



Hydraulic gear pumps and motors

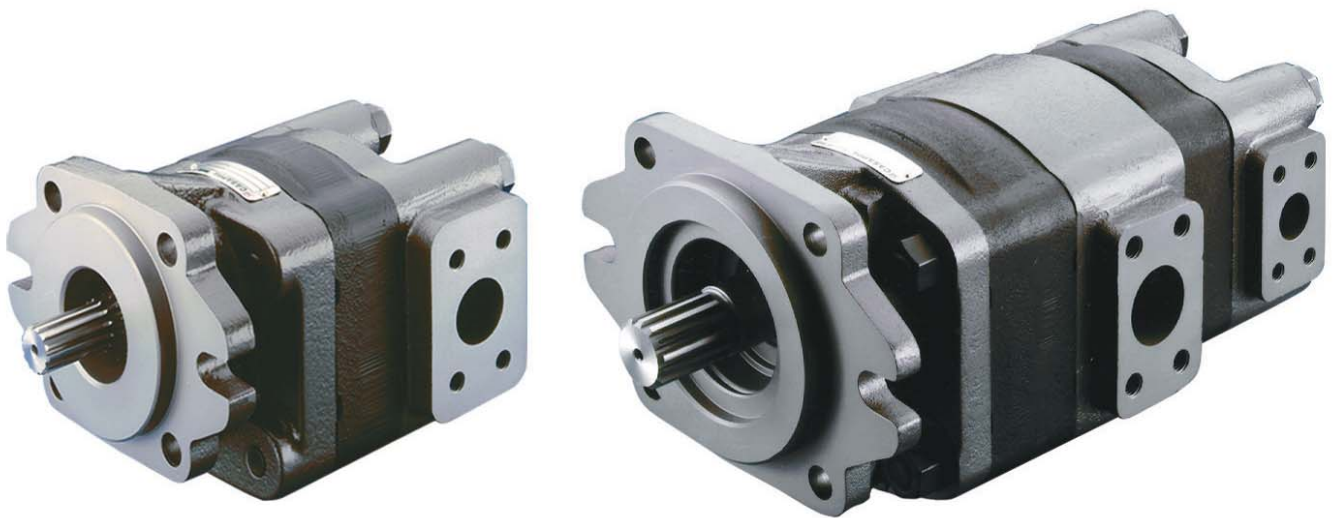
three piece cast iron housing

Replaces: MA 05 T IE

DISPLACEMENTS

From 1.05 in³/rev
(17,28 cm³/rev)

To 7.66 in³/rev
(125,63 cm³/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

Edition: 01/07.2005

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.



INDEX

Section	Page
FEATURES . . . . .	. 1
GENERAL DATA . . . . .	. 3
PUMP PERFORMANCE CURVES . . . . .	. 5
MOTOR PERFORMANCE CURVES . . . . .	. 12
SINGLE UNITS DIMENSIONS . . . . .	. 19
MULTIPLE PUMPS. . . . .	. 23
MULTIPLE PUMPS DIMENSIONS. . . . .	. 30
VERSIONS (OUTBOARD BEARINGS FOR SHAFTS) . . . . .	. 40
DRIVE SHAFTS . . . . .	. 45
MOUNTING FLANGES . . . . .	. 46
PORTS . . . . .	. 49
CHANGING ROTATION . . . . .	. 54
INSTRUCTIONS . . . . .	. 55

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	$\Delta p > 2900$ psi - (200 bar)	
	$\Delta p > 2900$ psi - (200 bar)	$\Delta p < 2900$ psi - (200 bar)
Contamination class NAS 1638	8	10
Contamination class ISO 4406	19/17/14	21/19/16
Achieved with filter $\beta_{x \geq 75}$	10 μ m	25 μ m

Casappa recommends to use its own production filters:

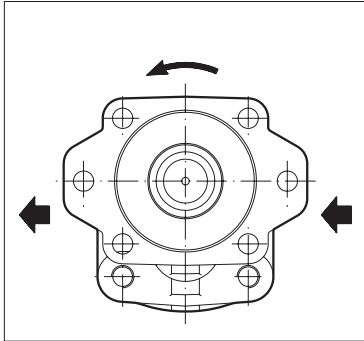


GENERAL NOTES

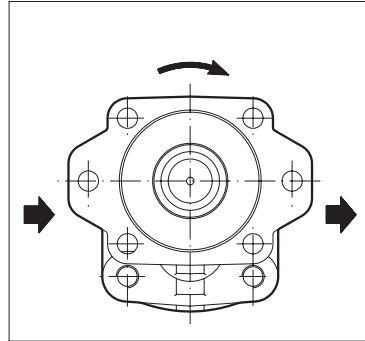
Available with different inlet and outlet ports. If you use fire resistant fluids, specify the fluid type when ordering.
For more information please consult our technical sales department.

FEATURES

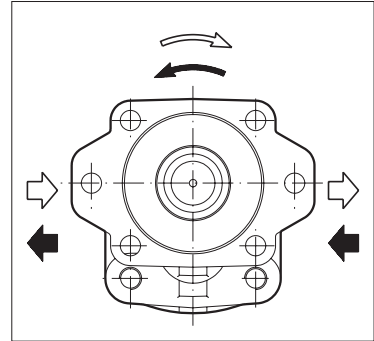
DEFINITION OF ROTATION DIRECTION LOOKING AT THE DRIVE SHAFT



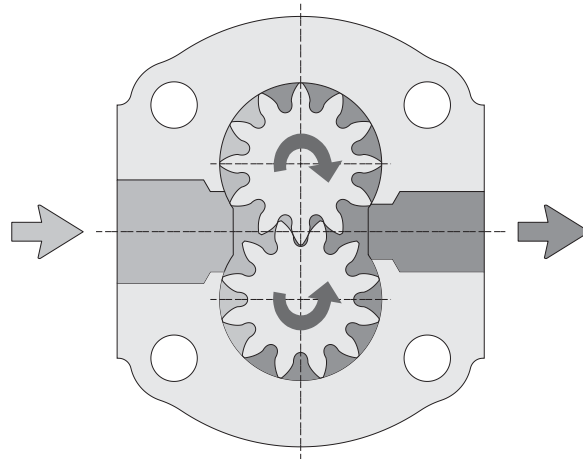
Anti-clock rotation



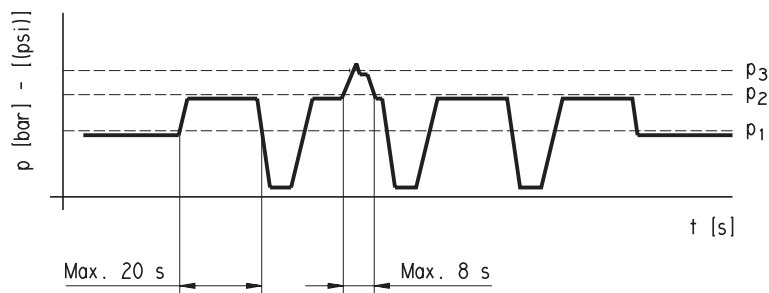
Clockwise rotation



Reversible rotation



PRESSURE DEFINITION



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

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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	(≈ 0,98)	(≈ 0,97)
$\eta_m = \eta_m(V, \Delta p, n)$	Mechanical efficiency	(≈ 0,90)	(≈ 0,88)
$\eta_t = \eta_v \cdot \eta_m$	Overall efficiency	(≈ 0,88)	(≈ 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

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

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

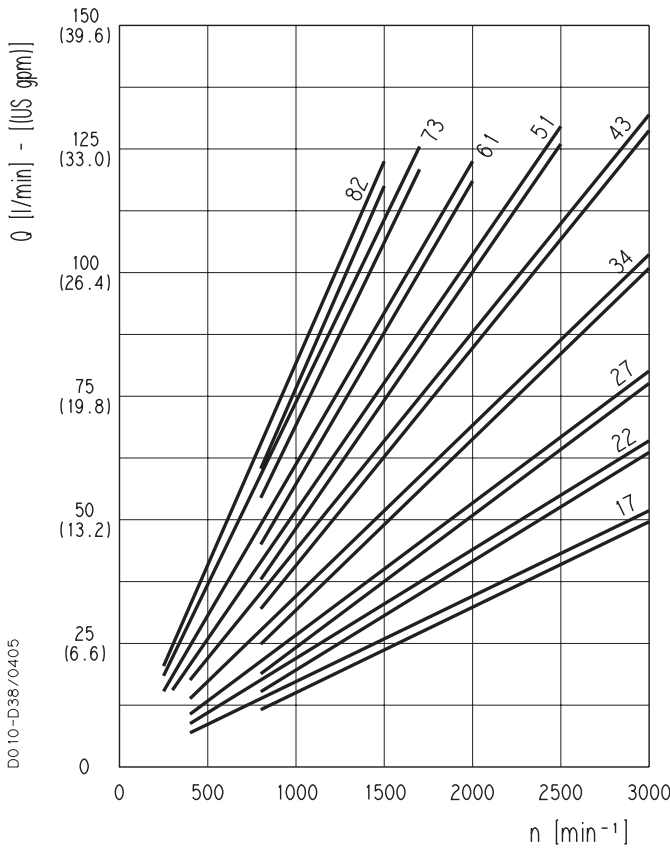
$$P = \frac{\Delta p (\text{bar}) \cdot V (\text{cm}^3/\text{rev}) \cdot n \cdot \eta_t}{600 \cdot 1000} \quad [\text{kW}]$$

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

MAGNUM 30 GEAR PUMPS PERFORMANCE CURVES

HDP 30

HDP 30

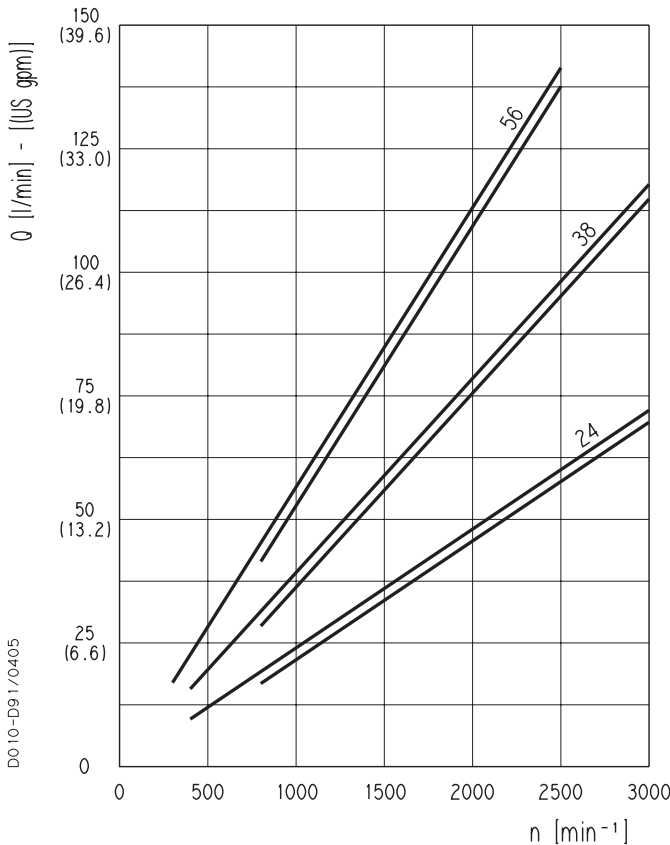


Each curve has been obtained at 122 °F (50°C), using oil with viscosity 168 SSU (36 cSt) at 104 °F (40°C) and at these pressures:

- 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)

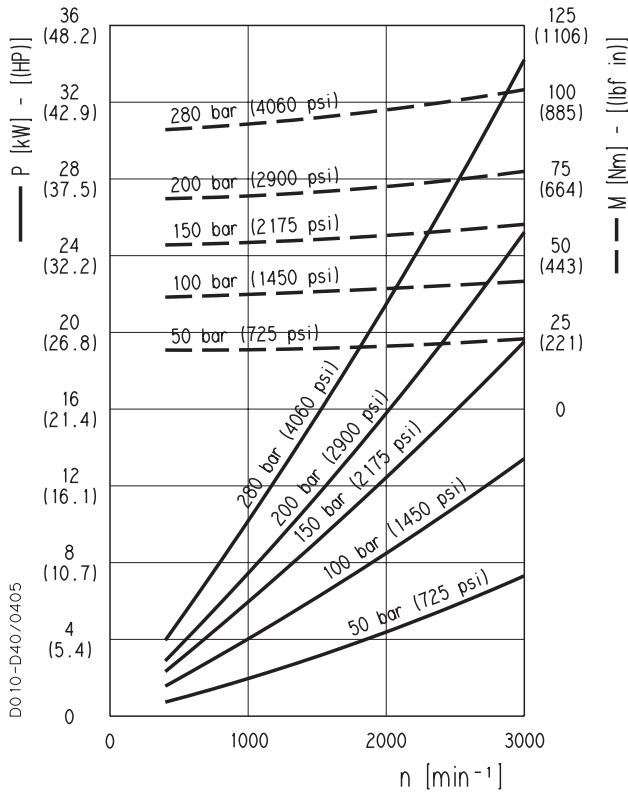


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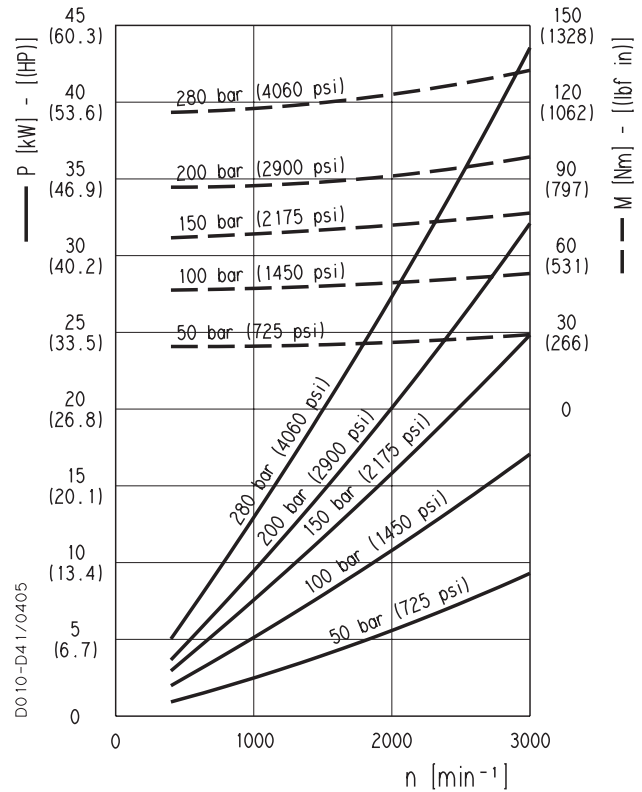
MAGNUM 30 GEAR PUMPS PERFORMANCE CURVES

HDP 30

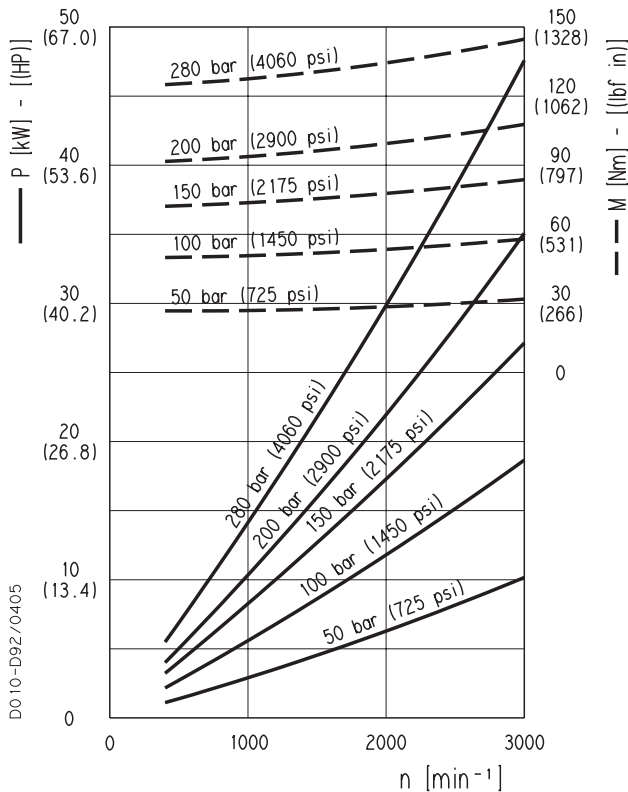
HDP 30-17



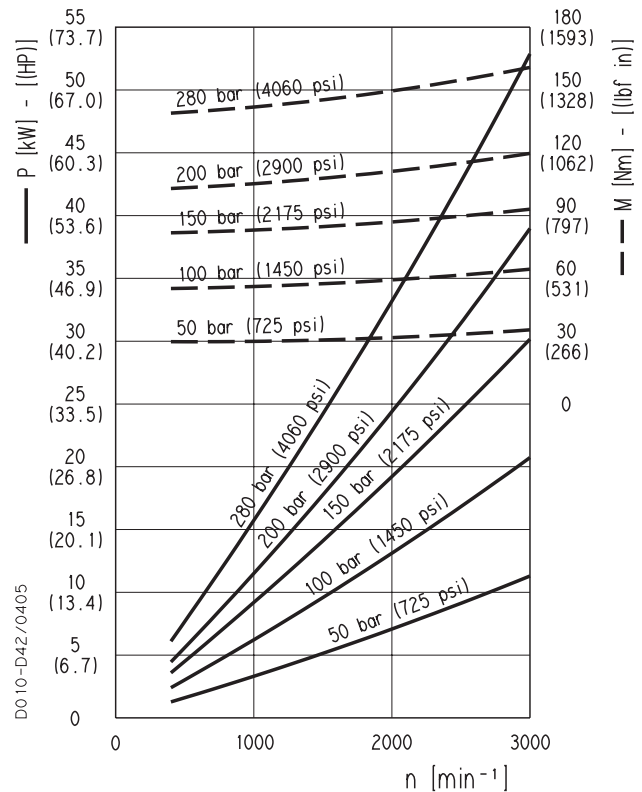
HDP 30-22



HDP 30-24



HDP 30-27

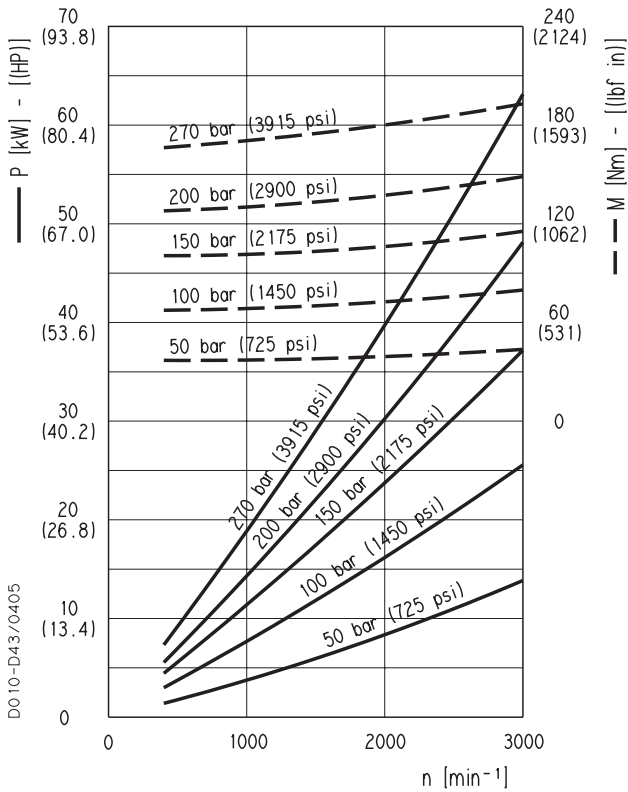


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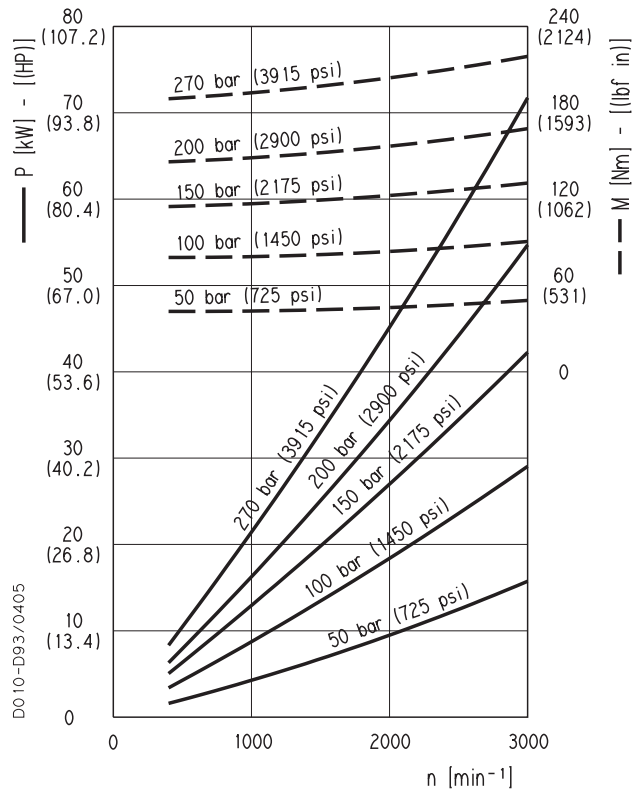
MAGNUM 30 GEAR PUMPS PERFORMANCE CURVES

HDP 30

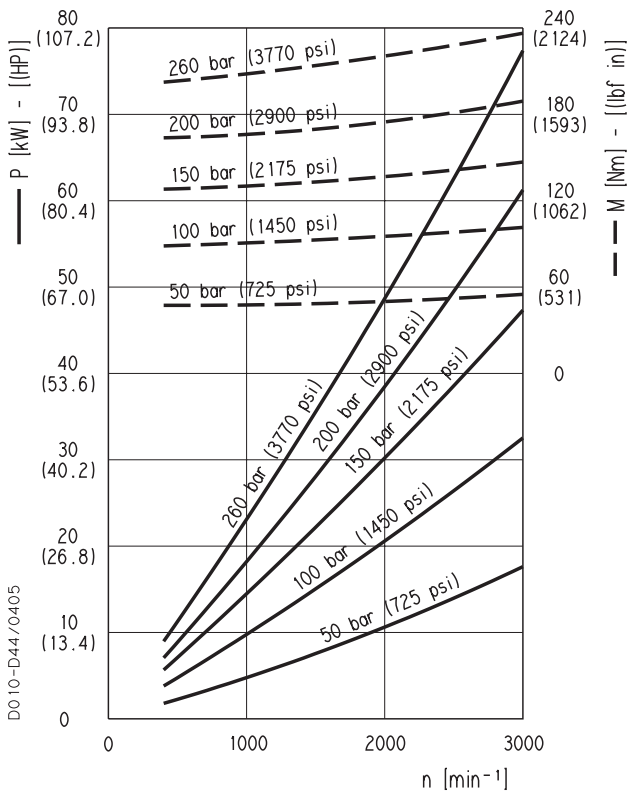
HDP 30-34



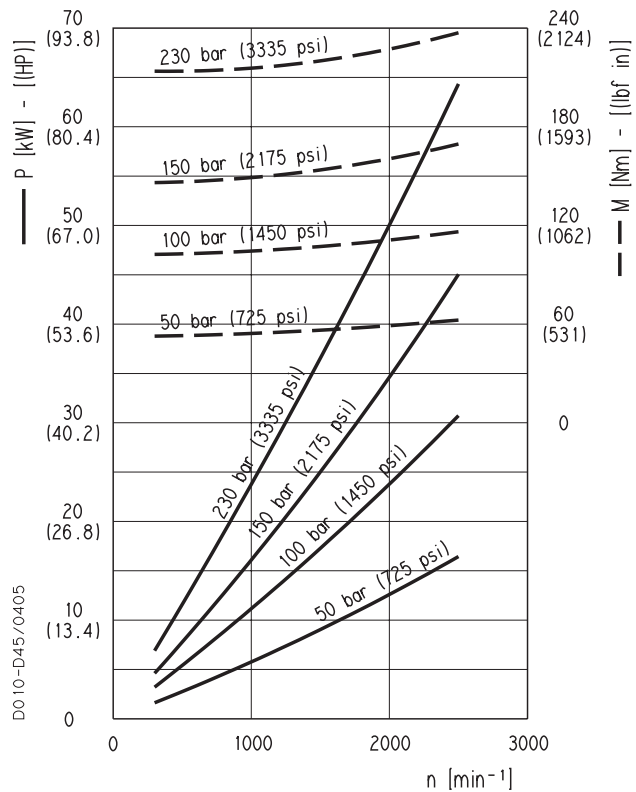
HDP 30-38



HDP 30-43



HDP 30-51

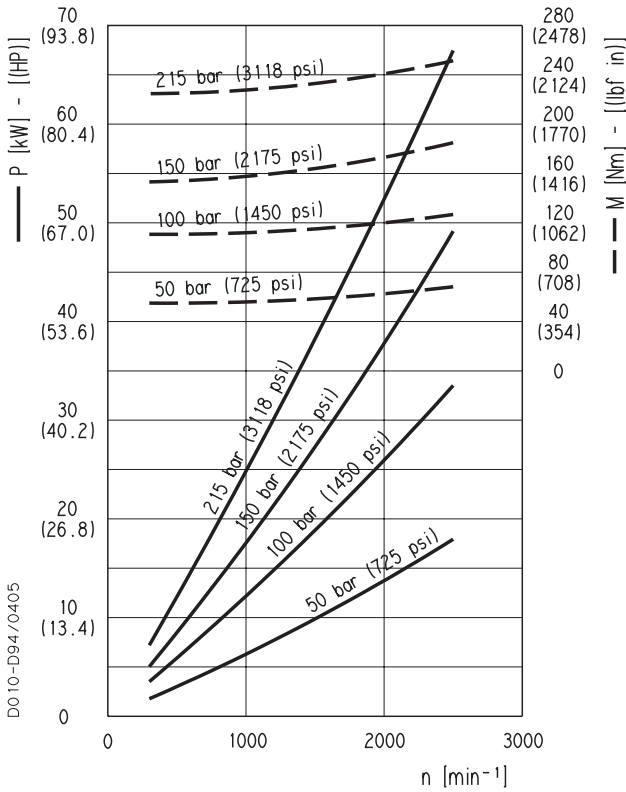


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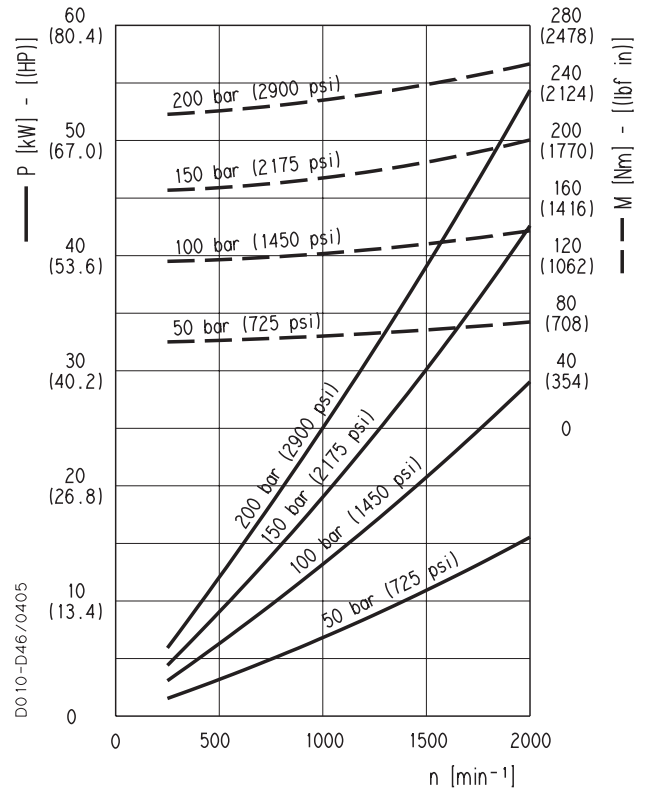
MAGNUM 30 GEAR PUMPS PERFORMANCE CURVES

HDP 30

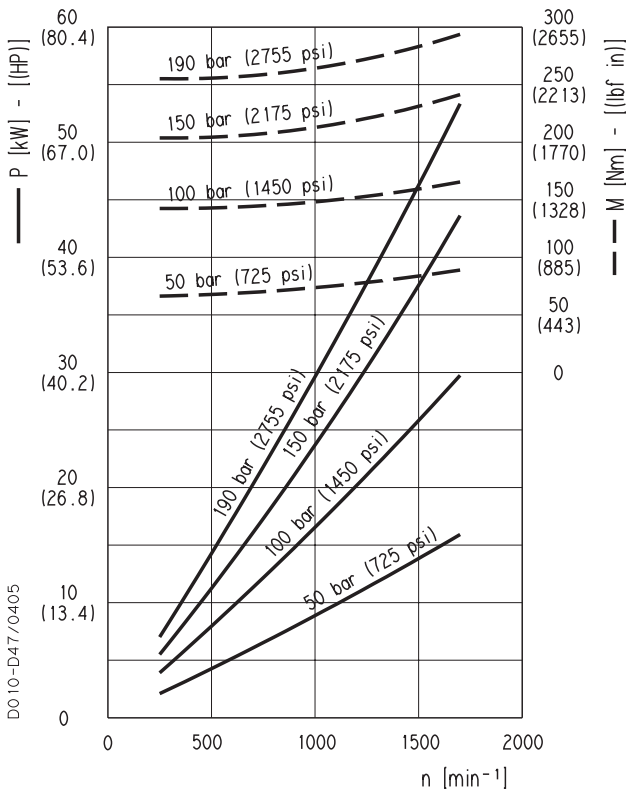
HDP 30-56



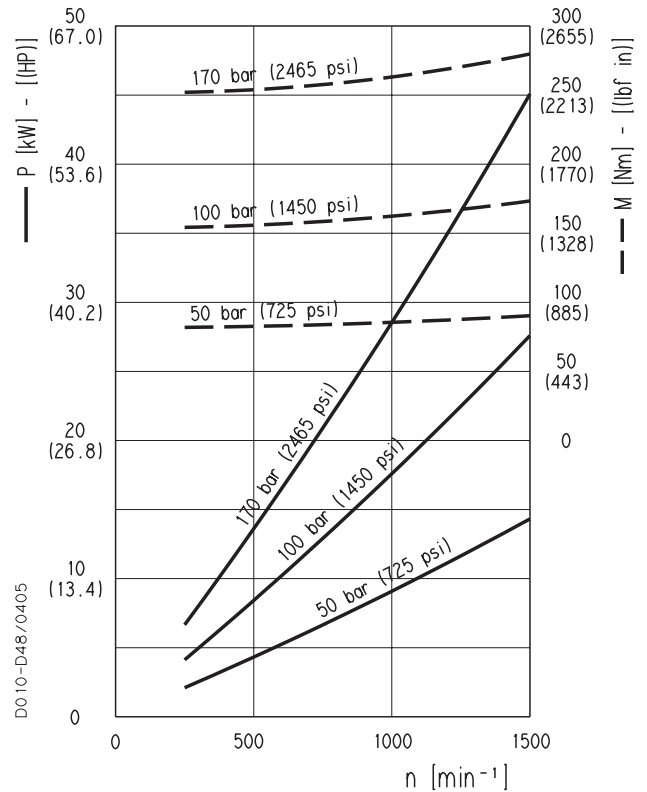
HDP 30-61



HDP 30-73



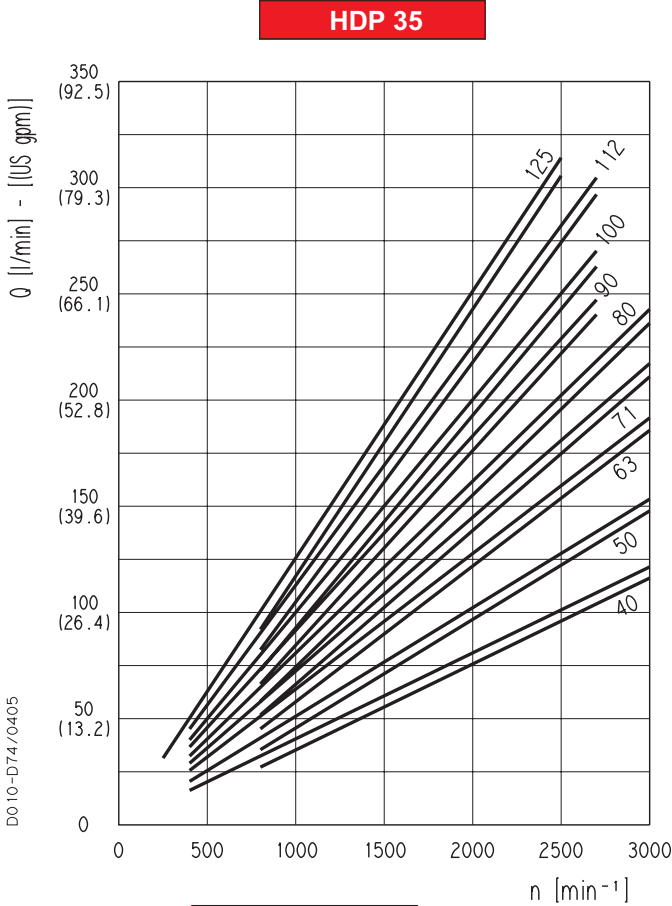
HDP 30-82



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MAGNUM 35 GEAR PUMPS PERFORMANCE CURVES

HDP 35



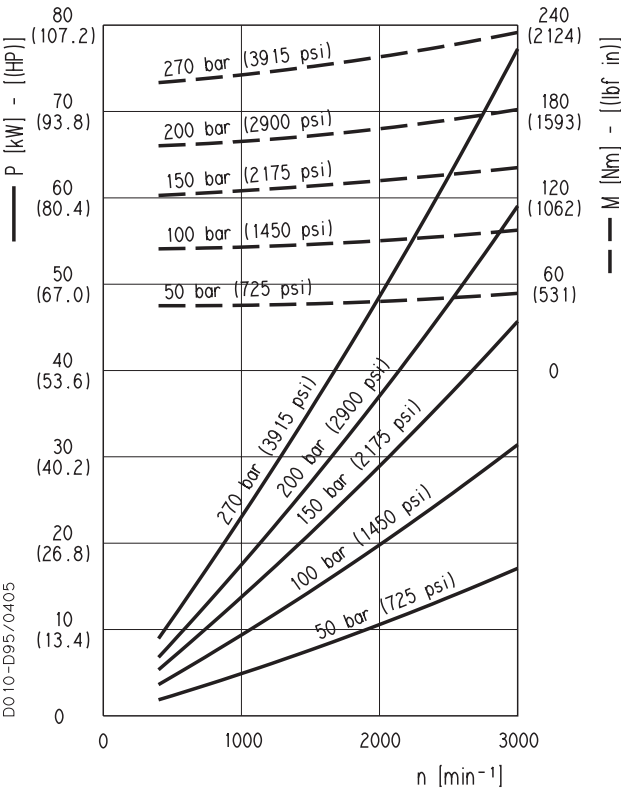
Each curve has been obtained at 122 °F (50°C), using oil with viscosity 168 SSU (36 cSt) at 104 °F (40°C) and at these pressures:

- 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)

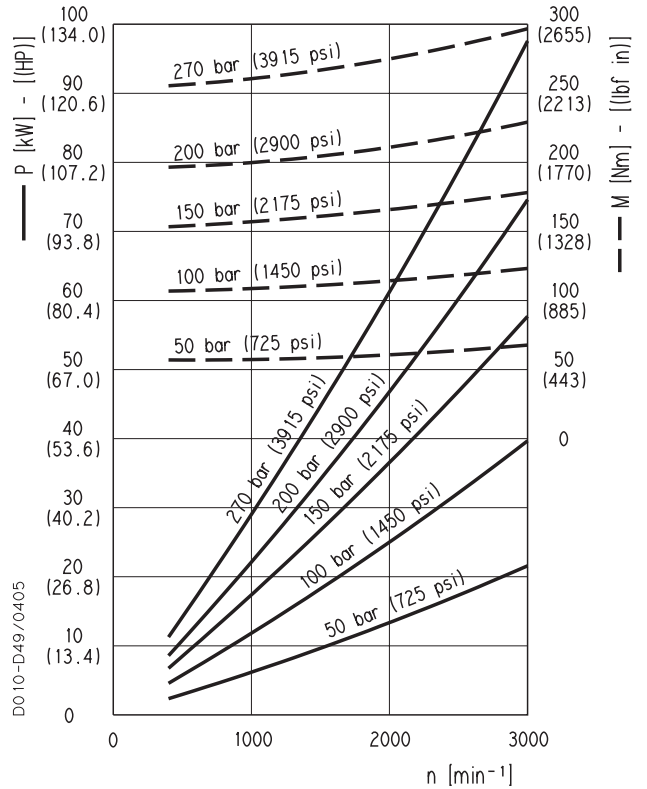
New displacements

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

HDP 35-40



HDP 35-50

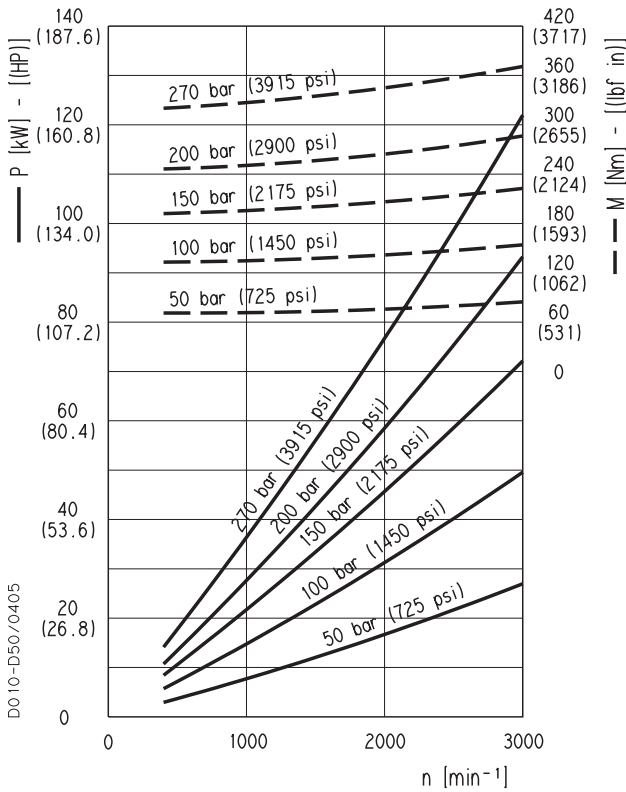


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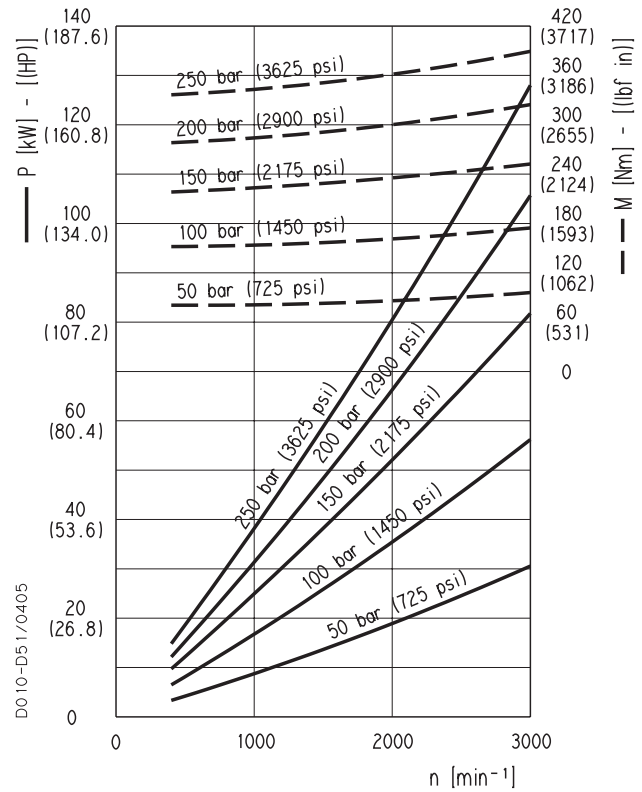
MAGNUM 35 GEAR PUMPS PERFORMANCE CURVES

HDP 35

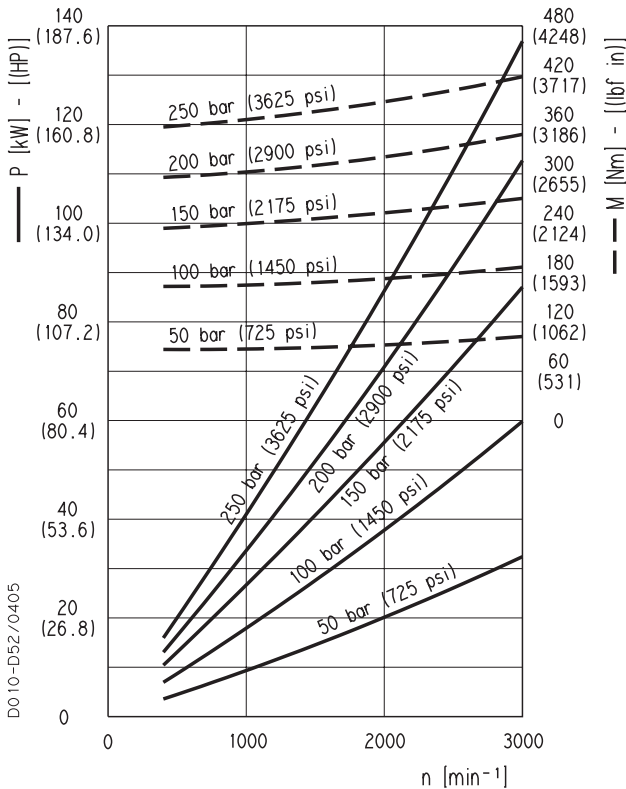
HDP 35-63



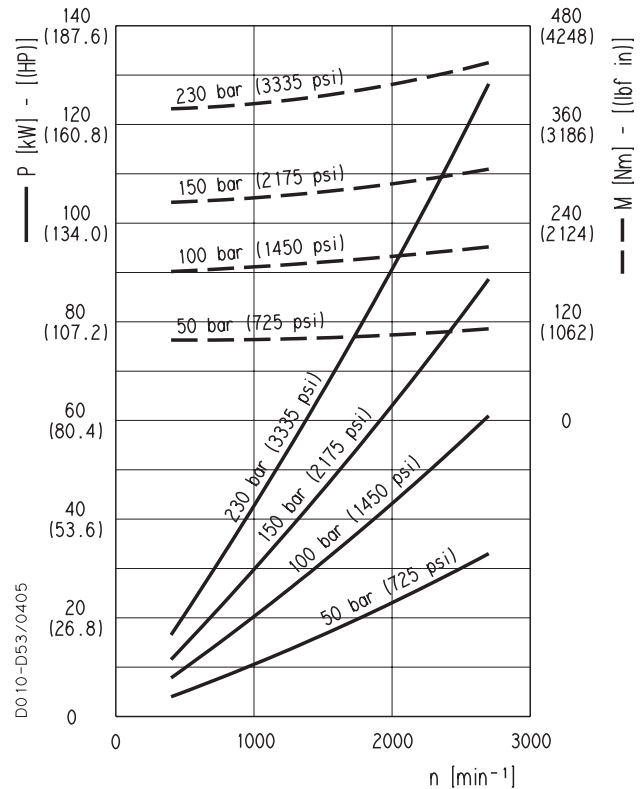
HDP 35-71



HDP 35-80



HDP 35-90

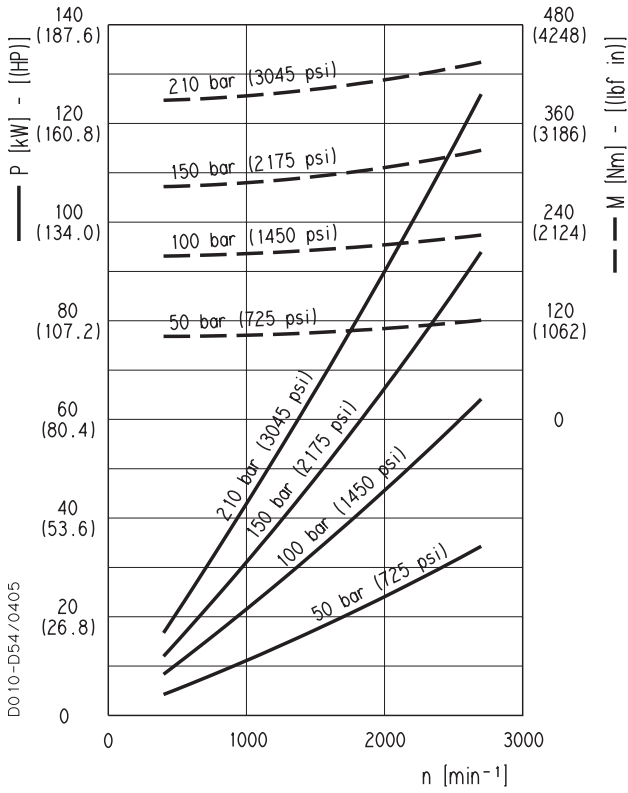


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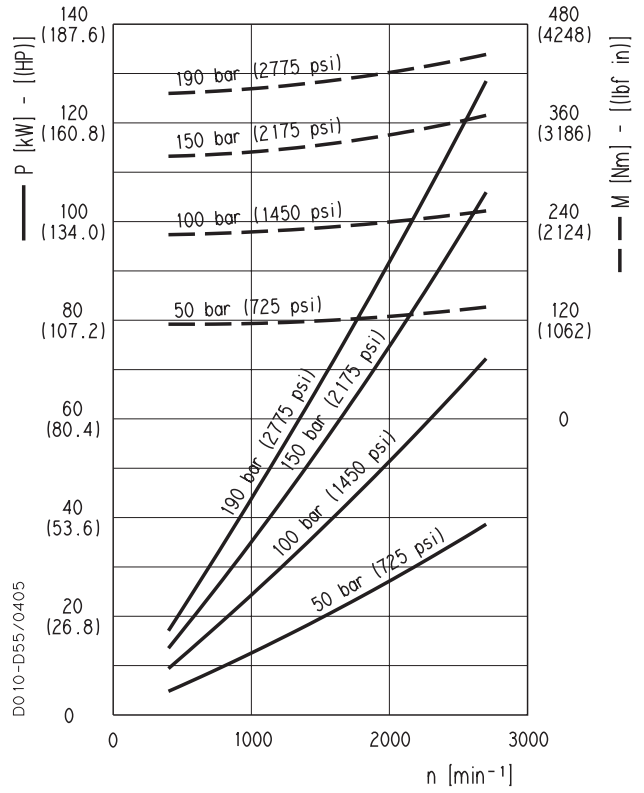
MAGNUM 35 GEAR PUMPS PERFORMANCE CURVES

HDP 35

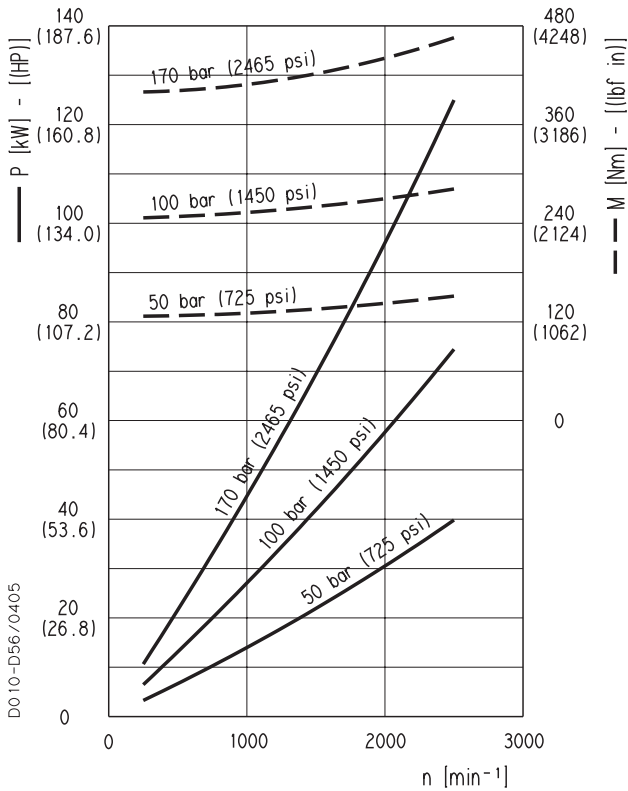
HDP 35•100



HDP 35•112



HDP 35•125

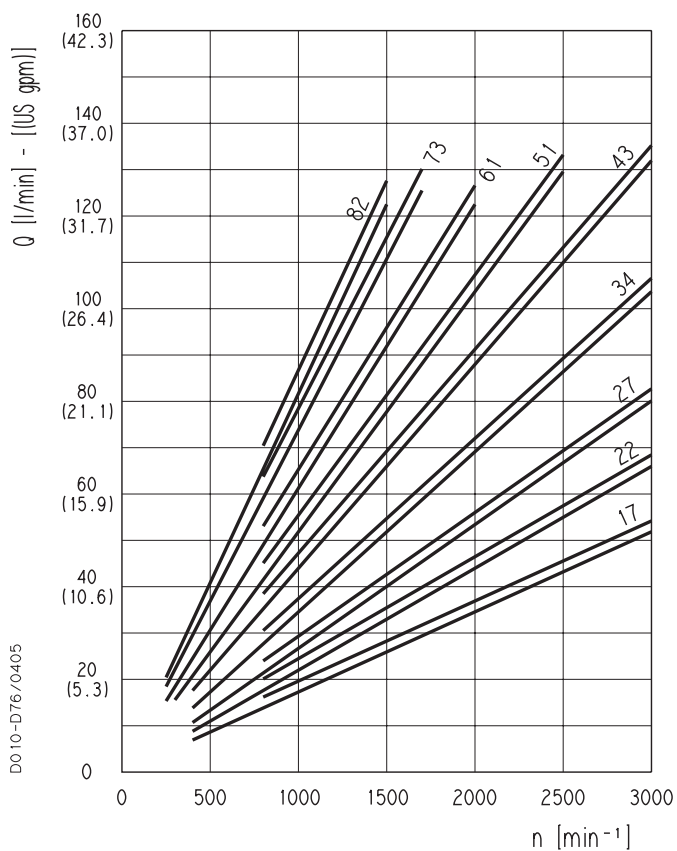


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MAGNUM 30 GEAR MOTORS PERFORMANCE CURVES

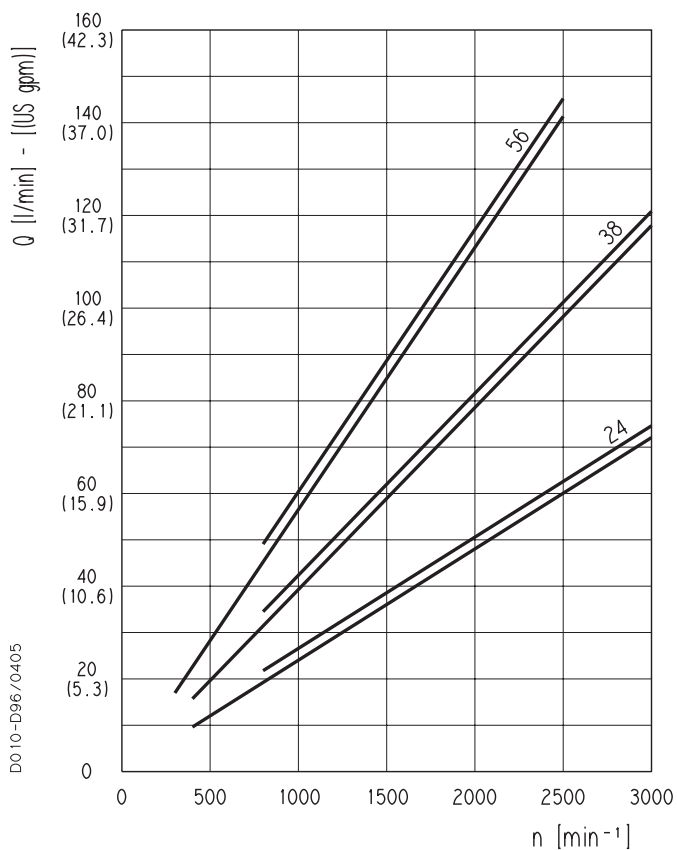
HDM 30

HDM 30



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- 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

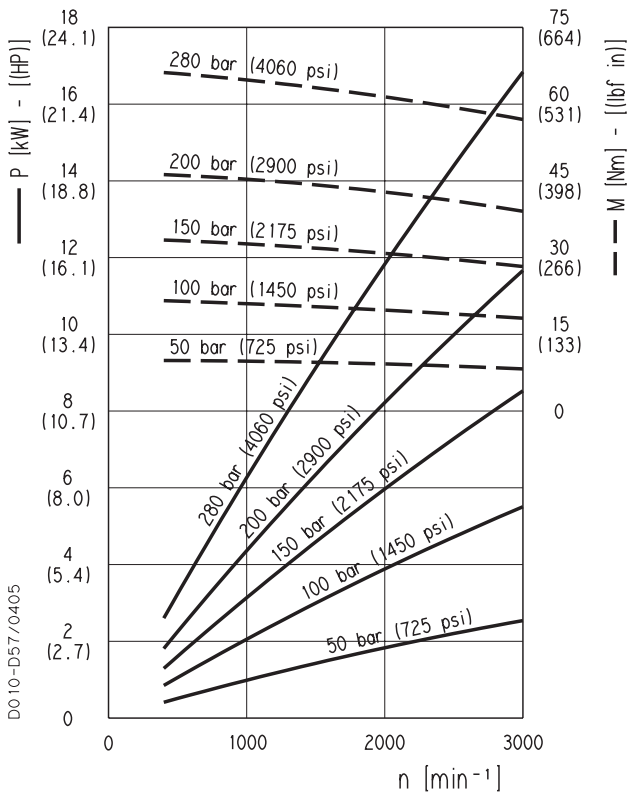
- HDM 30•24 . . . 290-4060 psi (20-280 bar)
- HDM 30•38 . . . 290-3915 psi (20-270 bar)
- HDM 30•56 . . . 290-3118 psi (20-215 bar)

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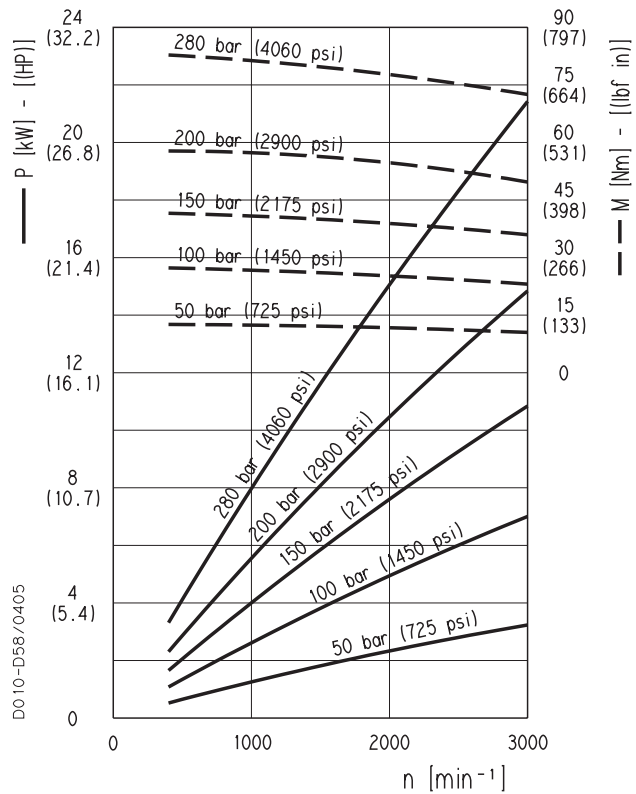
MAGNUM 30 GEAR MOTORS PERFORMANCE CURVES

HDM 30

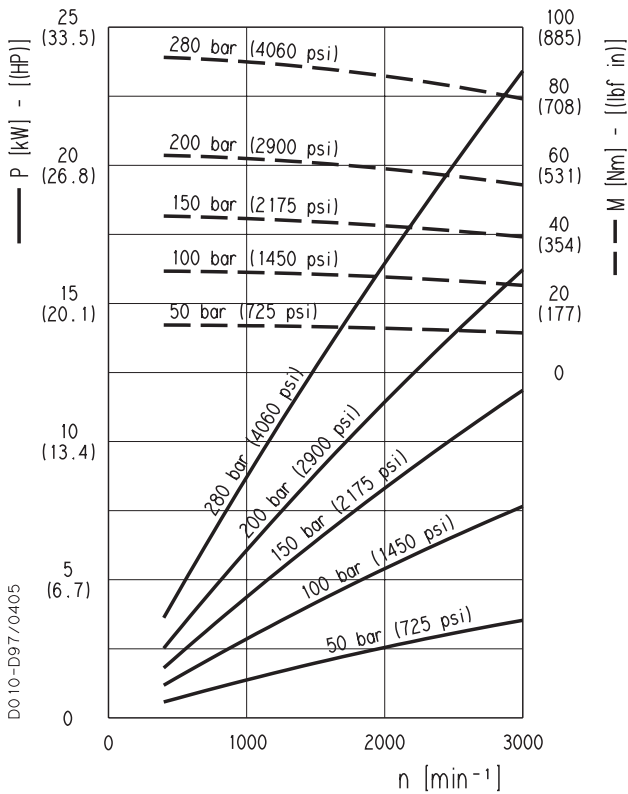
HDM 30-17



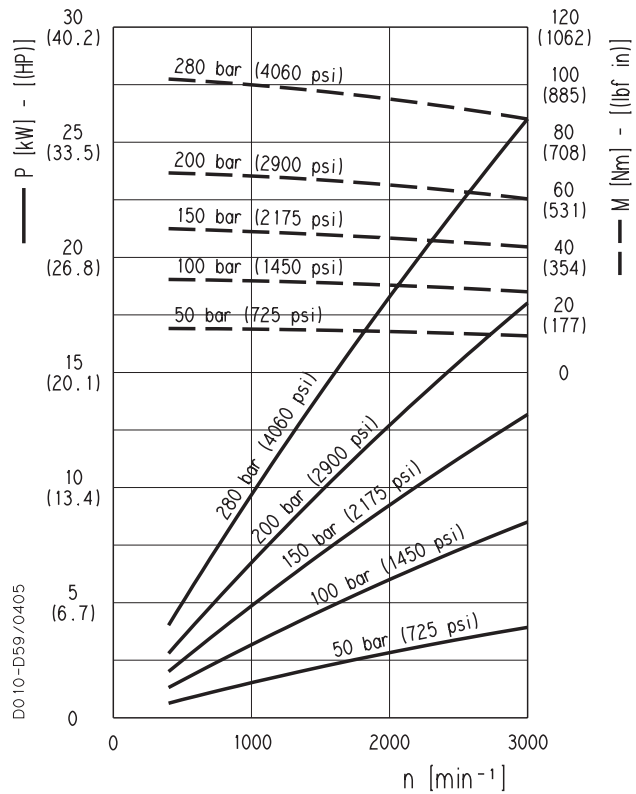
HDM 30-22



HDM 30-24



HDM 30-27

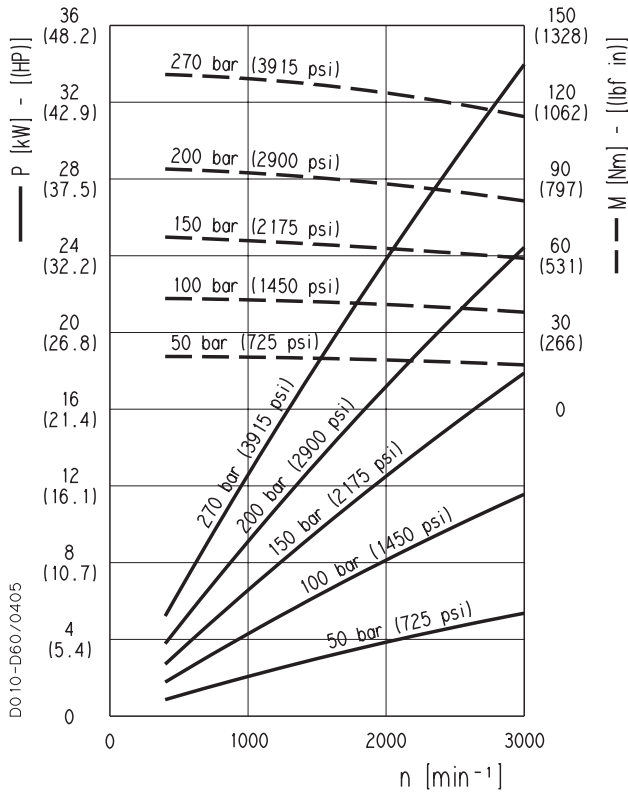


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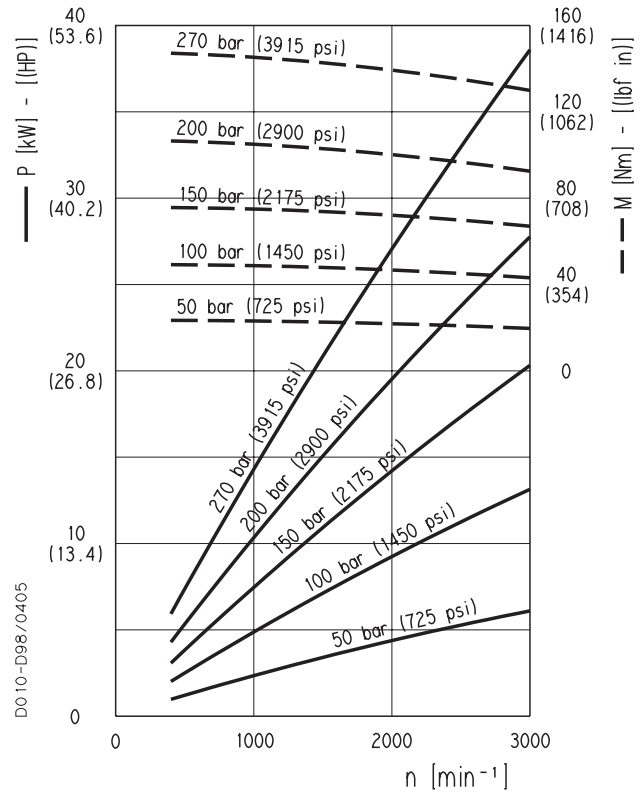
MAGNUM 30 GEAR MOTORS PERFORMANCE CURVES

HDM 30

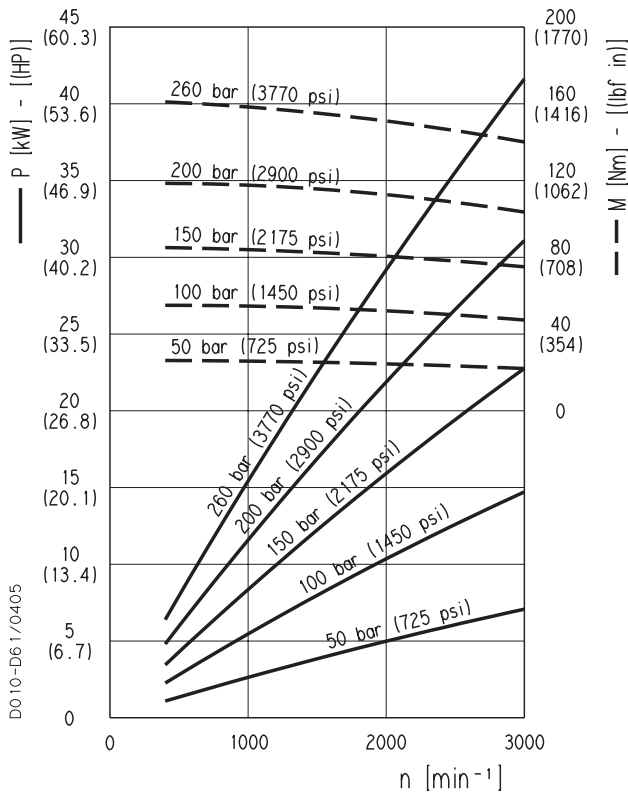
HDM 30-34



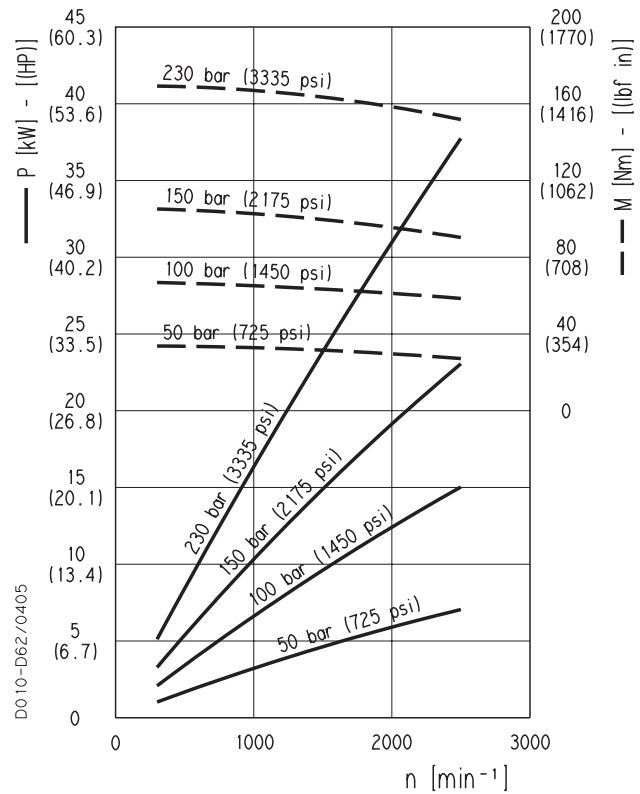
HDM 30-38



HDM 30-43



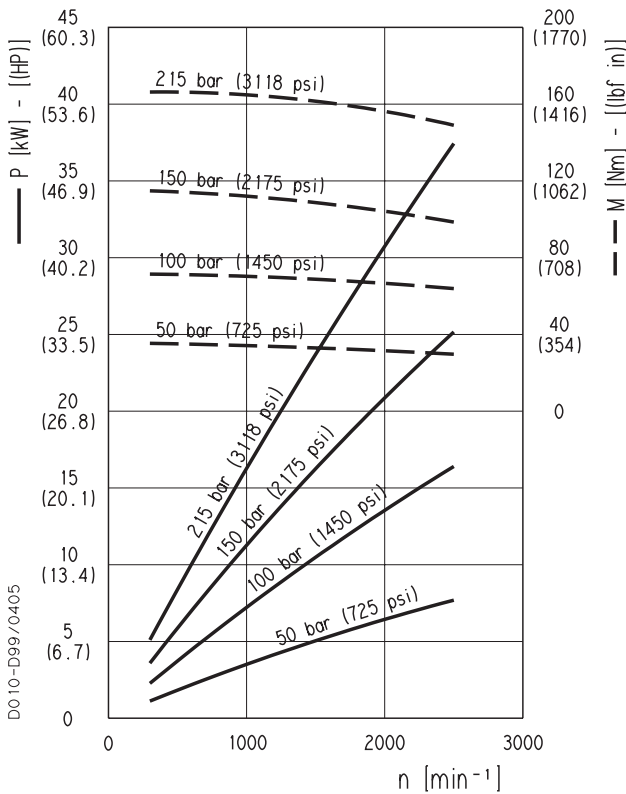
HDM 30-51



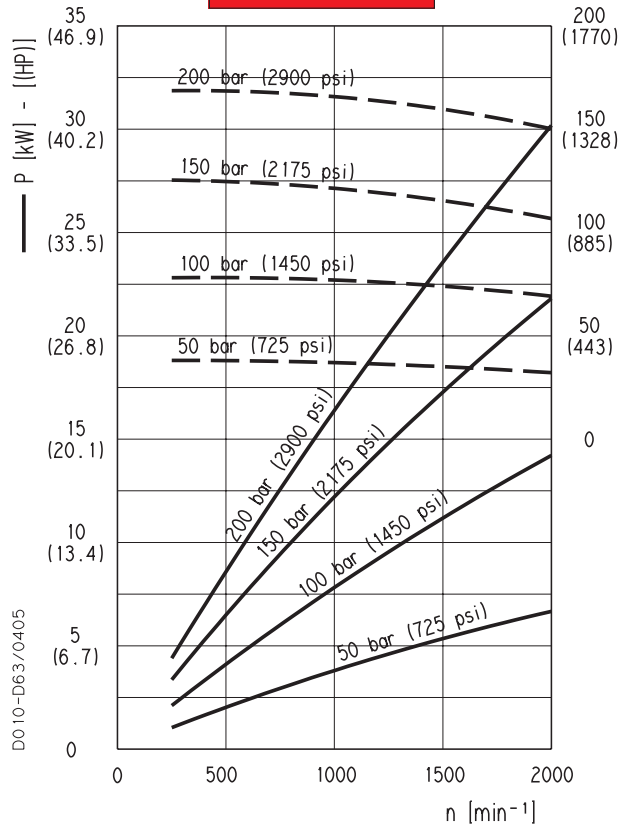
MAGNUM 30 GEAR MOTORS PERFORMANCE CURVES

HDM 30

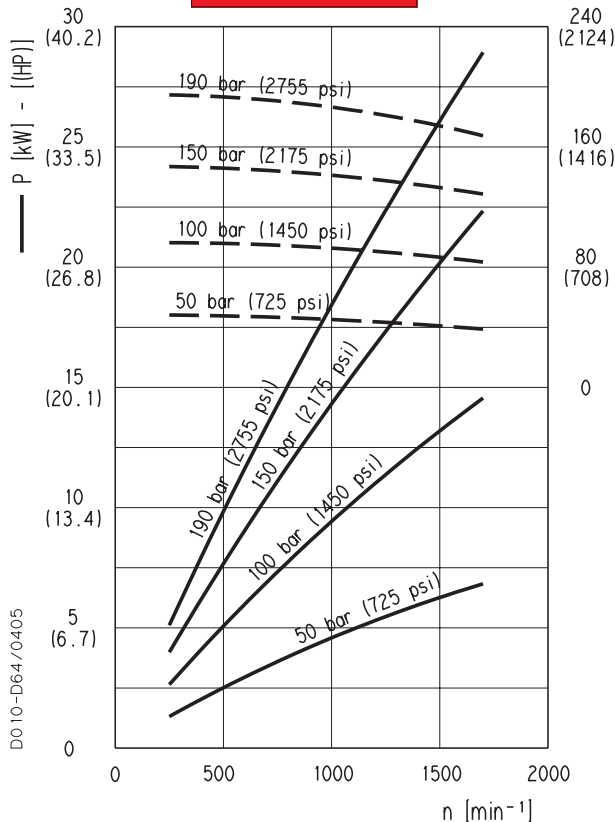
HDM 30-56



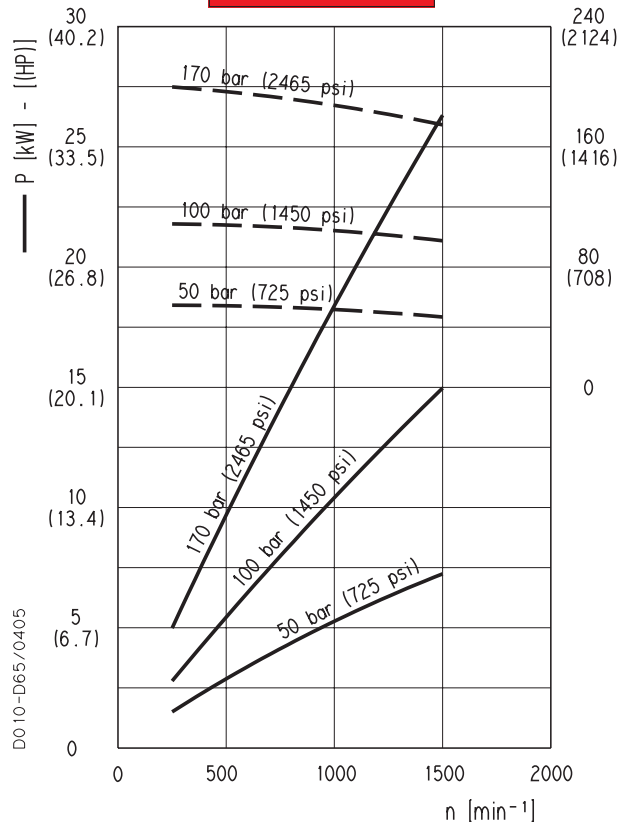
HDM 30-61



HDM 30-73



HDM 30-82

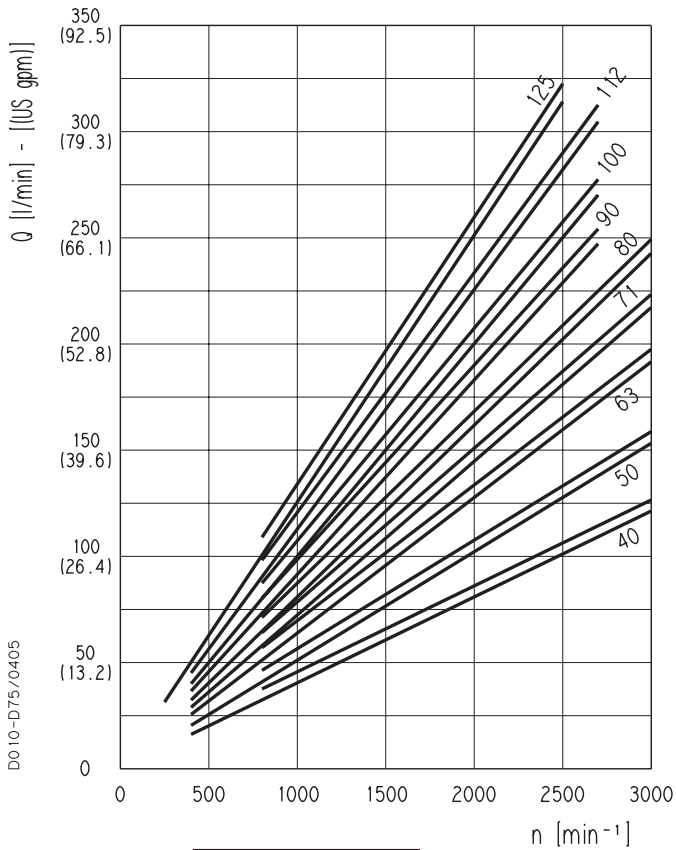


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MAGNUM 35 GEAR MOTORS PERFORMANCE CURVES

HDM 35

HDM 35



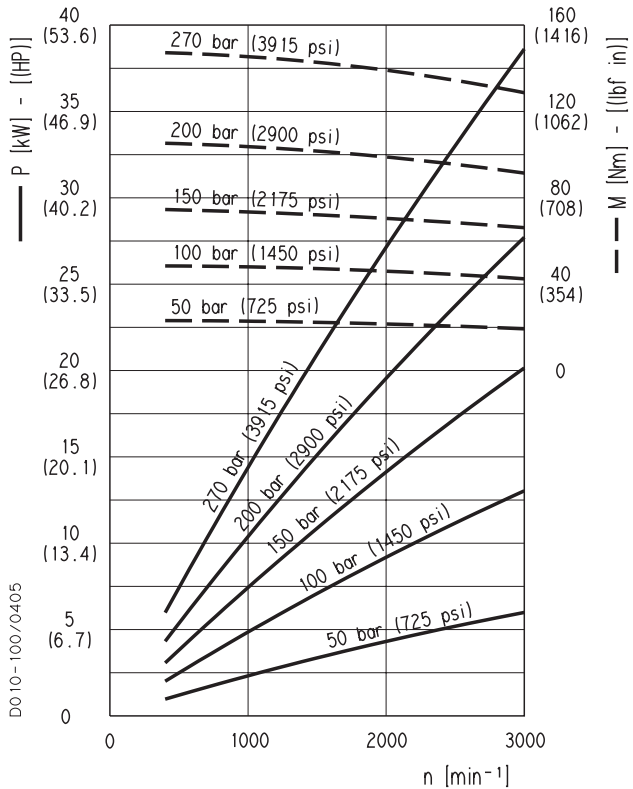
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- HDM 35•50 . . . 290-3915 psi (20-270 bar)
- HDM 35•63 . . . 290-3915 psi (20-270 bar)
- HDM 35•71 . . . 290-3625 psi (20-250 bar)
- HDM 35•80 . . . 290-3625 psi (20-250 bar)
- HDM 35•90 . . . 290-3335 psi (20-230 bar)
- HDM 35•100 . . . 290-3045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

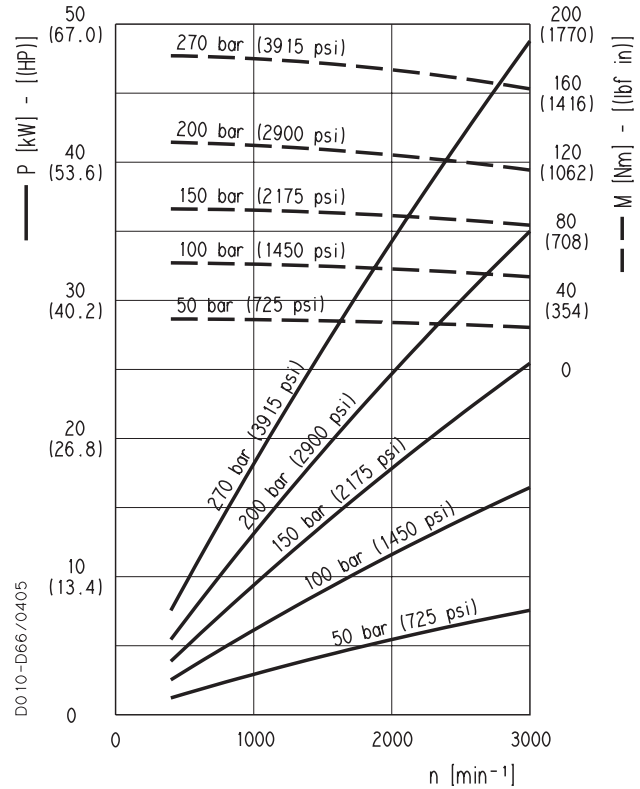
New displacements

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

HDM 35•40



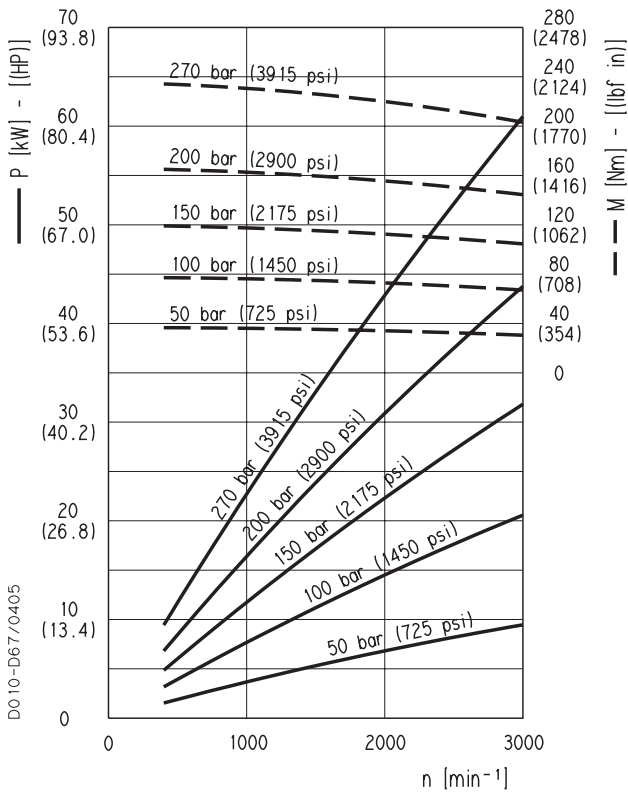
HDM 35•50



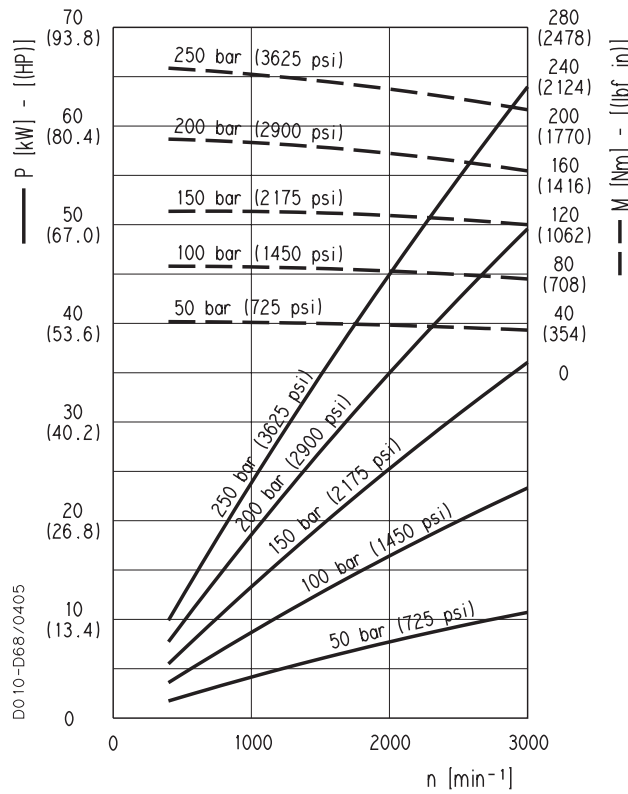
MAGNUM 35 GEAR MOTORS PERFORMANCE CURVES

HDM 35

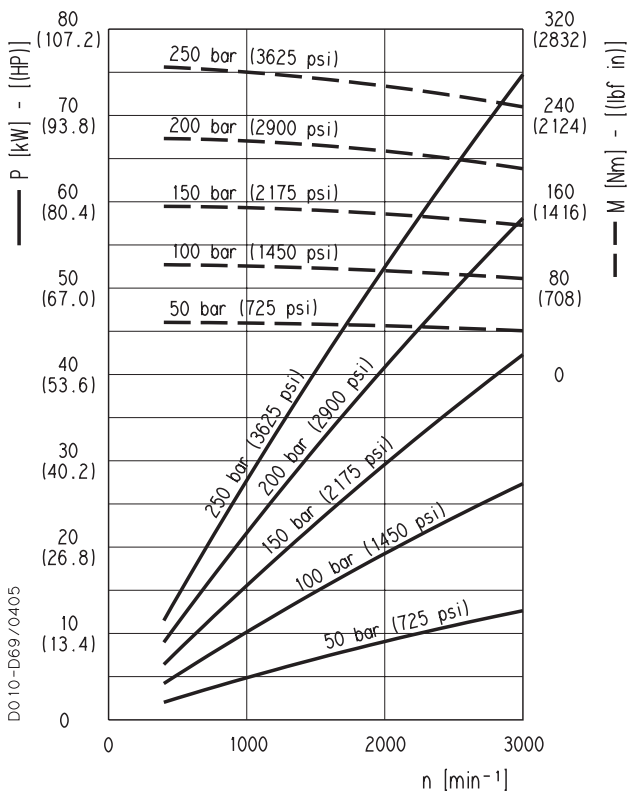
HDM 35-63



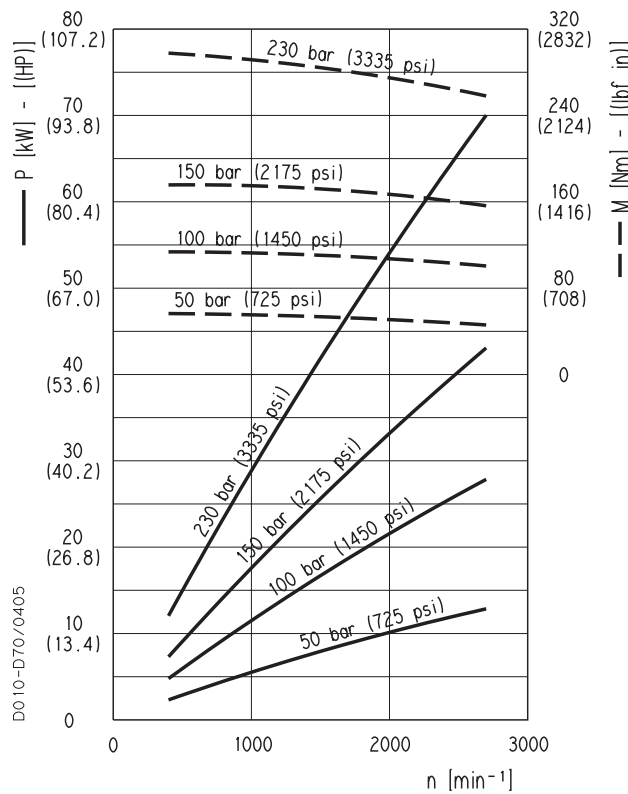
HDM 35-71



HDM 35-80



HDM 35-90



01/07.05

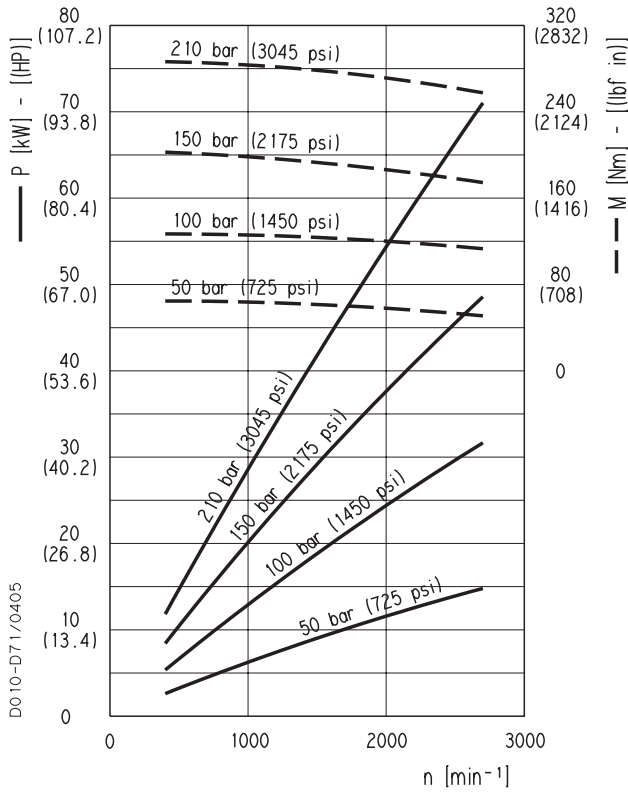
D010-D69/0405

D010-D70/0405

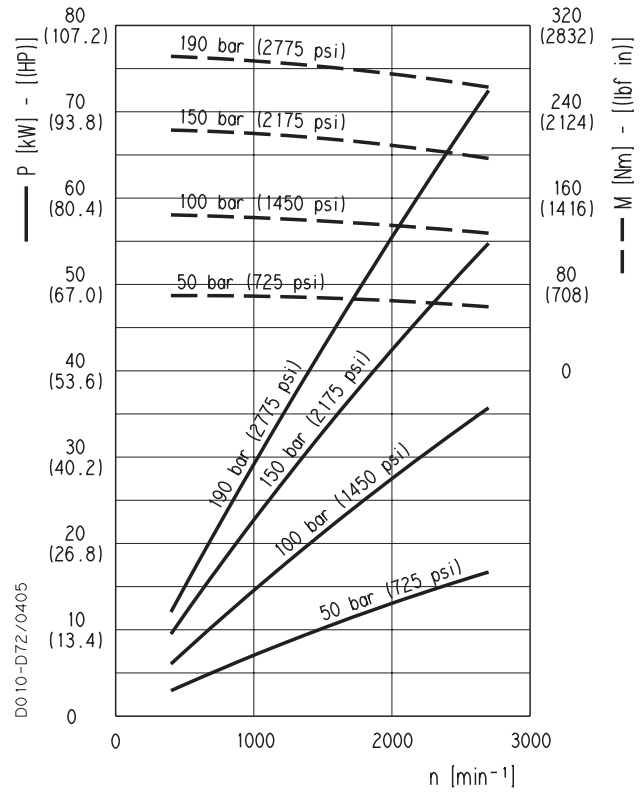
MAGNUM 35 GEAR MOTORS PERFORMANCE CURVES

HDM 35

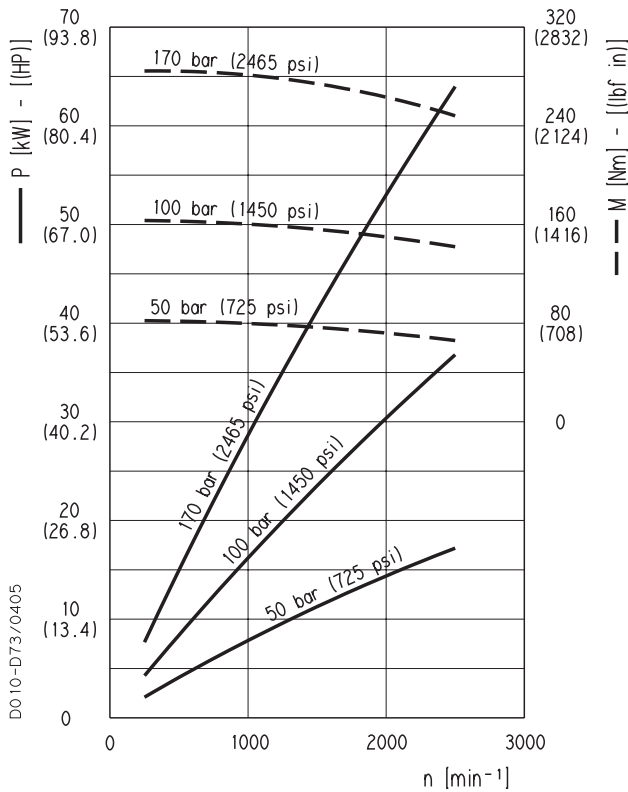
HDM 35•100



HDM 35•112



HDM 35•125

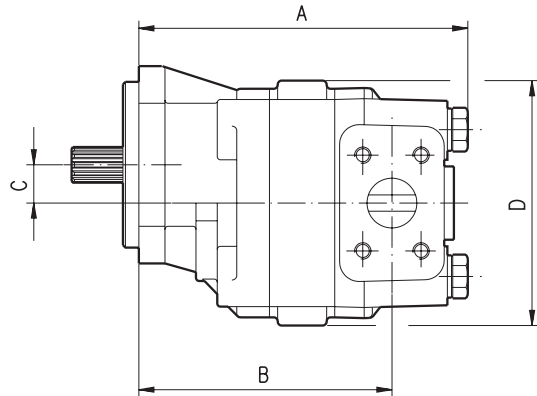
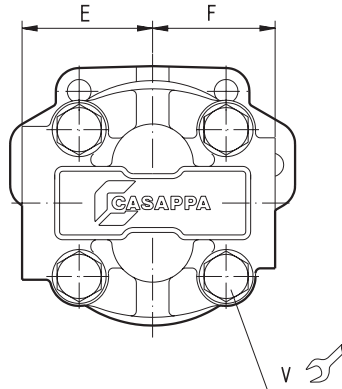


01/07.05

SINGLE UNITS SIDE PORTS

L

D010-D01/0405



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

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 ÷ 48

PORTS:
see page 49

The drawing shows a single unit with left rotation.

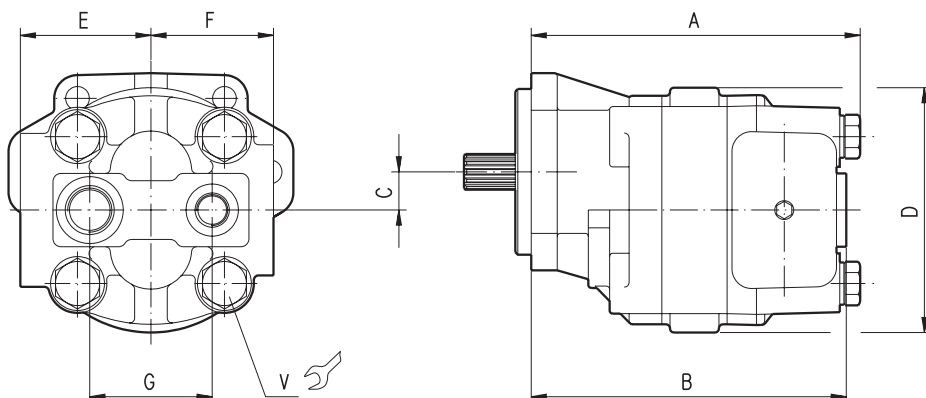
Pump type Motor type	A	B	C	D	E (IN)	F (OUT)
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
HD. 30•17	184,5 (7.2638)	138 (5.4331)	23,45 (0.9232)	150 (5.9055)	80 (3.1496)	75 (2.9528)
HD. 30•22	187,5 (7.3819)	141 (5.5512)				
HD. 30•24	188,8 (7.4331)	142,3 (5.6024)				
HD. 30•27	190,5 (7.5000)	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)				

01/07.05

SINGLE UNITS REAR PORTS

P

D010-D81/0405



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

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 ÷ 48

PORTS:
see page 49

The drawing shows a single unit with left rotation.

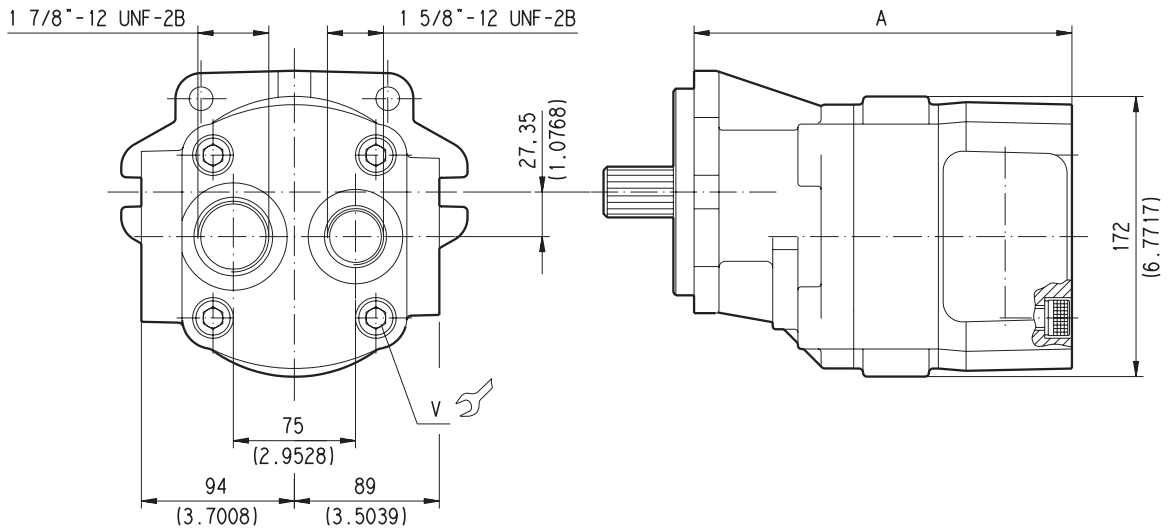
Pump type Motor type	A	B	C	D	E	F	G
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
HD. 30•17	184,5 (7.2638)	173 (6.8110)	23,45 (0.9232)	150 (5.9055)	80 (3.1496)	75 (2.9528)	75 (2.9528)
HD. 30•22	187,5 (7.3819)	176 (6.9291)					
HD. 30•24	188,8 (7.4331)	177,3 (6.9803)					
HD. 30•27	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 \div 2726)

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 \div 48

PORTS:
see page 53

The drawing shows a single unit with left rotation.

Pump type	A	Ports code (ODT)	
		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

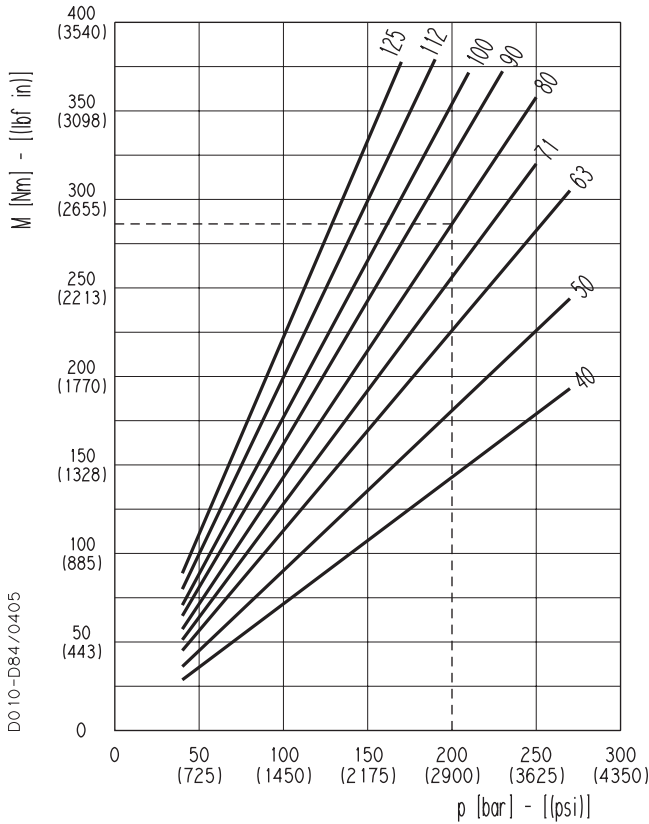
$$M = \frac{\Delta p \text{ (bar)} \cdot V \text{ (cm}^3\text{/rev)}}{62,83 \cdot \eta_m} \quad [\text{Nm}]$$

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

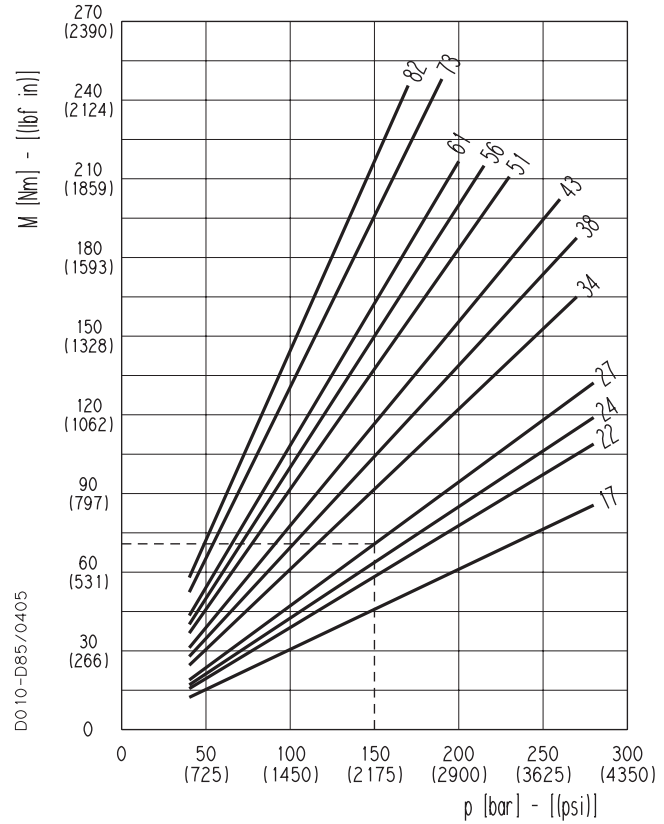
HDP 35

1



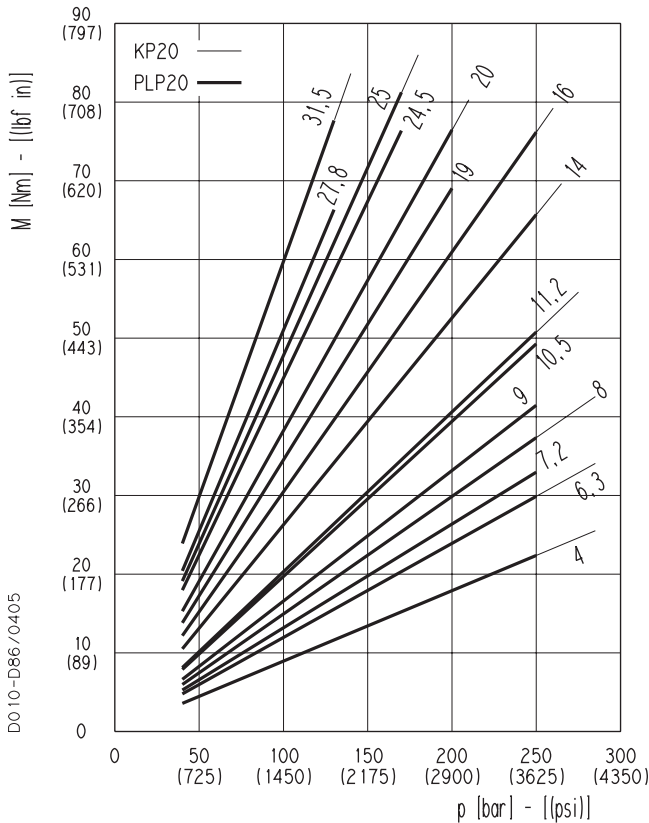
HDP 30

2



KP 20 - PLP 20

3



DRIVE SHAFT SELECTION

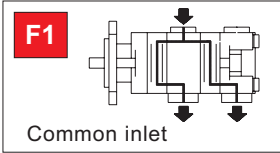
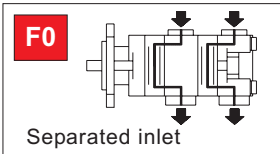
Let us consider a double pump HDP35•80 + HDP30•27. If we suppose that we have to work with the first pump at a pressure of 2900 psi (200 bar) and the second pump at a pressure of 2175 psi (150 bar), the graph 1 shows that the torque absorbed by HDP35•80 is 2523 lbf in (285 Nm) and the graph 2 shows that 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

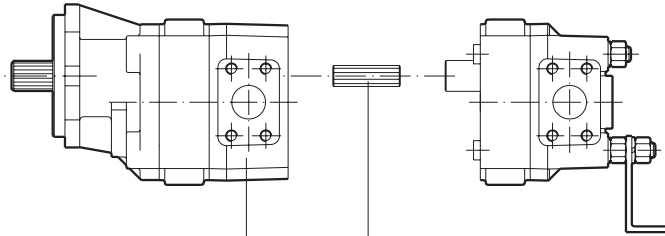
MULTIPLE PUMPS HDP.. / HDP..

STANDARD VERSION

HDP 35/35



D010-D29/0405



Connecting flange

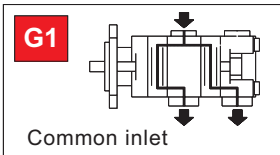
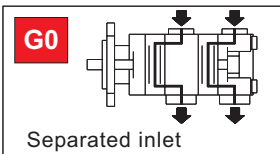
60

**MAX 350 Nm
(3098 lbf in)**

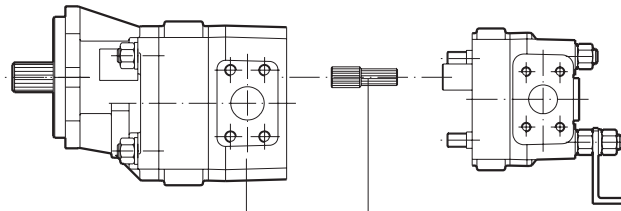
Connecting shaft

STANDARD VERSION

HDP 35/30



D010-D30/0405



Connecting flange

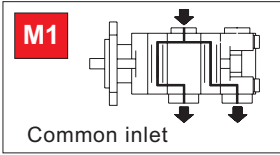
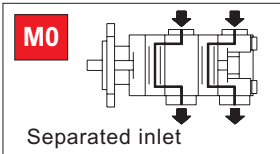
61

**MAX 170 Nm
(1505 lbf in)**

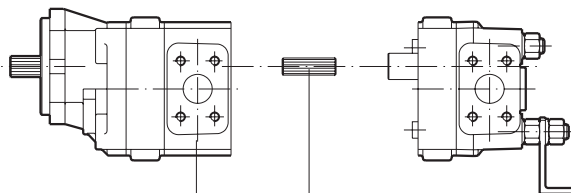
Connecting shaft

STANDARD VERSION

HDP 30/30



D010-D32/0405



Connecting flange

65

**MAX 170 Nm
(1505 lbf in)**

Connecting shaft

REAR COVER VERSION

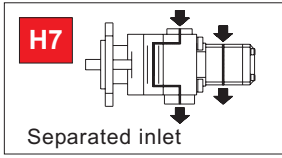
All multiple pumps with more than two sections are available with bracket.

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

01/07.05

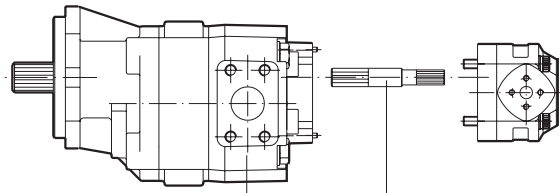
DOUBLE PUMPS HDP 35 / KP 20

STANDARD VERSION



D010-D31/0405

Connecting flange

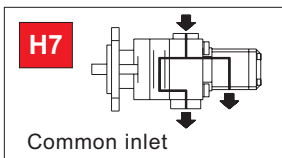


98

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

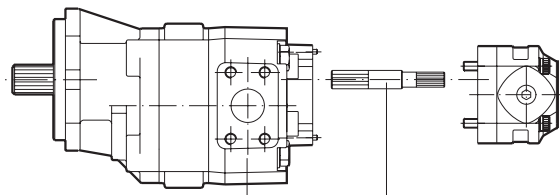
Connecting shaft

KP20•.... - **N6**



D010-111/0405

Connecting flange

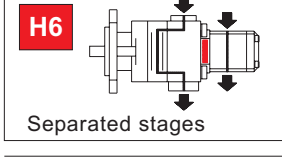


98

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

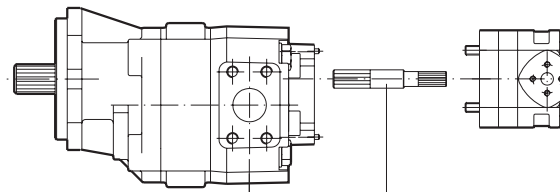
Connecting shaft

KP20•.... - **N7**



D010-112/0405

Connecting flange



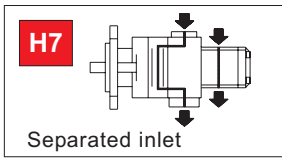
98

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

Connecting shaft

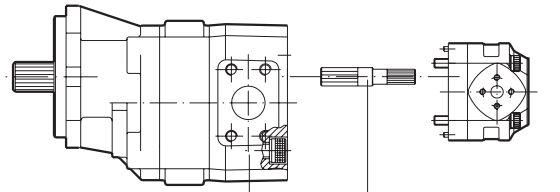
KP20•.... - **W4**

EM VERSION



D010-108/0405

Connecting flange

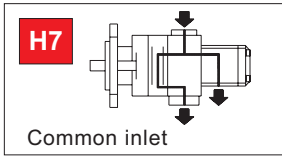


96

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

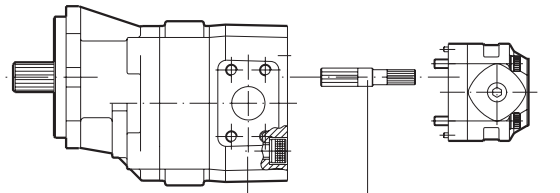
Connecting shaft

KP20•.... - **N6 / EM**



D010-113/0405

Connecting flange



96

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

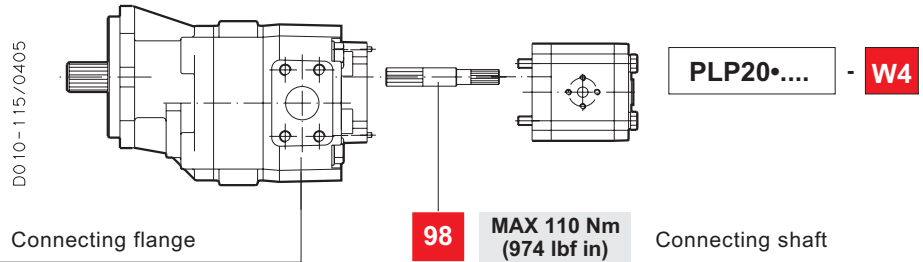
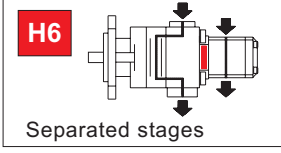
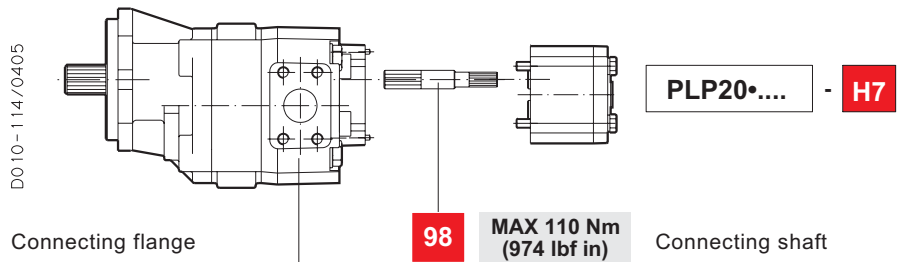
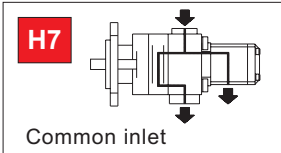
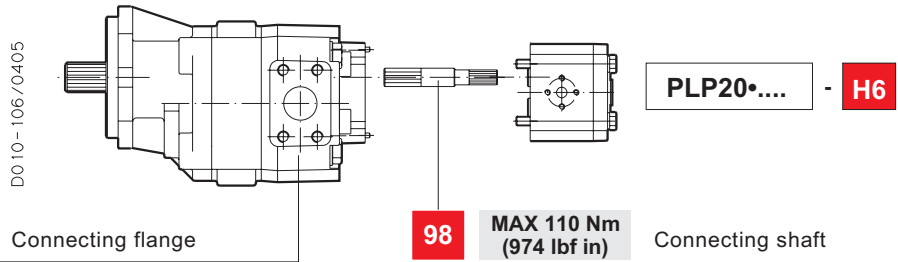
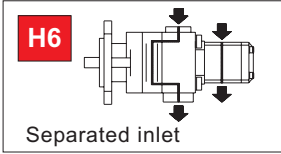
Connecting shaft

KP20•.... - **N7 / EM**

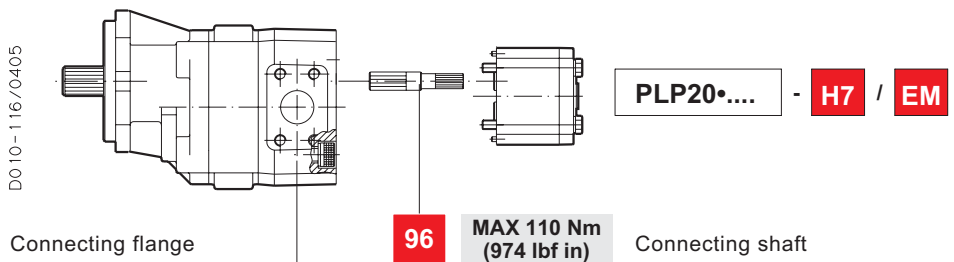
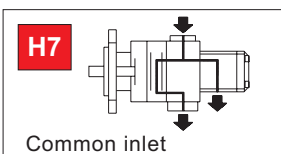
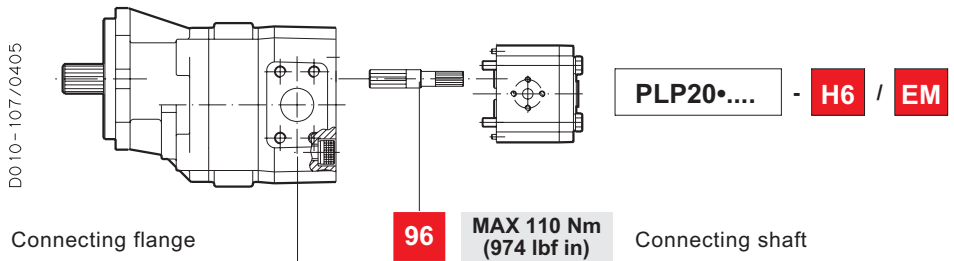
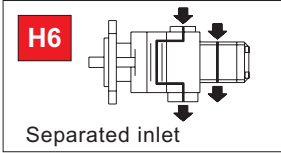
01/07.05

DOUBLE PUMPS HDP 35 / PLP 20

STANDARD VERSION



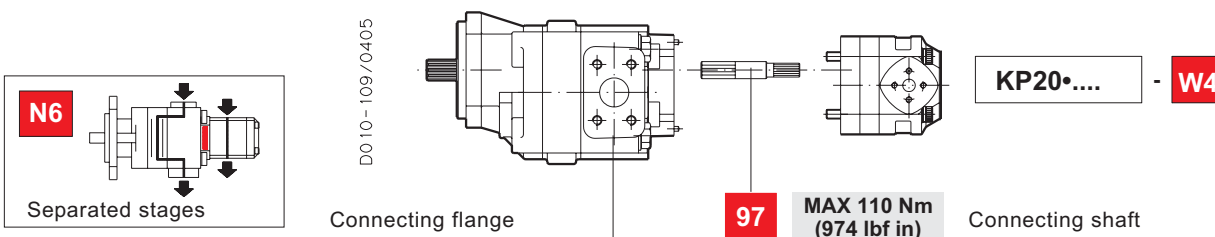
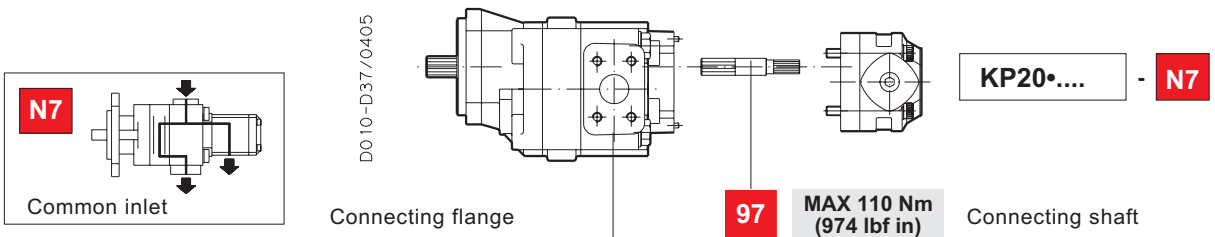
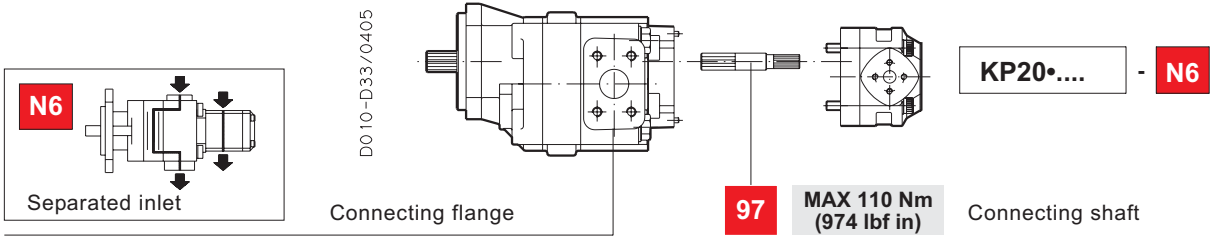
EM VERSION



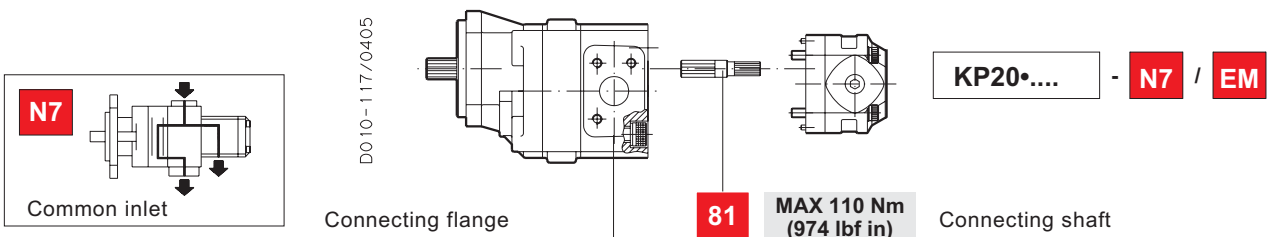
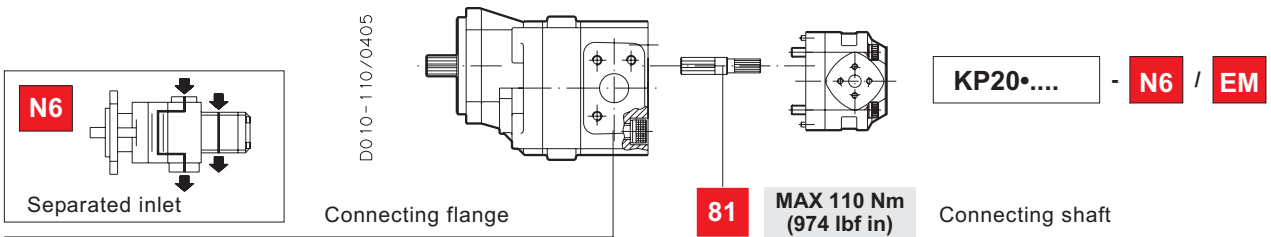
01/07.05

DOUBLE PUMPS HDP 30 / KP 20

STANDARD VERSION



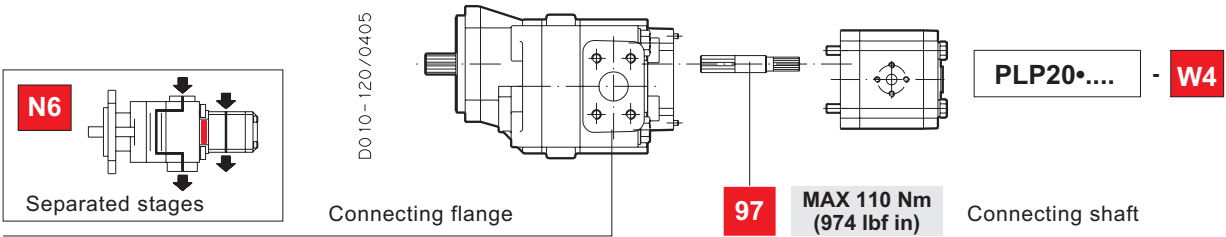
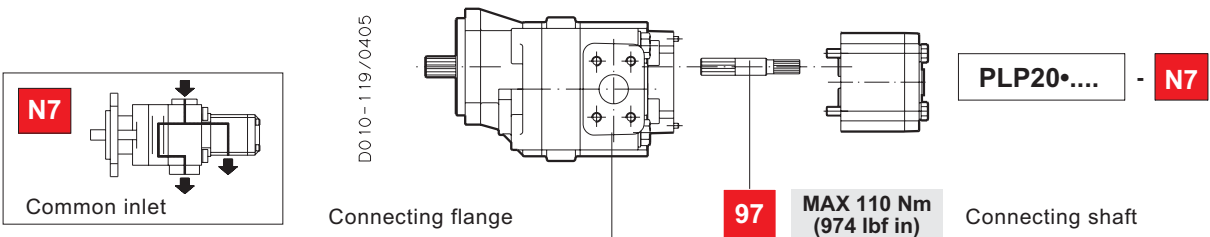
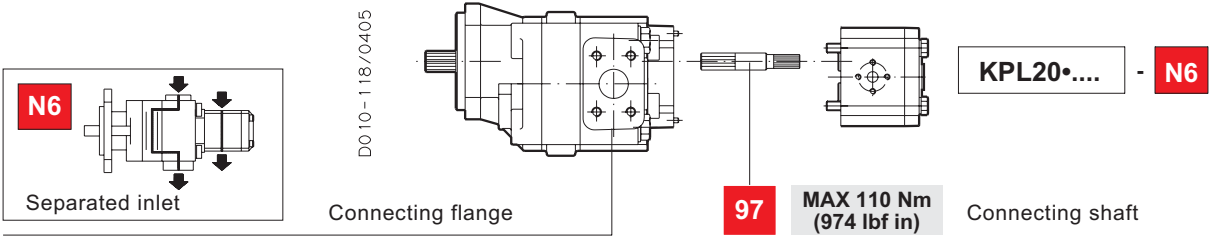
EM VERSION



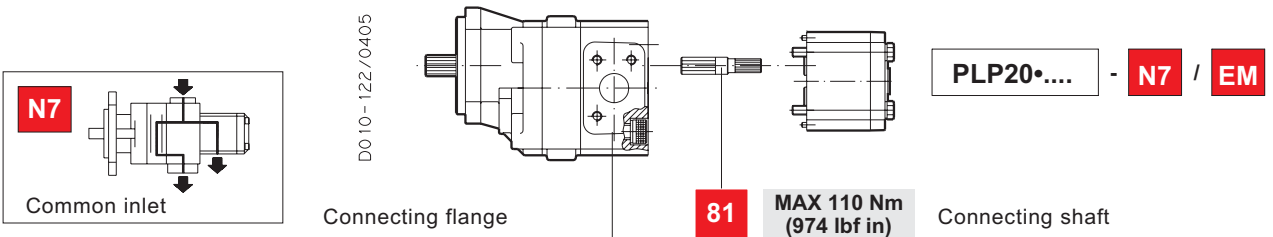
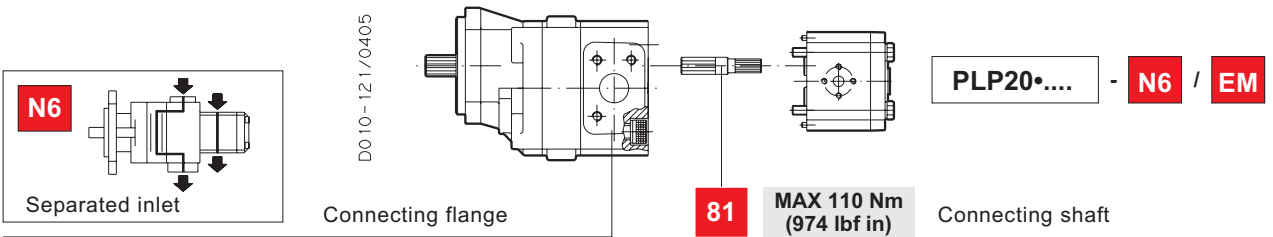
01/07.05

DOUBLE PUMPS HDP 30 / PLP 20

STANDARD VERSION

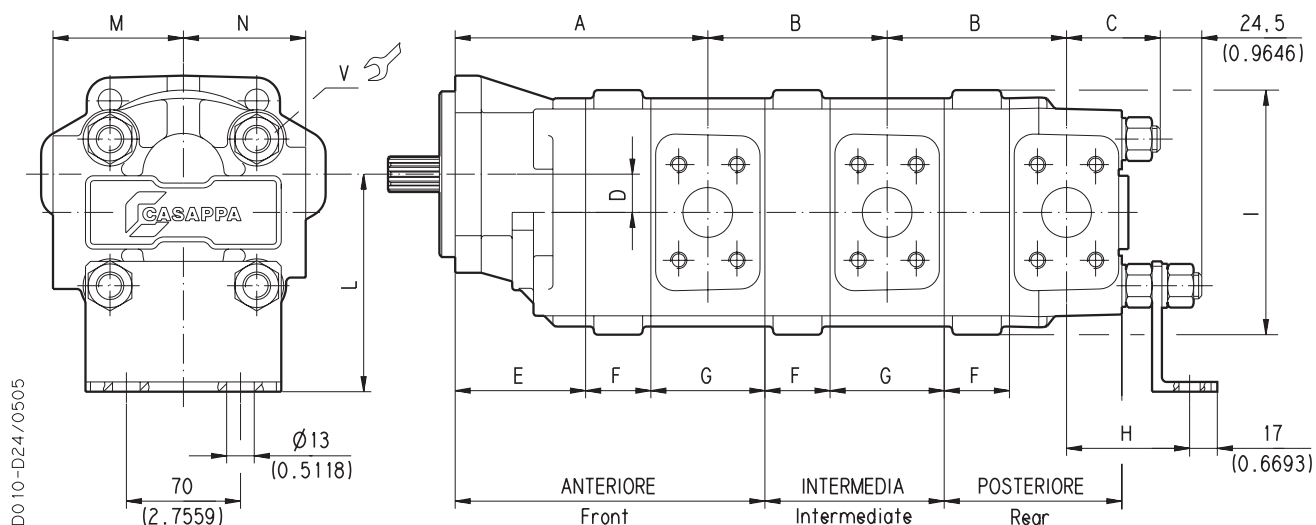


EM VERSION



01/07.05

MULTIPLE PUMPS SAME GROUPS



D010-D24/0505

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

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 ÷ 48

PORTS:
see page 49

The drawing shows a pump with left rotation.

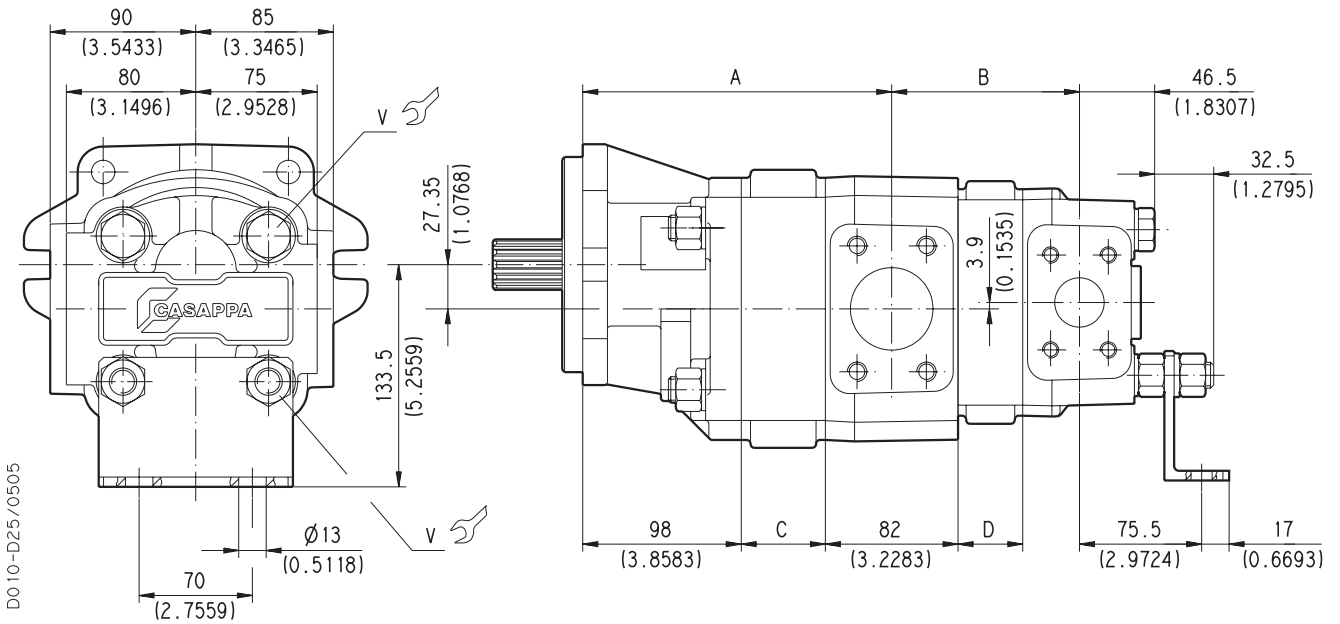
Pump type	A	B	C	D	E	G	H	I	L	M (IN)	N (OUT)
	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
HDP35/35	139+F (5.4724+F)	82+F (3.2283+F)	60,5 (2.3819)	27,35 (1.0807)	98 (3.8583)	82 (3.2283)	91,5 (3.6024)	172 (6.7717)	162,4 (6.3937)	90 (3.5433)	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)

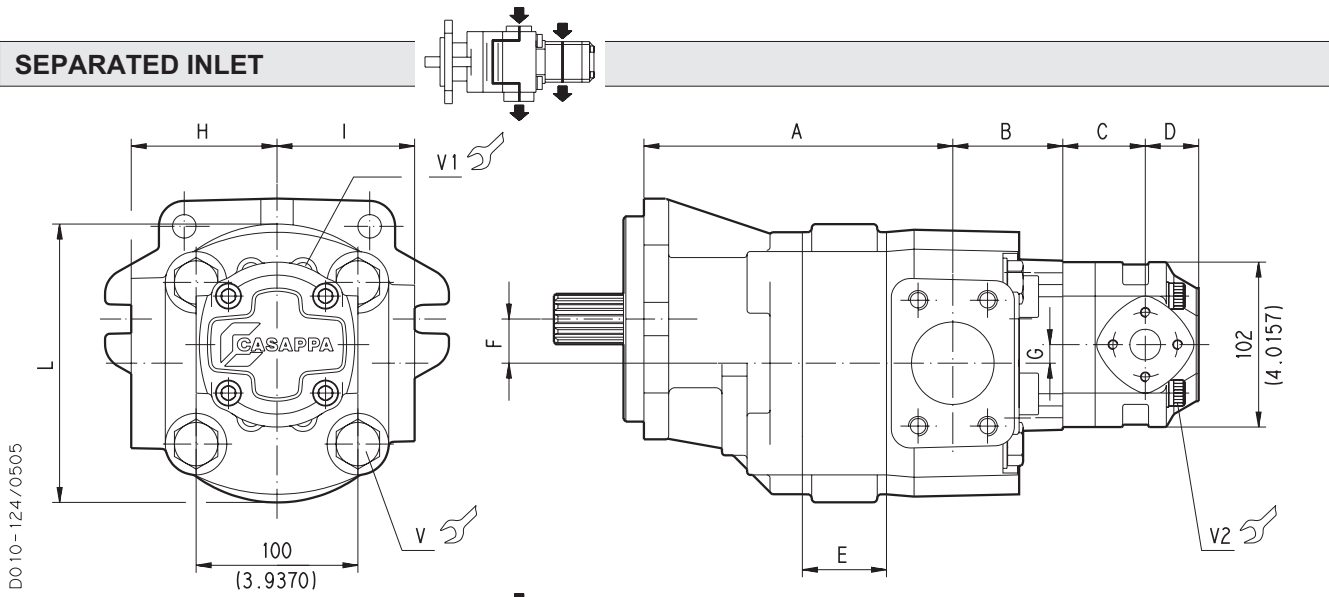
Pump type	C
	mm (inch)
HDP 35•40	33 (1.2992)
HDP 35•50	38 (1.4961)
HDP 35•63	44 (1.7323)
HDP 35•71	48 (1.8898)
HDP 35•80	52 (2.0472)
HDP 35•90	57 (2.2441)
HDP 35•100	61 (2.4016)
HDP 35•112	67 (2.6378)
HDP 35•125	73 (2.8740)

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)

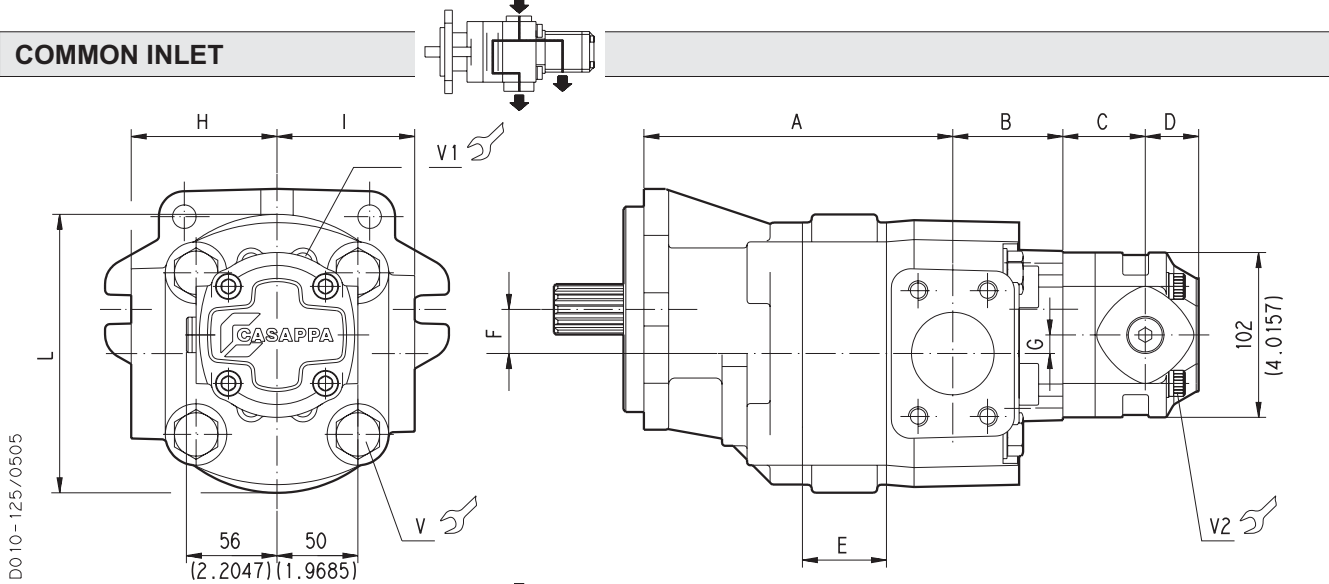
01/07.05

DOUBLE PUMPS HDP.. / KP20 STANDARD VERSION

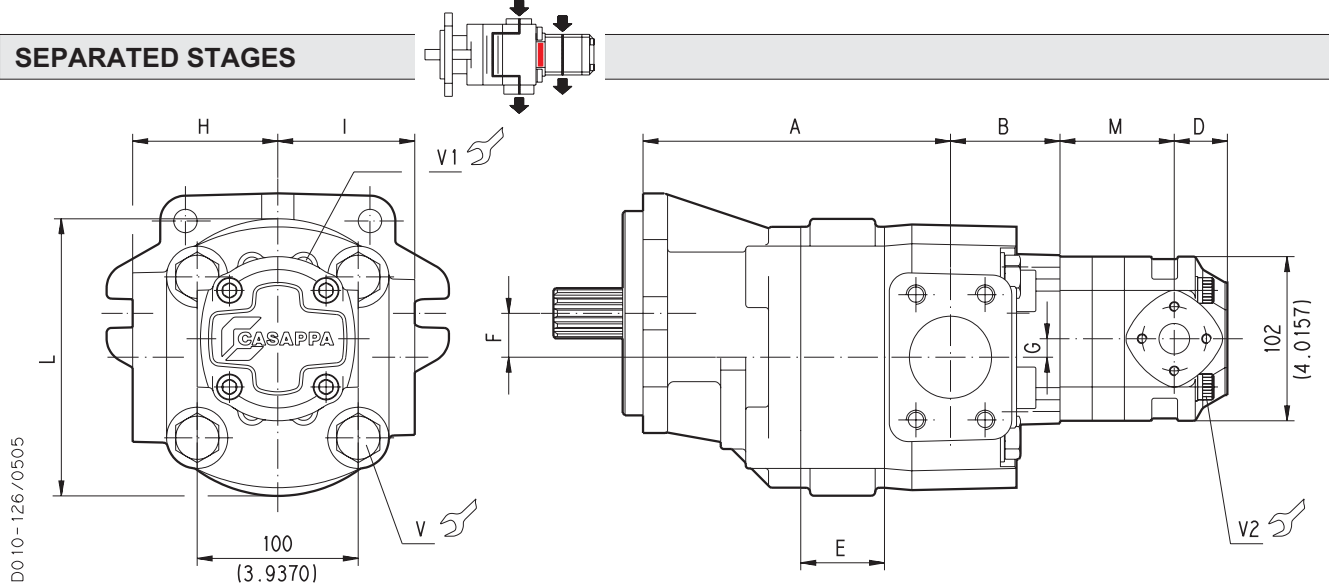
SEPARATED INLET



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

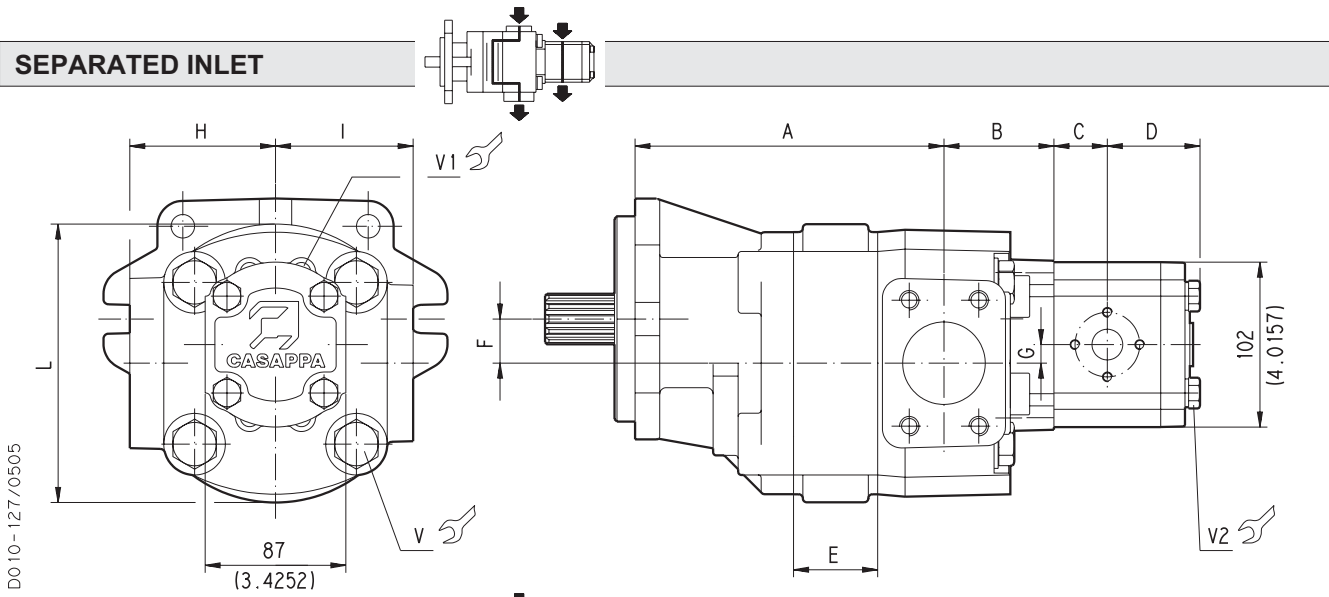
PORTS:
see page 49

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)

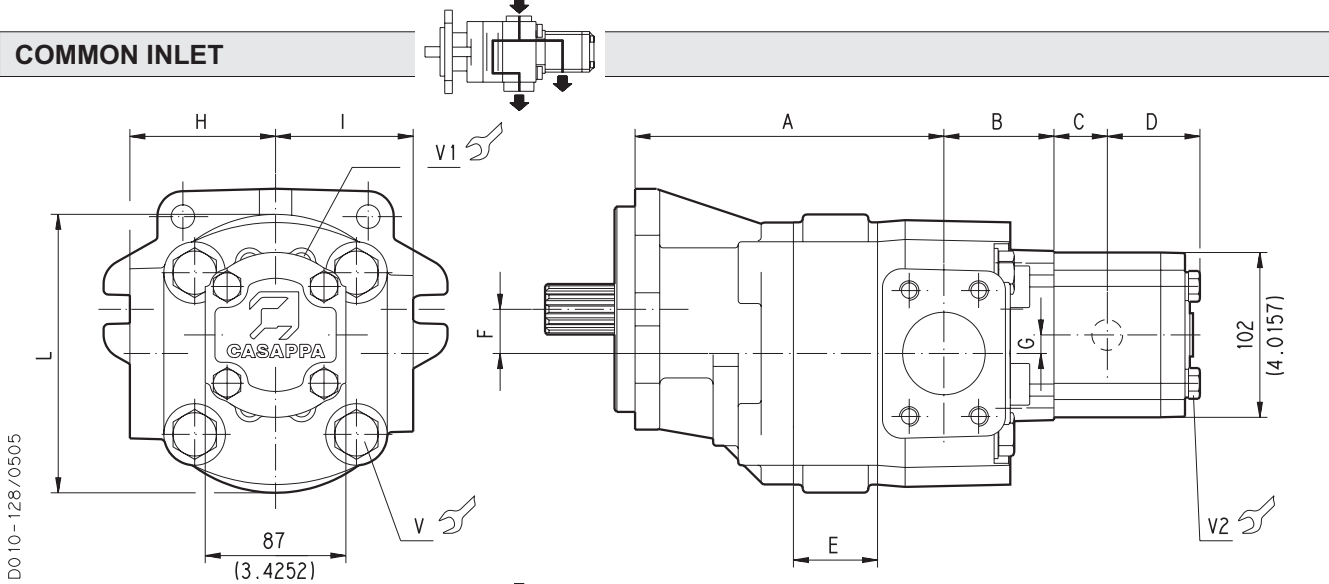
01/07.05

DOUBLE PUMPS HDP.. / PLP 20 STANDARD VERSION

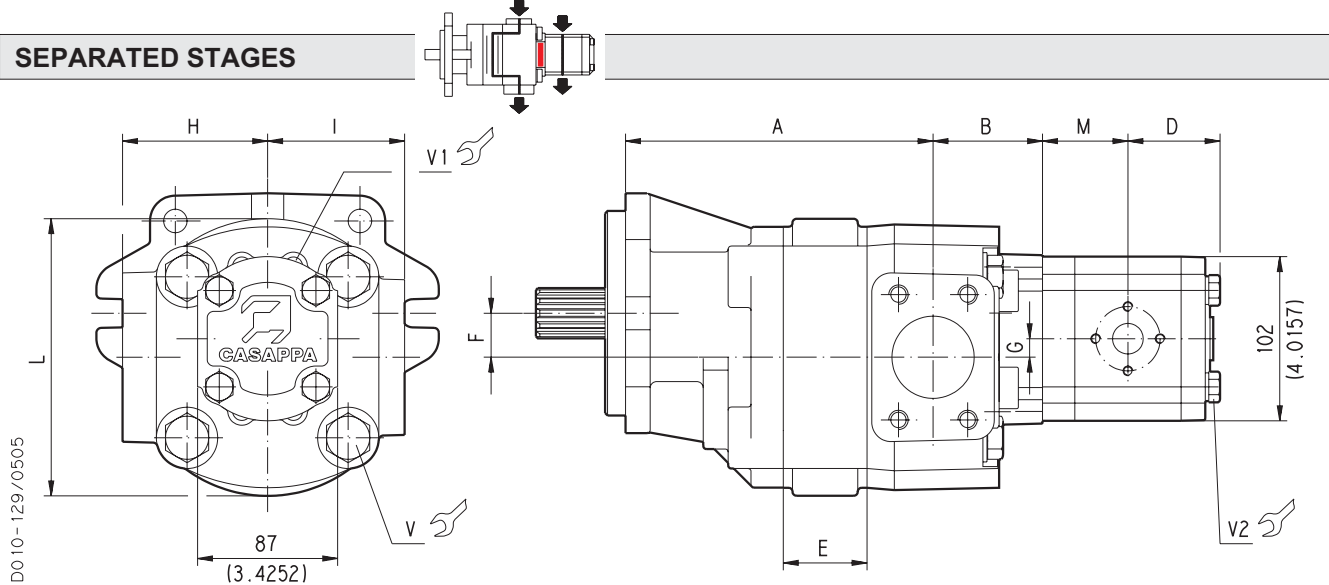
SEPARATED INLET



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 ÷ 2726)	25 $\pm 2,5$ (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/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 ÷ 48

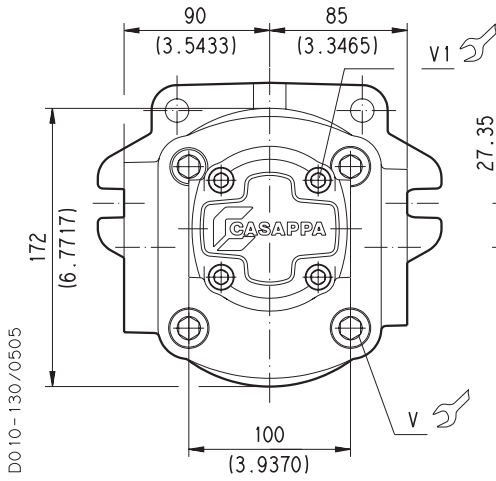
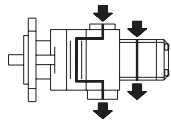
PORTS:
see page 49

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)

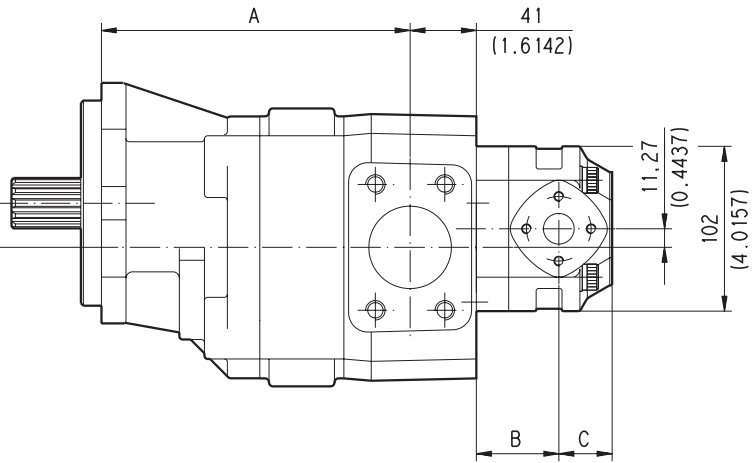
01/07.05

DOUBLE PUMPS HDP35 / KP20 EM VERSION

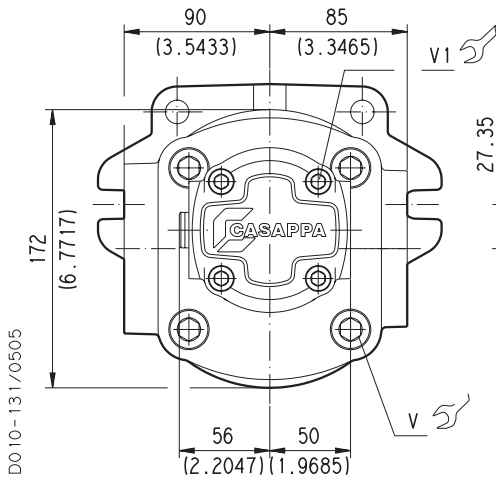
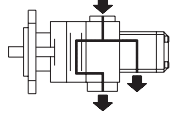
SEPARATED INLET



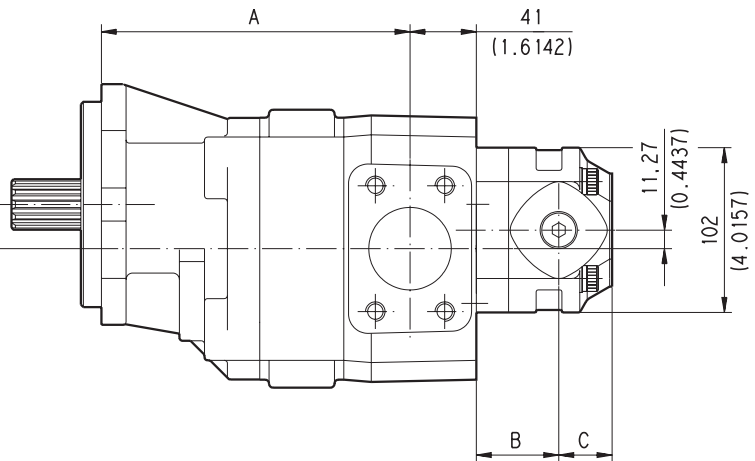
D010-130/0505



COMMON INLET



D010-131/0505



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

Drawings show pumps with left rotation.

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 ÷ 48

PORTS:
see page 49

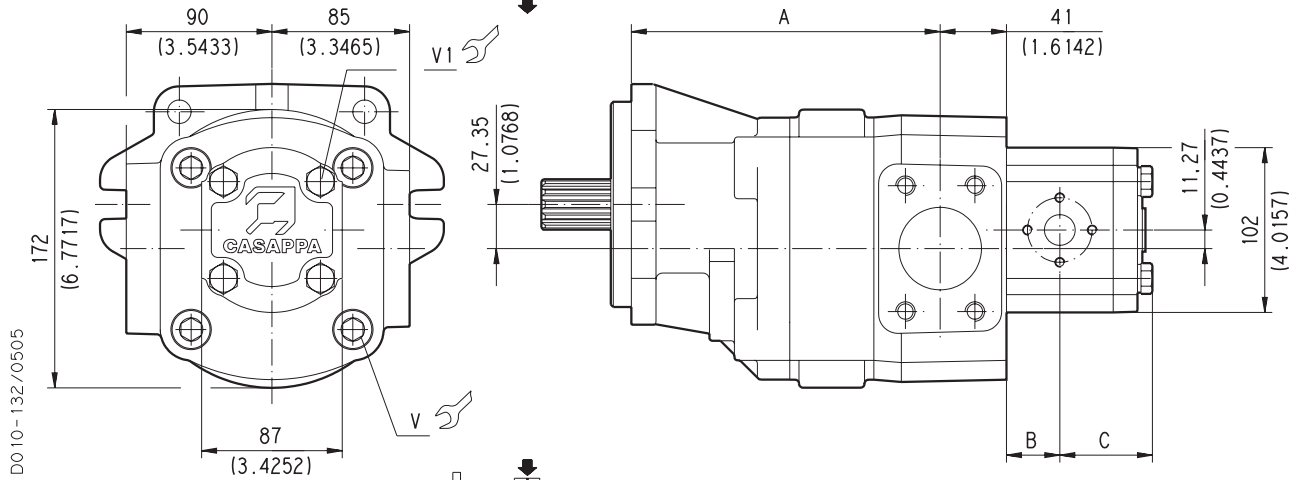
Pump type	A
	mm (inch)
HDP 35•40	172 (6.7717)
HDP 35•50	177 (6.9685)
HDP 35•63	183 (7.2047)
HDP 35•71	187 (7.3622)
HDP 35•80	191 (7.5197)
HDP 35•90	196 (7.7165)
HDP 35•100	200 (7.8740)
HDP 35•112	206 (8.1102)
HDP 35•125	212 (8.3465)

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)

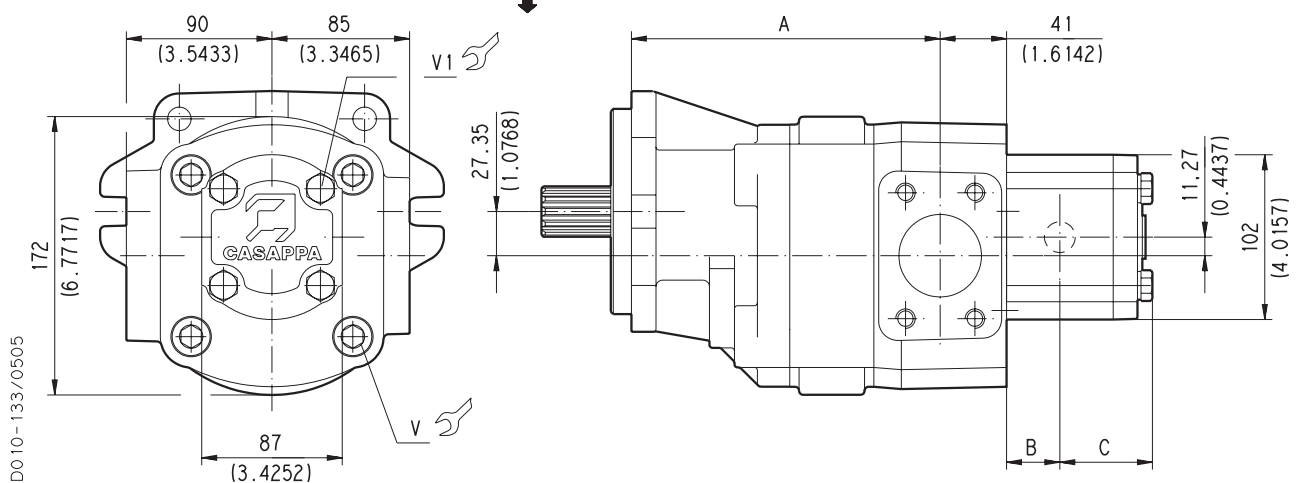
01/07.05

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 ÷ 2726)	70 ±7 (558 ÷ 682)

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 ÷ 48

PORTS:
see page 49

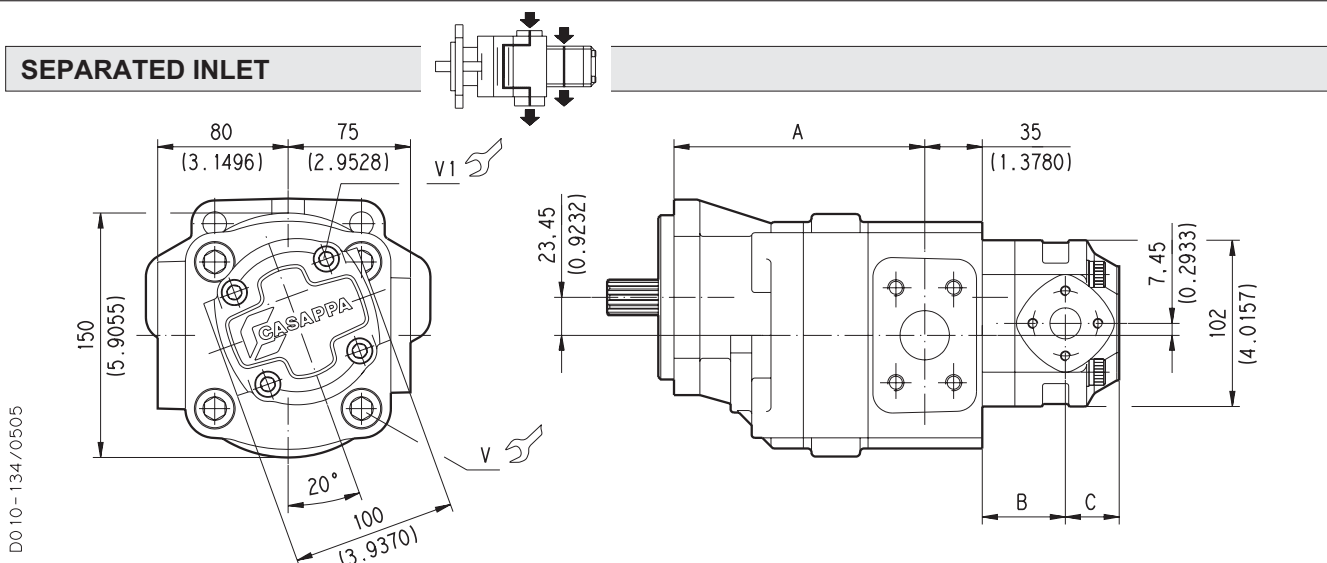
Pump type	A
	mm (inch)
HDP 35•40	172 (6.7717)
HDP 35•50	177 (6.9685)
HDP 35•63	183 (7.2047)
HDP 35•71	187 (7.3622)
HDP 35•80	191 (7.5197)
HDP 35•90	196 (7.7165)
HDP 35•100	200 (7.8740)
HDP 35•112	206 (8.1102)
HDP 35•125	212 (8.3465)

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)

01/07.05

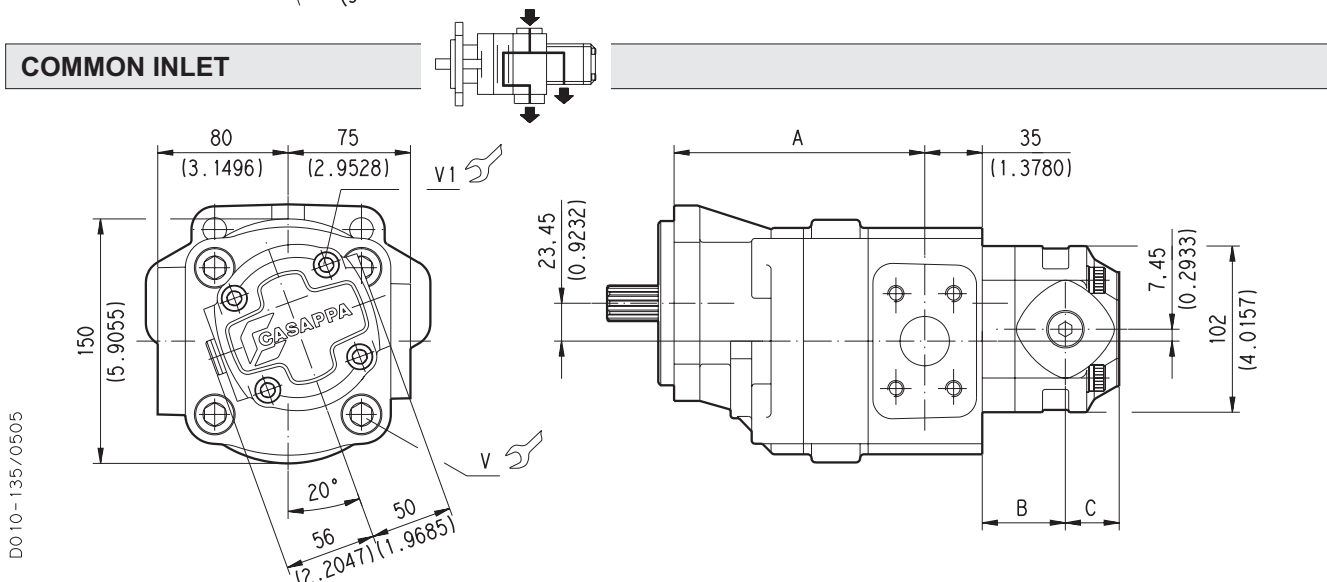
DOUBLE PUMPS HDP30 / KP20 EM VERSION

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 ÷ 2726)	70 ^{±7} (558 ÷ 682)

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 ÷ 48

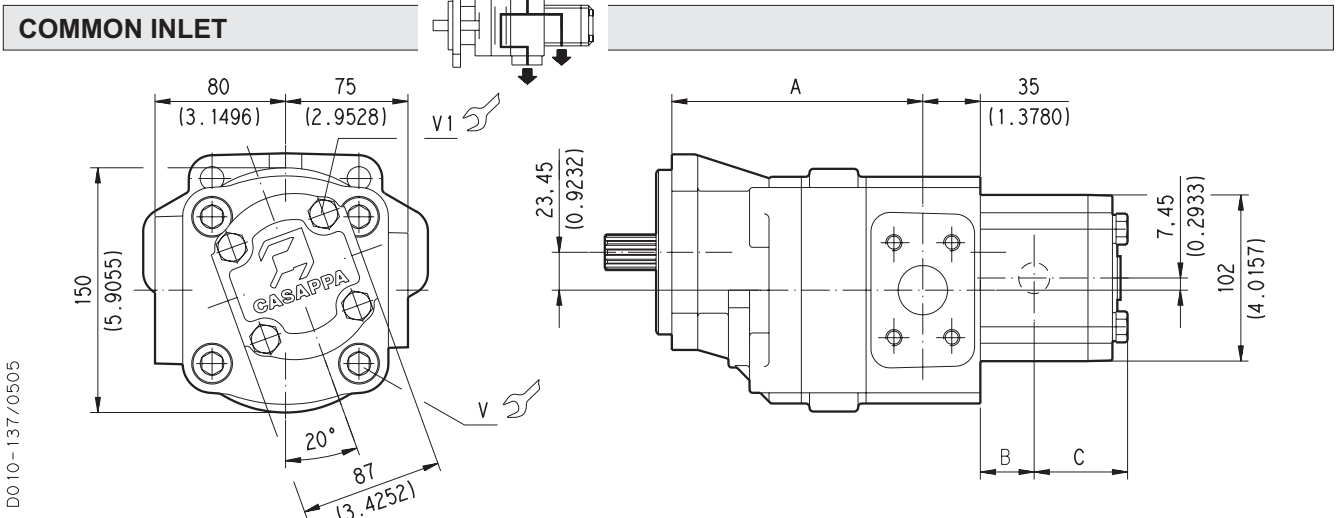
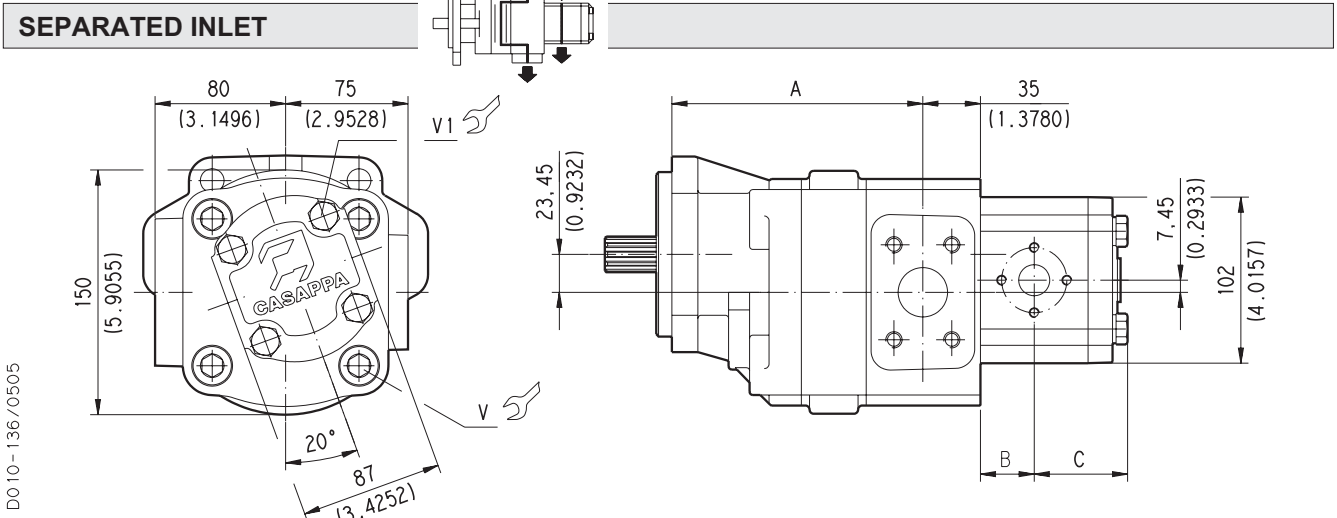
PORTS:
see page 49

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)
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)

01/07.05

DOUBLE PUMPS HDP30 / PLP20 EM VERSION



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

Drawings show pumps with left rotation.

DRIVE SHAFTS:
see page 45

MOUNTING FLANGE:
see page 46 ÷ 48

PORTS:
see page 49

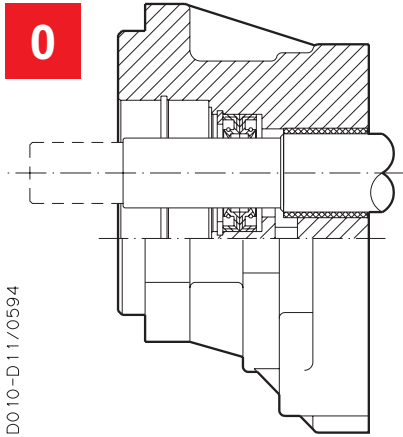
Pump type	A
	mm (inch)
HDP 30•17	138 (5.4331)
HDP 30•22	141 (5.5512)
HDP 30•24	142,3 (5.6024)
HDP 30•27	144 (5.6693)
HDP 30•34	149 (5.8661)
HDP 30•38	152 (5.9843)
HDP 30•43	155 (6.1024)
HD. 30•51	160 (6.2992)
HDP 30•56	163 (6.4173)
HDP 30•61	166 (6.5354)
HDP 30•73	174 (6.8504)
HDP 30•82	179 (7.0472)

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)

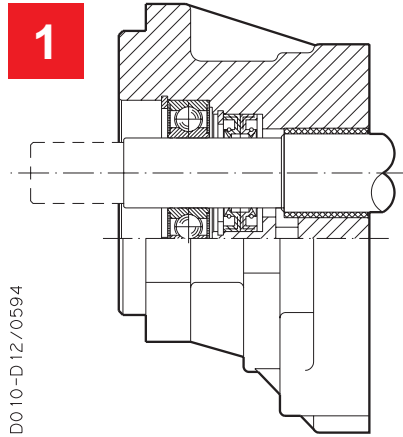
01/07.05

VERSIONS

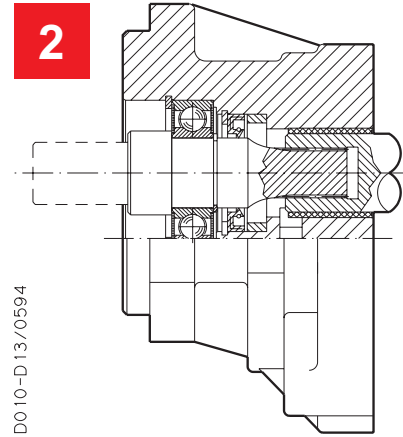
For each version, the possible combination between drive shafts and mounting flanges are shown on pages 46 ÷ 48.



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

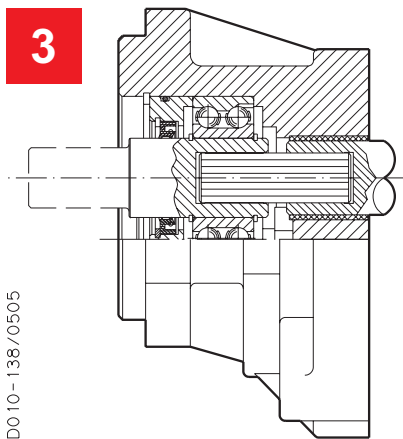


Version for applications with low radial load and without axial load on the drive shaft.



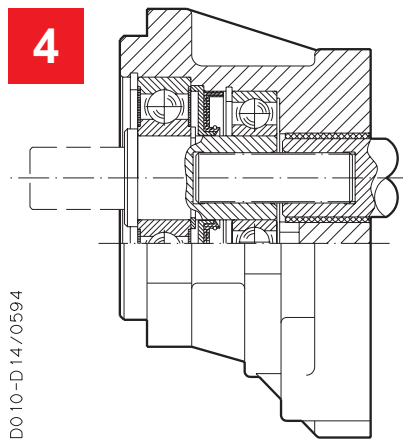
Special version with independent shaft for applications with low radial load and without axial load on the drive shaft.

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



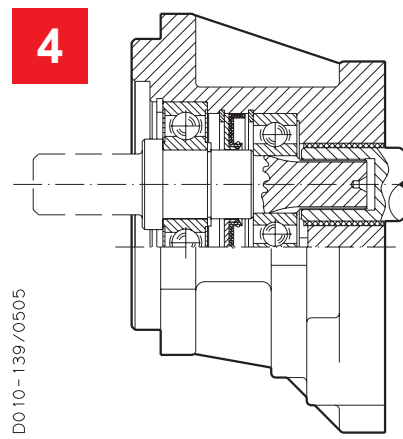
Version for applications with radial and axial load on the drive shaft.

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.

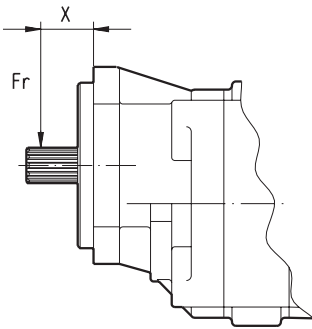
Max. torque version 4:
 HD. 35: 350 Nm (3098 lbf in)

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.

01/07.05

VERSION WITH OUTBOARD BEARINGS MAGNUM 30

D010-143/0405

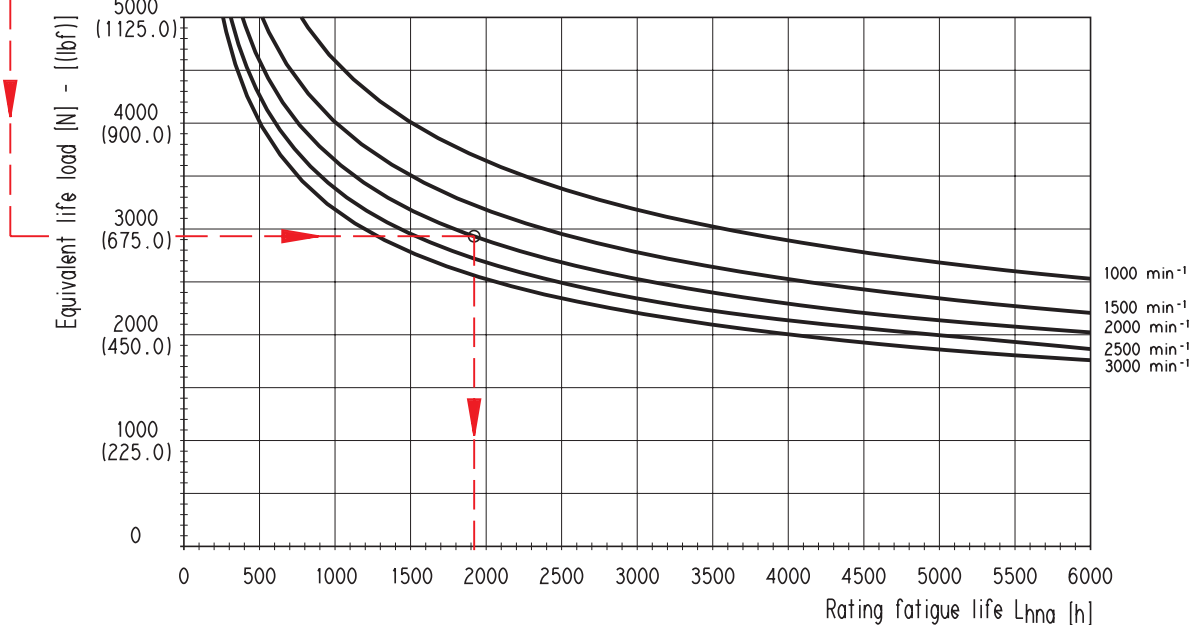
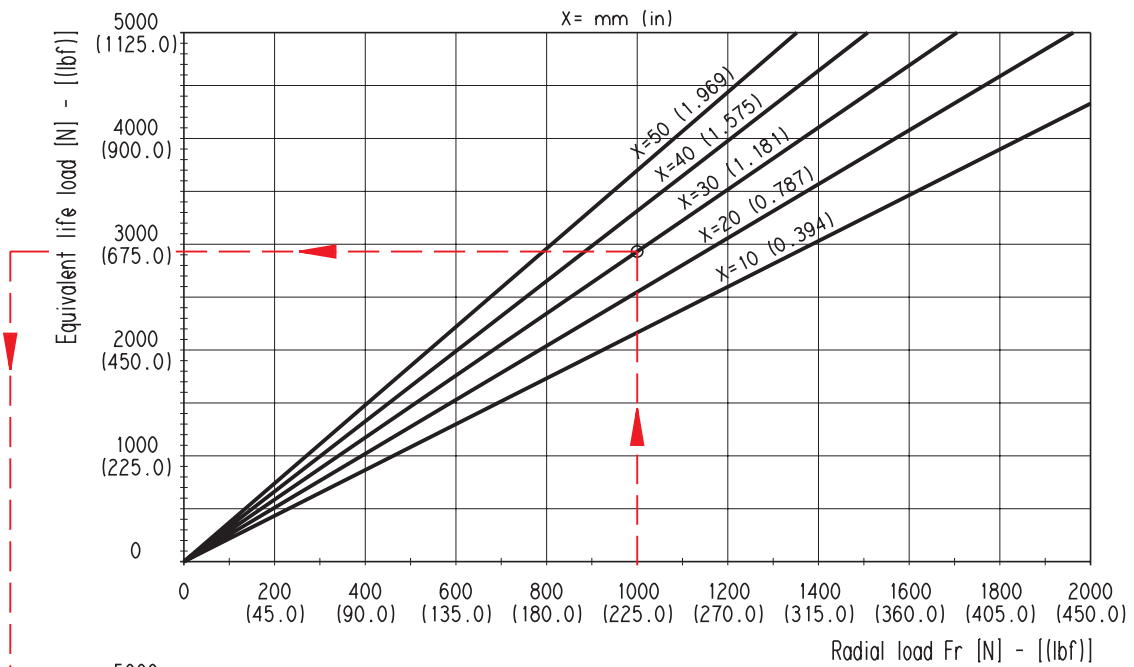


X = Distance of the radial load result from the mounting flange [mm (in)].

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



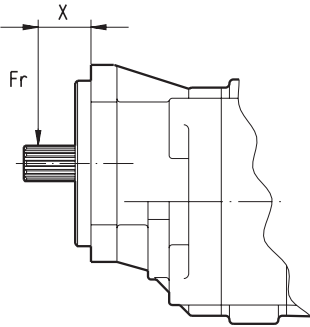
01/07.05

D010-147/0605

VERSION WITH OUTBOARD BEARINGS MAGNUM 35

3

D010-143/0405

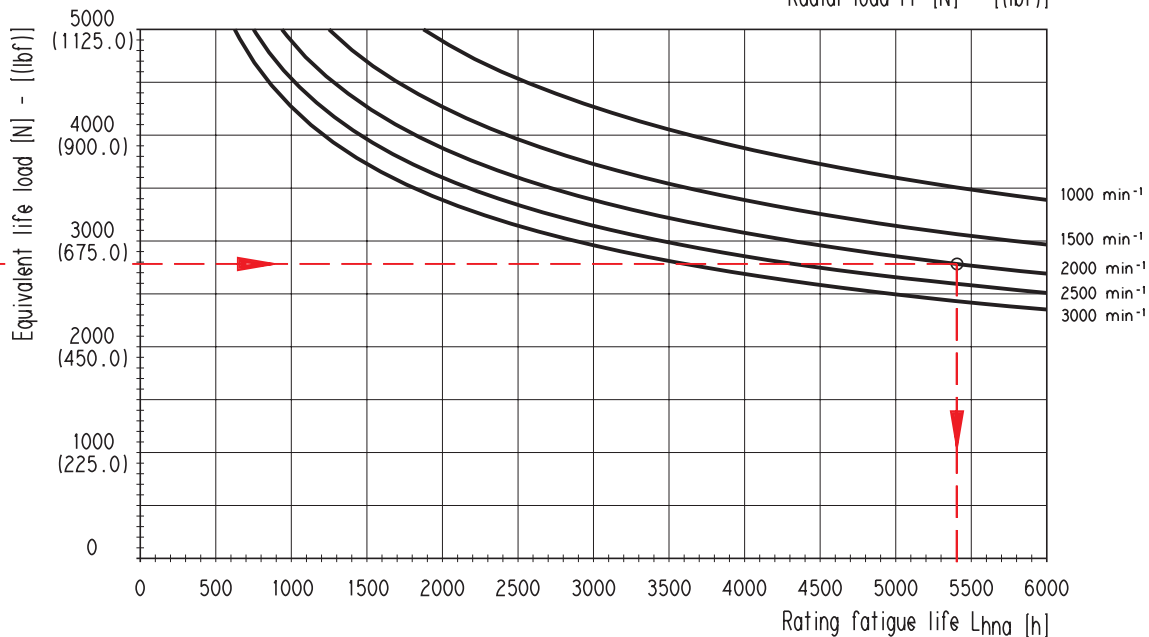
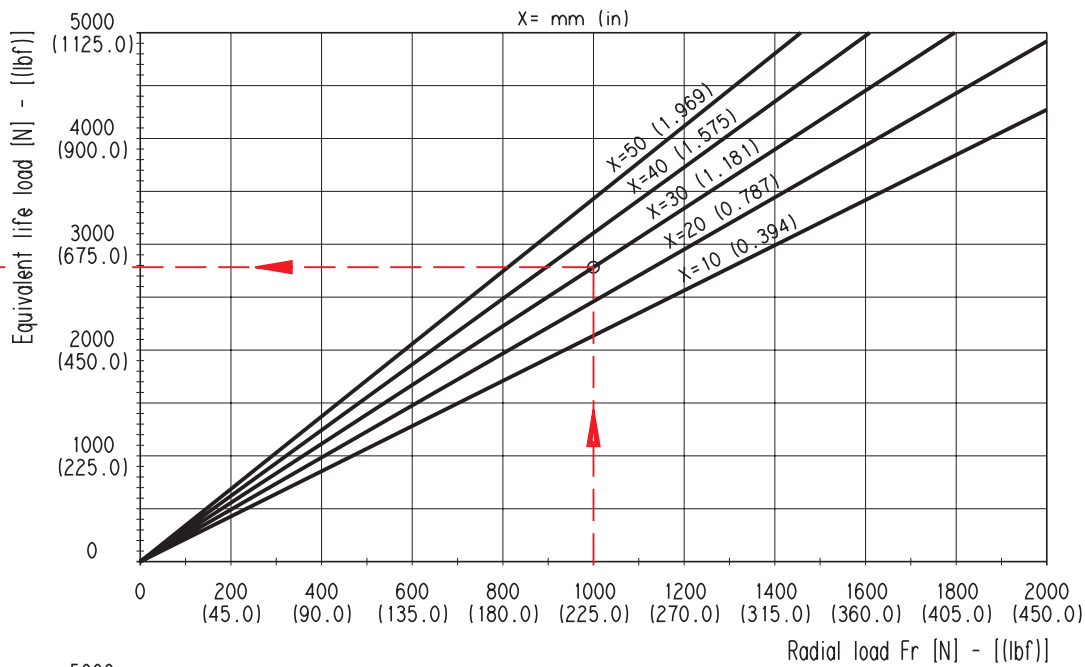


X= Distance of the radial load result from the mounting flange [mm (in)].

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	.....	≈ 5400 h

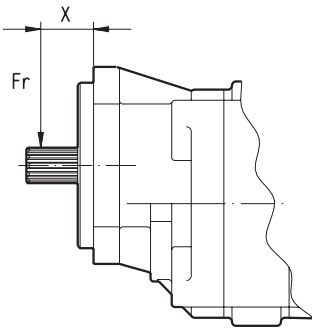


D033-148/0605

01/07.05

VERSION WITH OUTBOARD BEARINGS MAGNUM 30

D010-143/0405

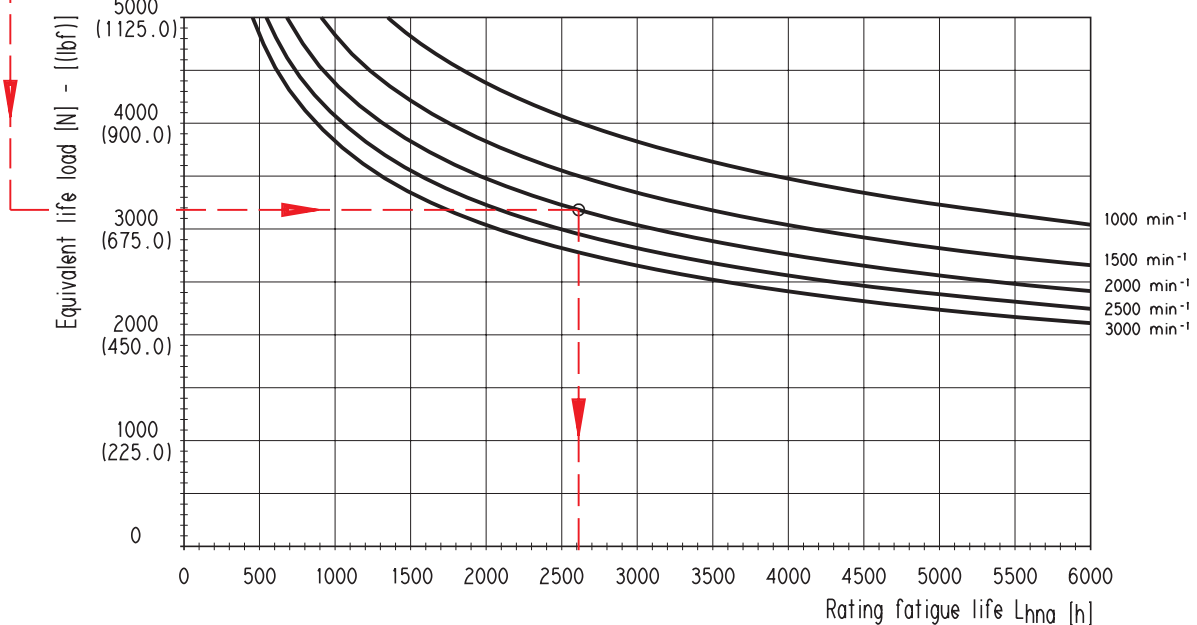
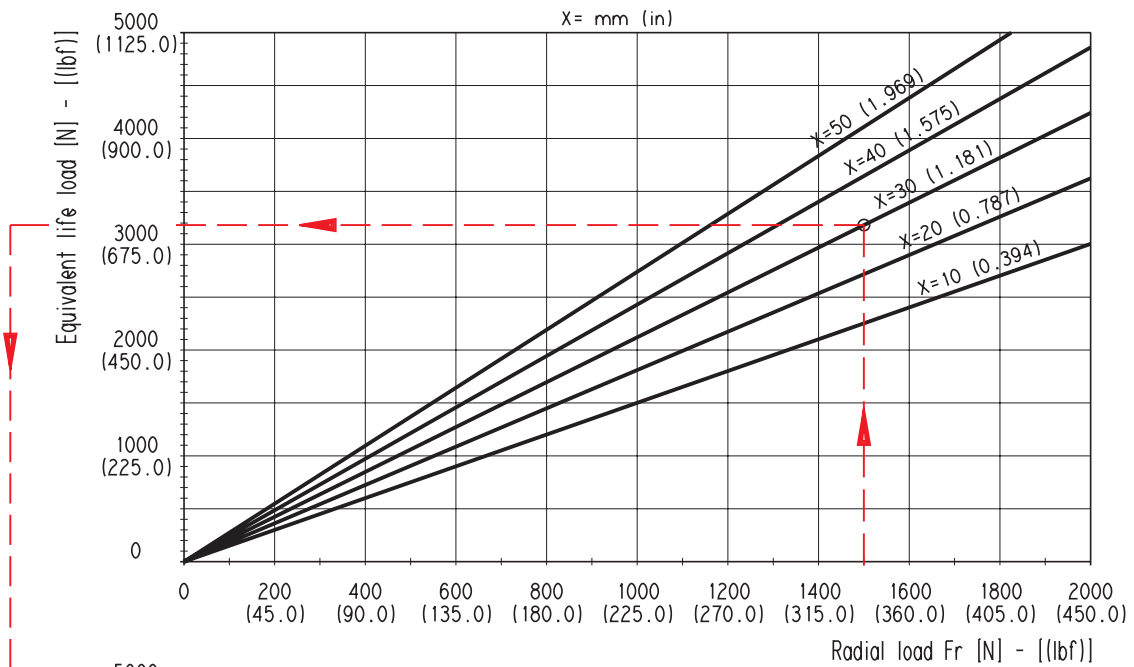


X= Distance of the radial load result from the mounting flange [mm (in)].

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

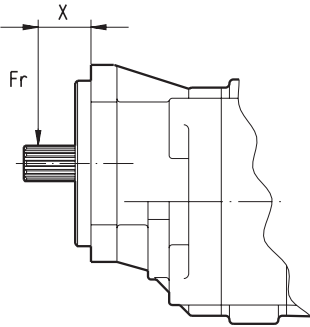


01/07.05

D010-149/0605

VERSION WITH OUTBOARD BEARINGS MAGNUM 35

D010-143/0405

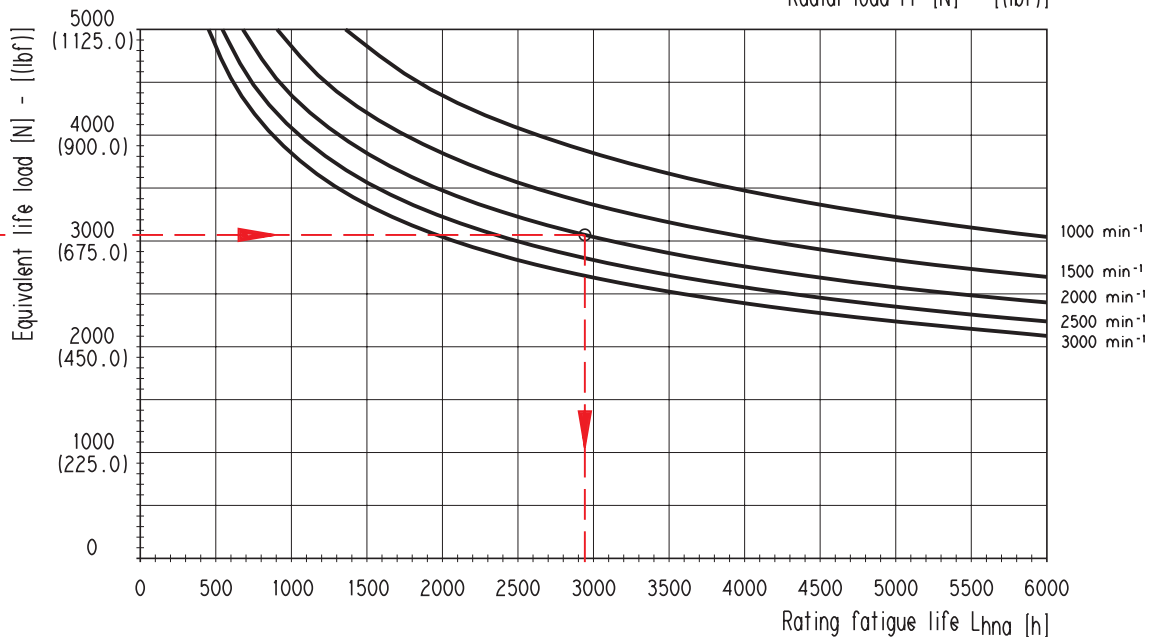
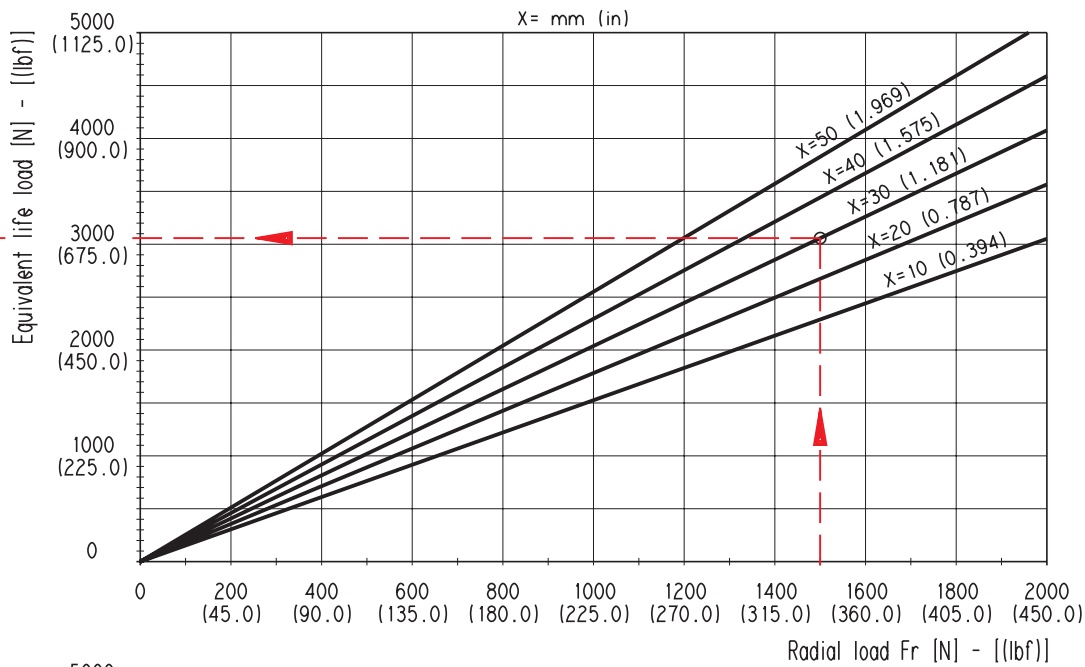


X= Distance of the radial load result from the mounting flange [mm (in)].

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	≈ 2943 h



D010-150/0605

01/07.05

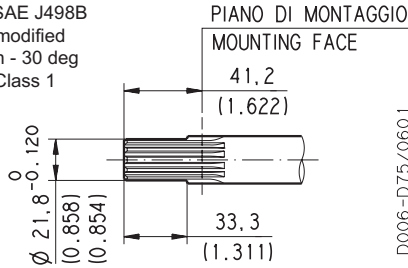
DRIVE SHAFTS

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



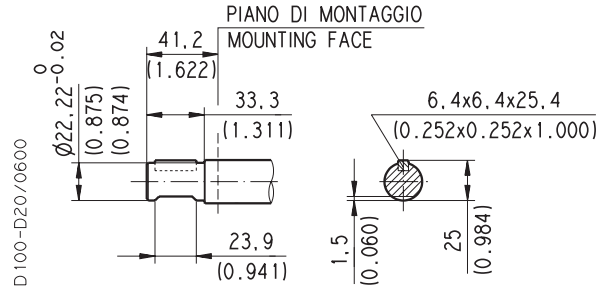
HD. 30 **MAX 330 Nm (2921 lbf in)** ◆

HD. 35 **MAX 300 Nm (2655 lbf in)** ◆

SAE "B" STRAIGHT

32

Mounting face refer to flange code **S3**



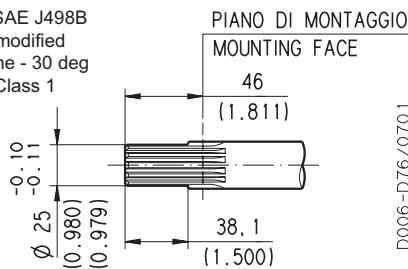
MAX 200 Nm (1770 lbf in) ◆

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



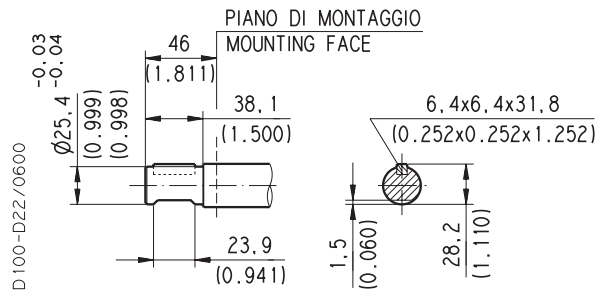
HD. 30 **MAX 500 Nm (4426 lbf in)** ◆

HD. 35 **MAX 450 Nm (3983 lbf in)** ◆

SAE "BB" STRAIGHT

33

Mounting face refer to flange code **S3**

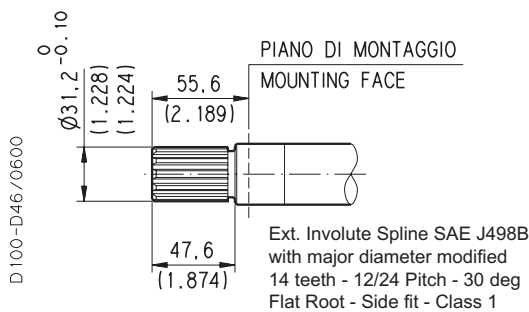


MAX 280 Nm (2478 lbf in) ◆

SAE "C" SPLINE

06

Mounting face refer to flange code **S8**



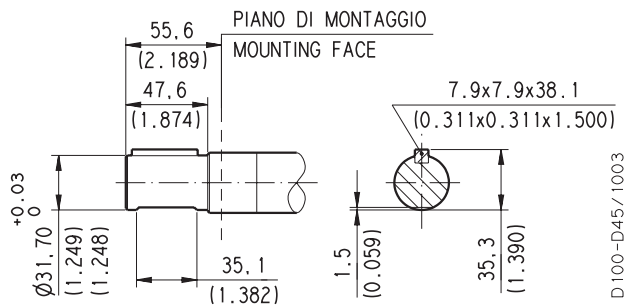
HD. 30 **MAX 170 Nm (1505 lbf in)** ◆

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)

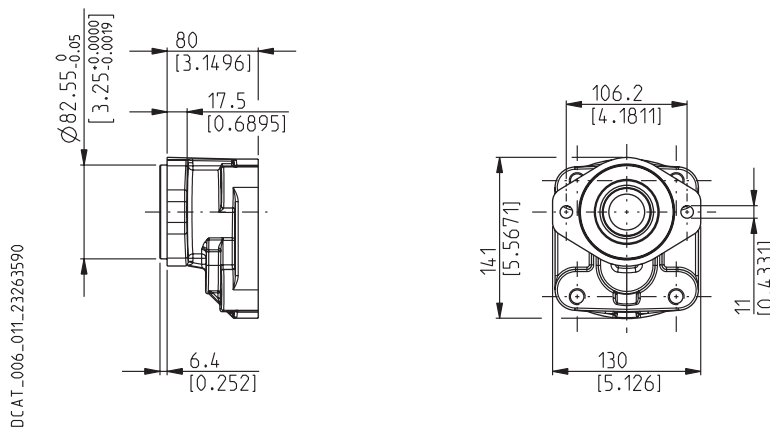
01/07.05

MOUNTING FLANGES AND TABLE OF COMPATIBILITY

SAE "A" 2 HOLES

S1

Conforms to SAE J744



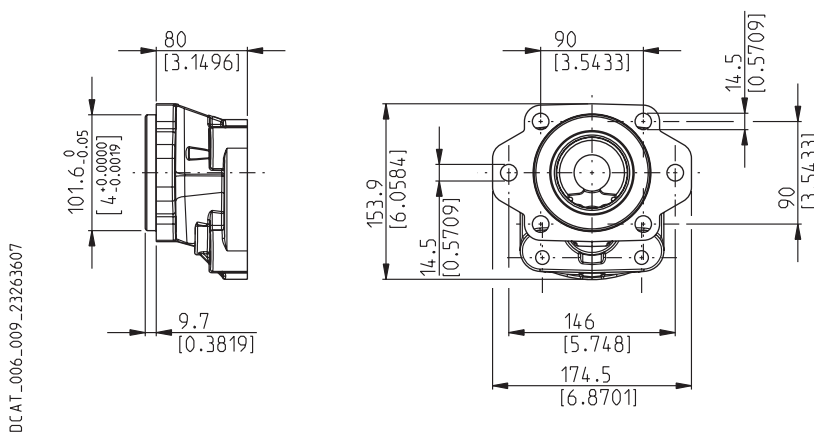
GROUP	VERSIONS See page 40	DRIVE SHAFTS See page 45					
		04	32	05	33	06	34
HD. 30	0	X	X	X	X		
	1	X	X	X	X		
	2	X	X	X	X	X	X

X Available combination

SAE "B" 2-4 HOLES

S3

Conforms to SAE J744



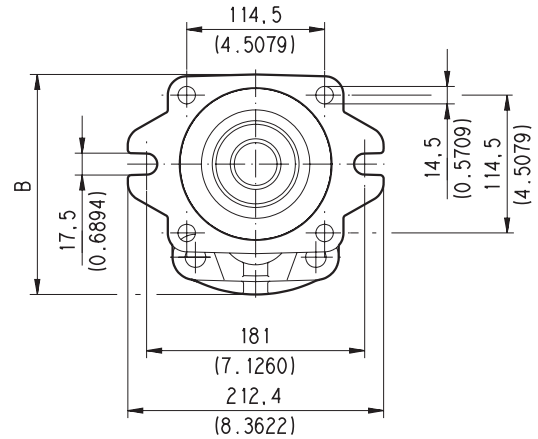
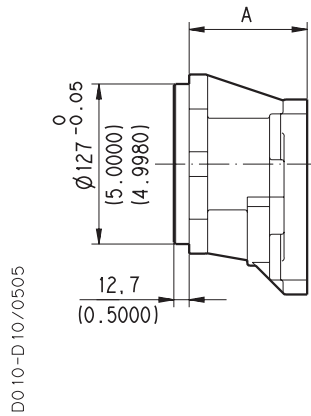
GROUP	VERSIONS See page 40	DRIVE SHAFTS See page 45					
		04	32	05	33	06	34
HD. 30	0	X	X	X	X		
	1	X	X	X	X		
	2	X	X	X	X	X	X
	3	X	X	X		X	X
	4	X	X		X	X	X

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)

GROUP	VERSIONS See page 40	DRIVE SHAFTS See page 45					
		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

01/07.05

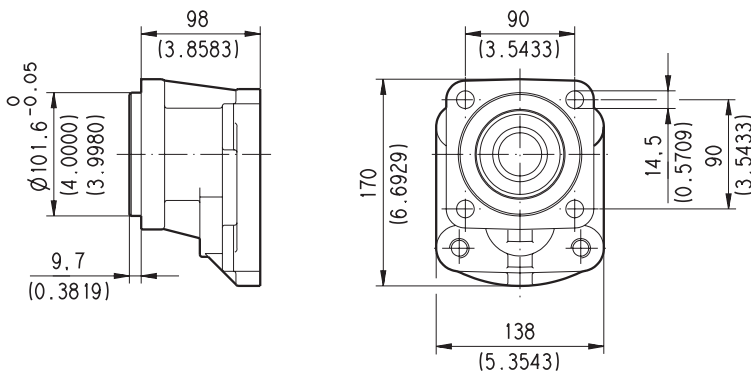
MOUNTING FLANGES AND TABLE OF COMPATIBILITY

SAE "B" 4 HOLES

S4

Conforms to SAE J744

D010-D09/0505



DRIVE SHAFTS
See page 45

GROUP	VERSIONS See page 40	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

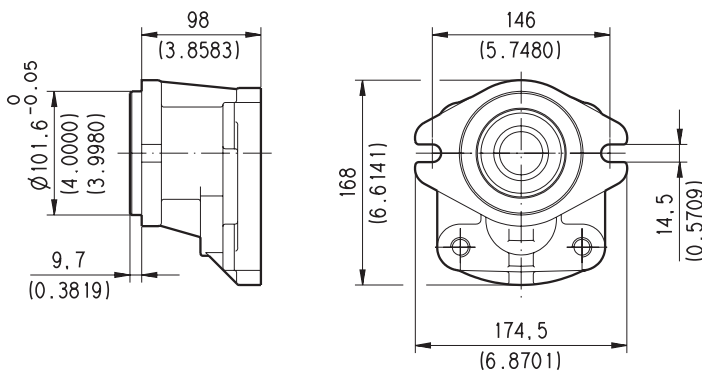
X Available combination

SAE "B" 2 HOLES

S5

Conforms to SAE J744

D010-D90/0505



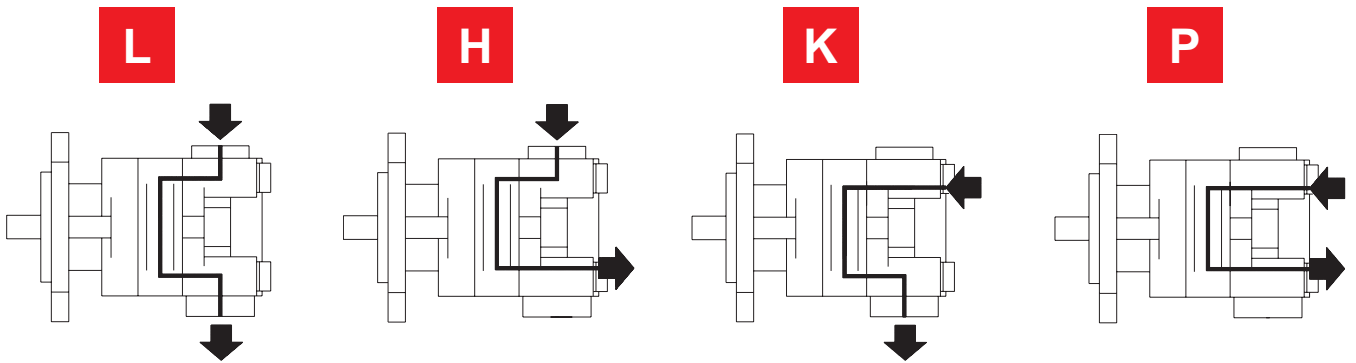
DRIVE SHAFTS
See page 45

GROUP	VERSIONS See page 40	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



PORTS TYPE	SIDE PORTS								REAR PORTS			
	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	OF	OD
HD. 30-51												
HD. 30-56												
HD. 30-61	ME	MD	SE	SD	GG	GF	OG	OF	GF (●)	GE	OF	OD
HD. 30-73												
HD. 30-82												
HD. 35-40	ME	MD	SE	SD	GH	GG	OG	OF	GG (●)	GF	OF	OD
HD. 35-50												
HD. 35-63												
HD. 35-71												
HD. 35-80	MF	ME	SF	SE	GL	GH	OH	OG	GG (●)	GF	OH (◆)	OG (◆)
HD. 35-90												
HD. 35-100												
HD. 35-112												
HD. 35-125												

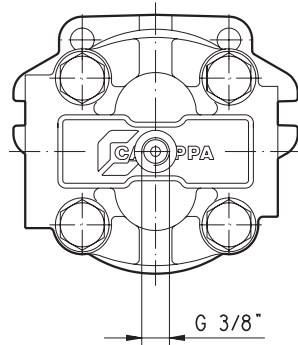
(●) Not available for reversible pumps and motors with external drain.

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

01/07.05

EXTERNAL DRAIN PORTS HD. 30 E HD. 35

D010-D27/0505

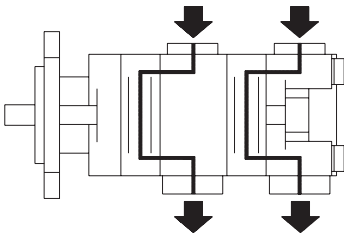


Rear port for reversible pumps and motors with external drain (R).
For dimensions see page 52.

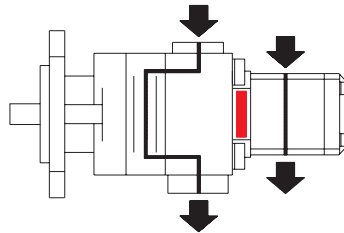
BSPP

PORTS FOR MULTIPLE PUMPS

SEPARATED INLET

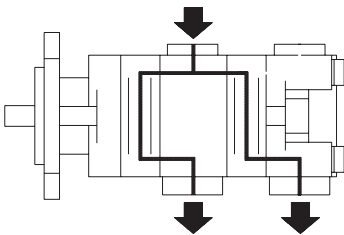


SEPARATED STAGES



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).

PORTS TYPE	SIDE PORTS			
	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

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

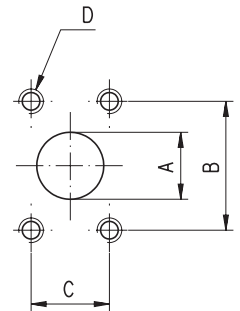
SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI

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



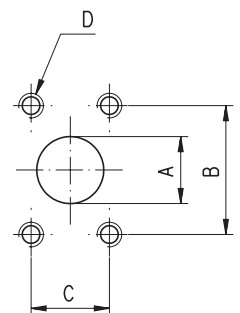
SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI

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



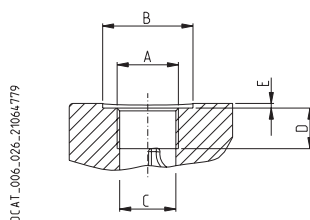
Tightening torque for high pressure side port [values obtained at 5075 psi (350 bar)]

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	∅ B	∅ 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



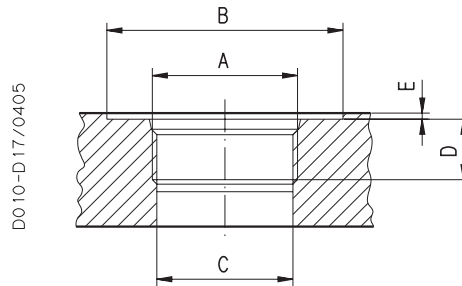
Tightening torque for high pressure side port [values obtained at 5075 psi (350 bar)]

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)
			45 (◆) (1.7717)					
OG	1" 1/4	1 5/8" - 12 UNF - 2B	60 (2.3622)	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

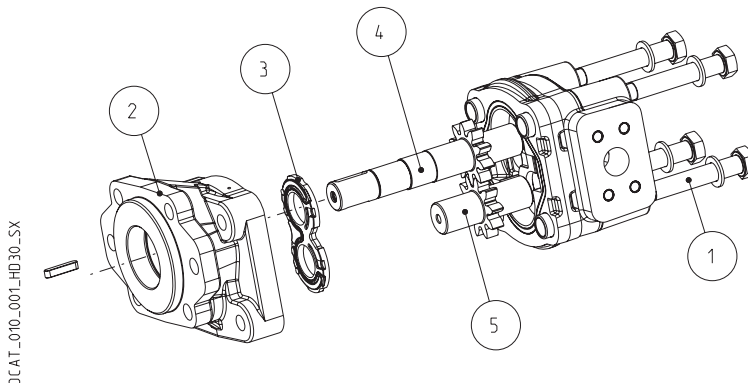
01/07.05

CHANGING ROTATION

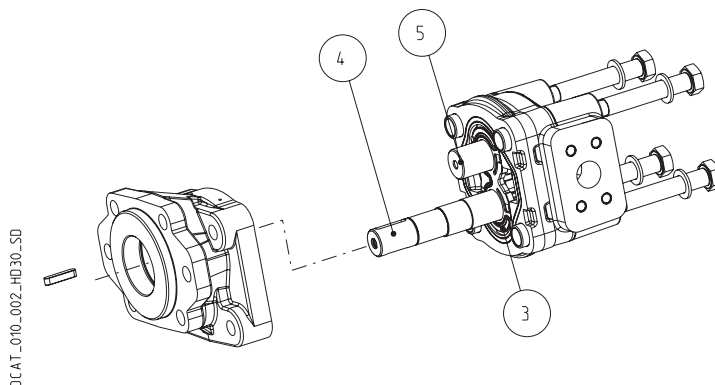
Example of changing rotation: from HDP30 pump counterclockwise to clockwise

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

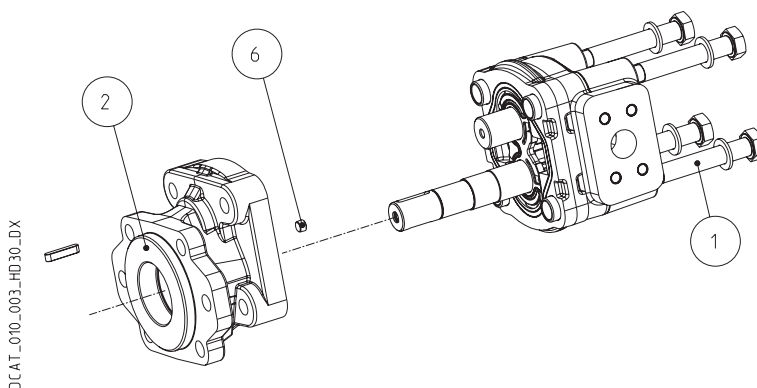
- 1 - Clean the pump externally with care.
- 2 - Loosen, and remove, the clamp bolts (1).
- 3 - Coat the sharp edges of the drive shaft (4) with adhesive tape and smear a layer of clean grease on the shaft end extension to avoid damaging the lip of the shaft seal when removing the mounting flange.
-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

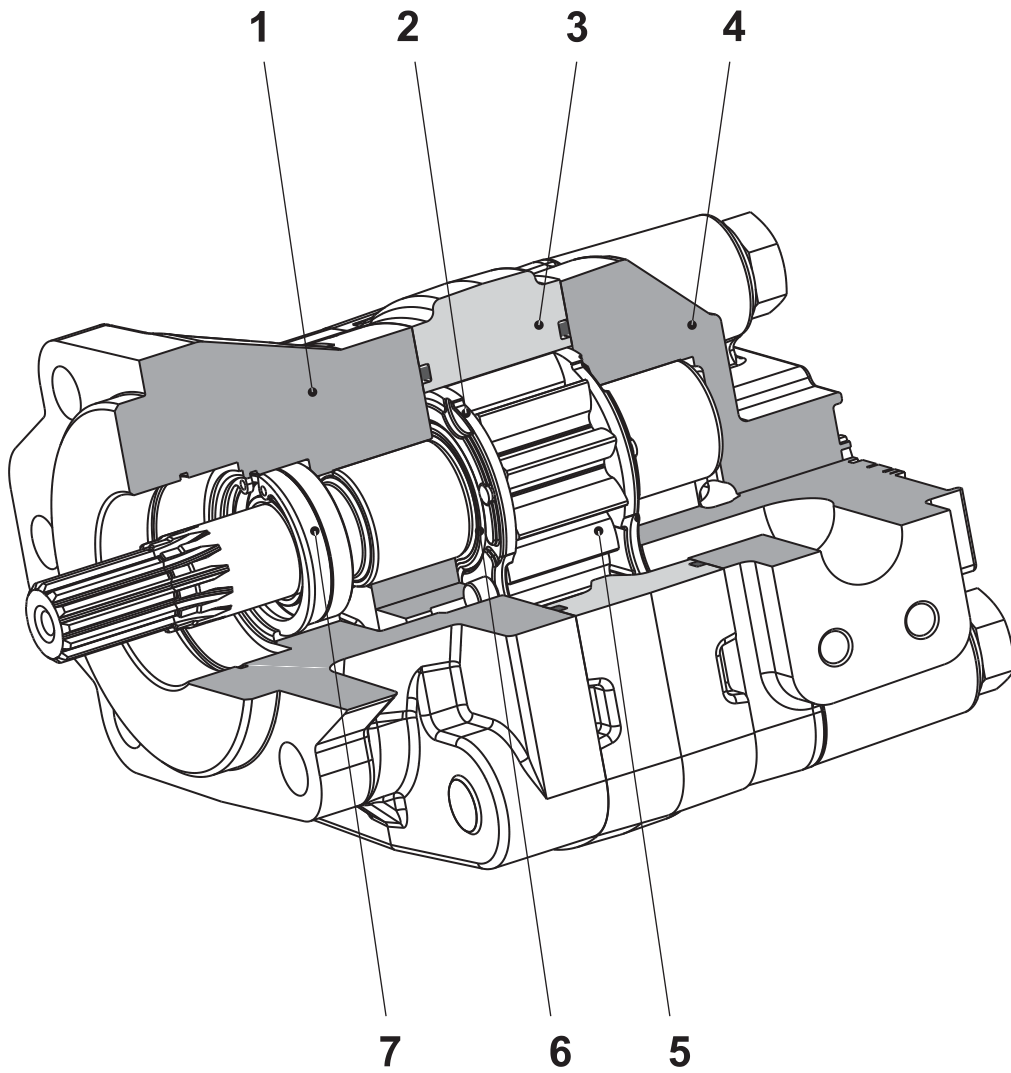
Check that all circuit connections are tight and that the entire system is completely clean. Insert the oil in the tank, using a filter. Bleed the circuit to assist in filling. Set the pressure relief valves to the lowest possible setting. Turn on the system for a few moments at minimum speed, then bleed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

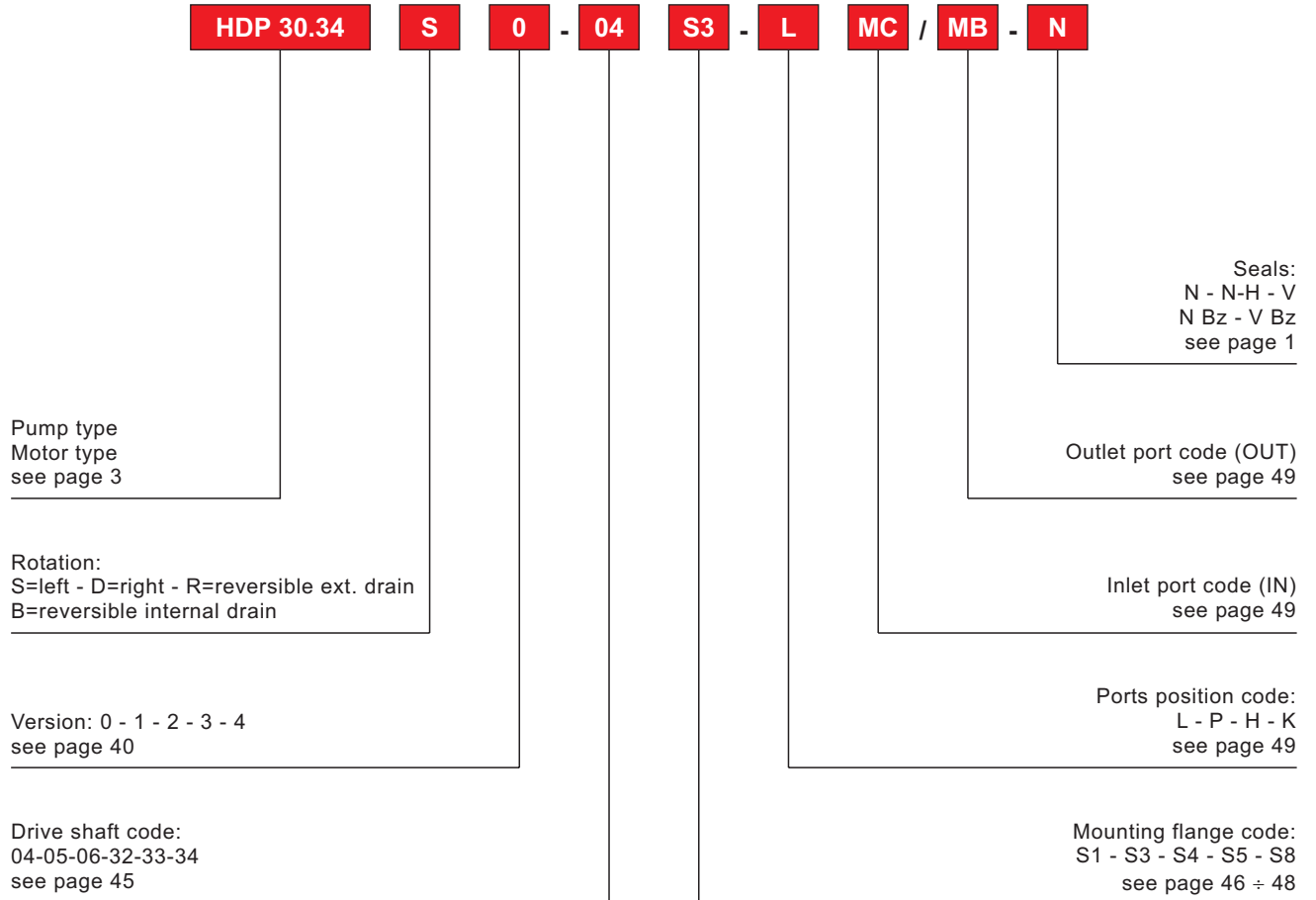
01/07.05



- 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

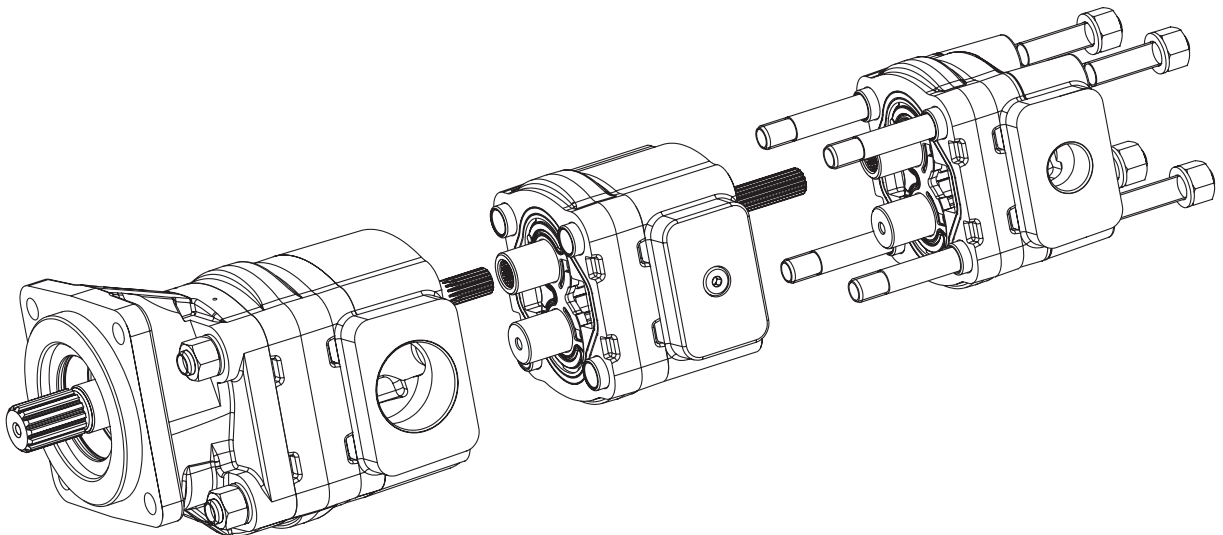
Front section **HDP35•71 S0 - 06 S6 - L GL/GG - 61 G1 - N - A**

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

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

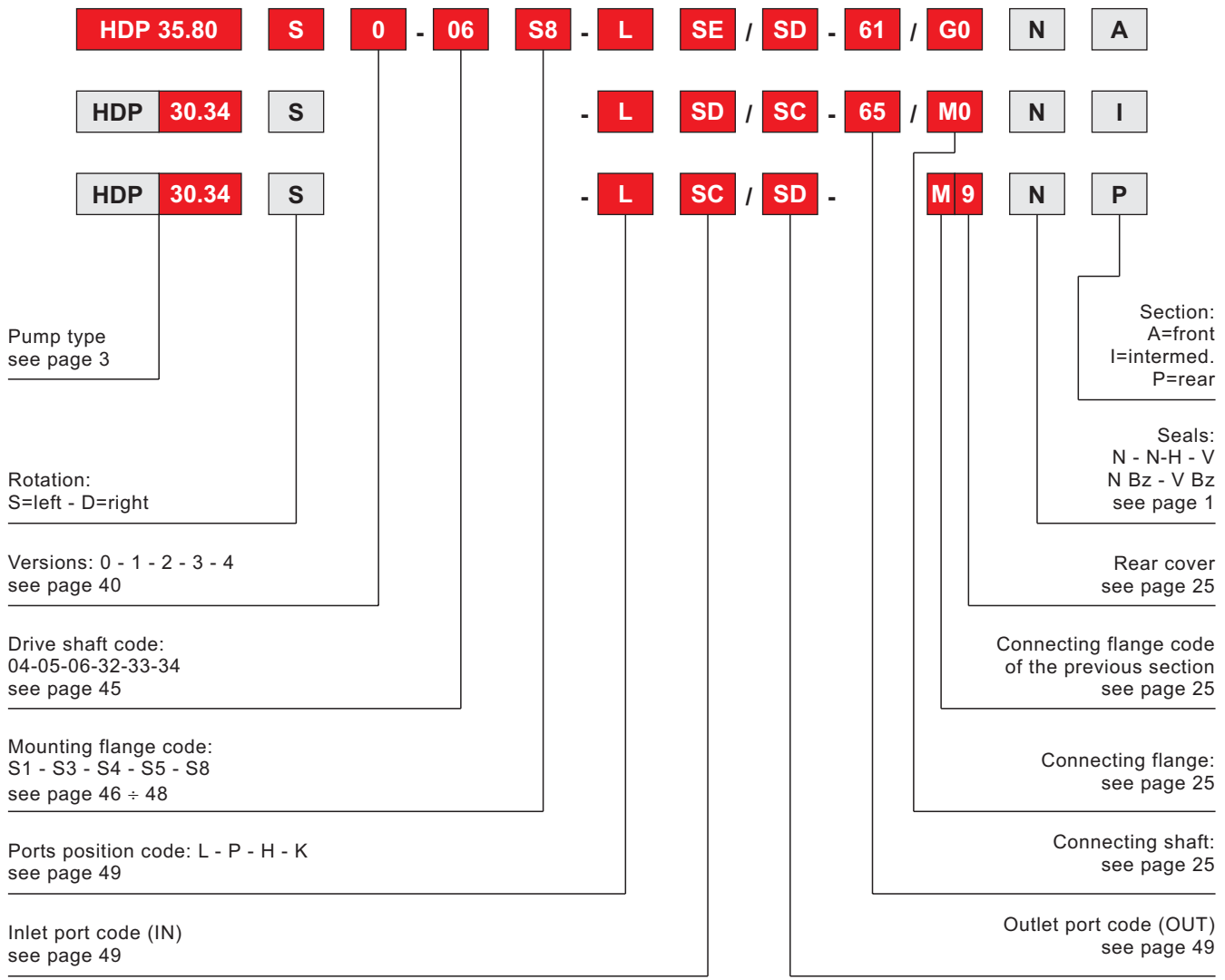
HOW TO ORDER AN ASSEMBLED TRIPLE PUMP

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



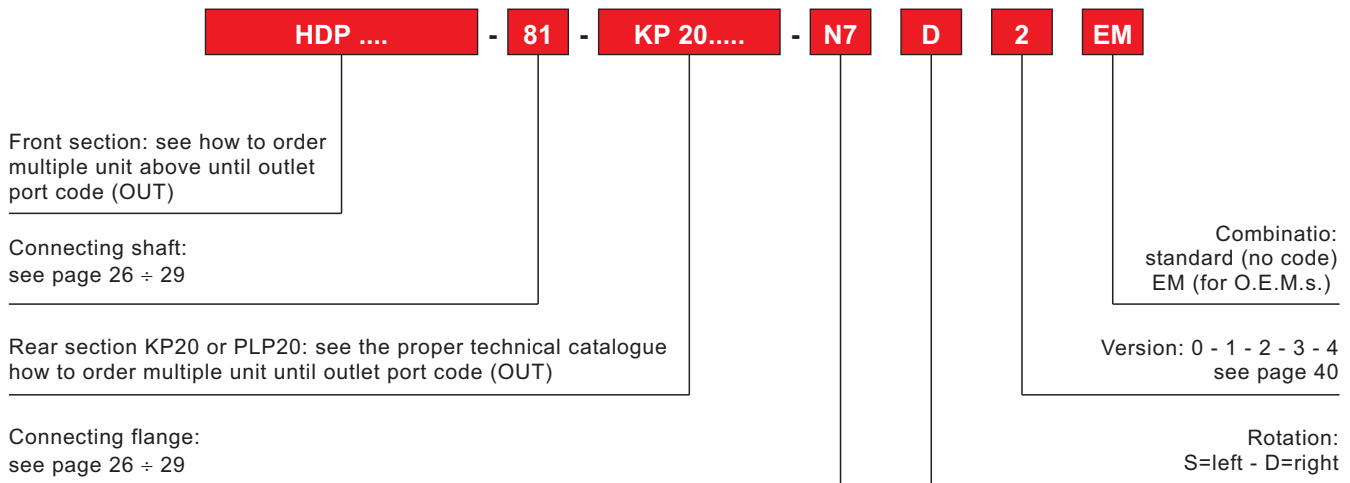
HOW TO ORDER MULTIPLE UNITS HDP... / HDP...

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

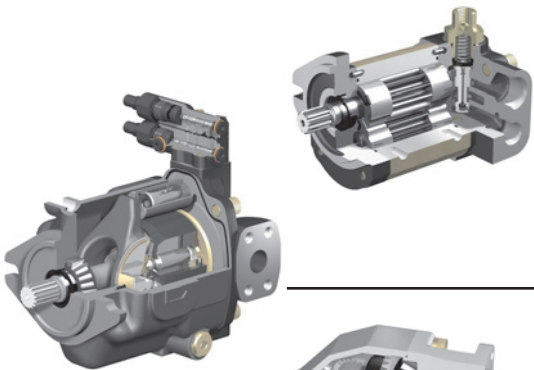


Omit code only if ordering complete multiple assembly

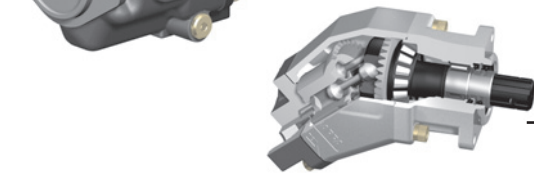
HOW TO ORDER DOUBLE PUMPS HDP.. / KP 20 or PLP 20



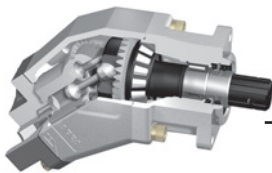
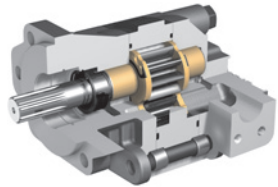
Casappa: Fluid Power Design at 360°



Gear pumps and motors.
High performance, low noise.



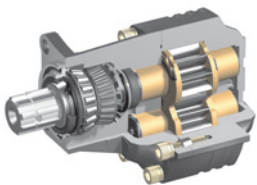
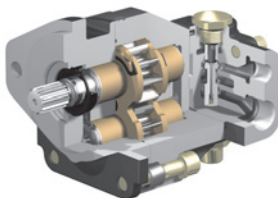
Variable displacement axial piston pumps,
for open circuit.



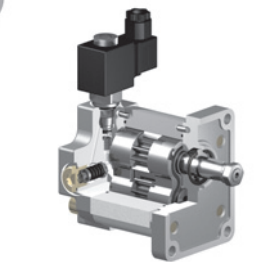
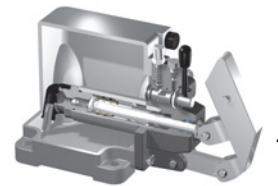
Fixed displacement bent axis piston pumps,
for truck applications.



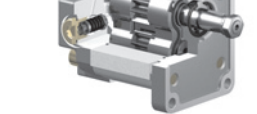
Cast iron gear pumps and
motors of three part construction.



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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