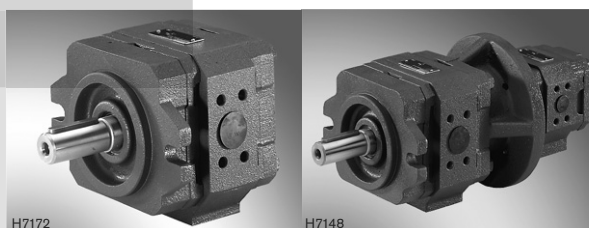


## Internal gear pump, fixed displacement

**RE 10223/10.05** 1/26  
Replaces: 03.05

### Type PGH

Frame sizes 2, 3, 4 and 5  
Component series: 2X  
Maximum operating pressure 350 bar  
Maximum displacement 250 cm<sup>3</sup>



H7172

H7148

Type PGH... with SAE 2-hole mounting flange

Double pump type PGH4 + PGH3

### Table of contents

Contents	Page
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Characteristic curves	6 to 11
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SAE connecting flanges	23
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Commissioning notes	25
Engineering notes	26

### Features

- Fixed displacement
- Low operating noise
- Low flow pulsation
- High efficiency even at low speed and viscosity due to sealing gap compensation
- Suitable for wide viscosity and speed ranges
- All frame sizes and nominal sizes can freely combined with each other
- Can be combined with PGF internal gear pumps, vane pumps and axial piston pumps
- Suitable for operation with HFC fluids (seal version "W")

**Ordering code**

PG		H	-2X/						*		
<b>Series</b>		Further details in clear text									
High pressure pump		= H									
<b>Frame size</b>		<b>Mounting flange centring</b>									
FS2		= 2									
FS3		= 3									
FS4		= 4									
FS5		= 5									
<b>Component series:</b> Component series 20 to 29 (20 to 29: unchanged installation and connection dimensions)		= 2X									
<b>Size</b>		<b>Seal material</b>									
	Size	Displacement/revolution		FKM seals							
FS2	5.0	5.2 cm <sup>3</sup>		W = <sup>2)</sup> Shaft seal ring made of NBR (other seals made of FKM)							
	6.3	6.5 cm <sup>3</sup>		= 005							
	8.0	8.2 cm <sup>3</sup>		= 006							
FS3	11	11.0 cm <sup>3</sup>		= 008							
	13	13.3 cm <sup>3</sup>		= 011							
	16	16.0 cm <sup>3</sup>		= 013							
FS4	20	20.10 cm <sup>3</sup>		= 016							
	25	25.30 cm <sup>3</sup>		= 020							
	32	32.70 cm <sup>3</sup>		= 025							
	40	40.10 cm <sup>3</sup>		= 032							
	50	50.70 cm <sup>3</sup>		= 040							
	63	65.50 cm <sup>3</sup>		= 050							
FS5	80	80.30 cm <sup>3</sup>		= 063							
	100	101.40 cm <sup>3</sup>		= 080							
	63	64.70 cm <sup>3</sup>		= 100							
	80	81.40 cm <sup>3</sup>		= 063							
	100	100.20 cm <sup>3</sup>		= 080							
	125	125.30 cm <sup>3</sup>		= 100							
	160	162.80 cm <sup>3</sup>		= 125							
	200	200.40 cm <sup>3</sup>		= 160							
	250	250.50 cm <sup>3</sup>		= 200							
				= 250							
		<b>Suction and pressure port to SAE <sup>3)</sup></b>									
		07 = Pressure port for standard pressure series									
		11 = Pressure port for high pressure series									
		<b>Shaft version</b>									
		E = Cylindrical									
		R = SAE involute splined shaft									
		<b>Direction of rotation (viewed to shaft end)</b>									
		R = Clockwise									
		L = Counter-clockwise									

<sup>1)</sup> Only in conjunction with cylindrical shaft (to VDMA), frame sizes 4 and 5 only, clockwise rotation only

<sup>2)</sup> FS4 and FS5 only for operation with HFC fluid

<sup>3)</sup> A type of connection 07 or 11 is determined for each size:

07: PGH2-2X/005/006/008...

PGH3-2X/011/013/016...

PGH4-2X/063/080/100...

PGH5-2X/160/200/250...

11: PGH4-2X/020/025/032/040/050...

PGH5-2X/063/080/100/125...

The suction ports are standard pressure series ports (for the dimensions, see page 17).

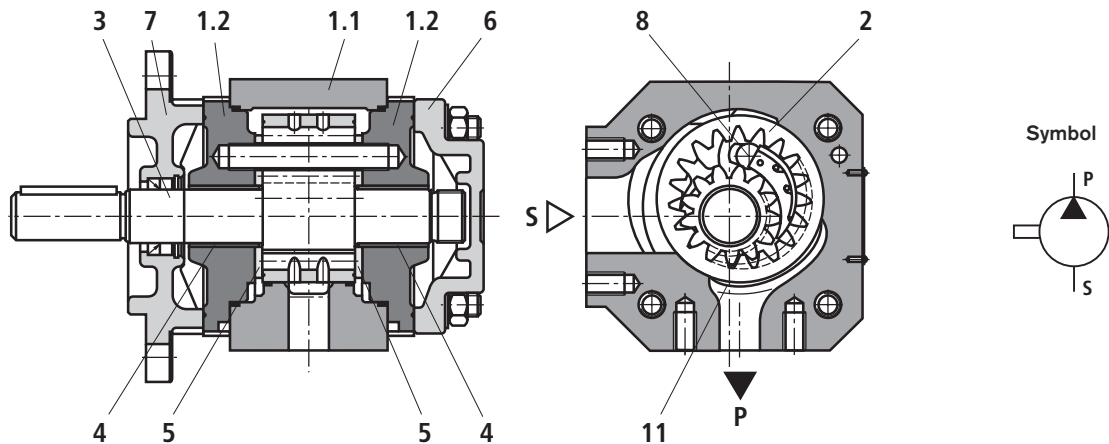
**Order example:** PGH4-2X/032RE11VU2

**Material number:** R900932141

Not all variants according to the type code are possible! Please select the desired pump on the basis of the selection table (pages 12 to 17) or consult Bosch Rexroth.



## Function, section, symbol



### Design

Hydraulic pumps of type PGH are gap-compensated internal gear pumps with fixed displacement.

They basically consist of housing (1), bearing cover (1.1), hollow gear (2), pinion shaft (3), plain bearings (4), axial plates (5), blanking plate (6), mounting flange (7) and abutment pin (8) as well as segment assembly (9), which comprises segment (9.1), segment carrier (9.2) and sealing rolls (9.3).

### Suction and displacement process

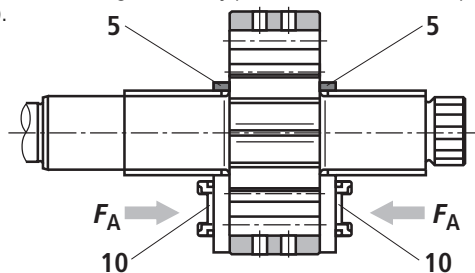
The pinion shaft (3) which is supported on hydrodynamic bearings drives the internally geared hollow gear (2) in the direction of rotation shown.

During rotation, the volume increases in the suction area at an angle of approx. 90°. A negative pressure develops and fluid flows into the chambers.

The sickle-shaped segment assembly (9) separates the suction chamber from the pressure chamber. Within the pressure chamber, the teeth of pinion shaft (3) mesh with the teeth of hollow gear (2). The fluid is then displaced via pressure channel (P).

### Axial compensation

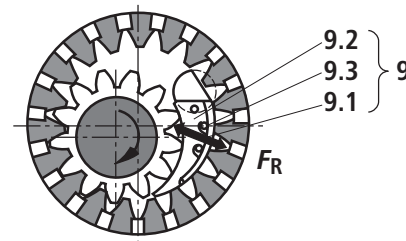
The axial compensation force  $F_A$  acts within the pressure chamber and is generated by pressure field (10) in axial plates (5).



Axial longitudinal gaps between rotating and fixed parts are therefore extremely small, which ensures optimum axial sealing of the pressure chamber.

### Radial compensation

Radial compensation force  $F_R$  acts on segment (9.1) and segment carrier (9.2).



Depending on the operating pressure, the two segment elements (9.1) and (9.2) are pressed against the crowns of the teeth on pinion shaft (3) and hollow gear (2).

The area ratios and position of the sealing rolls (9.3) between the segment and segment carrier are designed so that a largely leakage-gap-free sealing is achieved between the internal gear (2), segment (9) and pinion shaft (3).

Spring elements under sealing rolls (9.3) ensure adequate contact pressure, even at very low pressures

### Hydrodynamic and hydrostatic bearings

The forces acting on the pinion shaft (3) are absorbed by hydrodynamically lubricated radial sliding bearings (4), and those acting on internal gear (2) are absorbed by hydrostatic bearings (11).

### Gear

The toothing is of involute design. Its long meshing length results in little flow and pressure pulsation; this low pulsation rates greatly contribute the low noise operation.

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

**General**

Design	Internal gear pump, gap-compensated
Type	PGH
Type of mounting	SAE 2-hole flange to ISO 3019/1 or 4-hole flange to VDMA 24560 part 1 and ISO 3019/2
Type of connection, pipe connection	Flanged connection
Installation position	Optional
Shaft loading	Radial and axial forces (e.g. pulley) <b>only</b> after consultation
Direction of rotation (viewed to shaft end)	Clockwise or counter-clockwise – <b>not</b> bidirectional!

Frame size		FS2			FS3		
Size	Size	5.0	6.3	8.0	11	13	16
Weight	<i>m</i> kg	4.3	4.4	4.6	4.8	5	5.3
Speed range	$n_{min}$ min <sup>-1</sup>	600					
	$n_{max}$ min <sup>-1</sup>	3000					
Displacement	<i>V</i> cm <sup>3</sup>	5.24	6.5	8.2	11.0	13.3	16.0
Flow <sup>1)</sup>	$q_V$ L/min	7.5	9.3	11.8	15.8	19.1	23.0
Operating pressure, absolute		0.8 to 2 (briefly at start 0.6 bar)					
– Inlet	$p$ bar						
– Outlet, continuous	$p_{max}$ bar						
	HLP fluid	315					
	Special fluid	210					
intermittent <sup>2)</sup>	$p_{max}$ bar						
	HLP fluid	350					
	Special fluid <sup>3)</sup>	230					

Frame size		FS4								
Size	Size	20	25	32	40	50	63	80	100	
Weight	<i>m</i> kg	13.5	14	14.5	15	16	17	18.5	20	
Speed range	$n_{min}$ min <sup>-1</sup>	500	500	500	500	500	400	400	400	
	$n_{max}$ min <sup>-1</sup>	3000	3000	3000	2600	2600	2600	2200	2200	
Displacement	<i>V</i> cm <sup>3</sup>	20.1	25.3	32.7	40.1	50.7	65.5	80.3	101.4	
Flow <sup>1)</sup>	$q_V$ L/min	28.9	36.3	46.9	57.6	72.8	94.0	115.3	145.6	
Operating pressure, absolute		0.8 to 2 (briefly at start 0.6 bar)								
– Inlet	$p$ bar									
– Outlet, continuous	$p_{max}$ bar									
	HLP fluid	250			210		160		125	
	Special fluid	175			140		140		100	
intermittent <sup>2)</sup>	$p_{max}$ bar									
	HLP fluid	315			250		210		160	
	Special fluid <sup>3)</sup>	210			175		175		140	

For footnotes, see page 5

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

Fame size			FS5							
Size	Size		63	80	100	125	160	200	250	
Weight	<i>m</i>	kg	39	40.5	42.5	45	49	52.5	57.5	
Speed range	<i>n<sub>min</sub></i>	min <sup>-1</sup>	400	400	400	400	300	300	300	
	<i>n<sub>max</sub></i>	min <sup>-1</sup>	2600	2200	2200	2200	1800	1800	1800	
Displacement	<i>V</i>	cm <sup>3</sup>	64.7	81.4	100.2	125.3	162.8	200.4	250.5	
Flow <sup>1)</sup>	<i>q<sub>V</sub></i>	L/min	92.8	116.9	143.8	179.8	233.7	287.7	359.6	
Operating pressure, absolute			0.8 to 2 (briefly at start 0.6 bar)							
– Inlet										
– Outlet, continuous			250				210		160	
			175				140		100	
intermittent <sup>2)</sup>			315				250		210	
			210				175		175	

**Hydraulic**

Hydraulic fluid			HLP – mineral oil to DIN 51524 part 2 HFC – watery polymer solutions to DIN EN ISO 12922 <sup>3)</sup> ; seal version W HEES – fluids to DIN ISO 15380 <sup>3)</sup> HFD-U – fluids to VDMA 24317 <sup>3)</sup> , DIN EN ISO 12922 <sup>3)</sup> <b>Please observe our regulations according to data sheet RE 07075.</b> <b>Other fluids on inquiry!</b>						
Hydraulic fluid	HLP fluid	°C	– 10 to + 80; for other temperatures, please consult us!						
temperature range	Special fluid	°C	– 10 to + 50; for other temperatures, please consult us!						
Ambient temperature range			– 20 to + 60						
Viscosity range			mm <sup>2</sup> /s 10 to 300; permissible starting viscosity 2000						
Max. permissible degree of contamination of the hydraulic fluid			Class 20/18/15 <sup>4)</sup>						
Cleanliness class to ISO 4406 (c)									

<sup>1)</sup> measured at  $n = 1450 \text{ min}^{-1}$ ,  $p = 10 \text{ bar}$  and  $v = 46 \text{ mm}^2/\text{s}$

<sup>2)</sup> max 10 s, max. 50 % of duty cycle

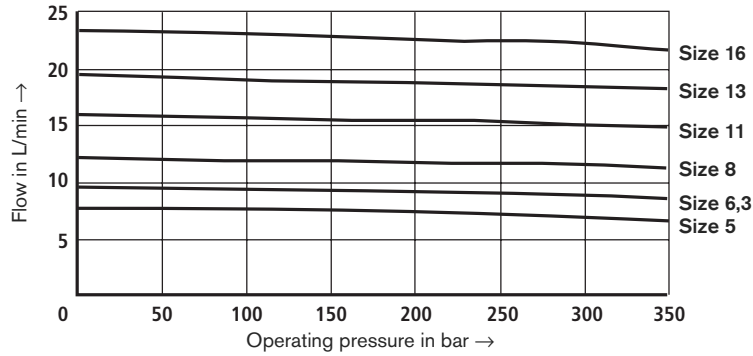
\*\*\*\*\*<sup>3)</sup> **Caution!** The restrictions for special fluids also apply for these media

<sup>4)</sup> The cleanliness classes specified for components must be adhered to in hydraulic systems. Effective filtration prevents malfunction and, at the same time, prolongs the service life of components.

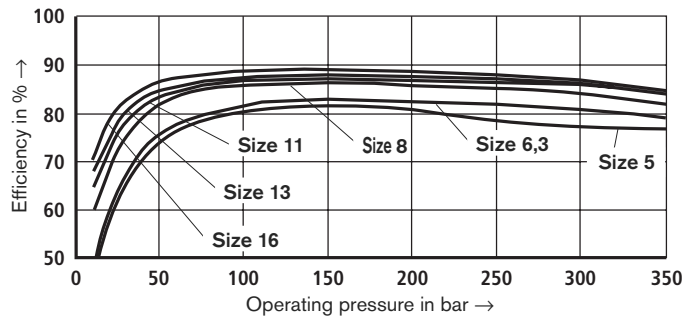
For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086 and RE 50088.

**Characteristic curve average values of FS 2 and 3** (measured at  $n = 1450 \text{ min}^{-1}$ ;  $v = 46 \text{ mm}^2/\text{s}$  and  $\vartheta = 50 \text{ }^\circ\text{C}$ )

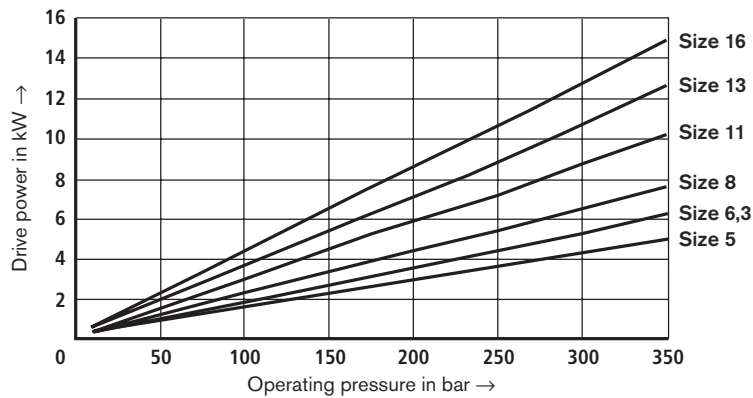
Flow



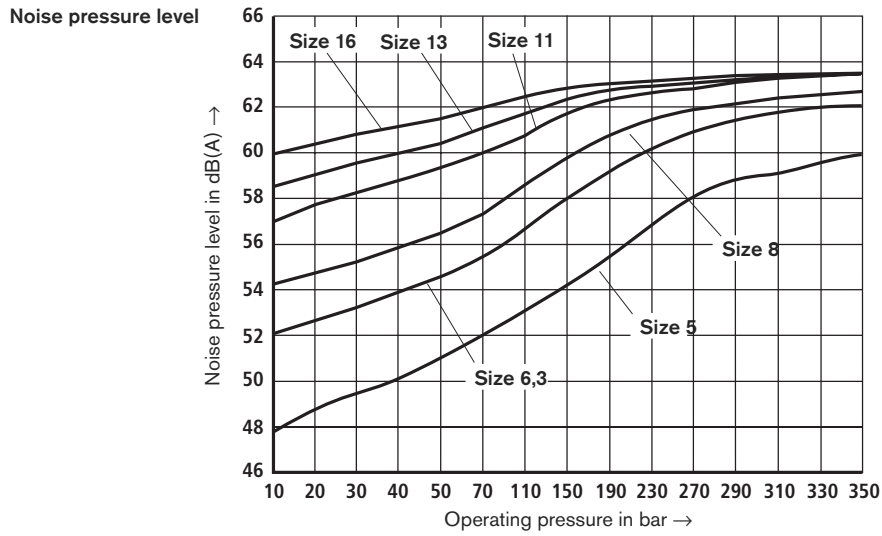
Efficiency



Drive power

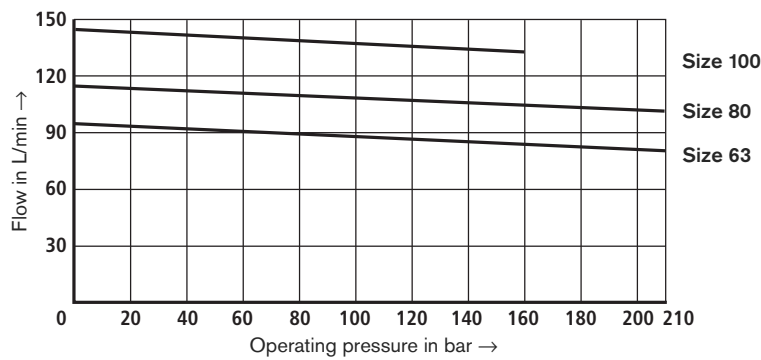
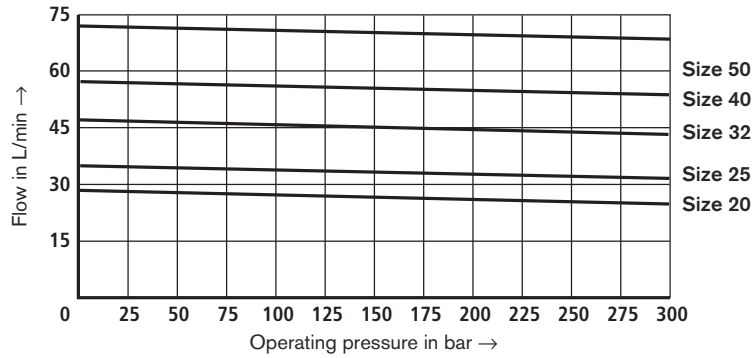


**Characteristic curve average values of FS 2 and 3** (measured at  $n = 1450 \text{ min}^{-1}$ ;  $v = 46 \text{ mm}^2/\text{s}$  and  $\vartheta = 50 \text{ }^\circ\text{C}$ )

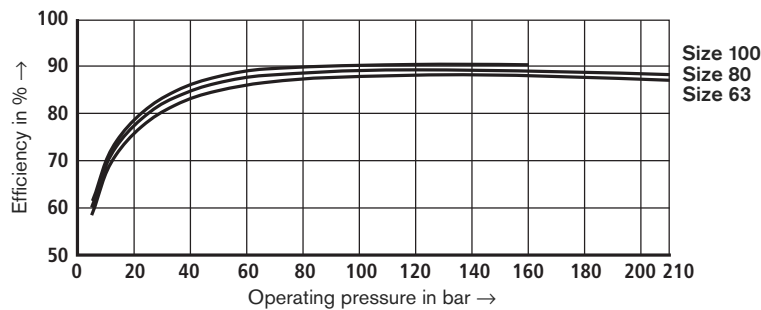
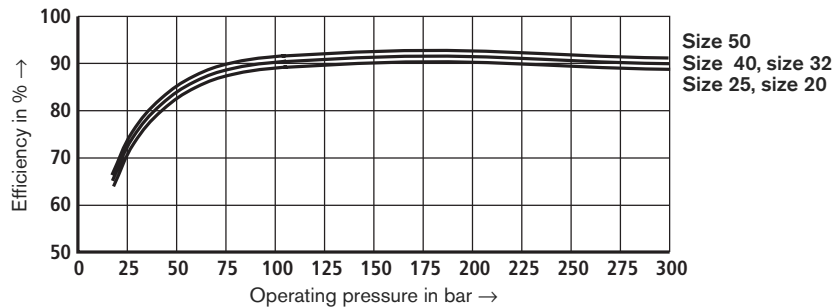


**Characteristic curve average values of FS 4 (measured at  $n = 1450 \text{ min}^{-1}$ ;  $v = 46 \text{ mm}^2/\text{s}$  and  $\vartheta = 40 \text{ }^\circ\text{C}$ )**

Flow

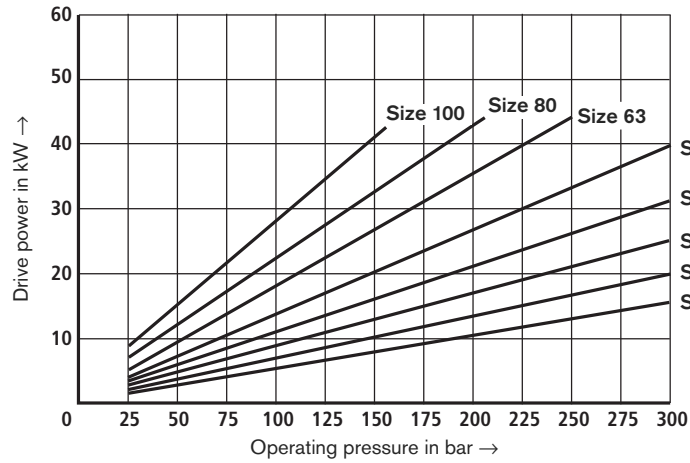


Efficiency



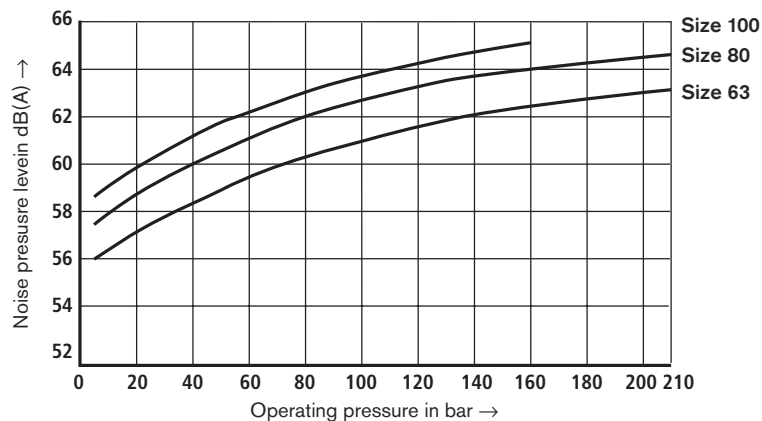
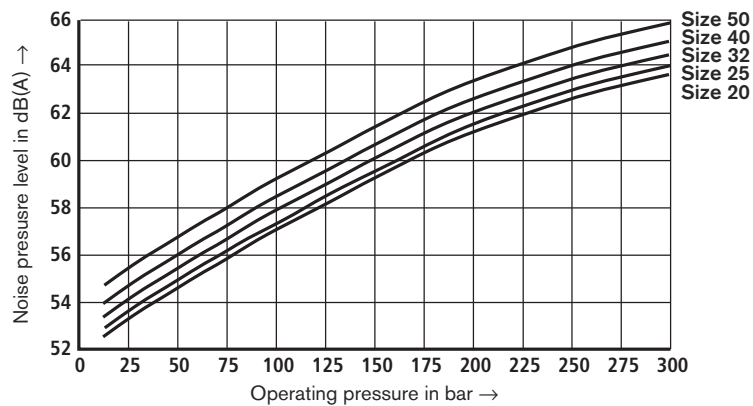
**Characteristic curve average values of FS 4** (measured at  $n = 1450 \text{ min}^{-1}$ ;  $v = 46 \text{ mm}^2/\text{s}$  and  $\vartheta = 40 \text{ }^\circ\text{C}$ )

**Drive power**



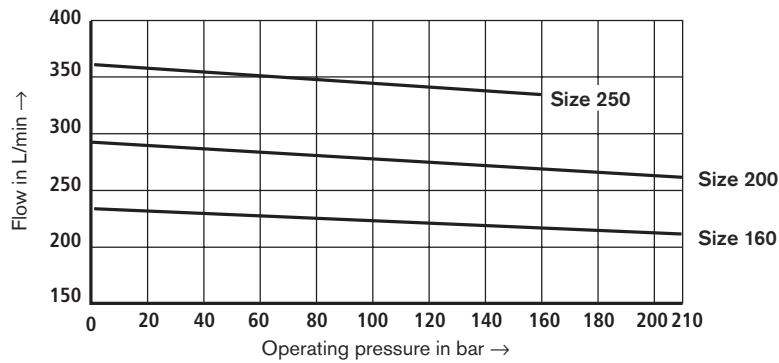
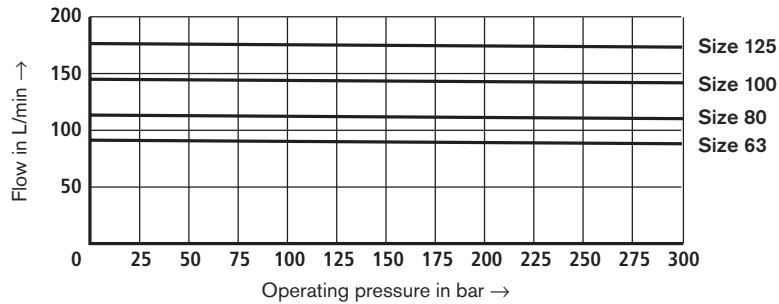
**Noise pressure level**

Measured in the anechoic chamber in line with DIN 45635, page 26  
Distance from microphone to pumps = 1 m

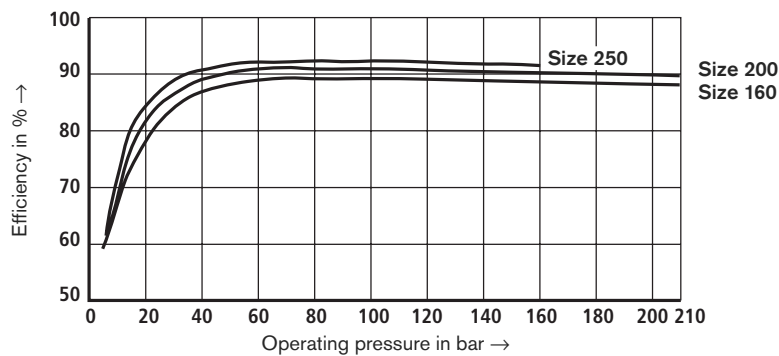
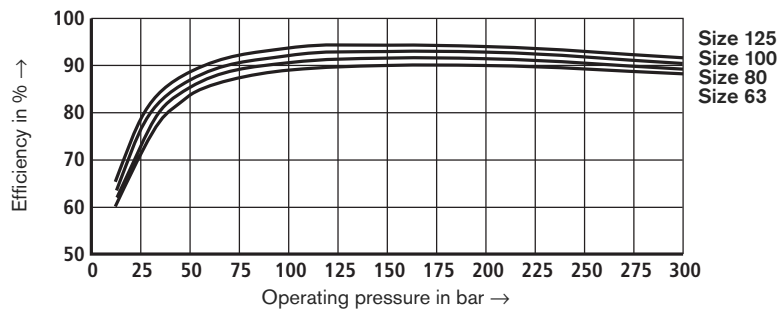


**Characteristic curve average values of FS 5** (measured at  $n = 1450 \text{ min}^{-1}$ ;  $v = 46 \text{ mm}^2/\text{s}$  and  $\vartheta = 40 \text{ }^\circ\text{C}$ )

**Flow**

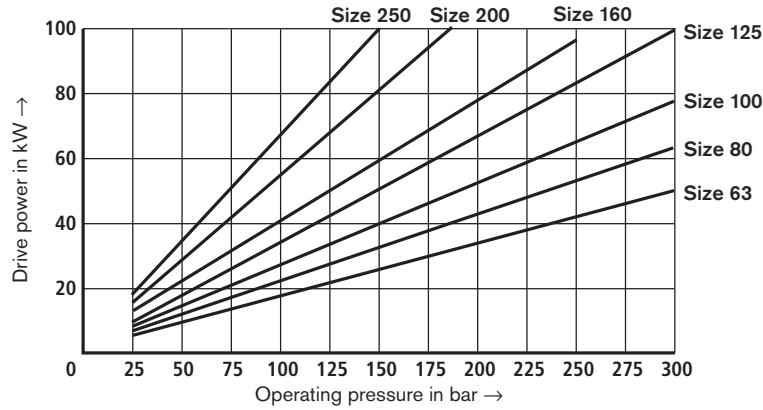


**Efficiency**



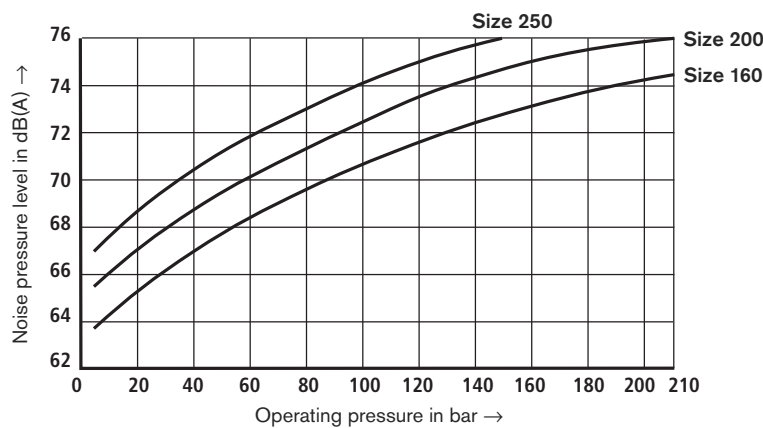
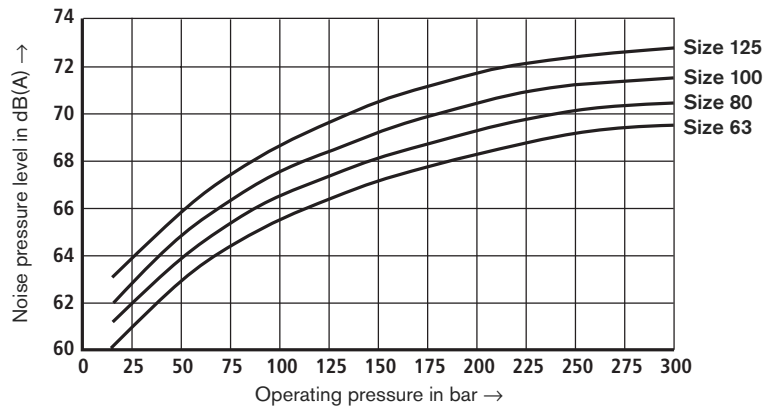
**Characteristic curve average values of FS 5** (measured at  $n = 1450 \text{ min}^{-1}$ ;  $v = 46 \text{ mm}^2/\text{s}$  and  $\vartheta = 40 \text{ }^\circ\text{C}$ )

Drive power



Noise pressure level

Measured in the anechoic chamber in line with DIN 45635, page 26  
Distance from microphone to pumps = 1 m

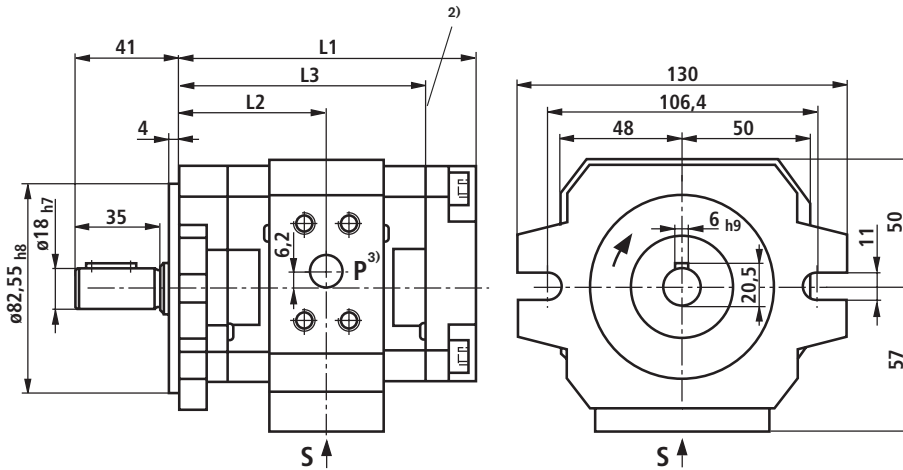


**Unit dimensions of frame size 2 (nominal dimensions in mm, Δ preferred types)**

PGH2-2X/...<sup>R</sup><sub>L</sub> E07VU2

Drive shaft cylindrical, SAE 2-hole mounting flange

Type	Size	Material no.		L1	L2	L3	S	P
		"R" clockwise	"L" counter-clockwise					
PGH2-2X/005..E07VU2		R900968999 Δ	R900703725	110	54.2	89.5	1/2"S <sup>1)</sup>	1/2"S <sup>1)</sup>
PGH2-2X/006..E07VU2		R900951301 Δ	R900961547	112.5	55.5	92	1/2"S <sup>1)</sup>	1/2"S <sup>1)</sup>
PGH2-2X/008..E07VU2		R900951302 Δ	R900961548	116	57.3	95.5	1/2"S <sup>1)</sup>	1/2"S <sup>1)</sup>



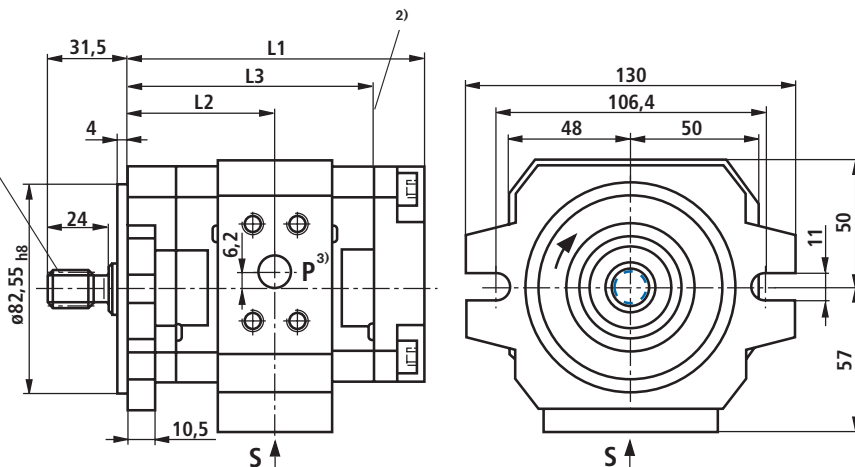
PGH2-2X/...<sup>R</sup><sub>L</sub> R07VU2

Drive shaft splined, SAE 2-hole mounting flange

(middle and rear pump for multiple pumps)

Type	Size	Material no.		L1	L2	L3	S	P
		"R" clockwise	"L" counter-clockwise					
PGH2-2X/005..R07VU2		R900972378 Δ	R900703727	110	54.2	89.5	1/2"S <sup>1)</sup>	1/2"S <sup>1)</sup>
PGH2-2X/006..R07VU2		R900961549 Δ	R900961550	112.5	55.5	92	1/2"S <sup>1)</sup>	1/2"S <sup>1)</sup>
PGH2-2X/008..R07VU2		R900961551 Δ	R900961552	116	57.3	95.5	1/2"S <sup>1)</sup>	1/2"S <sup>1)</sup>

Shaft 16-4; SAE J 744 JUL 88; involute splined shaft ANSI B92.1a-1976, 9T 16/32 DP 30°



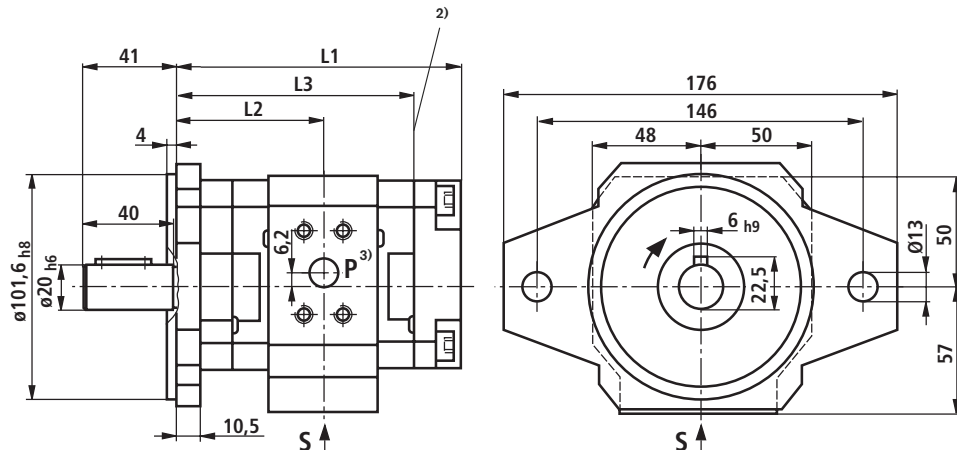
<sup>1)</sup> S = Standard pressure series; for precise dimensions, see table on page 17    <sup>2)</sup> For multiple pumps the combination part starts here  
<sup>3)</sup> Pumps shown for clockwise rotation; for counter-clockwise rotation, the pressure port is on the opposite side!

**Unit dimensions for frame size 3** (nominal dimensions in mm, Δ preferred types)

PGH3-2X/...<sup>R</sup><sub>L</sub> E07VU2

Drive shaft cylindrical,  
SAE 2-hole mounting  
flange

Type	Size	Material no.		L1	L2	L3	S	P
		"R" clockwise	"L" counter-clockwise					
PGH3-2X/011..E07VU2		R900951303 Δ	R900961553	128	66.5	107.5	1"S <sup>1)</sup>	1/2"S <sup>1)</sup>
PGH3-2X/013..E07VU2		R900951304 Δ	R900961554	133	69	112.5	1"S <sup>1)</sup>	1/2"S <sup>1)</sup>
PGH3-2X/016..E07VU2		R900951305 Δ	R900961555	138	71.5	117.5	1"S <sup>1)</sup>	1/2"S <sup>1)</sup>



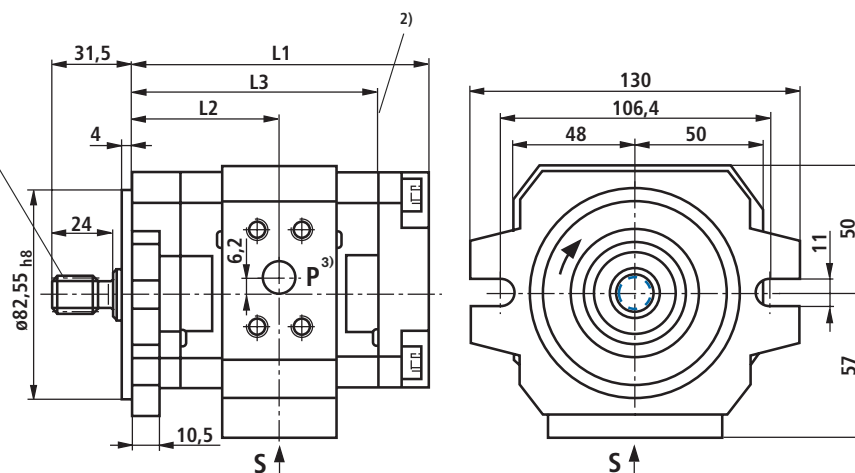
PGH3-2X/...<sup>R</sup><sub>L</sub> R07VU2

Drive shaft splined,  
SAE 2-hole mounting  
flange

(middle and rear pump  
for multiple pumps)

Typ	Size	Material no.		L1	L2	L3	S	P
		"R" clockwise	"L" counter-clockwise					
PGH3-2X/011..R07VU2		R900961556 Δ	R900961559	121.5	60	101	1"S <sup>1)</sup>	1/2"S <sup>1)</sup>
PGH3-2X/013..R07VU2		R900961557 Δ	R900961560	126.5	62.5	106	1"S <sup>1)</sup>	1/2"S <sup>1)</sup>
PGH3-2X/016..R07VU2		R900961558 Δ	R900961561	131.5	65	111	1"S <sup>1)</sup>	1/2"S <sup>1)</sup>

Shaft 16-4; SAE J 744 JUL 88;  
involute splined shaft ANSI B92.1a-1976, 9T 16/32 DP 30°



S = Standard pressure series; for precise dimensions, see table on page 17 <sup>2)</sup> For multiple pumps the combination part starts here  
<sup>3)</sup> Pumps shown for clockwise rotation; for counter-clockwise rotation, the pressure port is on the opposite side!



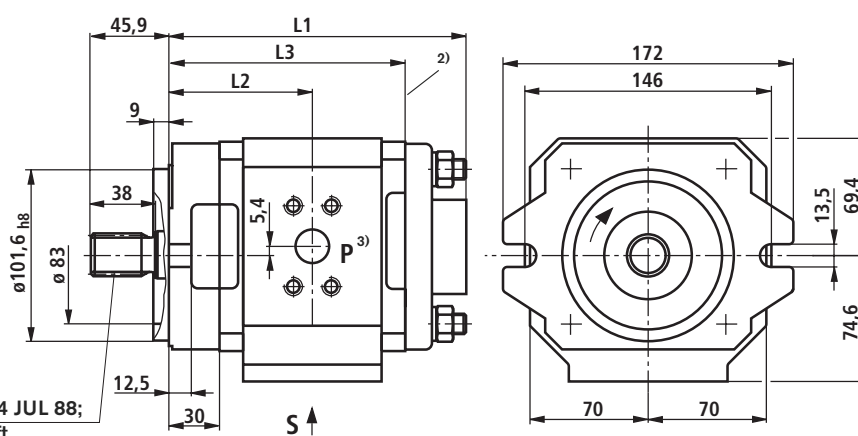
**Unit dimensions of frame size 4** (nominal dimensions in mm, Δ preferred types)

PGH4-2X/...<sup>R</sup> R...VU2  
<sub>L</sub>

Drive shaft splined,  
SAE 2-hole mounting  
flange

(middle and rear pump  
for multiple pumps)

Typ	Size	Material no.		L1	L2	L3	S	P
		"R" clockwise	"L" counter-clockwise					
PGH4-2X/020..R11VU2		R900086356 Δ	R900086379	147	70.5	111	1 1/4"S <sup>1)</sup>	3/4"H <sup>1)</sup>
PGH4-2X/025..R11VU2		R900086357 Δ	R900086380	152	73	116	1 1/4"S <sup>1)</sup>	3/4"H <sup>1)</sup>
PGH4-2X/032..R11VU2		R900086358 Δ	R900086381	159	76.5	123	1 1/2"S <sup>1)</sup>	3/4"H <sup>1)</sup>
PGH4-2X/040..R11VU2		R900086359 Δ	R900086382	166	80	130	1 1/2"S <sup>1)</sup>	3/4"H <sup>1)</sup>
PGH4-2X/050..R11VU2		R900086360 Δ	R900086383	176	85	140	1 1/2"S <sup>1)</sup>	1"H <sup>1)</sup>
PGH4-2X/063..R07VU2		R900086362 Δ	R900086385	190	92	154	2"S <sup>1)</sup>	1 1/4"S <sup>1)</sup>
PGH4-2X/080..R07VU2		R900086363 Δ	R900086386	204	99	168	2"S <sup>1)</sup>	1 1/2"S <sup>1)</sup>
PGH4-2X/100..R07VU2		R900086364 Δ	R900086387	224	109	188	2"S <sup>1)</sup>	1 1/2"S <sup>1)</sup>



Shaft 25-4; SAE J 744 JUL 88;  
involute splined shaft  
ANSI B92.1a-1976,  
15T 16/32 DP 30°

<sup>1)</sup> S = standard pressure series, H = high pressure series;  
for precise dimensions, see page 17

<sup>2)</sup> For multiple pumps the combination part starts here

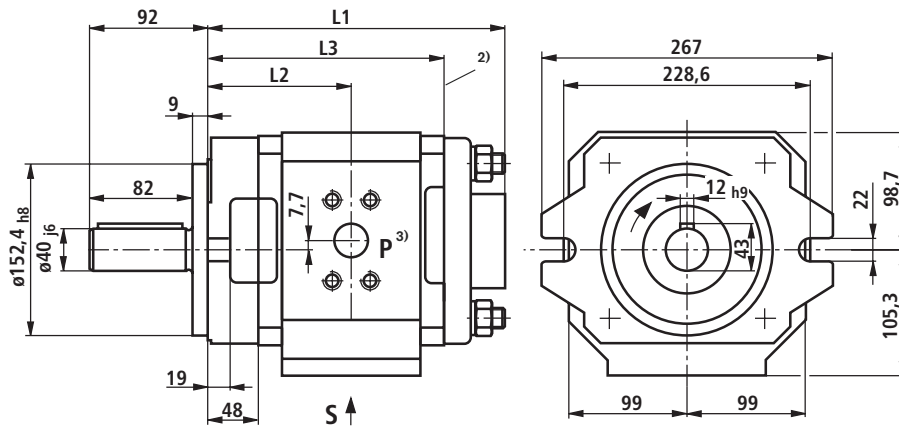
<sup>3)</sup> Pumps shown for clockwise rotation; for counter-clockwise rotation, the pressure port is on the opposite side!

**Unit dimensions of frame size 5** (nominal dimensions in mm, Δ preferred types)

PGH5-2X/...<sup>R</sup> E...VU2  
<sub>L</sub>

Drive shaft  
cylindrical,  
SAE 2-hole mounting  
flange

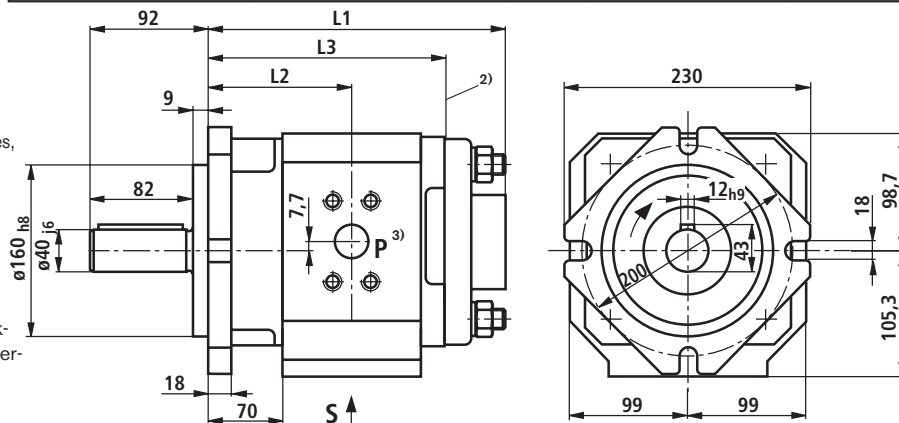
Type	Size	Material no.		L1	L2	L3	S	P
		"R" clockwise	"L" counter-clockwise					
PGH5-2X/063..E11VU2		R900932168 Δ	R900086496	208	105.5	163	1 1/2"S <sup>1)</sup>	1"H <sup>1)</sup>
PGH5-2X/080..E11VU2		R900086460 Δ	R900086497	216	109.5	171	2"S <sup>1)</sup>	1 1/4"H <sup>1)</sup>
PGH5-2X/100..E11VU2		R900086461 Δ	R900086498	225	114	180	2"S <sup>1)</sup>	1 1/4"H <sup>1)</sup>
PGH5-2X/125..E11VU2		R900932169 Δ	R900086499	237	120	192	2"S <sup>1)</sup>	1 1/4"H <sup>1)</sup>
PGH5-2X/160..E07VU2		R900932171 Δ	R900086501	255	129	210	3"S <sup>1)</sup>	2"S <sup>1)</sup>
PGH5-2X/200..E07VU2		R900086465 Δ	R900086503	273	138	228	3"S <sup>1)</sup>	2"S <sup>1)</sup>
PGH5-2X/250..E07VU2		R900086466 Δ	R900086504	297	150	252	3"S <sup>1)</sup>	2"S <sup>1)</sup>



PGH5-2X/...RE...VE4

Drive shaft  
cylindrical,  
with 4-hole mount-  
ing flange to  
ISO 3019/2 and  
VDMA 24560 part 1

Type	Size	Material no.		L1	L2	L3	S	P
		"R" clockwise	"L" counter-clockwise					
PGH5-2X/063RE11VE4		R900086551		208	105.5	163	1 1/2"S <sup>1)</sup>	1"H <sup>1)</sup>
PGH5-2X/080RE11VE4		R900932173		216	109.5	171	2"S <sup>1)</sup>	1 1/4"H <sup>1)</sup>
PGH5-2X/100RE11VE4		R900932174		225	114	180	2"S <sup>1)</sup>	1 1/4"H <sup>1)</sup>
PGH5-2X/125RE11VE4		R900932175		237	120	192	2"S <sup>1)</sup>	1 1/4"H <sup>1)</sup>
PGH5-2X/160RE07VE4		R900086556		255	129	210	3"S <sup>1)</sup>	2"S <sup>1)</sup>
PGH5-2X/200RE07VE4		R900086557		273	138	228	3"S <sup>1)</sup>	2"S <sup>1)</sup>
PGH5-2X/250RE07VE4		R900932176		297	150	252	3"S <sup>1)</sup>	2"S <sup>1)</sup>



<sup>1)</sup> S = standard pressure series,  
H = high pressure series;  
for precise dimensions,  
see table on page 17

<sup>2)</sup> For multiple pumps the  
combination part starts  
here

<sup>3)</sup> Pumps shown for clock-  
wise rotation; for counter-  
clockwise rotation, the  
pressure port is on the  
opposite side!

**Unit dimensions of frame size 5 (nominal dimensions in mm, Δ preferred types)**

PGH5-2X/...<sup>R</sup><sub>L</sub>...VU2

Drive shaft splined,  
SAE 2-hole mounting  
flange

(middle and rear pump  
for multiple pumps)

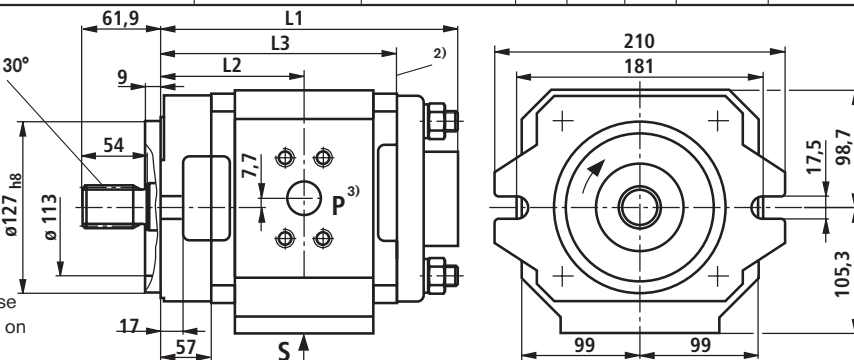
Shaft 38-4;  
SAE J 744 JUL 88;  
involute splined shaft  
ANSI B92.1a-1976, 17T 12/24 DP 30°

<sup>1)</sup> S = standard pressure series,  
H = high pressure series;  
for precise dimensions, see  
table on page 17

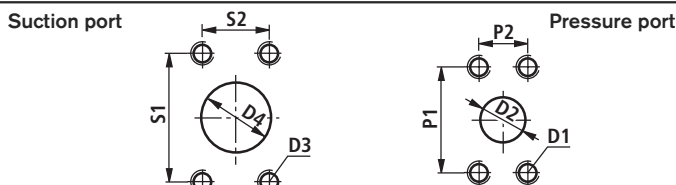
<sup>2)</sup> For multiple pumps the  
combination part starts here

<sup>3)</sup> Pumps shown for clockwise  
rotation; for counter-clockwise  
rotation, the pressure port is on  
the opposite side!

Type	Size	Material no.		L1	L2	L3	S	P
		"R" clockwise	"L" counter-clockwise					
PGH5-2X/063..R11VU2		R900932172 Δ	R900086533	217	114.5	172	1 1/2"S <sup>1)</sup>	1"H <sup>1)</sup>
PGH5-2X/080..R11VU2		R900086516 Δ	R900086534	225	118.5	180	2"S <sup>1)</sup>	1 1/4"H <sup>1)</sup>
PGH5-2X/100..R11VU2		R900086517 Δ	R900086535	234	123	189	2"S <sup>1)</sup>	1 1/4"H <sup>1)</sup>
PGH5-2X/125..R11VU2		R900086518 Δ	R900086536	246	129	201	2"S <sup>1)</sup>	1 1/4"H <sup>1)</sup>
PGH5-2X/160..R07VU2		R900086520 Δ	R900086538	264	138	219	3"S <sup>1)</sup>	2"S <sup>1)</sup>
PGH5-2X/200..R07VU2		R900086521 Δ	R900086539	282	147	237	3"S <sup>1)</sup>	2"S <sup>1)</sup>
PGH5-2X/250..R07VU2		R900086522 Δ	R900086540	306	159	261	3"S <sup>1)</sup>	2"S <sup>1)</sup>



**Suction and pressure ports (nominal dimensions in mm)**



FS	Size	Porting pattern/ suction p., S	Porting pattern/ pressure p., P	D1	D2	D3	D4	P1	P2	S1	S2
2	005	1/2" 5000 PSI	1/2" 5000 PSI	M8x15	13	M8x15	13	38.1	17.5	38.1	17.5
	006	1/2" 5000 PSI	1/2" 5000 PSI	M8x15	13	M8x15	13	38.1	17.5	38.1	17.5
	008	1/2" 5000 PSI	1/2" 5000 PSI	M8x15	13	M8x15	13	38.1	17.5	38.1	17.5
3	011	1" 3000 PSI	1/2" 5000 PSI	M8x15	13	M10x17	19	38.1	17.5	52.4	26.2
	013	1" 3000 PSI	1/2" 5000 PSI	M8x15	13	M10x17	19	38.1	17.5	52.4	26.2
	016	1" 3000 PSI	1/2" 5000 PSI	M8x15	13	M10x17	19	38.1	17.5	52.4	26.2
4	020	1 1/4" 4000 PSI	3/4" 6000 PSI	M10x18	19	M10x18	30	50.8	23.8	58.7	30.2
	025	1 1/4" 4000 PSI	3/4" 6000 PSI	M10x18	19	M10x18	32	50.8	23.8	58.7	30.2
	032	1 1/2" 3000 PSI	3/4" 6000 PSI	M10x18	19	M12x20	35	50.8	23.8	69.9	35.7
	040	1 1/2" 3000 PSI	3/4" 6000 PSI	M10x18	19	M12x20	38	50.8	23.8	69.9	35.7
	050	1 1/2" 3000 PSI	1" 6000 PSI	M12x22	21	M12x20	40	57.2	27.8	69.9	35.7
	063	2" 3000 PSI	1 1/4" 4000 PSI	M10x18	32	M12x20	51	30.2	58.7	77.8	42.9
	080	2" 3000 PSI	1 1/2" 3000 PSI	M12x20	38	M12x20	51	35.7	69.9	77.8	42.9
5	063	1 1/2" 3000 PSI	1" 6000 PSI	M12x22	25	M12x20	40	57.2	27.8	69.9	35.7
	080	2" 3000 PSI	1 1/4" 6000 PSI	M14x24	32	M12x20	51	66.7	31.8	77.8	42.9
	100	2" 3000 PSI	1 1/4" 6000 PSI	M14x24	32	M12x20	51	66.7	31.8	77.8	42.9
	125	2" 3000 PSI	1 1/4" 6000 PSI	M14x24	32	M12x20	51	66.7	31.8	77.8	42.9
	160	3" 3000 PSI	2" 3000 PSI	M12x20	34	M16x24	76	42.9	77.8	106.4	61.9
	200	3" 3000 PSI	2" 3000 PSI	M12x20	43	M16x24	76	42.9	77.8	106.4	61.9
	250	3" 3000 PSI	2" 3000 PSI	M12x20	51	M16x24	76	42.9	77.8	106.4	61.9



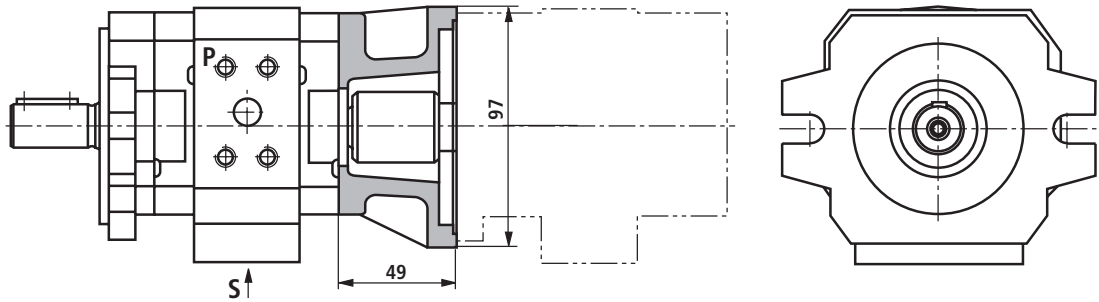
## Multiple pumps

**Unit dimensions** (nominal dimensions in mm)

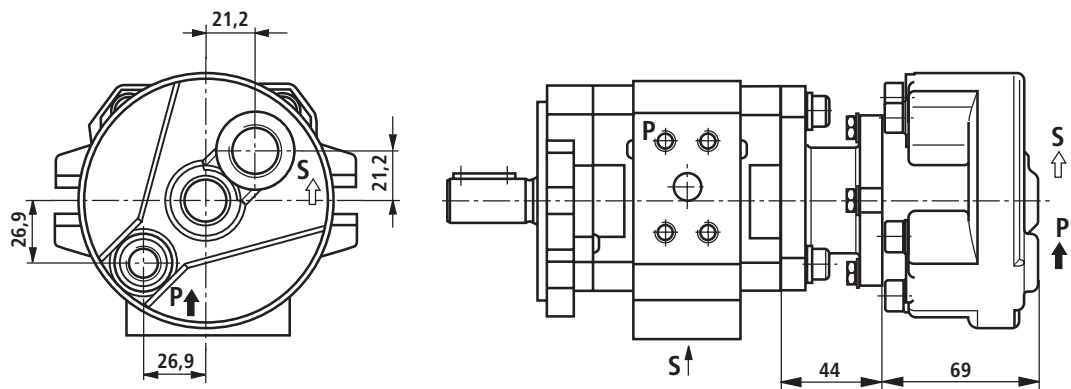
The dimensional drawings show the front pump and the combination part. <sup>1)</sup>

### PGH2/PGH3

PGH2 with combination part for PGH2, PGH3, PGF1, PGF2, PGP2, AZPF, A10VSO10/18 (SAE-A flange, shaft 9T 16/32 DP)



### PGH2/PGH3 + R4-Mini



<sup>1)</sup> For the dimensions of the individual pumps, see pages 12 to 17 or the relevant data sheets of the rear pump.

## Multiple pumps

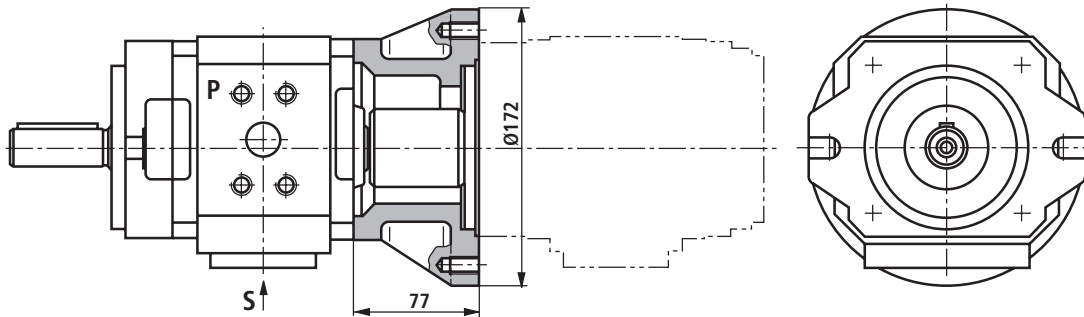
**Unit dimensions** (nominal dimensions in mm)

The dimensional drawings show the front pump and the combination part. <sup>1)</sup>

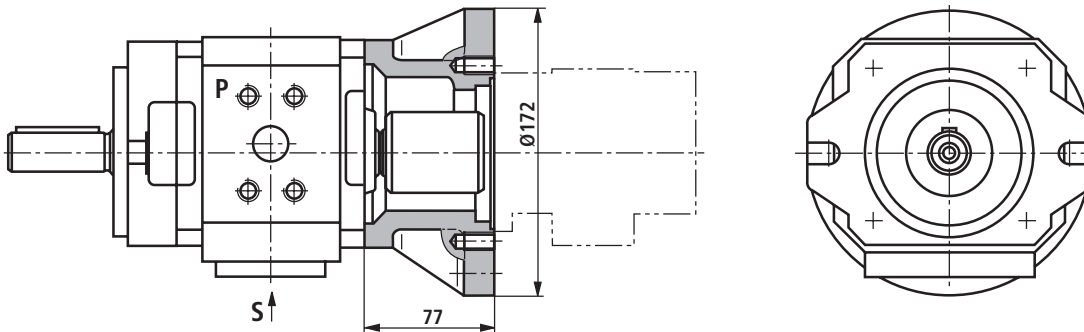
### PGH4

PGH4 with combination part for PGH4, A10VO45 (SAE-B flange, shaft 15T 16/32 DP)

PGP3, PGF3, PVV/Q1, PVV/Q2, A10VO28 (SAE-B flange, shaft 13T 16/32 DP)



PGH4 with combination part for PGH2, PGH3, PGF2, PGP2, AZPF, A10VSO10/18 (SAE-A flange, shaft 9T 16/32 DP)



<sup>1)</sup> For the dimensions of the individual pumps, see pages 12 to 17 or the relevant data sheets of the rear pump.

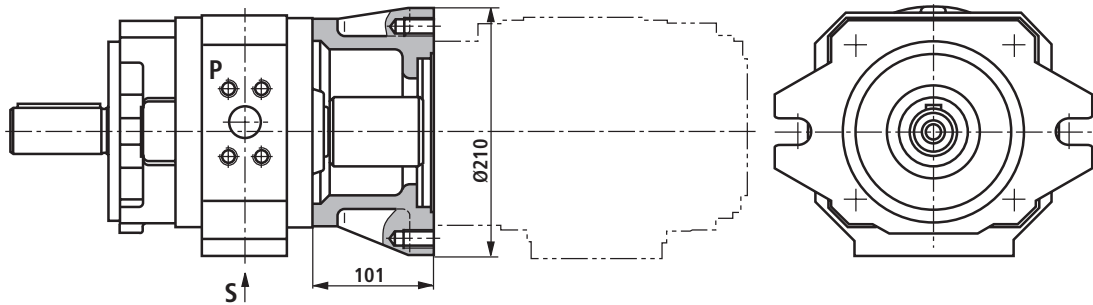
## Multiple pumps

### Unit dimensions (nominal dimensions in mm)

The dimensional drawings show the front pump and the combination part. <sup>1)</sup>

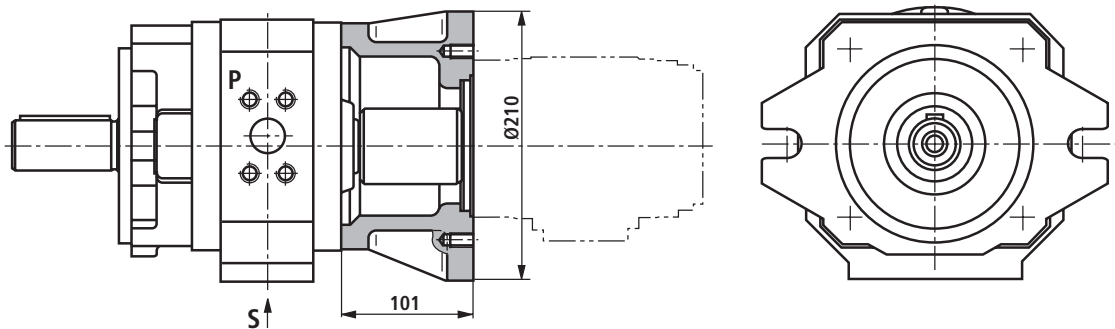
#### PGH5

PGH5 with combination part for PGH5, A10VO100 (SAE-C flange, shaft 17T 12/24 DP)  
PVV/Q4, PVV/Q5 (SAE-C flange, shaft 14T 12/24 DP)

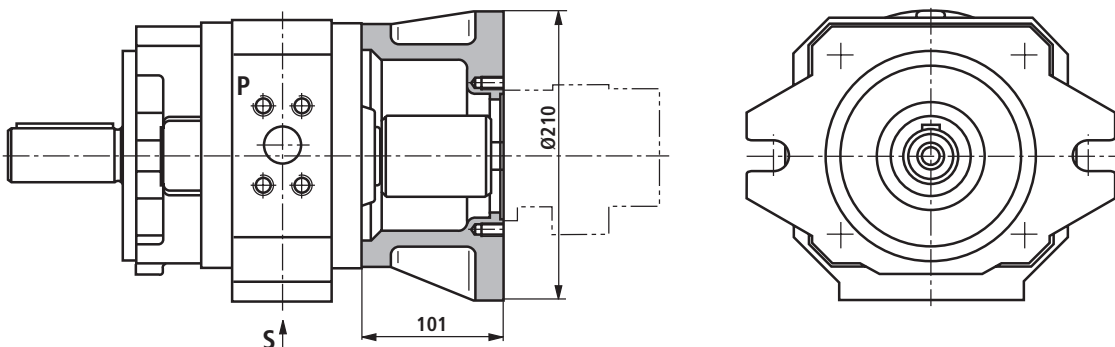


PGH5 with combination part for PGH4, A10VO45 (SAE-B flange, shaft 15T 16/32 DP)

PGP3, PGF3, PVV/Q1, PVV/Q2, A10VO28 (SAE-B flange, shaft 13T 16/32 DP)



PGH5 with combination part for PGH2, PGH3, PGF2, PGP2, G2-4X, A10VSO10/18 (SAE-A flange, shaft 9T 16/32 DP)



<sup>1)</sup> For the dimensions of the individual pumps, see pages 12 to 17 or the relevant data sheets of the rear pump.

## Multiple pumps

### Engineering notes

- The general technical data are the same as for single pumps (see pages 4 and 5).
- Combined pumps must all have the same direction of rotation.
- The pump that requires the highest torque should be provided as first pump.
- The engineer must verify the maximum troughdrive torque for each application. This is also valid for existing (coded) multiple pumps.
- The drive torque of a pump stage can be calculated as follows:

$$T = \frac{\Delta p \cdot V \cdot 0.0159}{\eta_{\text{hydr-mech.}}}$$

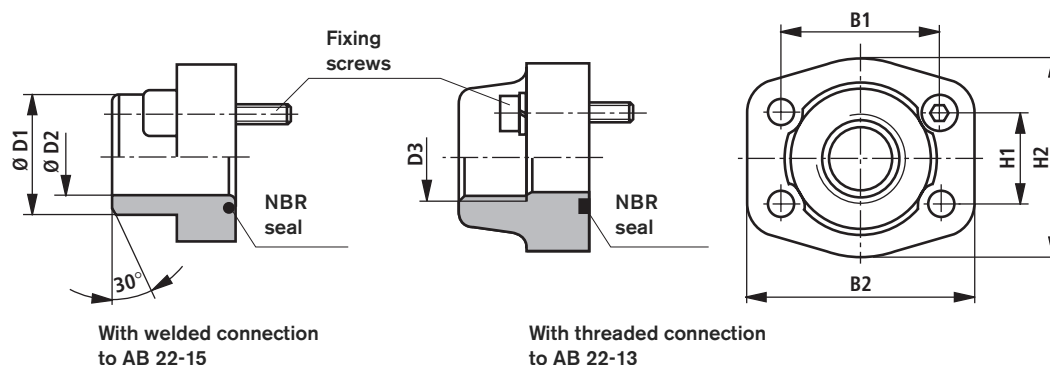
- $T$ : torque in Nm  
 $\Delta p$ : operating pressure in bar  
 $V$ : displacement in cm<sup>3</sup>  
 $\eta$ : hydraulic-mechanical efficiency

Max. permissible torques in Nm:

Type	Input torque		Output torque
	Cylindrical shaft ..E	Splined shaft ..R	
PGH2	100	120	75
PGH3	110	120	75
PGH4	450	450	280
PGH5	1100	1400	700

- The sum of torques in a multiple pump must not exceed the max. input torque.
- Common suction is impossible.
- For strength and stability reasons, we recommend ISO 4-hole mounting flanges to VDMA "E4" for combinations of three or more pumps.
- Before using pump combinations with different media, please consult Industrial Hydraulics.
- Middle and rear pumps must have shaft version "R" (splined).

**SAE connecting flange** (nominal dimensions in mm)



Suction flange for PGH.../...	Pressure flange	Flange size , pressure	Material number for flange with		B1	B2	H1	H2	D1 Ø	D2 Ø	D3	Fixing screws
			welded connection	threaded connection								
-	PGH4/020/025/032/040	3/4", 6000 PSI	R900012344	R900031447	50.8	71	23.8	60	25	17	G 3/4	M10x35
-	PGH4/050; PGH5/063	1", 6000 PSI	R900026315	R900035817	57.2	81	27.8	70	25	17	G 1	M12x45
-	PGH5/080/100/125	1 1/4", 6000 PSI	R900012346	R900211976	66.7	95	31.8	78	38	26	G 1 1/4	M14x45
PGH2/005/006/008	PGH2/005/006/008 PGH3/011/013/016	1/2", 5000 PSI	R900026298	R900024200	38.1	54	17.5	46	20	14	G 1/2	M8x30
PGH3/011/013/016	-	1", 3000 PSI	R900012937	R900014154	52.4	70	26.2	59	35	27	G 1	M10x35
PGH4/020/025	PGH4/063	1 1/4", 4000 PSI	R900012946	R900014153	58.7	79	30.2	73	38	30	G 1 1/4	M10x35
PGH4/032/040/050; PGH5/063	PGH4/080/100	1 1/2", 3000 PSI	R900013500	R900014827	69.9	93	35.7	83	38	30	G 1 1/2	M12x45
PGH4/063/080/100 PGH5/080/100/125	PGH5/160/200/250	2", 3000 PSI	R900049861	R900014829	77.8	102	42.9	97	60	44	G 2	M12x45
PGH5/160/200/250	-	3", 3000 PSI	R900012940	-	106.4	135	61.9	131	89	82	-	M16x45

The material number includes the flange, O-ring (NBR) and fixing screws. BSP thread "G" to ISO 228/1

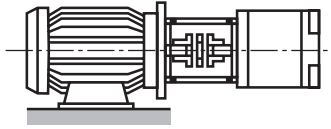
**Pump safety block**

For the limitation of the operating pressure or (and) for solenoid operated unloading of the operating pressure we recommend the use of our pump safety blocks according to RE 25880 and RE 25890.

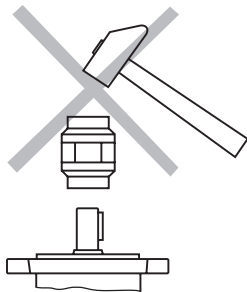
## Installation notes

### Drive

El. motor + pump mounting bracket + coupling + pump

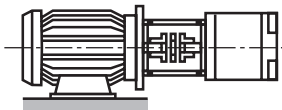


- No radial and axial forces permitted on the pump drive shaft!
- Motor and pump must be exactly aligned!
- Always use a coupling that is suitable for compensating for shaft offsets!
- When installing the coupling, avoid axial forces, that is, **do not hammer or press the coupling onto the shaft!** Use the female thread of the drive shaft!

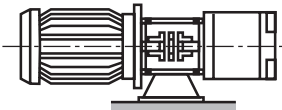


### Installation positions

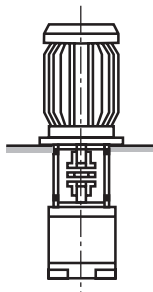
B3



B5



V1



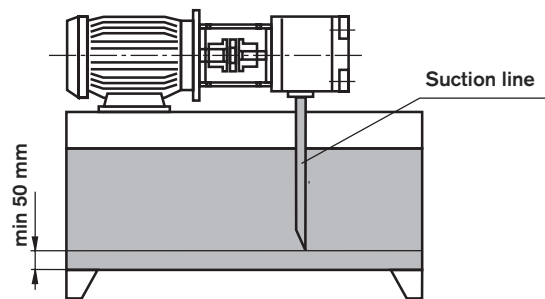
### Fluid tank

- Adjust the useful capacity of the tank to the operating conditions
- The permissible fluid temperature must not be exceeded; if required, provide cooler

### Lines and connections

- Remove protective plug from pump
- We recommend the use of seamless precision steel pipes according to DIN 2391 and pipe connections that can be loosened
- Select the clear width of pipes according to the connections (suction velocity 1 to 1.5 m/s)
- For inlet pressure, see page 5
- Thoroughly clean pipes and fittings before their installation

### Recommendation for piping



- The returning oil must **under no circumstances** be re-spired directly, i.e. select the largest possible distance between suction and return line
- The return oil outlet must always be immersed in the oil
- Ensure suction-tight installation of the pipes

### Filters

- If possible, use return line or pressure filters.  
(Use suction filters only in conjunction with an underpressure switch/clogging indicator)

### Hydraulic fluid

- Please observe our regulations according to data sheet RE 07075
- We recommend the use of branded hydraulic oils
- Different oil grades must not be mixed, since this can result in decomposition and deterioration of the lubricating properties
- The fluid must be changed at certain intervals depending on the operating conditions. This involves cleaning of the fluid tank from residues.

## Commissioning notes

### Preparations

- Check whether the system is thoroughly and properly installed.
- Fill the hydraulic fluid only in through filters with the required minimum retention rate.
- Fill the pump completely with hydraulic fluid via the suction or pressure tube.
- Check direction of rotation of the motor for compliance with the direction of rotation according to the pump type.

### Bleeding

- Open the bleeding port of the system by hand or change over to circulation at zero pressure in accordance with the operating instructions of the system. During bleeding, the pressureless transportation of entrapped air must be ensured.
- To bleed the pump, briefly switch the motor on and then switch it immediately off again (inching mode). Repeat this process until the pump is completely bled.
- Close the open bleeding ports by hand.

### Commissioning

- When it is ensured that the pump is completely bled, switch the motor on. Let the pump run at zero pressure until the system is completely bled. For system bleeding, observe the operating instructions for the system.
- Commission the system according to the operating instructions and load pumps.
- After some time in operation, check the hydraulic fluid in the tank for bubbles or foaming on the surface.

### Operation

- During operation, take note of changes in the noise emission. Due to warming up of the operating medium, a slight increase in the noise level is normal. A remarkable increase in the noise level or brief, stochastic changes in the noise characteristics can indicate the aspiration of air. In the case of too short suction pipes or low oil levels of the operating medium, air can also be sucked in through a vortex.
- Changes in the operating velocities, temperatures, increase in noise or power requirement indicate wear or damage to the system or the pump.

### Re-commissioning

- Inspect the pump and system for leakage. Loss of oil indicates leakage below the hydraulic fluid level. An increased hydraulic fluid level in the tank indicates leakage above the hydraulic fluid level.
- When the pump is arranged above the hydraulic fluid level, the pump can drain via leaking points, e.g. a worn-out shaft seal ring. In this case, it must be bled again during re-commissioning. Have the damage repaired.
- After repair and maintenance were carried out, re-bleeding is required.
- Switch the motor on when the system is in flawless condition.

### General

- Pumps delivered by us are tested for function and performance. Never make any changes of whatever nature to the pump, otherwise the warranty will become void!
- Repairs may only be carried out by the manufacturer or his authorised dealers and agencies. Repairs carried out by yourselves will not be covered by the warranty.

### ⚠ Important notes

- Adjustments, maintenance and repair of the pump may only be carried out by authorised, trained and instructed personnel!
- Use only genuine Rexroth spare parts!
- The pump may only be operated at the permissible data.
- The pump may only be operated when in perfect condition!
- When carrying out any work on the pump (e.g. installation or removal), the system must be switched off and depressurised!
- Unauthorised conversions or changes that affect safety and function are not permitted!
- Attach protective guards (e.g. coupling protection)!
- Any existing protective guards must not be removed!
- The generally valid safety regulations and regulations for the prevention of accidents must be strictly observed!

## Engineering notes

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Comprehensive notes and suggestions can be found in The Hydraulic Trainer, Volume 3 RE 00281, "notes on the planning and design of hydraulic systems".

When using internal gear pumps, provide an additional manual, switchable or automatic bleeding option. The bleed point for manual bleeding must be provided in the pressure line upstream of the first valve or check valve in order that bleeding can be carried out at zero pressure.

### Technical data

All technical data given depend on manufacturing tolerances and are valid in conjunction with certain boundary conditions.

Please note that certain tolerances are therefore possible, and that technical data may vary when boundary conditions (e.g. viscosity) are changed.

### Characteristic curves

When dimensioning the drive motor, observe the max. permissible operating data on the basis of the characteristic curves shown on pages 6 to 11.

### Noise pressure level

The noise pressure level values shown on pages 7, 9 and 11 were measured in line with DIN 45635, page 26.

This means that only the noise emitted by the pump is shown. Influences by the surroundings (such as place of installation, piping, etc.) were eliminated.

The values always refer to only one pump.

With internal gear pumps, the excitation of valves, pipes, machine parts, etc. is very low due to the low flow pulsation (approx. 2 to 3 %).

Nevertheless, under unfavourable conditions, the noise pressure level at the place of installation of the power unit can be 5 to 10 dB(A) higher than the values of the pump itself.

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## Notes

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