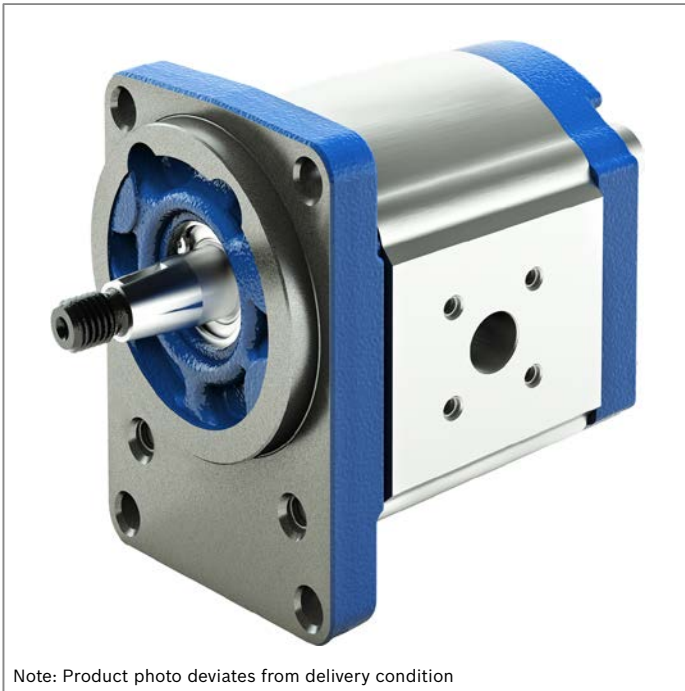


# External gear pump High Performance AZPF



Note: Product photo deviates from delivery condition

- ▶ Platform F
- ▶ Fixed displacement
- ▶ Size 4 ... 28
- ▶ Continuous pressure up to 250 bar
- ▶ Intermittent pressure up to 280 bar

## Features

- ▶ Consistent high quality based on large-volume production
- ▶ Long service life
- ▶ Slide bearings for high loads
- ▶ Drive shafts according to ISO or SAE and customer-specific solutions
- ▶ Line ports: connection flange or screw thread
- ▶ Combination of several pumps possible

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## Product description

### General information

It is the central task of external gear pumps to convert mechanical energy (torque and speed) into hydraulic energy (flow and pressure). To reduce heat losses, Rexroth's external gear units offer very high efficiencies. They are realized by pressure-dependent gap sealing and highly precise production technology.

Rexroth external gear pumps are built in four frame sizes:

Platform B, F, N and G. Within each platform different displacements 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, shafts, valve arrangements and multiple pump combinations.

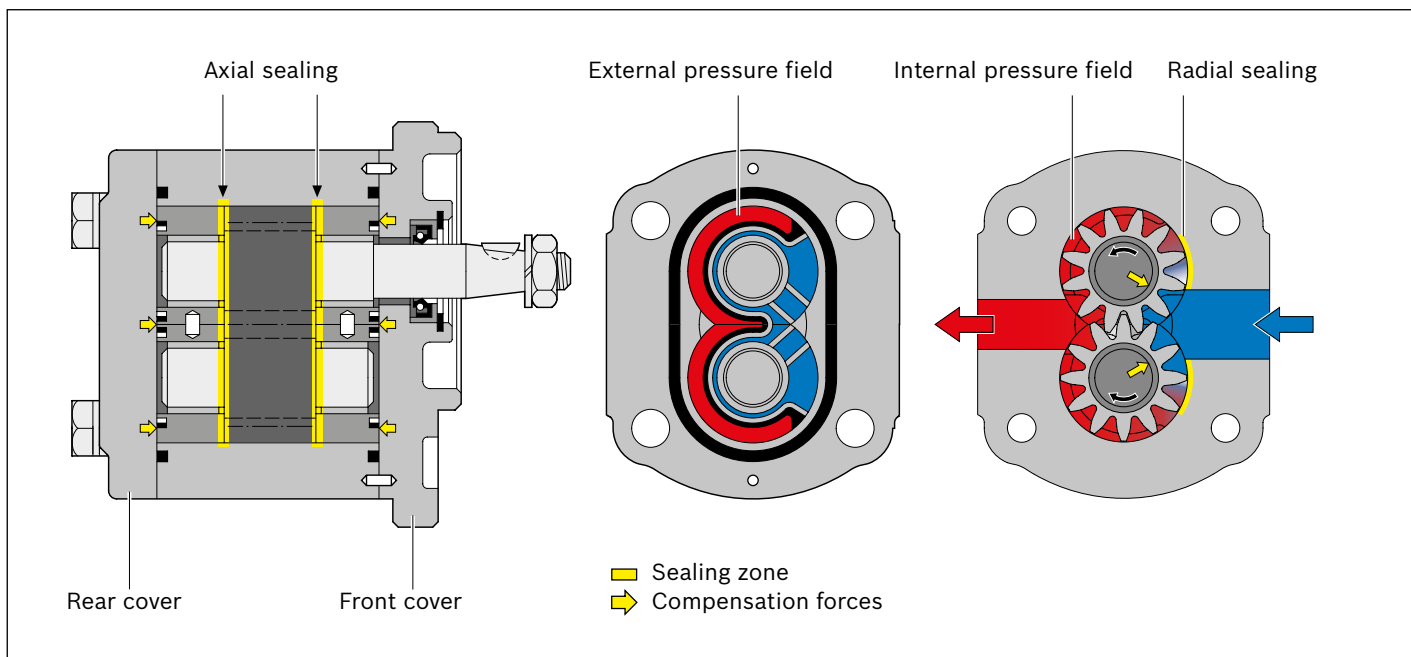
### Construction

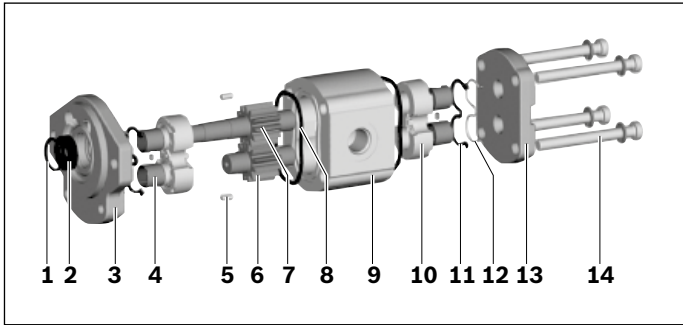
The external gear pump consists essentially of a pair of gear wheels supported in bearing bushes and the housing with a front and a rear cover.

The drive shaft protrudes from the front cover where it is usually sealed by the shaft seal ring. The bearing forces are absorbed by slide bearings. These are designed for high pressures and have excellent dry-running qualities, especially at low rotational speeds. The gear wheels have 12 teeth. This keeps both flow pulsation and noise emission to a minimum.

The internal sealing of the pressure chambers is achieved by operating pressure-dependent forces. This ensures optimum efficiency. On the outer face, the movable bearing bushes are pressurized with operating pressure and pressed as seals against the gear wheels. Special seals form the boundary of the pressurized zone. The radial sealing at the tips of the gear teeth against the case is provided by smallest possible gaps that are formed pressure-dependent between the gear wheels and the housing.

### Assembly external gear pump

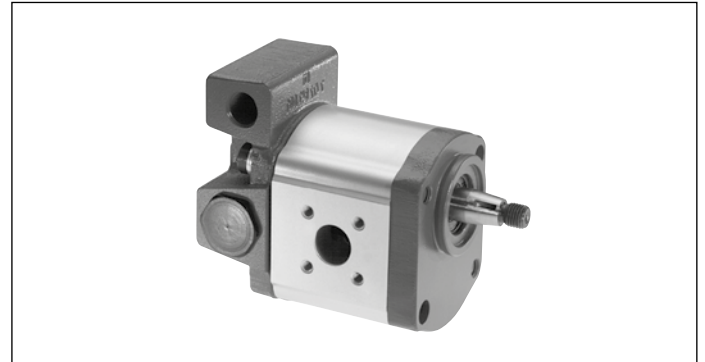




- |   |                |    |                    |
|---|----------------|----|--------------------|
| 1 | Snap ring      | 8  | Housing seal ring  |
| 2 | Shaft seal     | 9  | Pump housing       |
| 3 | Front cover    | 10 | Bearing bushing    |
| 4 | Slide bearings | 11 | Axial field seal   |
| 5 |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

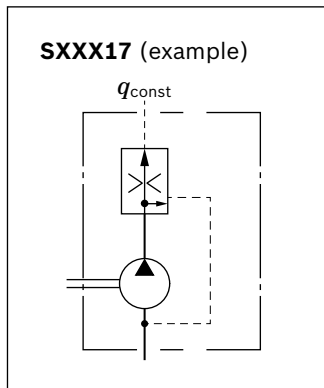
## Gear pumps with integrated valves

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



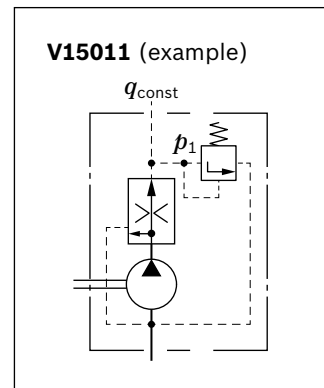
### 3-way flow control valve, residual flow returned in suction line

$q_{\text{const}} = 2 \text{ to } 30 \text{ l/min}$



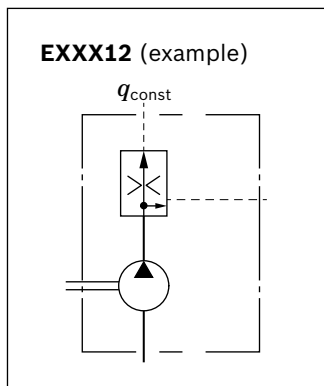
### 3-way flow control valve with pressure relief valve, residual flow returned in suction line

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



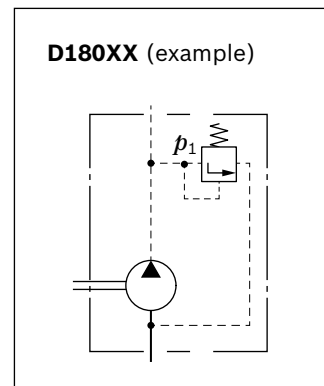
### 3-way flow control valve, residual flow distributed externally; loadable

$q_{\text{const}} = 2 \text{ to } 30 \text{ l/min}$



### Pressure relief valve, pressure discharge into suction line

$p_1 = 5 \text{ to } 250 \text{ bar}$



# Type codes

## Type code single pump

01	02	03	04	05	06	07	08	09	10	11	12	13	14
<b>AZP</b>	<b>F</b>	<b>-</b>			<b>-</b>								

### External gear unit

01	External gear pump	<b>AZP</b>
----	--------------------	------------

### Series

02	High Performance, Platform F	<b>F</b>
----	------------------------------	----------

### Unit version

03	Standard bearing	<b>1</b>
	Reinforced bearing	<b>2</b>

### Version

04	Phosphated	<b>0</b>
	Phosphated, pinned	<b>1</b>
	Chromated, pinned	<b>2</b>

### Size (NG)

05	Geometric displacement $V_g$ [cm <sup>3</sup> ], see "Technical data"	<b>004</b>	<b>005</b>	<b>008</b>	<b>011</b>	<b>014</b>	<b>016</b>	<b>019</b>	<b>022</b>	<b>025</b>	<b>028</b>
----	--	------------	------------	------------	------------	------------	------------	------------	------------	------------	------------

### Direction of rotation

06	Viewed on drive shaft	clockwise	<b>R</b>
		counter-clockwise	<b>L</b>

### Drive shaft

### Suitable front cover

07	Tapered shaft	1 : 5	B, P, N	<b>C</b>
		1 : 5	A, G	<b>S</b>
		1 : 8	O	<b>H</b>
	Tang drive		M, L, T	<b>N</b>
	Splined shaft	SAE J744 16-4 9T	R, C	<b>R</b>
		SAE J744 19-4 11T	R, C	<b>P</b>
		DIN 5482 B17 × 14	B, P, N, O	<b>F</b>
	Parallel keyed shaft	SAE J744 16-1 A	R	<b>Q</b>
		ISO Ø18 mm	B	<b>A</b>

### Front cover

08	Rectangular flange	Ø80 mm		B
		Ø36.47 mm		O
	2-bolt flange	Ø82.55 mm	SAE J744 82-2 A	R
		Ø101.6 mm	SAE J744 101-2 B	C
	2-bolt mounting	Ø52 mm	with seal ring	M
		Ø52 mm	compressor port	L
		Ø50 mm	connection variant 1	P
		Ø50 mm	connection variant 2	N
	4-bolt mounting	Ø52 mm	with seal ring	T
	Outboard bearing	Ø80 mm	type 1	A
type 2			G	

Line connection		004	005	008	011	014	016	019	022	025	028	
09	Pipe thread ISO 228-1	•	•	•	•	•	•	•	•	•	•	01
	Thread, metric, ISO 6149 with seal ring	•	•	•	•	•	•	•	•	•	•	50
	Thread (UNF-2B) SAE Seal ring BOSS	•	•	•	•	•	•	•	•	•	•	12
	Square flange	•	•	•	•	•	•	•	•	•	•	20
	Square flange	•	•	•	•	•	•	•	•	•	•	30

#### Sealing material

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

#### Rear cover

11	Without valve (standard)		B
	With pressure relief valve	Pressure discharge internal	D
	With flow control valve	Residual flow external	E
		internal	S
	With pressure relief valve and flow control valve		V

**Valve setting pressure relief valve** (parameter only required for rear cover with pressure relief and/or flow control valve)

12	Without pressure relief valve	XXX
	Cracking pressure in bar, 3-digit, e.g. 180 bar	180

**Valve setting flow control valve** (parameter only required for rear cover with pressure relief and/or flow control valve)

13	Without flow control valve	XX
	Flow in l/min, 2-digit, e.g. 9 l/min	09

#### Special version

14	Special version <sup>1)</sup>	SXXXX
----	-------------------------------	-------

• = Available    – = Not Available

<sup>1)</sup> or further information on special versions, please contact us.

#### Note

- 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.

**Type code multiple pump**

01	02	03	04	05	06	07	08	09	10	11	12
<b>AZP</b>		-			-						

**External gear unit**

01	External gear pump	<b>AZP</b>
----	--------------------	------------

**Series<sup>1)</sup>**

02	High Performance	1.0 to 7.1 cm³/U	Data sheet 10088	<b>B</b>
		4.0 to 28 cm³/U	Data sheet 10089	<b>F</b>
		20.0 to 36 cm³/U	Data sheet 10091	<b>N</b>
		22.5 to 100 cm³/U	Data sheet 10093	<b>G</b>
	SILENCE	4.0 to 28 cm³/U	Data sheet 10095	<b>S</b>
		20.0 to 36 cm³/U	Data sheet 10092	<b>T</b>
		22.5 to 63 cm³/U	Data sheet 10098	<b>U</b>
	SILENCE PLUS	12.0 to 28 cm³/U	Data sheet 10094	<b>J</b>

**Unit version** (according to data sheet of pump stage 1)

03	Standard bearing	<b>1</b>
	Reinforced bearing	<b>2</b>

**Version** (according to data sheet of pump stage 1)

04	Phosphated, pinned	<b>1</b>
	Chromated, pinned	<b>2</b>

**Size (NG)<sup>2)</sup>**

05	In accordance with data sheet for the individual series	
----	---	--

**Direction of rotation**

06	Viewed on drive shaft	clockwise	<b>R</b>
		counter-clockwise	<b>L</b>

**Drive shaft** (relates to pump stage 1)

07	In accordance with data sheet of pump stage 1	
----	---	--

**Front cover** (relates to pump stage 1)

08	In accordance with data sheet of pump stage 1	
----	---	--

**Line connection** (per pump stage)<sup>3)</sup>

09	In accordance with data sheet for the individual series	
----	---	--

**Sealing material**

10	NBR (nitrile rubber)	<b>M</b>
	FKM (fluoroelastomer)	<b>P</b>
	NBR (nitrile rubber), shaft seal in FKM (fluoroelastomer)	<b>K</b>

**Rear cover** (relates to last pump stage)

11	In accordance with data sheet of the last pump stage	
----	--	--

**Special version**

12	Special version	<b>SXXXX</b>
----	-----------------	--------------

<sup>1)</sup> A letter is to be selected for each pump stage, e.g. 3-way pump AZPJ + AZPJ + AZPB: **JJB**

<sup>2)</sup> A numerical value is to be selected for each pump stage, e.g. 3-way pump **028/016/2.0**

<sup>3)</sup> A numerical value is to be selected for each pump stage, e.g. 3-way pump **202020**

**Note**

- ▶ 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-way pump:**

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

01	02		03	04		05	06	07	08	09	10	11
<b>AZP</b>	<b>GGJJ</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>032/022/016/012</b>	<b>R</b>	<b>C</b>	<b>B</b>	<b>20202020</b>	<b>K</b>	<b>B</b>

## Technical data

### Table of values

Size				4	5	8	11	14	16	19	22
Series				Series 1x							
Displacement geometric, per revolution	$V_g$	cm <sup>3</sup>		4	5,5	8	11	14	16	19	22,5
Pressure at suction port S <sup>1)</sup>	absolute	$p_e$	bar	0,7 ... 3							
Maximum continuous pressure		$p_1$	bar	250	250	250	250	250	250	210	180
Maximum intermittent pressure <sup>2)</sup>		$p_2$	bar	280	280	280	280	280	280	230	210
Maximum pressure peaks		$p_3$	bar	300	300	300	300	300	300	250	230
Minimum speed at	$v = 12 \text{ mm}^2/\text{s}$	$p < 100 \text{ bar}$	$n_{\min}$	rpm	600	500	500	500	500	500	500
		$p = 100 \text{ bar} \dots 180 \text{ bar}$	$n_{\min}$	rpm	1200	1200	1000	1000	800	800	800
		$p = 180 \text{ bar} \dots p_2$	$n_{\min}$	rpm	1400	1400	1400	1200	1000	1000	1000
	$v = 25 \text{ mm}^2/\text{s}$	at $p_2$	$n_{\min}$	rpm	700	700	700	600	500	500	500
Maximum speed		at $p_2$	$n_{\max}$	rpm	4000	4000	4000	3500	3000	3000	2500

Size				4	5	8	11	14	16	19	22
Series				Series 2x							
Displacement geometric, per revolution	$V_g$	cm <sup>3</sup>		4	5,5	8	11	14	16	19	22,5
Pressure at suction port S <sup>1)</sup>	absolute	$p_e$	bar	0,7 ... 3							
Maximum continuous pressure		$p_1$	bar	250	250	250	250	250	250	250	220
Maximum intermittent pressure <sup>2)</sup>		$p_2$	bar	280	280	280	280	280	280	280	250
Maximum pressure peaks		$p_3$	bar	300	300	300	300	300	300	300	290
Minimum speed at	$v = 12 \text{ mm}^2/\text{s}$	$p < 100 \text{ bar}$	$n_{\min}$	rpm	600	500	500	500	500	500	500
		$p = 100 \text{ bar} \dots 180 \text{ bar}$	$n_{\min}$	rpm	1200	1200	100	100	800	800	800
		$p = 180 \text{ bar} \dots p_2$	$n_{\min}$	rpm	1400	1400	1400	1200	1000	1000	1000
	$v = 25 \text{ mm}^2/\text{s}$	at $p_2$	$n_{\min}$	rpm	700	700	700	600	500	500	500
Maximum speed		at $p_2$	$n_{\max}$	rpm	4000	4000	4000	3500	3000	3000	3500

Size				25	28
Series				Series 2x	
Displacement geometric, per revolution		V <sub>g</sub>	cm <sup>3</sup>	25	28
Pressure at suction port S <sup>1)</sup>		absolute	p <sub>e</sub> bar	0,7 ... 3	
Maximum continuous pressure		p <sub>1</sub>	bar	195	170
Maximum intermittent pressure <sup>2)</sup>		p <sub>2</sub>	bar	225	200
Maximum pressure peaks		p <sub>3</sub>	bar	265	240
Minimum speed at	v = 12 mm <sup>2</sup> /s	p < 100 bar	n <sub>min</sub> rpm	500	500
		p = 100 bar ... 180 bar	n <sub>min</sub> rpm	800	800
		p = 180 bar ... p2	n <sub>min</sub> rpm	1000	1000
	v = 25 mm <sup>2</sup> /s	at p <sub>2</sub>	n <sub>min</sub> rpm	500	500
Maximum speed		at p <sub>2</sub>	n <sub>max</sub> rpm	3000	3000

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

<sup>2)</sup> Limited service life with threaded line ports and  $p_2 > 210 \text{ bar}$



## General technical data

Weight	m	kg	See chapter Dimensions
Installation position	No restrictions		
Mounting type	Flange or through-bolting with spigot		
Line connections	See chapter Dimensions		
Direction of rotation, viewed on drive shaft	Clockwise or counter-clockwise, the pump may only be driven in the direction indicated		
Drive shaft loading	Axial and radial forces only after consultation		
Ambient temperature range	$t$	°C	-30 to +80 with NBR seals (NBR = nitrile rubber) -20 to +110 with FKM seals (FKM = fluoroelastomer)

## Note

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

## Determining the operating characteristics

$$\text{Flow } q_v = \frac{V_g \times n \times \eta_v}{1000} \quad [\text{l/min}]$$

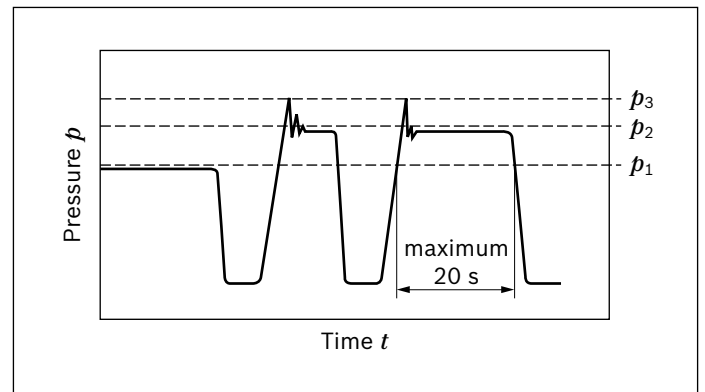
$$\text{Torque } M = \frac{V_g \times \Delta p}{20 \times \pi \times \eta_{hm}} \quad [\text{Nm}]$$

$$\text{Power } P = \frac{2 \pi \times M \times n}{60000} = \frac{q_v \times \Delta p}{600 \times \eta_t} \quad [\text{kW}]$$

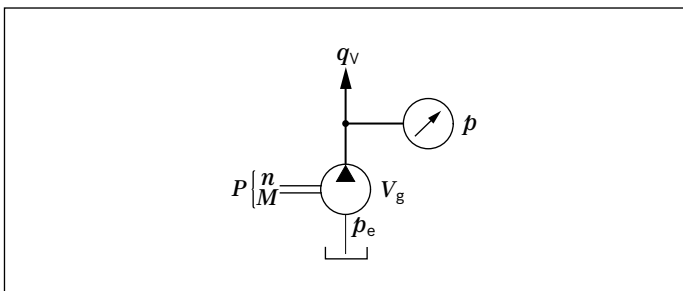
## Key

- $V_g$  Displacement per revolution [ $\text{cm}^3$ ]  
 $\Delta p$  Differential pressure [bar]  
 $n$  Rotational speed [rpm]  
 $\eta_v$  Volumetric efficiency  
 $\eta_{hm}$  Hydraulic-mechanical efficiency  
 $\eta_t$  Total efficiency ( $\eta_t = \eta_v \cdot \eta_{hm}$ )

## Pressure definition



- $p_1$ : Continuous pressure max.  
 $p_2$ : Intermittent pressure max.  
 $p_3$ : Pressure peaks max.



## Note

You can find diagrams for a rough calculation in chapter "Diagrams / Characteristic curves".

Hydraulic fluids

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

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:

during operation as well as disposal and environmental protection before you begin project planning:

- ▶ [90220: Hydraulic fluids based on mineral oils and related hydrocarbons](#)

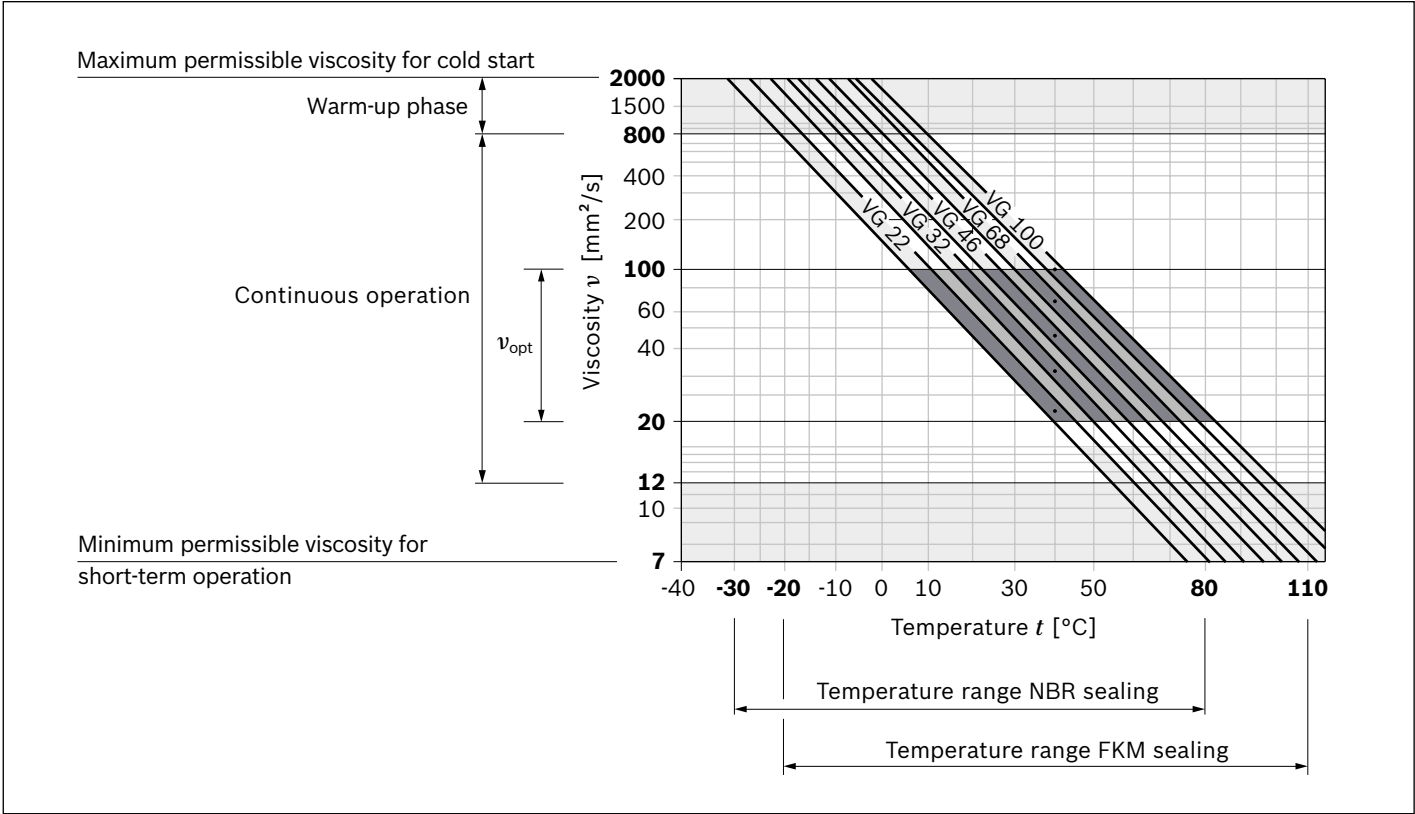
Other hydraulic fluids on request.

- ▶ [90245: Bosch Rexroth Fluid Rating List for Rexroth hydraulic components \(pumps and motors\)](#)

The hydraulic fluid should be selected so that the operating viscosity in the operating temperature range is within the optimum range ( $v_{opt}$ ; see selection diagram).

Viscosity and temperature of hydraulic fluids

Viscosity range	
Permissible in continuous operation	$v = 12 \dots 800 \text{ mm}^2/\text{s}$
Recommended in continuous operation	$v_{opt} = 20 \dots 100 \text{ mm}^2/\text{s}$
Permissible for cold start	$v_{max} \leq 2000 \text{ mm}^2/\text{s}$
Temperature range	
With NBR seals (NBR = nitrile rubber)	$t = -30 \text{ }^\circ\text{C} \dots +80 \text{ }^\circ\text{C}$
With FKM seals (FKM = fluoroelastomer)	$t = -20 \text{ }^\circ\text{C} \dots +110 \text{ }^\circ\text{C}$

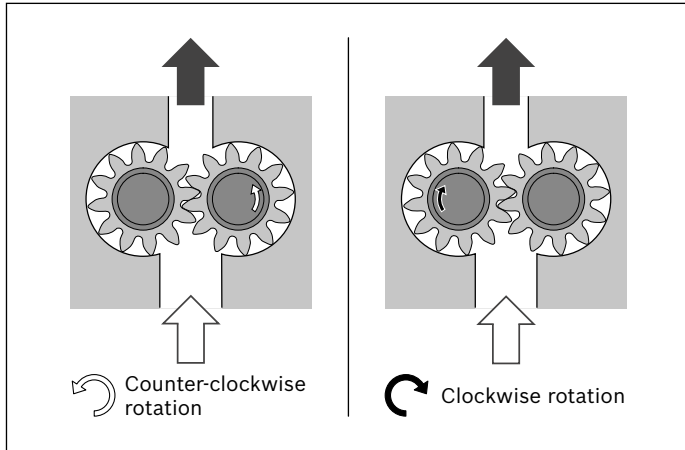


Observe the instructions for the filtration of the hydraulic fluid (see chapter Project planning information).

## Direction of rotation

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

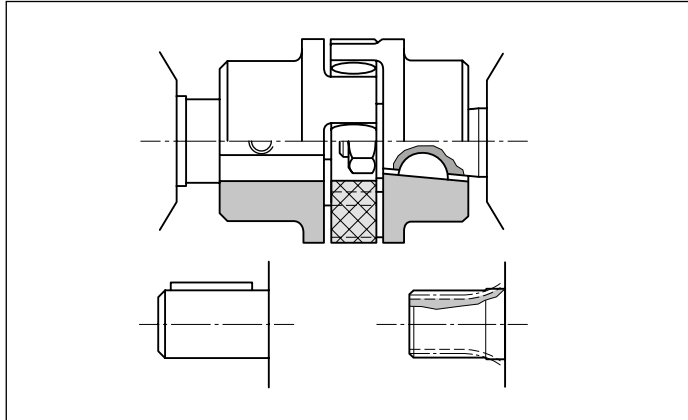
### Direction of rotation, viewed on drive shaft



## Drives

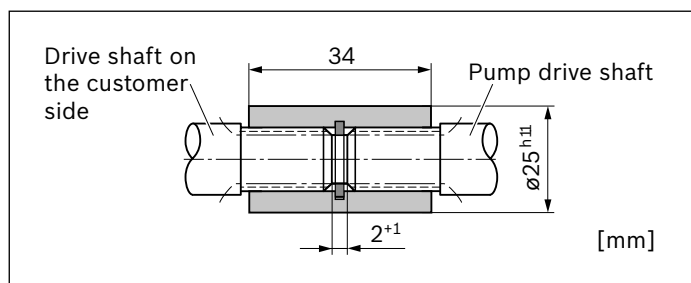
### 1. Elastic couplings

- ▶ The coupling must not transfer any radial and axial forces onto the pump.
- ▶ The maximum admissible radial run-out deviation from the shaft to the fitting slot is 0.2 mm.
- ▶ Admissible shaft shifting see installation information of the coupling manufacturers.



### 2. Coupling sleeve

- ▶ To be used on splined shaft profile according to DIN and SAE.
- ▶ Attention: No radial or axial forces are permitted on the pump shaft or coupling sleeve. The coupling sleeve must be free to move axially.
- ▶ The distance between the pump drive shaft and drive shaft on the customer side must  $2^{+1}$  mm.
- ▶ Provide installation space for the snap ring.
- ▶ Oil-bath or oil-mist lubrication is required.

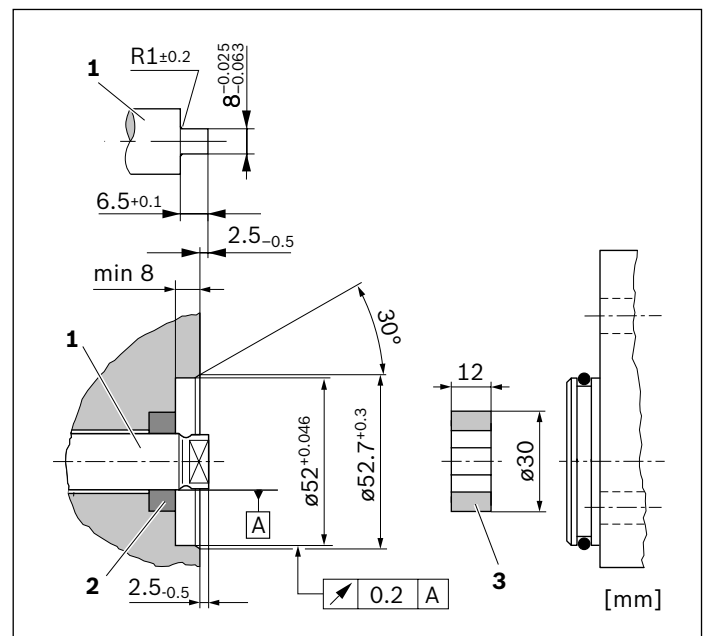


### 3. Tang drive coupling

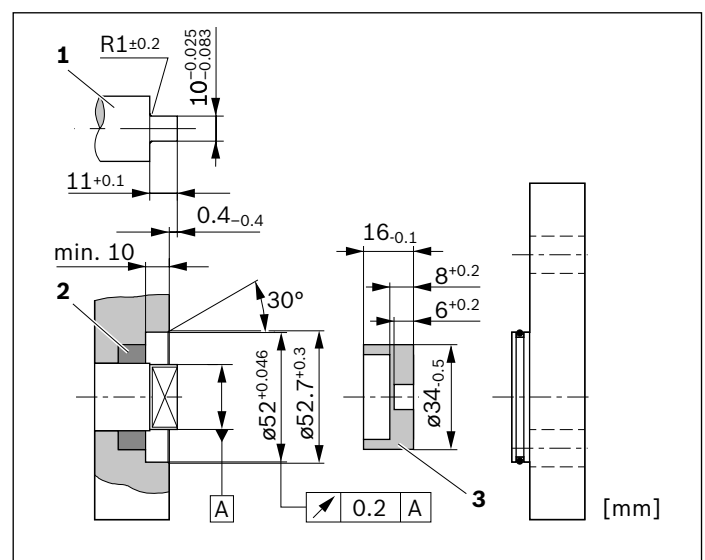
- ▶ For attaching the pump directly to an electric motor or combustion engine, gear, etc.
- ▶ The pump shaft has a special tang drive and driver (3)
- ▶ There is no shaft sealing
- ▶ Drive-side installation and sealing according to the following recommendations and dimensions

- ▶ Drive shaft on the customer side (1)
  - Case-hardening steel DIN EN 10084 e.g. 20MnCrS5 case-hardened 0.6 mm deep; HRC 60 $^{+3}$
  - Seal ring running surface ground without rifling  
 $R_{\max} \leq 4 \mu\text{m}$
- ▶ Radial shaft seals on the customer side (2)
  - Provide with rubber cover (see DIN 3760, type AS, or double-lipped ring)
  - Provide installation edge with 15° slant or install shaft seal with protection sleeve

#### AZPF-1x

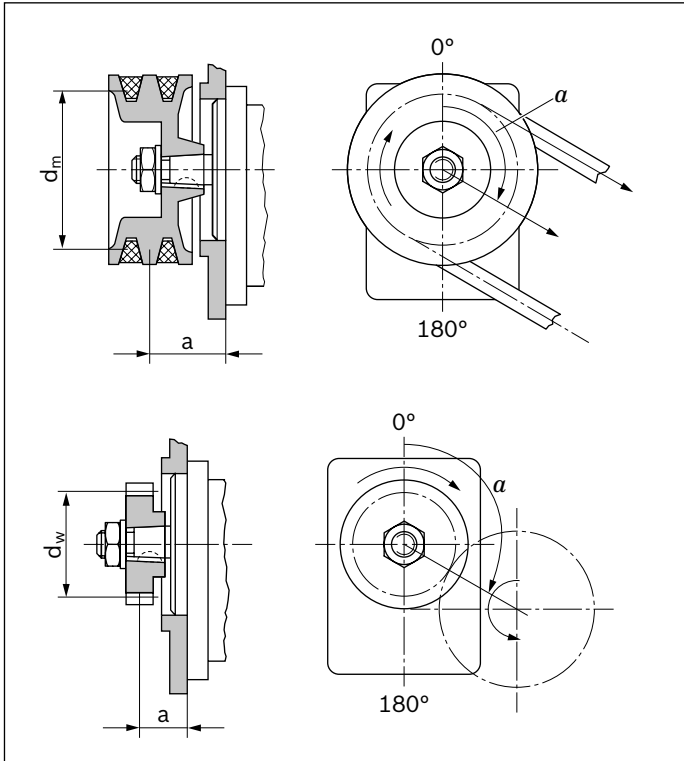


#### AZPF-2x



#### 4. V-belts and straight gear wheels or helical toothed gear drives without outboard bearing

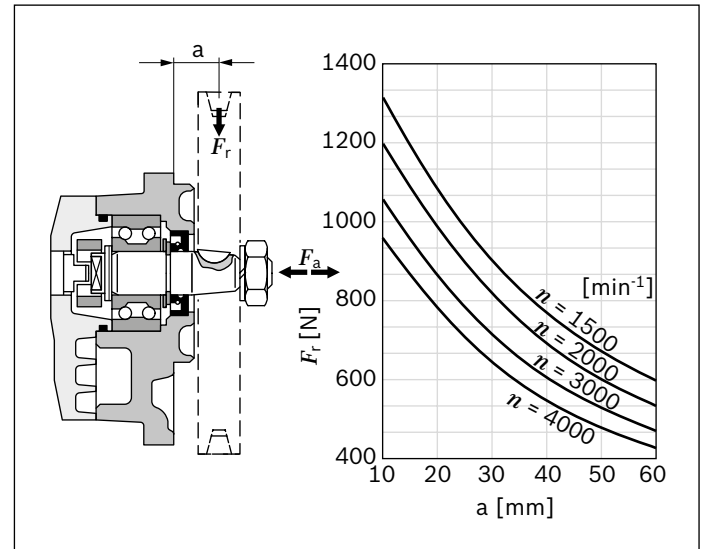
For V-belt or gear wheel drives, please contact us specifying the application and mounting conditions (dimensions  $a$ ,  $d_m$ ,  $d_w$  and angle  $\alpha$ ). For helical toothed gear drives, details of the helix angle  $\beta$  are also required.



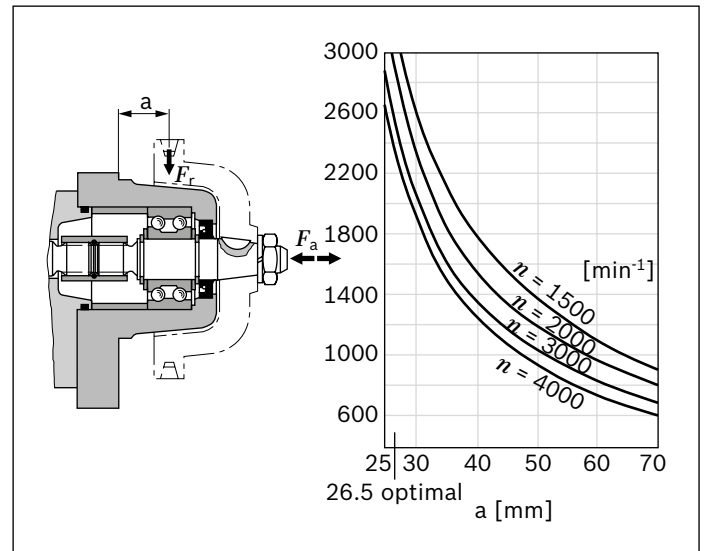
#### 5. Outboard bearing

Outboard 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

### Splined shafts

Drive shaft		M <sub>max</sub>	Size	P <sub>2 max</sub> Serie 1x	P <sub>2 max</sub> Serie 2x
Code	Designation	Nm		bar	bar
<b>F</b>	DIN 5482 B17 × 14	100	4 ... 16	280	280
			19	230	
			22	210	250
			25	-	225
			28	-	200
<b>R</b>	SAE J744 16-4 9T	110	4 ... 16	280	280
			19	230	
			22	210	250
			25	-	225
			28	-	200
<b>P</b>	SAE J744 19-4 11T	180	4 ... 16	280	280
			19	230	
			22	210	250
			25	-	225
			28	-	200

### Tapered shafts

Drive shaft		M <sub>max</sub>	Size	P <sub>2 max</sub> Serie 1x	P <sub>2 max</sub> Serie 2x
Code	Type	Nm		bar	bar
<b>C</b>	1 : 5	155	4 ... 16	280	280
			19	230	
			22	210	250
			25	-	225
			28	-	200
<b>H</b>	1 : 8	160	4 ... 16	280	280
			19	230	
			22	210	250
			25	-	225
			28	-	200

### Parallel keyed shafts

Drive shaft		$M_{\max}$	Size	$p_{2 \max}$
Code	Designation	Nm		bar
<b>Q</b>	SAE J744 16-1 A	55	4 ... 11	280
			14	220
			16	190
			19	160
			22	130
			25	120
			28	110
<b>A</b>	ISO Ø18 mm	75	4 ... 14	280
			16	260
			19	220
			22	180
			25	160
			28	150

### Tang drive

Drive shaft		$M_{\max}$	Size	$p_{2 \max}$ Serie 1x	$p_{2 \max}$ Serie 2x
Code	Designation	Nm		bar	bar
<b>N</b>	Tang drive	65	4 ... 11	280	
			14	260	
			16	220	
			19	190	
			22	160	
		85	4 ... 16		280
			19		250
			22		210
			25		190
			28		170

**With outboard bearing**

Drive shaft	Outboard bearing	M <sub>max</sub>	Size	P <sub>2 max</sub> Serie 1x	P <sub>2 max</sub> Serie 2x
Code	Type	Nm		bar	bar
S	Type 1 (with tang drive coupling)	65	4 ... 11	280	280
			14	260	
			16	230	250
			19	190	190
			22	160	160
			25	140	140
			28	130	130
	Type 1 (with sleeve)	160	4 ... 16	280	280
			19	230	
			22	210	250
			25	-	225
			28	-	200
			4 ... 16	280	280
			19	230	
	Type 2		22	210	250
			25	-	225
			28	-	200



## 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.

In most cases, each pump stage is hydraulically isolated from its neighbor and the suction ports are separate from one another. On request a common suction port or separated but hydraulically connected suction ports are available.

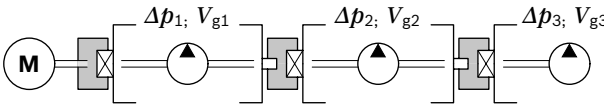
### Note

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

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

### Addition of drive torques

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



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

$\Delta p$  [bar]  
 $V_g$  [cm<sup>3</sup>]

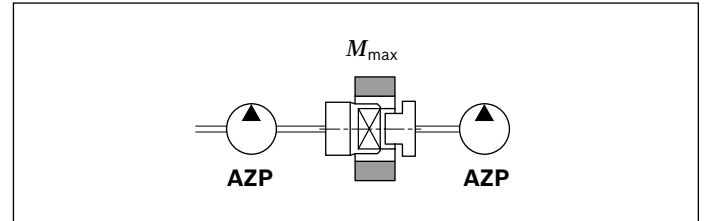
<sup>1)</sup>  $M_{\max}$ : see table above "Maximum transferable drive torques"

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

### Standard through drive (tang drive coupling)

In the case of pumps of the platform F the driver for the following pump stage can carry a load of up to  $M_{\max} = 65$  Nm (AZPF-1x) resp.  $M_{\max} = 85$  Nm (AZPF-2x). Please note possibly resulting pressure restrictions for the following pump stages.

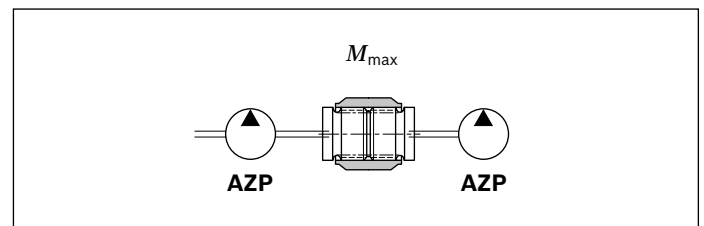
Subsequent pumps of a smaller series determine the max. transmissible torque



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

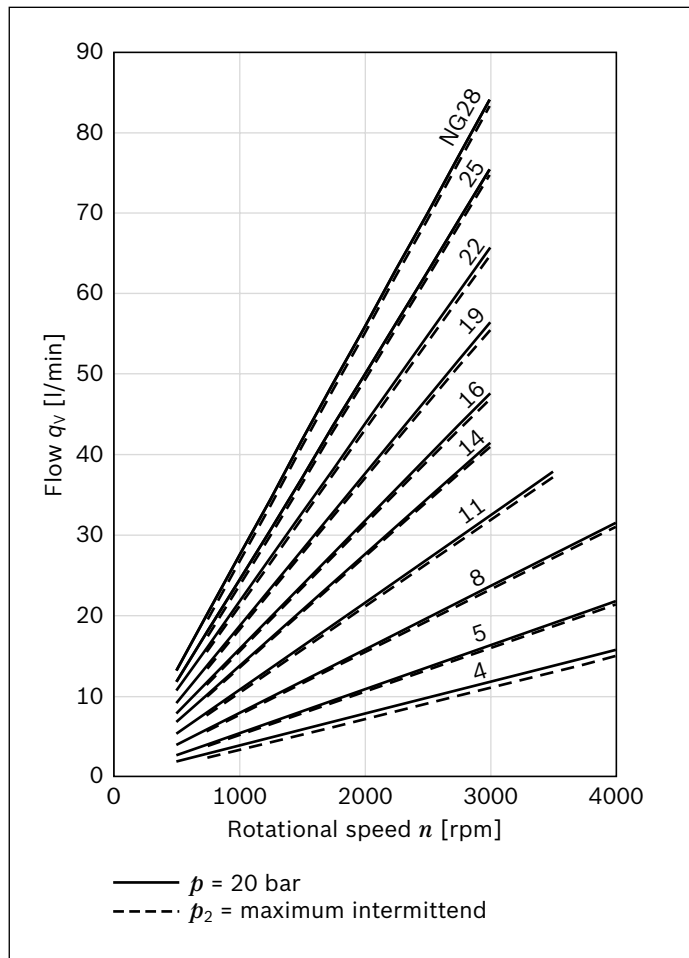
### Reinforced through drives

For applications with higher transfer torques or torsional vibrations reinforced through drives up to  $M_{\max} = 160$  Nm are available. Lay out design on request.



## Diagrams/characteristic curves

### Flow characteristic curves

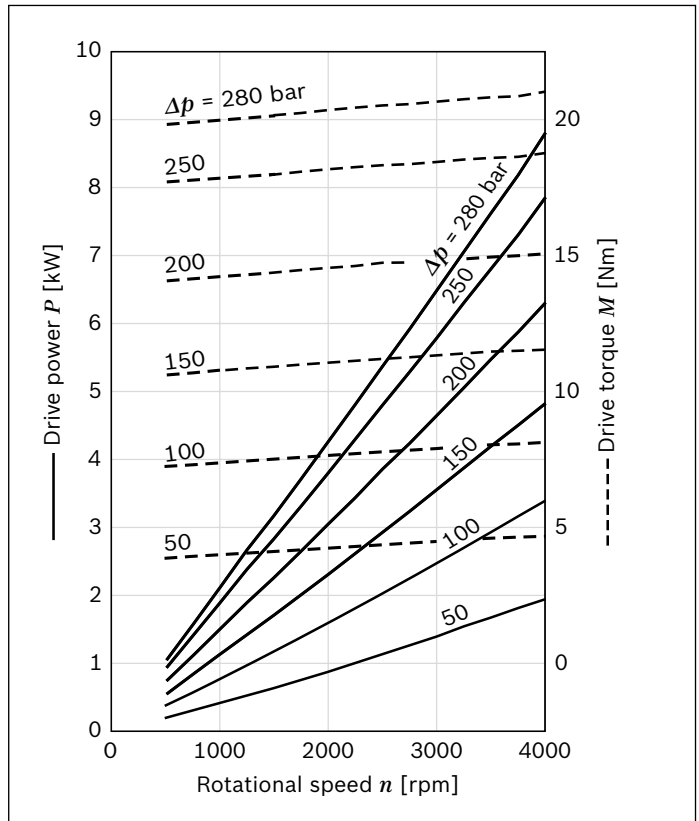


#### Note

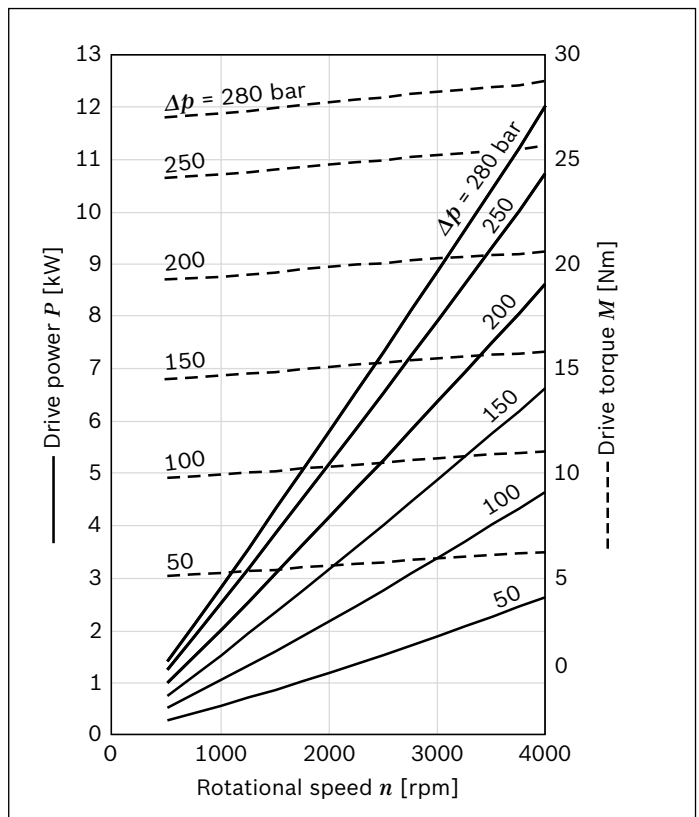
- Characteristic curves measured at  $\nu = 32 \text{ mm}^2/\text{s}$  and  $t = 50 \text{ }^\circ\text{C}$ .

### Power diagrams

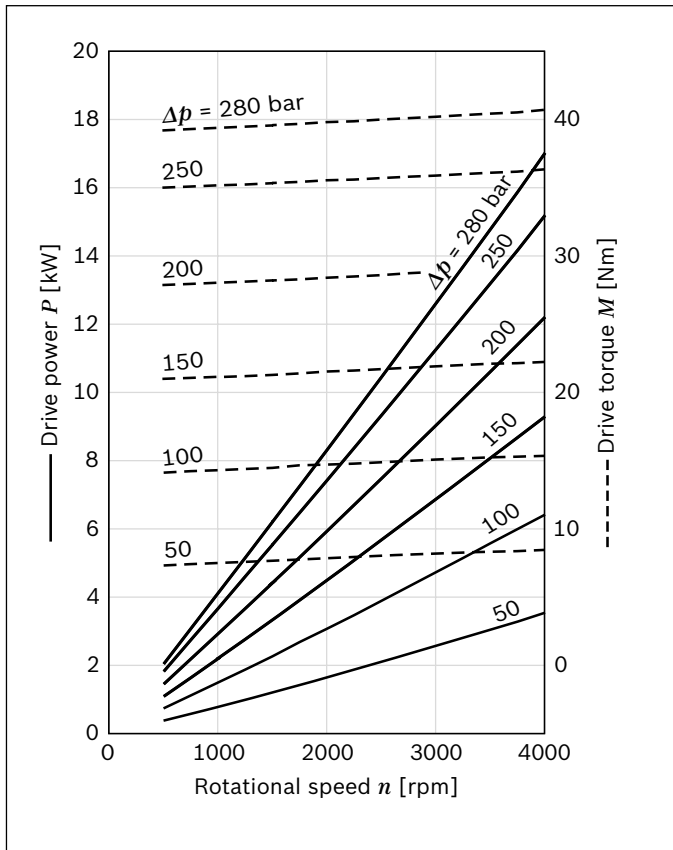
#### Size 4



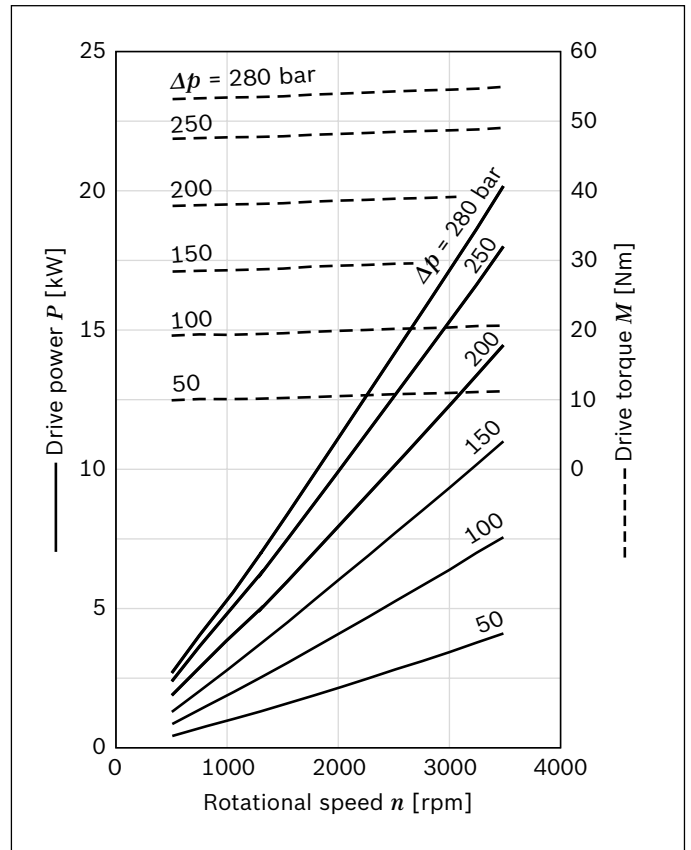
#### Size 5



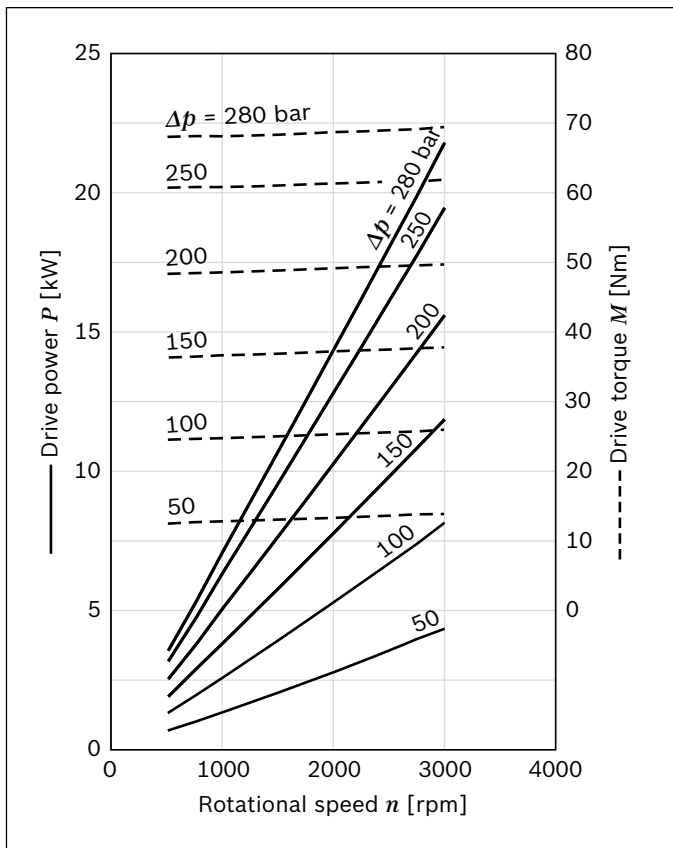
**Size 8**



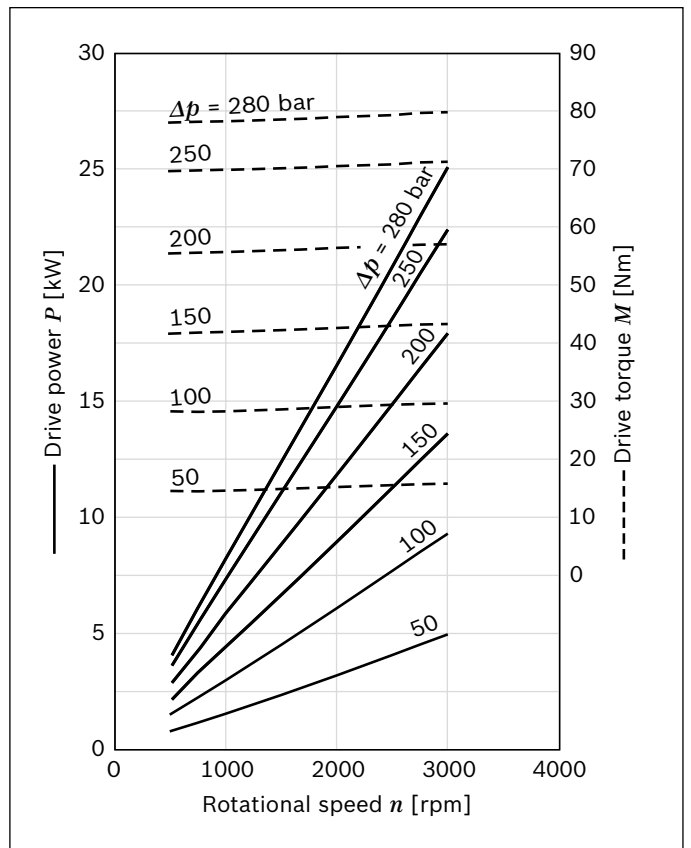
**Size 11**



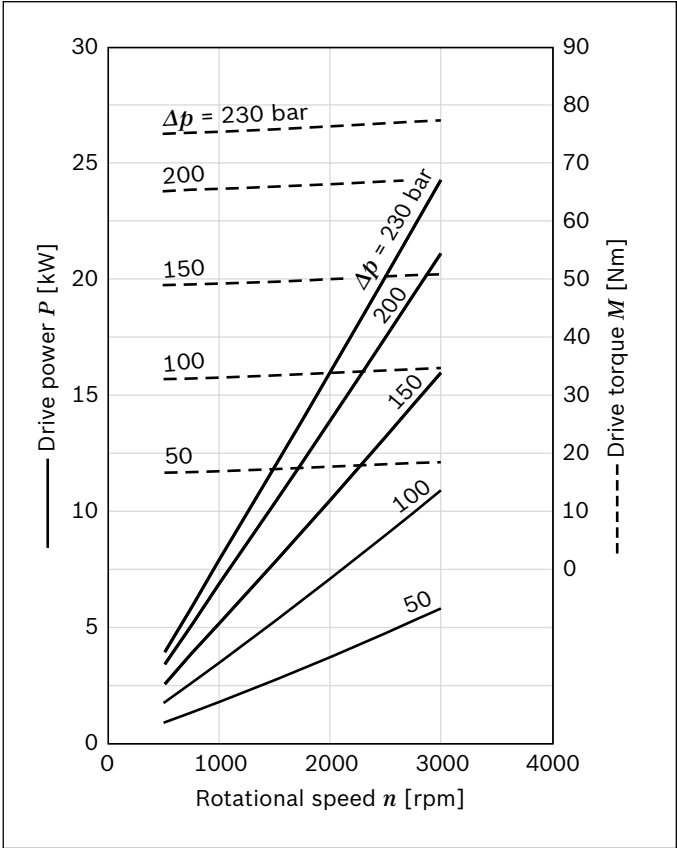
**Size 14**



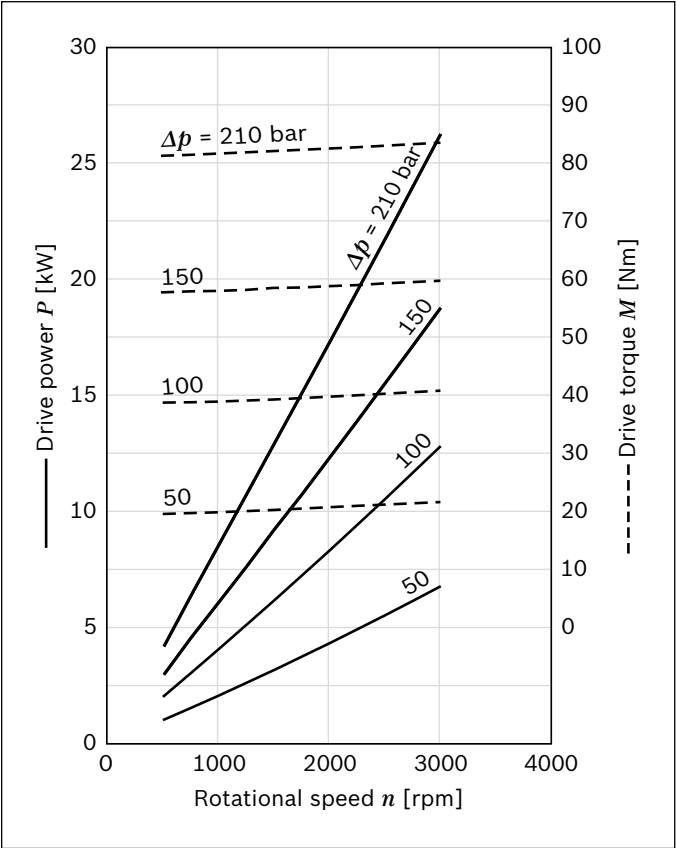
**Size 16**



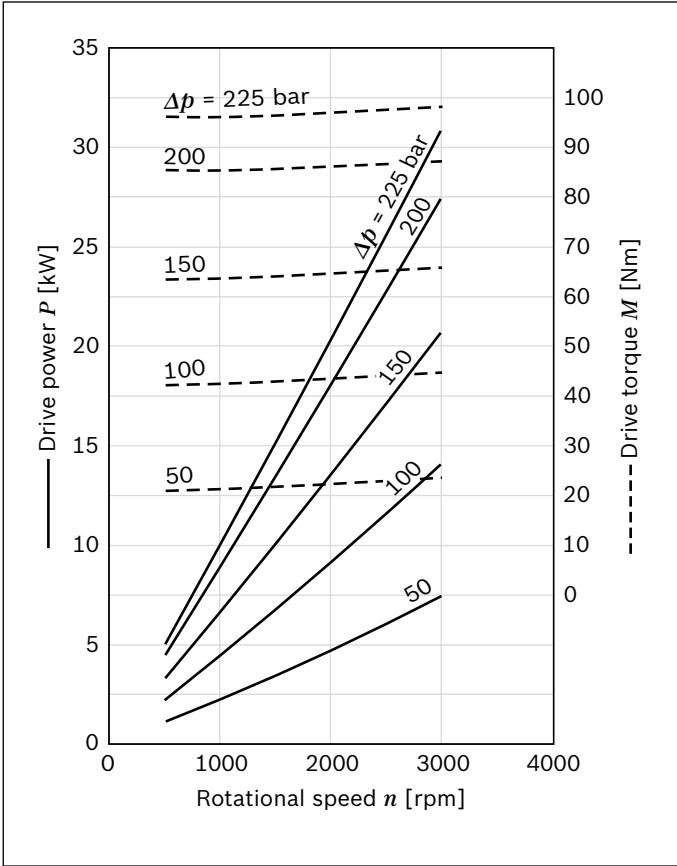
Size 19



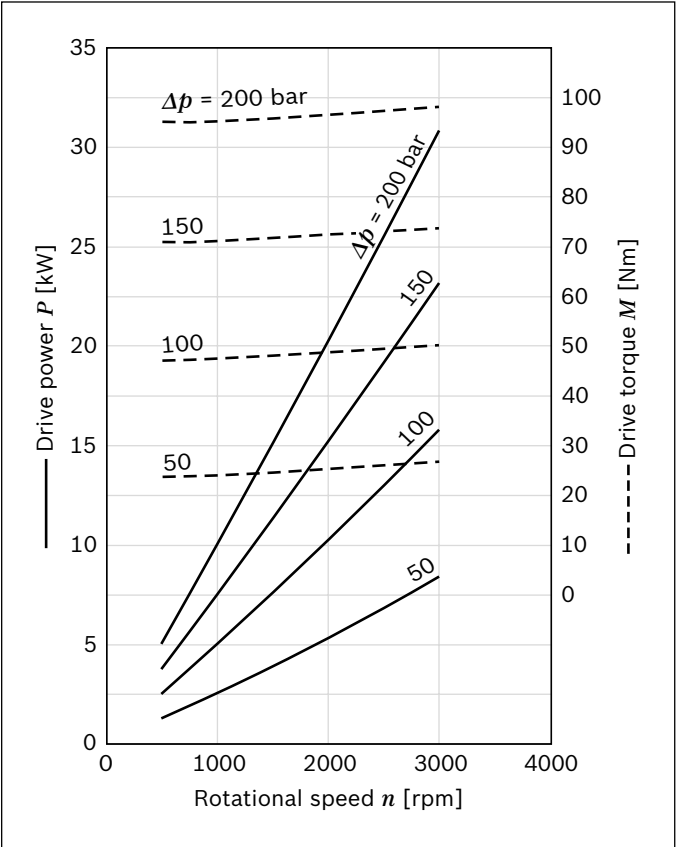
Size 22



Size 25



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.

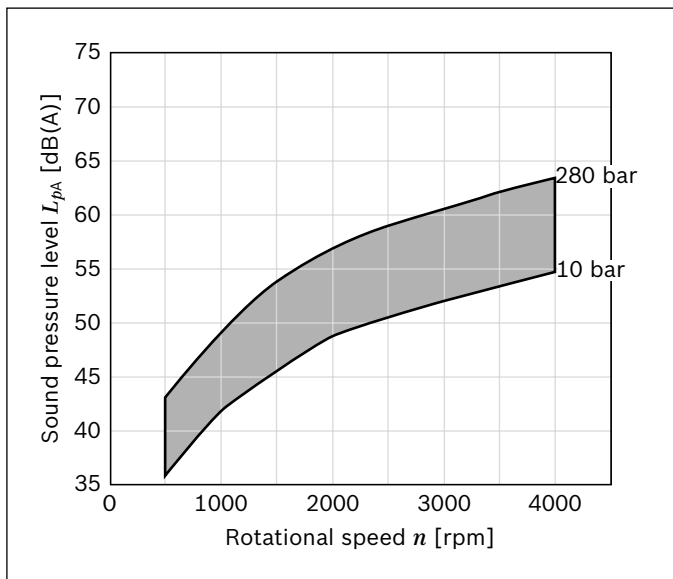
Ambient influences (installation site, piping, other system components) were not taken into account.

The values refer to one individual pump.

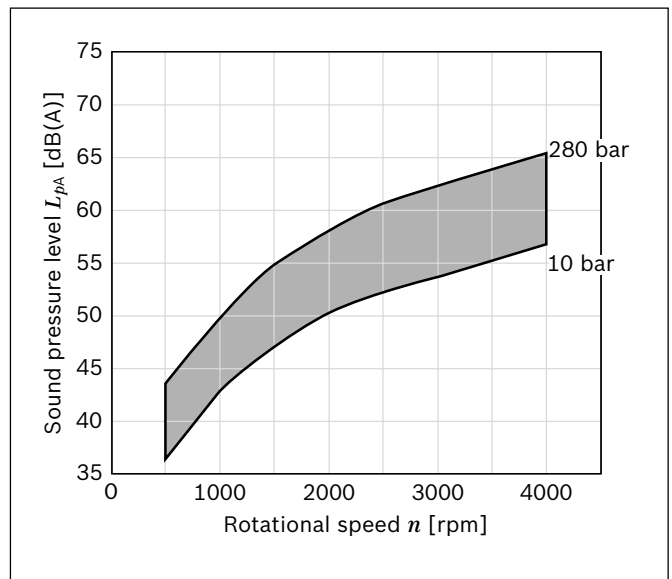
### Note

- ▶ Characteristic curves measured at  $\nu = 32 \text{ mm}^2/\text{s}$  and  $t = 50 \text{ }^\circ\text{C}$ .
- ▶ 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.

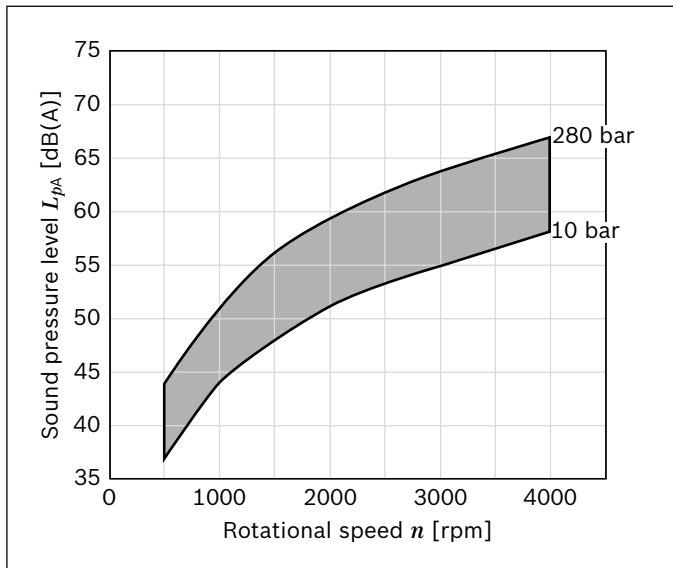
### Size 4



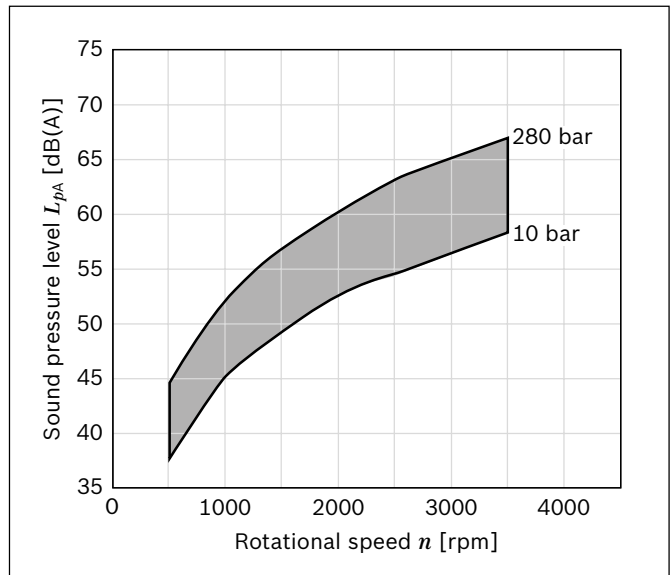
### Size 5



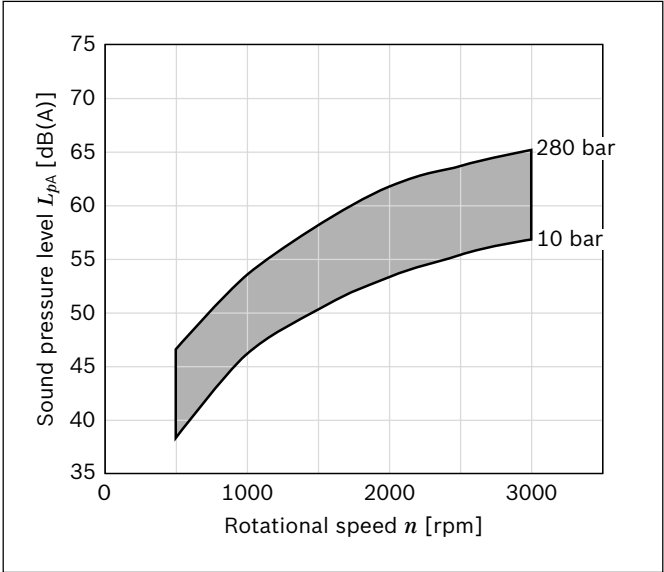
### Size 8



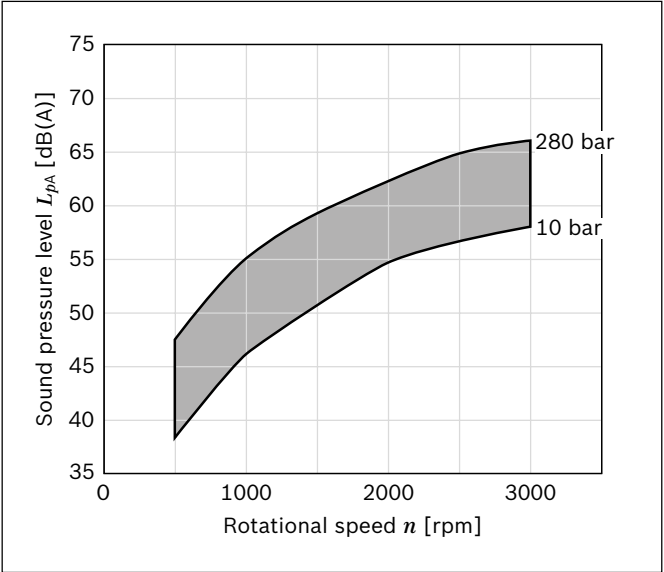
### Size 11



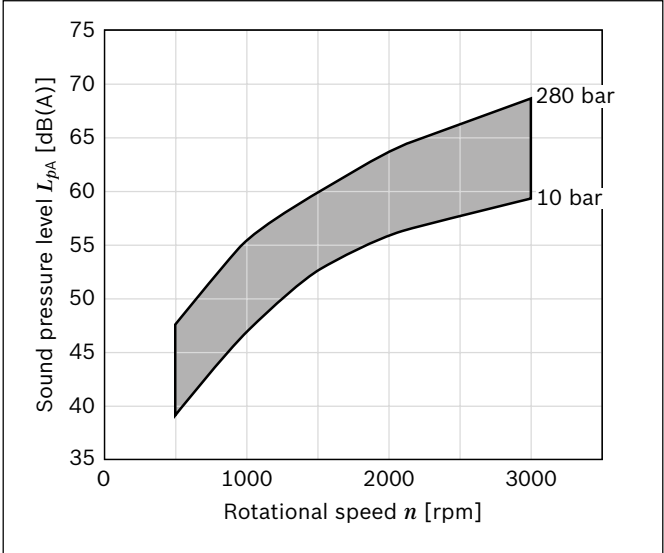
**Size 14**



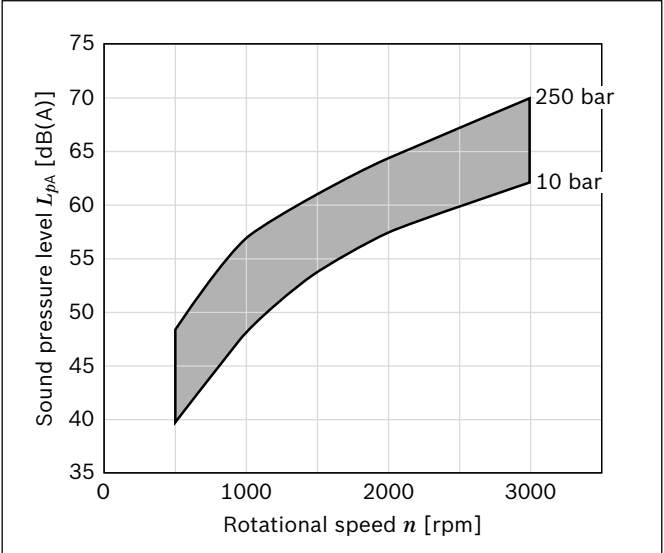
**Size 16**



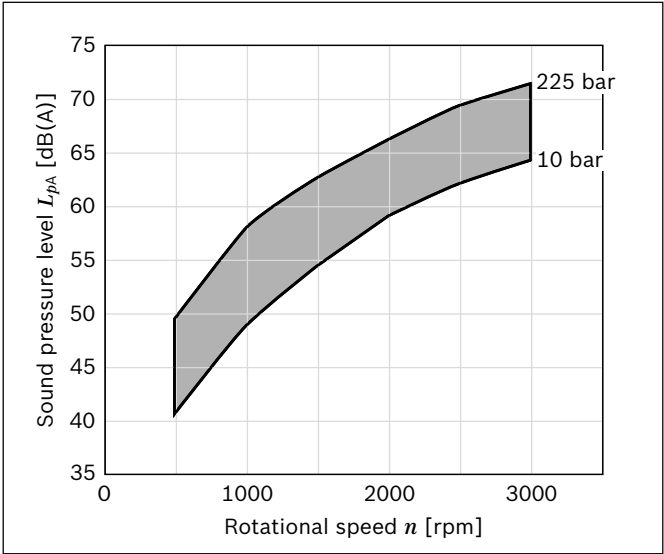
**Size 19**



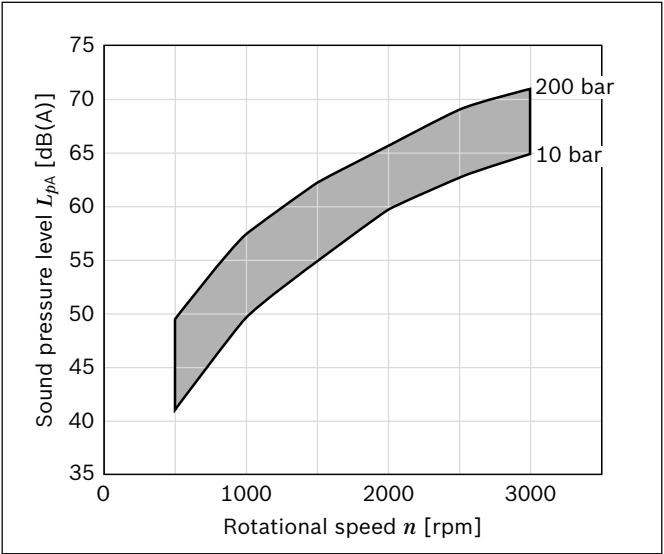
**Size 22**



**Size 25**



**Size 28**

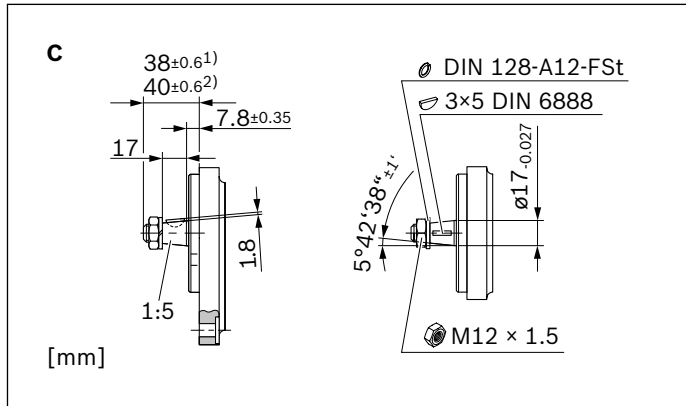


## Dimensions

### Drive shafts

#### Tapered shaft 1:5

(for front cover B, P, N)

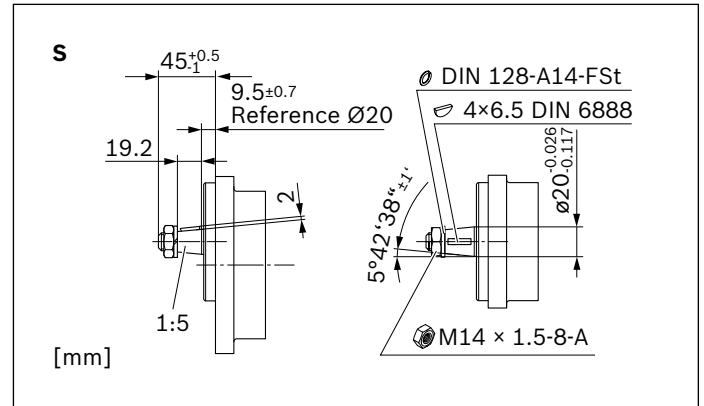


1) In combination with front cover B

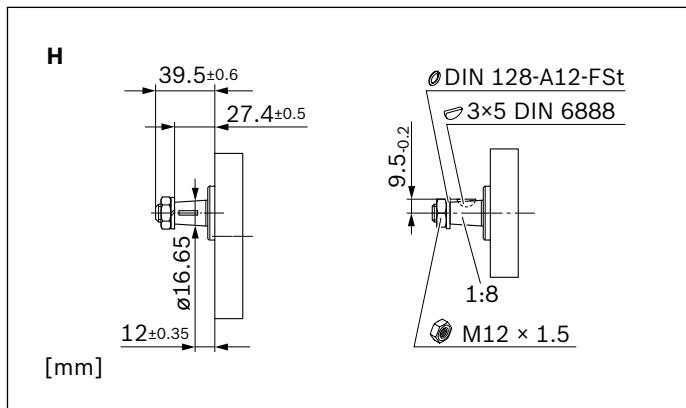
2) In combination with front cover P and front cover N

#### Tapered shaft 1:5

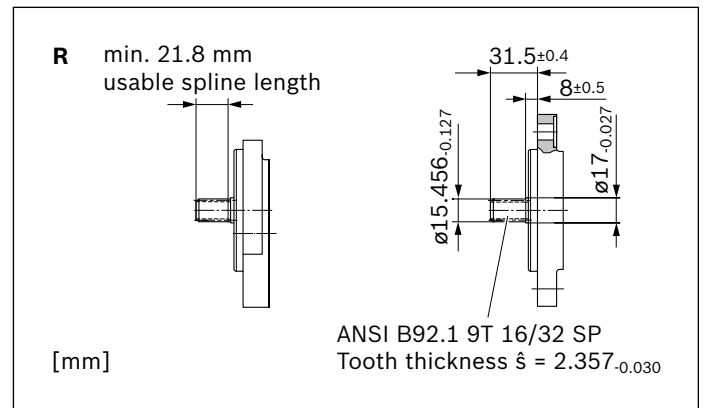
(for outboard bearing A, G)



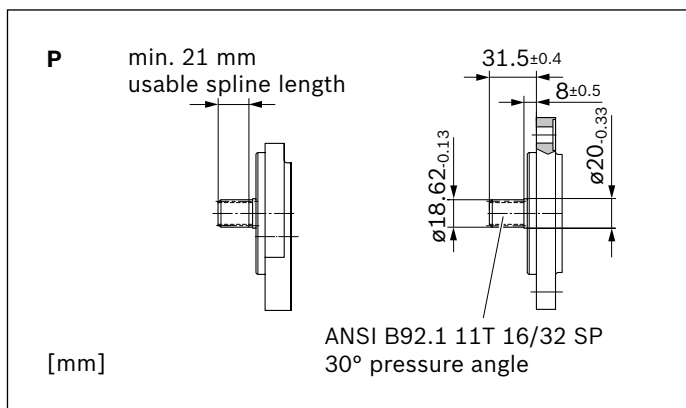
#### Tapered shaft 1:8



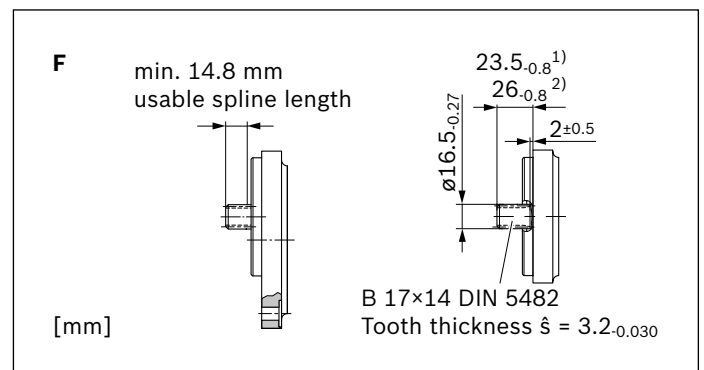
#### Splined shaft (SAE J744 16-4 9T)



#### Splined shaft (SAE J744 19-4 11T)



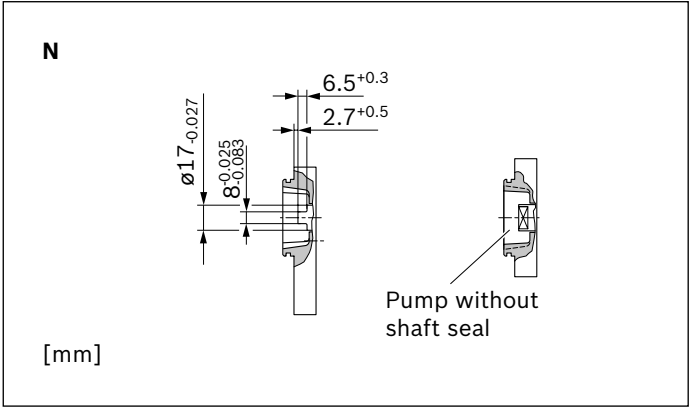
#### Splined shaft (DIN 5482 B17 x 14)



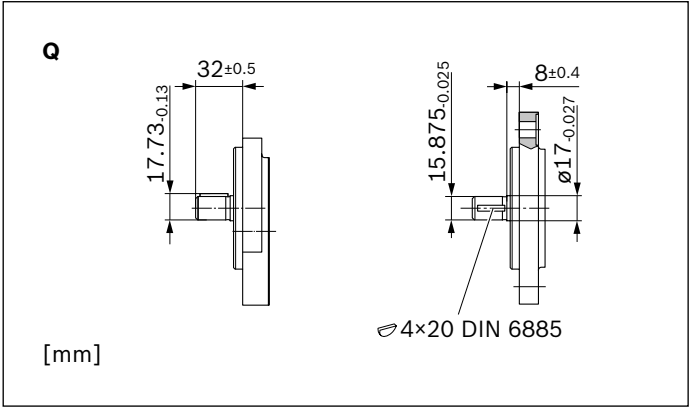
1) In combination with front cover B

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

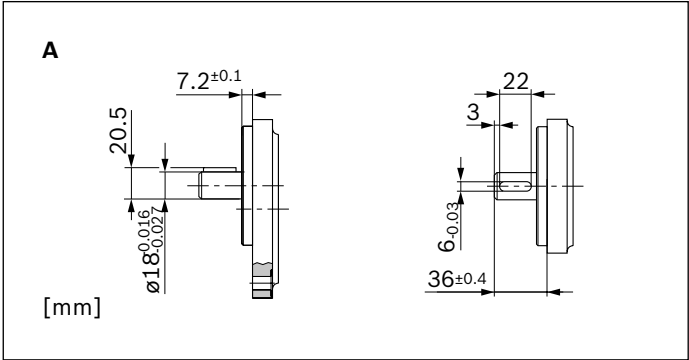
Tang drive



Parallel keyed shaft (SAE J744 16-1 A)



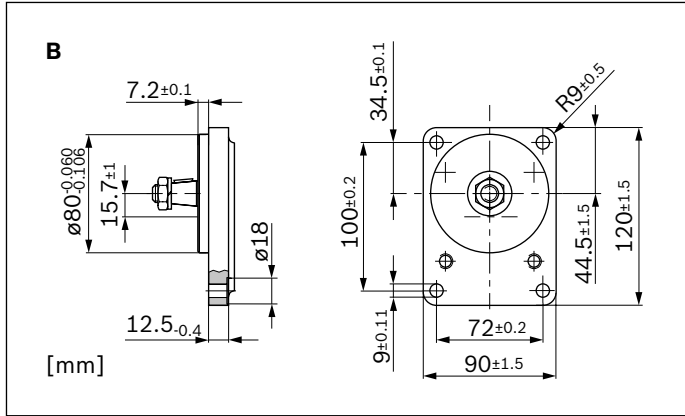
Parallel keyed shaft (ISO  $\varnothing 18$  mm)



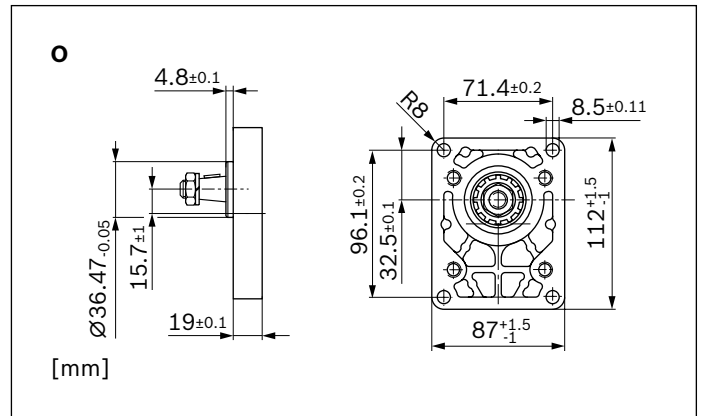


## Front cover

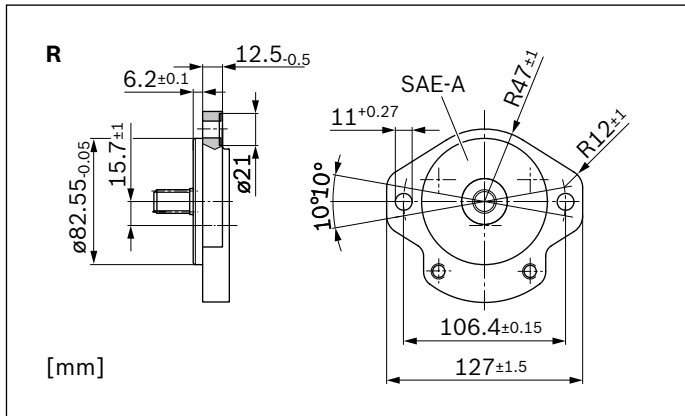
### Rectangular flange Ø80 mm



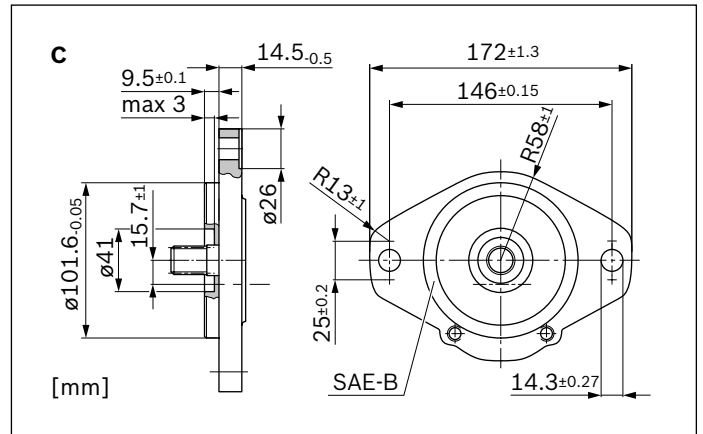
### Rectangular flange Ø36.47mm



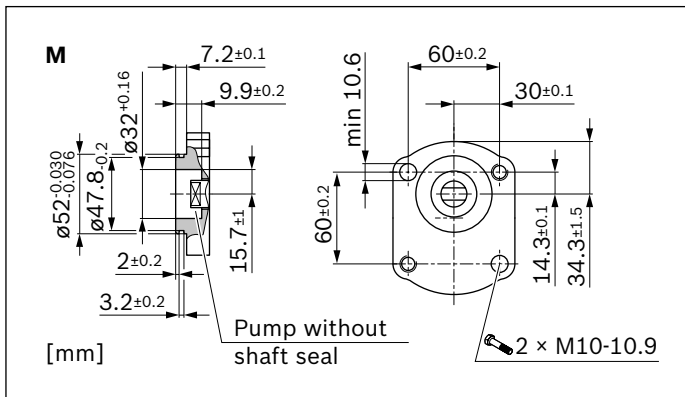
### 2-bolt flange Ø82.55 mm, SAE J744 82-2 (A)



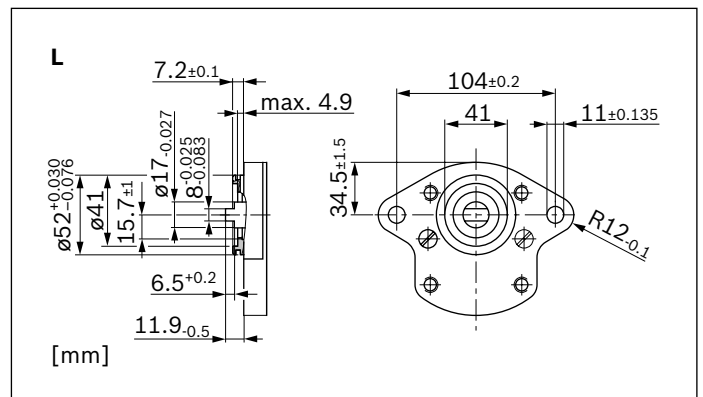
### 2-bolt flange Ø101.6mm, SAE J744 101-2 (B)



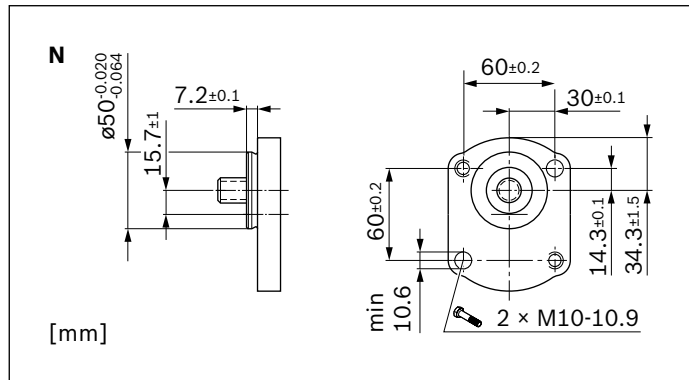
### 2-bolt mounting Ø52mm, with O-ring



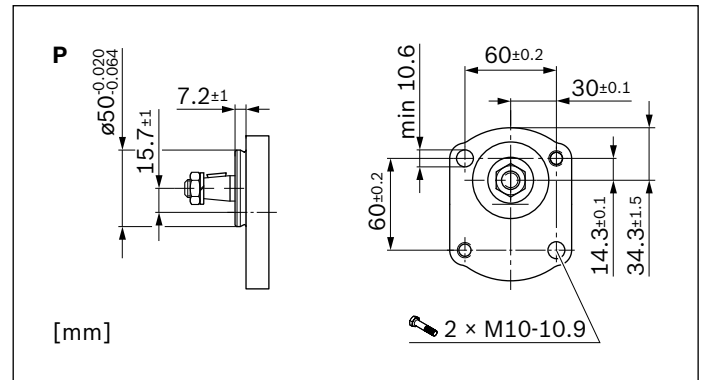
### 2-bolt mounting Ø52 mm, compressor port



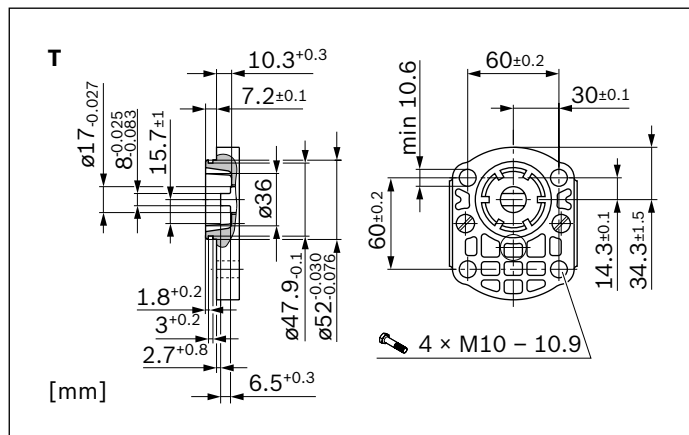
**2-bolt mounting Ø50mm, connection variant 1**



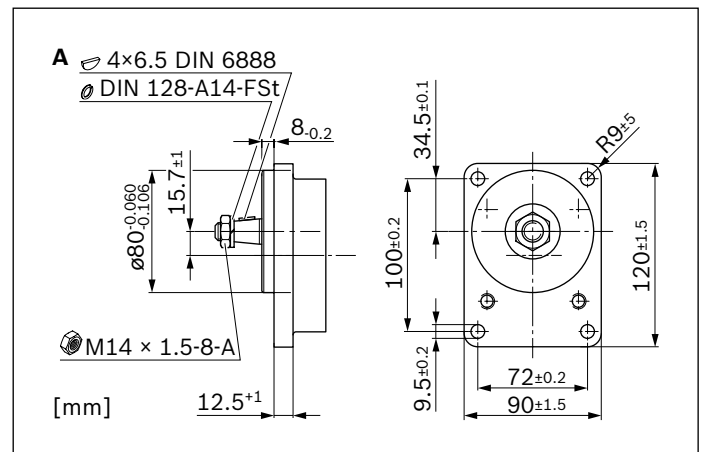
**2-bolt mounting Ø50 mm, connection variant 2**



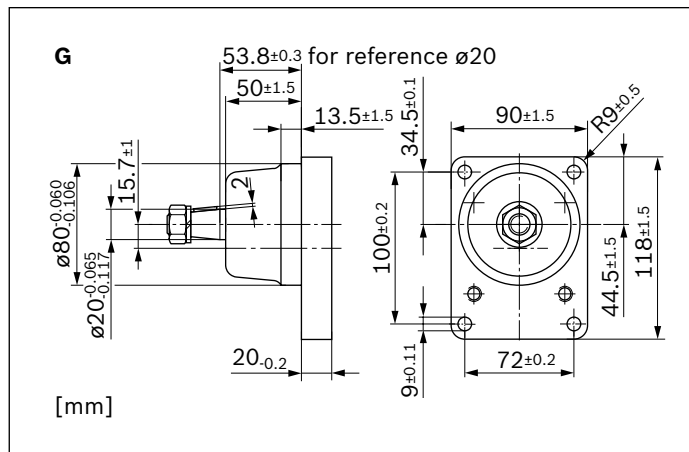
**4-bolt mounting Ø52 mm, with O-ring**



**Outboard bearing Ø80 mm, type 1**

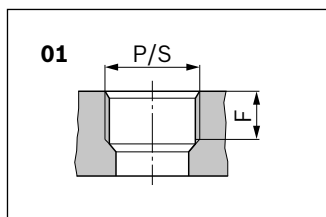


**Outboard bearing Ø80 mm, type 2**



## Line connections

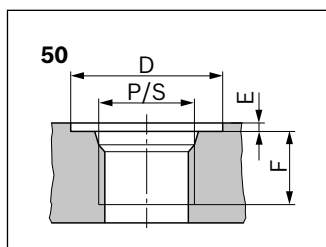
### Pipe thread according to ISO 228-1



NG	Pressure side		Suction side	
	P	F	S	F
	mm		mm	
5 ... 22	G 1/2	16	G 3/4	16

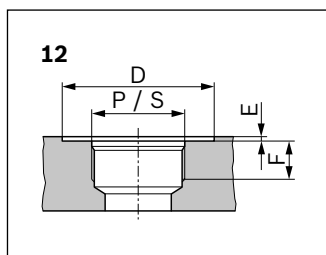
Note: Special version "AB01" deviates from standard, see page 33

### Metric threads according to ISO 6149-1 (with O-ring seal)



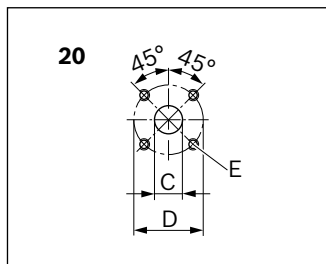
NG	Pressure side			Suction side			
	P	D	E	F	S	D	F
	mm			mm		mm	mm
4 ... 5	M18 × 1.5	29		16	M18 × 1.5	29	16
8 ... 16	M22 × 1.5	34	0,5	18	M27 × 2	40	19
19 ... 28					M33 × 2	46	22

### Thread SAE (with O-ring seal BOSS)



NG	Pressure side				Suction side			
	P	D	E	F	S	D	E	F
		mm	mm	mm		mm	mm	mm
4 ... 5	3/4-16 UNF-2B	25	0,5	13	7/8-14 UNF-2B	25	0,5	13
8	7/8-14 UNF-2B	35		16		35		16
11 ... 28					1 1/16-12 UN-2B	45		19

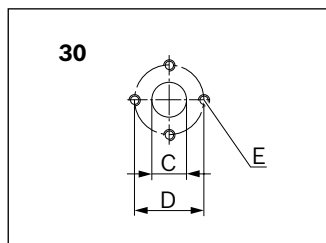
### Square flange



NG	Pressure side			Suction side		
	C	D	E	C	D	E
	mm	mm		mm	mm	
4 ... 5				15		
8 ... 22	15	35	M6; 13 mm deep	20	40	M6; 13 mm deep
19 ... 28 <sup>1)</sup>				26	55	M8; 13 mm deep

<sup>1)</sup> Series 2x

### Square flange



NG	Pressure side			Suction side		
	C	D	E	C	D	E
	mm	mm		mm	mm	
4 ... 8				13,5	30,2	M6; 13 mm deep
11 ... 28	13,5	30,2	M6; 13 mm deep	20	39,7	M8; 13 mm deep

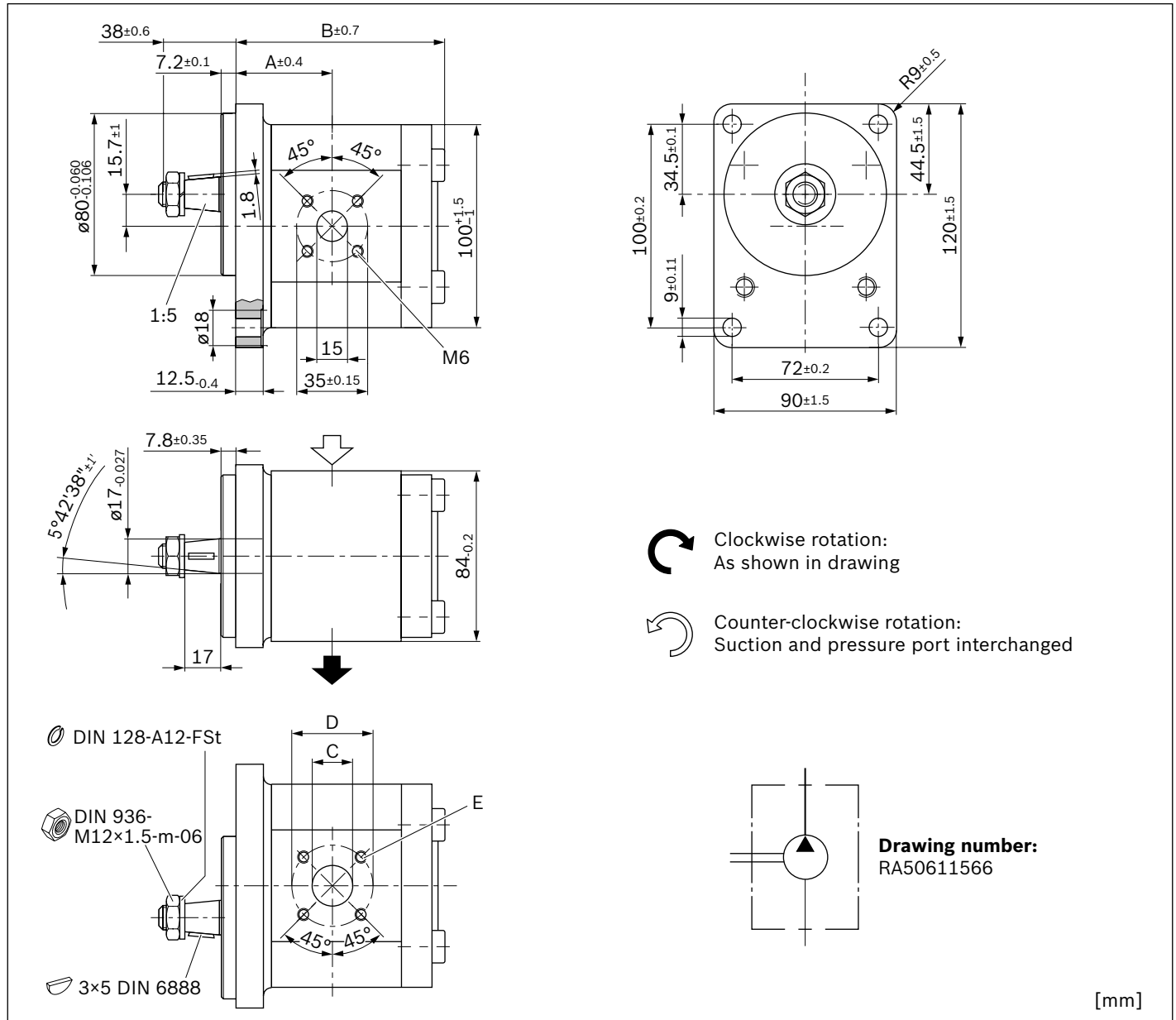
### Note

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.

## Preferred program

**Tapered shaft 1:5 with rectangular flange Ø80 mm**

AZPF – 1X – ... **CB20MB**



NG	Material number		Maximum pressure intermittend	Maximum speed	Weight	Dimensions				
	Direction of rotation		p <sub>2</sub>	n <sub>max</sub>	m	A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	
4	0 510 225 306	0 510 225 006 <sup>1)</sup>	280	4000	3.2	39.9	85	15	40	
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	M6; 13 mm deep
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	

<sup>1)</sup> Version with shaft seal ring in FKM (Type code - ...KB)

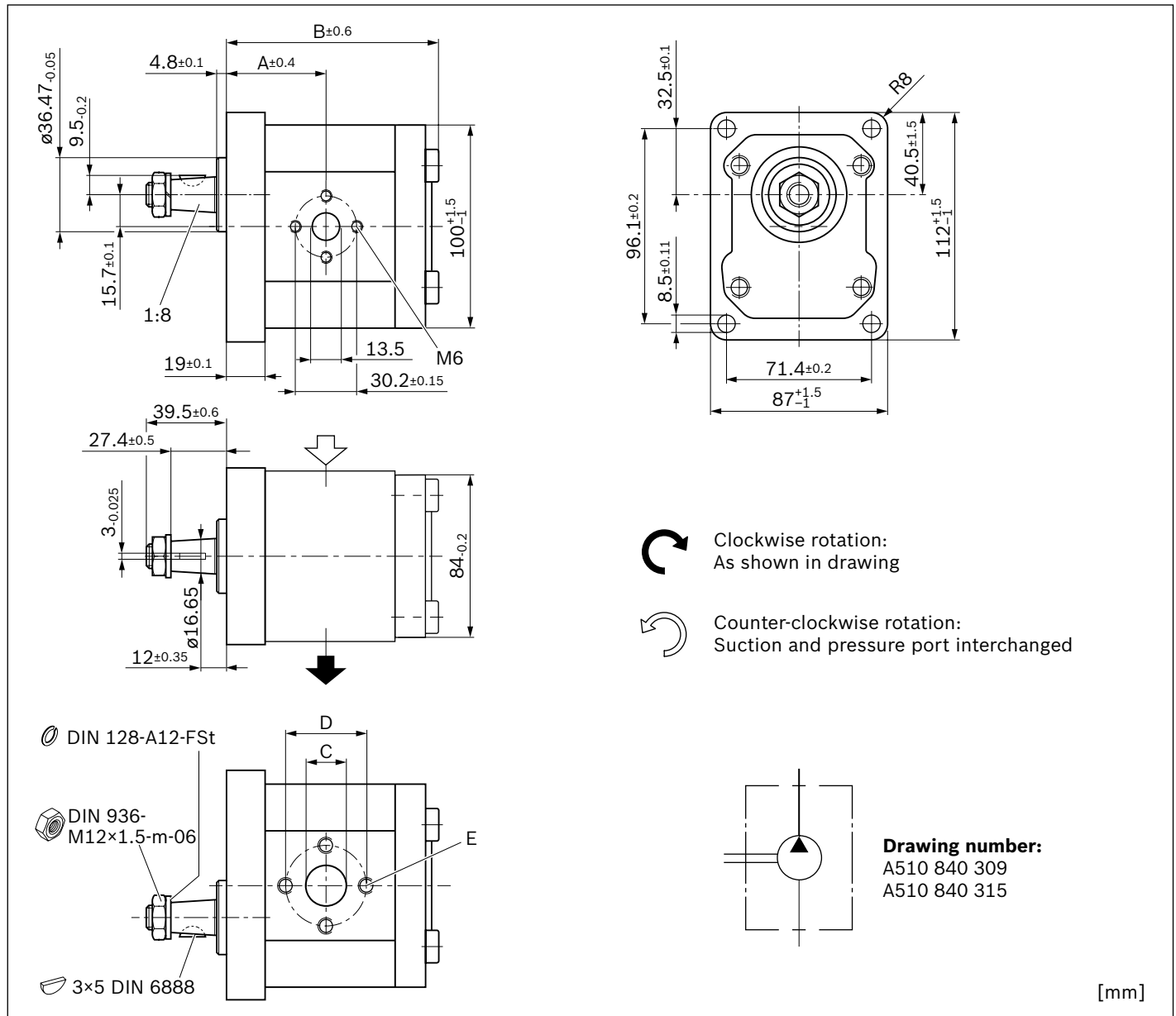
AZPF - 1X - ... **FB20MB**



M6; 13 mm deep

**Tapered shaft 1:8 with rectangular flange  $\varnothing 36.47$  mm**

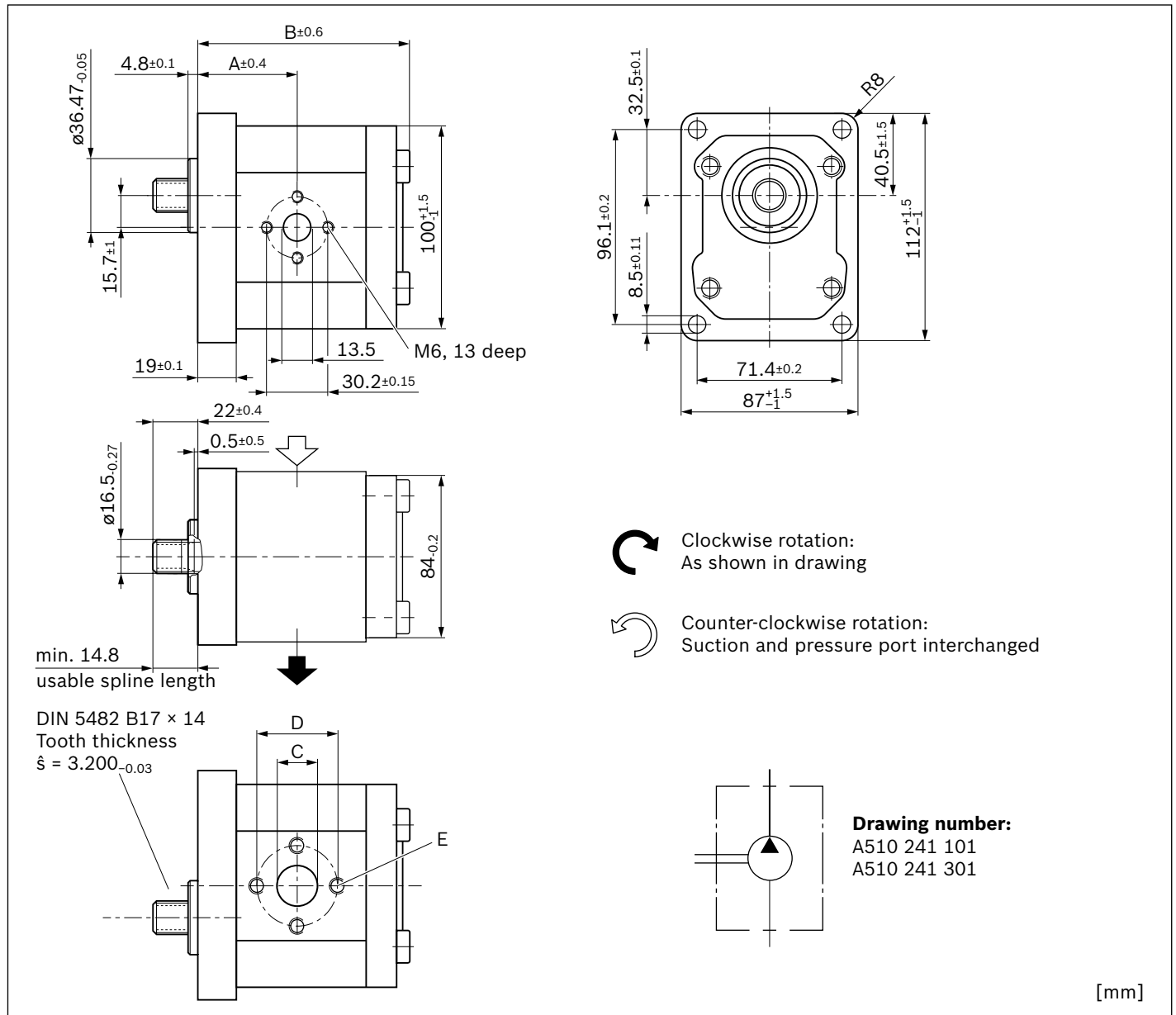
AZPF - 12 - ... **HO30KB**



NG	Material number		Maximum pressure intermittent	Maximum speed	Weight	Dimensions				
	Direction of rotation		$p_2$	$n_{max}$	m	A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	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 mm 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	13.5	30.2	
14	0 510 525 375	0 510 525 075	280	3000	3.6	49	102.5	13.5	30.2	
16	0 510 625 381	0 510 625 075	280	3000	3.6	49	105.9	13.5	30.2	M8; 13 mm deep
19	0 510 625 386 <sup>1)</sup>	0 510 625 076 <sup>1)</sup>	280	3500	4.1	59.9	121.1	20	39.7	
22	0 510 725 410 <sup>1)</sup>	0 510 725 112 <sup>1)</sup>	250	3500	4.2	62.6	126.5	20	39.7	
25	0 510 725 411 <sup>1)</sup>	0 510 725 113 <sup>1)</sup>	225	3000	4.4	64.7	132.5	20	39.7	
28	0 510 725 412 <sup>1)</sup>	0 510 725 114 <sup>1)</sup>	200	3000	4.5	67.1	137.3	20	39.7	

<sup>1)</sup> Version with reinforced bearings, Series 2X (AZPF - 22 - ...)

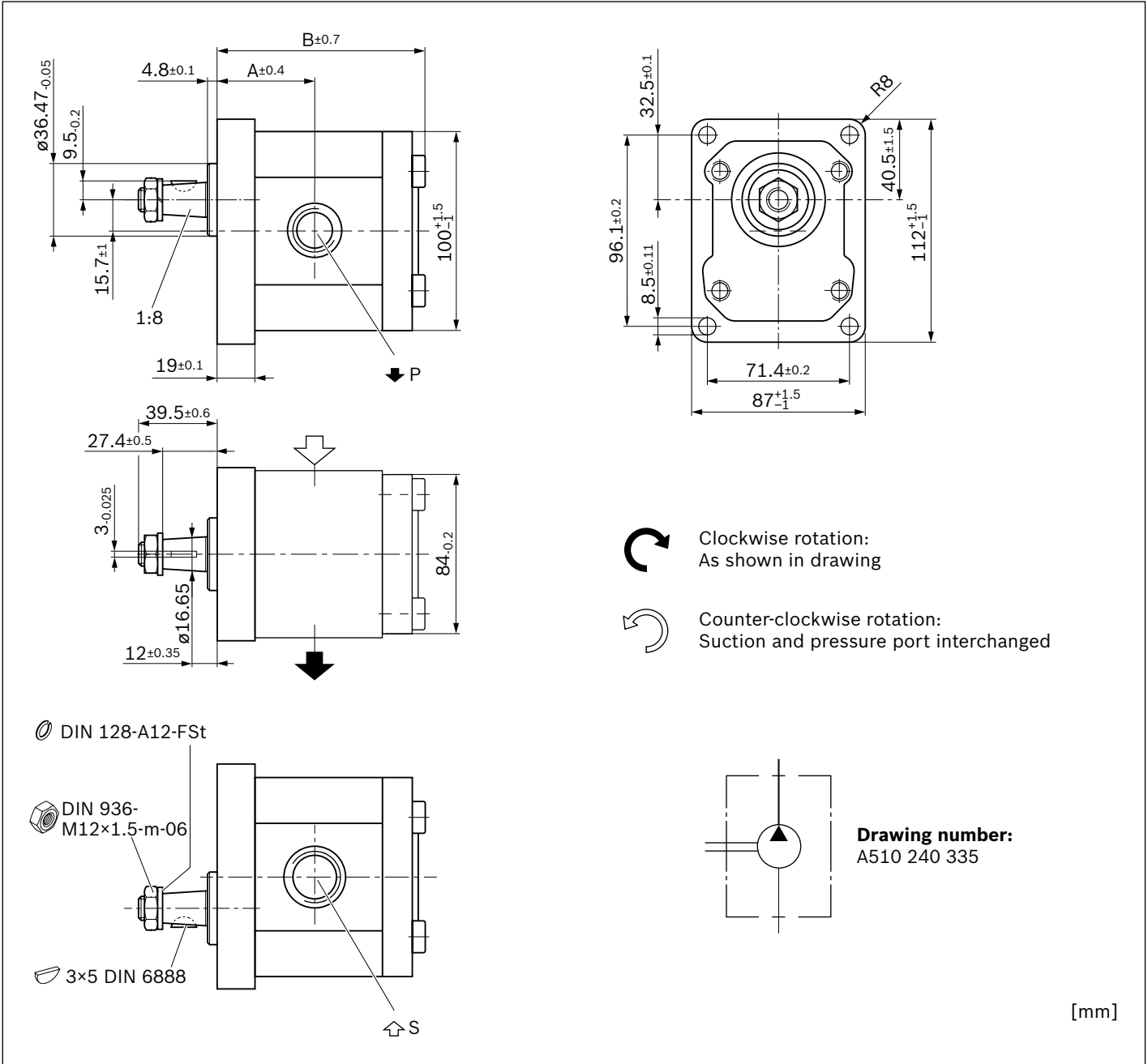
**Splined shaft (DIN 5482 B17 x 14) with rectangular flange Ø36.47 mm**  
AZPF - 10 - ... **FO30MB**



NG	Material number		Maximum pressure intermittend	Maximum speed	Weight	Dimensions				
	Direction of rotation		p <sub>2</sub> bar	n <sub>max</sub> rpm	m kg	A mm	B mm	C mm	D mm	E
	counter-clockwise	clockwise								
8	0 510 425 315	0 510 425 021	280	4000	3.3	44.7	93.1	13.5	30.2	M6; 13 mm 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 <sup>1)</sup>		210	3500	3.3	48.5	98.1	20	39.7	
14		0 510 525 034 <sup>1)</sup>	210	3000	3.4	49	103.1	20	39.7	
16	0 510 625 327 <sup>1)</sup>	0 510 625 329 <sup>1)</sup>	210	3000	3.5	49	106.5	20	39.7	M8; 13 mm deep
19		0 510 625 049 <sup>1)</sup>	210	3000	3.7	49	111.5	20	39.7	
19	0 510 625 332 <sup>1)</sup>		210	3000	4	59.9	123.5	20	39.7	
22	0 510 725 348 <sup>1)</sup>	0 510 725 076 <sup>1)</sup>	210	3000	4.2	62.6	127.8	20	39.7	

<sup>1)</sup> Version with seals in FKM (Type code - ...PB)

**Tapered shaft 1:8 with rectangular flange  $\varnothing 36.47$  mm**  
AZPF – 10 – ... **HO01MB**

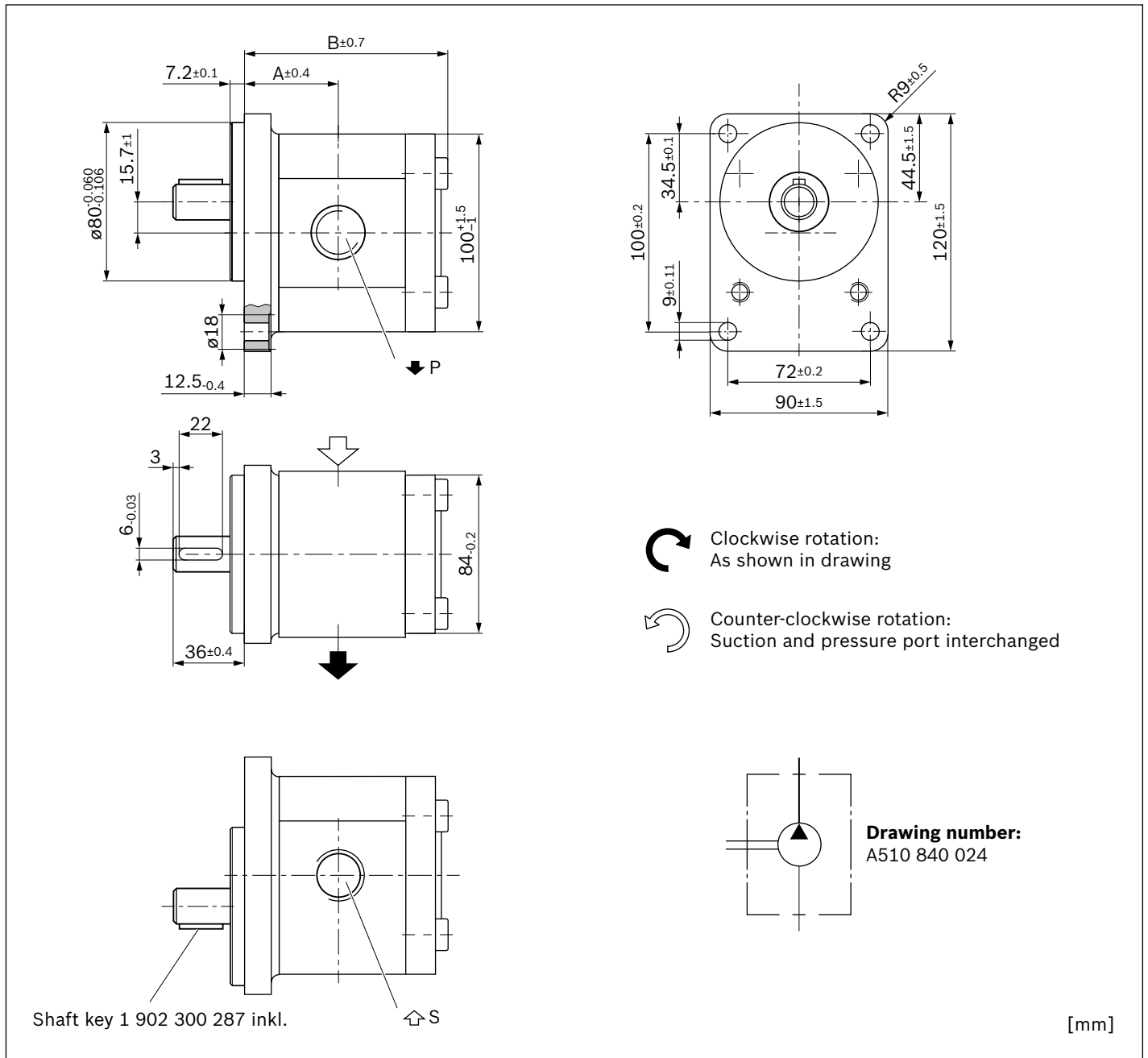


NG	Material number	Maximum pressure intermittend	Maximum speed	Weight	Dimensions			
	Direction of rotation	p <sub>2</sub>	n <sub>max</sub>	m	A	B	S	P
	clockwise	bar	rpm	kg	mm	mm		
4								
5	0 510 325 018	280	4000	3.1	42.6	89		
8	0 510 425 027	280	4000	3.15	44.7	93.1		
11	0 510 525 039	280	3500	3.3	48.5	98.1		
14	0 510 525 040	280	3000	3.4	49	103.1	G 3/4; 16 mm deep	G 1/2; 16 mm 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		

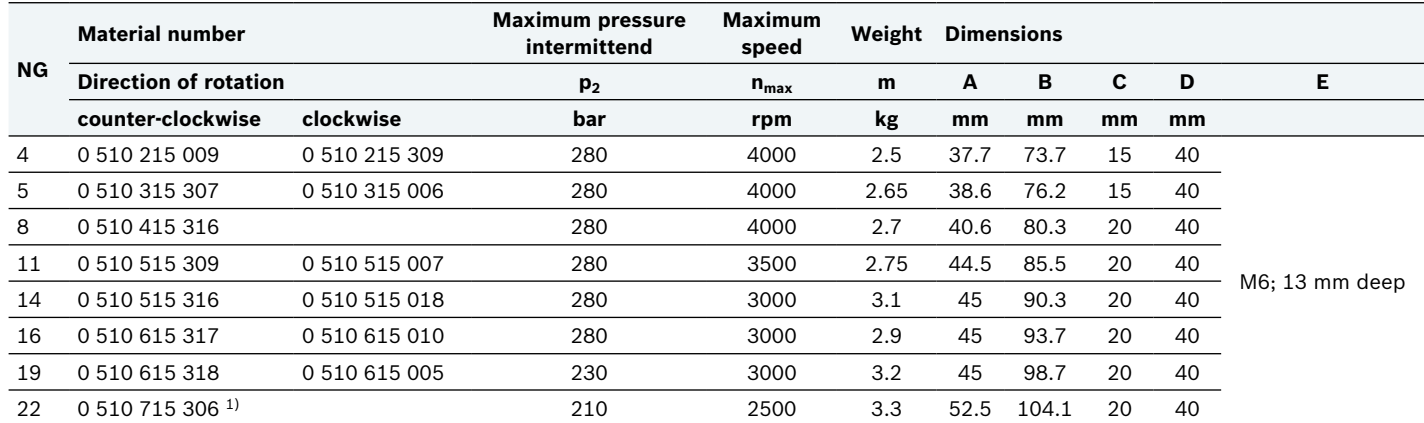


**Parallel keyed shaft (ISO Ø18) with rectangular flange Ø80 mm**

AZPF – 11 – ... **AB01MB**



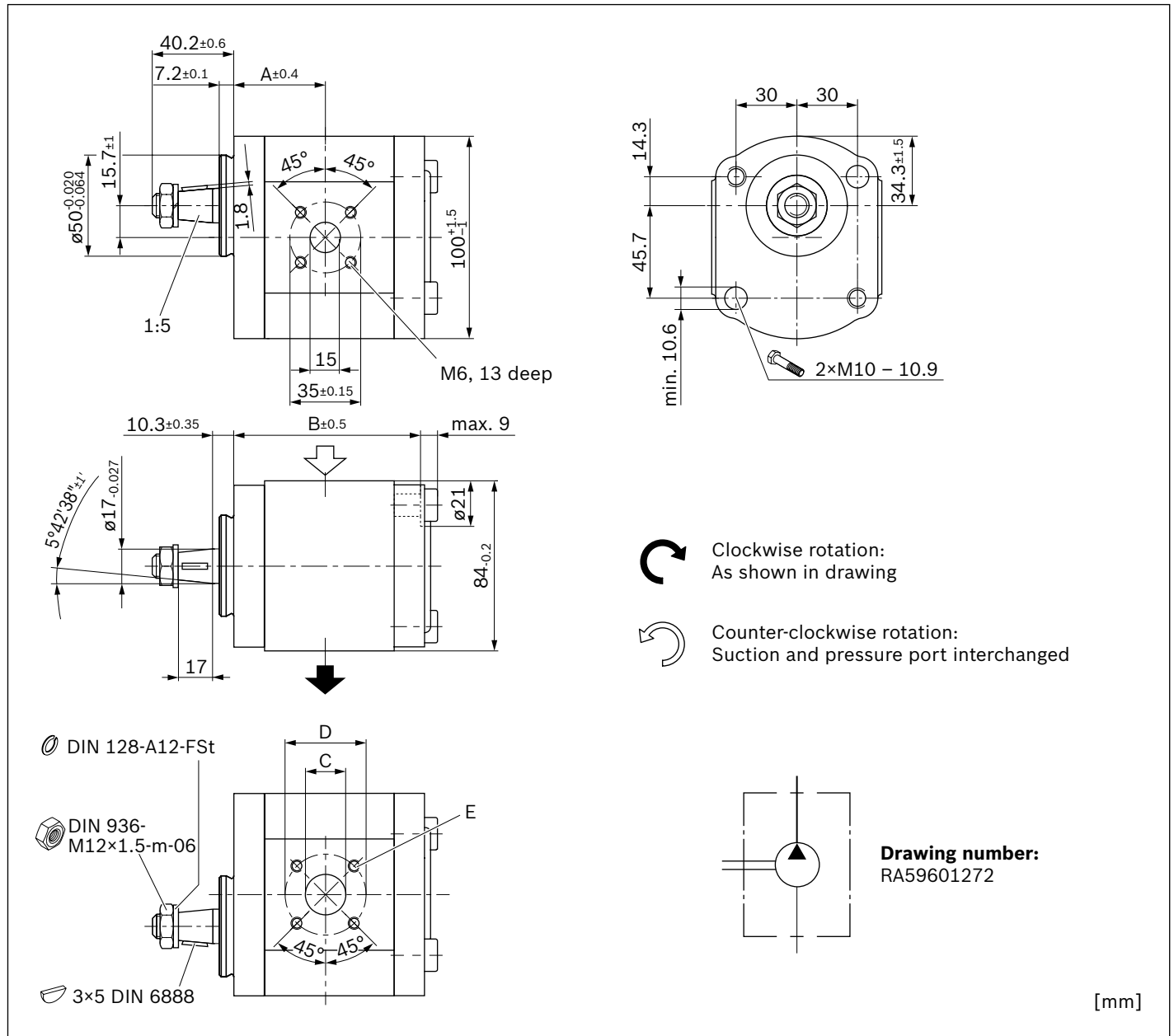
NG	Material number		Maximum pressure intermittend	Maximum speed	Weight	Dimensions		
	Direction of rotation		p <sub>2</sub>	n <sub>max</sub>	m	A	B	S
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	P
4	0 510 225 318	0 510 225 023	280	4000	3.3	39.9	84.3	
5	0 510 325 321	0 510 325 026	280	4000	3.3	41.1	85.2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



Bosch Rexroth AG, RE 10089/2019-07-17

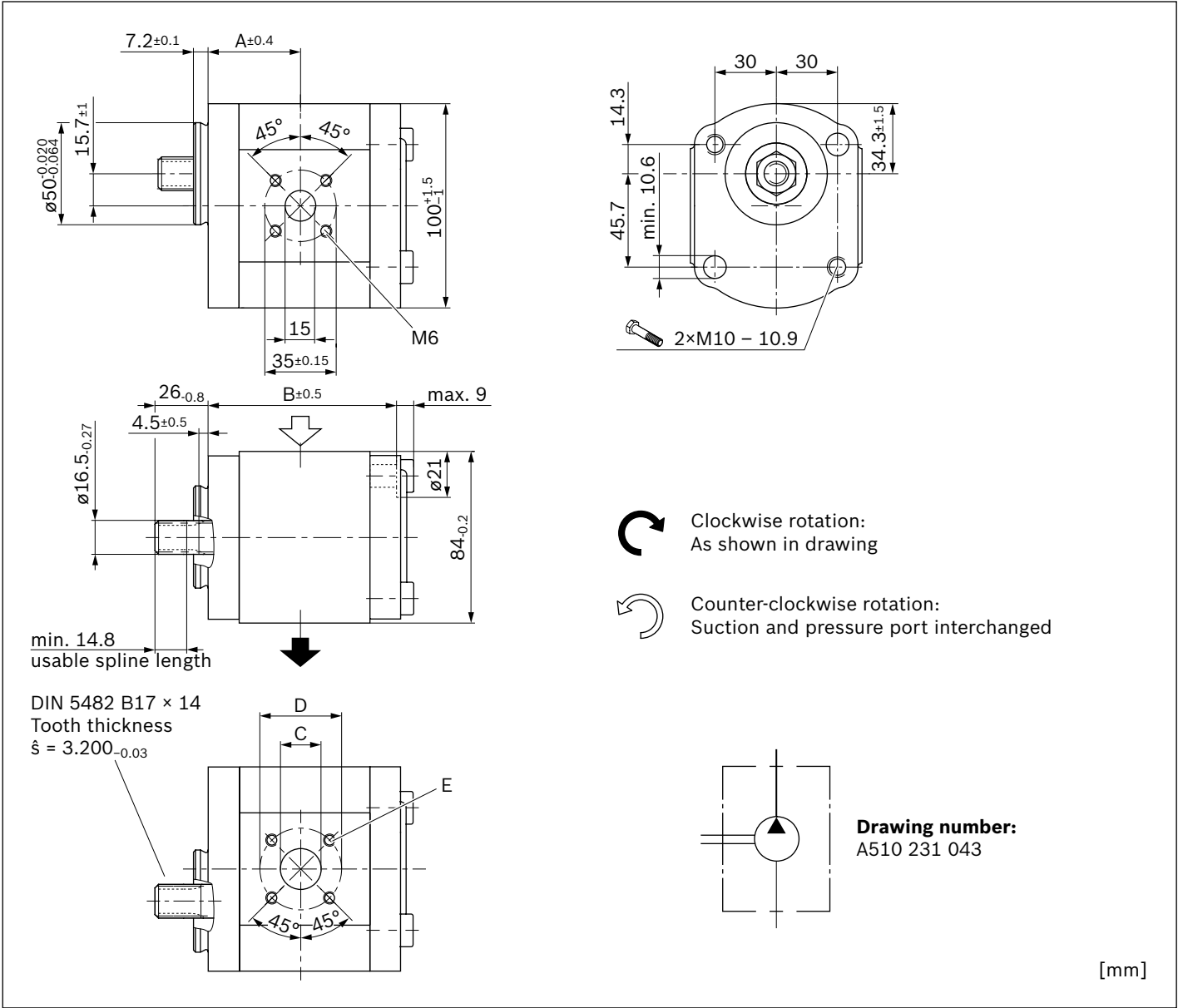
**Tapered shaft 1:5 with 2-bolt mounting Ø50 mm**

AZPF – 1X – ... **CN20MB**



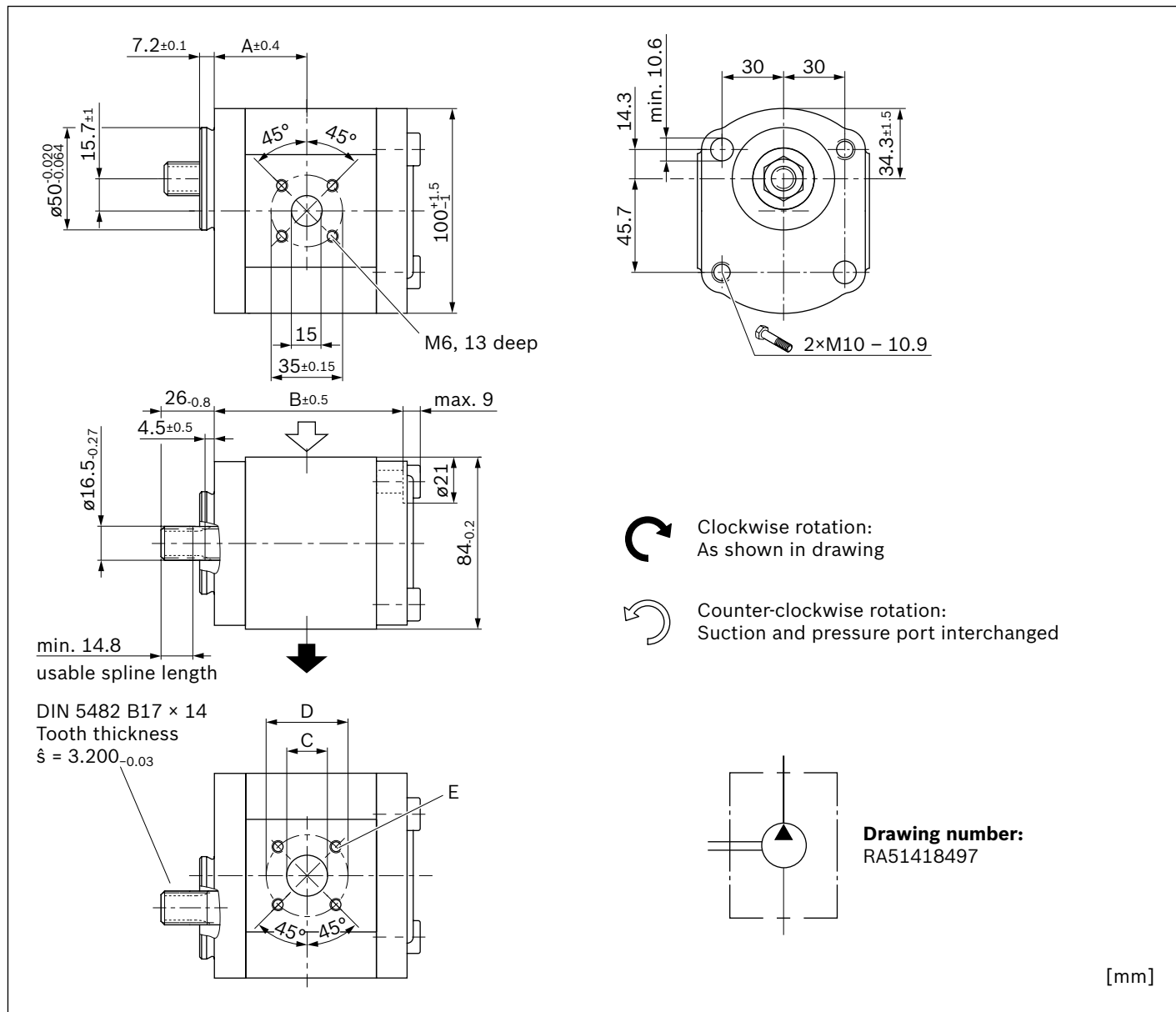
NG	Material number		Maximum pressure intermittent	Maximum speed	Weight	Dimensions				
	Direction of rotation		p <sub>2</sub>	n <sub>max</sub>	m	A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	
4	0 510 215 306	0 510 215 006	280	4000	2.6	37.4	73.7	15	40	
5	0 510 315 304	0 510 315 004	280	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	M6; 13 mm deep
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	

**Splined shaft (DIN 5482 B17 x 14) with 2-bolt mounting Ø50 mm**  
AZPF – 10 – ... **FN20MB**



NG	Material number	Maximum pressure intermittent	Maximum speed	Weight	Dimensions				
	Direction of rotation	$p_2$	$n_{max}$	m	A	B	C	D	E
	clockwise	bar	rpm	kg	mm	mm	mm	mm	
5	0 510 315 007	280	4000	2.55	38.6	76.2	15	40	M6; 13 mm 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									

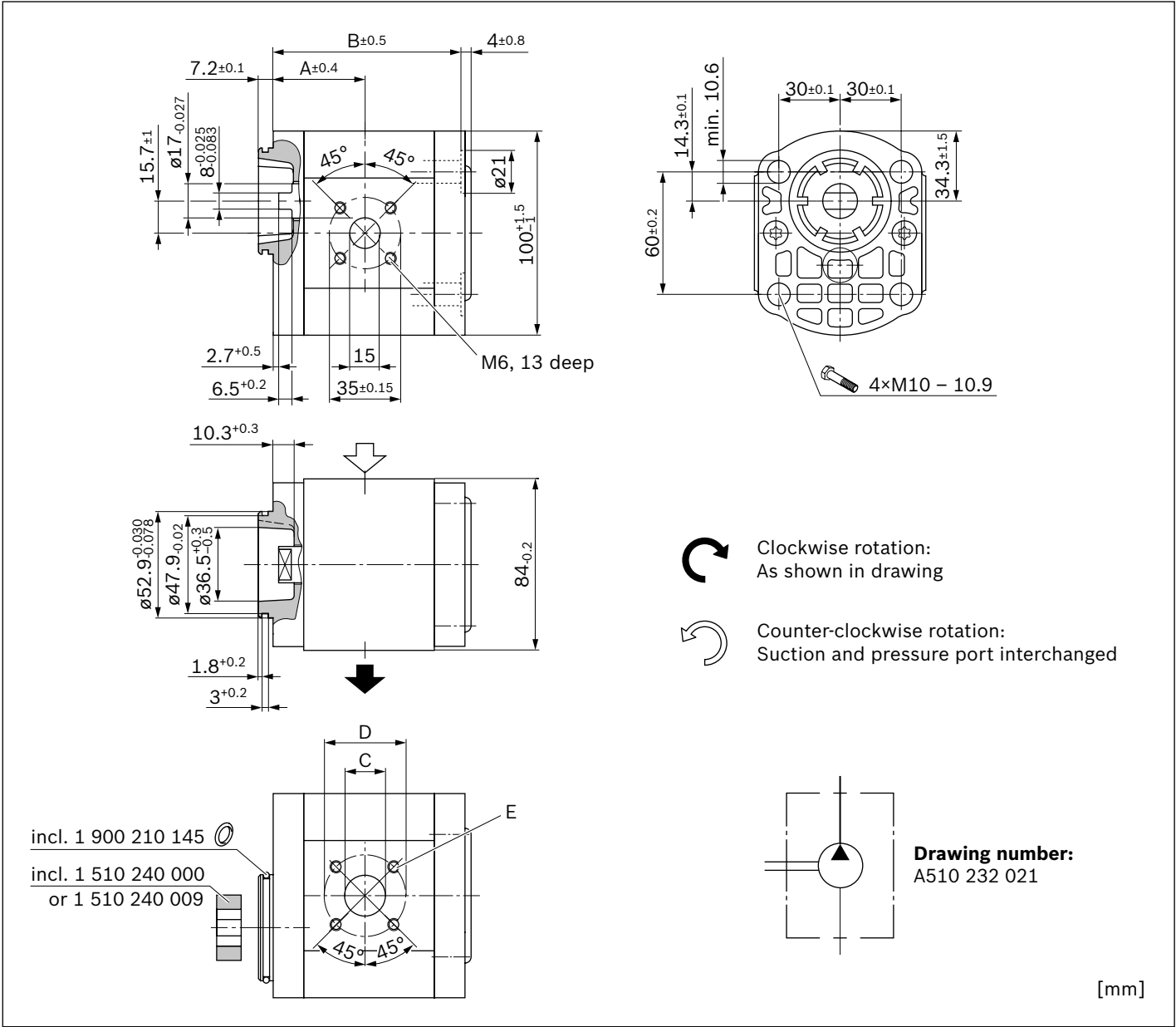
AZPF – 1X – ... **FP20PB**



NG	Material number		Maximum pressure intermittend	Maximum speed	Weight	Dimensions				
	Direction of rotation		p <sub>2</sub>	n <sub>max</sub>	m	A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	
5										
8	0 510 415 328		210	4000	2.7	40.7	80.3	20	15	M6; 13 mm deep
11	0 510 515 337		280	3500	2.8	44.5	85.3	20	15	
14	0 510 515 338	0 510 515 013	210	3000	3	45	90.3	20	15	
16										
19										
22	0 510 715 008 <sup>1)</sup>		210	3000	3.6	58.6	116.1	20	15	

1) Special version

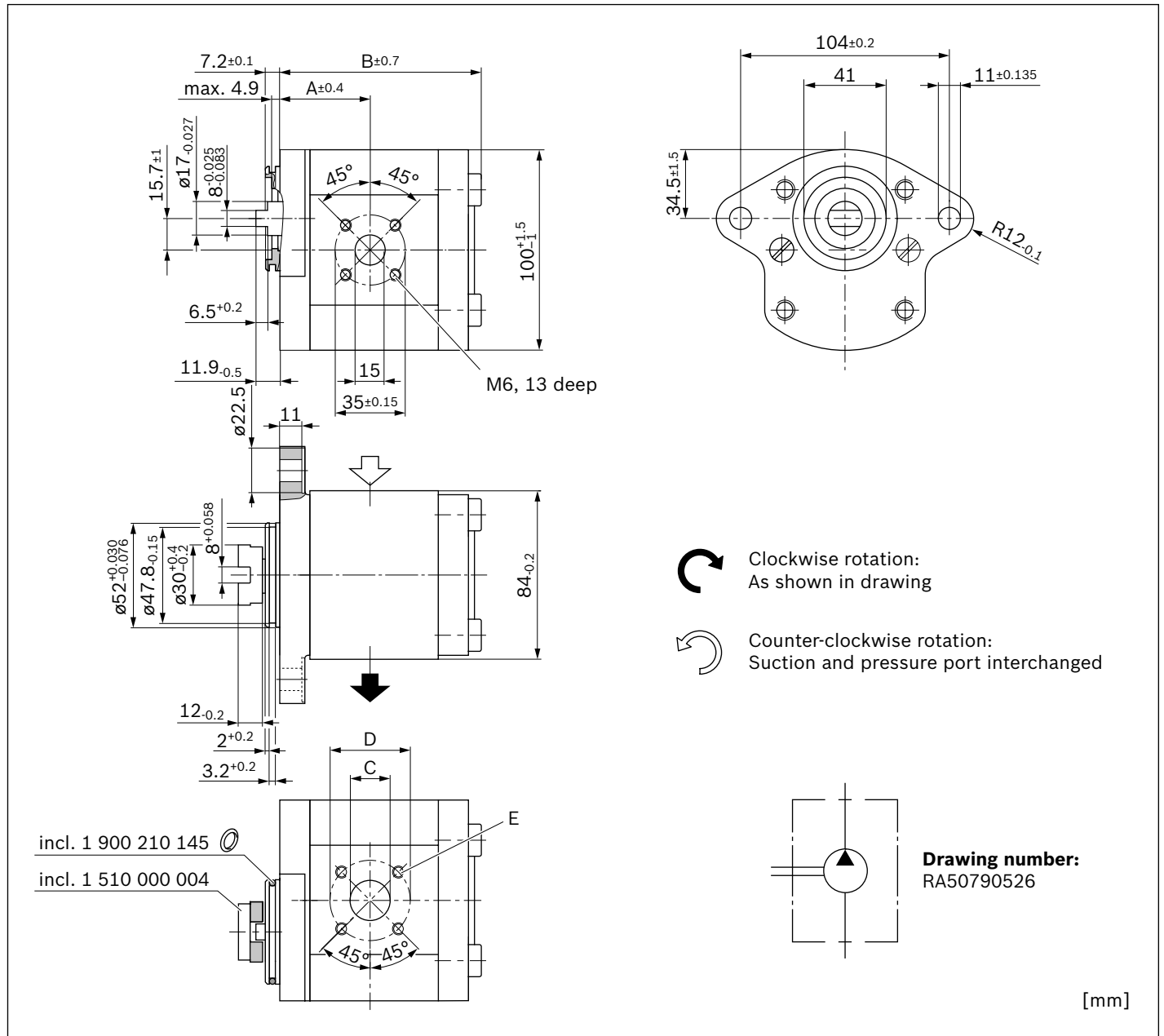
**Tang drive with 4-bolt mounting  $\varnothing 52$  mm**  
AZPF – XX – ... **NT20MB**



NG	Material number		Maximum pressure intermittend	Maximum speed	Weight	Dimensions				
	Direction of rotation		p <sub>2</sub>	n <sub>max</sub>	m	A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	
4	0 510 215 307	0 510 215 007	280	4000	2.5	37.4	73.7	15	40	
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	M6; 13 mm deep
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	

**Tang drive with 2-bolt mounting Ø52 mm and O-ring (compressor port)**

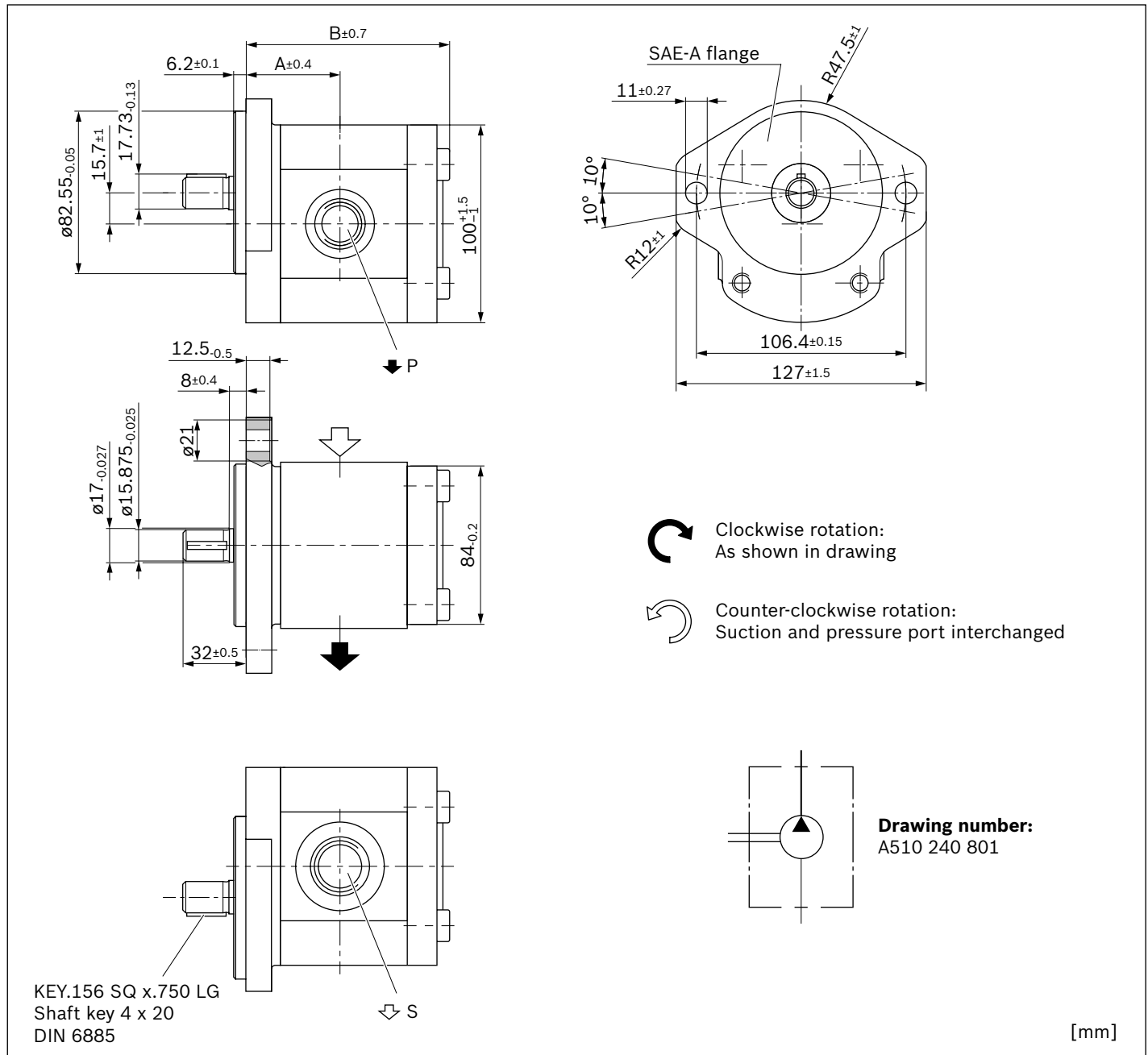
AZPF – 1X – ... **NL20KB**



NG	Material number		Maximum pressure intermittent	Maximum speed	Weight	Dimensions				
	Direction of rotation		p <sub>2</sub>	n <sub>max</sub>	m	A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	
4		0 510 225 012	280	4000	2.8	37.4	81.7	15	40	
5	0 510 325 312	0 510 325 012	280	4000	2.82	38.6	84.4	15	40	
8	0 510 425 331	0 510 425 019	280	4000	3	40.7	88.5	20	40	
11		0 510 525 025	280	3500	3.1	44.5	93.3	20	40	M6; 13 mm deep
16	0 510 625 358	0 510 625 027	230	3000	3.3	45	101.9	20	40	
19	0 510 625 368	0 510 625 032	190	3000	3.5	45	106.9	20	40	
22		0 510 725 044	160	3000	4	58.6	122.5	20	40	

**Parallel keyed shaft (SAE J744 16-1 A) with 2-bolt flange Ø82.55 mm (SAE J744 82-2 A)**

AZPF – 10 – ... **QR12MB**

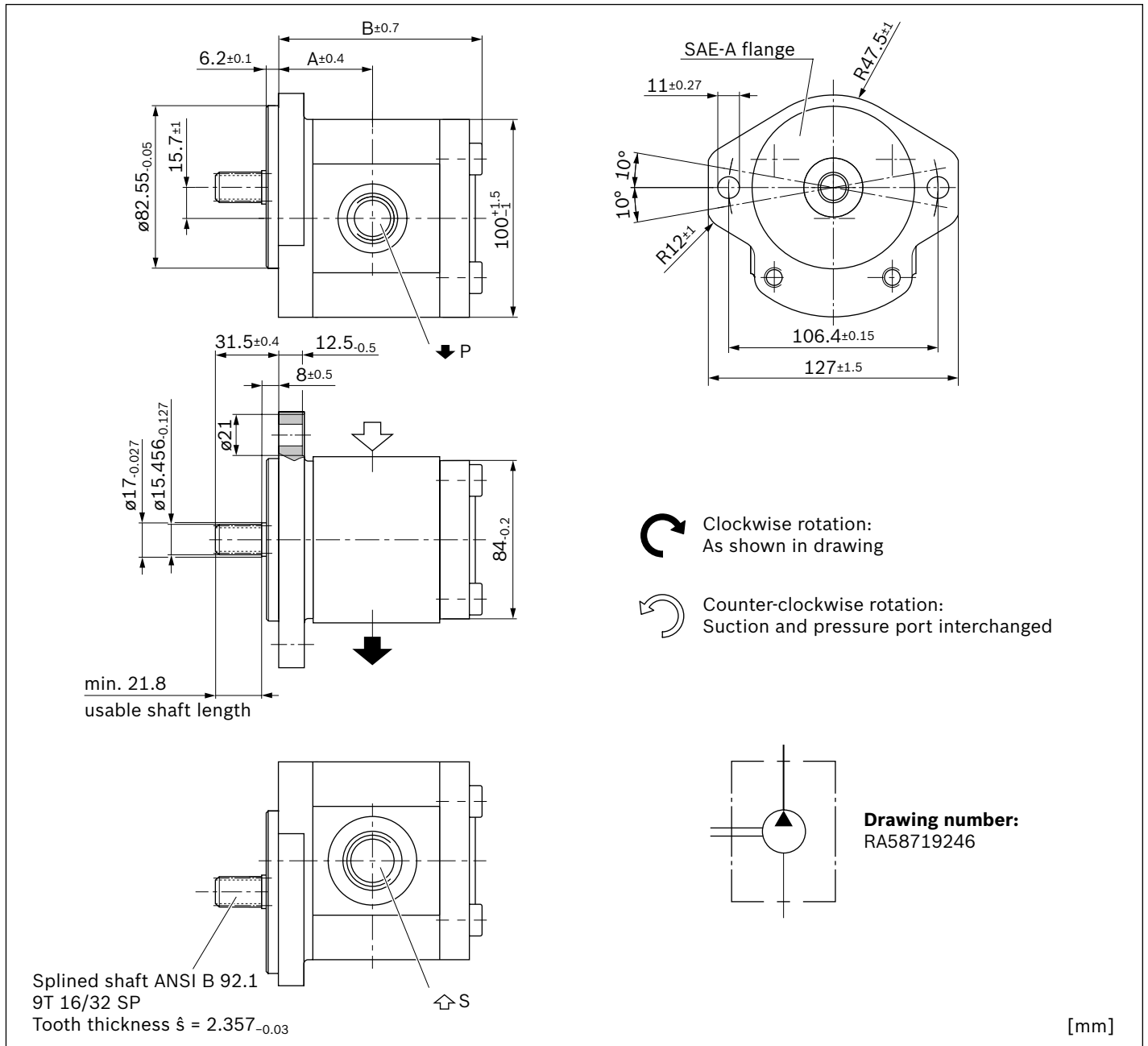


NG	Material number	Maximum pressure intermittend	Maximum speed	Weight	Dimensions		
	Direction of rotation	p <sub>2</sub>	n <sub>max</sub>	m	A	B	S
	clockwise	bar	rpm	kg	mm	mm	P
4	0 510 225 011	260	4000	3.3	39.9	85	9/16-18 UNF-2B; 13 mm deep
5	0 510 325 011	260	4000	3.3	41.1	87.5	9/16-18 UNF-2B; 13 mm deep
8	0 510 425 016	260	4000	3.4	43.2	91.6	7/8-14 UNF-2B; 16 mm deep
11	0 510 525 015	260	3500	3.6	47	96.6	7/8-14 UNF-2B; 16 mm deep
14	0 510 525 031	230	3000	3.65	47.5	101.6	7/8-14 UNF-2B; 16 mm deep
16	0 510 625 021	200	3000	3.7	47.5	105	1 1/16-12 UN-2B; 19 mm deep
19	0 510 625 041	170	3500	3.9	47.5	110	1 1/16-12 UN-2B; 19 mm deep
22	0 510 725 059	140	2500	4	55.1	115.4	1 1/16-12 UN-2B; 19 mm deep



**Splined shaft (SAE J744 16-4 9T) with 2-bolt flange Ø82.55 mm**

AZPF – 10 – ... **RR12MB**

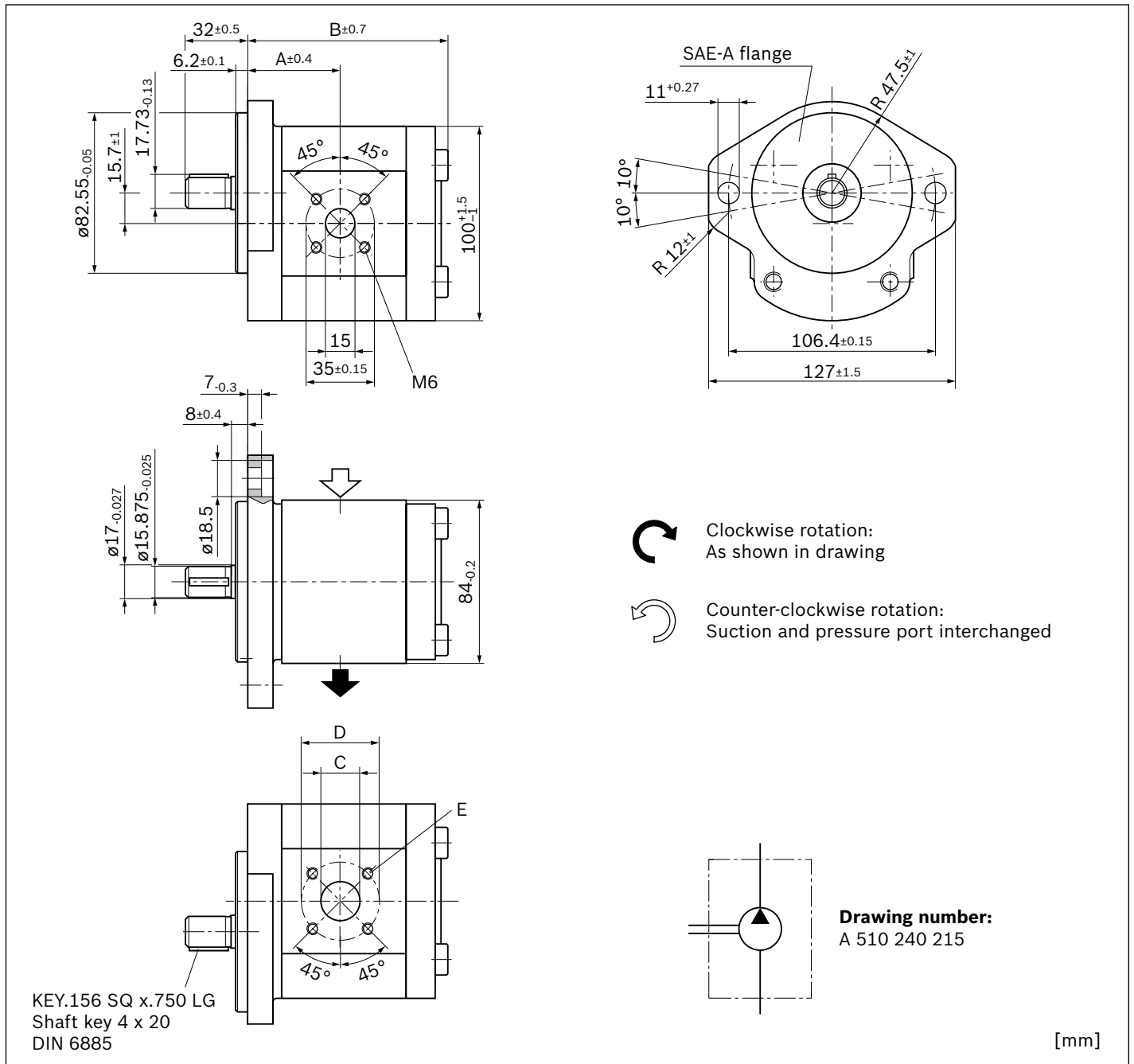


NG	Material number		Maximum pressure intermittent	Maximum speed	Weight	Dimensions			
	Direction of rotation		p <sub>2</sub>	n <sub>max</sub>	m	A	B	S	P
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm		
4		0 510 225 010	280	4000	3.15	39.9	82.7	9/16-18 UNF-2B; 13 mm deep	9/16-18 UNF-2B; 13 mm deep
5		0 510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



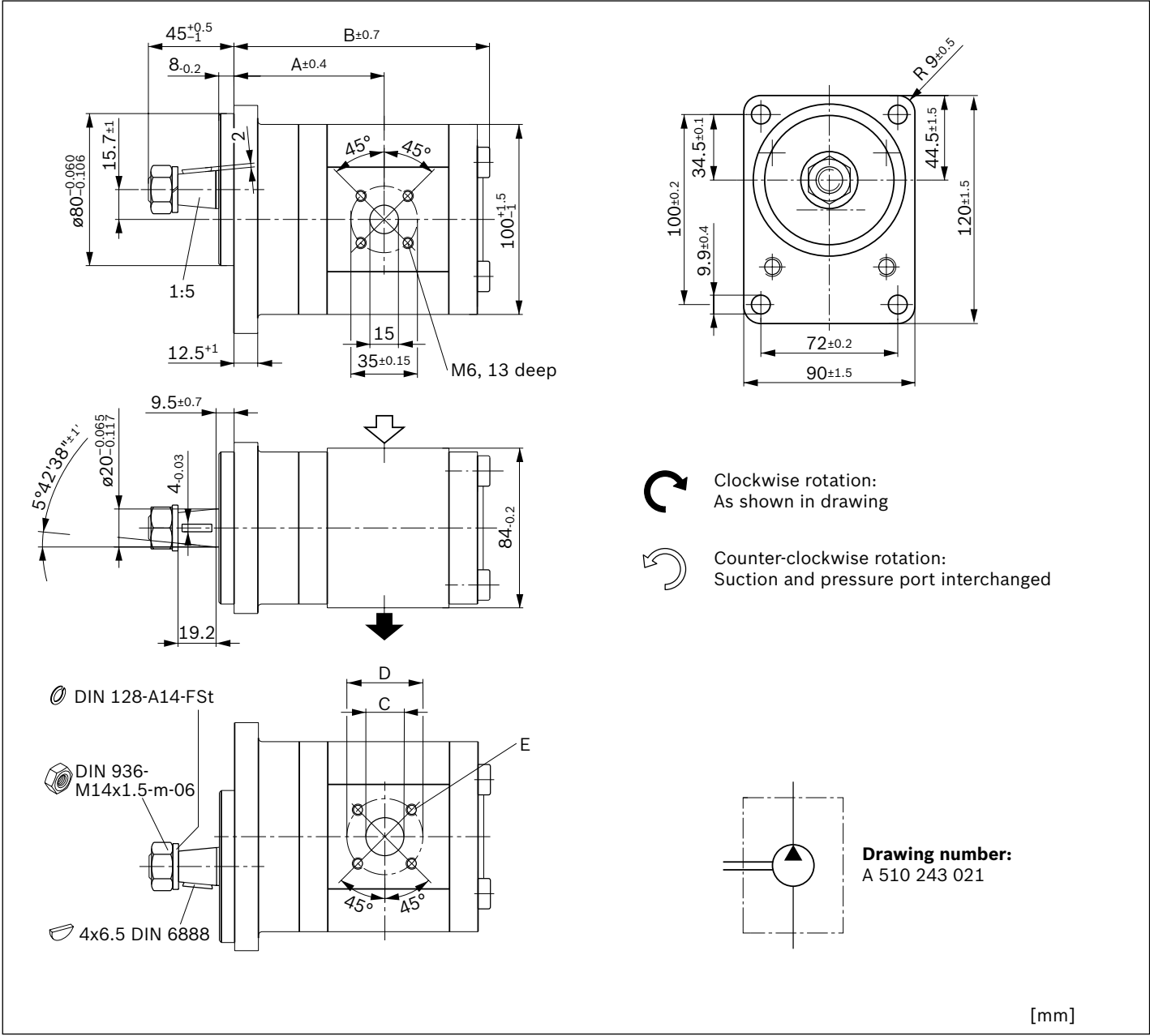
**Parallel keyed shaft (SAE J744 16-1 A) with 2-bolt flange Ø82.55 mm (SAE J744 82-2 A)**

AZPF – 10 – ... **QR20MB**



NG	Material number		Maximum pressure intermittent	Maximum speed	Weight	Dimensions				
	Direction of rotation		p <sub>2</sub>	n <sub>max</sub>	m	A	B	C	D	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	mm	
4		0 510 225 014	280	4000	3.2	39.9	84.5	15	40	
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	M6; 13 mm deep
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 shaft 1:5 with outboard bearing Ø80 mm, type 1**  
AZPF – 11 – ... **SA20MB**



NG	Material number		Maximum pressure intermittend	Maximum speed	Weight	Dimensions			
	Direction of rotation		p <sub>2</sub>	n <sub>max</sub>	m	A	B	C	E
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm	mm	
4	0 510 245 300	0 510 245 001	280	4000	3.1	71.1	114.2	15	M6; 13 mm deep
5	0 510 345 300	0 510 345 001	280	4000	3.1	72.3	116.7	15	
8	0 510 445 300	0 510 445 001 <sup>1)</sup>	280	4000	3.3	74.4	120.8	20	
11	0 510 545 300	0 510 545 001	280	3500	3.5	78.2	125.8	20	
14			280	3000		78.7	130.8	20	
16	0 510 645 300	0 510 645 004	230	3000	3.6	78.7	134.2	20	
19		0 510 645 002	190	3000	3.9	78.7	139.2	20	
22			160	2500		92.3	156.6	20	

<sup>1)</sup> Version with shaft seal ring in FKM (Type code - ...KB)

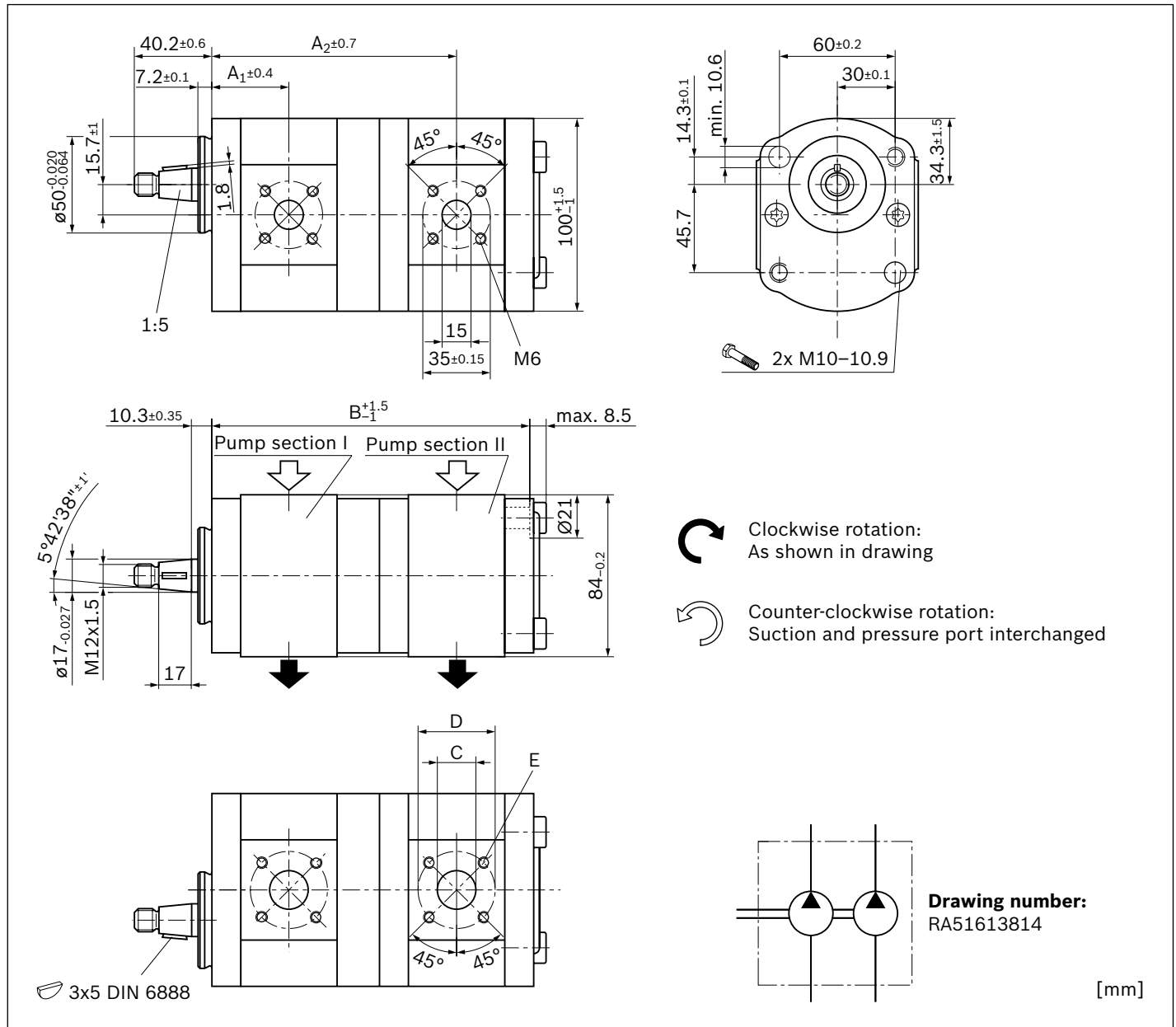
AZPF – 10 – ... **SG20MB**



M6; 13 mm deep

**Tapered shaft 1:5 with 2-bolt mounting Ø50 mm**

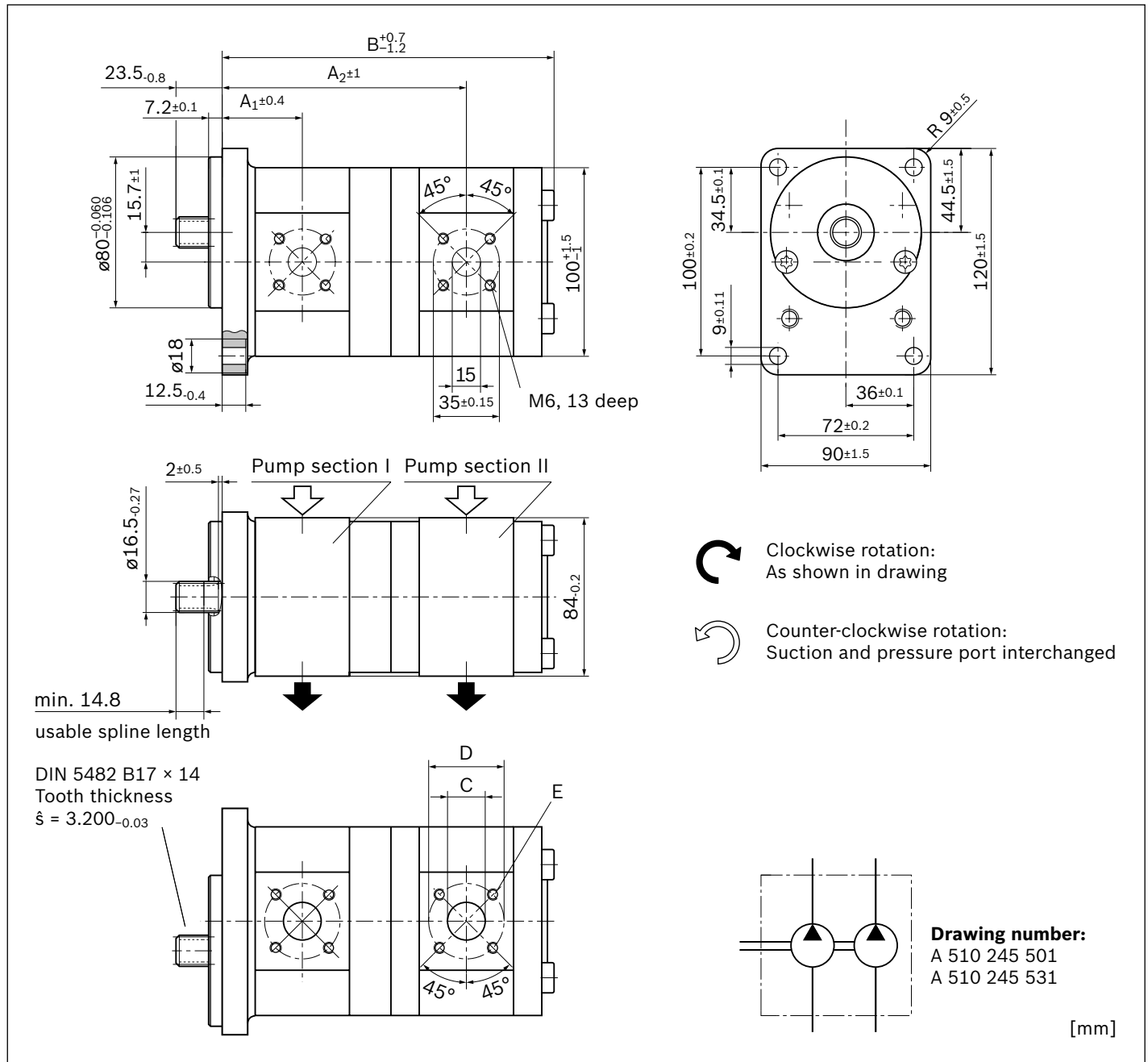
AZPFF – 12 – ... **CP2020KB**



NG		Material number		Maximum pressure intermittend		Maximum speed	Weight	Dimensions					
P <sub>I</sub>	P <sub>II</sub>	Direction of rotation		P <sub>2 I</sub>	P <sub>2 II</sub>	n <sub>max</sub>	m	A <sub>1</sub>	A <sub>2</sub>	B	C	D	E
		counter-clockwise	clockwise	bar	bar	rpm	kg	mm	mm	mm	mm	mm	
5	4	0 510 365 305		280	280	4000	4.8	38.6	121.6	157.9	15	40	M6; 13 mm deep
8	4	0 510 465 324	0 510 465 011	280	280	4000	4.4	40.7	125.7	162	20 <sup>1)</sup>	40	
8	5	0 510 465 344	0 510 465 032	280	280	4000	4.4	40.7	126.9	164.5	20 <sup>1)</sup>	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 <sup>1)</sup>	40	
11	5	0 510 565 319	0 510 565 095	280	280	3500	4.5	44.5	131.9	169.5	20 <sup>1)</sup>	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 <sup>1)</sup>	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 <sup>1)</sup>	40	
16	5	0 510 665 337		280	280	3000	4.8	45	140.3	177.9	20 <sup>1)</sup>	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 <sup>1)</sup>	40	
19	5			230	280	3000	4.8	45	145.3	183.2	20 <sup>1)</sup>	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	

<sup>1)</sup> At pump section with size 4 and 5: C = 15 mm

**Splined shaft (DIN 5482 B17 x 14) with rectangular flange Ø80 mm**  
AZPFF – 1X – ... **FB2020MB**



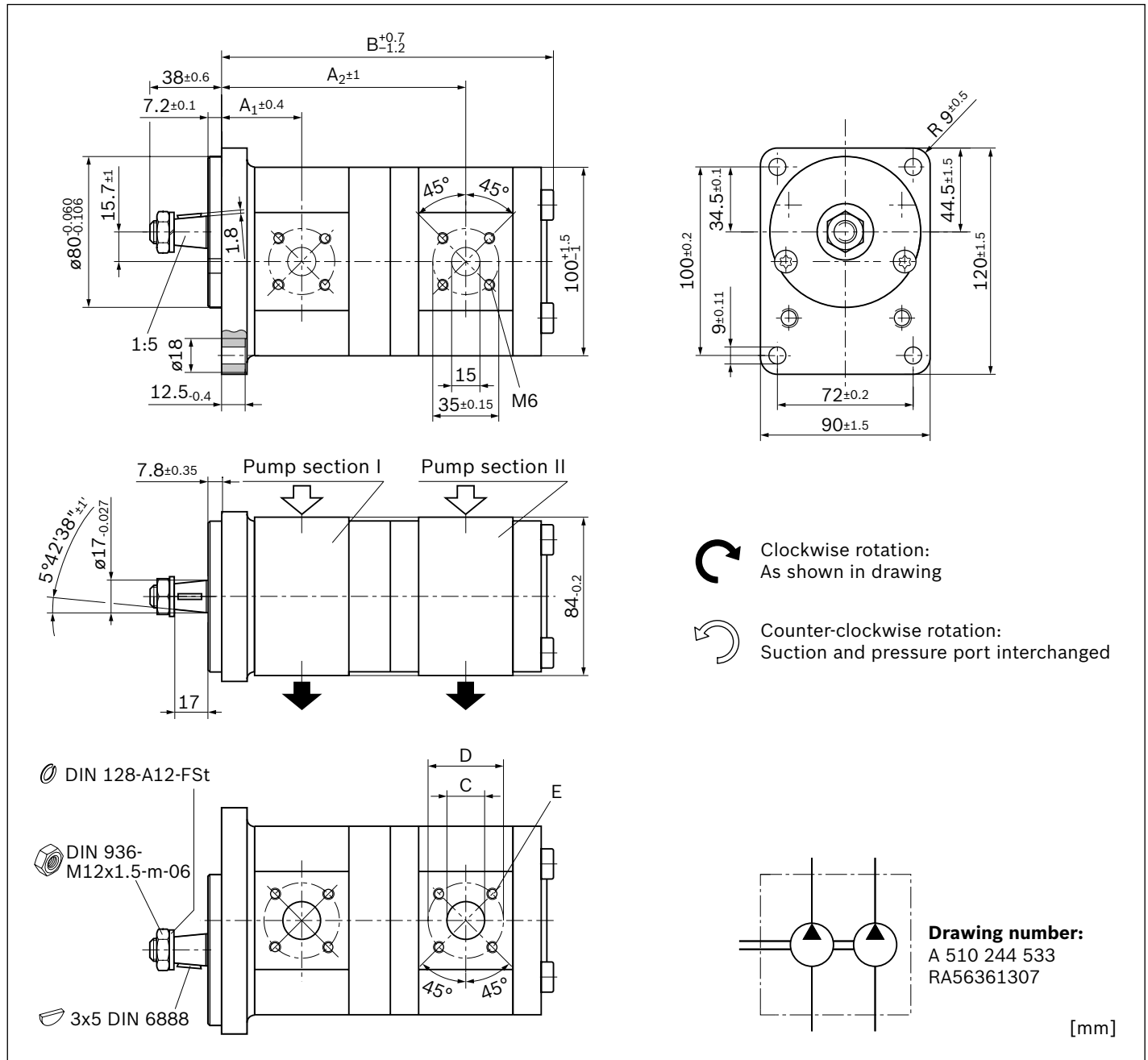


NG		Material number		Maximum pressure intermittend		Maximum speed	Weight	Dimensions					
P <sub>I</sub>	P <sub>II</sub>	Direction of rotation		p <sub>2 I</sub>	p <sub>2 II</sub>	n <sub>max</sub>	m	A <sub>1</sub>	A <sub>2</sub>	B	C	D	E
		counter-clockwise	clockwise	bar	bar	rpm	kg	mm	mm	mm	mm	mm	
8	5	0 510 465 345		280	280	4000	5.1	43.2	129.4	174	20 <sup>1)</sup>	40	M6; 13 mm deep
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 <sup>1)</sup>	40	
11	5	0 510 565 332	0 510 565 034	280	280	3500	6.35	47	134.4	179	20 <sup>1)</sup>	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 <sup>1)</sup>	40	
14	5	0 510 565 069		280	280	3500	6.5	47.5	139.4	183.7	20 <sup>1)</sup>	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	
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 <sup>1)</sup>	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	

<sup>1)</sup> At pump section with size 4 and 5: C = 15 mm

**Tapered shaft 1:5 with rectangular flange Ø80 mm**

AZPFF – 1X – ... **CB2020MB**



NG		Material number		Maximum pressure intermittent		Maximum speed	Weight	Dimensions					
P <sub>I</sub>	P <sub>II</sub>	Direction of rotation		P <sub>2 I</sub> bar	P <sub>2 II</sub> bar	n <sub>max</sub> rpm	m kg	A <sub>1</sub> mm	A <sub>2</sub> mm	B mm	C mm	D mm	E
		counter-clockwise	clockwise										
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 <sup>1)</sup>	40	
8	5	0 510 900 009	0 510 900 007	280	280	4000	5.1	43.2	129.4	173.5	20 <sup>1)</sup>	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 <sup>1)</sup>	40	
11	5	0 510 900 017	0 510 900 046	280	280	3500	5.2	47	134.4	178.5	20 <sup>1)</sup>	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 <sup>1)</sup>	40	
14	5		0 510 900 060	280	280	3000	5.4	47.5	139.4	183.5	20 <sup>1)</sup>	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 <sup>1)</sup>	40	
16	5	0 510 900 028		280	280	3000	5.5	47.5	142.8	186.9	20 <sup>1)</sup>	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	
19	4	0 510 900 043	0 510 900 049	230	280	3000	5.6	47.5	146.6	189.4	20 <sup>1)</sup>	40	
19	5		0 510 665 067	230	280	3000	5.6	47.5	147.8	192.4	20 <sup>1)</sup>	40	
19	5		0 510 900 027	230	280	3000	5.6	47.5	147.8	191.9	20 <sup>1)</sup>	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 <sup>1)</sup>	40	
22	5	0 510 900 055	0 510 900 045	210	280	2500	5.8	55.1	153.2	197.3	20 <sup>1)</sup>	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		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		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	210	160	3000	6.5	61	185.2	249.7	20	40	

M6; 13 mm deep

<sup>1)</sup> At pump section with size 4 and 5: C = 15 mm



NG		Material number		Maximum pressure intermittend		Maximum speed	Weight	Dimensions					
P <sub>I</sub>	P <sub>II</sub>	Direction of rotation		P <sub>2 I</sub>	P <sub>2 II</sub>	n <sub>max</sub>	m	A <sub>1</sub>	A <sub>2</sub>	B	C	D	E
		counter-clockwise	clockwise	bar	bar	rpm	kg	mm	mm	mm	mm	mm	
4	4		0 510 901 500	280	280	4000	4.7	41.4	123.1	165.9	15	40	M6; 13 mm deep
8	5	0 510 901 512		280	280	4000	4.9	44.7	130.9	175	20 <sup>2)</sup>	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 <sup>2)</sup>	40	
11	5	0 510 565 436 <sup>1)</sup>	0 510 901 503	280	280	3500	5.1	48.5	135.9	180	20 <sup>2)</sup>	40	
14	5	0 510 565 435 <sup>1)</sup>		280	280	3000	5.2	49	140.9	185	20 <sup>2)</sup>	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 <sup>2)</sup>	40	
16	8	0 510 901 514		280	280	3000	5.4	49	146.4	192.5	20	40	
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	

<sup>1)</sup> Version with shaft seal ring in FKM (Type code - ...KB)

<sup>2)</sup> At pump section with size 4 and 5: C = 15 mm



NG		Material number		Maximum pressure intermittend		Maximum speed	Weight	Dimensions					
P <sub>I</sub>	P <sub>II</sub>	Direction of rotation		P <sub>2 I</sub>	P <sub>2 II</sub>	n <sub>max</sub>	m	A <sub>1</sub>	A <sub>2</sub>	B	C	D	E
		counter-clockwise	clockwise	bar	bar	rpm	kg	mm	mm	mm	mm	mm	
5	4	0 510 901 029		280	280	4000	4.9	41.1	124.1	166.9	15	40	M6; 13 mm deep
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 <sup>2)</sup>	40	
8	5	0 510 901 018	0 510 901 030	280	280	4000	5.1	43.2	129.4	173.5	20 <sup>2)</sup>	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 <sup>2)</sup>	40	
11	4		0 510 565 022	280	280	3500	5.2	47	133.2	176.5	20 <sup>2)</sup>	40	
11	5	0 510 901 015	0 510 901 000	280	280	3500	5.2	47	134.4	178.5	20 <sup>2)</sup>	40	
11	5			280	280	3500	5.2	47	134.4	179	20 <sup>2)</sup>	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 <sup>1)</sup>	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 <sup>2)</sup>	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 <sup>2)</sup>	40	
16	8	0 510 901 006	0 510 901 005	280	280	3000	5.5	47.5	144.9	191	20	40	
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 <sup>2)</sup>	40	
19	5	0 510 901 041	0 510 901 043	230	280	3000	5.6	47.5	147.8	191.9	20 <sup>2)</sup>	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 <sup>1)</sup>	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 <sup>2)</sup>	40	
22	5		0 510 901 020	210	280	2500	5.7	55.1	153.2	197.3	20 <sup>2)</sup>	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	

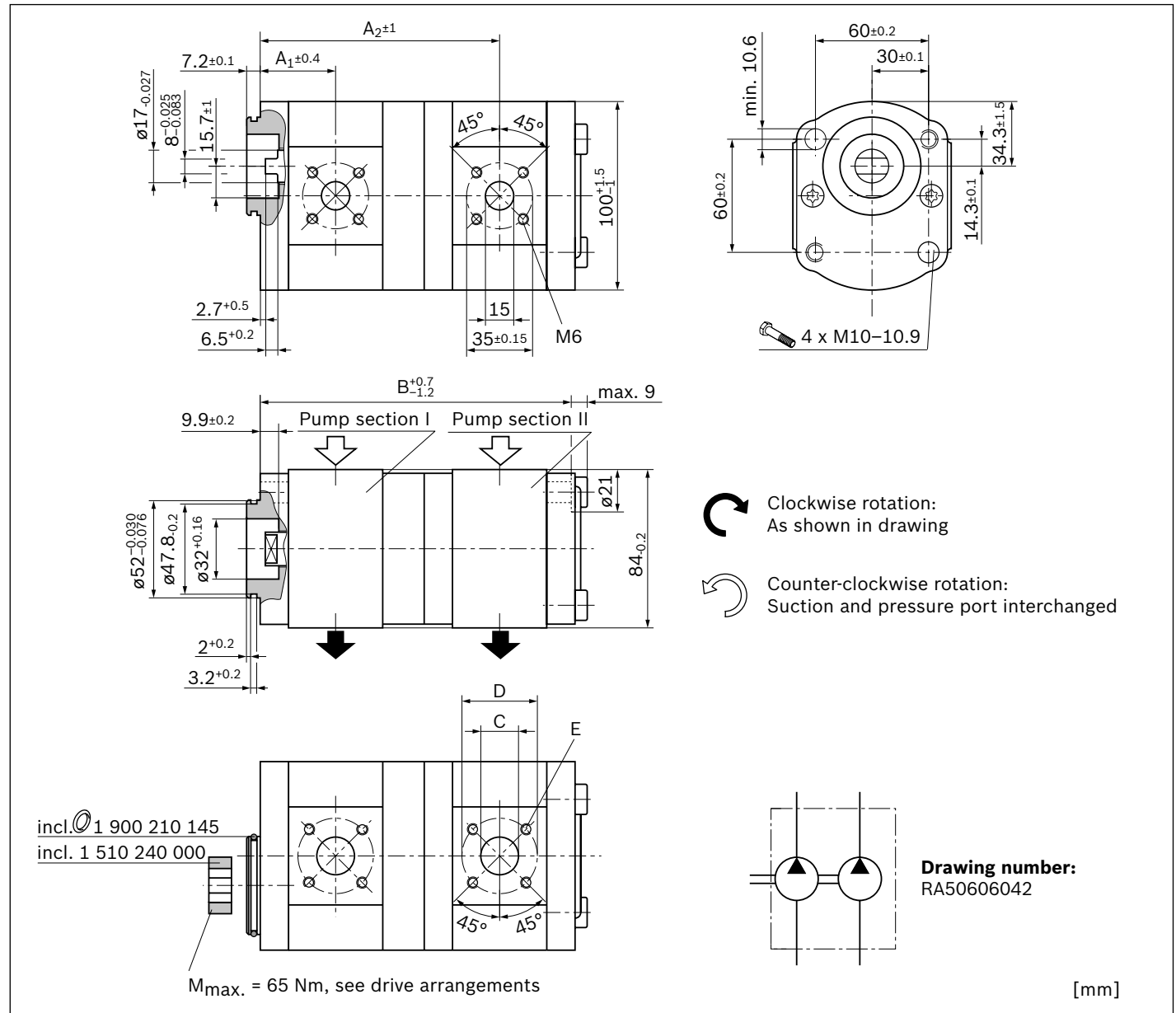
M6; 13 mm deep

<sup>1)</sup> Version with shaft seal ring in FKM (Type code - ...KB)

<sup>2)</sup> At pump section with size 4 and 5: C = 15 mm

**Tang drive with 2-bolt mounting Ø52 mm and O-ring**

AZPFF – 10 – ... **NM2020MB**

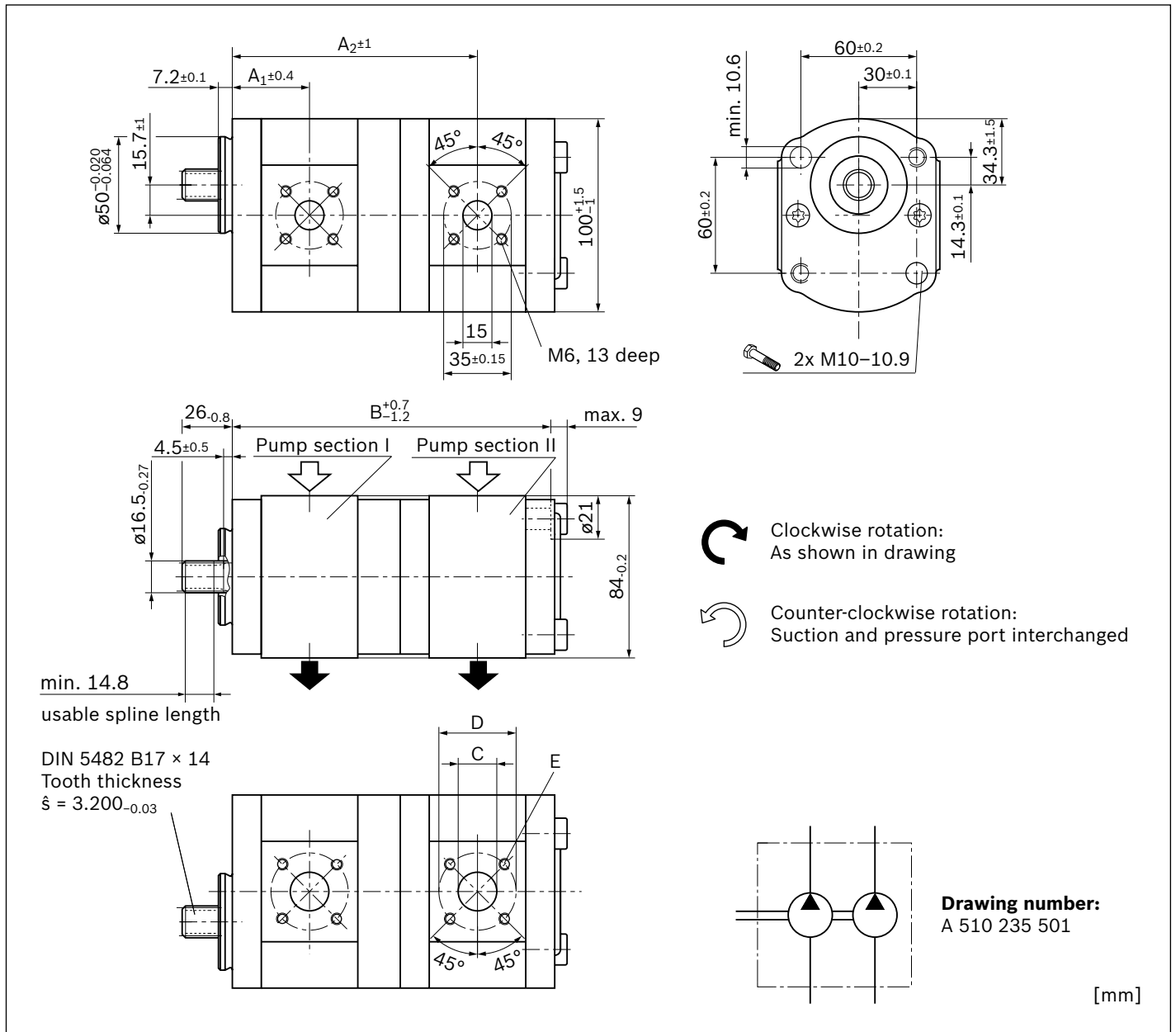


NG		Material number		Maximum pressure intermittend		Maximum speed	Weight	Dimensions					
P <sub>I</sub>	P <sub>II</sub>	Direction of rotation		p <sub>2 I</sub>	p <sub>2 II</sub>	n <sub>max</sub>	m	A <sub>1</sub>	A <sub>2</sub>	B	C	D	E
		counter-clockwise	clockwise	bar	bar	rpm	kg	mm	mm	mm	mm	mm	
5	4	0 510 365 314	0 510 365 010	280	280	4000	4.2	38.6	121.6	157.9	15	40	M6; 13 mm deep
8	4		0 510 465 012	280	280	4000	4.4	40.7	125.7	162	20 <sup>1)</sup>	40	
8	5	0 510 465 346		280	280	4000	4.4	40.7	126.9	164.5	20 <sup>1)</sup>	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 <sup>1)</sup>	40	
11	5		0 510 565 016	280	280	3500	4.6	44.5	131.9	169.5	20 <sup>1)</sup>	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	

<sup>1)</sup> At pump section with size 4 and 5: C = 15 mm



**Splined shaft (DIN 5482 B17 x 14) with 2-bolt mounting Ø50 mm**  
AZPFF – 10 – ... **FP2020MB**

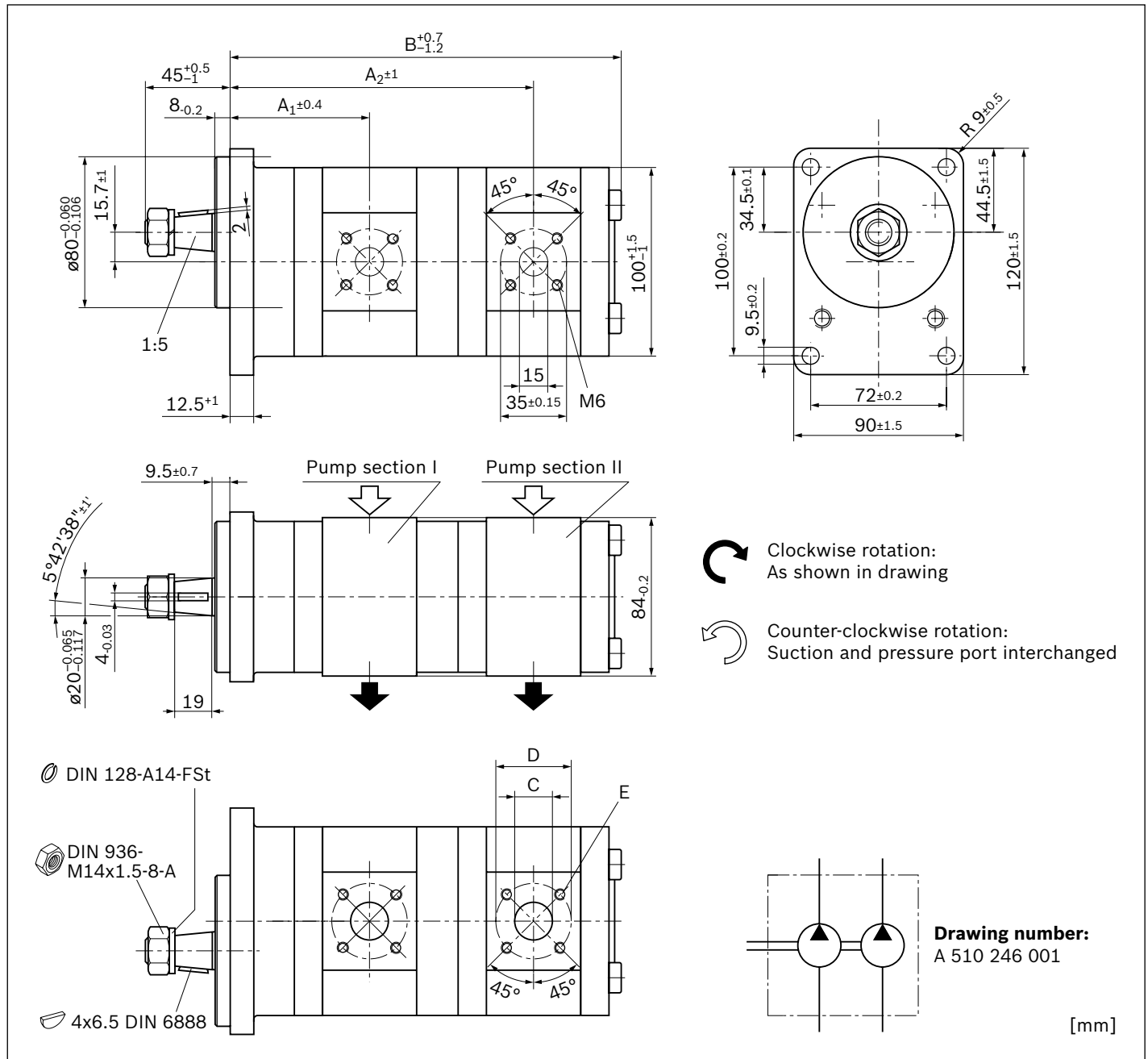


NG		Material number	Maximum pressure intermittend		Maximum speed $n_{max}$	Weight $m$	Dimensions				
$P_I$	$P_{II}$		$P_{2I}$	$P_{2II}$			$A_1$	$A_2$	$B$	$C$	$D$
		Direction of rotation	bar	bar	rpm	kg	mm	mm	mm	mm	mm
		counter-clockwise	clockwise								
8	4	0 510 465 355	280	280	4000	4.4	40.7	125.7	162	20 <sup>1)</sup>	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
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	280	230	3000	5.2	45	146.7	195.4	20	40

<sup>1)</sup> At pump section with size 4 and 5:  $C = 15$  mm

**Tapered shaft 1:5 with outboard bearing Ø80 mm, type 1**

AZPFF – 10 – ... **SA2020MB**



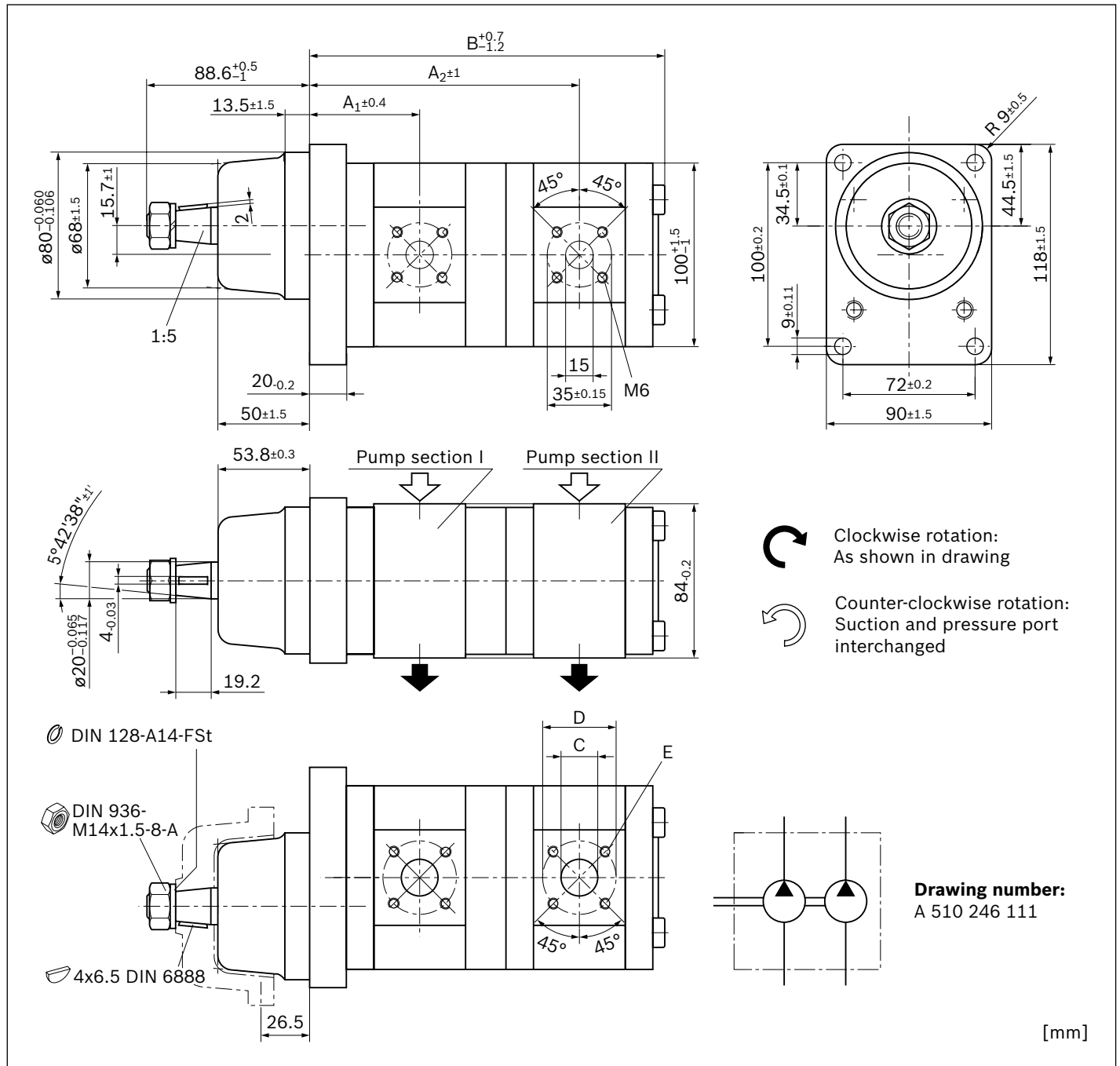
NG		Material number		Maximum pressure intermittend		Maximum speed	Weight	Dimensions					
P <sub>I</sub>	P <sub>II</sub>	Direction of rotation		p <sub>2 I</sub>	p <sub>2 II</sub>	n <sub>max</sub>	m	A <sub>1</sub>	A <sub>2</sub>	B	C	D	E
		counter-clockwise	clockwise	bar	bar	rpm	kg	mm	mm	mm	mm	mm	
4	4	0 510 255 300		280	280	4000	4.8	71.3	153	197	15	40	M6; 13 mm 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 <sup>1)</sup>	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 <sup>1)</sup>	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 <sup>1)</sup>	40	
16	5	0 510 655 301	0 510 655 002	280	280	3000	5.5	79	174.2	219.5	20 <sup>1)</sup>	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	

M6; 13 mm deep

<sup>1)</sup> At pump section with size 4 and 5: C = 15 mm

**Tapered shaft 1:5 with outboard bearing Ø80 mm, type 2**

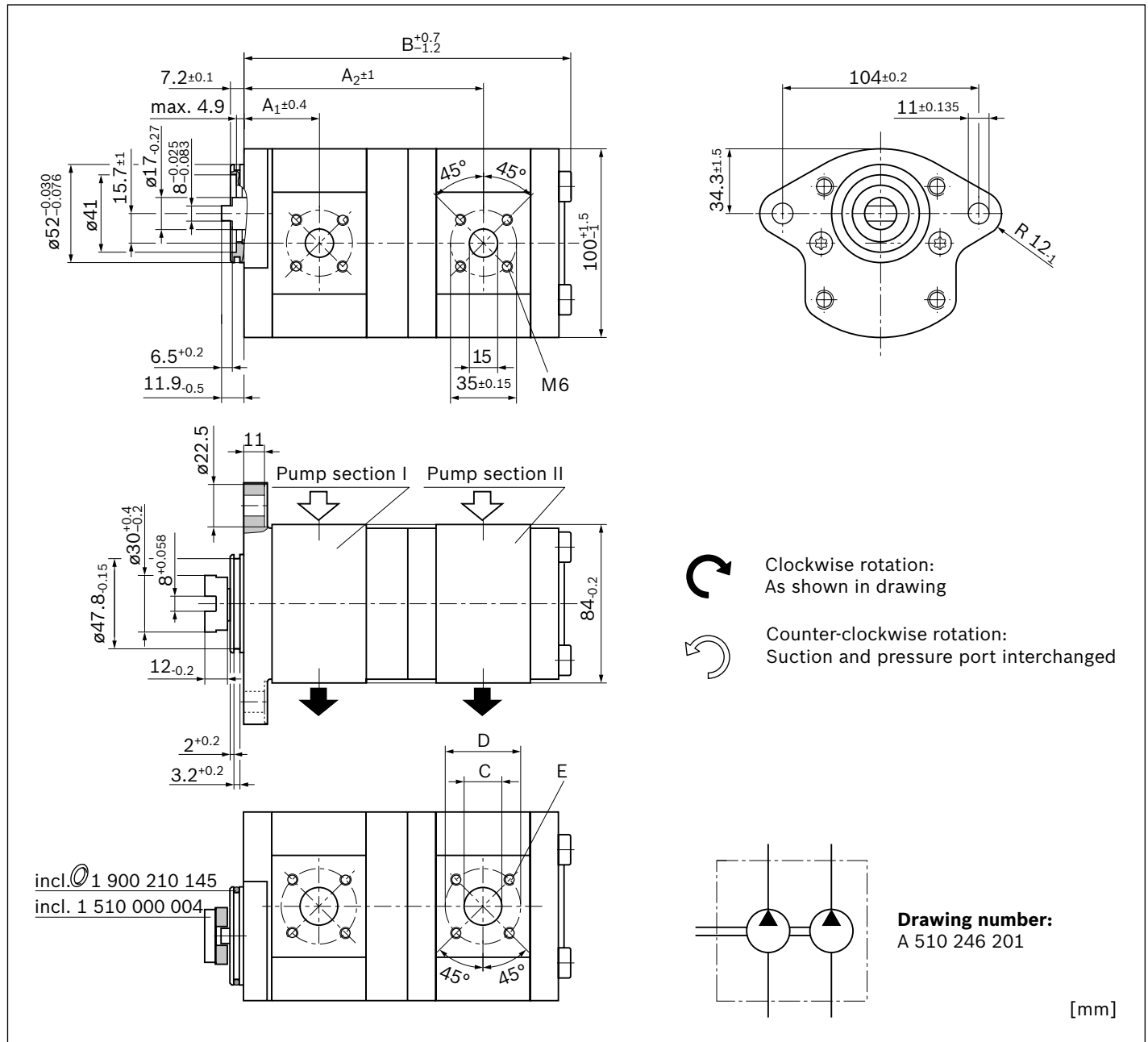
AZPFF – 10 – ... **SG2020PB**



NG		Material number	Maximum pressure intermittent		Maximum speed	Weight	Dimensions					
P <sub>I</sub>	P <sub>II</sub>	Direction of rotation	p <sub>2 I</sub>	p <sub>2 II</sub>	n <sub>max</sub>	m	A <sub>1</sub>	A <sub>2</sub>	B	C	D	E
		clockwise	bar	bar	rpm	kg	mm	mm	mm	mm	mm	
16	16	0 510 655 007	280	280	3000	6.2	65	166.7	221.9	20	40	M6; 13 mm deep
19	19	0 510 655 011	230	190	3000	6.6	65	171.7	231.9	20	40	

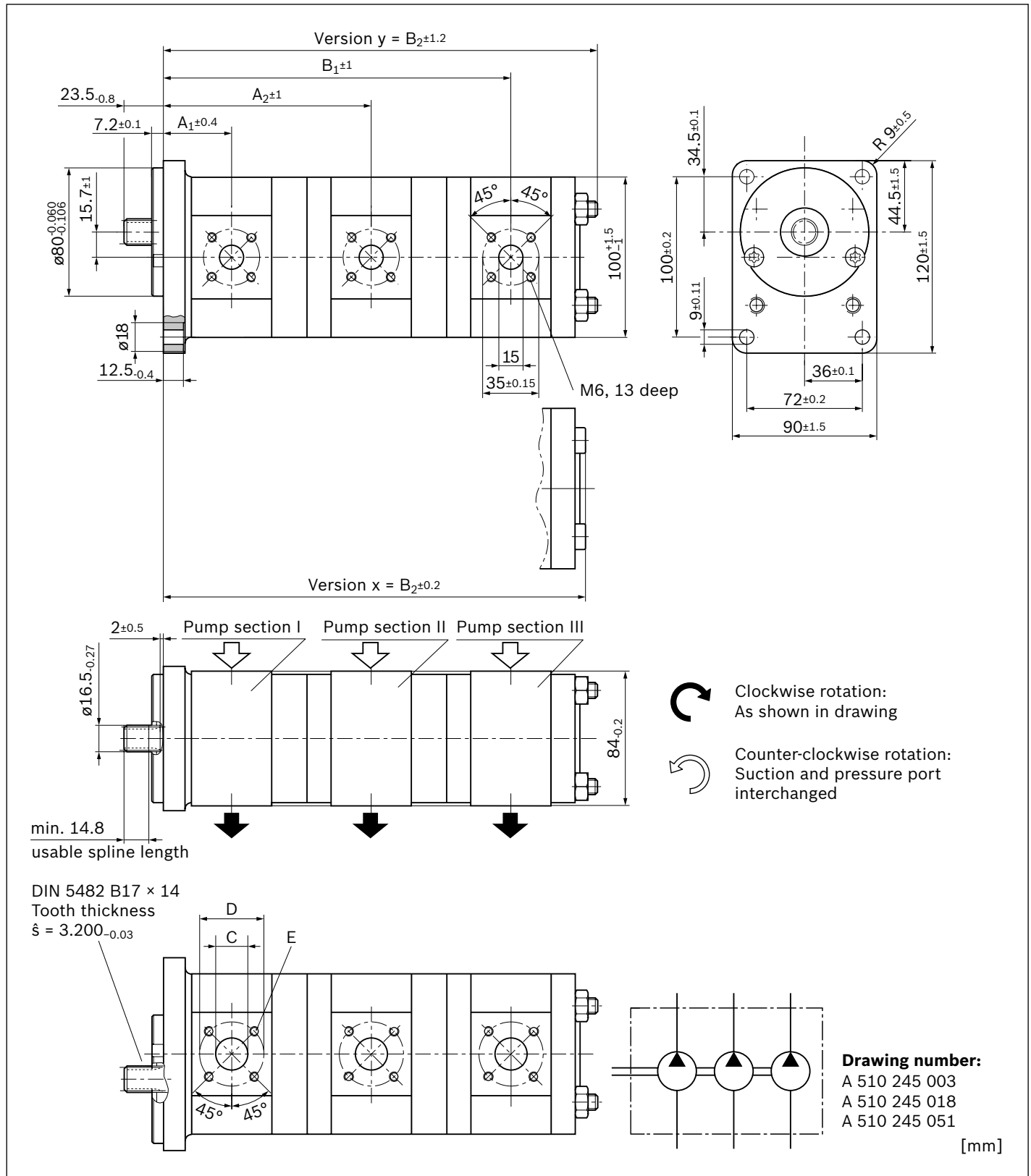
**Tang drive with 2-bolt mounting Ø52 mm and O-ring**

AZPFF – 10 – ... **NL2020KB**



NG		Material number		Maximum pressure intermittend		Maximum speed	Weight	Dimensions					
P <sub>I</sub>	P <sub>II</sub>	Direction of rotation		p <sub>2 I</sub>	p <sub>2 II</sub>	n <sub>max</sub>	m	A <sub>1</sub>	A <sub>2</sub>	B	C	D	E
		counter-clockwise	clockwise	bar	bar	rpm	kg	mm	mm	mm	mm	mm	
5	5			280	280	4000	4.65	38.6	122.8	169.2	15	40	M6; 13 mm 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		280	160	2500	6.17	45	160.3	226.6	20	40	

M6; 13 mm deep



NG			Material number		Maximum pressure intermittend			Maximum speed	Weight	Dimensions						Version	
P <sub>I</sub>	P <sub>II</sub>	P <sub>III</sub>	Direction of rotation		P <sub>2 I</sub>	P <sub>2 II</sub>	P <sub>2 III</sub>	n <sub>max</sub>	m	A <sub>1</sub>	A <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>	C	D	E	
			counter-clockwise	clockwise	bar	bar	bar	rpm	kg	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 <sup>1)</sup>	40		x
11	4	4			280	280	280	3500	6.9	47	133.2	214.9	259	20 <sup>1)</sup>	40		y
14	4	8	0 510 565 408		280	280	280	3000	7.2	47.5	138.2	223.2	270.6	20 <sup>1)</sup>	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 <sup>1)</sup>	40		
16	5.5	5.5		0 510 665 061	280	280	280	3000	7.4	47.5	142.8	227	272.4	20 <sup>1)</sup>	40	M6; 13 mm deep	
16	11	4			280	210	210	3000	7.5	47.5	148.7	234.9	276.5	20 <sup>1)</sup>	40		x
16	11	5.5			280	210	120	3000	7.6	47.5	148.7	236.1	280.2	20 <sup>1)</sup>	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 <sup>1)</sup>	40		
19	11	5.5			230	230	230	3000	7.6	47.5	153.7	241.1	285.2	20 <sup>1)</sup>	40		
19	16	4			230	190	190	3000	7.8	47.5	154.2	248.3	297.5	20 <sup>1)</sup>	40		y

M6;  
13 mm  
deep

x

y

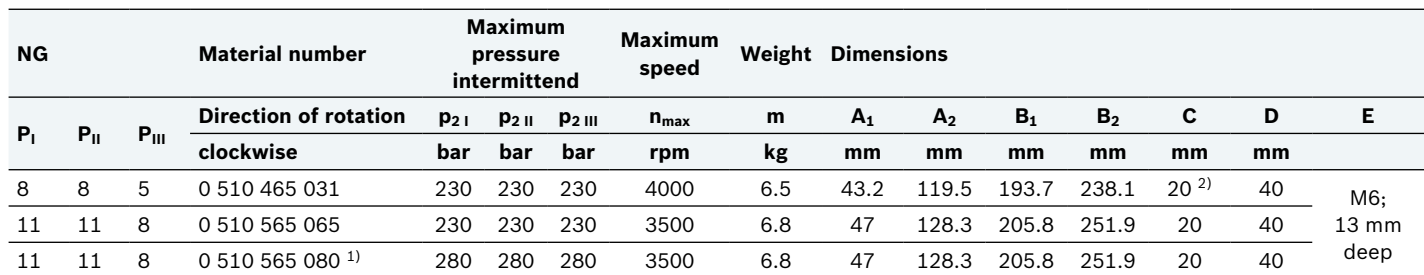
<sup>1)</sup> At pump section with size 4 and 5: C = 15 mm





NG			Material number		Maximum pressure intermittend			Maximum speed	Weight	Dimensions							Version
P <sub>I</sub>	P <sub>II</sub>	P <sub>III</sub>	Direction of rotation		P <sub>2 I</sub>	P <sub>2 II</sub>	P <sub>2 III</sub>	n <sub>max</sub>	m	A <sub>1</sub>	A <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>	C	D	E	
			counter-clockwise	clockwise	bar	bar	bar	rpm	kg	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 <sup>1)</sup>	40		M6; 13 mm deep x y
11	8	8		0 510 565 081	280	230	230	3500	7.2	47	136.5	224.8	272.2	20	40		
16	4	4			280	280	280	3000	7.1	47.5	141.6	223.3	267.4	20 <sup>1)</sup>	40		
16	8	4		0 510 665 134	280	280	280	3000	7.3	47.5	144.9	229.9	272.7	20 <sup>1)</sup>	40		
22	8	9			230	210	210	3000	8.15	61.6	167.3	255.6	307.5	20	40		y

<sup>1)</sup> At pump section with size 4 and 5: C = 15 mm

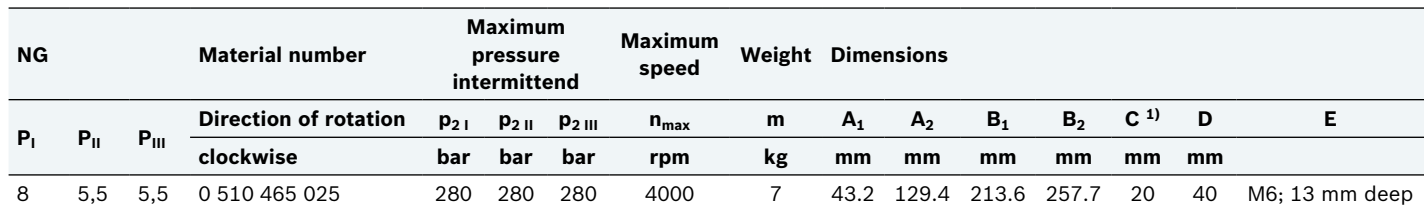


- 1) Reinforced through drive (Type code...- S0054)
- 2) At pump section with size 4 and 5: C = 15 mm

AZPFFF - 10 - ... **SG2020**MB



<sup>1)</sup> 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.

### Characteristic curves

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

### 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 class 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.

### 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" ([07012-B](#), chapter 5.5).

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").

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.

### Notice

When used as an auxiliary steering pump, the vehicle manufacturer should make sure that the steering system continues to operate safely as per ECE R-79 even if the auxiliary steering pump fails.

## 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.

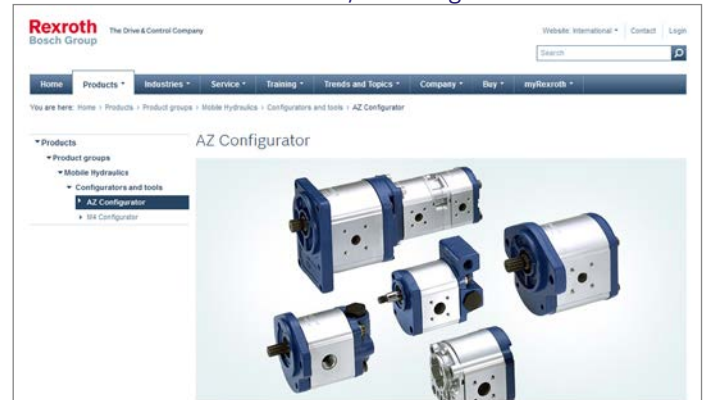
The selector guides you through a selection of features to all of the products available for order. By clicking on the order number, you can view and download the following product information: Data sheet, dimension sheet, operating conditions, and tightening torques.

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](http://www.boschrexroth.com/az-configurator)



### Fit4SILENCE app

You want to quickly determine the noise level of an application but don't have a measuring device at hand? No problem with Fit4SILENCE! Our new noise measurement app for all Android devices can be immediately downloaded free of charge. After calibration, you can start using it straight away and conduct fast, accurate noise measurements with different weightings in no time at all. An additional measuring device is no longer necessary, because calibrated smartphones using the app can achieve an accuracy that approximates professional measuring devices.

Last but not least, the app contains interesting information about the SILENCE PLUS technology, including an audio sample.

Link: [www.boschrexroth.com/silence-plus](http://www.boschrexroth.com/silence-plus)

#### ▼ Download the Android app:

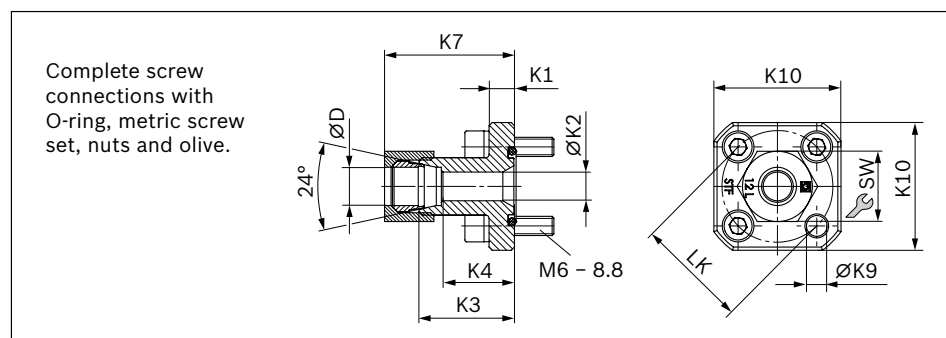


### Further information

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

## Accessories

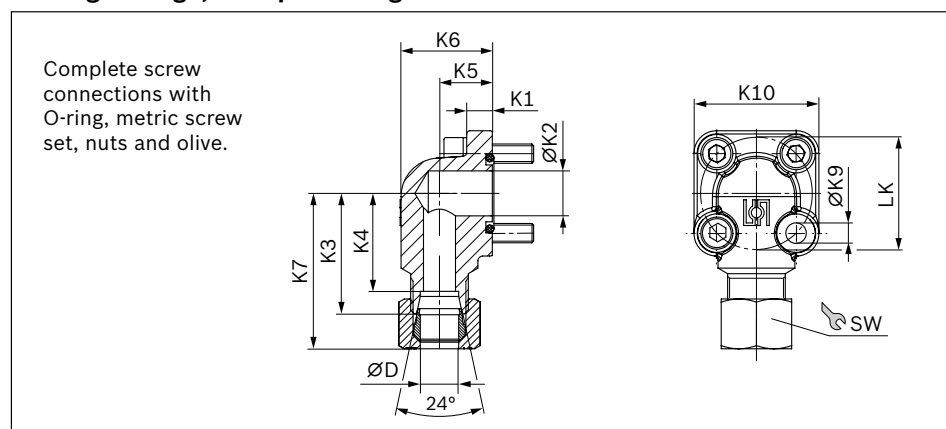
### Straight flange, for square flange 20



LK	D	Range <sup>1)</sup>	Material number	p <sub>max</sub>	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

<sup>1)</sup> See DIN EN ISO 8434-1

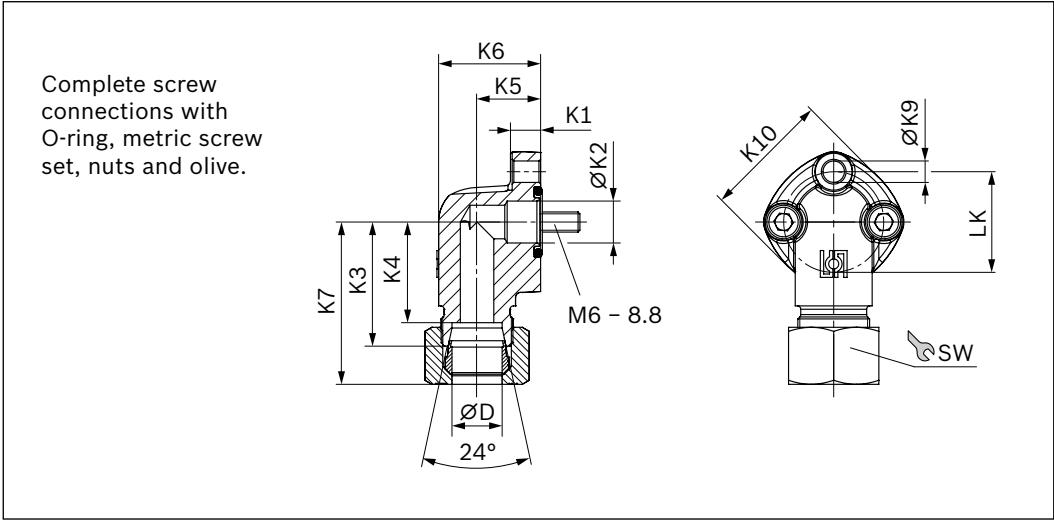
### 90° angle flange, for square flange 20



LK	D	Range <sup>1)</sup>	Material number	p <sub>max</sub>	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	1 515 702 006	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

<sup>1)</sup> See DIN EN ISO 8434-1

**90° angle flange, 3-hole, for square flange 30**



LK	D	Range <sup>1)</sup>	Material number	p <sub>max</sub>	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

<sup>1)</sup> See DIN EN ISO 8434-1

**Note**

Permissible tightening torques can be found in the “General Operating Instructions for External Gear Units” (07012-B).

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