MANNESMANN REXROTH

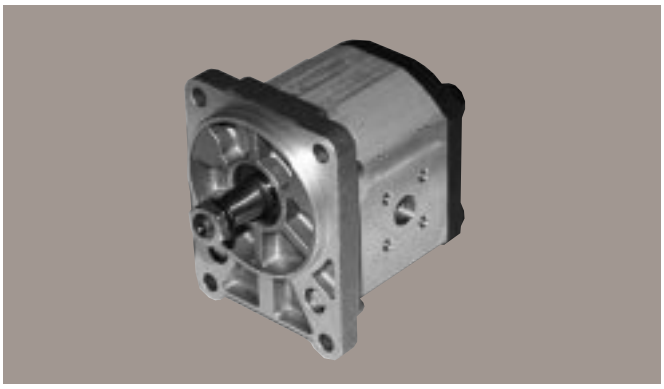
External gear pumps Type G2, Series 4X

NS 4 to 22	up to 250 bar	up to 22.4 cm³

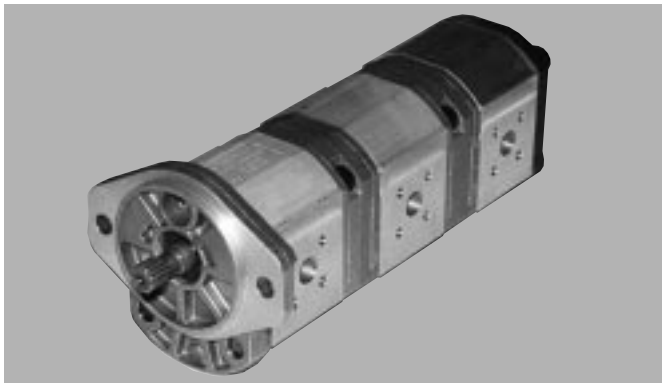
RE 10 030/04.99

Replaces: 05.98

- New principle of housing sealing, thereby giving a very long housing service life
- Long seal service life also at maximum temperatures
- Plain bearings for high loads
- Mono-block bearing
- Simple and robust design
- New prinicple of hydrostatic gap compensation
- Common suction port for double pump, on request
- Mono block intermediate flange



1 PF 2 G2-4X/011 RC 20 MB



1 PFG2-4X/011 RR 20 MRK**+**
1 PFG2-4X/011 LN 20 MDN**+**
1 PFG2-4X/008 LN 20 MDL

Special version (S107) with a common suction port, on request

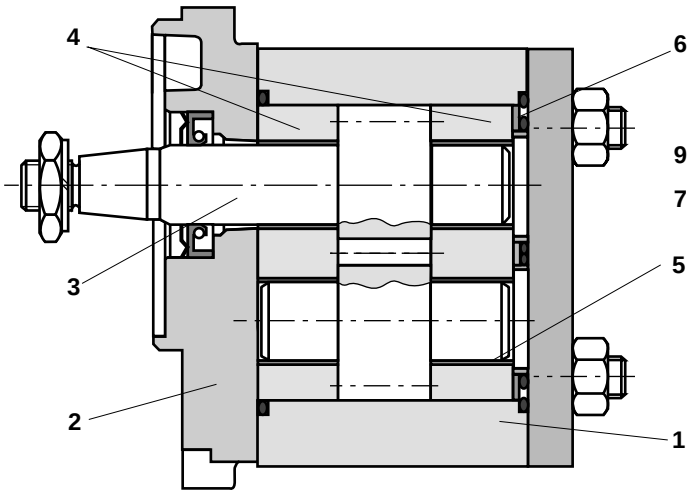
Type G2 hydraulic pumps are self-priming external gear pumps. Their task is to produce a constant flow and at the same time pass on the required forces.

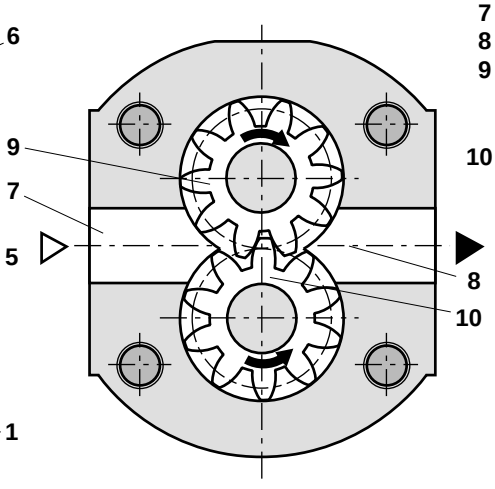
They mainly consist of the housing (1), mounting flange (2), drive shaft (3), 2 bearing blocks (4), bearing bush (5) and discs (6) for the hydrostatic gap compensation.

The gears separating during the rotational movement releases the gear chambers. The negative pressure resulting from this, as well as the atmospheric pressure acting on the pressure fluid level in the tank causes the pressure fluid to flow to the pump from the tank. This pressure fluid fills the gear chambers and is moved, in the direction of the arrow (see sectional drawing), from the the suction to the pressure side.

Here the gears mesh once more and push the pressure fluid out of the gear chambers and prevent return flow to the suction chamber.

In order to avoid hard and jolting running of the pump, small unloading grooves are cut into the sides of the bearing blocks (4). The "compressed fluid" is thereby passed into the pressure chamber.





7 Suction side
8 Pressure side
9 Driven gear (clockwide rotation)
10 Driven gear

Ordering details

1 PF 2 G2 – 4X/ | | | | | | | | *

Series 40 to 49 (40 to 49: unchanged installation and connection dimensions) **= 4X**

(Nominal flow)		NS	
4	cm^3	4	**= 004**
5.5	cm^3	5	**= 005**
8.2	cm^3	8	**= 008**
11	cm^3	11	**= 011**
14.1	cm^3	14	**= 014** [1]
16.2	cm^3	16	**= 016**
19	cm^3	19	**= 019** [1]
22.4	cm^3	22	**= 022**

Clockwise rotation **= R**
Anti-clockwise rotation **= L**

Tapered shaft 1:5 Ø 17 mm **= C**
Splined shaft SAE-A 5/8", 9 teeth **= R**
Tongued shaft with coupling for single pump, centre/rear pump **= N**
Tapered shaft 1:5 Ø 20 mm for front bearing **= S**
Cylindrical shaft ISO Ø 18 (with 01 ports) **= A**
Tapered shaft 1:8 Ø 17.4 mm **= H**

20 = Suction and pressure port square flange, metric mounting threads
01 = Pipe thread to ISO 228/1 (with cylindrical shaft A)
30 = Suction and pressure port square flange, metric mounting threads at the vertical and horizontal connection axis (Italian version)

M = NBR seals up to 80 °C
K = FKM shaft seal ring other seals NBR (connection to diesel engines)

B = Rectangular flange Ø 80 mm
P = 2-hole fixing Ø 50 mm
R = SAE-A-2-hole flange Ø 82.5 mm
M = 2-hole fixing Ø 52 mm
O = Rectangular flange Ø 36.5 mm
A = Front bearing Ø 80 mm
D = Combination flange for G2 (rear and centre pump)
H = Combination flange for G3, G4

No code = Single pump
K = Front pump for combination
L = Rear pump for combination
N = Centre pump for combination

Further details in clear text

Ordering examples for single pumps:

1PF2G2-4X/005RC20MB **Material no. 363013**
1PF2G2-4X/016RC20MBK **Material no. 363115**
(only front pump)
1PF2G2-4X/008LN20MDL **Material no. 363126**
(only rear pump)

Note: Only pump types which are listed in the catalogue sheets and have material numbers are available.

Other types on request.

Flange fittings for pipe connections (see page 12) and pump mounting brackets to catalogue sheet RE 32 110 for rectangular flanges version "B" have to be ordered separately.

Ordering example for multiple pumps

1PF2G2-4X/008RC20MBK **Material no. 363109**
1PF2G2-4X/004LN20MDL **Material no. 363122**
Combination parts G2/008 + G2/004

Multiple pumps are supplied completely assembled. The combination parts, however, have to be listed as separate items within an order (see ordering example).

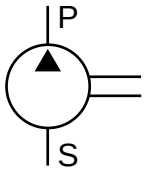
The material no. of the combination parts is entered during order processing.

It is possible to order the combination parts as a kit on their own. For the ordering code see the multiple pumps example. The kit consists of 2 tie rods and 2 nuts. The coupling is included within the scope of supply of the rear or centre pump.

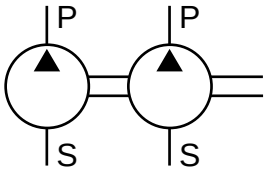
1PF2G2-4X/022RC20MBK **Material no. 363119**
1PF2G2-4X/011LN20MDN **Material no. 363296**
1PF2G2-4X/005LN20MDL **Material no. 363124**
Combination parts G2/022 + G2/011 + G2/005

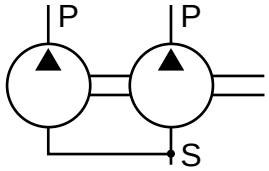
Symbols

Single pump



Double pump





On request

Technical data (for applications outside these parameters, please consult us!)

Pressure fluid: Mineral oil to catalogue sheet RE 07 075.

For operation with HFC-, HFD-, HETG-, HEPG- and HEES- fluids see RE 10 025-S.

Pressure fluid temperature range: – 15 to + 80 °C.

For higher temperatures please consult us

Ambient temperature range: – 15 to + 60 °C

Viscosity range:

10 bis 300 mm^2/s (recommended viscosity)
1000 mm^2/s (permissible start-up viscosity)

Maximum permissible degree of contamination of the pressure fluid is to NAS 1638, class 10. We, therefore, recommend a filter with a minimum retention rate of $ß_{20} \geq 100$. To ensure a long service life we recommend class 9, NAS 1638; achievable with a filter retention rate of $ß_{10} \geq 100$.

Drive type: elastic coupling, for other drive types please consult us

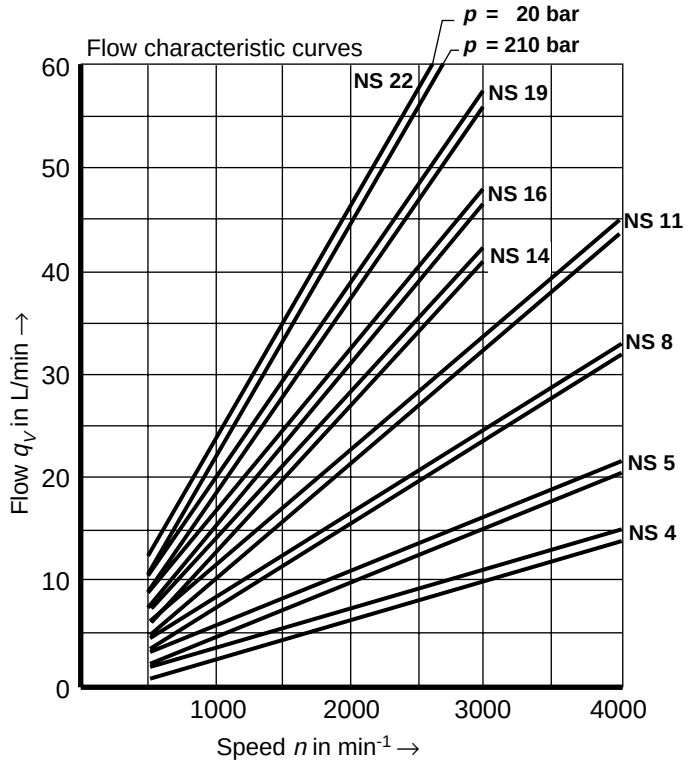
Installation: optional

Direction of rotation: the pump may only be driven in the given direction of rotation

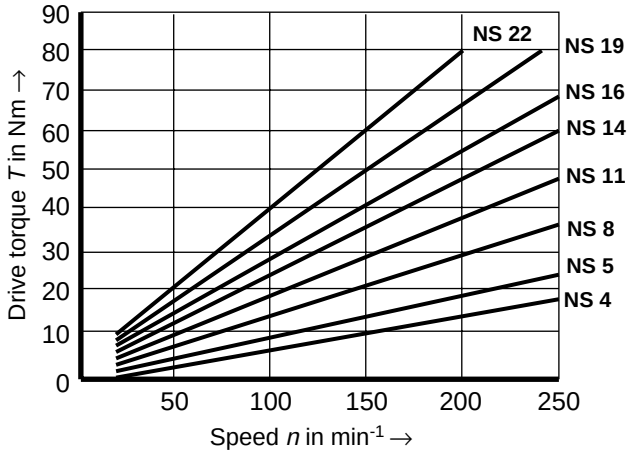
Weight: see table for individual pump types

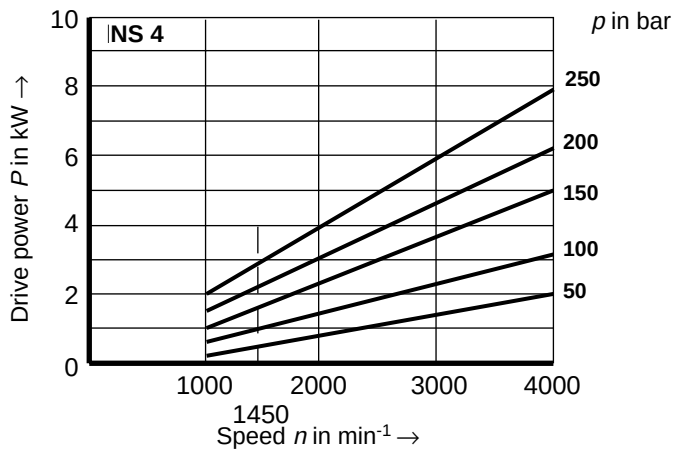
Nominal size		4	5	8	11	14	16	19	22
Nominal flow	cm^3	4	5.5	8.2	11	14.1	16.2	19	22.4
Operating pressure, inlet: absolute pressure	bar	$p_{abs\ min}$ 0.7 $p_{abs\ max}$ 3.0							
Max. continuous pressure *p*1	bar	250	250	250	250	250	250	240	210
Max. peak pressure *p*2 (10^6 peaks)	bar	275	275	275	275	275	275	270	230
Max. speed at continuous pressure *p*1	min^{-1}	5000	4000	4000	4000	3500	3000	3000	2500
Min. speed at p = 180 bar	min^{-1}	1000	1000	700	500	500	500	500	500
Min. speed at *p*1	min^{-1}	1200	1200	1000	700	700	700	700	700

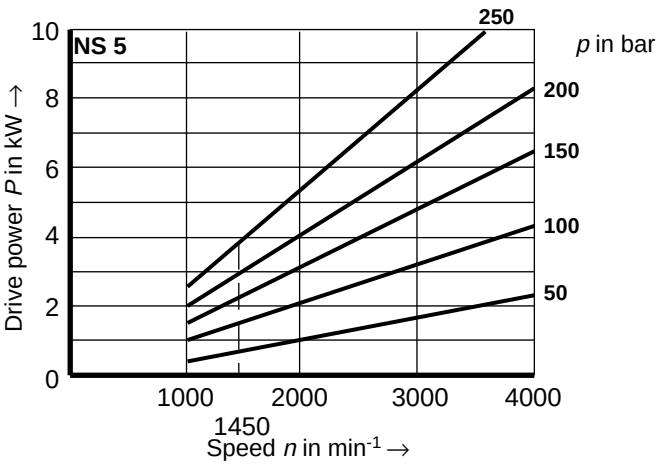
Characteristic curves (measured at ν = 41 mm^2/s and ϑ = 50°C)



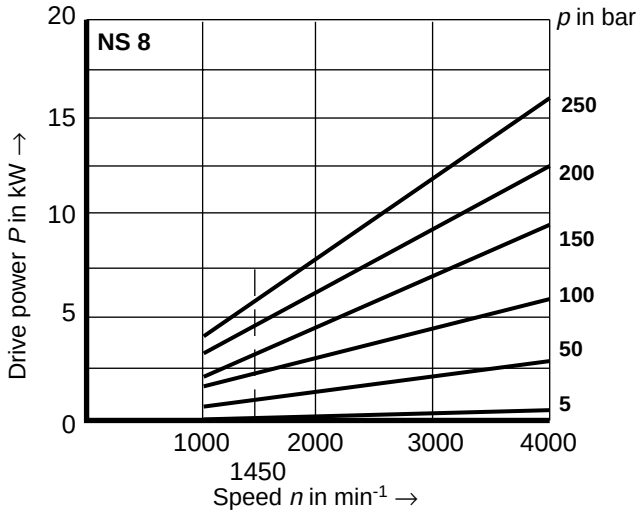
A =	Cylindrical shaft Ø 18 mm	T_{max} =	70 Nm
C =	Tapered shaft 1 : 5 Ø 17 mm	T_{max} =	150 Nm
R =	Splined shaft SAE-A5/8"	T_{max} =	110 Nm
N =	Shaft with tongued coupling	T_{max} =	70 Nm
S =	Tapered shaft 1 : 5 Ø 20 mm for front bearing	T_{max} =	70 Nm
H =	Tapered shaft 1 : 8 Ø 17,4 mm	T_{max} =	150 Nm

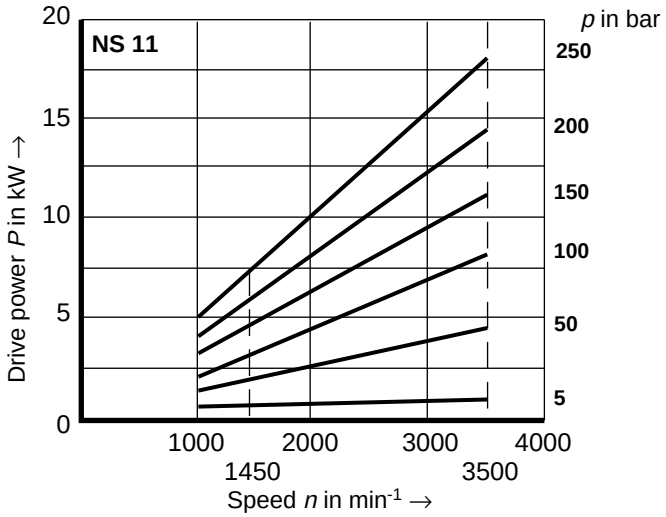


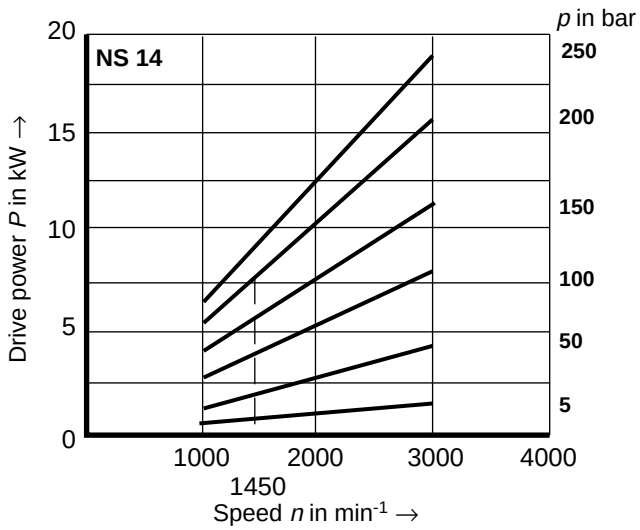


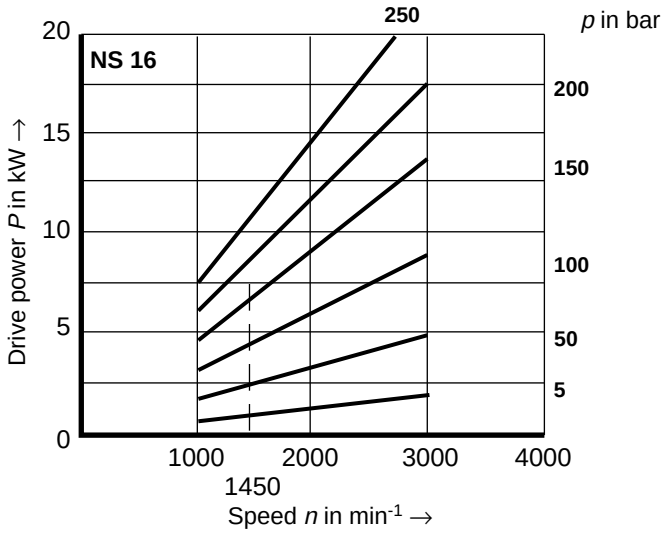


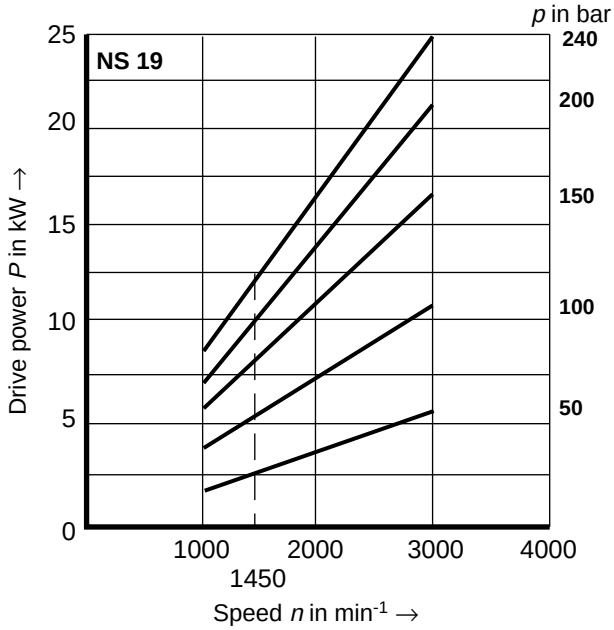
Characteristic curves (measured at ν = 41 mm²/s and ϑ = 50°C)

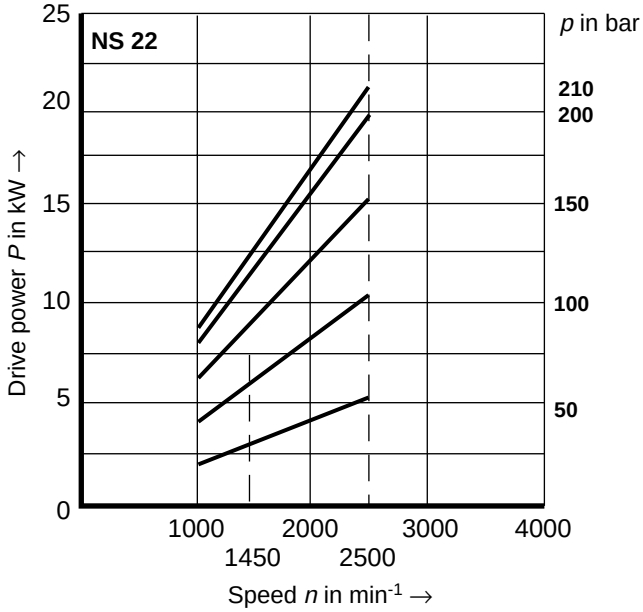












Noise pressure level (measured at v = 1450 min^{-1}, n = 41 mm^2/s and ϑ = 50 °C)

NS / p in bar	4	5	8	11	14	16	19	22
5	57	59	59	59	62	62	62.5	62
50	58.5	60	60	60	64	66.5	67	66
100	59	61	61	62	65.5	68	69.5	67
150	60	62	62	64.5	66.5	69	70.5	68.5
200	61	63	63.5	66	68	69.5	70	69
250	61.5	64.5	65	68	69.5	70.5	71	–

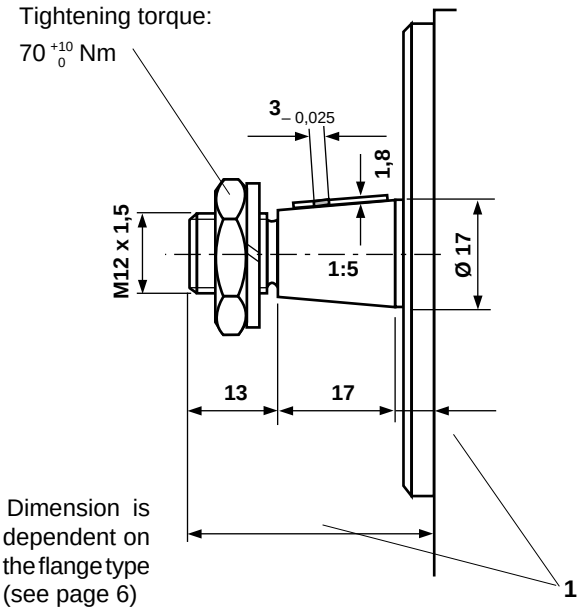
Measured in an anechoic chamber to DIN 45 635 part 26 in dB(A)

Distance microphone – pump = 1 m

Shaft end (Dimensions in mm)

C

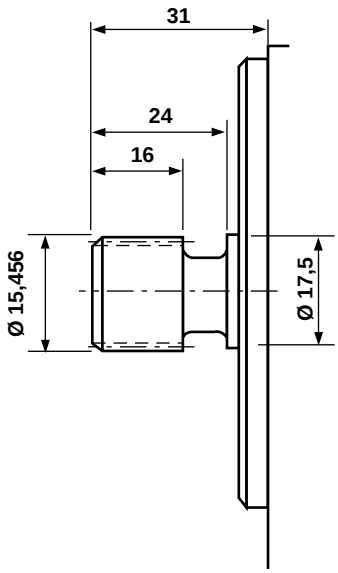
Tapered shaft 1 : 5, Ø 17 mm



1 Dimension is dependent on the flange type (see page 6)

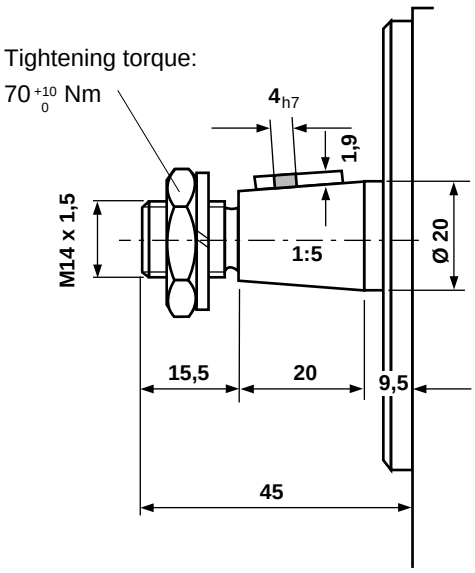
R

Splined shaft SAE-A 5/8", 9T, 16/32 D/P and tooth thickness t = 2,357 $^{-0,030}$



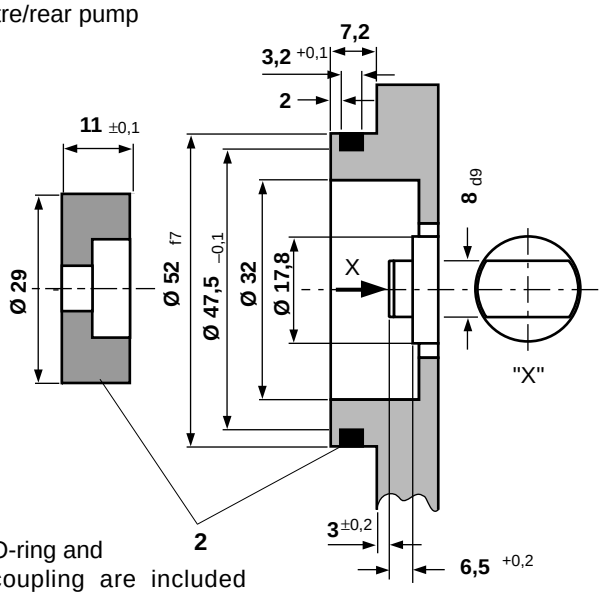
S

Tapered shaft 1 : 5, Ø 20 mm for front bearing



N

Tongued shaft with coupling for single pump, centre/rear pump

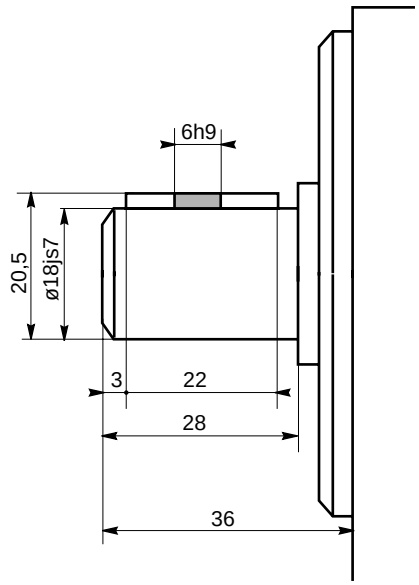


2 O-ring and coupling are included within the scope of supply

Shaft end (Dimensions in mm)

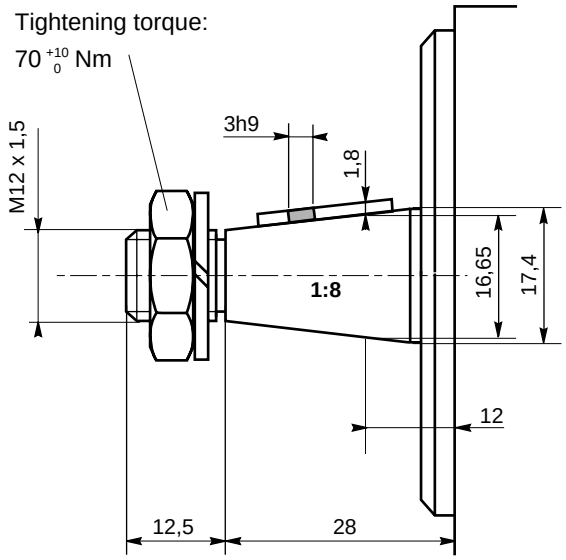
A

Cylindrical shaft ISO Ø 18 mm



H

Tapered shaft 1 : 8, Ø 17,4 mm

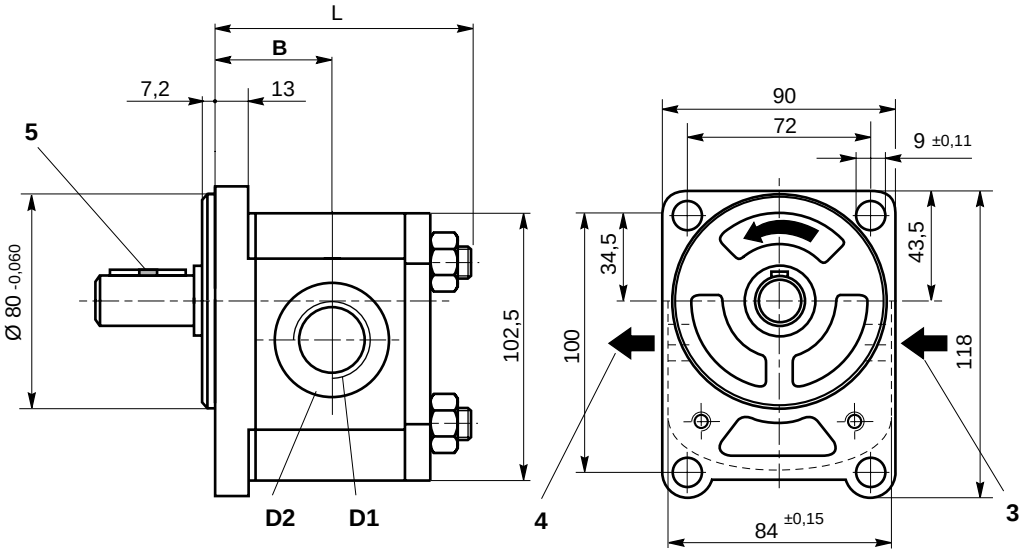


Unit dimensions, ordering details: (dimensions in mm, A = preferred types)

1 PF 2 G2-4X/... R/L A 01 MB

- Nominal size (see table)
- Direction of rotation:
  - Clockwise = **R**
  - anti-clockwise = **L**
- Cylindrical shaft Ø 18 mm

Nominal size	Dimensions L	B	D1	D2	Material no. Clockwise	Anti-clockwise	Weight in kg
004	88	42.25	G 1/2	34	530566A	530567	2.7
005	93	41.5	G 1/2	34	530568A	530569	2.7
008	93	45.25	G 1/2	34	530570A	530571	2.8
011	98	47.25	G 3/4	42	530572A	530573	3.0
016	108	49	G 3/4	42	530574A	530575	3.0
022	113	55.5	G 3/4	42	530576A	530577	3.5



Direction of rotation: anti-clockwise (version "L") viewed on the shaft end
With clockwise rotation version "R" the suction and pressure ports are exchanged!

3 Suction side
4 Pressure side
5 Cylindrical shaft Ø 18 mm

Unit dimensions, ordering details: (dimensions in mm, A = preferred types)

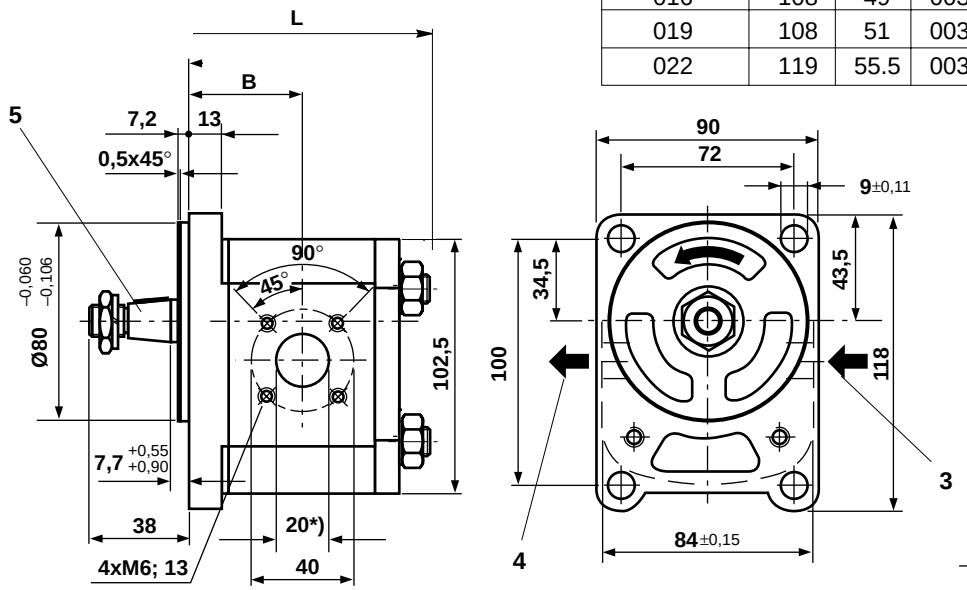
1 PF 2 G2-4X/... R/L C 20 MB

Nom. size (see table)

Direction of rotation:
Clockwise = R
Anti-clockwise = L

Tapered shaft
1 : 5; Ø 17 mm

Nom. size	Dimensions		Material no.		Weight
	L	B	Clockwise	Anti-clockwise	in kg
004	88	42.25	00363011 A	00363012	2.4
005	93	41.5	00363013 A	00363014	2.5
008	93	45.25	00363015 A	00363016	2.6
011	98	47.25	00363017 A	00363018	2.7
014	103	49.5	00363019	00363020	2.8
016	108	49	00363021 A	00363022	2.9
019	108	51	00363023 A	00363024	3.1
022	119	55.5	00363025 A	00363026	3.3



*) Ø15 with NS 4 and 5

Direction of rotation: anti-clockwise (version "L") viewed on the shaft end
With clockwise rotation version "R" the suction and pressure ports are exchanged!

3 Suction side
4 Pressure side
5 Tapered shaft 1 : 5; Ø 17 mm (see page 5)

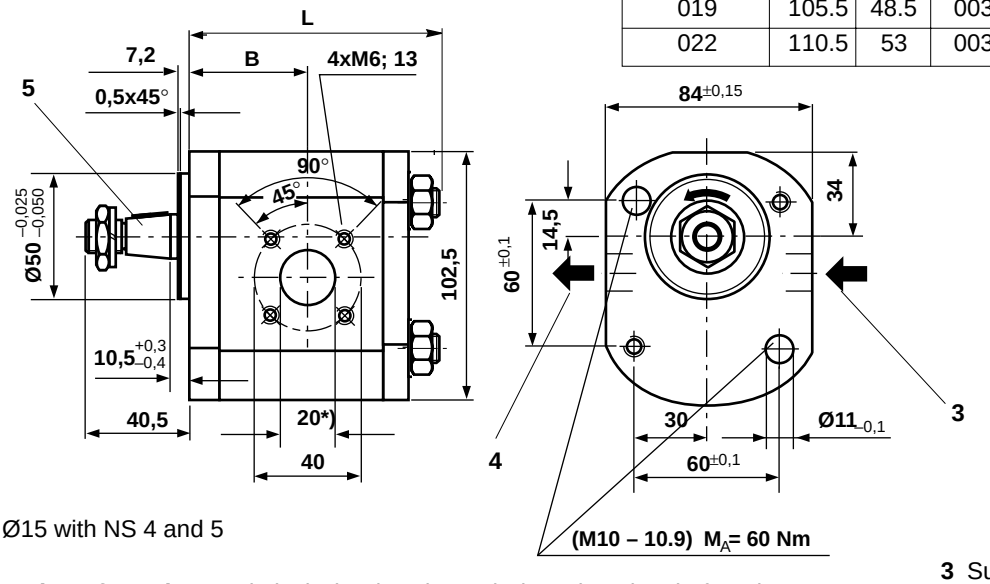
1 PF 2 G2-4X/... R/L C 20 KP

Nom. size (see table)

Direction of rotation:
Clockwise = R
Anti-clockwise = L

Tapered shaft
1 : 5; Ø 17 mm

Nom. size	Dimensions		Material no.		Weight
	L	B	Clockwise	Anti-clockwise	in kg
004	85.5	39.75	00363027	00363028	2.7
005	90.5	39	00363029	00363030	2.7
008	90.5	42.75	00363031	00363032	2.8
011	95.5	45	00363033	00363034	3.0
014	100.5	47	On request		3.0
016	105.5	46.5	00363037	00363038	3.0
019	105.5	48.5	00363039	00363040	3.2
022	110.5	53	00363041	00363042	3.5



*) Ø15 with NS 4 and 5

Direction of rotation: anti-clockwise (version "L") viewed on the shaft end
With clockwise rotation version "R" the suction and pressure ports are exchanged!

3 Suction side
4 Pressure side
5 Tapered shaft 1 : 5; Ø 17 mm (see page 5)

Unit dimensions, ordering details: (dimensions in mm, A = preferred types)

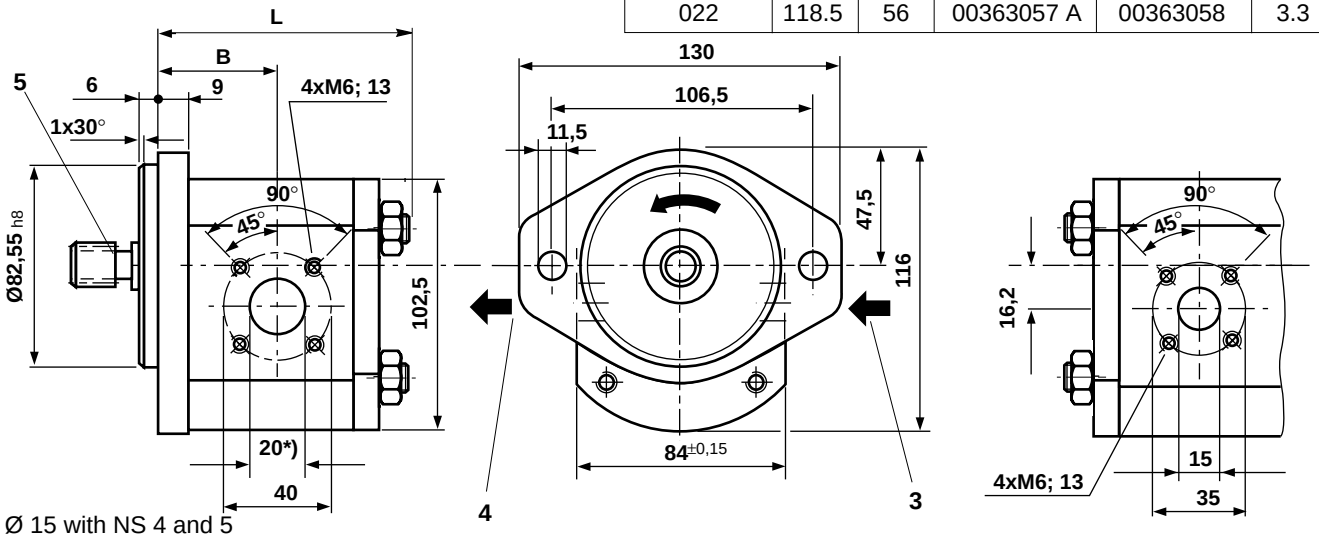
1 PF 2 G2-4X/... R / L R 20 MR

Nom. size (see table)

Direction of rotation:
Clockwise = R
Anti-clockwise = L

Splined shaft
SAE-A5/8"
9teeth

Nom. size	Dimensions L	Dimensions B	Material no. Clockwise	Material no. Anti-clockwise	Weight in kg
004	88.5	42.75	00363043 A	00363044	2.6
005	93.5	42	00363045	00363046	2.6
008	93.5	45.75	00363047 A	00363048	2.8
011	98.5	47.75	00363049 A	00363050	2.9
014	103.5	50	00363051	00363052	3.0
016	108.5	49.5	00363053 A	00363054	3.1
019	108.5	51.5	00363055 A	00363056	3.2
022	118.5	56	00363057 A	00363058	3.3



*) Ø 15 with NS 4 and 5

Direction of rotation: Anti-clockwise (version "L") viewed on the shaft
With clockwise rotation version "R" the suction and pressure ports are exchanged!

3 Suction side
4 Pressure side
5 Splined shaft (see page 5)

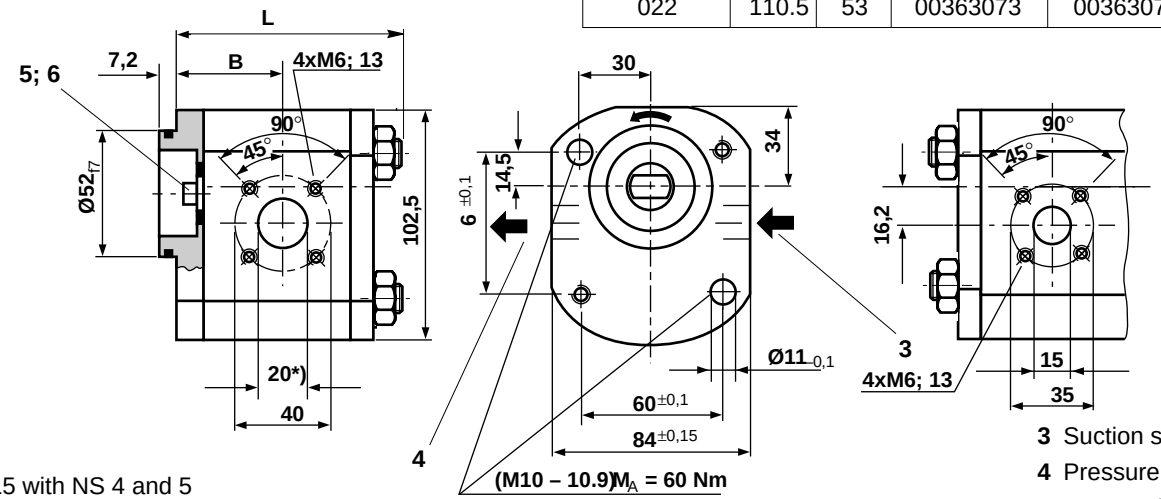
1 PF 2 G2-4X/... R / L N 20 MM

Nom. size (see table)

Direction of rotation:
Clockwise = R
Anti-clockwise = L

Shaft
with tongued coupling

Nom. size	Dimensions L	Dimensions B	Material no. Clockwise	Material no. Anti-clockwise	Weight in kg
004	85.5	39.75	00363059	00363060	2.6
005	90.5	39	00363061	00363062	2.6
008	90.5	42.75	00363063	00363064	2.7
011	95.5	45	00363065	00363066	3.0
014	100.5	47	On request		3.0
016	105.5	46.5	00363069	00363070	3.0
019	105.5	48.5	00363071	00363072	3.0
022	110.5	53	00363073	00363074	3.5



*) Ø 15 with NS 4 and 5

Direction of rotation: Anti-clockwise (version "L") viewed on the shaft
With clockwise rotation version "R" the suction and pressure ports are exchanged!
Attention: With NS 19 and 22 pressure limitation due to maximum permissible torque (see page 3).

3 Suction side
4 Pressure side
5 Tongued shaft with coupling (see page 5)
6 Pump without shaft seal ring

Unit dimensions, ordering details

(Dimensions in mm)

1 PF 2 G2-4X/... R/L S 20 MA

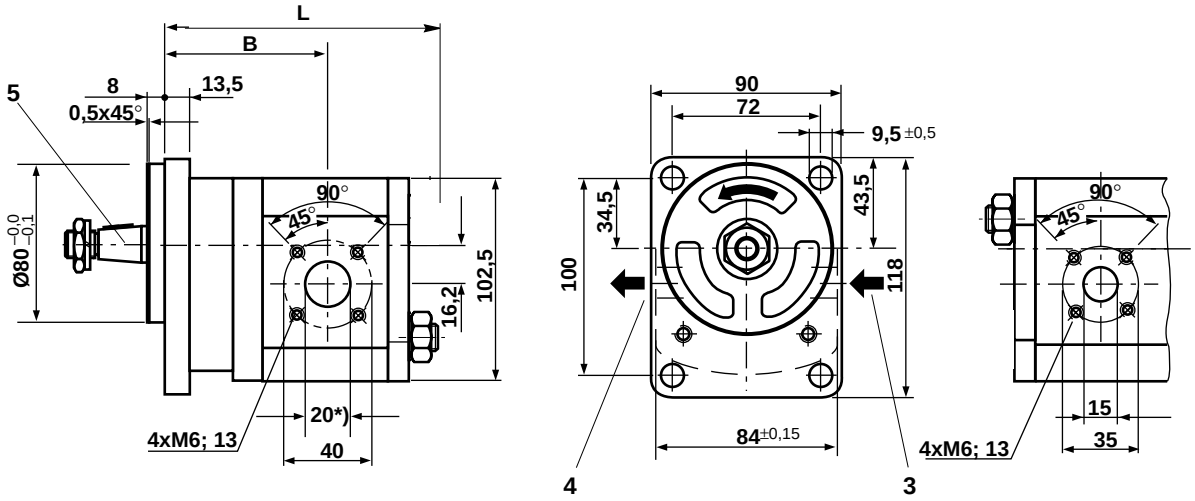
Nom. size (see table)

Direction of rotation:
Clockwise = R
Anti-clockwise = L

Tapered shaft
1 : 5; Ø 20 mm

Pump with front bearing
to take up radial
and axial forces
(see below)

Nom. size	Dimensions		Material no.		Weight
	L	B	Clockwise	Anti-clockwise	in kg
004	117.5	71.5	00363075	00363076	3.4
005	122.5	71	00363077	00363078	3.4
008	122.5	74.75	00363079	00363080	3.5
011	127.5	77	00363081	00363082	3.8
014	132.5	79	On request		3.8
016	137.5	78.5	00363085	00363086	3.8
019	142.5	80.5	00363087	00363088	3.8
022	147.5	85	00363089	00363090	4.3

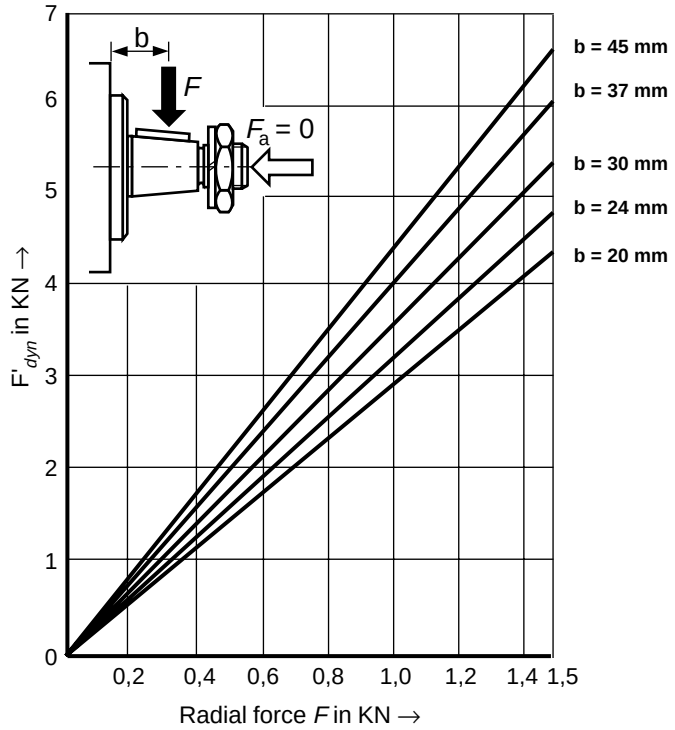


*) Ø 15 with NS 4 and 5

Direction of rotation: Anti-clockwise (version "L") viewed on the shaft end with clockwise rotation version "R" the suction and pressure ports are exchanged!
Attention: With NS 19 and 22 pressure limitation due to maximum permissible torque at the front bearing (see page 3).

3 Suction side
4 Pressure side
5 Tapered shaft
1 : 5; Ø 20 mm
(see page 5)

Front bearing, theoretical service life



$$L_h = \frac{10^6}{n \bullet 60} \left(\frac{C_{dyn}}{F'_{dyn}}\right)^3$$

n = Speed in min^{-1}
L_h = Theorectical bearing life in hours
F'_{dyn} = Equivalent dynamic load
C_{dyn} = Dynamic load constant 21,2 kN

Unit dimensions, ordering details: (dimensions in mm, A = preferred types)

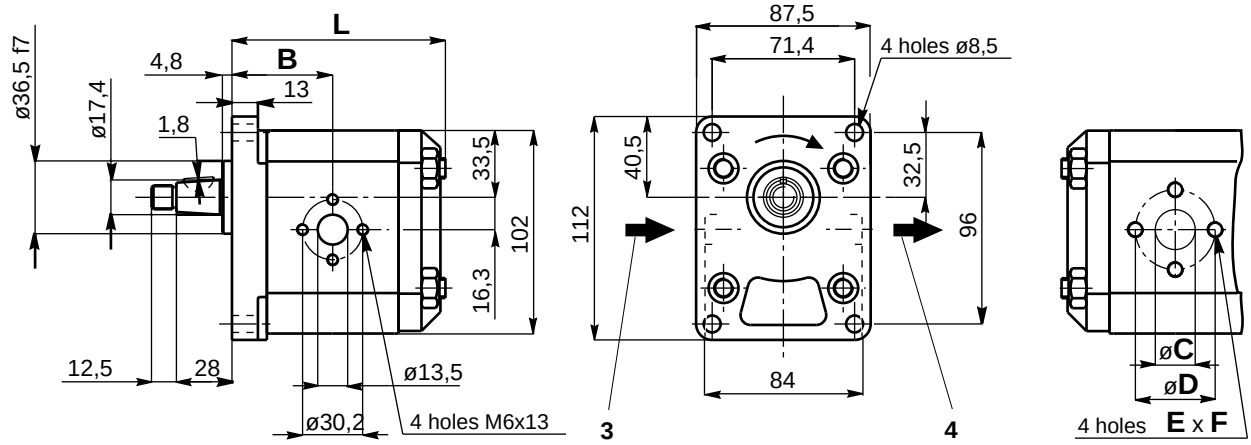
1 PF 2 G2-4X/... $\frac{R}{L}$ **H 30 MO**

NS (see table)

Direction of rotation:
Clockwise = **R**
Anti-clockwise = **L**

Tapered shaft
1 : 8; Ø 17.4 mm

NS	Dimensions						Material no.		Weight
	B	L	C	D	E	F	Clockwise	Anti-clockwise	in kg
004	41.8	87.5	13.5	30.2	M6	13	00530858 A	On request	2.6
005	41	92.5	13.5	30.2	M6	13	00530859 A	On request	2.6
008	44.8	92.5	13.5	30.2	M6	13	00530860 A	On request	2.8
011	46.8	97.5	13.5	30.2	M6	13	00530861 A	00530887	2.9
014	49	102.5	20	39.7	M8	16	00530862 A	On request	3.0
016	48.5	107.5	20	39.7	M8	16	00530863 A	On request	3.1
019	50.5	112.5	20	39.7	M8	16	00530864 A	On request	3.2
022	55	117.5	20	39.7	M8	16	00530865 A	On request	3.3



3 Suction side
4 Pressure side
5 Tapered shaft
1:8 ; Ø 17.4 mm (see page 6)

Direction of rotation: Clockwise (version "R") viewed on the shaft end
With anti-clockwise rotation version "L" the suction and pressure ports are exchanged !

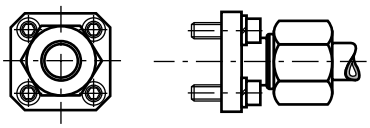
Seal kits (NBR)

Pump type (all nominal sizes)	Seal kit Material no.	Shaft seal Material no.
1 PF 2 G2-4X/...C 20 MB	00309401	00001855
1 PF 2 G2-4X/...C 20 KP	00309402	00013133 (FKM)
1 PF 2 G2-4X/...R 20 MR	00309401	00001855
1 PF 2 G2-4X/...S 20 MA	00309403	00005721
1 PF 2 G2-4X/...N 20 MM	00309401	–
1 PF 2 G2-4X/...H 30 MO	00309401	00001855
1 PF 2 G2-4X/...A 01 MS	00309401	00001855

Pump type (all nominal size)	Seal kit Material- no.	Shaft seal Material no.
1 PF 2 G2-4X/...C 20 MBK	00309401	00001855
1 PF 2 G2-4X/...C 20 KPK	00309402	00013133 (FKM)
1 PF 2 G2-4X/...R 20 MRK	00309401	00001855
1 PF 2 G2-4X/...N 20 MDL	00309401	00001855
1 PF 2 G2-4X/...N 20 MDN	00309401	00001855
1 PF 2 G2-4X/...H 30 MDK	00309401	00001855
1 PF 2 G2-4X/...A 01 MSK	00309401	00001855

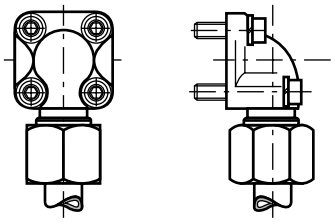
Flange fittings for line connections

Straight flange fitting



Suction side		Pressure side	
Pipe-Ø	Material no.	Pipe-Ø	Material no.
15	00321433	10	321436
18	00321434	12	321437
22	00321435	15	321438
28	00323237	16	323235

Angled flange fitting

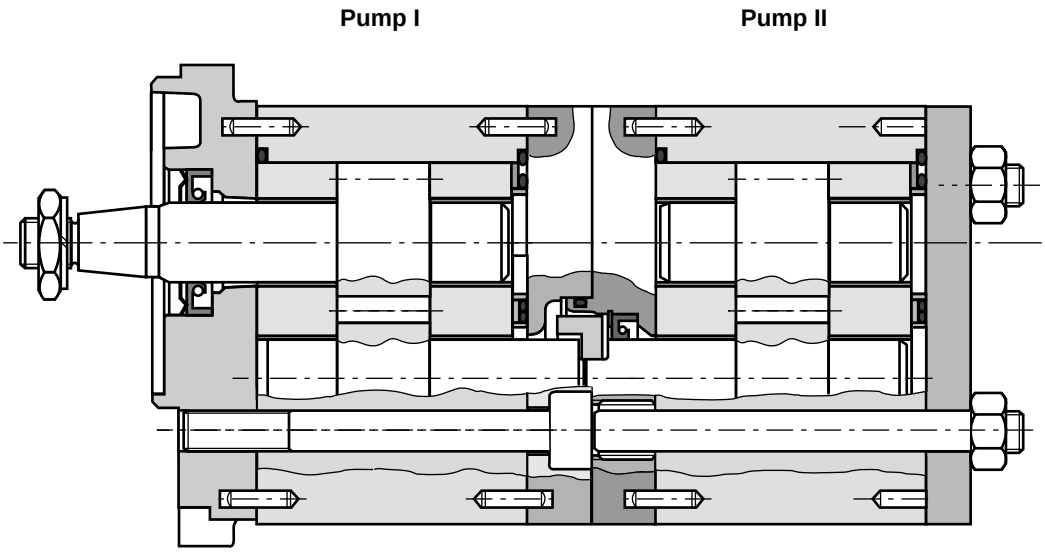


Suction side		Pressure side	
Pipe-Ø	Material no.	Pipe-Ø	Material no.
–	–	10	00321444
15	00321440	12	00321445
18	00321441	15	00321446
22	00321442	16	00321447
28	00321443	20	00321448

All fittings are supplied complete with screws, O-ring, cutting ring and nut

For technical data see RN 206.21

Multiple pumps type G2, series 4X



Technical data (for applications outside these parameters, please consult us)

– The same general parameters apply as with single pumps (see page 3)

Please note with multiple pumps the following is of particular importance:

– Nominal size 4 cannot be used as pump 1.

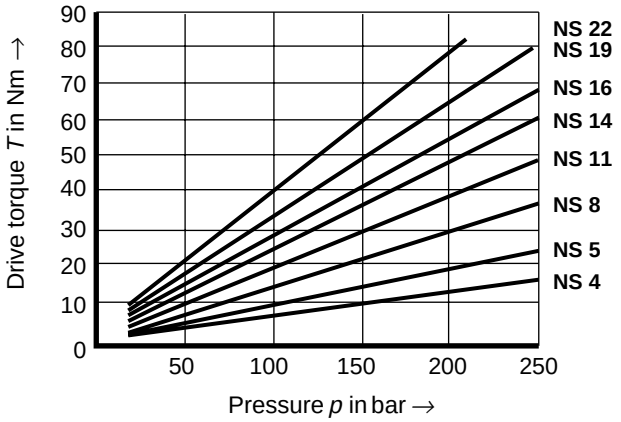
– Pump I should have a higher load than pump II (pressure x flow).

– The individual pumps are separated on the suction side by a shaft seal ring (pumps can draw from different tanks).

– The drive shafts and the coupling piece between the pumps have limitations with regard to the transferable torque (see below).

– When selecting the multiple pumps it must be ensured that the sum of the torques does not excced the permissible values.

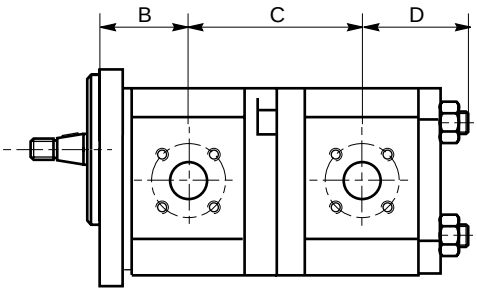
Weight: See table of individual pump types
Combination parts: plus 0,4 kg

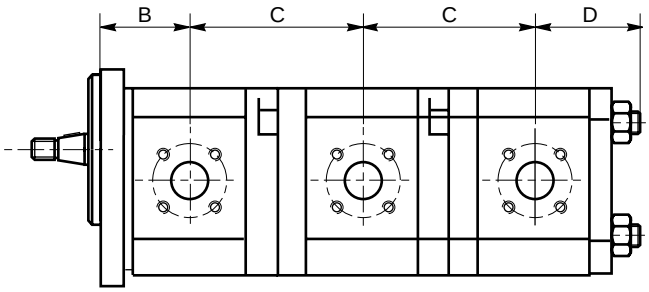


Permissible torques at shaft end:

A =	Cylinderical shaft Ø 18 mm	T_{max} =	70 Nm
C =	Tapered shaft 1: 5; Ø 17 mm	T_{max} =	150 Nm
R =	Splined shaft SAE-A 5/8"	T_{max} =	110 Nm
H =	Tapered shaft 1: 8; Ø 17.4 mm	T_{max} =	150 Nm
N =	Shaft with tongued coupling	T_{max} =	70 Nm
Coupling between pump I and pump II		T_{max} =	70 Nm

Multiple pumps (dimensions in mm, A = preferred types)





1 PF 2 G2-4X/ ... RC 20 MBK

1 PF 2 G2-4X/ ... LN 20 MDN

1 PF 2 G2-4X/ ... LN 20 MDL

Nom. size (see table)

Direction of rotation::
Clockwise **= R**
Anti-clockwise **= L**

Ports (01, 20)

Shaft end (A, C, N, R)

Dim. C and D

		Front pump							
		Dim. C							Dim. D
		005	008	011	014	016	019	022	
Rear pump	004	84 ,75	84 ,5	86 ,5	88 ,75	92 ,25	94 ,25	94 ,75	46,0
	005	84	83 ,75	85 ,75	88	91 ,5	93 ,5	94	51,5
	008		87 ,5	89 ,5	91 ,75	95 ,25	97 ,25	97 ,75	48,0
	011			91 ,5	93 ,75	97 ,25	99 ,25	99 ,75	51,0
	014				96	99 ,5	101 ,5	99 ,75	53,5
	016					99	101	101 ,5	59,0
	019						103	103 ,5	57,0
	022							108	57,5

Dim. B : see single pump

Material numbers for front centre and rear pumps

		004	005	008	011	014	016	019	022
Front	RC20MBK	NA	00363107 A	00363109 A	00363111 A	00363113	00363115 A	00363117	00363119 A
	RR20MRK	NA	00363151	00363153 A	00363155 A	00363157	00363159 A	00363161	00363163 A
	RC20KPK	NA	00363137	00363139	00363141	00363143	00363145	00363147	00363149
	RA01MBK	NA	00530581	00530583	00530585	NA	00530587	NA	00530589
Centre	LN20MDN	NA	00363286	00363294	00363296	00363298	00363300	00363302	00363304
	LN01MDN	NA	00530601	00530602	00530603	NA	00530604	NA	00530605
Rear	LN20MDL	00363122 A	00363124 A	00363126 A	00363128 A	00363130	00363132 A	00363134	00363136
	LN01MDL	00530611	00530612	00530613	00530614	NA	00530615	NA	00530616

		004	005	008	011	014	016	019	022
Front	LC20MBK	NA	00363108	00363110	00363112	00363114	00363116	00363118	00363120
	LR20MRK	NA	00363152	00363154	00363156	00363158	00363160	00363162	00363164
	LC20KPK	NA	00363138	00363140	00363142	00363144	00363146	00363148	00363150
	LA01MBK	NA	00530582	00530584	00530586	NA	00530588	NA	00530590
Centre	RN20MDN	NA	00363291	00363293	00363297	00363295	00363301	00363299	00363303
	RN01MDN	NA	00530606	00530607	00530608	NA	00530609	NA	00530610
Rear	RN20MDL	00363121	00363123	00363125	00363127	00363129	00363131	00363133	00363135
	RN01MDL	00530617	00530618	00530619	00530620	NA	00530621	NA	00530622

NA : Not available

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