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Replaces: 01/08.2005

FEATURES

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

DISPLACEMENTS

From 0.50 in³/rev (8,26 cm³/rev)
To 9.20 in³/rev (150,79 cm³/rev)

PRESSURE

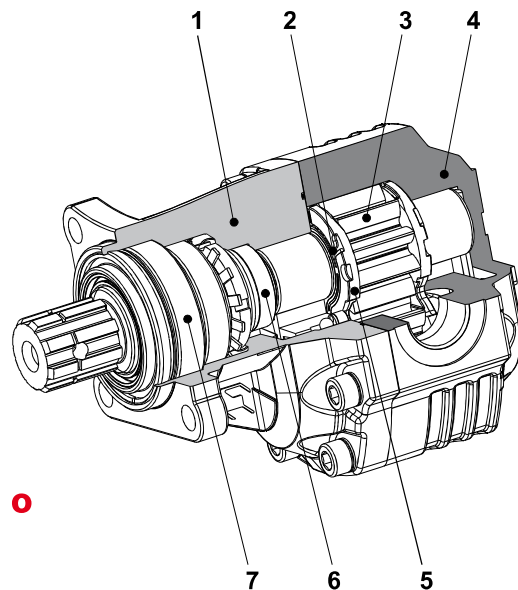
Max. continuous 4205 psi (290 bar)
Max. intermittent 4568 psi (315 bar)
Max. di peak 4713 psi (325 bar)

MAX. SPEED

Max. 3000 min⁻¹

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

1	Mounting flange
2	Seals
3	Gear
4	Body
5	Thrust plates
6	Shaft
7	Outboard bearing



● 03/05.2013

● **Modification from former edition.**

FEATURES

WARNING !

Failure or improper use of the product can cause damage at the same product or system.

Make sure that this is the last issue.

Replaces: 02/07.2008

Construction	External gear type pumps
Mounting	ISO (ZF), ITALIAN (triangular) and SAE flanges
Line connections	Screw
Direction of rotation (looking at the drive shaft)	Anti-clock (S) - clockwise (D) - reversible (R or B)
Inlet pressure range for pumps	10 ÷ 44 psi - [0,7 ÷ +3 bar (abs.)]
Fluid temperature range	See table (1)
Fluid	Mineral oil based hydraulic fluids to ISO/DIN and fire resistant fluids [see table (1)]. For other fluids please consult our technical sales department.
Viscosity range	From 60 to 456 SSU [12 to 100 mm ² /s (cSt)] recommended Up to 3410 SSU [750 mm ² /s (cSt)] permitted
Filtering requirement	See table (2)
Antioxidant protection	Red paint IC105

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 5 - 6 - 7	See page 5 - 6 - 7	-13 (-25)	176 (80)	212 (100)	N
				-13 (-25)	230 (110)	257 (125)	V
HFA	Oil emulsion in water 5 ÷ 15% of oil	725 (50)	1500	36 (2)	131 (55)	—	N
HFB	Water emulsion in oil 40 % of water	1740 (120)	1500	36 (2)	140 (60)	—	N
HFC	Water - glycol	1450 (100)	1500	-4 (-20)	140 (60)	—	N Bz
HFD	Phosphate ester (●)	2175 (150)	1500	14 (-10)	176 (80)	—	V Bz

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

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

03/05.2013

Tab. 2

Working pressure psi (bar)	Δp<2030	2030<Δp<3045	Δp>3045
	(140)	(140) (210)	(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:



FORMULA 20 GENERAL DATA PUMPS
FP 20

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

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

p₁= Max. continuous pressure

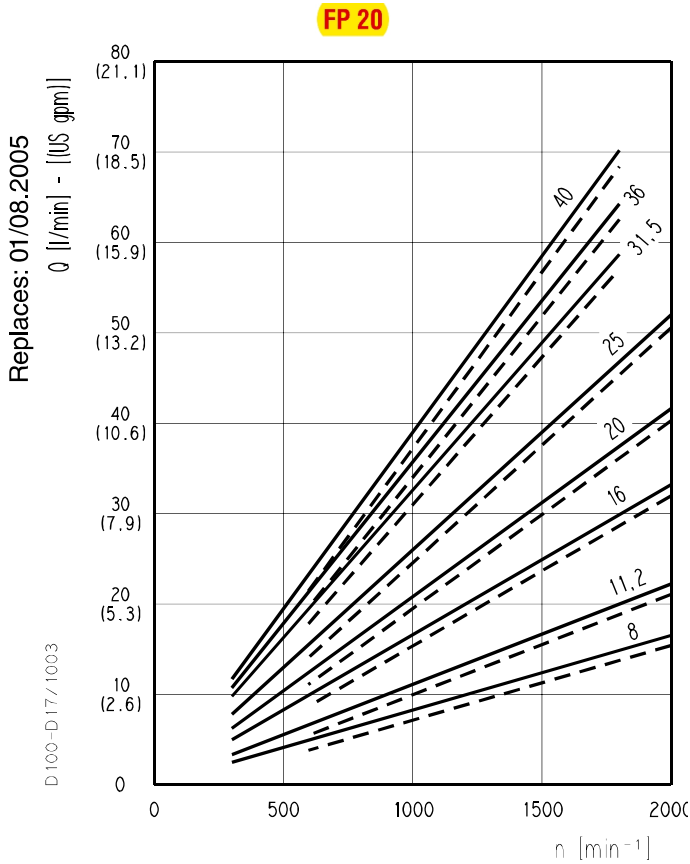
p₂= Max. intermittent pressure

p₃= Max. peak pressure

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

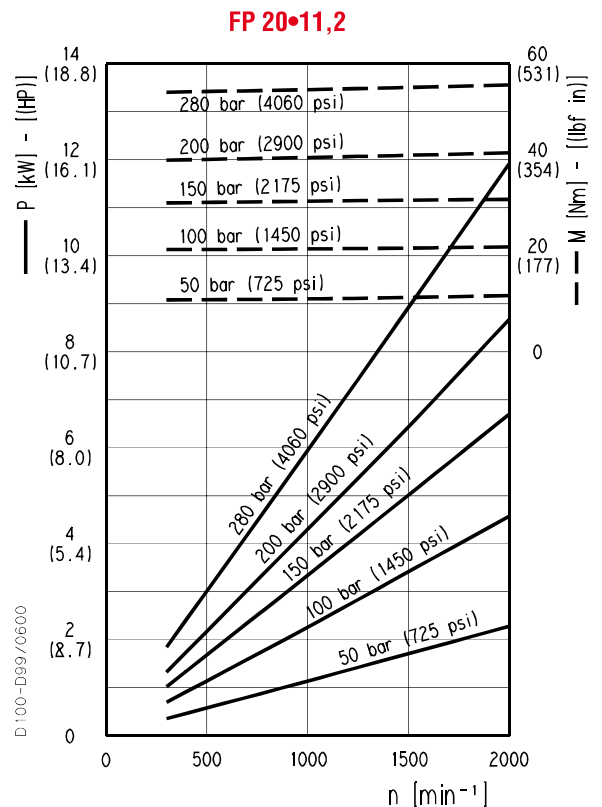
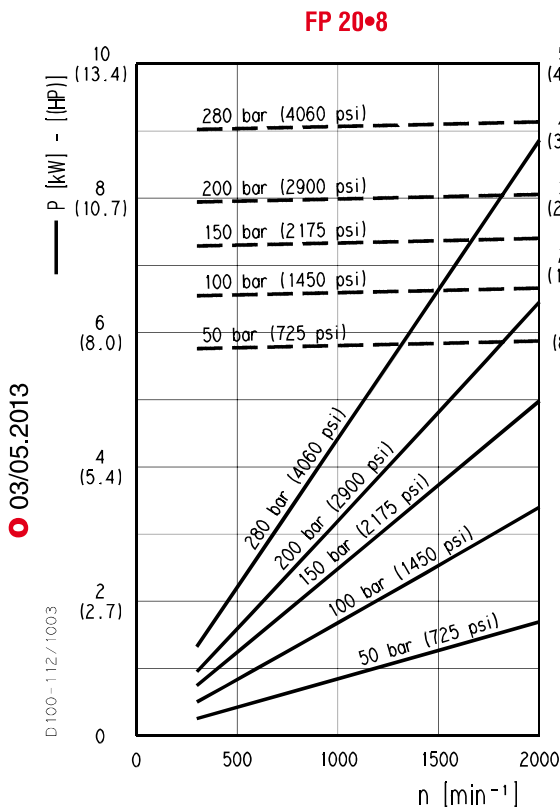
FORMULA 20 GEAR PUMPS PERFORMANCE CURVES

FP 20



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

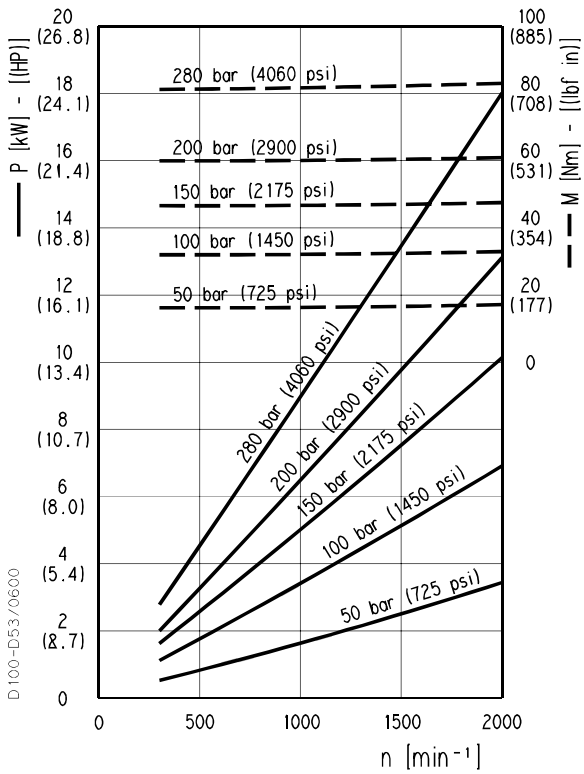
○ FP 20•8	---	290 psi (20 bar)
	—	4060 psi (280 bar)
○ FP 20•11,2	---	290 psi (20 bar)
	—	4060 psi (280 bar)
○ FP 20•16	---	290 psi (20 bar)
	—	4060 psi (280 bar)
○ FP 20•20	---	290 psi (20 bar)
	—	3770 psi (260 bar)
○ FP 20•25	---	290 psi (20 bar)
	—	3190 psi (220 bar)
○ FP 20•31,5	---	290 psi (20 bar)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



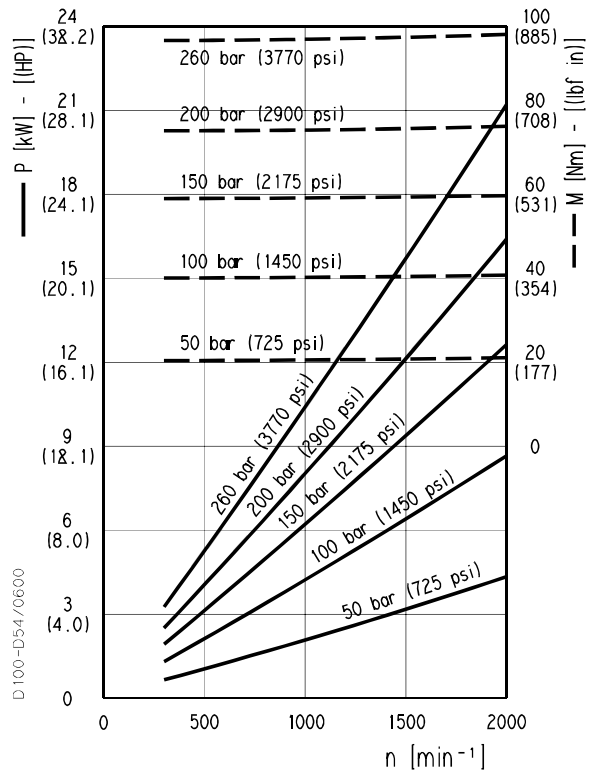
FORMULA 20 GEAR PUMPS PERFORMANCE CURVES

FP 20

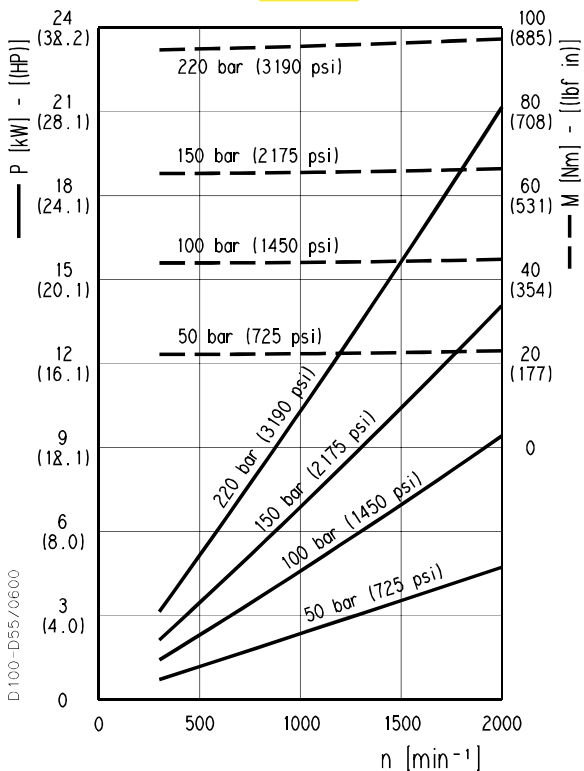
FP 20•16



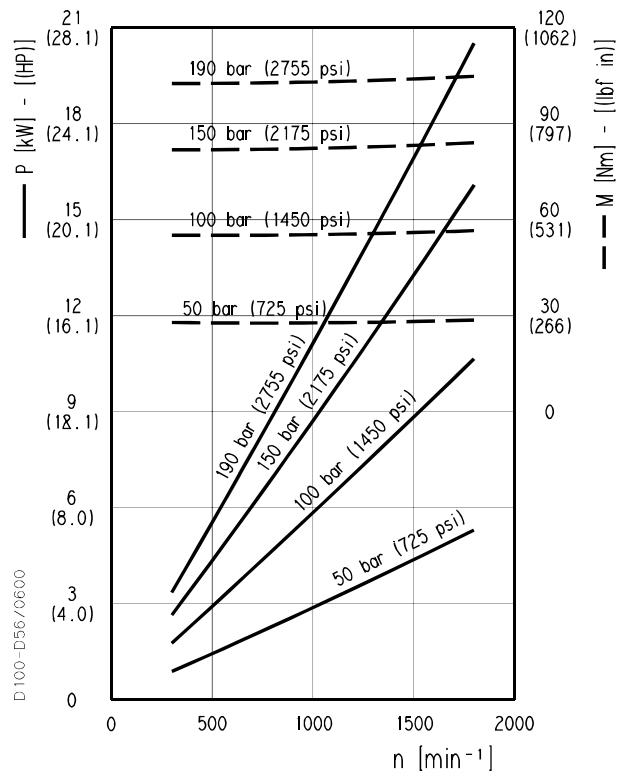
FP 20•20



FP 20•25



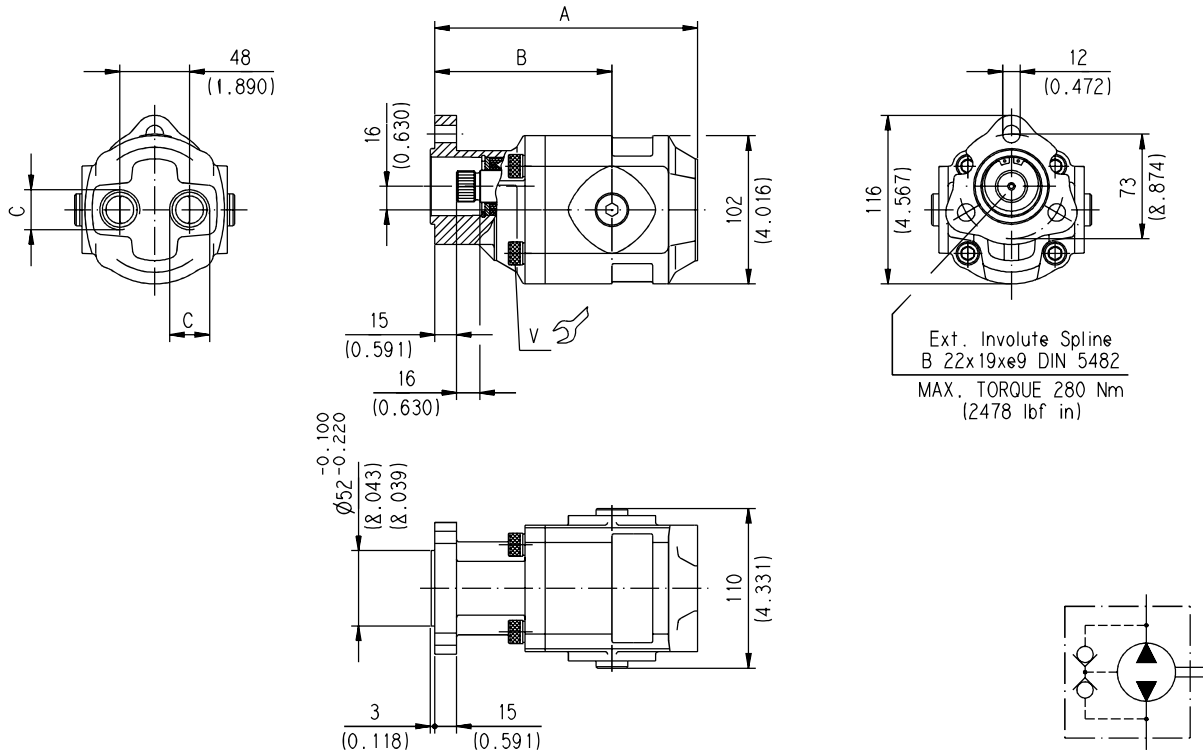
FP 20•31,5



01/08.2005

GAS STRAIGHT THREAD PORTS

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



Standard version pumps have reversible rotation and internal drain.

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

Screw tightening torque Nm (lbf in)

V
70 ±7 (558 ÷ 682)

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

How to order:

FP 20•11,2 B0-13T1-P GD/GD-N



FP 20.25 B0-13T1-P GD/GD-N

01/08.2005