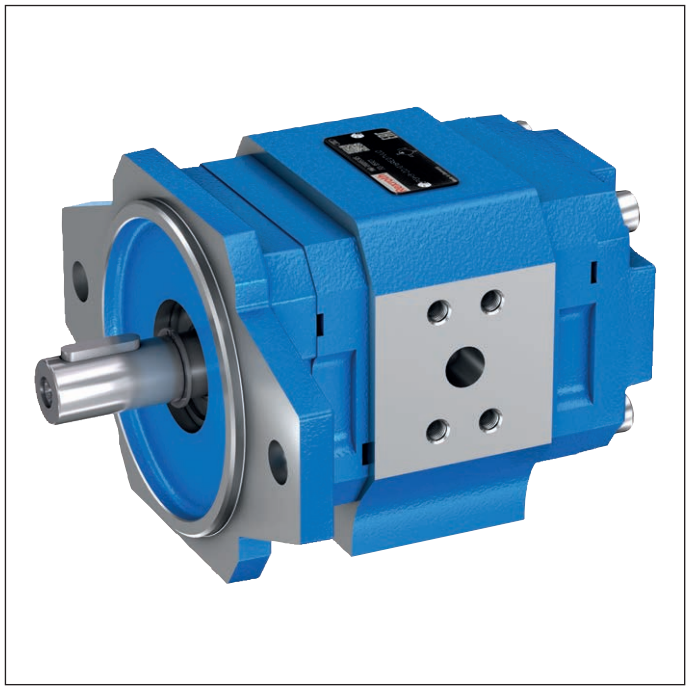
RE 10223
Edition: 2026-03
Replaces: 2026-02

rexroth
A Bosch Company

Internal gear pump

Type PGH



- Component series 2X
- Frame size 2 and 3
- Size 5 ... 16
- Maximum operating pressure 315 bar
- Displacement 5.2 ... 16.0 cm^3
- Fixed displacement

Features

- Low operating noise
- Low flow pulsation
- High efficiency also at low speed and viscosity due to sealing gap compensation
- Suitable for wide viscosity and speed ranges
- Can be combined with internal gear pumps, radial piston pumps, gerotor pumps, and external gear pumps
- Application:
  Drives with high power and pressure range at a very high number of load cycles (e.g. plastics processing machines, automated presses, foundry machines, and other applications with accumulator charging mode).

Contents

Ordering codes: Single pumps

01	02	03		04		05	06	07	08	09	10	11
PG	**H**		**–**	**2X**	**/**				**07**		**U2**	

01	Internal gear pump	**PG**
02	High-pressure pump	**H**
03	Frame size 2	**2**
	Frame size 3	**3**
04	Component series 20 ... 29 (20 ... 29: unchanged installation and connection dimensions)	**2X**
05	**Frame size 2**	
	Size 5 (displacement 5.24 cm³)	**005**
	Size 6 (displacement 6.50 cm³)	**006**
	Size 8 (displacement 8.20 cm³)	**008**
	Frame size 3	
	Size 11 (displacement 11.00 cm³)	**011**
	Size 13 (displacement 13.30 cm³)	**013**
	Size 16 (displacement 16.00 cm³)	**016**

Direction of rotation

06	When looking at the shaft end, right	**R**
	When looking at shaft end, left	**L**

Shaft end

07	Cylindrical with fitting key according to ISO 3019-2	**E**
	Geared according to ISO 3019-1 (16-4 9T 16/32DP)	**R**
	Geared according to ISO 3019-1 (19-4 11T 16/32DP)	**S**

Line connections

08	Suction and pressure port according to ISO 6162-1	**07**

Seal material

09	FKM shaft seal ring and FKM seals	**V**
	NBR shaft seal ring and FKM seals	**W** [1]

Mounting

10	2-hole mounting flange according to ISO 3019-1	**U2**
11	Further details in the plain text	*****

[1] Special applications (e.g. HFC fluids)

☞ **Notice:**
Not every combination of ordering codes is possible.
Please select the desired pump using the selection tables (page 11 ... 13) or after consultation.

Ordering codes: Pump combination

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
		/	+	/	+	/			**07**	+		+		**U2**

Combination

	01	2-fold	**P2**
		3-fold	**P3**

Pump 1 1)	02	Frame size 2	**GH2**
		Frame size 3	**GH3**
	03	Size 005 ... 016	e.g. **011**
Pump 2 2)	04	Frame size	e.g. **GH2**
	05	Size	e.g. **006**
Pump 3 2)	06	Frame size	e.g. **GH2**
	07	Size	e.g. **006**

Direction of rotation

	08	When looking at the shaft end, right	**R**
		When looking at shaft end, left	**L**

Shaft end

Pump 1	09	Cylindrical with fitting key according to ISO 3019-2	**E**
		Geared according to ISO 3019-1 (16-4 9T 16/32DP)	**R**
		Geared according to ISO 3019-1 (19-4 11T 16/32DP)	**S**

Line connections

	10	Suction and pressure port according to ISO 6162-1	**07**

Shaft end

Pump 2 2)	11	Cylindrical with fitting key according to ISO 3019-2	**A**
		Geared according to ISO 3019-1 (16-4 9T 16/32DP)	**J**
		Geared according to ISO 3019-1 (16-4 9T 16/32DP)	**R**
		Geared according to ISO 3019-1 (19-4 11T 16/32DP)	**T**

Line connections

	12	Suction and pressure port	e.g. **07**

Shaft end

Pump 3 2)	13	Cylindrical with fitting key according to ISO 3019-2	**A**
		Geared according to ISO 3019-1 (16-4 9T 16/32DP)	**J**
		Geared according to ISO 3019-1 (16-4 9T 16/32DP)	**R**
		Geared according to ISO 3019-1 (19-4 11T 16/32DP)	**T**

Line connections

	14	Suction and pressure port	e.g. **07**

Mounting

	15	2-hole mounting flange according to ISO 3019-1	**U2**

1) Details see page 2.

2) For details, see the data sheet of the pump used, e.g. type PGF (data sheet 10213).

Order example:
P3GH3/016+GH2/008+GH2/005RE07+R07+R07U2

☞ **Notice:**
- For further information, see configuration possibilities and dimensions page 15... 18.
- Further configuration possibilities available following consultation.

Function, section, symbol

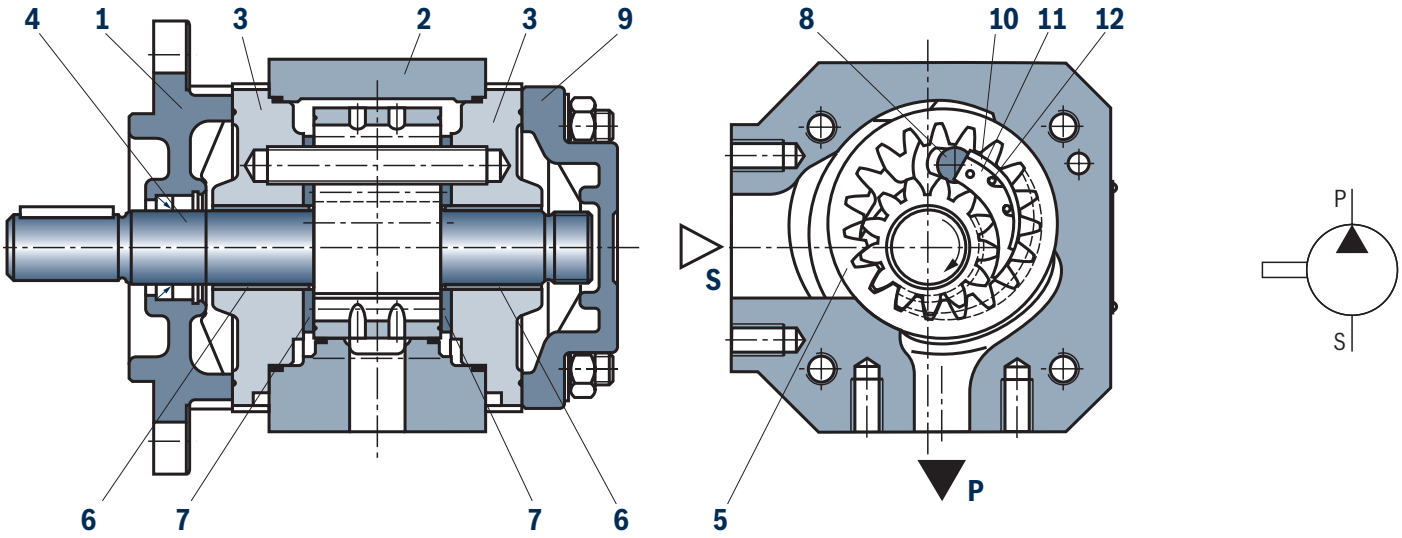
Set-up
Hydraulic pumps of type PGH are gap-compensated internal gear pumps with constant displacement.
They essentially consist of a mounting flange (1), housing (2), bearing cover (3), pinion shaft (4), internal gear (5), plain bearings (6), axial washers (7), stop pin (8), and end cover (9), as well as the radial compensation, consisting of segment (10), segment support (11), and the sheet seals (12).

Suction and displacement procedure
The hydrodynamically mounted pinion shaft (4) drives the internally geared internal gear (5) in the direction of rotation shown.
The tooth clearances opening in the suction range suck in the hydraulic fluid. The hydraulic fluid is transported in the interdental spaces of the pinion and internal gear from the suction range (S) to the pressure range (P).
There, the hydraulic fluid is displaced from the closing gaps between the gears and pumped into the pressure connection (P).
The suction and pressure range are separated by the elements of radial compensation (10 ... 12) and the tooth engagement between the internal gear (5) and the pinion shaft (4).

Hydrodynamic and hydrostatic mounting
The pinion shaft (4) is accepted by hydrodynamically lubricated radial plain bearings (6).
The internal gear (5) is mounted hydrostatically in the housing.

Gear tooth system
The gear tooth system with involute edges has a large meshing length for little flow and pressure pulsation and thus guarantees low-noise running.

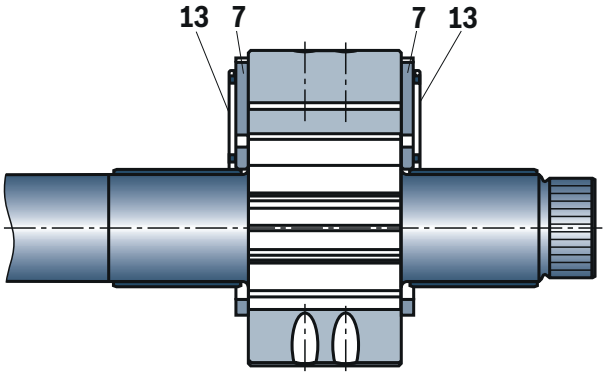
Materials used
- Mounting flange (1), housing (2), bearing cover (3), and end cover (9): Cast iron
- Pinion shaft (4), internal gear (5) and stop pin (8): Hardened steel
- Plain bearings (6): Steel bronze
- Axial washers (7): Bronze-coated steel plate
- Segment (10) and segment support (11): Brass
- Sheet seals (12): Plastic



Function, section

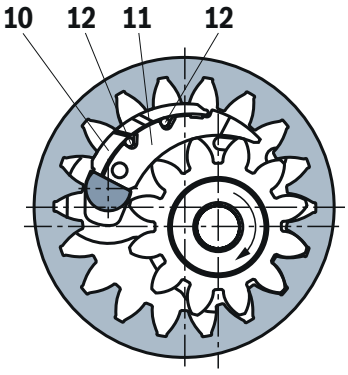
Axial compensation

The displacement area in the pressure range is axially sealed by axial washers (7).
A pressure field (13) is applied to the sides of the axial washers facing away from the displacement area.
This balances the axial washers vis-à-vis the displacement area, which results in optimal sealing with low mechanical losses.



Radial compensation

The radial compensation elements consist of segment (10), segment support (11) and sheet seals (12).
The segment (10) and segment support (11) are arranged in the pressure field so that the resulting force generated by pressure is essentially supported by the stop pin.
A small component of the force generated by pressure presses the segment and segment support onto the tooth tips of the pinion shaft and internal gear and in this way provides for the sealing of the pressure range to the suction range with automatic clearance adjustment.
This is the prerequisite for constantly high volumetric efficiency during the entire operating time.
The clearance adjustment of the segment and segment support is made possible by the sheet seals located in between.



Technical data: Frame size 2
(For applications outside these values, please consult us.)

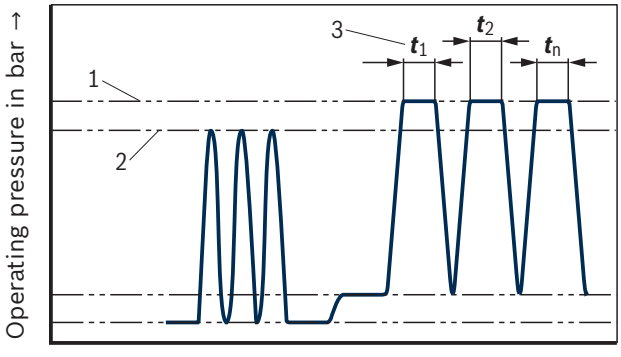
General				
Size	NG	5	6	8
Pump design		Internal gear pump, gap-compensated		
Type of mounting		Mounting flange		
Type of connection		Flange connection		
Mass	kg	4.3	4.4	4.6
Installation position		Preferably horizontal (suction port bottom)		
Shaft load		Radial and axial forces (e.g. belt pulley) [1]		
Direction of rotation		Right or left		
Minimum speed [2]	rpm	600		
Maximum speed [2]	rpm	3000		
Minimum drive power [3]	kW	0.55		
Maximum drive power	kW	See characteristic curves on page 9		
Moment of inertia	kgm^2	0.000064	0.000074	0.000088
Ambient temperature range	°C	–20 ... +60		
Surface protection		None; unpainted		

Hydraulic				
Minimum suction pressure (load-free)	bar	0.8 (short-time during start 0.6 bar)		
Maximum suction pressure (load-free)	bar	2		
Maximum operating pressure	bar	315		
Pressure peak [4]	bar	350		
Hydraulic fluid		See table, page 8		
Hydraulic fluid temperature range	°C	–10 ... +80		
Viscosity range (hydraulic fluid temperature ≤ +80 °C)				
▶ Continuous operation				
– up to speed 1800 rpm	mm^2/s	300 ... 10		
– up to speed 3000 rpm	mm^2/s	100 ... 10		
▶ Optimal operating range				
– up to speed 3000 rpm	mm^2/s	36 ... 16		
Admissible start viscosity	mm^2/s	2000 [5]		
Maximum admissible degree of contamination of the hydraulic fluid; cleanliness class according to ISO 4406 (c)		Class 20/18/15 [6]		
Displacement (geometric)	cm^3	5.24	6.5	8.2
Maximum flow rate (at 10 bar and 1450 rpm)	l/min	7.5	9.3	11.8

1) Only after consultation
2) Speeds at permanent operating pressure or maximum drive power and absolute pressure 1 bar at the suction port.
3) At maximum suction pressure ≈ 1 bar
4) Maximum individual duration t = 10 ms and maximum total duration of action 300 hours (see characteristic curve "Pressure definition" on the right).
5) Speed range 600 to 1800 rpm; hydraulic fluid temperature ≥ -10 °C; duration ≤3 min; without load (operating pressure ≤30 bar).
6) The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the life cycle of the components.

☞ **Notice:**
The stated technical data were measured with HLP46, ϑ_{oil} = 50 °C and viscosity approx. 30 mm^2/s.

Pressure definition



1 Pressure peak
2 Maximum operating pressure
3 Individual duration of action (total duration of action = t_1 + t_2 + ... + t_n)

Technical data: Frame size 3
(For applications outside these values, please consult us.)

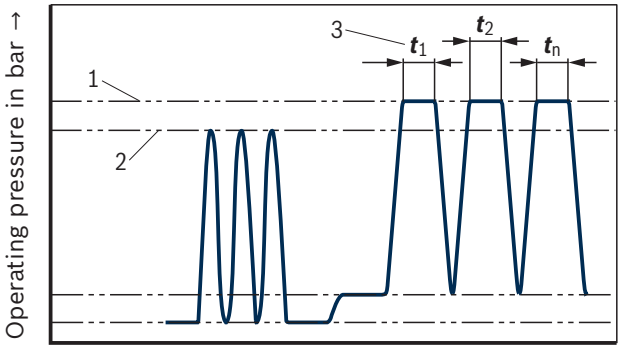
General				
Size	NG	11	13	16
Pump design		Internal gear pump, gap-compensated		
Type of mounting		Mounting flange		
Type of connection		Flange connection		
Mass	kg	4.8	5.0	5.3
Installation position		Preferably horizontal (suction port bottom)		
Shaft load		Radial and axial forces (e.g. belt pulley) [1]		
Direction of rotation		Right or left		
Minimum speed [2]	rpm	600		
Maximum speed [2]	rpm	3000		
Minimum drive power [3]	kW	0.55		
Maximum drive power	kW	See characteristic curves on page 10		
Moment of inertia	kgm^2	0.000118	0.000142	0.000160
Ambient temperature range	°C	–20 ... +60		
Surface protection		None; unpainted		

Hydraulic				
Minimum suction pressure (load-free)	bar	0.8 (short-time during start 0.6 bar)		
Maximum suction pressure (load-free)	bar	2		
Maximum operating pressure	bar	315		
Pressure peak [4]	bar	350		
Hydraulic fluid		See table, page 8		
Hydraulic fluid temperature range	°C	–10 ... +80		
Viscosity range (hydraulic fluid temperature ≤ +80 °C) ▶ Continuous operation				
– up to speed 1800 rpm	mm^2/s	300 ... 10		
– up to speed 3000 rpm	mm^2/s	100 ... 10		
▶ Optimal operating range				
– up to speed 3000 rpm	mm^2/s	36 ... 16		
Admissible start viscosity	mm^2/s	2000 [5]		
Maximum admissible degree of contamination of the hydraulic fluid; cleanliness class according to ISO 4406 (c)		Class 20/18/15 [6]		
Displacement (geometric)	cm^3	11.0	13.3	16.0
Maximum flow rate (at 10 bar and 1450 rpm)	l/min	15.8	19.1	23.0

1) Only after consultation
2) Speeds at permanent operating pressure or maximum drive power and absolute pressure 1 bar at the suction port.
3) At maximum suction pressure ≈ 1 bar
4) Maximum individual duration t = 10 ms and maximum total duration of action 300 hours (see characteristic curve "Pressure definition" on the right).
5) Speed range 600 to 1800 rpm; hydraulic fluid temperature ≥ -10 °C; duration ≤3 min; without load (operating pressure ≤30 bar).
6) The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the life cycle of the components.

☞ **Notice:**
The stated technical data were measured with HLP46, ϑ_{oil} = 50 °C and viscosity approx. 30 mm^2/s.

Pressure definition



1 Pressure peak
2 Maximum operating pressure
3 Individual duration of action (total duration of action = $t_1 + t_2 + ... + t_n$)

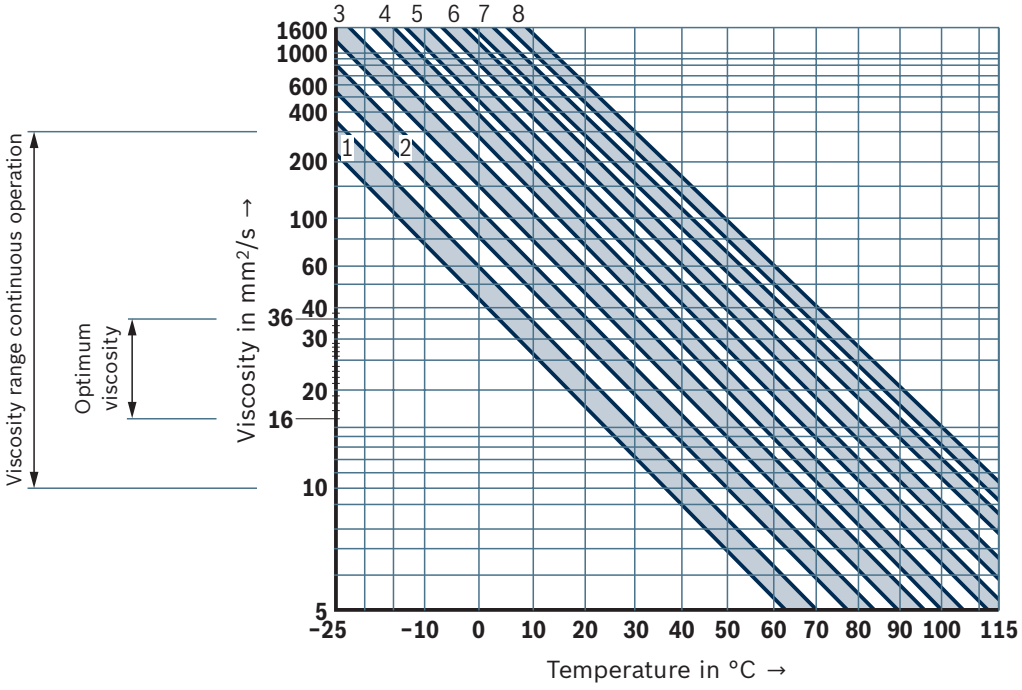
Technical data
(For applications outside these values, please consult us.)

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils	HL, HLP, HLPD, HVLP, HVLPD	NBR, FKM	DIN 51524	90220

☞ **Important information on hydraulic fluids:**

- For further information, application notes and application requirements for selecting hydraulic fluids, operational behavior as well as disposal and environmental protection, see the data sheets above or contact us.
- The hydraulic fluid should be selected so that the operating viscosity is in the optimum range in the operating temperature range (see viscosity-temperature diagram).
- **Additional hydraulic fluids upon request**

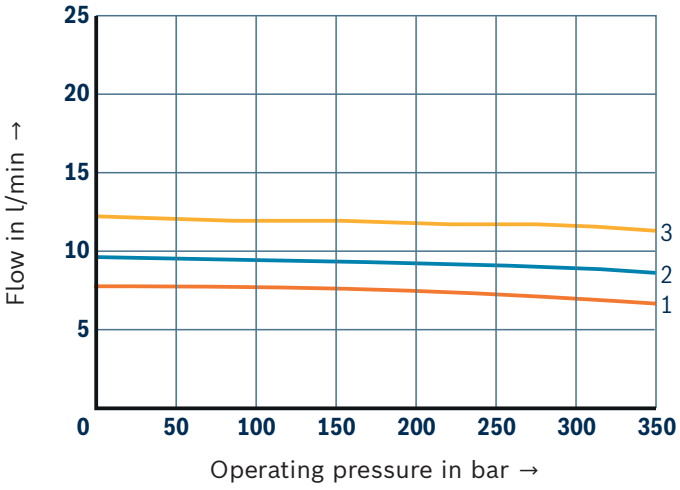
Viscosity dependent on temperature for HLP (viscosity index VI 100, double logarithmic representation)



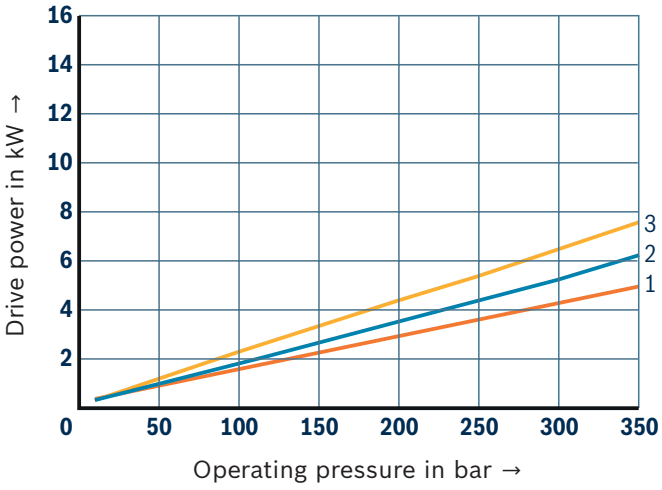
1 Viscosity class VG10
2 Viscosity class VG15
3 Viscosity class VG22
4 Viscosity class VG32
5 Viscosity class VG46
6 Viscosity class VG68
7 Viscosity class VG100
8 Viscosity class VG150

Characteristic curves: Frame size 2
(measured with HLP46, ϑ_{oil} = 40±5 °C, ***n*** = 1450 rpm; ***v*** = 46 mm²/s)

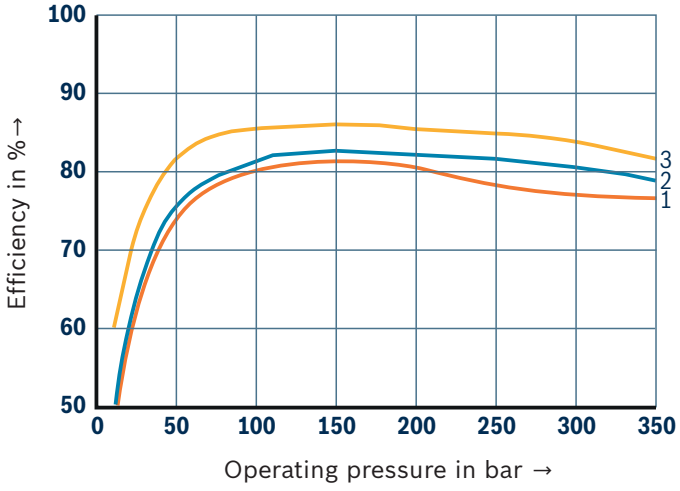
Flow dependent on operating pressure



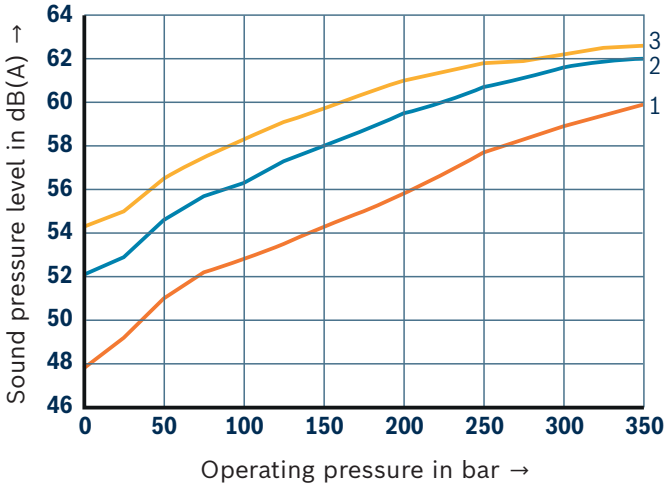
Drive power dependent on operating pressure



Efficiency dependent on operating pressure



Sound pressure level dependent on operating pressure

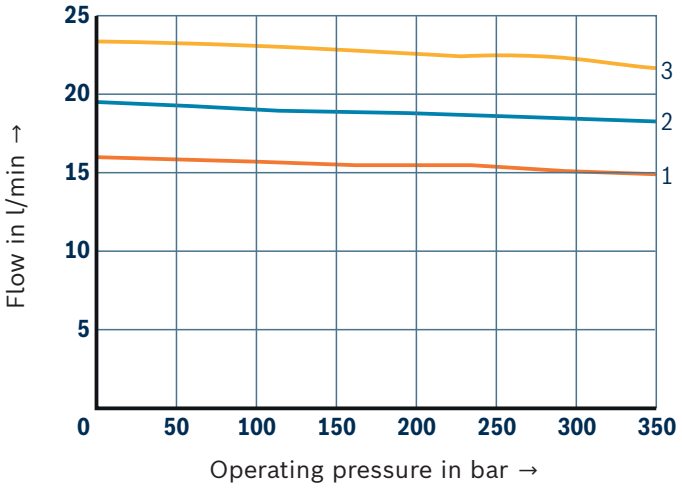


Notice:
Sound pressure level measured in the sound measuring chamber according to DIN 45635-26; distance microphone – pump = 1 m

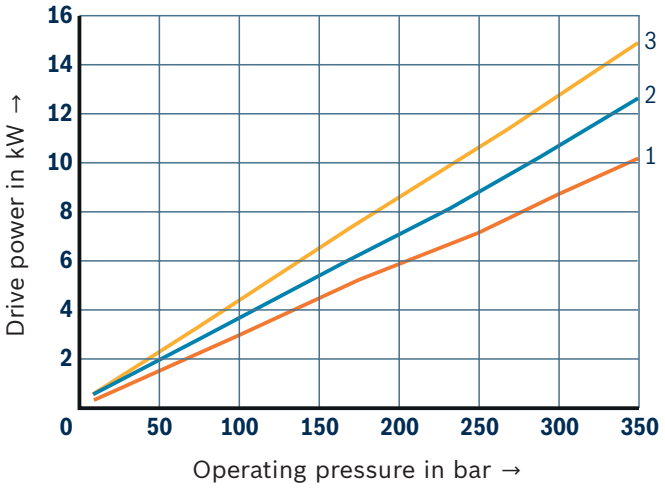
1 NG5
2 NG6
3 NG8

Characteristic curves: Frame size 3
(measured with HLP46, ϑ_{oil} = 40±5 °C, ***n*** = 1450 rpm; ***v*** = 46 mm²/s)

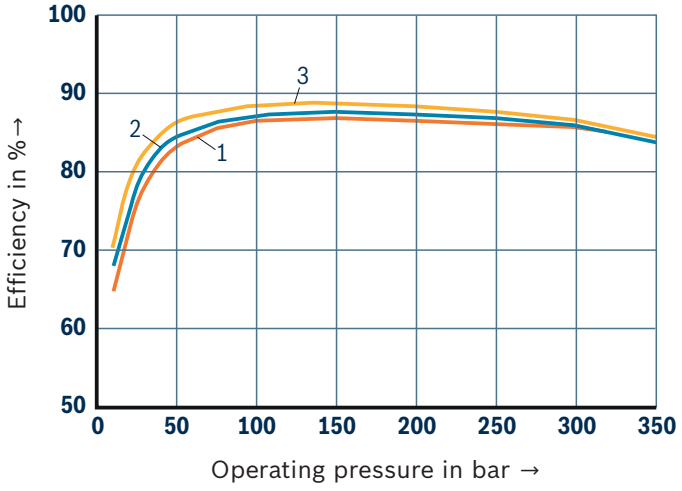
Flow dependent on operating pressure



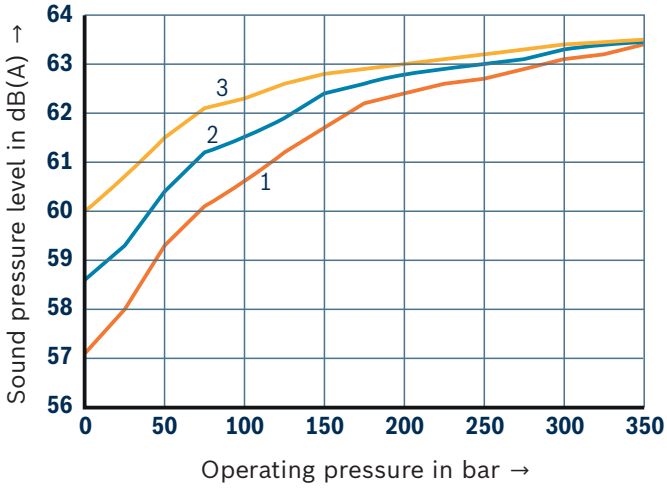
Drive power dependent on operating pressure



Efficiency dependent on operating pressure



Sound pressure level dependent on operating pressure

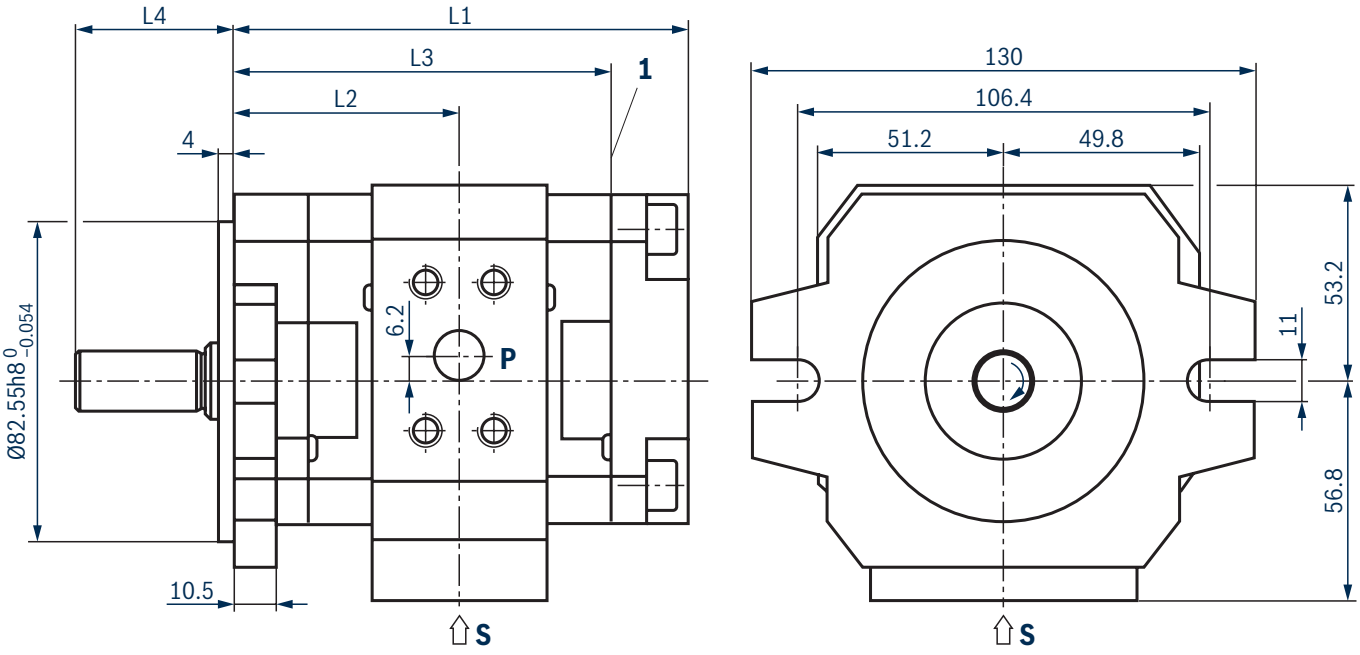


Notice:
Sound pressure level measured in the sound measuring chamber according to DIN 45635-26; distance microphone – pump = 1 m

1 NG11
2 NG13
3 NG16

Dimensions: Frame size 2 – version "RE07VU2" (clockwise); "LE07VU2" (counterclockwise) and "RR07VU2" (clockwise); "LR07VU2" (counterclockwise) (dimensions in mm)

Shaft end "E" – cylindrical with fitting key according to ISO 3019-2 or **shaft end "R" – geared** according to ISO 3019-1
Mounting "U2" – 2-hole mounting flange according to ISO 3019-1, 82-2 (SAE A)



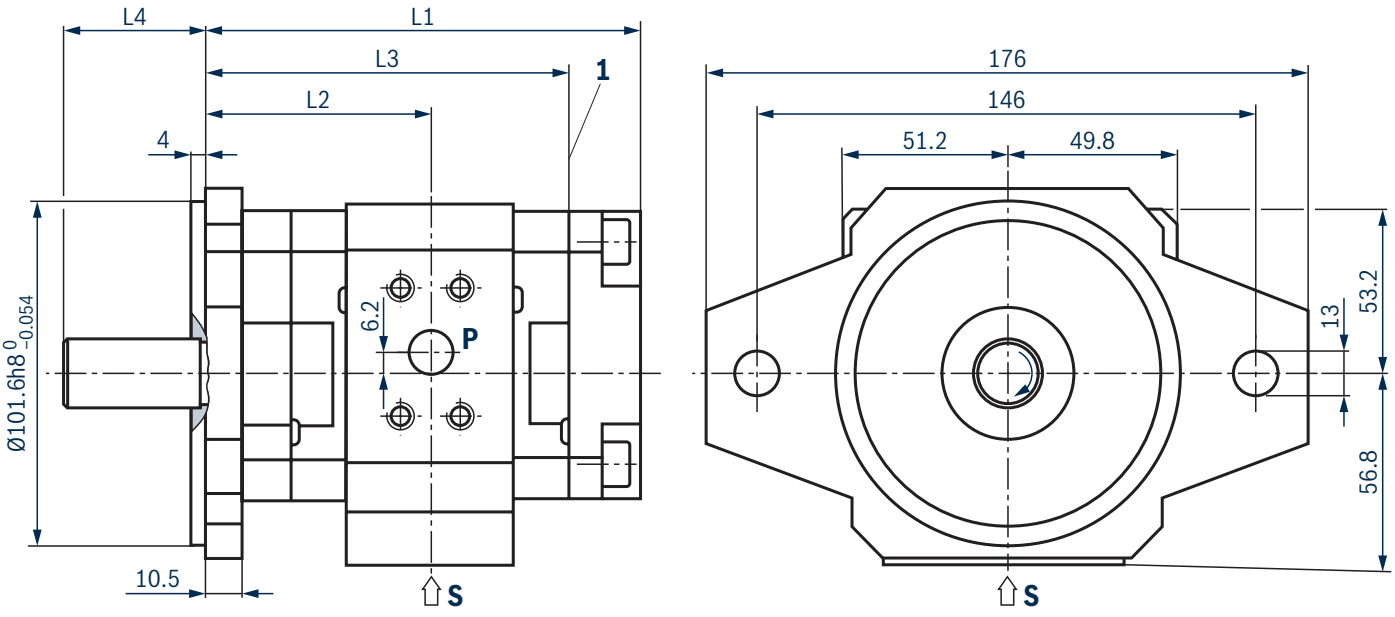
NG	L1	L2	L3	L4	S	P	Material number	Type
5	110	54.2	89.5	41	DN13 (SAE 1/2)	DN13 (SAE 1/2)	R900968999	PGH2-2X/005R**E**07VU2
	110	54.2	89.5	41	DN13 (SAE 1/2)	DN13 (SAE 1/2)	R900703725	PGH2-2X/005L**E**07VU2
	110	54.2	89.5	31.5	DN13 (SAE 1/2)	DN13 (SAE 1/2)	R900972378	PGH2-2X/005R**R**07VU2
	110	54.2	89.5	31.5	DN13 (SAE 1/2)	DN13 (SAE 1/2)	R900703727	PGH2-2X/005L**R**07VU2
6	112.5	55.5	92	41	DN13 (SAE 1/2)	DN13 (SAE 1/2)	R900951301	PGH2-2X/006R**E**07VU2
	112.5	55.5	92	41	DN13 (SAE 1/2)	DN13 (SAE 1/2)	R900961547	PGH2-2X/006L**E**07VU2
	112.5	55.5	92	31.5	DN13 (SAE 1/2)	DN13 (SAE 1/2)	R900961549	PGH2-2X/006R**R**07VU2
	112.5	55.5	92	31.5	DN13 (SAE 1/2)	DN13 (SAE 1/2)	R900961550	PGH2-2X/006L**R**07VU2
8	116	57.3	95.5	41	DN13 (SAE 1/2)	DN13 (SAE 1/2)	R900951302	PGH2-2X/008R**E**07VU2
	116	57.3	95.5	41	DN13 (SAE 1/2)	DN13 (SAE 1/2)	R900961548	PGH2-2X/008L**E**07VU2
	116	57.3	95.5	31.5	DN13 (SAE 1/2)	DN13 (SAE 1/2)	R900961551	PGH2-2X/008R**R**07VU2
	116	57.3	95.5	31.5	DN13 (SAE 1/2)	DN13 (SAE 1/2)	R900961552	PGH2-2X/008L**R**07VU2

1 Start of combi part for multiple pumps

Information:
- Connections and shaft end see page 14.
- The illustration shows the "clockwise" version; for the "counterclockwise" version, the pressure connection is opposite.
- The dimensions are nominal dimensions which are subject to tolerances.

Dimensions: Frame size 3 – version "RE07VU2" (clockwise); "LE07VU2" (counterclockwise) (dimensions in mm)

Shaft end "E" – cylindrical with fitting key according to ISO 3019-2 or **shaft end "R" – geared** according to ISO 3019-1
Mounting "U2" – 2-hole mounting flange according to ISO 3019-1, 101-2 (SAE B)



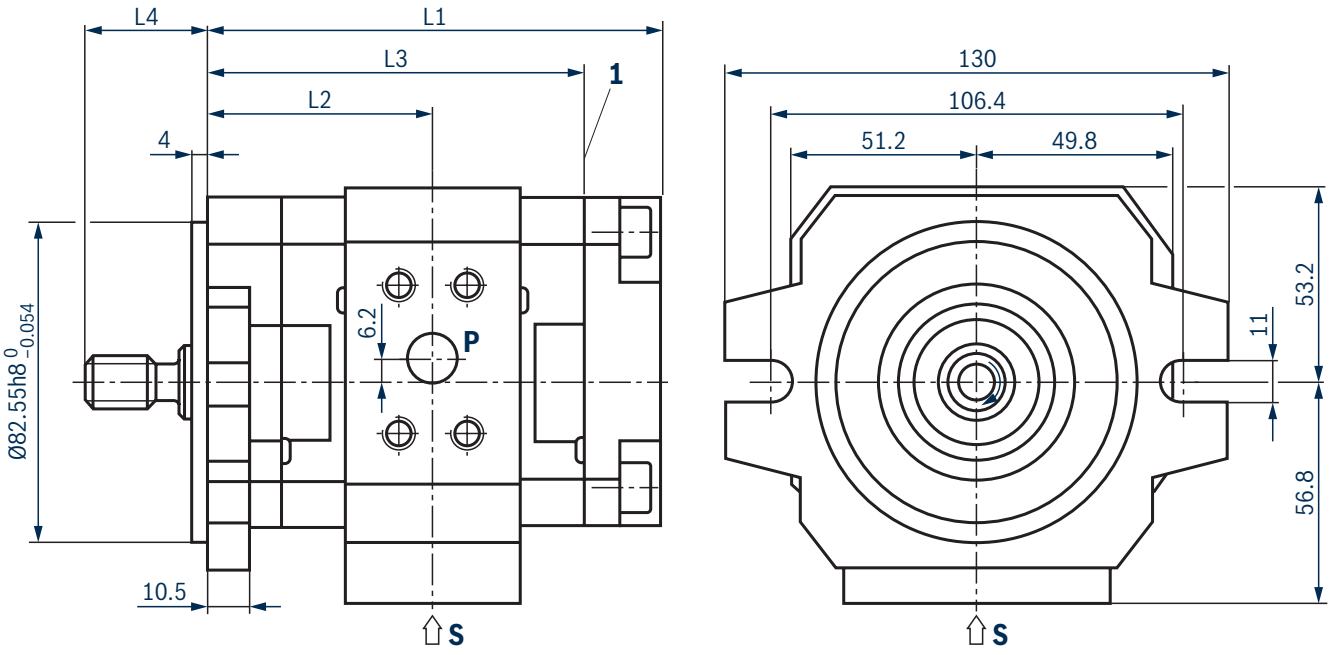
NG	L1	L2	L3	L4	S	P	Material number	Type
11	128	66.5	107.5	41	DN25 (SAE 1)	DN13 (SAE 1/2)	R900951303	PGH2-2X/011R**E**07VU2
	128	66.5	107.5	41	DN25 (SAE 1)	DN13 (SAE 1/2)	R900961553	PGH2-2X/011L**E**07VU2
13	133	69	112.5	41	DN25 (SAE 1)	DN13 (SAE 1/2)	R900951304	PGH2-2X/013R**E**07VU2
	133	69	112.5	41	DN25 (SAE 1)	DN13 (SAE 1/2)	R900961554	PGH2-2X/013L**E**07VU2
16	138	71.5	117.5	41	DN25 (SAE 1)	DN13 (SAE 1/2)	R900951305	PGH2-2X/016R**E**07VU2
	138	71.5	117.5	41	DN25 (SAE 1)	DN13 (SAE 1/2)	R900961555	PGH2-2X/016L**E**07VU2

1 Start of combi part for multiple pumps

Information:
- Connections and shaft end see page 14.
- The illustration shows the "clockwise" version; for the "counterclockwise" version, the pressure connection is opposite.
- The dimensions are nominal dimensions which are subject to tolerances.

Dimensions: Frame size 3 – version "RR07VU2" (clockwise); "RS07VU2" (counterclockwise) (dimensions in mm)

Shaft end "R" or **"S" – geared** according to ISO 3019-1
Mounting "U2" – 2-hole mounting flange according to ISO 3019-1, 82-2 (SAE A)



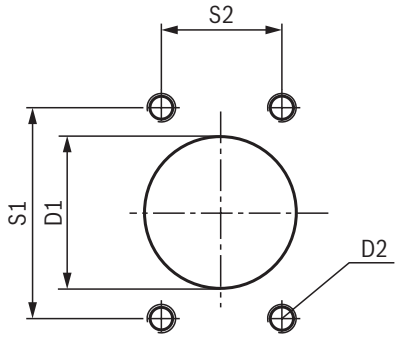
NG	L1	L2	L3	L4	S	P	Material number	Type
11	121.5	60	101	31.5	DN25 (SAE 1)	DN13 (SAE 1/2)	R900961556	PGH3-2X/011R**R**07VU2
	121.5	60	101	31.5	DN25 (SAE 1)	DN13 (SAE 1/2)	R900961559	PGH3-2X/011L**R**07VU2
13	126.5	62.5	106	31.5	DN25 (SAE 1)	DN13 (SAE 1/2)	R900961557	PGH3-2X/013R**R**07VU2
	126.5	62.5	106	31.5	DN25 (SAE 1)	DN13 (SAE 1/2)	R900961560	PGH3-2X/013L**R**07VU2
	126.5	62.5	106	31.5	DN25 (SAE 1)	DN13 (SAE 1/2)	R901281697	PGH3-2X/013R**S**07VU2
	126.5	62.5	106	31.5	DN25 (SAE 1)	DN13 (SAE 1/2)	Upon request	PGH3-2X/013L**S**07VU2
16	131.5	65	111	31.5	DN25 (SAE 1)	DN13 (SAE 1/2)	R900961558	PGH3-2X/016R**R**07VU2
	131.5	65	111	31.5	DN25 (SAE 1)	DN13 (SAE 1/2)	R900961561	PGH3-2X/016L**R**07VU2
	131.5	65	111	37	DN25 (SAE 1)	DN13 (SAE 1/2)	R901281698	PGH3-2X/016R**S**07VU2
	131.5	65	111	37	DN25 (SAE 1)	DN13 (SAE 1/2)	R901465533	PGH3-2X/016L**S**07VU2

1 Start of combi part for multiple pumps

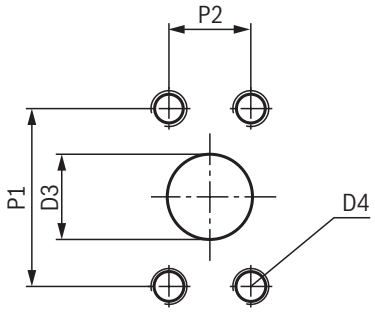
Information:
- Connections and shaft end see page 14.
- The illustration shows the "clockwise" version; for the "counterclockwise" version, the pressure connection is opposite.
- The dimensions are nominal dimensions which are subject to tolerances.

Connections: Suction port and pressure port (dimensions in mm)

Suction port S

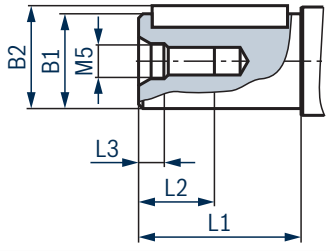
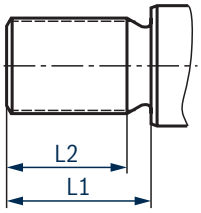
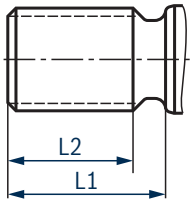


Pressure port P



BG	NG	Suction port S	D1	D2	S1	S2	Pressure port P	D3	D4	P1	P2
2	5	DN13 (SAE 1/2)	Ø13	M8; 15	38.1	17.5	DN13 (SAE 1/2)	Ø13	M8; 15	38.1	17.5
	6	DN13 (SAE 1/2)	Ø13	M8; 15	38.1	17.5	DN13 (SAE 1/2)	Ø13	M8; 15	38.1	17.5
	8	DN13 (SAE 1/2)	Ø13	M8; 15	38.1	17.5	DN13 (SAE 1/2)	Ø13	M8; 15	38.1	17.5
3	11	DN25 (SAE 1)	Ø19	M10; 17	52.4	26.2	DN13 (SAE 1/2)	Ø13	M8; 15	38.1	17.5
	13	DN25 (SAE 1)	Ø19	M10; 17	52.4	26.2	DN13 (SAE 1/2)	Ø13	M8; 15	38.1	17.5
	16	DN25 (SAE 1)	Ø19	M10; 17	52.4	26.2	DN13 (SAE 1/2)	Ø13	M8; 15	38.1	17.5

Shaft end (dimensions in mm)

Version "E"	Version "R"	Version "S"
		

BG	Version	L1	L2	L3	B1	B2	Marking
2	"E"	$35^{\pm 0.3}$	14^{+2}	$5.5^{\pm 0.5}$	$Ø18h7\ ^{0}_{-0.018}$	20.5	–
	"R"	$24^{\pm 0.2}$	$16^{\pm 0.2}$	–	–	–	16-4 9T 16/32DP
3	"E"	$40^{\pm 0.3}$	14^{+2}	$5.5^{\pm 0.5}$	$Ø20h5\ ^{0}_{-0.009}$	22.5	–
	"R"	$24^{\pm 0.2}$	$16^{\pm 0.2}$	–	–	–	16-4 9T 16/32DP
	"S"	$29^{\pm 0.2}$	$23^{\pm 0.2}$	–	–	–	19-4 11T 16/32DP

Configuration possibilities: Pump combination

Type PGH-2X internal gear pumps can be combined. Each pump has an output shaft gearing. The possible combinations and material numbers of the required combination parts are available in the following table.

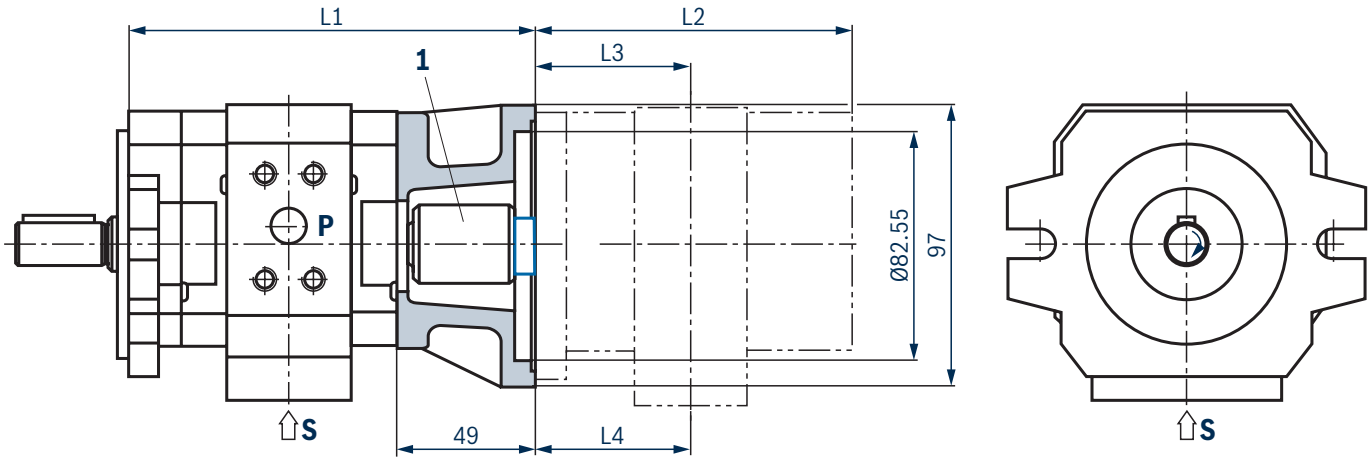
Upstream pump	Downstream pump	Material number	Data sheet
"PGH2" **"PGH3"**	PGH2-2X/..R..U2	R900886137	10223
	PGH3-2X/..R..U2	R900886137	10223
	PGP2-2X/..J..U2	R900886137	10231
	PGF2-2X/..J..U2	R900886137	10213
	AZPF...RR...B...	R900886137	10089
	PR4-1X.WA...	R901015657	11260
	PGZ4-1X/..T..U2	R901405441	10545
	PGZ5-1X/..T..U2	R901405441	10545

☞ **Information:**

- ▶ Please note the project planning information for pump combinations on page 22.
- ▶ For further information, see "Ordering codes: Pump Combination" page 3.

Dimensions: Pump combination – version "P2GH...+GH2..."; "P2GH3...+GH3..."; "P2GH...+GP2..."; "P2GH...+GF2..."; "P2GH...+AZPF..." (dimensions in mm)

Material number combi part: **R900886137**
– Pump 2 with shaft end (16-4) and 2-hole mounting flange (82-2) according to ISO 3019-1



1 Drive with involute tooth system shaft (16-4) according to ISO 3019-1 – 9T – 16/32DP

Pump 1: "PGH2-2X...U2"

Size	"RE"; "LE"	"RR"; "LR"
	L1	L1
005	138.5	138.5
006	141	141
008	144.5	144.5

Pump 1: "PGH3-2X...U2"

Size	"RE"; "LE"	"RR"; "LR"; "RS"; "LS"
	L1	L1
011	156.5	150
013	161.5	155
016	166.5	160

Pump 2: "PGH2-2X...U2" [1)]

Size	"RR"; "LR"		
	L2	L3 (P)	L4 (S)
005	110	54.2	54.2
006	112.5	55.5	55.5
008	116	57.3	57.3

Pump 2: "PGH3-2X...U2" [1)]

Size	"RR"; "LR"		
	L2	L3 (P)	L4 (S)
011	121.5	60	60
013	126.5	62.5	62.5
016	131.5	65	65

Order examples:
- P2GH3/016+GH2/008RE07+R07U2
- P2GH2/006+AZPF/022RR07+R20U2

Pump 2: "PGF2-2X...U2" [2)]; "PGP2-2X...U2" [3)]

Size	"RJ"; "LJ"		
	L2	L3 (P)	L4 (S)
006	106.1	65	65
008	109.6	66.8	66.8
011	115.1	69.5	69.5
013	120.1	72	72
016	125.1	74.5	74.5
019	131.1	77.5	77.5

Pump 2: "AZPF...B..." [4)]

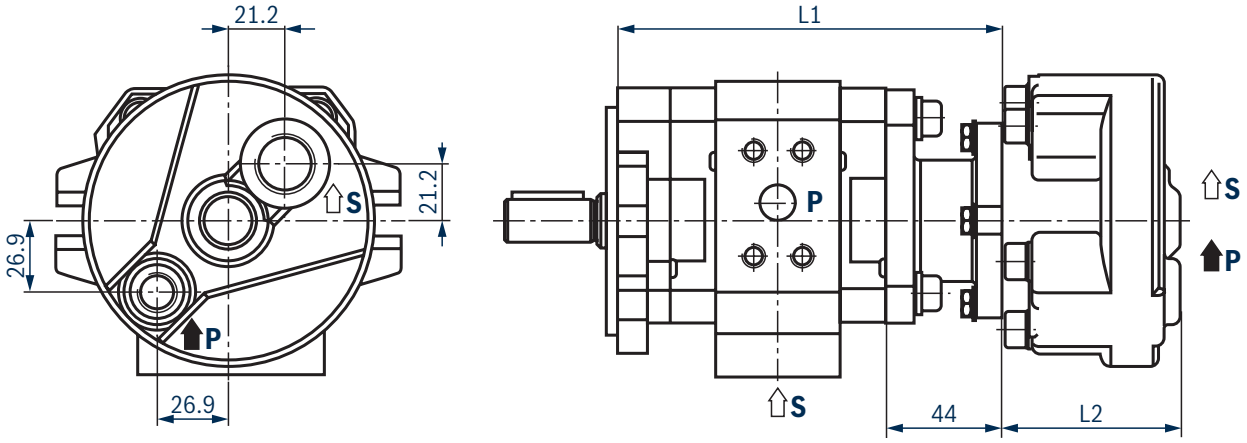
Size	"RRR"; "LRR"		
	L2	L3 (P)	L4 (S)
004	85	39.9	39.9
005	87.5	41.1	41.1
008	91.6	43.2	43.2
011	96.6	47	47
014	101.6	47.5	47.5
016	105	47.5	47.5
019	110	47.5	47.5
022	115.4	55.1	55.1

1) For further information refer to data sheet 10223.
2) For further information refer to data sheet 10213.
3) For further information refer to data sheet 10231.
4) For further information refer to data sheet 10089.

Information:
- The dimensional drawings show the front pump and the combination part.
- The dimensions are nominal dimensions which are subject to tolerances.

Dimensions: Pump combination – version "P2GH...+PR4..." (dimensions in mm)

Material number combi part: **R901015657**



Pump 1: "PGH2-2X...U2"

Size	"RE"; "LE"	"RR"; "LR"
	L1	L1
005	133.5	133.5
006	136	136
008	139.5	139.5

Pump 1: "PGH3-2X...U2"

Size	"RE"; "LE"	"RR"; "LR"; "RS"; "LS"
	L1	L1
011	151.5	145
013	156.5	150
016	161.5	155

Pump 2: "PR4-1X...WA01..." [1)]

Size	L2
0.40-700	69
0.63-700	69
1.00-450	69
1.60-250	69
2.00-175	69

[1)] For further information refer to data sheet 11260.

Order examples:

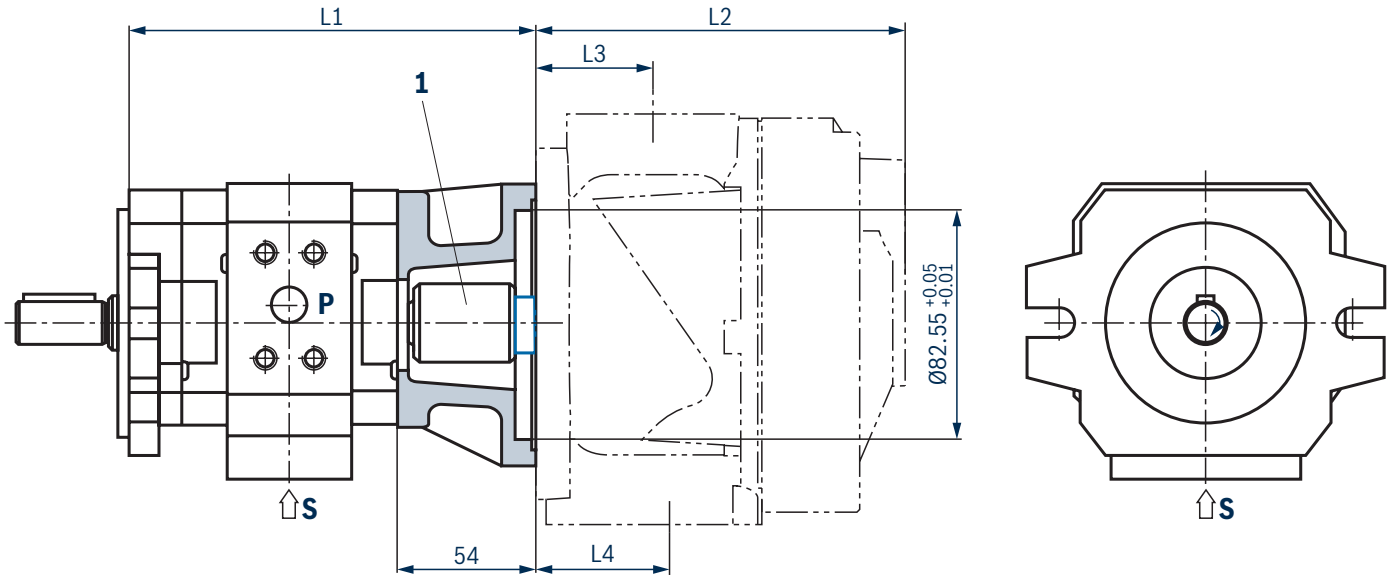
- P2GH2/008+R4/0.63-700RE07+A01U2
- P2GH3/011+R4/1.00-450RE07+A01U2

Information:

- The dimensional drawings show the front pump and the combination part.
- The dimensions are nominal dimensions which are subject to tolerances.
- The suction port is above the pressure port for type PR4.

Dimensions: Pump combination – version "PGH...+PGZ..." (dimensions in mm)

Material number combi part: **R901405441**
– Pump 2 with shaft end (19-4) and 2-hole mounting flange (82-2) according to ISO 3019-1



1 Drivers with involute tooth system shaft (19-4) according to ISO 3019-1 – 11T – 16/32DP

Pump 1: "PGH2-2X...U2"

Size	"RE"; "LE"	"RR"; "LR"
	L1	L1
005	143.5	143.5
006	146	146
008	149.5	149.5

Pump 1: "PGH3-2X...U2"

Size	"RE"; "LE"	"RR"; "LR"; "RS"; "LS"
	L1	L1
011	161.5	155
013	166.5	160
016	171.5	165

Pump 2: "PGZ4-1X...RT..VU2" [1)]

Size	L2	L3 (P)	L4 (S)
020	116.5	42.5	42.5
032	121.5	42.5	42.5
040	125	42.5	42.5
050	129	42.5	42.5
063	134	42.5	42.5
080	142	42.5	42.5

Pump 2: "PGZ5-1X...RT..VU2" [1)]

Size	L2	L3 (P)	L4 (S)
063	134	42.5	48.5
080	142	42.5	48.5
100	150.5	42.5	48.5
140	163	42.5	48.5

Order examples:
- P2GH2/008+GZ4/050RE07+T07U2
- P2GH3/013+GZ5/100RE07+T07U2

[1)] For further information refer to data sheet 10545.

Information:
- The dimensional drawings show the front pump and the combination part.
- The dimensions are nominal dimensions which are subject to tolerances.

Project planning information: general

This project planning information refers to the specific properties of the internal gear pump type PGH.-2X.
You will find extensive general information and suggestions in the Hydraulics Trainer, Volume 3 "Project planning information and design of hydraulic systems", 00281.

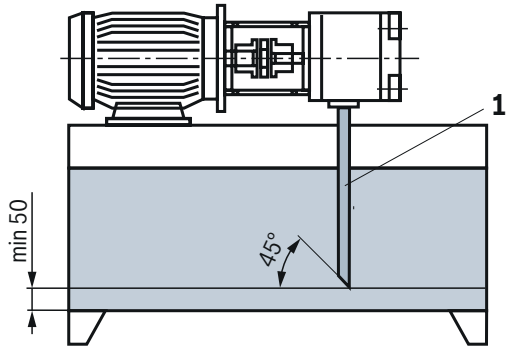
Intended use
Rexroth internal gear pumps are intended for the set-up of hydraulic drive systems in mechanical engineering and plant construction. During project planning, the basic principles of the EU Machinery Directive or comparable national regulations outside the EU must be observed.

Technical data
The plant or machine manufacturer must ensure compliance with the admissible technical data and operating conditions. The pump itself does not contain a device to prevent operation outside the admissible data. All specified technical performance features are average values and apply with the specified boundary conditions. In case of modifications to the basic conditions (e.g. viscosity), the technical data may change as well. Variations corresponding to the current state of the art is possible.
Operation of the pump outside the admissible technical data (pages 6 and 7) is possible to a certain extent, but requires explicit written release from Bosch Rexroth.

Project planning information: Hydraulic project planning

Suction line
The line cross-sections must be rated for the intended volume flows in such a way that an optimum suction speed of 1.0 ... 1.5 m/s is achieved on average. The suction speed must not exceed a maximum value of 2 m/s.
The suction cross-sections at the pump itself are dimensioned for the maximum flow and can therefore only be used as reference. In the case of continuous operation at speeds lower than the admissible maximum speed, the suction tube diameter is to be dimensioned smaller than the suction port of the pump in accordance with the actual suction speed.
The suction line as a whole must be designed in such a way that the admissible input operating pressure is maintained (0.8...2 bar absolute).
It is on the system side to ensure that the pressure at the suction port S is never higher than at the pressure connection P.
Bends and the combination of the suction pipes of several pumps are to be avoided. If suction filters must be used, make sure that the lowest admissible inlet operating pressure is not exceeded on the system side, even if the filter is contaminated.
Please ensure air tightness of the transitions and dimensional stability of the suction tube to the external air pressure.

The immersion depth of the suction pipe should be as large as possible. Dependent on the internal pressure of the container, the viscosity of the hydraulic fluid and the flow ratio in the container, no vortex may form even at maximum volume flow. Otherwise, there is the risk that air is sucked in.
We recommend selecting suction pipes according to AB 23-03.



1 Suction line

Project planning information: Hydraulic project planning

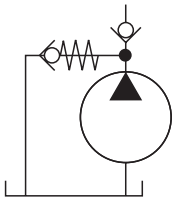
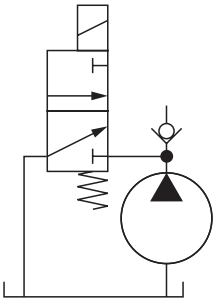
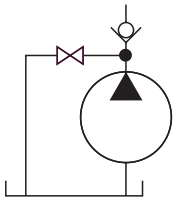
Pressure line
For pressure lines, make sure that sufficient bursting protection of the pipes, hoses and connection elements is provided. The cross-sections should be based on the maximum flow in order to avoid additional excessive load of the pump due to back pressure. Here, you must also consider the pipe losses over the entire pressure line length and other line resistances (e.g. bends, pressure filters).
It is on the system side to ensure that the pressure at the suction port S is never higher than at the pressure connection P. Ensure an absolute pressure of 1 bar in the pressure line. 10 bar absolute in regular operation is recommended.

Pressure limitation
The internal gear pump type PGH does not contain any devices to maintain the maximum operating pressure. Setting and limiting the admissible operating pressure has to be ensured on the system side.
The pressure relief valves necessary for that purpose are to be designed considering the maximum flow and the existing pressure increase speed so that the admissible intermittent operating pressure is not exceeded.

Pressure holding function
In the variable-speed drive, the pump can temporarily also be operated below the specified minimum speed, in the pressure holding function. The holding time and the speed necessary for that purpose results dependent on the operating viscosity and the pressure level. For the design, please contact Bosch Rexroth's technical sales department.
When switched off (speed = 0), a leakage flow streams through the pump back into the container dependent on the load pressure. Use a check valve to prevent this. When using a check valve, please observe the information for bleeding.

Bleeding option for commissioning
For internal gear pumps type PGH.-2X, a manual, switchable or automatic bleeding option must be provided for initial commissioning or re-commissioning after maintenance and repair work. The bleeding point must be placed in the pressure line in front of the first valve or check valve.

Examples of bleeding circuits

Automatic bleeding via self-acting bleed valve	Switchable bleeding	Manually operated bleeding
		

Project planning information: Mechanical project planning

Disassembly and installation option
For disassembling and mounting the pump on the drive, accessibility has to be ensured on the system side by means of suitable lifting gear.
Provide screws of property class 8.8 or 10.9 for mounting purposes.

Mounting
The screws must be accessible on the machine-side so that the required tightening torque can be applied. The tightening torque of the screws is based on the operating conditions and the involved elements of the screw connection, and must be specified by the manufacturer in the power unit, machine or system project planning.

Tank
In the tank construction or the selection of suitable standard tanks, the following requirements are to be observed:

- Selection of the largest tank volume possible, dependent on the permanent or average flow, in order to allow for the separation of air bubbles by means of sufficient duration time of the medium in the tank. The air release capacity of the fluid used is also of importance.
- Provision of settling zones for the hydraulic fluid in the tank in order to allow for air release.
- Provision of guiding plates in order to allowing for the deposit of contamination at the tank bottom outside the pump suction area.
- Generous dimensioning of the tank surfaces depending on the heat output to be dissipated via the tank walls.

Required power unit functions
Hydraulic power units should be equipped with at least the following features:

- Tanks, where internal pressure corresponds to the ambient pressure in accordance with the design, must be equipped with breathing filters for pressure compensation purposes.
- The hydraulic fluid should only be filled via filling connections that exclude filling with unfiltered hydraulic fluid.
- The ingress of contamination or humidity must be avoided. When used in highly contaminated environments, the container should be pre-tensioned using air pressure. If cleansing of the external tank side is intended or to be expected during the period of use, select tank fittings for pipes, lines, or hoses, which ensure safe sealing against external pressurization with water jet.

Place of installation and environmental conditions
For a place of installation at a geodetic altitude of more than 1000 m, the pump must be installed in or below the container to ensure the minimum inlet pressure is maintained.
A short suction line with large cross-section must be selected; bends should not be used.
If the pump is located more than 10 m below the container, additional measures must be taken to ensure that the inlet pressure is reduced to the maximum admissible value.
When operating the pump in salt-containing or corrosive environments, or when pressure loading with strongly abrasive substances is possible, make sure on the system side that the shaft seal ring and the sealing area of the shaft do not make direct contact with the environment.

Installation position

- Horizontal, suction port facing downwards preferred
- Vertical, upwards shaft when installed in tank

Pump combination

- For pump combinations, make sure that the admissible operating data for the relevant pump type are complied with in every stage.
- The combined pumps must all have the same direction of rotation.
- The pump with the highest torque, variable displacement pumps or pumps with intermittent load should be provided as the first stage in the pump combination.
- Formula for torque (input shaft)

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

T	Torque in Nm
Δp	Operating pressure in bar
V	Displacement in cm³
η	Hydraulic mechanical efficiency

- Joint aspiration is not possible.
- Before operating pump combinations with different hydraulic fluids, please consult us.
- PGF combinations are mounted without combination parts and are not sealed against each other.
- The maximum through-drive torque must be checked by the project planner for every application. This is also true for already existing (coded) multiple pumps.
- The total of the torques in a multiple pump must not exceed the maximum drive torque.

Maximum torque in Nm

Type	Drive torque			Output torque
	"E"	"R"	"S"	
PGH2	100	80	–	75
PGH3	110	80	155	75

Maintenance schedule and operational safety

For safe operation and a long life cycle of the pump, a maintenance schedule has to be developed for the power unit, the machine, or the system. The maintenance schedule must ensure that the intended or admissible operating conditions of the pump are complied with over the entire period of use.
In particular, compliance with the following operating parameters must be ensured:

- Maximum admissible degree of contamination of the hydraulic fluid
- Hydraulic fluid temperature range
- Filling level of the hydraulic fluid

Furthermore, the pump and the system have to be checked for modifications of the following parameters on a regular basis:

- Vibrations
- Noise
- Temperature difference pump – hydraulic fluid in the tank
- Foam formation in the tank
- Leak-tightness

Modifications of these parameters indicate wear of components (e.g. drive motor, coupling, pump, etc.).
The cause must be identified and remedied immediately.

In order to achieve high operational safety of the pump in the machine or system, we recommend checking the parameters mentioned above permanently and automatically and shutting the system off automatically in case of modifications exceeding the usual fluctuations in the intended operating range.
Plastic components of drive couplings should be replaced regularly, however, after 5 years at the latest. The relevant manufacturer's specifications must be considered and be given priority.
For preventive maintenance of the pump, we recommend having the seals replaced by an authorized Bosch Rexroth service company after a maximum operating time of 5 years.

Accessories

Pump safety block
To limit the operating pressure and to ensure depressurized circulation of the pump, we recommend our pump safety blocks type DBA according to data sheet 25891.
However, automatic bleeding during commissioning is not possible using pump safety blocks of type DBA.
We recommend separate, manual bleeding in this case.

SAE connection flanges
We recommend selecting the SAE connection flanges for suction and pressure connection according to AB 22-15 (with welded connection) or AB 22-13 (with threaded connection).

Miscellaneous accessories
To set up the internal gear pump type PGH.-2X on electric motors, we recommend selecting the pump carriers according to AB 41-20 and the torsionally flexible couplings according to AB 33-22.

Further information

▶ Hydraulic fluids on mineral oil basis	Data sheet 90220
▶ Environmentally compatible hydraulic fluids	Data sheet 90221
▶ Pump safety block	Data sheet 25891
▶ Information on available spare parts	www.boschrexroth.com/spc

Notes

Bosch Rexroth AG
Industrial Hydraulics
Zum Eisengießer 1
97816 Lohr am Main, Germany
Phone +49 (0) 93 52 / 40 30 20
my.support@boschrexroth.com
www.boschrexroth.com

Bosch Rexroth AG, RE 10223, edition: 2026-03