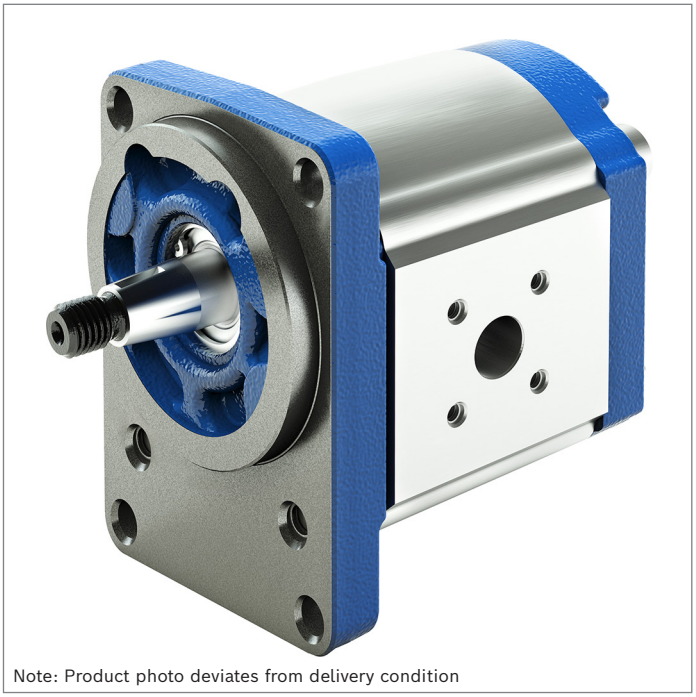
RE 10090/2024-11-14
Replaces: 06.2016

rexroth
A Bosch Company

External gear pump Standard Performance AZPW



Note: Product photo deviates from delivery condition

- Platform F
- Fixed displacement
- Nominal size 4 to 25
- Continuous pressure up to 190 bar
- Intermittent pressure up to 210 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

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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.

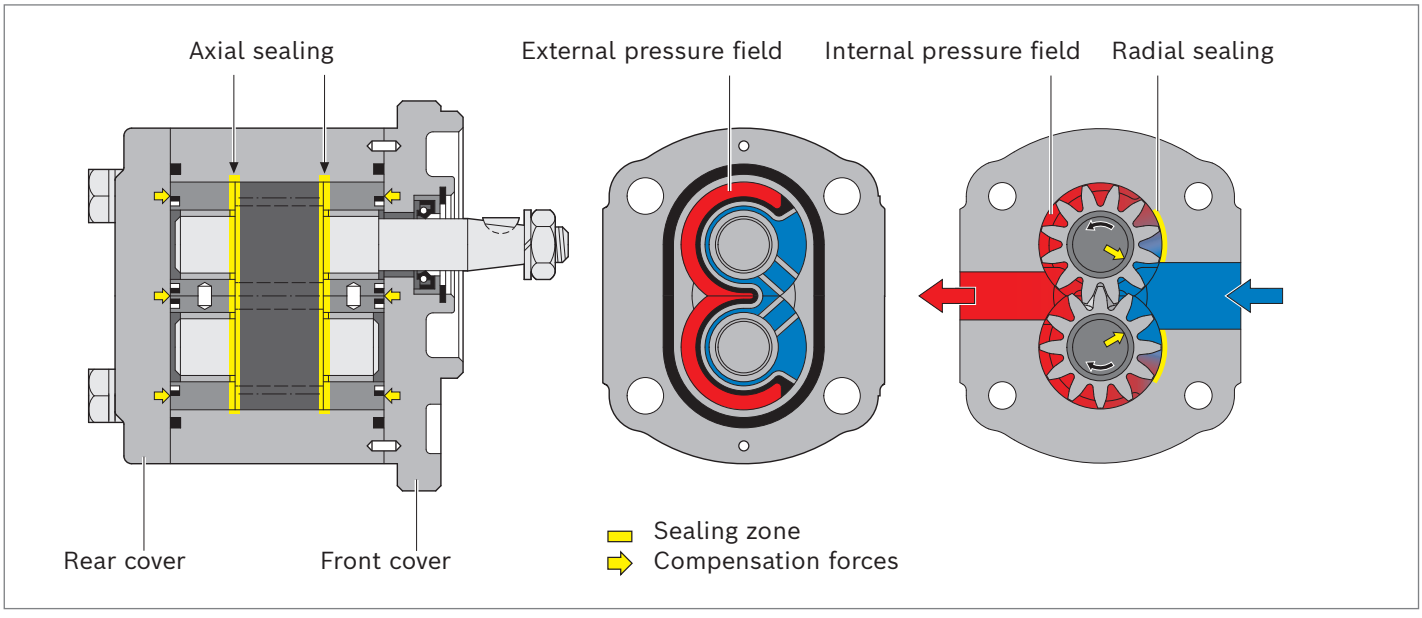
Pumping principle

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.

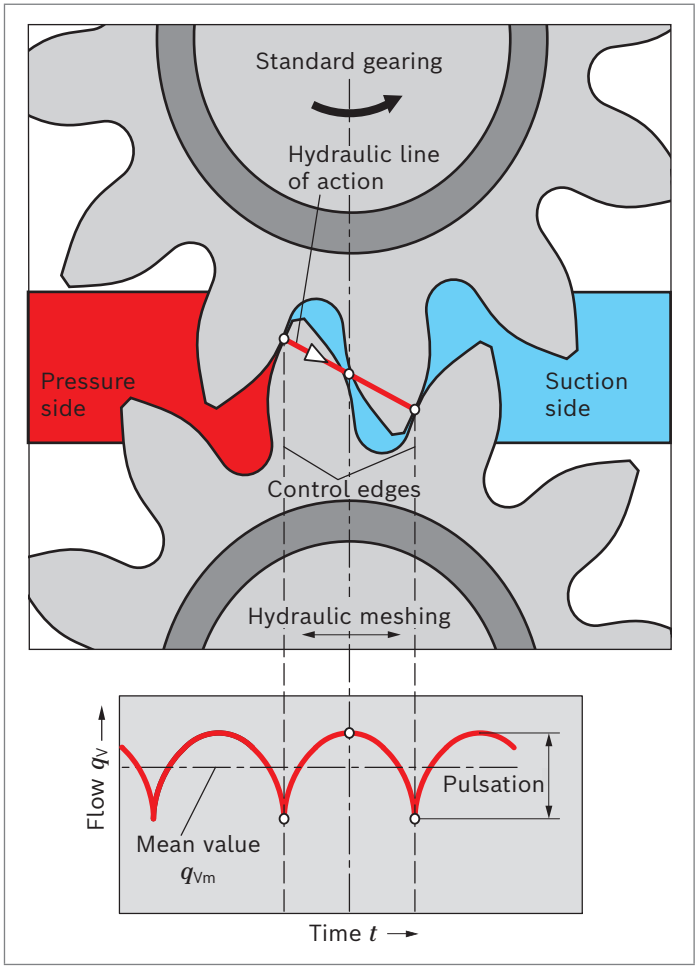
Construction

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.

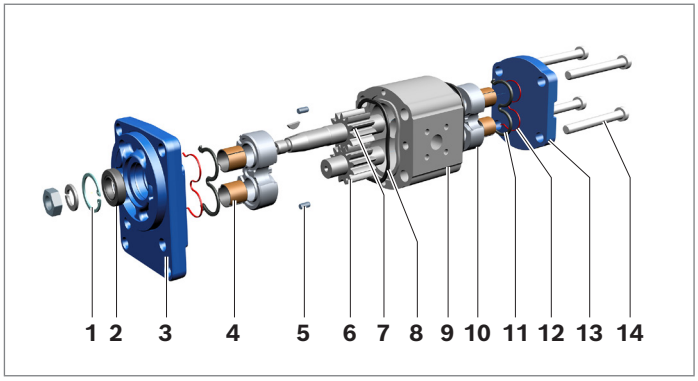
▼ **Axial and radial sealing of gear chambers**



▼ Pumping principle of Standard Performance pump



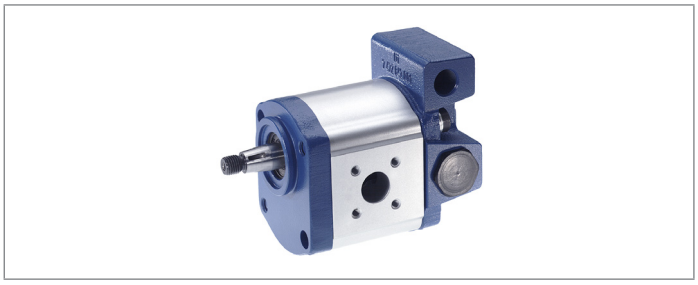
▼ Principle design of external gear pump



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

Gear pumps with integrated valve

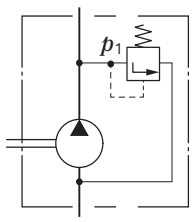
In order to reduce piping complexity, a pressure-relief valve can be integrated in the rear cover of the gear pump. The residual flow is either returned internally to the suction port or distributed externally to other consumers.



Pressure relief valve, with internal residual flow

p_1 = 5 to 210 bar

D180XX (example)



Notice

In case of external gear pumps with integrated valves, the code of the port connection defines the code of the valve ports:

- For pumps with port connection 20, 30 and 50 the valve ports are metric
- For pumps with port connection 12 the valve ports are UNF threaded (ISO 11926-1)
- For pumps with port connection 01 the valve ports are pipe threaded (ISO 228-1) (BSP)
- Deviations are described by a special number.

Type codes

Type code single pump

01	02	03		04	05		06	07	08	09	10	11	12	13		14
AZ	**P**	**W**	**–**	**1**		**–**									**–**	

Product

01	External gear unit	**AZ**

Function

02	Pump	**P**

Model

03	Standard Performance, platform F (4 ... 25 cm^3/rev)	**W**

Series

04	Bearing diameter 18 mm	**1**

Version

05	Phosphated	**1**
	Zinc plated[1)]	**2**

Nominal size (NG)

06	Geometric displacement V_g [cm^3/rev], see “Technical data”	**004**	**005**	**007**	**008**	**009**	**011**	**012**	**014**	**016**	**019**	**021**	**022**	**025**

Direction of rotation

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

Drive shaft			**Typical front cover**	
08	Tapered keyed shaft	1 : 3	B, P, N	**B**
		1 : 5	B, P, N	**C**
		1 : 8	O	**H**
	Tang drive		M	**N**
	Splined shaft	B17 × 14 according to DIN 5482	B, P	**F**
		SAE J744 19-4 11T, length 38 mm, (diameter 18.62 mm)	R, C	**P**
		SAE J744 16-4 9T	R	**R**
	Parallel keyed shaft	ISO diameter 18 mm	B	**A**
		SAE J744 19-1, length 32 mm	R	**K**
		SAE J744 16-1, length 32 mm	R	**Q**

Front cover

09	Rectangular flange	spigot diameter 80 mm		**B**
		spigot diameter 36.47 mm	M8	**O**
	2-bolt flange	spigot diameter 101.6 mm	SAE J744 101-2 (B)	**C**
		spigot diameter 82.55 mm	SAE J744 82-2 (A)	**R**
	2-bolt mounting	spigot diameter 52 mm	with O-ring	**M**
		spigot diameter 50 mm	option 1	**N**
		spigot diameter 50 mm	option 2	**P**
	4-bolt mounting	spigot diameter 52 mm	with O-ring	**T**
	4-bolt rectangular flange	112 × 87.2 mm		**J**

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

01	02	03		04	05		06	07	08	09	10	11	12	13		14
AZ	**P**	**W**	**–**	**1**		**–**									**–**	

Port connection

10	Pipe thread according to ISO 228-1		**01**
	UN-thread according to ISO 11926-1 / ASME B 1.1, O-ring		**12**
	Square flange (German version)		**20**
	Square flange (Italian version)		**30**
	Metric thread according to ISO 6149, O-ring		**50**

Sealing material

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

Rear cover

12	Standard (cast iron)		**B**
	Pressure relief valve	with internal residual flow	**D**
	Short cover	12.5 mm thick	**U**

Valve settings

13	Cracking pressure in bar, 3-digit, e.g. 180 bar	**180XX**

Non standard version

14	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 (fluoroelastomer)	**P**
	NBR (nitrile rubber), shaft seal in FKM (fluoroelastomer)	**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-way pump AZPJ + AZPJ + AZPB: AZP**JJB**
2) A numerical value is to be selected for each pump stage, e.g.3-way pump **028/016/2.0**
3) A numerical value is to be selected for each pump stage, e.g.3-way 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 double pump:

AZPW...019... + AZPW...008

01	02	03		04	05		06	07	08	09	10	11	12
AZ	**P**	**WW**	**–**	**1**	**1**	**–**	**019/008**	**R**	**R**	**R**	**0101**	**P**	**B**

Technical data

Operating conditions

Nominal size				**NG**	**004**	**005**	**007**	**008**	**009**	**011**	**012**
Series					1x						
Displacement, geometric, per revolution			V_g	cm³	4.0	5.5	7.0	8.0	9.0	11.0	12.0
Pressure at suction port **S**[1]		absolute	p_e	bar	0.7 ... 3						
Maximum continuous pressure			p_1	bar	190	190	190	190	190	190	190
Maximum intermittent pressure			p_2	bar	210	210	210	210	210	210	210
Maximum pressure peaks			p_3	bar	230	230	230	230	230	230	230
Minimum rotational speed	ν = 12 mm²/s	< 100 bar	n_{min}	rpm	700	700	700	700	700	700	700
		100 to 180 bar	n_{min}	rpm	1200	1200	1000	1000	1000	1000	800
		180 bar to p_2	n_{min}	rpm	1400	1400	1400	1400	1200	1200	1000
	ν = 25 mm²/s	at p_2	n_{min}	rpm	700	700	700	700	700	700	700
Maximum rotational speed		at p_2	n_{max}	rpm	3500	3500	3500	3500	3500	3500	3000

Nominal size				**NG**	**014**	**016**	**019**	**021**	**022**	**025**
Series					1x					
Displacement, geometric, per revolution			V_g	cm³	14.0	16.0	19.0	21	22.5	25
Pressure at suction port **S**[1]		absolute	p_e	bar	0.7 ... 3					
Maximum continuous pressure			p_1	bar	190	190	180	170	170	**150**
Maximum intermittent pressure			p_2	bar	210	210	200	190	190	**170**
Maximum pressure peaks			p_3	bar	230	230	220	210	210	**190**
Minimum rotational speed	ν = 12 mm²/s	< 100 bar	n_{min}	rpm	700	700	700	700	700	**700**
		100 to 180 bar	n_{min}	rpm	800	800	800	800	800	**800**
		180 bar to p_2	n_{min}	rpm	1000	1000	1000	1000	1000	**1000**
	ν = 25 mm²/s	at p_2	n_{min}	rpm	700	700	700	700	700	**700**
Maximum rotational speed		at p_2	n_{max}	rpm	3000	3000	3000	2500	2500	**2500**

Rotary stiffness of drive shaft

Drive shaft			**B**	**C**	**H**	**N**	**F**	**P**	**R**	**A**	**K**	**Q**
Rotary stiffness	c	Nm/rad	209	215	246	264	250	305	220	290	314	232

1) In the case of tandem pumps, the suction-side pressure difference between the individual pump stages must not exceed 0.5 bar.

General technical data

Installation position			No restrictions
Mounting type			See offer drawing
Port connections			See chapter “Port connections” The screw threads for the suction and pressure port, that are manufactured true to gauge, are deformed slightly due to the pump assembly. The mounting of conventional screw fittings in accordance with DIN EN ISO 1179, 6149, 9974 etc. is easily possible.
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 to +80 with NBR seals (NBR = nitrile rubber)
			–20 to +110 with FKM seals (FKM = fluoroelastomer)

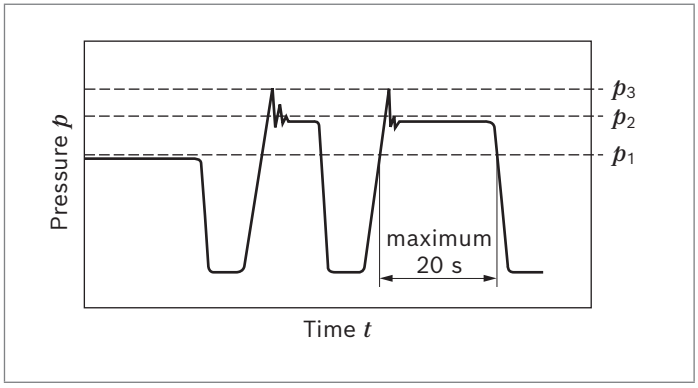
Corrosion protection

Version 1 (Phosphated): Unit with low corrosion protection	The surface serves for protection against flash rust during transport or as priming for painting.	
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.

▼ **Pressure definition**

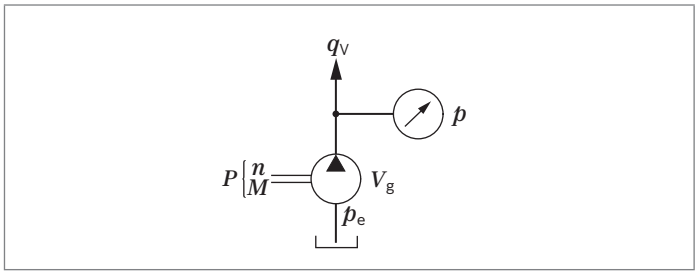


p_1: Maximum continuous pressure
p_2: Maximum intermittent pressure
p_3: Maximum pressure peaks

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 [cm^3]
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 ($\eta_t = \eta_v \times \eta_{hm}$)

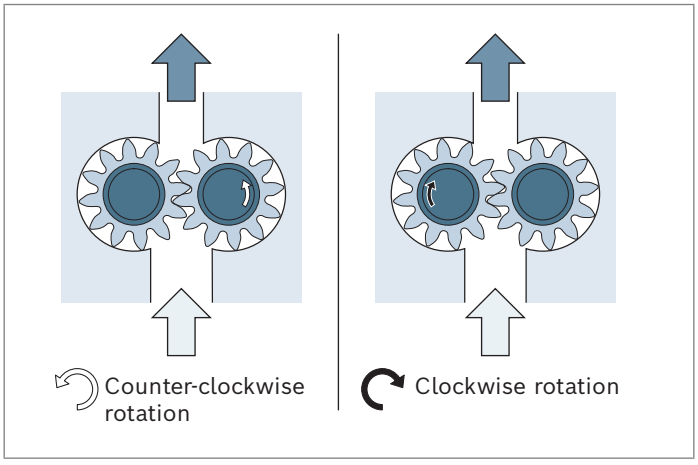


Notice
You can find diagrams for a rough calculation in chapter “Flow characteristic curves” and “Power diagrams”.

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:

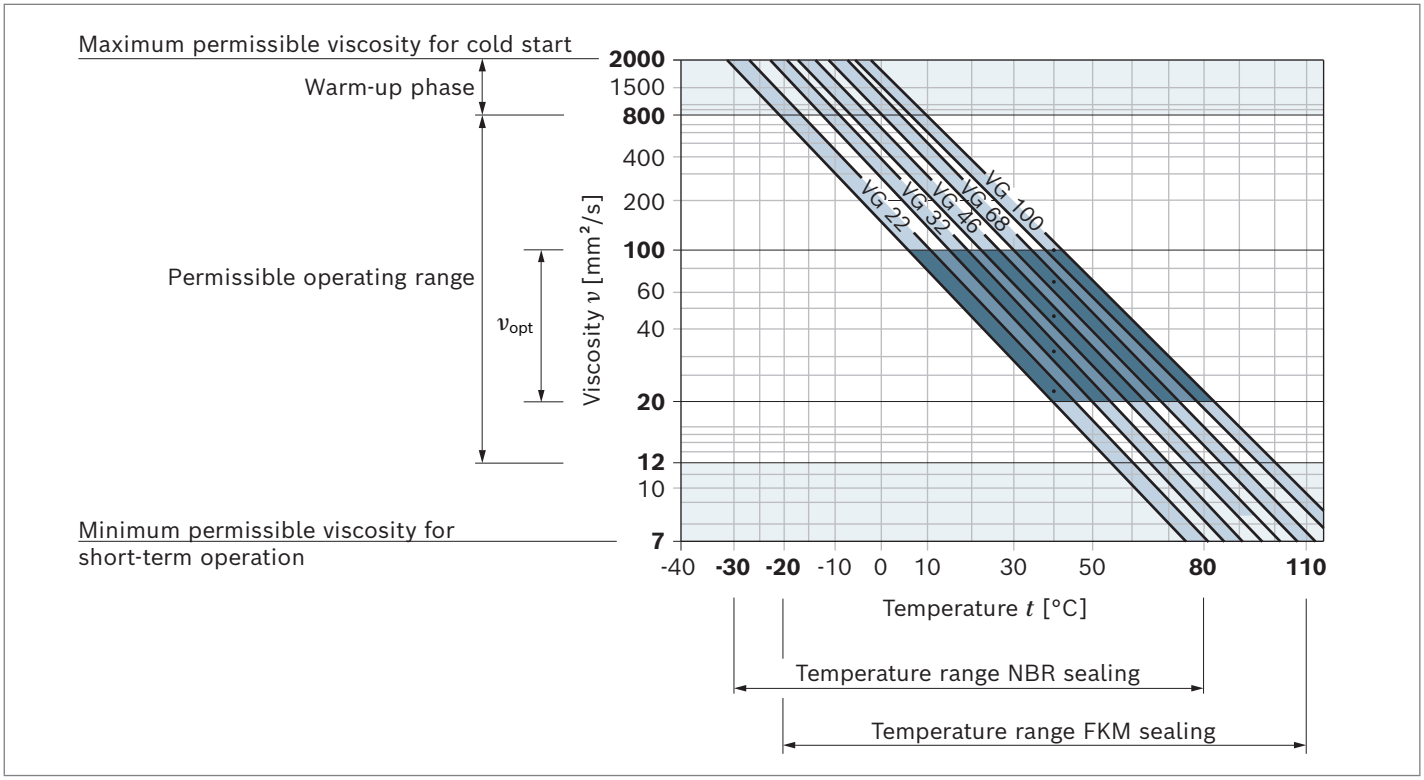
- 90245: Bosch Rexroth Fluid Rating List for Rexroth hydraulic components (pumps and motors)

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 = fluoroelastomer)	t = -20 °C ... +110 °C

▼ **Selection diagram**

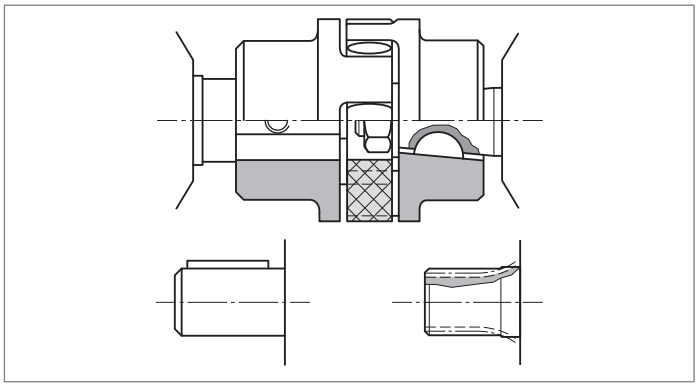


Observe the instructions for the filtration of the hydraulic fluid (see chapter “Project planning information”).

Drive

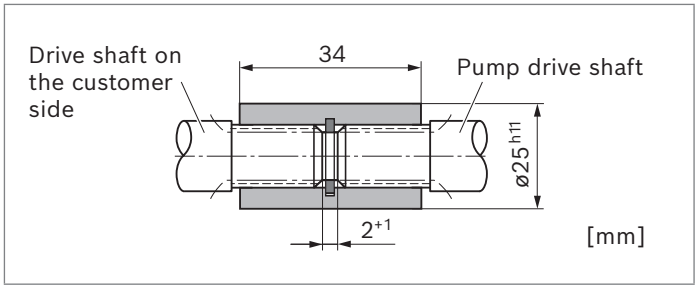
Elastic couplings

- 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.



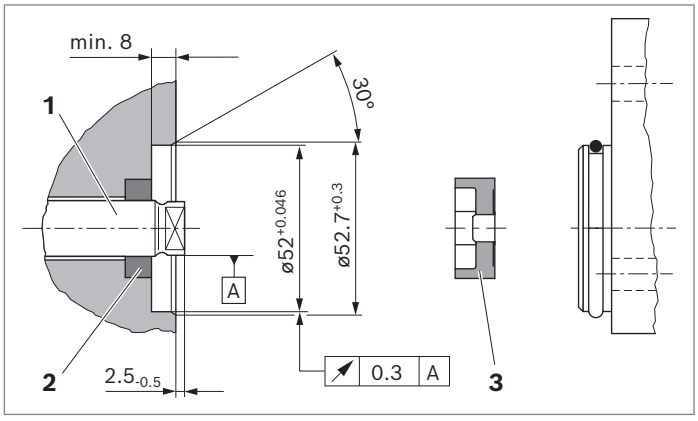
Coupling sleeve

- To be used for splined shaft profile according to DIN and 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



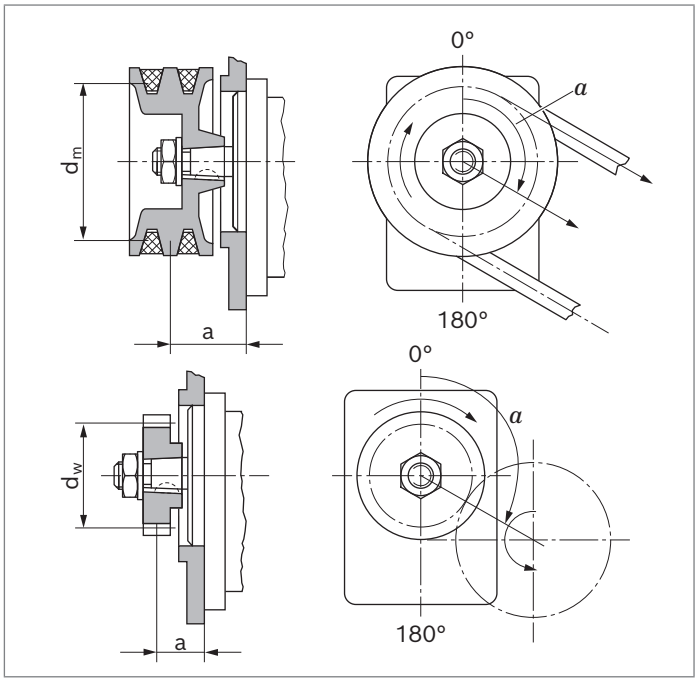
Tang drive coupling

- 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.



Maximum transferable drive torques

▼ **Tapered keyed shafts**

Drive shaft code	Designation	M_{max} Nm	Nominal size	$p_{2\ max}$ bar
B	1 : 3	130	4 ... 16	210
			19	200
			21	190
			22	190
			25	170
C	1 : 5	155	4 ... 16	210
			19	200
			21	190
			22	190
			25	170
H	1 : 8	160	4 ... 16	210
			19	200
			21	190
			22	190
			25	170

▼ **Parallel keyed shafts**

Drive shaft code	Designation	M_{max} Nm	Nominal size	$p_{2\ max}$ bar
A	ISO diameter 18 mm	140	4 ... 16	210
			19	200
			21	190
			22	190
			25	170
K	SAE J744 19-1, length 32 mm	140	4 ... 16	210
			19	200
			21	190
			22	190
			25	170
Q	SAE J744 16-1, length 32 mm	80	4 ... 16	210
			19	200
			21	190
			22	190
			25	170

▼ **Tang drive**

Drive shaft code	Designation	M_{max} Nm	Nominal size	$p_{2\ max}$ bar
N	Tang drive	65	4 ... 16	210
			19	190
			21	160
			22	160
			25	140

▼ **Splined shafts**

Drive shaft code	Designation	M_{max} Nm	Nominal size	$p_{2\ max}$ bar
F	B17 × 14 according to DIN 5482	100	4 ... 16	210
			19	200
			21	190
			22	190
			25	170
P	SAE J744 19-4 11T, length 38 mm, (diameter 18.62 mm)	180	4 ... 16	210
			19	200
			21	190
			22	190
			25	170
R	SAE J744 16-4 9T	110	4 ... 16	210
			19	200
			21	190
			22	190
			25	170

Multiple gear pumps

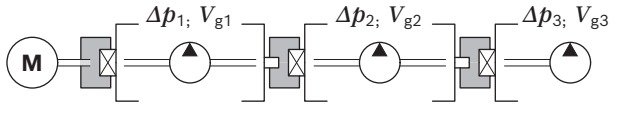
Gear pumps are well-suited to multiple arrangements, whereby the drive shaft of the first pump stage is extended to a second and possibly third pump stage. The shaft of the individual pump sections are normally connected via a driver or via a splined coupling (reinforced through drive). The individual 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 single 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:



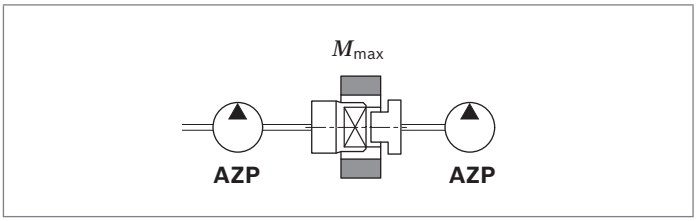
$$\frac{\Delta p_1 \times V_{g1} + \Delta p_2 \times V_{g2} + \Delta p_3 \times V_{g3}}{18 \times \pi} \leq M_{max}\ ^{1)}$$

Δp [bar]
V_g [cm³]

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

Standard through drive (tang drive coupling)

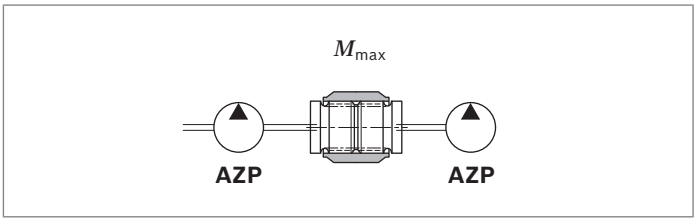
For AZPW pumps, the driver for the next pump stage can support loads of up to M_{max} = 52 Nm. This may result in pressure limitations for subsequent pump stages. Subsequent pumps of a smaller series determine the maximum transmissible torque.



Following pump		M_{max} [Nm]
Platform F	AZPW	52
Platform B	AZPB-3x	25

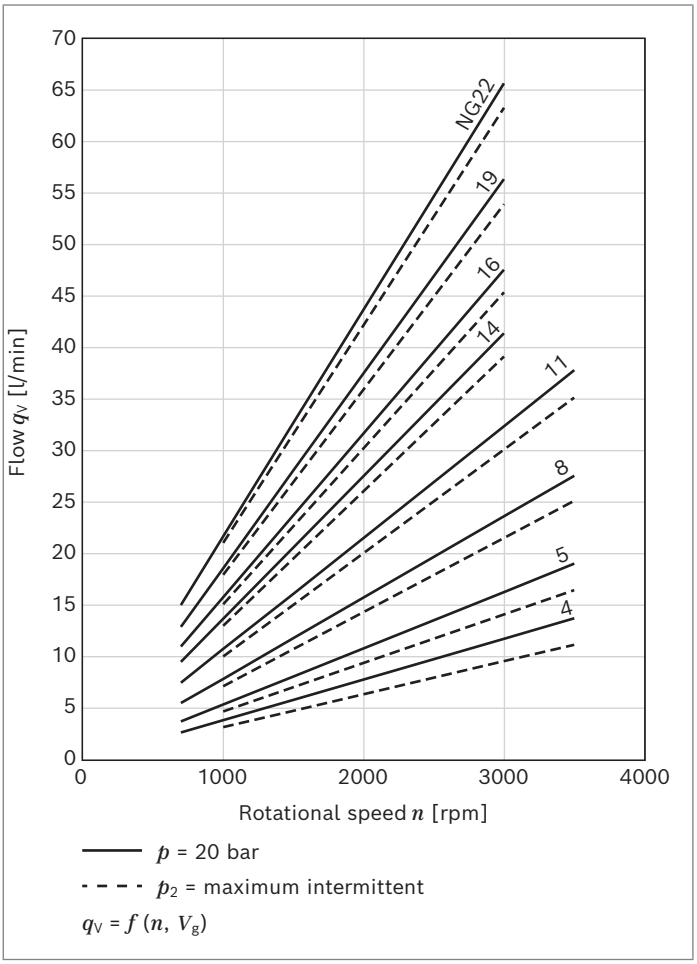
Reinforced through drive

Reinforced through drives (for up to M_{max} = 160 Nm) are available for applications with higher torques/torsional vibrations. Design available on request.



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

Flow characteristic curves

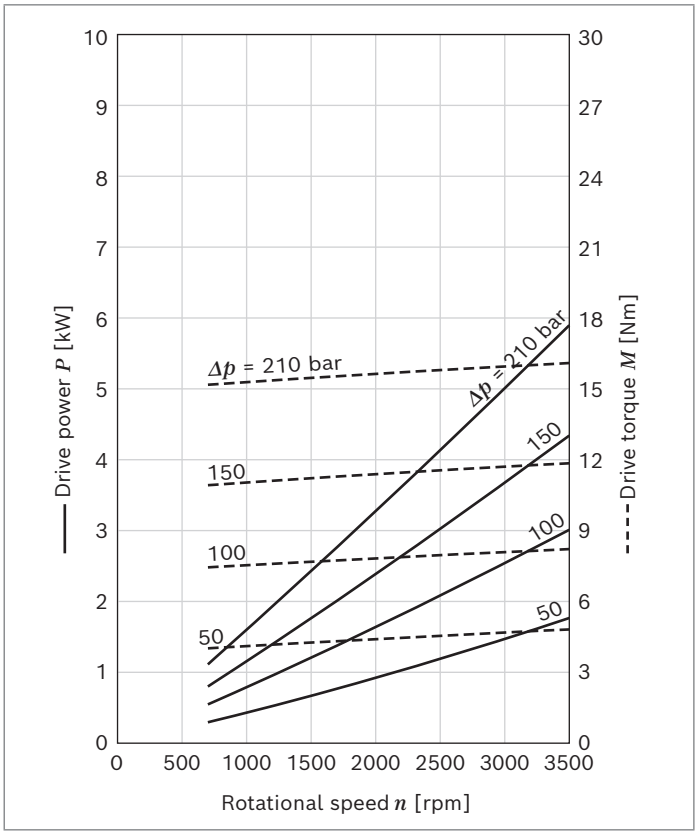


Notice

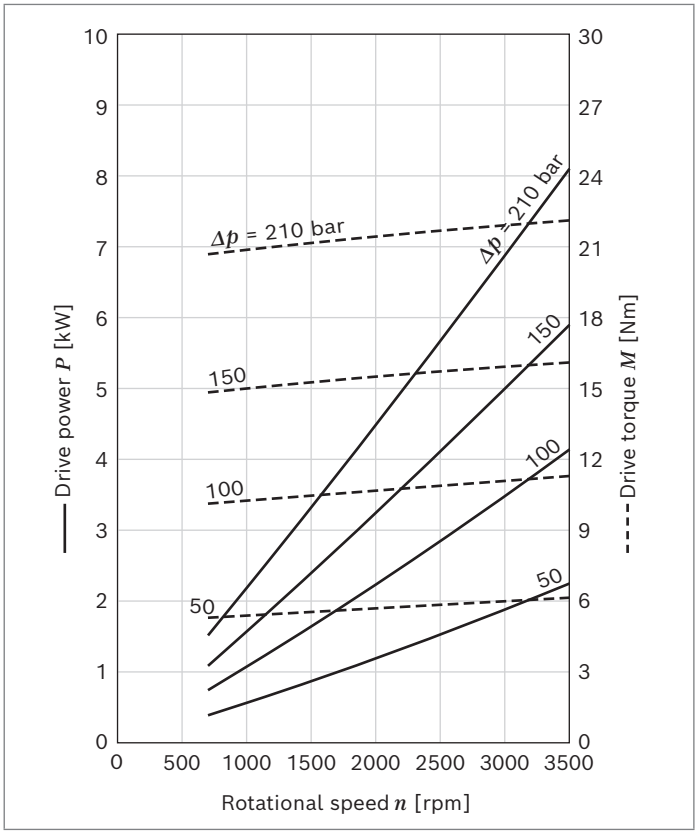
- Characteristic curves measured at ν = 32 mm²/s and t = 50 °C
- n_{min} = 88%

Power diagrams

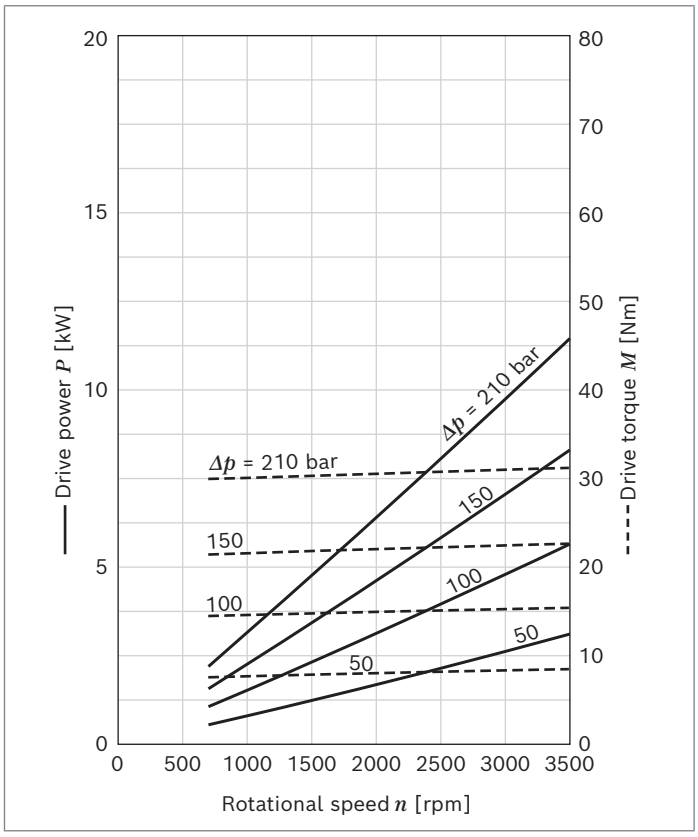
▼ **Nominal size 4**



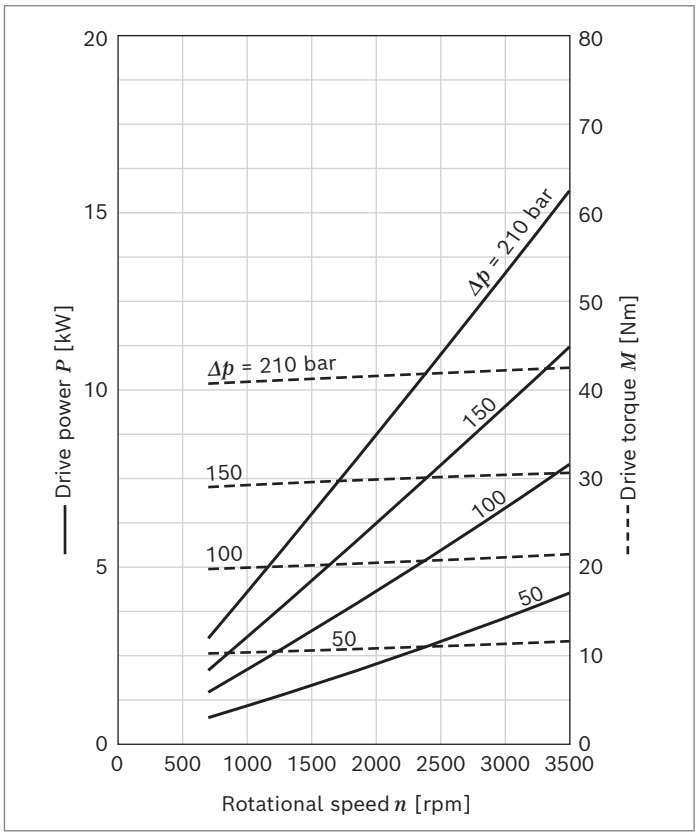
▼ **Nominal size 5**



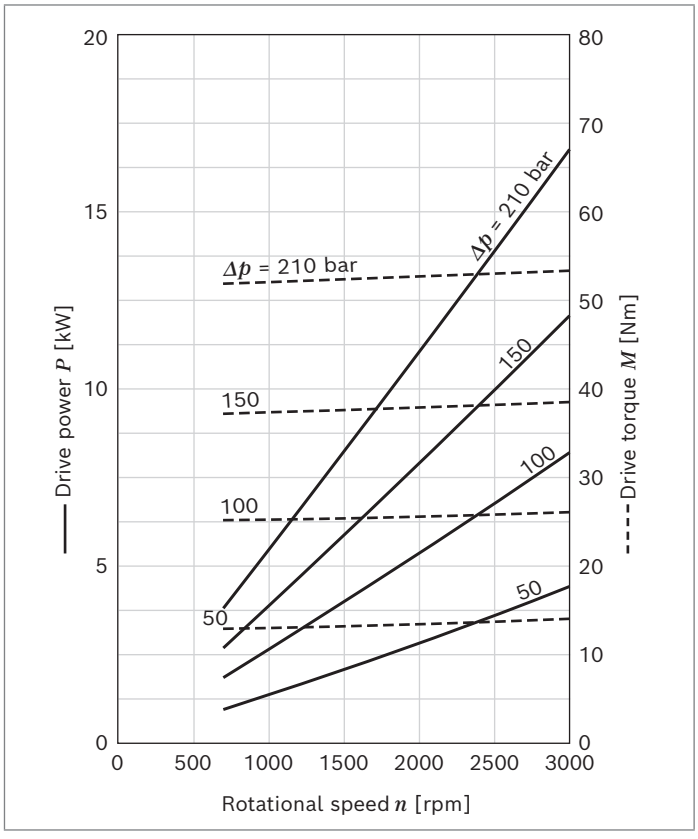
▼ **Nominal size 8**



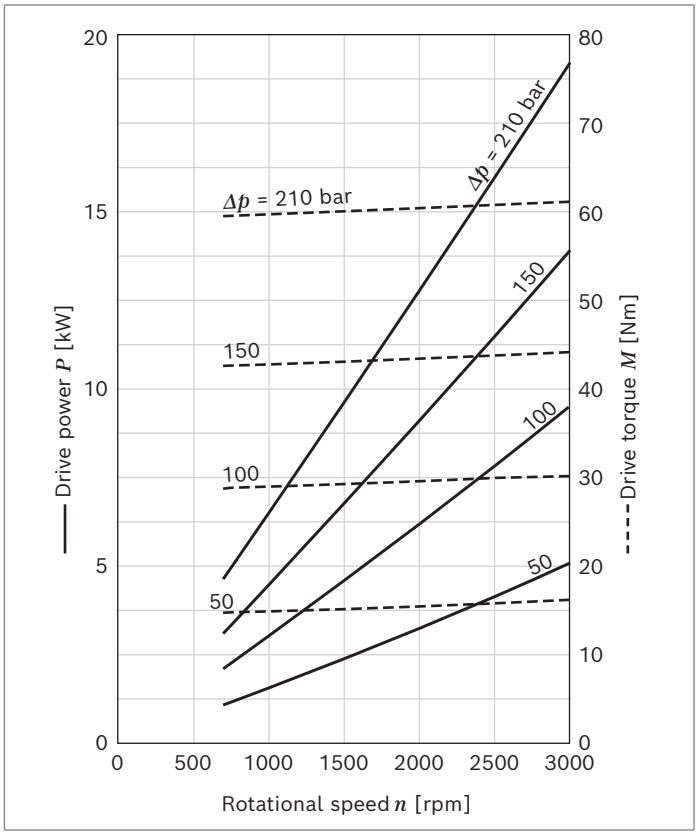
▼ **Nominal size 11**



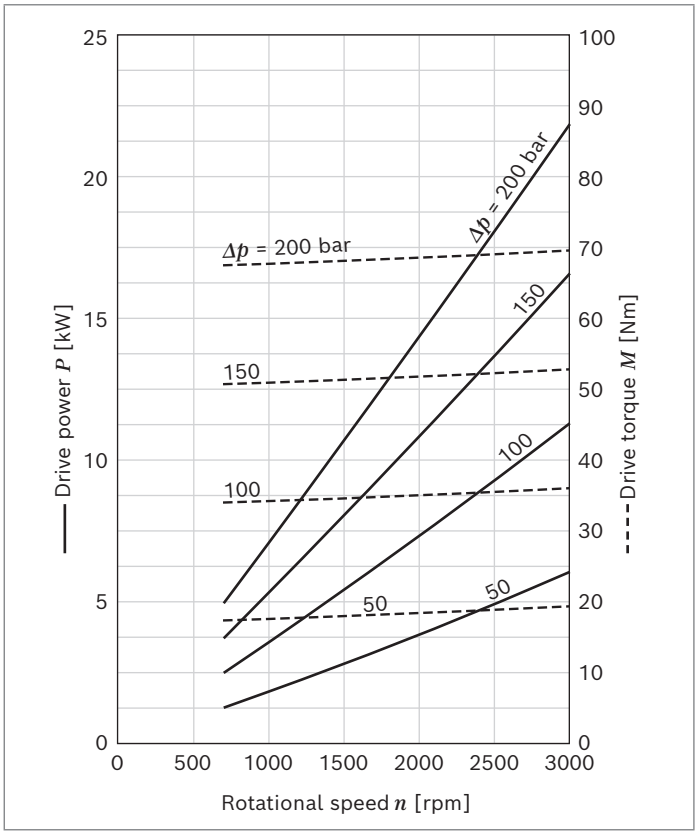
▼ **Nominal size 14**



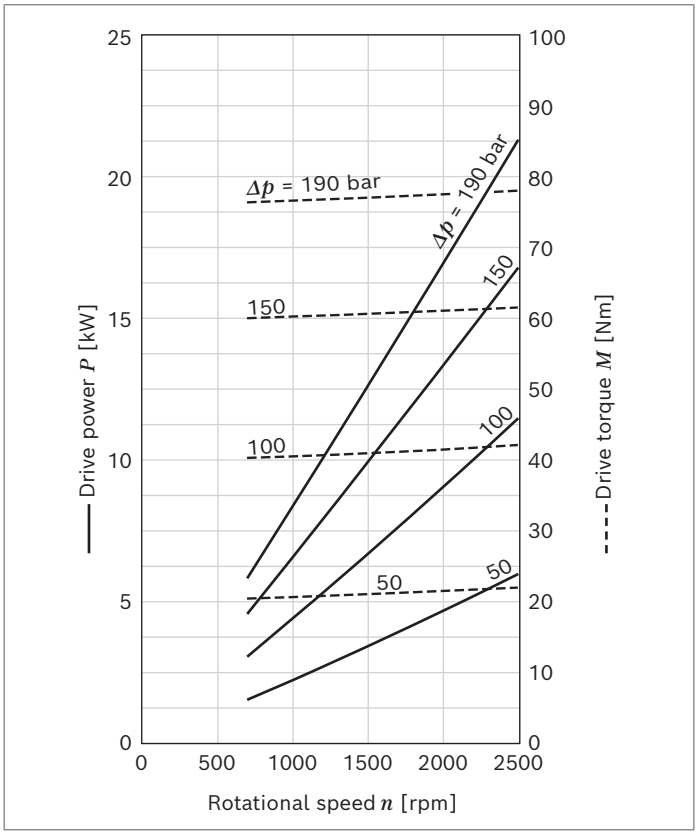
▼ **Nominal size 16**



▼ **Nominal size 19**



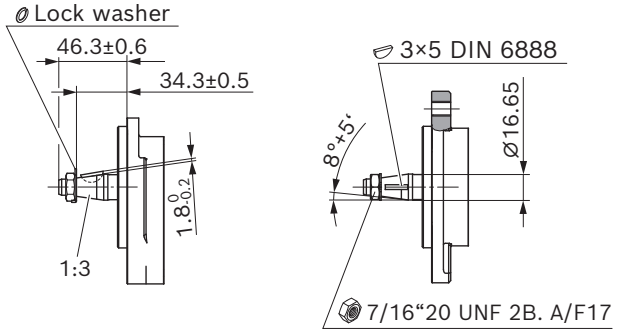
▼ **Nominal size 22**



Drive shafts

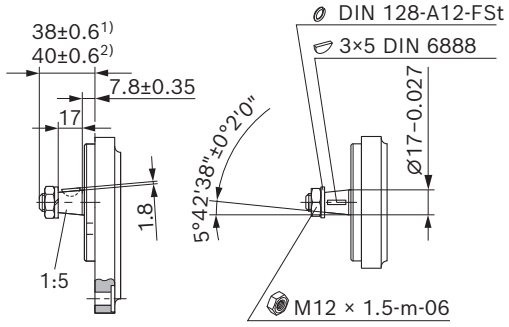
▼ **Tapered keyed shaft 1:3**

B



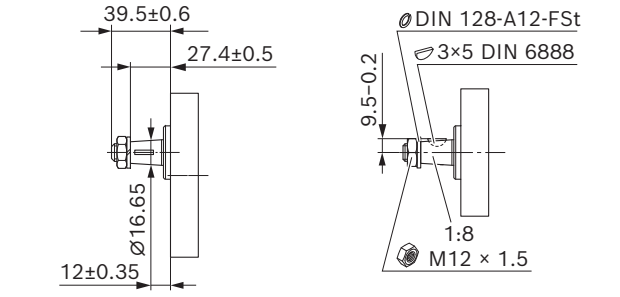
▼ **Tapered keyed shaft 1:5**

C



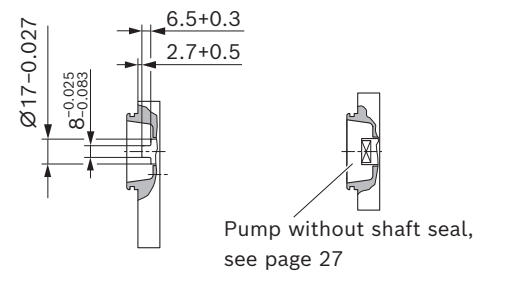
▼ **Tapered keyed shaft 1:8**

H



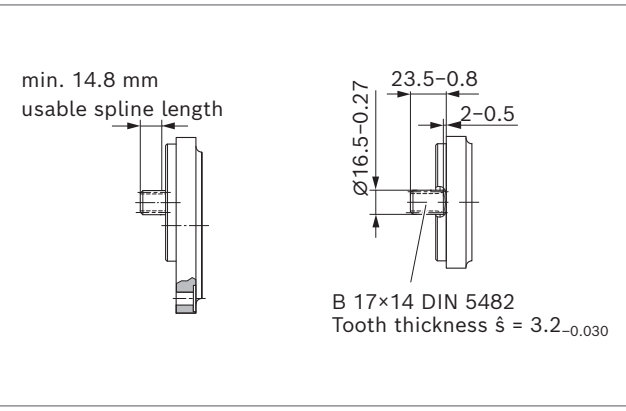
▼ **Tang drive**

N



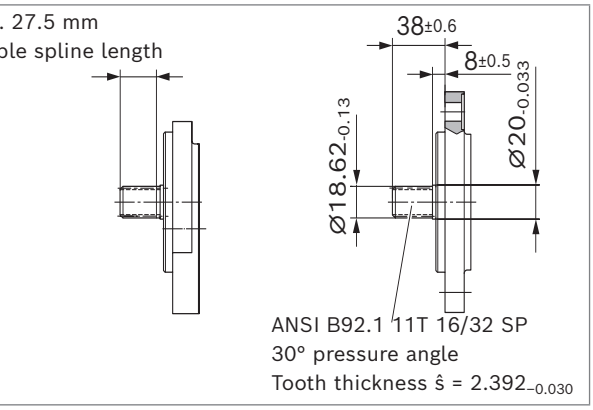
▼ **Splined shaft B17 × 14 according to DIN 5482**

F



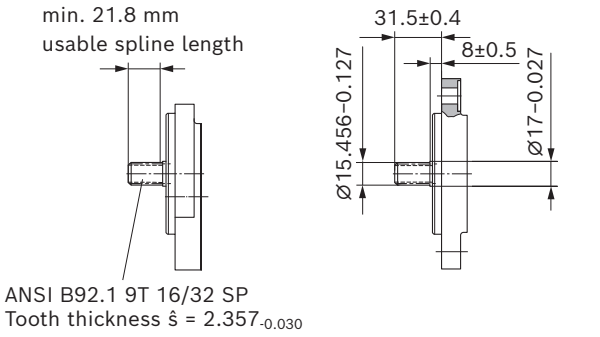
▼ **Splined shaft SAE J744 19-4 11T, length 38 mm,**

P



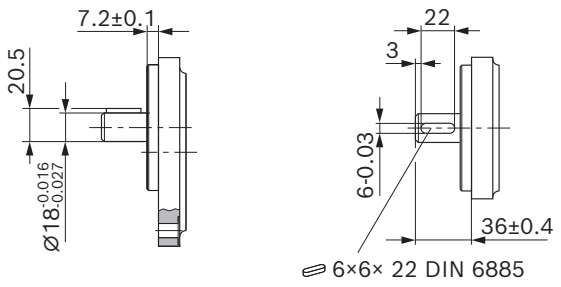
▼ Splined shaft SAE J744 16-4 9T

R



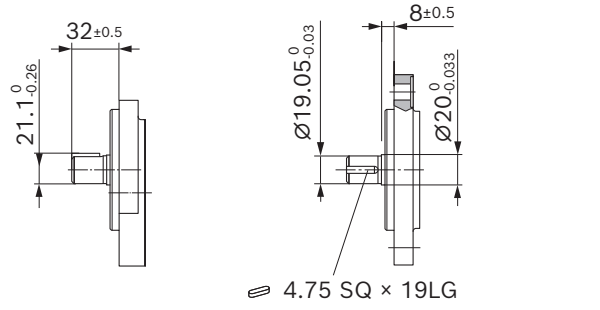
▼ Parallel keyed shaft ISO diameter 18 mm

A



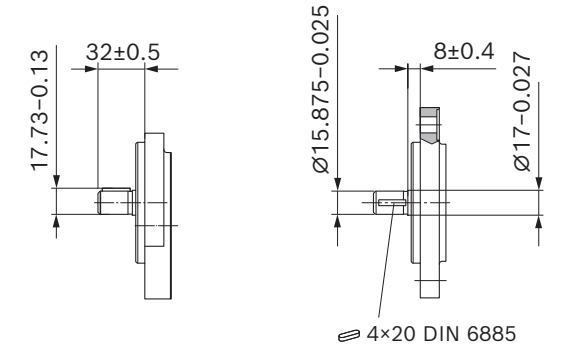
▼ Parallel keyed shaft SAE J744 19-1, length 32 mm

K



▼ Parallel keyed shaft SAE J744 16-1, length 32 mm

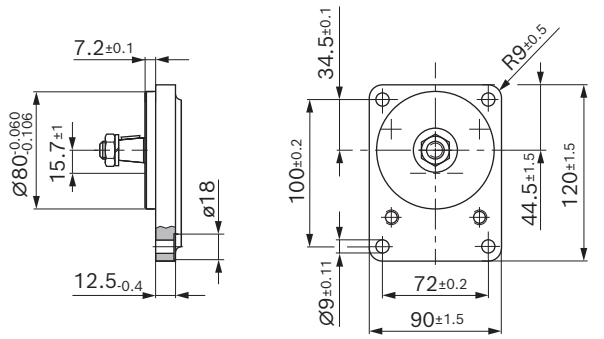
Q



Front covers

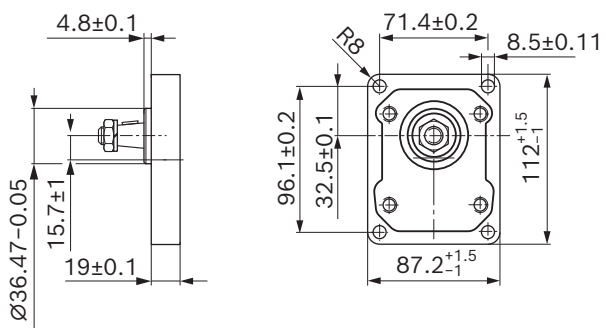
▼ **Rectangular flange spigot diameter 80 mm**

B



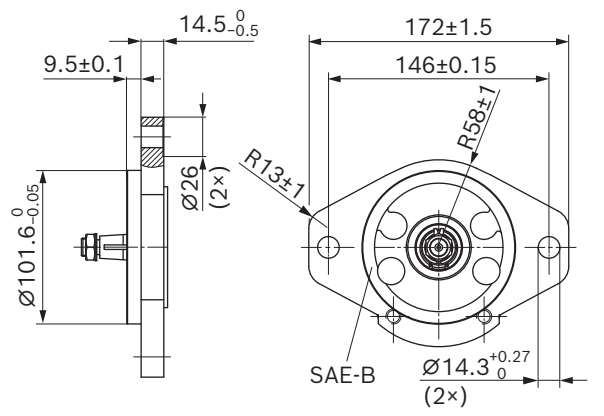
▼ **Rectangular flange spigot diameter 36.47 mm, M8**

O



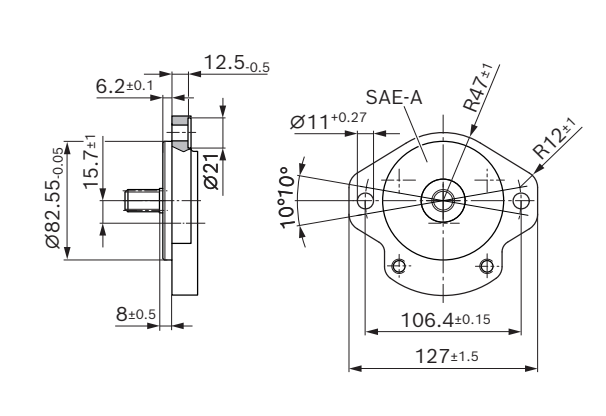
▼ **2-bolt flange spigot diameter 101.6 mm, SAE J744 101-2 (B)**

C



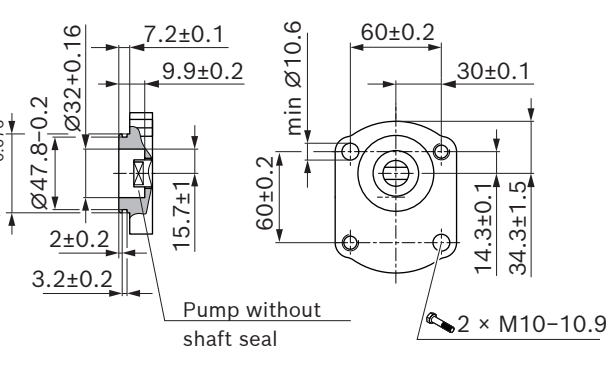
▼ **2-bolt flange spigot diameter 82.55 mm, SAE J744 82-2 (A)**

R



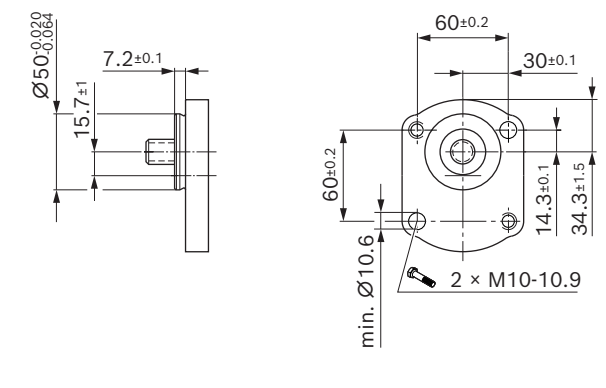
▼ **2-bolt mounting spigot diameter 52 mm, with O-ring**

M



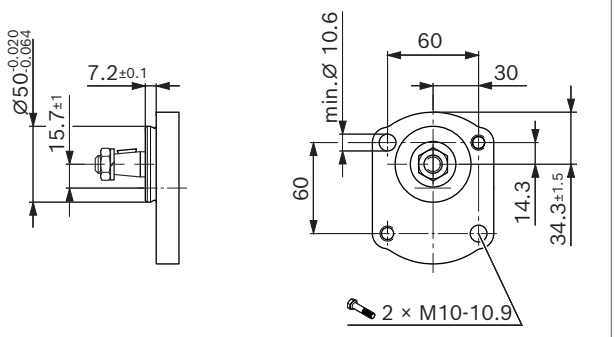
▼ **2-bolt mounting spigot diameter 50 mm, option 1**

N



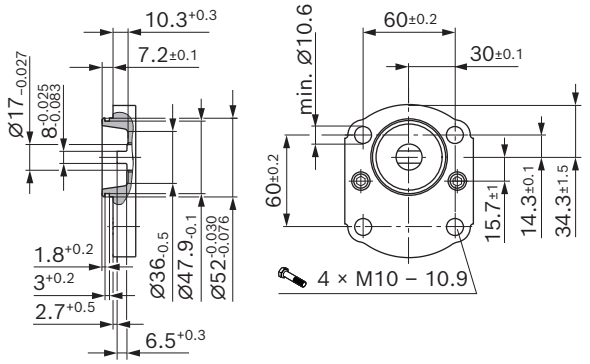
▼ **2-bolt mounting spigot diameter 50 mm, option 2**

P



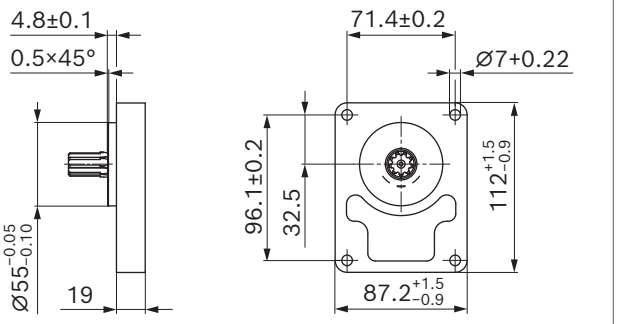
▼ **4-bolt mounting spigot diameter 52 mm, with O-ring**

T



▼ **4-bolt rectangular flange, 112 × 87.2 mm**

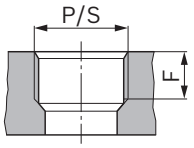
J



Port connections

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

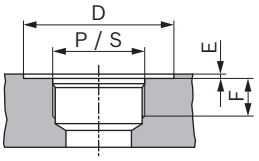
01



Nominal size	Pressure side		Suction side	
	P	F	S	F
		mm		mm
4 ... 16	G 1/2	16	G 3/4	16
19 ... 25	G 3/4		G 1	19

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

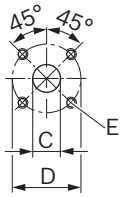
12



Nominal size	Pressure side				Suction side			
	P	D	E	F	S	D	E	F
		mm	mm	mm		mm	mm	mm
4 ... 5	3/4-16 UN-2B	30.2	0.5	14	7/8-14 UN-2B	35	0.5	17
8 ... 14	7/8-14 UN-2B	35		17	1 1/16-12 UN-2B	45		19
16 ... 25					1 5/16-12 UN-2B	50		20

▼ **Square flange (German version)**

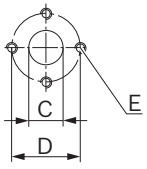
20



Nominal size	Pressure side			Suction side		
	C	D	E	C	D	E
	mm	mm		mm	mm	
4 ... 5	15	35	M6; 13 mm deep	15	40	M6; 13+1 mm deep
8 ... 25				20		

▼ **Square flange (Italian version)**

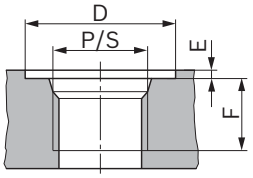
30



Nominal size	Pressure side			Suction side		
	C	D	E	C	D	E
	mm	mm		mm	mm	
4 ... 5	13.5	30.2	M6; 13 mm deep	13.5	30.2	M6; 13 mm deep
8 ... 25				20	39.7	M8; 13 mm deep

▼ **Metric thread according to ISO 6149, O-ring**[1)]

50



Nominal size	Pressure side				Suction side			
	P	D	E	F	S	D	E	F
		mm	mm	mm		mm	mm	mm
4 ... 5	M18 × 1.5	29	0.5	16	M18 × 1.5	29	0.5	16
8 ... 14	M22 × 1.5	34		18	M27 × 2	40		19
16 ... 25					M33 × 2	46		18

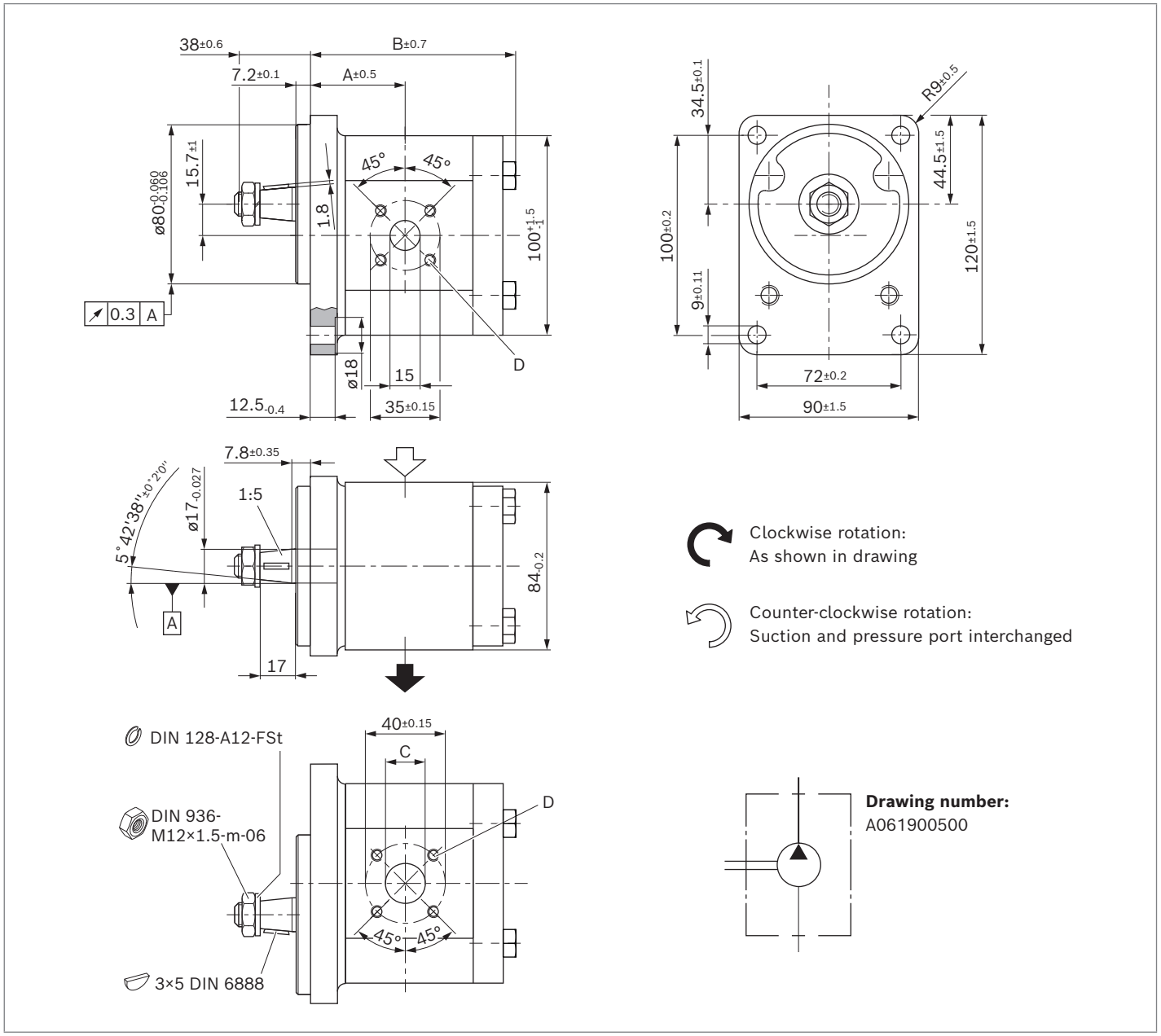
Notice
Depending on the design variant, the size of the threaded connections may differ from the sizes specified in the table. See information in the dimensional drawings.

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

Dimensions – Preferred program

Tapered keyed shaft 1:5 with rectangular flange spigot diameter 80 mm (German version)

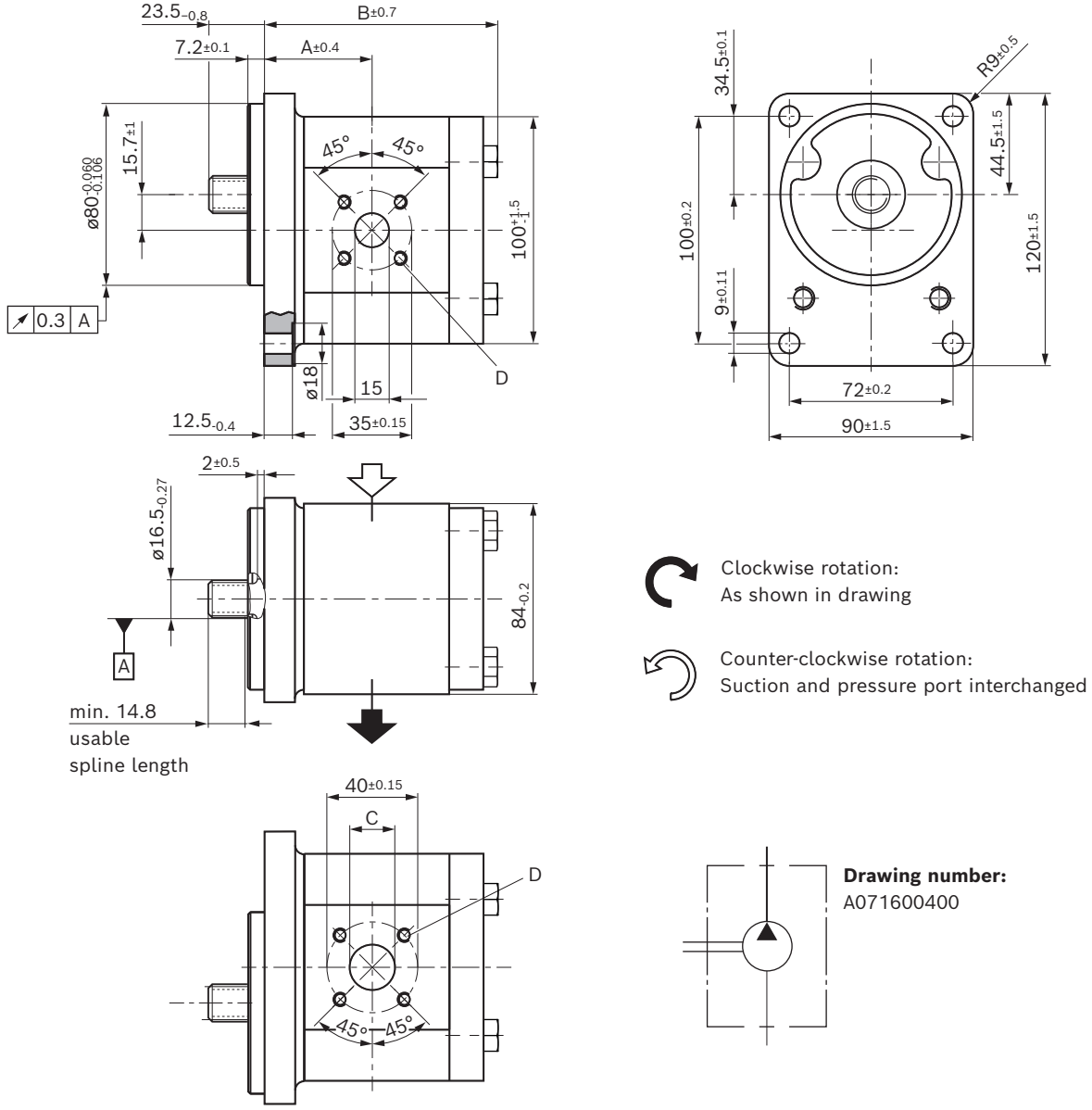
AZPW–11– ... **CB20**MB



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
4	R983074473	R983074465	210	3500	39.9	83.8	15	M6; 13+1 deep
5	R983074474	R983074466	210	3500	41.1	86.3	15	
8	R983074475	R983074467	210	3500	43.2	90.4	20	
11	R983074476	R983074468	210	3500	47	95.4	20	
14	R983074477	R983074469	210	3000	47.5	100.4	20	
16	R983074478	R983074470	210	3000	47.5	103.8	20	
19	R983074479	R983074471	200	3000	47.5	108.8	20	
22	R983074480	R983074472	190	2500	55.1	114.2	20	

Splined shaft B17 × 14 according to DIN 5482 with rectangular flange spigot diameter 80 mm (German version)

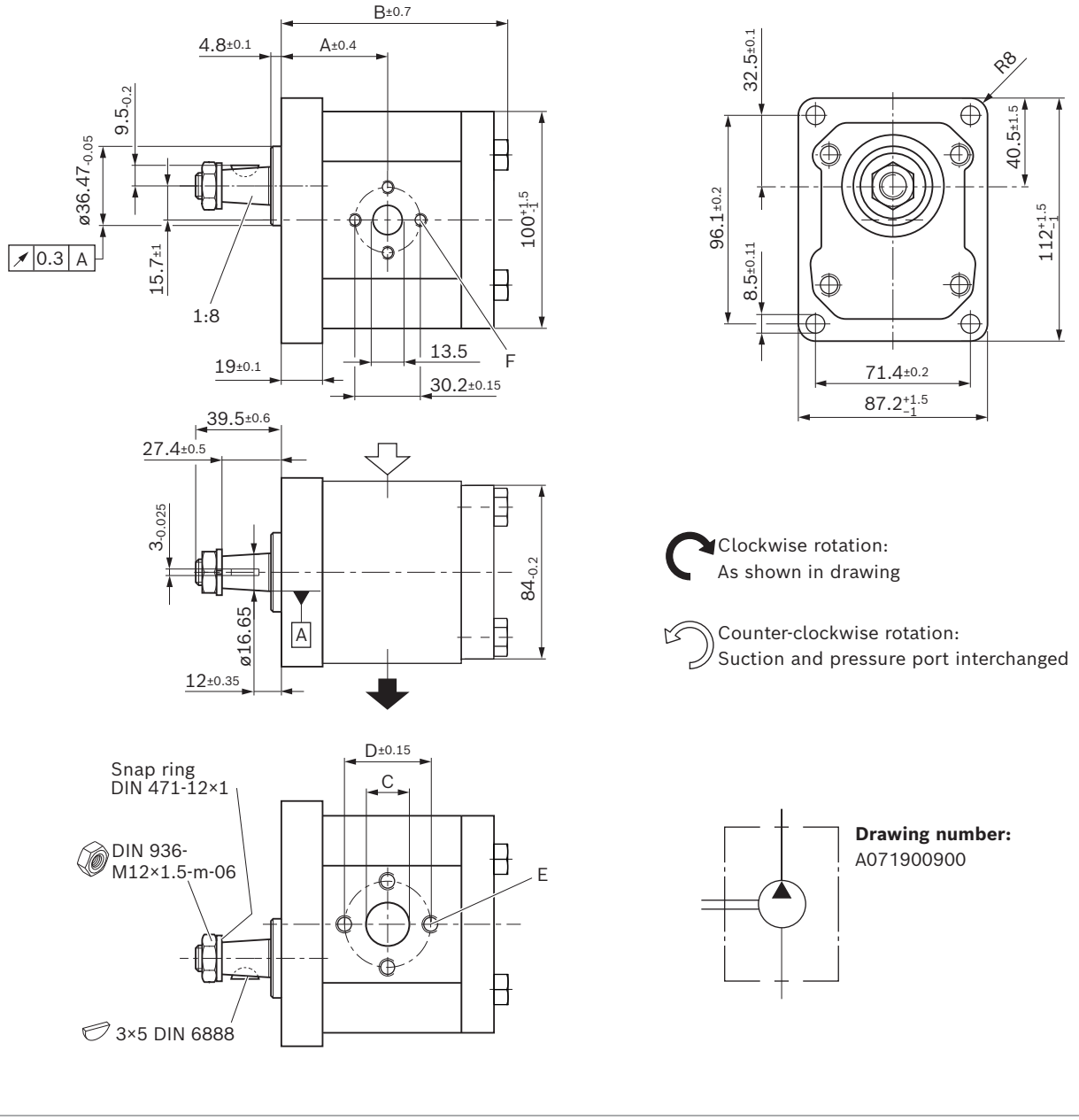
AZPW–11 – … **FB20**MB



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
4	R983072848	R983072840	210	3500	39.9	83.8	15	M6; 13+1 deep
5	R983072849	R983072841	210	3500	41.1	86.3	15	
8	R983072850	R983072842	210	3500	43.2	90.4	20	
11	R983072851	R983072843	210	3500	47	95.4	20	
14	R983072852	R983072844	210	3000	47.5	100.4	20	
16	R983072853	R983072845	210	3000	47.5	103.8	20	
19	R983072854	R983072846	200	3000	47.5	108.8	20	
22	R983072855	R983072847	190	2500	55.1	114.2	20	

Tapered keyed shaft 1:8 with rectangular flange spigot diameter 36.47 mm, M8 (Italian version)

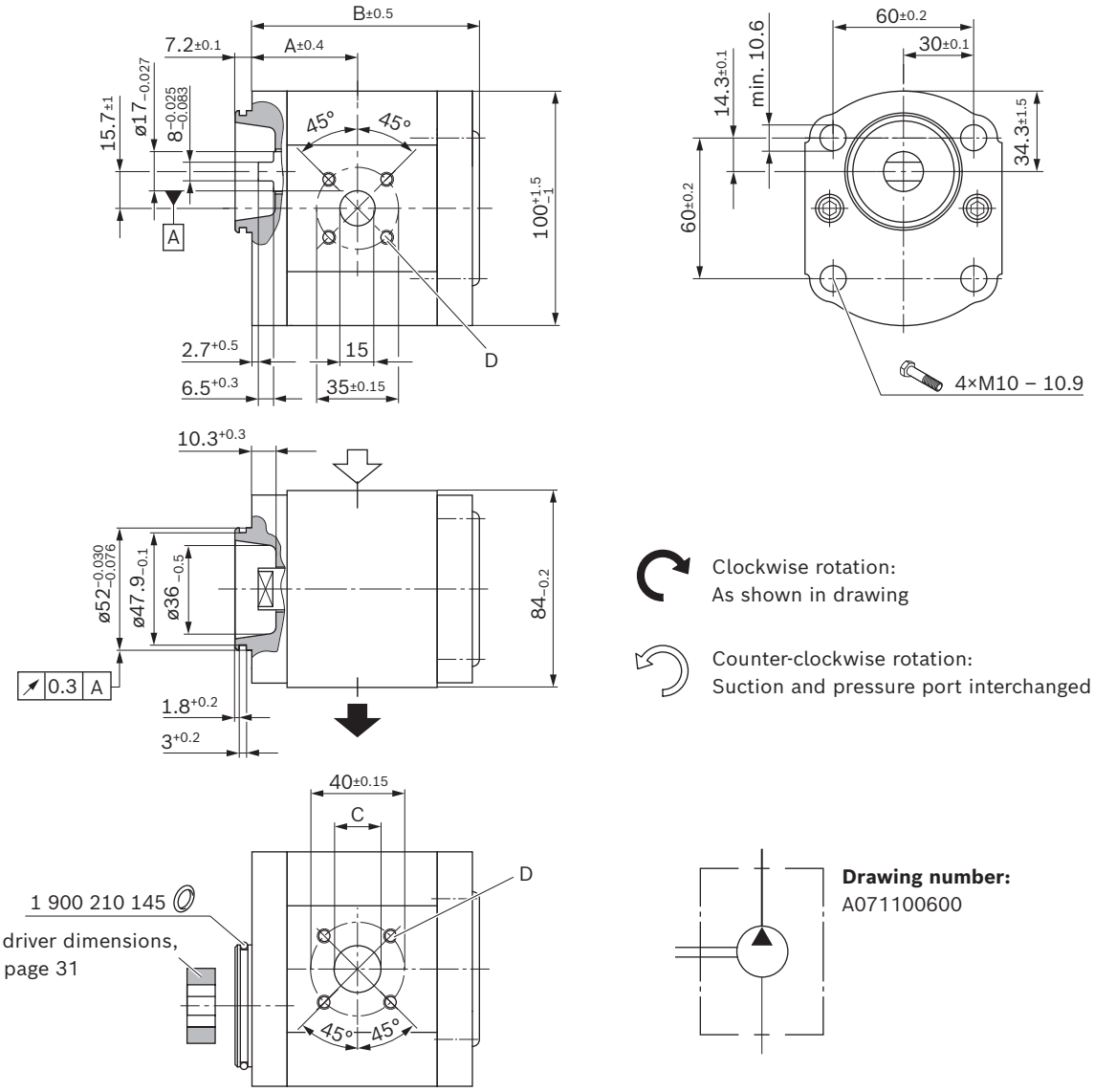
AZPW–11 – ... **HO30**MB



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	F
4	R983072831	R983072823	210	3500	41.4	85.4	13.5	30.2	M6; 13+1 deep	M6; 13+1 deep
5	R983072832	R983072824	210	3500	42.6	87.9	13.5	30.2		
8	R983072833	R983072825	210	3500	44.7	92	13.5	30.2		
11	R983072834	R983072826	210	3500	48.5	97	20	39.7	M8; 13+1 deep	
14	R983072835	R983072827	210	3000	49	102	20	39.7		
16	R983072836	R983072828	210	3000	49	105.4	20	39.7		
19	R983072837	R983072829	200	3000	49	110.4	20	39.7		
22	R983072838	R983072830	190	2500	56.6	115.8	20	39.7		

Tang drive with 4-bolt mounting spigot diameter 52 mm with O-ring (German version)

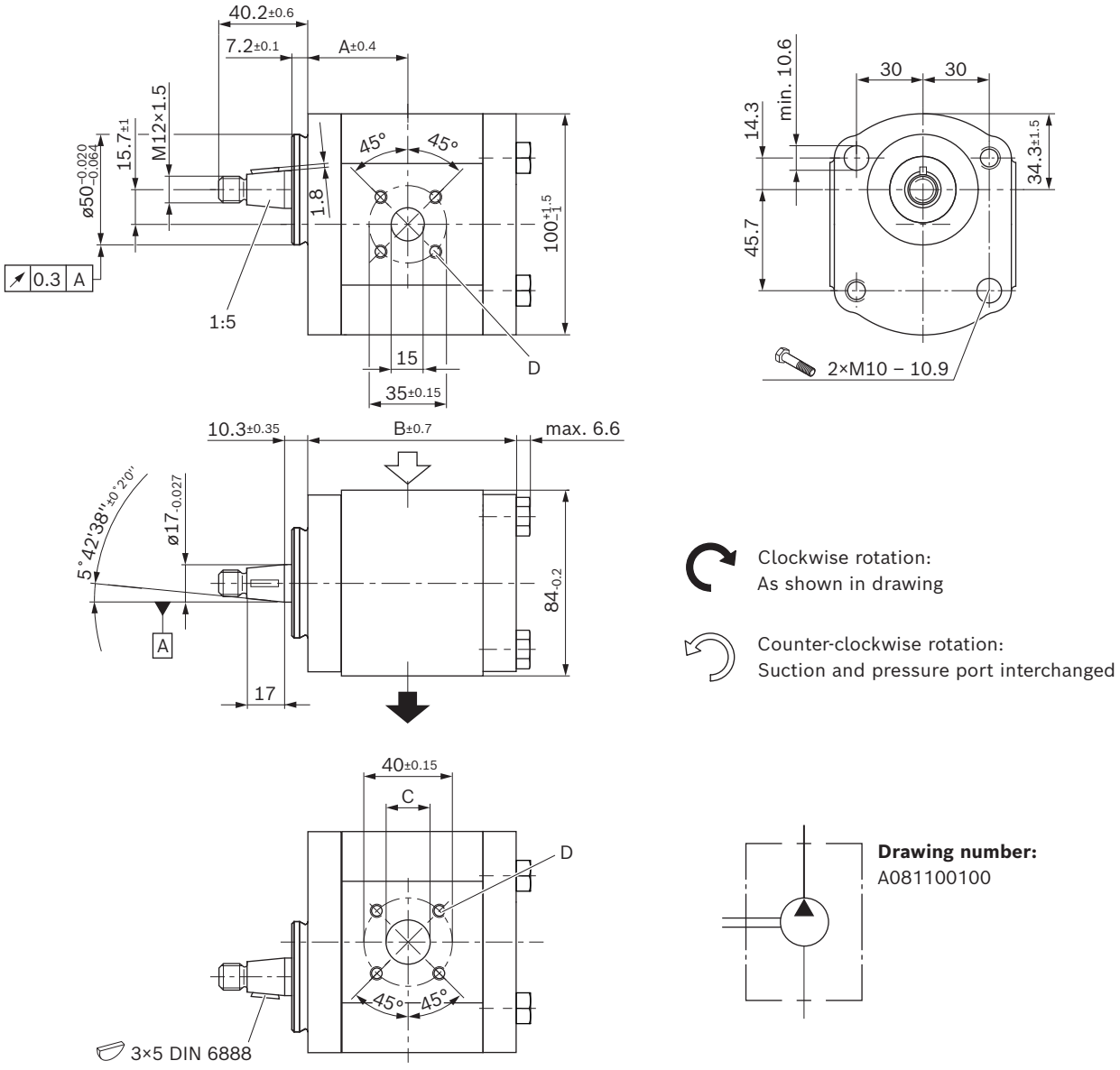
AZPW–11 – ... **NT20**MB



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
4	R983072863	R983072856	210	3500	37.4	75	15	M6; 13+1 deep
5	R983072864	R983076112	210	3500	38.6	77.5	15	
8	R983072865	R983072857	210	3500	40.7	81.6	20	
11	R983072866	R983072858	210	3500	44.5	86.6	20	
14	R983072867	R983072859	210	3000	45	91.6	20	
16	R983072868	R983072860	180	3000	45	95	20	
19	R983072869	R983072861	150	3000	45	100	20	
22	R983072870	R983072862	130	2500	52.6	105.4	20	

Tapered keyed shaft 1:5 with 2-bolt mounting spigot diameter 50 mm, option 2 (German version) without nut and washer

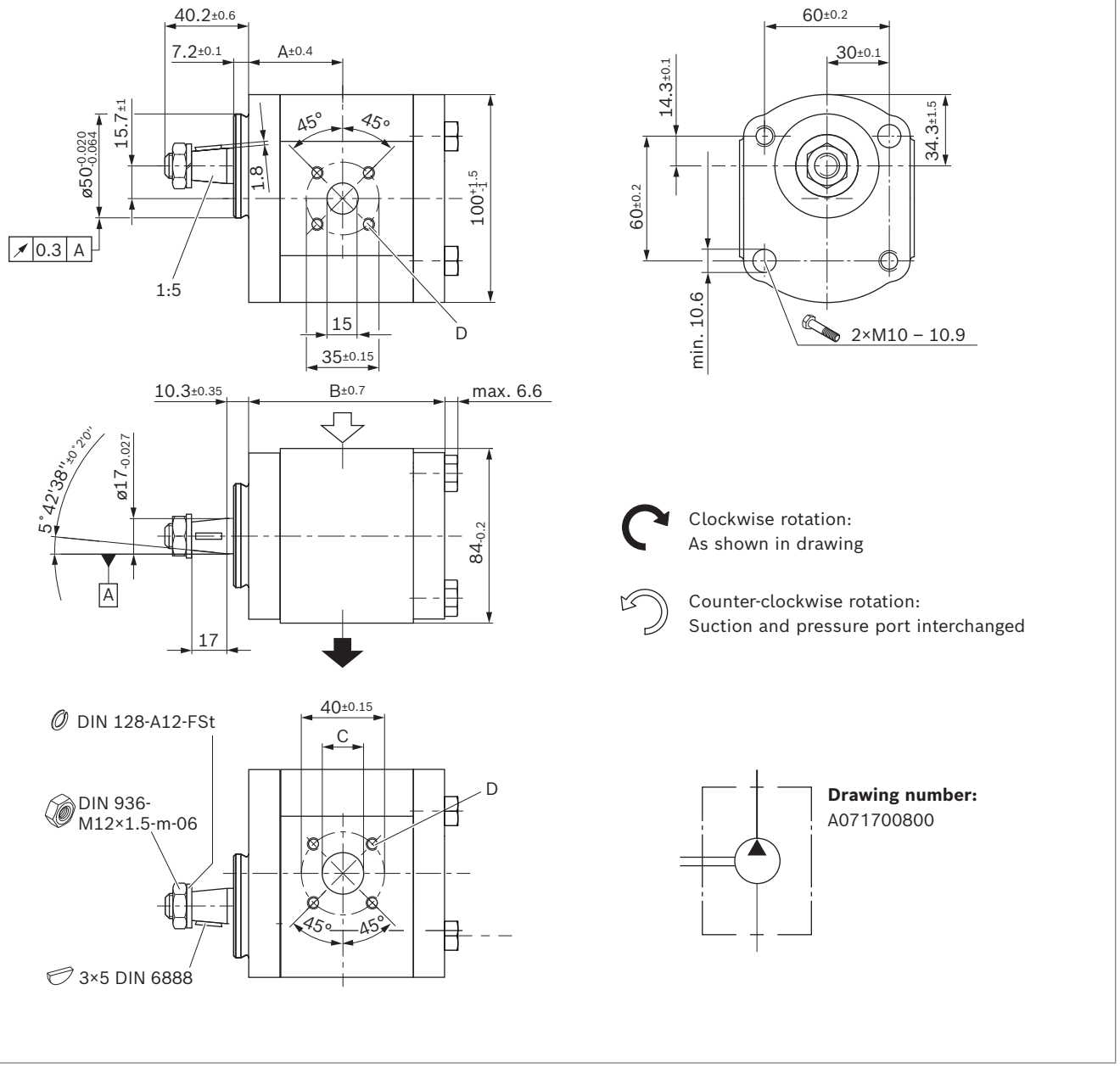
AZPW–11 – ... **CP20**MB-S0007



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
4	R983072788	R983072780	210	3500	37.3	75	15	M6; 13+1 deep
5	R983072789	R983072781	210	3500	38.6	77.5	15	
8	R983072790	R983072782	210	3500	40.6	81.6	20	
11	R983072791	R983072783	210	3500	44.5	86.6	20	
14	R983072792	R983072784	210	3000	45	91.6	20	
16	R983072793	R983072785	210	3000	45	95	20	
19	R983072794	R983072786	200	3000	45	100	20	
22	R983072795	R983072787	190	2500	52.6	105.4	20	

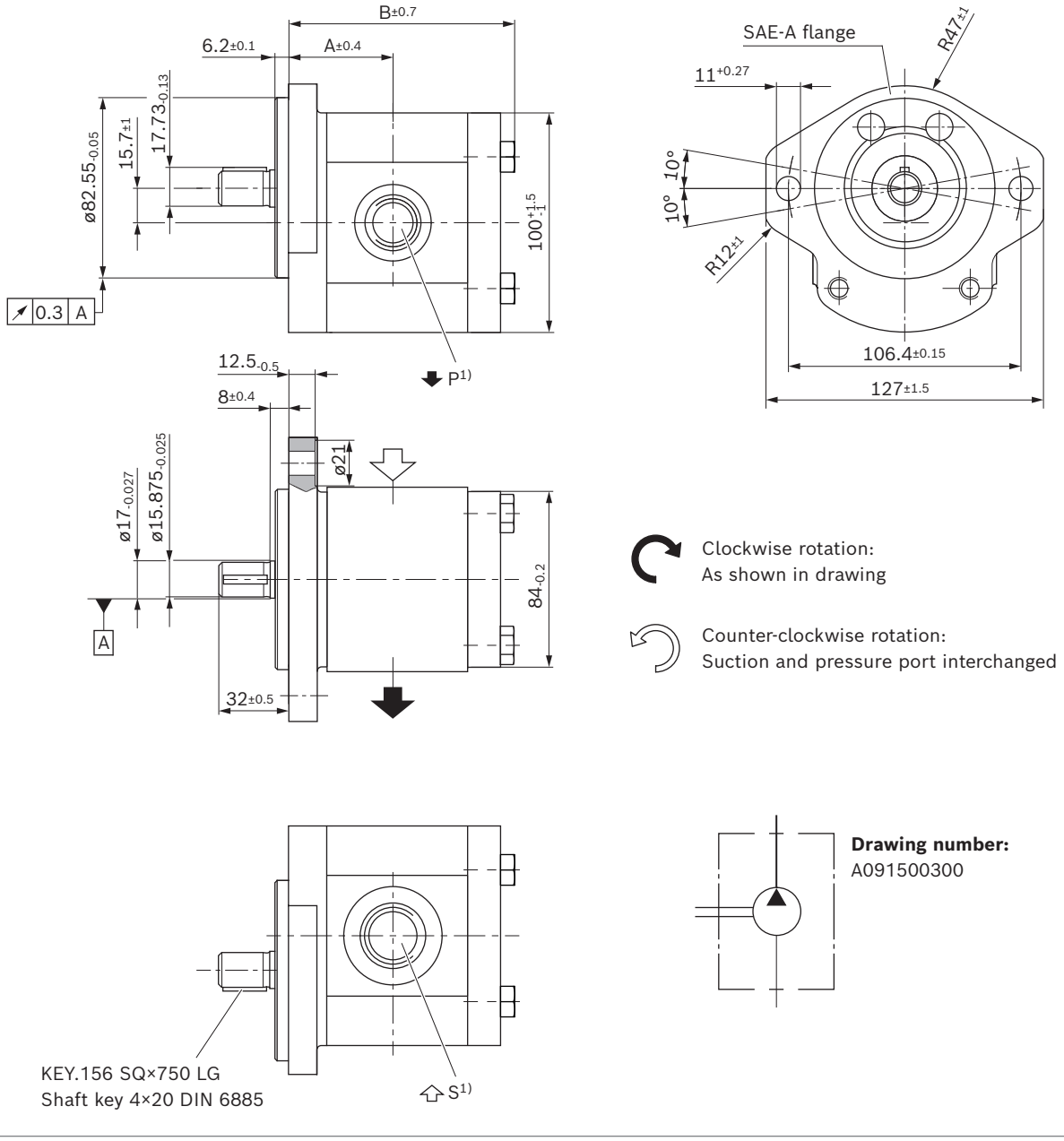
Tapered keyed shaft 1:5 with 2-bolt mounting spigot diameter 50 mm, option 1 (German version)

AZPW–11 – … **CN20**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
4	R983072886	R983072878	210	3500	37.3	75	15	M6; 13+1 deep
5	R983072887	R983072879	210	3500	38.6	77.5	15	
8	R983072888	R983072880	210	3500	40.6	81.6	20	
11	R983072889	R983072881	210	3500	44.5	86.6	20	
14	R983072890	R983072882	210	3000	45	91.6	20	
16	R983072891	R983072883	210	3000	45	95	20	
19	R983072892	R983072884	200	3000	45	100	20	
22	R983072893	R983072885	190	2500	52.6	105.4	20	

Parallel keyed keyed shaft SAE J744 16-1, length 32 mm with 2-bolt flange SAE J744 82-2 (A), spigot diameter 82.55 mm
AZPW–11 – … **QR12**MB

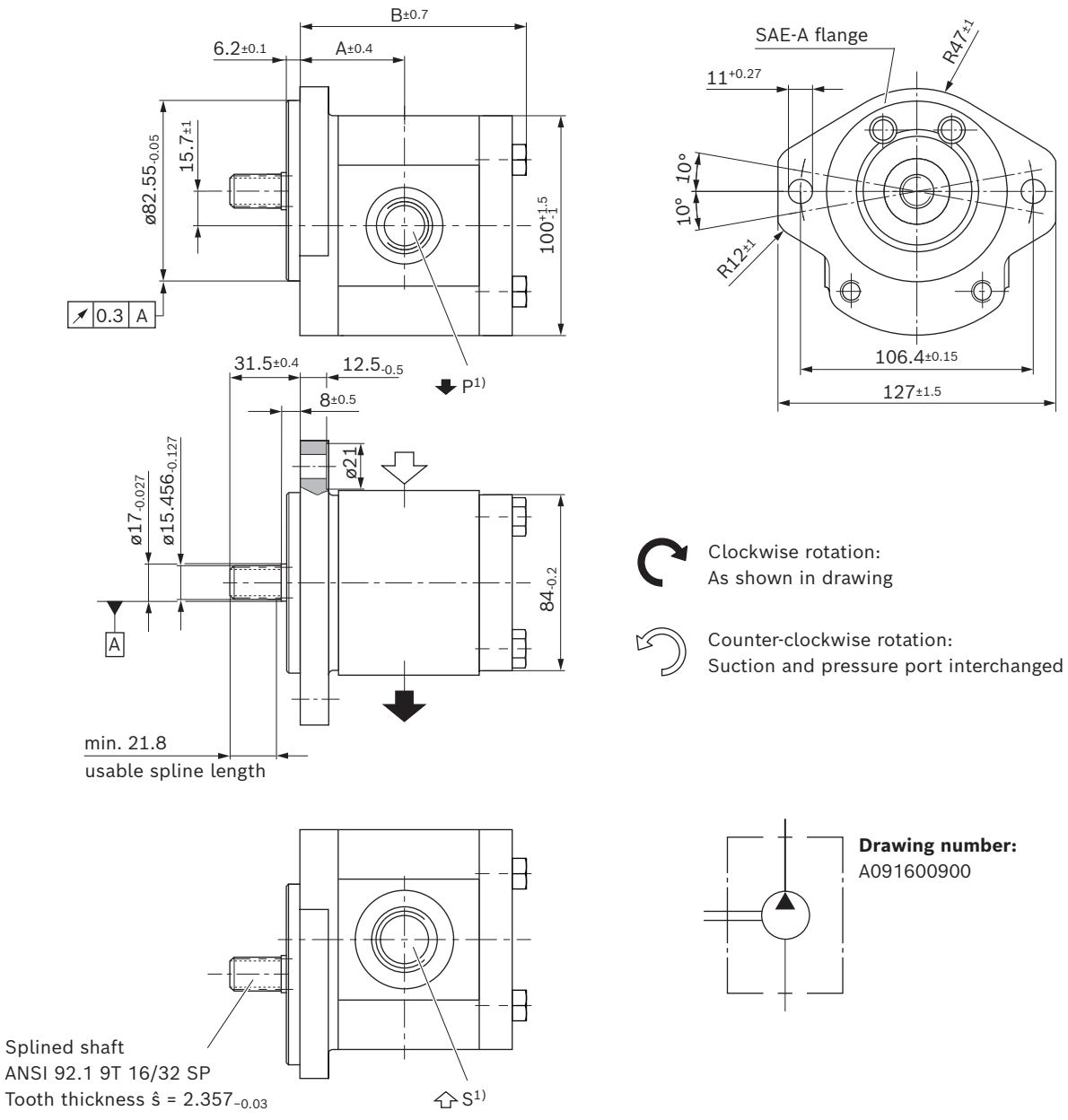


NG	Material number Direction of rotation		Maximum intermittent pressure p_2	Maximum speed n_{max}	Dimensions			
	counter-clockwise	clockwise	[bar]	[rpm]	A	B	P	S
4	R983072763	R983072755	210	3500	39.9	83.8	3/4-16 UN-2B	7/8-14 UN-2B
5	R983072765	R983072756	210	3500	41.1	86.3	3/4-16 UN-2B	7/8-14 UN-2B
8	R983072766	R983072757	210	3500	43.2	90.4	7/8-14 UN-2B	1 1/16-12 UN-2B
11	R983072767	R983072758	210	3500	47	95.4	7/8-14 UN-2B	1 1/16-12 UN-2B
14	R983072768	R983072759	210	3000	47.5	100.4	7/8-14 UN-2B	1 1/16-12 UN-2B
16	R983072769	R983072760	190	3000	47.5	103.8	7/8-14 UN-2B	1 5/16-12 UN-2B
19	R983072770	R983072761	165	3000	47.5	108.8	7/8-14 UN-2B	1 5/16-12 UN-2B
22	R983072772	R983072762	140	2500	55.1	114.2	7/8-14 UN-2B	1 5/16-12 UN-2B

1) For dimension please see chapter “Port connections” on page 23

Splined shaft SAE J744 16-4 9T with 2-bolt flange SAE J744 82-2 (A), spigot diameter 82.55 mm

AZPW–11 – ... **RR12**MB

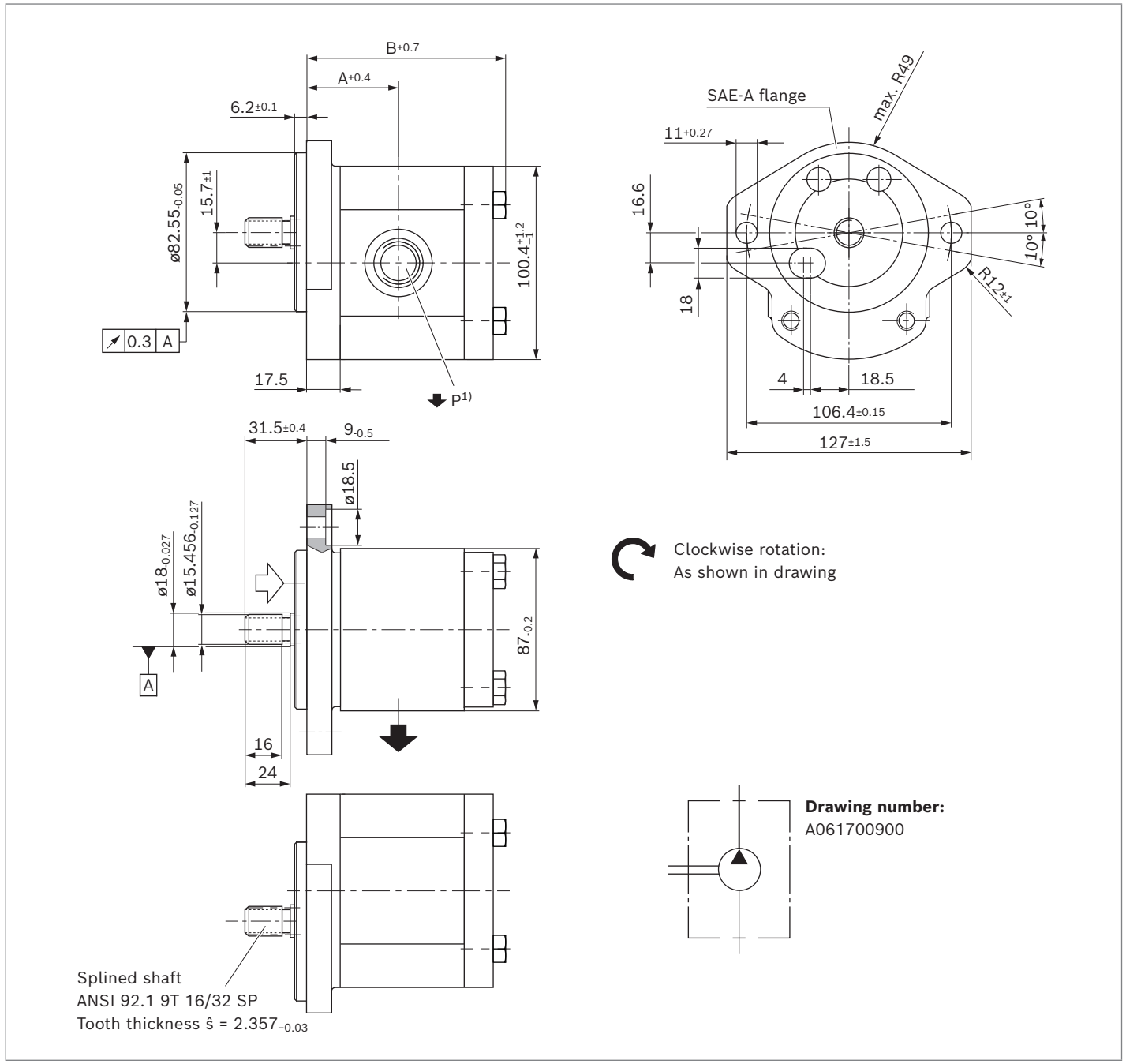


NG	Material number Direction of rotation		Maximum intermittent pressure p_2	Maximum speed n_{max}	Dimensions			
	counter-clockwise	clockwise	[bar]	[rpm]	A	B	P	S
4	R983075416	R983075404	210	3500	39.9	83.8	3/4-16 UN-2B	7/8-14 UN-2B
5	R983075417	R983075405	210	3500	41.1	86.3	3/4-16 UN-2B	7/8-14 UN-2B
8	R983075418	R983075406	210	3500	43.2	90.4	7/8-14 UN-2B	1 1/16-12 UN-2B
11	R983075419	R983075409	210	3500	47	95.4	7/8-14 UN-2B	1 1/16-12 UN-2B
14	R983075420	R983075412	210	3000	47.5	100.4	7/8-14 UN-2B	1 1/16-12 UN-2B
16	R983075421	R983075413	210	3000	47.5	103.8	7/8-14 UN-2B	1 5/16-12 UN-2B
19	R983075422	R983075414	200	3000	47.5	108.8	7/8-14 UN-2B	1 5/16-12 UN-2B
22	R983075423	R983075415	190	2500	55.1	114.2	7/8-14 UN-2B	1 5/16-12 UN-2B

1) For dimension please see chapter “Port connections” on page 23

Splined shaft SAE J744 16-4 9T with 2-bolt flange SAE J744 82-2 (A) spigot diameter 82.55 mm for mounting on an axial piston unit and suction port in the front cover

AZPW–11 – ... **RR12**PB-S0036

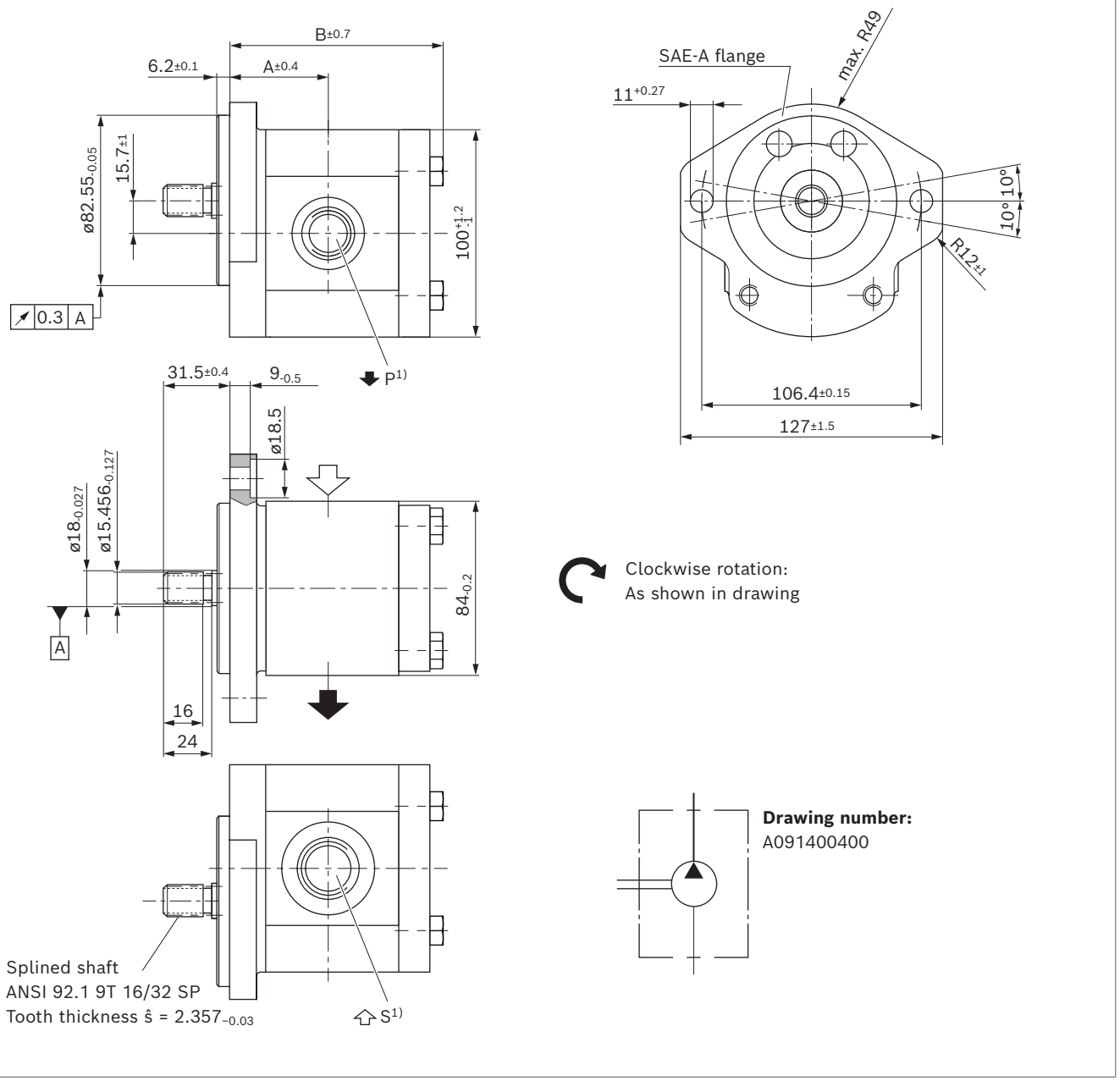


NG	Material number Direction of rotation clockwise	Maximum intermittent pressure p_2 [bar]	Maximum speed n_{max} [rpm]	Dimensions A	 B	 P
5	R983074188	210	3500	41.2	86.3	3/4-16 UN-2B
8	R983067892	210	3500	43.2	90.4	7/8-14 UN-2B
11	R983074189	210	3500	45.6	95.4	7/8-14 UN-2B
14	R983070537	210	3000	48.4	100.4	7/8-14 UN-2B
16	R983074190	210	3000	49.9	103.8	7/8-14 UN-2B
19	R983064536	200	2900	53.9	108.8	7/8-14 UN-2B
22	R983074191	190	2400	55	114.2	7/8-14 UN-2B

1) For dimension please see chapter “Port connections” on page 23

Splined shaft SAE J744 16-4 9T with 2-bolt flange SAE J744 82-2 (A), spigot diameter 82.55 mm for mounting on an axial piston unit

AZPW–11 – ... **RR12**PB-S0081

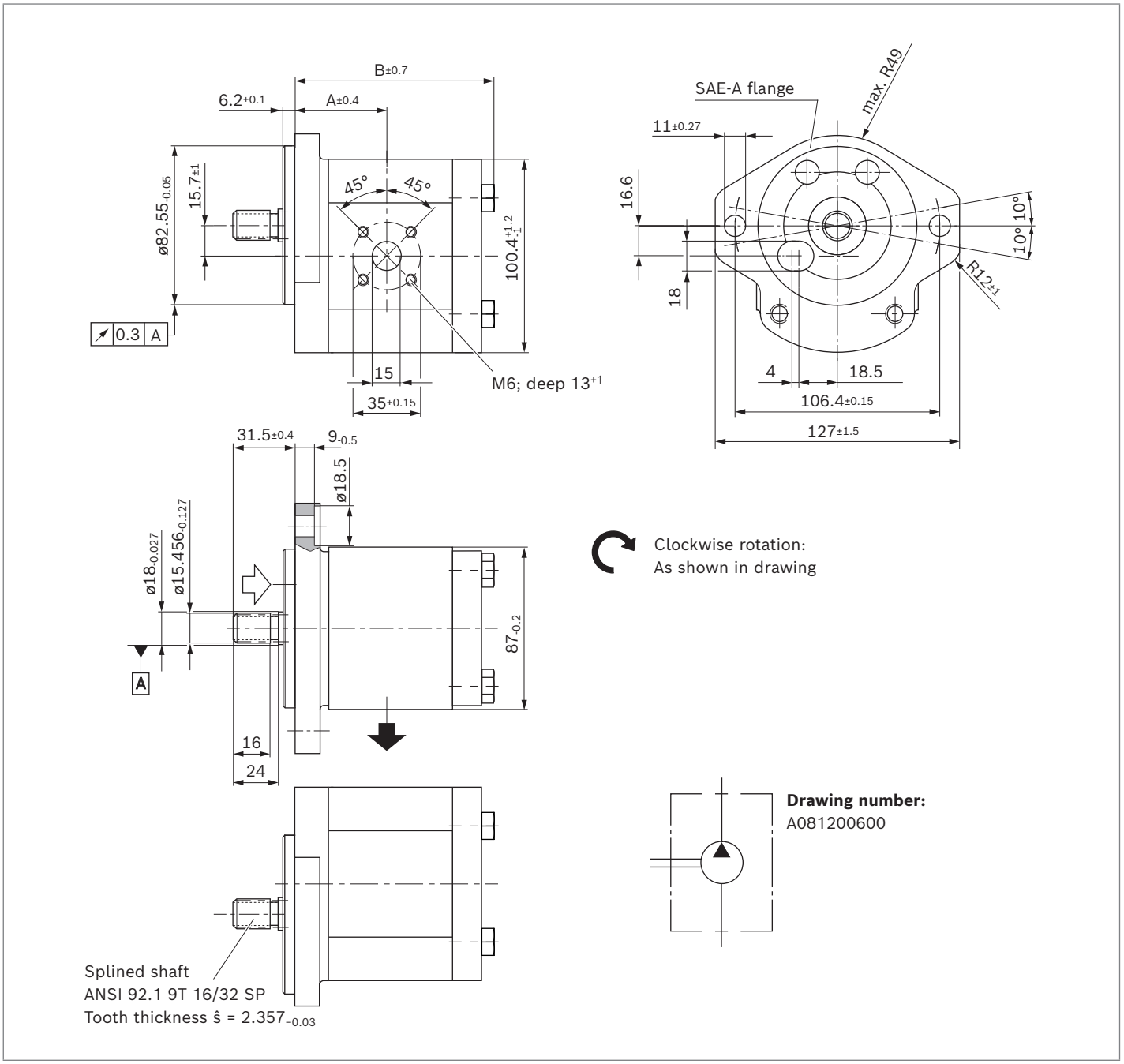


NG	Material number Direction of rotation clockwise	Maximum intermittent pressure p_2 [bar]	Maximum speed n_{max} [rpm]	Dimensions A	 B	 P	 S
5	R983072871	210	3500	41.1	86.4	3/4-16 UN-2B	7/8-14 UN-2B
8	R983072872	210	3500	43.2	90.5	7/8-14 UN-2B	1 1/16-12 UN-2B
11	R983072873	210	3500	45.7	95.5	7/8-14 UN-2B	1 1/16-12 UN-2B
14	R983072874	210	3000	48.2	100.5	7/8-14 UN-2B	1 1/16-12 UN-2B
16	R983072875	210	3000	49.9	103.9	7/8-14 UN-2B	1 5/16-12 UN-2B
19	R983072876	200	3000	52.4	108.9	7/8-14 UN-2B	1 5/16-12 UN-2B
22	R983072877	190	2500	55.1	114.3	7/8-14 UN-2B	1 5/16-12 UN-2B

1) For dimension please see chapter “Port connections” on page 23

Splined shaft SAE J744 16-4 9T with 2-bolt flange SAE J744 82-2 (A), spigot diameter 82.55 mm (German version) for mounting on an axial piston unit and suction port in the front cover

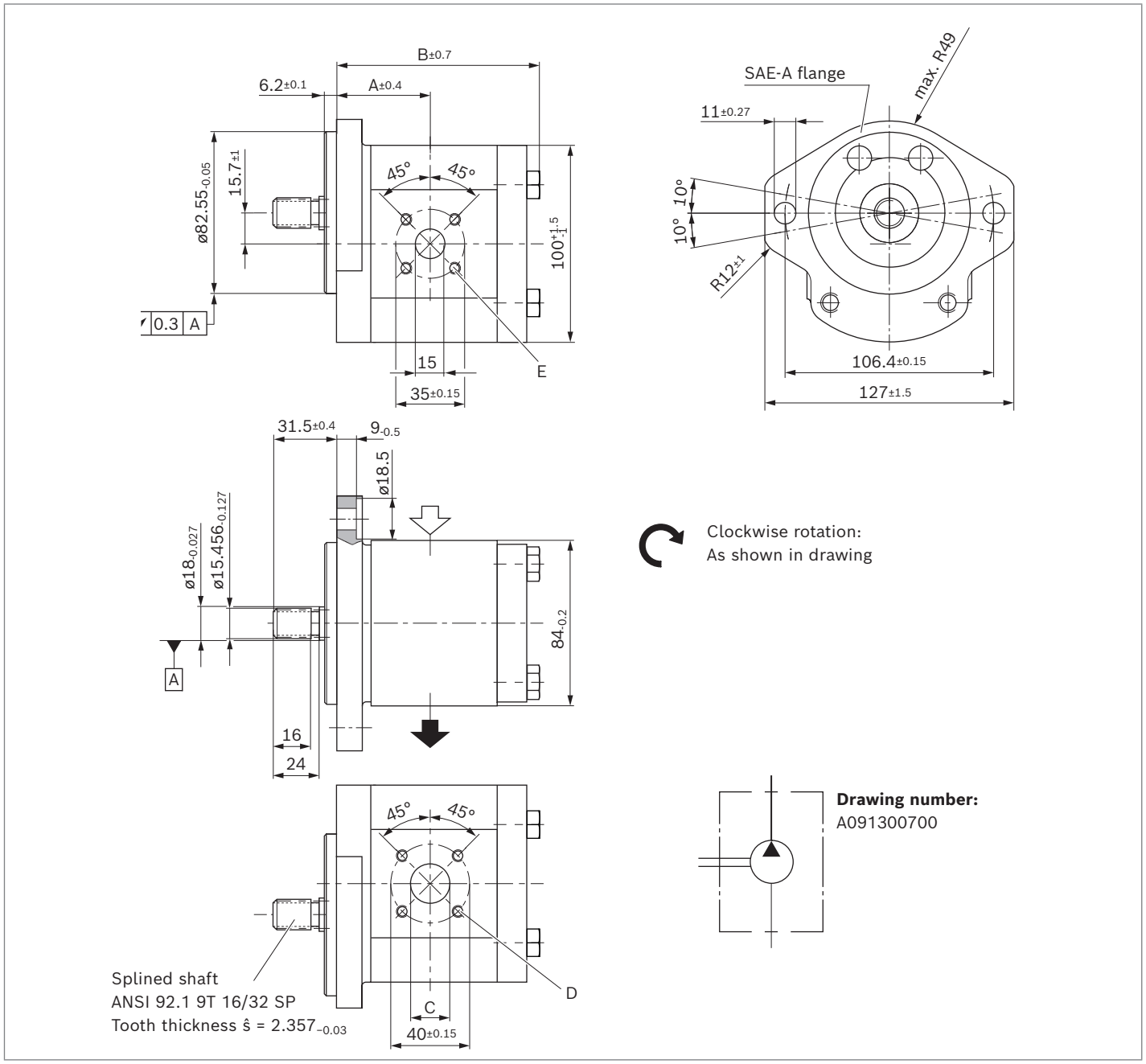
AZPW–11 – ... **RR20**PB-S0036



NG	Material number Direction of rotation clockwise	Maximum intermittent pressure p_2 [bar]	Maximum speed n_{max} [rpm]	Dimensions A	 B
5	R983072894	210	3500	41.1	86.3
8	R983072895	210	3500	43.2	90.4
11	R983072896	210	3500	47	95.4
14	R983072897	210	3500	47.5	100.4
16	R983072898	210	3500	47.5	103.8
19	R983072899	200	2900	47.5	108.8
22	R983072900	190	2400	55.1	114.2

Splined shaft SAE J744 16-4 9T with 2-bolt flange spigot diameter 82.55 mm SAE J744 82-2 (A) (German version) for mounting on an axial piston unit

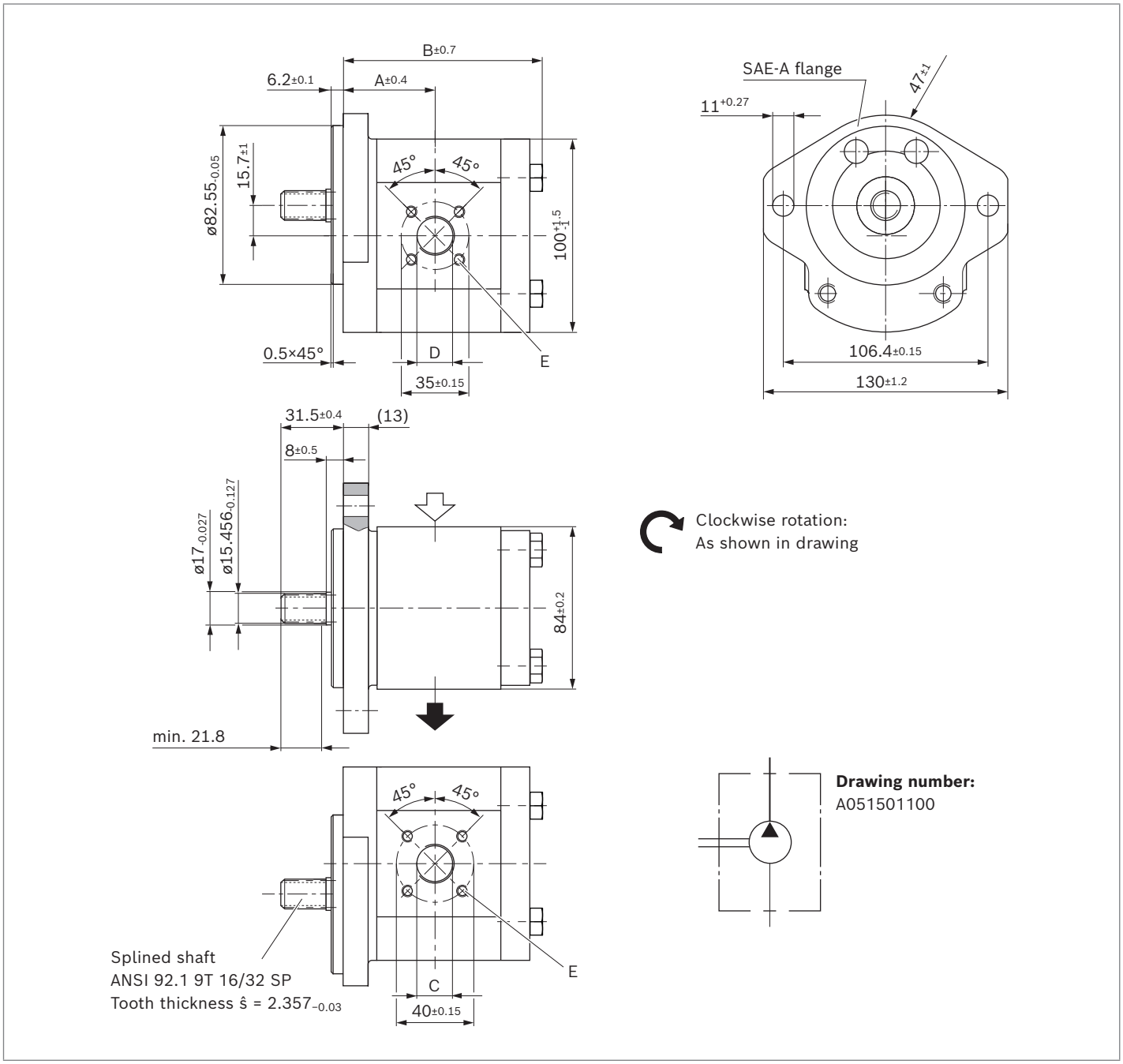
AZPW–11 – ... **RR20**PB-S0081



NG	Material number Direction of rotation clockwise	Maximum intermittent pressure p_2 [bar]	Maximum speed n_{max} [rpm]	Dimensions A	 B	 C	 D	 E
5	R983077585	210	3500	41.1	86.3	15	M6; 13+1 deep	M6; 13+1 deep
8	R983077586	210	3500	43.2	90.4	20		
11	R983077587	210	3500	47	95.4	20		
14	R983077588	210	3500	47.5	100.4	20		
16	R983077589	210	3500	47.5	103.8	20		
19	R983077590	200	3300	47.5	108.8	20	M8; 13+1 deep	
22	R983077591	190	3200	55.1	114.2	20		

Splined shaft SAE J744 16-4 9T with 2-bolt flange SAE J744 82-2 (A) spigot diameter 82.55 mm for mounting on an axial piston unit and line connections in Non-standard version

AZPW–21 – ... **RRXX**MB-S0593



NG	Material number Direction of rotation clockwise	Maximum intermittent pressure p_2 [bar]	Maximum speed n_{max} [rpm]	Dimensions A	B	C	D	E
4	R983035496	210	3500	39.9	84.7	3/8; 15 deep	3/8; 15 deep	M6; min. 13 deep
5	R983035497	210	3500	41.1	87.3	3/8; 15 deep	3/8; 15 deep	
8	R983035498	210	3500	43.2	91.4	1/2; 15 deep	1/2; 15 deep	
11	R983035499	210	3500	47	95.7	1/2; 19 deep	1/2; 15 deep	
14	R983035500	210	3500	47.5	101.4	3/4; 19 deep	1/2; 15 deep	
16	R983035501	210	3500	47.5	104.8	3/4; 19 deep	1/2; 15 deep	
19	R983035502	200	3300	47.5	109.8	3/4; 19 deep	1/2; 15 deep	
22	R983035503	190	3200	55.1	115.2	3/4; 19 deep	1/2; 15 deep	

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

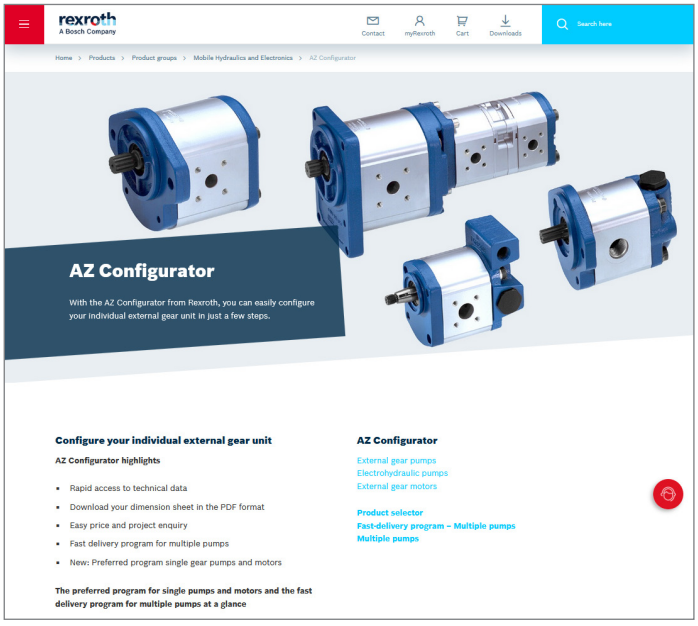
Installation drawings and dimensions are valid at date of publication, subject to modifications.
Further information and notes on project planning can be found in the “General instruction manual for external gear units”: www.boschrexroth.com/07012-B, chapter 5.5.

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

Information

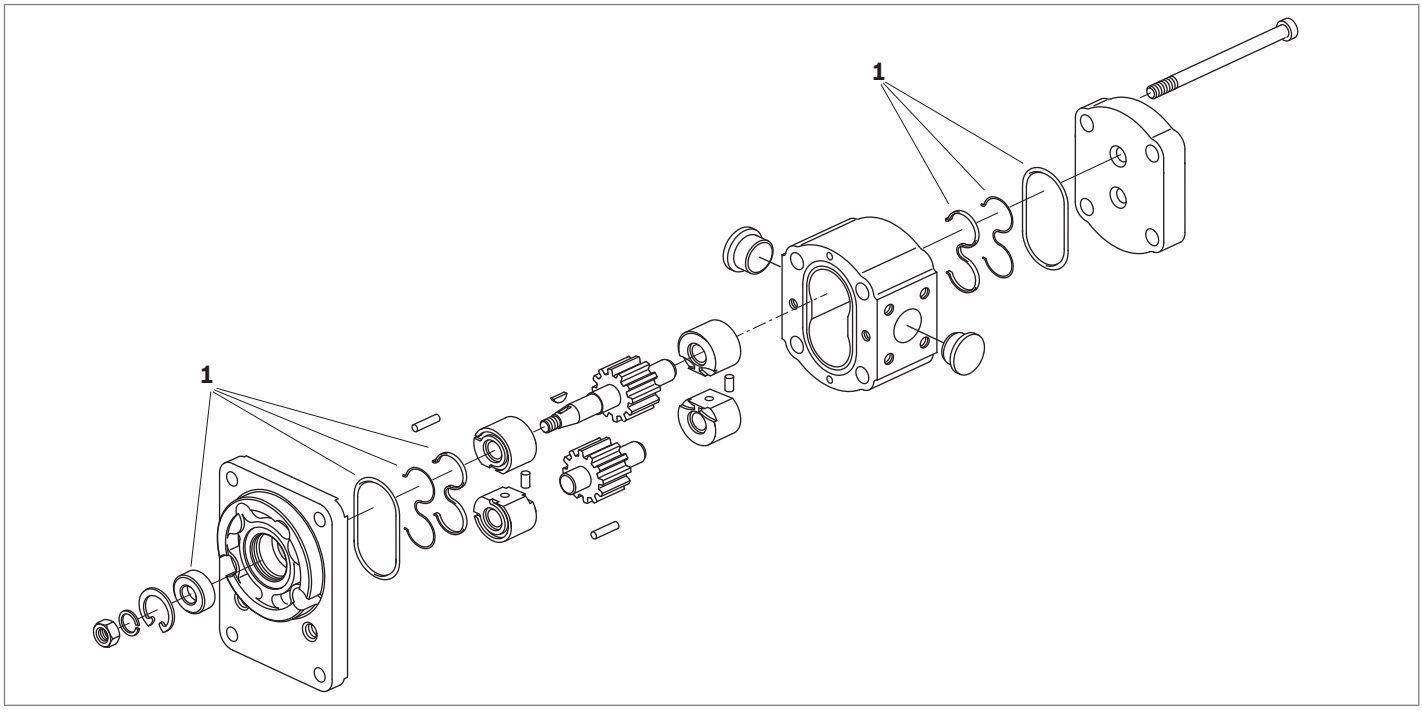
AZ configurator

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



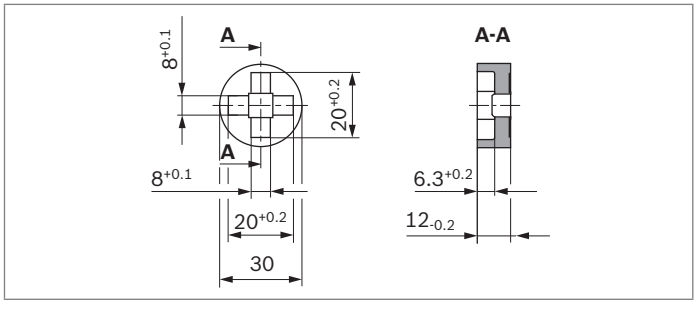
Spare parts

▼ Schematic diagram

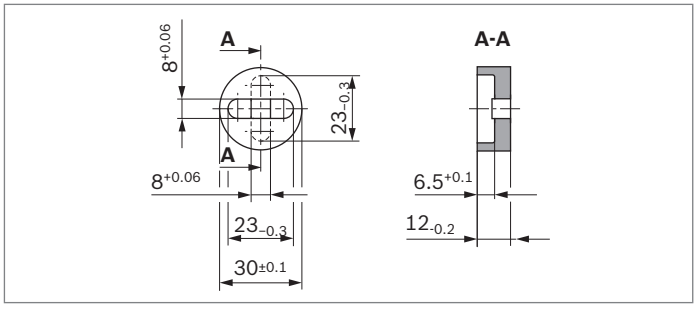


Item	Designation	Material number	Material	AZPW–XX – …								
				CB…	FB…	HO…	NT…	CP…	CN…	QR…	RR12	RR20
1	Seal kit	R983032388	NBR	x	x	x	x	x	x	x	x	
		R983069216	FKM								x	x

▼ Driver for sizes 4 to 11



▼ Driver for sizes 14 to 25



Designation	Material number EU	Material number APA / US
Driver for sizes 4 to 11	1 510 240 009	R 002 G11 025
Driver for sizes 14 to 25	1 510 240 011	F 000 511 445

Notice
Spare parts can be found online at
www.boschrexroth.com/spc

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