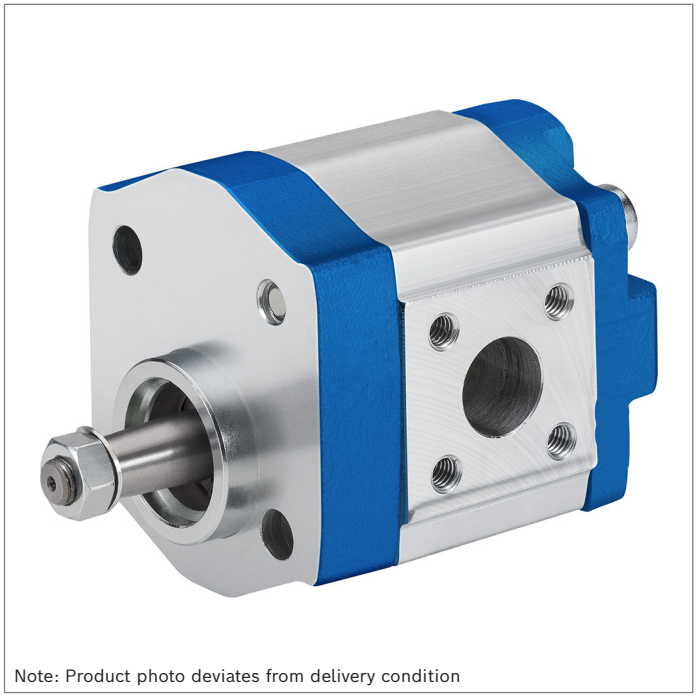
RE 10088/2024-06-14
Replaces: 01.2019

rexroth
A Bosch Company

External gear pump High Performance AZPB



Note: Product photo deviates from delivery condition

- Platform B
- Fixed displacement
- Nominal size 1 to 7.1
- Continuous pressure up to 220 bar
- Intermittent pressure up to 250 bar

Features

- Consistent high quality based on large-volume production
- Long service life
- Slide bearings for high loading
- Drive shafts conforming to ISO or SAE and customer-specific solutions
- Port connections: Connection flanges or screw-in threads
- Combinations of several pumps possible

Contents

Product description

General information

It is the central task of external gear pumps to convert mechanical energy (torque and speed) into hydraulic energy (flow and pressure). To reduce heat losses, Rexroth's external gear units offer very high efficiencies. They are realized by pressure-dependent gap sealing and highly precise production technology.
Rexroth external gear pumps are built in four frame sizes: Platform B, F, N and G. Within each platform different sizes can be realized by different gear widths. The pumps are available in the versions Standard, High Performance, SILENCE und SILENCE PLUS. Further configuration variants are given by different flanges, ports, shafts, valve arrangements and multiple pump combinations.

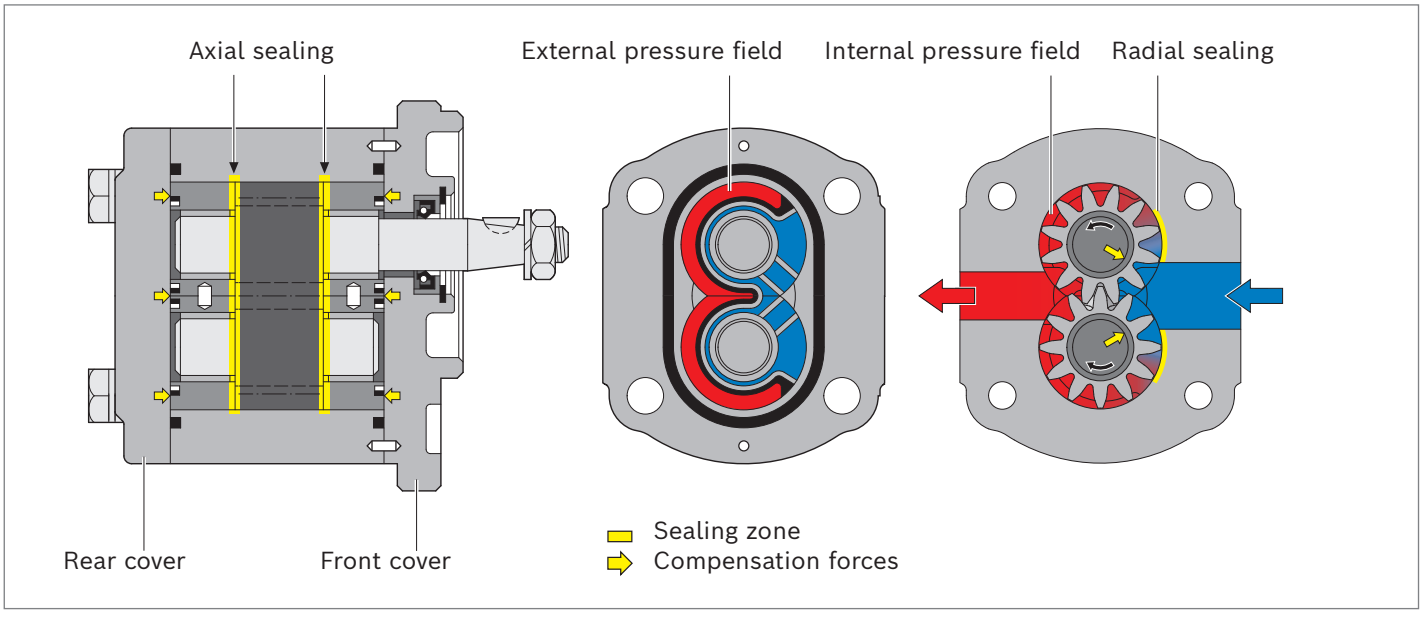
Pumping principle

Due to the teeth moving apart during the rotation from the tooth mesh, the gear chambers become clear. The resulting negative pressure as well as the atmospheric pressure on the hydraulic fluid level in the reservoir cause hydraulic fluid to flow from the reservoir to the pump. This hydraulic fluid fills the gear chambers and is transported in them in the direction of the arrow (see sectional drawing) along the housing from the suction side to the pressure side. The teeth mesh again then, force the hydraulic fluid out of the gear chambers and prevent it from flowing back to the suction chamber.

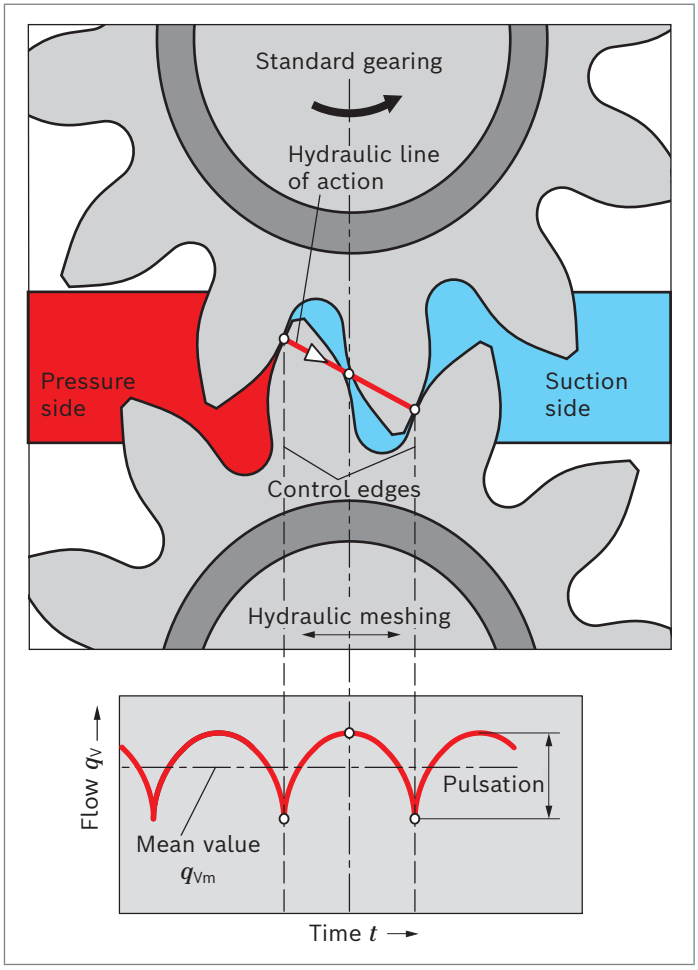
Construction

The external gear pump consists essentially of a pair of gear wheels supported in bearing bushings and the housing with a front cover and a rear cover.
The drive shaft protrudes from the front cover where it is usually sealed by the shaft seal. The bearing forces are absorbed by slide bearings. These bearings were designed for high pressures and have excellent emergency running properties, especially at low rotational speeds.
The gear wheels have 12 teeth. This keeps both flow pulsation and noise emission to a minimum. The sealing of the pressure chambers is achieved by forces depending on the working pressure. This ensures optimum efficiency.
The working pressure generated in the gear chambers is transferred to the outside of the bearing bushings in specifically designed pressure fields in such a way that they are pressed against the gears and seal them up. The pressurized compression areas are limited by special seals. The seal in the area between the gear teeth and the housing is ensured by the smallest of gaps that are set depending on the pressure between the gear teeth and housing.

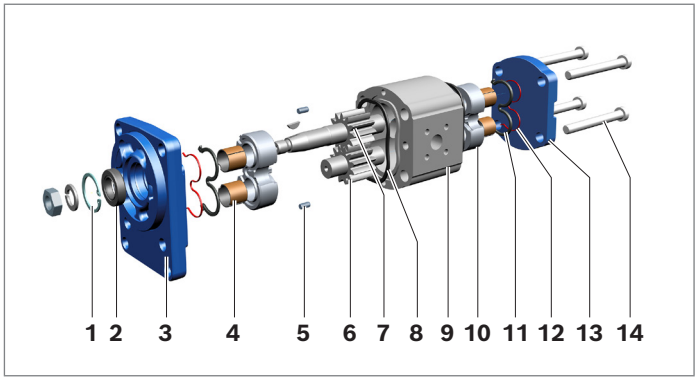
▼ **Axial and radial sealing of gear chambers**



▼ Pumping principle of High Performance pump



▼ Principle design of external gear pump



1	Retaining ring	**8**	Housing seal ring
2	Shaft seal	**9**	Pump housing
3	Front cover	**10**	Bearing bushing
4	Slide bearings	**11**	Axial field seal
5	Centering pin	**12**	Supporting element
6	Gear wheel	**13**	Rear cover
7	Drive shaft	**14**	Torx screws

Type codes

Type code solo pump

01	02	03		04	05		06	07	08	09	10	11	12		13
AZ	**P**	**B**	**–**	**3**	**2**	**–**								**–**	

Product

01	External gear unit	**AZ**

Function

02	Pump	**P**

Model

03	High Performance, platform B (1 ... 7.1 cm³/rev)	**B**

Series

04	Bearing diameter 12 mm or 12.7 mm	**3**

Version

05	Zinc plated or aluminum, high precision cover fixation[1)]	**2**

Nominal size (NG)

06	Geometric displacement V_g [cm³/rev], see “Technical data”	**1.0**	**2.0**	**2.5**	**3.1**	**4.0**	**4.5**	**5.0**	**6.3**	**7.1**

Direction of rotation

07	Viewed on drive shaft	clockwise	**R**
		counter-clockwise	**L**

Drive shaft			**Typical front cover**	
08	Tapered keyed shaft	1 : 5	P	**C**
		1 : 8	O	**H**
	Tang drive		M	**N**
	Splined shaft	SAE J744 13-4 9T	R	**R**
	Parallel keyed shaft	SAE J744 13-1, length 27 mm	R	**Q**

Front cover

09	Rectangular flange	spigot diameter 25.38 mm	Italian version	**O**
	2-bolt flange	spigot diameter 50.80 mm	SAE J744 50-2 (A-A)	**R**
	2-bolt mounting	spigot diameter 32 mm	with O-ring	**M**
		spigot diameter 32 mm		**P**

Port connection

10	Pipe thread according to ISO 228-1		**01**
	Metric thread according to ISO 9974-1		**02**
	UN-thread according to ISO 11926-1 / ASME B 1.1, O-ring		**12**
	Square flange (German version)		**20**

Sealing material

11	NBR (nitrile rubber)	**M**
	FKM (fluorocarbon rubber)	**P**
	NBR (nitrile rubber), shaft seal in FKM (fluorocarbon rubber)	**K**

1) Corrosion-protected version, details see “Technical data“

Rear cover

12	With axial pressure and suction port	**A**
	Standard (cast iron)	**B**

Non standard version

13	Special version[2)] (characteristics not covered by type code)	**SXXXX**

Notice

- Not all of the variants according to the type code are possible.
- Please select the desired pump with the help of the selection table (preferred types) or after consultation with Bosch Rexroth.
- Special options are available on request.

2) For more information about special version, please contact us.

Type code multiple pump

01	02	03		04	05		06	07	08	09	10	11	12		13
AZ	**P**		**–**			**–**								**–**	

Product

01	External gear unit	**AZ**

Function

02	Pump	**P**

Model[1)]

03	Standard Performance	4.0 ... 25 cm^3/rev	Data sheet 10090	**W**
	High Performance	1.0 ... 7.1 cm^3/rev	Data sheet 10088	**B**
		4.0 ... 28 cm^3/rev	Data sheet 10089	**F**
		20.0 ... 36 cm^3/rev	Data sheet 10091	**N**
		22.5 ... 100 cm^3/rev	Data sheet 10093	**G**
	SILENCE	4.0 ... 28 cm^3/rev	Data sheet 10095	**S**
		20.0 ... 36 cm^3/rev	Data sheet 10092	**T**
		22.5 ... 100 cm^3/rev	Data sheet 10098	**U**
	SILENCE PLUS	12.0 ... 28 cm^3/rev	Data sheet 10094	**J**

Series (according to data sheet of pump stage 1)

04	Standard bearing	**1**
	Reinforced bearing	**2**

Version (according to data sheet of pump stage 1)

05	Phosphated, high precision cover fixation	**1**
	Zinc plated, high precision cover fixation	**2**

Nominal size (NG)[2)]

06	In accordance with data sheet for the individual series	

Direction of rotation

07	Viewed on drive shaft	clockwise	**R**
		counter-clockwise	**L**

Drive shaft (according to pump stage 1)

08	In accordance with data sheet of pump stage 1	

Front cover (according to pump stage 1)

09	In accordance with data sheet of pump stage 1	

Port connection (per pump stage)[3)]

10	In accordance with data sheet for the individual series	

Sealing material

11	NBR (nitrile rubber)	**M**
	FKM (fluorocarbon rubber)	**P**
	NBR (nitrile rubber), shaft seal in FKM (fluorocarbon rubber)	**K**

Rear cover (according to last pump stage)

12	In accordance with data sheet of the last pump stage	

Non standard version

13	Special version (characteristics not covered by type code)	**SXXXX**

1) A letter is to be selected for each pump stage, e.g. 3-fold pump AZPJ + AZPJ + AZPB: AZP**JJB**
2) A numerical value is to be selected for each pump stage, e.g.3-fold pump **028/016/2.0**
3) A numerical value is to be selected for each pump stage, e.g.3-fold pump **202020**

Notice

- Not all of the variants according to the type code are possible.
- Please select the desired pump with the help of the selection table (preferred types) or after consultation with Bosch Rexroth.
- Special options are available on request.

Example dual pump:

AZPB...6.3... + AZPB... 2.0...

01	02	03		04	05		06	07	08	09	10	11	12
AZ	**P**	**BB**	**–**	**3**	**2**	**–**	**6.3/2.0**	**L**	**H**	**O**	**0101**	**M**	**B**

Technical data

Operating conditions

Nominal size				1.0	2.0	2.5	3.1	4.0	4.5	5.0	6.3	7.1
Series				3x								
Displacement geometric, per revolution		V_g	cm^3	1.0	2.0	2.5	3.15	4.0	4.5	5.0	6.3	7.1
Pressure at suction port **S**[1]	absolute	p_e	bar	0.7 ... 3								
Maximum continuous pressure		p_1	bar	220	220	220	220	220	220	220	220	200
Maximum intermittent pressure[2]		p_2	bar	250	250	250	250	250	250	250	250	230
Maximum pressure peaks		p_3	bar	270	270	270	270	270	270	270	270	250
Minimum rotational speed	at p_2	n_{min}	rpm	750	750	750	750	750	750	750	750	750
Maximum rotational speed	at p_2	n_{max}	rpm	6000	5000	5000	4000	4000	4000	4000	3500	3500

Rotary stiffness of drive shaft

Drive shaft			C	H	N	Q	R
Rotary stiffness	c	Nm/rad	41	34	68	63	60

General technical data

Installation position			No restrictions
Mounting type			See offer drawing
Port connections			See chapter “Port connections”
Direction of rotation, viewed on drive shaft			Clockwise or counter-clockwise, the pump may only be driven in the direction indicated
Drive shaft loading			Axial and radial forces only after consultation
Ambient temperature range	t	°C	–30 ... +80 with NBR seals (NBR = nitrile rubber)
			–10 ... +110 with FKM seals (FKM = fluorocarbon rubber)

Corrosion protection

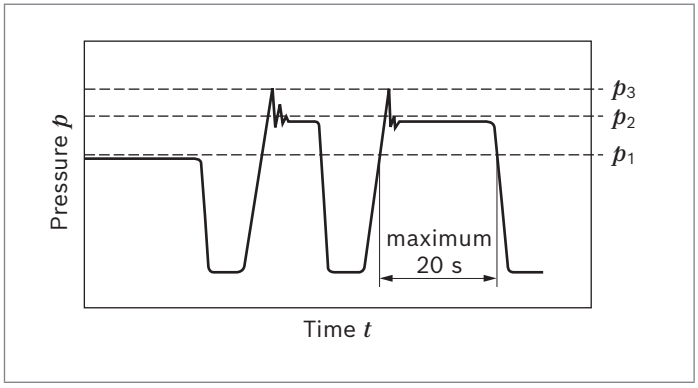
Version 2 (galvanized, passivated): Unit with corrosion protection	Degree of corrosion and rust according to DIN EN ISO 9227	Test duration 96 h: no red rust

Notice

- Safety requirements pertaining to the whole systems are to be observed.
- Please contact us for applications with frequent load changes.

1) In the case of tandem pumps, the suction-side pressure difference between the individual pump stages must not exceed 0.5 bar.
2) Limited service life with threaded ports (applicable for applications with p_2 > 210 bar)

▼ **Pressure definition**

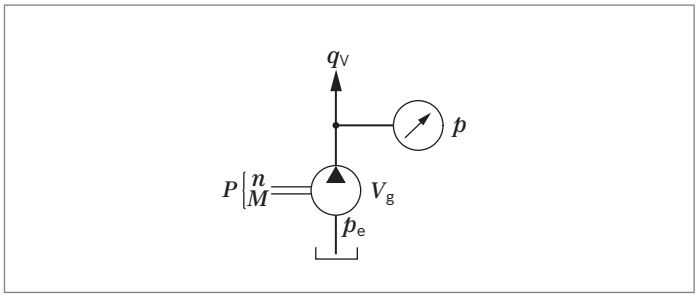


p_1: Maximum continuous pressure
p_2: Maximum intermittent pressure
p_3: Maximum pressure peaks

Determining the operating characteristics		
Flow	$q_v = \frac{V_g \times n \times \eta_v}{1000}$	[l/min]
Torque	$M = \frac{V_g \times \Delta p}{20 \times \pi \times \eta_{hm}}$	[Nm]
Power	$P = \frac{2 \pi \times M \times n}{60000} = \frac{q_v \times \Delta p}{600 \times \eta_t}$	[kW]

Key

V_g	Displacement per revolution [cm³]
Δp	Differential pressure [bar] ($\Delta p = p - p_e$)
n	Rotational speed [rpm]
η_v	Volumetric efficiency
η_{hm}	Hydraulic-mechanical efficiency
η_t	Total efficiency ($\eta_t = \eta_v \times \eta_{hm}$)

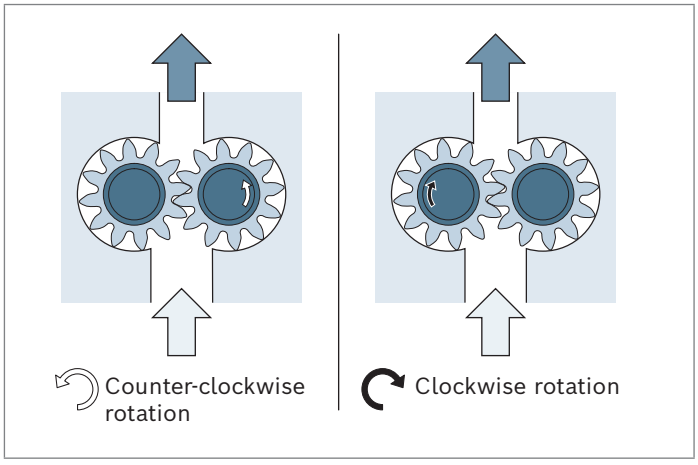


Notice
You can find diagrams for a rough calculation in chapter “Flow characteristic curves” and “Power diagrams”.

Direction of rotation

The dimensional drawings in the chapter “Dimensions” represent pumps for clockwise rotation. The position of the drive shaft and/or the position of suction and pressure port changes for counter-clockwise rotation.

▼ **Direction of rotation, viewed on drive shaft**



Hydraulic fluid

The external gear unit is designed for operation with HLP mineral oil according to DIN 51524, 1-3. Under higher load, however, Bosch Rexroth recommends at least HLP compliant with DIN 51524 Part 2.
See the following data sheet for application instructions and requirements for selecting hydraulic fluid, behavior during operation as well as disposal and environmental protection before you begin project planning:

- 90220: Hydraulic fluids based on mineral oils and related hydrocarbons

Other hydraulic fluids on request.

Selection of hydraulic fluid
Bosch Rexroth evaluates hydraulic fluids on the basis of the Fluid Rating according to the technical data sheet 90235.
Hydraulic fluids with positive evaluation in the Fluid Rating are provided in the following technical data sheet:

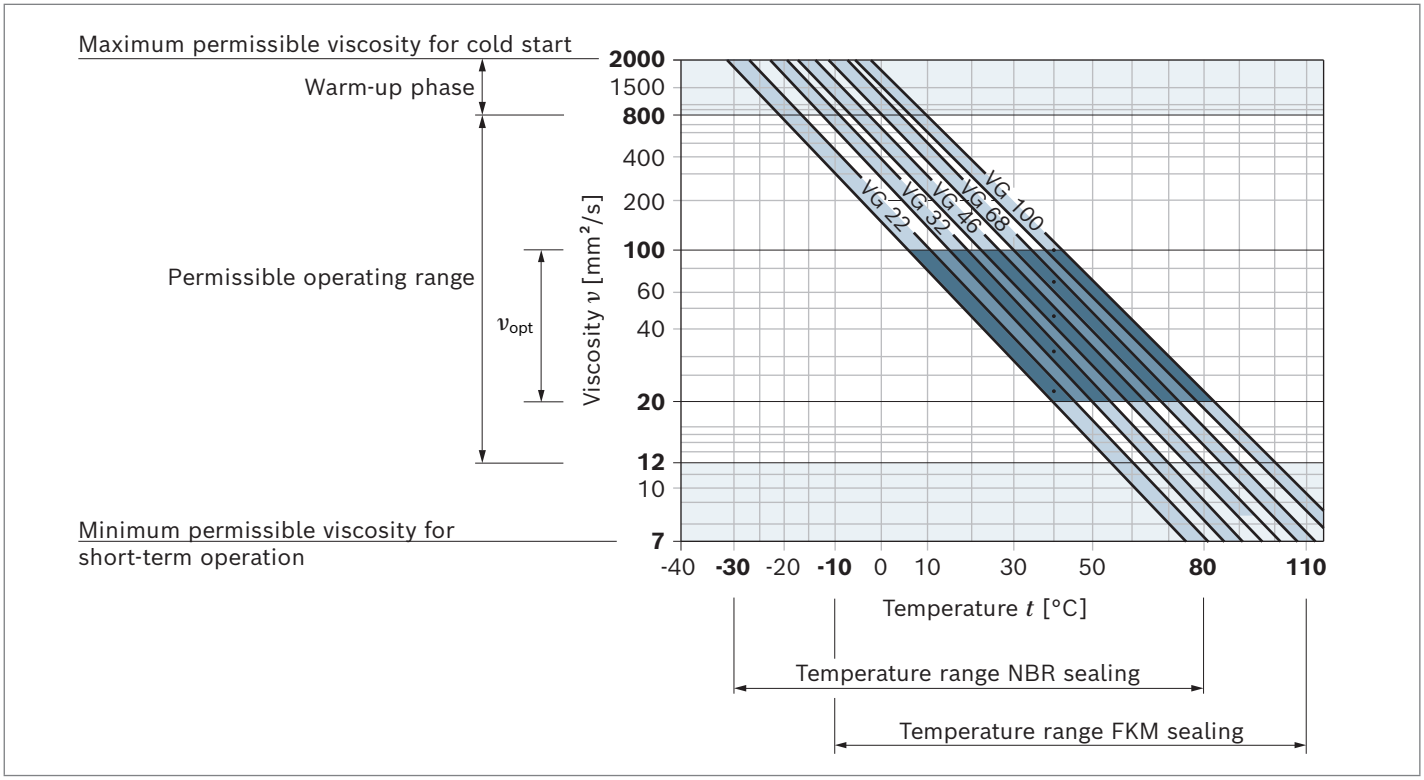
- 90245: Bosch Rexroth Fluid Rating List for Rexroth hydraulic components (pumps and motors)

Selection of hydraulic fluid shall make sure that the operating viscosity in the operating temperature range is within the optimum range (ν_{opt} see “Selection diagram”)

Viscosity and temperature of hydraulic fluids

Viscosity range	
Permissible operating range	ν = 12 ... 800 mm²/s
Recommended in continuous operation	ν_{opt} = 20 ... 100 mm²/s
Permissible for cold start	ν_{max} ≤ 2000 mm²/s
Temperature range	
With NBR seals (NBR = nitrile rubber)	t = -30 °C ... +80 °C
With FKM seals (FKM = fluorocarbon rubber)	t = -10 °C ... +110 °C

▼ **Selection diagram**

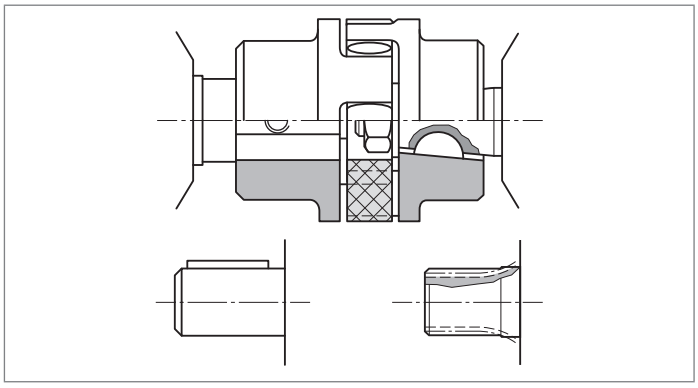


Observe the instructions for the filtration of the hydraulic fluid (see chapter “Project planning information”).

Drive

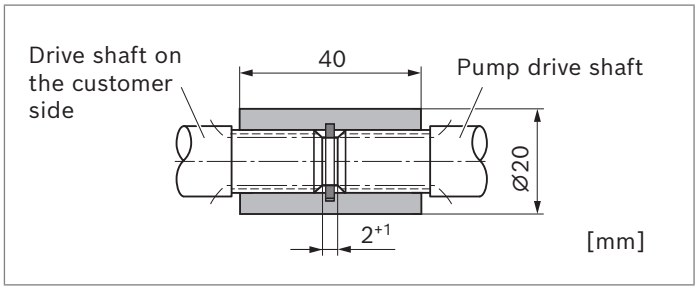
Elastic couplings

- The coupling may not transfer any radial or axial forces to the pump.
- The radial runout deviation from the shaft to the spigot should not exceed 0.2 mm.
- See the coupling manufacturer's assembly instructions for shaft misalignment tolerances.



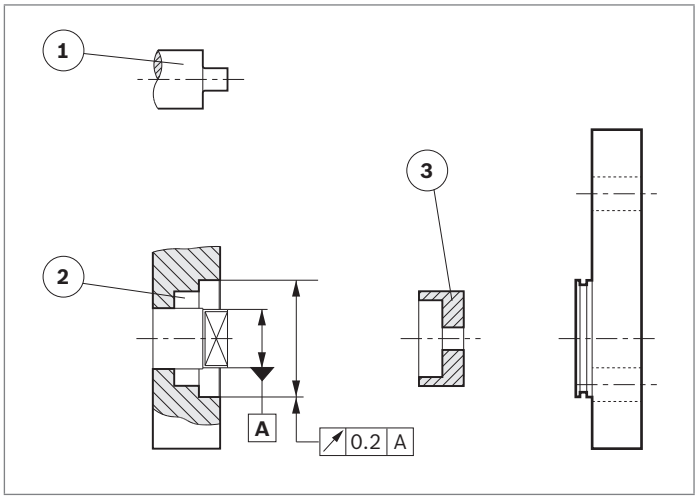
Coupling sleeve

- To be used for splined shaft profile according to SAE
- Attention: Make sure no radial or axial forces act on the pump drive shaft or coupling sleeve. The coupling sleeve should freely move in the axial direction.
- The distance between the pump drive shaft and the output shaft on the customer side should be 2^{+1} mm
- Reserve installation space for the retaining ring.
- Oil-bath or oil-mist lubrication required



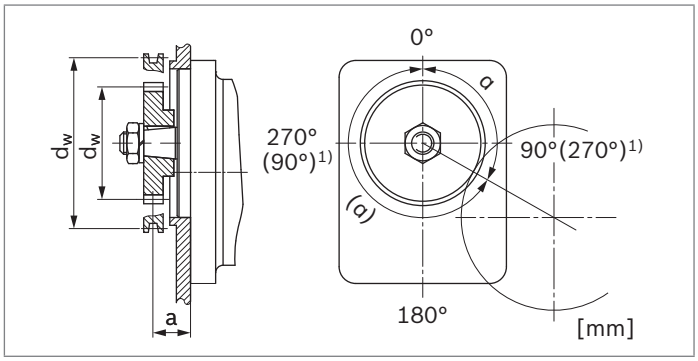
Tang drive coupling

- For attaching the pump directly to an electric motor or combustion engine, gearbox, etc.
- Pump drive shaft with special tang drive coupling and driver (**3**) (scope of delivery see offer drawing)
- No shaft seal
- Drive-side installation and sealing according to the following recommendations and dimensions
- Drive shaft on the customer side (**1**)
  - Case-hardened steel DIN 17210, e.g. 20MnCrS5 case-hardened 0.6 deep; HRC 60±3
  - Seal ring contact surface ground without rifling $R_t \leq 4$ µm
- Radial shaft seal ring on the customer side (**2**)
  - Provide with rubber cover (see DIN 3760, type AS, or double-lipped ring)
  - Provide installation edges with 15° chamfer or install shaft seal with protection sleeve



V-belts and straight gear wheels or helical toothed gear drives without outrigger bearing

For V-belt or gear wheel drives, please contact us specifying the application and mounting conditions (dimensions a, d_m, d_w and angle α). For helical toothed gear drives, details of the helix angle β are also required.



1) Values in parentheses refer to counter-clockwise rotation.

Maximum transferable drive torques

▼ **Tapered keyed shafts**

Drive shaft code	Designation	M_{max} Nm	Nominal size	$p_{2\ max}$ bar
C	1 : 5	26	1 ... 5	250
			6.3	235
			7.1	210
H	1 : 8	30	1 ... 5	250
			6.3	250
			7.1	230

▼ **Tang drive**

Drive shaft code	Designation	M_{max} Nm	Nominal size	$p_{2\ max}$ bar
N		25	1 ... 5	250
			6.3	225
			7.1	200

▼ **Splined shafts**

Drive shaft code	Designation	M_{max} Nm	Nominal size	$p_{2\ max}$ bar
R	SAE J744 13-4 9T	55	1 ... 5	250
			6.3	250
			7.1	230

▼ **Parallel keyed shafts**

Drive shaft code	Designation	M_{max} Nm	Nominal size	$p_{2\ max}$ bar
Q	SAE J744 13-1	**35**	1 ... 5	250
			6.3	250
			7.1	230

Multiple gear pumps

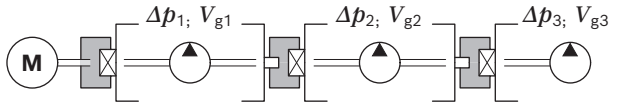
Gear pumps are well-suited to multiple arrangements, whereby the drive shaft of the first pump stage is extended to a second and possibly third pump stage. The shaft of the individual pump sections are normally connected via a driver or via a splined coupling (reinforced through drive). The individual pump stages are usually hydraulically isolated and have separate suction ports. On request a common suction port or separated but hydraulically connected suction ports are available.
For the configuration of multiple pumps, Bosch Rexroth recommends arranging the pump stage with the largest displacement on the drive side.

Notice
Basically, the parameters of the solo pumps apply, however certain restrictions need to be observed:

- **Maximum rotational speed:**
  This is determined by the largest pump stage used.
- **Pressures:**
  These are restricted by the maximum transmissible torques of the drive shaft, the through drive and the driver.

Addition of drive torques

Please note, that in multiple pump arrangements the drive torques of the individual pump stages will add up according to the following formula:



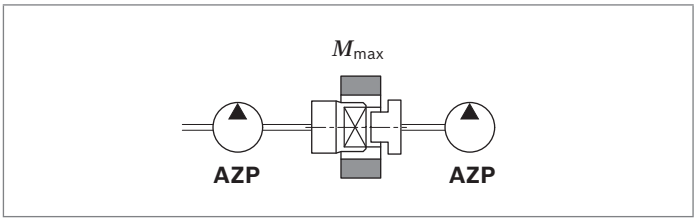
$$\frac{\Delta p_1 \times V_{g1} + \Delta p_2 \times V_{g2} + \Delta p_3 \times V_{g3}}{18 \times \pi} \leq M_{max}\ ^{1)}$$

Δp [bar]
V_g [cm³]

This may result in pressure restrictions for the respective pump stages.

Standard through drive (tang drive coupling)

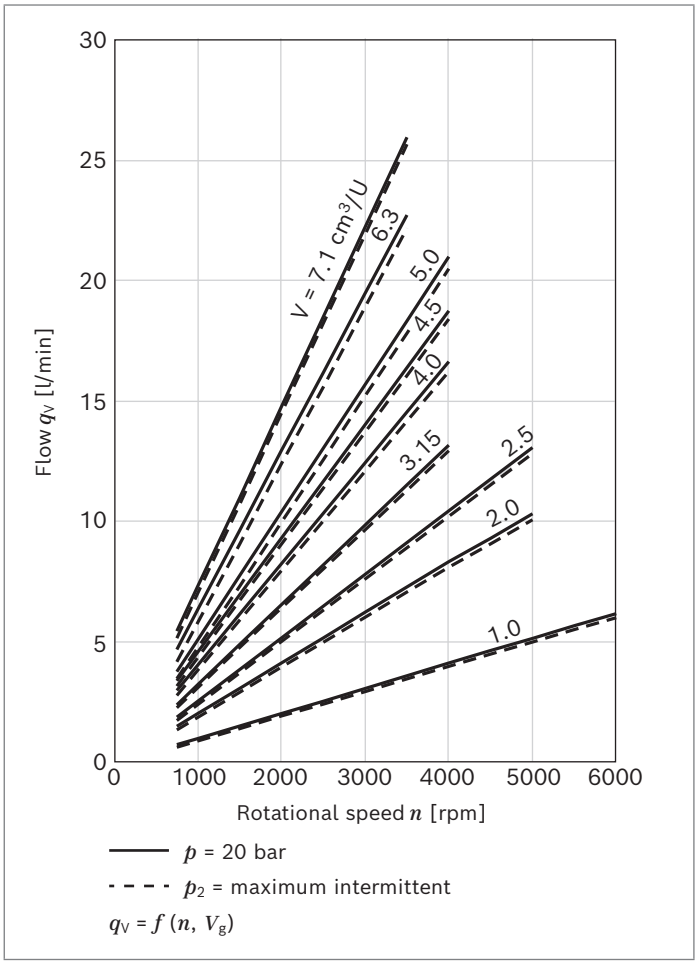
For AZPB pumps, the driver for the next pump stage can support loads up to M_{max} = 25 Nm. This may result in pressure limitations for subsequent pump stages. Subsequent pumps of a smaller series determine the maximum transmissible torque.



Following pump		M_{max} [Nm]
Platform B	AZPB-3x	25

1) M_{max}: see table above “Maximum transferable drive torques”

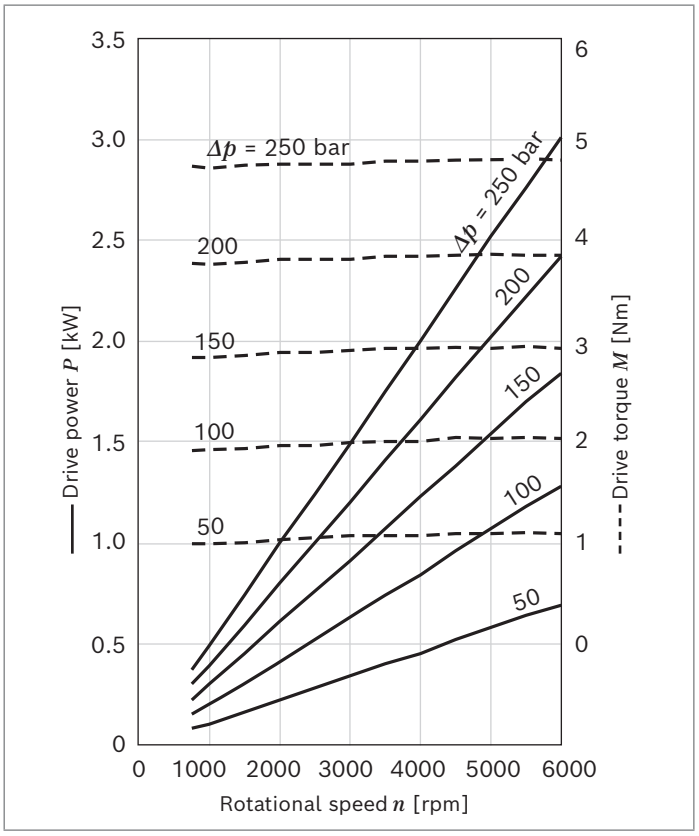
Flow characteristic curves



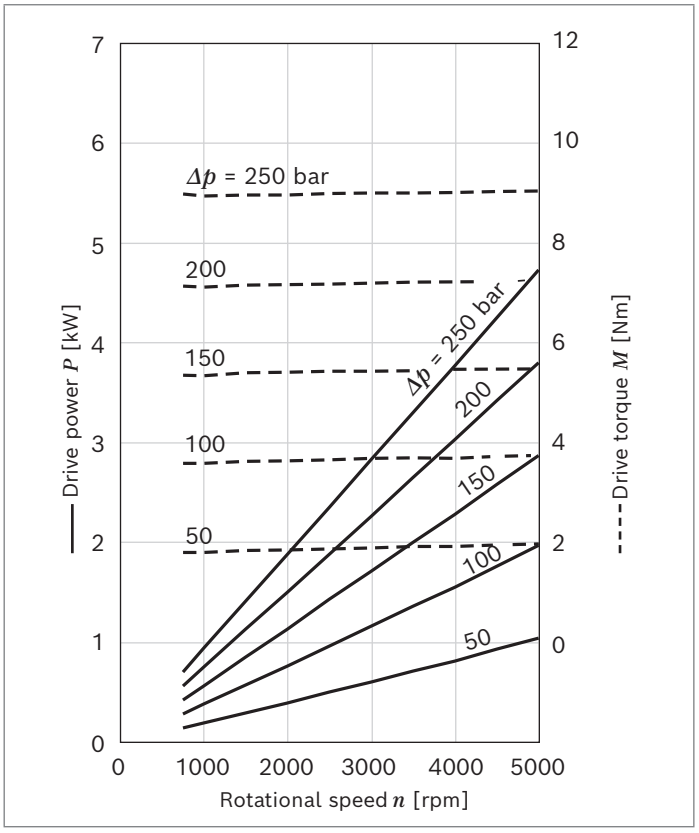
Notice
Characteristic curves measured at ν = 32 mm²/s and t = 50 °C

Power diagrams

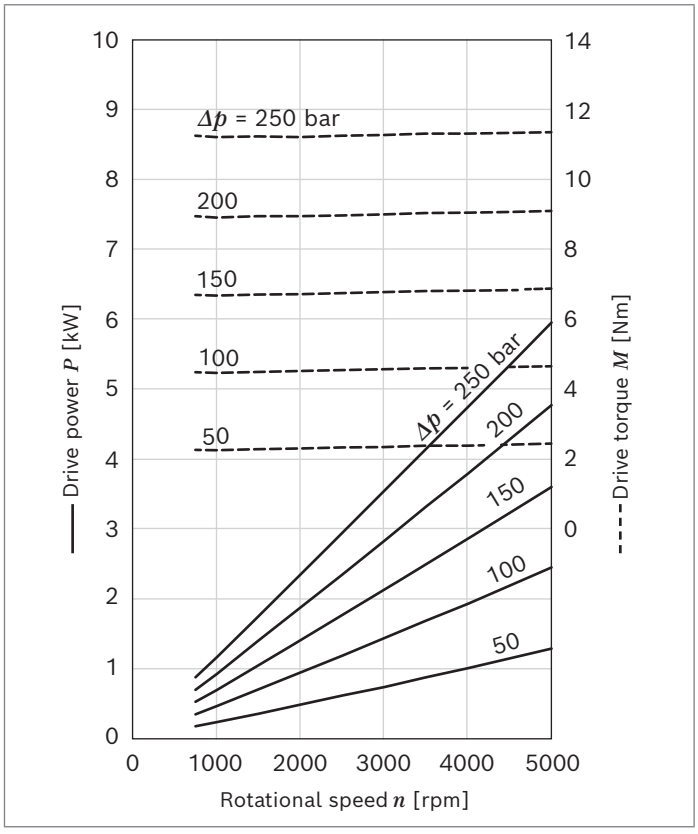
▼ **Nominal size 1.0**



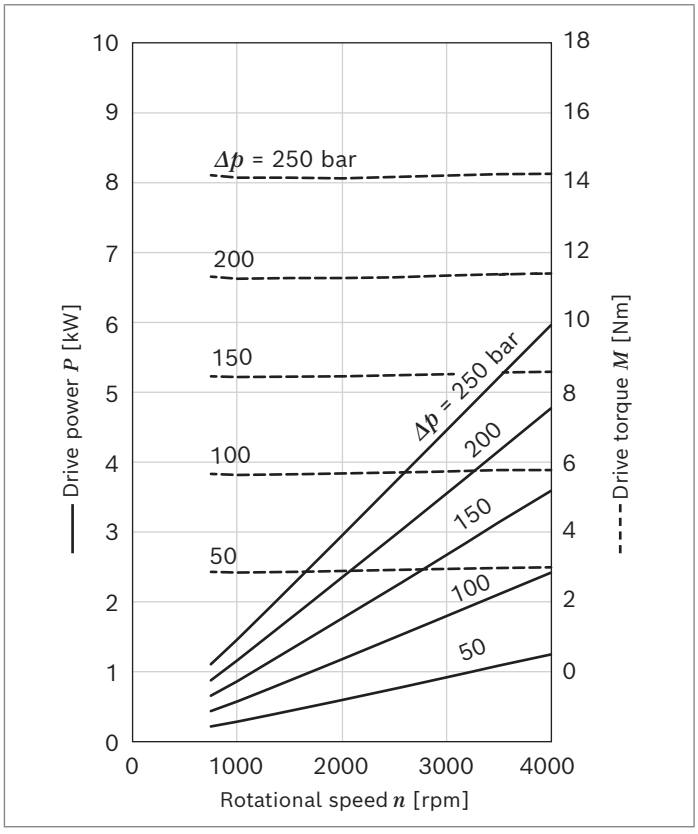
▼ **Nominal size 2.0**



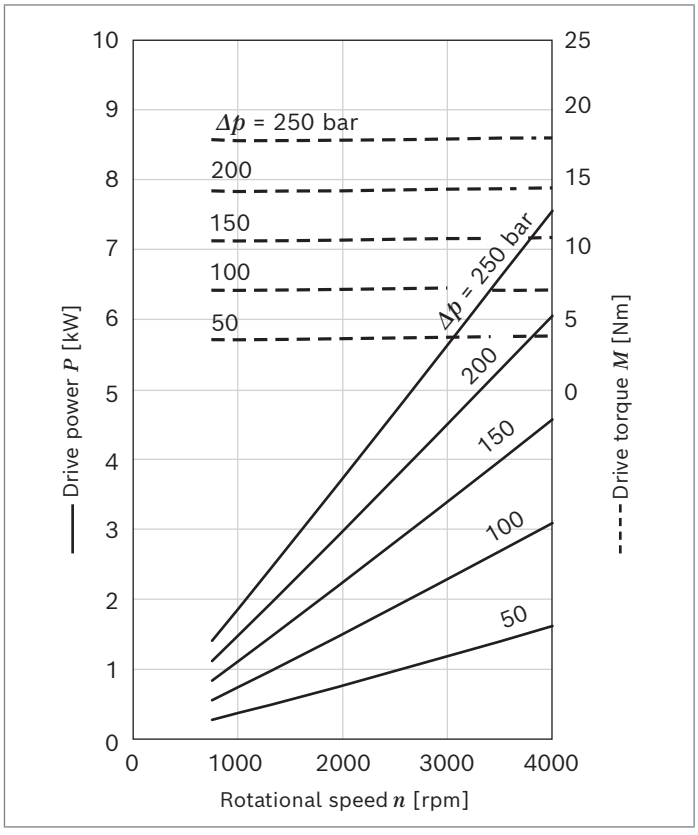
▼ **Nominal size 2.5**



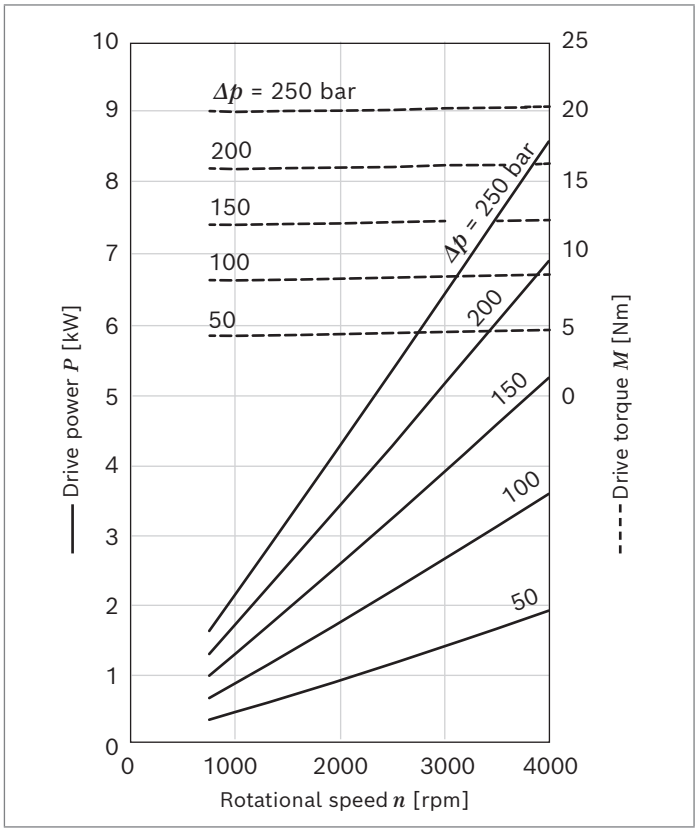
▼ **Nominal size 3.15**



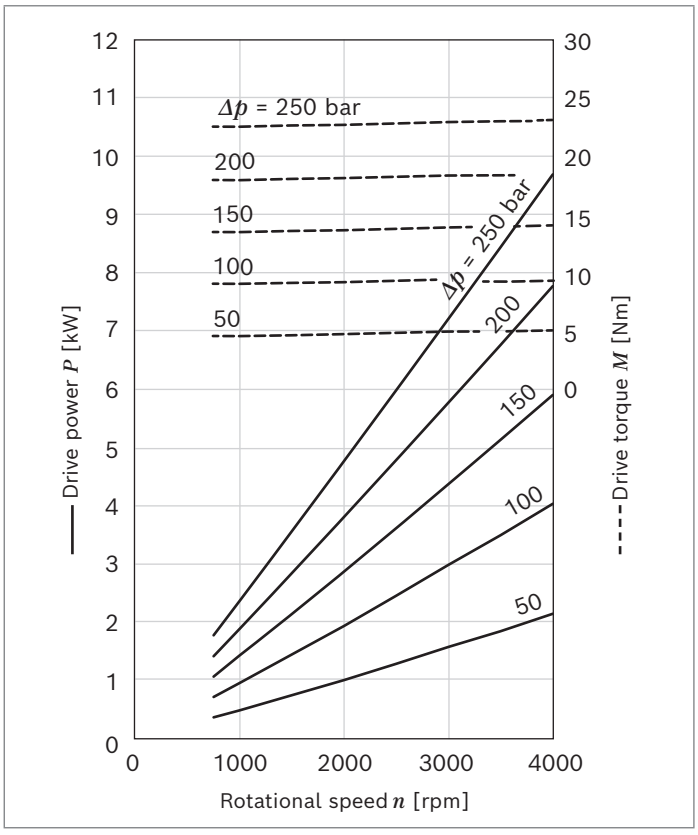
▼ **Nominal size 4.0**



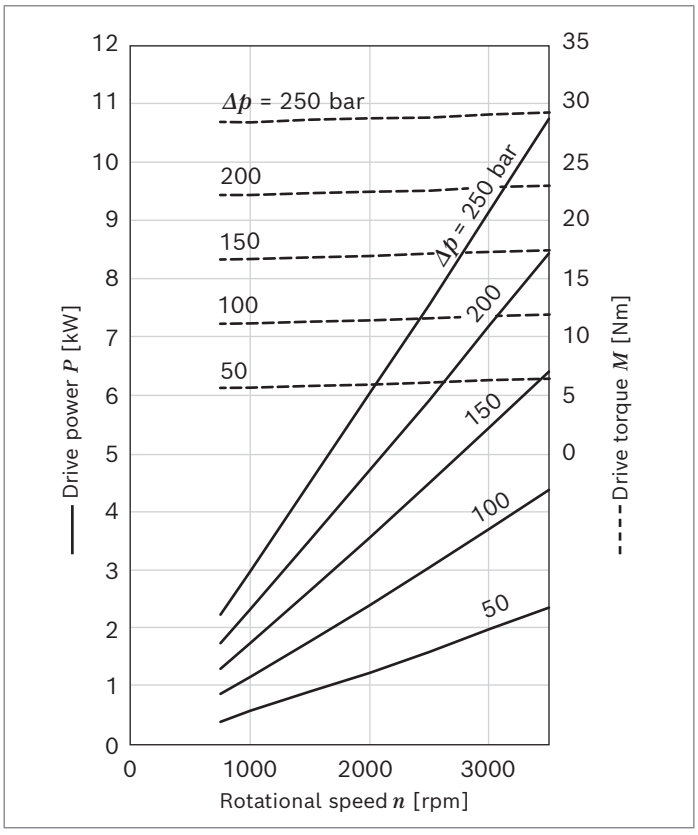
▼ **Nominal size 4.5**



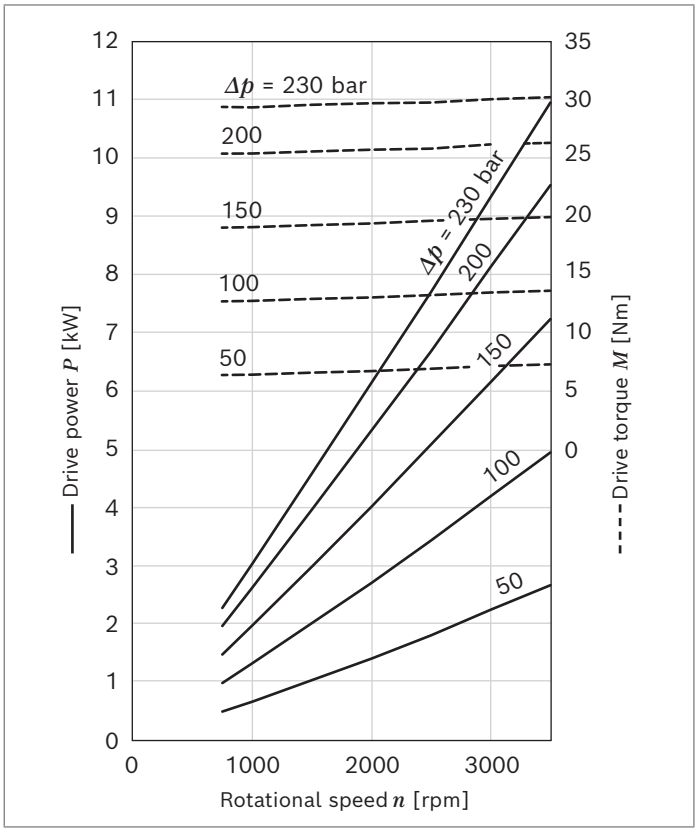
▼ **Nominal size 5.0**



▼ **Nominal size 6.3**



▼ **Nominal size 7.1**



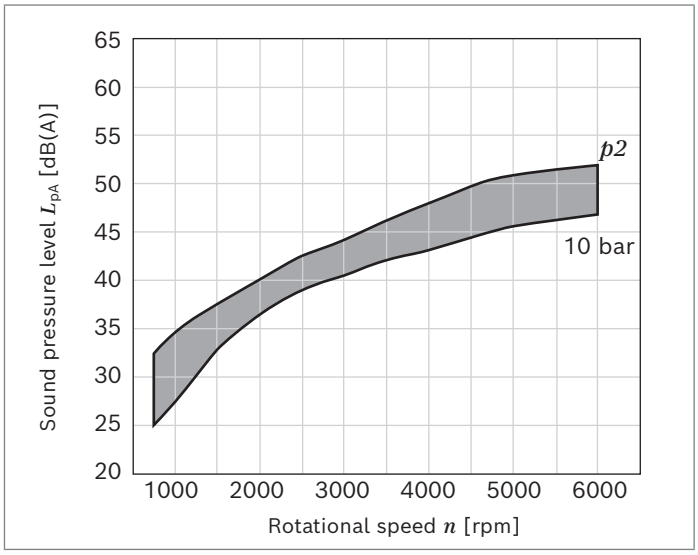
Noise charts

Noise levels dependent on the rotational speed, pressure range between 10 bar and pressure value p_2 (see chapter “Technical data”).
These are typical characteristic values for the respective size. They describe the airborne sound emitted solely by the pump.
Ambient influences (installation site, piping, other system components) were not taken into account.
The values refer to one individual pump.

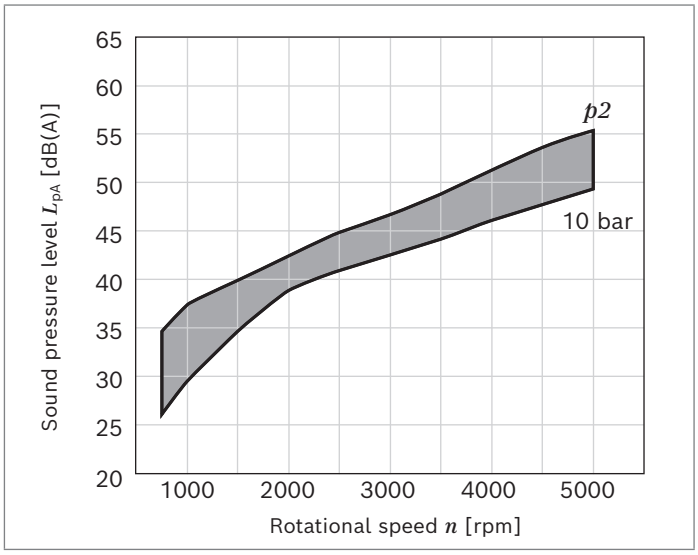
Notice

- Characteristic curves measured at ν = 32 mm²/s and t = 50 °C.
- Sound pressure level calculated from noise measurements made in the low reflection measuring room according to DIN 45635, Part 26.
- Distance from measuring sensor to pump: 1 m.

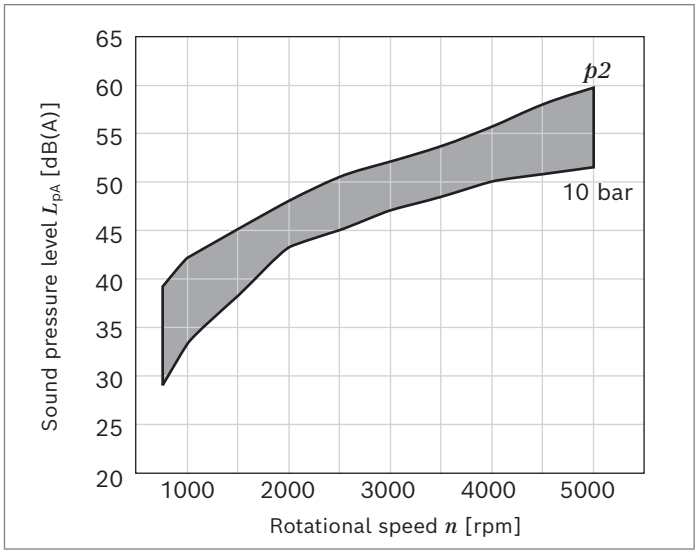
▼ **Nominal size 1.0**



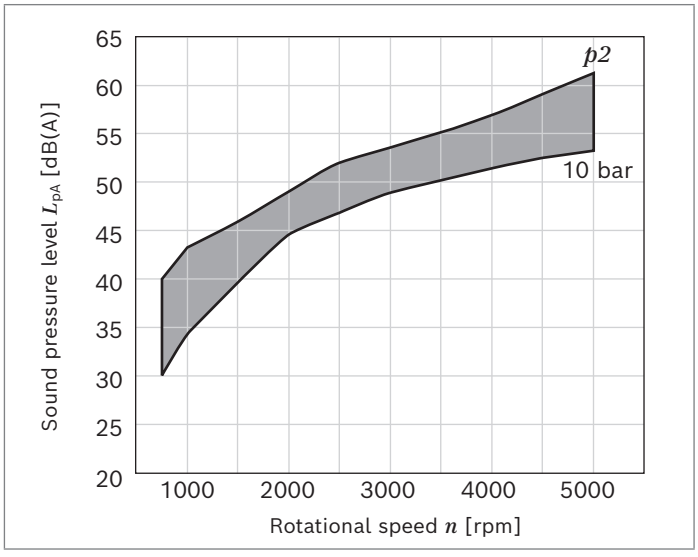
▼ **Nominal size 2.0**



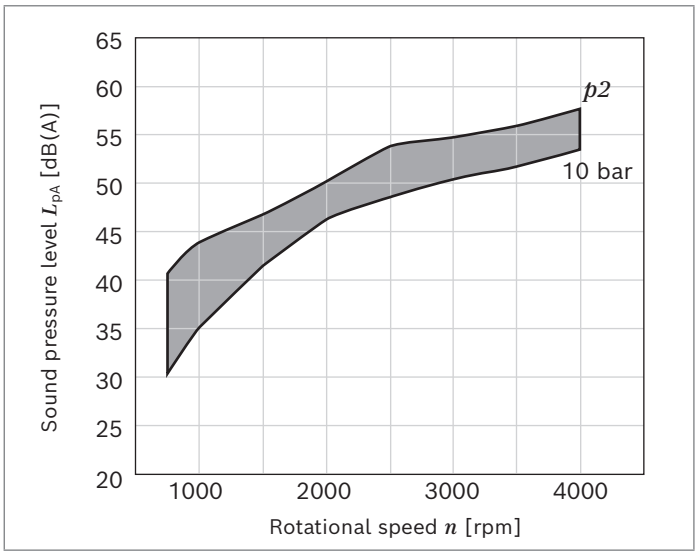
▼ **Nominal size 2.5**



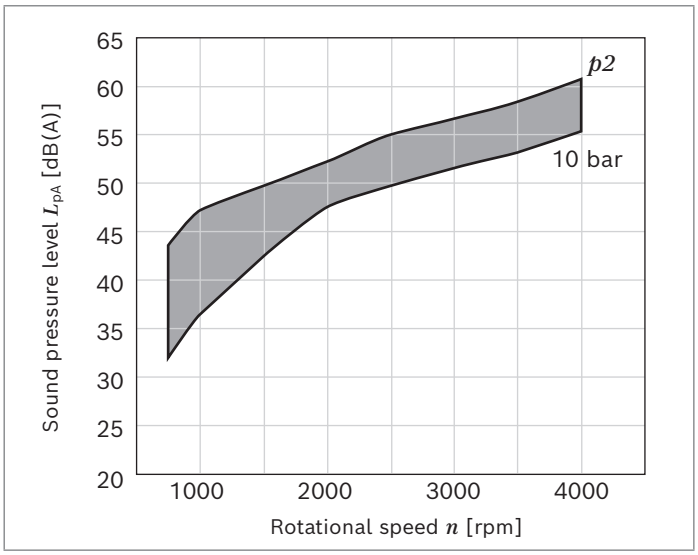
▼ **Nominal size 3.15**



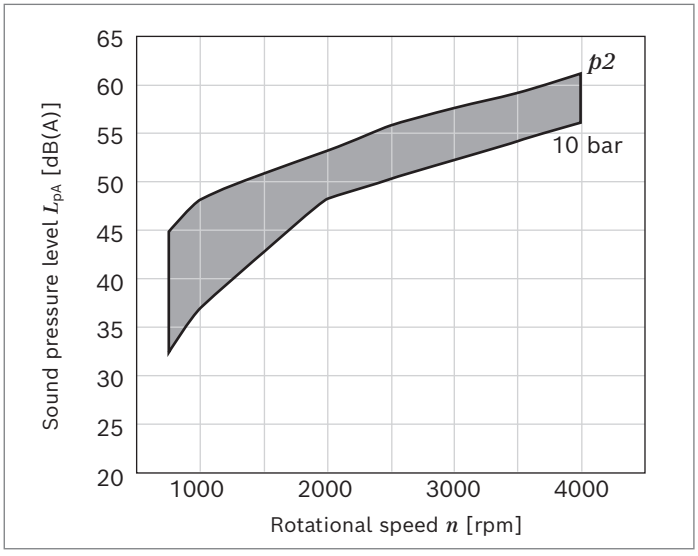
▼ **Nominal size 4.0**



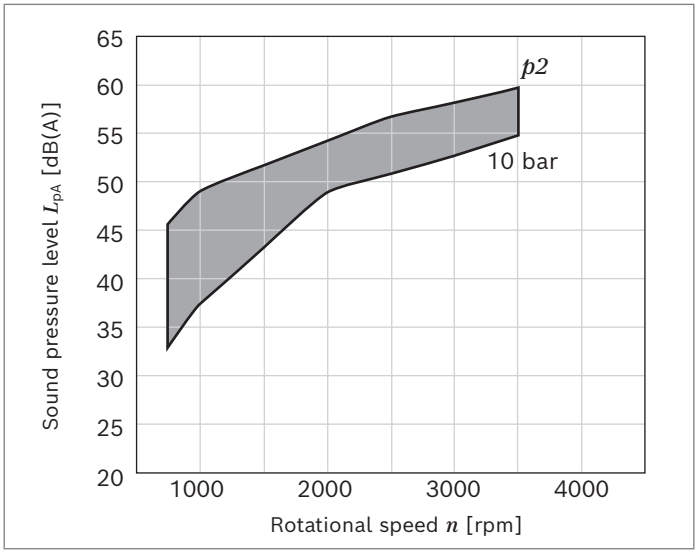
▼ **Nominal size 4.5**



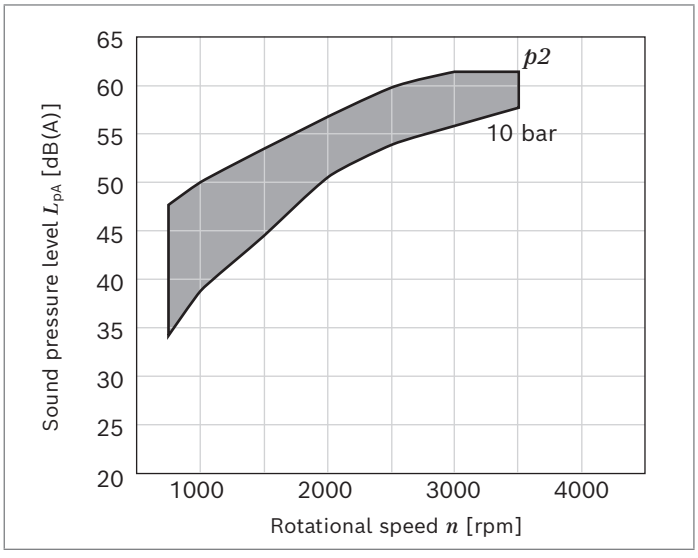
▼ **Nominal size 5.0**



▼ **Nominal size 6.3**



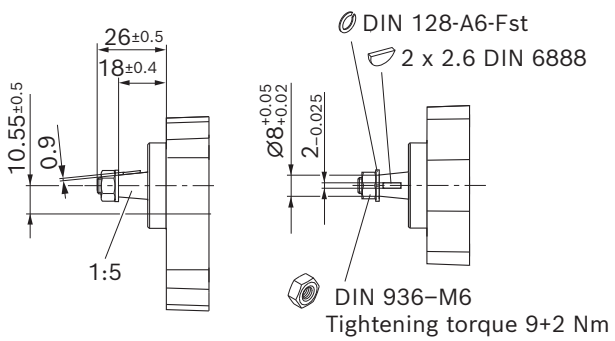
▼ **Nominal size 7.1**



Drive shafts[1)]

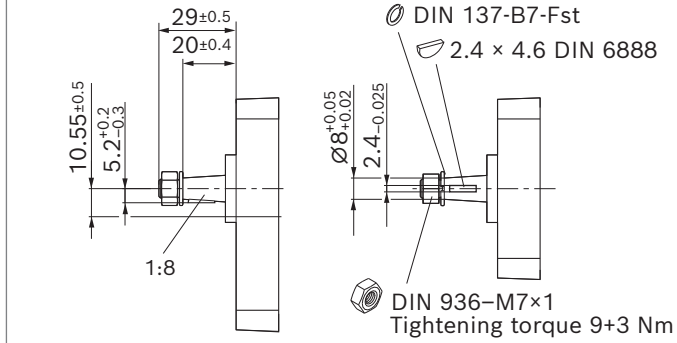
▼ **Tapered keyed shaft 1 : 5**

C



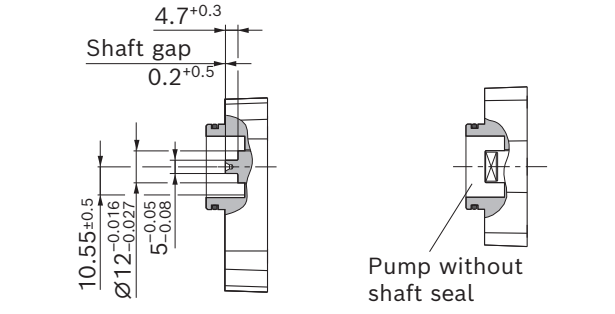
▼ **Tapered keyed shaft 1 : 8**

H



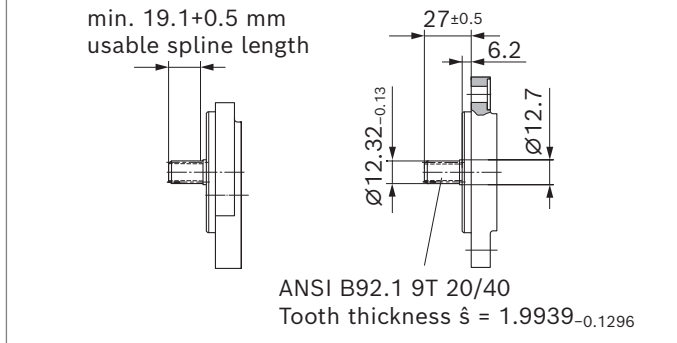
▼ **Tang drive**

N



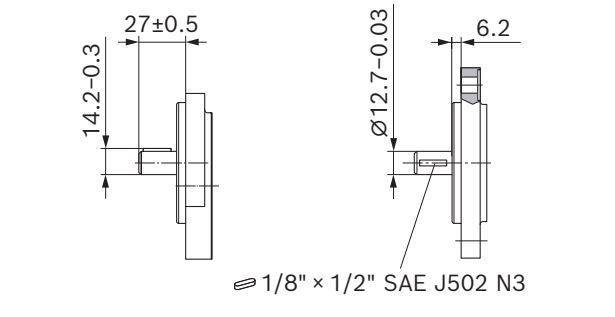
▼ **Splined shaft SAE J744 13-4 9T**

R



▼ **Parallel keyed shaft SAE J744 13-1, length 27 mm**

Q

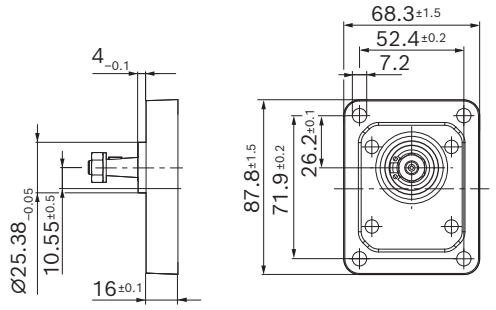


1) For other version, see offer drawing.

Front covers[1)]

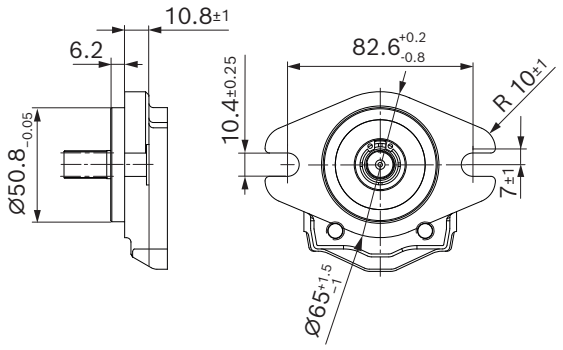
▼ **Rectangular flange spigot diameter 25.38 mm, Italian version**

O



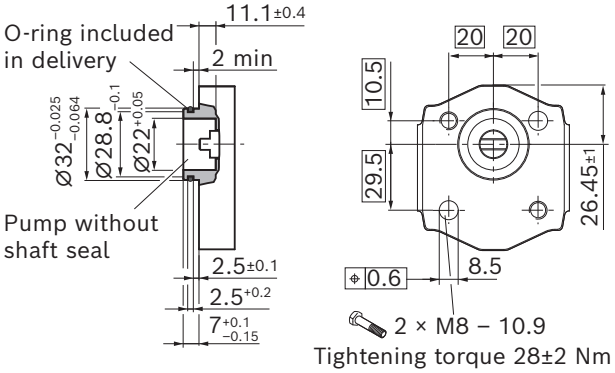
▼ **2-bolt flange spigot diameter 50.80 mm, SAE J744 50-2 (A-A)**

R



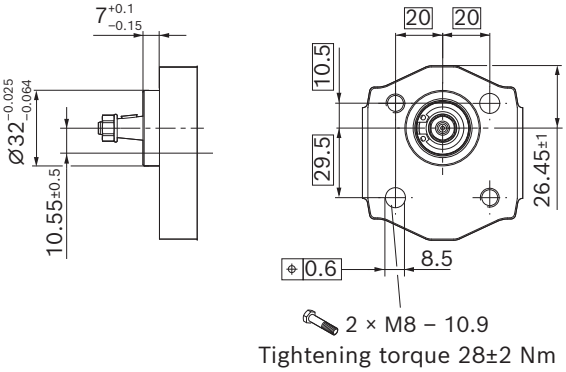
▼ **2-bolt mounting spigot diameter 32 mm, with O-ring**

M



▼ **2-bolt mounting spigot diameter 32 mm**

P

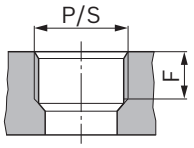


1) For other version, see offer drawing.

Port connections

▼ **Pipe thread according to ISO 228-1**[1)]

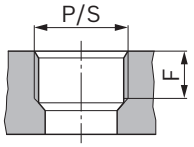
01



Nominal size	Pressure side		Suction side	
	P	F	S	F
		mm		mm
1.0 ... 3.1	G 3/8	13	G 3/8	13
4.0 ... 7.1			G 1/2	14

▼ **Metric thread according to ISO 9974-1**[1)]

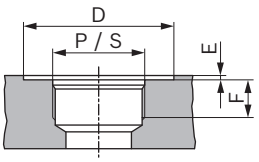
02



Nominal size	Pressure side		Suction side	
	P	F	S	F
		mm		mm
1.0 ... 3.1	M14 × 1.5	13	M18 × 1.5	13
4.0 ... 7.1			M22 × 1.5	14

▼ **UN-thread according to ISO 11926-1 / ASME B 1.1, O-ring**[1)]

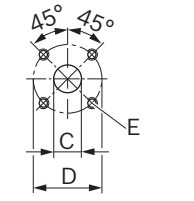
12



Nominal size	Pressure side				Suction side			
	P	D	E	F	S	D	E	F
		mm	mm	mm		mm	mm	mm
1.0	9/16-18 UN-2B	25	0.5	13	9/16-18 UN-2B	25	0.5	13
2.0 ... 5.0					3/4-16 UN-2B	30	0.5	15
6.3 ... 7.1	3/4-16 UN-2B	30	0.5	15	7/8-14 UN-2B	34	0.5	17

▼ **Square flange (German version)**

20



Nominal size	Pressure side			Suction side		
	C	D	E	C	D	E
	mm	mm		mm	mm	
2.0 ... 2.5	12	30	M6; 11.5 deep	12	30	M6; 11.5 deep
3.1 ... 7.1	15	35		15	35	

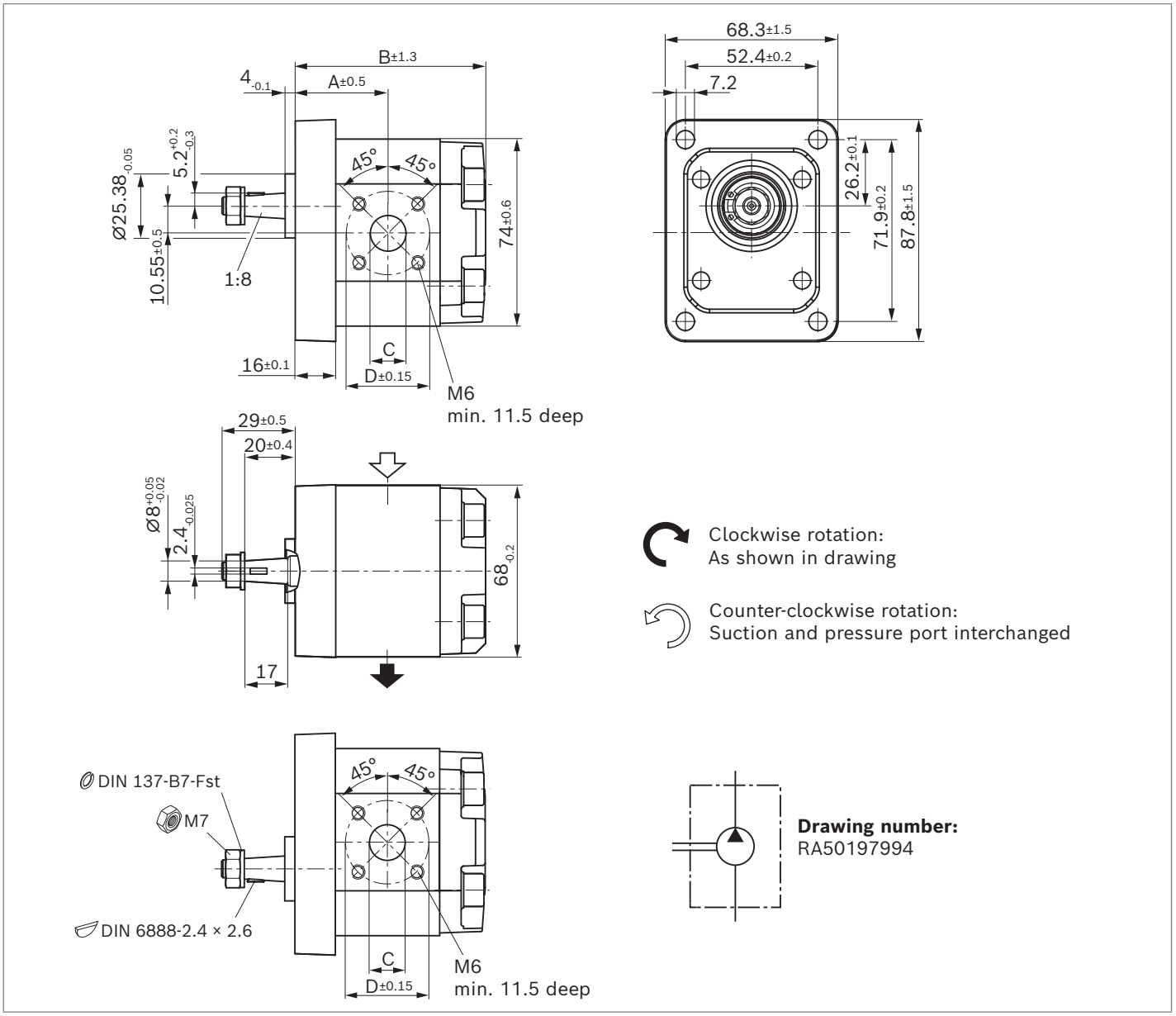
Notice
Depending on the design variant, the size of the threaded connections may differ from the sizes specified in the table. See information in the dimensional drawings.

1) Limited service life with threaded ports
(applicable for applications with p_2 > 210 bar)

Dimensions – Preferred program

Tapered keyed shaft 1 : 8 with rectangular flange spigot diameter 25.38 mm (Italian version)

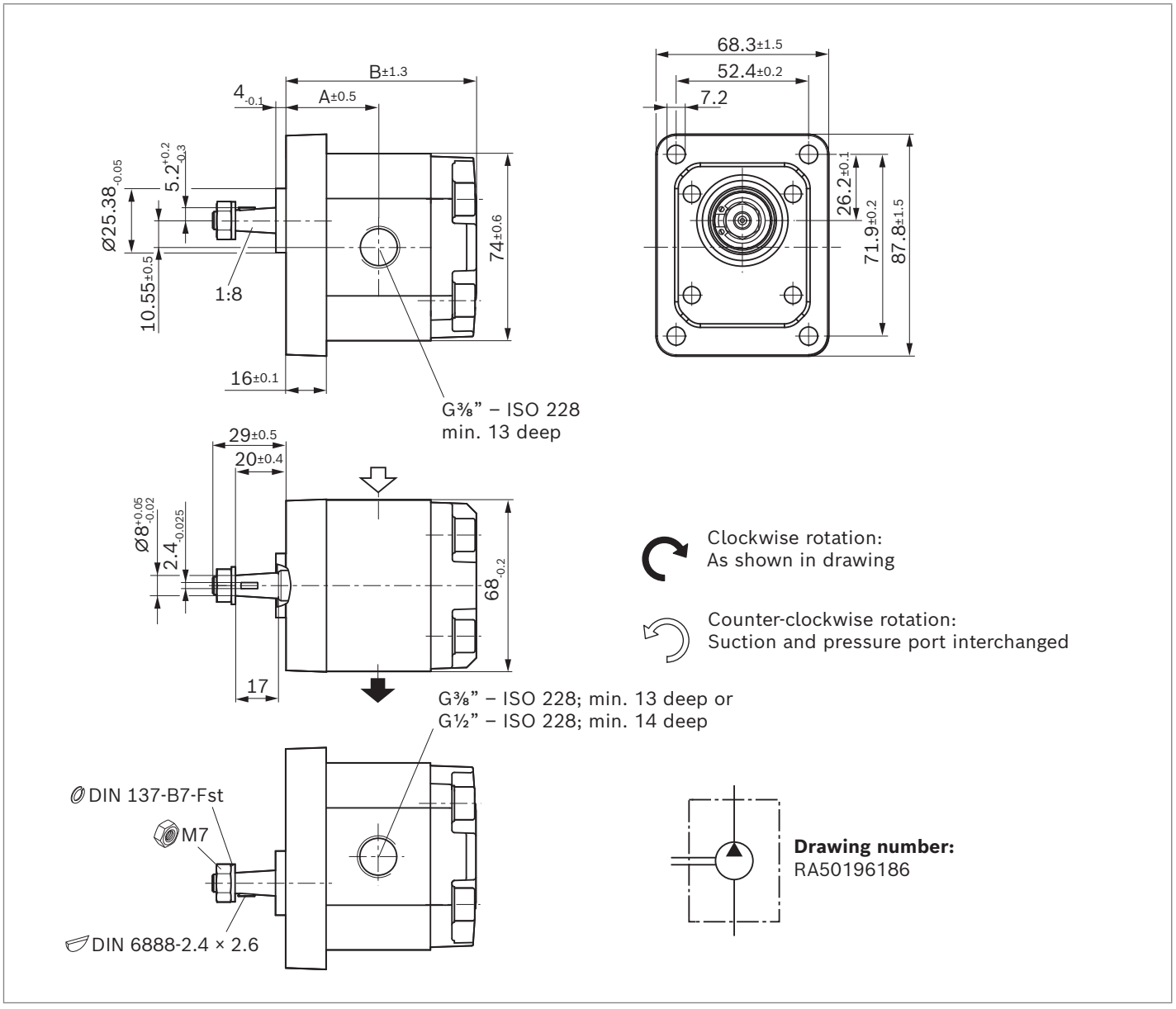
AZPB – 32 – … **HO20**MB



NG	Material number Direction of rotation		Maximum intermittent pressure p_2	Maximum speed n_{max}	Dimensions			
	counter-clockwise	clockwise	[bar]	[rpm]	A	B	C	D
2.0	0510120326	0510120028	250	5000	32.8	67.9	12	30
2.5	0510120327	0510120029	250	5000	33.8	69.8	12	30
3.15	0510120328	0510120030	250	4000	35.0	72.3	15	35
4.0	0510120329	0510120031	250	4000	36.6	75.5	15	35
4.5	0510120330	0510120032	250	4000	37.6	77.4	15	35
5.0	0510120331	0510120033	250	4000	38.6	79.5	15	35
6.3	0510120332	0510120034	250	3500	41.0	84.2	15	35
7.1	0510120333	0510120035	230	3500	42.5	87.3	15	35

Tapered keyed shaft 1 : 8 with rectangular flange spigot diameter 25.38 mm (Italian version)

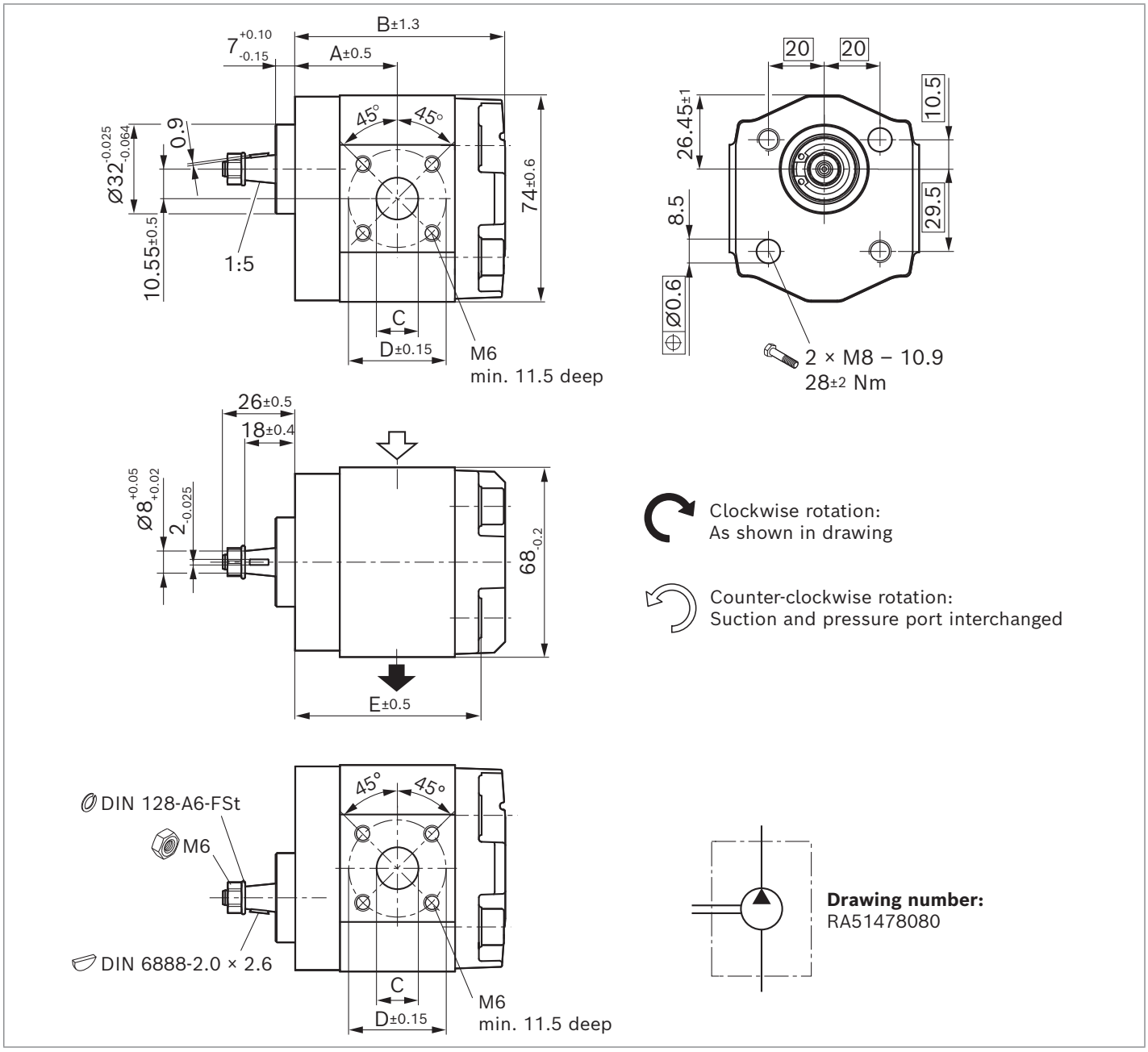
AZPB – 32 – … **HO01**MB



NG	Material number Direction of rotation		Maximum intermittent pressure p_2	Maximum speed n_{max}	Dimensions		
	counter-clockwise	clockwise	[bar]	[rpm]	A	B	Version
1.0	0510020303	0510020003	250	6000	30.9	64.1	3/8
2.0	0510120318	0510120020	250	5000	32.8	67.9	3/8
2.5	0510120319	0510120021	250	5000	33.8	69.8	3/8
3.15	0510120320	0510120022	250	4000	35.0	72.3	3/8
4.0	0510120321	0510120023	250	4000	36.6	75.5	1/2
4.5	0510120322	0510120024	250	4000	37.6	77.4	1/2
5.0	0510120323	0510120025	250	4000	38.6	79.5	1/2
6.3	0510120324	0510120026	250	3500	41.0	84.2	1/2
7.1	0510120325	0510120027	230	3500	42.5	87.3	1/2

Tapered keyed shaft 1 : 5 with 2-bolt mounting spigot diameter 32 mm

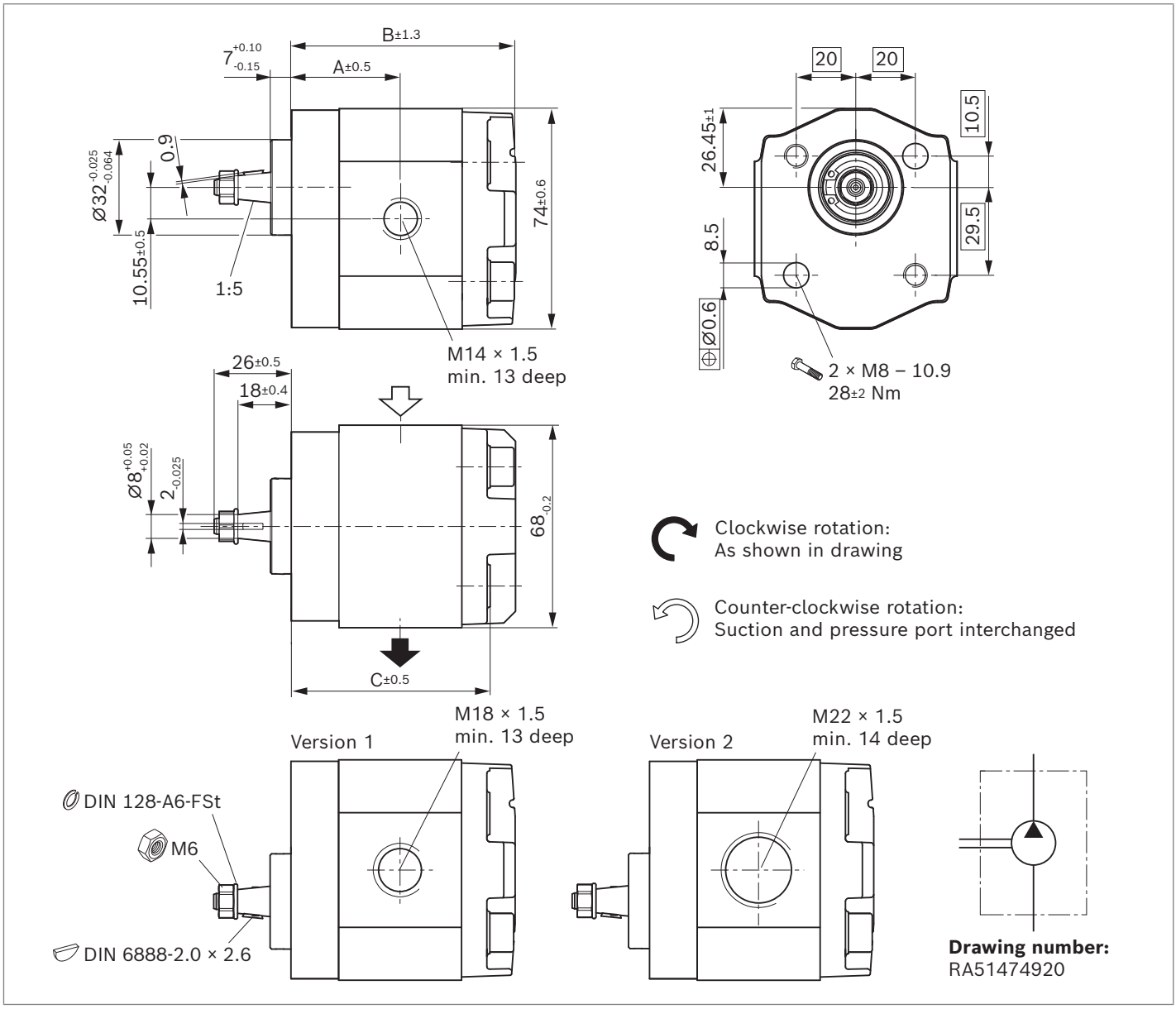
AZPB – 32 – ... **CP20**MB



NG	Material number Direction of rotation		Maximum intermittent pressure p_2	Maximum speed n_{max}	Dimensions				
	counter-clockwise	clockwise	[bar]	[rpm]	A	B	C	D	E
2.0	0510110332	0510110025	250	5000	32.8	67.9	12	30	59.0
2.5	0510110333	0510110026	250	5000	33.8	69.8	12	30	60.9
3.15	0510112325	0510112019	250	4000	35.0	72.3	15	35	63.4
4.0	0510114336	0510114030	250	4000	36.6	75.5	15	35	66.6
4.5	0510114337	0510114031	250	4000	37.6	77.4	15	35	68.5
5.0	0510114338	0510114032	250	4000	38.6	79.5	15	35	70.6
6.3	0510122324	0510122020	250	3500	41.0	84.2	15	35	75.3
7.1	0510122325	0510122021	230	3500	42.5	87.3	15	35	78.4

Tapered keyed shaft 1 : 5 with 2-bolt mounting spigot diameter 32 mm and metric thread

AZPB – 32 – … **CP02**MB/**CP02**KB[1)]

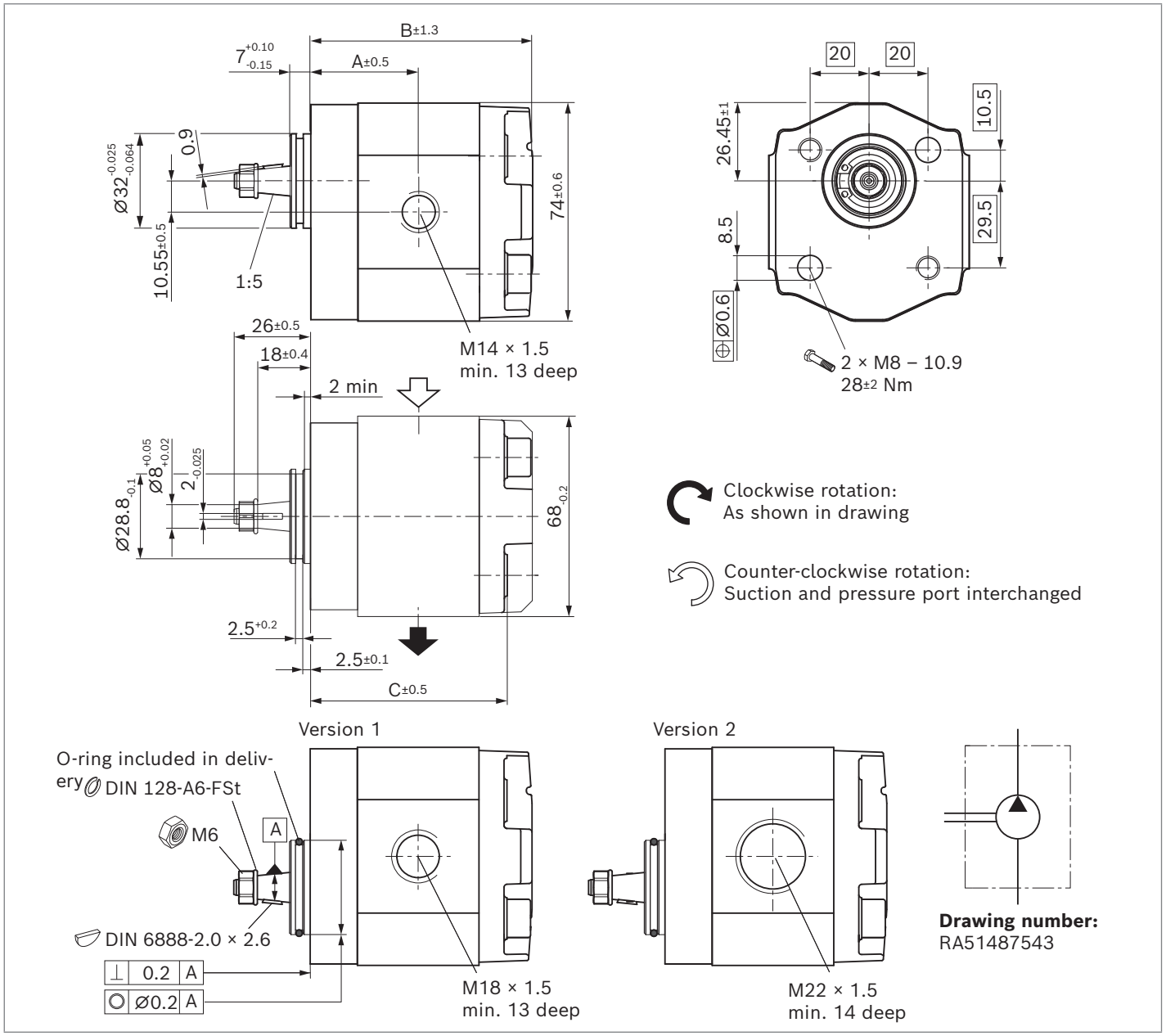


NG	Material number Direction of rotation		Maximum intermittent pressure p_2	Maximum speed n_{max}	Dimensions			
	counter-clockwise	clockwise	[bar]	[rpm]	A	B	C	Version
1.0	0510010313	0510010008	250	6000	30.9	64.1	55.2	1
2.0	0510110324	0510110017	250	5000	32.8	67.9	59.0	1
2.5	0510110325	0510110018	250	5000	33.8	69.8	60.9	1
3.15		0510112015[1)]	250	4000	35.0	72.3	63.4	1
3.15	0510112321	0510112014	250	4000	35.0	72.3	63.4	1
4.0	0510114324	0510114018	250	4000	36.6	75.5	66.6	2
4.5	0510114325	0510114019	250	4000	37.6	77.4	68.5	2
5.0	0510114326	0510114020	250	4000	38.6	79.5	70.6	2
6.3	0510122316	0510122012	250	3500	41.0	84.2	75.3	2
7.1	0510122317	0510122013	230	3500	42.5	87.3	78.4	2

1) Version with NBR, FKM shaft seal

Tapered keyed shaft 1 : 5 with 2-bolt mounting spigot diameter 32 mm, metric thread and O-ring groove

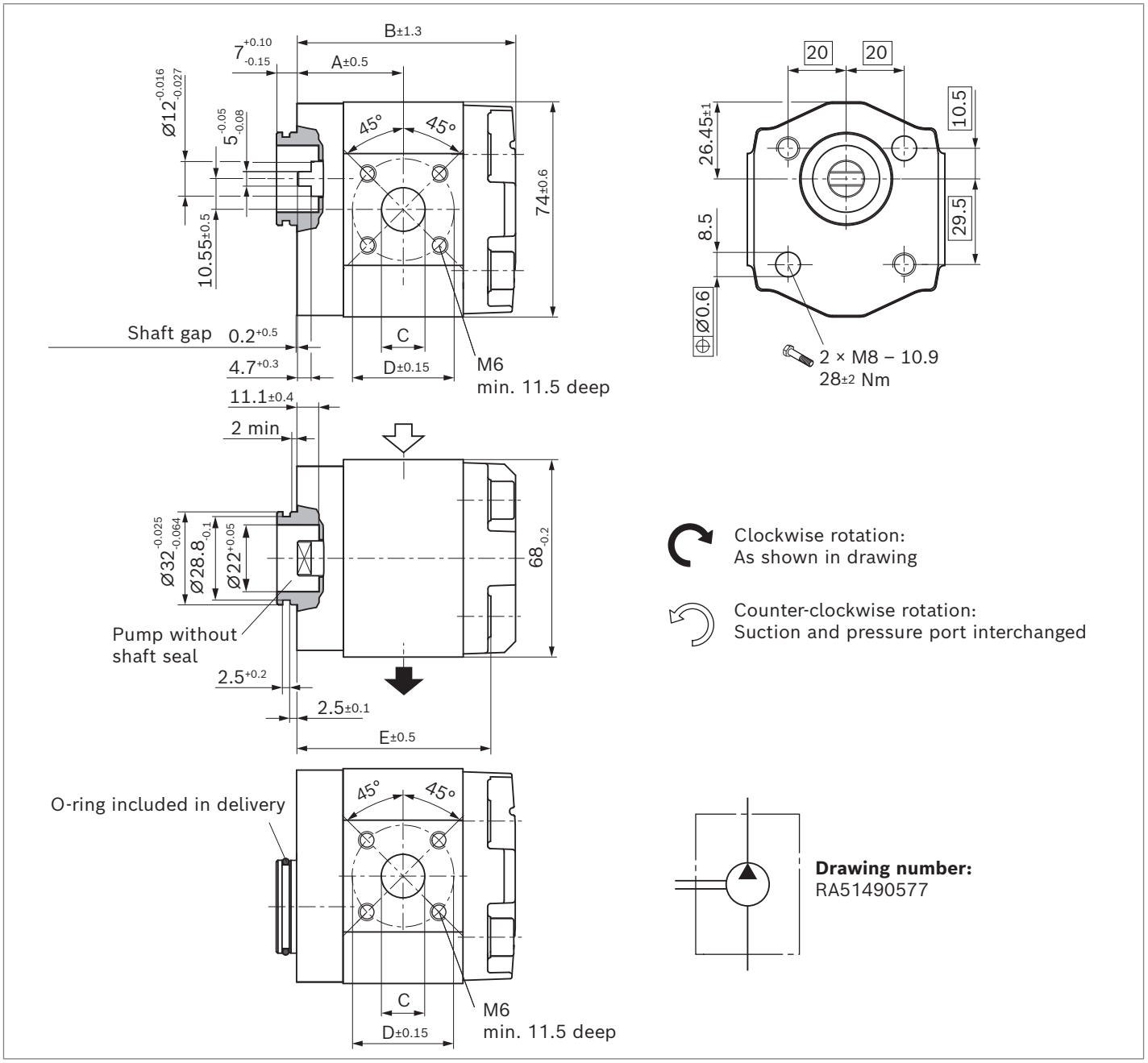
AZPB – 32 – … **CP02**MB–S0177



NG	Material number Direction of rotation		Maximum intermittent pressure p_2	Maximum speed n_{max}	Dimensions			
	counter-clockwise	clockwise	[bar]	[rpm]	A	B	C	Version
1.0	0510010315	0510010010	250	6000	30.9	64.1	55.2	1
2.0	0510110328	0510010022	250	5000	32.8	67.9	59.0	1
2.5	0510110329	0510010023	250	5000	33.8	69.8	60.9	1
3.15	0510112323	0510112018	250	4000	35.0	72.3	63.4	1
4.0	0510114330	0510114025	250	4000	36.6	75.5	66.6	2
4.5	0510114331	0510114026	250	4000	37.6	77.4	68.5	2
5.0	0510114332	0510114027	250	4000	38.6	79.5	70.6	2
6.3	0510122320	0510122016	250	3500	41.0	84.2	75.3	2
7.1	0510122321	0510122017	230	3500	42.5	87.3	78.4	2

Tang drive with 2-bolt mounting spigot diameter 32 mm and square flange (German version)

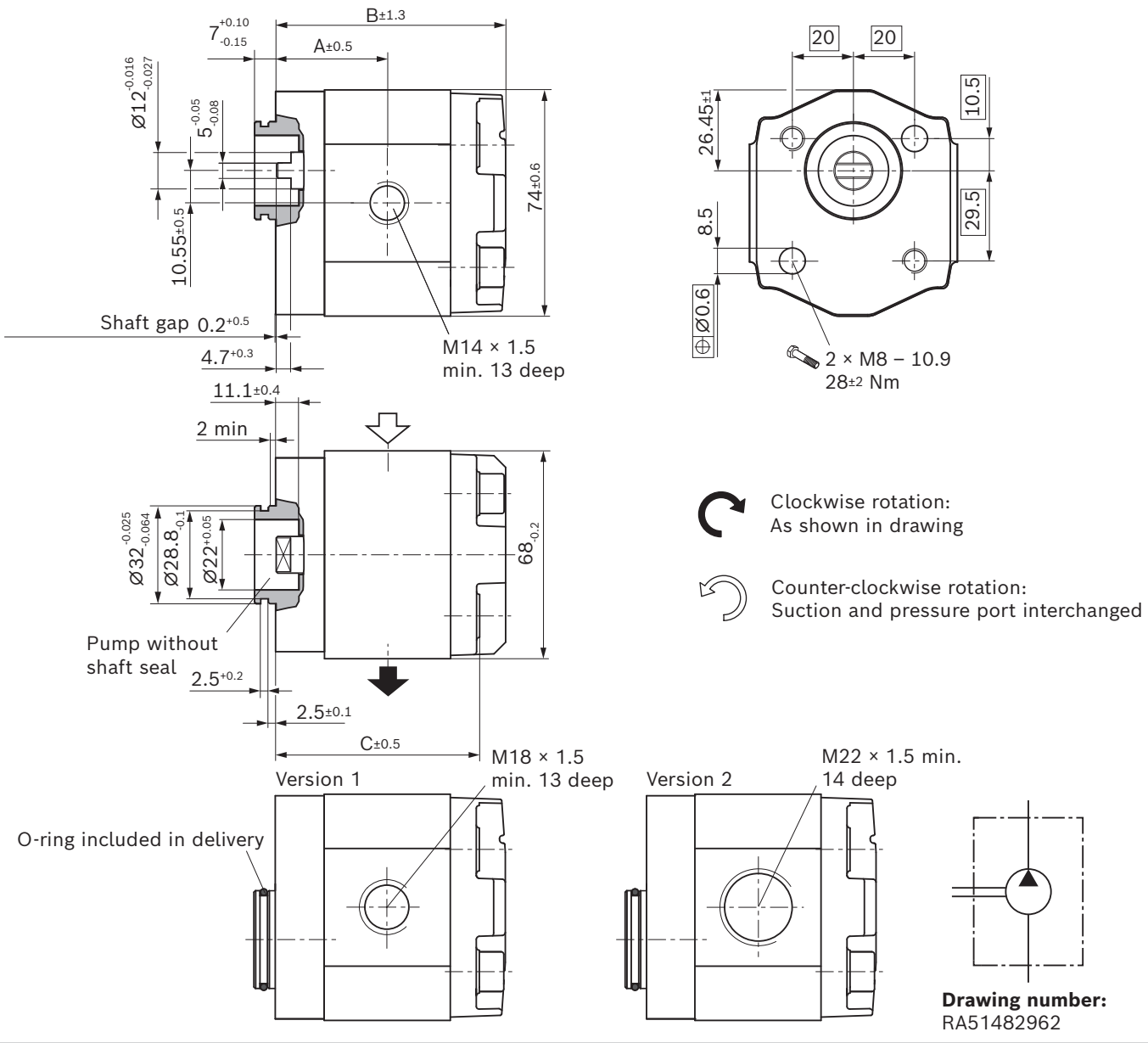
AZPB – 32 – … **NM20**MB



NG	Material number		Maximum intermittent pressure p_2	Maximum speed n_{max}	Dimensions				
	Direction of rotation								
	counter-clockwise	clockwise	[bar]	[rpm]	A	B	C	D	E
2.0	0510110334	0510110027	250	5000	32.8	67.9	12	30	59.0
2.5	0510110335	0510110028	250	5000	33.8	69.8	12	30	60.9
3.15	0510112326	0510112020	250	4000	35.0	72.3	15	35	63.4
4.0	0510114339	0510114033	250	4000	36.6	75.5	15	35	66.6
4.5	0510114340	0510114034	250	4000	37.6	77.4	15	35	68.5
5.0	0510114341	0510114035	250	4000	38.6	79.5	15	35	70.6
6.3	0510122326	0510122022	250	3500	41.0	84.2	15	35	75.3
7.1	0510122327	0510122023	230	3500	42.5	87.3	15	35	78.4

Tang drive with 2-bolt mounting spigot diameter 32 mm and metric thread

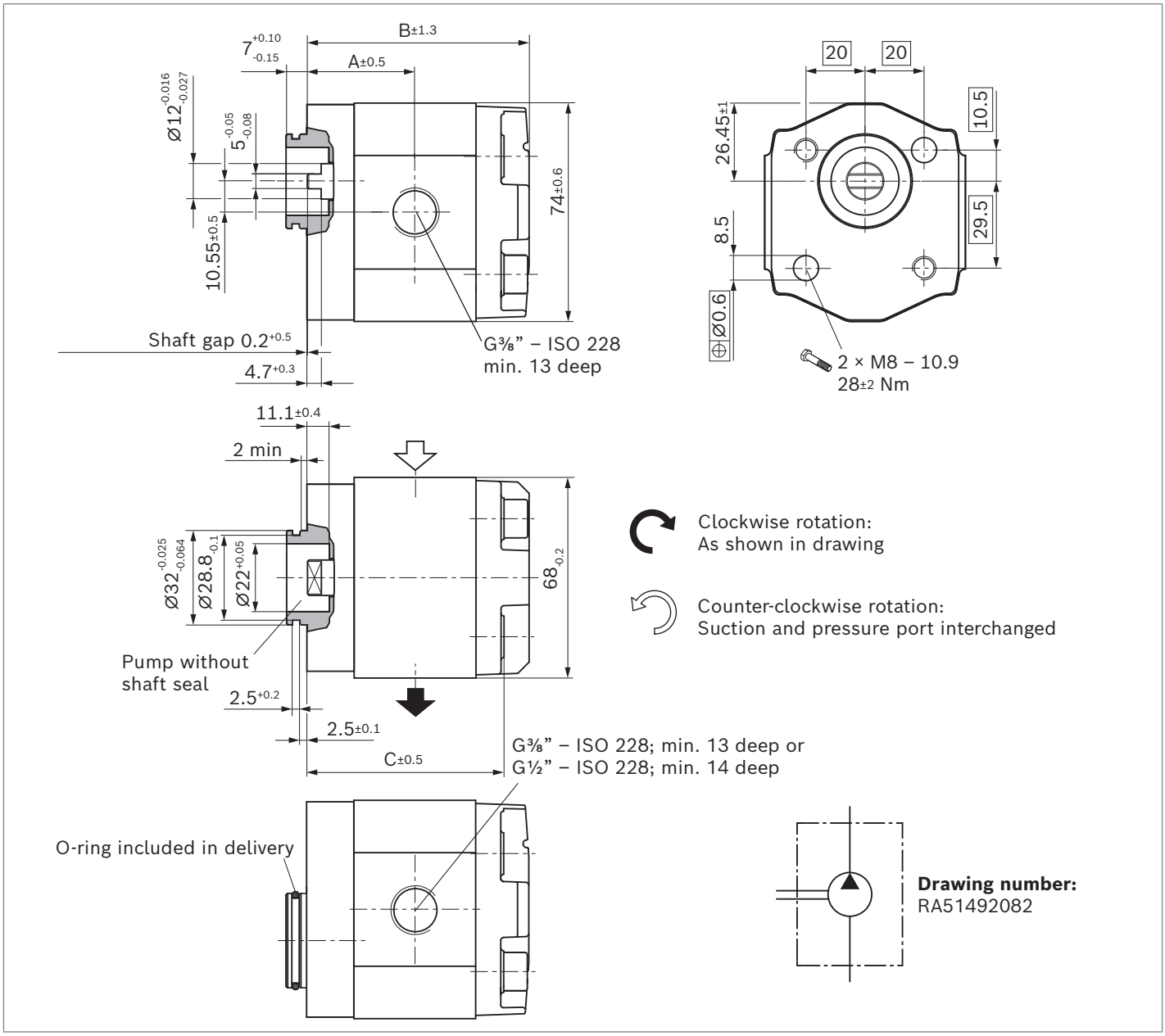
AZPB – 32 – ... **NM02**MB



NG	Material number Direction of rotation		Maximum intermittent pressure p_2	Maximum speed n_{max}	Dimensions			
	counter-clockwise	clockwise	[bar]	[rpm]	A	B	C	Version
1.0	0510010314	0510010009	250	6000	30.9	64.1	55.2	1
2.0	0510110326	0510010019	250	5000	32.8	67.9	59.0	1
2.5	0510110327	0510010020	250	5000	33.8	69.8	60.9	1
3.15	0510112322	0510112016	250	4000	35.0	72.3	63.4	1
4.0	0510114327	0510114021	250	4000	36.6	75.5	66.6	2
4.5	0510114328	0510114022	250	4000	37.6	77.4	68.5	2
5.0	0510114329	0510114023	250	4000	38.6	79.5	70.6	2
6.3	0510122318	0510122014	250	3500	41.0	84.2	75.3	2
7.1	0510122319	0510122015	230	3500	42.5	87.3	78.4	2

Tang drive with 2-bolt mounting spigot diameter 32 mm and pipe thread

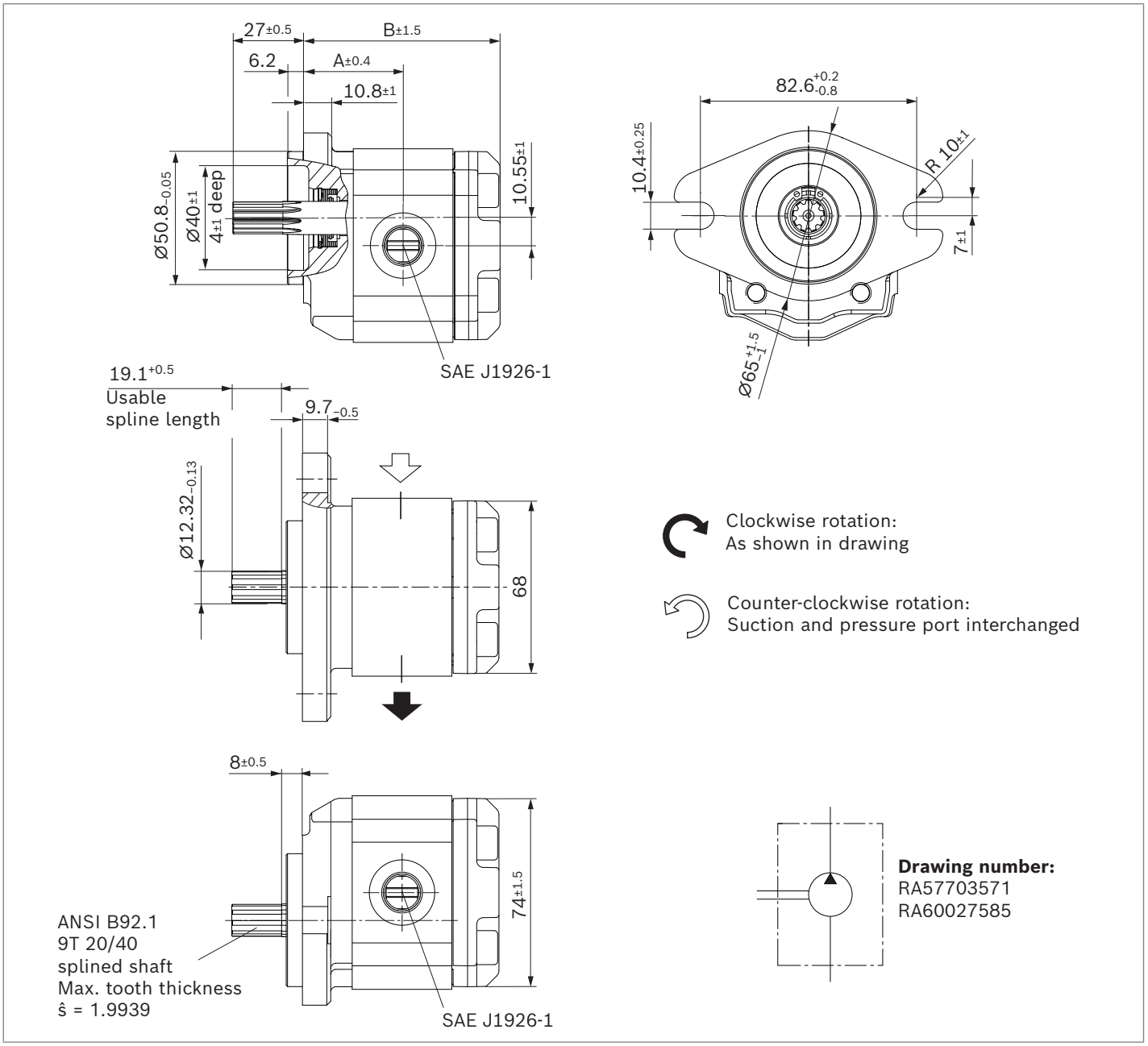
AZPB – 32 – … **NM01**MB



NG	Material number Direction of rotation		Maximum intermittent pressure p_2	Maximum speed n_{max}	Dimensions			
	counter-clockwise	clockwise	[bar]	[rpm]	A	B	C	Version
1.0	0510010316	0510010011	250	6000	30.9	64.1	55.2	3/8
2.0	0510110330	0510110021	250	5000	32.8	67.9	59.0	3/8
2.5	0510110331	0510110024	250	5000	33.8	69.8	60.9	3/8
3.15	0510112324	0510112017	250	4000	35.0	72.3	63.4	3/8
4.0	0510114333	0510114028	250	4000	36.6	75.5	66.6	1/2
4.5	0510114334	0510114024	250	4000	37.6	77.4	68.5	1/2
5.0	0510114335	0510114029	250	4000	38.6	79.5	70.6	1/2
6.3	0510122322	0510122018	250	3500	41.0	84.2	75.3	1/2
7.1	0510122323	0510122019	230	3500	42.5	87.3	78.4	1/2

Splined shaft SAE J744 13-4 9T with 2-bolt flange spigot diameter 50.80 mm SAE J744 50-2 (A-A)

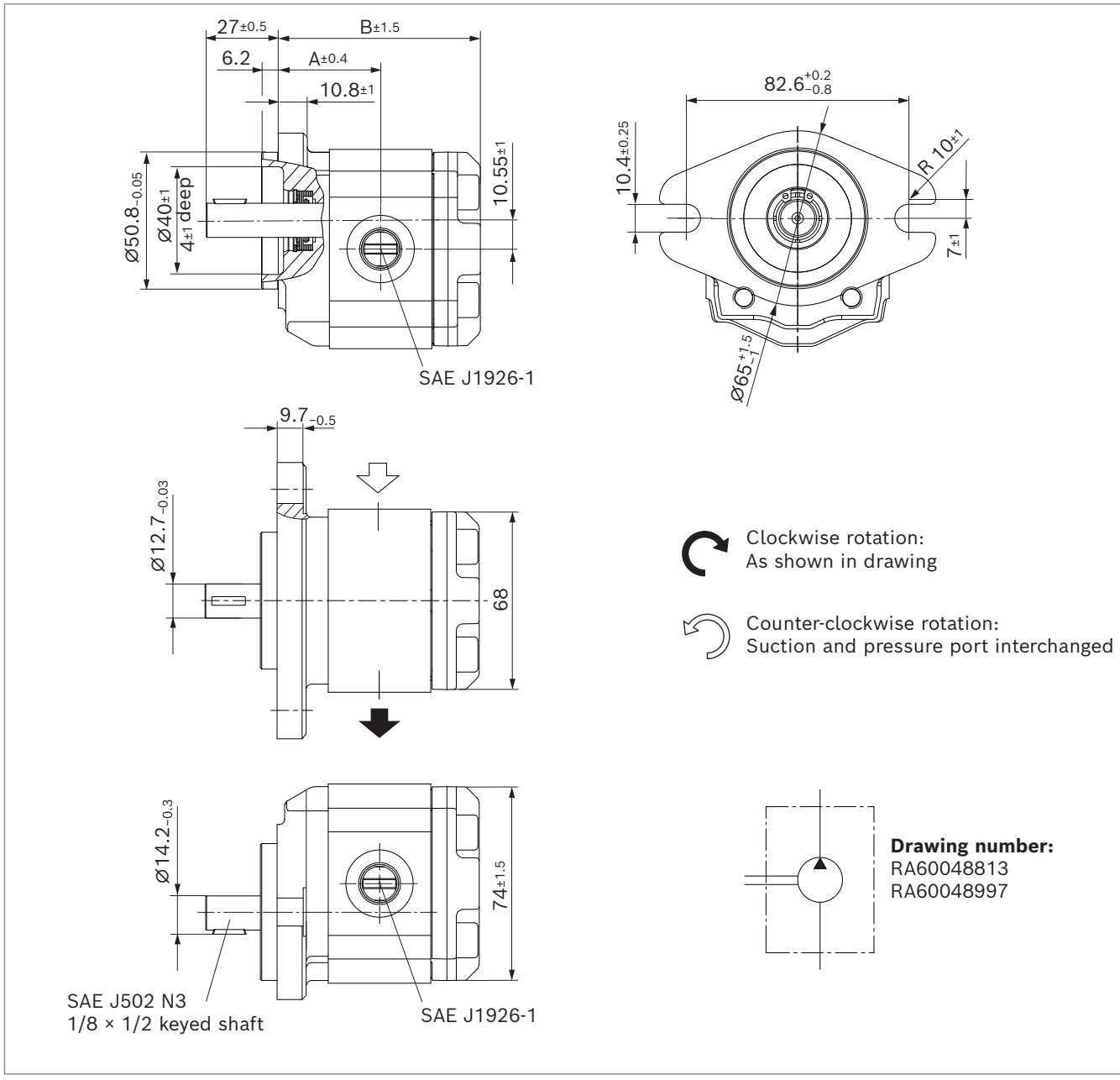
AZPB – 32 – ... **RR12**KB



NG	Material number Direction of rotation		Maximum intermittent pressure p_2	Maximum speed n_{max}	Dimensions	
	counter-clockwise	clockwise	[bar]	[rpm]	A	B
1.0	R979107392	R979107365	250	6000	34.0	66.9
2.0	R979107393	R979107366	250	5000	35.8	70.7
2.5	R979107394	R979107367	250	5000	36.8	72.6
3.15	R979107395	R979107368	250	4000	38.0	75.0
4.0	R979107396	R979107369	250	4000	39.6	78.3
4.5	R979107397	R979107370	250	4000	40.6	80.2
5.0	R979107398	R979107371	250	4000	41.6	82.3
6.3	R979107399	R979107372	250	3500	44.0	87.0
7.1	R979107400	R979107373	230	3500	45.5	90.1

Parallel keyed shaft SAE J744 13-1, length 27 mm with 2-bolt flange spigot diameter 50.80 mm SAE J744 50-2 (A-A)

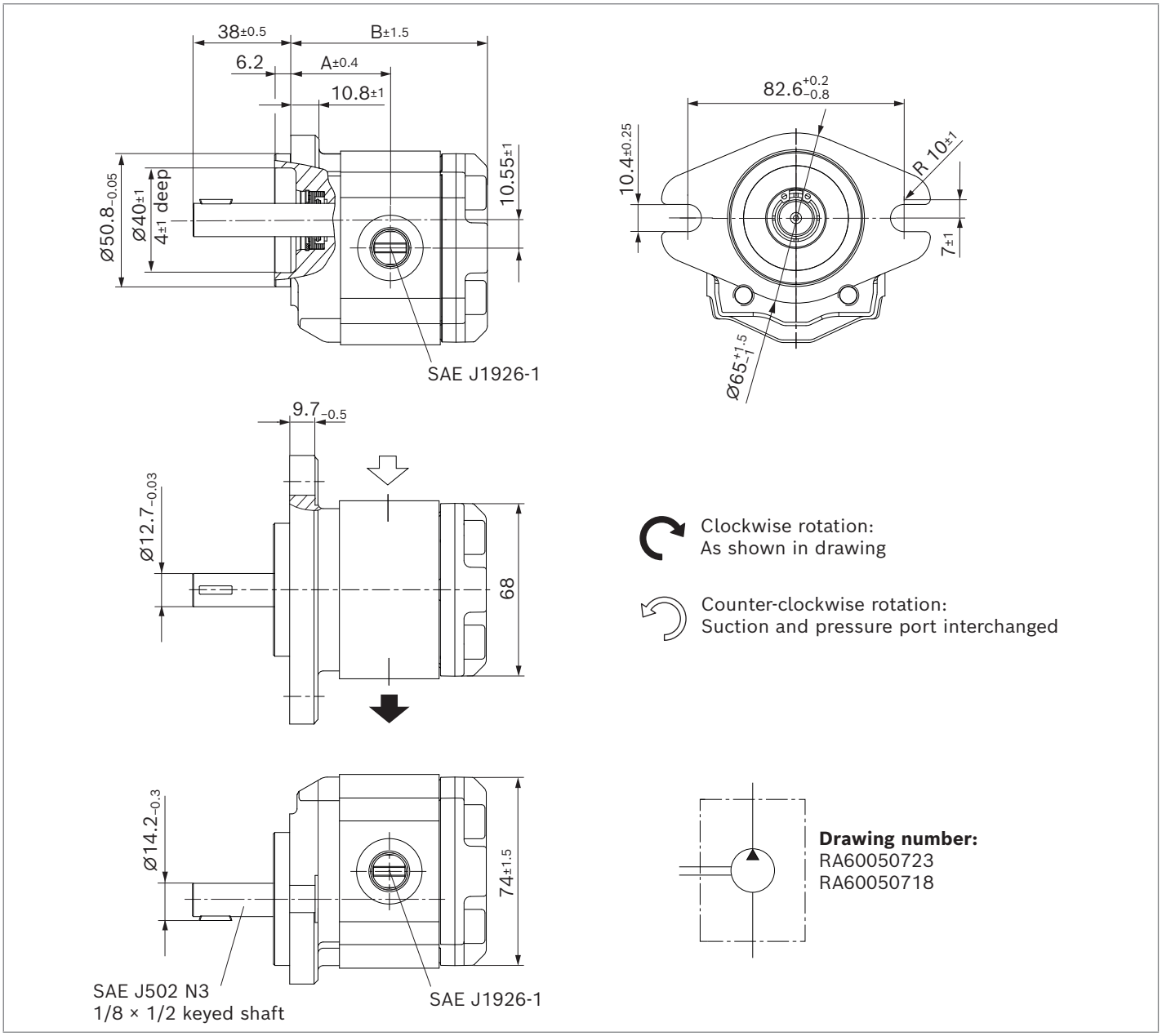
AZPB – 32 – … **QR12**KB



NG	Material number Direction of rotation		Maximum intermittent pressure p_2	Maximum speed n_{max}	Dimensions	
	counter-clockwise	clockwise	[bar]	[rpm]	A	B
1.0	R979107401	R979107374	250	6000	34.0	66.9
2.0	R979107402	R979107375	250	5000	35.8	70.7
2.5	R979107403	R979107376	250	5000	36.8	72.6
3.15	R979107404	R979107377	250	4000	38.0	75.0
4.0	R979107405	R979107378	250	4000	39.6	78.3
4.5	R979107406	R979107379	250	4000	40.6	80.2
5.0	R979107407	R979107380	250	4000	41.6	82.3
6.3	R979107408	R979107381	250	3500	44.0	87.0
7.1	R979107409	R979107382	230	3500	45.5	90.1

Parallel keyed shaft SAE J744 13-1, length 38 mm with 2-bolt flange spigot diameter 50.80 mm SAE J744 50-2 (A-A)

AZPB – 32 – … **QR12**KB–S0022



NG	Material number Direction of rotation		Maximum intermittent pressure p_2	Maximum speed n_{max}	Dimensions	
	counter-clockwise	clockwise	[bar]	[rpm]	A	B
1.0	R979107410	R979107383	250	6000	34.0	66.9
2.0	R979107411	R979107384	250	5000	35.8	70.7
2.5	R979107412	R979107385	250	5000	36.8	72.6
3.15	R979107413	R979107386	250	4000	38.0	75.0
4.0	R979107414	R979107387	250	4000	39.6	78.3
4.5	R979107415	R979107388	250	4000	40.6	80.2
5.0	R979107416	R979107389	250	4000	41.6	82.3
6.3	R979107417	R979107390	250	3500	44.0	87.0
7.1	R979107418	R979107391	230	3500	45.5	90.1

Project planning information

Technical data

All mentioned technical data are dependent on manufacturing tolerances and are applicable for certain boundary conditions.
Note that certain deviations are therefore possible and that technical data may vary when certain boundary conditions (e.g., viscosity) change.
Pumps delivered by Bosch Rexroth are tested for function and performance.
The pump may only be operated with the permissible data (see chapter “Technical data”).

Characteristic curves

When dimensioning the gear pump, observe the maximum possible application data on the basis of the characteristic curves shown.

Application information

External gear units are not approved in on-highway vehicles for safety-relevant functions, as well as functions in the drive train, for steering, braking and level regulation. Classified as on-highway vehicles are e.g. vehicles such as motorbikes, private cars, trucks, vans, freight cars, buses and trailers. The European vehicle classes L (motorbikes), M (private cars), N (vehicles for transporting goods such as trucks and vans) and O (trailers and semi-trailers) serve as reference.

Notice
When used as an auxiliary steering pump, the vehicle manufacturer should make sure that the steering system continues to operate safely, even if the auxiliary steering pump fails (regulation similar to ECE R-79 can be referred).

Filtration of the hydraulic fluid

Since the majority of premature failures in gear pumps occur due to contaminated hydraulic fluid, filtration should maintain a cleanliness level of 20/18/15 as defined by ISO 4406. Thus contamination can be reduced to an acceptable degree in terms of particle size and concentration.
Bosch Rexroth generally recommends full-flow filtration.
The basic contamination of the hydraulic fluid filled in should not exceed level 20/18/15 as defined by ISO 4406. New fluids are often above this value. In such instances, a filling device with a special filter should be used.
Bosch Rexroth is not liable for wear due to contamination.
For hydraulic systems or devices with function-related critical failure effects, such as steering and brake valves, the type of filtration selected must be adapted to the sensitivity of these devices.

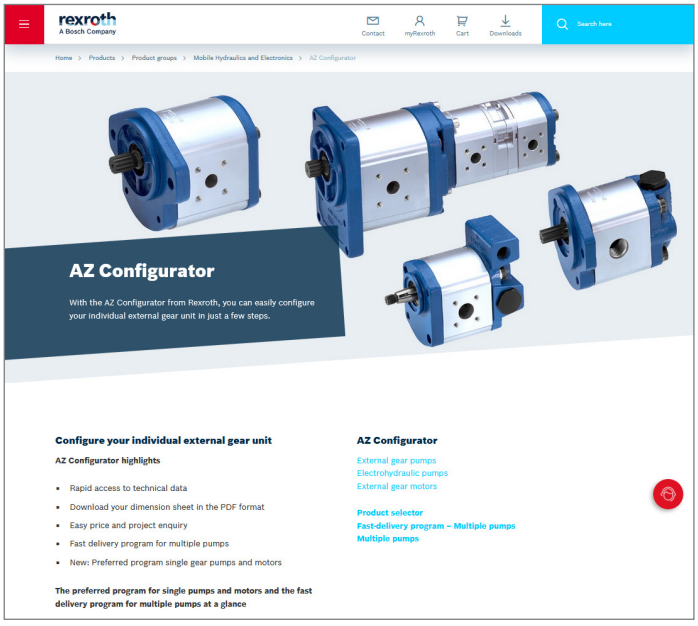
Further information

Installation drawings and dimensions are valid at date of publication, subject to modifications.
Further information and notes on project planning can be found in the “General instruction manual for external gear units”: www.boschrexroth.com/07012-B, chapter 5.5.

Information

AZ configurator

With our practical product selector, it will take you next to no time to find the right solution for your applications, no matter whether it is SILENCE PLUS or another external gear unit.
The selector guides you through a selection of features to all of the products available for order. By clicking on the order number, you can view and download the following product information: Data sheet, dimension sheet, operating conditions, and tightening torques.
You can order your selection directly via our online shop and at the same time benefit from an additional discount of 2%. And if you need something really quickly, simply use our fast delivery and preferred programs (GoTo). Then the goods will be sent within 10 working days.
You also have the possibility to easily and conveniently configure your individual external gear unit with our AZ configurator. All the necessary data that you need for the project planning of external gear units is requested by means of the menu navigation.
For an already existing configuration you receive as a result the order number, the type code, as well as further information. If your configuration does not lead to a product that is available for order, our online tools provide you with the possibility of sending a project request directly to Bosch Rexroth. We will then get in contact with you.
Link: www.boschrexroth.com/az-configurator

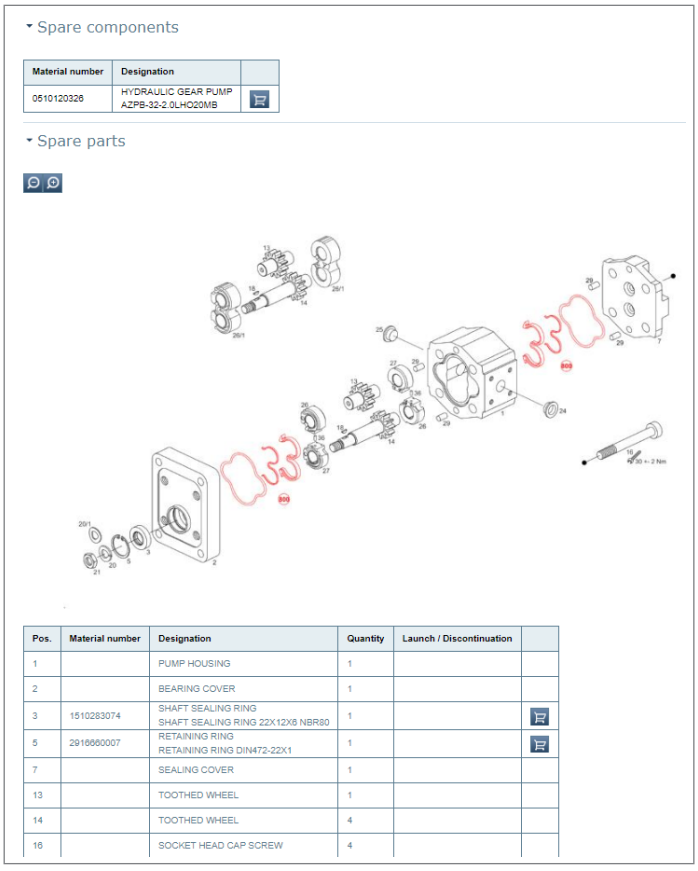


Spare parts

Spare parts can be found online at
www.boschrexroth.com/spc
Select “Spare parts and accessories” and enter the material number of the external gear units into the search field.

Example:
Material number: **0 510 120 326**
Type designation: AZPB–32–2.0LHO20MB

All available spare parts are listed under “Spare parts” and can be ordered via the shopping basket.



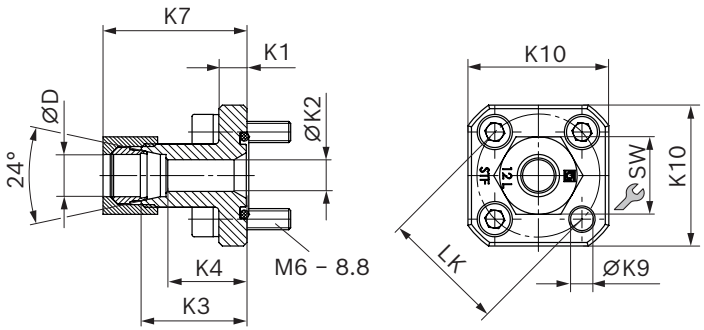
Further information

Extensive notes and suggestions can be found in the Hydraulic Trainer, volume 3: “Planning and Design of Hydraulic Power Systems”, order number R900018547.

Accessories

Straight flange, for square flange 20 (German version)

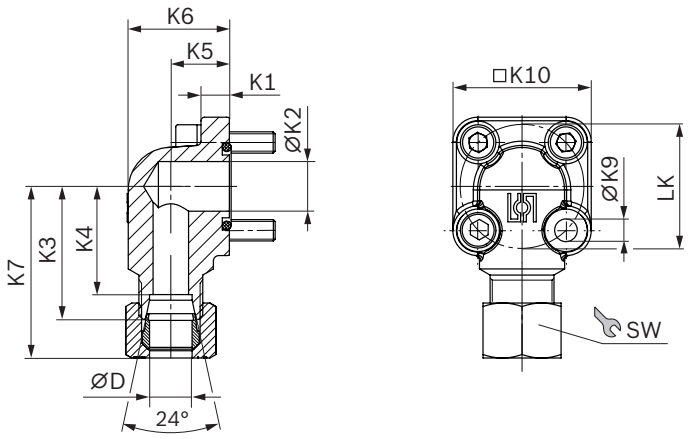
Complete screw connections with O-ring, metric screw set, nuts and olive.



LK	D	Series[1]	Material number	p_{max}	K1	K2	K3	K4	K7	K9	K10	SW	Screws	O-ring	Weight
mm	mm			bar	mm	mm	mm	mm	mm	mm	mm	mm	4 ×	NBR	kg
35	10	L	1 515 702 064	315	8	7	30	23	38	6.5	40	19	M6 × 22	20 × 2.5	0.13
35	12	L	1 515 702 065	315	8	9	30	23	38.5	6.5	40	22	M6 × 22	20 × 2.5	0.14
35	15	L	1 515 702 066	250	8	11	30	23	39	6.5	40	27	M6 × 22	20 × 2.5	0.15

90° angle flange, for square flange 20 (German version)

Complete screw connections with O-ring, metric screw set, nuts and olive.



LK	D	Series[1]	Material number	p_{max}	K1	K2	K3	K4	K5	K6	K7	K9	K10	SW	Screws		O-ring	Weight
mm	mm			bar	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	2 ×	2 ×	NBR	kg
35	10	L	1 515 702 070	315	8	14	37.5	30.5	16.5	28.5	45	6.4	39	19	M6 × 22	M6 × 35	20 × 2.5	0.18
35	12	L	1 515 702 071	315	8	14	37.5	30.5	16.5	28.5	46	6.4	39	22	M6 × 22	M6 × 35	20 × 2.5	0.19
35	15	L	1 515 702 072	250	8	14	37.5	30.5	16.5	28.5	46	6.4	39	27	M6 × 22	M6 × 35	20 × 2.5	0.2
35	16	S	1 515 702 002	315	8	15	38	29.5	20	33	49	6.4	39	30	M6 × 22	M6 × 40	20 × 2.5	0.25
35	18	L	1 545 702 006	250	8	15	37.5	30	20	33	47	6.4	39	32	M6 × 22	M6 × 40	20 × 2.5	0.22
35	20	S	1 515 702 017	315	8	15	45	34.5	25	38	57	6.4	39	36	M6 × 22	M6 × 45	20 × 2.5	0.3

Notice
Permissible tightening torques can be found in the “General instruction manual for external gear units”:
www.boschrexroth.com/07012-B

1) See DIN EN ISO 8434-1

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