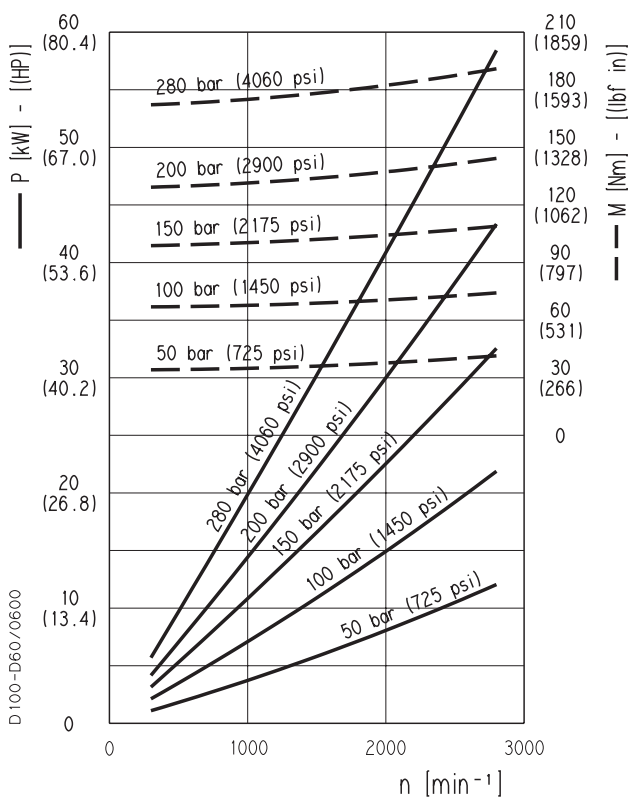
FP 30•27



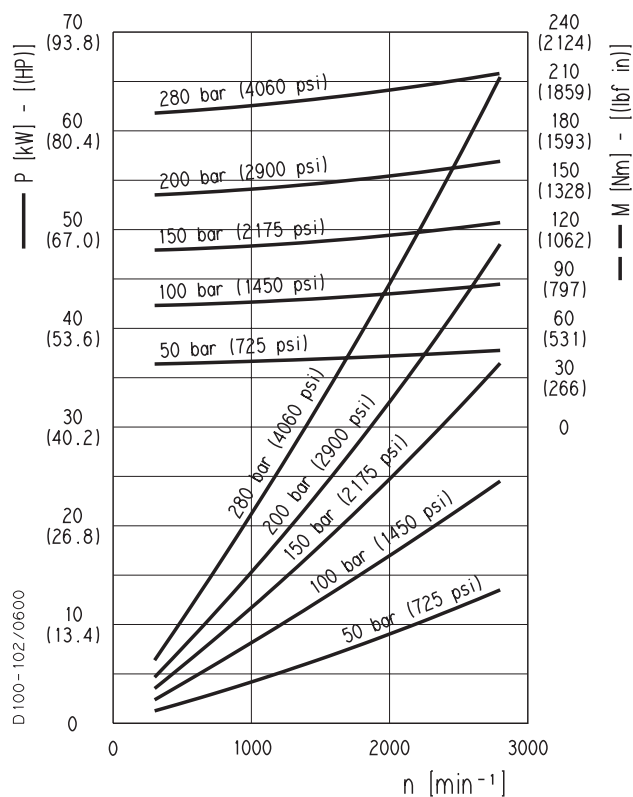
FORMULA 30 GEAR PUMPS PERFORMANCE CURVES

FP 30

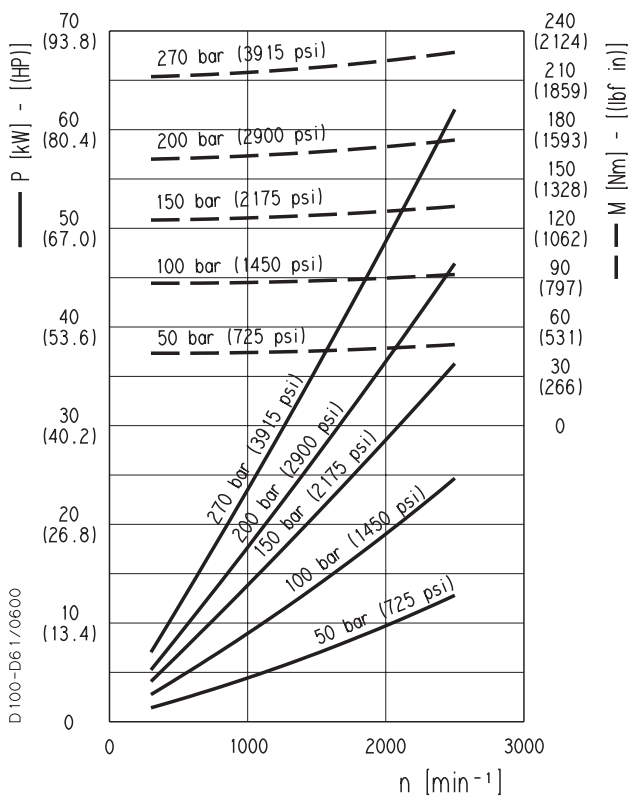
FP 30-34



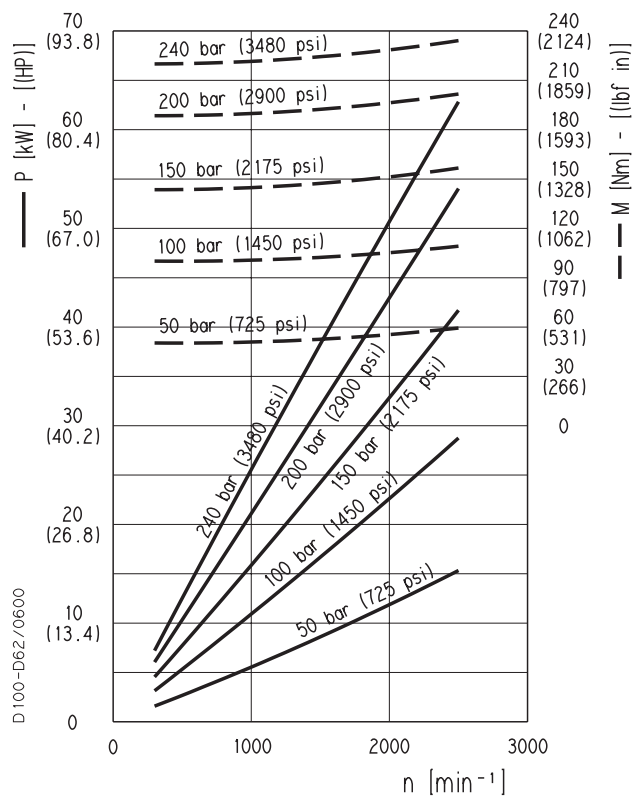
FP 30-38



FP 30-43



FP 30-51

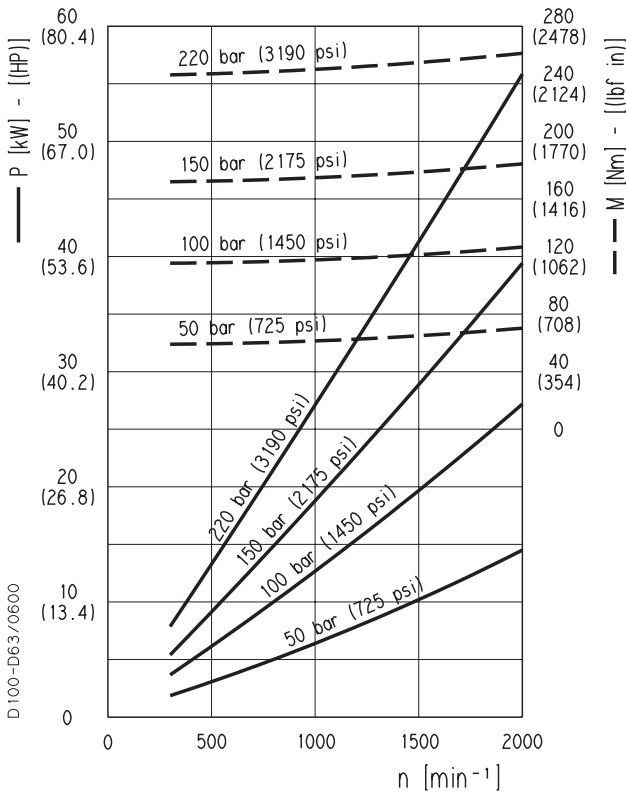


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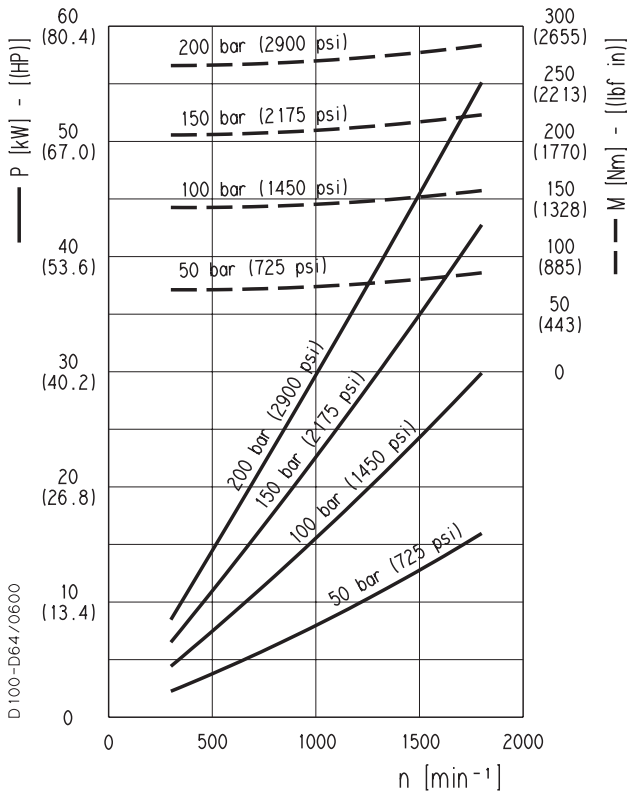
FORMULA 30 GEAR PUMPS PERFORMANCE CURVES

FP 30

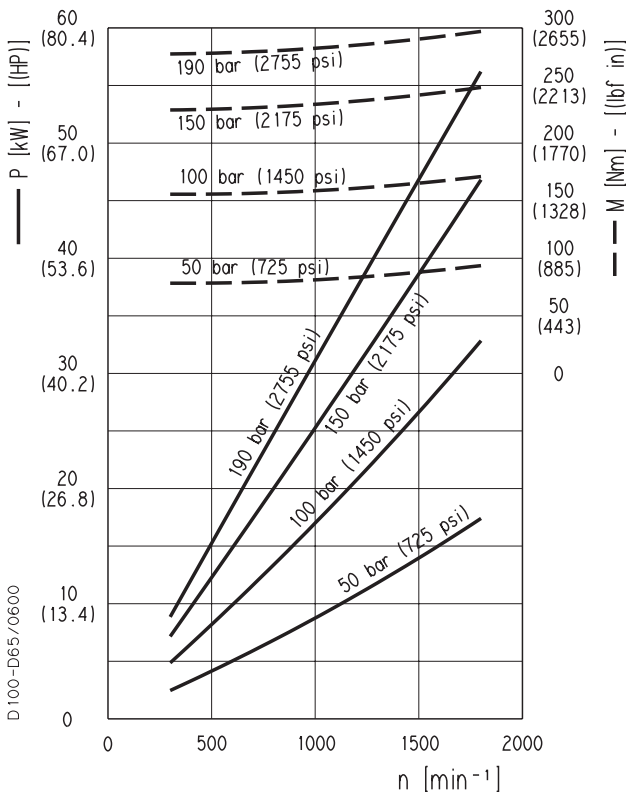
FP 30-61



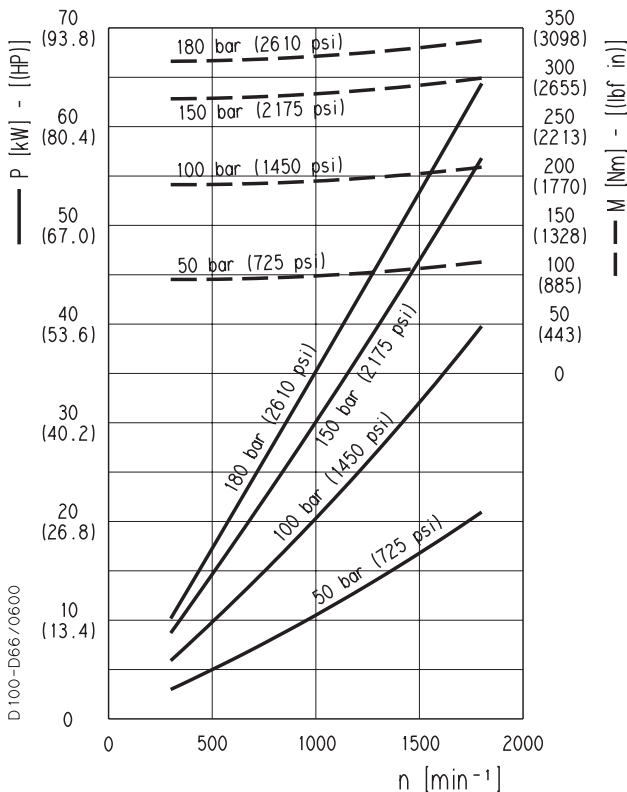
FP 30-73



FP 30-82



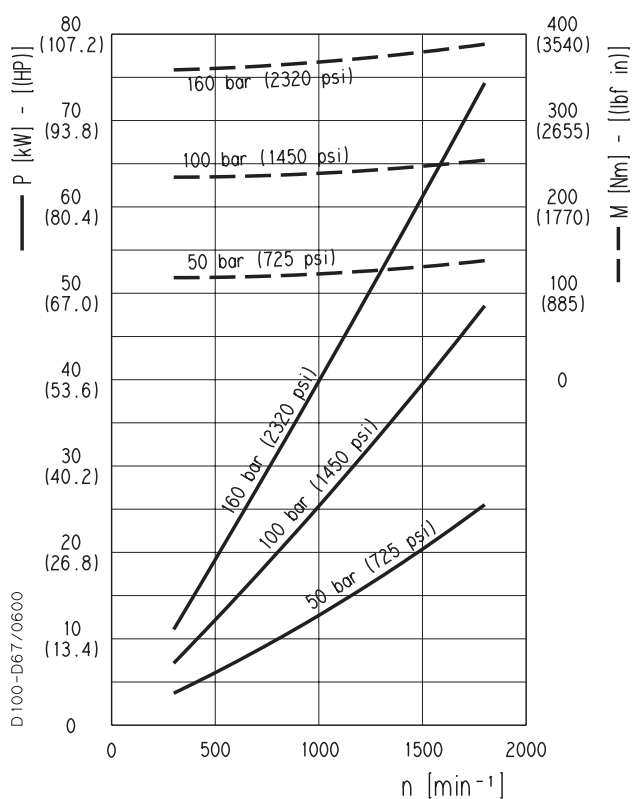
FP 30-100



FORMULA 30 GEAR PUMPS PERFORMANCE CURVES

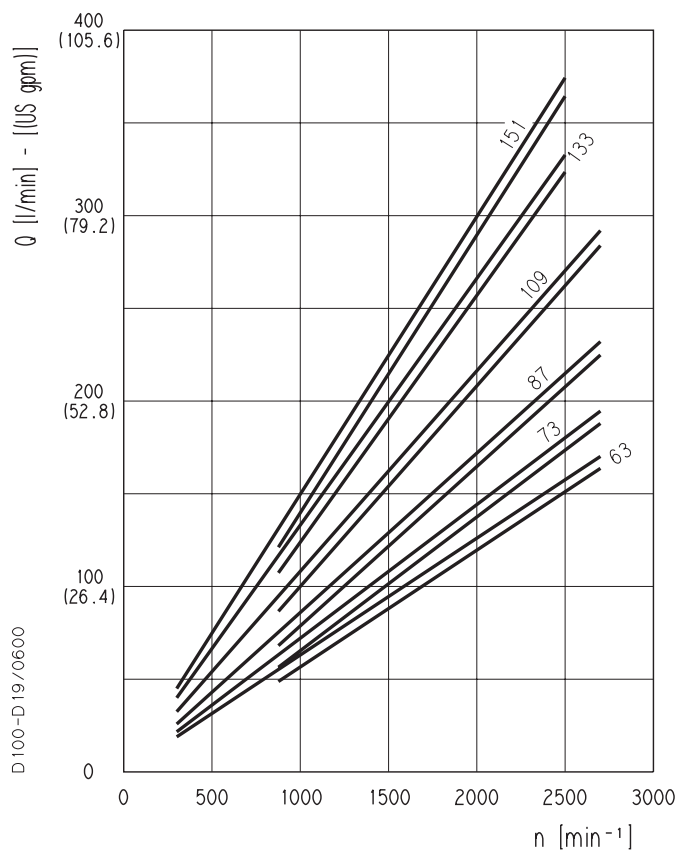
FP 30

FP 30•125



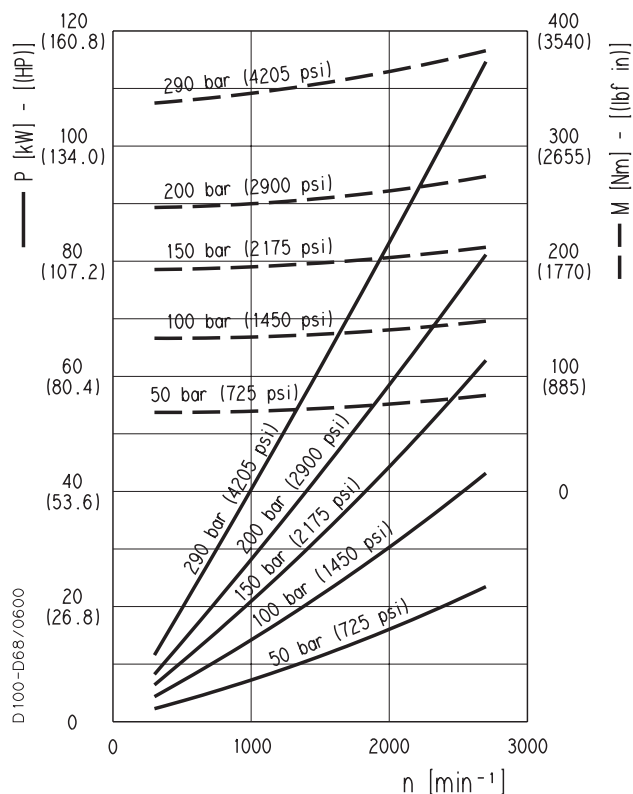
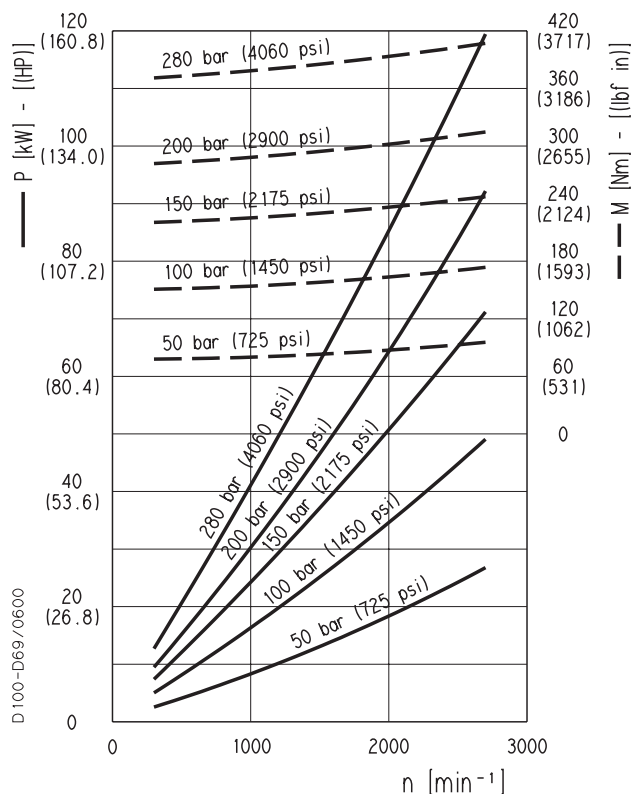
01/08.05

FORMULA 40 GEAR PUMPS PERFORMANCE CURVES

FP 40
FP 40


Each curve has been obtained at 122 °F (50°C), using oil with viscosity 168 SSU (36 cSt) at 104 °F (40°C) and at these pressures:

- FP 40•63 290-4205 psi (20-290 bar)
- FP 40•73 290-4060 psi (20-280 bar)
- FP 40•87 290-3770 psi (20-260 bar)
- FP 40•109 290-3480 psi (20-240 bar)
- FP 40•133 290-3190 psi (20-220 bar)
- FP 40•151 290-2610 psi (20-180 bar)

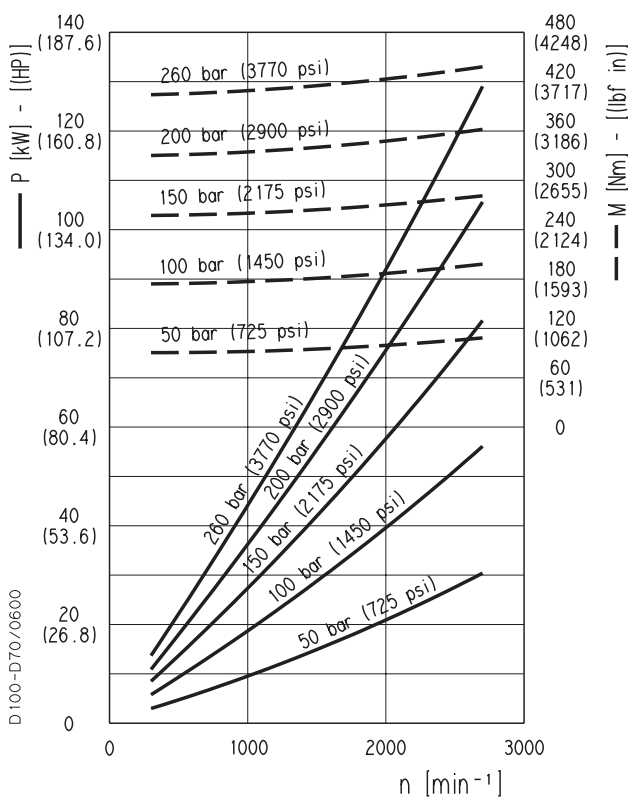
FP 40•63

FP 40•73


01/08.05

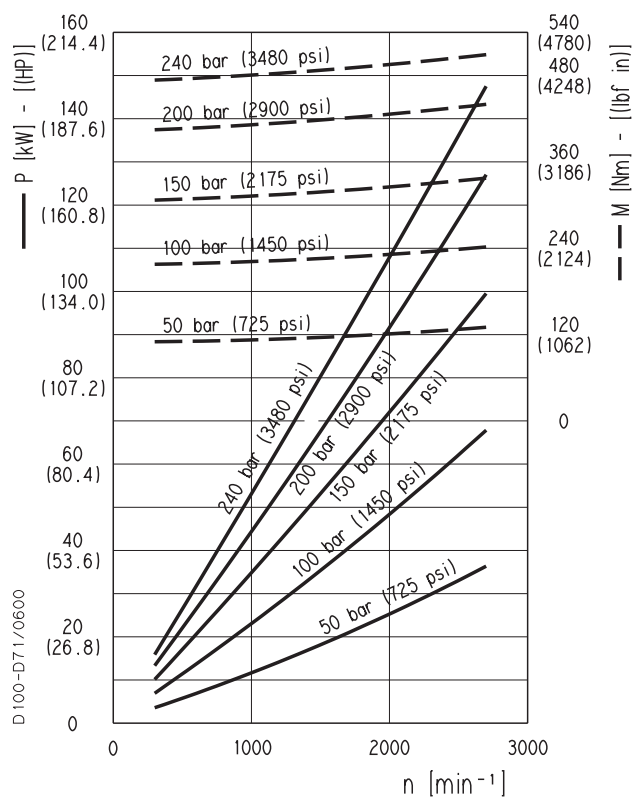
FORMULA 40 GEAR PUMPS PERFORMANCE CURVES

FP 40

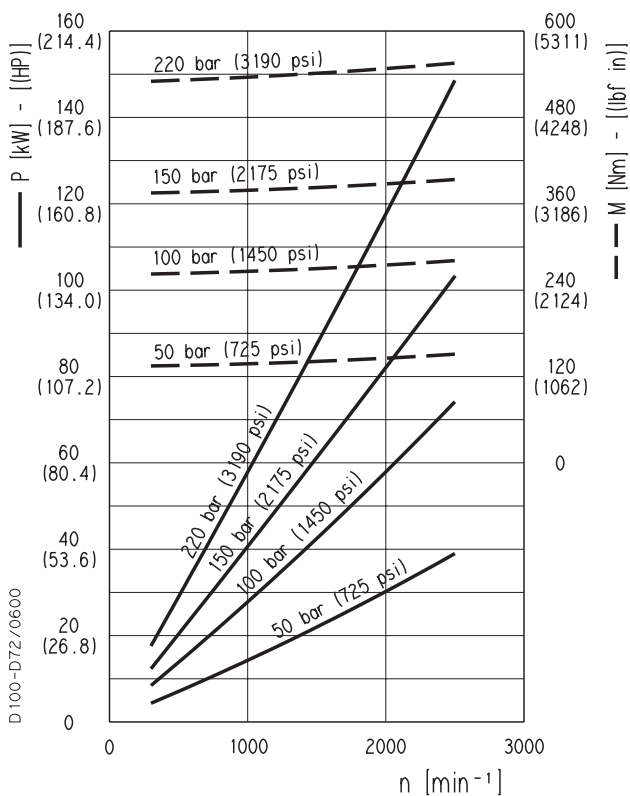
FP 40-87



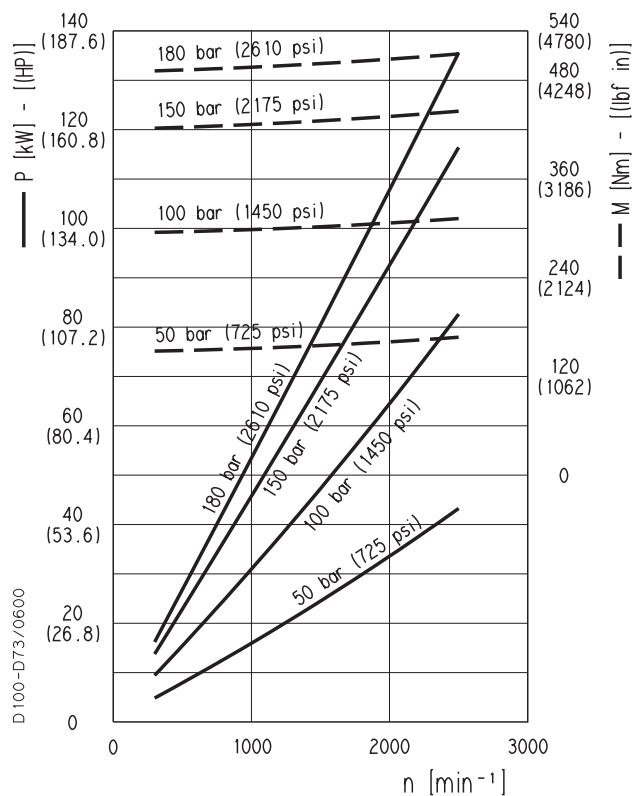
FP 40-109



FP 40-133



FP 40-151

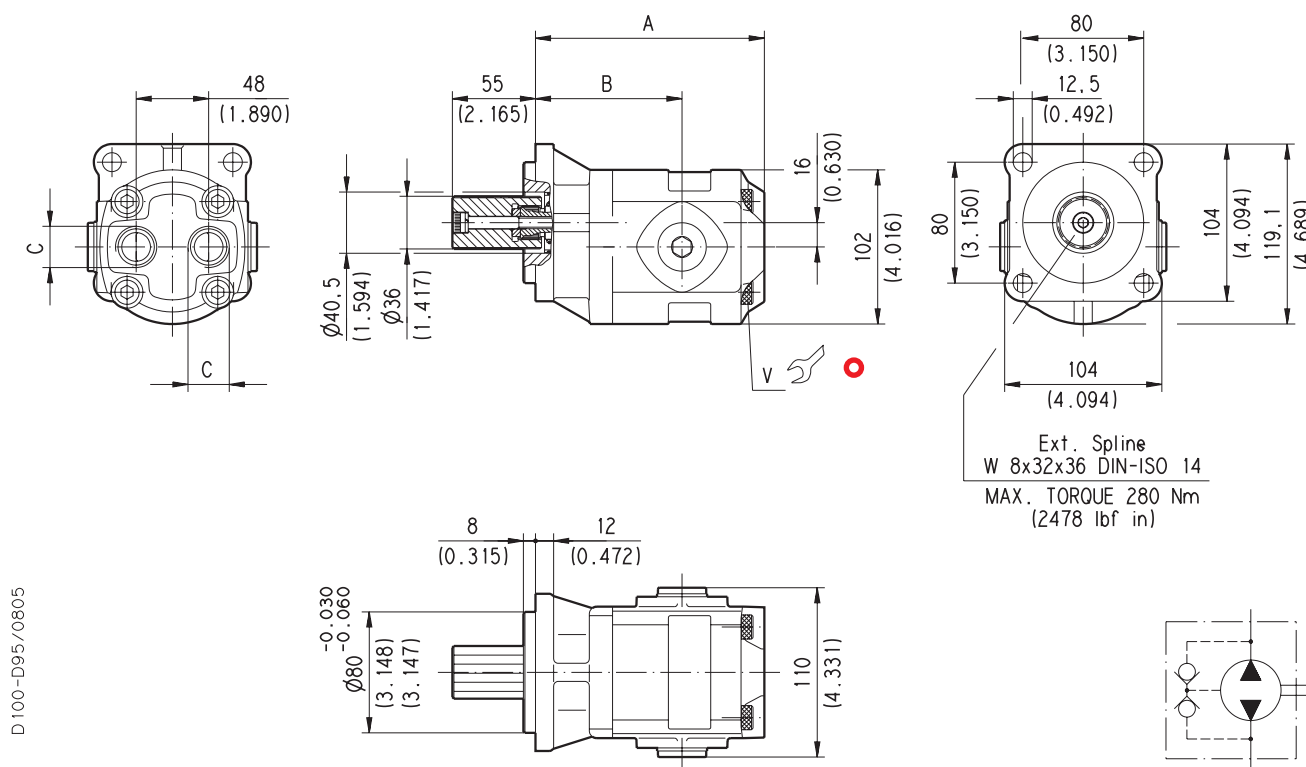


01/08.05

FORMULA 20
HYDRAULIC GEAR PUMPS ISO STANDARD
16 Z0

GAS STRAIGHT THREAD PORTS

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



D 100-D95/0805

Radial and/or axial load are not allowed.

Standard version pumps have reversible rotation and internal drain.

The drawing shows the version with rear ports.

Removing the lateral plugs all possible combination ports are allowed.

V Tightening torque Nm (lbf in)

70 $\pm$ 7 (558 ÷ 682)

Pump type		A	B	C	Mass
		mm (in)	mm (in)		kg (lbs)
FP 20•8	B0-16 Z0-LP GD/GD-N	104 (4.094)	80 (3.150)	G 1/2	5,31 (11.71)
FP 20•11,2		107,5 (4.232)	83,5 (3.287)		5,70 (12.57)
FP 20•16		117 (4.606)	87,5 (3.445)		6,00 (13.23)
FP 20•20		123,5 (4.862)	94 (3.701)		6,35 (14.00)
FP 20•25	B0-16 Z0-LP GE/GE-N	131,5 (5.177)	87 (3.425)	G 3/4	6,80 (14.99)
FP 20•31,5		141,5 (5.571)	97 (3.819)		7,18 (15.83)
FP 20•36		146,4 (5.764)	91,4 (3.598)		7,44 (16.41)
FP 20•40		151,5 (5.965)	97 (3.819)		7,80 (17.20)

How to order:

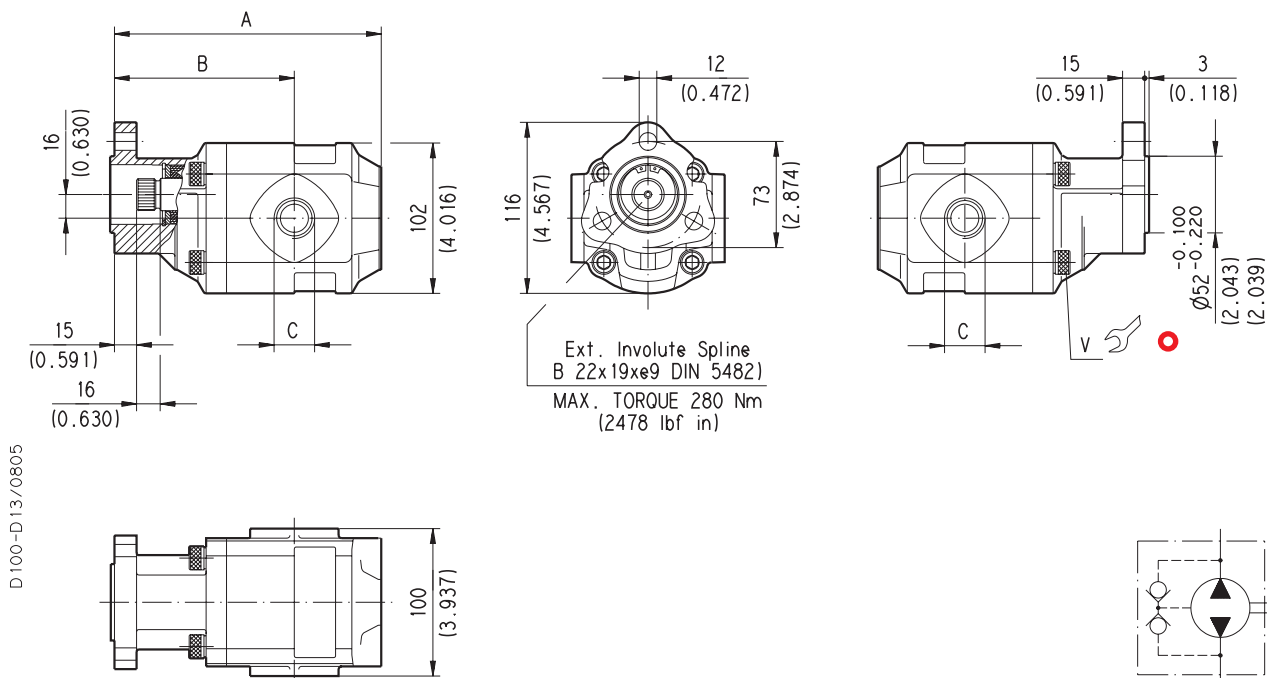
FP 20•8 B0 - 16 Z0 - LP GD/GD - N

01/08.05

FORMULA 20
HYDRAULIC GEAR PUMPS ITALIAN STANDARD
13 T1 - L

GAS STRAIGHT THREAD PORTS

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



Standard version pumps have reversible rotation and internal drain.

V Tightening torque Nm (lbf in)

70 ± 7 (558 ÷ 682)

Pump type		A	B	C	Mass
		mm (in)	mm (in)		kg (lbs)
FP 20•8	B0-13 T1-L GD/GD-N	132,5 (5.217)	105 (4.134)	G 1/2	4,8 (10.58)
FP 20•11,2		136 (5.354)	108,5 (4.272)		5 (11.03)
FP 20•16		145,5 (5.728)	112,5 (4.429)		5,2 (11.47)
FP 20•20		152 (5.984)	119 (4.685)		5,3 (11.69)
FP 20•25	B0-13 T1-L GE/GE-N	160 (6.299)	112 (4.409)	G 3/4	5,9 (13.01)
FP 20•31,5		170 (6.693)	122 (4.803)		6 (13.23)
FP 20•36		175,5 (6.909)	116,5 (4.587)		6,3 (13.89)
FP 20•40		181 (7.126)	122 (4.803)		6,6 (14.55)

How to order:

FP 20•8 B0 - 13 T1 - L GD/GD - N

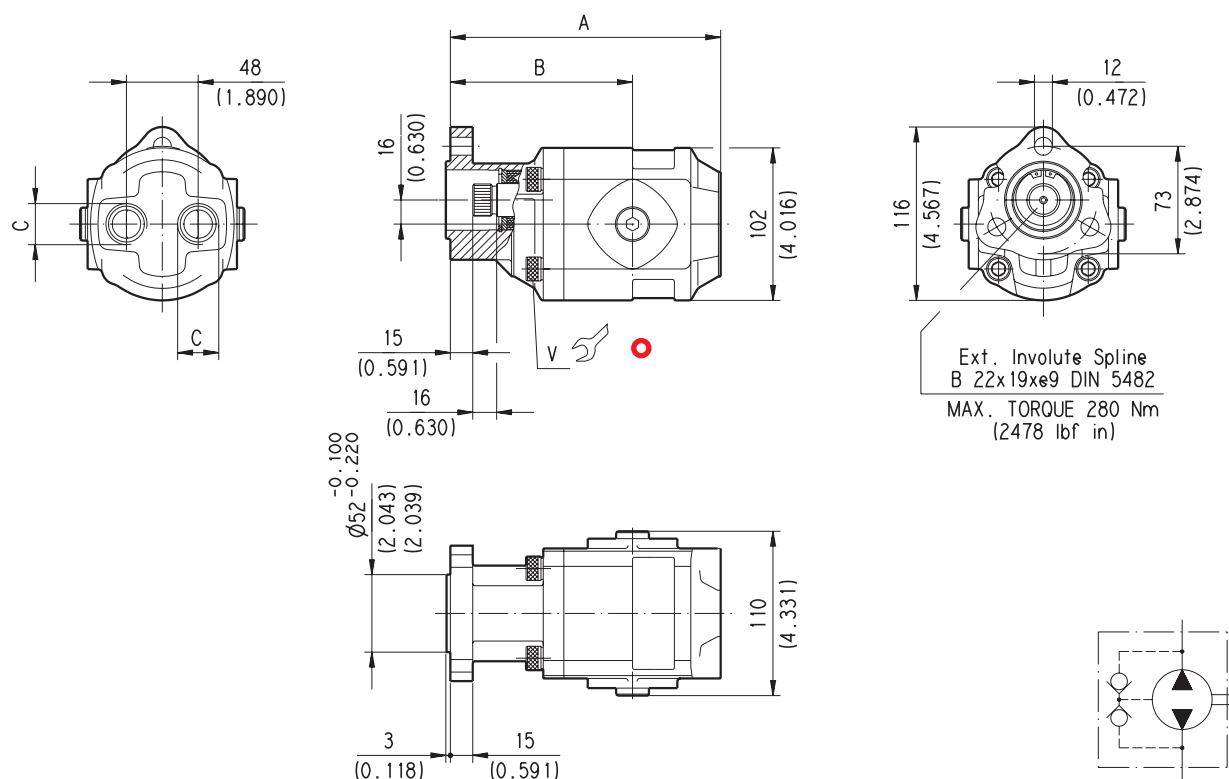
FORMULA 20

HYDRAULIC GEAR PUMPS ITALIAN STANDARD

13 T1 - P

GAS STRAIGHT THREAD PORTS

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



D100-D47/0805

Standard version pumps have reversible rotation and internal drain.

The version with rear ports allow, removing the lateral plugs all possible combination ports.

V Tightening torque Nm (lbf in)

 $70^{+7} (558 \div 682)$

Pump type		A	B	C	Mass
		mm (in)	mm (in)		kg (lbs)
FP 20•8	B0-13 T1-P GD/GD-N	129 (5.079)	105 (4.134)	G 1/2	4,8 (10.58)
FP 20•11,2		132,5 (5.217)	108,5 (4.272)		5 (11.03)
FP 20•16		142 (5.591)	112,5 (4.429)		5,2 (11.47)
FP 20•20		148,5 (5.846)	119 (4.685)		5,3 (11.69)
FP 20•25	B0-13 T1-P GE/GE-N	156,5 (6.161)	112 (4.409)	G 3/4	5,9 (13.01)
FP 20•31,5	B0-13 T1-(L)P GE/GE-N	166,5 (6.555)	122 (4.803)		6 (13.23)
FP 20•36		172,5 (6.791)	116,5 (4.587)		6,3 (13.89)
FP 20•40		178 (7.008)	122 (4.803)		6,6 (14.55)

How to order:

FP 20•11,2 B0 - 13 T1 - P GD/GD - N

01/08.05

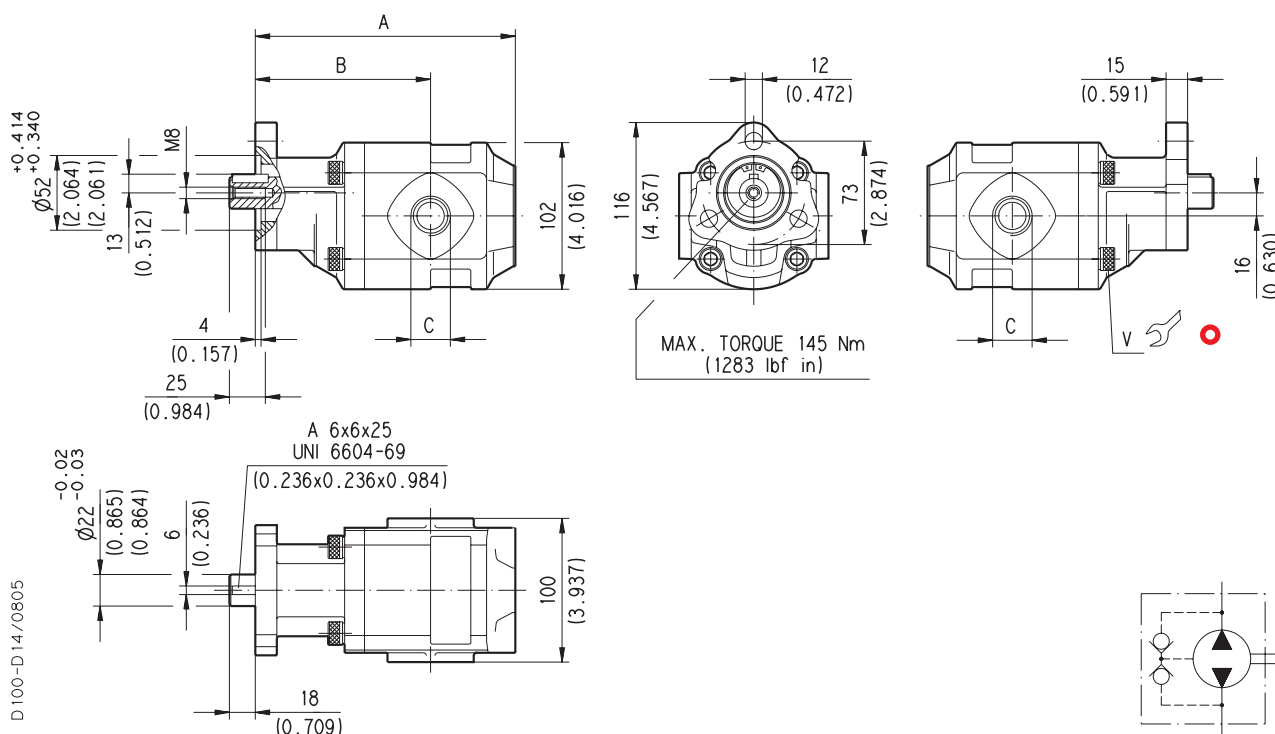
FORMULA 20

HYDRAULIC GEAR PUMPS ITALIAN STANDARD

43 T0 - L

GAS STRAIGHT THREAD PORTS

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



Standard version pumps have reversible rotation and internal drain.

V Tightening torque Nm (lbf in)

$$70^{+7} (558 \div 682)$$

Pump type		A	B	C	Mass
		mm (in)	mm (in)		kg (lbs)
FP 20•16	B0-43 T0-L GD/GD-N	145,5 (5.728)	112,5 (4.429)	G 1/2	5,2 (11.47)
FP 20•20		152 (5.984)	119 (4.685)		5,3 (11.69)
FP 20•25	B0-43 T0-L GE/GE-N	160 (6.299)	112 (4.409)	G 3/4	5,9 (13.01)
FP 20•31,5		170 (6.693)	122 (4.803)		6 (13.23)
FP 20•40		181 (7.126)	122 (4.803)		6,6 (14.55)

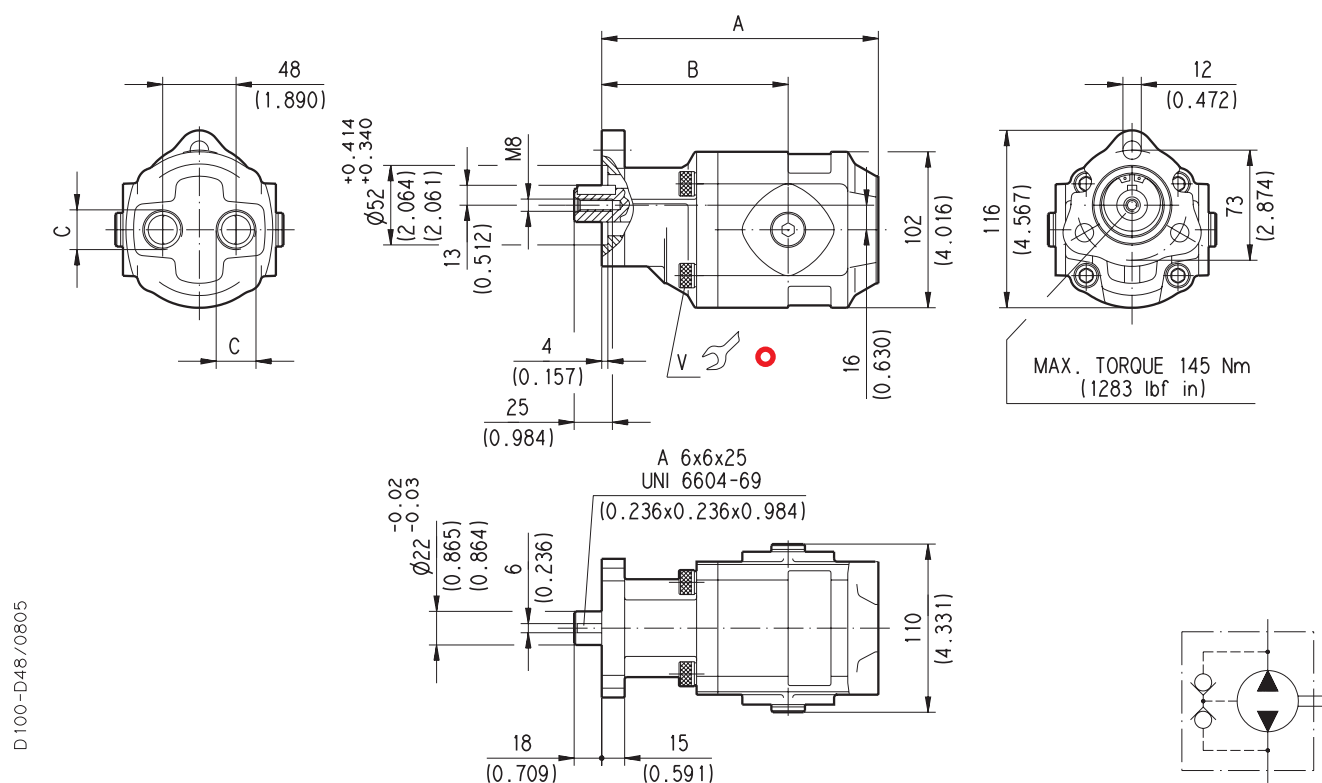
How to order:

FP 20•16 B0 - 43 T0 - L GD/GD - N

FORMULA 20
HYDRAULIC GEAR PUMPS ITALIAN STANDARD
43 T0 - P

GAS STRAIGHT THREAD PORTS

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



Standard version pumps have reversible rotation and internal drain.

The version with rear ports allow, removing the lateral plugs all possible combination ports.

V Tightening torque Nm (lbf in)

70 $\pm$ 7 (558 ÷ 682)

Pump type		A	B	C	Mass
		mm (in)	mm (in)		kg (lbs)
FP 20•16	B0-43 T0-P GD/GD-N	142 (5.591)	112,5 (4.429)	G 1/2	5,2 (11.47)
FP 20•20		148,5 (5.846)	119 (4.685)		5,3 (11.69)
FP 20•25	B0-43 T0-P GE/GE-N	156,5 (6.161)	112 (4.409)	G 3/4	5,9 (13.01)
FP 20•31,5	B0-43 T0-(L)P GE/GE-N	166,5 (6.555)	122 (4.803)		6 (13.23)
FP 20•40		178 (7.008)	122 (4.803)		6,6 (14.55)

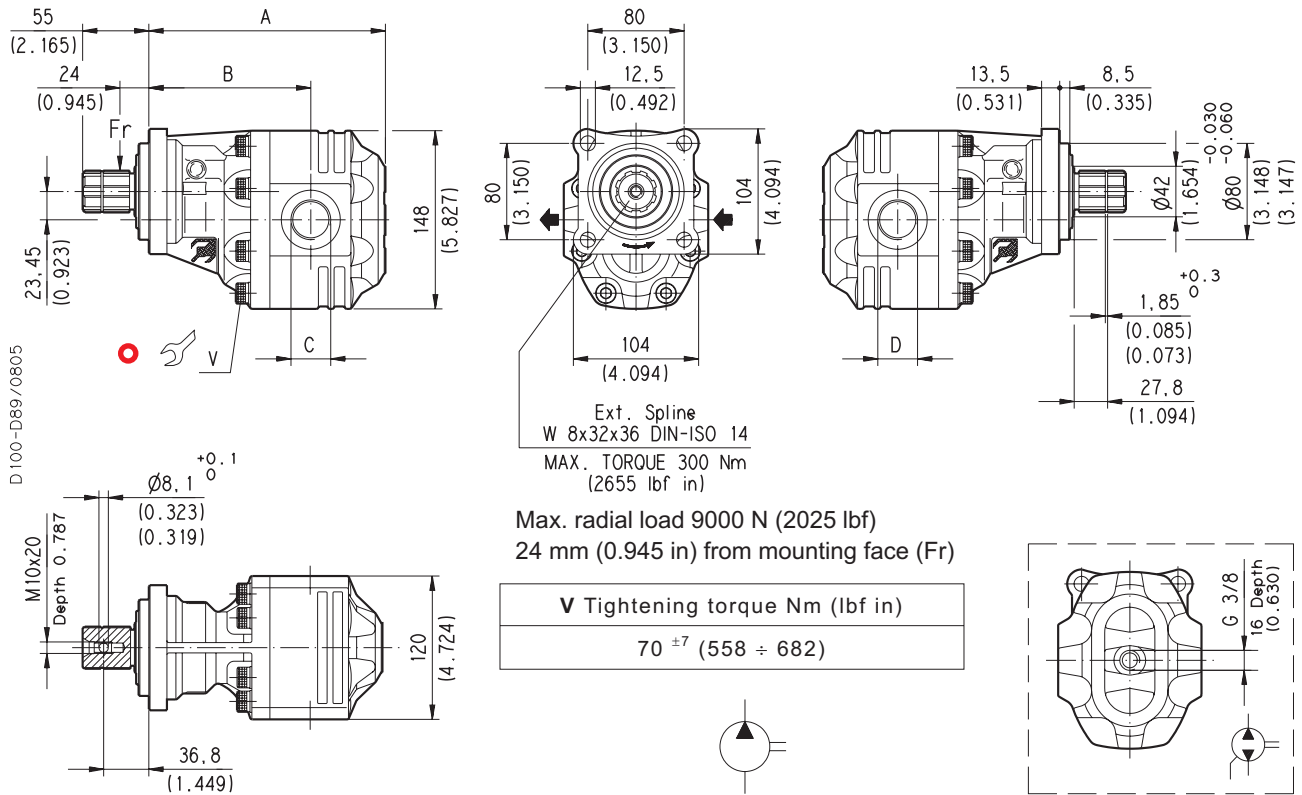
How to order:

FP 20•16 B0 - 43 T0 - P GD/GD - N

FORMULA 30
HYDRAULIC GEAR PUMPS ISO STANDARD
16 Z0

GAS STRAIGHT THREAD PORTS

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



Multiple pumps available.

For the applications without radial load is available the light weight version without outboard bearing.

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

Pump type			A	B	C	D	Mass
			mm (in)	mm (in)	IN	OUT	kg (lbs)
FP 30•17	S D R B	L GD/GD-N	168,5 (6.634)	118,5 (4.665)	G 1/2	G 1/2	10,65 (23.48)
FP 30•27			174,5 (6.870)	124,5 (4.902)	G 3/4	G 3/4	11,10 (24.48)
FP 30•34		L GE/GE-N	179,5 (7.067)	124,5 (4.902)			11,56 (25.49)
FP 30•38			182,5 (7.185)	127,5 (5.020)			12,10 (26.68)
FP 30•43			185,5 (7.303)	130,5 (5.138)			12,30 (27.12)
FP 30•51		L GF/GF-N	190,5 (7.500)	128,5 (5.059)	G 1	G 1	12,45 (27.45)
FP 30•61			196,5 (7.736)	134,5 (5.295)			13,00 (28.67)
FP 30•73			204,5 (8.051)	135,5 (5.335)			13,70 (30.21)
FP 30•82		L GG/GF-N	209,5 (8.248)	140,5 (5.531)	G 1 1/4	G 1 1/4	14,05 (30.98)
FP 30•100		L GG/GG-N	226,5 (8.917)	145,5 (5.728)			15,55 (34.29)
FP 30•125			242,5 (9.547)	161,5 (6.358)			17,05 (37.60)

Rotation: S=left - D=right - R=reversible - B=reversible internal drain

How to order:

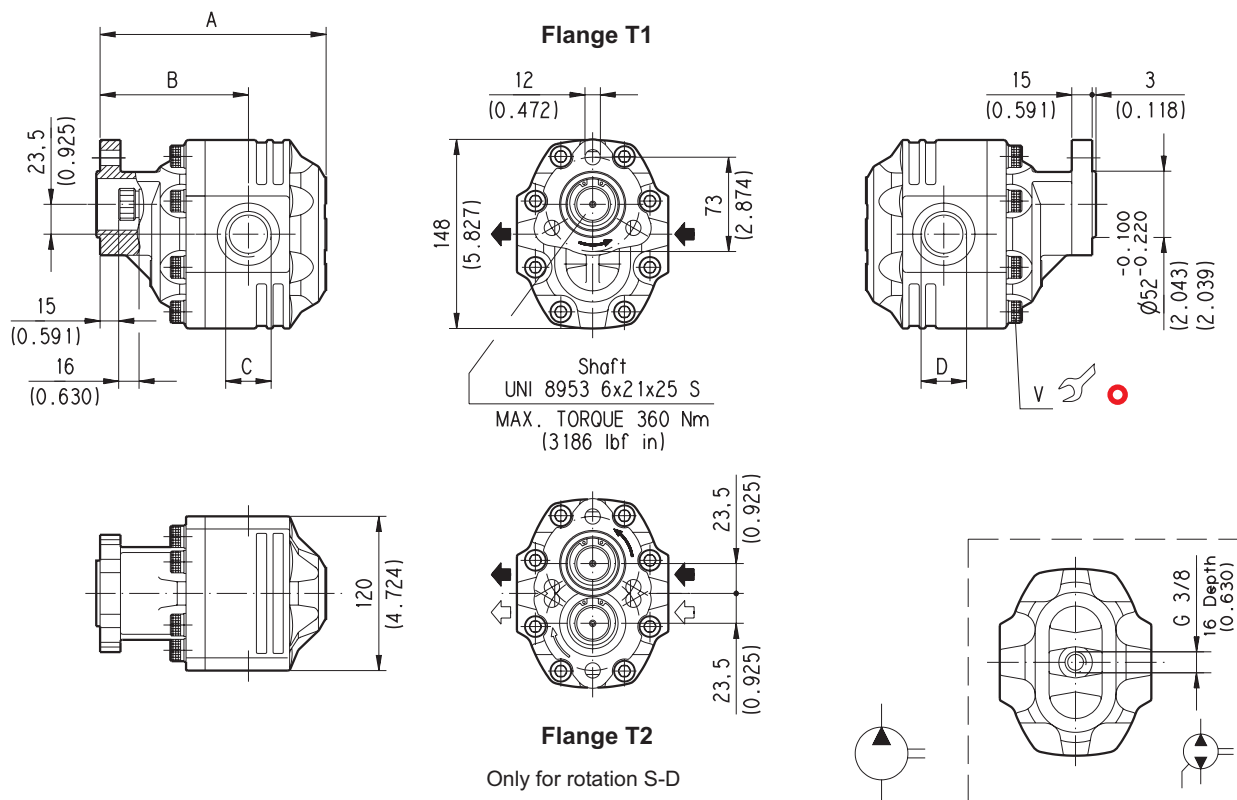
FP 30•17 S0 - 16 Z0 - L GD/GD - N

01/08.05

FORMULA 30
HYDRAULIC GEAR PUMPS ITALIAN STANDARD
19 T

GAS STRAIGHT THREAD PORTS

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



Pump type				A	B	C	D	Mass
				mm (in)	mm (in)	IN	OUT	kg (lbs)
FP 30•17	S D R B	0-19	L GD/GD-N	150,5 (5.925)	100,5 (3.957)	G 1/2	G 1/2	9 (19.85)
FP 30•27			L GE/GE-N	156,5 (6.161)	106,5 (4.193)	G 3/4	G 3/4	9,3 (20.51)
FP 30•34				161,5 (6.358)	106,5 (4.193)			9,6 (21.17)
FP 30•38				164,5 (6.476)	109,5 (4.311)			9,8 (21.61)
FP 30•43				167,5 (6.594)	112,5 (4.429)			10 (22.05)
FP 30•51			L GF/GF-N	172,5 (6.791)	110,5 (4.350)	G 1	G 1	10,3 (22.71)
FP 30•61				178,5 (7.028)	116,5 (4.587)			10,7 (23.59)
FP 30•73				186,5 (7.343)	117,5 (4.623)			10,9 (24.03)
FP 30•82				191,5 (7.539)	122,5 (4.823)			11 (24.26)
FP 30•100 (•)			L GG/GG-N	217 (8.543)	136 (5.354)	G 1 1/4	G 1 1/4	11,5 (25.36)
FP 30•125 (•)				233 (9.173)	152 (5.984)			12,3 (27.12)

Rotation: S=left - D=right - R=reversible - B=reversible internal drain

(•) Only available in T1 version.

How to order:

FP 30•17 S0 - 19 T1 - L GD/GD - N

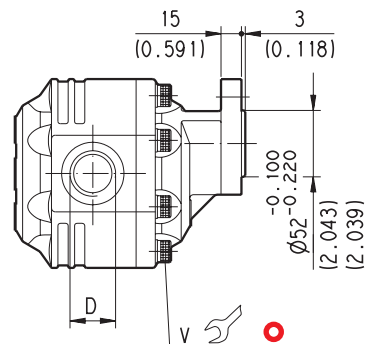
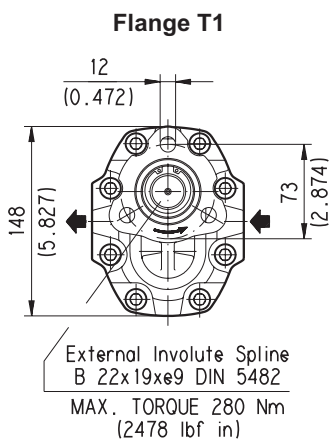
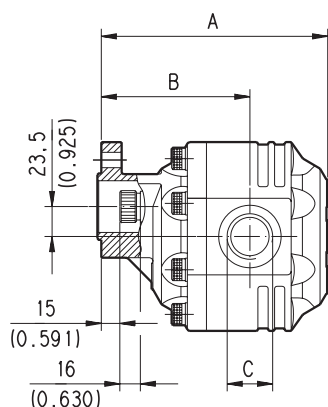
FORMULA 30

HYDRAULIC GEAR PUMPS ITALIAN STANDARD

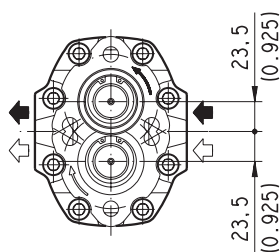
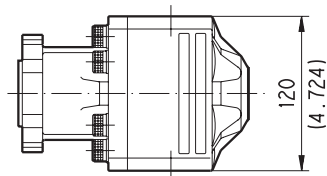
13 T

GAS STRAIGHT THREAD PORTS

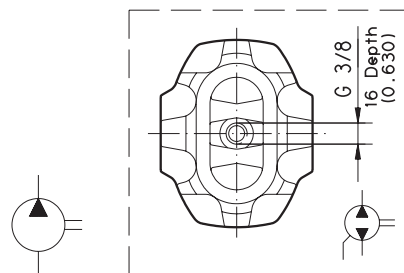
British standard pipe parallel (55°) conforms to UNI - ISO 228



D 100-D39/0805



Only for rotation S-D



V Tightening torque Nm (lbf in)

 70 ± 7 (558 ÷ 682)

Pump type				A	B	C	D	Mass
				mm (in)	mm (in)	IN	OUT	kg (lbs)
FP 30-61	S	0-13	T1	L GF/GF-N	178,5 (7.028)	116,5 (4.587)	G 1	10,7 (23.59)
FP 30-82	D R B		T2	L GG/GF-N	191,5 (7.539)	122,5 (4.823)	G 1 1/4	11 (24.26)

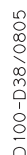
Rotation: S=left - D=right - R=reversible - B=reversible internal drain

How to order:

FP 30-61 S0 - 13 T1 - L GF/GF - N

43 T0

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



V Tightening torque Nm (lbf in)
70 ± 7 (558 $\div$ 682)

Pump type			A	B	C	D	Mass
			mm (in)	mm (in)	IN	OUT	kg (lbs)
FP 30•61	S D R B	0-43 T0-L GF/GF-N	178,5 (7.028)	116,5 (4.587)	G 1	G 1	10,7 (23.59)
FP 30•82		0-43 T0-L GG/GF-N	191,5 (7.539)	122,5 (4.823)	G 1 1/4		11 (24.26)

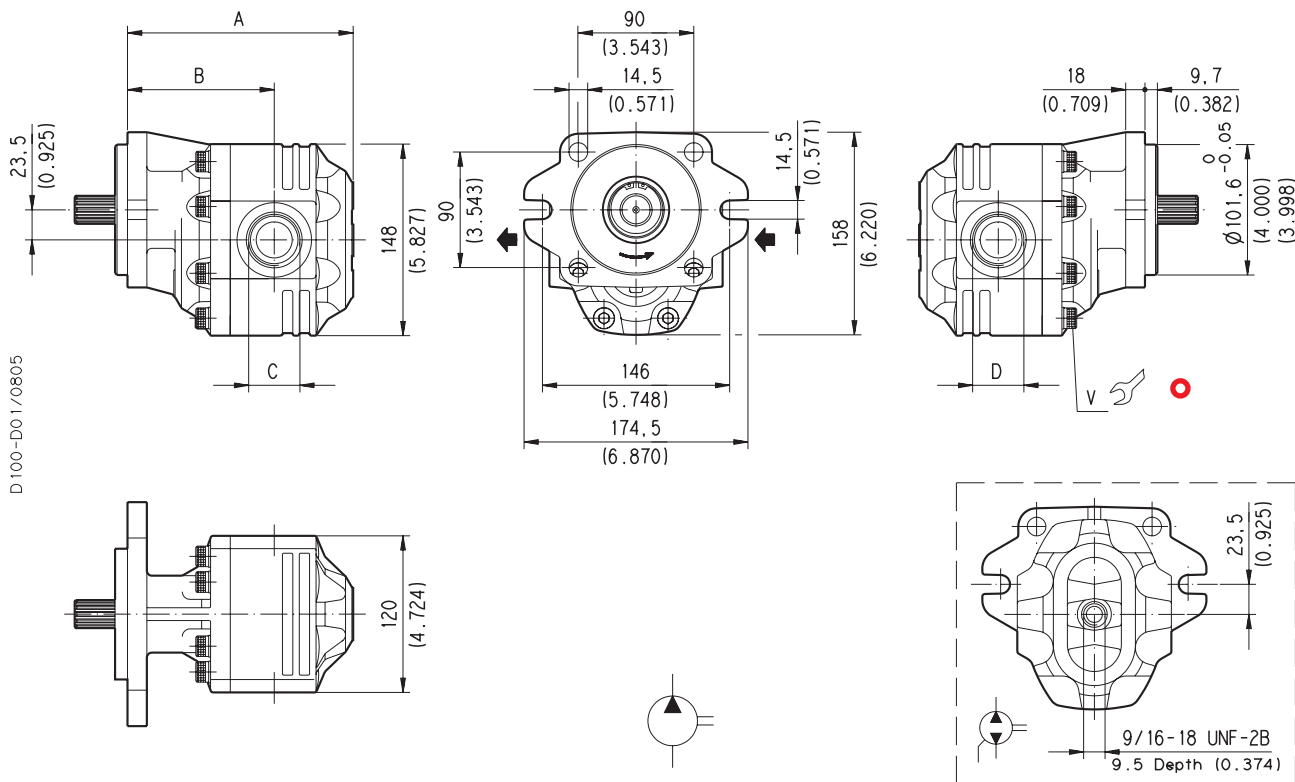
How to order:

FP 30•61 S0 - 43 T0 - L GF/GF - N

FORMULA 30
HYDRAULIC GEAR PUMPS SAE STANDARD
SAE

SAE STRAIGHT THREAD PORTS J514

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


V Tightening torque Nm (lbf in)
 70 ± 7 (558 ÷ 682)

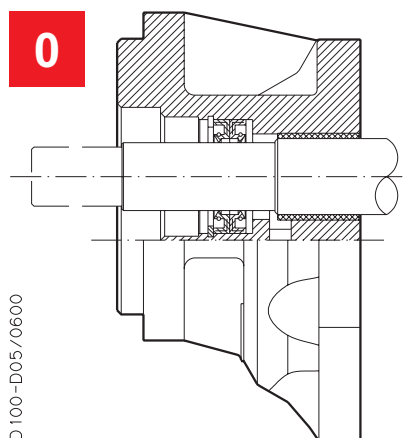
To order see page 26 - 28.

Pump type	A	B	C	D	Ports code		Mass
	mm (in)	mm (in)	IN	OUT	IN	OUT	kg (lbs)
FP 30•17 (•)	148 (5.827)	98 (3.858)	3/4-16 UNF-2B	3/4-16 UNF-2B	OB	OB	10,4 (22.93)
FP 30•27	154 (6.063)	104 (4.094)	1-1/16-12 UN-2B	1-1/16-12 UN-2B	OD	OD	10,8 (23.81)
FP 30•34	159 (6.260)	104 (4.094)					11,3 (24.92)
FP 30•38	162 (6.378)	107 (4.213)					11,5 (25.36)
FP 30•43	165 (6.496)	110 (4.331)					11,8 (26.02)
FP 30•51	170 (6.693)	108 (4.252)	1-5/16-12 UN-2B	1-3/16-12 UN-2B	OF	OE	12 (26.46)
FP 30•61	176 (6.929)	114 (4.488)					13 (28.67)
FP 30•73	184 (7.244)	115 (4.528)	1-5/8-12 UN-2B	1-5/16-12 UN-2B	OG	OF	13,4 (29.55)
FP 30•82	189 (7.441)	120 (4.724)					13,9 (30.65)

(•) Only available in version 2.

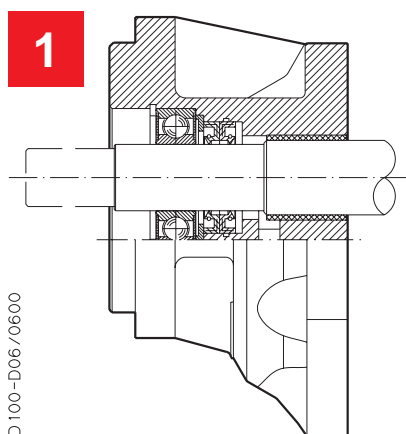
FORMULA 30 SAE VERSION

SAE



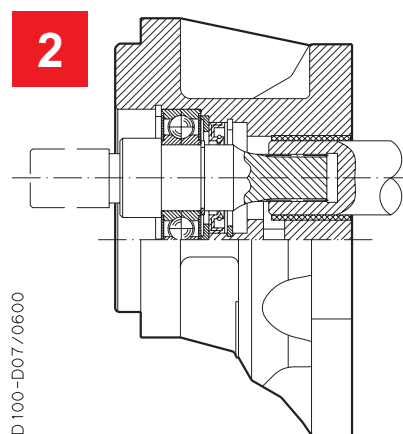
D100-D05/0600

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



D100-D06/0600

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



D100-D07/0600

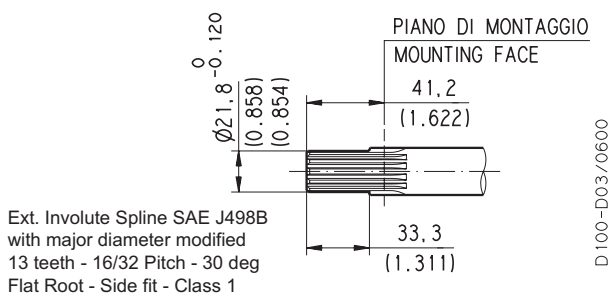
Special version with independent shaft for applications with low radial load and without axial load on the drive shaft.

FORMULA 30 SAE END DRIVE SHAFTS

SAE

SAE "B" SPLINE

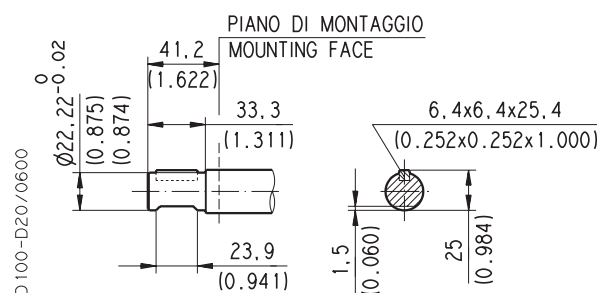
04



MAX 330 Nm (2921 lbf in) ◆

SAE "B" STRAIGHT

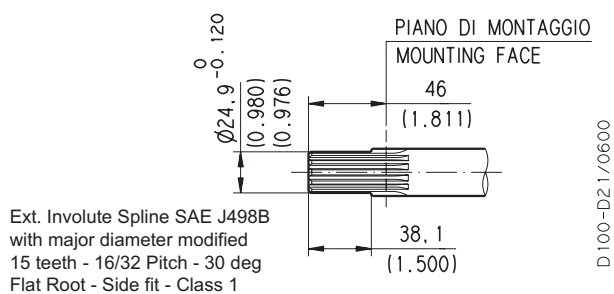
32



MAX 200 Nm (1770 lbf in) ◆

SAE "BB" SPLINE

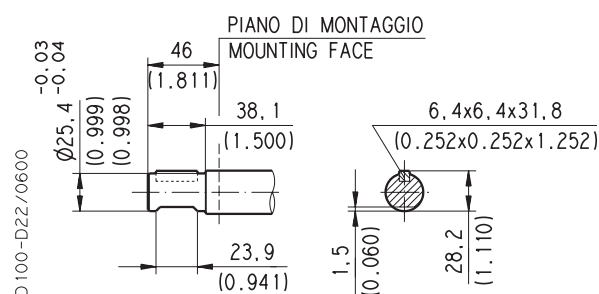
05



MAX 500 Nm (4426 lbf in) ◆

SAE "BB" STRAIGHT

33



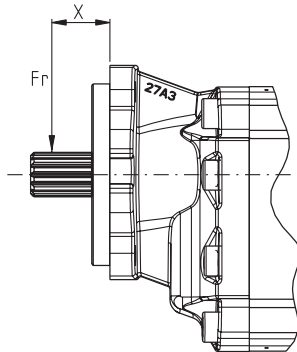
MAX 280 Nm (2478 lbf in) ◆

◆ For "2" version whichever end shaft, the max. torque applicable is M= 170 Nm (1505 lbf in)

01/08.05

FORMULA 30 PERMISSIBLE RADIAL LOADING

SAE



X = Distance of the radial load result from the mounting flange.

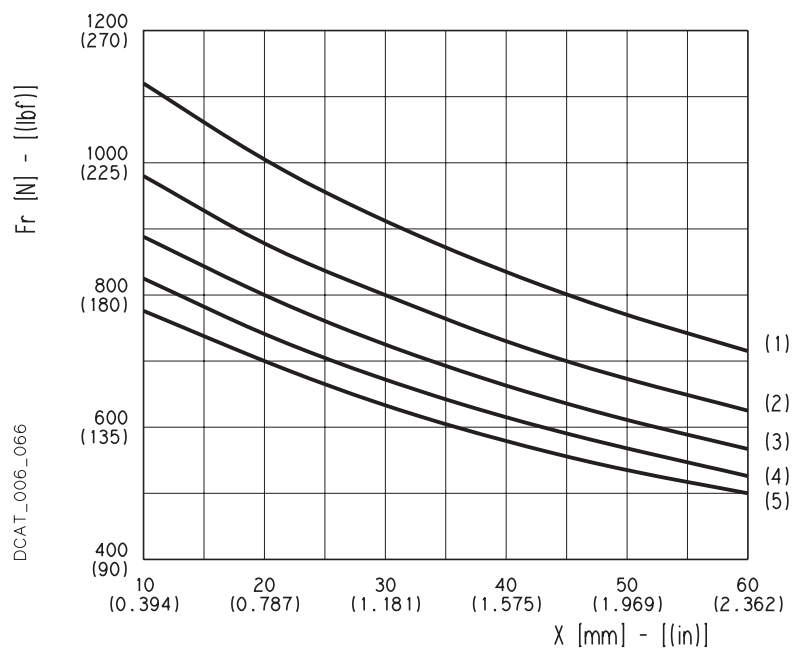
Fatigue life (hours) $L_n = 1000$ [h]

Each curve has been obtained at:

- (1) 1000 min^{-1} (4) 2500 min^{-1}
- (2) 1500 min^{-1} (5) 3000 min^{-1}
- (3) 2000 min^{-1}

VERSION

1 - 2



HOW TO ORDER SINGLE PUMPS

1	2	3	4	5	6	7	8
Pump type	Rotation	Version	Drive shaft	Mounting flange	Ports position	Ports IN/OUT	Seals
FP30•17	S	0	04	S3	L	OD/OD	N

1	Pump type	CODE
in ³ /rev (cm ³ /rev)		
1.05 (17,28) - (a)		FP 30•17
1.63 (26,70)		FP 30•27
2.11 (34,56)		FP 30•34
2.40 (39,27)		FP 30•38
2.68 (43,98)		FP 30•43
3.16 (51,83)		FP 30•51
3.74 (61,26)		FP 30•61
4.50 (73,82)		FP 30•73
4.98 (81,68)		FP 30•82

2	Rotation	CODE
Left		S
Right		D
Reversible		R
Reversible with internal drain		B

3	Version	CODE
Without outboard bearing		0
With outboard bearing		1
With outboard bearing and indep. shaft		2

4	Drive shaft	CODE
SAE "B" spline (13 teeth)		04
SAE "B" straight		32
SAE "BB" spline (15 teeth)		05
SAE "BB" straight		33

5	Mounting flange	CODE
SAE "B" 2-4 holes		S3

(a) Only available in version 2

CODE	Ports position	6
L	Side	

CODE	Ports IN/OUT	7
SAE STRAIGHT THREAD PORTS (ODT)		
Side	Pump type	
OB/OB	FP 30•17	
OD/OD	FP 30•27	
OD/OD	FP 30•34	
OD/OD	FP 30•38	
OF/OD	FP 30•43	
OF/OE	FP 30•51	
OF/OE	FP 30•61	
OG/OF	FP 30•73	
OG/OF	FP 30•82	

CODE	Seals (b)	8
N	Buna N (standard)	
V	Viton	
N Bz	Buna N and Bronze thrust plates	
V Bz	Viton and Bronze thrust plates	

(b) Choose the seals according to the temperature shown on page 1

ORDER EXAMPLE

Standard pump

FP 30•27 S0 - 04 S3 - L OD/OD - N

Special version pump

FP 30•17 S2 - 32 S3 - L OB/OB - V Bz

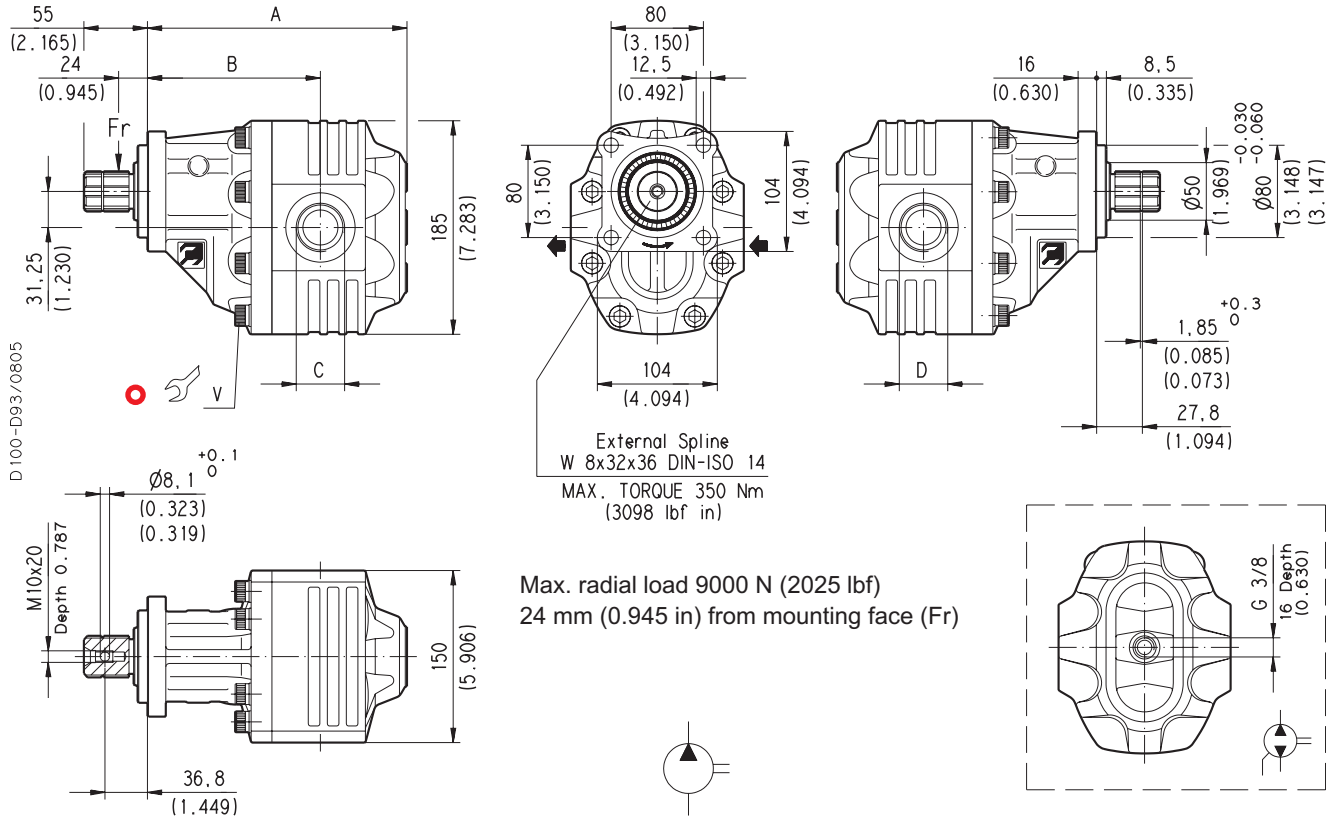
FORMULA 40

HYDRAULIC GEAR PUMPS ISO STANDARD

16 Z0

GAS STRAIGHT THREAD PORTS

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



V Tightening torque Nm (lbf in)

100 ⁺¹⁰ (797 ÷ 974)

Pump type			A	B	C	D	Mass	
			mm (in)	mm (in)	IN	OUT	kg (lbs)	
FP 40•63	S D R B	0-16 Z0	L GF/GE-N	199 (7.835)	131 (5.157)	G 1	G 3/4	18,65 (41.12)
FP 40•73			203 (7.992)	135 (5.315)	19,30 (42.56)			
FP 40•87			L GG/GF-N	208 (8.189)	140 (5.512)	G 1 1/4	G 1	19,75 (43.55)
FP 40•109				216 (8.504)	141 (5.551)			21 (46.31)
FP 40•133			L GH/GF-N	225 (8.858)	150 (5.906)	G 1 1/2		22,10 (48.73)
FP 40•151				231 (9.094)	156 (6.142)			22,90 (50.49)

Rotation: S=left - D=right - R=reversible - B=reversible internal drain

How to order:

FP 40•63 S0 - 16 Z0 - L GF/GE - N

FORMULA 40

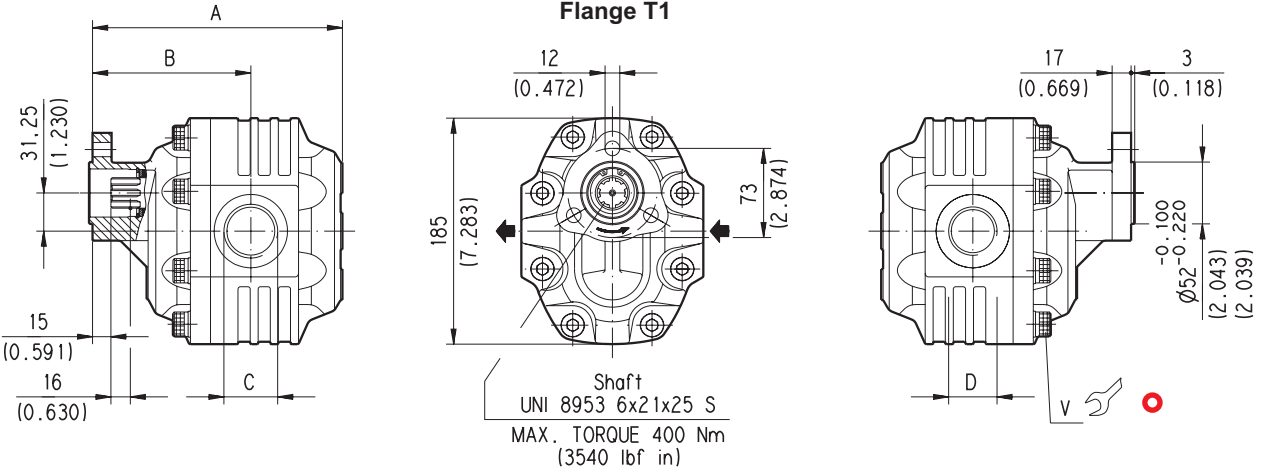
HYDRAULIC GEAR PUMPS ITALIAN STANDARD

19 T

GAS STRAIGHT THREAD PORTS

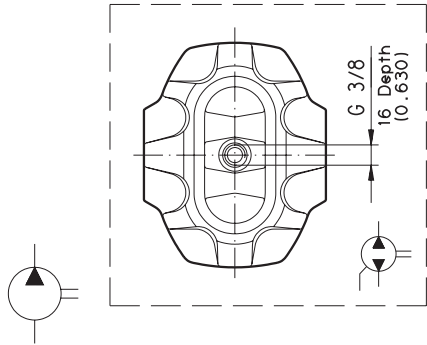
British standard pipe parallel (55°) conforms to UNI - ISO 228

Flange T1



Flange T2

Only for rotation S-D



V Tightening torque Nm (lbf in)

100 ^{±10} (797 ÷ 974)

Pump type					A	B	C	D	Mass
					mm (in)	mm (in)	IN	OUT	kg (lbs)
FP 40•63	S D R B	0-19	T1	L GF/GE-N	187,5 (7.382)	119,5 (4.705)	G 1	G 3/4	16,1 (35.50)
FP 40•73					191,5 (7.539)	123,5 (4.862)			16,5 (36.38)
FP 40•87			T2	L GG/GF-N	196,5 (7.736)	128,5 (5.059)	G 1 1/4	G 1	17 (37.49)
FP 40•109					204,5 (8.051)	129,5 (5.098)			18 (39.69)
FP 40•133				L GH/GF-N	213,5 (8.406)	138,5 (5.453)	G 1 1/2		19,5 (43.00)
FP 40•151					219,5 (8.642)	144,5 (5.689)			20 (44.10)

Rotation: S=left - D=right - R=reversible - B=reversible internal drain

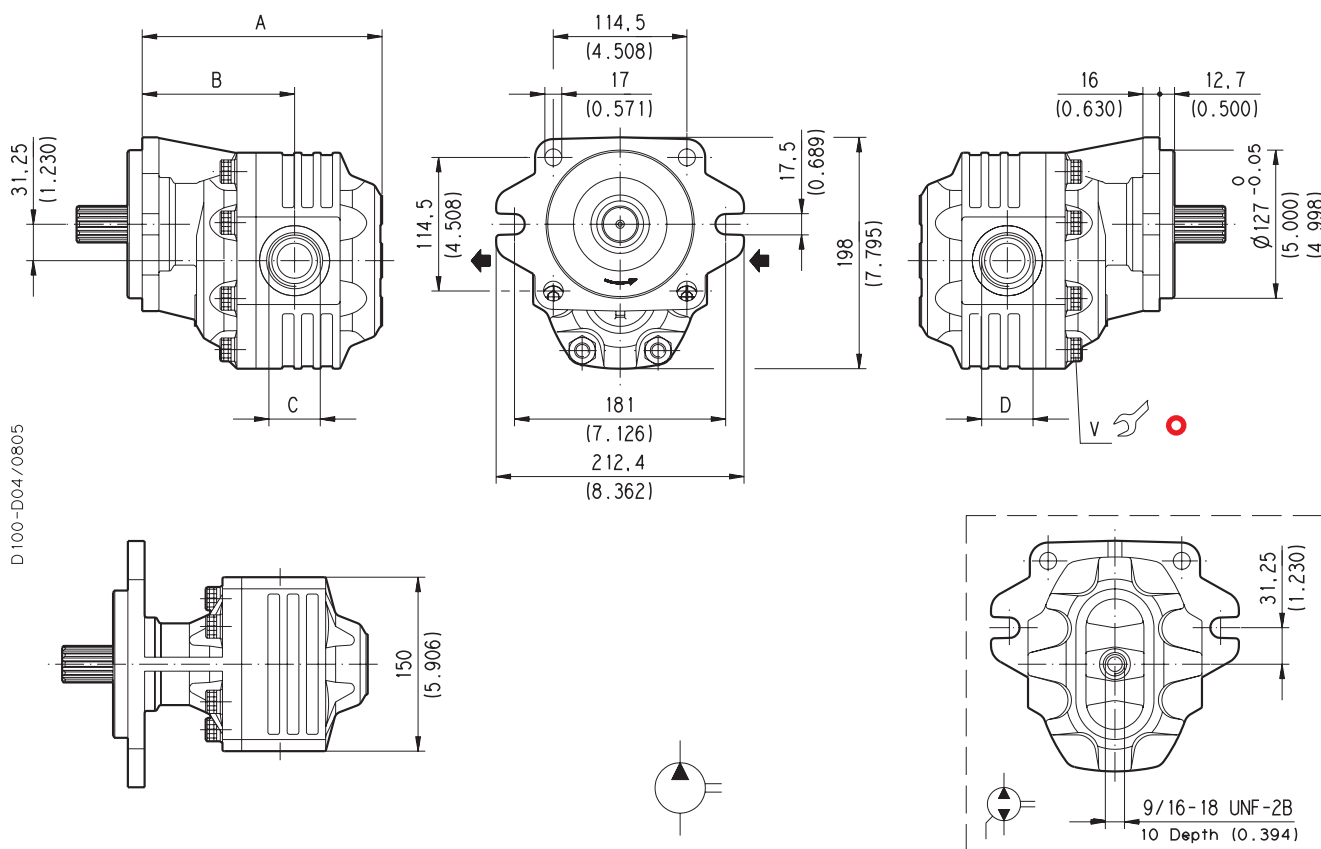
How to order:

FP 40•63 S0 - 19 T1 - L GF/GE - N

FORMULA 40
HYDRAULIC GEAR PUMPS SAE STANDARD
SAE

SAE STRAIGHT THREAD PORTS J514

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



To order see page 32 - 35.

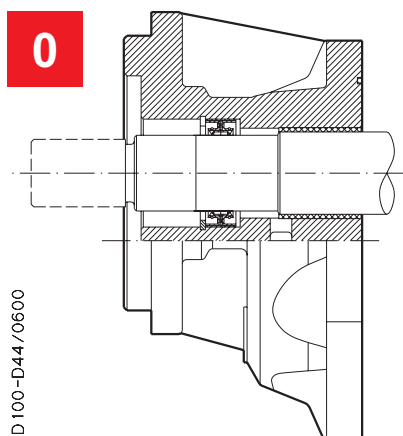
V Tightening torque Nm (lbf in)

100 ± 10 (797 ÷ 974)

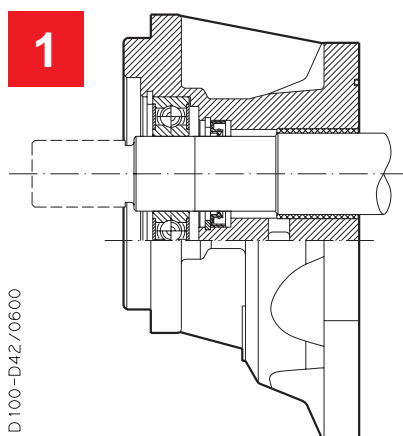
Pump type	A	B	C	D	Ports code		Mass
	mm (in)	mm (in)	IN	OUT	IN	OUT	kg (lbs)
FP 40•63	188,5 (7.421)	120,5 (4.744)	1-5/16-12 UN-2B	1-1/16-12 UN-2B	OF	OD	19,5 (43.00)
FP 40•73	192,5 (7.579)	124,5 (4.902)					20 (44.10)
FP 40•87	197,5 (7.776)	129,5 (5.098)	1-5/8-12 UN-2B	1-5/16-12 UN-2B	OG	OF	20,5 (45.20)
FP 40•109	205,5 (8.091)	130,5 (5.138)					21 (46.31)
FP 40•133	214,5 (8.445)	139,5 (5.492)	1-7/8-12 UN-2B		OH		23 (50.72)
FP 40•151	220,5 (8.681)	145,5 (5.728)					25 (55.13)

FORMULA 40 SAE VERSION

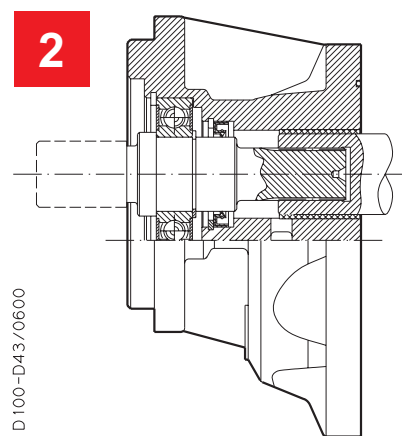
SAE



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



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



Special version with independent shaft for applications with low radial load and without axial load on the drive shaft.

FORMULA 40 SAE END DRIVE SHAFTS

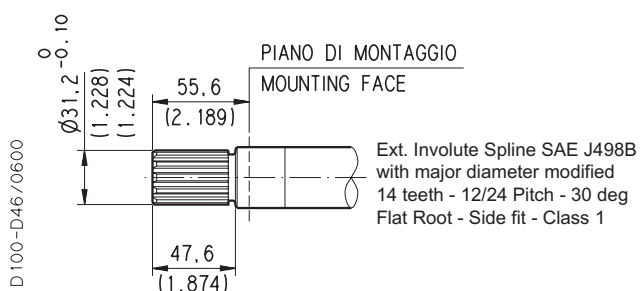
SAE

SAE "C" SPLINE

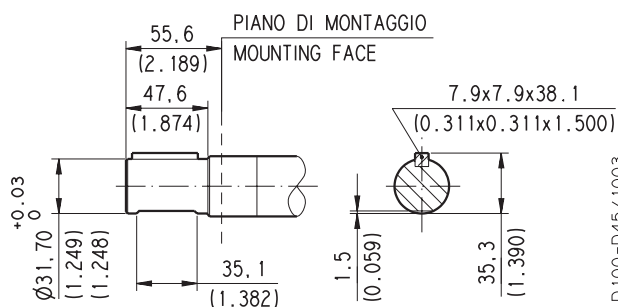
06

SAE "C" STRAIGHT

34



MAX 900 Nm (7966 lbf in) ◆



MAX 600 Nm (5311 lbf in) ◆

◆ For "2" version whichever end shaft, the max. torque applicable is M= 600 Nm (5311 lbf in)

PUMP - VERSION - SHAFT AVAILABILITY TABLE

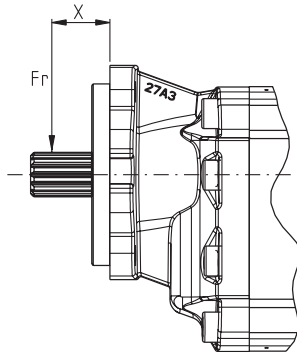
SAE

Pump type	VERSION			SHAFT
	0	1	2	
FP 40•63	06	06	06 - 34	
FP 40•73	06 - 34	06 - 34	06 - 34	
FP 40•87	06 - 34	06 - 34	06 - 34	
FP 40•109	06	06	06 - 34	
FP 40•133	06 - 34	06 - 34	06 - 34	
FP 40•151	06 - 34	06 - 34	06 - 34	

01/08.05

FORMULA 40 PERMISSIBLE RADIAL LOADING

SAE



X = Distance of the radial load result from the mounting flange.

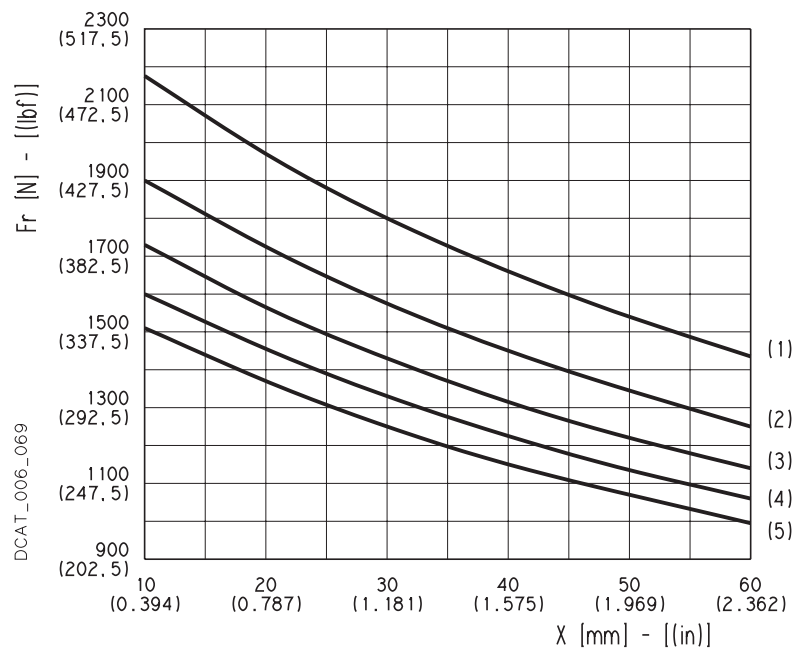
Fatigue life (hours) $L_h = 1000$ [h]

Each curve has been obtained at:

- | | |
|-----------------------------|-----------------------------|
| (1) 1000 min^{-1} | (4) 2500 min^{-1} |
| (2) 1500 min^{-1} | (5) 3000 min^{-1} |
| (3) 2000 min^{-1} | |

VERSION

1 - 2



HOW TO ORDER SINGLE PUMPS

1	2	3	4	5	6	7	8
Pump type	Rotation	Version	Drive shaft	Mounting flange	Ports position	Ports IN/OUT	Seals
FP40•63	S	0	06	S8	L	OF/OD	N

1	Pump type	CODE
in ³ /rev (cm ³ /rev)		
3.75 (61,43)		FP 40•63
4.43 (72,60)		FP 40•73
5.28 (86,56)		FP 40•87
6.64 (108,90)		FP 40•109
8.18 (134,03)		FP 40•133
9.20 (150,79)		FP 40•151

2	Rotation	CODE
Left		S
Right		D
Reversible		R
Reversible with internal drain		B

3	Version	CODE
Without outboard bearing		0
With outboard bearing		1
With outboard bearing and indep. shaft		2

4	Drive shaf	CODE
SAE "C" spline (14 teeth)		06
SAE "C" straigh		34

5	Mounting flange	CODE
SAE "C" 2-4 holes		S8

CODE	Ports position	6
L	Side	

CODE	Ports IN/OUT	7
SAE STRAIGHT THREAD PORTS (ODT)		
Side	Pump type	
OF/OD	FP 40•63	
OF/OD	FP 40•73	
OG/OF	FP 40•87	
OG/OF	FP 40•109	
OH/OF	FP 40•133	
OH/OF	FP 40•151	

CODE	Seals (a)	8
N	Buna N (standard)	
V	Viton	
N Bz	Buna N and Bronze thrust plates	
V Bz	Viton and Bronze thrust plates	

(a) Choose the seals according to the temperature shown on page 1

ORDER EXAMPLE

Standard pump

FP 40•63 S0 - 06 S8 - L OF/OD - N

Special version pump

FP 40•63 S2 - 34 S8 - L OF/OD - V Bz

MULTIPLE PUMPS

FORMULA series pumps can be coupled together in combination. Where input power requirement of each element 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.

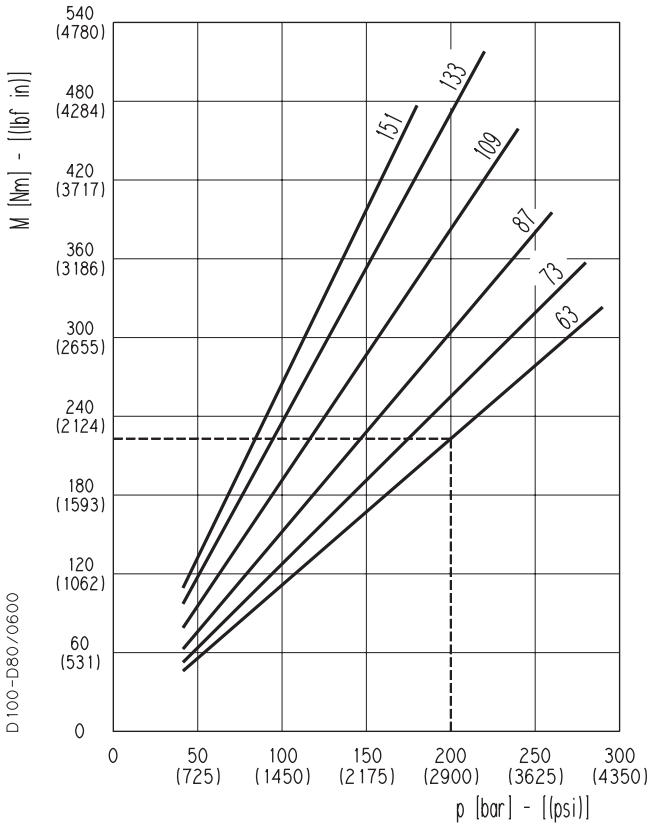
M	lbf in (Nm)	Torque
V	in ³ /rev (cm ³ /rev)	Displacement
Δp	psi (bar)	Pressure
$\eta_m = \eta_m(V, \Delta p, n) \quad (\approx 0,90)$		Mechanical efficiency

$$M = \frac{\Delta p \text{ (bar)} \cdot V \text{ (cm}^3\text{/rev)}}{62,83 \cdot \eta_m} \quad (\text{Nm})$$

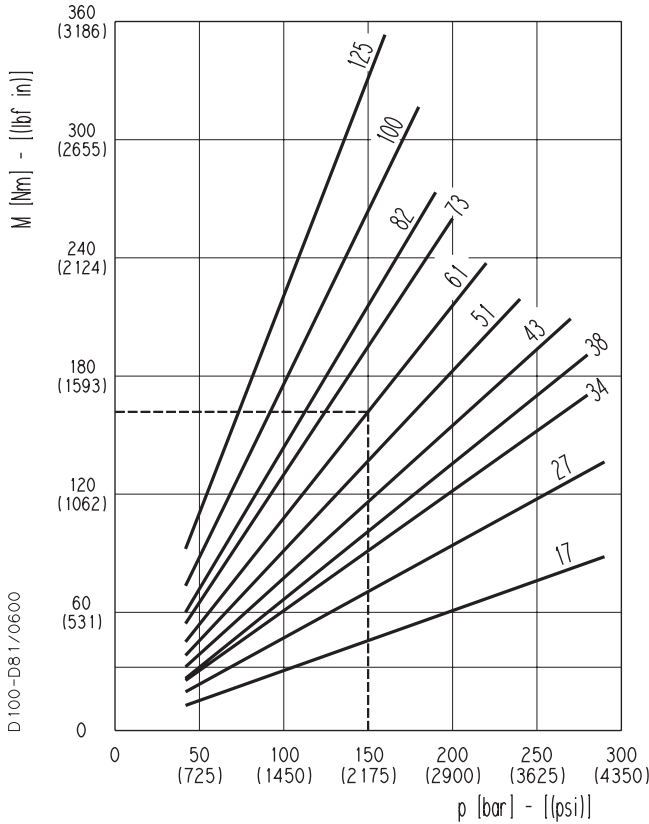
Note: The torque absorbed from the shaft of the first pump results from the sum of the torques due to all single stages. The achieved value must not exceed the maximum torque limit given for the shaft of the first pump. Diagrams providing approximate selection data will be found on page 36.

ABSORBED TORQUE

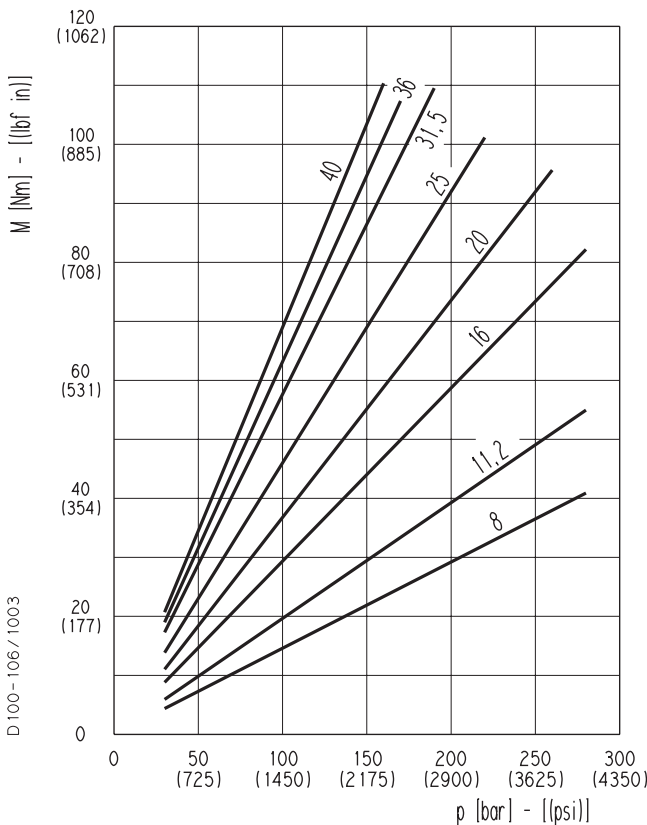
FP 40 1



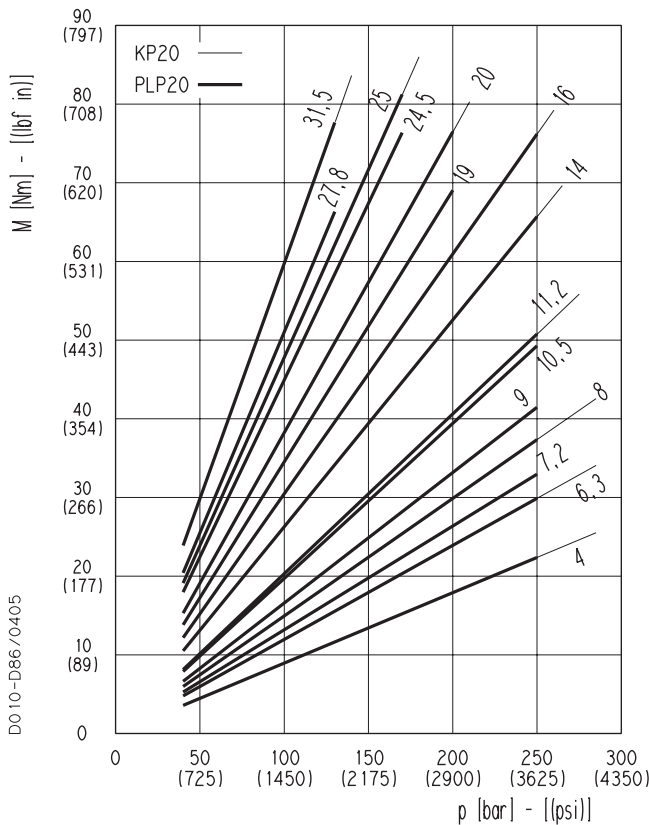
FP 30 2



FP 20 3

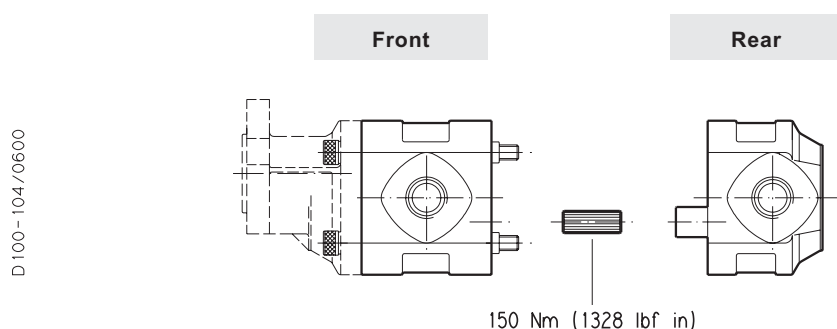


KP 20 - PLP 20 4



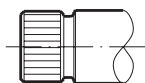
DRIVE SHAFT SELECTION

Let us consider a double pump FP40•63+ FP30•61. If we suppose that we have to work with the first pump at a pressure of 2900 psi (200 bar) and the second pump at a pressure of 2175 psi (150 bar), the graph 1 shows that the torque absorbed by FP40•63 is 1974 lbf in (223 Nm) and the graph 2 shows that the torque absorbed by FP30•61 is 1416 lbf in (160 Nm) [acceptable value because it doesn't exceed the maximum drive shaft torque that is 2478 lbf in (280 Nm), see page 40]. The torque to be transmitted by the first drive shaft will thus be $1974+1416=3390$ lbf in ($223+160=383$ Nm), this value must not exceed the shaft's maximum rated value.

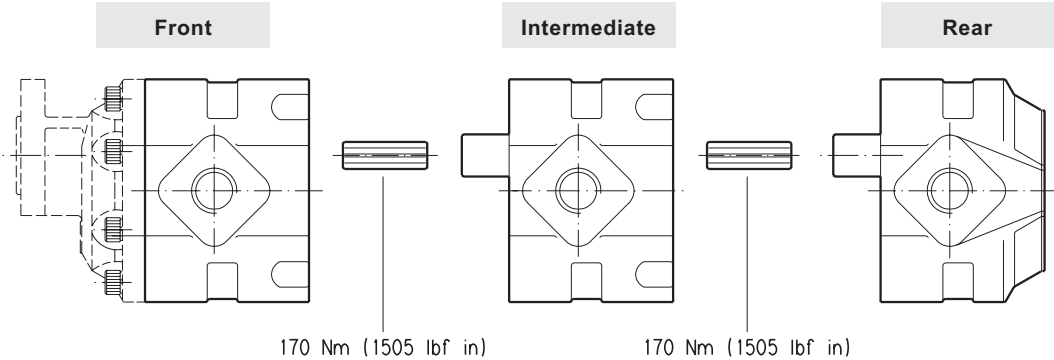
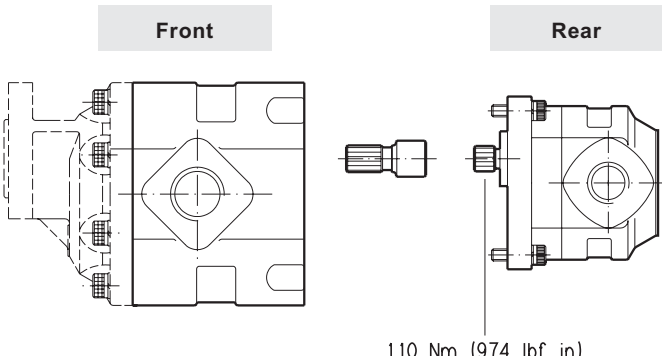
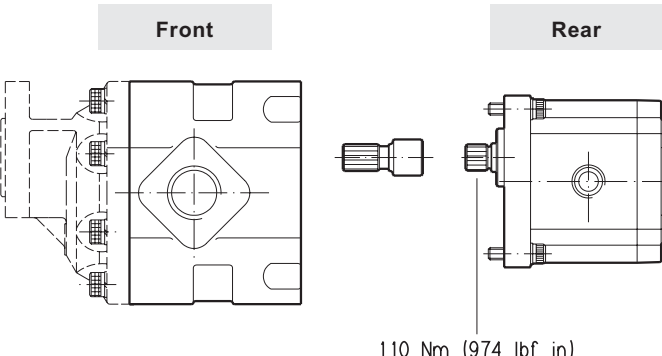
FORMULA 20 + FORMULA 20**FORMULA 20 END DRIVE SHAFT**

ITALIAN STANDARD

13



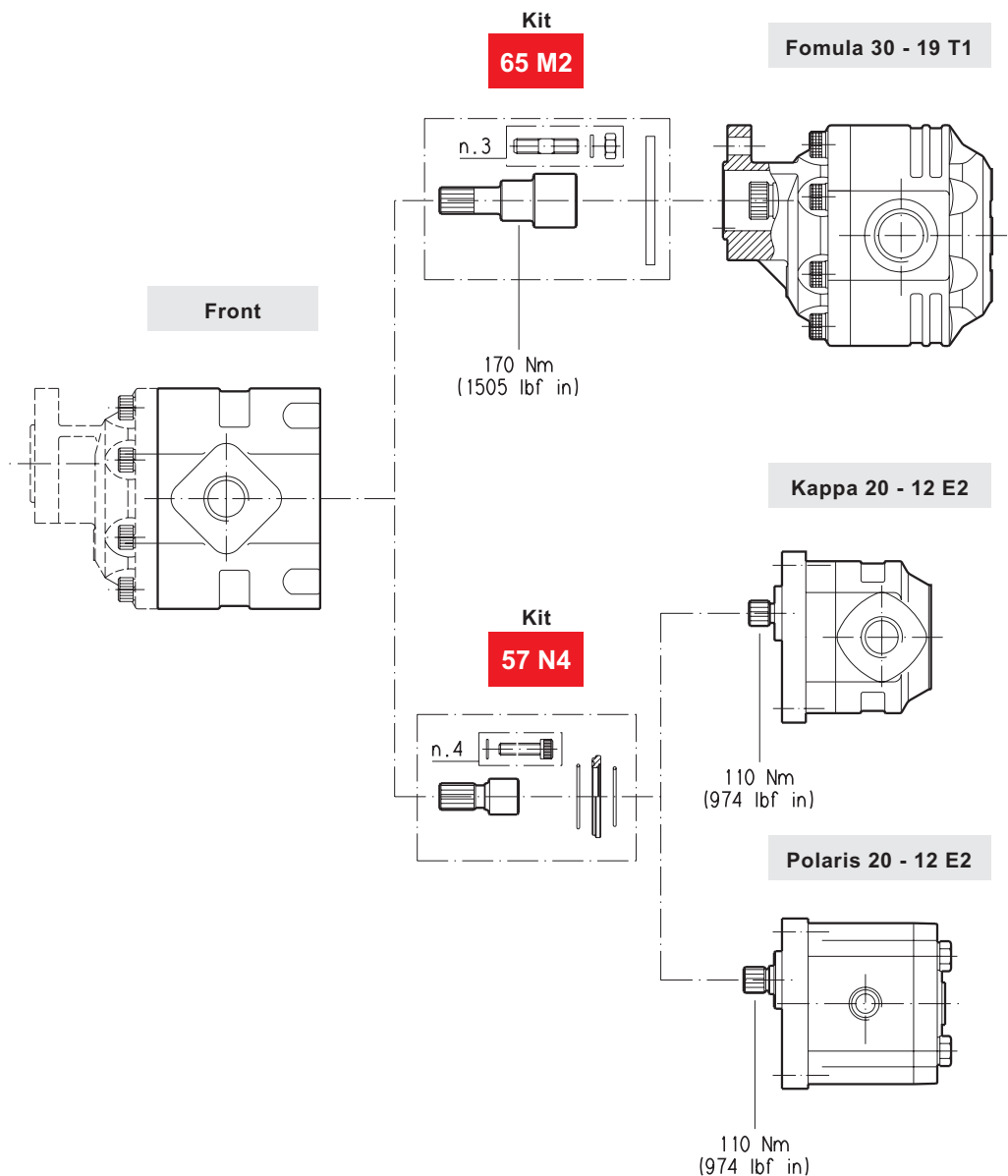
MAX 280 Nm (2478 lbf in)

Fomula 30 + Formula 30		STANDARD COMBINATION	
D 100-D26/1003	Front Intermediate Rear  170 Nm (1505 lbf in) 170 Nm (1505 lbf in)		
Fomula 30 + Kappa 20		STANDARD COMBINATION	
D 100-D78/0600	Front Rear  110 Nm (974 lbf in)		
Fomula 30 + Polaris 20		STANDARD COMBINATION	
D 100-D79/0600	Front Rear  110 Nm (974 lbf in)		

Fomula 30

SPECIAL COMBINATION

Special front section arranged to fit single pumps.
To order please consult our technical sales department.



D100-110/1003

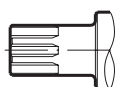
FORMULA 30 END DRIVE SHAFT

ITALIAN STANDARD

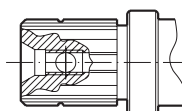
19

ISO STANDARD

16



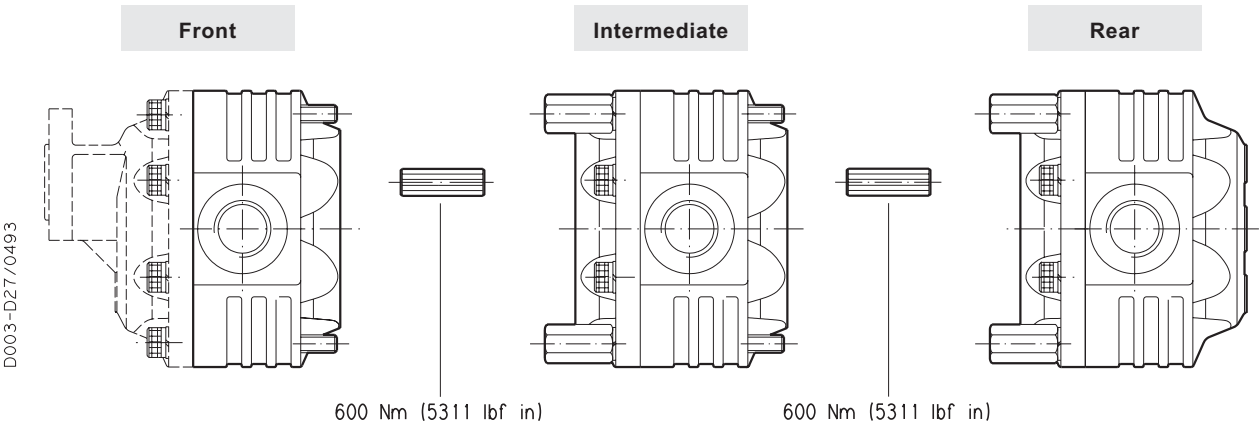
MAX 360 Nm (3186 lbf in)



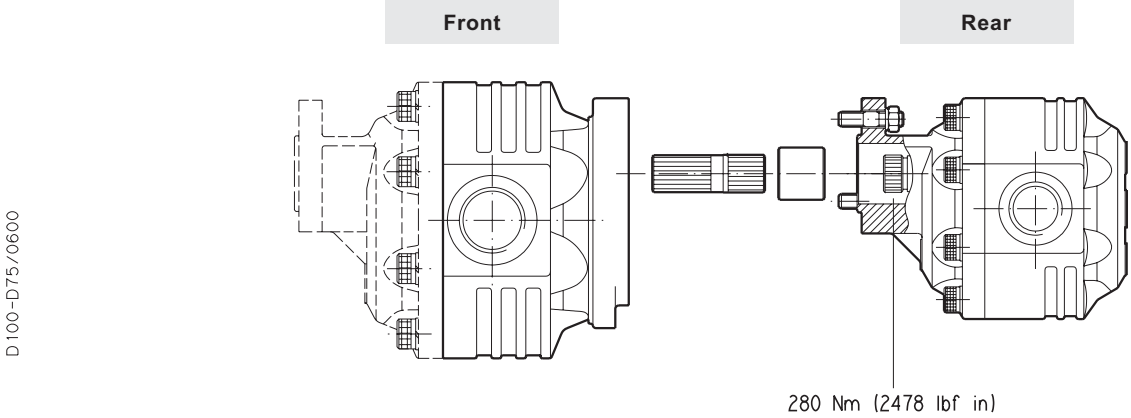
MAX 300 Nm (2655 lbf in)

01/08.05

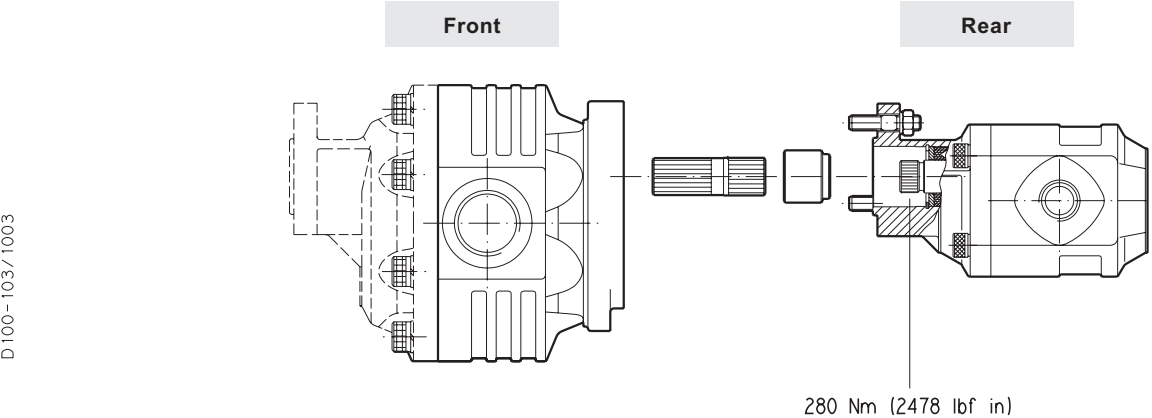
Fomula 40 + Formula 40



Fomula 40 + Formula 30



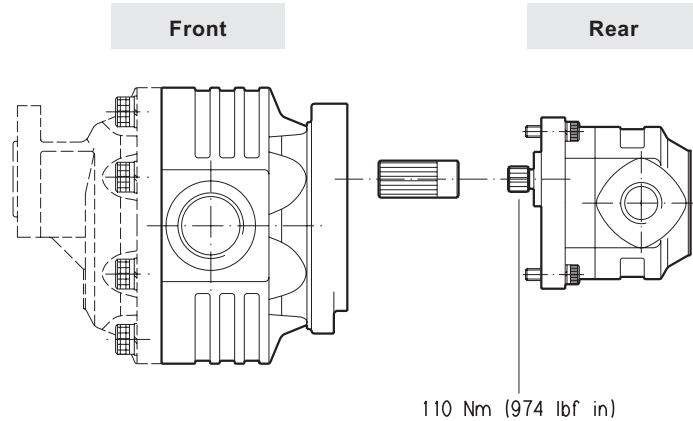
Fomula 40 + Formula 20



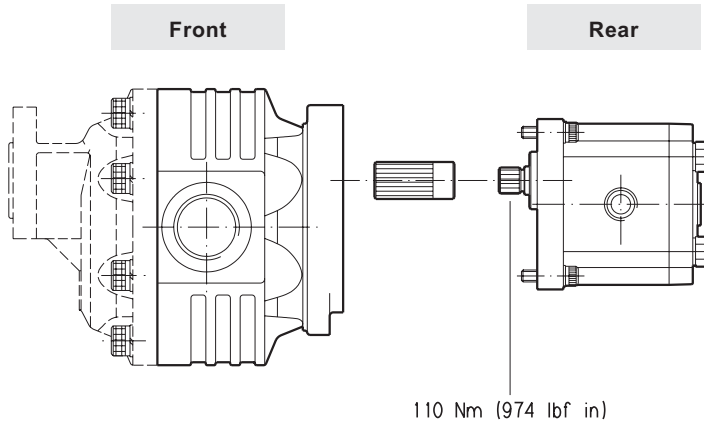
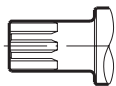
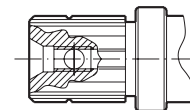
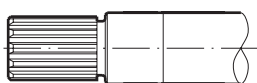
01/08.05

Fomula 40 + Kappa 20

D100-D76/0600


Fomula 40 + Polaris 20

D100-D77/0600


FORMULA 40 END DRIVE SHAFT
ITALIAN STANDARD
19
ISO STANDARD
16

MAX 400 Nm (3540 lbf in)

MAX 350 Nm (3098 lbf in)
SPLINE SAE STANDARD
06
STRAIGHT SAE STANDARD
34

MAX 900 Nm (7965 lbf in)

MAX 600 Nm (5310 lbf in)

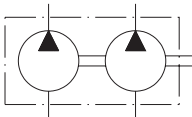
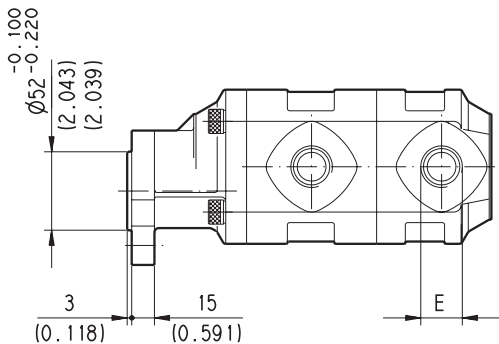
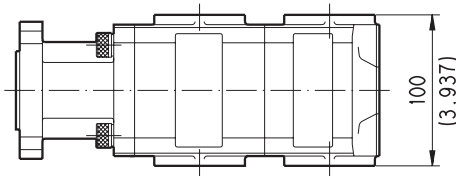
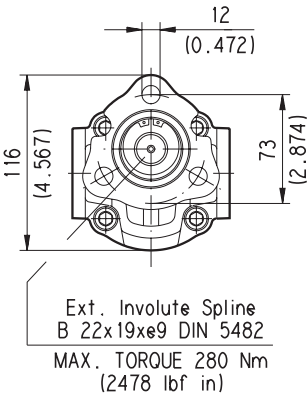
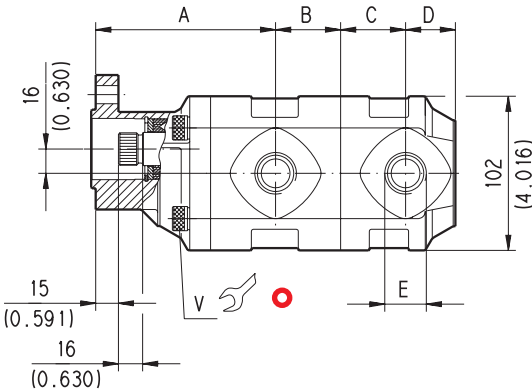
01/08.05

FORMULA 20

HYDRAULIC GEAR PUMPS ITALIAN STANDARD

13 T1

GAS STRAIGHT THREAD PORTS
British standard pipe parallel (55°) conforms to UNI - ISO 228



Tightening torque Nm (lbf in)
V
70 ^{±7} (558 ÷ 682)

FORMULA 20
HYDRAULIC GEAR PUMPS ITALIAN STANDARD
13 T1

Pump type	A	B	C	D	E
	mm (in)	mm (in)	mm (in)	mm (in)	
FP 20•8	105 (4.272)	37,5 (1.476)	29 (1.142)	27,5 (1.083)	G 1/2
FP 20•11,2	108,5 (4.272)	38,5 (1.516)	32,5 (1.280)	27,5 (1.083)	
FP 20•16	112,5 (4.429)	43 (1.693)	36,5 (1.437)	32,5 (1.280)	
FP 20•20	119 (4.685)	43 (1.693)	43 (1.693)	33 (1.299)	
FP 20•25	112 (4.409)	58 (2.283)	36 (1.417)	48 (1.890)	G 3/4
FP 20•31,5	122 (4.803)	58 (2.283)	46 (1.811)	48 (1.890)	

The lenght of a triple pump is obtained with the sum of the following dimensions: **A+B+C+B+C+D**.

How to order a triple pump

(for double pump omit the intermediate pump)

Front pump	/	Intermediate pump	/	Rear pump	-	(1) Rotation	-	(2) Seals
---------------	---	----------------------	---	--------------	---	-----------------	---	--------------

FP20•11,2 / 20•11,2 / 20•11,2 S -

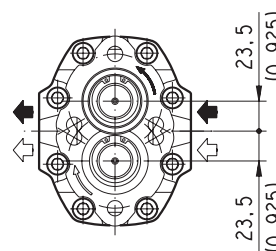
(1) S= Left - D= Right

(2) See page 1 (for Buna N seals no code)

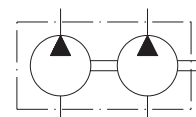
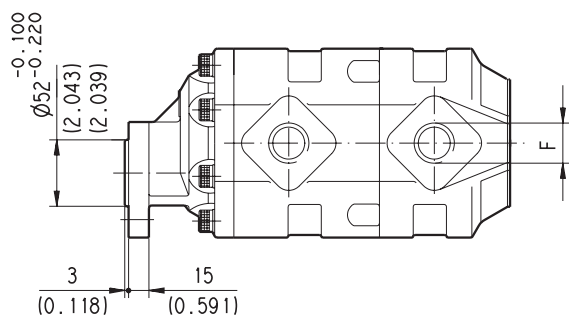
01/08.05

19 T

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



Flange T2

V

70 $\pm$ 7 (558 ÷ 682)

FORMULA 30
HYDRAULIC GEAR PUMPS ITALIAN STANDARD
19 T

	(◆) Dimension "A". ISO and SAE version
	mm (in)
A (Z0)	A (19 T) + 18 (0.709)
A (S3)	A (19 T) - 2,5 (0.098)

Pump type	A (19 T)	B	C	D	E	F	G
	mm (in)	mm (in)	mm (in)	mm (in)	IN	OUT	mm (in)
FP 30•17	111,5 (4.390)	63 (2.480)	29 (1.142)	49 (1.929)	G 3/4	G 3/4	130 (5.118)
FP 30•27	117,5 (4.626)	63 (2.480)	35 (1.378)	49 (1.929)			
FP 30•34	122,5 (4.823)	63 (2.480)	40 (1.575)	49 (1.929)			
FP 30•38	125,5 (4.941)	63 (2.480)	43 (1.693)	49 (1.929)			
FP 30•43	128,5 (5.059)	63 (2.480)	46 (1.811)	49 (1.929)			
FP 30•51	125,5 (4.941)	71 (2.795)	43 (1.693)	57 (2.244)	G 1	G 1	135 (5.315)
FP 30•61	132,5 (5.217)	70 (2.756)	50 (1.969)	56 (2.205)			
FP 30•73	140,5 (5.531)	70 (2.756)	58 (2.283)	56 (2.205)			
FP 30•82 (•)	145,5 (5.728)	70 (2.756)	—	—	G 1 1/4		

(•) Available only for front and intermediate sections.

The length of a triple pump is obtained with the sum of the following dimensions: **A+B+C+B+C+D**.

How to order a triple pump

(for double pump omit the intermediate pump)

Front pump	/	Intermediate pump	/	Rear pump	—	(1) Rotation	—	(2) Seals
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FP30•17 / 30•17 / 30•17 S —

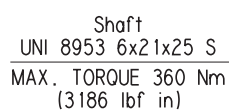
(1) S= Left - D= Right

(2) See page 1 (for Buna N seals no code)

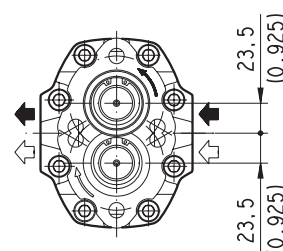
01/08.05

19 T+KP20

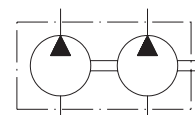
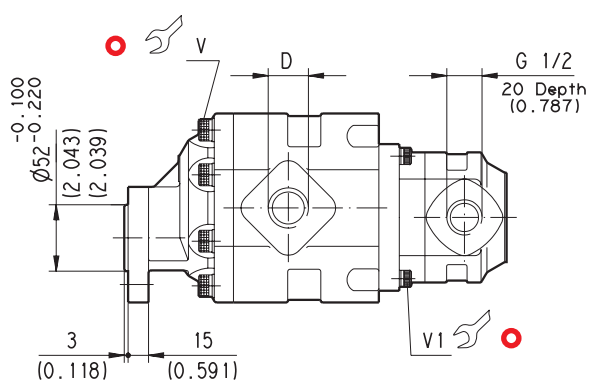
British standard pipe parallel (55°) conforms to UNI - ISO 228



Flange T1



Flange T2



Tightening torque Nm (lbf in)	
V	V1
70 ^{±7} (558 ÷ 682)	70 ^{±7} (558 ÷ 682)

FORMULA 30
HYDRAULIC GEAR PUMPS ITALIAN STANDARD
19 T+KP20

(♦) Dimension "A". ISO and SAE version	
mm (in)	
A (Z0)	A (19 T) + 18 (0.709)
A (S3)	A (19 T) - 2,5 (0.098)

Pump type	A (19 T)	B	C	D	E
	mm (in)	mm (in)	IN	OUT	mm (in)
FP 30•17	111,5 (4.390)	63 (2.480)	G 3/4	G 3/4	130 (5.118)
FP 30•27	117,5 (4.626)	63 (2.480)			
FP 30•34	122,5 (4.823)	63 (2.480)			
FP 30•38	125,5 (4.941)	63 (2.480)			
FP 30•43	128,5 (5.059)	63 (2.480)			
FP 30•51	125,5 (4.941)	71 (2.795)	G 1	G 1	135 (5.315)
FP 30•61	132,5 (5.217)	70 (2.756)			
FP 30•73	140,5 (5.531)	70 (2.756)			
FP 30•82	145,5 (5.728)	70 (2.756)	G 1 1/4		

Pump type	F	G	H	Ports code		
	mm (in)	mm (in)	IN	IN	OUT	
KP 20•4	60 (2.362)	27,5 (1.083)	G 1/2 Depth 20 (0.787)	GD	GD	
KP 20•6,3	62,5 (2.460)	27,5 (1.083)				
KP 20•8	65 (2.559)	27,5 (1.083)				
KP 20•11,2	68,5 (2.697)	27,5 (1.083)				
KP 20•14	67 (2.638)	33 (1.299)	G 3/4 Depth 22 (0.866)	GE		
KP 20•16	72,5 (2.854)	33 (1.299)				
KP 20•20	79 (3.110)	33 (1.299)				
KP 20•25	72 (2.835)	48 (1.890)				
KP 20•31,5	82 (3.228)	48 (1.890)				

How to order

Front pump	/	Rear pump	-	Ports position	Ports IN/OUT	(1) Rotation	-	(2) Seals
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FP30•17 - 67 / KP20•4 - L GD/GD S -

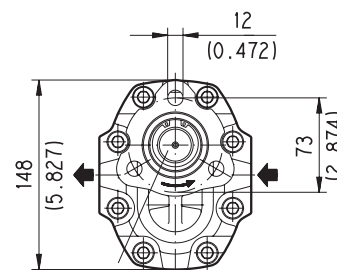
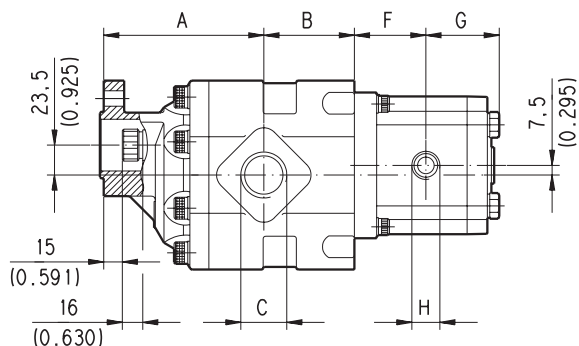
(1) S= Left - D= Right

(2) See page 1 (for Buna N seals no code)

FORMULA 30
HYDRAULIC GEAR PUMPS ITALIAN STANDARD
19 T+PL20

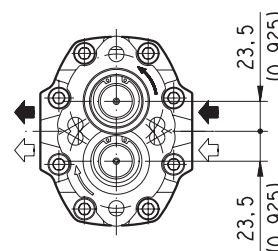
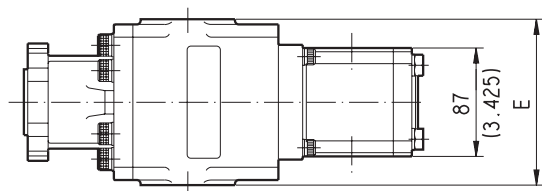
ISO (Z0) and SAE (S3) version available (◆).

GAS STRAIGHT THREAD PORTS
British standard pipe parallel (55°) conforms to UNI - ISO 228

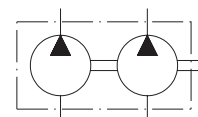
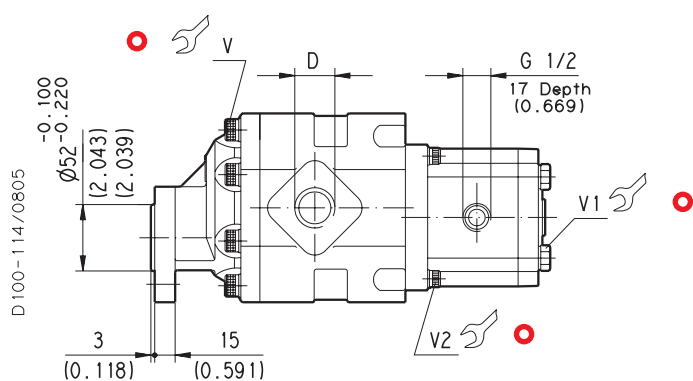


Shaft
UNI 8953 6x21x25 S
MAX. TORQUE 360 Nm
(3186 lbf in)

Flange T1



Flange T2



Tightening torque Nm (lbf in)		
V	V1 (●)	V2
70 $\pm$ 7 (558 ÷ 682)	70 $\pm$ 7 (558 ÷ 682)	70 $\pm$ 7 (558 ÷ 682)

(●) With cast iron front cover.

01/08.05

FORMULA 30
HYDRAULIC GEAR PUMPS ITALIAN STANDARD
19 T+PL20

(◆) Dimension "A". ISO and SAE version	
mm (in)	
A (Z0)	A (19 T) + 18 (0.709)
A (S3)	A (19 T) - 2,5 (0.098)

Pump type	A (19 T)	B	C	D	E
	mm (in)	mm (in)	IN	OUT	mm (in)
FP 30•17	111,5 (4.390)	63 (2.480)	G 3/4	G 3/4	130 (5.118)
FP 30•27	117,5 (4.626)	63 (2.480)			
FP 30•34	122,5 (4.823)	63 (2.480)			
FP 30•38	125,5 (4.941)	63 (2.480)			
FP 30•43	128,5 (5.059)	63 (2.480)			
FP 30•51	125,5 (4.941)	71 (2.795)	G 1	G 1	135 (5.315)
FP 30•61	132,5 (5.217)	70 (2.756)			
FP 30•73	140,5 (5.531)	70 (2.756)			
FP 30•82	145,5 (5.728)	70 (2.756)	G 1 1/4		

Pump type ⦿	F	G	H	Ports code		
	mm (in)	mm (in)	mm (in)	IN	OUT	
PLP 20•4	43,8 (1.722)	49,3 (1.941)	G 1/2 Depth 17 (0.669)	GD	GD	
PLP 20•6,3	45 (1.772)	50,5 (1.988)				
PLP 20•7,2	45,5 (1.791)	51 (2.008)				
PLP 20•8	46,3 (1.821)	51,8 (2.039)				
PLP 20•9	46,9 (1.846)	52,4 (2.063)				
PLP 20•10,5	48,3 (1.900)	53,8 (2.118)				
PLP 20•11,2	48,5 (1.909)	54 (2.126)				
PLP 20•14	51 (2.008)	56,5 (2.224)	G 3/4 Depth 18 (0.709)	GE		
PLP 20•16	52,8 (2.077)	58,3 (2.295)				
PLP 20•19	54,5 (2.146)	60 (2.553)				
PLP 20•20	56 (2.205)	61,5 (2.421)				
PLP 20•24,5	58,8 (2.315)	64,3 (2.531)				
PLP 20•25	60 (2.362)	65,5 (2.579)				
PLP 20•27,5	61,4 (2.417)	66,9 (2.634)				
PLP 20•31,5	65 (2.559)	70,5 (2.776)				

How to order

Front pump	/	Rear pump	-	Ports position		Ports IN/OUT		(1) Rotation	-	(2) Seals
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FP30•17 - 67 / PLP20•4 - L GD/GD S -

(1) S= Left - D= Right

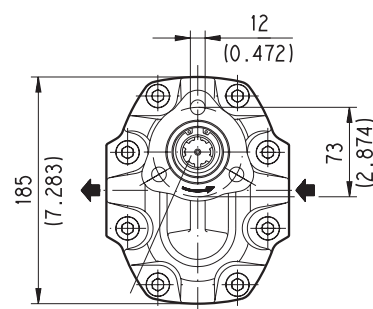
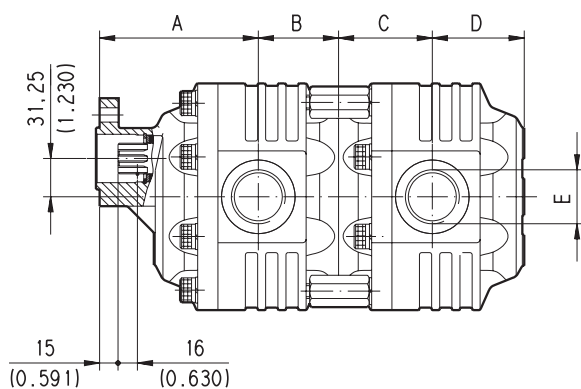
(2) See page 1 (for Buna N seals no code)

FORMULA 40
HYDRAULIC GEAR PUMPS ITALIAN STANDARD
19 T

ISO (Z0) version available (◆).
SAE (S8) version on page 60.

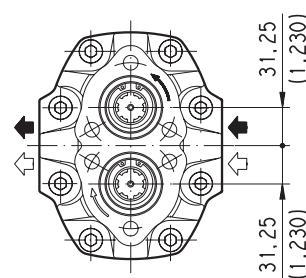
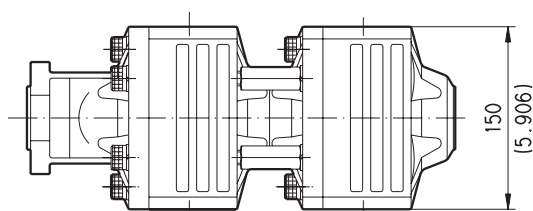
GAS STRAIGHT THREAD PORTS

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

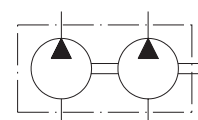
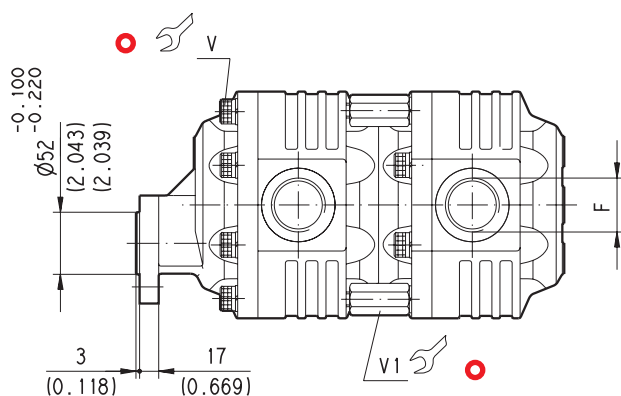


Shaft
UNI 8953 6x21x25 S
MAX. TORQUE 400 Nm
(3540 lbf in)

Flange T1



Flange T2



Tightening torque Nm (lbf in)

V

V1

100 ± 10 (797 ÷ 974)

100 ± 10 (797 ÷ 974)

01/08.05

FORMULA 40
HYDRAULIC GEAR PUMPS ITALIAN STANDARD
19 T

A (Z0)	(◆) Dimension "A". ISO version
	mm (in)
	A (19 T) + 11,5 (0.453)

Pump type	A (19 T)	B	C	D	E	F
	mm (in)	mm (in)	mm (in)	mm (in)	IN	OUT
FP 40•63	119,5 (4.705)	57,5 (2.264)	65,5 (2.579)	68 (2.677)	G 1	G 3/4
FP 40•73	123,5 (4.862)	57,5 (2.264)	69,5 (2.736)	68 (2.677)		
FP 40•87	128,5 (5.059)	57,5 (2.264)	74,5 (2.933)	68 (2.677)	G 1 1/4	G 1
FP 40•109	129,5 (5.098)	64,5 (2.539)	75,5 (2.972)	75 (2.953)		
FP 40•133	138,5 (5.453)	64,5 (2.539)	84,5 (3.327)	75 (2.953)	G 1 1/2	
FP 40•151	144,5 (5.689)	64,5 (2.539)	90,5 (3.563)	75 (2.953)		

The length of a triple pump is obtained with the sum of the following dimensions: **A+B+C+B+C+D**.

How to order a triple pump

(for double pump omit the intermediate pump)

Front pump	/	Intermediate pump	/	Rear pump	-	(1) Rotation	-	(2) Seals
---------------	---	----------------------	---	--------------	---	-----------------	---	--------------

FP40•63 / 40•63 / 40•63 S -

(1) S= Left - D= Right

(2) See page 1 (for Buna N seals no code)

01/08.05

FORMULA 40

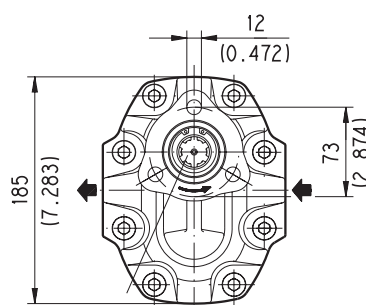
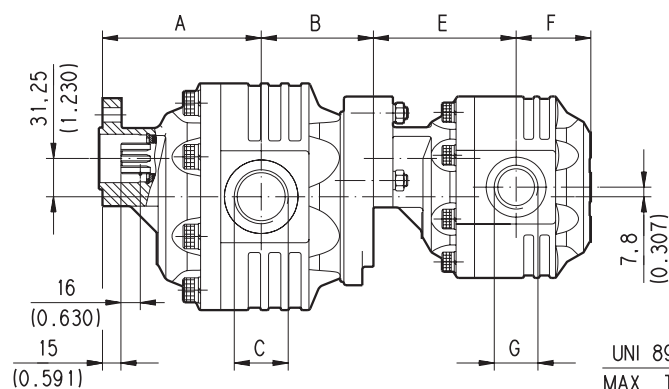
HYDRAULIC GEAR PUMPS ITALIAN STANDARD

19 T+FP30

ISO (Z0) and SAE (S8) version available (◆).

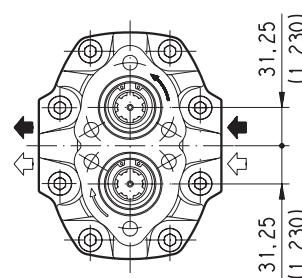
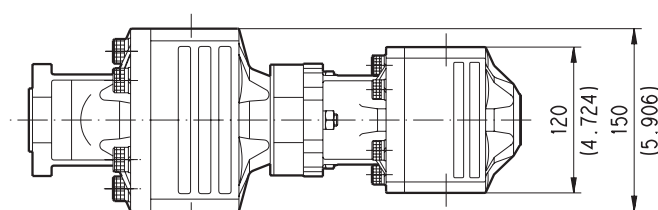
GAS STRAIGHT THREAD PORTS

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

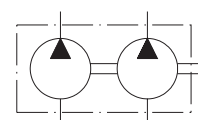
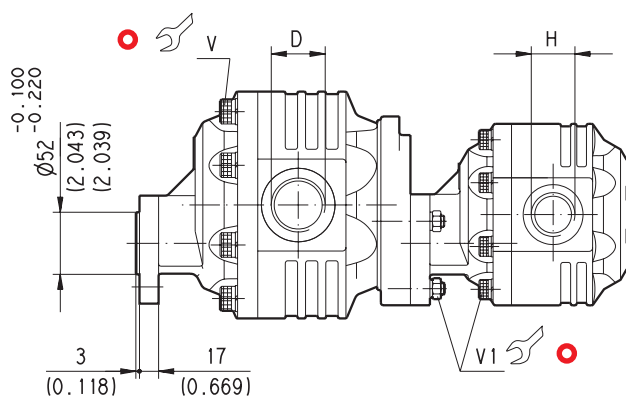


Shaft
UNI 8953 6x21x25 S
MAX. TORQUE 400 Nm
(3540 lbf in)

Flange T1



Flange T2



Tightening torque Nm (lbf in)

V

V1

100 ± 10 (797 ÷ 974)

70 ± 7 (558 ÷ 682)

FORMULA 40
HYDRAULIC GEAR PUMPS ITALIAN STANDARD
19 T+FP30

	(◆) Dimension "A". ISO and SAE version
	mm (in)
A (Z0)	A (19 T) + 11,5 (0.453)
A (S8)	A (19 T) + 1 (0.039)

Pump type	A (19 T)	B	C	D
	mm (in)	mm (in)	IN	OUT
FP 40•63	119,5 (4.705)	84,5 (3.327)	G 1	G 3/4
FP 40•73	123,5 (4.862)	84,5 (3.327)		
FP 40•87	128,5 (5.059)	84,5 (3.327)	G 1 1/4	G 1
FP 40•109	129,5 (5.098)	91,5 (3.602)		
FP 40•133	138,5 (5.453)	91,5 (3.602)	G 1 1/2	
FP 40•151	144,5 (5.689)	91,5 (3.602)		

Pump type	E	F	G	H
	mm (in)	mm (in)	IN	OUT
FP 30•17	100,5 (5.925)	50 (1.969)	G 1/2	G 1/2
FP 30•27	106,5 (4.193)	50 (1.969)	G 3/4	G 3/4
FP 30•34	106,5 (4.193)	55 (2.165)		
FP 30•38	109,5 (4.311)	55 (2.165)		
FP 30•43	112,5 (4.429)	55 (2.165)		
FP 30•51	110,5 (4.350)	62 (2.441)	G 1	G 1
FP 30•61	116,5 (4.587)	62 (2.441)		
FP 30•73	117,5 (4.623)	69 (2.717)		
FP 30•82	122,5 (4.823)	69 (2.717)	G 1 1/4	

How to order

Front pump	/	Rear pump	(1) Rotation	–	(2) Seals
---------------	---	--------------	-----------------	---	--------------

FP40•63 - 53 / FP30•17 S –

(1) S= Left - D= Right

(2) See page 1 (for Buna N seals no code)

01/08.05

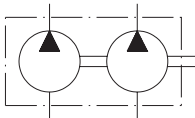
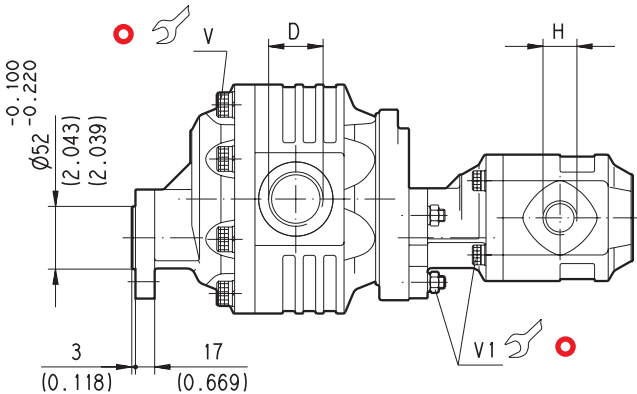
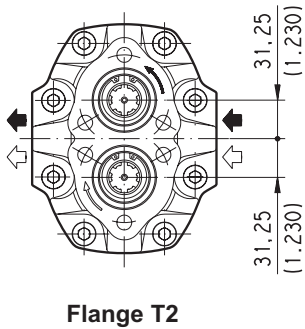
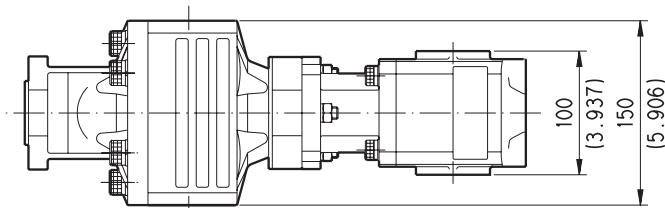
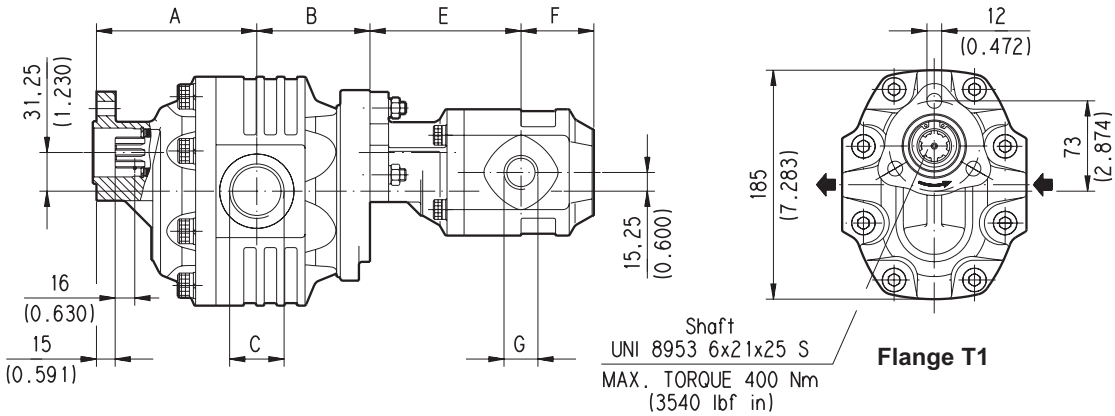
FORMULA 40

HYDRAULIC GEAR PUMPS ITALIAN STANDARD

19 T+FP20

ISO (Z0) and SAE (S8) version available (◆).

GAS STRAIGHT THREAD PORTS
British standard pipe parallel (55°) conforms to UNI - ISO 228



Tightening torque Nm (lbf in)	
V	V1
100 ^{±10} (797 ÷ 974)	70 ^{±7} (558 ÷ 682)

FORMULA 40
HYDRAULIC GEAR PUMPS ITALIAN STANDARD
19 T+FP20

	(◆) Dimension "A". ISO and SAE version
	mm (in)
A (Z0)	A (19 T) + 11,5 (0.453)
A (S8)	A (19 T) + 1 (0.039)

Pump type	A (19 T)	B	C	D
	mm (in)	mm (in)	IN	OUT
FP 40•63	119,5 (4.705)	84,5 (3.327)	G 1	G 3/4
FP 40•73	123,5 (4.862)	84,5 (3.327)		
FP 40•87	128,5 (5.059)	84,5 (3.327)	G 1 1/4	G 1
FP 40•109	129,5 (5.098)	91,5 (3.602)		
FP 40•133	138,5 (5.453)	91,5 (3.602)	G 1 1/2	
FP 40•151	144,5 (5.689)	91,5 (3.602)		

Pump type	E	F	G	H
	mm (in)	mm (in)	IN	OUT
FP 20•8	105 (4.134)	27,5 (1.083)	G 1/2	G 1/2
FP 20•11,2	108,5 (4.272)	27,5 (1.083)		
FP 20•16	112,5 (4.429)	33 (1.299)		
FP 20•20	119 (4.685)	33 (1.299)		
FP 20•25	112 (4.409)	48 (1.890)	G 3/4	G 3/4
FP 20•31,5	122 (4.803)	48 (1.890)		
FP 20•36	116,5 (4.587)	59 (2.323)		
FP 20•40	122 (4.803)	59 (2.323)		

How to order

Front pump	/	Rear pump	(1) Rotation	–	(2) Seals
---------------	---	--------------	-----------------	---	--------------

FP40•63 - 54 / FP20•11,2 S –

(1) S= Left - D= Right

(2) See page 1 (for Buna N seals no code)

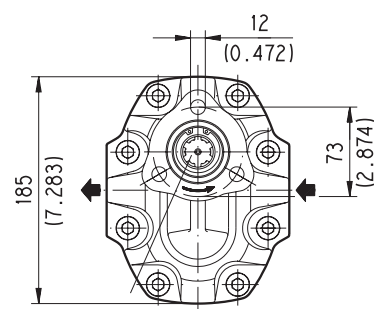
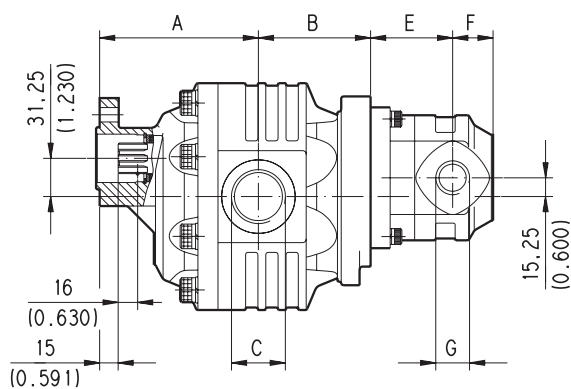
01/08.05

FORMULA 40
HYDRAULIC GEAR PUMPS ITALIAN STANDARD
19 T+KP20

ISO (Z0) and SAE (S8) version available (◆).

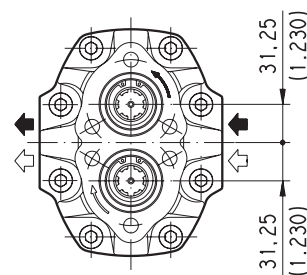
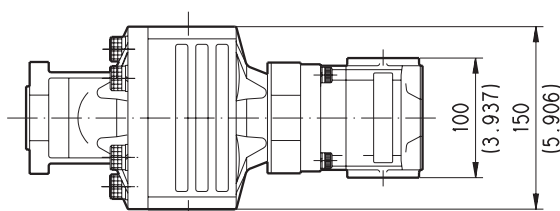
GAS STRAIGHT THREAD PORTS

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

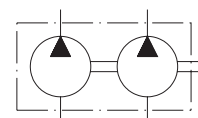
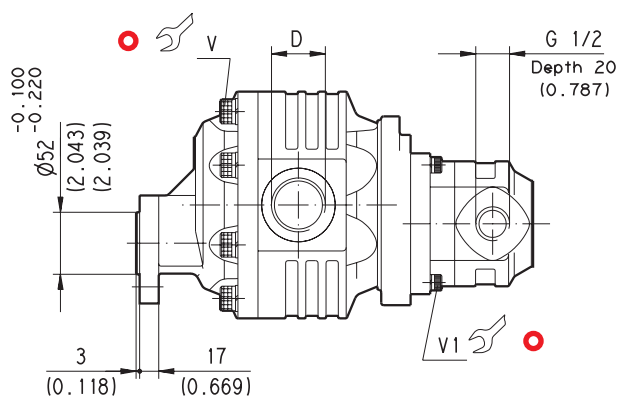


Shaft
UNI 8953 6x21x25 S
MAX. TORQUE 400 Nm
(3540 lbf in)

Flange T1



Flange T2



D100-D34/0805

Tightening torque Nm (lbf in)	
V	V1
100 ± 10 (797 ÷ 974)	70 ± 7 (558 ÷ 682)

01/08.05

FORMULA 40
HYDRAULIC GEAR PUMPS ITALIAN STANDARD
19 T+KP20

	(◆) Dimension "A". ISO and SAE version
	mm (in)
A (Z0)	A (19 T) + 11,5 (0.453)
A (S8)	A (19 T) + 1 (0.039)

Pump type	A (19 T)	B	C	D
	mm (in)	mm (in)	IN	OUT
FP 40•63	119,5 (4.705)	84,5 (3.327)	G 1	G 3/4
FP 40•73	123,5 (4.862)	84,5 (3.327)		
FP 40•87	128,5 (5.059)	84,5 (3.327)	G 1 1/4	G 1
FP 40•109	129,5 (5.098)	91,5 (3.602)		
FP 40•133	138,5 (5.453)	91,5 (3.602)	G 1 1/2	
FP 40•151	144,5 (5.689)	91,5 (3.602)		

Pump type	E	F	G	Ports code		
	mm (in)	mm (in)	IN	IN	OUT	
KP 20•4	60 (2.362)	27,5 (1.083)	G 1/2 Depth 20 (0.787)	GD	GD	
KP 20•6,3	62,5 (2.460)	27,5 (1.083)				
KP 20•8	65 (2.559)	27,5 (1.083)				
KP 20•11,2	68,5 (2.697)	27,5 (1.083)				
KP 20•14	67 (2.638)	33 (1.299)	G 3/4 Depth 22 (0.866)	GE		GD
KP 20•16	72,5 (2.854)	33 (1.299)				
KP 20•20	79 (3.110)	33 (1.299)				
KP 20•25	72 (2.835)	48 (1.890)				
KP 20•31,5	82 (3.228)	48 (1.890)				

How to order

Front pump	/	Rear pump	-	Ports position	Ports IN/OUT	(1) Rotation	-	(2) Seals
FP40•63	-	52	/	KP20•4	-	L	GD/GD	S -

(1) S= Left - D= Right

(2) See page 1 (for Buna N seals no code)

01/08.05

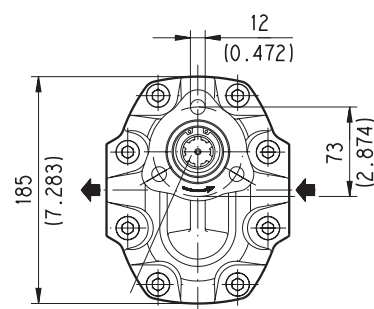
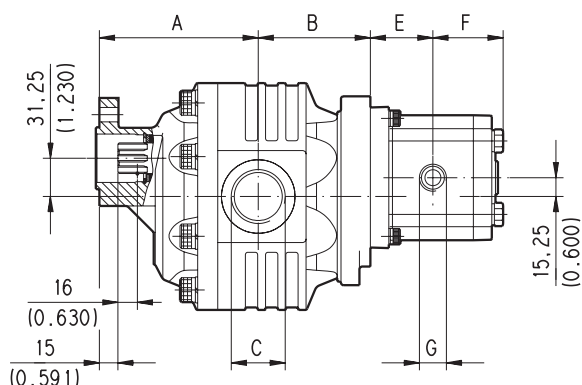
FORMULA 40

HYDRAULIC GEAR PUMPS ITALIAN STANDARD

19 T+PL20

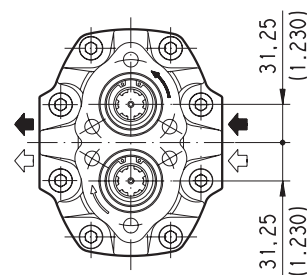
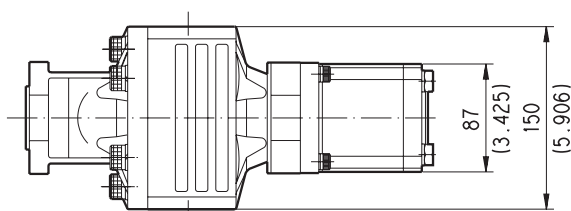
ISO (Z0) and SAE (S8) version available (◆).

GAS STRAIGHT THREAD PORTS
British standard pipe parallel (55°) conforms to UNI - ISO 228

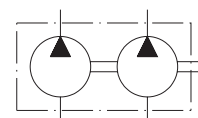
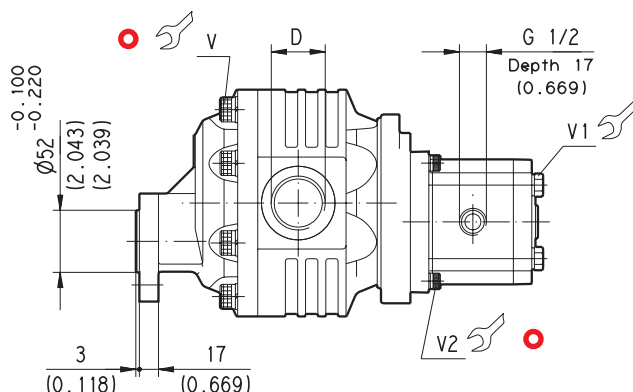


Shaft
UNI 8953 6x21x25 S
MAX. TORQUE 400 Nm
(3540 lbf in)

Flange T1



Flange T2



D100-D31/0805

Tightening torque Nm (lbf in)		
V	V1 (●)	V2
100 ± 10 (797 ÷ 974)	70 ± 7 (558 ÷ 682)	70 ± 7 (558 ÷ 682)

(●) With cast iron front cover.

01/08.05

FORMULA 40
HYDRAULIC GEAR PUMPS ITALIAN STANDARD
19 T+PL20

	(◆) Dimensione "A". Versione ISO e SAE
	mm (in)
A (Z0)	A (19 T) + 11,5 (0.453)
A (S8)	A (19 T) + 1 (0.039)

Pump type	A (19 T)	B	C	D
	mm (in)	mm (in)	IN	OUT
FP 40•63	119,5 (4.705)	84,5 (3.327)	G 1	G 3/4
FP 40•73	123,5 (4.862)	84,5 (3.327)		
FP 40•87	128,5 (5.059)	84,5 (3.327)	G 1 1/4	G 1
FP 40•109	129,5 (5.098)	91,5 (3.602)		
FP 40•133	138,5 (5.453)	91,5 (3.602)	G 1 1/2	
FP 40•151	144,5 (5.689)	91,5 (3.602)		

 Pump type	E	F	G	Ports code		
	mm (in)	mm (in)	mm (in)	IN	OUT	
PLP 20•4	43,8 (1.722)	49,3 (1.941)	G 1/2 Depth 17 (0.669)	GD	GD	
PLP 20•6,3	45 (1.772)	50,5 (1.988)				
PLP 20•7,2	45,5 (1.791)	51 (2.008)				
PLP 20•8	46,3 (1.821)	51,8 (2.039)				
PLP 20•9	46,9 (1.846)	52,4 (2.063)				
PLP 20•10,5	48,3 (1.900)	53,8 (2.118)				
PLP 20•11,2	48,5 (1.909)	54 (2.126)				
PLP 20•14	51 (2.008)	56,5 (2.224)	G 3/4 Depth 18 (0.709)	GE		
PLP 20•16	52,8 (2.077)	58,3 (2.295)				
PLP 20•19	54,5 (2.146)	60 (2.553)				
PLP 20•20	56 (2.205)	61,5 (2.421)				
PLP 20•24,5	58,8 (2.315)	64,3 (2.531)				
PLP 20•25	60 (2.362)	65,5 (2.579)				
PLP 20•27,5	61,4 (2.417)	66,9 (2.634)				
PLP 20•31,5	65 (2.559)	70,5 (2.776)				

How to order

Front pump	/	Rear pump	-	Ports position	Ports IN/OUT	(1) Rotation	-	(2) Seals
FP40•63	-	52	/	PLP20•4	-	L	GD/GD	S -

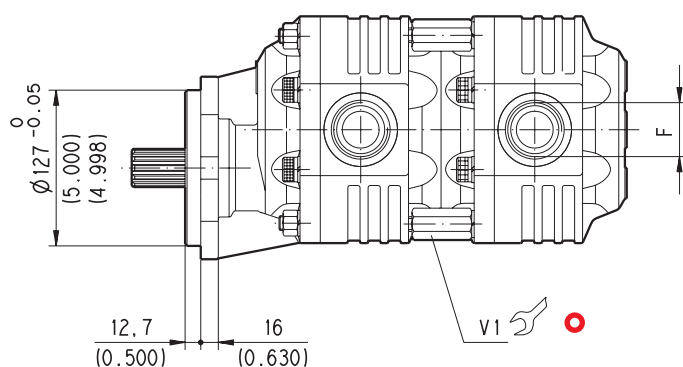
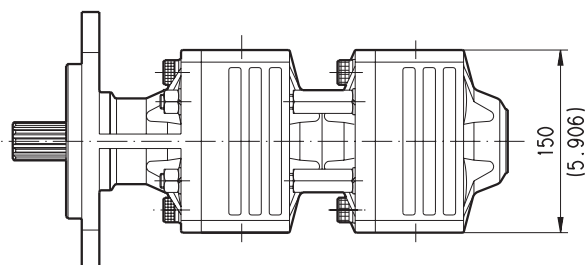
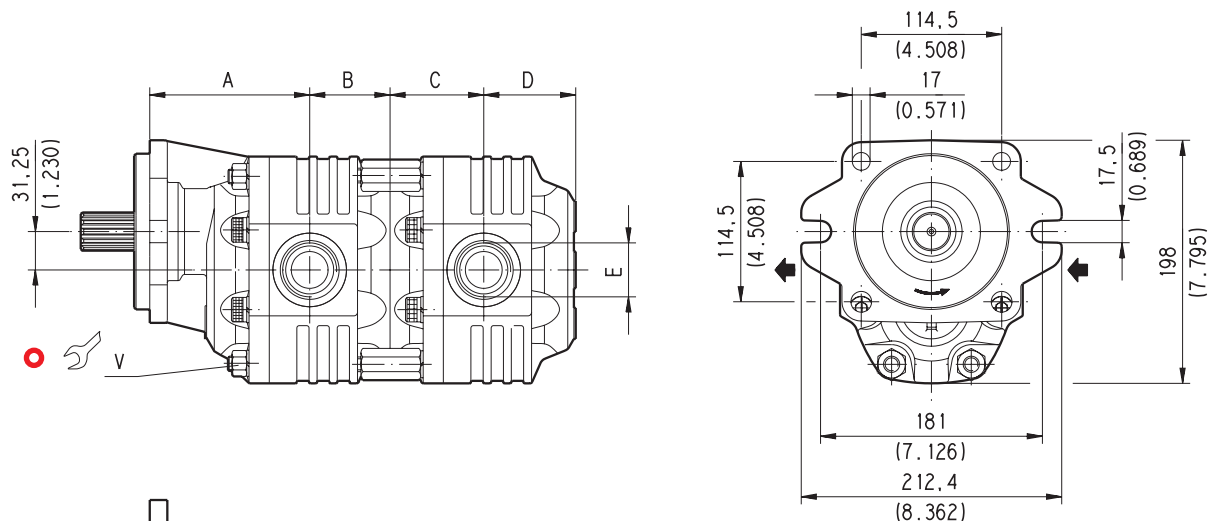
(1) S= Left - D= Right

(2) See page 1 (for Buna N seals no code)

FORMULA 40
HYDRAULIC GEAR PUMPS SAE STANDARD
SAE

SAE STRAIGHT THREAD PORTS J514

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

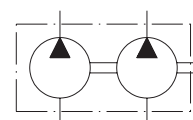


Tightening torque Nm (lbf in)

V
V1
 100 ± 10 (797 ÷ 974)

 100 ± 10 (797 ÷ 974)

To order see page 61 - 62.

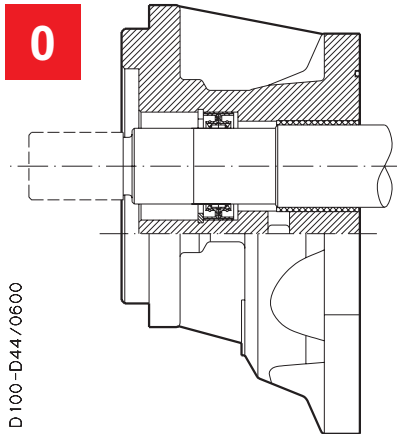


Pump type	A	B	C	D	E	F	Ports code	
	mm (in)	mm (in)	mm (in)	mm (in)	IN	OUT	IN	OUT
FP 40•63	120,5 (4.744)	57,5 (2.264)	65,5 (2.579)	68 (2.677)	1-5/16-12 UN-2B	1-1/16-12 UN-2B	OF	OD
FP 40•73	124,5 (4.902)	57,5 (2.264)	69,5 (2.736)	68 (2.677)				
FP 40•87	129,5 (5.098)	57,5 (2.264)	74,5 (2.933)	68 (2.677)	1-5/8-12 UN-2B	1-5/16-12 UN-2B	OG	OF
FP 40•109	130,5 (5.138)	64,5 (2.539)	75,5 (2.972)	75 (2.953)				
FP 40•133	139,5 (5.492)	64,5 (2.539)	84,5 (3.327)	75 (2.953)	1-7/8-12 UN-2B		OH	
FP 40•151	145,5 (5.728)	64,5 (2.539)	90,5 (3.563)	75 (2.953)				

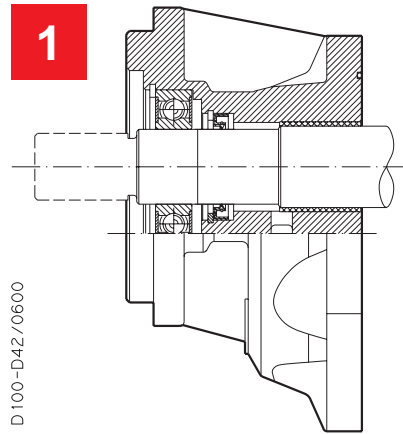
The length of a triple pump is obtained with the sum of the following dimensions: **A+B+C+B+C+D**.

FORMULA 40 SAE VERSION

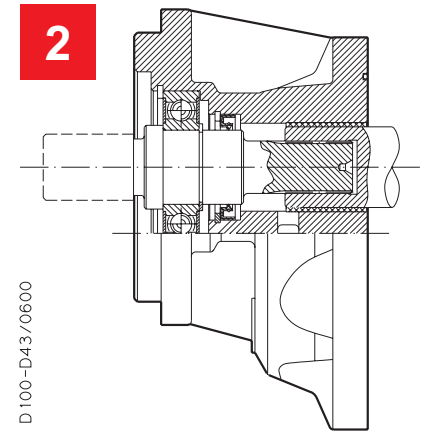
SAE



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



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



Special version with independent shaft for applications with low radial load and without axial load on the drive shaft.

FORMULA 40 SAE END DRIVE SHAFTS

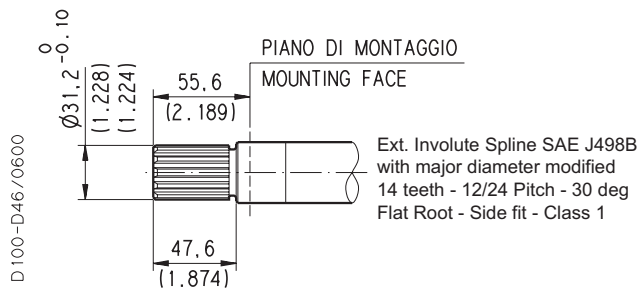
SAE

SAE "C" SPLINE

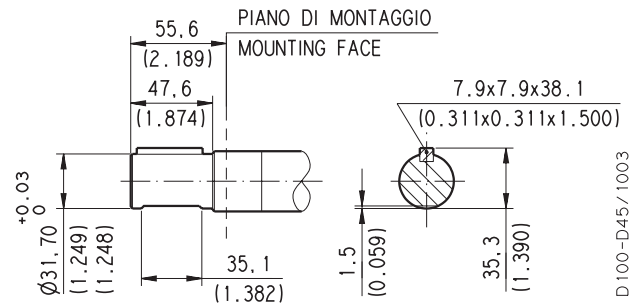
06

SAE "C" STRAIGHT

34



MAX 900 Nm (7966 lbf in) ◆



MAX 600 Nm (5311 lbf in) ◆

◆ For "2" version whichever end shaft, the max. torque applicable is M= 600 Nm (5311 lbf in)

PUMP - VERSION - SHAFT AVAILABILITY TABLE

SAE

Pump type	VERSION			SHAFT
	0	1	2	
FP 40•63	06	06	06 - 34	
FP 40•73	06 - 34	06 - 34	06 - 34	
FP 40•87	06 - 34	06 - 34	06 - 34	
FP 40•109	06	06	06 - 34	
FP 40•133	06 - 34	06 - 34	06 - 34	
FP 40•151	06 - 34	06 - 34	06 - 34	

01/08.05

HOW TO ORDER MULTIPLE PUMPS

1	2	3	4	5	6	7	8
Pump type	Drive shaf	Mounting flange	Ports position	Ports IN/OUT	Rotation	Version	Seals
FP 40•63	–	19	T1	–	L	OF/OD	/
Front ump							
40•63	–		L	OF/OD	/		
Intermediate pump							
40•63	–		L	OF/OD	–	S	– 0 N
Rear pump							

1	Pump type	CODE
	in ³ /rev (cm ³ /rev)	
	3.75 (61,43)	FP 40•63
	4.43 (72,60)	FP 40•73
	5.28 (86,56)	FP 40•87
	6.64 (108,90)	FP 40•109
	8.18 (134,03)	FP 40•133
	9.20 (150,79)	FP 40•151

2	Drive shaf	CODE
	SAE "C" spline (14 teeth)	06
	SAE "C" straigh	34

3	Mounting flange	CODE
	SAE "C" 2-4 holes	S8

4	Ports position	CODE
	Side	L

CODE	Ports IN/OUT	5
SAE STRAIGHT THREAD PORTS (ODT)		
Side	Pump type	
OF/OD	FP 40•63	
OF/OD	FP 40•73	
OG/OF	FP 40•87	
OG/OF	FP 40•109	
OH/OF	FP 40•133	
OH/OF	FP 40•151	

CODE	Rotation	6
S	Left	
D	Right	

CODE	Version	7
0	Without outboard bearing	
1	With outboard bearing	
2	With outboard bearing and indep. shaft	

CODE	Seals (a)	8
N	Buna N (standard)	
V	Viton	
N Bz	Buna N and Bronze thrust plates	
V Bz	Viton and Bronze thrust plates	

(a) Choose the seals according to the temperature shown on page 1

ORDER EXAMPLE

Triple pump

FP 40•63 - 06 S8 - L OF/OD / 40•63 - L OF/OD / 40•63 - L OF/OD S - 0 - N

PORTS CONNECTORS TIGHTENING TORQUE



Tightening torque for low pressure side port.



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

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

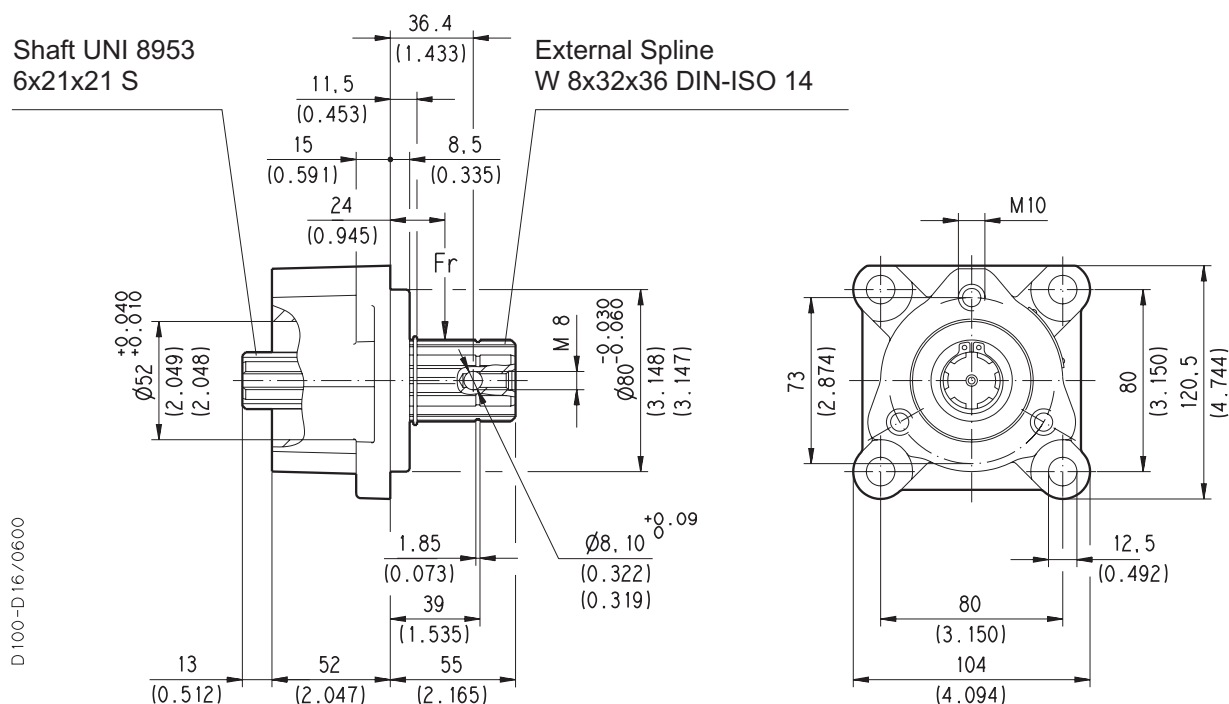
GAS STRAIGHT THREAD PORTS					BSPP
CODE					
	Nm	(lbf in)	Nm	(lbf in)	
GC (■)	15 ⁺¹	133 ÷ 142	—	—	
GD	20 ⁺¹	177 ÷ 186	50 ^{+2,5}	443 ÷ 465	
GE	30 ^{+2,5}	266 ÷ 288	90 ⁺⁵	797 ÷ 841	
GF	50 ^{+2,5}	443 ÷ 465	130 ⁺¹⁰	1151 ÷ 1239	
GG	60 ⁺⁵	531 ÷ 575	170 ⁺¹⁰ (FP30)	1505 ÷ 1593 (FP30)	
			210 ⁺¹⁰ (FP40)	1859 ÷ 1947 (FP30)	
GH	70 ⁺⁵	620 ÷ 664	—	—	

SAE STRAIGHT THREAD PORTS J514					ODT
CODE					
	Nm	(lbf in)	Nm	(lbf in)	
OA (■)	15 ⁺¹	133 ÷ 142	—	—	
OB	20 ⁺¹	177 ÷ 186	45 ^{+2,5}	398 ÷ 420	
OD	40 ^{+2,5}	354 ÷ 376	120 ⁺¹⁰	1062 ÷ 1151	
OE	50 ^{+2,5}	443 ÷ 465	145 ⁺¹⁰	1283 ÷ 1372	
OF	60 ⁺⁵	531 ÷ 575	170 ⁺¹⁰	1505 ÷ 1593	
OG	70 ⁺⁵	620 ÷ 664	—	—	
OH	100 ⁺⁵	885 ÷ 929	—	—	

(■) Drain port: FORMULA 30 and FORMULA 40 rear drain (R).

BEARING SUPPORT FOR COUPLING TO ZF P.T.O. (ISO standard)

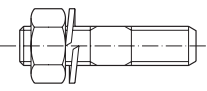
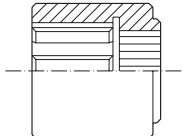
SL9 - SR9



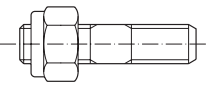
The bearing support allows FORMULA Italian standard pumps to be coupled to P.T.O. of commercial vehicles.

Ordering code	Max. radial load 24 mm (0.945 in) from mounting face (Fr)	Mass
	N	kg (lbs)
SL9	—	2,7 (5.95)
SR9	Low load	

KIT to assemble FP20 - 13 T1 and FP30 - 13 T pumps with support

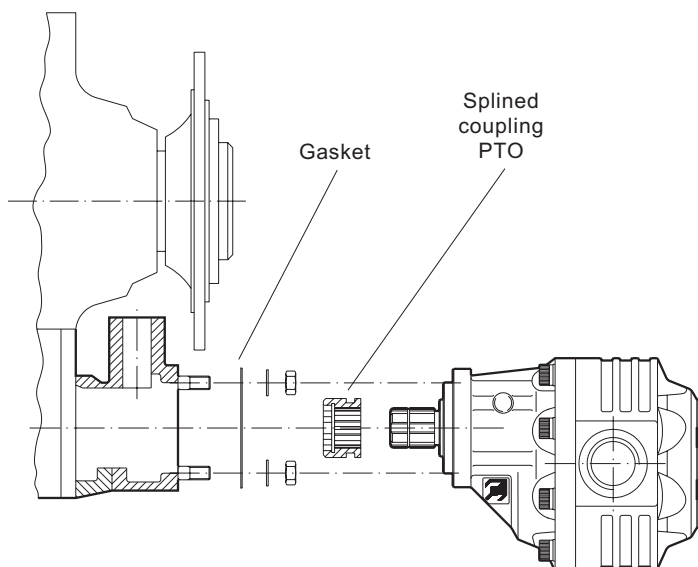
Part	Q.ty	Description	Ordering code
	3	Stud M 10x30 UNI 5911 Nut M 10 Washer 10 DIN 7980	KIT 10 - A
	1	Gasket	
	1	Splined coupling MA 6x21x25 UNI 8953 - A 22x19 DIN 5482 L= 31	

KIT to assemble FP30 - 19 T and FP40 - 19 T pumps with support

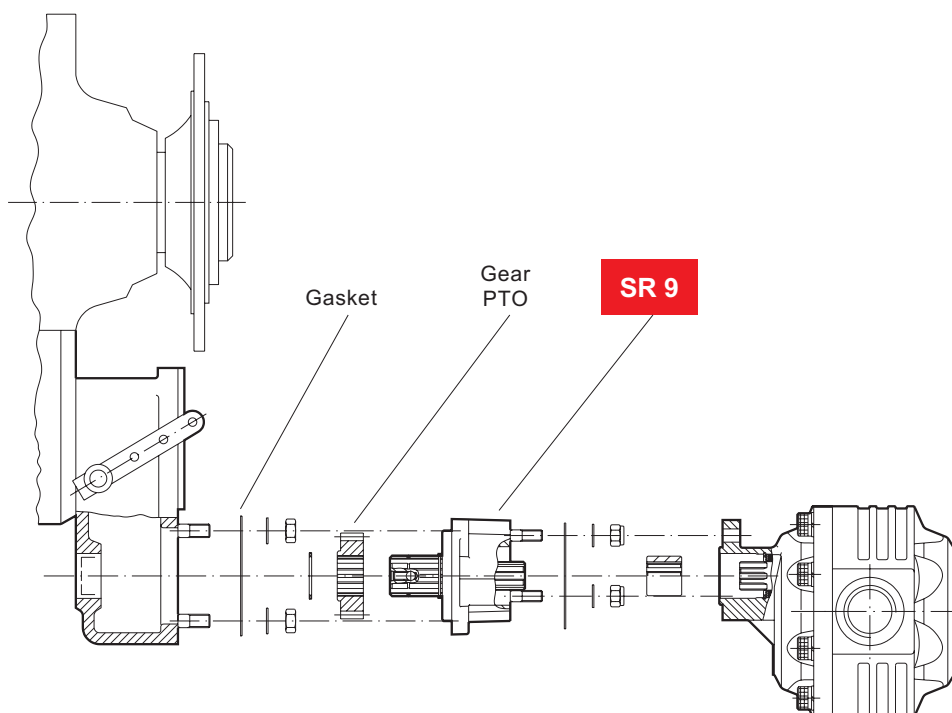
Part	Q.ty	Description	Ordering code
	3	Stud M 10x30 UNI 5911 Nut M 10 UNI 7473	KIT 17 - A
	1	Gasket	
	1	Splined coupling MA 6x21x25 UNI 8953 L= 31	

01/08.05

APPLICATIONS OF FORMULA PUMPS WITH ZF P.T.O. (ISO STANDARD)

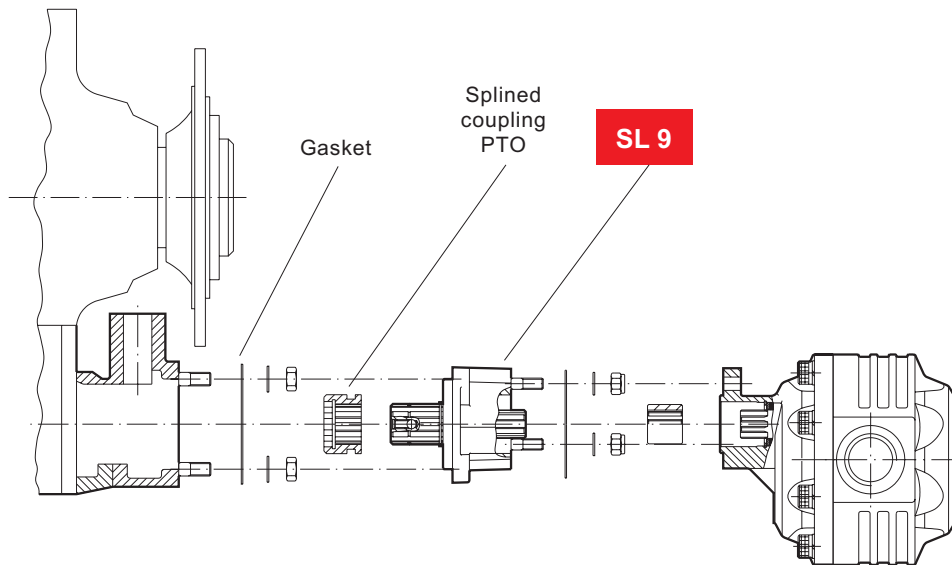


The FORMULA pumps in the application with radial load can be directly connected to the "ZF" P.T.O.



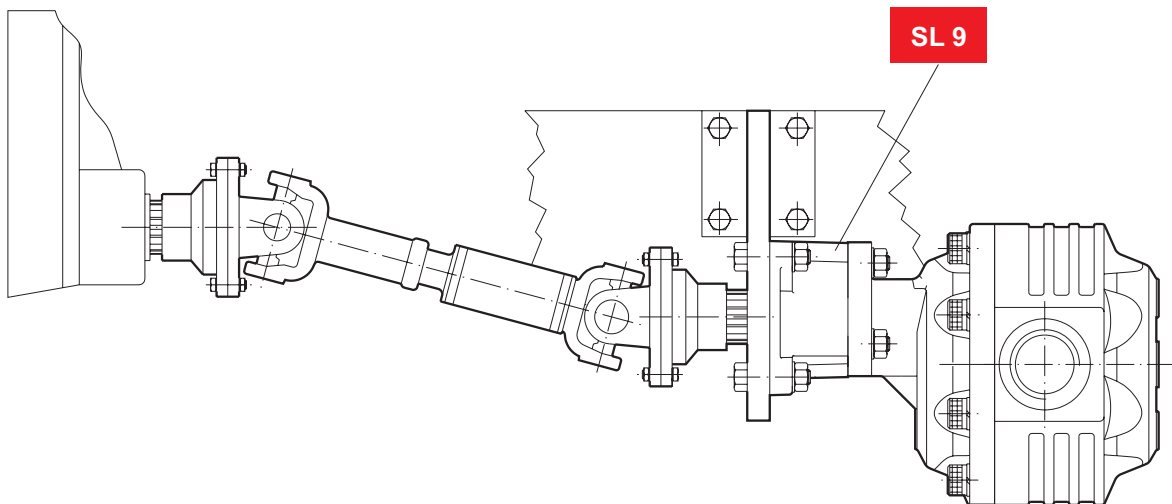
The FORMULA pumps in the application with radial load can be directly connected to the "ZF" P.T.O. with straight teeth gear using the SR9 support.

APPLICATIONS OF FORMULA PUMPS WITH ZF P.T.O. (ISO STANDARD)



D 100-D84/0493

The FORMULA pumps in the application without radial load can be directly connected to the "ZF" P.T.O. only on self sealed version using the SL9 support.



D 100-D86/0493

Use SL9 support to apply the universal joint.

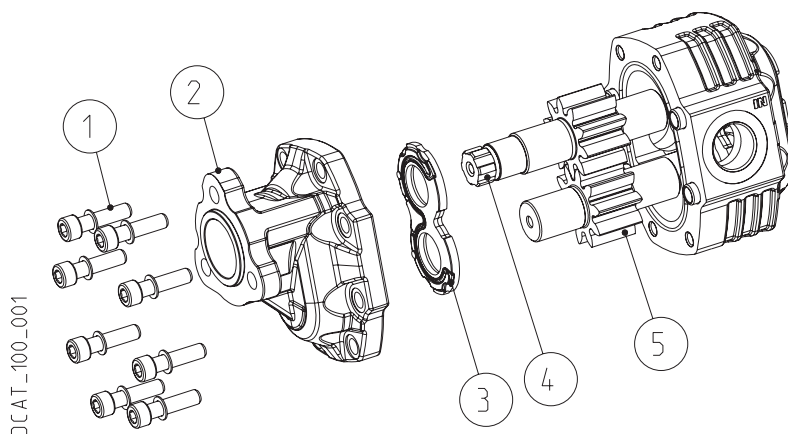
001/08.05

CHANGING ROTATION

Example of changing rotation: from FP30 pump counterclockwise to clockwise

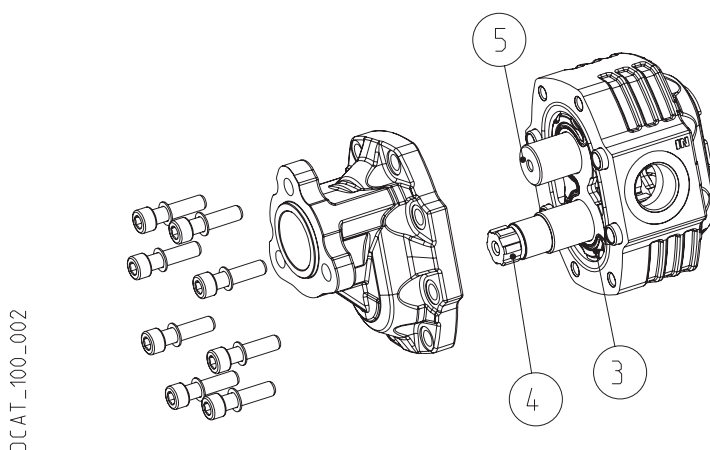
To change rotation of unidirectional pumps is necessary to operate in the following way:

- 1 - Clean the pump externally with care.
- 2 - Loosen, and remove, the clamp bolts (1).
- 3 - Coat the sharp edges of the drive shaft (4) with adhesive tape and smear a layer of clean grease on the shaft end extension to avoid damaging the lip of the shaft seal when removing the mounting flange.
- 4 - Remove the mounting flange (2), taking care to keep the flange as straight as possible during removal. If the flange is stuck, tap around the edge with a fibre or rubber mallet in order to break away from the body. Ensure that while removing the front mounting flange, the drive shaft and other components remain position.

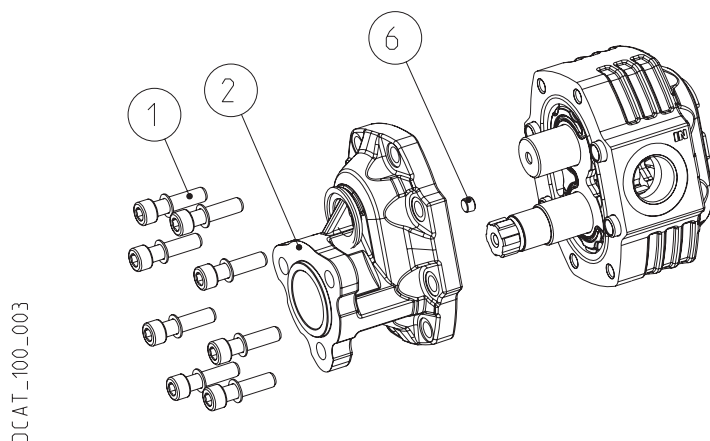


- 5 - Ease the drive gear (4) up to facilitate removal the front plate (3), taking care that the precision ground surfaces do not become damaged, and remove the drive gear.
- 6 - Remove the driven gear (5) without overturning. The rear plate has not to be removed.

- 7 - Re-locate the driven gear (5) in the position previously occupied by the drive gear (4)
- 8 - Re-locate the drive gear (4) in the position previously occupied by the driven gear (5).
- 9 - Replace the front plate (3) in its original position.



- 10 - Remove the grub screw (6) from the mounting flange (2) and re-locate it in the other threaded hole in the same flange.
- 11 - Gently wipe the machined surface of the mounting flange (2) and the body with a flat hand stone.
- 12 - Refit the front mounting flange (2) turned 180° from its original position.
- 13 - Refit the clamp bolts (1) with the washers and tighten in a crisscross pattern to a torque value of 70 ± 7 Nm ($558 \div 682$ lbf in).
- 14 - Check that the pump rotates freely when the drive shaft (4) is turned by hand. If not a pressure plate seal may be pinched.



- 15 - The pump is ready for installation with the original rotation reversed.

01/08.05

INSTRUCTIONS

INSTALLATION

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, the connection do not generate an axial or radial load on the pump 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 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.

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:



HYDRAULIC FLUID

Use hydraulic fluid conforming to the table 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.

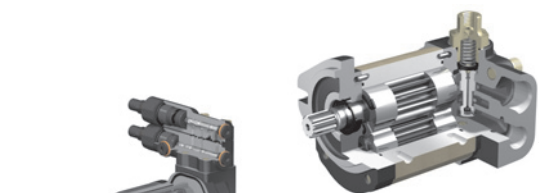
STARTING UP

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. Then gradually increase the pressure and speed of rotation until the pre-set operating levels as specified in the catalogue are attained.

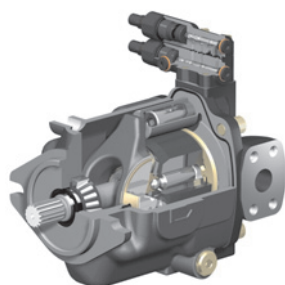
PERIODICAL CHECKS - MAINTENANCE

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.

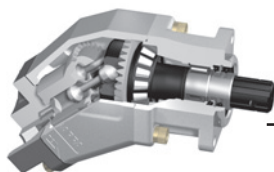
Casappa: Fluid Power Design at 360°



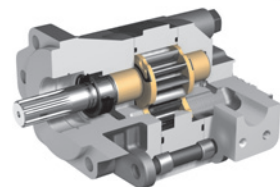
Gear pumps and motors.
High performance, low noise.



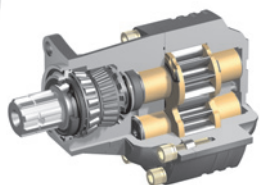
Variable displacement axial piston pumps,
for open circuit.



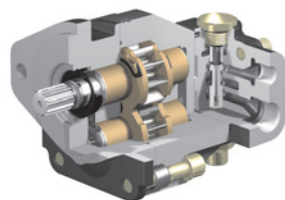
Fixed displacement bent axis piston pumps,
for truck applications.



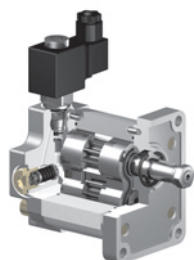
Cast iron gear pumps and
motors of three part construction.



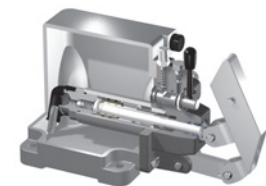
Cast iron gear pumps,
for truck applications.



Cast iron gear pumps and
motors of two part construction.



Gear pumps and
motors in aluminium.



Double acting hydraulic hand pumps
with or without reservoir.



Filters : suction filters, return filters, in line filters spin-on
type, for medium and high pressure filters.



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