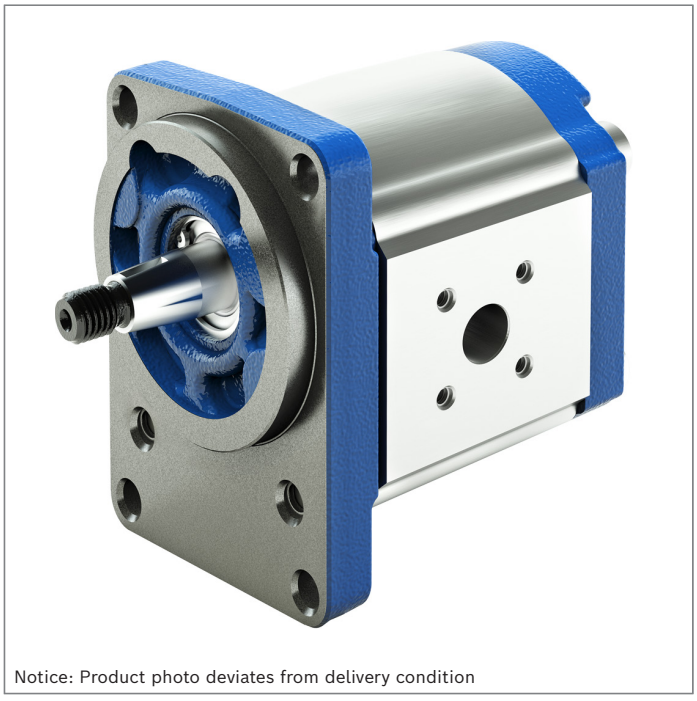
RE 10089/2024-06-14
Replaces: 2021-11-24

rexroth
A Bosch Company

External gear pump High Performance AZPF



Notice: Product photo deviates from delivery condition

- Platform F
- Fixed displacement
- Nominal size 4 to 28
- Continuous pressure up to 250 bar
- Intermittent pressure up to 280 bar

Features

- Consistently 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.

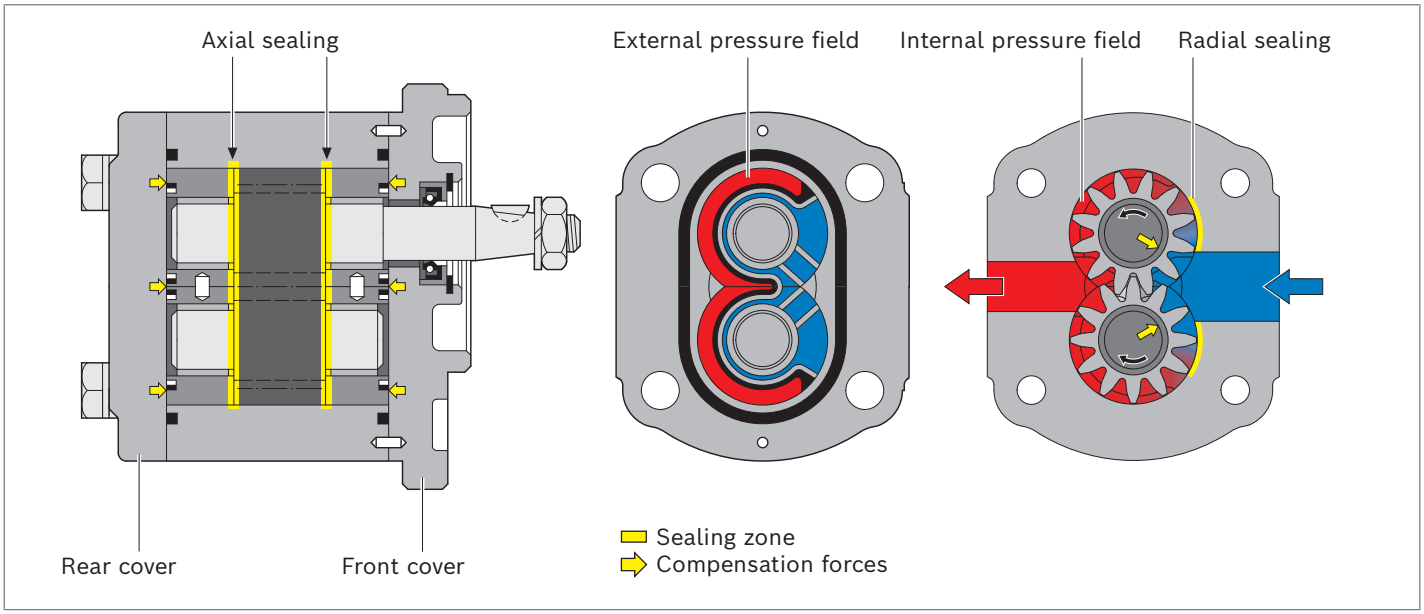
Pumping principle

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.

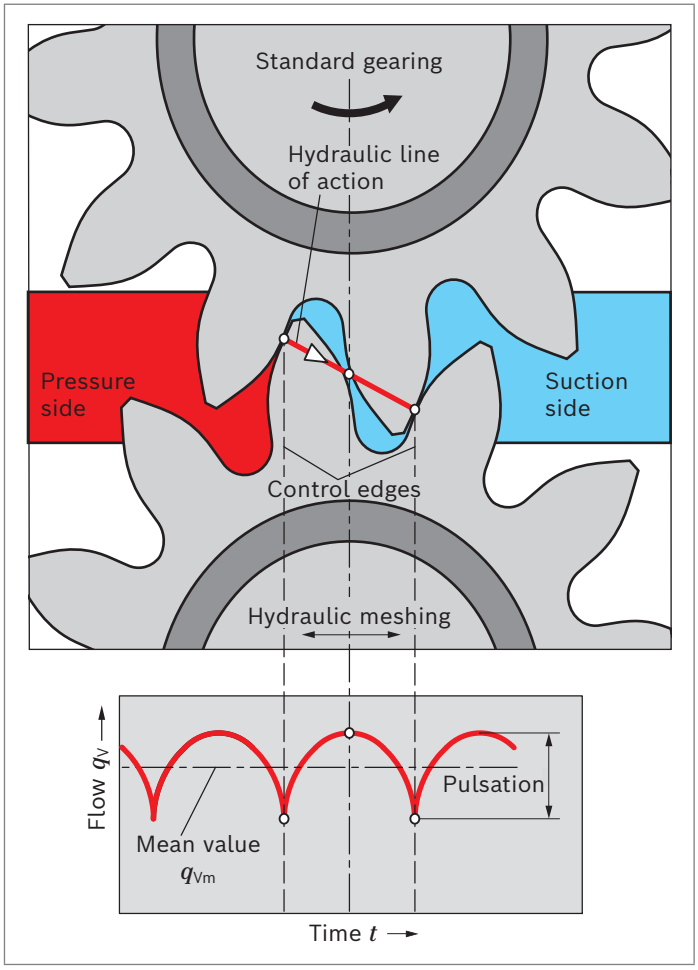
Construction

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.

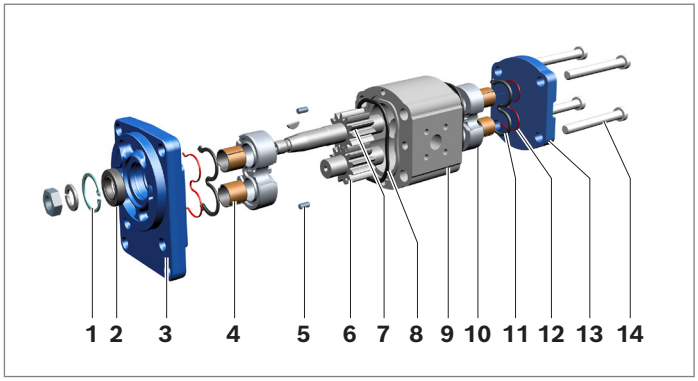
▼ **Axial and radial sealing of gear chambers**



▼ Pumping principle of High Performance pump



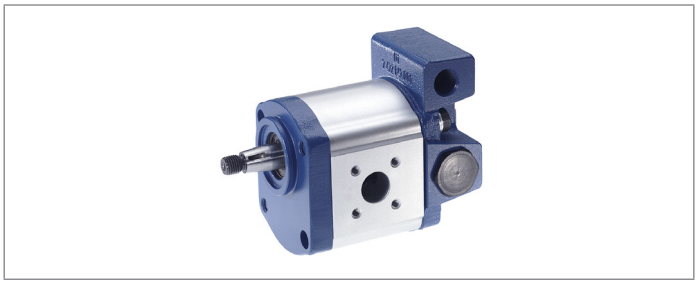
▼ Principle design of external gear pump



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

Gear pumps with integrated valves

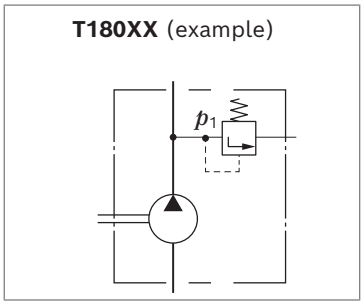
In order to reduce piping complexity, a flow control valve or pressure-relief valve can be integrated in the rear cover of the gear pump. Such solutions are used, for instance, for the hydraulic oil supply of power steering systems. The pump delivers a constant flow or maximum pressure irrespective of the rotational speed. The residual flow is either returned internally to the suction port or distributed externally to other consumers.



Pressure relief valve, with external residual flow

p_1 = 5 to 250 bar

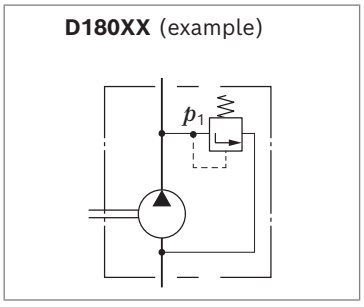
T180XX (example)



Pressure relief valve, with internal residual flow

p_1 = 5 to 250 bar

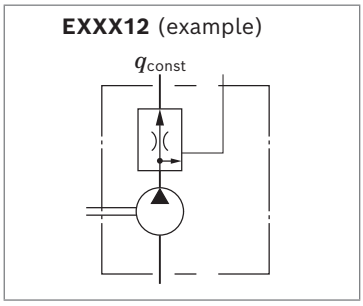
D180XX (example)



Flow control valve, with external residual flow

q_{const} = 2 to 30 l/min

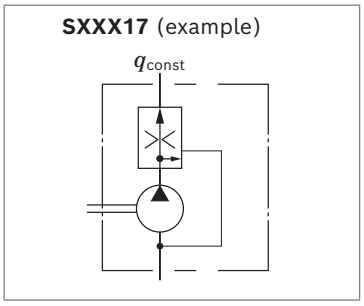
EXXX12 (example)



Flow control valve, with internal residual flow

q_{const} = 2 to 30 l/min

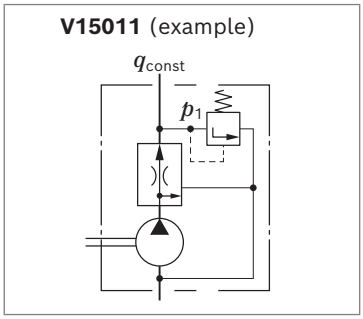
SXXX17 (example)



Flow control valve with pressure relief valve, with internal residual flow

q_{const} = 2 to 30 l/min; p_1 = 100 to 180 bar

V15011 (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 and 30 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 solo pump

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

Product

01	External gear unit	**AZ**

Function

02	Pump	**P**

Model

03	High Performance, platform F (4 ... 28 cm³/rev)	**F**

Series

04	Bearing diameter 18 mm	**1**
	Bearing diameter 20 mm	**2**

Version

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

Nominal size (NG)

06	Geometric displacement V_g [cm³/rev], see “Technical data”	**004**	**005**	**008**	**011**	**014**	**016**	**019**	**022**	**025**	**028**

Direction of rotation

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

Drive shaft			**Typical front cover**	
08	Tapered keyed shaft	1 : 5	B, P, N	**C**
		1 : 5	A, G	**S**
		1 : 8	O	**H**
	Tang drive		M, L, T	**N**
	Splined shaft	B17 × 14 according to DIN 5482	B, P, N, O	**F**
		SAE J744 16-4 9T	R, C	**R**
		SAE J744 19-4 11T, length 38 mm	R, C	**P**
	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**

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

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

Front cover

09	Rectangular flange	spigot diameter 80 mm		**B**
		spigot diameter 36.47 mm	M8	**O**
	2-bolt flange	spigot diameter 82.55 mm	SAE J744 82-2 (A)	**R**
		spigot diameter 101.6 mm	SAE J744 101-2 (B)	**C**
	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**
	Outrigger bearing	spigot diameter 80 mm	type 1	**A**
		spigot diameter 80 mm	type 2	**G**

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

Rear cover

12	Standard (cast iron)		**B**
	Pressure relief valve	with internal residual flow	**D**
		with external residual flow	**T**
	Flow control valve	with internal residual flow	**S**
		with external residual flow	**E**
	Flow control valve and pressure relief valve	with internal residual flow	**V**

Valve settings

13	Flow in l/min, 2-digit, e.g. 9 l/min	**XXX09**
	Cracking pressure in bar, 3-digit, e.g. 180 bar	**180XX**
	Cracking pressure in bar, 3-digit, e.g. 180 bar and flow in l/min, 2-digit, e.g. 9 l/min	**18009**

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 (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. triple pump AZPJ + AZPJ + AZPB: AZP**JJB**
2) A numerical value is to be selected for each pump stage, e.g. triple pump **028/016/2.0**
3) A numerical value is to be selected for each pump stage, e.g. triple 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 4-fold pump:

AZPG...032... + AZPG...022... + AZPJ...016...+ AZPJ...012...

01	02	03		04	05		06	07	08	09	10	11	12
AZ	**P**	**GGJJ**	**–**	**2**	**2**	**–**	**032/022/016/012**	**R**	**C**	**B**	**20202020**	**K**	**B**

Technical data

Operating conditions

Nominal size					**4**	**5**	**8**	**11**	**14**	**16**
Series					1x					
Displacement, geometric, per revolution			V_g	cm^3	4	5.5	8	11	14	16
Pressure at suction port **S**[1]		absolute	p_e	bar	0.7 ... 3					
Maximum continuous pressure			p_1	bar	250	250	250	250	250	250
Maximum intermittent pressure[2]			p_2	bar	280	280	280	280	280	280
Maximum pressure peaks			p_3	bar	300	300	300	300	300	300
Minimum rotational speed at	ν =12 mm^2/s	p < 100 bar	n_{min}	rpm	600	500	500	500	500	500
		p = 100 ... 180 bar	n_{min}	rpm	1200	1200	1000	1000	800	800
		p = 180 bar ... p_2	n_{min}	rpm	1400	1400	1400	1200	1000	1000
	ν =25 mm^2/s	at p_2	n_{min}	rpm	700	700	700	600	500	500
Maximum rotational speed		at p_2	n_{max}	rpm	4000	4000	4000	3500	3000	3000

Nominal size					**19**	**22**	**25**	**28**
Series					2x			
Displacement, geometric, per revolution			V_g	cm^3	19	22.5	25	28
Pressure at suction port **S**[1]		absolute	p_e	bar	0.7 ... 3			
Maximum continuous pressure			p_1	bar	250	220	195	170
Maximum intermittent pressure[2]			p_2	bar	280	250	225	200
Maximum pressure peaks			p_3	bar	300	290	265	240
Minimum rotational speed at	ν =12 mm^2/s	p < 100 bar	n_{min}	rpm	500	500	500	500
		p = 100 ... 180 bar	n_{min}	rpm	800	800	800	800
		p = 180 bar ... p_2	n_{min}	rpm	1000	1000	1000	1000
	ν =25 mm^2/s	at p_2	n_{min}	rpm	500	500	500	500
Maximum rotational speed		at p_2	n_{max}	rpm	3500	3500	3000	3000

Rotary stiffness of drive shaft

Drive shaft			**C**	**S**	**H**	**N**	**R**	**P**	**F**	**Q**	**K**	**A**
Rotary stiffness	c	Nm/rad	246	352	287	312	251	370	292	268	383	349

General technical data

Weight	m	kg	See chapter “Dimensions”
Installation position			No restrictions
Mounting type			Flange or through-bolting with spigot
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)
			-20 ... +110 with FKM seals (FKM = fluorocarbon rubber)

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

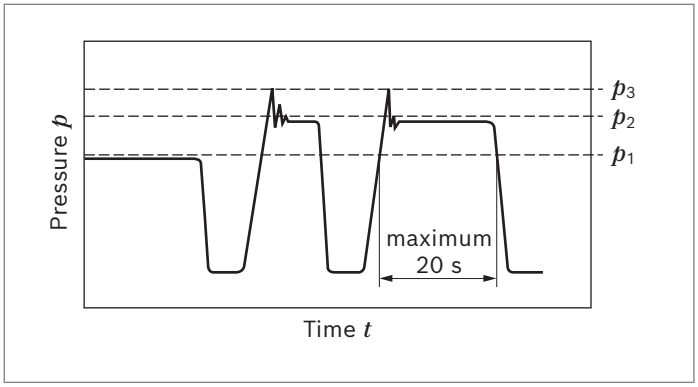
1) In the case of tandem pumps, the suction-side pressure difference between the individual pump stages must not exceed 0.5 bar.

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

Notice

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

▼ Pressure definition

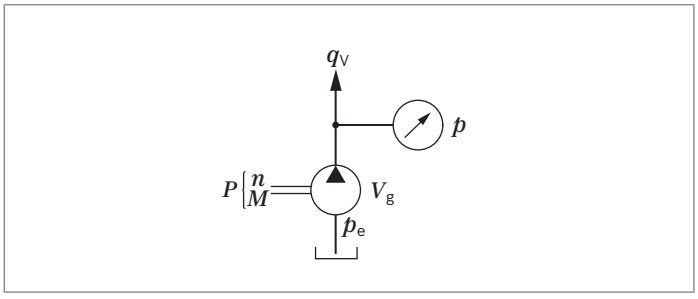


p_1: Maximum continuous pressure
p_2: Maximum intermittent pressure
p_3: Maximum pressure peaks

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 [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 ($\eta_t = \eta_v \times \eta_{hm}$)



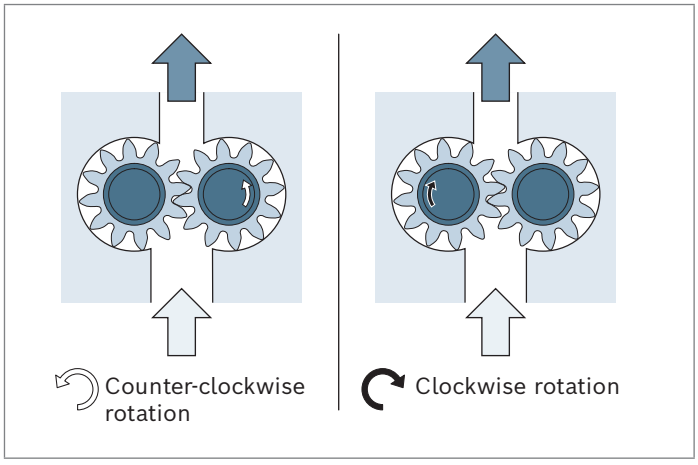
Notice

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:

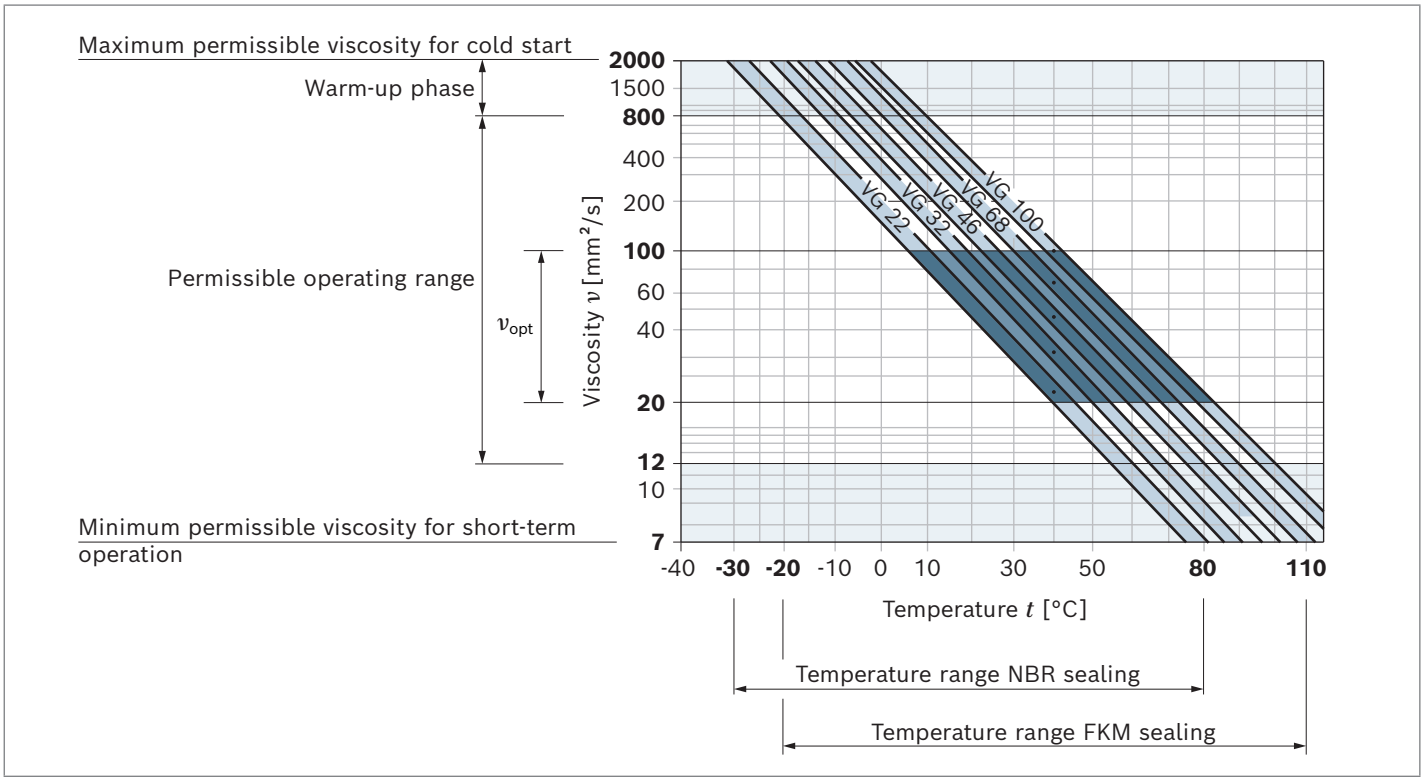
- 90245: Bosch Rexroth Fluid Rating List for Rexroth hydraulic components (pumps and motors)

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 = -20 °C ... +110 °C

▼ **Selection diagram**

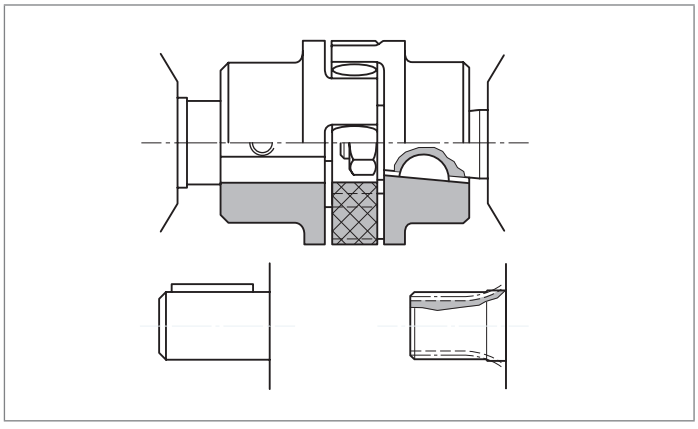


Observe the instructions for the filtration of the hydraulic fluid (see chapter “Project planning information”).

Drive

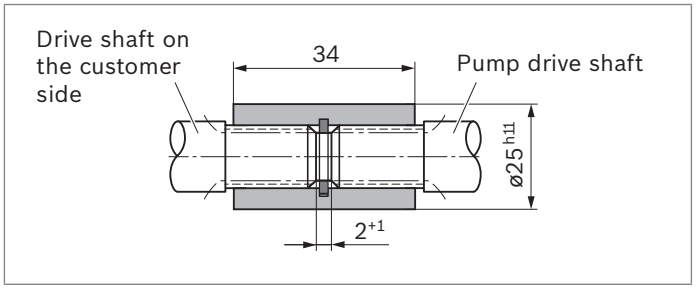
Elastic couplings

- 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

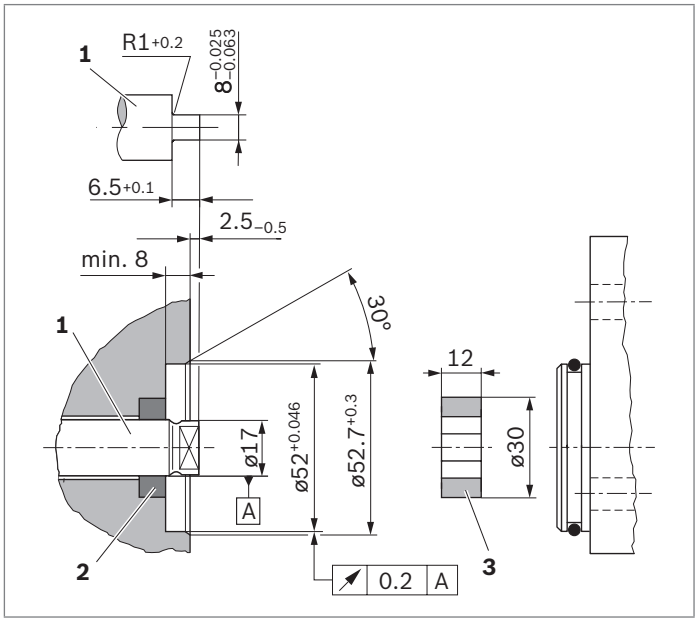
- To be used for splined shaft profile according to DIN and SAE.
- Attention: Make sure no radial or axial forces act on the pump drive shaft or coupling sleeve. The coupling sleeve should freely move in the axial direction.
- The distance between the pump drive shaft and the output shaft on the customer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



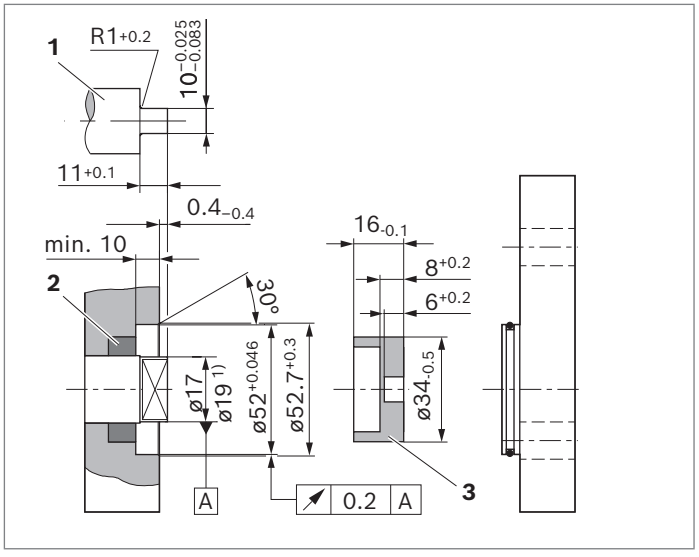
Tang drive coupling

- 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

▼ **AZPF-1x**



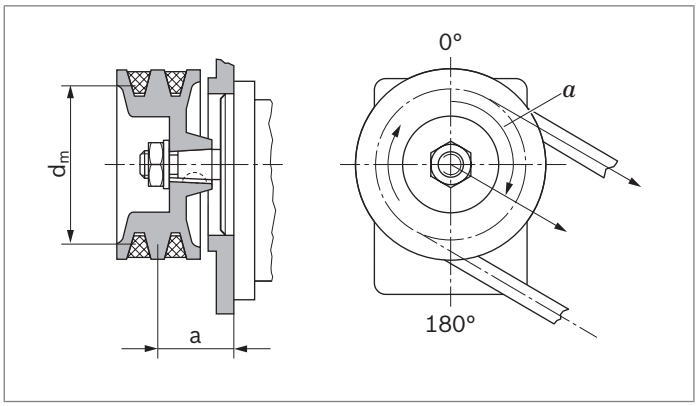
▼ **AZPF-2x**



1) See offer drawing

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

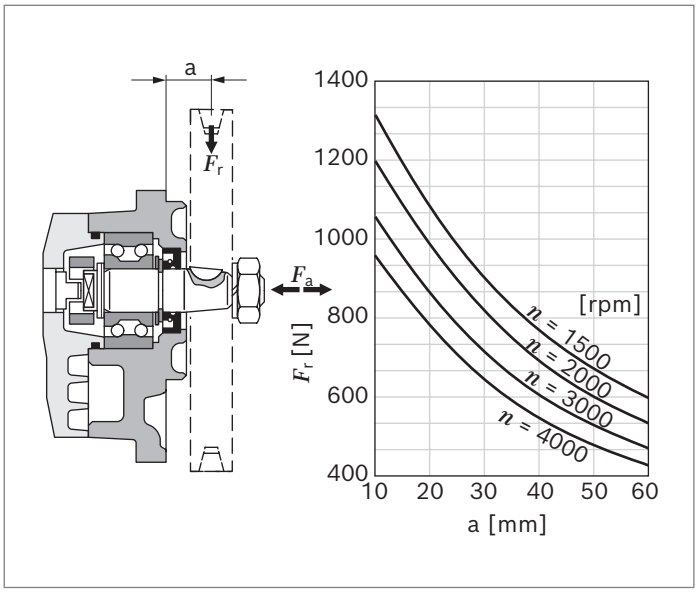
For V-belt or gear wheel drives, please contact us specifying the application and mounting conditions (dimensions a, d_m, d_w and angle α). For helical toothed gear drives, details of the helix angle β are also required.



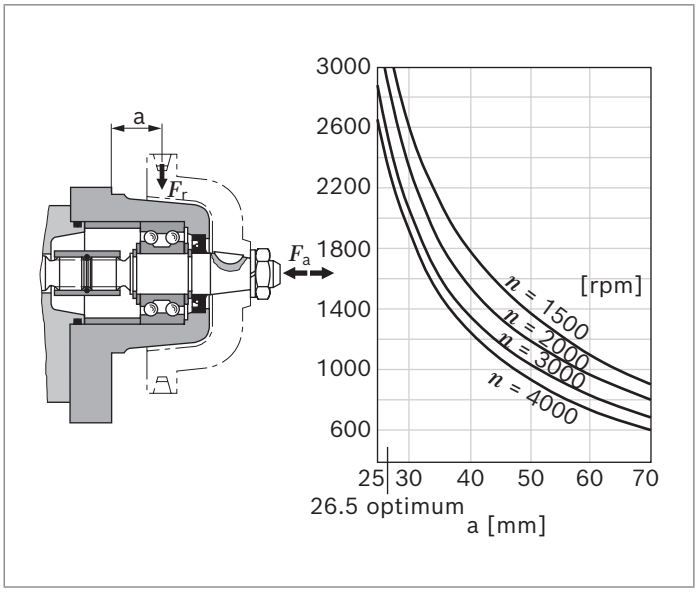
Outrigger bearing

Outrigger bearing are offered to eliminate possible problems when the pumps are driven by V-belts or gear wheels. The diagrams show the radial and axial load capacity in relation to a bearing service life of L_H = 1000 h

▼ **Front cover A (type 1)**



▼ **Front cover G (type 2)**



Maximum transferable drive torques

▼ **Tapered keyed shafts**

Drive shaft code	Designation	M_{max} Nm	Nominal size	$p_{2\,max}$ Series 1x bar	$p_{2\,max}$ Series 2x bar
C	1 : 5	155	4 ... 16	280	–
			19	–	280
			22	–	250
			25	–	225
			28	–	200
H	1 : 8	160	4 ... 16	280	–
			19	–	280
			22	–	250
			25	–	225
			28	–	200

▼ **Tapered keyed shafts with outrigger bearing**

Drive shaft code	Outrigger bearing type (code)	M_{max} Nm	Nominal size	$p_{2\,max}$ Series 1x bar	$p_{2\,max}$ Series 2x bar
S	Type 1 (A) (with tang drive coupling)	65	4 ... 11	280	–
			14	260	–
			16	230	–
			19	–	190
			22	–	160
			25	–	140
			28	–	130
	Type 1 (A) (with sleeve)	160	4 ... 16	280	–
			19	–	280
			22	–	250
			25	–	225
			28	–	200
	Type 2 (G)		4 ... 16	280	–
			19	–	280
			22	–	250
			25	–	225
			28	–	200

▼ **Tang drive**

Drive shaft code	Designation	M_{max} Nm	Nominal size	$p_{2\,max}$ Series 1x bar	$p_{2\,max}$ Series 2x bar
N	Tang drive	65	4 ... 11	280	–
			14	260	–
			16	220	–
		85	19	–	250
			22	–	210
			25	–	190
			28	–	170

▼ **Splined shafts**

Drive shaft code	Designation	M_{max} Nm	Nominal size	$p_{2\,max}$ Series 1x bar	$p_{2\,max}$ Series 2x bar
F	DIN 5482 B17 × 14	100	4 ... 16	280	–
			19	–	280
			22	–	250
			25	–	225
			28	–	200
R	SAE J744 16-4 9T	110	4 ... 16	280	–
			19	–	280
			22	–	250
			25	–	225
			28	–	200
P	SAE J744 19-4 11T	180	4 ... 16	280	–
			19	–	280
			22	–	250
			25	–	225
			28	–	200

▼ **Parallel keyed shafts**

Drive shaft code	Designation	M_{max} Nm	Nominal size	$p_{2\,max}$ Series 1x bar	$p_{2\,max}$ Series 2x bar
A	ISO diameter 18 mm	140	4 ... 14	280	–
			16	280	–
			19	–	280
			22	–	250
			25	–	225
			28	–	200
K	SAE J744 19-1, length 32 mm	140	4 ... 14	280	–
			16	280	–
			19	–	280
			22	–	250
			25	–	225
			28	–	200
Q	SAE J744 16-1, length 32 mm	80	4 ... 11	280	–
			14	280	–
			16	280	–
			19	–	230
			22	–	200
			25	–	180
			28	–	160

Multiple gear pumps

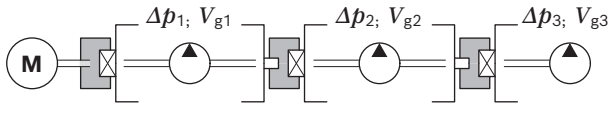
Gear pumps are well-suited to multiple arrangements, whereby the drive shaft of the first pump stage is extended to a second and possibly third pump stage. The shaft of the individual pump sections are normally connected via a driver or via a splined coupling (reinforced through drive). The individual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

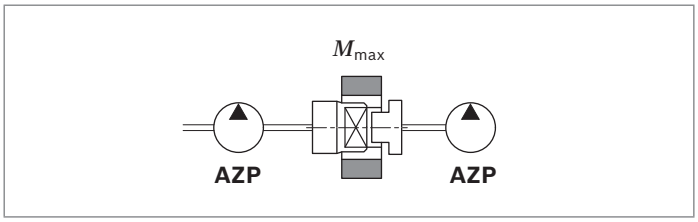


$$\frac{\Delta p_1 \times V_{g1} + \Delta p_2 \times V_{g2} + \Delta p_3 \times V_{g3}}{18 \times \pi} \leq M_{max}\ ^{1)} \qquad \begin{matrix} \Delta p \text{ [bar]} \\ V_g \text{ [cm}^3\text{]} \end{matrix}$$

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

Standard through drive (tang drive coupling)

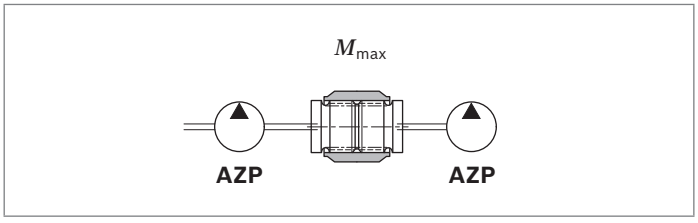
For AZPF pumps, the driver for the next pump stage can support loads of up to M_{max} = 65 Nm (AZPF-1x) resp. M_{max} = 85 Nm (AZPF-2x). This may result in pressure limitations for subsequent pump stages.
Subsequent pumps of a smaller series determine the maximum transmissible torque.



Following pump		M_{max} [Nm]
Platform F	AZPW	52
	AZPF-1x	65
	AZPF-2x	85
	AZPS-1x	65
	AZPS-2x	85
	AZPJ	65
Platform B	AZPB-3x	25

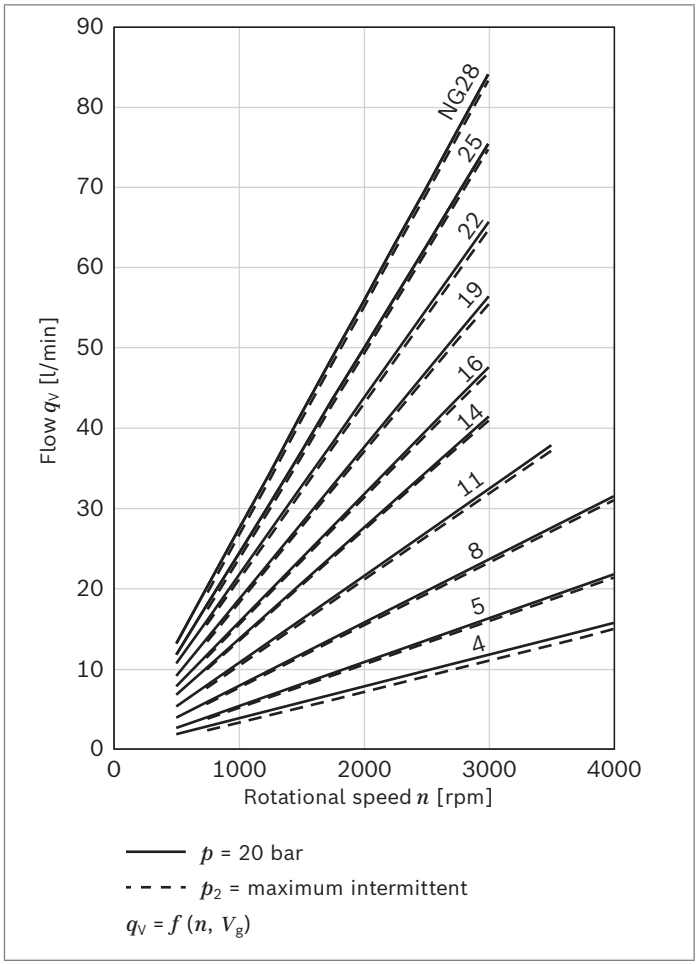
Reinforced through drive

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

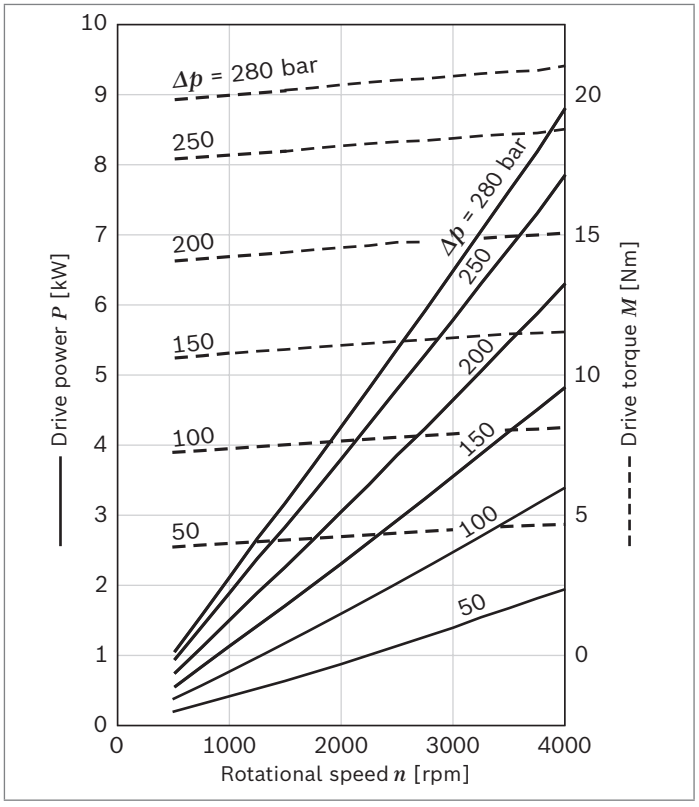


Notice

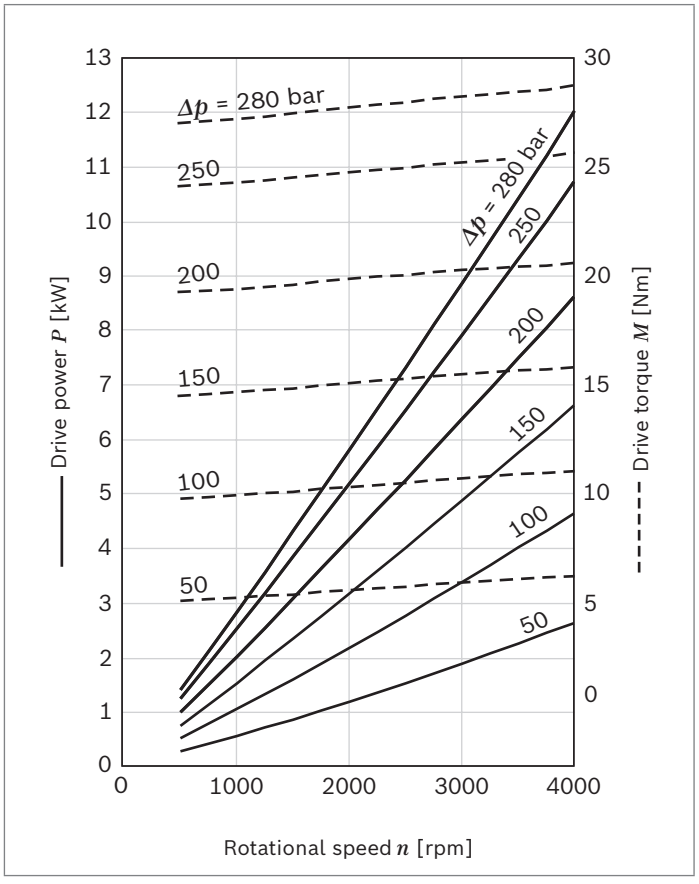
- Characteristic curves measured at ν = 32 mm²/s and t = 50 °C

Power diagrams

▼ **Nominal size 4**



▼ **Nominal size 5**



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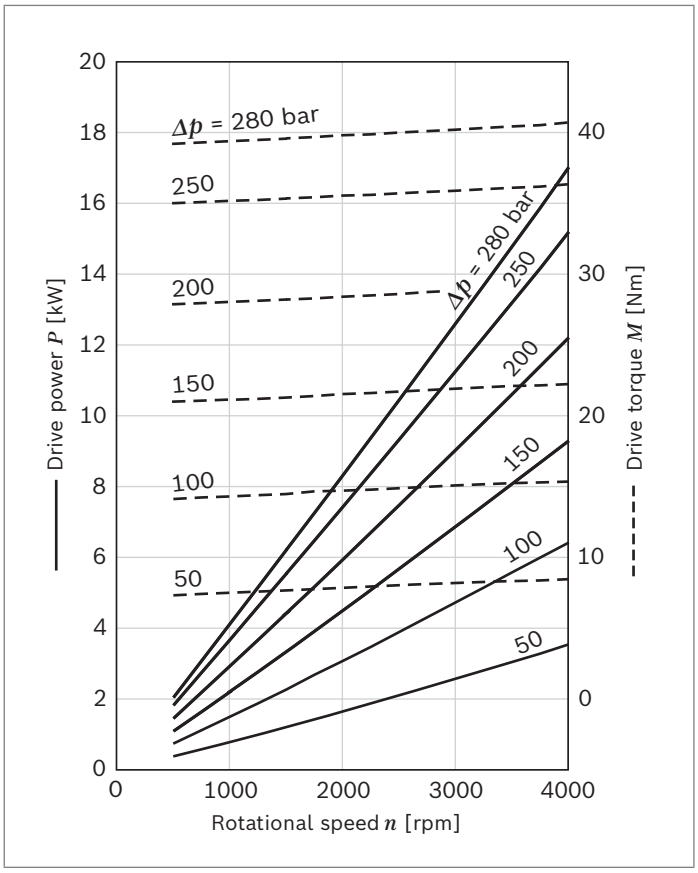
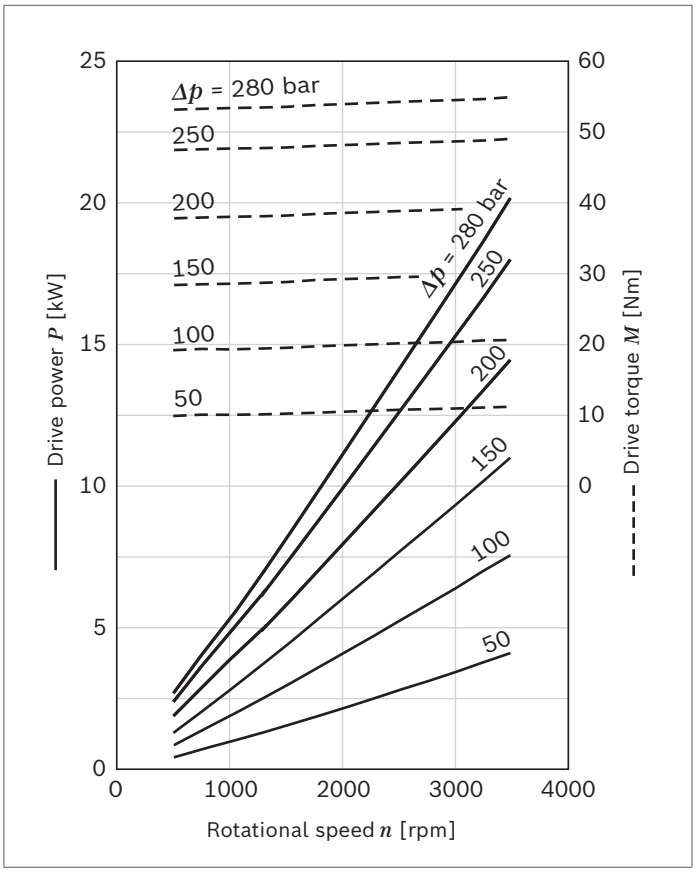
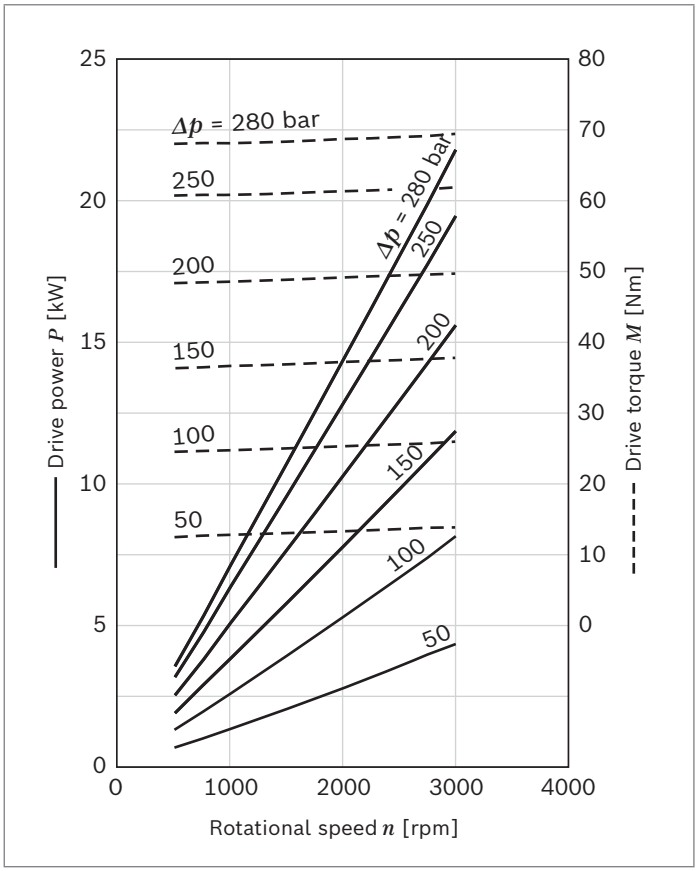


▼ **Nominal size 11**



▼ **Nominal size 14**



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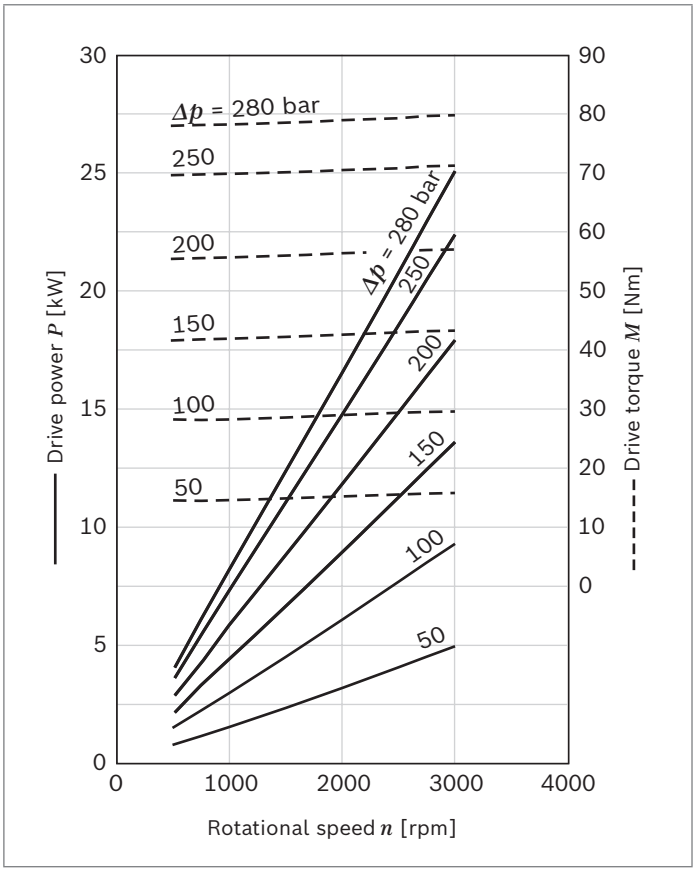
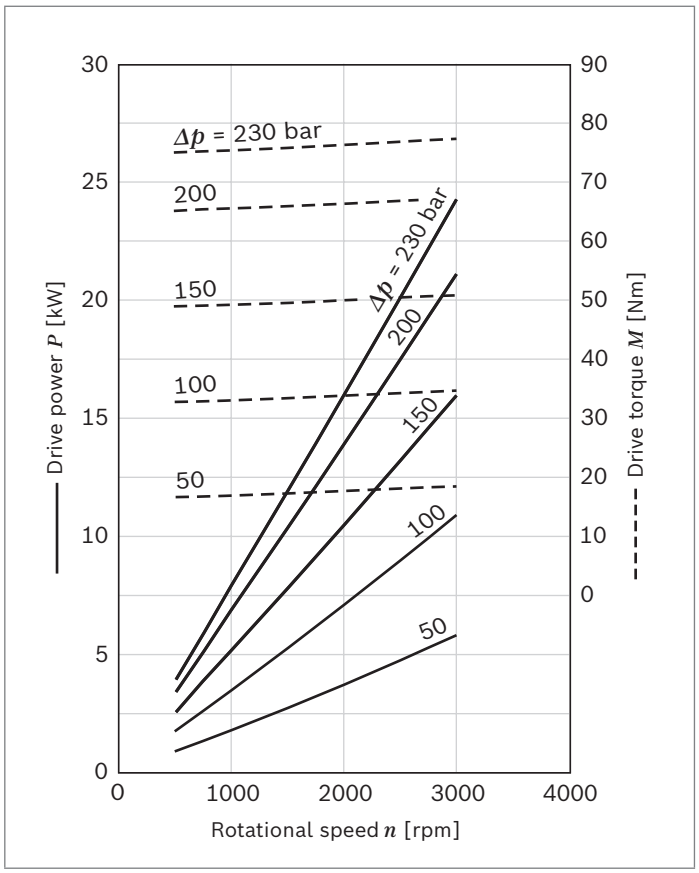
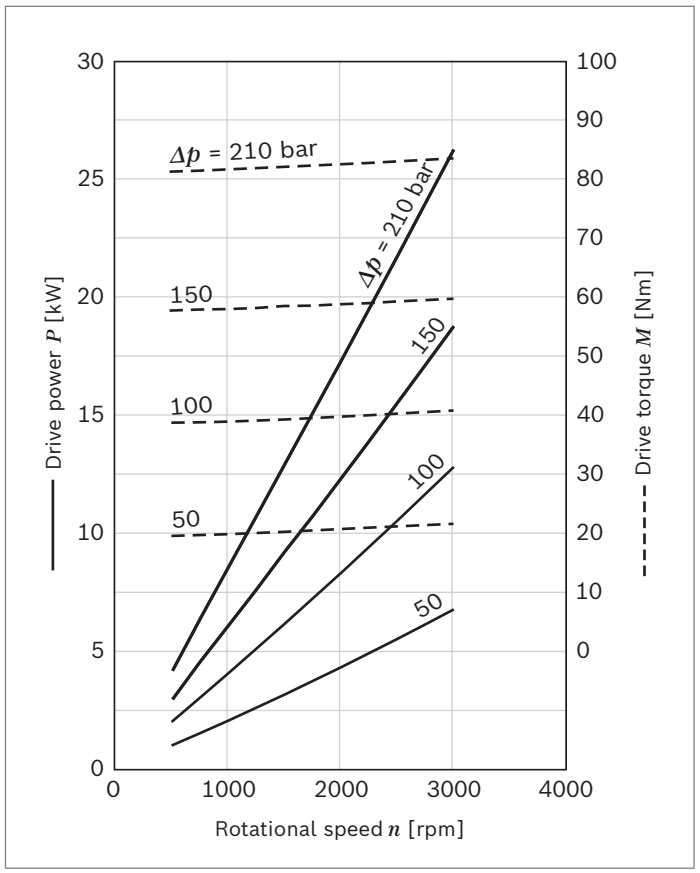


▼ **Nominal size 19**



▼ **Nominal size 22**



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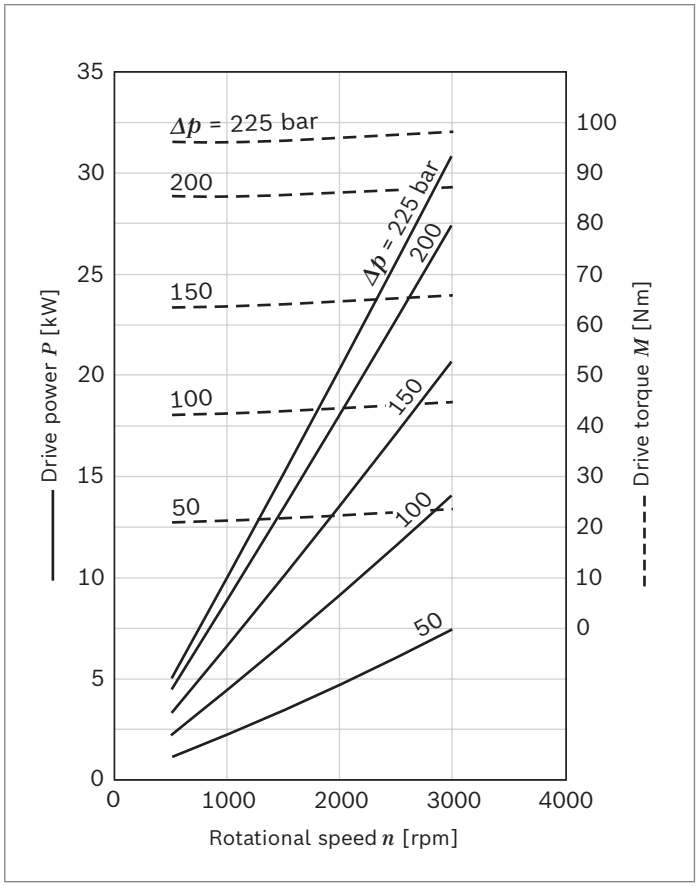
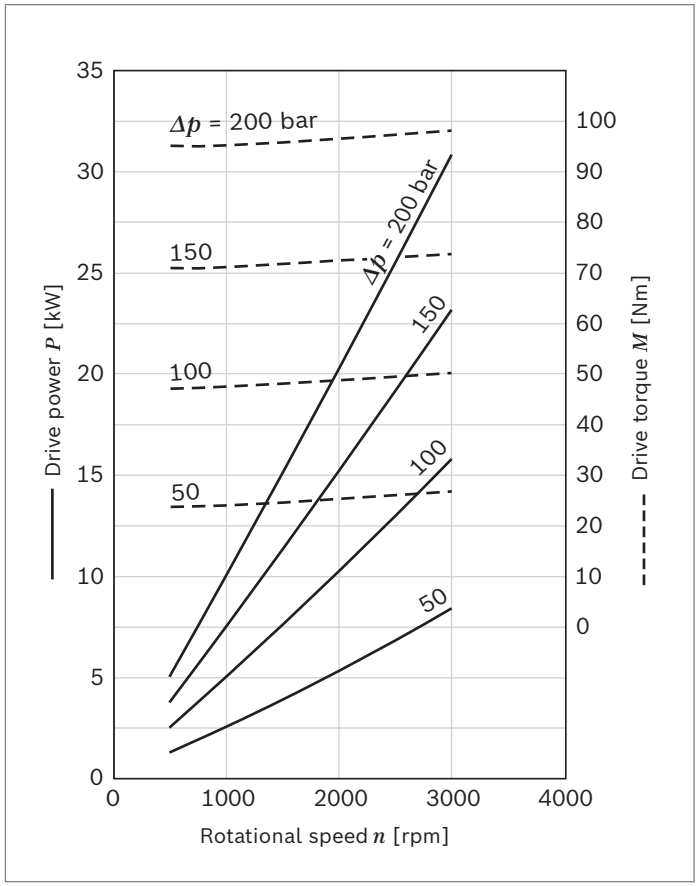


▼ **Nominal size 28**



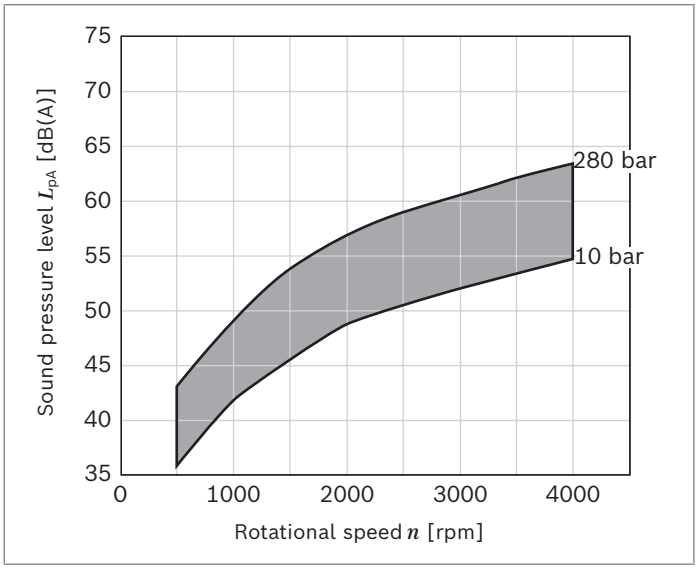
Noise charts

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.

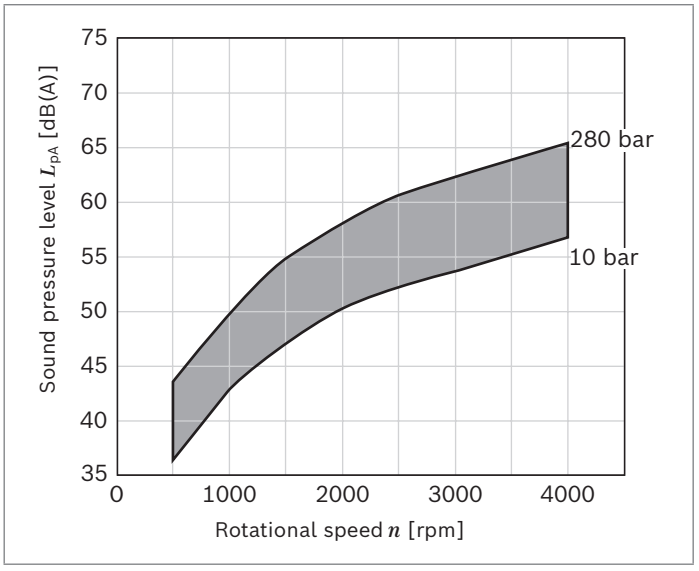
Notice

- 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.

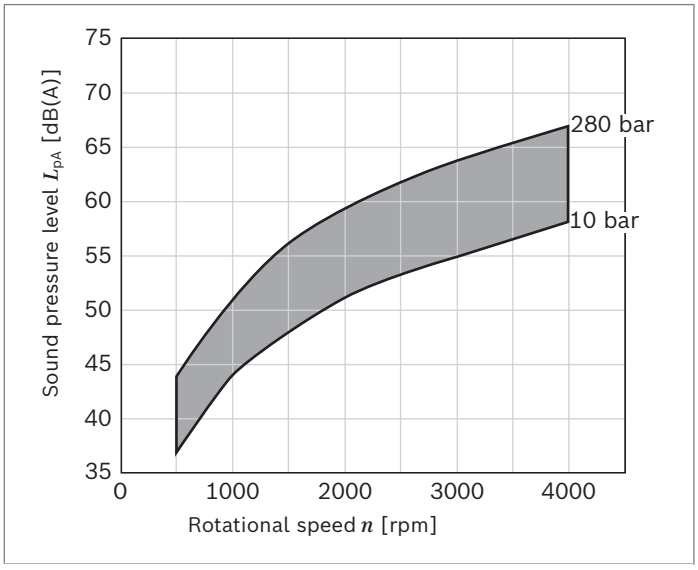
▼ **Nominal size 4**



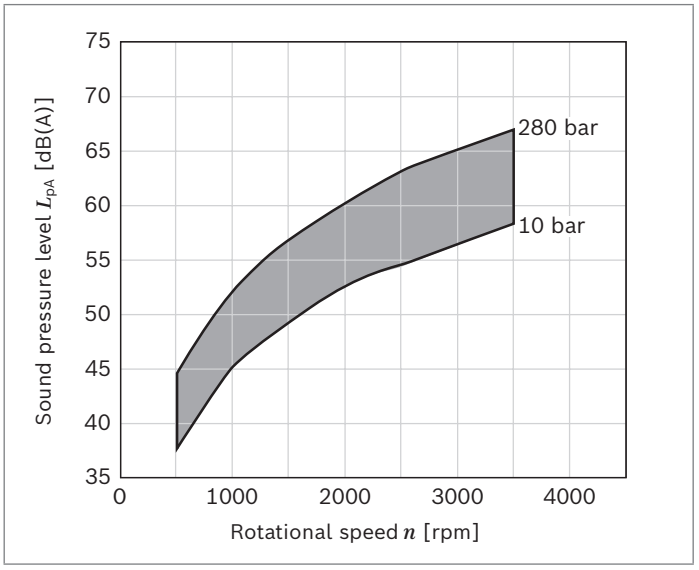
▼ **Nominal size 5**



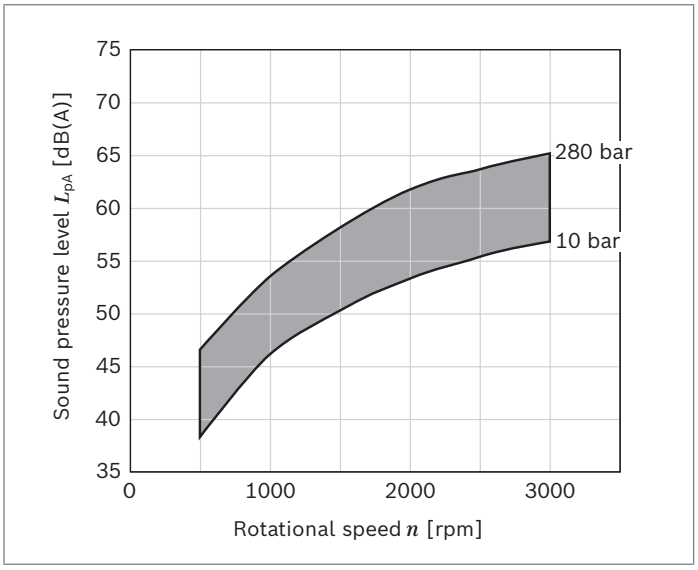
▼ **Nominal size 8**



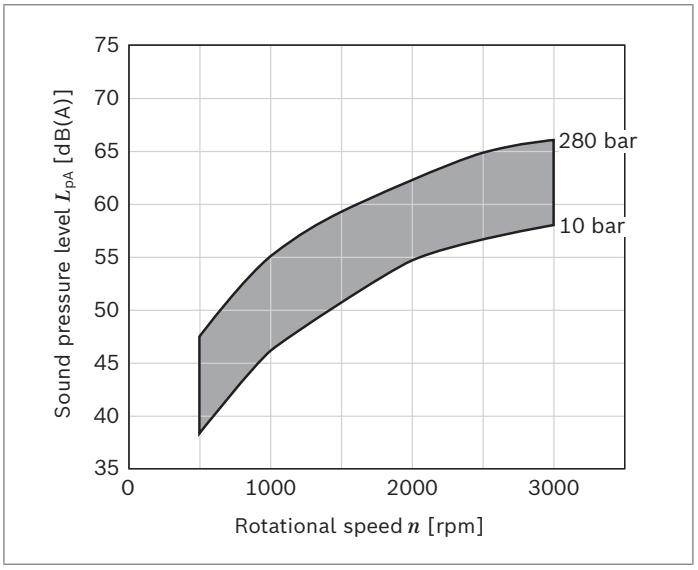
▼ **Nominal size 11**



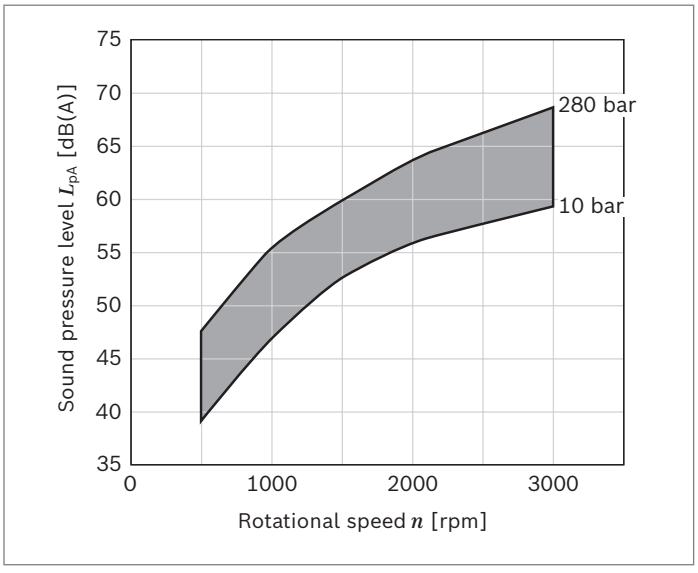
▼ **Nominal size 14**



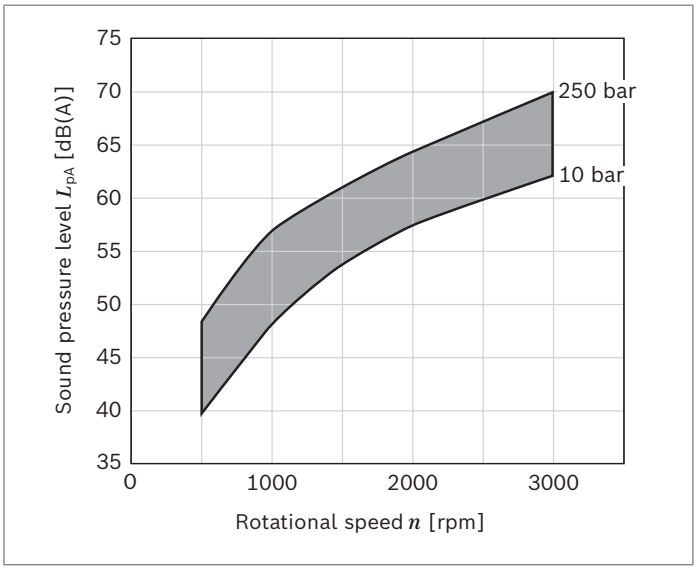
▼ **Nominal size 16**



▼ **Nominal size 19**



▼ **Nominal size 22**



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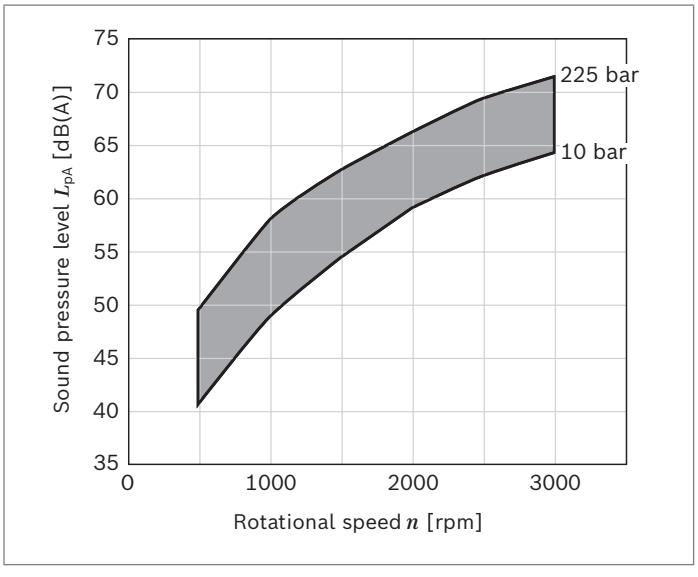
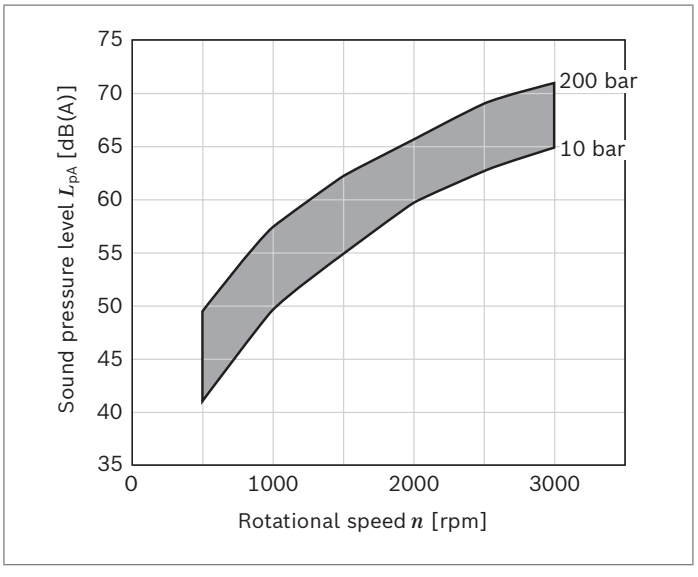


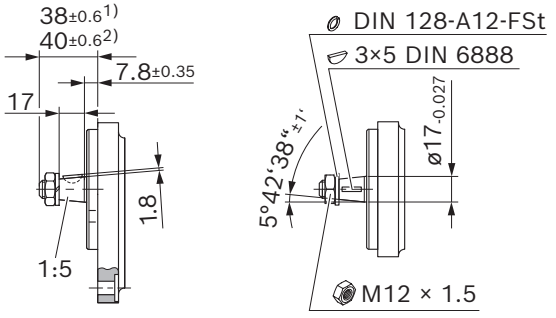
▼ **Nominal size 28**



Drive shafts

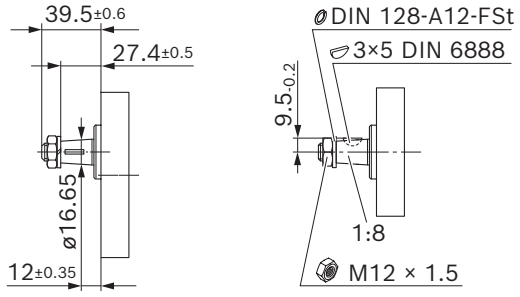
▼ **Tapered keyed shaft 1:5 (for front cover B, P, N)**

C



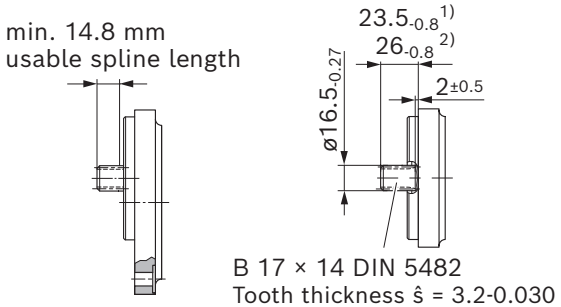
▼ **Tapered keyed shaft 1:8 (for front cover O)**

H



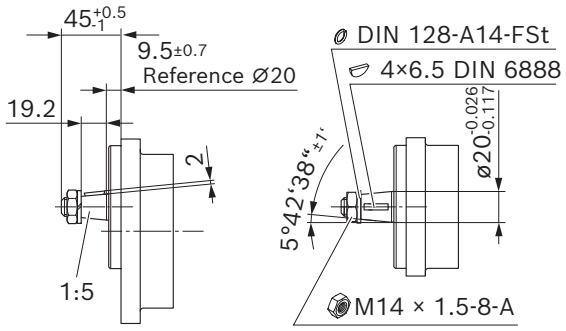
▼ **Splined shaft B17 x 14 acc. to DIN 5482 (for front cover B,P, N, O)**

F



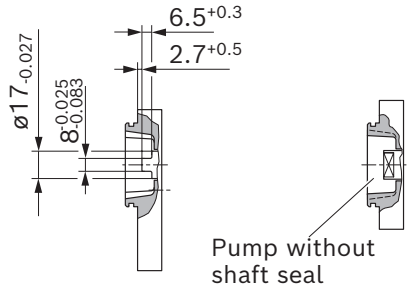
▼ **Tapered keyed shaft 1:5 (for outrigger bearing A, G)**

S



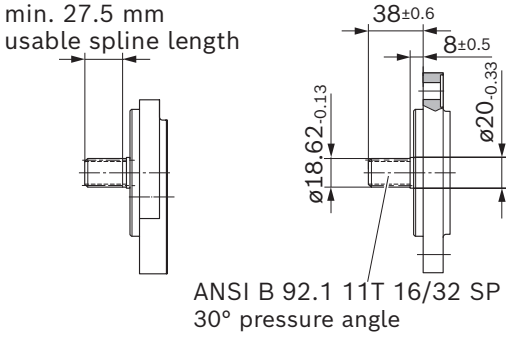
▼ **Tang drive (for front cover M, L, T)**

N



▼ **plined shaft SAE J744 19-4 11T length 38 mm (for front cover R, C)**

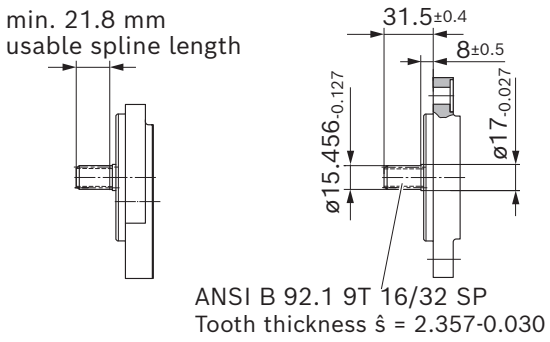
P



1) In combination with front cover B
2) In combination with front cover P and front cover N

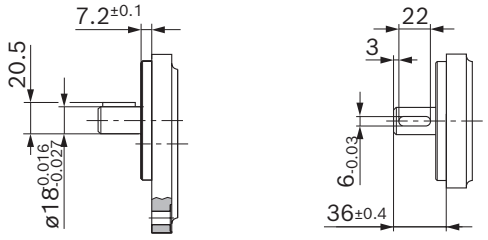
▼ **Splined shaft SAE J744 16-4 9T (for front cover R, C)**

R



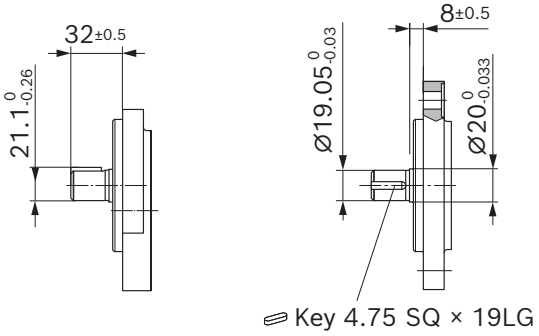
▼ **Parallel keyed shaft ISO diameter 18 mm (for front cover B)**

A



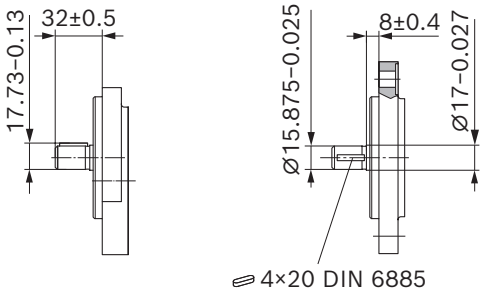
▼ **Parallel keyed shaft SAE J744 19-1, length 32 mm (for front cover R)**

K



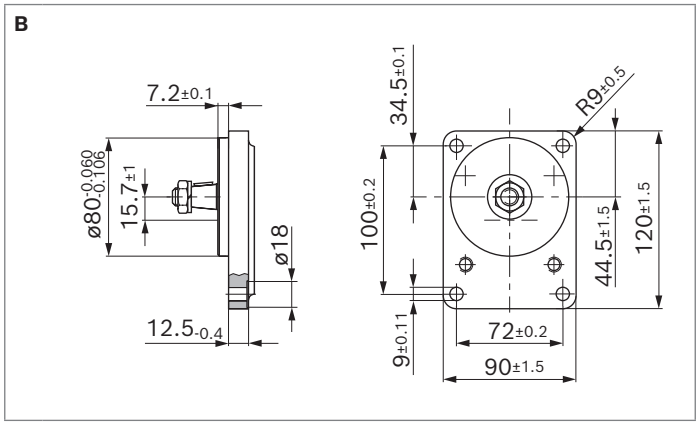
▼ **Parallel keyed shaft SAE J744 16-1 A, length 32 mm (for front cover R)**

Q

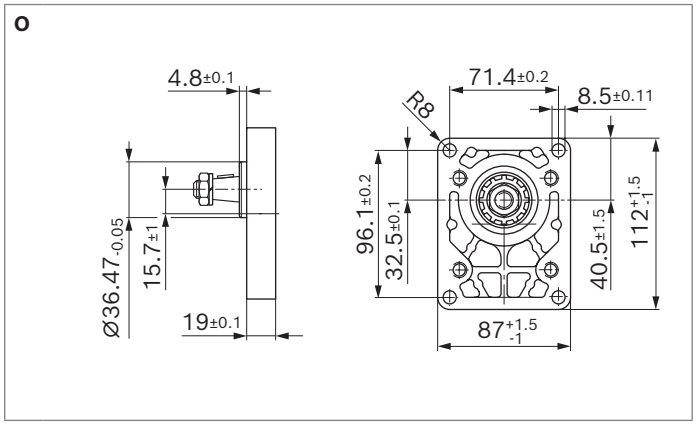


Front covers

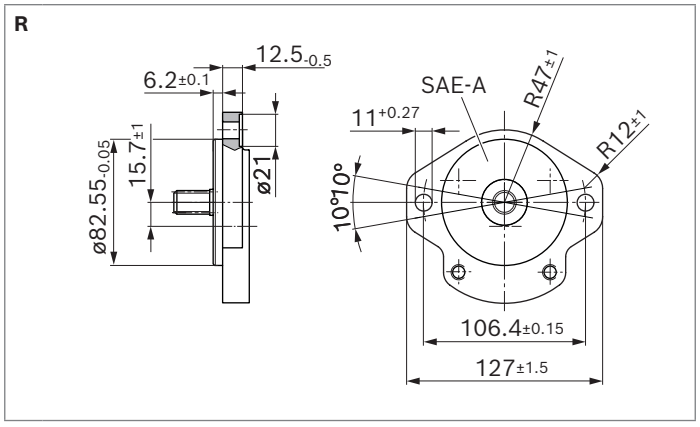
▼ **Rectangular flange spigot diameter 80 mm**



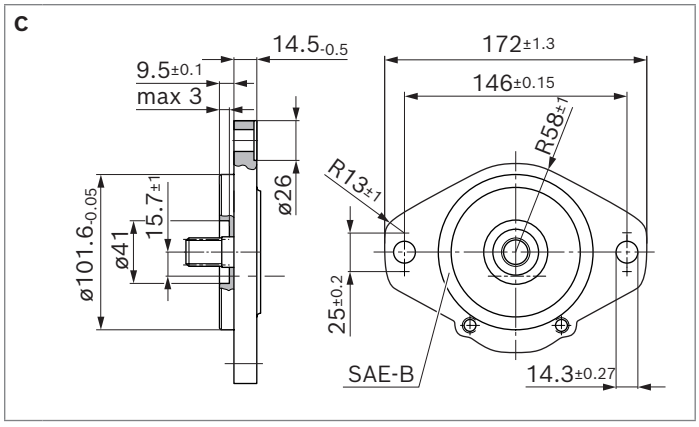
▼ **Rectangular flange spigot diameter 36.47 mm (M8)**



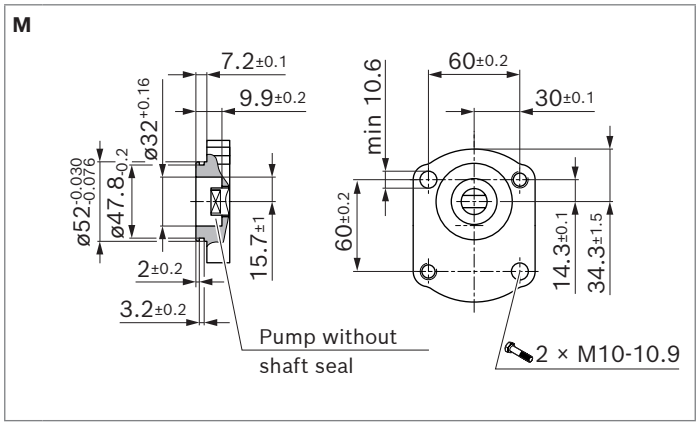
▼ **2-bolt flange spigot diameter 82.55 mm, SAE J744 82-2 (A)**



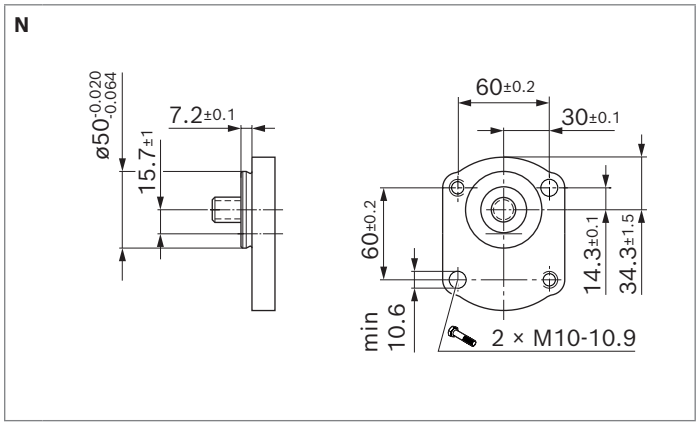
▼ **2-bolt flange spigot diameter 101.6 mm, SAE J744 101-2 (B)**



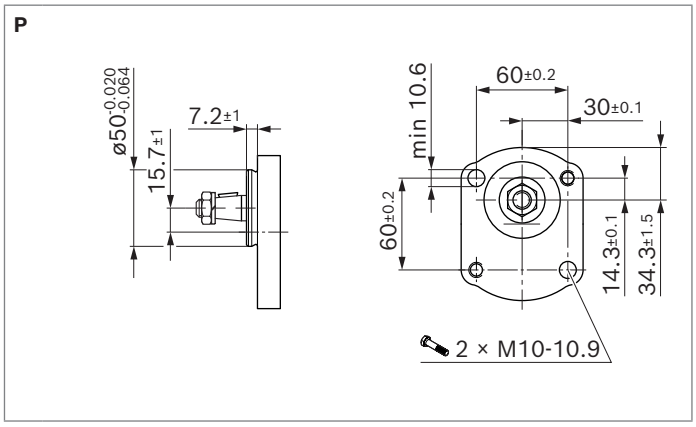
▼ **2-bolt mounting spigot diameter 52 mm (with O-ring)**



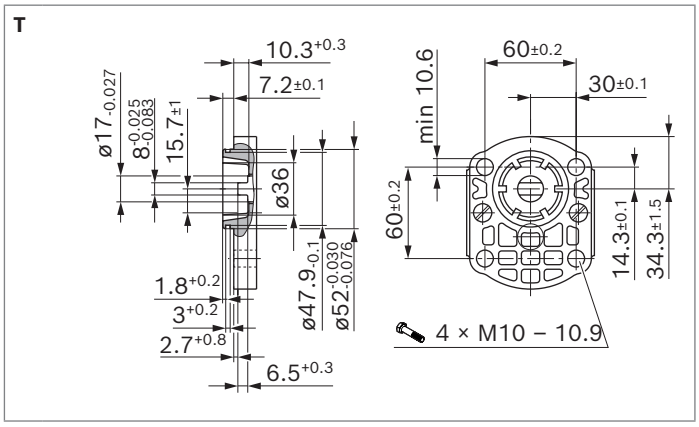
▼ **2-bolt mounting spigot diameter 50 mm (option 1)**



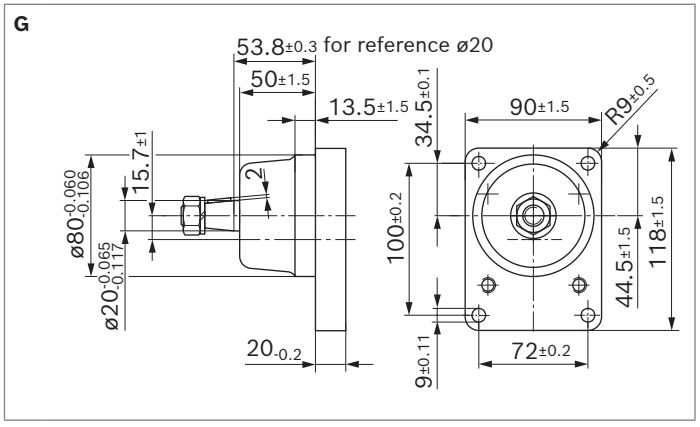
▼ **2-bolt mounting spigot diameter 50 mm (option 2)**



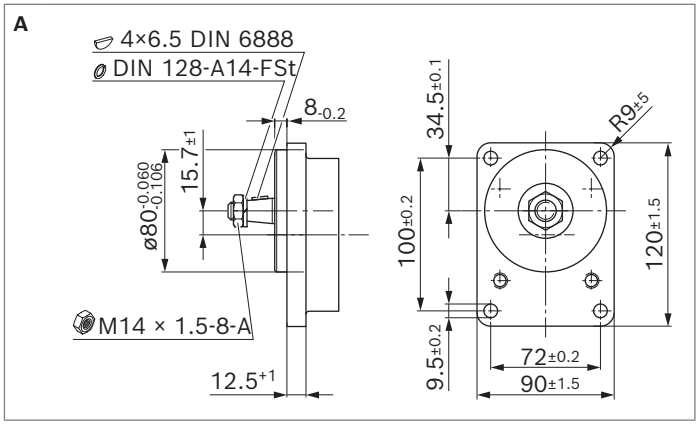
▼ **4-bolt mounting spigot diameter 52 mm (with O-ring)**



▼ **Outrigger bearing spigot diameter 80 mm (type 2)**



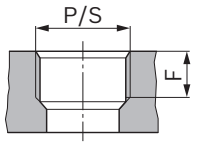
▼ **Outrigger bearing spigot diameter 80 mm (type 1)**



Port connections

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

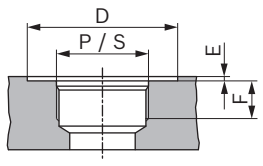
01



Nominal size	Pressure side		Suction side	
	P	F	S	F
		mm		mm
4 ... 16	G 1/2	16	G 3/4	16
19 ... 28	G 3/4		G 1	19

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

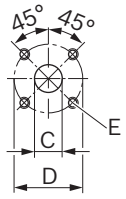
12



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 ... 28					1 5/16-12 UN-2B	50		20

▼ **Square flange (German version)**

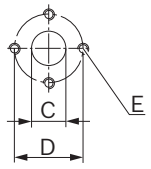
20



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 mm deep
8 ... 22				20		
19 ... 28				26	55	M8; 13 mm deep

▼ **Square flange (Italian version)**

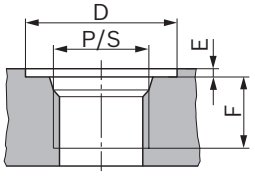
30



Nominal size	Pressure side			Suction side		
	C	D	E	C	D	E
	mm	mm		mm	mm	
4 ... 8	13.5	30.2	M6; 13 mm deep	13.5	30.2	M6; 13 mm deep
11 ... 28				20	39.7	M8; 13 mm deep

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

50



Nominal size	Pressure side				Suction side			
	P	D	E	F	C	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 ... 16	M22 × 1.5	34		18	M27 × 2	40		19
19 ... 28					M33 × 2	46		18

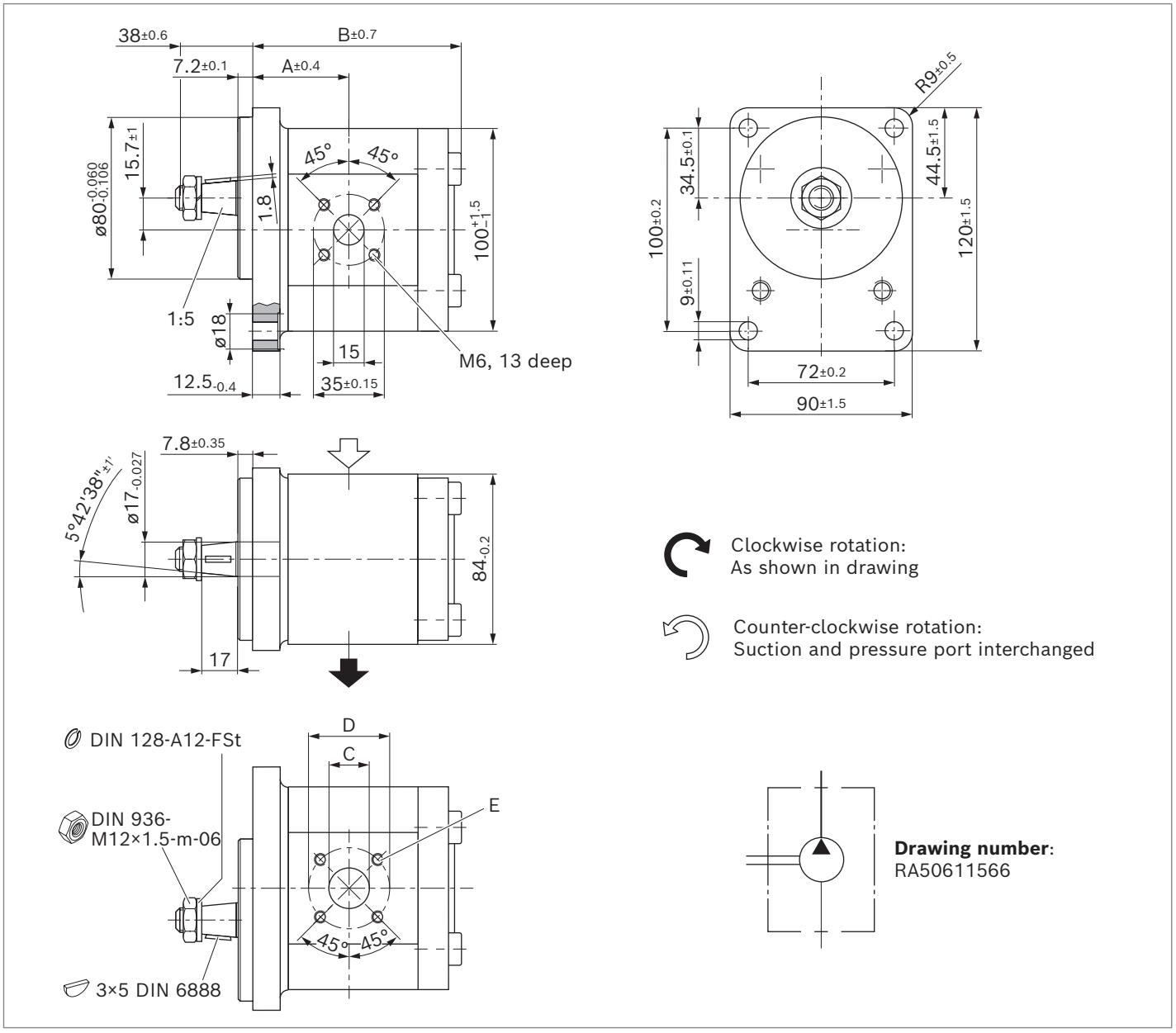
Notice
Depending on the design variant, the size of the threaded connections may differ from the sizes specified in the table. See information in the dimensional drawings.

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

AZPF–1X– ... **CB20**MB

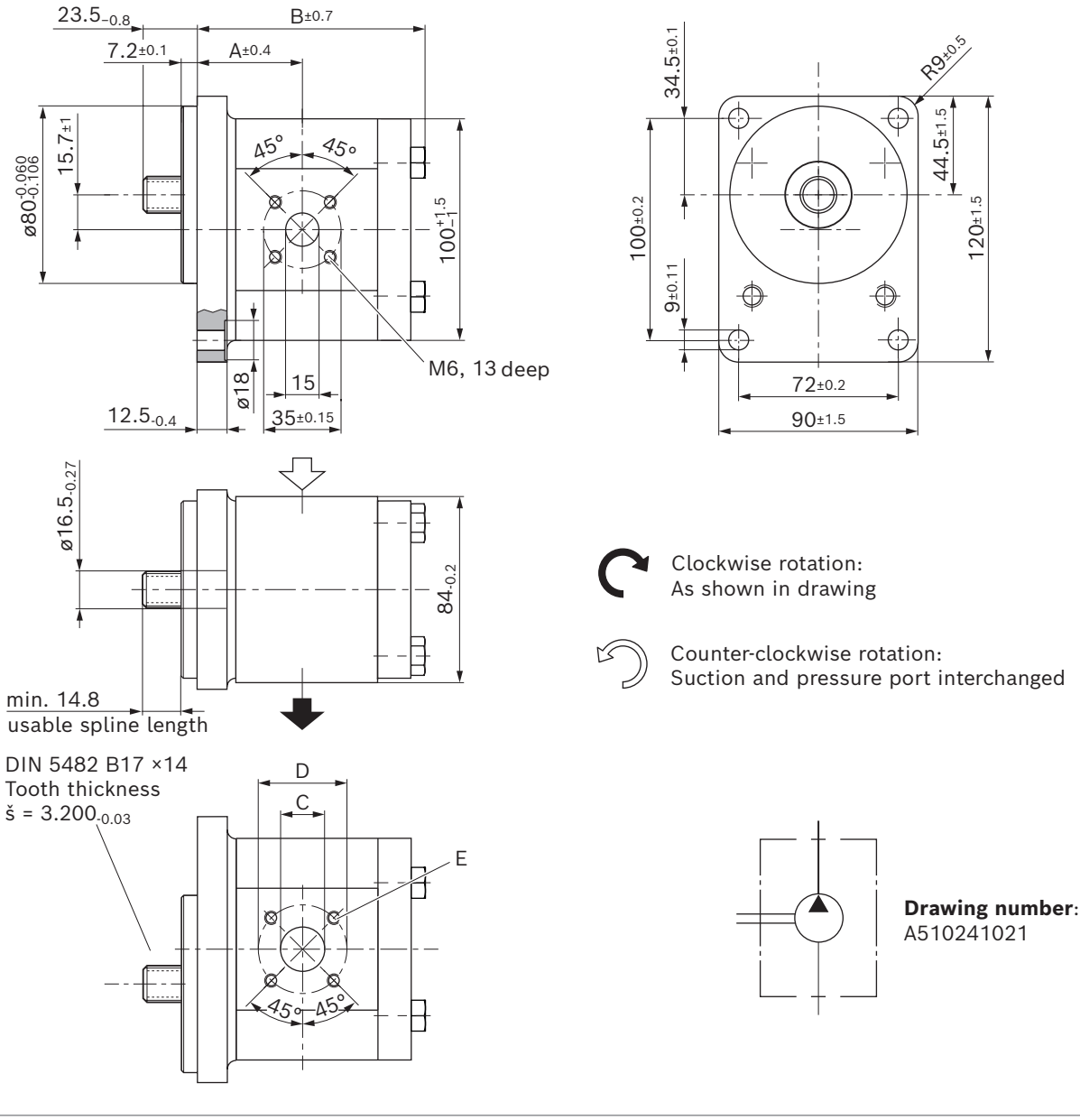


NG	Material number		Maximum intermittent pressure p_2	Maximum speed n_{max}	Weight m	Dimensions				
	Direction of rotation					A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	mm
4	0 510 225 306	0 510 225 006 [1]	280	4000	3.2	39.9	85	15	40	M6; 13 deep
5	0 510 325 306	0 510 325 006	280	4000	3.2	41.1	87.5	15	40	
8	0 510 425 307	0 510 425 009	280	4000	3.3	43.2	91.6	20	40	
11	0 510 525 311	0 510 525 009	280	3500	3.5	47	96.6	20	40	
14	0 510 525 319	0 510 525 018	280	3000	3.7	47.5	101.6	20	40	
16	0 510 625 315	0 510 625 022	280	3000	3.7	47.5	105	20	40	
19	0 510 625 314	0 510 625 013	230	3500	3.8	47.5	110	20	40	
22	0 510 725 330	0 510 725 030	210	2500	3.8	55.1	115.4	20	40	

1) Version with shaft seal ring in FKM (Type code - ...KB)

Tapered keyed shaft 1:5 with rectangular flange spigot diameter 80 mm

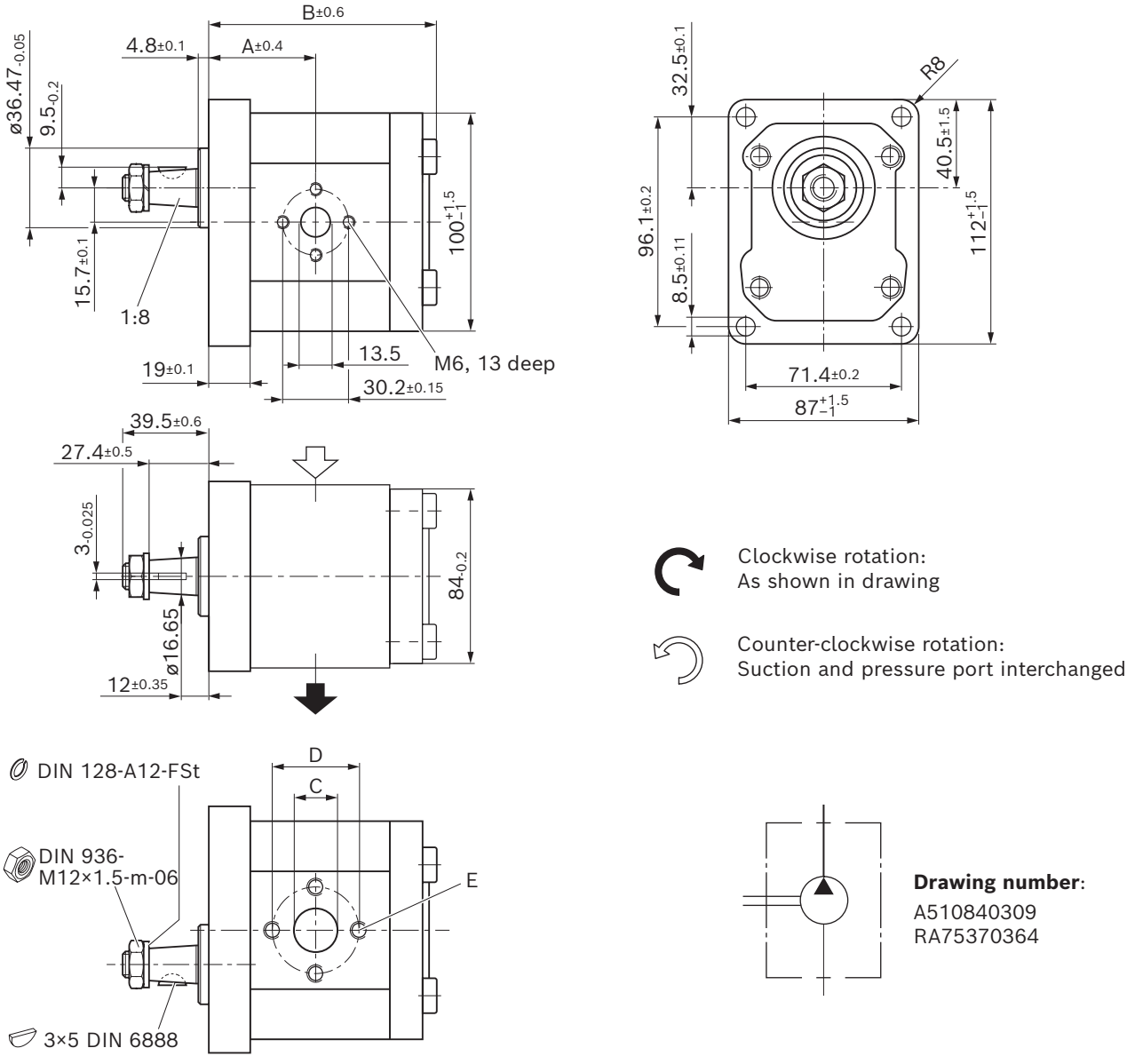
AZPF–1X– ... **FB20**MB



NG	Material number		Maximum intermittent	Maximum speed	Weight	Dimensions				
	Direction of rotation		pressure p_2	n_{max}	m	A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	mm
4	0 510 225 307	0 510 225 007	280	4000	3.1	39.9	85	15	40	
5	0 510 325 307	0 510 325 007	280	4000	3.2	41.1	87.5	15	40	
8	0 510 425 308	0 510 425 010	280	4000	3.3	43.2	91.6	20	40	
11	0 510 525 312	0 510 525 010	280	3500	3.5	47	96.6	20	40	
14	0 510 525 328	0 510 525 030	280	3000	3.6	47.5	101.6	20	40	M6; 13 deep
16	0 510 625 317	0 510 625 015	280	3000	3.65	47.5	105	20	40	
19	0 510 625 316	0 510 625 014	230	3000	3.8	47.5	110	20	40	
22	0 510 725 349		230	3000	4.4	61.1	127.4	20	40	
22		0 510 725 062	210	2500	4	55.1	115.4	20	40	

Tapered keyed shaft 1:8 with rectangular flange spigot diameter 36.47 mm

AZPF – 12 – … **HO30**KB

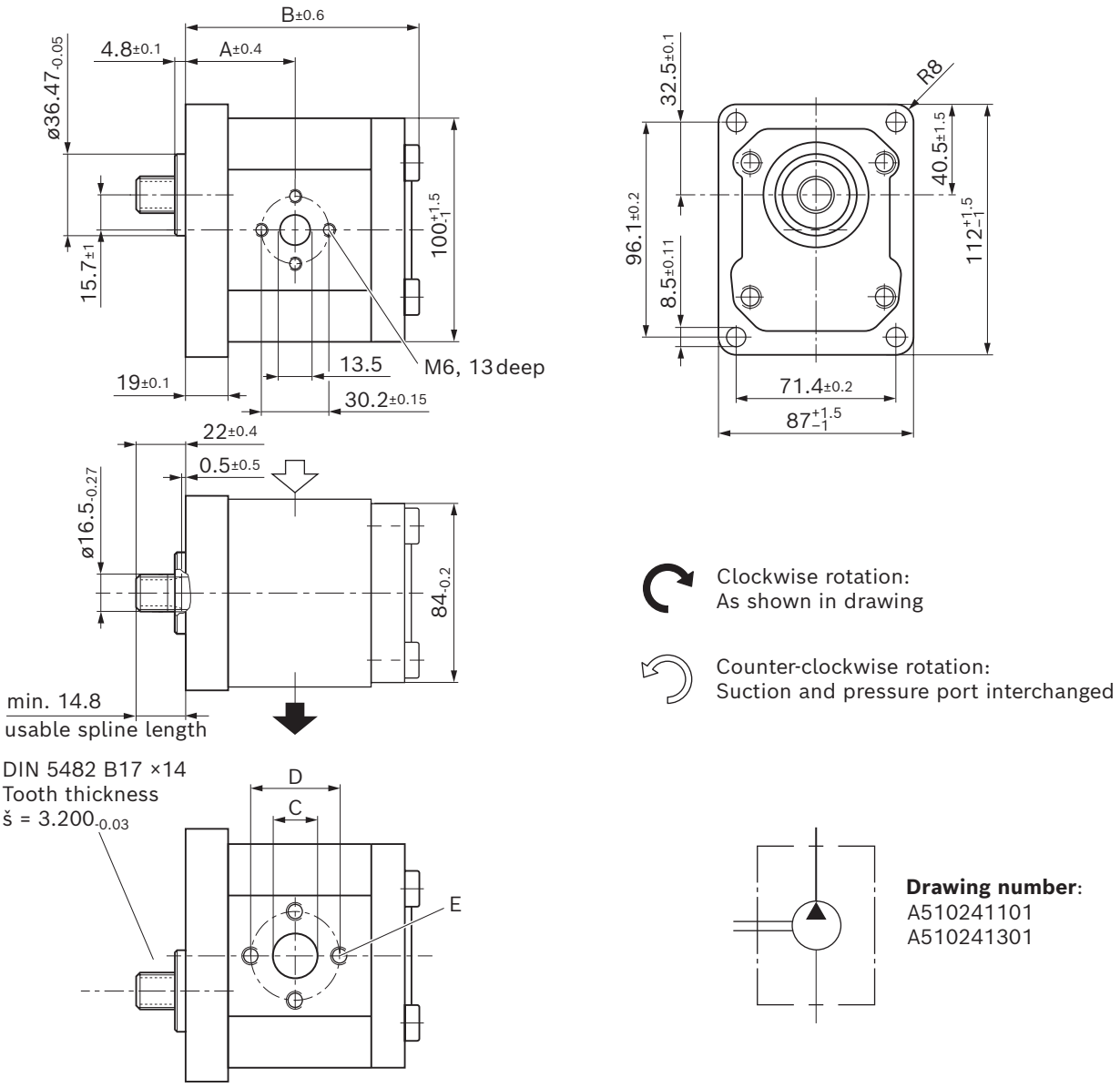


NG	Material number		Maximum intermittent	Maximum speed	Weight	Dimensions				
	Direction of rotation		pressure p_2	n_{max}	m	A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	mm
4	0 510 225 317	0 510 225 022	280	4000	3.1	41.4	84.1	13.5	30.2	
5	0 510 325 320	0 510 325 025	280	4000	3.2	42.6	86.6	13.5	30.2	M6; 13 deep
8	0 510 425 334	0 510 425 043	280	4000	3.3	44.7	92.5	13.5	30.2	
11	0 510 525 374	0 510 525 074	280	3500	3.4	48.5	97.5	20	39,7	
14	0 510 525 375	0 510 525 075	280	3000	3.6	49	102.5	20	39,7	
16	0 510 625 381	0 510 625 075	280	3000	3.6	49	105.9	20	39,7	
19	0 510 625 386 [1]	0 510 625 076 [1]	280	3500	4.1	59.9	121.1	20	39.7	M8; 13 deep
22	0 510 725 410 [1]	0 510 725 112 [1]	250	3500	4.2	62.6	126.5	20	39.7	
25	0 510 725 411 [1]	0 510 725 113 [1]	225	3000	4.4	64.7	132.5	20	39.7	
28	0 510 725 412 [1]	0 510 725 114 [1]	200	3000	4.5	67.1	137.3	20	39.7	

1) Version with reinforced bearings, Series 2X (AZPF - 22 - …)

Splined shaft DIN 5482 B17 x 14 with rectangular flange spigot diameter 36.47 mm

AZPF – 1X – ... **FO30**MB

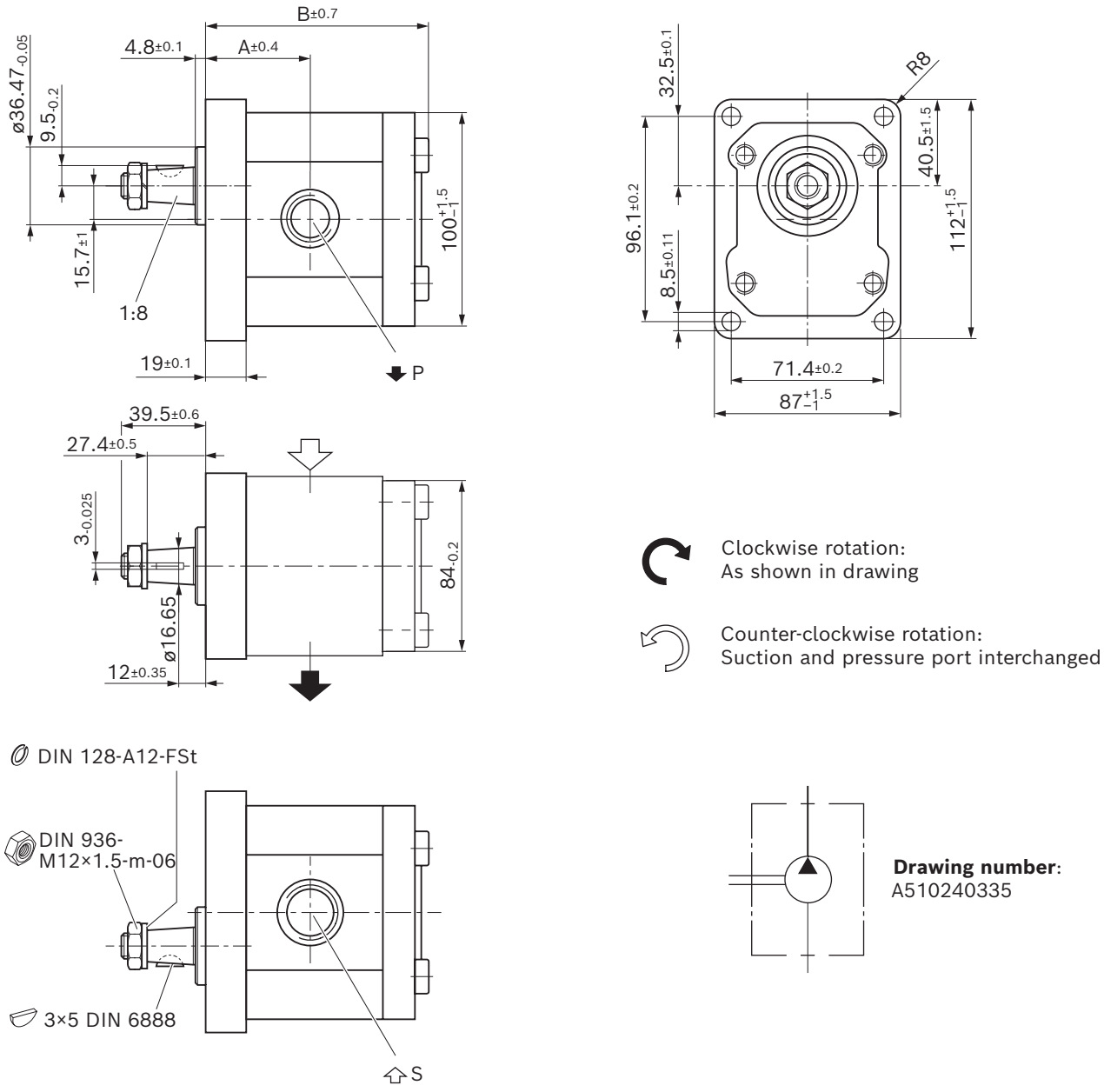


NG	Material number		Maximum intermittent pressure p_2	Maximum speed n_{max}	Weight m	Dimensions				
	Direction of rotation					A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	mm
8	0 510 425 315	0 510 425 021	280	4000	3.3	44.7	93.1	13.5	30.2	M6; 13 deep
11	0 510 525 323	0 510 525 024	280	3500	3.4	48.5	98.1	20	39.7	
11	0 510 525 331 [1]		210	3500	3.3	48.5	98.1	20	39.7	
14		0 510 525 034 [1]	210	3000	3.4	49	103.1	20	39.7	
16	0 510 625 327 [1]	0 510 625 329 [1]	210	3000	3.5	49	106.5	20	39.7	M8; 13 deep
19		0 510 625 049 [1]	210	3000	3.7	49	111.5	20	39.7	
19	0 510 625 332 [1]		210	3000	4	59.9	123.5	20	39.7	
22	0 510 725 348 [1]	0 510 725 076 [1]	210	3000	4.2	62.6	127.8	20	39.7	

1) Version with seals in FKM (Type code - ...PB)

Tapered keyed shaft 1:8 with rectangular flange spigot diameter 36.47 mm

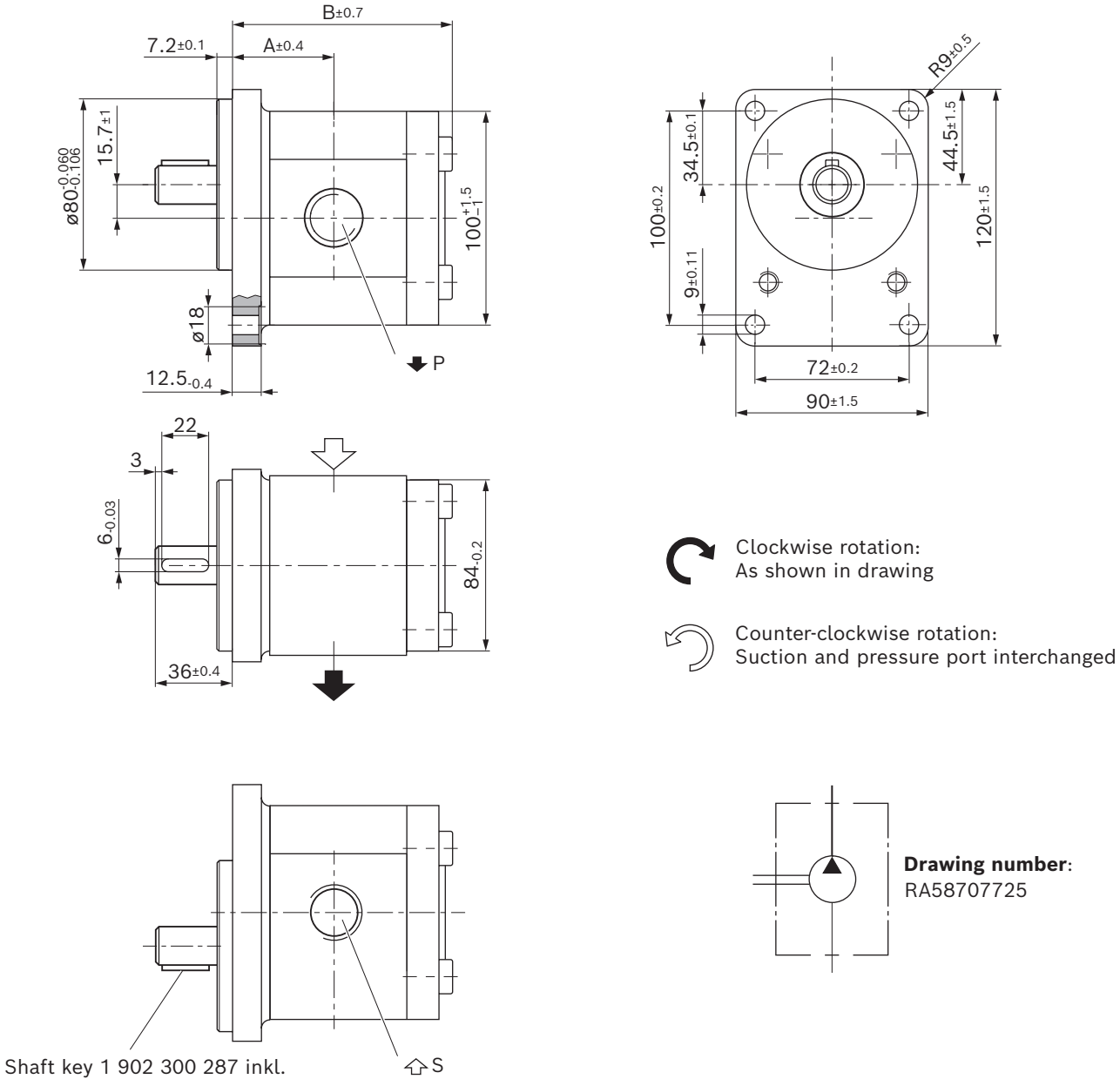
AZPF – 1X – … **HO01**MB



NG	Material number Direction of rotation clockwise	Maximum intermittent pressure p_2 bar	Maximum speed n_{max} rpm	Weight m kg	Dimensions A mm	 B mm	S mm	P mm
4								
5	0 510 325 018	280	4000	3.1	42.6	89		
8	0 510 425 027	280	4000	3.15	44.7	93.1		
11	0 510 525 039	280	3500	3.3	48.5	98.1		
14	0 510 525 040	280	3000	3.4	49	103.1	G 3/4; 16 deep	G 1/2; 16 deep
16	0 510 625 047	280	3000	3.58	49	106.5		
19	0 510 625 052	230	3000	3.6	49	111.5		
22	0 510 725 084	210	2500	3.8	56.6	116.4		

Parallel keyed shaft ISO diameter 18 with rectangular flange spigot diameter 80 mm

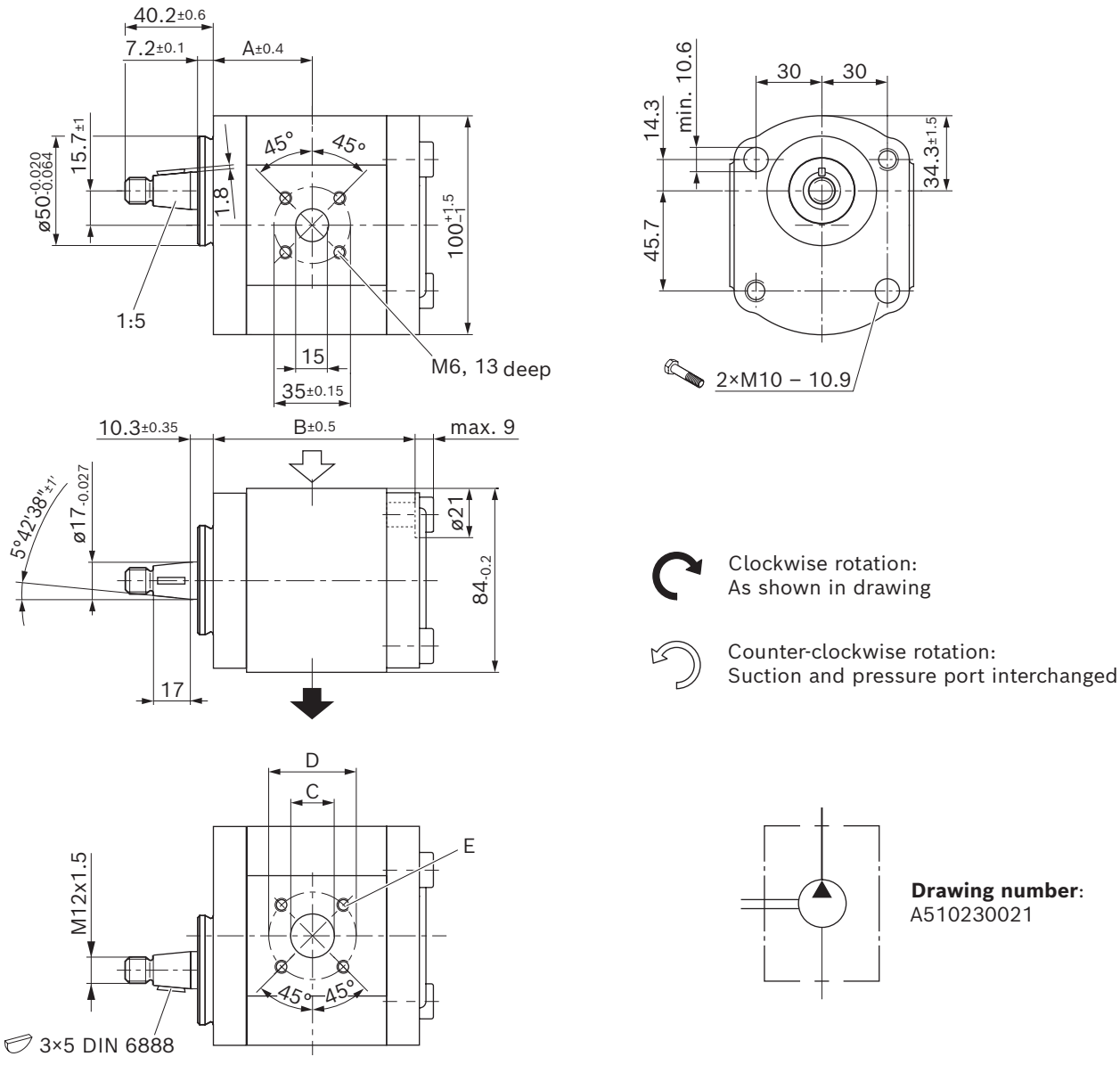
AZPF – 11 – … **AB01**MB – S0356



NG	Material number		Maximum intermittent pressure p_2	Maximum speed n_{max}	Weight m	Dimensions A	B	S	P
	Direction of rotation counter clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm
4	0 510 225 318	0 510 225 023	280	4000	3.3	39.9	84.3	G 1/2; 16 deep	G 1/2; 16 deep
5	0 510 325 321	0 510 325 026	280	4000	3.3	41.1	85.2		
8	0 510 425 335	0 510 425 044	280	4000	3.4	43.2	89.3		
11	0 510 525 376	0 510 525 076	280	3500	3.6	45.6	94.3	G 3/4; 16 deep	G 3/4; 16 deep
14									
16	0 510 625 382	0 510 625 077	250	3000	3.8	49.9	102.7		
19									
22	0 510 725 418	0 510 725 120	180	2500	4.1	55.1	114.7		

Tapered keyed shaft 1:5 with 2-bolt mounting spigot diameter 50mm

AZPF – 1X – ... **CP20** ... B[1)]

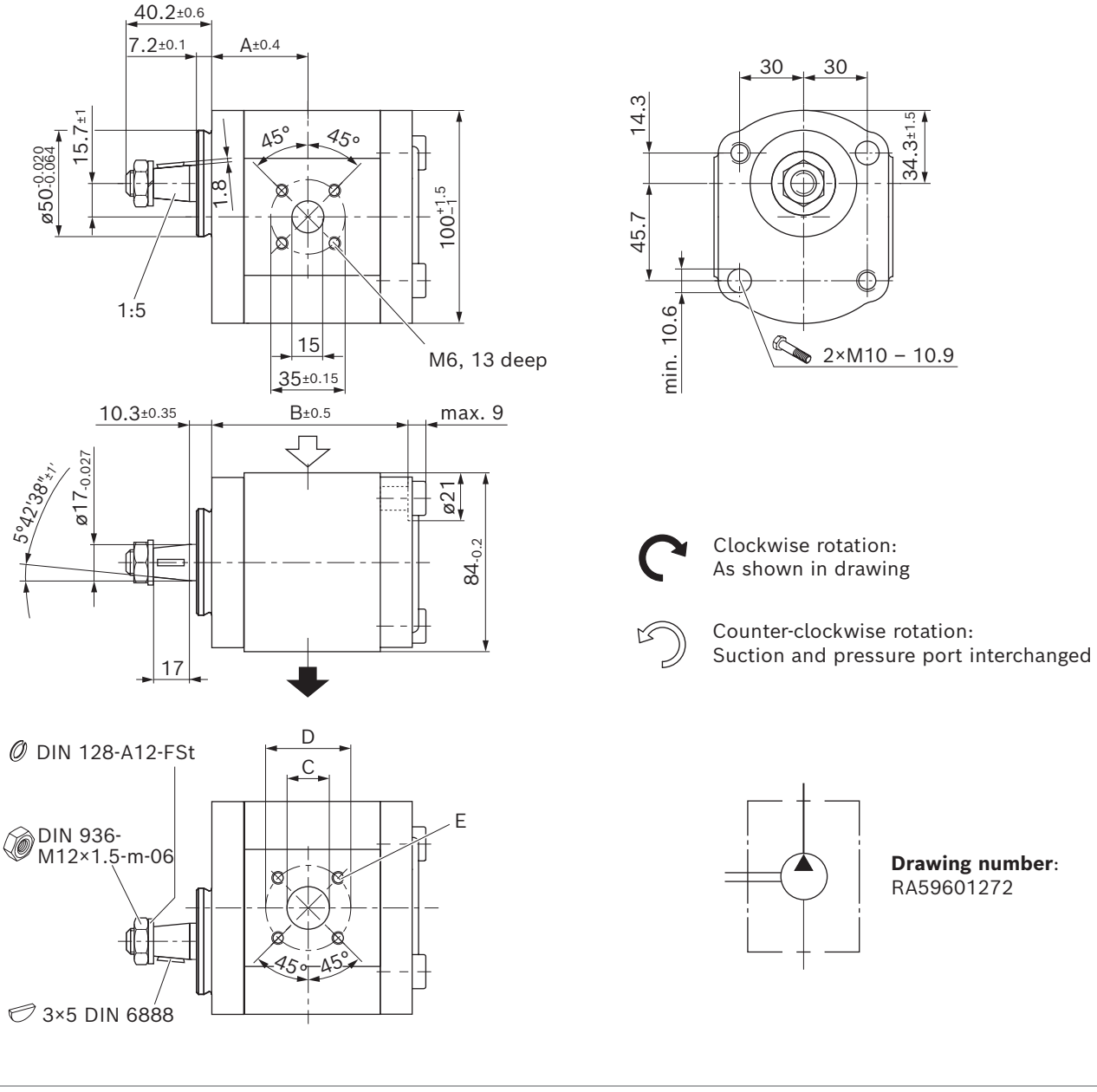


NG	Material number		Maximum intermittent pressure p_2	Maximum speed n_{max}	Weight m	Dimensions				
	Direction of rotation					A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	mm
4	0 510 215 009	0 510 215 309	280	4000	2.5	37.7	73.7	15	40	M6; 13 deep
5	0 510 315 307	0 510 315 006	280	4000	2.65	38.6	76.2	15	40	
8	0 510 415 316		280	4000	2.7	40.6	80.3	20	40	
11	0 510 515 309	0 510 515 007	280	3500	2.75	44.5	85.5	20	40	
14	0 510 515 316	0 510 515 018	280	3000	3.1	45	90.3	20	40	
16	0 510 615 317	0 510 615 010	280	3000	2.9	45	93.7	20	40	
19	0 510 615 318	0 510 615 005	230	3000	3.2	45	98.7	20	40	
22	0 510 715 306		210	2500	3.3	52.5	104.1	20	40	

1) Various combination of Series, version and seals are possible.

Tapered keyed shaft 1:5 with 2-bolt mounting spigot diameter 50mm

AZPF – 1X – ... **CN20** ... B[1)]

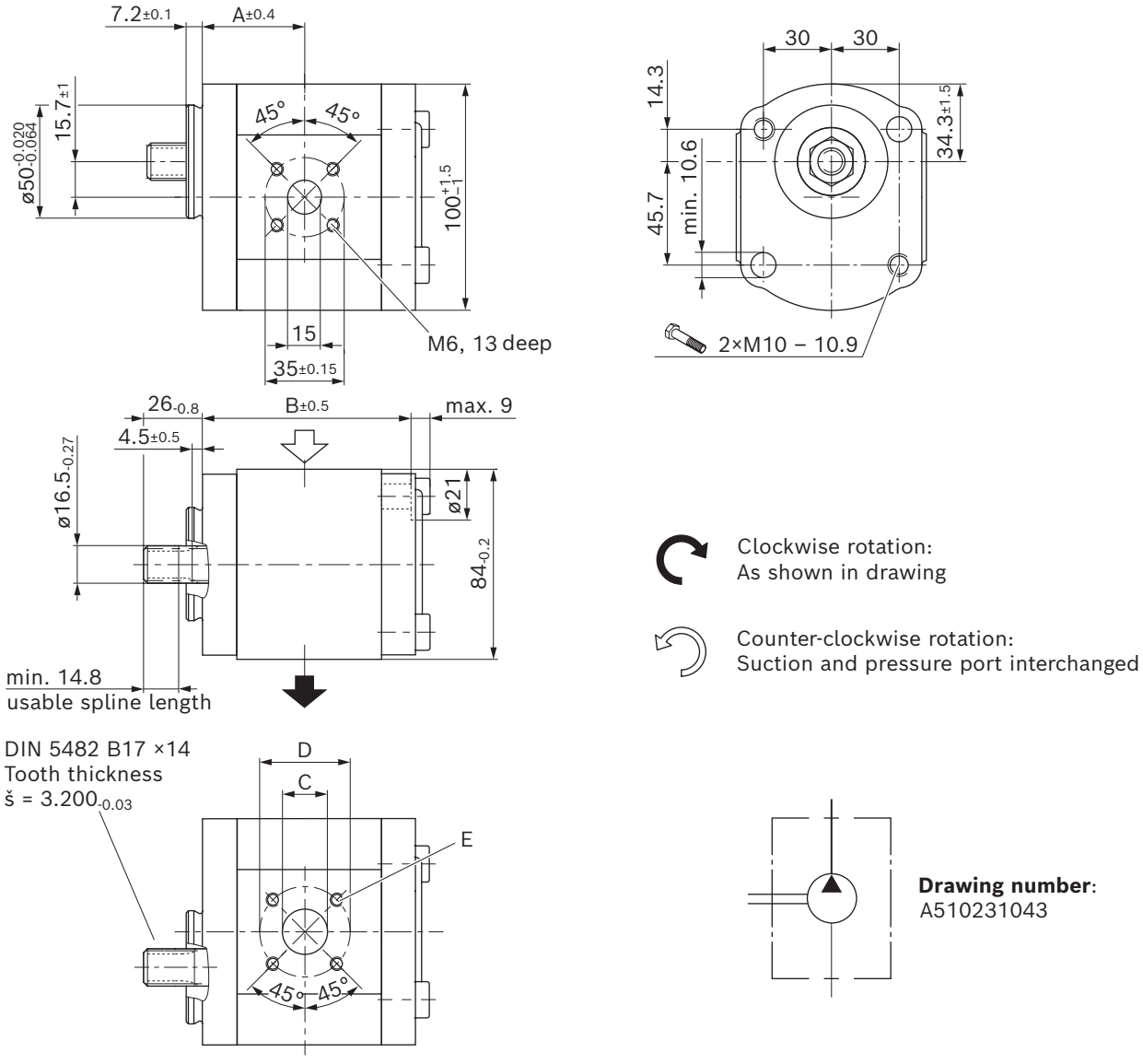


NG	Material number		Maximum intermittent pressure p_2	Maximum speed n_{max}	Weight m	Dimensions				
	Direction of rotation					A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	mm
4	0 510 215 306	0 510 215 006	280	4000	2.6	37.4	73.7	15	40	M6; 13 deep
5	0 510 315 304	0 510 315 004	280	4000	2.6	38.6	76.2	15	40	
8	0 510 415 313	0 510 415 005	280	4000	2.8	40.7	80.3	20	40	
11	0 510 515 310	0 510 515 004	280	3500	2.9	44.5	85.3	20	40	
14		0 510 515 015	280	3000	3	45	90.3	20	40	
16	0 510 615 314		280	3000	3.1	45	93.7	20	40	
19	0 510 615 341		230	3000	3.2	45	98.7	20	40	

1) Various combination of Series, version and seals are possible.

Splined shaft (DIN 5482 B17 x 14) with 2-bolt mounting spigot diameter 50 mm

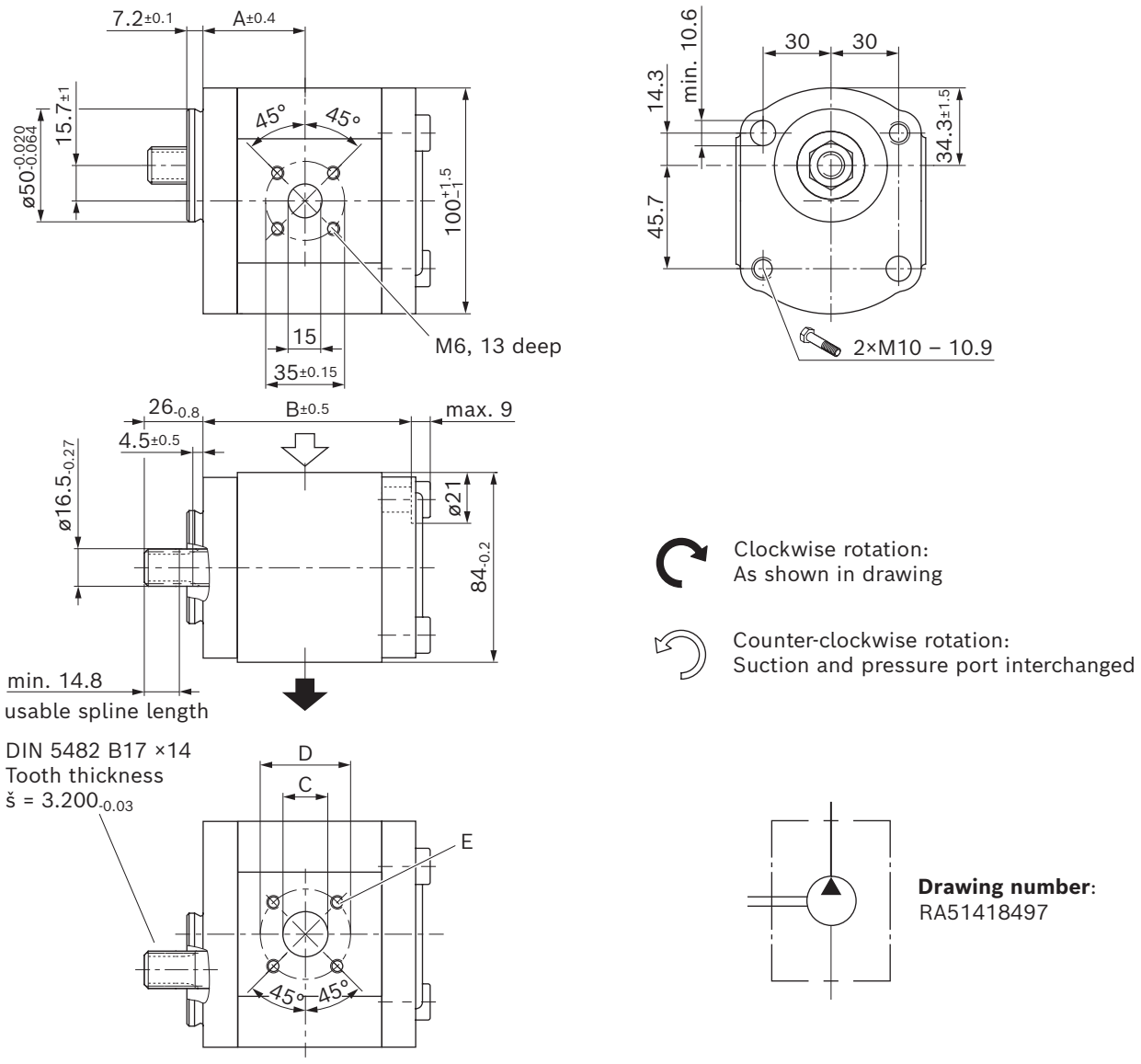
AZPF – 1X – … **FN20**MB



NG	Material number Direction of rotation clockwise	Maximum intermittent pressure p_2 bar	Maximum speed n_{max} rpm	Weight m kg	Dimensions A mm	B mm	C mm	D mm	E mm
5	0 510 315 007	280	4000	2.55	38.6	76.2	15	40	M6; 13 deep
8									
11	0 510 515 011	280	3500	2.85	44.5	85.3	20	40	
14									
19	0 510 615 009	230	3000	3.2	45	98.7	20	40	
22									

Splined shaft DIN 5482 B17 x 14 with 2-bolt mounting spigot diameter 50mm

AZPF – 1X – ... **FP20**PB

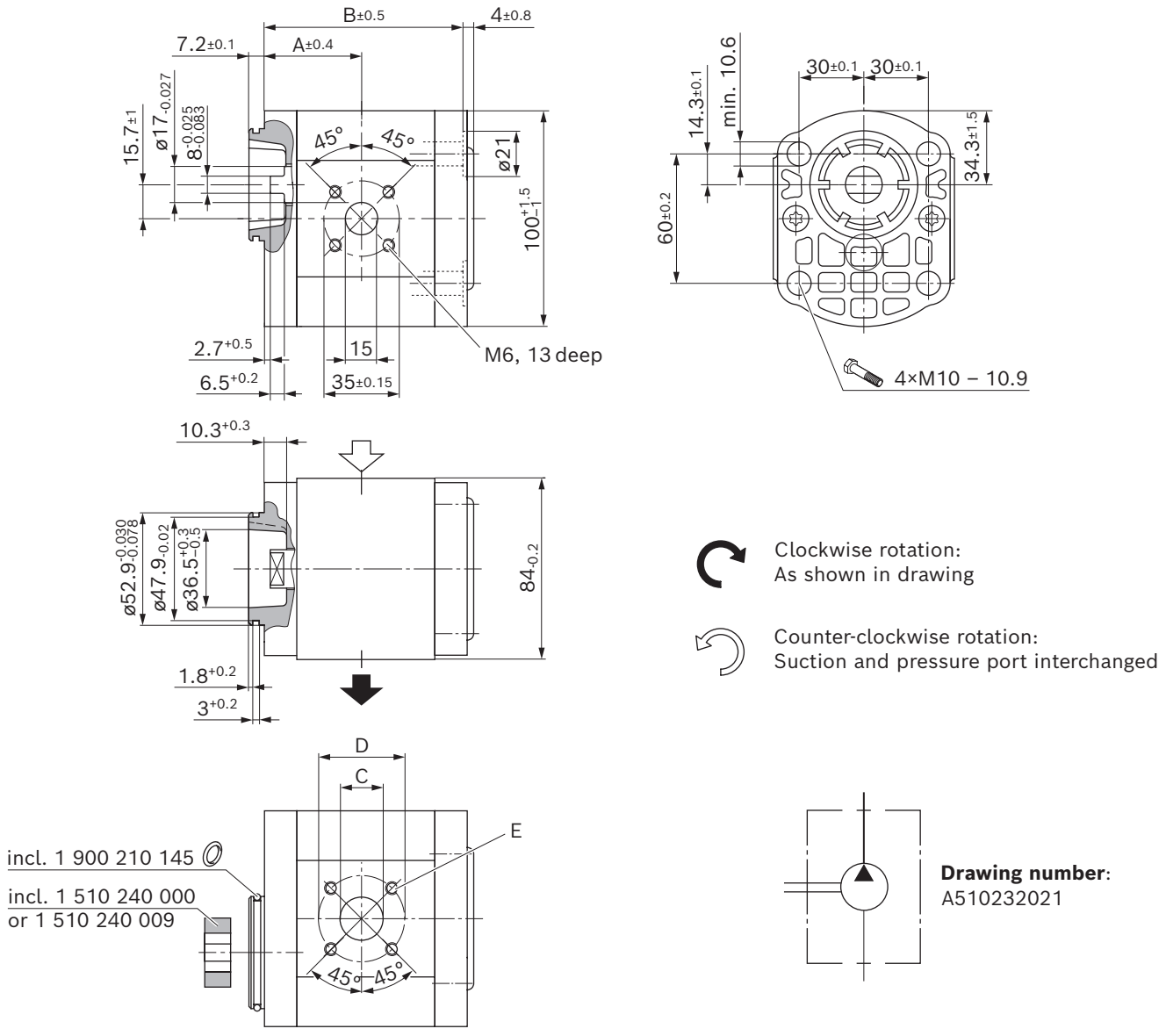


NG	Material number		Maximum intermittent	Maximum speed	Weight	Dimensions				
	Direction of rotation		pressure p_2	n_{max}	m	A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	mm
5	0 510 315 310		210	4000		38.6	72.6	15	40	
8	0 510 415 328		210	4000	2.7	40.7	80.3	20	40	
8	0 510 515 337		280	3500	2.8	44.5	85.3	20	40	
14	0 510 515 338	0 510 515 013	210	3000	3	45	90.3	20	40	M6; 13 deep
16	0 510 515 354	0 510 515 038	210	3000		45	93.7	20	40	
19	0 510 615 353	0 510 615 040	210	3000		45	98.7	20	40	
22		0 510 715 008 [1)]	210	3000	3.6	58.6	116.1	20	40	

1) Special version-S0040

Tang drive with 4-bolt mounting spigot diameter 52mm

AZPF – XX – … **NT20**MB

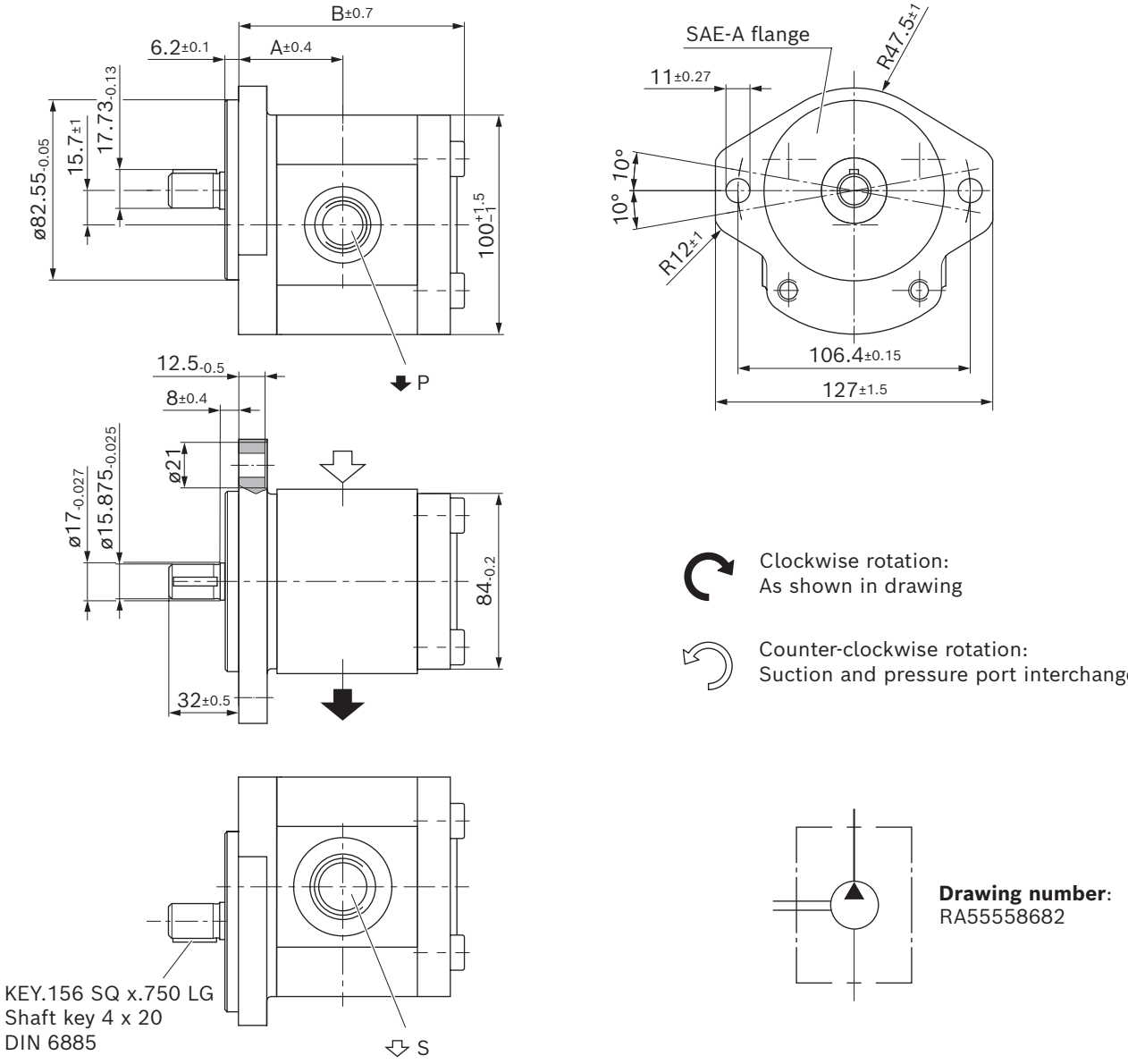


NG	Material number		Maximum intermittent	Maximum speed	Weight	Dimensions				
	Direction of rotation		pressure p_2	n_{max}	m	A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	mm
4	0 510 215 307	0 510 215 007	280	4000	2.5	37.4	73.7	15	40	M6; 13 deep
5	0 510 315 305	0 510 315 005	280	4000	2.5	38.6	76.2	15	40	
8	0 510 415 314	0 510 415 006	280	4000	2.5	40.7	80.3	20	40	
11	0 510 515 311	0 510 515 005	280	3500	2.6	44.5	85.3	20	40	
14	0 510 515 340	0 510 515 019	280	3000	2.38	45	90.3	20	40	
16	0 510 615 315	0 510 615 007	230	3000	3	45	93.7	20	40	
19	0 510 615 321	0 510 615 008	190	3000	3	45	98.7	20	40	
22	0 510 715 307	0 510 715 004	160	2500	3.2	52.6	104.1	20	40	
25		0 510 715 017[1)]	150	3000		60.7	120.5	26	55	M8; 13 deep
28		0 510 715 018[1)]	130	3000		63.1	125.3	26	55	

1) Special version-S0033

Parallel keyed shaft (SAE J744 16-1 A) with 2-bolt flange spigot diameter 82.55 mm, SAE J744 82-2 (A)

AZPF – 1X – … **QR12**MB

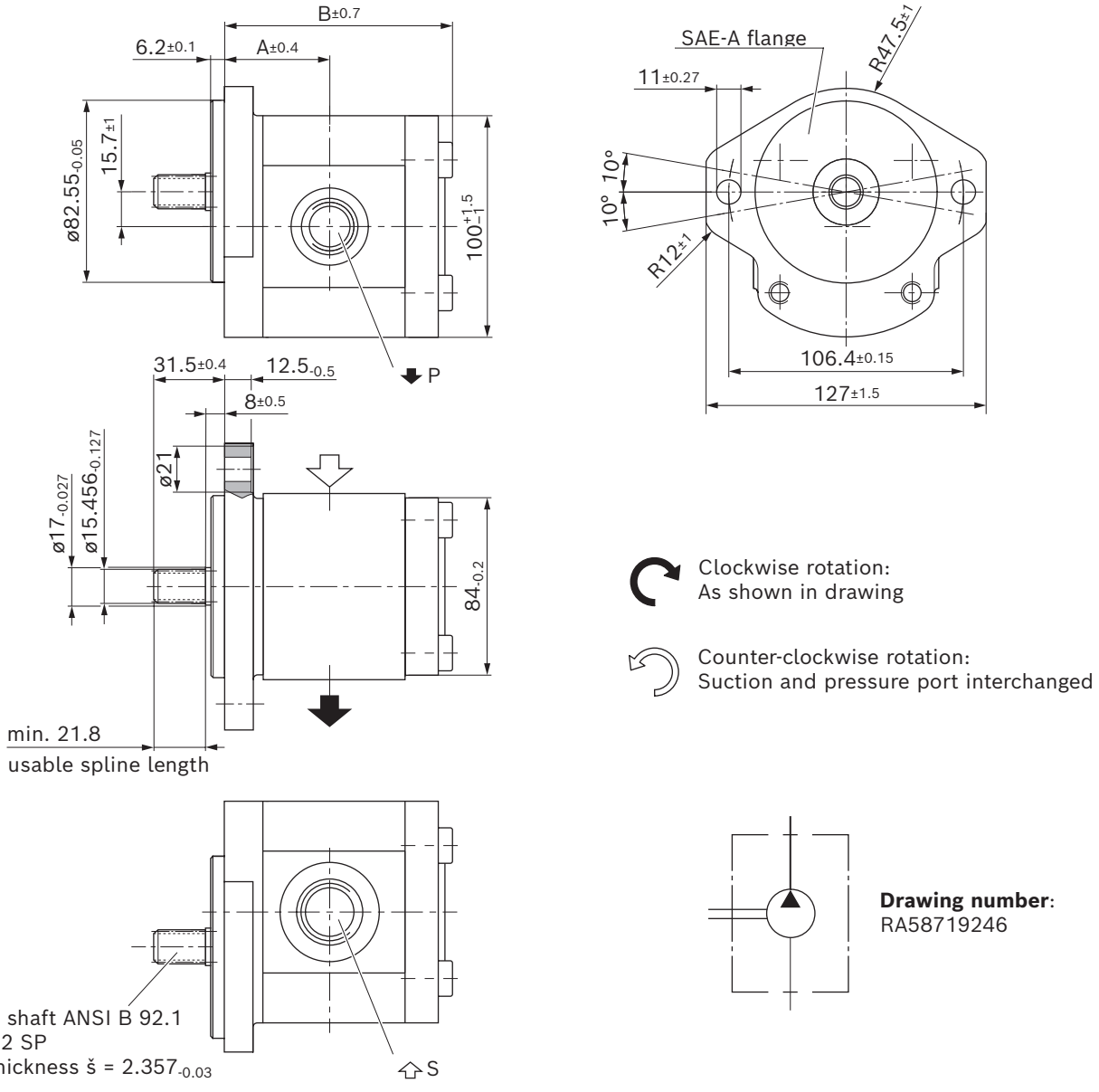


NG	Material number Direction of rotation counter clockwise	 clockwise	Maximum intermittent pressure p_2 bar	Maximum speed n_{max} rpm	Weight m kg	Dimensions A mm	B mm	S mm	P mm
4		0 510 225 011 [1]	260	4000	3.3	39.9	85	9/16-18 UNF-2B; 13 deep	9/16-18 UNF-2B; 13 deep
5	0 510 325 310 [1]	0 510 325 011 [1]	260	4000	3.3	41.1	85.1		
8		0 510 425 016 [1]	260	4000	3.4	43.2	91.6	7/8-14 UNF-2B; 16 deep	
11	0 510 525 316 [2]	0 510 525 015 [2]	260	3500	3.6	47	96.6		
14		0 510 525 031	230	3000	3.65	47.5	101.6	1 1/16-12 UN-2B; 19 deep	7/8-14 UNF-2B; 16 deep
16		0 510 625 021 [2]	200	3000	3.7	47.5	105		
19		0 510 625 041 [2]	170	3500	3.9	47.5	110		
22		0 510 725 059 [2]	140	2500	4	55.1	115.4		

1) Special version S0270
2) Special version S0040

Splined shaft (SAE J744 16-1 A) with 2-bolt flange spigot diameter 82.55 mm, SAE J744 82-2 (A)

AZPF – 1X – … **RR12**MB

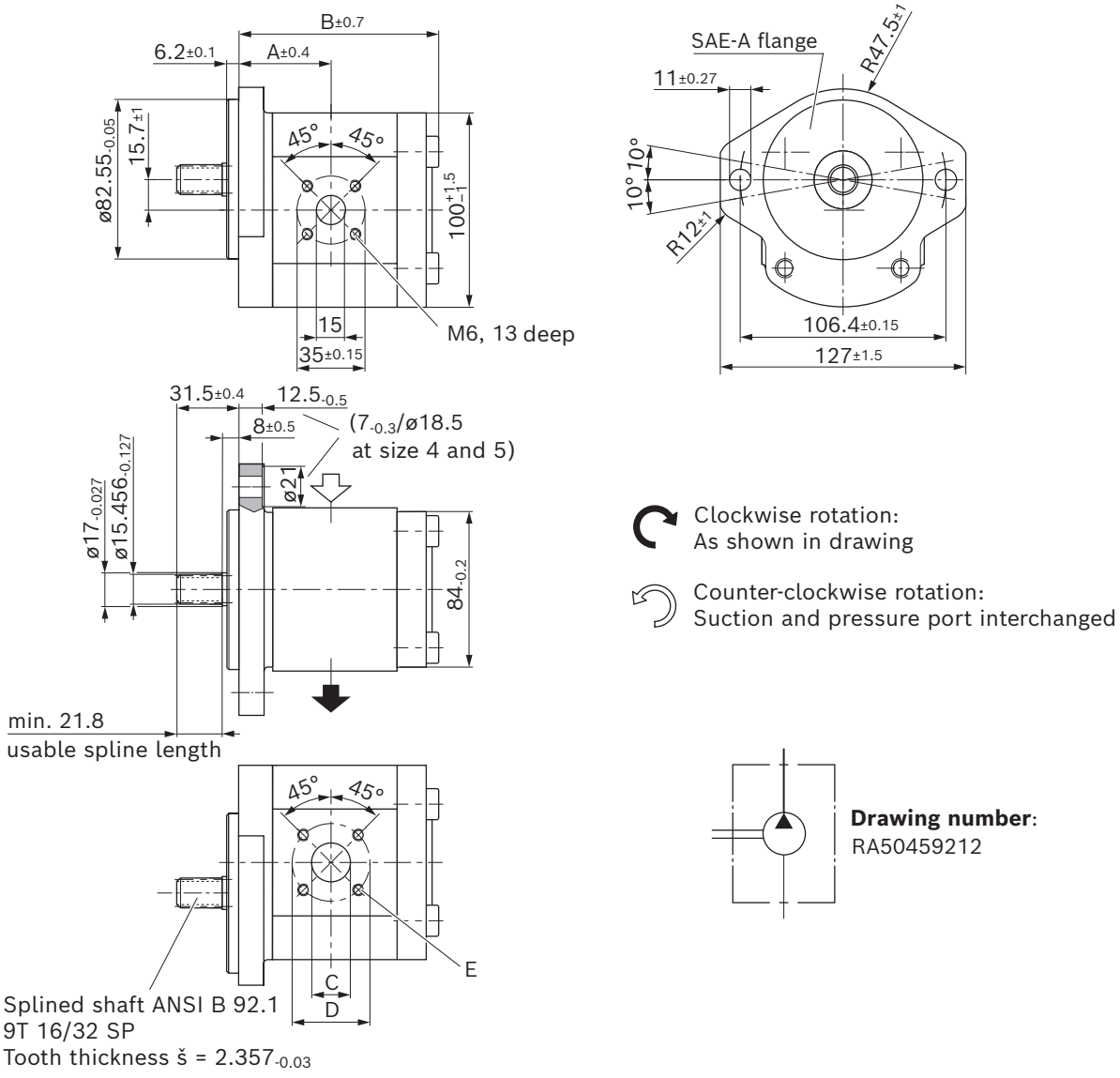


NG	Material number		Maximum intermittent pressure p_2	Maximum speed n_{max}	Weight m	Dimensions A	B	S	P
	Direction of rotation counter clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm
4		0 510 225 010 [2]	280	4000	3.15	39.9	82.7	9/16-18 UNF-2B; 13 deep	9/16-18 UNF-2B; 13 deep
5		0 510 325 010 [2]	280	4000	3.2	41.4	85.2		
8		0 510 425 015 [1]	280	4000	3.3	43.2	91.1	7/8-14 UNF-2B; 16 deep	7/8-14 UNF-2B; 16 deep
11	0 510 525 315	0 510 525 014	280	3500	3.4	47	96.1	1 1/16-12 UN-2B; 19 deep	
14		0 510 525 041	280	3000	3.5	47.5	101.1		
16		0 510 625 020 [1]	280	3000	3.75	47.5	104.5		
19	0 510 625 346 [1]	0 510 625 048 [1]	230	3000	3.9	47.5	109.5		
22		0 510 725 063 [1]	210	2500	4	55.1	114.9		

1) Special version S0270
2) Special version S0040

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

AZPF – 1X – ... **RR20**MB

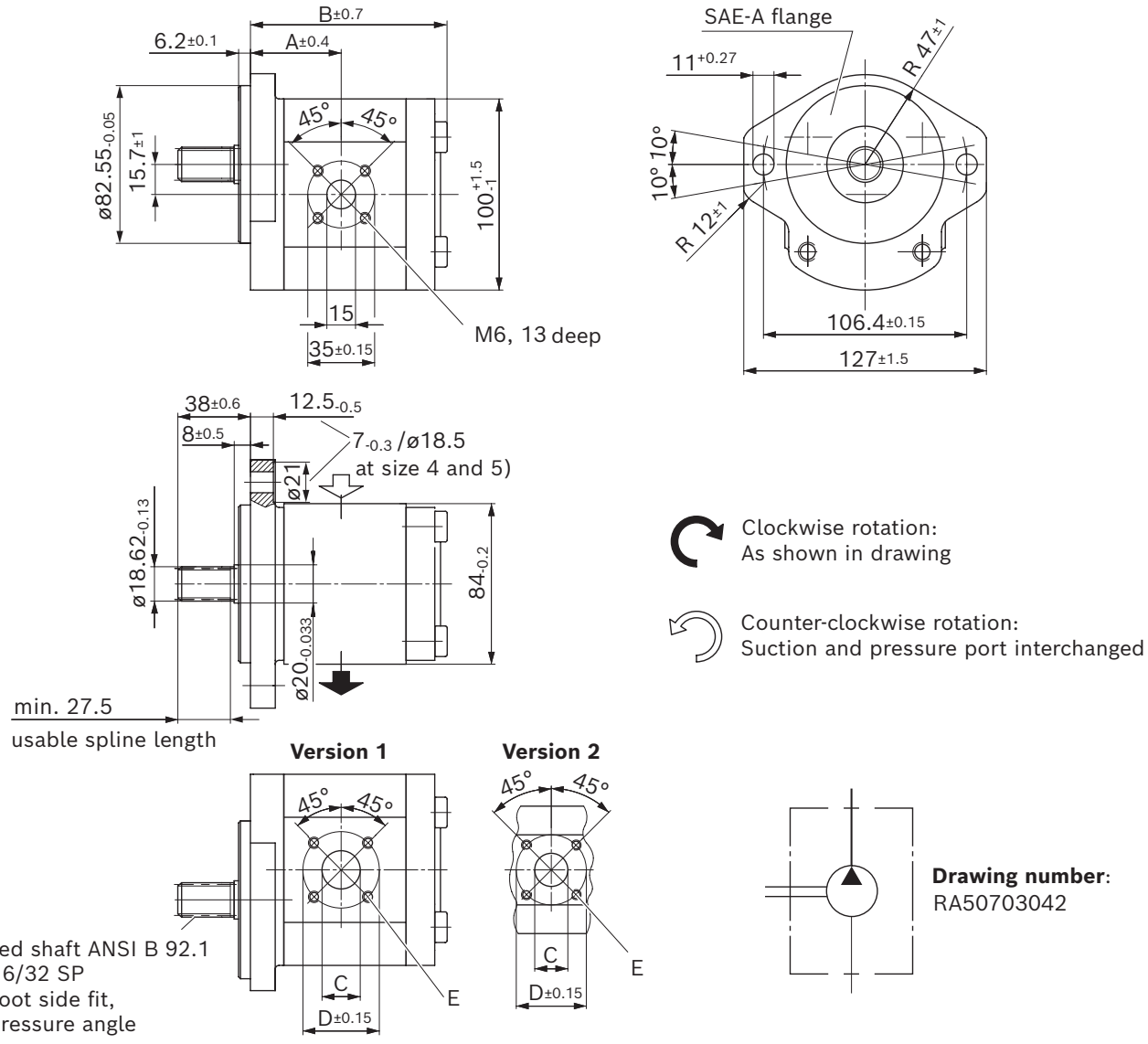


NG	Material number		Maximum intermittent pressure p_2	Maximum speed n_{max}	Weight m	Dimensions				
	Direction of rotation					A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	mm
4	0 510 225 314	0 510 225 013	280	4000	3.15	39.9	85	15	40	M6; 13 deep
5	0 510 325 313	0 510 325 013	280	4000	3.2	41.1	87.5	15	40	
8	0 510 425 314	0 510 425 020	280	4000	3.3	43.2	91.6	20	40	
11	0 510 525 324 [1]	0 510 525 019	280	3500	3.5	47	96.6	20	40	
14	0 510 525 325	0 510 525 020	280	3000	3.6	47.5	101.6	20	40	
16	0 510 625 329	0 510 625 028	280	3000	3.8	47.5	105	20	40	
19	0 510 625 330 [1]	0 510 625 029 [1]	230	3000	3.9	47.5	110	20	40	
22	0 510 725 361	0 510 725 077 [1]	210	2500	4.1	55.1	115.4	20	40	

1) Version with shaft seal ring in FKM (Type code - ...KB)

Splined shaft (SAE J744 19-4 11T) with 2-bolt flange spigot diameter 82,55 mm, SAE J744 82-2 (A)

AZPF – 2X – … **PR20**KB

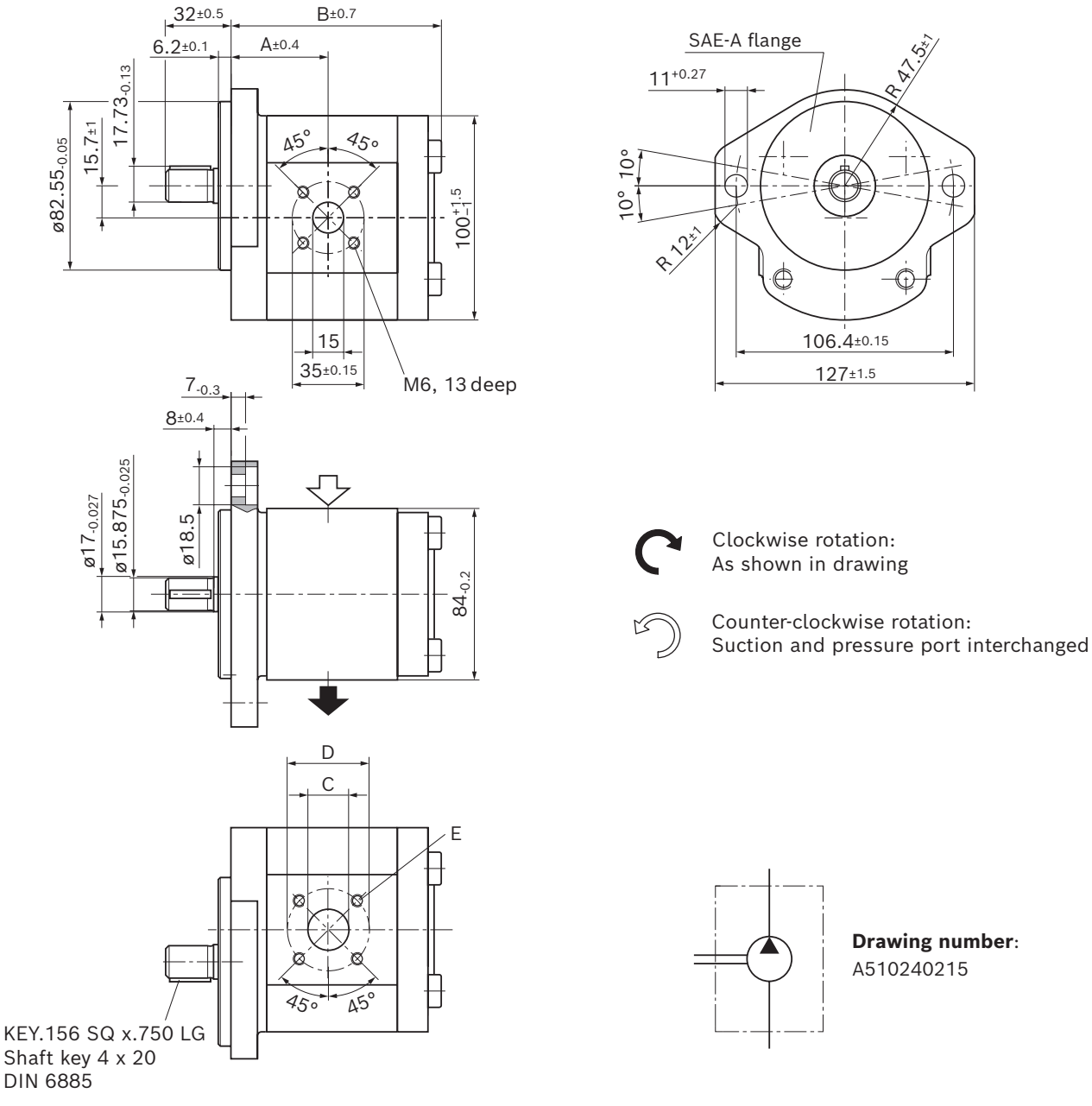


NG	Material number Direction of rotation counter-clockwise	 clockwise	Maximum intermittent pressure p_2 bar	Maximum speed n_{max} rpm	Weight m kg	Dimensions A mm	B mm	C mm	D mm	E mm	Version
5	0 510 325 329		210	2600	3.2	41.1	85.1	15	40	M6; 13 deep	1
8		0 510 425 060	280	4000	3.3	43.2	89.2	20	40		
11			280	3500		47	94.2	20	40		
14		0 510 525 108 [2]	280	3000	3.6	47.5	99.2	20	40		
16	0 510 625 405	0 510 625 101	280	3000	3.7	47.5	102.6	20	40		
19	0 510 625 401 [1]	0 510 625 102 [1]	250	3000 [3]	4.1	58.4	119.4	20	40		
19			250	3500		58.4	119.4	26	55	M8; 13 deep	2
22		0 510 725 215 [1]	250	3000 [3]	4.3	61.1	125	20	40	M6; 13 deep	1
22	0 510 725 479 [2]		250	3500	4.3	61.1	125	26	55	M8; 13 deep	2
28	0 510 725 488		200	3000	4.4	65.6	134	26	55		

1) Special version S0040
2) Version with sealing material in FKM (Type code - ...PB)
3) Pressure in suction port at least 0.9 bar absolute

Parallel keyed shaft (SAE J744 16-1 A) with 2-bolt flange spigot diameter 82.55 mm, SAE J744 82-2 (A)

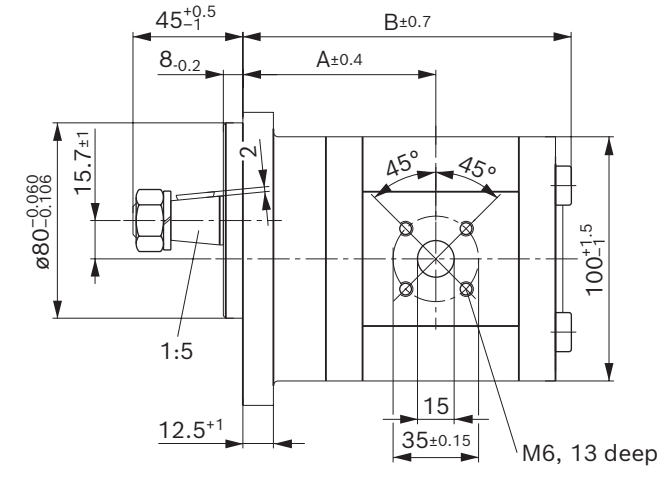
AZPF – 1X – … **QR20**MB

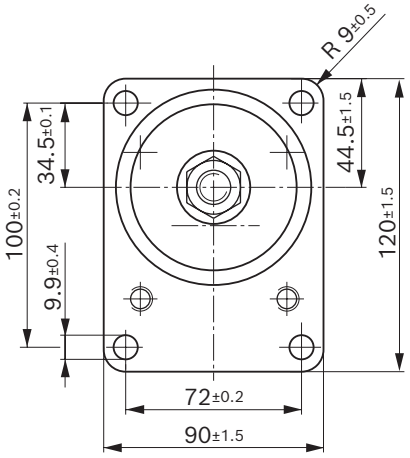


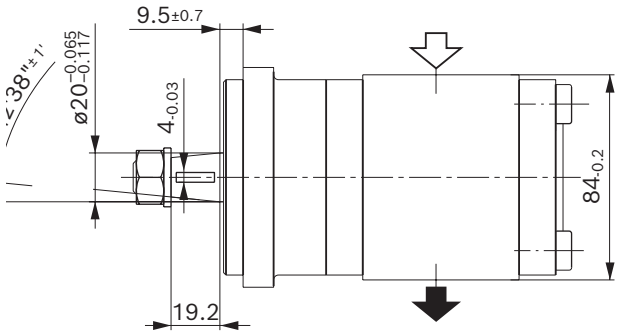
NG	Material number		Maximum intermittent pressure p_2	Maximum speed n_{max}	Weight m	Dimensions				
	Direction of rotation					A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	mm
4		0 510 225 014	280	4000	3.2	39.9	84.5	15	40	M6; 13 deep
5		0 510 325 016	280	4000	3.3	41.1	87	15	40	
8		0 510 425 025	280	4000	3.3	43.2	91.1	20	40	
11		0 510 525 033	280	3500	3.5	47	96.1	20	40	
16		0 510 625 042	200	3000	3.8	47.5	104.5	20	40	
19		0 510 625 043	170	3000	3.9	47.5	109.5	20	40	
22	0 510 725 396	0 510 725 060	140	2500	3.9	55.1	114.9	20	40	

Tapered keyed shaft 1:5 with outrigger bearing spigot diameter 80 mm, type 1

AZPF – 11 – … **SA20**MB

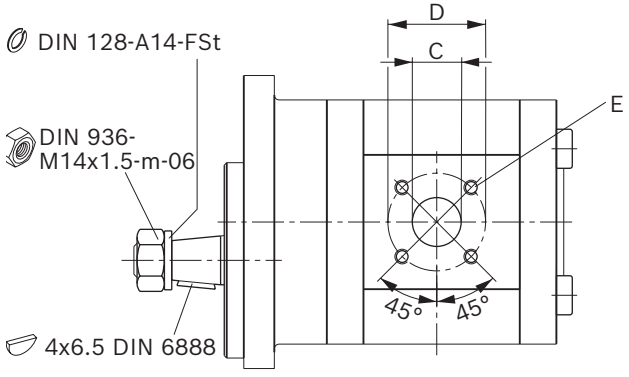


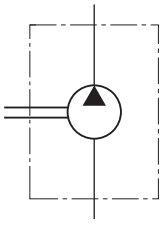




Clockwise rotation:
As shown in drawing

Counter-clockwise rotation:
Suction and pressure port interchanged





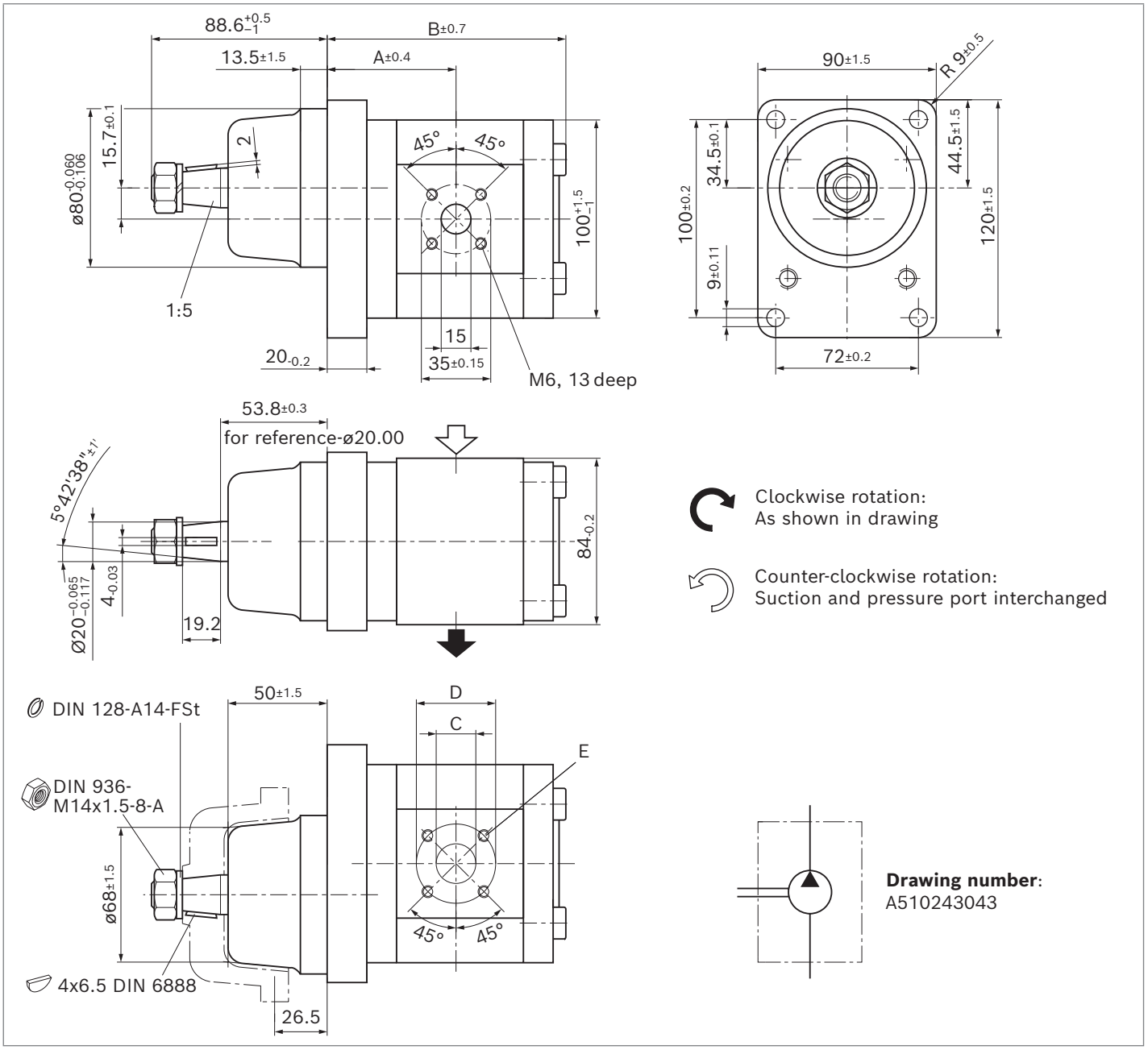
Drawing number:
A510243021

NG	Material number		Maximum intermittent pressure p_2	Maximum speed n_{max}	Weight m	Dimensions A	B	C	D	E
	Direction of rotation									
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	mm
4	0 510 245 300	0 510 245 001	280	4000	3.1	71.1	114.2	15	40	M6; 13 deep
5	0 510 345 300	0 510 345 001	280	4000	3.1	72.3	116.7	15	40	
8	0 510 445 300	0 510 445 001 [1]	280	4000	3.3	74.4	120.8	20	40	
11	0 510 545 300	0 510 545 001	280	3500	3.5	78.2	125.8	20	40	
14			280	3000		78.7	130.8	20	40	
16	0 510 645 300	0 510 645 004	230	3000	3.6	78.7	134.2	20	40	
19		0 510 645 002	190	3000	3.9	78.7	139.2	20	40	
22			160	2500		92.3	156.6	20	40	

1) Version with shaft seal ring in FKM (Type code - ...KB)

Tapered keyed shaft 1:5 with outrigger bearing spigot diameter 80mm, type 2

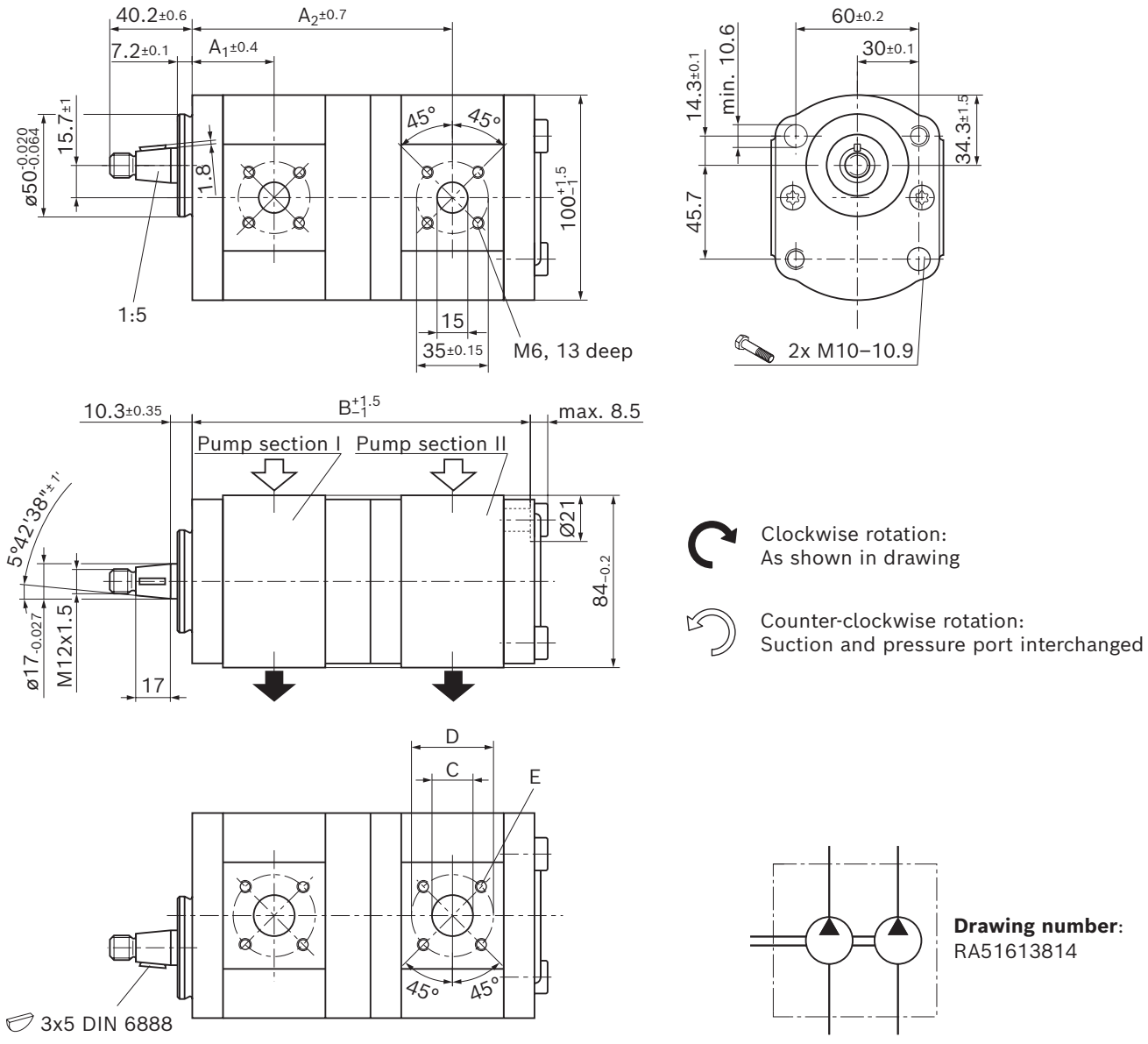
AZPF – 1X – … **SG20**MB



NG	Material number		Maximum intermittent pressure p_2	Maximum speed n_{max}	Weight m	Dimensions				
	Direction of rotation					A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	mm
11		0 510 545 003	280	3500	3.8	64.5	113.8	20	40	M6; 13 deep
14	0 510 545 302	0 510 545 002	280	3000	4	65	118.8	20	40	
16		0 510 645 005	230	3000	4.1	65	122	20	40	
19		0 510 645 003	230	3000	4.3	65	127	20	40	

Tapered keyed shaft 1:5 with 2-bolt mounting spigot diameter 50 mm

AZPFF – 12 – … **CP2020**KB-S0007

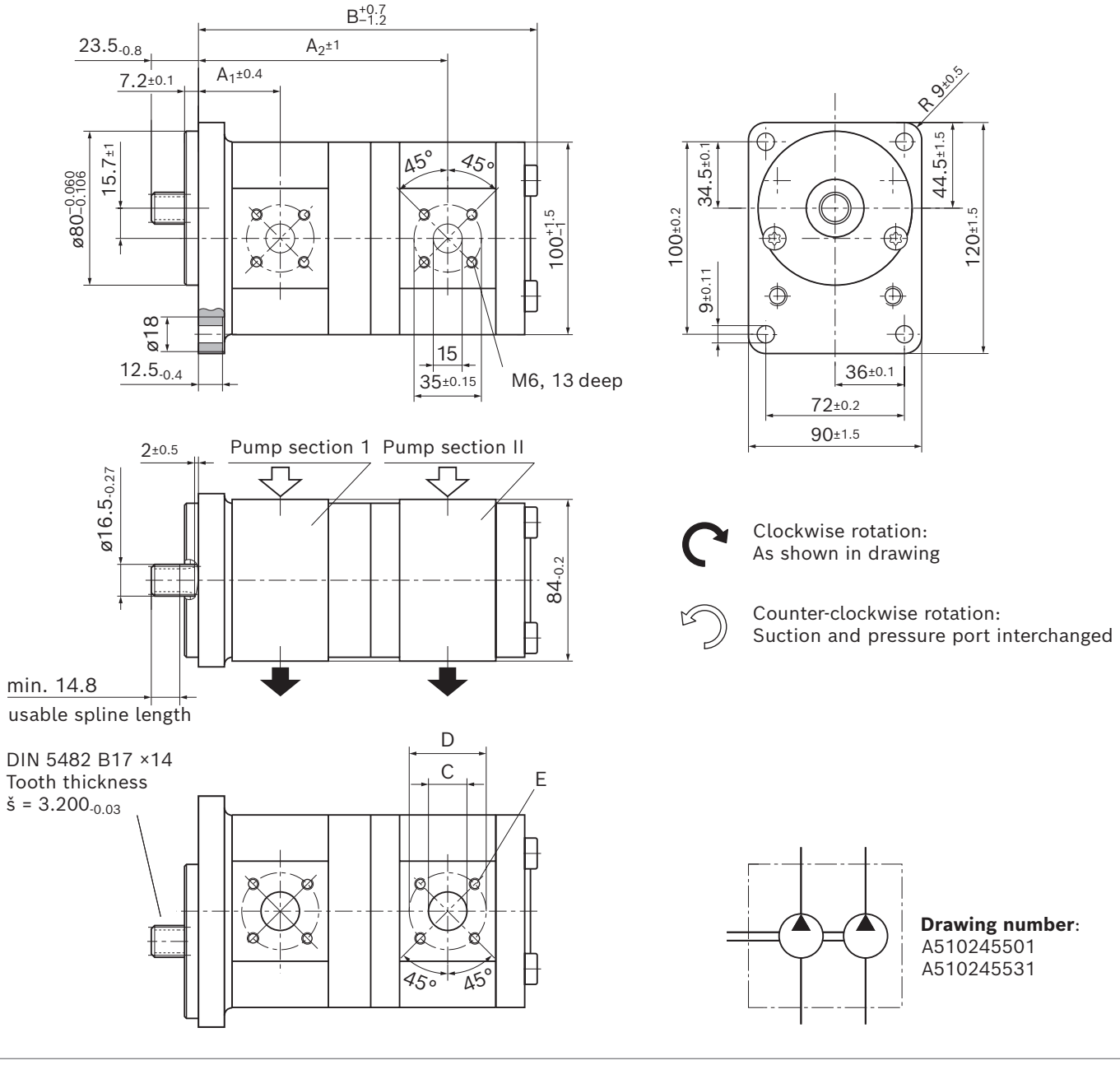


NG		Material number		Maximum intermittend pressure		Maximum speed	Weight	Dimensions					
P_I	P_{II}	Direction of rotation		$p_{2\,I}$	$p_{2\,II}$	n_{max}	m	A_1	A_2	B	C	D	E
		counter-clockwise	clockwise	bar	bar	rpm	kg	mm	mm	mm	mm	mm	mm
5	4	0 510 365 305		280	280	4000	4.8	38.6	121.6	157.9	15	40	
8	4	0 510 465 324	0 510 465 011	280	280	4000	4.4	40.7	125.7	162	20 [1]	40	
8	5	0 510 465 344	0 510 465 032	280	280	4000	4.4	40.7	126.9	164.5	20 [1]	40	
8	8	0 510 465 320	0 510 465 023	280	280	4000	5.4	40.7	129	168.6	20	40	
11	4	0 510 565 387		280	280	3500	4.5	44.5	130.7	167	20 [1]	40	
11	5	0 510 565 319	0 510 565 095	280	280	3500	4.5	44.5	131.9	169.5	20 [1]	40	
11	8	0 510 565 389	0 510 565 014	280	280	3500	4.6	44.5	134	173.6	20	40	
11	11	0 510 565 376	0 510 565 061	280	280	3500	4.8	44.5	137.8	178.6	20	40	
14	4	0 510 565 406		280	280	3000	4.6	45	135.7	172	20 [1]	40	
14	8	0 510 565 335	0 510 565 072	280	280	3000	4.8	45	139	178.6	20	40	
14	11	0 510 565 393		280	280	3000	5	45	142.8	183.6	20	40	
14	14		0 510 565 417	280	280	3000	5	45	143.3	188.6	20	40	
16	4	0 510 665 348		280	280	3000	4.75	45	139.1	175.4	20 [1]	40	M6; 13 deep
16	5	0 510 665 337		280	280	3000	4.8	45	140.3	177.9	20 [1]	40	
16	8	0 510 665 328	0 510 665 135	280	280	3000	6	45	142.4	182	20	40	
16	11	0 510 665 382	0 510 665 152	280	280	3000	5	45	146.2	187	20	40	
16	14	0 510 665 381	0 510 665 144	280	280	3000	5.1	45	146.7	192	20	40	
16	16	0 510 665 330	0 510 665 052	280	230	3000	6.4	45	146.7	195.4	20	40	
22	8	0 510 765 345		210	280	2500	5.1	52.6	152.8	192.4	20	40	
22	11	0 510 765 309	0 510 765 049	210	280	2500	5.2	52.6	156.7	197.7	20	40	
22	16	0 510 765 343	0 510 765 028	210	230	2500	5.5	52.6	157.1	205.8	20	40	
19	4	0 510 665 369		230	280	3000	4.9	45	144.1	180.4	20 [1]	40	
19	5			230	280	3000	4.8	45	145.3	183.2	20 [1]	40	
19	11	0 510 665 368		230	280	3000	5.2	45	146.2	192	20	40	
19	14			230	280	3000	5	45	151.7	197	20	40	
19	19	0 510 665 336		230	190	3000	6.6	45	151.7	205.4	20	40	

1) At pump section with size 4 and 5: C = 15 mm

Splined shaft (DIN 5482 B17 x 14) with rectangular flange spigot diameter 80 mm

AZPFF – 1X – … **FB2020**MB

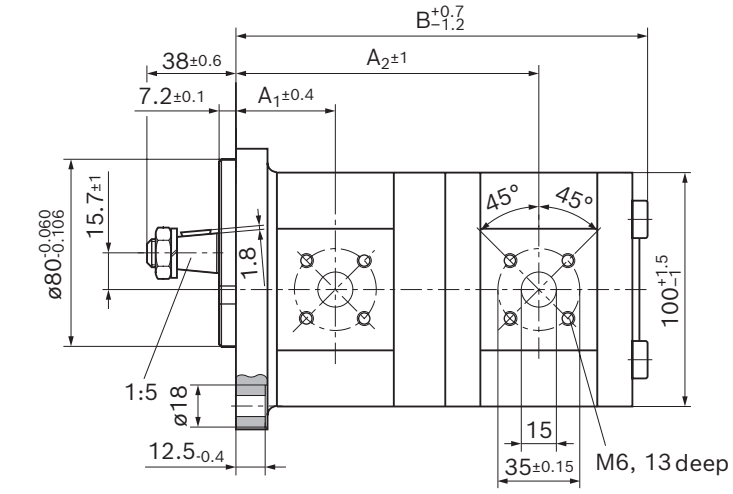


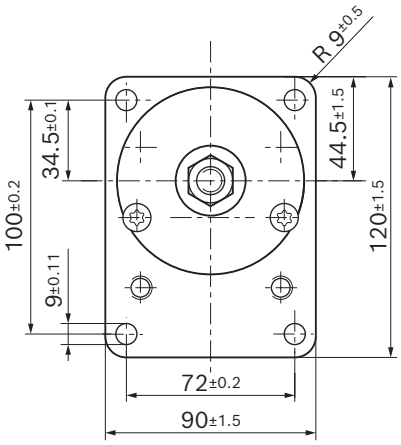
NG		Material number		Maximum intermittend pressure		Maximum speed	Weight	Dimensions					
P_I	P_{II}	Direction of rotation		$p_{2\,I}$	$p_{2\,II}$	n_{max}	m	A_1	A_2	B	C	D	E
		counter-clockwise	clockwise	bar	bar	rpm	kg	mm	mm	mm	mm	mm	mm
8	5	0 510 465 345		280	280	4000	5.1	43.2	129.4	174	20 [1]	40	
8	8	0 510 465 326		280	280	4000	5.1	43.2	131.5	178.1	20	40	
11	4		0 510 565 032	280	280	3500	6.3	47	133.2	176.5	20 [1]	40	
11	5	0 510 565 332	0 510 565 034	280	280	3500	6.35	47	134.4	179	20 [1]	40	
11	8		0 510 565 018	280	280	3500	6.4	47	136.5	183.1	20	40	
11	11	0 510 565 328	0 510 565 035	280	280	3500	6.5	47	140.3	188.1	20	40	
14	4	0 510 565 367		280	280	3000	6.4	47.5	138.2	181.5	20 [1]	40	
14	5	0 510 565 069		280	280	3500	6.5	47.5	139.4	183.7	20 [1]	40	
14	8	0 510 565 356	0 510 565 019	280	280	3000	6.5	47.5	141.5	188.1	20	40	
16	4			280	280	3000	6.7	47.5	141.6	184.9	20	40	M6; 13 deep
16	8	0 510 665 333	0 510 665 064	280	280	3000	6.8	47.5	144.9	191.5	20	40	
16	11	0 510 665 347	0 510 665 036	280	280	3000	6.9	47.5	148.7	196.5	20	40	
16	16	0 510 665 334	0 510 665 029	280	230	3000	7.3	47.5	149.2	204.9	20	40	
22	5	0 510 765 317	0 510 765 022	210	280	2500	5.8	61.1	165.2	209.8	20 [1]	40	
22	8	0 510 765 331		210	280	2500	6.18	61.1	167.3	213.9	20	40	
22	16	0 510 765 341		210	230	2500	6.4	61.1	171.6	227.3	20	40	
22	22	0 510 765 338		210	160	2500	7.05	61.1	185.2	249.7	20	40	
19	4			230	280	3000	5.5	47.5	146.6	189	20	40	
19	11	0 510 665 375		230	280	3000	5.9	47.5	153.7	201.5	20	40	
19	19		0 510 665 097	230	190	3000	6.3	47.5	154.2	214.9	20	40	

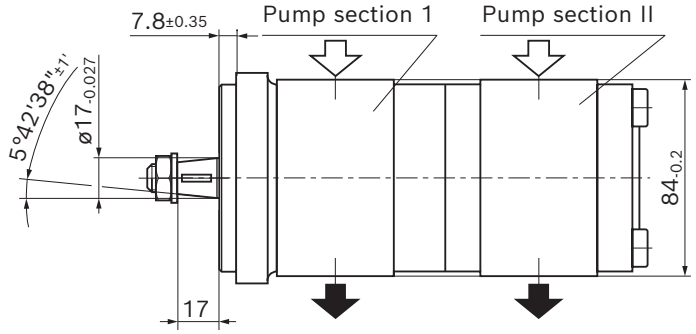
1) At pump section with size 4 and 5: C = 15 mm

Tapered keyed shaft 1:5 with rectangular flange spigot diameter 80 mm

AZPFF – 1X – … **CB2020**MB

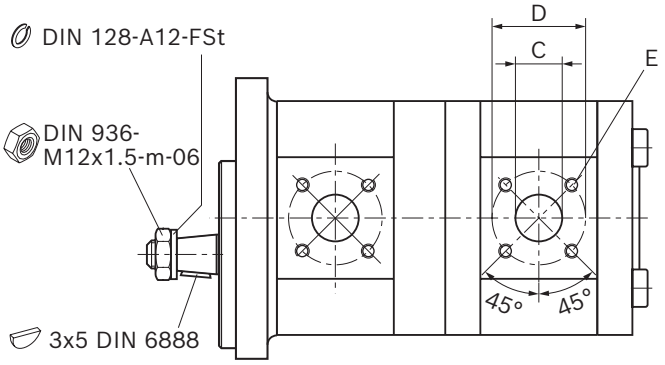


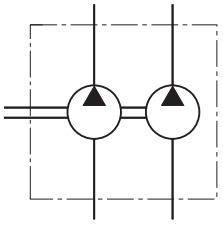




Clockwise rotation:
As shown in drawing

Counter-clockwise rotation:
Suction and pressure port interchanged





Drawing number:
A510244533
RA56361307

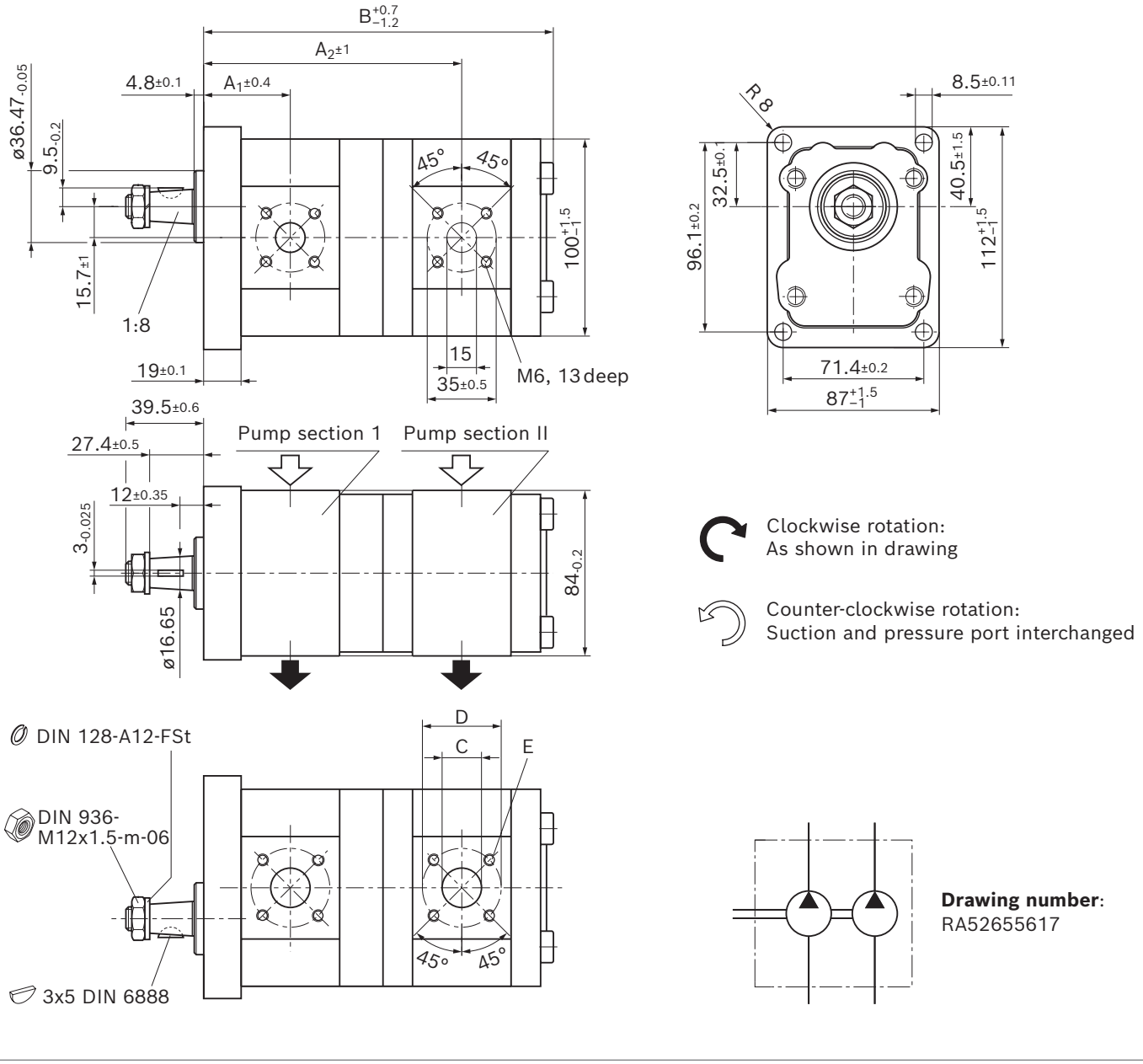
NG		Material number		Maximum intermittend pressure		Maximum speed	Weight	Dimensions					
P_I	P_{II}	Direction of rotation		$p_{2\,I}$	$p_{2\,II}$	n_{max}	m	A_1	A_2	B	C	D	E
		counter-clockwise	clockwise	bar	bar	rpm	kg	mm	mm	mm	mm	mm	mm
4	4	0 510 900 002	0 510 900 001	280	280	4000	4.5	39.9	121.6	164.4	15	40	
5	4	0 510 900 005		280	280	4000	4.9	41.1	124.1	166.9	15	40	
5	5	0 510 900 004	0 510 900 003	280	280	4000	5	41.1	125.3	169.4	15	40	
8	16		0 510 900 042	280	230	3000	5.6	43.2	135.8	191	20	40	
8	4	0 510 900 008	0 510 900 051	280	280	4000	5.1	43.2	128.2	171	20 [1]	40	
8	5	0 510 900 009	0 510 900 007	280	280	4000	5.1	43.2	129.4	173.5	20 [1]	40	
8	8	0 510 900 010	0 510 900 006	280	280	4000	5.2	43.2	131.5	177.6	20	40	
11	4	0 510 900 015	0 510 900 012	280	280	3500	5.2	47	133.2	176	20 [1]	40	
11	5	0 510 900 017	0 510 900 046	280	280	3500	5.2	47	134.4	178.5	20 [1]	40	
11	8	0 510 900 016	0 510 900 044	280	280	3500	5.4	47	136.5	182.6	20	40	
11	11	0 510 900 018	0 510 900 039	280	280	3500	5.5	47	140.3	187.6	20	40	
14	4	0 510 900 036		280	280	3000	5.3	47.5	138.2	181	20 [1]	40	
14	5		0 510 900 060	280	280	3000	5.4	47.5	139.4	183.5	20 [1]	40	
14	8	0 510 900 020	0 510 900 011	280	280	3000	5.5	47.5	141.5	187.6	20	40	
14	8		0 510 565 012	280	280	3000	5.6	47.5	141.5	188.1	20	40	
14	11	0 510 900 019	0 510 900 013	280	280	3000	5.6	47.5	145.3	192.6	20	40	
14	11	0 510 565 353	0 510 565 033	280	280	3000	5.7	47.5	145.3	193.1	20	40	
14	14		0 510 900 014	280	280	3000	5.8	47.5	145.8	197.6	20	40	
14	14			280	280	3000	5.9	47.5	145.8	198.1	20	40	
16	4	0 510 900 059	0 510 900 021	280	280	3000	5.5	47.5	141.6	184.4	20 [1]	40	
16	5	0 510 900 028		280	280	3000	5.5	47.5	142.8	186.9	20 [1]	40	
16	8	0 510 900 035	0 510 900 022	280	280	3000	5.6	47.5	144.9	191	20	40	
16	11	0 510 900 029	0 510 900 023	280	280	3000	5.7	47.5	148.7	196	20	40	
16	14		0 510 900 061	280	280	3000	5.9	47.5	149.2	201	20	40	
16	16	0 510 900 030	0 510 900 024	280	230	3000	6	47.5	149.2	204.4	20	40	M6; 13 deep
19	4	0 510 900 043	0 510 900 049	230	280	3000	5.6	47.5	146.6	189.4	20 [1]	40	
19	5		0 510 665 067	230	280	3000	5.6	47.5	147.8	192.4	20 [1]	40	
19	5		0 510 900 027	230	280	3000	5.6	47.5	147.8	191.9	20 [1]	40	
19	8	0 510 900 031	0 510 900 047	230	280	3000	5.8	47.5	149.9	196	20	40	
19	8	0 510 665 325	0 510 665 024	230	280	3000	6.7	47.5	149.9	196.5	20	40	
19	11	0 510 900 032	0 510 900 052	230	280	3000	5.9	47.5	153.7	201	20	40	
19	11	0 510 665 326		230	280	3000	6.9	47.5	153.9	201.5	20	40	
19	14	0 510 900 053		230	280	3000	6	47.5	154.2	206	20	40	
19	16	0 510 665 327		230	230	3000	7.1	47.5	154.2	209.9	20	40	
19	16	0 510 900 033	0 510 900 026	230	230	3000	6.1	47.5	154.2	209.4	20	40	
19	19	0 510 900 034	0 510 900 025	230	210	3000	6.2	47.5	154.2	214.4	20	40	
19	19	0 510 665 400	0 510 665 025	230	190	3000	6.2	47.5	154.2	214.9	20	40	
22	4		0 510 900 050	210	280	2500	5.8	55.1	152	194.8	20 [1]	40	
22	5	0 510 900 055	0 510 900 045	210	280	2500	5.8	55.1	153.2	197.3	20 [1]	40	
22	8	0 510 900 057	0 510 900 040	210	280	2500	5.9	55.1	155.3	201.4	20	40	
22	8		0 510 765 023	230	280	3000	5.9	61	167.3	213.9	20	40	
22	11		0 510 900 054	210	280	2500	6	55.1	159.1	206.4	20	40	
22	11	0 510 765 320 [2]		210	250	3000	6.3	61	171.1	218.9	20	40	
22	14	0 510 900 048	0 510 900 058	210	280	2500	6.2	55.1	159.6	211.4	20	40	
22	16	0 510 900 041	0 510 900 037	210	230	2500	6.2	55.1	159.6	214.8	20	40	
22	16	0 510 765 340 [2]		210	230	3000	6.55	61	171.6	227.3	20	40	
22	22	0 510 900 056	0 510 900 038	210	180	2500	6.5	55.1	167.2	225.2	20	40	
22	22		0 510 765 012 [2]	210	160	3000	6.5	61	185.2	249.7	20	40	

1) At pump section with size 4 and 5: C = 15 mm

2) Special version- S0012

Tapered keyed shaft 1:8 with rectangular flange spigot diameter 36.47 mm

AZPFF – 1X – … **HO2020**MB



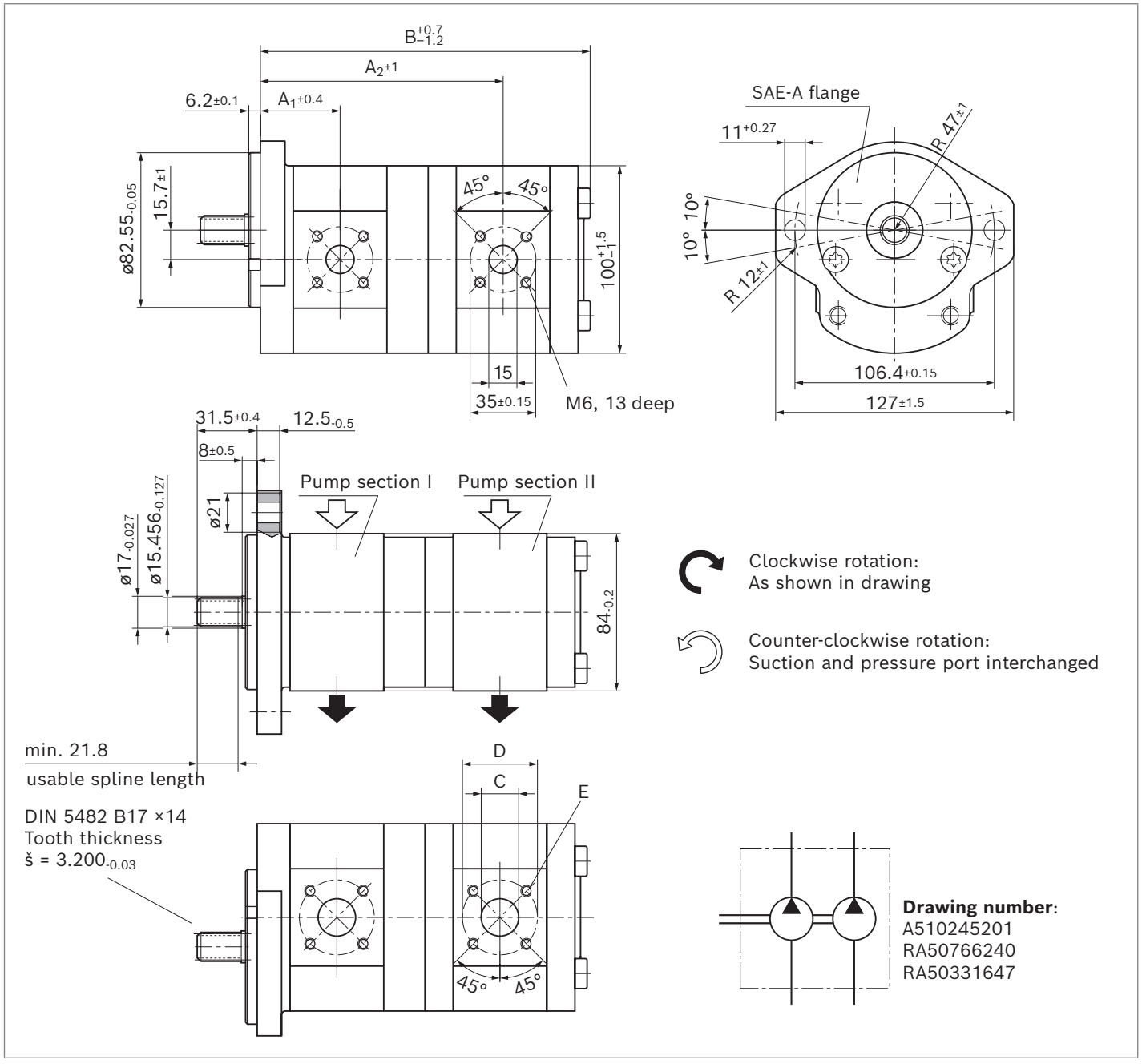
NG		Material number		Maximum intermittend pressure		Maximum speed	Weight	Dimensions					
		Direction of rotation		$p_{2\,I}$	$p_{2\,II}$	n_{max}	m	A_1	A_2	B	C	D	E
P_I	P_{II}	counter-clockwise	clockwise	bar	bar	rpm	kg	mm	mm	mm	mm	mm	mm
4	4		0 510 901 500	280	280	4000	4.7	41.4	123.1	165.9	15	40	
8	5	0 510 901 512		280	280	4000	4.9	44.7	130.9	175	20 [2]	40	
8	8		0 510 901 504	280	280	4000	5	44.7	133	179.1	20	40	
11	4		0 510 901 509	280	280	3500	5	48.5	134.7	177.5	20 [2]	40	
11	5	0 510 565 436 [1]	0 510 901 503	280	280	3500	5.1	48.5	135.9	180	20 [2]	40	
14	5	0 510 565 435 [1]		280	280	3000	5.2	49	140.9	185	20 [2]	40	
14	11		0 510 901 513	280	280	3000	5.5	49	146.8	194.1	20	40	
16	5		0 510 901 510	280	280	3000	5.3	49	144.3	188.4	20 [2]	40	
16	8	0 510 901 514		280	280	3000	5.4	49	146.4	192.5	20	40	M6; 13 deep
16	14		0 510 901 515	280	280	3000	5.7	49	150.7	202.5	20	40	
16	16		0 510 901 501	280	230	3000	5.8	49	150.7	205.9	20	40	
19	8		0 510 901 507	230	280	3000	5.5	49	151.4	197.5	20	40	
19	11		0 510 901 508	230	280	3000	5.6	49	155.2	202.5	20	40	
19	16		0 510 901 502	230	230	3000	5.9	49	155.7	210.9	20	40	
19	19	0 510 901 506		230	190	3000	6	49	155.7	215.9	20	40	
22	16	0 510 901 511		210	230	2500	6.1	56.6	161.1	216.3	20	40	
22	19		0 510 901 505	210	190	2500	6.2	56.6	161.7	220.3	20	40	

1) Version with shaft seal ring in FKM (Type code - ...KB) and special version-S0055

2) At pump section with size 4 and 5: C = 15 mm

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

AZPFF – 1X – … **RR2020**MB

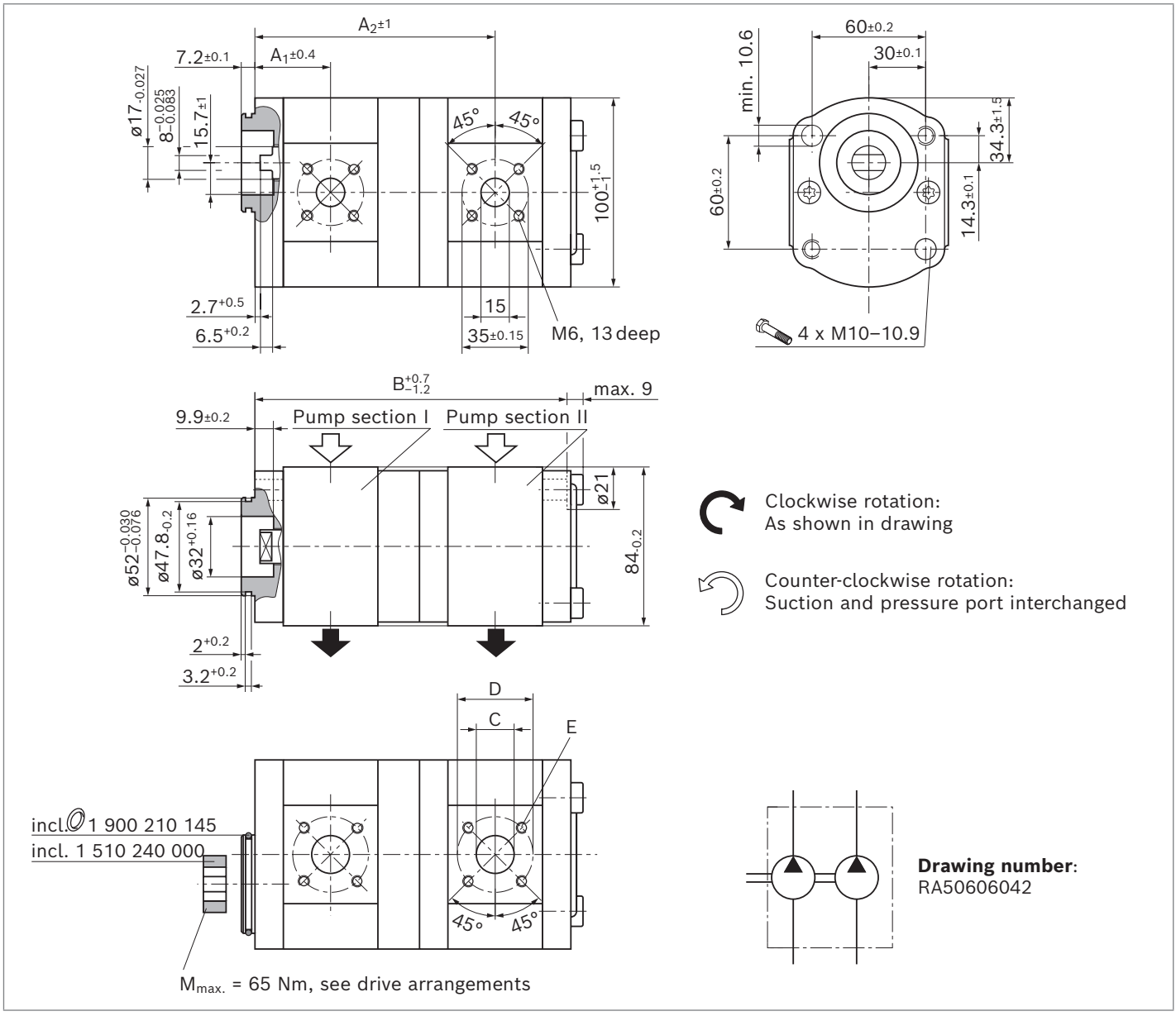


NG		Material number		Maximum intermittend pressure		Maximum speed	Weight	Dimensions					
P_I	P_{II}	Direction of rotation counter-clockwise	clockwise	$p_{2\,I}$ bar	$p_{2\,II}$ bar	n_{max} rpm	m kg	A_1 mm	A_2 mm	B mm	C mm	D mm	E mm
5	4	0 510 901 029		280	280	4000	4.9	41.1	124.1	166.9	15	40	
5	5		0 510 901 042	280	280	4000	5	41.1	125.3	169.4	15	40	
8	4	0 510 901 032	0 510 901 034	280	280	4000	5	43.2	128.2	171	20 [2]	40	
8	5	0 510 901 018	0 510 901 030	280	280	4000	5.1	43.2	129.4	173.5	20 [2]	40	
8	8		0 510 901 021	280	280	4000	5.1	43.2	131.5	177.6	20	40	
11	4		0 510 901 024	280	280	3500	5.1	47	133.2	176	20 [2]	40	
11	4		0 510 565 022	280	280	3500	5.2	47	133.2	176.5	20 [2]	40	
11	5	0 510 901 015	0 510 901 000	280	280	3500	5.2	47	134.4	178.5	20 [2]	40	
11	5			280	280	3500	5.2	47	134.4	179	20 [2]	40	
11	8	0 510 901 031	0 510 901 037	280	280	3500	5.3	47	136.5	182.2	20	40	
11	11	0 510 901 009	0 510 901 035 [1]	280	280	3500	5.5	47	140.3	187.6	20	40	
14	5	0 510 901 033		280	280	3000	5.4	47.5	139.4	183.5	20 [2]	40	
14	8		0 510 901 016	280	280	3000	5.5	47.5	141.5	187.6	20	40	
14	11			280	280	3000	5.7	47.5	145.3	193.1	20	40	
14	11	0 510 901 001	0 510 901 011	280	280	3000	5.6	47.5	145.3	192.6	20	40	
14	14		0 510 901 036	280	280	3000	5.7	47.5	145.8	197.6	20	40	
16	4		0 510 901 028	280	280	3000	5.4	47.5	141.6	184.4	20	40	
16	5	0 510 901 014	0 510 901 008	280	280	3000	5.4	47.5	142.8	186.9	20 [2]	40	
16	8	0 510 901 006	0 510 901 005	280	280	3000	5.5	47.5	144.9	191	20	40	M6; 13 deep
16	11	0 510 901 012	0 510 901 002	280	280	3000	5.7	47.5	148.7	196	20	40	
16	11	0 510 665 354		280	280	3000	5.8	47.5	148.7	196	20	40	
16	16	0 510 901 027	0 510 901 022	280	280	3000	5.9	47.5	149.2	204.4	20	40	
19	4		0 510 901 044	230	280	3000	5.5	47.5	146.6	189.4	20 [2]	40	
19	5	0 510 901 041	0 510 901 043	230	280	3000	5.6	47.5	147.8	191.9	20 [2]	40	
19	8	0 510 901 017	0 510 901 003	230	280	3000	5.7	47.5	149.9	196	20	40	
19	8		0 510 665 126 [1]	230	280	3000	5.6	47.5	149.9	196	20	40	
19	8			230	280	3000	5.8	47.5	149.9	196	20	40	
19	11	0 510 665 435	0 510 901 004	230	280	3000	5.8	47.5	153.7	201	20	40	
19	14	0 510 901 040	0 510 901 025	230	280	3000	5.9	47.5	154.2	206	20	40	
19	16	0 510 901 039	0 510 901 045	230	230	3000	6	47.5	154.2	209.4	20	40	
19	19	0 510 901 010		230	190	3000	6.2	47.5	154.2	214.4	20	40	
19	19		0 510 665 132	230	190	3000	6.1	47.5	154.2	214.4	20	40	
22	4		0 510 901 023	210	280	2500	5.7	55.1	152	194.8	20 [2]	40	
22	5		0 510 901 020	210	280	2500	5.7	55.1	153.2	197.3	20 [2]	40	
22	8		0 510 765 016	180	280	2500	7.6	55.1	155.3	201.4	20	40	
22	11	0 510 901 019	0 510 901 026	210	280	2500	5.9	55.1	159.1	206.4	20	40	
22	14	0 510 901 013	0 510 901 007	210	280	2500	6.1	55.1	159.6	211.4	20	40	
22	22	0 510 901 038		210	180	2500	6.4	55.1	167.2	225.2	20	40	

1) Version with shaft seal ring in FKM (Type code - ...KB)
2) At pump section with size 4 and 5: C = 15 mm

Tang drive with 2-bolt mounting spigot diameter 52 mm and O-ring

AZPFF – 1X – … **NM2020**MB

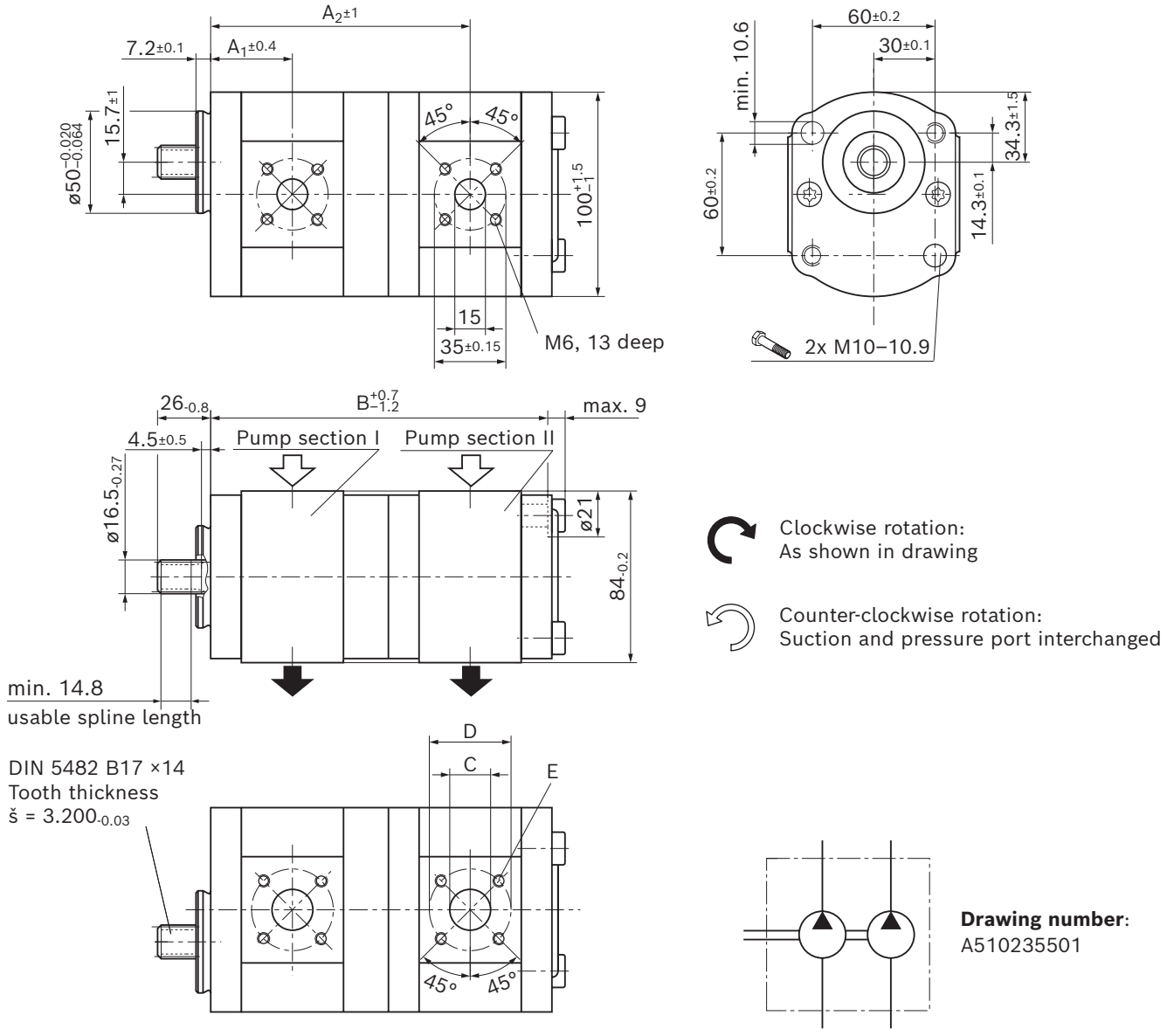


NG		Material number		Maximum inter-mittend pressure		Maximum speed	Weight	Dimensions					
P_I	P_{II}	Direction of rotation		$p_{2\,I}$	$p_{2\,II}$	n_{max}	m	A_1	A_2	B	C	D	E
		counter-clockwise	clockwise	bar	bar	rpm	kg	mm	mm	mm	mm	mm	mm
5	4	0 510 365 314	0 510 365 010	280	280	4000	4.2	38.6	121.6	157.9	15	40	
8	4		0 510 465 012	280	280	4000	4.4	40.7	125.7	162	20 [1]	40	
8	5	0 510 465 346		280	280	4000	4.4	40.7	126.9	164.5	20 [1]	40	
8	8		0 510 465 008	280	280	4000	5.6	40.7	129	168.6	20	40	
11	4		0 510 565 015	280	280	3500	4.5	44.5	130.7	167	20 [1]	40	M6; 13 deep
11	5		0 510 565 016	280	280	3500	4.6	44.5	131.9	169.5	20 [1]	40	
11	8	0 510 565 379	0 510 565 078	280	280	3500	4.65	44.5	134	173.6	20	40	
16	16	0 510 665 339	0 510 665 030	280	230	3000	5.2	45	146.7	195.4	20	40	
22	8	0 510 765 312		210	280	2500	5.2	52.5	152.8	192.4	20	40	

1) At pump section with size 4 and 5: C = 15 mm

Splined shaft (DIN 5482 B17 x 14) with 2-bolt mounting spigot diameter 50 mm

AZPFF – 1X – … **FP2020**MB

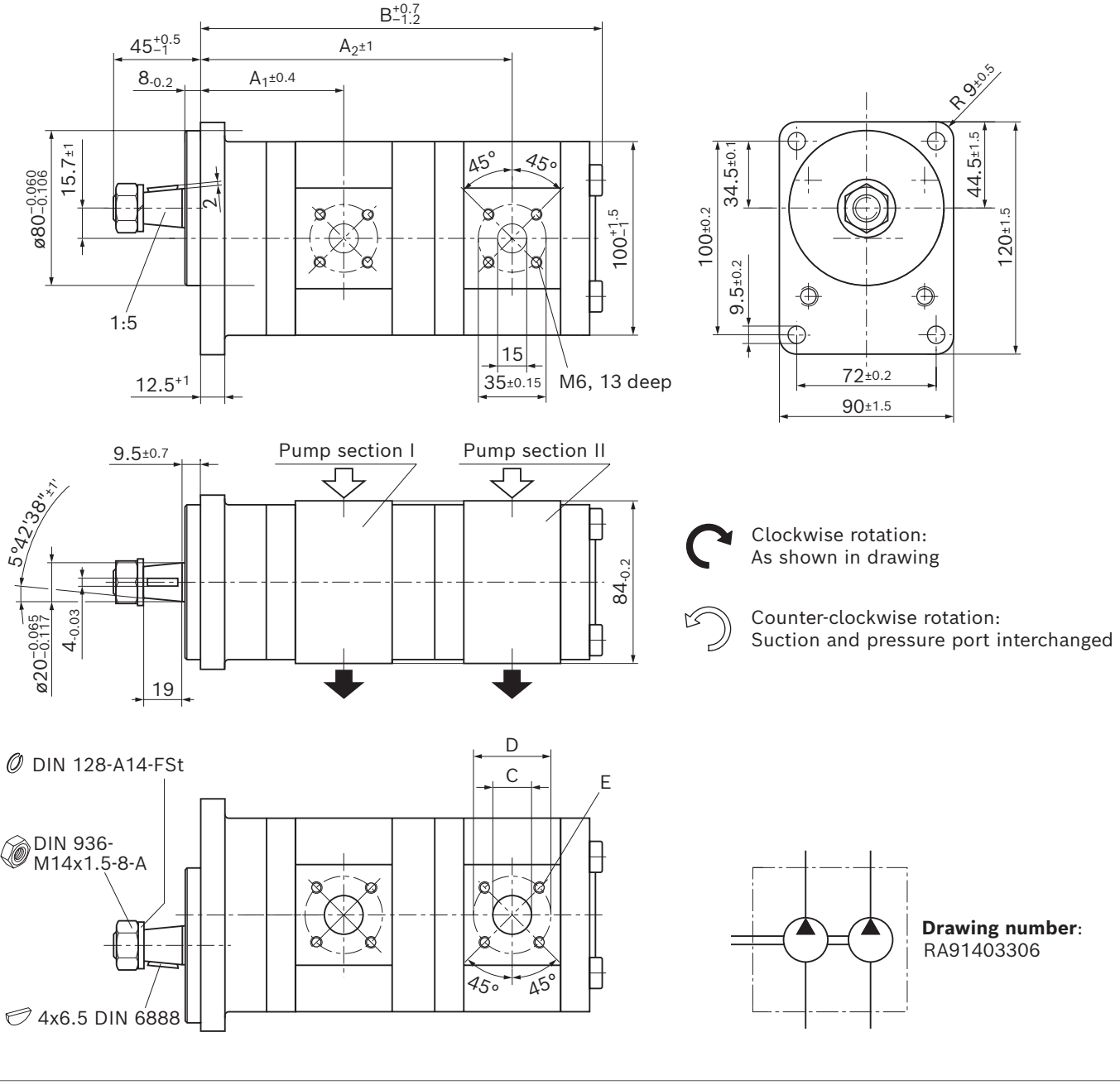


NG		Material number		Maximum intermittend pressure		Maximum speed	Weight	Dimensions					
P_I	P_{II}	Direction of rotation		$p_{2\,I}$	$p_{2\,II}$	n_{max}	m	A_1	A_2	B	C	D	E
		counter-clockwise	clockwise	bar	bar	rpm	kg	mm	mm	mm	mm	mm	mm
5	4	0 510 365 322		280	280	4000	4.2	36.8	121.6	157.9	15	40	
8	4	0 510 465 355		280	280	4000	4.4	40.7	125.7	162	20 [1]	40	
11	8	0 510 565 385		280	280	3500	4.6	44.5	134	173.6	20	40	
16	8		0 510 665 071	280	280	3000	4.85	45	142.4	182	20	40	M6; 13 deep
16	11		0 510 665 076	280	280	3000	4.98	45	146.2	187	20	40	
16	14	0 510 665 404		280	280	3000	5.12	45	146.7	192	20	40	
16	16	0 510 665 376	0 510 665 062	280	230	3000	5.2	45	146.7	195.4	20	40	

1) At pump section with size 4 and 5: C = 15 mm

Tapered keyed shaft 1:5 with outrigger bearing spigot diameter 80 mm, type 1

AZPFF – 1X – … **SA2020**MB

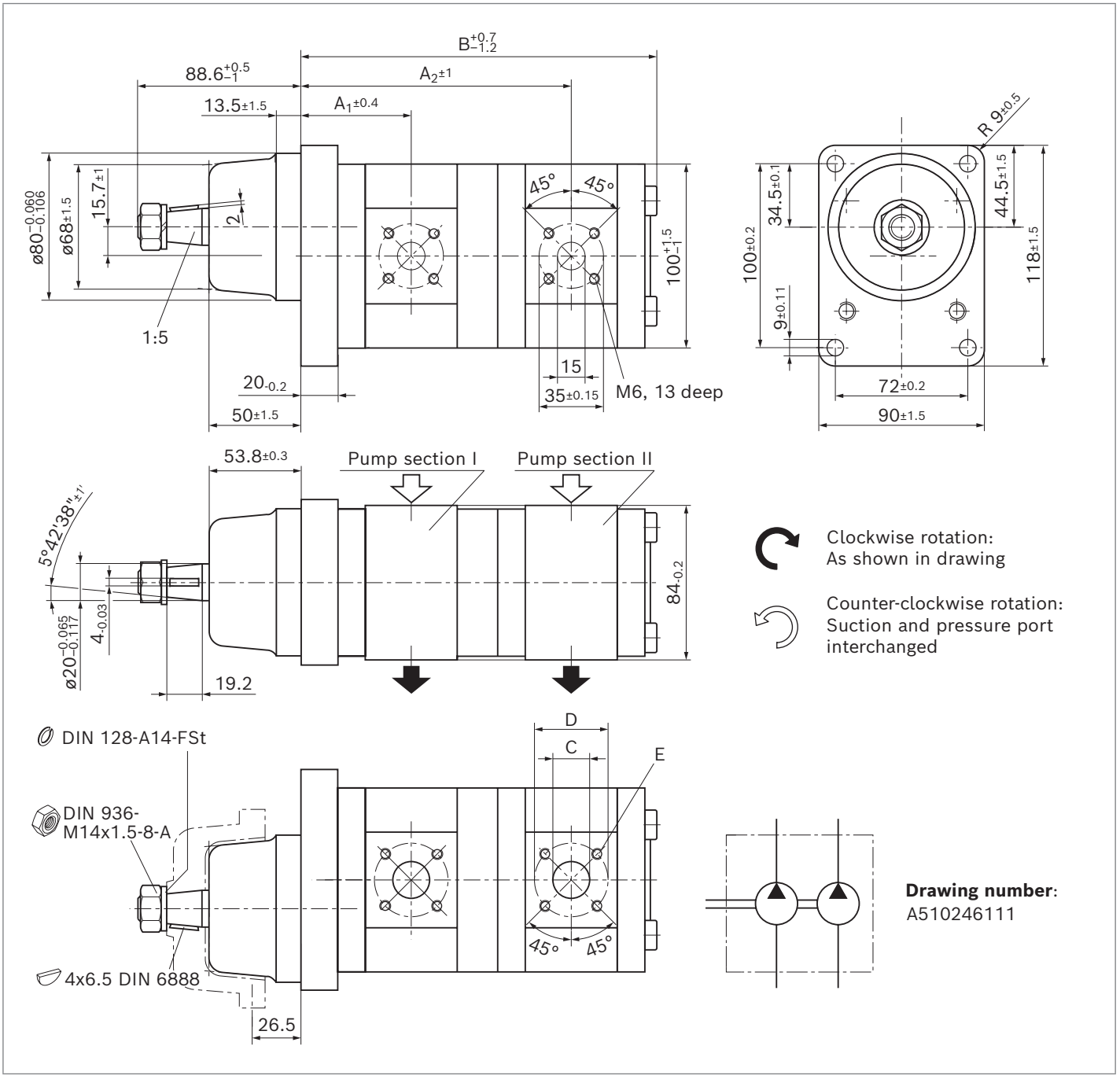


NG		Material number		Maximum intermittend pressure		Maximum speed	Weight	Dimensions					
P_I	P_{II}	Direction of rotation counter-clockwise	clockwise	$p_{2\,I}$ bar	$p_{2\,II}$ bar	n_{max} rpm	m kg	A_1 mm	A_2 mm	B mm	C mm	D mm	E mm
4	4	0 510 255 300		280	280	4000	4.8	71.3	153	197	15	40	M6; 13 deep
5	4	0 510 355 301		280	280	4000	5	72.6	155.5	199.5	15	40	
8	5	0 510 455 300	0 510 455 001	280	280	4000	5.2	74.6	160.8	206.1	20 [1)]	40	
8	8	0 510 455 301	0 510 455 002	280	280	4000	5.3	74.6	163	210.2	20	40	
11	5	0 510 555 300	0 510 555 001	280	280	3500	5.3	79	165.8	211.1	20 [1)]	40	
11	8	0 510 555 301	0 510 555 002	280	280	3500	5.4	79	168	215.2	20	40	
11	11	0 510 555 302	0 510 555 003	280	280	3500	5.5	79	172.3	220.2	20	40	
16	4	0 510 655 300	0 510 655 001	280	280	3000	6.4	79	173	217	20 [1)]	40	
16	5	0 510 655 301	0 510 655 002	280	280	3000	5.5	79	174.2	219.5	20 [1)]	40	
16	8	0 510 655 302	0 510 655 003	280	280	3000	5.6	79	176.3	223.6	20	40	
16	11	0 510 655 303	0 510 655 004	280	280	3000	5.7	79	180.7	228.6	20	40	
16	16	0 510 655 304	0 510 655 005	280	230	3000	6	79	180.7	237	20	40	

1) At pump section with size 4 and 5: C = 15 mm

Tapered keyed shaft 1:5 with outrigger bearing spigot diameter 80 mm, type 2

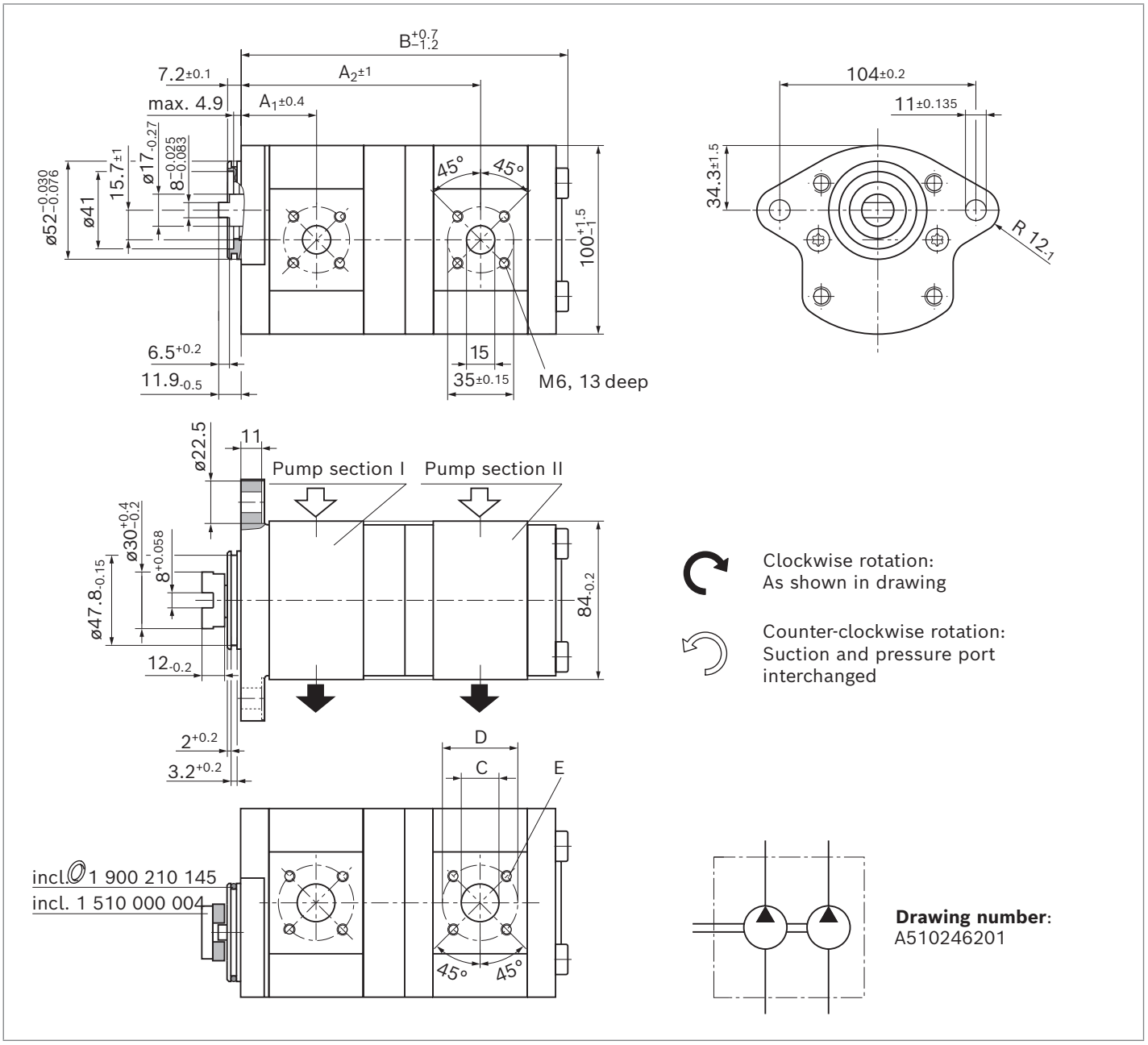
AZPFF–1X– … **SG2020**PB



NG		Material number	Maximum intermittend pressure		Maximum speed	Weight	Dimensions					
P_I	P_{II}	Direction of rotation clockwise	$p_{2\,I}$ bar	$p_{2\,II}$ bar	n_{max} rpm	m kg	A_1 mm	A_2 mm	B mm	C mm	D mm	E mm
11	11	0 510 555 011	220	220	3500	5.7	64.4	157.7	204.9	20	40	M6; 13 deep
16	16	0 510 655 007	280	280	3000	6.2	65	166.7	221.9	20	40	
19	19	0 510 655 011	230	190	3000	6.6	65	171.7	231.9	20	40	

Tang drive with 2-bolt mounting spigot diameter 52 mm and O-ring

AZPFF – 1X – … **NL2020**KB

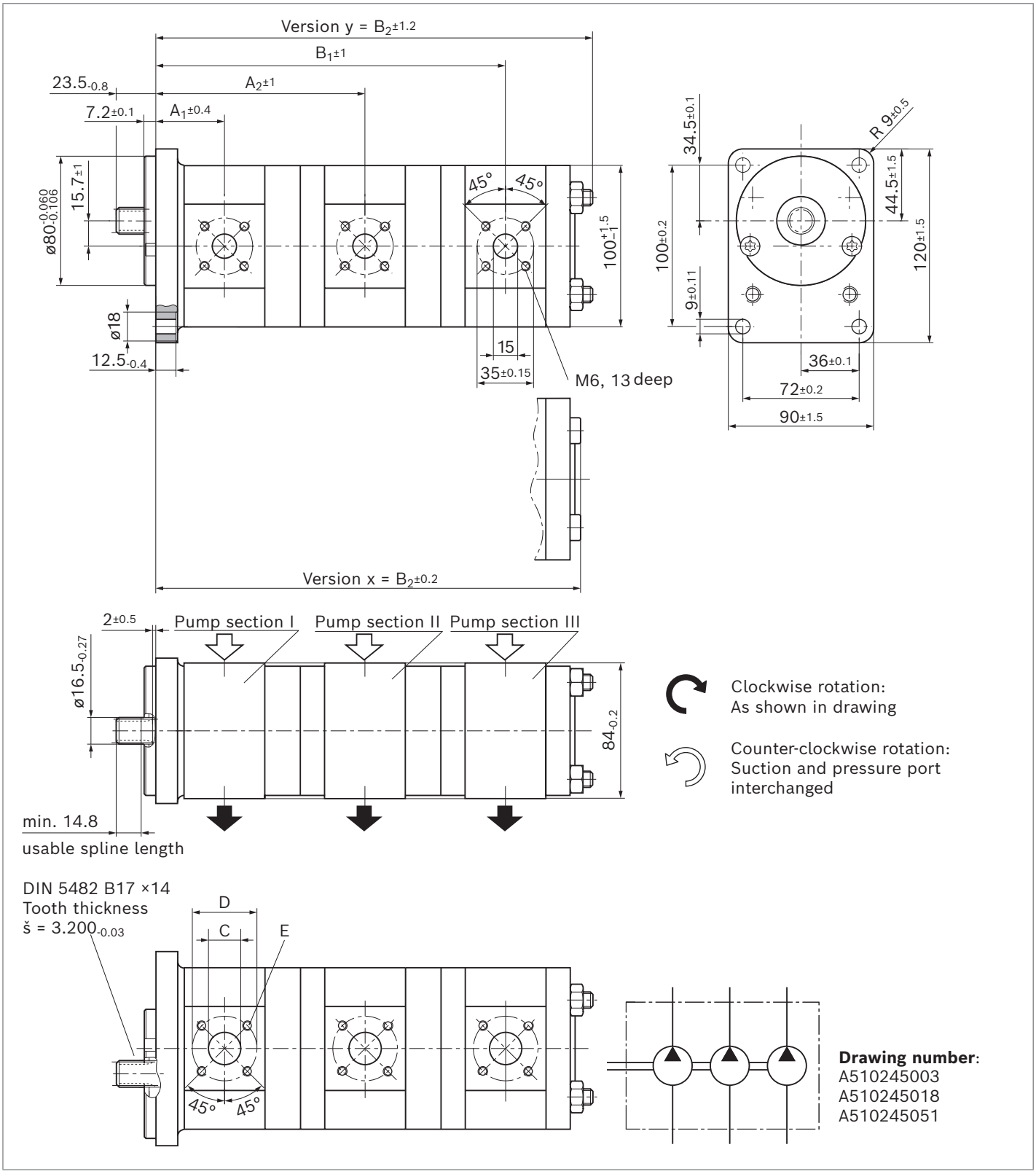


NG		Material number		Maximum intermittend pressure		Maximum speed	Weight	Dimensions					
		Direction of rotation		$p_{2\,I}$	$p_{2\,II}$	n_{max}	m	A_1	A_2	B	C	D	E
P_I	P_{II}	counter-clockwise	clockwise	bar	bar	rpm	kg	mm	mm	mm	mm	mm	mm
5	5			280	280	4000	4.65	38.6	122.8	169.2	15	40	M6; 13 deep
11	11		0 510 565 043	280	280	3500	5.2	44.5	137.5	187.4	20	40	
16	8			280	280	3000	5.2	45	142.4	188.4	20	40	
16	22	0 510 665 068 [1]		280	160	2500	6.17	45	160.3	226.6	20	40	

1) Special version-S0012

Splined shaft (DIN 5482 B17 x 14) with rectangular flange spigot diameter 80 mm

AZPFFF – 1X – … **FB202020**MB



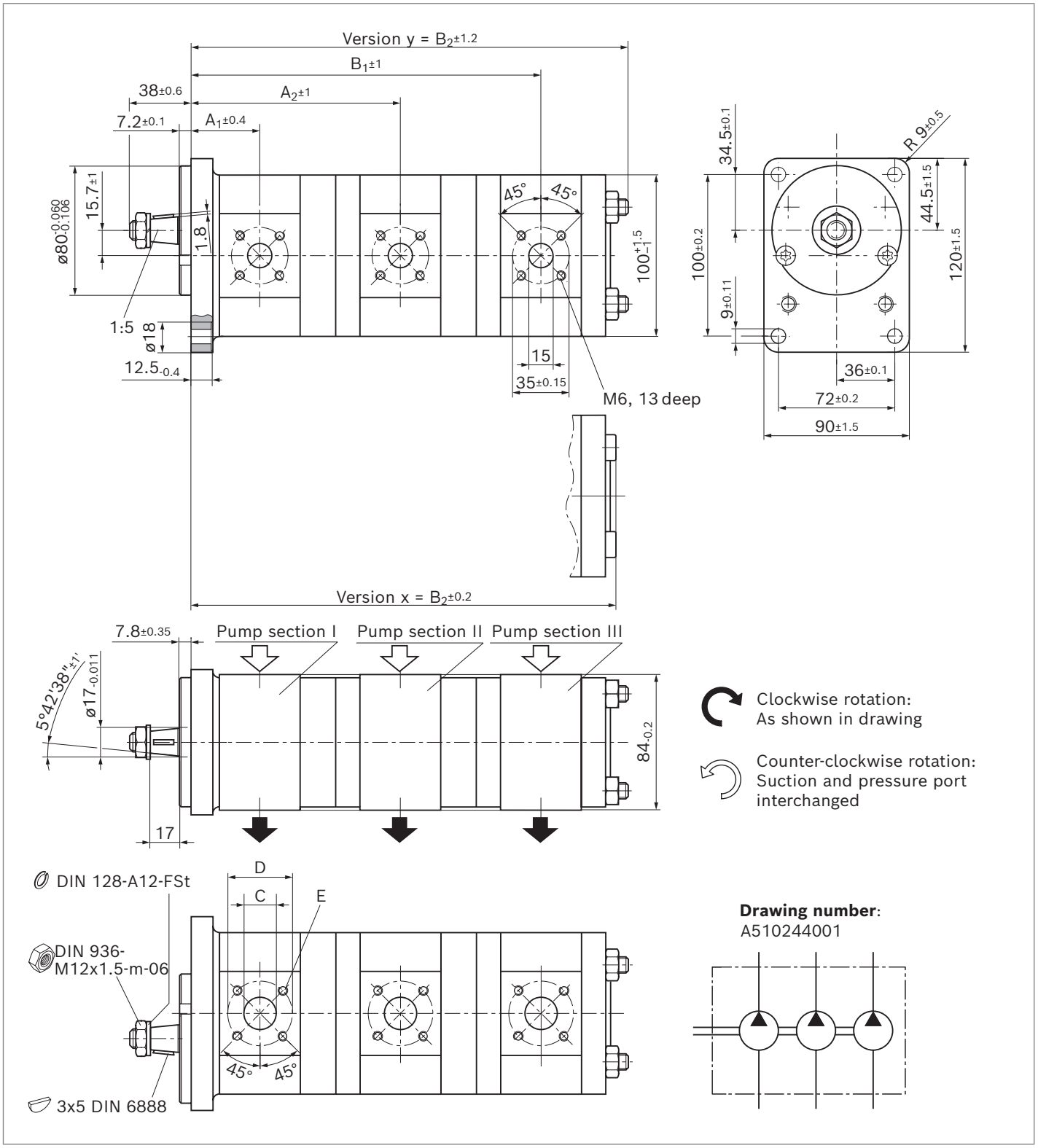
Drawing number:
A510245003
A510245018
A510245051

NG			Material number		Maximum intermittend pressure			Maxi-mum speed	Weight	Dimensions							Version
			Direction of rotation		$p_{2\,I}$	$p_{2\,II}$	$p_{2\,III}$	n_{max}	m	A_1	A_2	B_1	B_2	C	D	E	
P_I	P_{II}	P_{III}	counter-clockwise	clockwise	bar	bar	bar	rpm	kg	mm	mm	mm	mm	mm	mm	mm	
8	8	4		0 510 465 019	280	280	280	4000	7	43.2	131.5	216.5	260.8	20 [1]	40		x
11	4	4			280	280	280	3500	6.9	47	133.2	214.9	259	20 [1]	40		y
14	4	8	0 510 565 408		280	280	280	3000	7.2	47.5	138.2	223.2	270.6	20 [1]	40		
14	8	8			280	280	280	3000	7.3	47.5	141.5	229.8	275.9	20	40		
16	4	4	0 510 665 379		280	280	280	3000	7.2	47.5	141.6	223.3	267.4	20 [1]	40		
16	5.5	5.5		0 510 665 061	280	280	280	3000	7.4	47.5	142.8	227	272.4	20 [1]	40	M6;	
16	11	4			280	210	210	3000	7.5	47.5	148.7	234.9	276.5	20 [1]	40	13 deep	x
16	11	5.5			280	210	120	3000	7.6	47.5	148.7	236.1	280.2	20 [1]	40		
16	16	11	0 510 665 371		280	120	120	3000	8.1	47.5	149.2	250.4	302.5	20	40		
19	8	5.5		0 510 665 111	230	250	160	3000	7.5	47.5	149.2	236.1	280.2	20 [1]	40		
19	11	5.5			230	230	230	3000	7.6	47.5	153.7	241.1	285.2	20 [1]	40		
19	16	4			230	190	190	3000	7.8	47.5	154.2	248.3	297.5	20 [1]	40		y

1) At pump section with size 4 and 5: C = 15 mm

Tapered keyed shaft 1:5 with rectangular flange spigot diameter 80 mm

AZPFFF – 1X – … **CB202020**MB

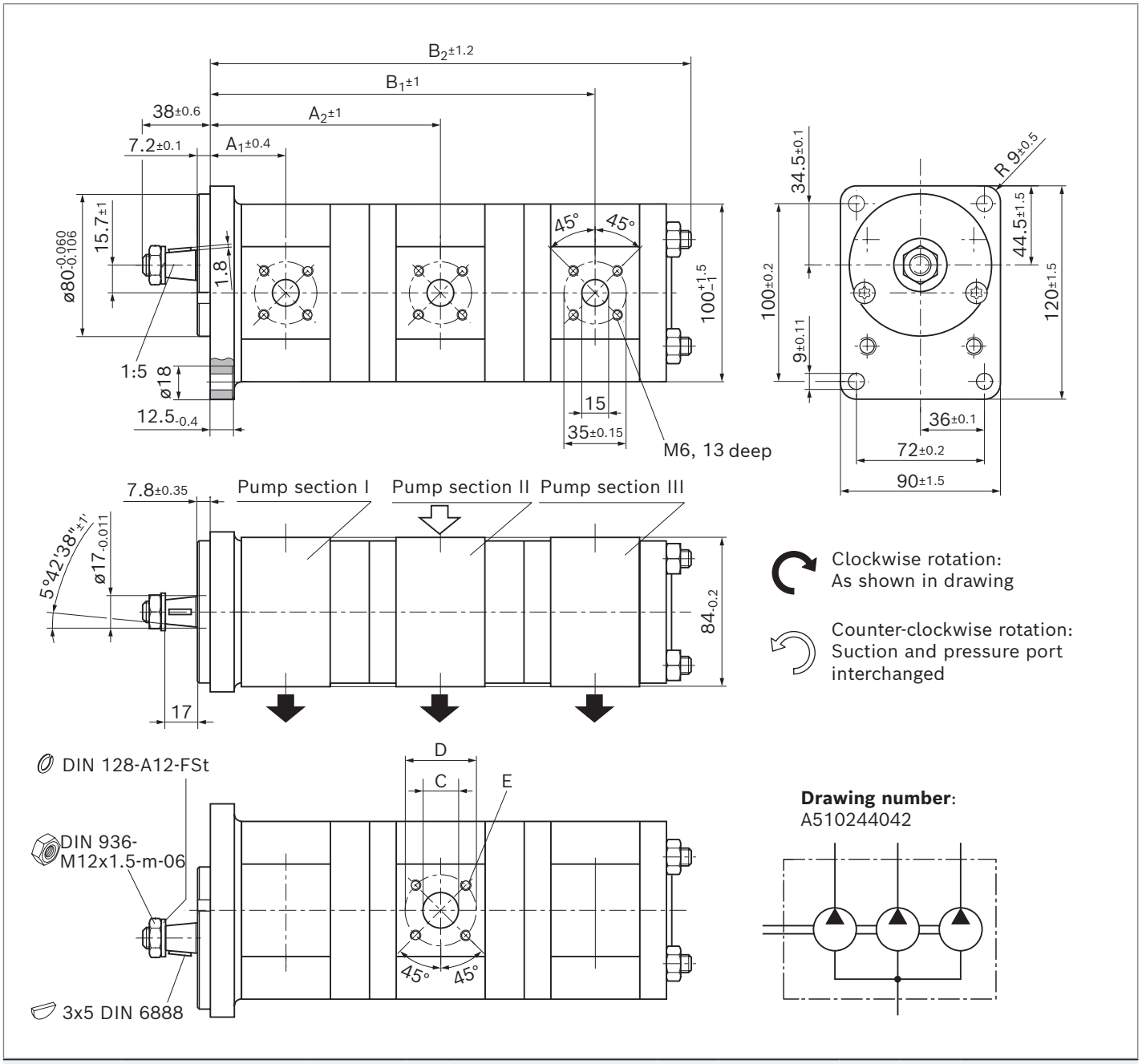


NG			Material number		Maximum intermittend pressure			Maximum speed	Weight	Dimensions							Version
			Direction of rotation		$p_{2\,I}$	$p_{2\,II}$	$p_{2\,III}$	n_{max}	m	A_1	A_2	B_1	B_2	C	D	E	
P_I	P_{II}	P_{III}	counter-clockwise	clockwise	bar	bar	bar	rpm	kg	mm	mm	mm	mm	mm	mm	mm	
8	8	4		0 510 465 027	280	280	280	4000	7	43.2	131.5	216.5	260.6	20 [1]	40	M6; 13 deep	x
11	8	8		0 510 565 081	280	230	230	3500	7.2	47	136.5	224.8	272.2	20	40		
14	8	8		0 510 565 102	280	230	230	3000	7.4	47.5	141.5	229.8	282.5	20	40		
14	8	11		0 510 565 136	130	170	40	3000	7.6	47.5	141.5	233.7	287.3	20	40		
16	4	4			280	280	280	3000	7.1	47.5	141.6	223.3	267.4	20 [1]	40		x
16	8	4		0 510 665 134	280	280	280	3000	7.3	47.5	144.9	229.9	272.7	20 [1]	40		
22	8	9			230	210	210	3000	8.15	61.6	167.3	255.6	307.5	20	40		y

1) At pump section with size 4 and 5: C = 15 mm

Tapered keyed shaft 1:5 with rectangular flange spigot diameter 80 mm , common suction port

AZPFFF – 11 – … **CB202020**MB – S0053



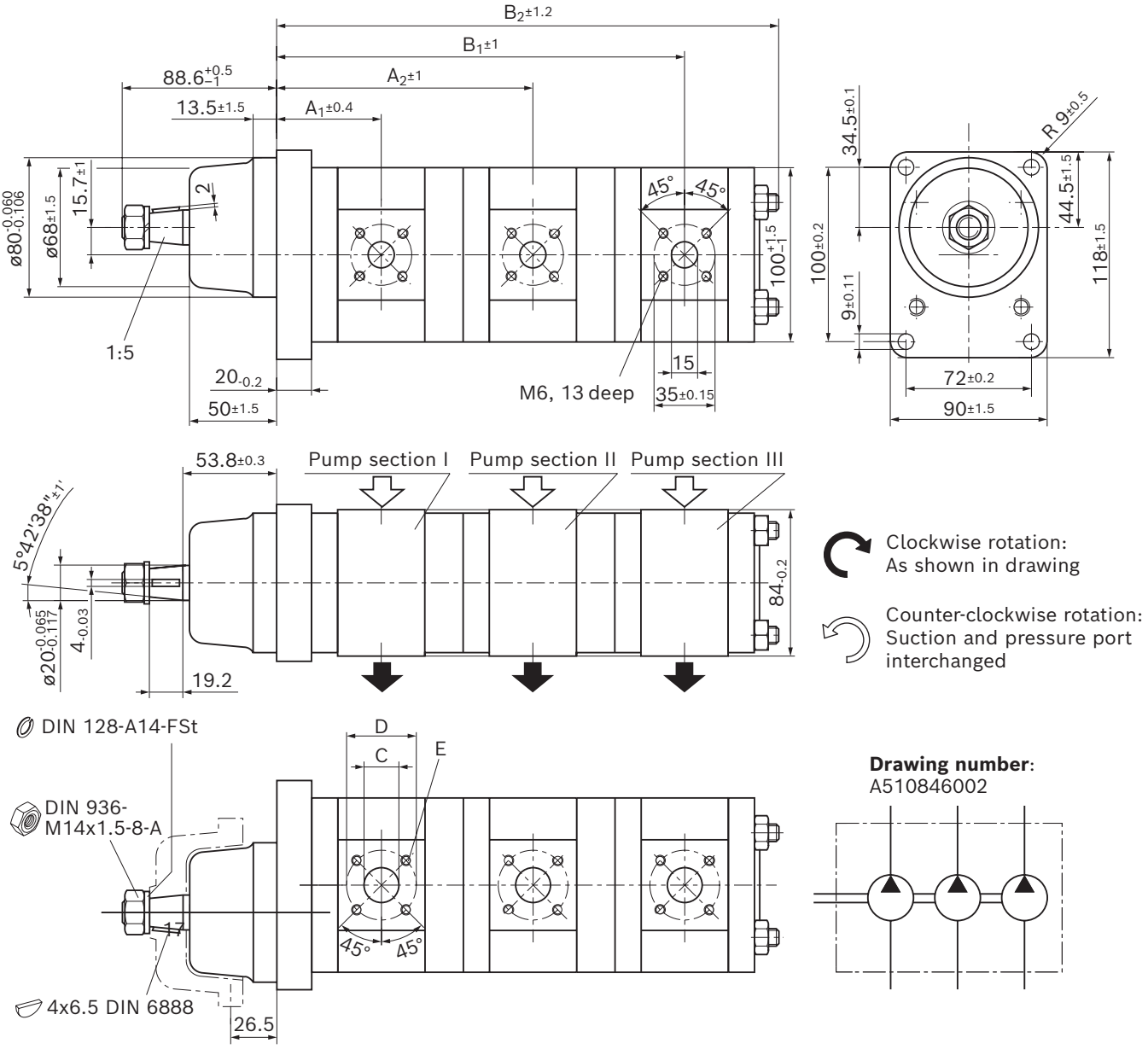
NG			Material number	Maximum intermittend pressure			Maximum speed	Weight	Dimensions						
P_I	P_{II}	P_{III}	Direction of rotation clockwise	$p_{2\,I}$ bar	$p_{2\,II}$ bar	$p_{2\,III}$ bar	n_{max} rpm	m kg	A_1 mm	A_2 mm	B_1 mm	B_2 mm	C mm	D mm	E mm
8	8	5	0 510 465 031	230	230	230	4000	6.5	43.2	119.5	193.7	238.1	20 [2]	40	M6; 13 deep
11	11	8	0 510 565 065	230	230	230	3500	6.8	47	128.3	205.8	251.9	20	40	
11	11	8	0 510 565 080 [1]	280	280	280	3500	6.8	47	128.3	205.8	251.9	20	40	

1) Reinforced through drive (Type code...- S0054)

2) At pump section with size 4 and 5: C = 15 mm

Tapered keyed shaft 1:5 with outrigger bearing spigot diameter 80 mm , type 2

AZPFFF – 1X – ... **SG202020**MB

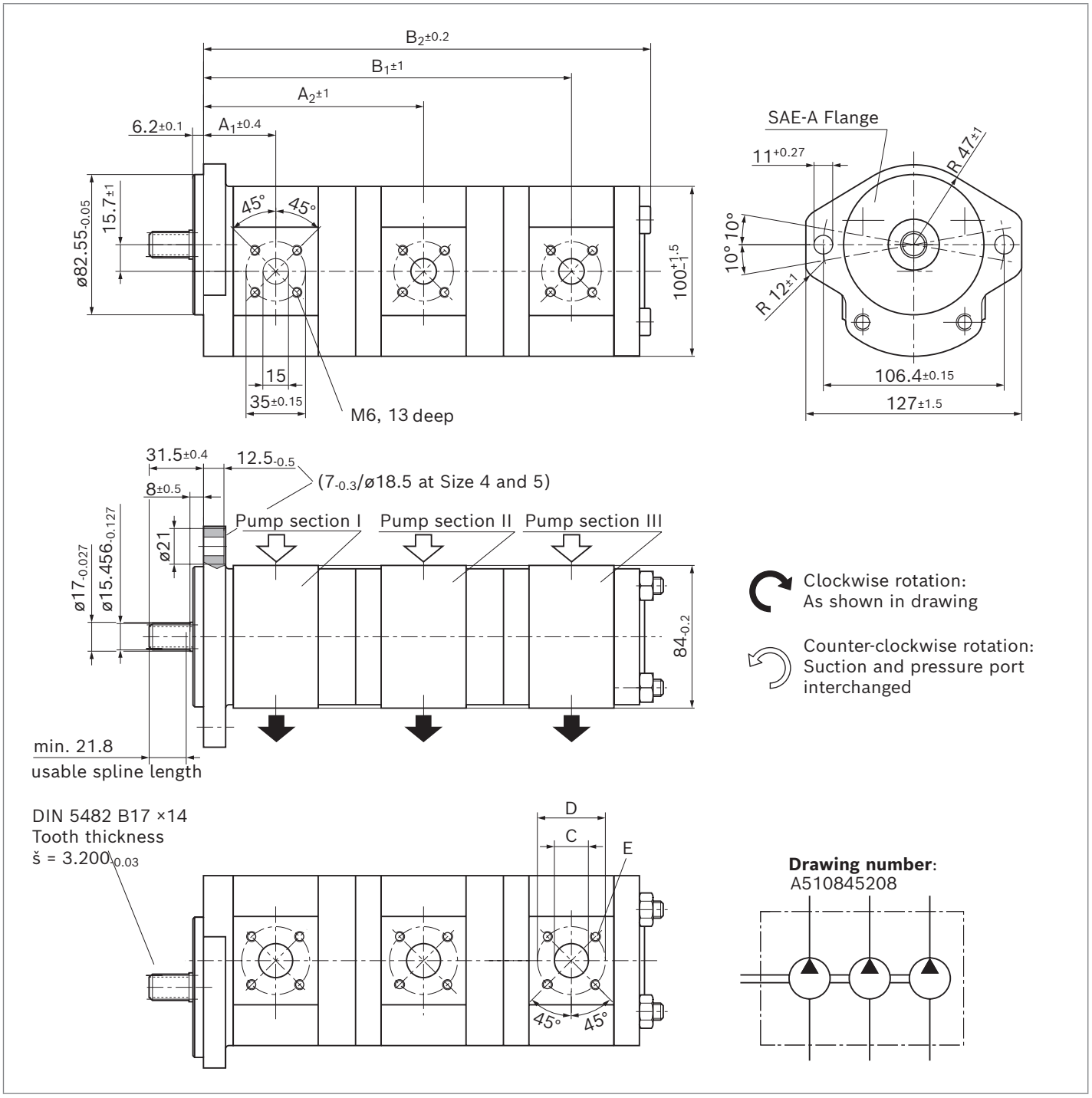


NG			Material number	Maximum intermittend pressure			Maximum speed	Weight	Dimensions						
P_I	P_{II}	P_{III}	Direction of rotation clockwise	$p_{2\,I}$ bar	$p_{2\,II}$ bar	$p_{2\,III}$ bar	n_{max} rpm	m kg	A_1 mm	A_2 mm	B_1 mm	B_2 mm	C [1] mm	D mm	E mm
8	8	5	0 510 455 004	280	250	250	4000	7.4	60.7	149	235.2	284	20	40	M6; 13 deep
14	14	5		280	210	210	3000	7.9	65	163.3	255.3	304	20	40	

1) At pump section with size 4 and 5: C = 15 mm

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

AZPFFF – 1X – … **RR202020**MB



NG			Material number	Maximum intermittend pressure			Maximum speed	Weight	Dimensions						
P_I	P_{II}	P_{III}	Direction of rotation clockwise	$p_{2\,I}$ bar	$p_{2\,II}$ bar	$p_{2\,III}$ bar	n_{max} rpm	m kg	A_1 mm	A_2 mm	B_1 mm	B_2 mm	C [1] mm	D mm	E mm
8	5.5	5.5	0 510 465 025	280	280	280	4000	7	43.2	129.4	213.6	257.7	20	40	M6; 13 deep

1) At pump section with size 4 and 5: C = 15 mm

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

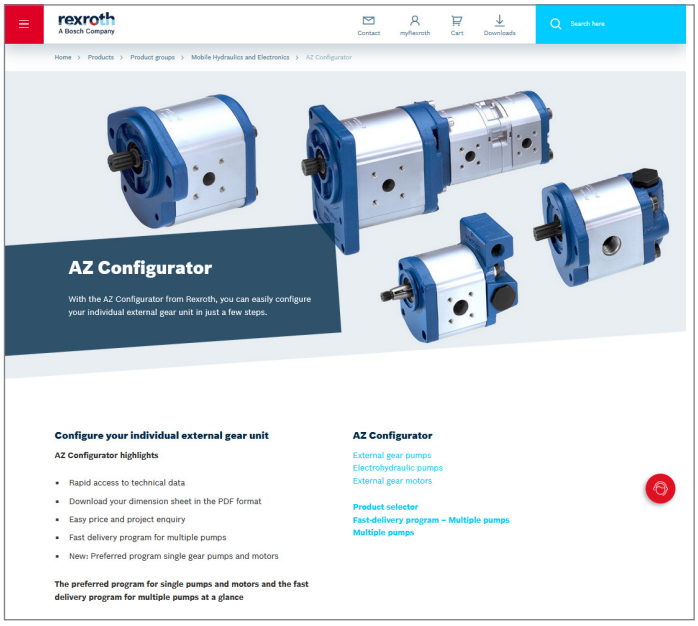
Installation drawings and dimensions are valid at date of publication, subject to modifications.
Further information and notes on project planning can be found in the “General Operating Instructions for external gear units”: www.boschrexroth.com/07012-B, chapter 5.5.

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

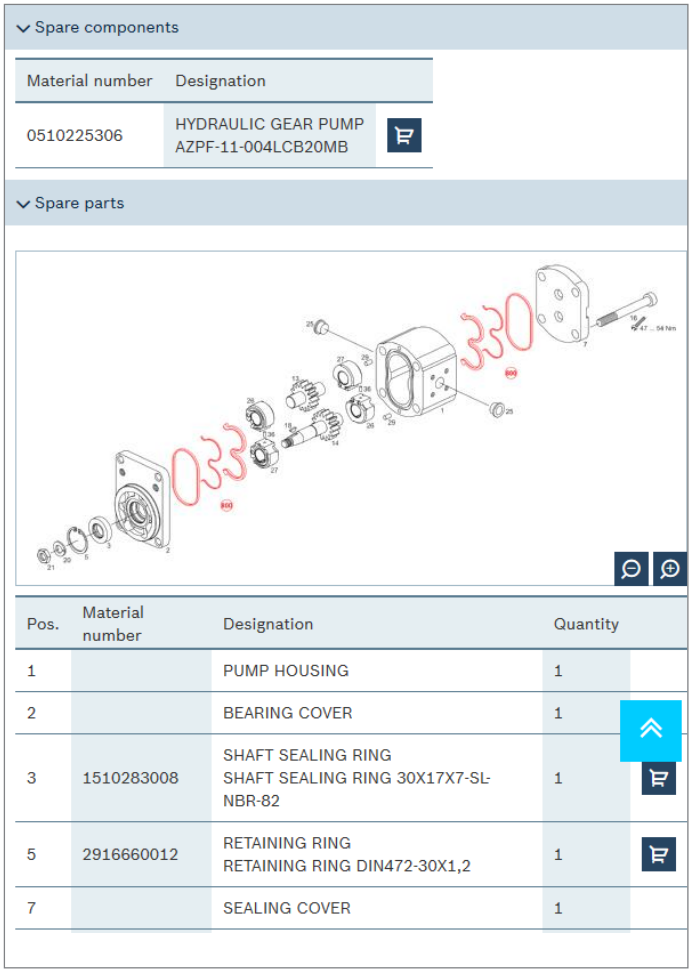


Spare parts

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: **0 510 225 306**
Type designation: AZPF-11-004LCB20MB

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



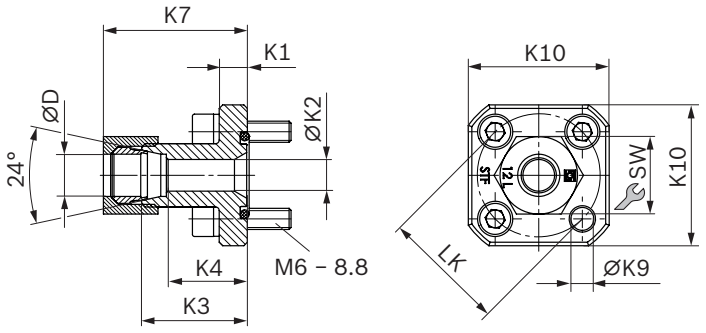
Further information

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 (German version) 20

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

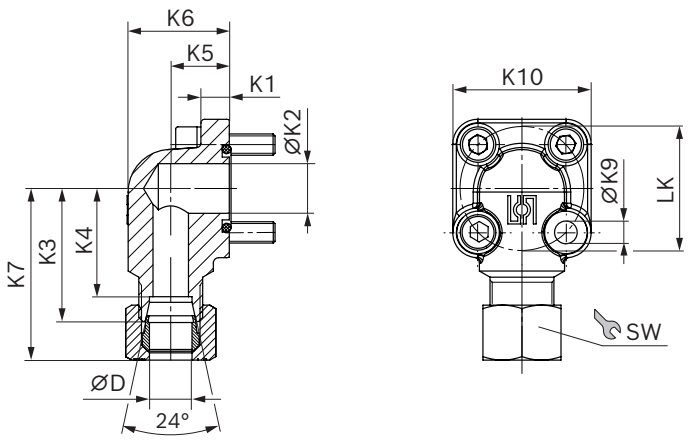


LK	D	Series[1)]	Material number	p_{max}	K1	K2	K3	K4	K7	K9	K10	SW	Screws	O-ring	Weight
mm	mm			bar	mm	mm	mm	mm	mm	mm	mm	mm	4 ×	NBR	kg
35	10	L	1 515 702 064	315	8	7	30	23	38	6.5	40	19	M6 × 22	20 × 2.5	0.13
35	12	L	1 515 702 065	315	8	9	30	23	38.5	6.5	40	22	M6 × 22	20 × 2.5	0.14
35	15	L	1 515 702 066	250	8	11	30	23	39	6.5	40	27	M6 × 22	20 × 2.5	0.15
40	15	L	1 515 702 067	100	8	11	35	28	44	6.5	40	27	M6 × 22	26 × 2.5	0.16
40	18	L	1 515 702 068	100	8	14	35	27.5	44	6.5	40	32	M6 × 22	26 × 2.5	0.17
40	22	L	1 515 702 069	100	8	18	35	27.5	45	6.5	40	36	M6 × 22	26 × 2.5	0.16
40	28	L	1 515 702 008	100	8	19	35	27.5	45	6.5	40	41	M6 × 22	26 × 2.5	0.18

1) See DIN EN ISO 8434-1

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

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

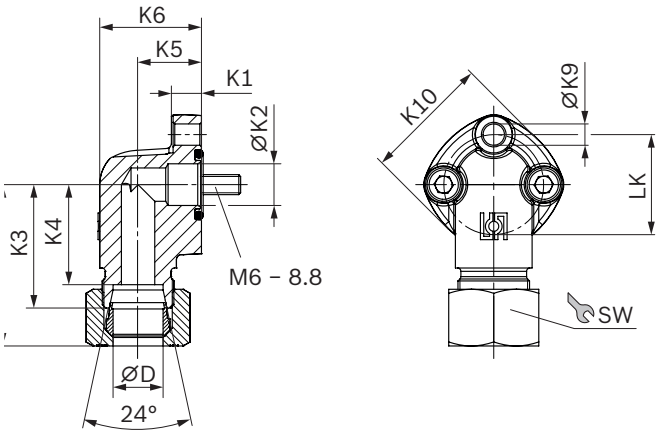


LK	D	Series[1)]	Material number	p_{max}	K1	K2	K3	K4	K5	K6	K7	K9	K10	SW	Screws		O-ring	Weight
mm	mm			bar	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	2 ×	2 ×	NBR	kg
35	10	L	1 515 702 070	315	8	14	37.5	30.5	16.5	28.5	45	6.4	39	19	M6 × 22	M6 × 35	20 × 2.5	0.18
35	12	L	1 515 702 071	315	8	14	37.5	30.5	16.5	28.5	46	6.4	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
40	15	L	1 515 702 073	100	9	20	38	31	22.5	38	47	6.4	42	27	M6 × 22	M6 × 22	26 × 2.5	0.26
40	18	L	1 515 702 074	100	9	20	38	30.5	22.5	38	47.5	6.4	42	32	M6 × 22	M6 × 22	26 × 2.5	0.27
40	20	S	1 515 702 011	250	9	20	40	29.5	22.5	37	52	6.4	42	36	M6 × 22	M6 × 45	26 × 2.5	0.26
40	22	L	1 515 702 075	100	9	20	38	30.5	22.5	38	48	6.4	42	36	M6 × 22	M6 × 22	26 × 2.5	0.27
40	28	L	1 515 702 010	100	9	20	40	32.5	28	44	50.5	6.4	42	41	M6 × 22	M6 × 50	26 × 2.5	0.37
40	35	L	1 515 702 018	100	9	20	41	30.5	34	53	53	6.4	42	50	M6 × 22	M6 × 60	26 × 2.5	0.41
55	20	S	1 515 702 004	250	13	18.2	45	34.5	24	38	57	8.4	58	36	M8 × 25	M8 × 50	32 × 2.5	0.62
55	30	S	1 545 719 006	250	12	26.5	49	38.5	32	51	63.5	8.4	58	50	M8 × 25	M8 × 50	32 × 2.5	0.63
55	35	L	1 515 702 005	100	12	26.5	49	38.5	32	52	61	8.4	58	50	M8 × 25	M8 × 60	32 × 2.5	0.77
55	42	L	1 515 702 019	100	12	26.5	49	38	40	64	61.5	8.4	58	60	M8 × 25	M8 × 70	32 × 2.5	1.04

1) See DIN EN ISO 8434-1

90° angle flange, 3-hole, for square flange (Italian version) 30

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	3 ×	NBR	kg
30	12	L	1 515 702 146	250	9	12.5	37	30	19	30.5	46	6.4	38	22	M6 × 25	16 × 2.5	0.18
30	15	L	1 515 702 147	250	9	12.5	37	30	19	30.5	45.5	6.4	38	27	M6 × 25	16 × 2.5	0.2
40	22	L	1 515 702 149	160	13.5	19	43	35.5	25	41	53	8.4	48	36	M8 × 30	24 × 2.5	0.4
40	28	L	1 515 702 150	160	13.5	19	43	35.5	25	41	53.5	8.4	48	41	M8 × 30	24 × 2.5	0.36

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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