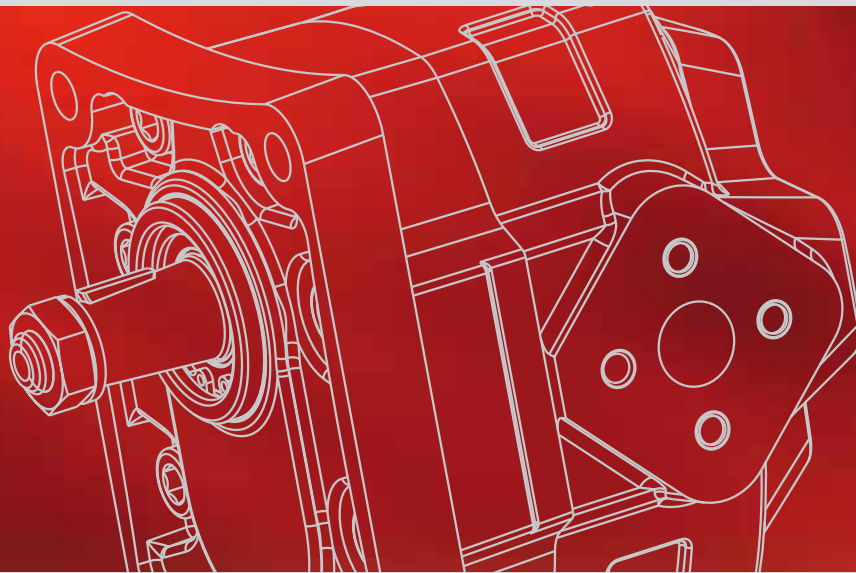




HYDRAULIC GEAR
PUMPS AND
MOTORS

FEATURES

Construction	External gear type pumps and motors
Mounting	EUROPEAN - SAE - ISO standard flanges
Line connections	Screw and flange
Direction of rotation (looking on drive shaft)	Anti-clock (S) - clockwise (D) - reversible (L, R or 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
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, 4 75, 76	See page 3, 4 75, 76	-13 (-25)	176 (80)	212 (100)	N
				-13 (-25)	230 (110)		N-H
HFA	Oil emulsion in water 5 ÷ 15% of oil	725 (50)	1500	36 (2)	131 (55)	257 (125)	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 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) ≥ 200 according to ISO 16889	-	10 μm	10 μm
Achieved with filter β ₂₅ (c) ≥ 200 according to ISO 16889	25 μm	-	-

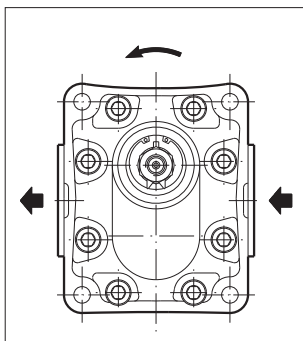
Casappa recommends to use its own production filters:



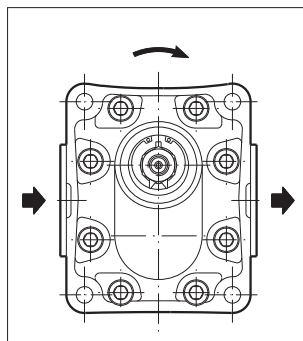
GENERAL NOTES

Available with different inlet and outlet ports. If you use fire resistant fluids specify the type of them at the order. For more information please consult our technical sales department.

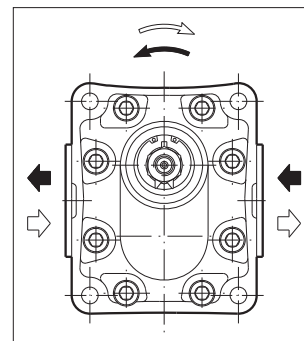
DEFINITION OF ROTATION DIRECTION LOOKING AT THE DRIVE SHAFT



Anti-clock rotation

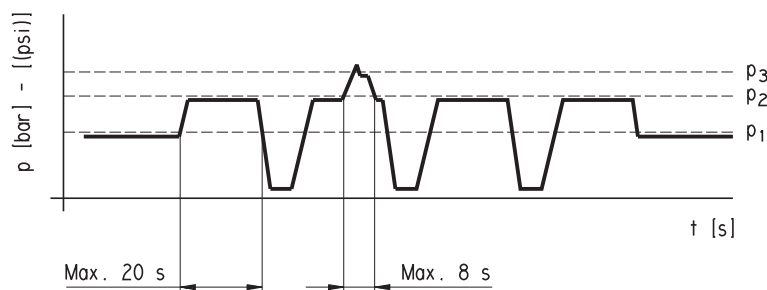


Clockwise rotation



Reversible rotation

PRESSURE DEFINITION



p_1 Max. continuous pressure

p_2 Max. intermittent pressure

p_3 Max. peak pressure

01/03.2002

KAPPA 20 GENERAL DATA PUMPS

KP 20

Pump type	Displacement	Max. pressure			Max. speed	Min. speed
		p ₁	p ₂	p ₃		
	in³/rev (cm³/rev)	psi (bar)			min ⁻¹	
KP 20•4	0.30 (4,95)	4133 (285)	4350 (300)	4785 (330)	4000	350
KP 20•6,3	0.40 (6,61)	4133 (285)	4350 (300)	4785 (330)	4000	350
KP 20•8	0.50 (8,26)	4133 (285)	4350 (300)	4785 (330)	3500	350
KP 20•11,2	0.69 (11,23)	3988 (275)	4205 (290)	4640 (320)	3500	350
KP 20•14	0.89 (14,53)	3843 (265)	4205 (290)	4640 (320)	3500	350
KP 20•16	1.03 (16,85)	3770 (260)	4205 (290)	4640 (320)	3000	300
KP 20•20	1.29 (21,14)	3045 (210)	3335 (230)	3625 (250)	3000	300
KP 20•25	1.61 (26,42)	2610 (180)	2900 (200)	3190 (220)	2500	300
KP 20•31,5	2.01 (33,03)	2030 (140)	2320 (160)	2610 (180)	2000	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.

01/03.2002

DESIGN CALCULATIONS FOR PUMPS

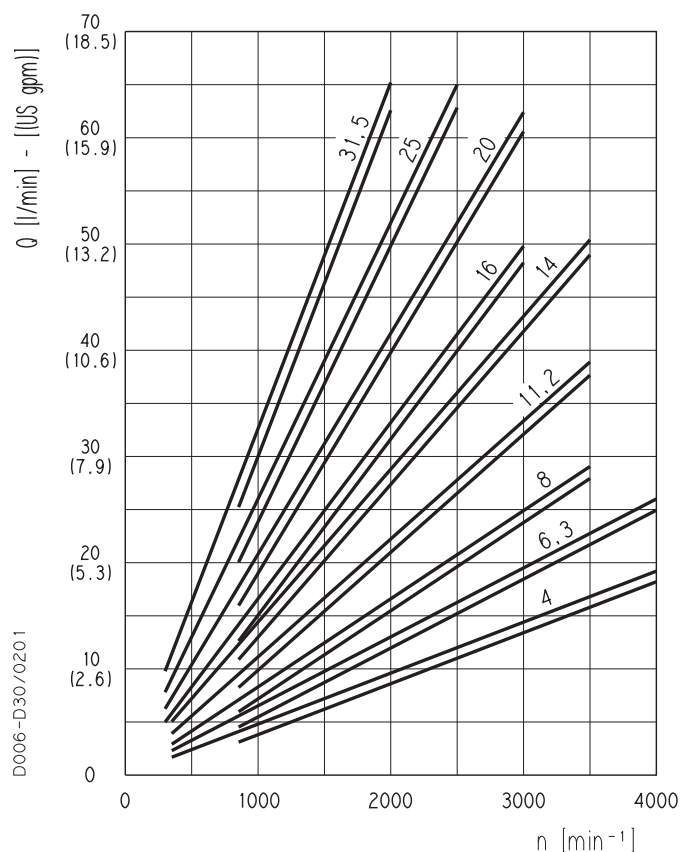
Q	US gpm (l/min)	Delivery
M	lbf in (Nm)	Torque
P	HP (kW)	Power
V	in ³ /rev (cm ³ /rev)	Displacement
n	min ⁻¹	Speed
Δp	psi (bar)	Pressure
$\eta_v = \eta_v(V, \Delta p, n) \quad (\approx 0,98)$		Volumetric efficiency
$\eta_{hm} = \eta_{hm}(V, \Delta p, n) \quad (\approx 0,90)$		Hydro-mechanical efficiency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

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

$$\begin{aligned}
 \text{○} \quad Q &= Q_{\text{theor.}} \cdot \eta_v \\
 Q_{\text{theor.}} &= \frac{V \text{ (cm}^3\text{/rev)} \cdot n \text{ (min}^{-1}\text{)}}{1000} \quad [\text{l/min}] \\
 M &= \frac{M_{\text{theor.}}}{\eta_{hm}} \quad [\text{Nm}] \\
 M_{\text{theor.}} &= \frac{\Delta p \text{ (bar)} \cdot V \text{ (cm}^3\text{/rev)}}{62,83} \\
 P_{\text{IN}} &= \frac{P_{\text{OUT}}}{\eta_t} \quad [\text{kW}] \\
 P_{\text{OUT}} &= \frac{\Delta p \text{ (bar)} \cdot Q \text{ (l/min)}}{600}
 \end{aligned}$$

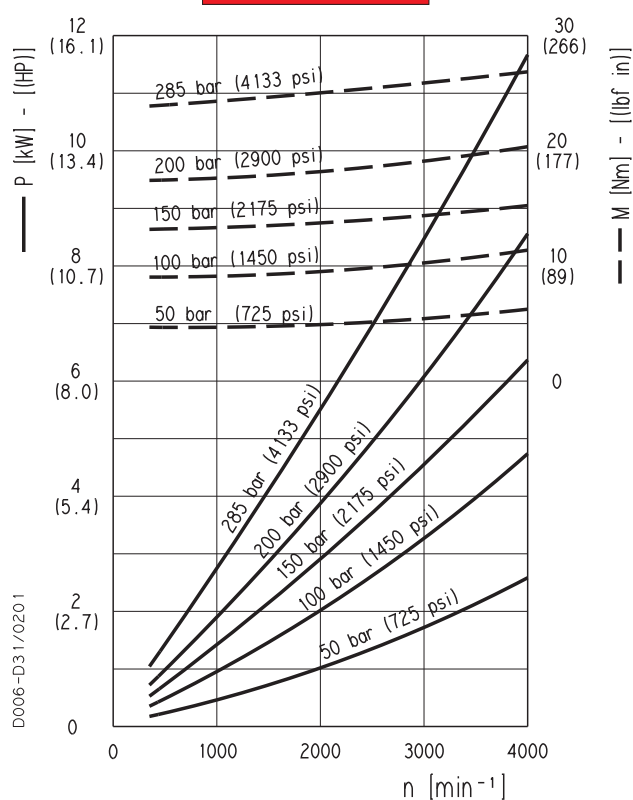
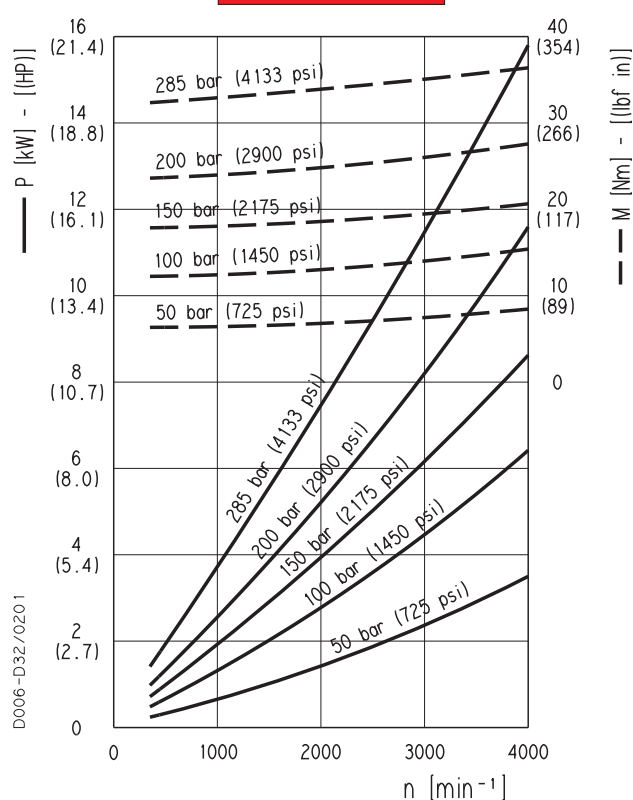
Note: Diagrams providing approximate selection data will be found on subsequent pages.

KAPPA 20 GEAR PUMPS PERFORMANCE CURVES

KP 20
KP 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:

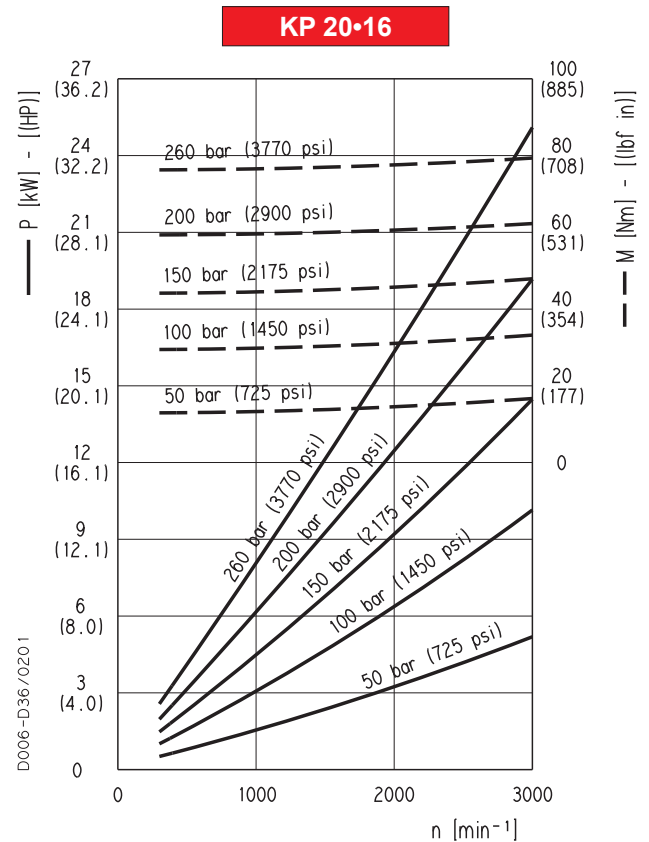
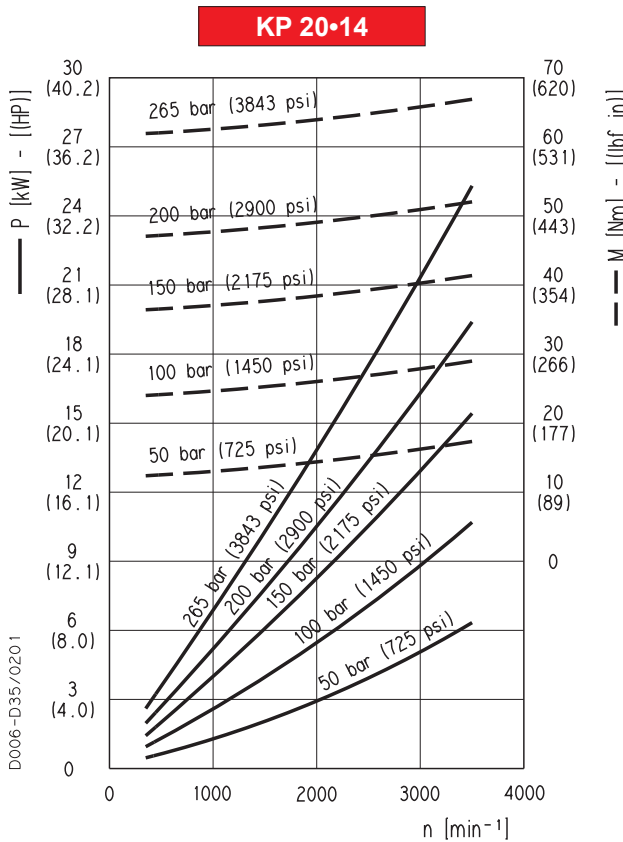
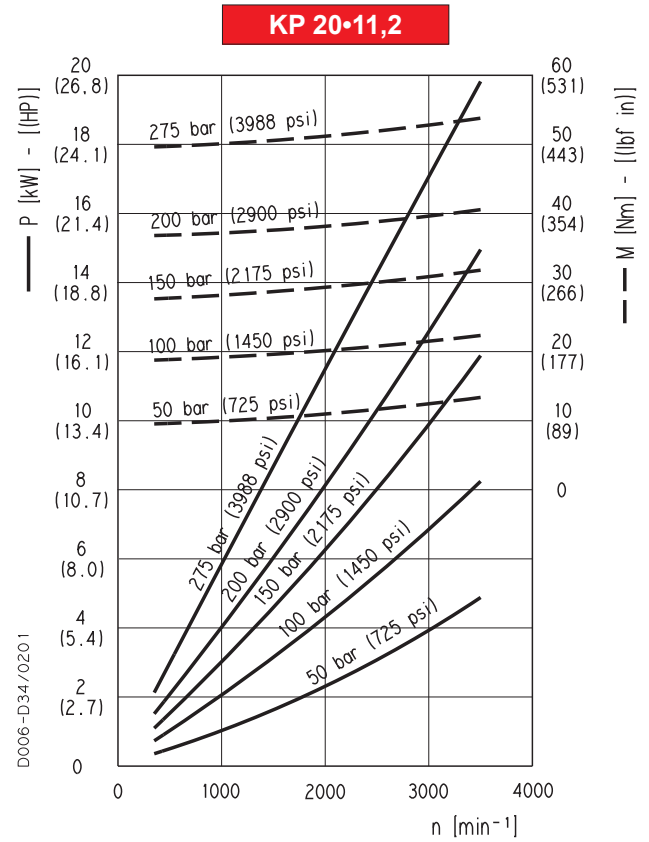
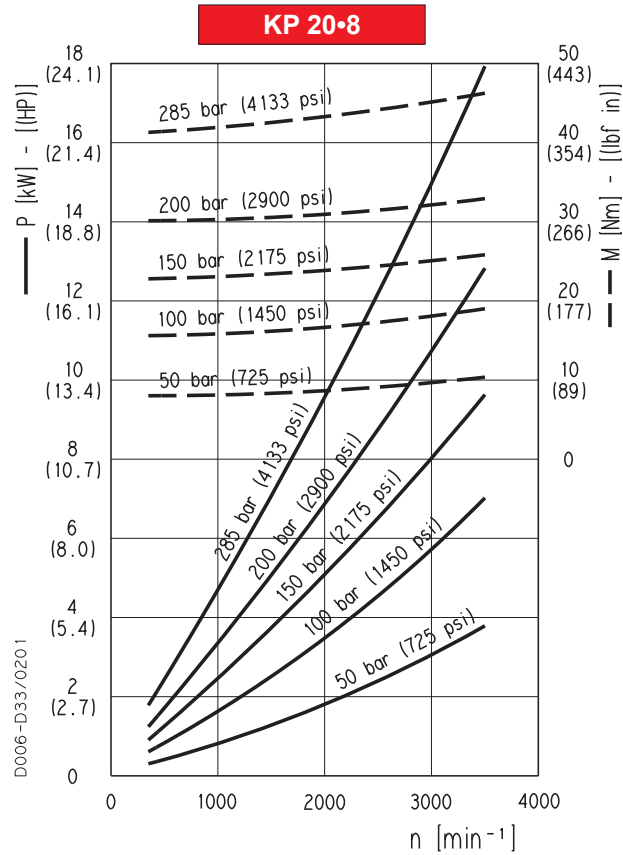
KP 20•4.	290-4133 psi (20-285 bar)
KP 20•6,3.	290-4133 psi (20-285 bar)
KP 20•8.	290-4133 psi (20-285 bar)
KP 20•11,2.	290-3988 psi (20-275 bar)
KP 20•14.	290-3843 psi (20-265 bar)
KP 20•16.	290-3770 psi (20-260 bar)
KP 20•20.	290-3045 psi (20-210 bar)
KP 20•25.	290-2610 psi (20-180 bar)
KP 20•31,5.	290-2030 psi (20-140 bar)

KP 20•4

KP 20•6,3


01/03.2002

KAPPA 20 GEAR PUMPS PERFORMANCE CURVES

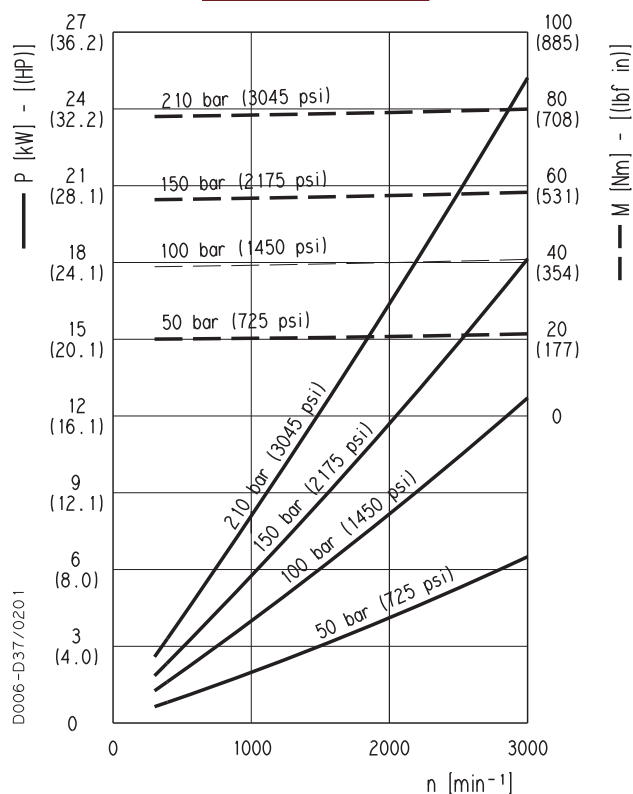
KP 20



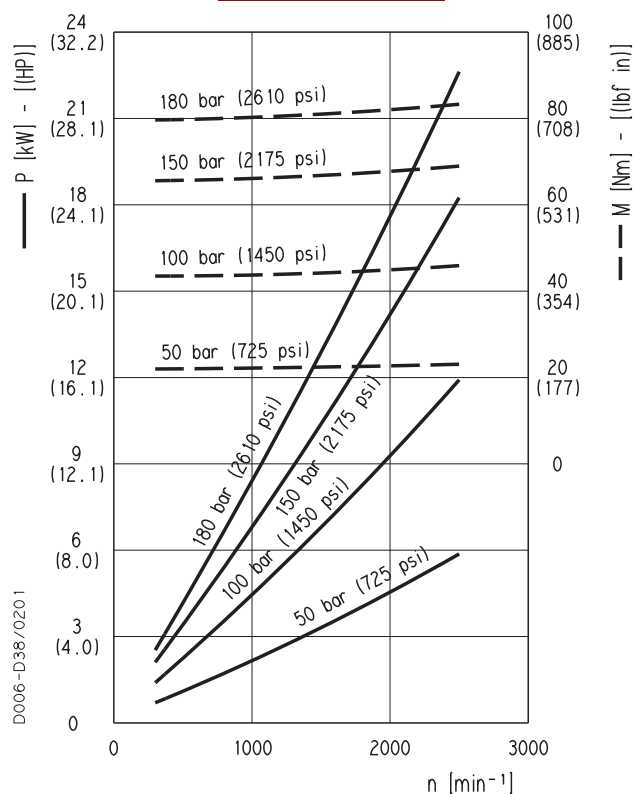
KAPPA 20 GEAR PUMPS PERFORMANCE CURVES

KP 20

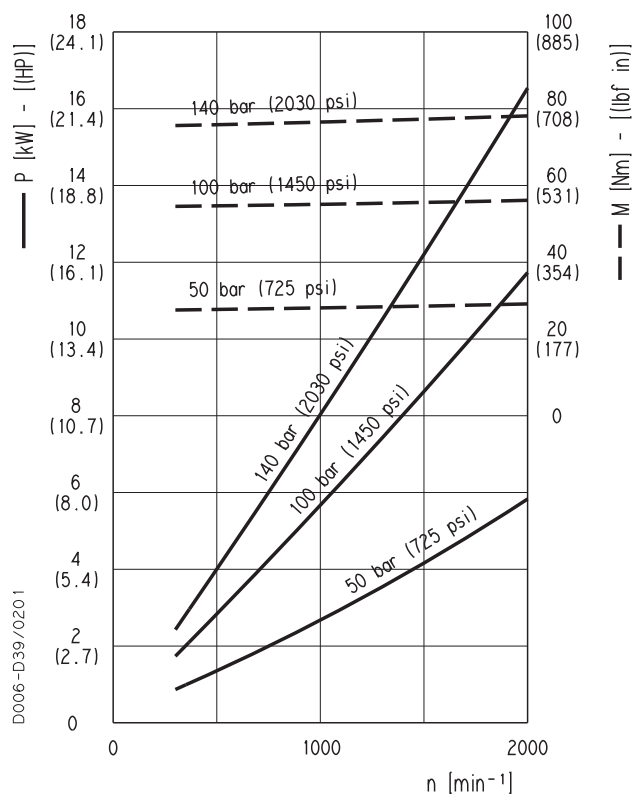
KP 20•20



KP 20•25

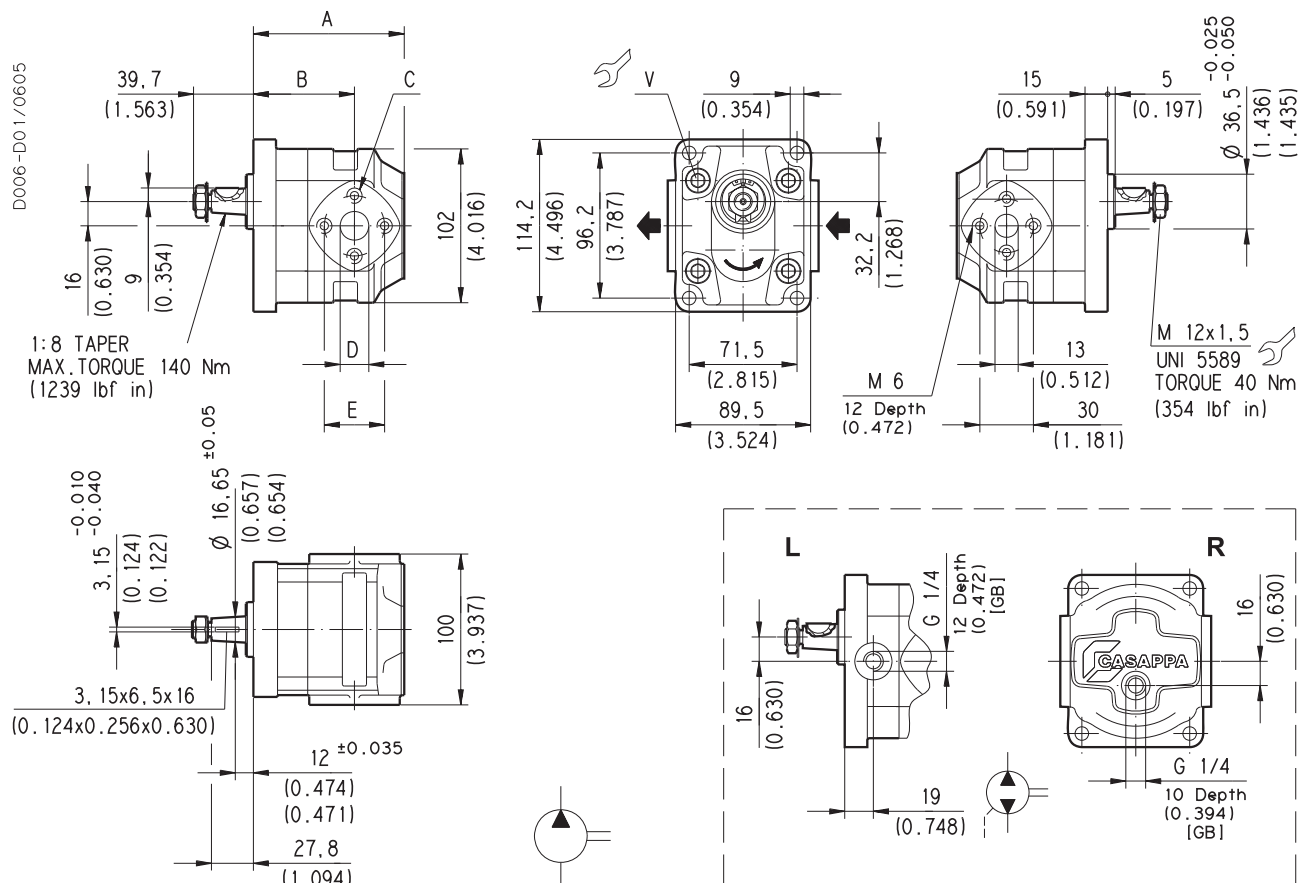


KP 20•31,5



01/03.2002

EUROPEAN FLANGED PORTS - 4 Bolts
Metric thread ISO 60° conforms to ISO/R 262



V Screws tightening torque Nm (lbf in)

70 ±7 (558 ÷ 682)

Pump type			A	B	C	D	E
			mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
KP 20•4	S D L R B	0-82 E2-L EA/EA-N	87,5 (3.445)	60 (2.362)	M6 Depth 12 (0.472)	13 (0.512)	30 (1.181)
KP 20•6,3			90 (3.543)	62,5 (2.461)			
KP 20•8			92,5 (3.642)	65 (2.559)			
KP 20•11,2			96 (3.780)	68,5 (2.697)			
KP 20•14		0-82 E2-L EB/EA-N	100 (3.937)	67 (2.638)	M8 Depth 14 (0.551)	19 (0.748)	40 (1.575)
KP 20•16			105,5 (4.154)	72,5 (2.854)			
KP 20•20			112 (4.409)	79 (3.110)			
KP 20•25			120 (4.724)	72 (2.835)			
KP 20•31,5			130 (5.118)	82 (3.228)			

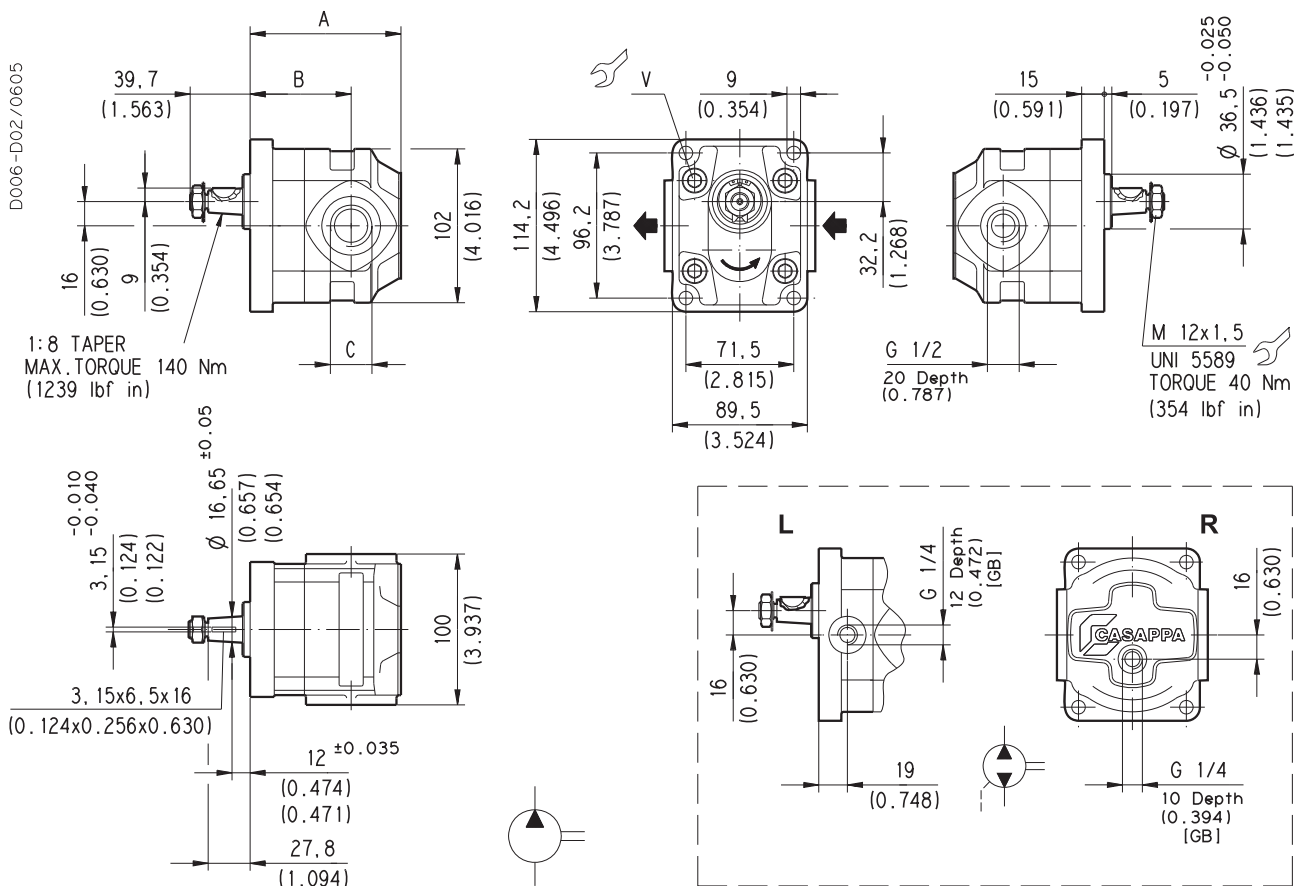
Rotation: S=left - D=right - L=reversible side drain - R=reversible rear drain - B=reversible internal drain

How to order:

KP 20•4 S0-82 E2-L EA/EA-N

GAS STRAIGHT THREAD PORTS

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



V Screws tightening torque Nm (lbf in)

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

Pump type			A	B	C
			mm (in)	mm (in)	mm (in)
KP 20•4	S D L R B	0-82 E2-L GD/GD-N	87,5 (3.445)	60 (2.362)	G 1/2 Depth 20 (0.787)
KP 20•6,3			90 (3.543)	62,5 (2.461)	
KP 20•8			92,5 (3.642)	65 (2.559)	
KP 20•11,2			96 (3.780)	68,5 (2.697)	
KP 20•14		0-82 E2-L GE/GD-N	100 (3.937)	67 (2.638)	G 3/4 Depth 22 (0.866)
KP 20•16			105,5 (4.154)	72,5 (2.854)	
KP 20•20			112 (4.409)	79 (3.110)	
KP 20•25			120 (4.724)	72 (2.835)	
KP 20•31,5			130 (5.118)	82 (3.228)	

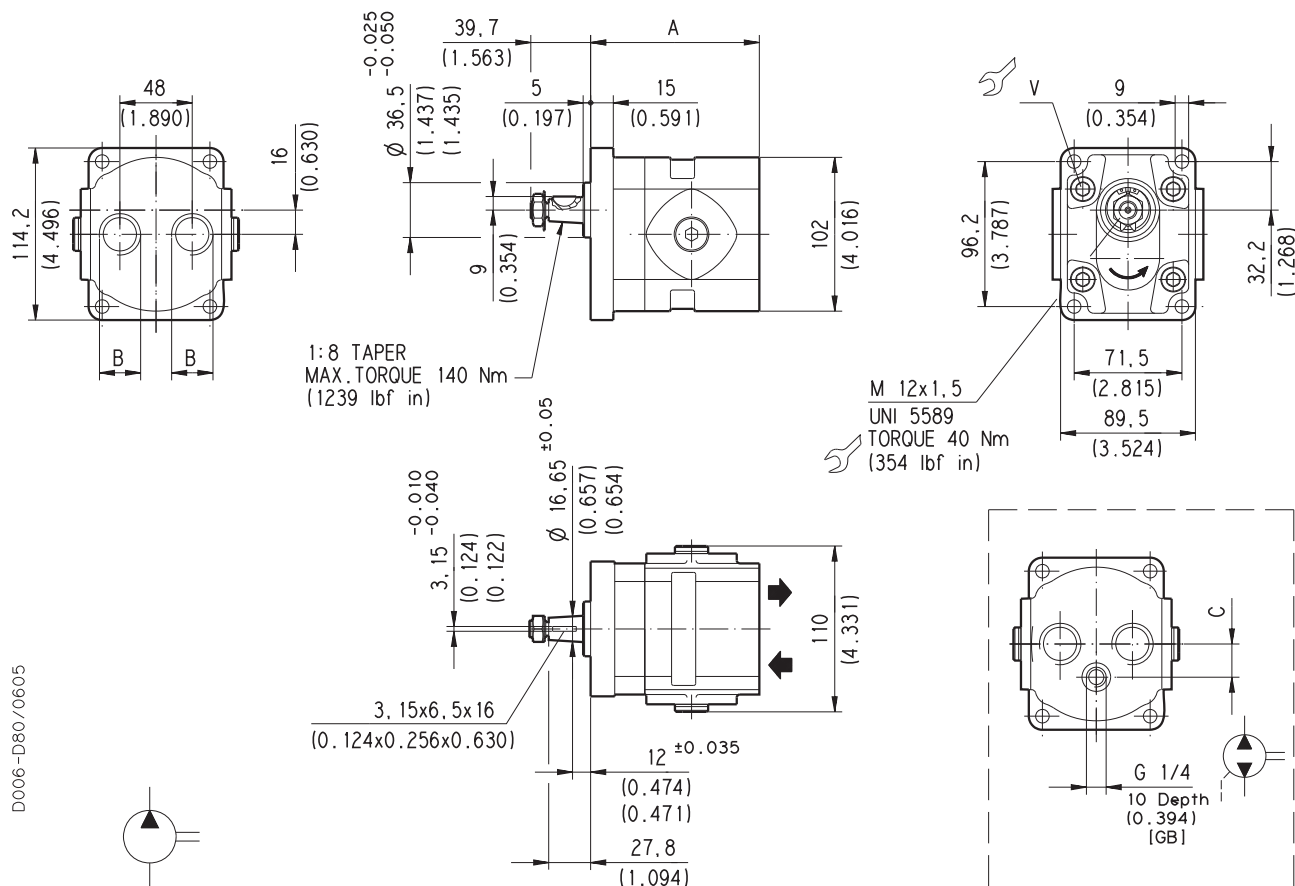
Rotation: S=left - D=right - L=reversible side drain - R=reversible rear drain - B=reversible internal drain

How to order:

KP 20•4 S0-82 E2-L GD/GD-N

GAS STRAIGHT THREAD PORTS

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



V Screws tightening torque Nm (lbf in)

70 ±7 (558 ÷ 682)

Rear ports version

Pump type			A	B	C
			mm (in)	mm (in)	mm (in)
KP 20•4	S D R B	0-82 E2-P GD/GD-N	84,5 (3.327)	G 1/2 Depth 17 (0.670)	19 (0.748)
KP 20•6,3			87 (3.425)		
KP 20•8			89,5 (3.524)		
KP 20•11,2			93 (3.661)		
KP 20•14		0-82 E2-P GE/GE-N	112 (4.409)	G 3/4 Depth 18 (0.709)	22 (0.866)
KP 20•16			115,5 (4.547)		
KP 20•20			122 (4.803)		
KP 20•25			130 (5.118)		
KP 20•31,5			140 (5.512)		

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

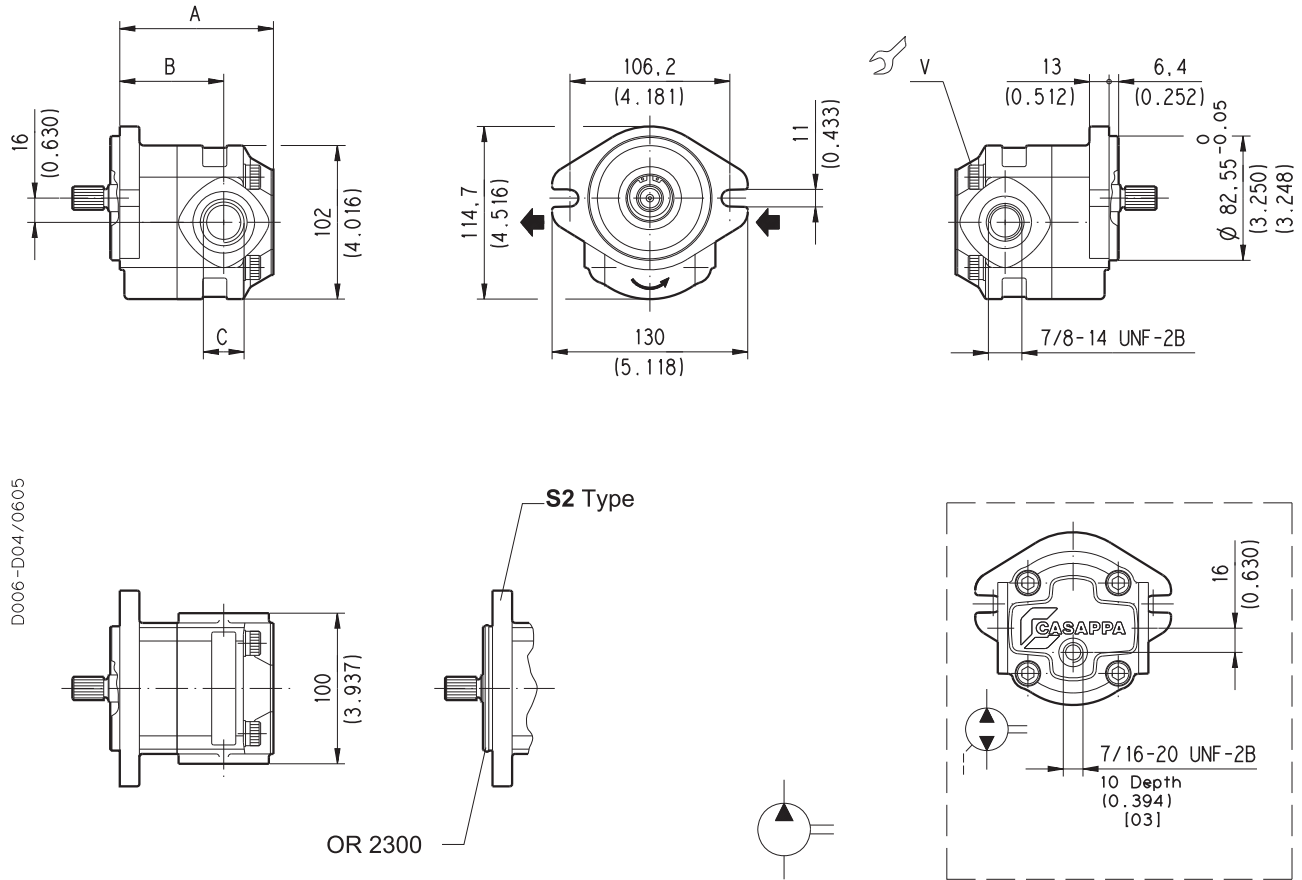
How to order:

KP 20•4 S0-82 E2-P GD/GD-N

KAPPA 20
HYDRAULIC GEAR PUMPS SAE STANDARD
... S1

SAE STRAIGHT THREAD PORTS J514

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


V Screws tightening torque Nm (lbf in)

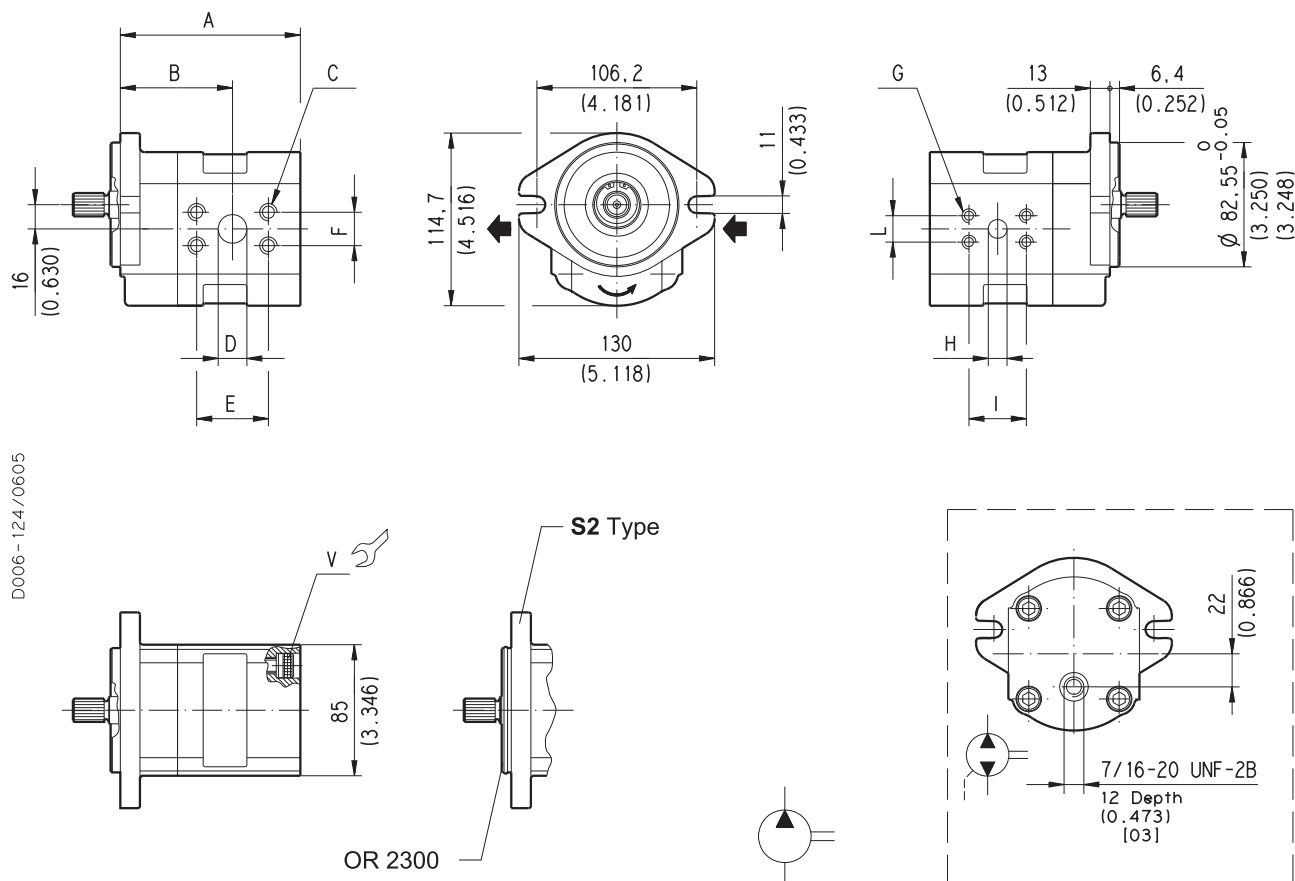
70 ^{±7} (558 ÷ 682)

Side ports version (L) - To order see page 22

Pump type	A	B	C	Ports code		
	mm (in)	mm (in)	mm (in)	IN	OUT	
KP 20•4	89,5 (3.524)	62 (2.441)	7/8-14 UNF-2B	OC	OC	
KP 20•6,3	92 (3.622)	64,5 (2.539)				
KP 20•8	94,5 (3.720)	67 (2.638)				
KP 20•11,2	98 (3.858)	70,5 (2.776)				
KP 20•14	102 (4.016)	69 (2.717)	1-1/16-12 UN-2B	OD		OC
KP 20•16	107,5 (4.232)	74,5 (2.933)				
KP 20•20	114 (4.488)	81 (3.189)				
KP 20•25	122 (4.803)	74 (2.913)				
KP 20•31,5	132 (5.197)	84 (3.307)				

SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI

Metric thread ISO 60° conforms to ISO/R 262


V Screws tightening torque Nm (lbf in)

70 ±7 (558 ÷ 682)

Side ports version (L) - To order see page 22

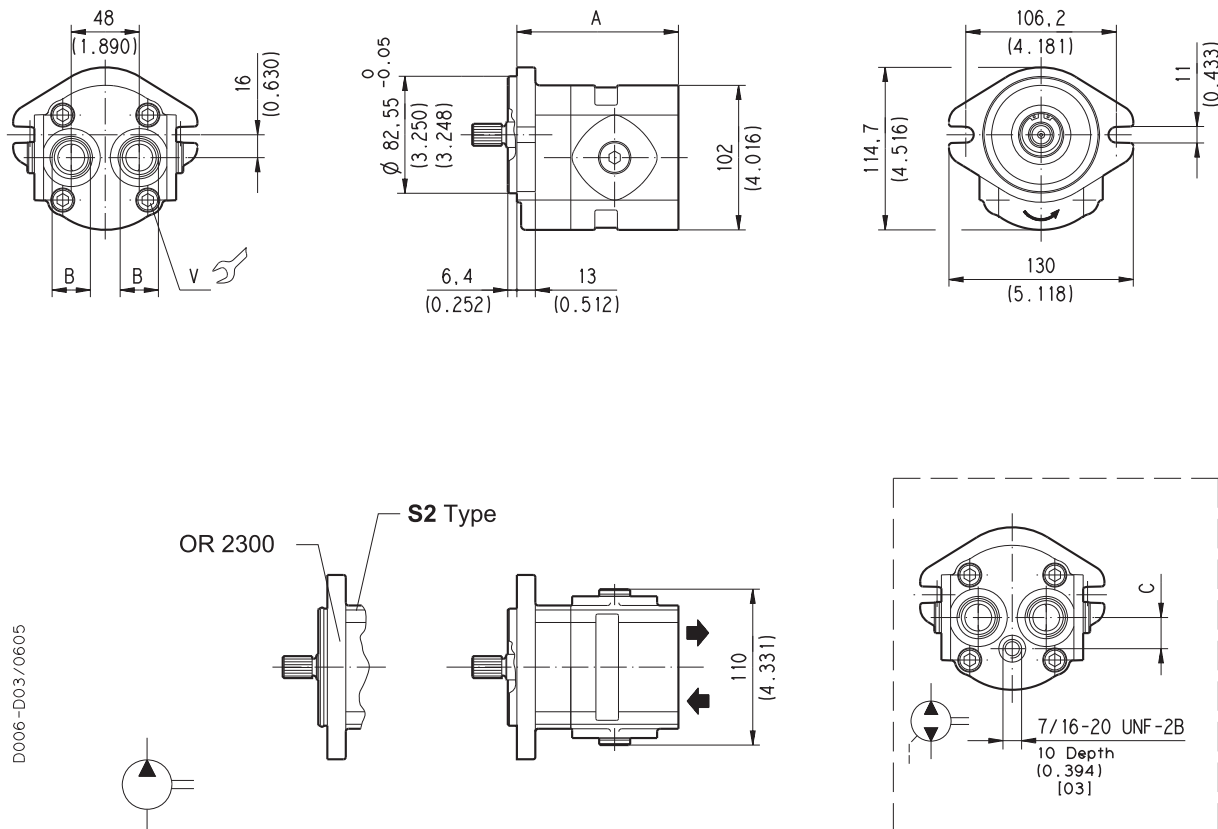
Pump type	A	B	C	D	E	F	G	H	I	L	Ports code	
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	IN	OUT
KP 20•4	101,5 (3.996)	62 (2.441)	M8 Depth 12 (0.472)	12,5 (0.492)	38,1 (1.500)	17,5 (0.689)	M8 Depth 12 (0.472)	12,5 (0.492)	38,1 (1.500)	17,5 (0.689)	MA	MA
KP 20•6,3	104 (4.094)	64,5 (2.539)										
KP 20•8	106,5 (4.193)	67 (2.638)										
KP 20•11,2	111 (4.370)	70,5 (2.776)										
KP 20•14	116 (4.567)	69 (2.717)	M10 Depth 12 (0.472)	19 (0.748)	47,6 (1.874)	22,2 (0.874)	M10 Depth 12 (0.472)	19 (0.748)	47,6 (1.874)	22,2 (0.874)	MB	MB
KP 20•16	119,5 (4.705)	74,5 (2.933)										
KP 20•20	126 (4.961)	81 (3.189)										
KP 20•25	134 (5.276)	74 (2.913)										
KP 20•31,5	144 (5.669)	84 (3.307)		25,4 (1.000)	52,4 (2.063)	26,2 (1.031)	M10 Depth 12 (0.472)	19 (0.748)	47,6 (1.874)	22,2 (0.874)	MC	MB

02/06.2005

KAPPA 20
HYDRAULIC GEAR PUMPS SAE STANDARD
... S1

SAE STRAIGHT THREAD PORTS J514

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


V Screws tightening torque Nm (lbf in)

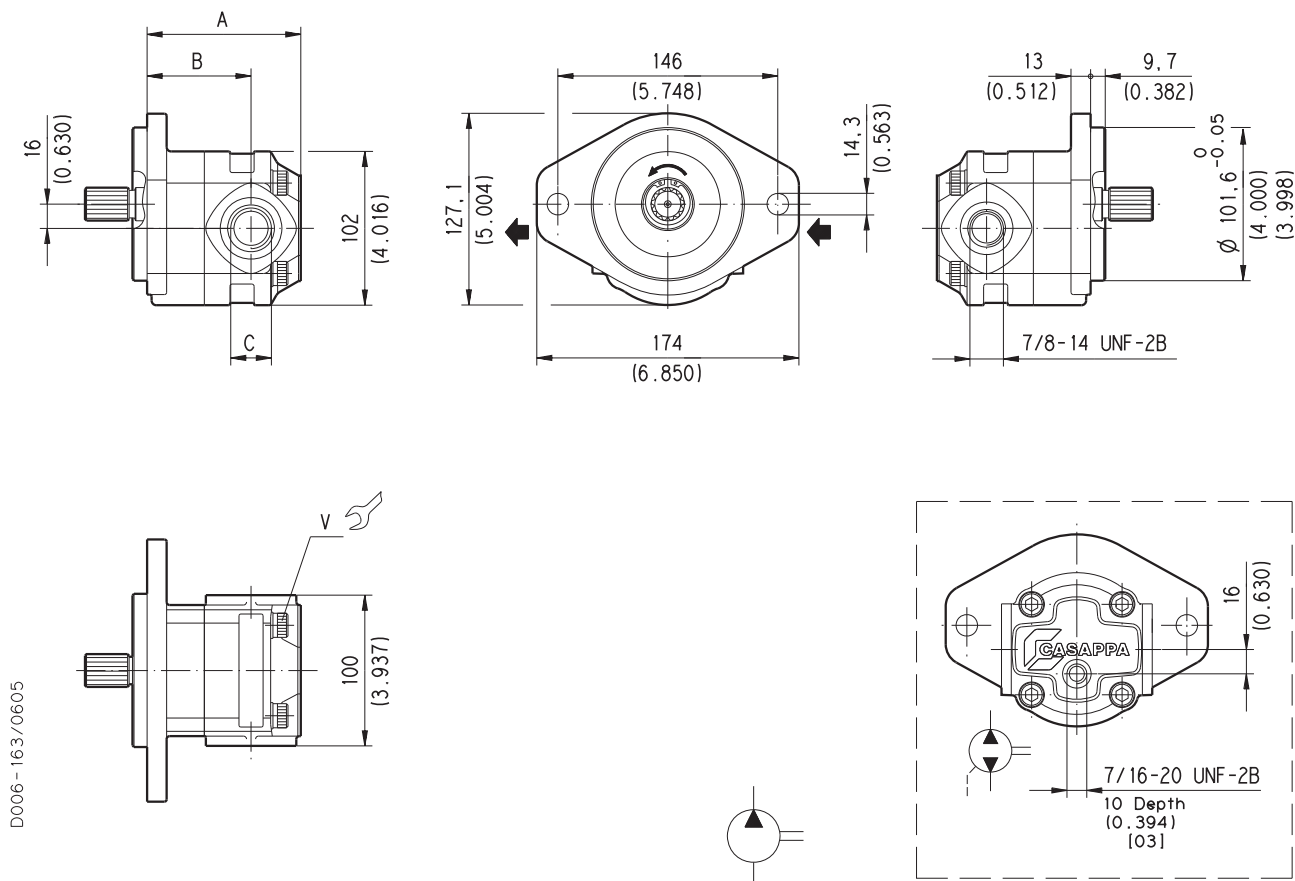
70 ±7 (558 ÷ 682)

Rear ports version (P) - To order see page 22

Pump type	A	B	C	Ports code	
	mm (in)		mm (in)	IN	OUT
KP 20•4	86,5 (3.406)	7/8-14 UNF-2B	19 (0.748)	OC	OC
KP 20•6,3	89 (3.504)				
KP 20•8	91,5 (3.602)				
KP 20•11,2	95 (3.740)				
KP 20•14	114 (4.488)	1-1/16-12 UN-2B	22 (0.866)	OD	
KP 20•16	117,5 (4.623)				
KP 20•20	124 (4.882)				
KP 20•25	132 (5.197)				
KP 20•31,5	142 (5.591)				

SAE STRAIGHT THREAD PORTS J514

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


V Screws tightening torque Nm (lbf in)

70 ±7 (558 ÷ 682)

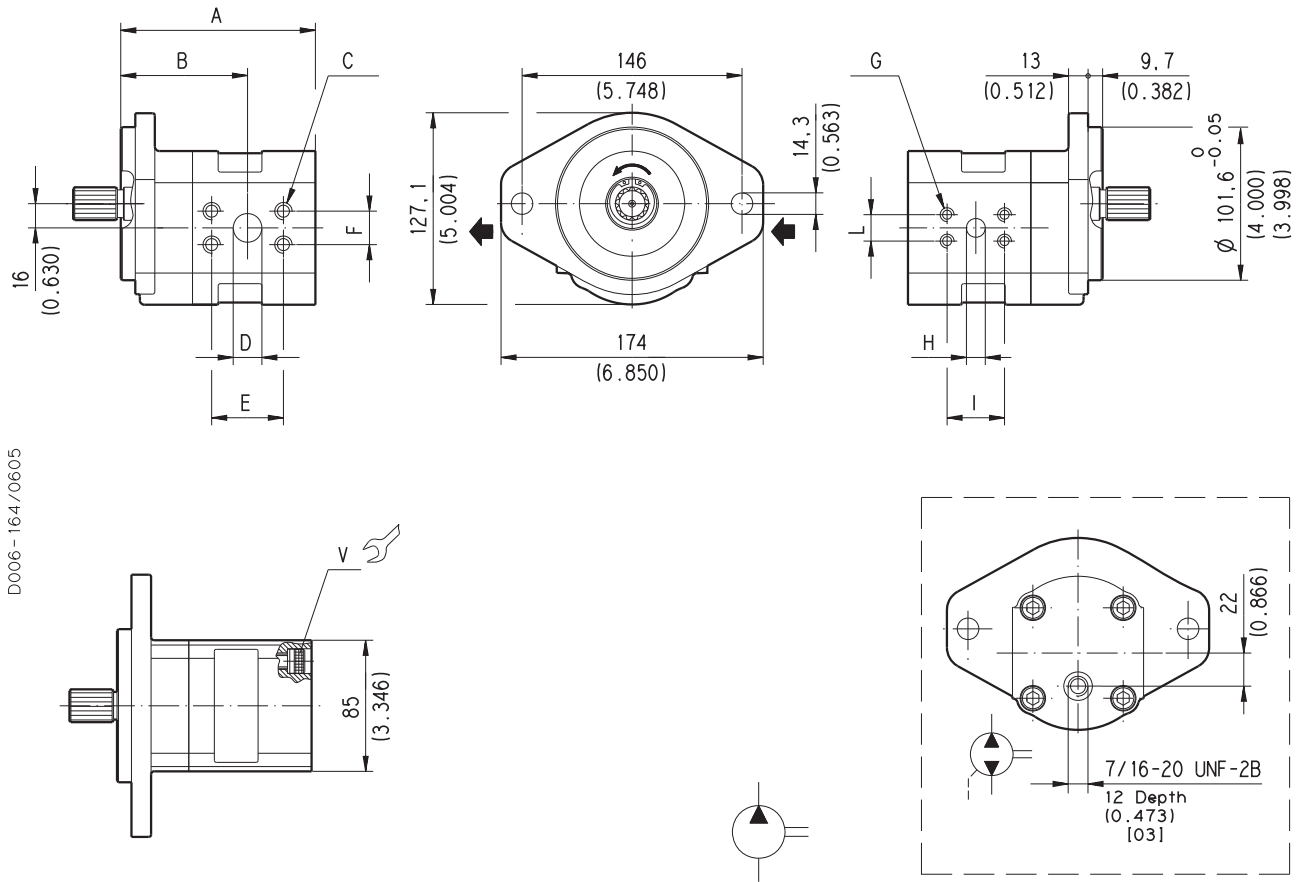
Side ports version (L) - To order see page 22

Pump type	A	B	C	Ports code	
	mm (in)		mm (in)	IN	OUT
KP 20•4	89,5 (3.524)	62 (2.441)	7/8-14 UNF-2B	OC	OC
KP 20•6,3	92 (3.622)	64,5 (2.539)			
KP 20•8	94,5 (3.720)	67 (2.638)			
KP 20•11,2	98 (3.858)	70,5 (2.776)			
KP 20•14	102 (4.016)	69 (2.717)	1-1/16-12 UN-2B	OD	
KP 20•16	107,5 (4.232)	74,5 (2.933)			
KP 20•20	114 (4.488)	81 (3.189)			
KP 20•25	122 (4.803)	74 (2.913)			
KP 20•31,5	132 (5.197)	84 (3.307)			

02/06.2005

SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI

Metric thread ISO 60° conforms to ISO/R 262



D006 - 164 / 0605

V Screws tightening torque Nm (lbf in)

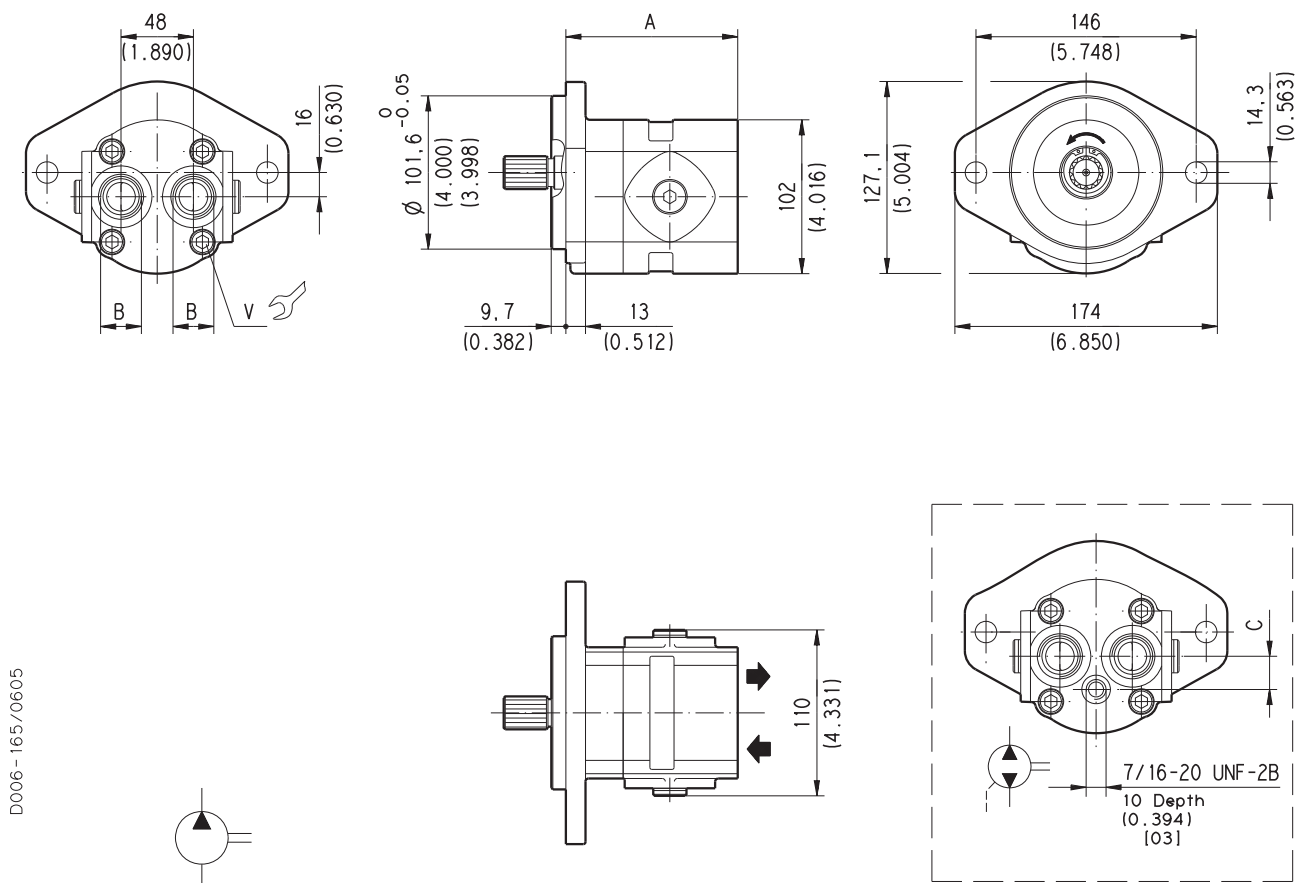
70 ±7 (558 ÷ 682)

Side ports version (L) - To order see page 22

Pump type	A	B	C	D	E	F	G	H	I	L	Ports code	
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	IN	OUT
KP 20-4	101,5 (3.996)	62 (2.441)	M8 Depth 12 (0.472)	12,5 (0.492)	38,1 (1.500)	17,5 (0.689)	M8 Depth 12 (0.472)	12,5 (0.492)	38,1 (1.500)	17,5 (0.689)	MA	
KP 20-6,3	104 (4.094)	64,5 (2.539)										
KP 20-8	106,5 (4.193)	67 (2.638)										
KP 20-11,2	111 (4.370)	70,5 (2.776)										
KP 20-14	116 (4.567)	69 (2.717)	M10 Depth 12 (0.472)	19 (0.748)	47,6 (1.874)	22,2 (0.874)	M10 Depth 12 (0.472)	19 (0.748)	47,6 (1.874)	22,2 (0.874)	MB	
KP 20-16	119,5 (4.705)	74,5 (2.933)										
KP 20-20	126 (4.961)	81 (3.189)										
KP 20-25	134 (5.276)	74 (2.913)									MC	MB
KP 20-31,5	144 (5.669)	84 (3.307)										

SAE STRAIGHT THREAD PORTS J514

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



D006 - 165/0605

V Screws tightening torque Nm (lbf in)

70 ±7 (558 ÷ 682)

Rear ports version (P) - To order see page 22

Pump type	A	B	C	Ports code	
	mm (in)		mm (in)	IN	OUT
KP 20•4	86,5 (3.406)	7/8-14 UNF-2B	19 (0.748)	OC	OC
KP 20•6,3	89 (3.504)				
KP 20•8	91,5 (3.602)				
KP 20•11,2	95 (3.740)				
KP 20•14	114 (4.488)	1-1/16-12 UN-2B	22 (0.866)	OD	
KP 20•16	117,5 (4.623)				
KP 20•20	124 (4.882)				
KP 20•25	132 (5.197)				
KP 20•31,5	142 (5.591)				

02/06.2005

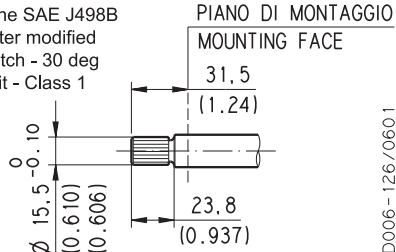
KAPPA 20 END DRIVE SHAFTS

SAE

SAE "A" SPLINE

03

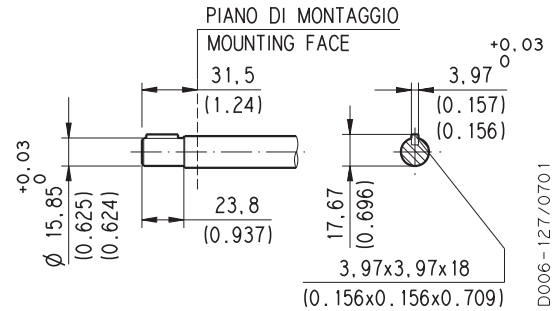
Ext. Involute Spline SAE J498B
with major diameter modified
9 teeth - 16/32 Pitch - 30 deg
Flat Root - Side fit - Class 1



MAX 885 lbf in (100 Nm)

SAE "A" STRAIGHT

31

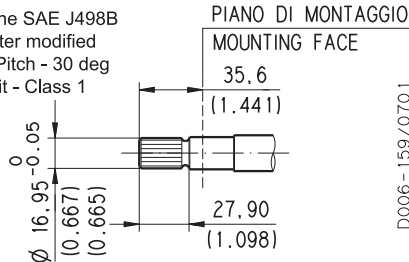


MAX 620 lbf in (70 Nm)

SAE SPLINE

01

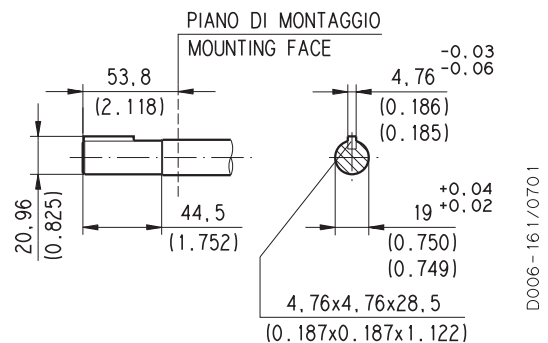
Ext. Involute Spline SAE J498B
with major diameter modified
10 teeth - 16/32 Pitch - 30 deg
Flat Root - Side fit - Class 1



MAX 1151 lbf in (130 Nm)

STRAIGHT

49

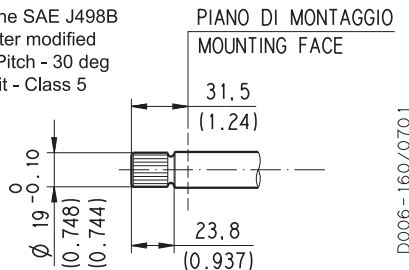


MAX 1239 lbf in (140 Nm)

SAE SPLINE

07

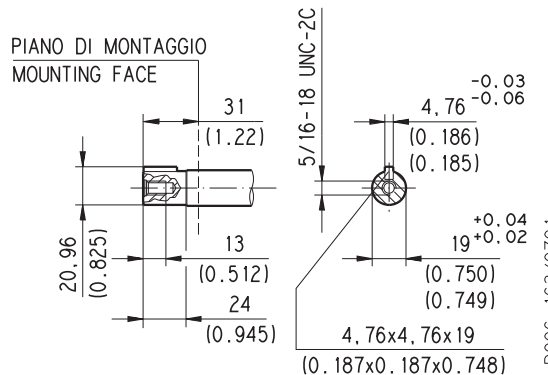
Ext. Involute Spline SAE J498B
with major diameter modified
11 teeth - 16/32 Pitch - 30 deg
Flat Root - Side fit - Class 5



MAX 1505 lbf in (170 Nm)

STRAIGHT

50

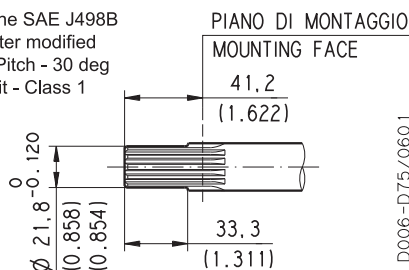


MAX 885 lbf in (100 Nm)

SAE "B" SPLINE

04

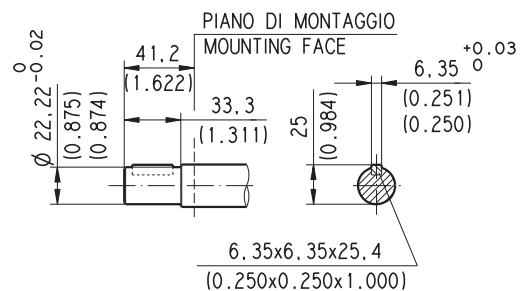
Ext. Involute Spline SAE J498B
with major diameter modified
13 teeth - 16/32 Pitch - 30 deg
Flat Root - Side fit - Class 1



MAX 2478 lbf in (280 Nm)

SAE "B" STRAIGHT

32



MAX 1770 lbf in (200 Nm)

Replaces: 01/03.2002

03/03.2006

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
KP30•17	S	0	03	S1	L	OC/OC	N

1	Pump Type	CODE
in³/rev	(cm³/rev)	
0.30	4,95	KP 20•4
0.40	6,61	KP 20•6,3
0.50	8,26	KP 20•8
0.69	11,23	KP 20•11,2
0.89	14,53	KP 20•14
1.03	16,85	KP 20•16
1.29	21,14	KP 20•20
1.61	26,42	KP 20•25
2.01	33,03	KP 20•31,5

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

3	Version	CODE
	Without outboard bearing	0

4	Drive shaft	CODE
	SAE “A” spline (9 teeth)	03
	SAE spline (10 teeth)	01
	SAE spline (11 teeth)	07
	SAE “B” spline (13 teeth)	04
	SAE “A” straight	31
	Straight	49
	Straight	50
	SAE “B” straight	32

5	Mounting flange	CODE
SAE "A" 2 holes		S1
SAE "A" 2 holes (with o-ring seal)		S2
SAE "B" 2 holes (a)		S5

CODE	Ports position	6
L	Side	
P	Rear	

CODE	Ports IN/OUT	7
SAE STRAIGHT THREAD PORTS (ODT)		
Side	Rear	Pump type
OC/OC	OC/OC	KP 20•4
OC/OC	OC/OC	KP 20•6,3
OC/OC	OC/OC	KP 20•8
OC/OC	OC/OC	KP 20•11,2
OD/OC	OD/OD	KP 20•14
OD/OC	OD/OD	KP 20•16
OD/OC	OD/OD	KP 20•20
OD/OC	OD/OD	KP 20•25
OD/OC	OD/OD	KP 20•31,5
METRIC SAE SPLIT PORTS SAE J518 C		
MA/MA		KP 20•4
MA/MA		KP 20•6,3
MA/MA		KP 20•8
MA/MA		KP 20•11,2
MB/MA		KP 20•14
MB/MA		KP 20•16
MB/MA		KP 20•20
MC/MB		KP 20•25
MC/MB		KP 20•31,5

CODE	Seals (b)	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	

(a) Available only with 04 and 32 shaft

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

ORDER EXAMPLE

Standard pump

KP 20•4 S0 - 03 S1 - L OC/OC - N

Special version pump

KP 20•4 S0 - 04 S5 - L MA/MA - V Bz

01/03.2002

MULTIPLE PUMPS

KAPPA 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.

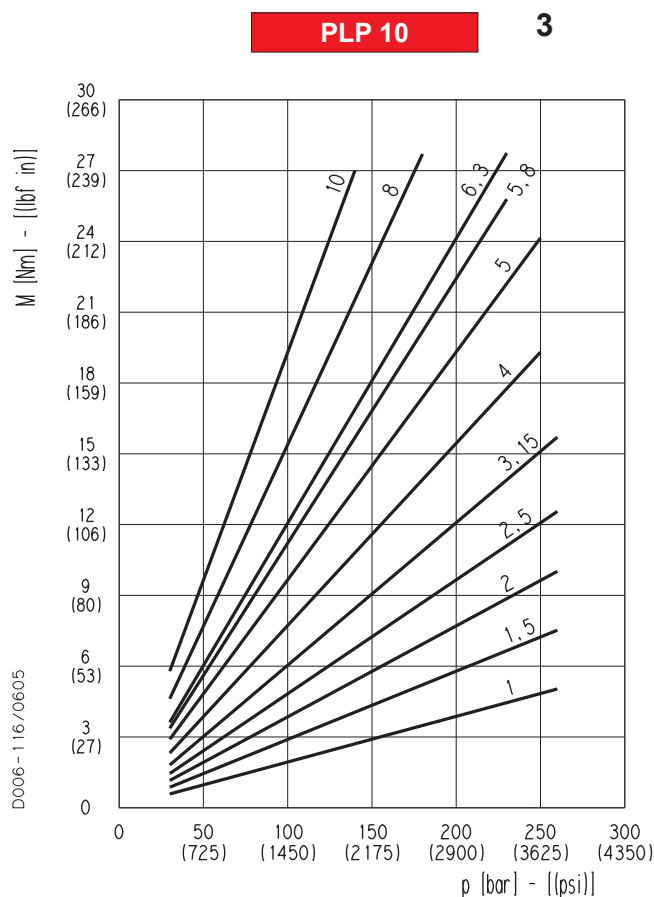
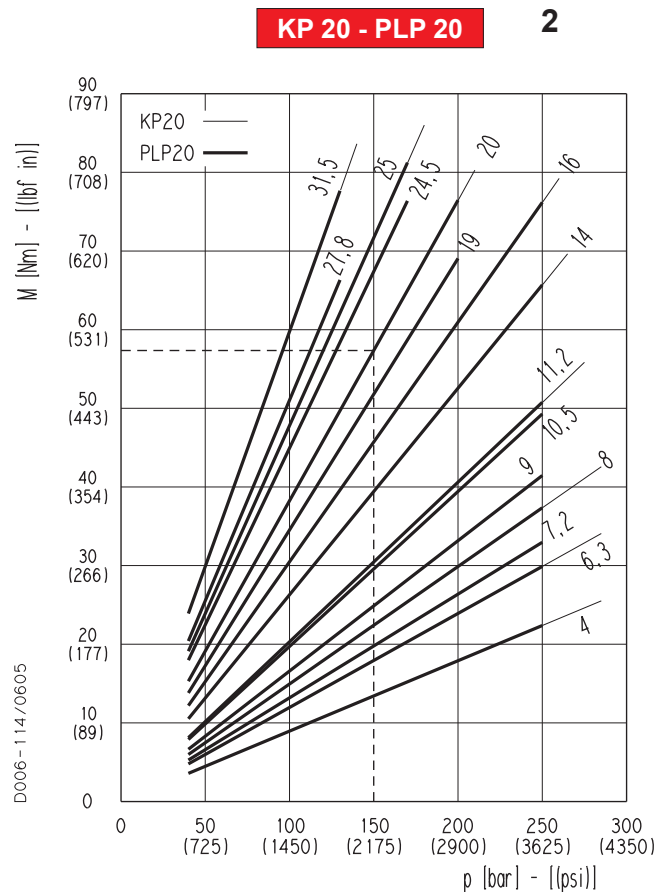
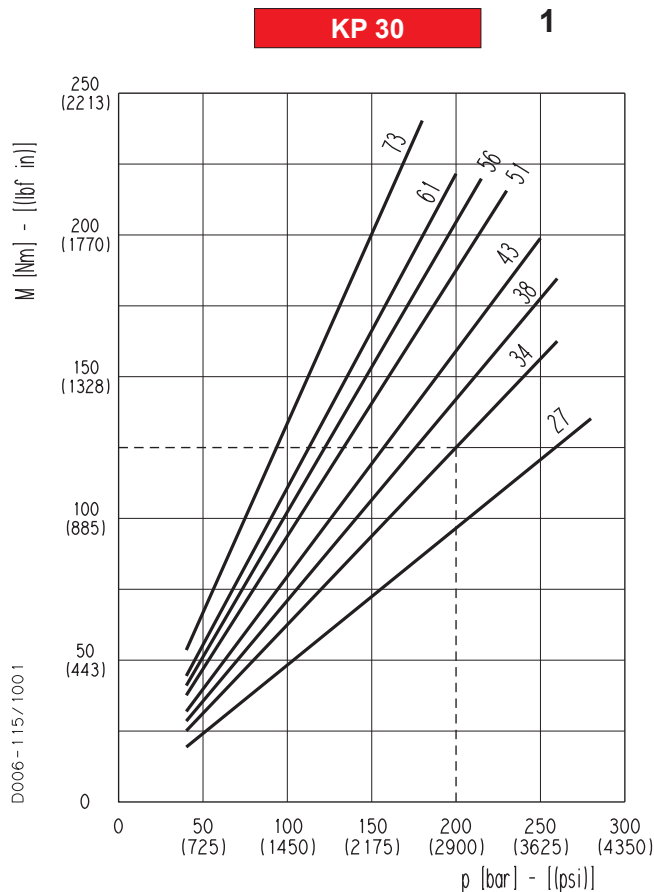
M	lbf in (Nm)	Torque
V	in ³ /rev (cm ³ /rev)	Displacement
Δp	psi (bar)	Pressure
$\eta_{hm} = \eta_{hm}(V, \Delta p, n) \quad (\approx 0,90)$		Hydro-mechanical efficiency

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

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

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

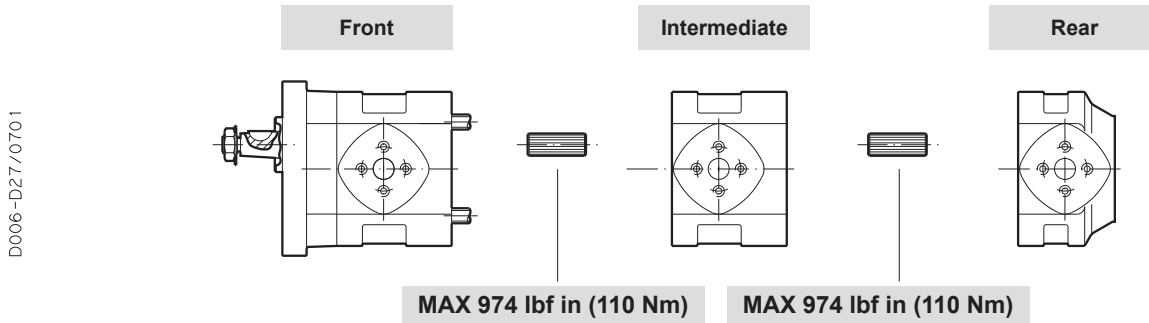


DRIVE SHAFT SELECTION

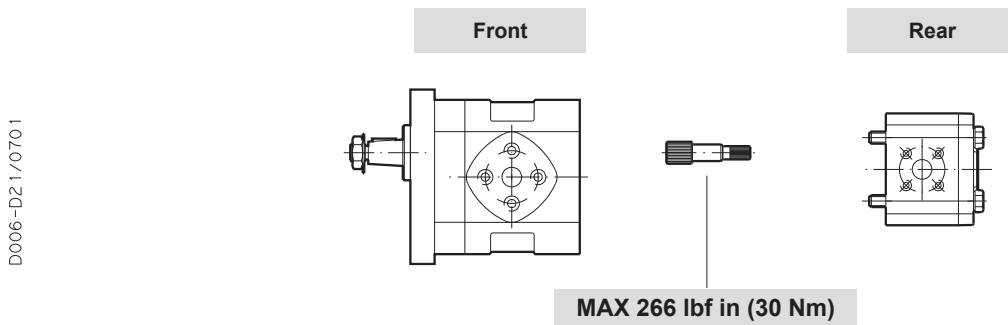
Let us consider a double pump KP30•34+KP20•20. If we suppose that we have to work with the first pump at a pressure of 2900 psi (200 bar) and the second pump at a pressure of 2175 psi (150 bar), the graph 1 shows that the torque absorbed by KP30•34 is 1106 lbf in (125 Nm) and the graph 2 shows that the torque absorbed by KP20•20 is 505 lbf in (57 Nm) acceptable value because it doesn't exceed the maximum drive shaft torque that is 974 lbf in (110 Nm), see page 38. The torque to be transmitted by the first drive shaft will thus be 1106+505= 1611 lbf in (125+57= 182 Nm), this value must not exceed the shaft's maximum rated value.

02/06.2005

KAPPA 20 + KAPPA 20



KAPPA 20 + POLARIS 10

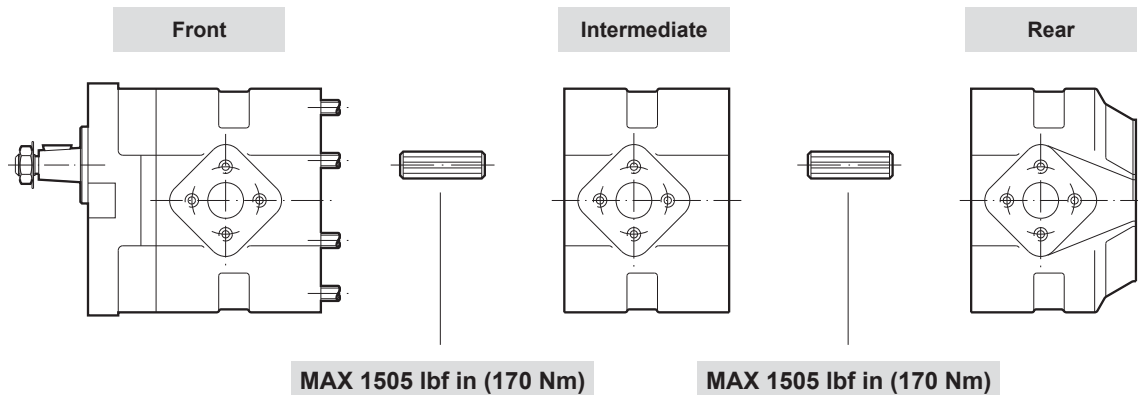


KAPPA 20 END DRIVE SHAFT

EUROPEAN TAPERED 1:8 82 MAX 1239 lbf in (140 Nm)	SAE "A" SPLINE 03 MAX 885 lbf in (100 Nm)	SAE SPLINE 01 MAX 1151 lbf in (130 Nm)
SAE SPLINE 07 MAX 1505 lbf in (170 Nm)	SAE "B" SPLINE 04 MAX 2478 lbf in (280 Nm)	SAE "A" STRAIGHT 31 MAX 620 lbf in (70 Nm)
STRAIGHT 49 MAX 1239 lbf in (140 Nm)	STRAIGHT 50 MAX 885 lbf in (100 Nm)	SAE "B" STRAIGHT 32 MAX 1770 lbf in (200 Nm)

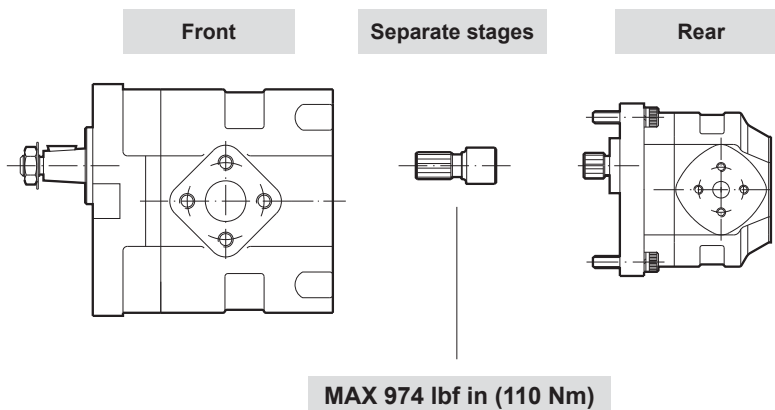
KAPPA 30 + KAPPA 30

D006-D23/0701



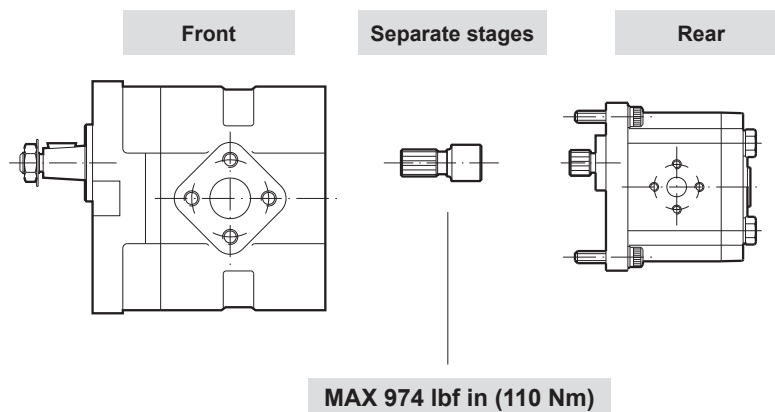
KAPPA 30 + KAPPA 20

D006-D22/0701



KAPPA 30 + POLARIS 20

D006-D26/0701



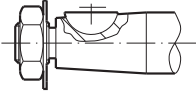
01/03.2002

KAPPA 30 END DRIVE SHAFTS

Replaces: 01/03.2002

EUROPEAN TAPERED 1:8

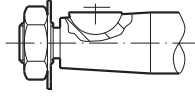
83



MAX 2124 lbf in (240 Nm)

EUROPEAN TAPERED 1:8

84



MAX 3098 lbf in (350 Nm)

SAE "B" SPLINE

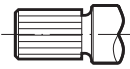
04



MAX 2921 lbf in (330 Nm)

SAE SPLINE

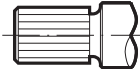
A8



MAX 2478 lbf in (280 Nm)

SAE SPLINE

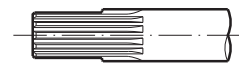
A5



MAX 3540 lbf in (400 Nm)

SAE "BB" SPLINE

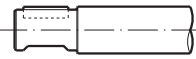
05



MAX 4426 lbf in (500 Nm)

SAE "B" STRAIGHT

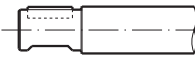
32



MAX 1770 lbf in (200 Nm)

SAE "BB" STRAIGHT

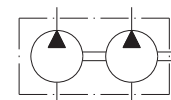
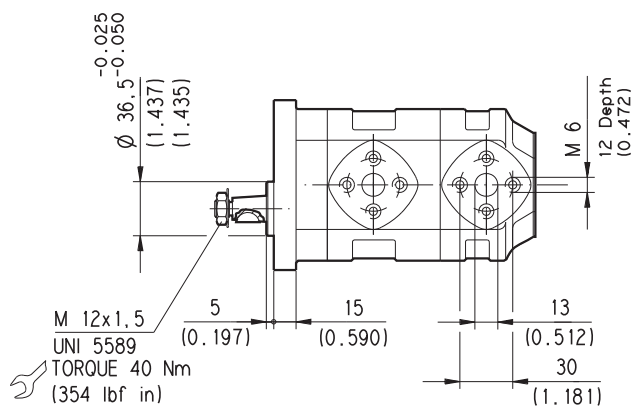
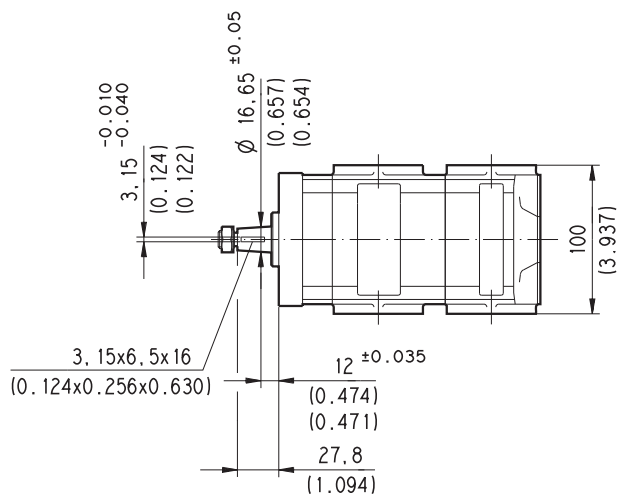
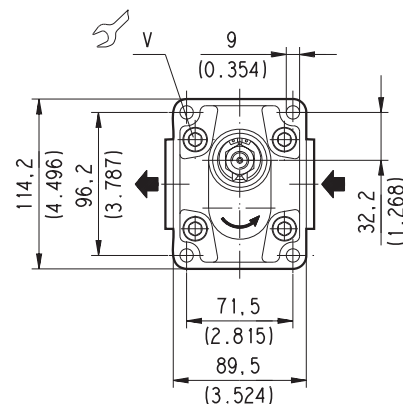
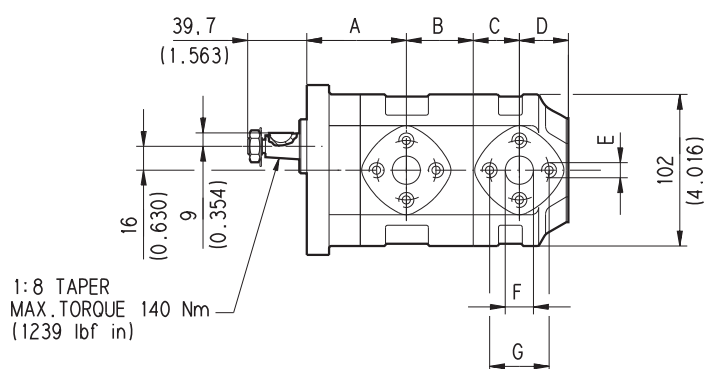
33



MAX 2478 lbf in (280 Nm)

03/03.2006

EUROPEAN FLANGED PORTS - 4 Bolts
Metric thread ISO 60° conforms to ISO/R 262



V Screws tightening torque Nm (lbf in)

70 ±7 (558 ÷ 682)

KAPPA 20
HYDRAULIC GEAR PUMPS EUROPEAN STANDARD
82 E2

Pump type	A	B	C	D	E	F	G
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
KP 20•4	60 (2.362)	37,5 (1.476)	24 (0.945)	27,5 (1.083)	M 6 Depth 12 (0.472)	13 (0.512)	30 (1.181)
KP 20•6,3	62,5 (2.461)		26,5 (1.043)				
KP 20•8	65 (2.559)		29 (1.142)				
KP 20•11,2	68,5 (2.697)	38,5 (1.51)	32,5 (1.280)	33 (1.299)	M 8 Depth 14 (0.551)	19 (0.748)	40 (1.575)
KP 20•14	67 (2.638)	45 (1.772)	31 (1.220)				
KP 20•16	72,5 (2.854)	43 (1.693)	36,5 (1.437)				
KP 20•20	79 (3.110)		43 (1.693)				
KP 20•25	72 (2.835)	58 (2.283)	36 (1.417)	48 (1.890)			
KP 20•31,5	82 (3.228)		46 (1.811)				

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	/	Rotation (1)	/	Seals (2)
KP20•4	/	20•4	/	20•4	/	S	-	FS

(1) Rotation: S= Left - D= Right

(2) For Buna N seals no code

ORDER EXAMPLE

Double pump

KP20•4/20•4 S/FS

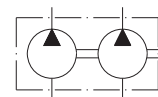
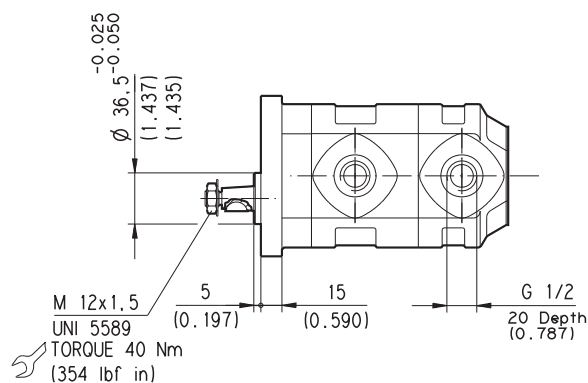
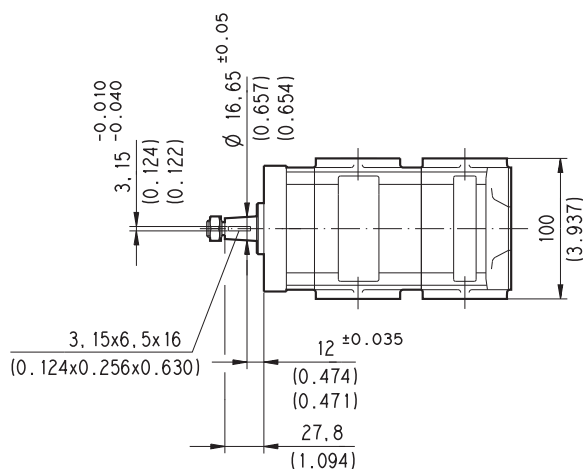
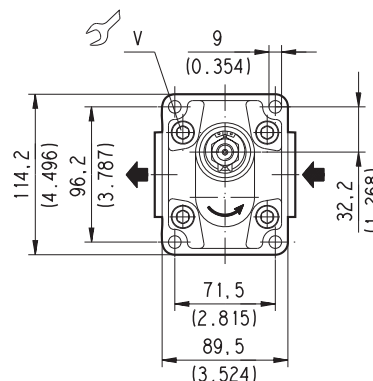
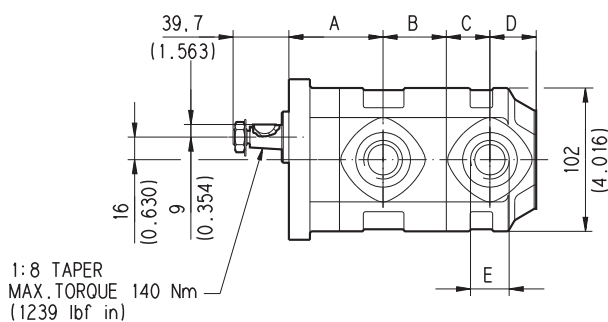
Triple pump

KP20•4/20•4/20•4 S/FS

02/06.2005

GAS STRAIGHT THREAD PORTS

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



V Screws tightening torque Nm (lbf in)

70 ± 7 (558 ± 682)

Pump type	A	B	C	D	E	Ports code	
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	IN	OUT
KP 20•4	60 (2.362)	37,5 (1.476)	24 (0.945)	27,5 (1.083)	G 1/2 Depth 20 (0.787)	GD	GD
KP 20•6,3	62,5 (2.461)		26,5 (1.043)				
KP 20•8	65 (2.559)		29 (1.142)				
KP 20•11,2	68,5 (2.697)		32,5 (1.280)				
KP 20•14	67 (2.638)	45 (1.772)	31 (1.220)	33 (1.299)	G 3/4 Depth 22 (0.866)	GE	
KP 20•16	72,5 (2.854)	43 (1.693)	36,5 (1.437)				
KP 20•20	79 (3.110)		43 (1.693)				
KP 20•25	72 (2.835)	58 (2.283)	36 (1.417)	48 (1.890)			
KP 20•31,5	82 (3.228)		46 (1.811)				

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)

Pump type	/	Ports position	/	Ports IN/OUT	-	Rotation (1)	/	-	Seals (2)
KP20•4	/	L	/	GD/GD	/				
Front pump									
20•4	/	L	/	GD/GD	/				
Intermediate pump									
20•4	/	L	/	GD/GD		S	/	FS	-
Rear pump									

(1) Rotation: S= Left - D= Right

(2) For Buna N seals no code

ORDER EXAMPLE

Double pump

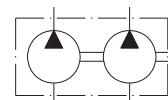
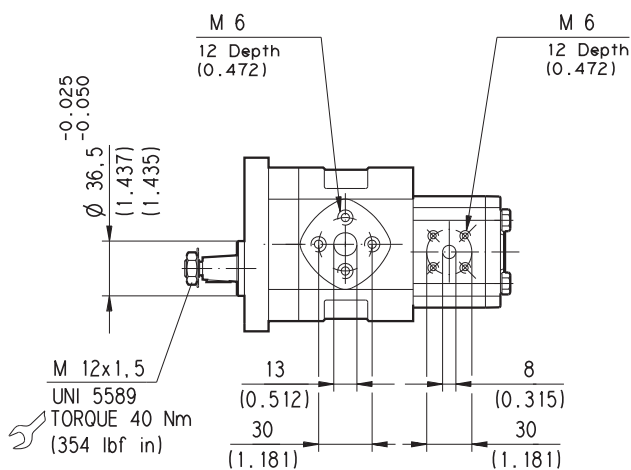
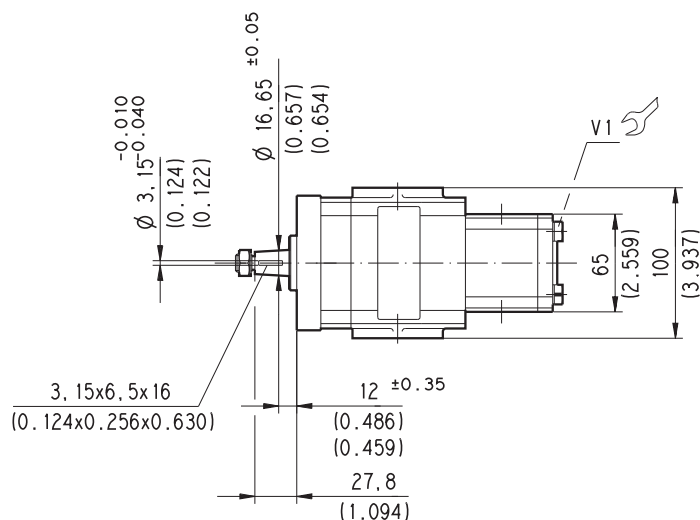
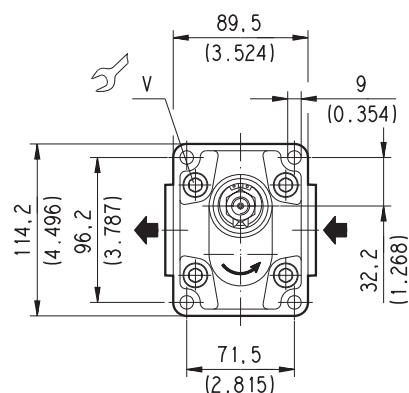
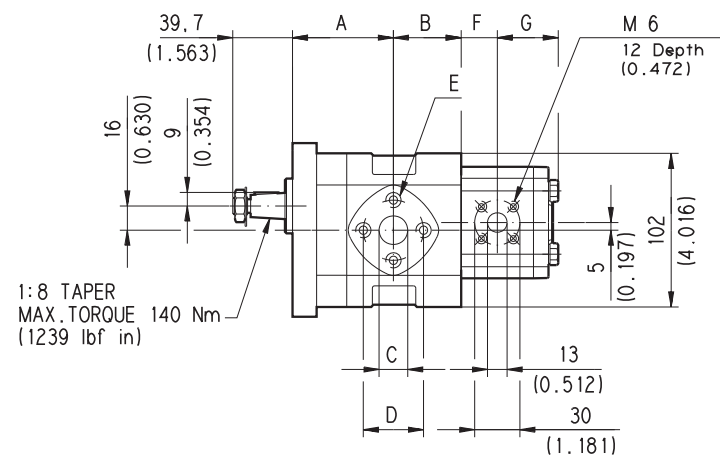
KP20•4-LGD/GD/20•4-LGD/GD S/FS

Triple pump

KP20•4-LGD/GD/20•4-LGD/GD/20•4-LGD/GD S/FS

02/06.2005

EUROPEAN FLANGED PORTS - 4 Bolts
Metric thread ISO 60° conforms to ISO/R 262



D006-D06/0605

02/06.2005

Screws tightening torque Nm (lbf in)	
V	V1
70 ±7 (558 ÷ 682)	25 ±2.5 (199 ÷ 243)

KAPPA 20
HYDRAULIC GEAR PUMPS EUROPEAN STANDARD
82 E2+PL10

Pump type	A	B	C	D	E
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
KP 20•4	60 (2.362)	37,5 (1.476)	24 (0.945)	27,5 (1.083)	M 6 Depth 12 (0.472)
KP 20•6,3	62,5 (2.461)		26,5 (1.043)		
KP 20•8	65 (2.559)		29 (1.142)		
KP 20•11,2	68,5 (2.697)	38,5 (1.51)	32,5 (1.280)		
KP 20•14	67 (2.638)	45 (1.772)	31 (1.220)	33 (1.299)	M 8 Depth 14 (0.551)
KP 20•16	72,5 (2.854)	43 (1.693)	36,5 (1.437)		
KP 20•20	79 (3.110)		43 (1.693)		
KP 20•25	72 (2.835)	58 (2.283)	36 (1.417)	48 (1.890)	
KP 20•31,5	82 (3.228)		46 (1.811)		

Pump type	F	G
	mm (in)	mm (in)
PL 10•1	17,6 (0.693)	34,6 (1.362)
PL 10•1,5	18,4 (0.724)	35,4 (1.394)
PL 10•2	19,2 (0.756)	36,2 (1.425)
PL 10•2,5	20 (0.787)	37 (1.457)
PL 10•3,15	21 (0.827)	38 (1.496)
PL 10•4	22,4 (0.882)	39,4 (1.551)
PL 10•5	24 (0.945)	41 (1.614)
PL 10•5,8	25,3 (0.996)	42,3 (1.665)
PL 10•6,3	26 (1.024)	43 (1.693)
PL 10•8	28,8 (1.134)	45,8 (1.803)
PL 10•10	32 (1.260)	49 (1.929)

For ports and general data of Polaris series, please see the proper technical catalogue.

How to order a double pump

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

KP20•4 / PLP10•1 / S / FS -

(1) Rotation: S= Left - D= Right

(2) For Buna N seals no code

ORDER EXAMPLE

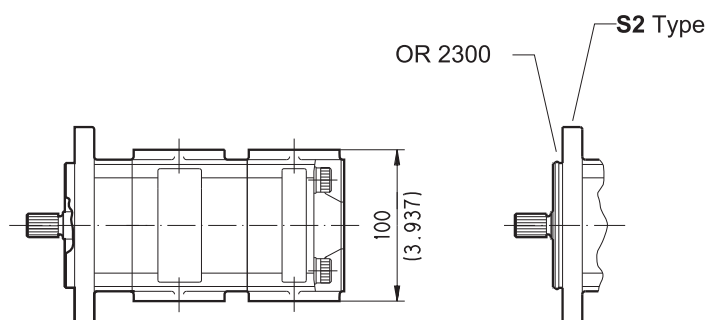
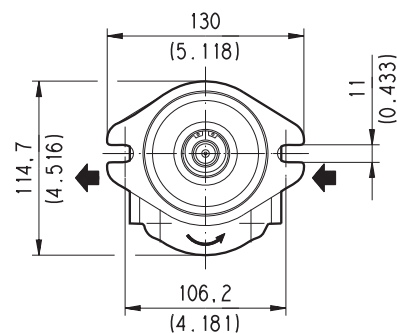
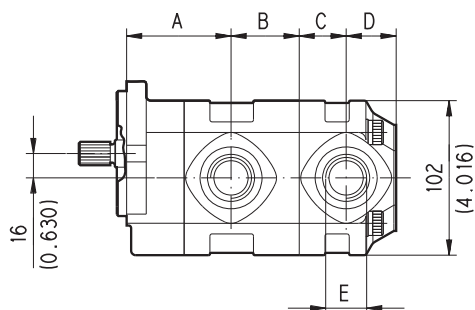
Double pump

KP20•4/PLP10•1 S/FS

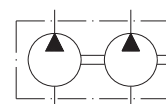
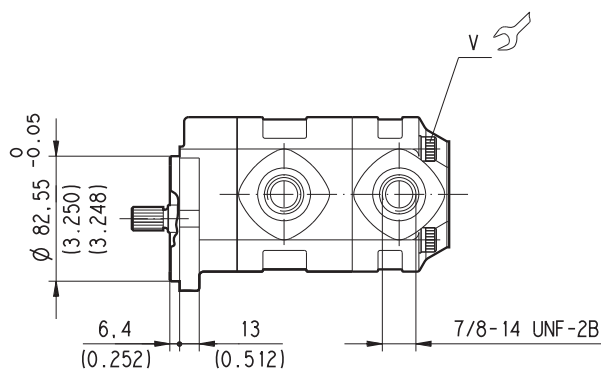
02/06.2005

SAE STRAIGHT THREAD PORTS J514

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



D006-D93/0605



02/06.2005

V Screws tightening torque Nm (lbf in)

70 ±7 (558 ± 682)

KAPPA 20
HYDRAULIC GEAR PUMPS SAE STANDARD
... S1

Pump type	A	B	C	D	E	Ports code	
	mm (in)	mm (in)	mm (in)	mm (in)		IN	OUT
KP 20•4	62 (2.441)	37,5 (1.476)	24 (0.945)	27,5 (1.083)	7/8-14 UNF-2B	OC	OC
KP 20•6,3	64,5 (2.539)		26,5 (1.043)				
KP 20•8	67 (2.638)		29 (1.142)				
KP 20•11,2	70,5 (2.776)	38,5 (1.51)	32,5 (1.280)	33 (1.299)	1-1/16-12 UN-2B	OD	
KP 20•14	69 (2.717)	45 (1.772)	31 (1.220)				
KP 20•16	74,5 (2.933)	43 (1.693)	36,5 (1.437)				
KP 20•20	81 (3.189)		43 (1.693)				
KP 20•25	74 (2.913)	58 (2.283)	36 (1.417)	48 (1.890)			
KP 20•31,5	84 (3.307)		46 (1.811)				

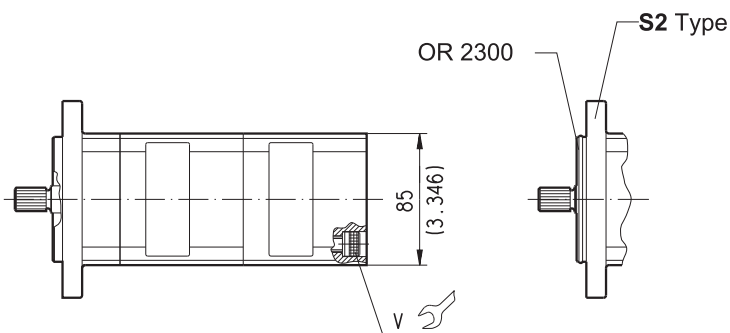
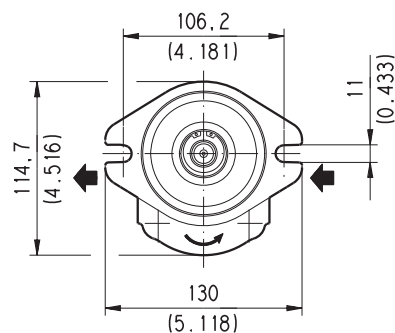
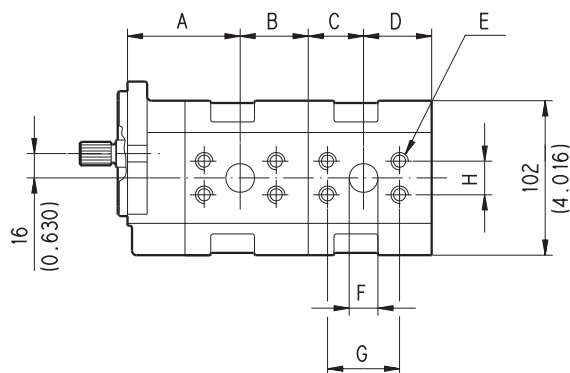
The lenght of a triple pump is obtained with the sum of the following dimensions: **A+B+C+B+C+D**.

To order see page 54 e 55

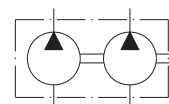
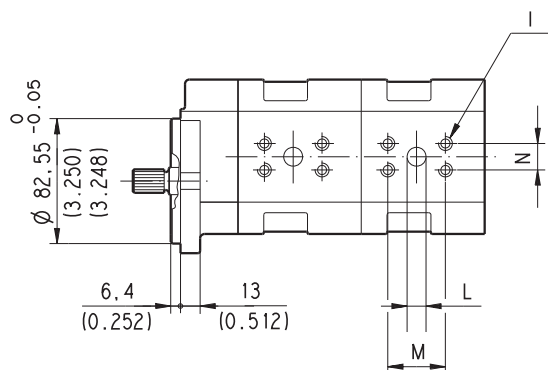
02/06.2005

SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI

Metric thread ISO 60° conforms to ISO/R 262



D006-128/0605



02/06.2005

V Screws tightening torque Nm (lbf in)

70 ±7 (558 ± 682)

KAPPA 20
HYDRAULIC GEAR PUMPS SAE STANDARD
... S1

Pump type	A	B	C	D
	mm (in)	mm (in)	mm (in)	mm (in)
KP 20-4	62 (2.441)	37,5 (1.476)	24 (0.945)	39,5 (1.555)
KP 20-6,3	64,5 (2.539)		26,5 (1.043)	
KP 20-8	67 (2.638)		29 (1.142)	
KP 20-11,2	70,5 (2.776)	38,5 (1.51)	32,5 (1.280)	40,5 (1.594)
KP 20-14	69 (2.717)	45 (1.772)	31 (1.220)	47 (1.850)
KP 20-16	74,5 (2.933)	43 (1.693)	36,5 (1.437)	45 (1.772)
KP 20-20	81 (3.189)		43 (1.693)	
KP 20-25	74 (2.913)	58 (2.283)	36 (1.417)	60 (2.362)
KP 20-31,5	84 (3.307)		46 (1.811)	

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

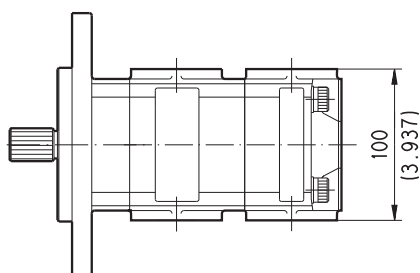
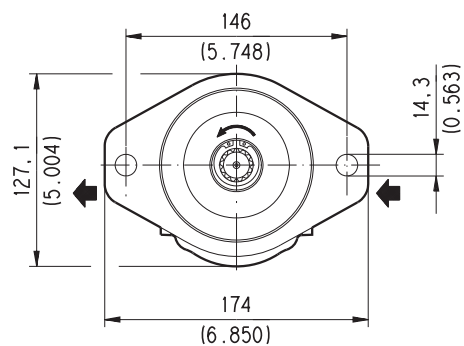
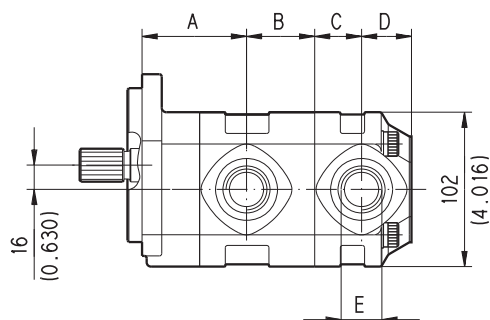
Pump type	E	F	G	H	I	L	M	N	Port code	
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	IN	OUT
KP 20-4	M 8 Depth 12 (0.472)	12,5 (0.492)	38,1 (1.500)	17,5 (0.689)	M8 Depth 12 (0.472)	12,5 (0.492)	38,1 (1.500)	17,5 (0.689)	MA	MA
KP 20-6,3										
KP 20-8										
KP 20-11,2										
KP 20-14	M 10 Depth 12 (0.472)	19 (0.748)	47,6 (1.874)	22,2 (0.874)	M10 Depth 12 (0.472)	19 (0.748)	47,6 (1.874)	22,2 (0.874)	MB	
KP 20-16										
KP 20-20										
KP 20-25									MC	
KP 20-31,5										

To order see page 54 e 55

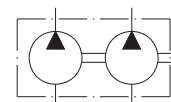
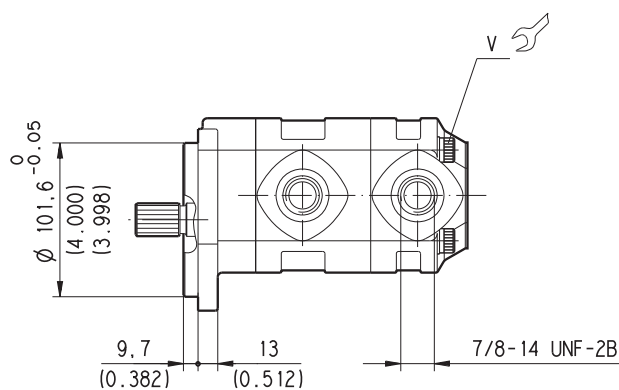
02/06.2005

SAE STRAIGHT THREAD PORTS J514

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



D006-166/0605



02/06.2005

V Screws tightening torque Nm (lbf in)

70 ±7 (558 ± 682)

KAPPA 20
HYDRAULIC GEAR PUMPS SAE STANDARD
... S5

Pump type	A	B	C	D	E	Ports code	
	mm (in)	mm (in)	mm (in)	mm (in)		IN	OUT
KP 20•4	62 (2.441)	37,5 (1.476)	24 (0.945)	27,5 (1.083)	7/8-14 UNF-2B	OC	OC
KP 20•6,3	64,5 (2.539)		26,5 (1.043)				
KP 20•8	67 (2.638)		29 (1.142)				
KP 20•11,2	70,5 (2.776)	38,5 (1.51)	32,5 (1.280)	33 (1.299)	1-1/16-12 UN-2B	OD	
KP 20•14	69 (2.717)	45 (1.772)	31 (1.220)				
KP 20•16	74,5 (2.933)	43 (1.693)	36,5 (1.437)				
KP 20•20	81 (3.189)		43 (1.693)				
KP 20•25	74 (2.913)	58 (2.283)	36 (1.417)	48 (1.890)			
KP 20•31,5	84 (3.307)		46 (1.811)				

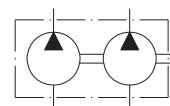
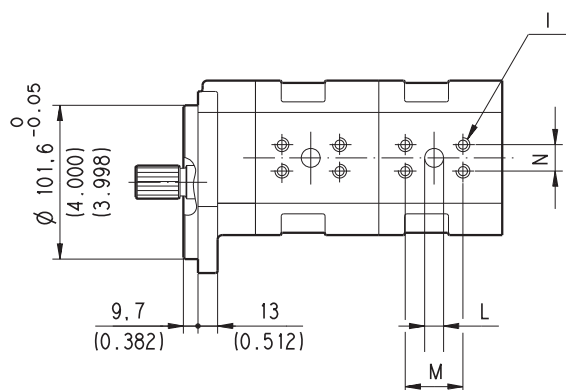
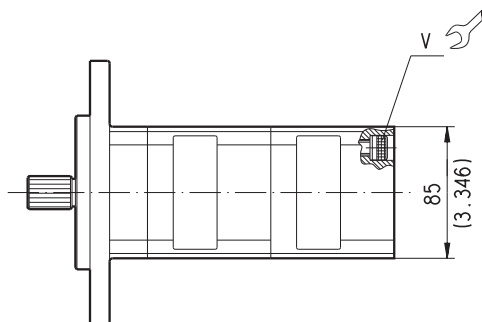
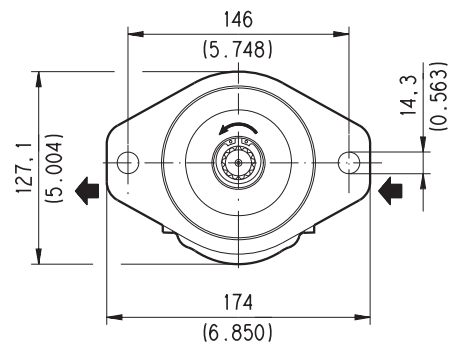
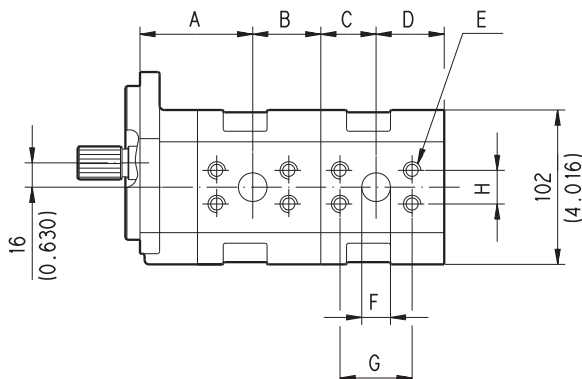
The lenght of a triple pump is obtained with the sum of the following dimensions: **A+B+C+B+C+D**.

To order see page 54 e 55

02/06.2005

SAE FLANGED PORTS J518 - Standard pressure series 3000 PSI

Metric thread ISO 60° conforms to ISO/R 262



V Screws tightening torque Nm (lbf in)

70 ±7 (558 ± 682)

D006-167/0605

02/06.2005

KAPPA 20
HYDRAULIC GEAR PUMPS SAE STANDARD
... S5

Pump type	A	B	C	D
	mm (in)	mm (in)	mm (in)	mm (in)
KP 20-4	62 (2.441)	37,5 (1.476)	24 (0.945)	39,5 (1.555)
KP 20-6,3	64,5 (2.539)		26,5 (1.043)	
KP 20-8	67 (2.638)		29 (1.142)	
KP 20-11,2	70,5 (2.776)	38,5 (1.51)	32,5 (1.280)	40,5 (1.594)
KP 20-14	69 (2.717)	45 (1.772)	31 (1.220)	47 (1.850)
KP 20-16	74,5 (2.933)	43 (1.693)	36,5 (1.437)	45 (1.772)
KP 20-20	81 (3.189)		43 (1.693)	
KP 20-25	74 (2.913)	58 (2.283)	36 (1.417)	60 (2.362)
KP 20-31,5	84 (3.307)		46 (1.811)	

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

Pump type	E	F	G	H	I	L	M	N	Port code	
		mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	IN	OUT
KP 20-4	M 8 Depth 12 (0.472)	12,5 (0.492)	38,1 (1.500)	17,5 (0.689)	M8 Depth 12 (0.472)	12,5 (0.492)	38,1 (1.500)	17,5 (0.689)	MA	MA
KP 20-6,3										
KP 20-8										
KP 20-11,2										
KP 20-14	M 10 Depth 12 (0.472)	19 (0.748)	47,6 (1.874)	22,2 (0.874)	M10 Depth 12 (0.472)	19 (0.748)	47,6 (1.874)	22,2 (0.874)	MB	
KP 20-16										
KP 20-20										
KP 20-25										
KP 20-31,5		25,4 (1.000)	52,4 (2.063)	26,2 (1.031)					MC	MB

To order see page 54 e 55

02/06.2005

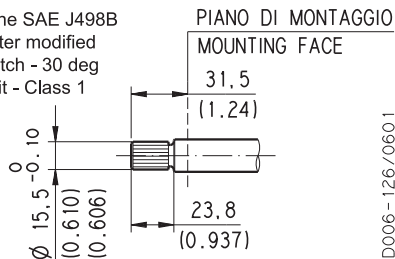
KAPPA 30 SAE VERSION

SAE

SAE "A" SPLINE

03

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

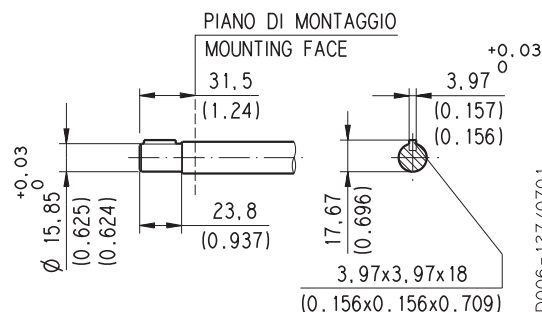


D006-126/0601

MAX 885 lbf in (100 Nm)

SAE "A" STRAIGHT

31



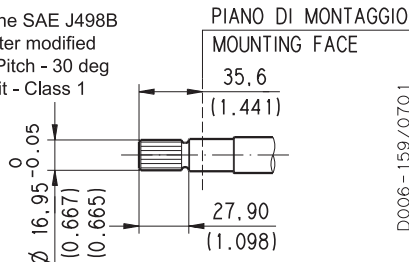
D006-127/0701

MAX 620 lbf in (70 Nm)

SAE SPLINE

01

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

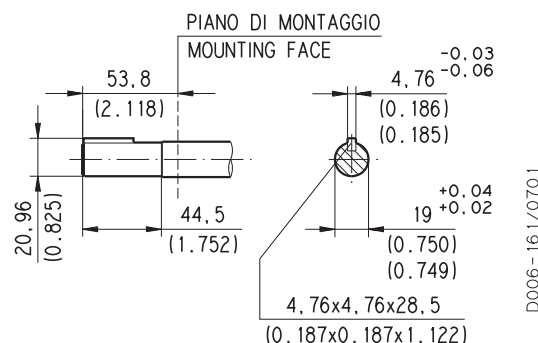


D006-159/0701

MAX 1151 lbf in (130 Nm)

STRAIGHT

49



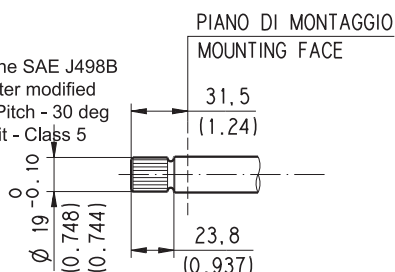
D006-161/0701

MAX 1239 lbf in (140 Nm)

SAE SPLINE

07

Ext. Involute Spline SAE J498B
with major diameter modified
11 teeth - 16/32 Pitch - 30 deg
Flat Root - Side fit - Class 5

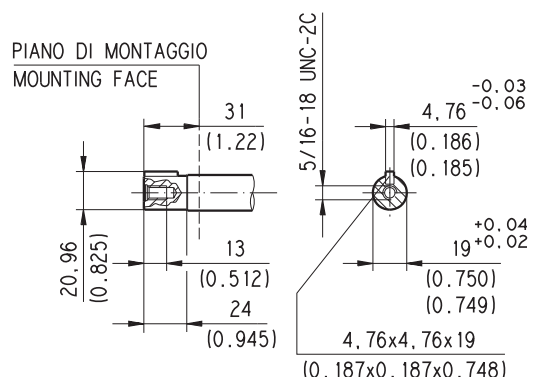


D006-160/0701

MAX 1505 lbf in (170 Nm)

STRAIGHT

50



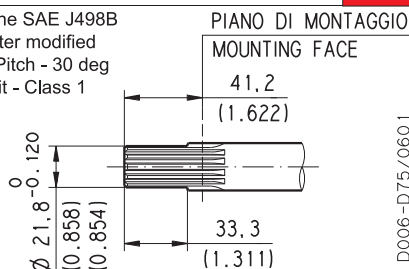
D006-162/0701

MAX 885 lbf in (100 Nm)

SAE "B" SPLINE

04

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

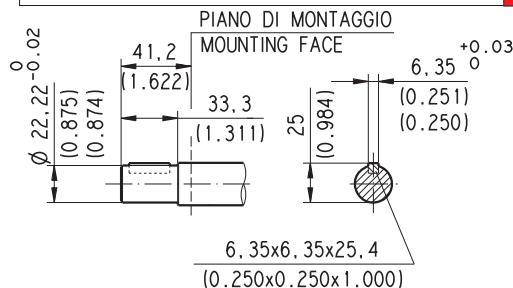


D006-D75/0601

MAX 2478 lbf in (280 Nm)

SAE "B" STRAIGHT

32



D006-D77/0601

MAX 1770 lbf in (200 Nm)

Replaces: 01/03.2002

03/03.2006

HOW TO ORDER KAPPA 20 MULTIPLE PUMPS

1	2	3	4	5	6	7
Pump type	Drive shaft	Mounting flange	Ports position	Ports IN/OUT	Rotation	Seals
KP 20•4	–	03	S1	–	L	OC/OC
Front ump						
20•4	–		L	O/COC	/	
Intermediate ump						
20•4	–		L	OC/OC	S	– 0 N
Rear ump						

1	Pump Type		CODE
	in ³ /rev	(cm ³ /rev)	
	0.30	4,95	KP 20•4
	0.40	6,61	KP 20•6,3
	0.50	8,26	KP 20•8
	0.69	11,23	KP 20•11,2
	0.89	14,53	KP 20•14
	1.03	16,85	KP 20•16
	1.29	21,14	KP 20•20
	1.61	26,42	KP 20•25
	2.01	33,03	KP 20•31,5

2	Drive shaft	CODE
	SAE "A" spline (9 teeth)	03
	SAE spline (10 teeth)	01
	SAE spline (11 teeth)	07
	SAE "B" spline (13 teeth)	04
	SAE "A" straight	31
	Straight	49
	Straight	50
	SAE "B" straight	32

3	Mounting flange	CODE
	SAE "A" 2 holes	S1
	SAE "A" 2 holes (with o-ring seal)	S2
	SAE "B" 2 holes (a)	S5

4	Ports position	CODE
	Side	L
	Rear (only for rear sections)	P

CODE		Ports IN/OUT	5
SAE STRAIGHT THREAD PORTS (ODT)			
Side	Rear	Pump type	
OC/OC	OC/OC	KP 20•4	
OC/OC	OC/OC	KP 20•6,3	
OC/OC	OC/OC	KP 20•8	
OC/OC	OC/OC	KP 20•11,2	
OD/OC	OD/OD	KP 20•14	
OD/OC	OD/OD	KP 20•16	
OD/OC	OD/OD	KP 20•20	
OD/OC	OD/OD	KP 20•25	
OD/OC	OD/OD	KP 20•31,5	
METRIC SAE SPLIT PORTS SAE J518 C			
MA/MA		KP 20•4	
MA/MA		KP 20•6,3	
MA/MA		KP 20•8	
MA/MA		KP 20•11,2	
MB/MA		KP 20•14	
MB/MA		KP 20•20	
MB/MA		KP 20•16	
MC/MB		KP 20•25	
MC/MB		KP 20•31,5	

CODE	Ports position	6
S	Left	
D	Right	

CODE	Seals (b)	7
	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	

(a) Available only with 04 and 32 shaft

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

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 ISO/DIN standards, having viscosity 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

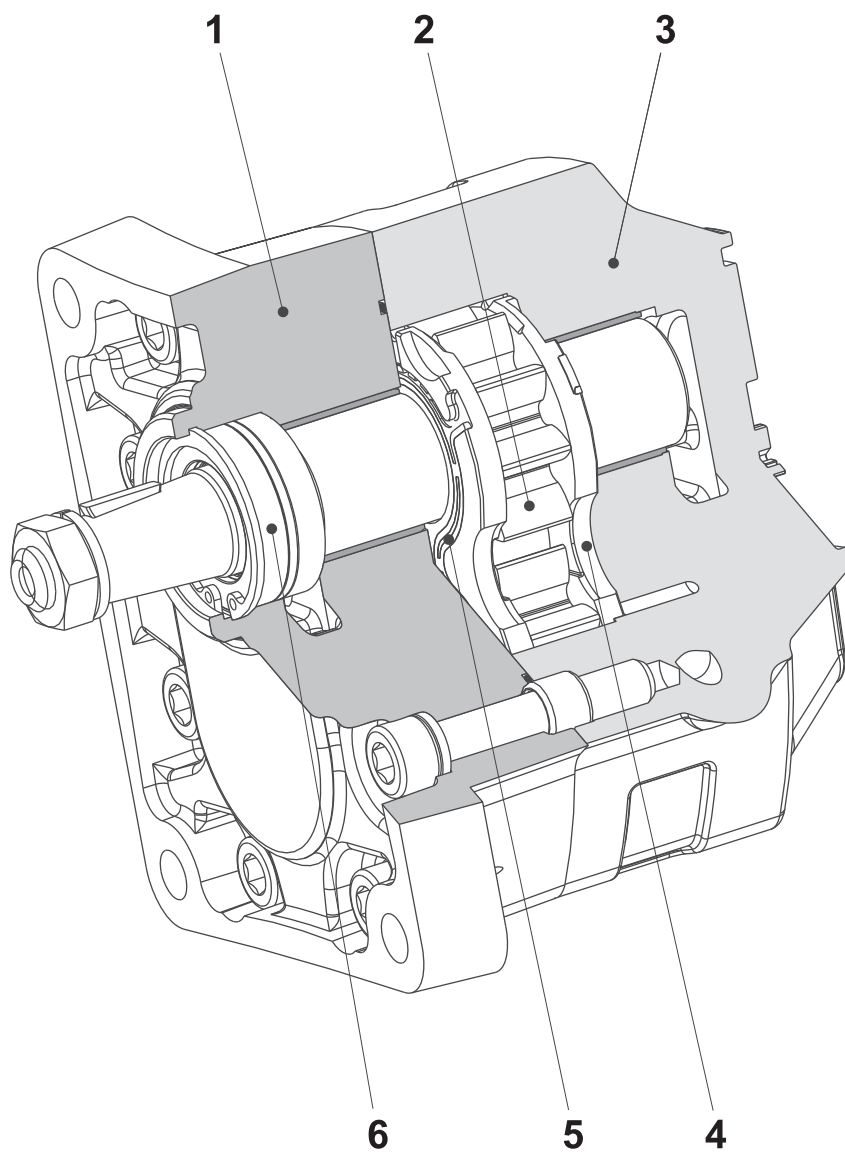
Check that all circuit connections are tight and that the entire system is completely clean. Insert the oil in the tank, using a filter. Bleed the circuit to assist in filling. Set the pressure relief valves to the lowest possible setting. Turn on the system for a few moments at minimum speed, then bleed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

02/06.2005

INSTRUCTIONS



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

01/03.2002

K 05 T A

Edition: 05/03.2012

Replaces: K 04 T A



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