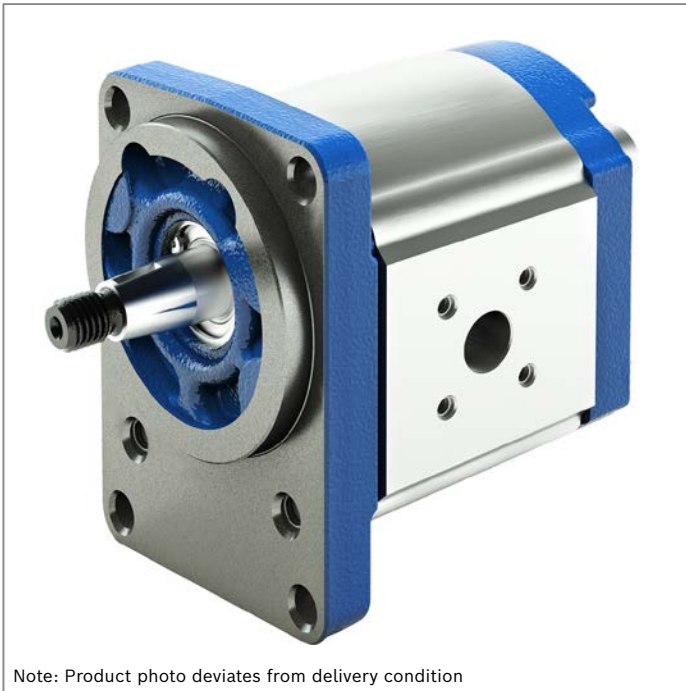


External gear pump **SILENCE PLUS** **AZPJ**



Note: Product photo deviates from delivery condition

- ▶ Platform F
- ▶ Low noise fixed pump
- ▶ Size 12 ... 28
- ▶ Continuous pressure up to 250 bar
- ▶ Intermittent pressure up to 280 bar

Features

- ▶ Optimized pressure pulsation, reduces noise emissions and oscillations in the system
- ▶ Pleasant pitch due to low frequency
- ▶ 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 flanges or screw thread
- ▶ Combination of several pumps possible

Contents

Product description	2
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Technical data	9
Diagrams/characteristic curves	16
Dimensions	20
Project planning information	30
Information	31
Accessories	32

Product description

General

The key task of external gear pumps is to convert mechanical energy (torque and rotational speed) into hydraulic energy (flow and pressure). To avoid unnecessarily high heat losses, units with high efficiencies are sought after. These are realized by means of pressure-dependent gap

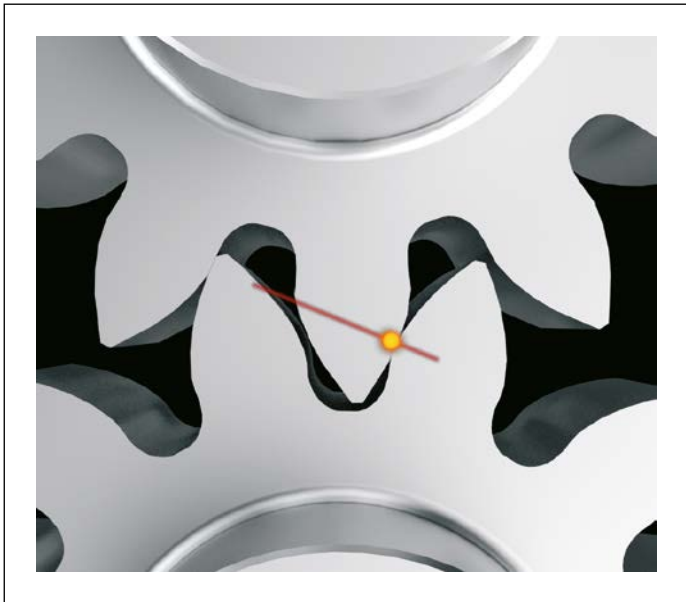
sealing and high-precision manufacturing technology. With extremely low-noise SILENCE PLUS pumps, the intrinsic noise is reduced by 15 dB (A) on average as compared with standard external gear pumps and the flow pulsation is also decreased by 75%.

Pumping principle

Continuous tooth contact reduces operating noise: A non-involute rounded tooth profile, combined with helical gearing, forms the heart of the SILENCE PLUS. Thanks to permanent tooth contact, the hydraulic fluid is transported almost continuously and noiselessly. The possibility of noise developing from trapped oil between the tooth flanks is prevented in the first place.

A hydrostatic bearing ensures long service life: The high performance and long service life of the SILENCE PLUS is due to a Rexroth patented solution: Hydrostatic grooves provide wear-free compensation for the internal axial forces generated in the helical gearing – even at pressures up to 280 bar.

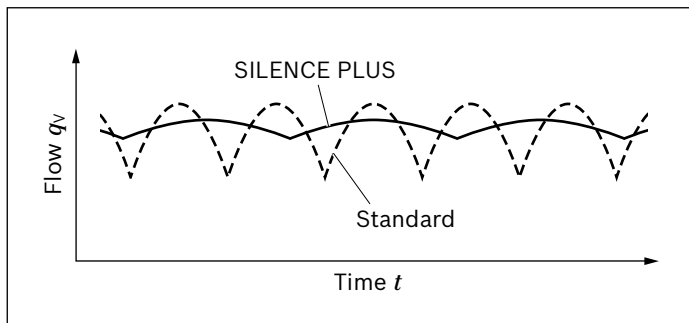
Standard



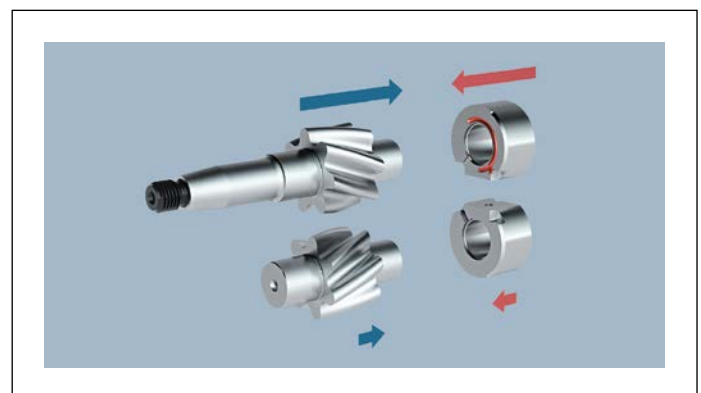
SILENCE PLUS



Flow pulsation



Hydrostatic bearing SILENCE PLUS



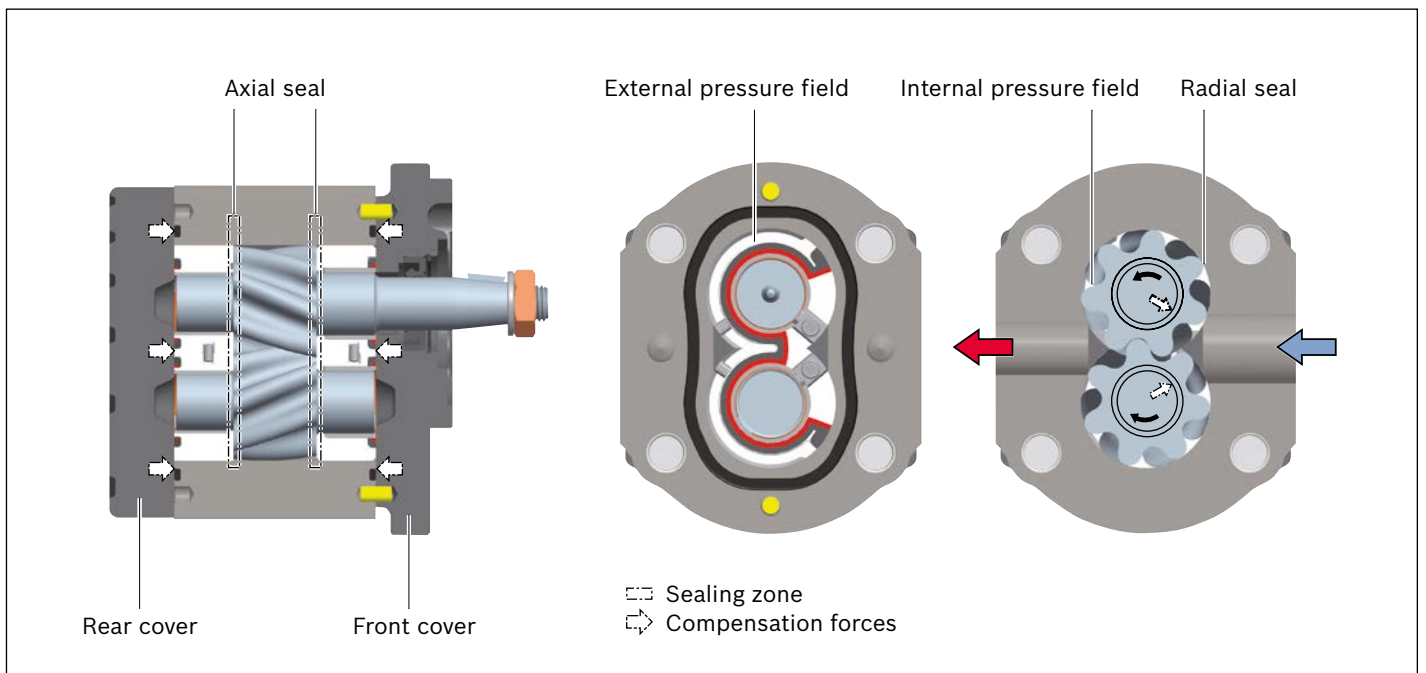
Construction

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.

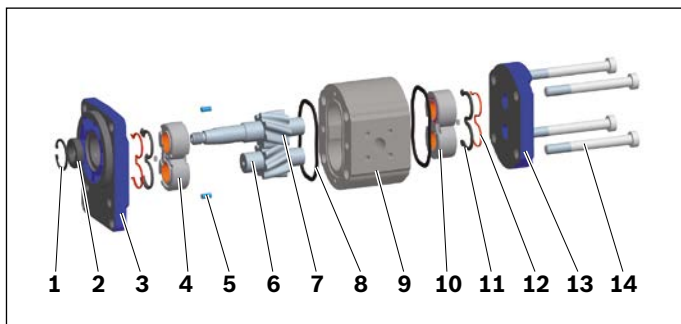
The drive shaft protrudes from the front cover where it is sealed by the shaft seal ring. The bearing forces are absorbed by slide bearings. These are designed for high pressures and have excellent dry-running qualities, especially at low rotational speeds. The gear wheels have 7 teeth. This keeps both 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.

Axial compensation SILENCE PLUS



Assembly AZPJ



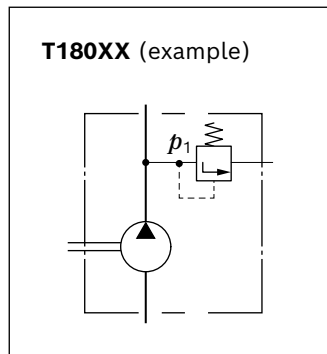
Gear pumps with integrated valves

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 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.



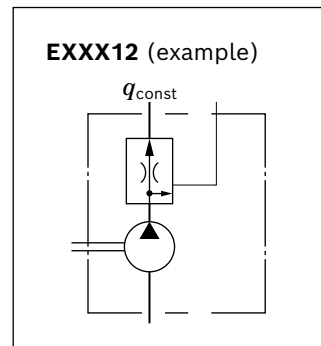
Pressure relief valve, external pressure discharge

$p_1 = 5$ to 250 bar



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

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



Type codes

Type code single pump

01	02	03	04	05	06	07	08	09	10	11	12	13	14
AZP	J	-			-								

External gear unit

01	External gear pump	AZP
----	--------------------	------------

Series

02	SILENCE PLUS, platform F	J
----	--------------------------	----------

Series

03	Shaft $\varnothing 20$	2
----	------------------------	----------

Version

04	Corrosion-protected, pinned ¹⁾	2
----	---	----------

Size (NG)

05	Geometric displacement V_g [cm ³], see section "Technical data"	012	014	016	019	022	025	028
----	---	------------	------------	------------	------------	------------	------------	------------

Direction of rotation

06	Viewed on drive shaft	clockwise	R
		counter-clockwise	L

Drive shaft



Suitable front cover

07	Tapered shaft	1 : 5	B, P, N	C
		1 : 5	A, G	S
		1 : 8	O	H
	Dihedral, claw		M, T	N
	Splined shaft	SAE J744 16-4 9T	R, C	R
		SAE J744 19-4 11T	R, C	P
		DIN 5482 B17 × 14	B, P, N	F
	Parallel keyed shaft	SAE J744 16-1 A	R	Q
		ISO $\varnothing 18$ mm	B	A

Front cover

08	Rectangular flange	$\varnothing 80$ mm	B	
		$\varnothing 36.47$ mm	O	
	2-bolt flange	$\varnothing 82.55$ mm	SAE J744 82-2 A	R
		$\varnothing 101.6$ mm	SAE J744 101-2 B	C
	2-bolt mounting	$\varnothing 52$ mm	With O-ring	M
		$\varnothing 50$ mm	Connection variant 1	N
		$\varnothing 50$ mm	Connection variant 2	P
	4-bolt mounting	$\varnothing 52$ mm	With O-ring	T
	Outrigger bearing	$\varnothing 80$ mm	Type 1	A
			Type 2	G

Line connection

		012	014	016	019	022	025	028	
09	UN-thread according to ISO 11926-1 / ASME B 1.1, O-ring	●	●	●	●	●	●	●	12
	Square flange 	●	●	●	●	●	●	●	20
	Square flange 	●	●	●	-	-	-	-	30

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

6 **AZPJ** | External gear pump SILENCE PLUS
Type codes

01	02	03	04	05	06	07	08	09	10	11	12	13	14
AZP	J	-			-								

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 external	T
	With flow control valve Residual flow external	E

Valve setting pressure relief valve (parameter only required for rear cover with pressure relief 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 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	SXXXX
----	-----------------	--------------

● = Available - = Not available

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
AZP		-			-						

External gear unit

01	External gear pump	AZP
----	--------------------	------------

Series¹⁾

02	High Performance	1.0 to 7.1 cm ³ /U	Data sheet 10088	B
		4.0 to 28 cm ³ /U	Data sheet 10089	F
		20.0 to 36 cm ³ /U	Data sheet 10091	N
		22.5 to 100 cm ³ /U	Data sheet 10093	G
	SILENCE	4.0 to 28 cm ³ /U	Data sheet 10095	S
		20.0 to 36 cm ³ /U	Data sheet 10092	T
		22.5 to 63 cm ³ /U	Data sheet 10098	U
	SILENCE PLUS	12.0 to 28 cm ³ /U	Data sheet 10094	J

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

03	Standard bearing	1
	Reinforced bearing	2

Version (according to data sheet of pump stage 1)

04	Phosphated, pinned	1
	Corrosion-protected, pinned	2

Size (NG)²⁾

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

Direction of rotation

06	Viewed on drive shaft	clockwise	R
		counter-clockwise	L

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)³⁾

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

Sealing material

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

Rear cover (relates to last pump stage)

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

Special version

12	Special version	SXXXX
----	-----------------	--------------

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

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

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

8 **AZPJ | External gear pump SILENCE PLUS**
Type codes

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		
AZP	GGJJ	-	2	2	-	032/022/016/012	R	C	B	20202020	K	B

Technical data

Table of values

Size			12	14	16	19	22	25	28	
Series			Series 2x							
Displacement geometric, per revolution	V_g	cm ³	12	14	16	19	22.5	25	28	
Pressure at suction port S ¹⁾	absolute	p_e	0.7 ... 3							
Maximum continuous pressure		p_1	250	250	250	250	210	185	130	
Maximum intermittent pressure		p_2	280	280	280	280	240	215	160	
Maximum pressure peaks		p_3	300	300	300	300	260	235	180	
Mini- imum speed at	$v = 12 \text{ mm}^2/\text{s}$	$p < 100 \text{ bar}$	n_{\min}	rpm	500	500	500	500	500	500
		$p = 100 \text{ bar} \dots 180 \text{ bar}$	n_{\min}	rpm	1000	800	800	800	800	800
	$v = 25 \text{ mm}^2/\text{s}$	$p = 180 \text{ bar} \dots p_2$	n_{\min}	rpm	1200	1000	1000	1000	1000	-
		at p_2	n_{\min}	rpm	600	500	500	500	500	500
Maximum speed			n_{\max}	rpm	3500	3000	3000	3000	2800	2600

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

General technical data

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)

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

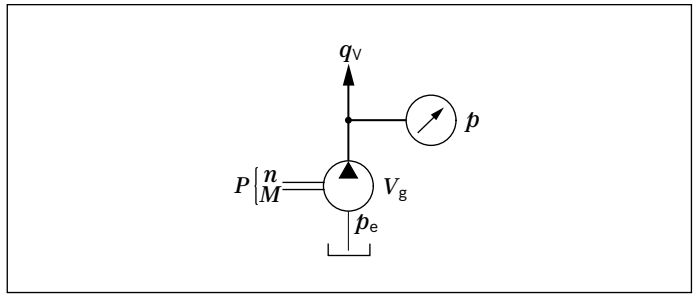
Note

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

Determining the operating characteristics

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]
 - n Rotational speed [rpm]
 - η_v Volumetric efficiency
 - η_{hm} Hydraulic-mechanical efficiency
 - η_t Total efficiency ($\eta_t = \eta_v \cdot \eta_{hm}$)

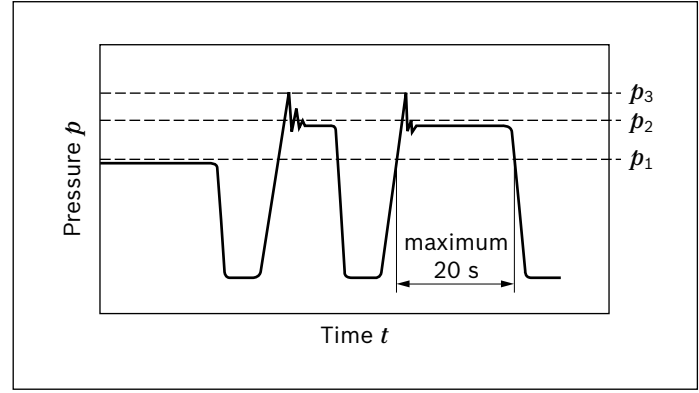


Note
 You can find diagrams for a rough calculation in chapter "Diagrams / Characteristic curves".

Direction of rotation

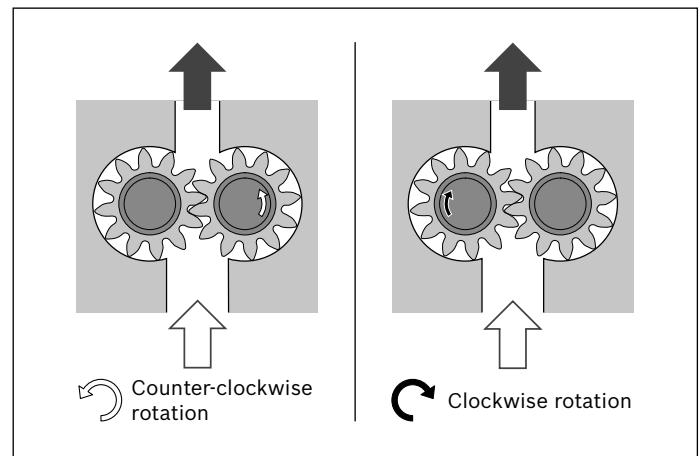
The dimensional drawings in the chapter Dimensions represent pumps for clockwise rotation. The position of the drive shaft or the position of suction and pressure port changes for counter-clockwise rotation.

Pressure definition



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

Direction of rotation, viewed on drive shaft



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:

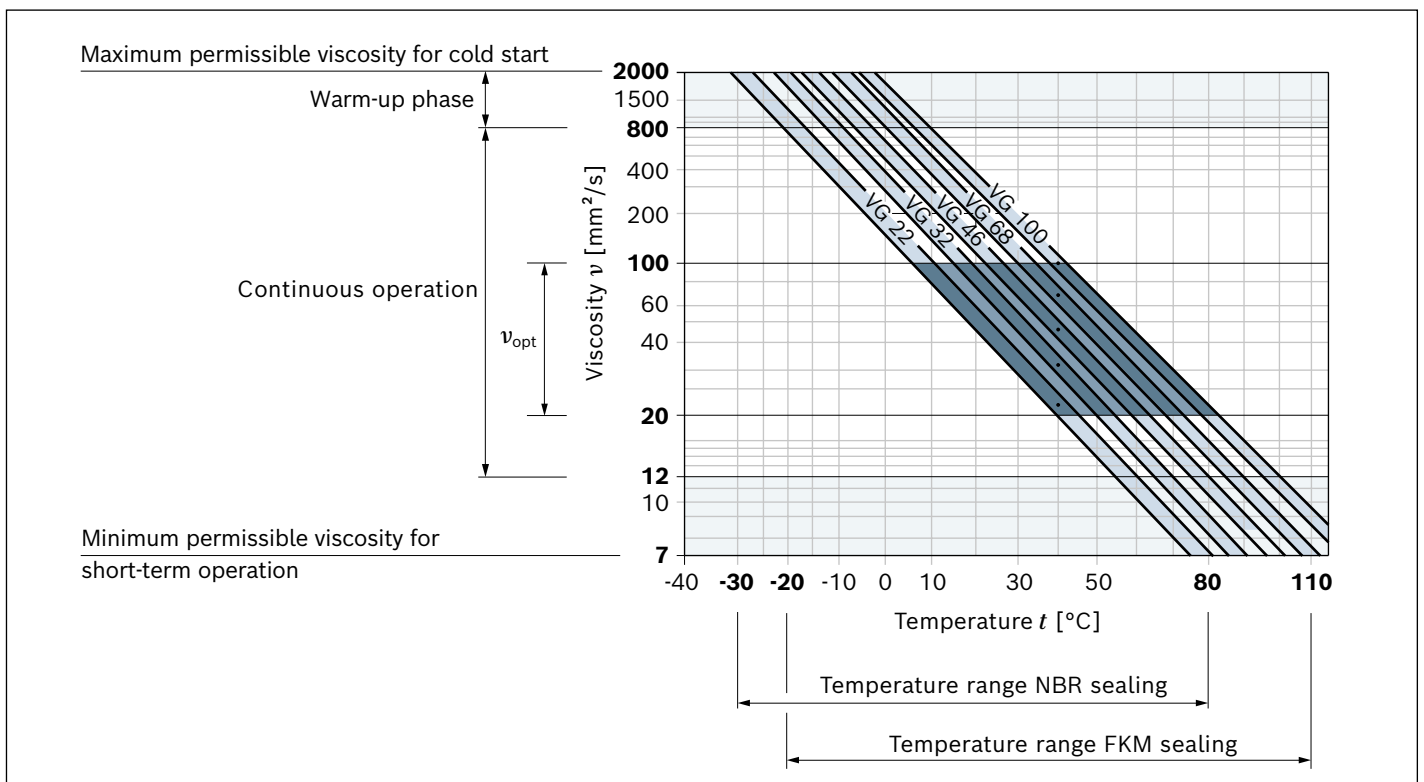
- ▶ 90220: Hydraulic fluids based on mineral oils and related hydrocarbons

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)	$t = -20 \text{ }^\circ\text{C} \dots +110 \text{ }^\circ\text{C}$

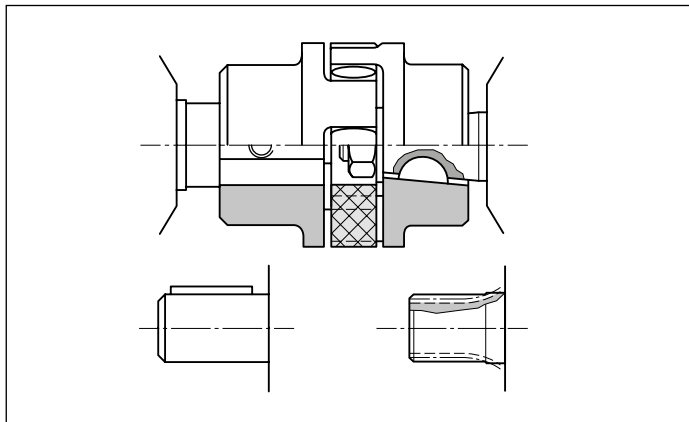


Observe the instructions for the filtration of the hydraulic fluid (see chapter Project planning information).

Drives

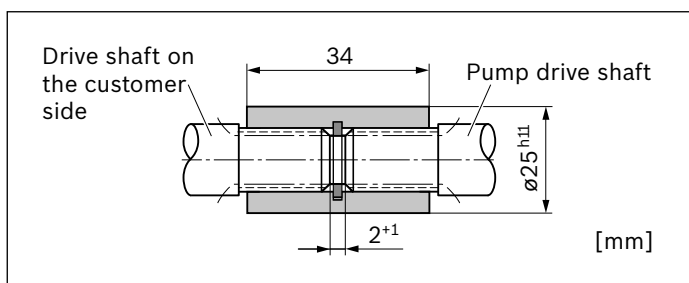
1. Elastic couplings

- ▶ 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.

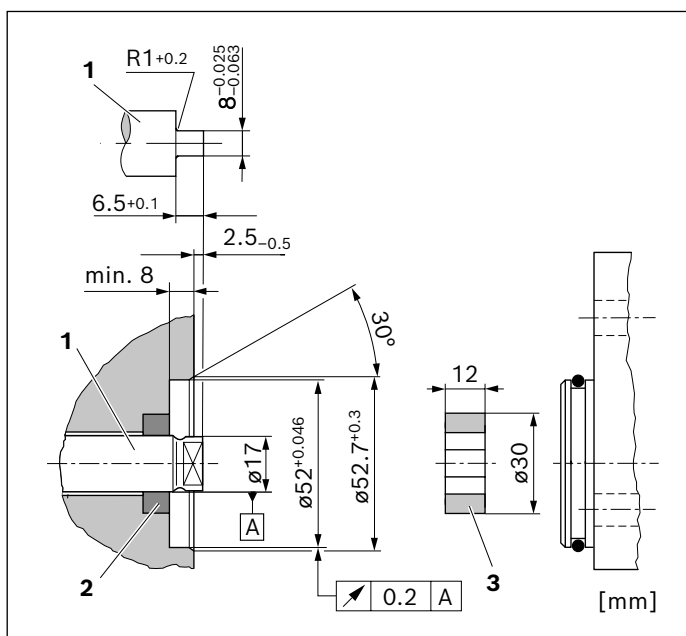


3. Tang drive coupling

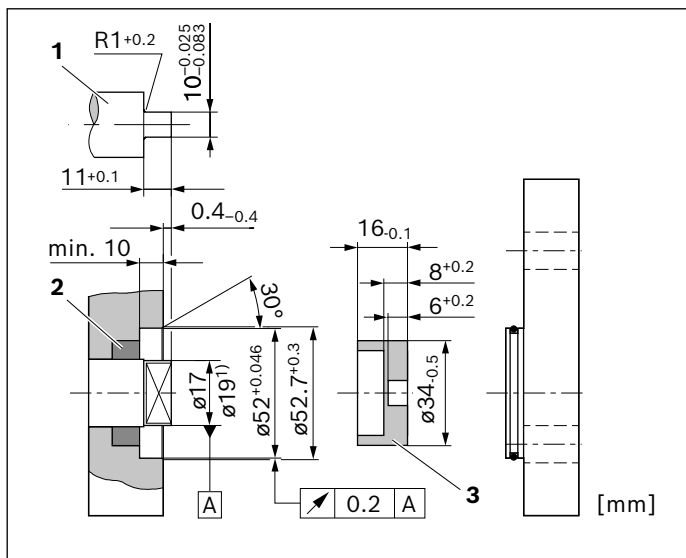
- ▶ For attaching the pump directly to an electric motor or combustion engine, gear, etc.
- ▶ The pump shaft has a special tang drive and driver (3) (scope of delivery see offer drawing)
- ▶ There is no shaft sealing
- ▶ Drive-side installation and sealing according to the following recommendations and 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 $R_t \leq 4 \mu\text{m}$
- ▶ 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

Sizes 12 ... 16



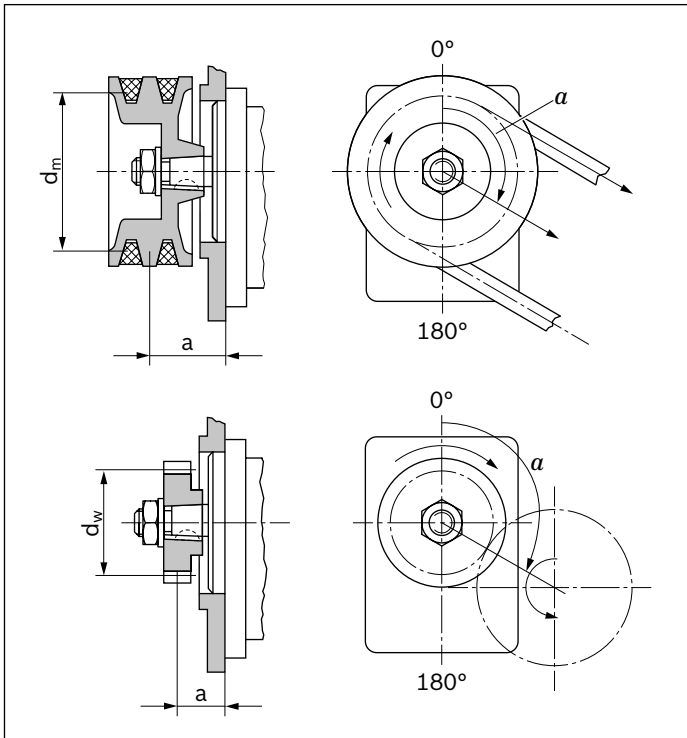
Sizes 19 ... 28



¹⁾ See offer drawing (maximum 34 mm)

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

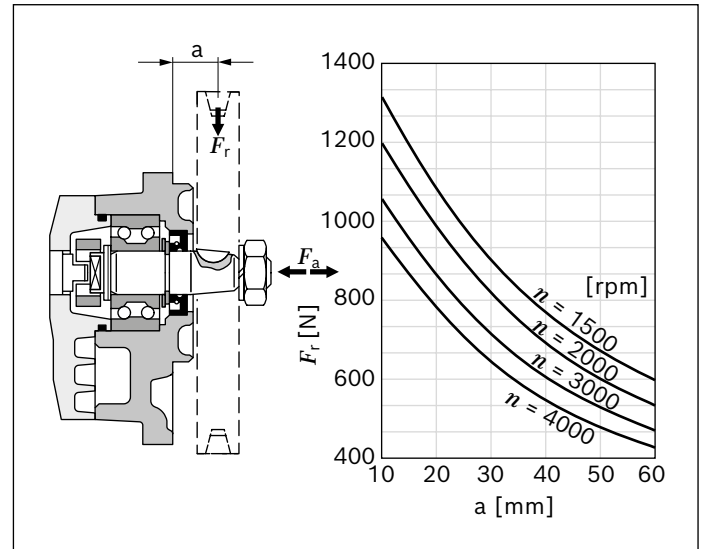
For V-belt or gear wheel drives, please contact us specifying the application and mounting conditions (dimensions a , d_m , d_w and angle α). For helical toothed gear drives, details of the helix angle β are also required.



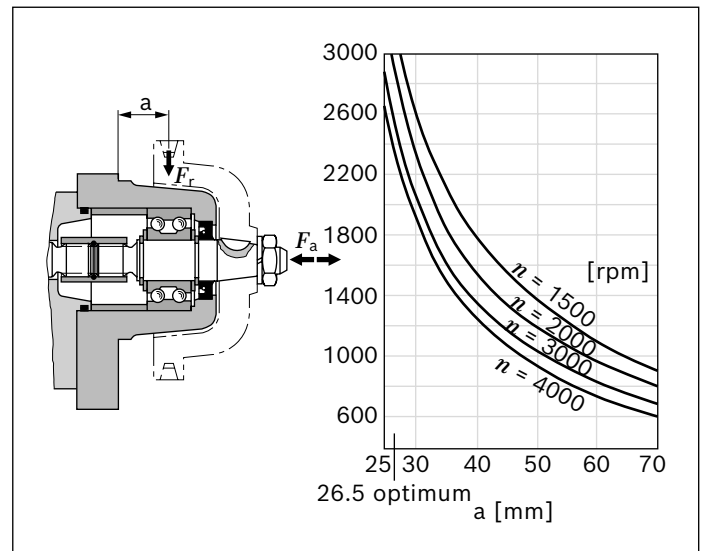
5. Outrigger bearing

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

Splined shafts

Drive shaft		M_{max}	Size	$P_{2\ max}$
Code	Designation	Nm		bar
F	DIN 5482 B17 × 14	100	12 ... 19	280
			22	240
			25	215
			28	160
R	SAE J744 16-4 9T	110	12 ... 19	280
			22	240
			25	215
			28	160
P	SAE J744 19-4 11T	180	12 ... 19	280
			22	240
			25	215
			28	160

Tapered shafts

Drive shaft		M_{max}	Size	$P_{2\ max}$
Code	Type	Nm		bar
C	1 : 5	155	12 ... 19	280
			22	240
			25	215
			28	160
H	1 : 8	160	12 ... 19	280
			22	240
			25	215
			28	160

Parallel keyed shafts

Drive shaft		M_{max}	Size	$P_{2\ max}$
Code	Designation	Nm		bar
Q	SAE J744 16-1 A	55	12	250
			14	220
			16	190
			19	160
			22	140
			25	120
			28	110
A	ISO Ø18 mm	75	12, 14	280
			16	260
			19	220
			22	190
			25	170
			28	150

Tang drive

Drive shaft		M_{max}	Size	$P_{2\ max}$
Code	Designation	Nm		bar
N	Tang drive	65	12	280
			14	260
			16	230
			19	250
		85	22	210
			25	190
			28	160

With outrigger bearing

Drive shaft	Outrigger bearing	M_{max}	Size	$P_{2\ max}$
Code	Type (code)	Nm		bar
S	Type 1 (A) (with tang drive coupling)	65	12	280
			14	260
			16	230
			19	190
			22	160
			25	140
	Type 1 (A) (with sleeve)	160	28	130
			12 ... 19	280
			22	240
			25	215
			28	160
			12 ... 19	280
Type 2 (G)			22	240
			25	215
			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.

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:

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

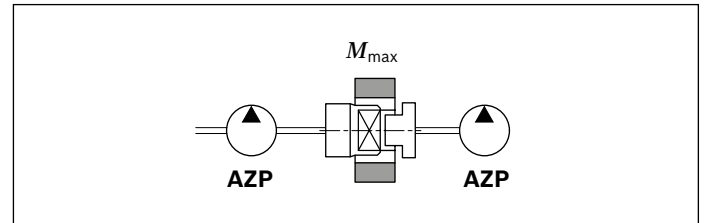
Δp [bar]
 V_g [cm³]

1) 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)

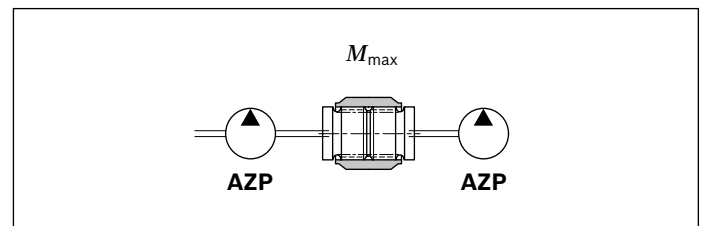
In the case of AZPJ pumps the driver for the following pump stage can carry a load of up to $M_{\max} = 65$ Nm. Please note possibly resulting pressure restrictions for the following pump stages. Subsequent pumps of a smaller series determine the max. transmissible torque.



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

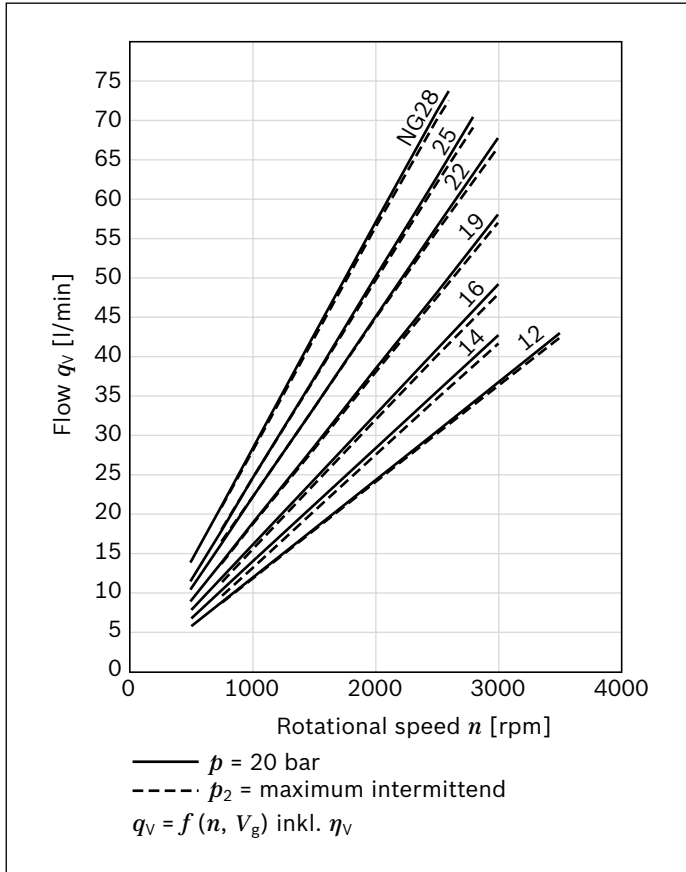
Reinforced through drives

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

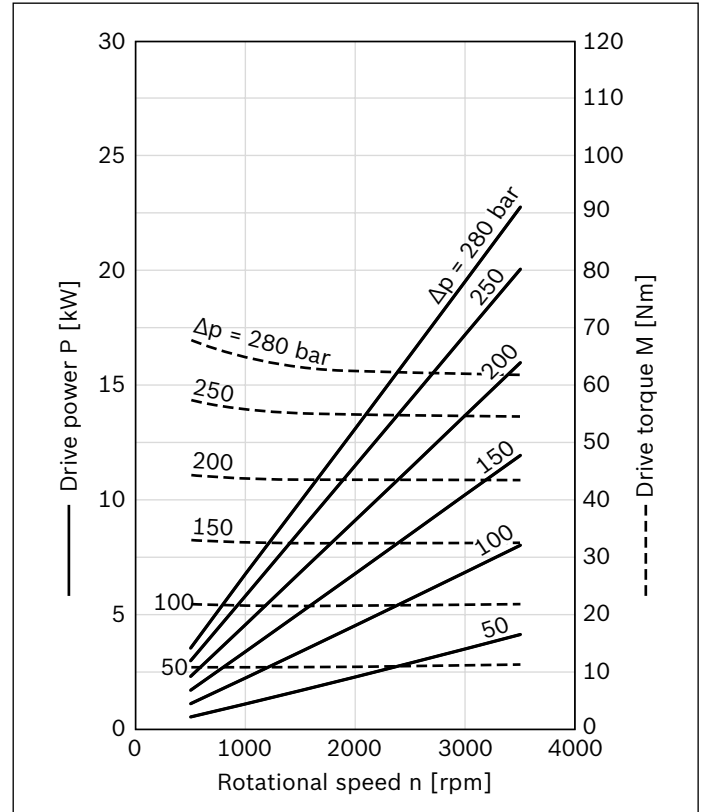


Note

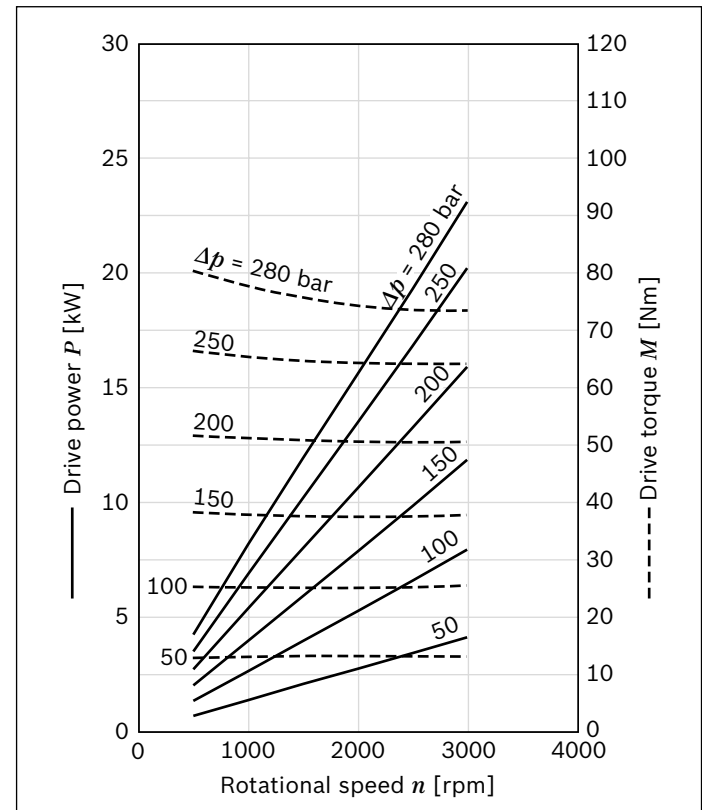
- Characteristic curves measured at $v = 32 \text{ mm}^2/\text{s}$ and $t = 50 \text{ }^\circ\text{C}$.

Power diagrams

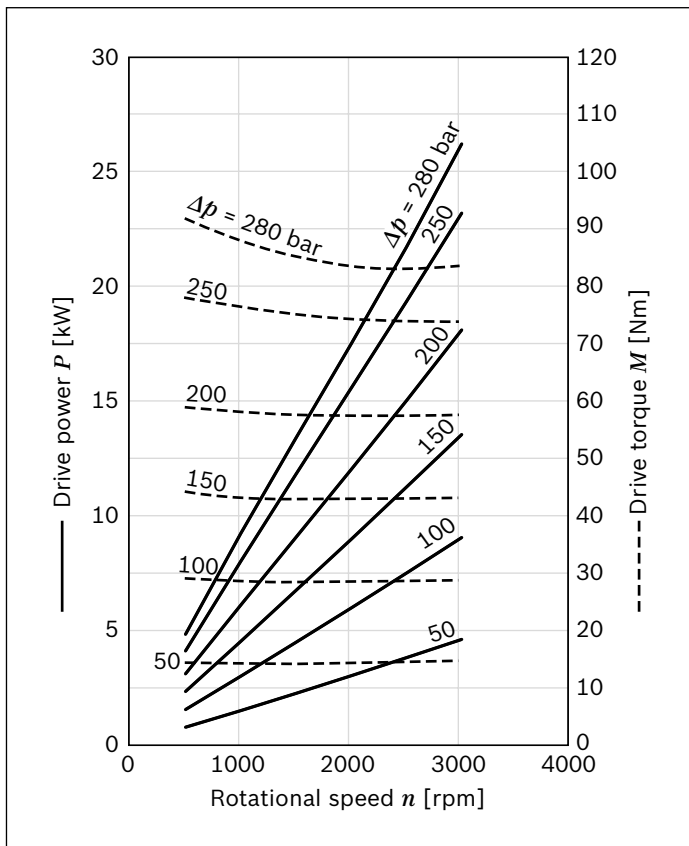
Size 12



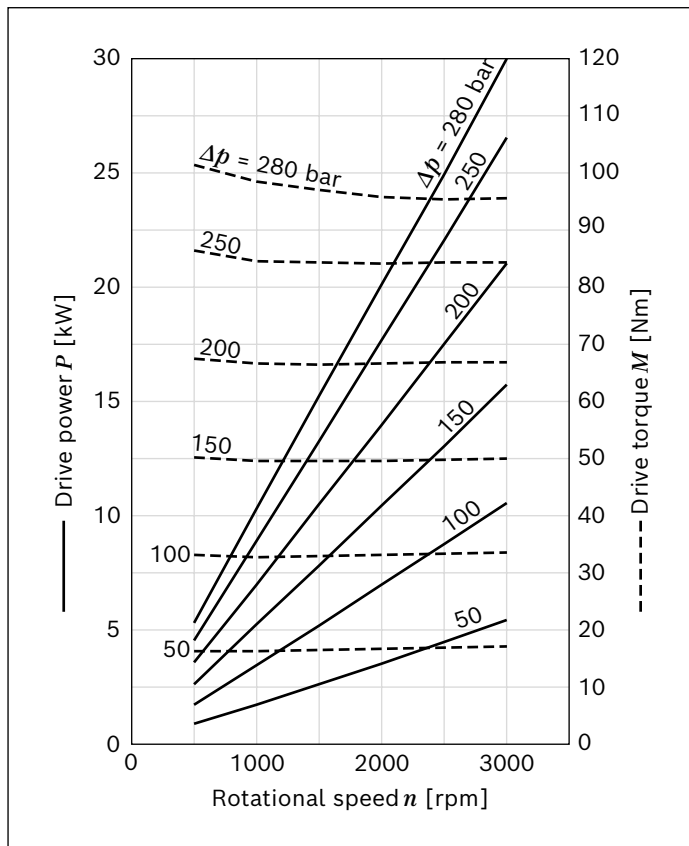
Size 14



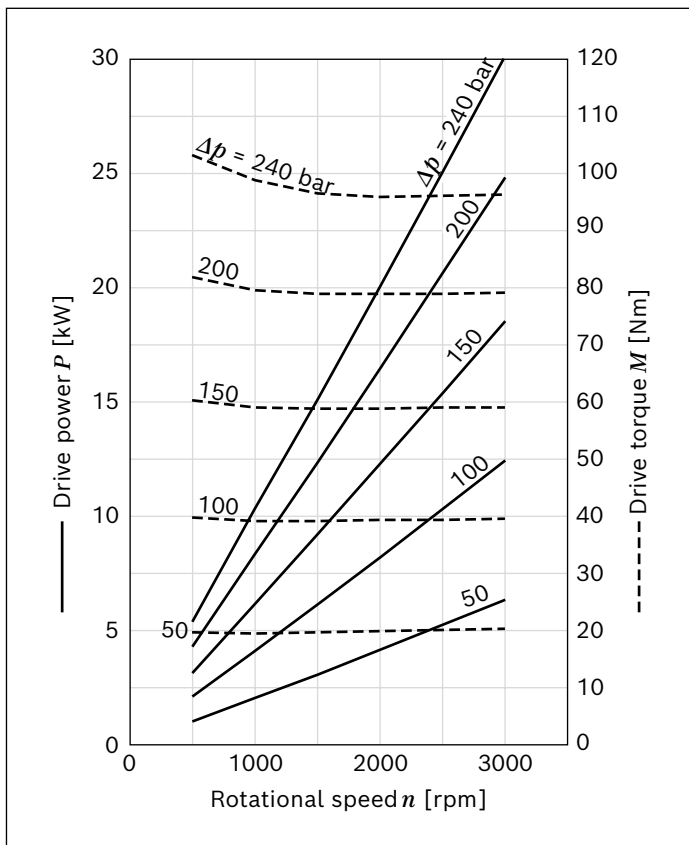
Size 16



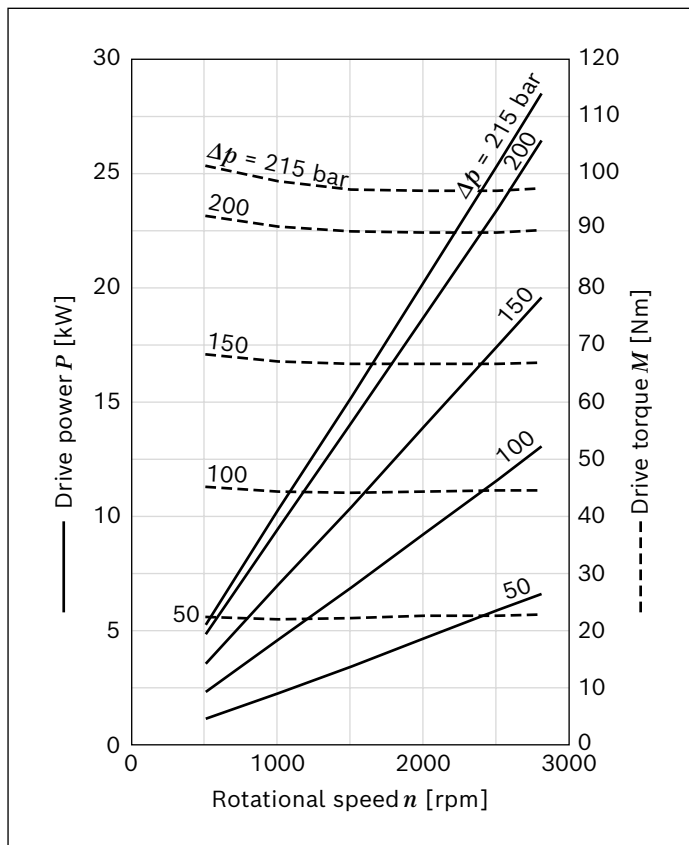
Size 19



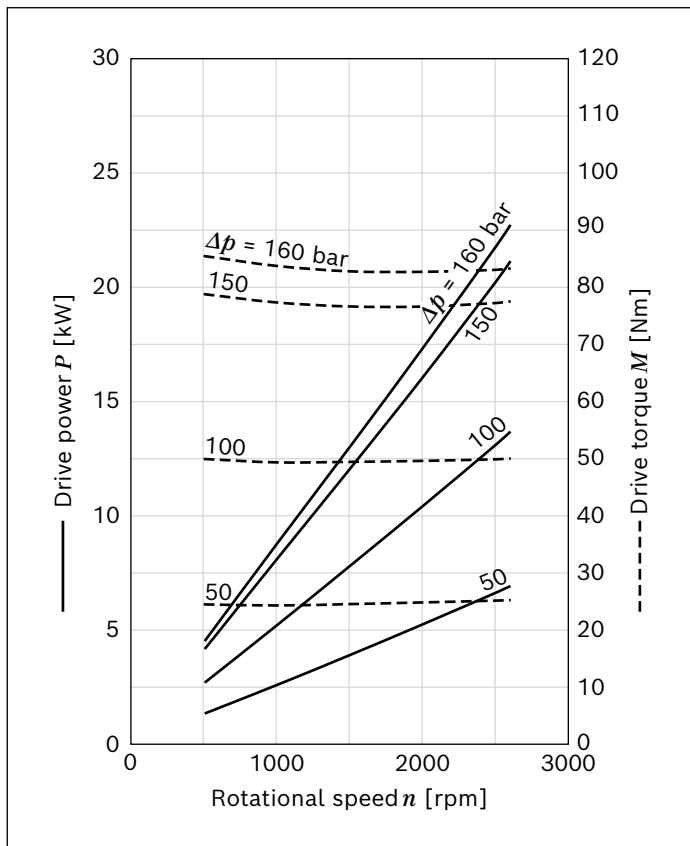
Size 22



Size 25



Size 28



Noise charts

Apart from the low levels, the much lower frequency also contributes to the substantial noise benefits of the SILENCE PLUS compared with other pump designs. 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.

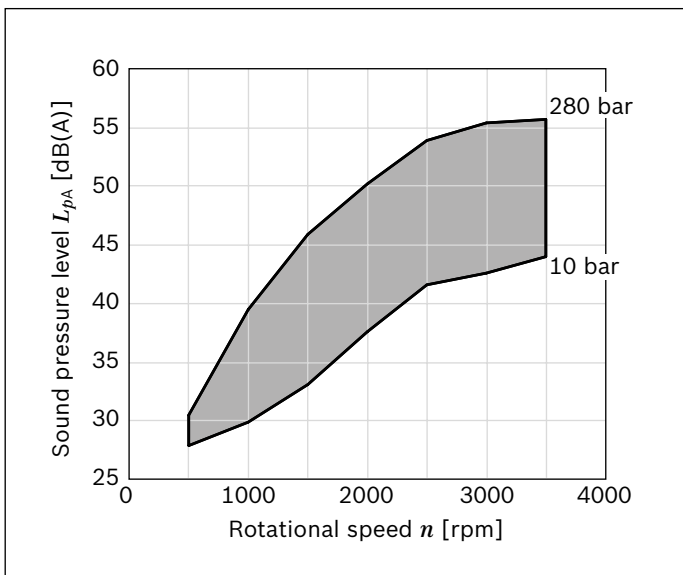
Ambient influences (installation site, piping, other system components) were not taken into account.

The values refer to one individual pump.

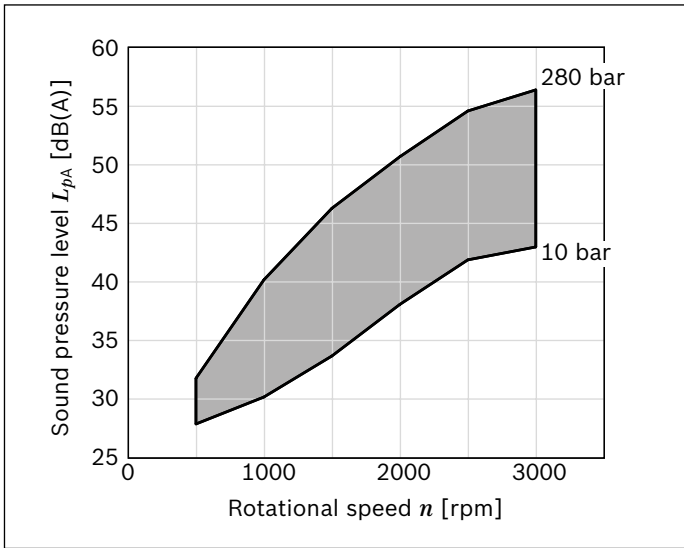
Note

- ▶ 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.

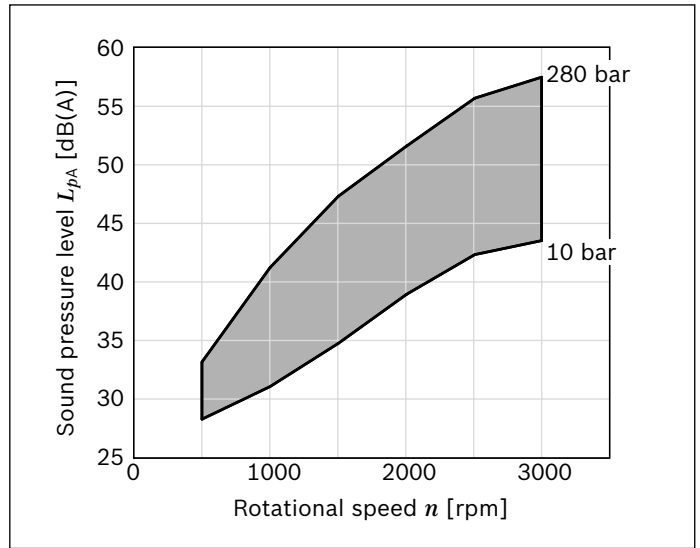
Size 12



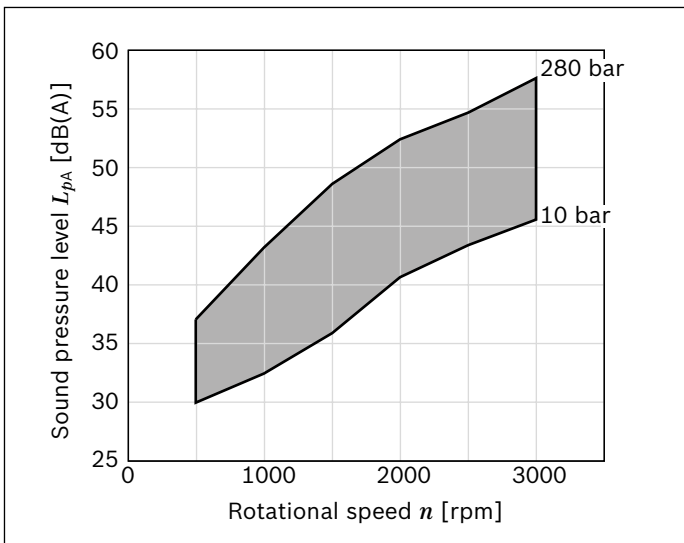
Size 14



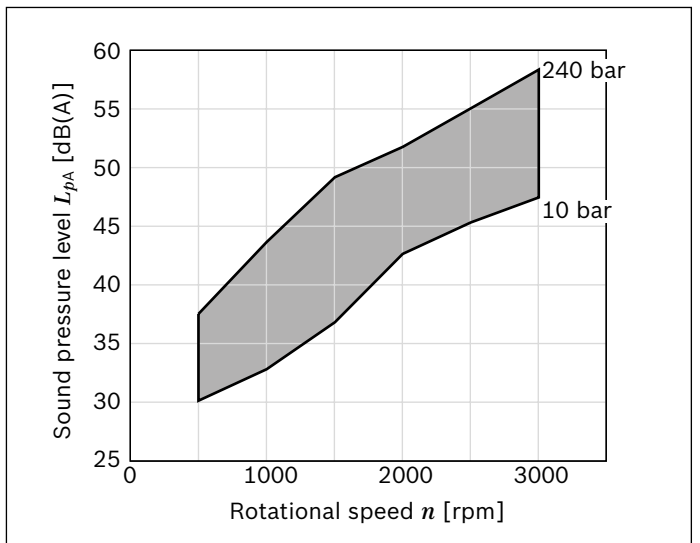
Size 16



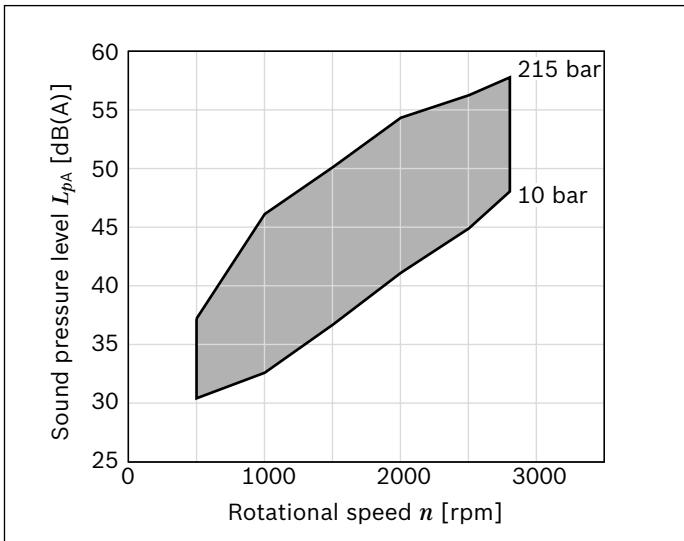
Size 19



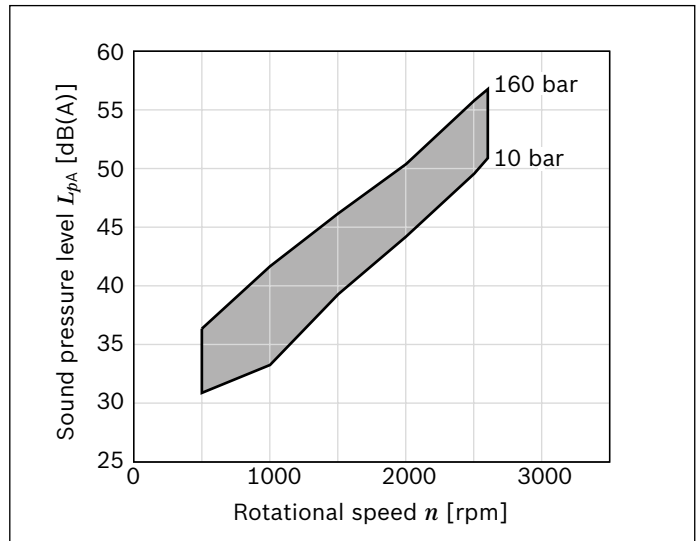
Size 22



Size 25



Size 28

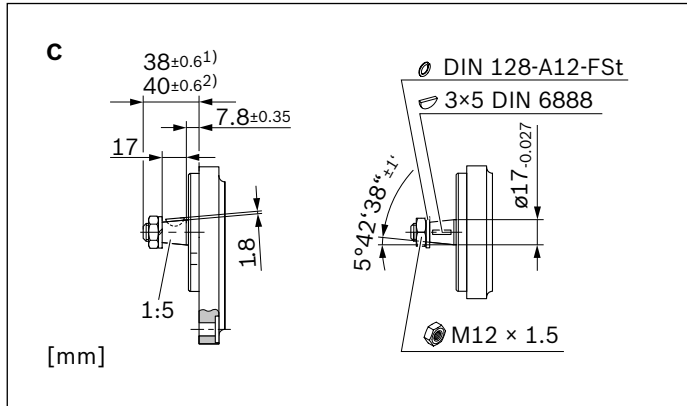


Dimensions

Drive shafts

Tapered shaft 1:5

(for front cover B, P, N)

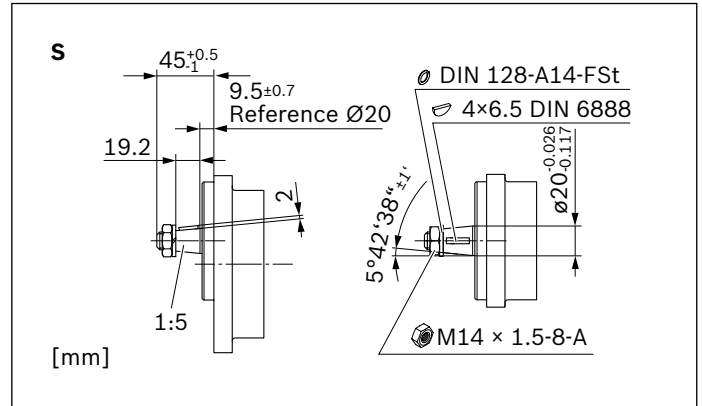


1) In combination with front cover B

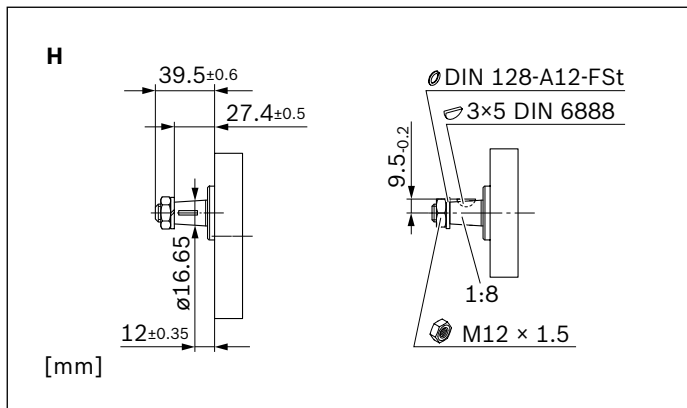
2) In combination with front cover P and front cover N

Tapered shaft 1:5

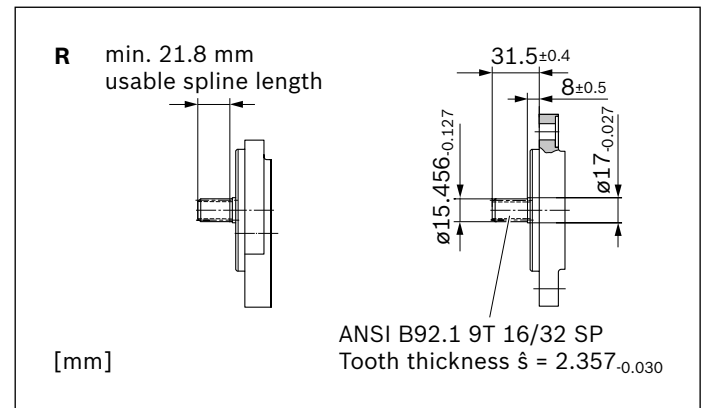
(for outrigger bearing A, G)



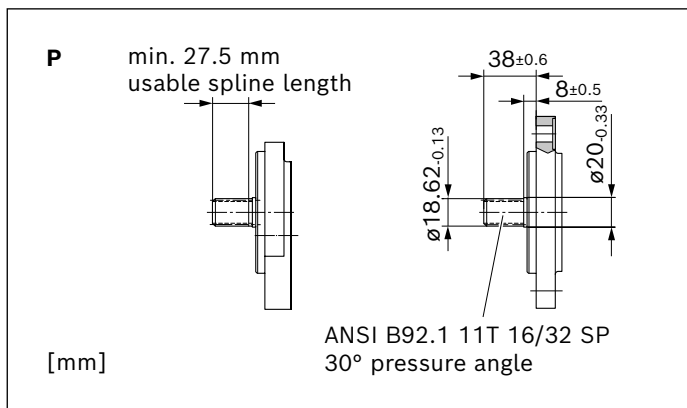
Tapered shaft 1:8



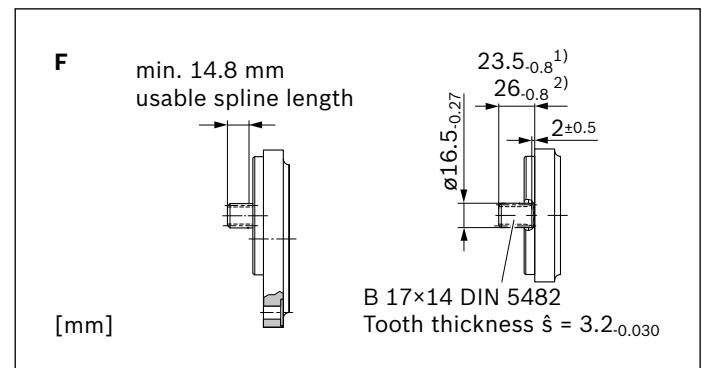
Splined shaft (SAE J744 16-4 9T)



Splined shaft (SAE J744 19-4 11T)



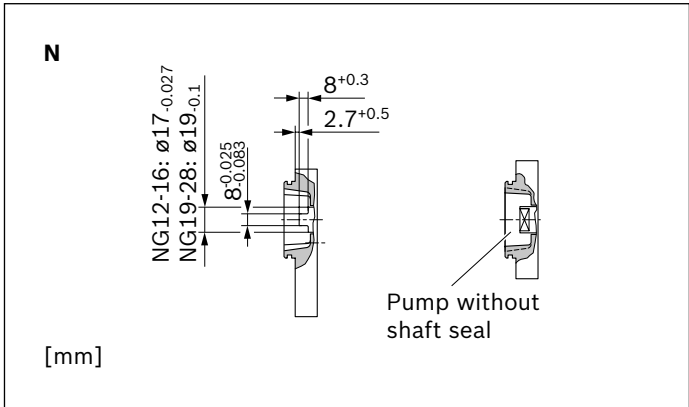
Splined shaft (DIN 5482 B17 x 14)



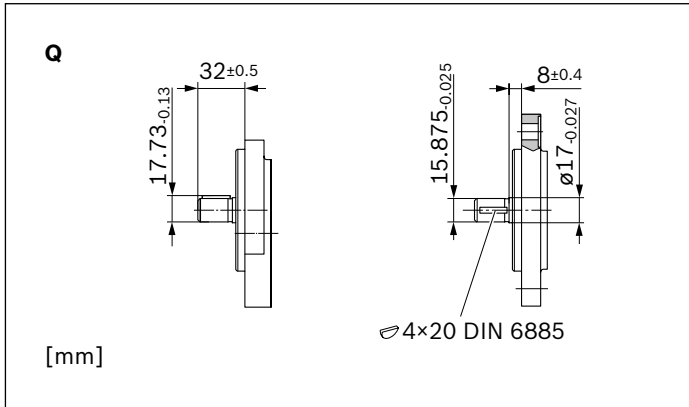
1) In combination with front cover B

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

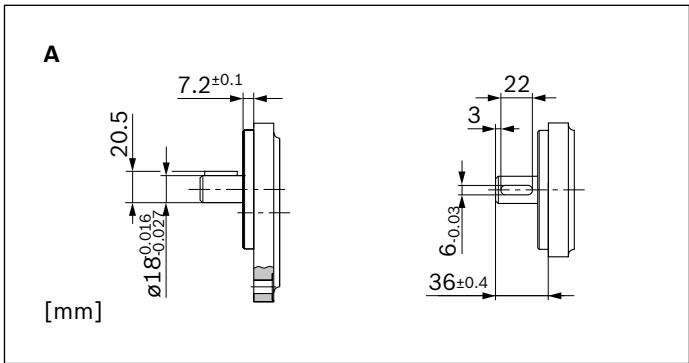
Tang drive



Parallel keyed shaft (SAE J744 16-1 A)

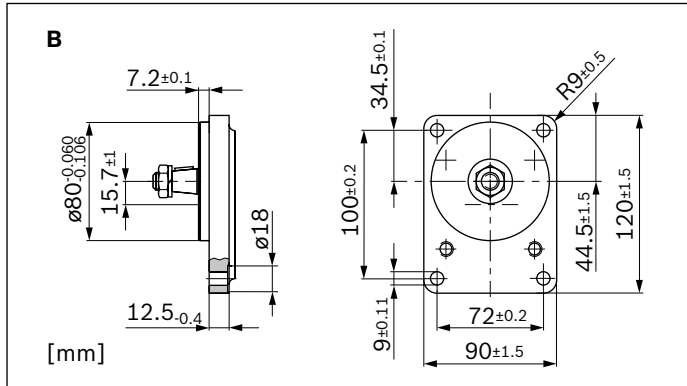


Parallel keyed shaft (ISO $\varnothing 18$ mm)

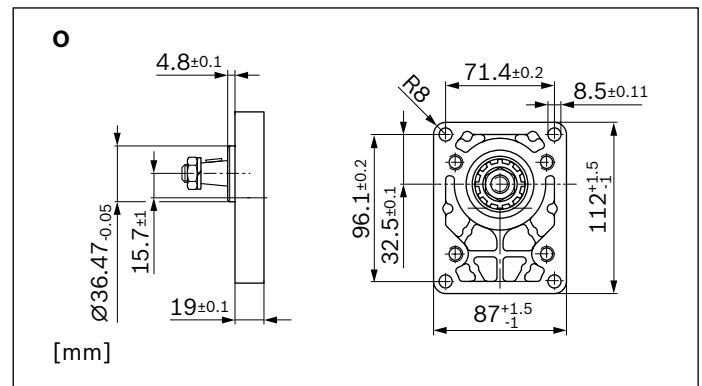


Front cover

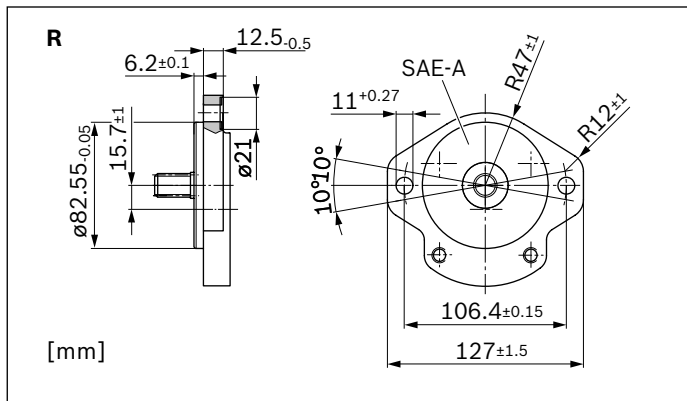
Rectangular flange Ø80 mm



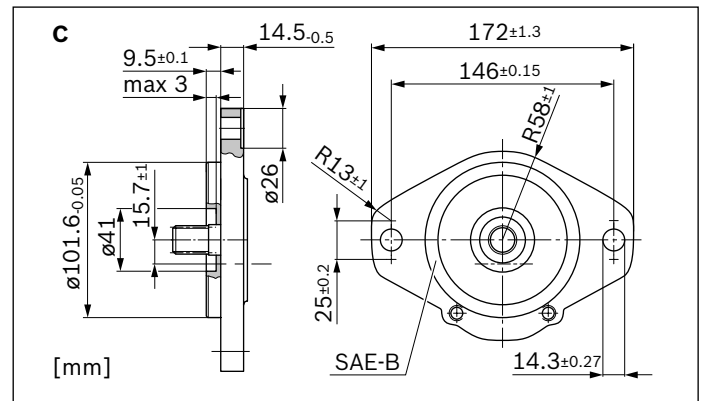
Rectangular flange Ø36.47mm



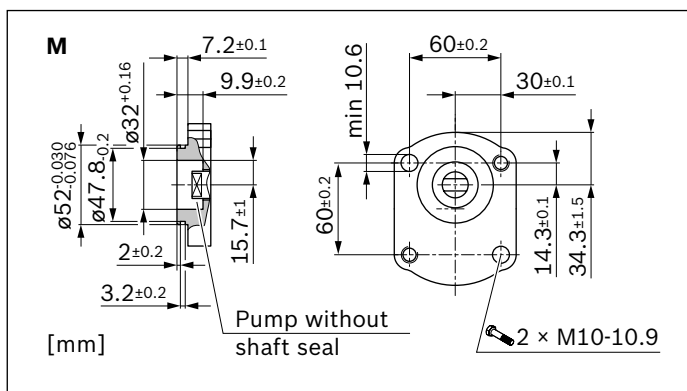
2-bolt flange Ø82.55 mm, SAE J744 82-2 (A)



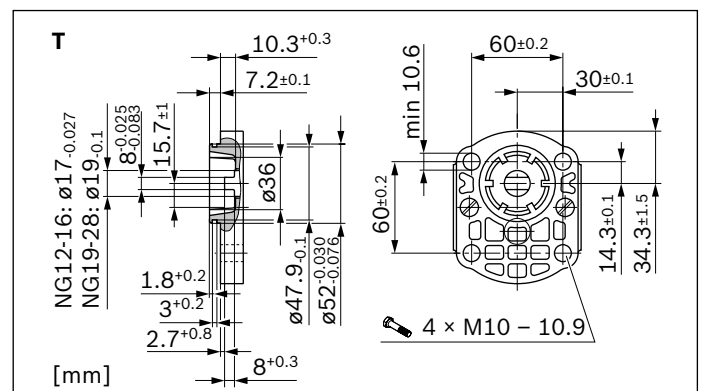
2-bolt flange Ø101.6mm, SAE J744 101-2 (B)



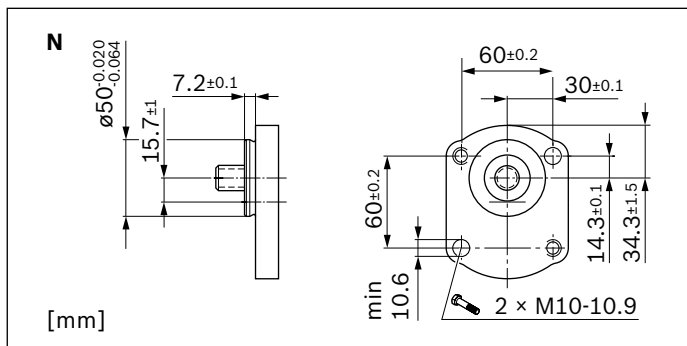
2-bolt mounting Ø52mm, with O-ring



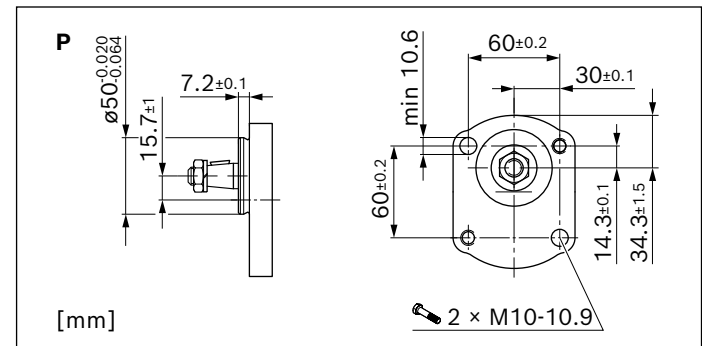
4-bolt mounting Ø52 mm, with O-ring



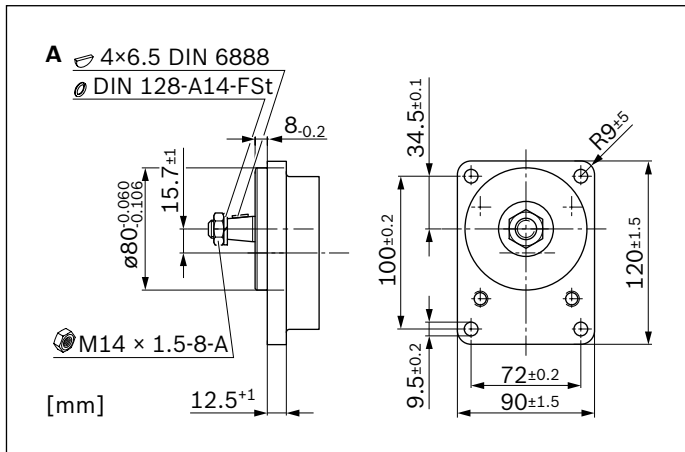
2-bolt mounting Ø50mm, connection variant 1



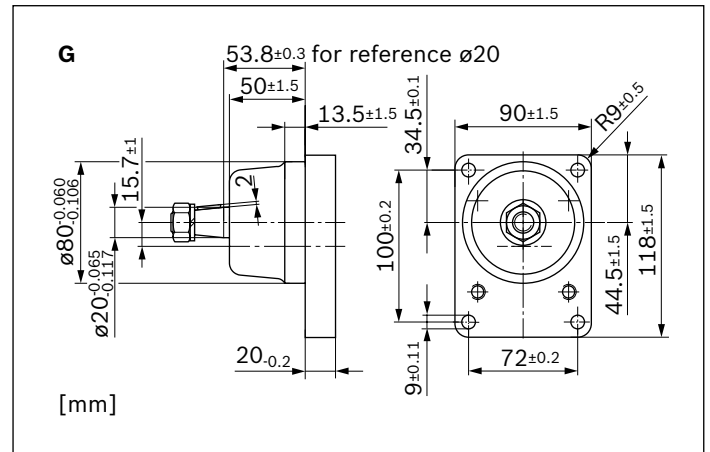
2-bolt mounting Ø50 mm, connection variant 2



Outrigger bearing Ø80 mm, type 1

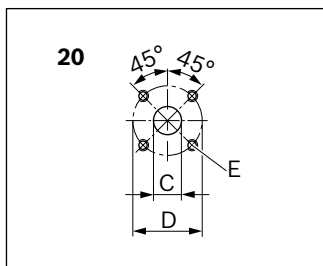


Outrigger bearing Ø80 mm, type 2



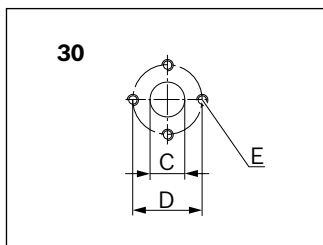
Line connections

Square flange



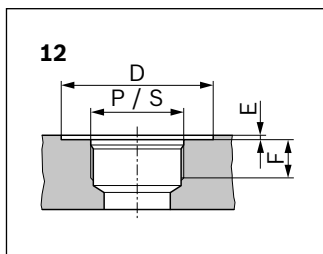
NG	Pressure side			Suction side		
	C	D	E	C	D	E
	mm	mm		mm	mm	
12 ... 16				20	40	M6; 13 mm deep
19	15	35	M6; 13 mm deep	22	55	M8; 13 mm deep
22 ... 28				26		M8; 13 mm deep

Square flange



NG	Pressure side			Suction side		
	C	D	E	C	D	E
	mm	mm		mm	mm	
12 ... 16	13.5	30.2	M6; 13 mm deep	20	39.7	M8; 13 mm deep

UN-thread according to ISO 11926-1 / ASME B 1.1, O-ring

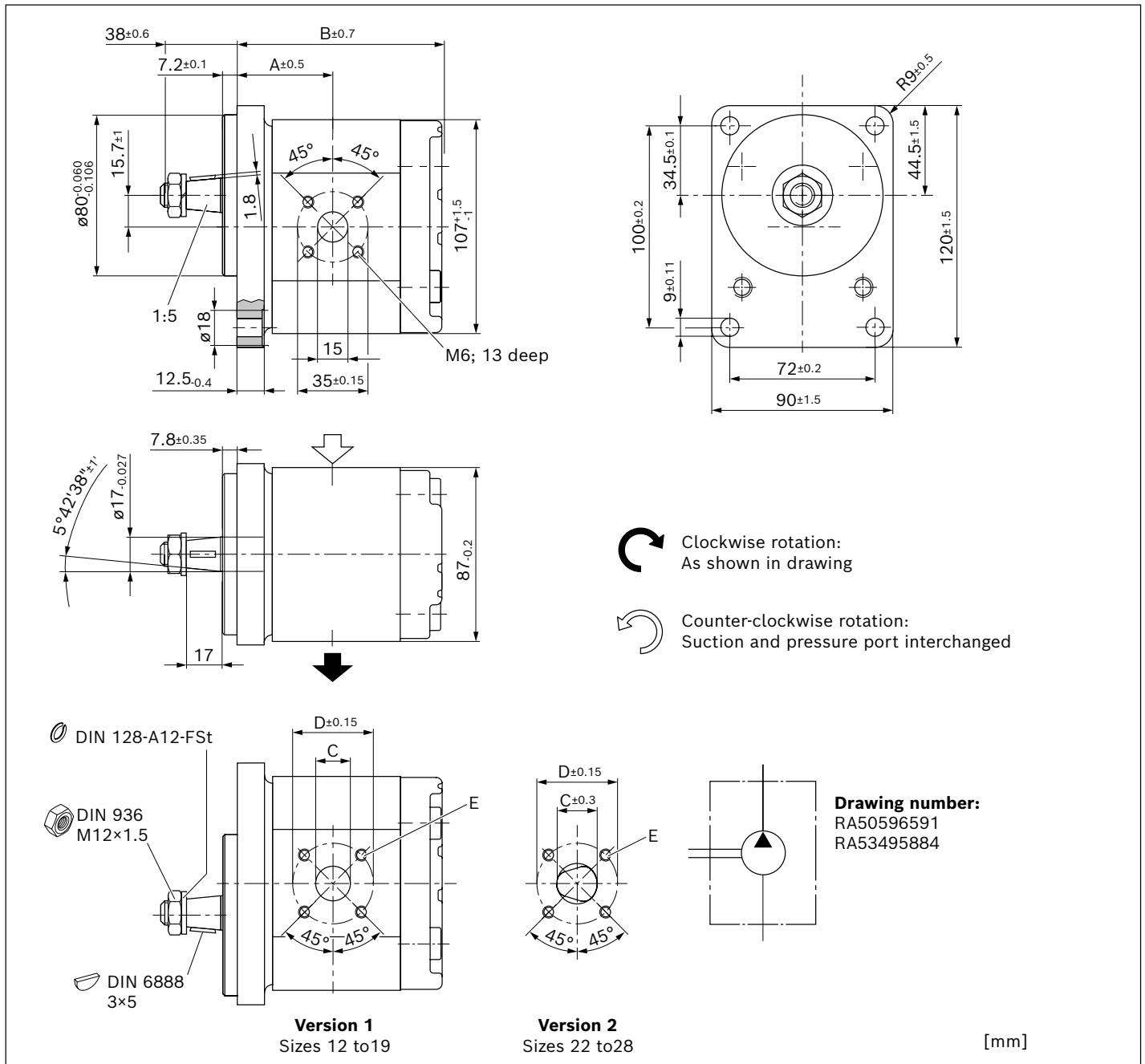


NG	Pressure side			Suction side				
	P	D	E	F	S	D	E	F
		mm	mm	mm		mm	mm	mm
12 ... 16					1 1/16-12 UN-2B	45		19
19 ... 22	7/8-14 UNF-2B	35	0.5	16	7/8-14 UNF-2B	35	0.5	16
25 ... 28					1 1/16-12 UN-2B	45		19

Preferred program

Tapered shaft 1:5 with rectangular flange $\varnothing 80$ mm

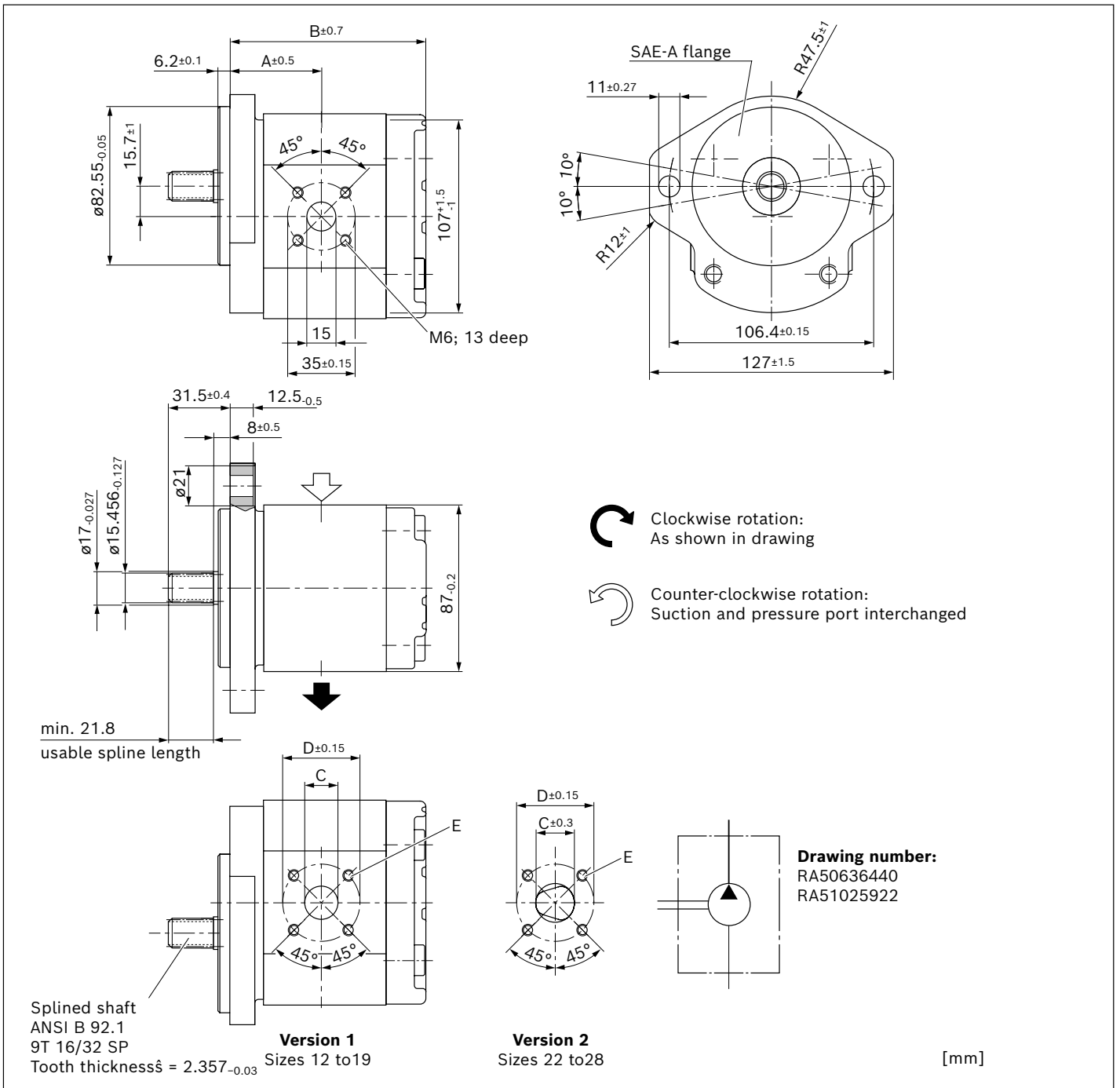
AZPJ-22- ... **CB20MB**



NG	Material number		Maximum pressure	Maximum	Weight	Dimensions				
	Direction of rotation		intermittend	speed		A	B	C	D	E
	counter-clockwise	clockwise	p_2	n_{max}	m	mm	mm	mm	mm	mm
12	0 518 525 302	0 518 525 001	280	3500	3.9	46.5	96.3	20	40	
14	0 518 525 303	0 518 525 002	280	3000	4	47.5	99.5	20	40	M6; 13 mm deep
16	0 518 625 301	0 518 625 001	280	3000	4.1	47.5	102.9	20	40	
19	0 518 625 309	0 518 625 010	280	3000	4.5	57.9	107.9	22	55	
22	0 518 725 310	0 518 725 011	240	3000	4.6	60.6	113.3	26	55	
25	0 518 725 311	0 518 725 012	215	2800	4.8	64.8	117.5	26	55	M8; 13 mm deep
28	0 518 725 312	0 518 725 013	160	2600	4.9	69.6	122.3	26	55	

Splined shaft (SAE J744 16-4 9T) with 2-bolt flange Ø82.55 mm, SAE J744 82-2 (A)

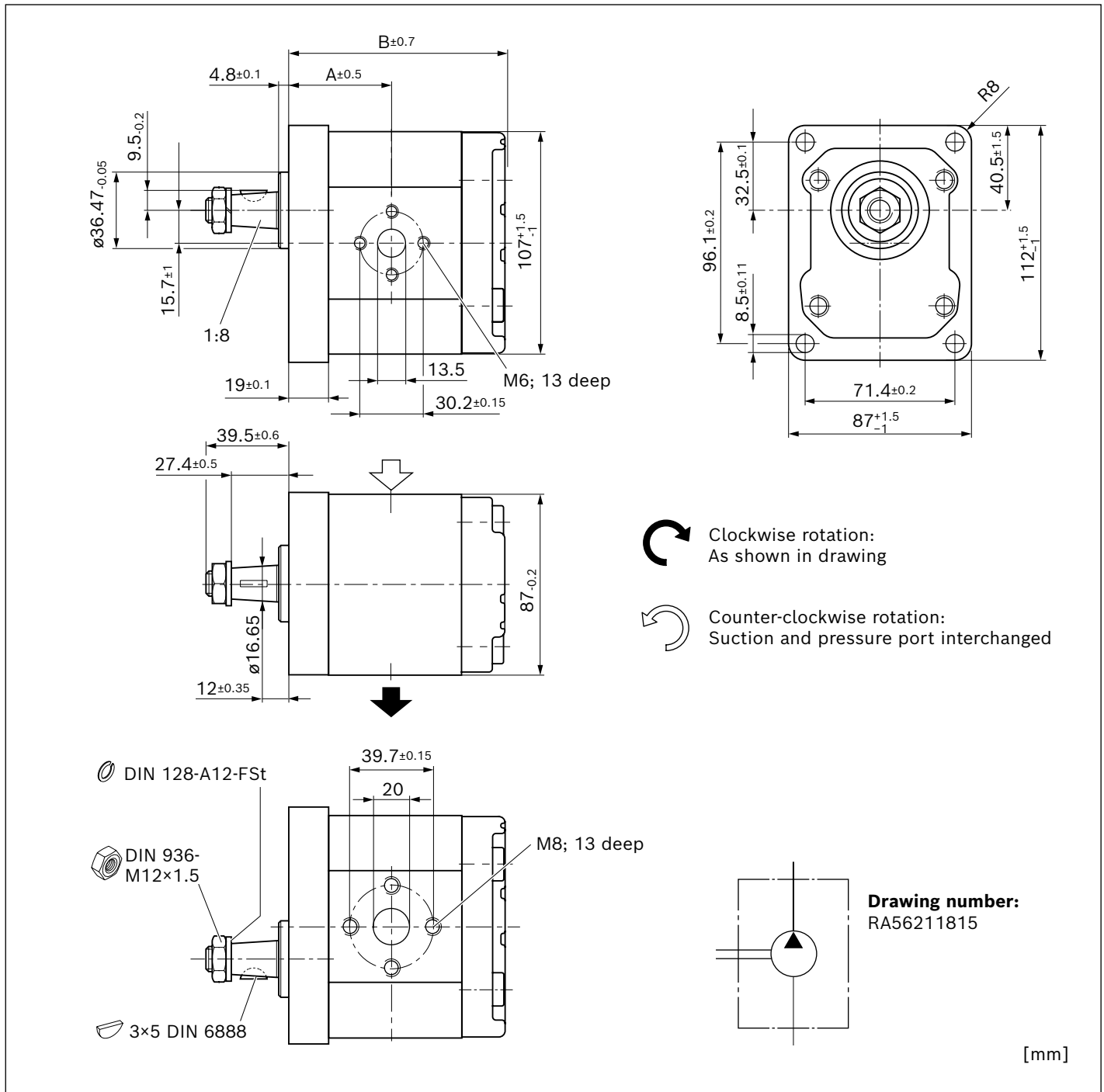
AZPJ-22- ... **RR20MB**



NG	Material number		Maximum pressure	Maximum	Weight	Dimensions				
	Direction of rotation		intermittent	speed		A	B	C	D	E
	counter-clockwise	clockwise	p ₂	n _{max}	m	mm	mm	mm	mm	mm
12	0 518 525 306	0 518 525 005	280	3500	3.8	46.5	96.3	20	40	
14	0 518 525 307	0 518 525 006	280	3000	3.9	47.5	99.5	20	40	M6; 13 mm deep
16	0 518 625 303	0 518 625 003	280	3000	4	47.5	102.9	20	40	
19	0 518 625 306	0 518 625 007	280	3000	4.4	57.9	107.9	22	55	
22	0 518 725 301	0 518 725 002	240	3000	4.6	60.6	113.3	26	55	M8; 13 mm deep
25	0 518 725 302	0 518 725 003	215	2800	4.7	64.8	117.5	26	55	
28	0 518 725 303	0 518 725 004	160	2600	4.8	69.6	122.3	26	55	

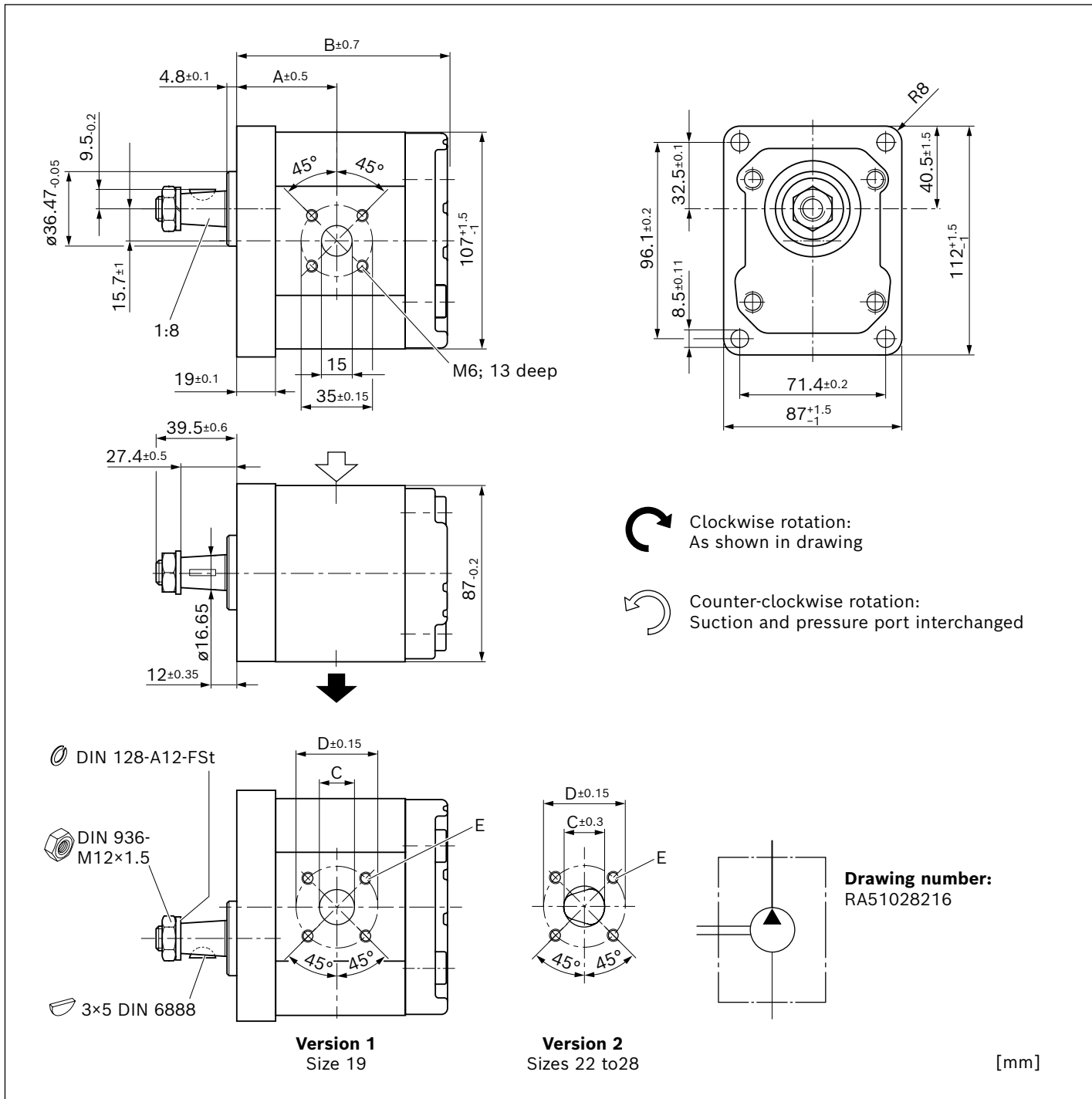
Tapered shaft 1:8 with rectangular flange Ø36.47 mm

AZPJ-22- ... HO30MB



NG	Material number		Maximum pressure	Maximum speed	Weight	Dimensions	
	Direction of rotation		p_2	n_{max}	m	A	B
	counter-clockwise	clockwise	bar	rpm	kg	mm	mm
12	0 518 525 308	0 518 525 007	280	3500	3.7	48	97.8
14	0 518 525 309	0 518 525 008	280	3000	2.8	49	101
16	0 518 625 304	0 518 625 004	280	3000	3.9	49	104.4

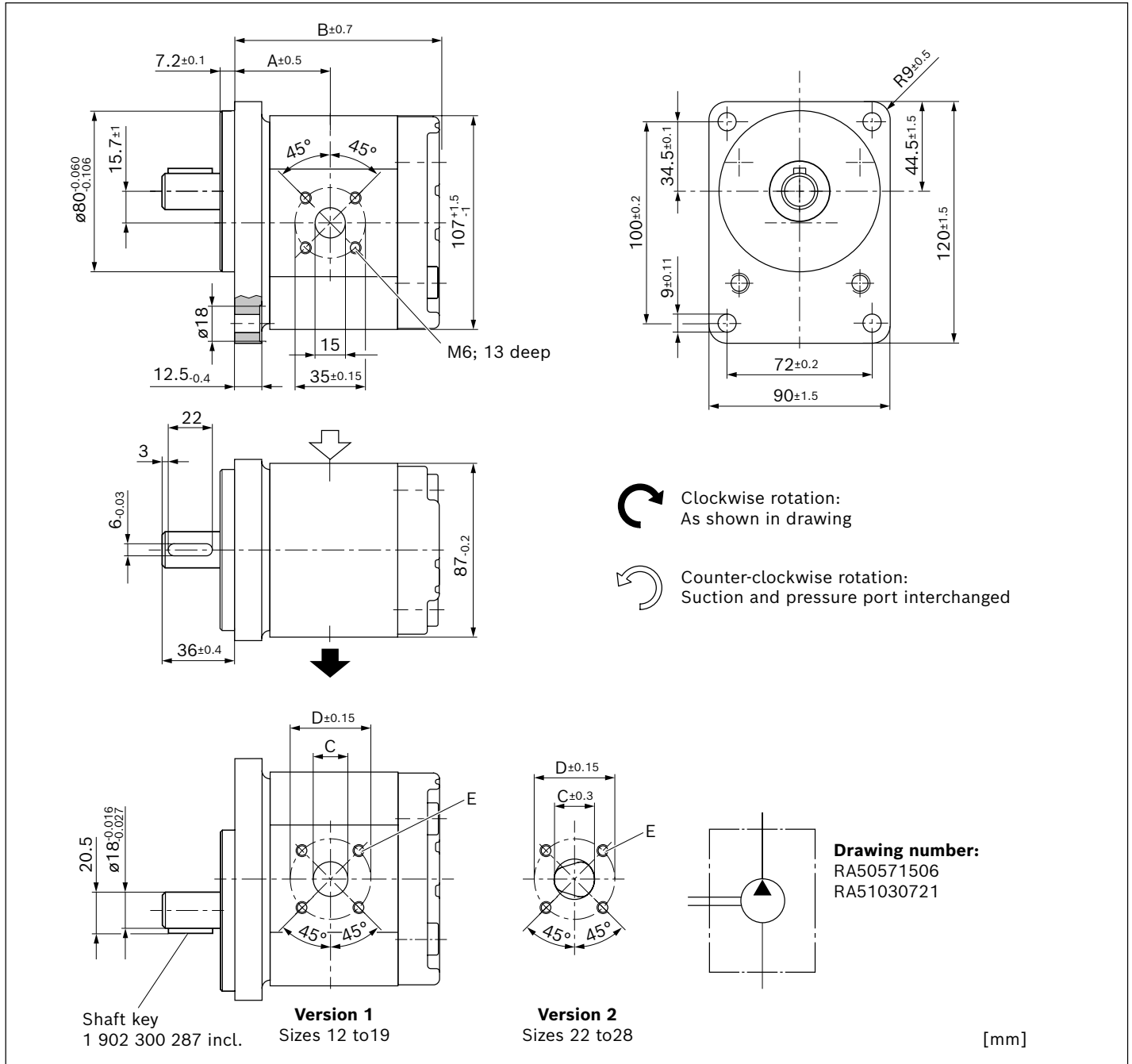
Tapered shaft 1:8 with rectangular flange $\varnothing 36.47$ mm
AZPJ-22- ... HO20MB



NG	Material number		Maximum pressure intermittend	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	mm
19	0 518 625 307	0 518 625 008	280	3000	4.5	59.4	109.4	22	55	M8; 13 mm deep
22	0 518 725 304	0 518 725 005	240	3000	4.6	62.1	114.8	26	55	
25	0 518 725 305	0 518 725 006	215	2800	4.8	66.3	119	26	55	
28	0 518 725 306	0 518 725 007	160	2600	4.9	71.1	123.8	26	55	

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

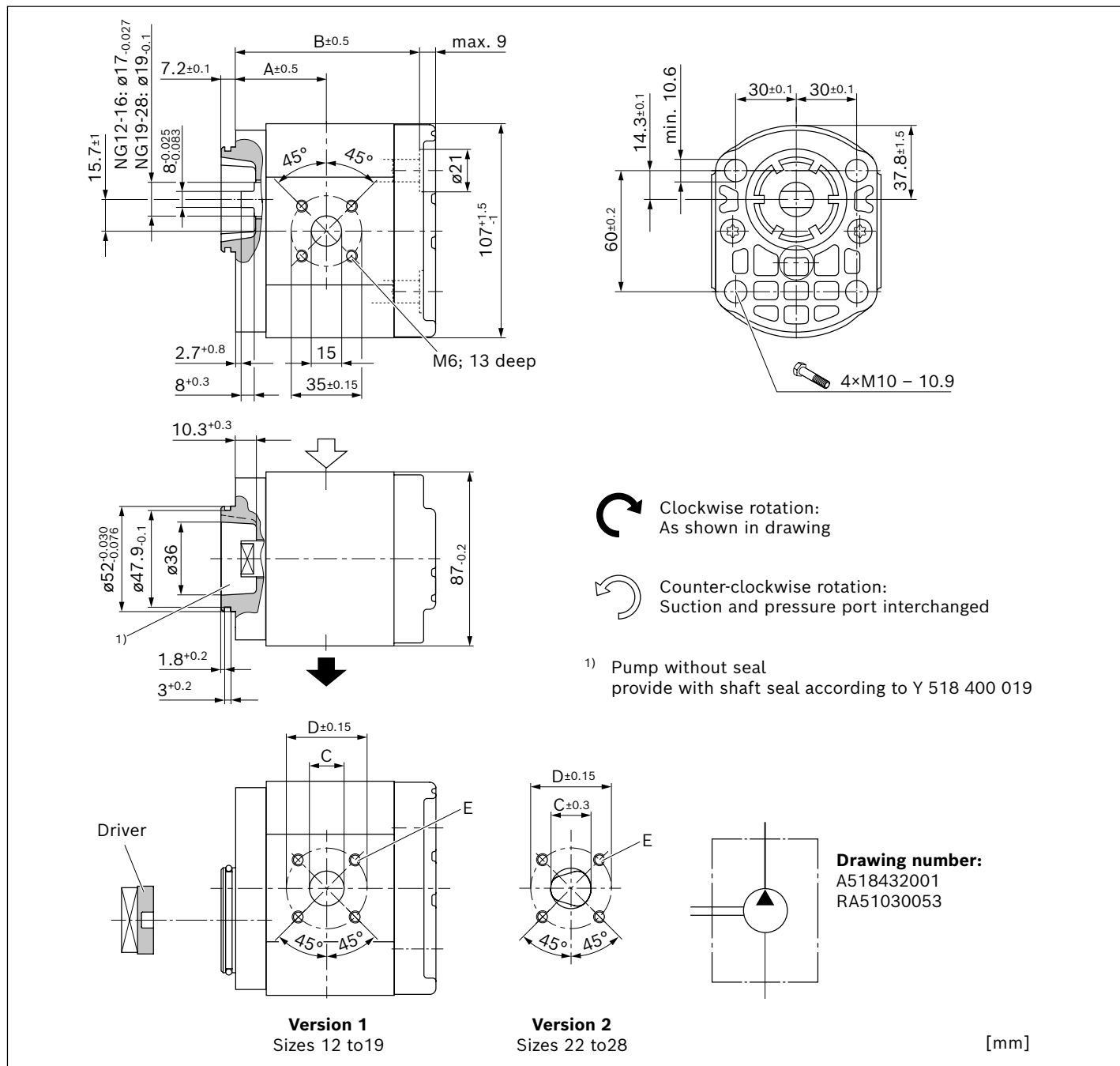
AZPJ-22- ... AB20MB



NG	Material number		Maximum pressure	Maximum	Weight	Dimensions				
	Direction of rotation		intermittend	speed		A	B	C	D	E
	counter-clockwise	clockwise	p ₂	n _{max}	m	mm	mm	mm	mm	mm
12	0 518 525 304	0 518 525 003	280	3500	3.9	46.5	96.3	20	40	M6; 13 mm deep
14	0 518 525 305	0 518 525 004	280	3000	4	47.5	99.5	20	40	
16	0 518 625 302	0 518 625 002	270	3000	4.1	47.5	102.9	20	40	
19	0 518 625 308	0 518 625 009	230	3000	4.5	57.9	107.9	22	55	M8; 13 mm deep
22	0 518 725 307	0 518 725 008	190	3000	4.6	60.6	113.3	26	55	
25	0 518 725 308	0 518 725 009	170	2800	4.8	64.8	117.5	26	55	
28	0 518 725 309	0 518 725 010	150	2600	4.9	69.6	122.3	26	55	

Tang drive with 4-bolt mounting $\varnothing 52$ mm

AZPJ-22- ... NT20MB



NG	Material number		Maximum pressure	Maximum	Weight	Dimensions				
	Direction of rotation		intermittend	speed		A	B	C	D	E
	counter-clockwise	clockwise	p ₂	n _{max}	m	mm	mm	mm	mm	mm
12	0 518 515 301	0 518 515 001	280	3500	2.5	44	87.1	20	40	M6; 13 mm deep
14	0 518 515 302	0 518 515 002	280	3000	2.6	45	90.3	20	40	
16	0 518 615 301	0 518 615 001	280	3000	2.7	45	93.7	20	40	
19	0 518 615 303	0 518 615 003	250	3000	3	55.4	98.7	22	55	M8; 13 mm deep
22	0 518 715 301	0 518 715 001	215	3000	3.2	58.1	104.1	26	55	
25	0 518 715 302	0 518 715 002	190	2800	3.3	62.3	108.3	26	55	
28	0 518 715 303	0 518 715 003	160	2600	3.4	67.1	113.1	26	55	

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 condi-

tions (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.

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. 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.

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).

Information

AZ configurator

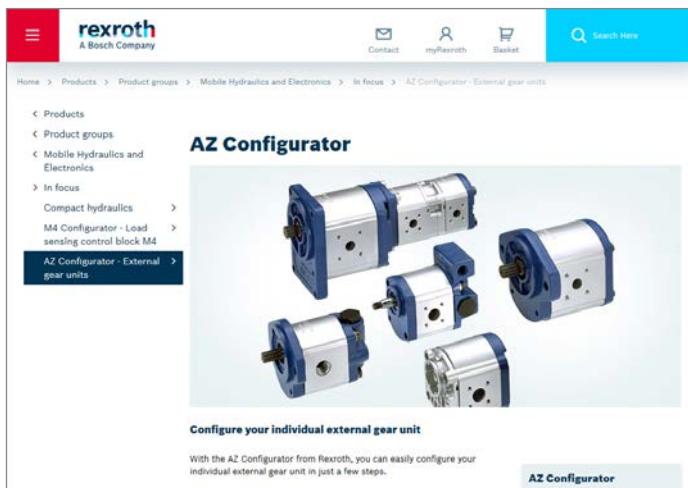
With our practical product selector, it will take you next to no time to find the right solution for your applications, no matter whether it is SILENCE PLUS or another external gear unit.

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/eshop. Select "Spare parts and accessories" and enter the material number of the external gear units into the search field.

Example:

Material number: **0 518 525 302**

Type designation: AZPJ-22-012LCB20MB

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

▼ Spare components

Material number	Designation	
0518525302	HYDRAULIC GEAR PUMP AZPJ-22-012LCB20MB	

▼ Spare parts

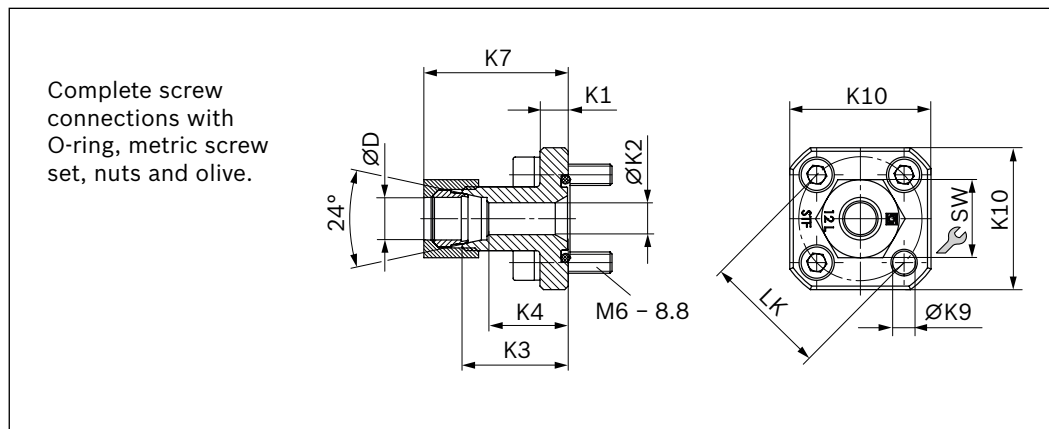
Pos.	Material number	Designation	Quantity
1		PUMP HOUSING	1
2		BEARING COVER	1
3	1510283008	SHAFT SEALING RING SHAFT SEALING RING 30X17X7-SL- NBR-82	1
5	2916660012	RETAINING RING RETAINING RING DIN472-30X1,2	1

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

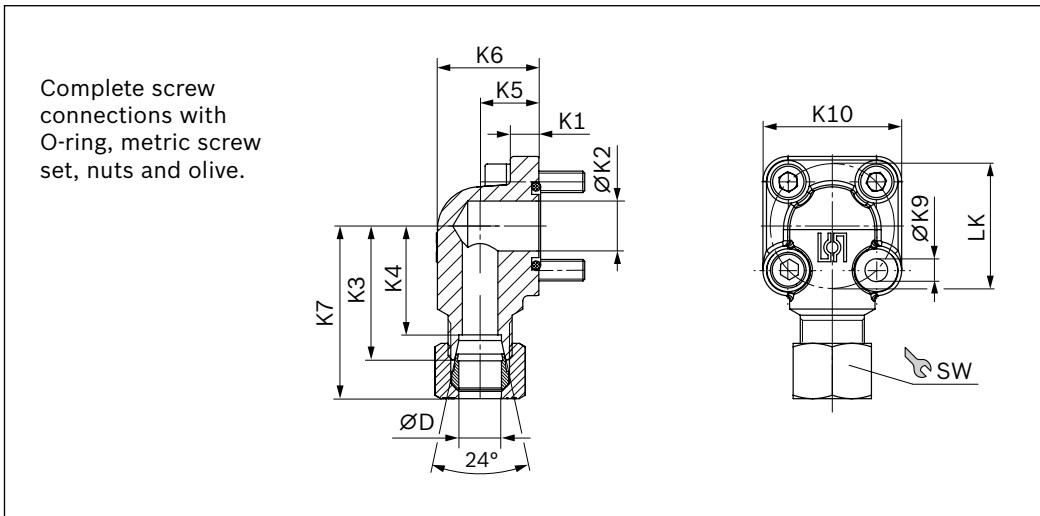
Straight flange, for square flange 20



LK	D	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

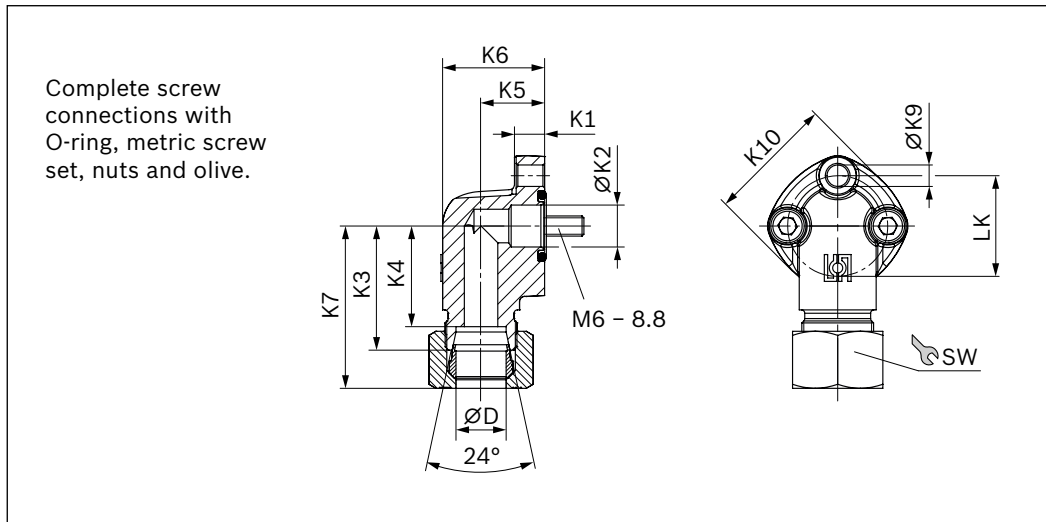
90° angle flange, for square flange 20



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	1 515 702 006	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
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	1 515 702 006	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 30



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

¹⁾ 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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