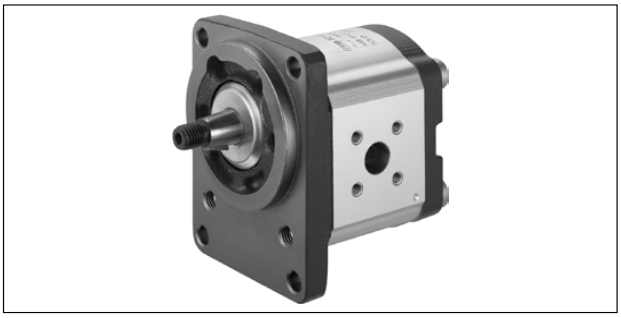
RE 14029/2019-05-14
Replaces: 14026

rexroth
A Bosch Company

External gear motor AZMN



- Platform N
- Fixed displacement
- Size 20 ... 36
- Continuous pressure up to 250 bar
- Maximum start-up pressure up to 280 bar

Features

- Consistently high quality due to high-volume series production
- Long service life
- Wide speed range
- Slide bearings for high loading
- Optional reversible version for 2- and 4-quadrant operation
- Numerous configuration variants available
- Output shafts according to ISO or SAE and customer-specific solutions
- Line connections: Connection flanges or screw-in threads
- High pressures though small installation space and low weight
- Wide viscosity and temperature range

Contents

Functional description

General

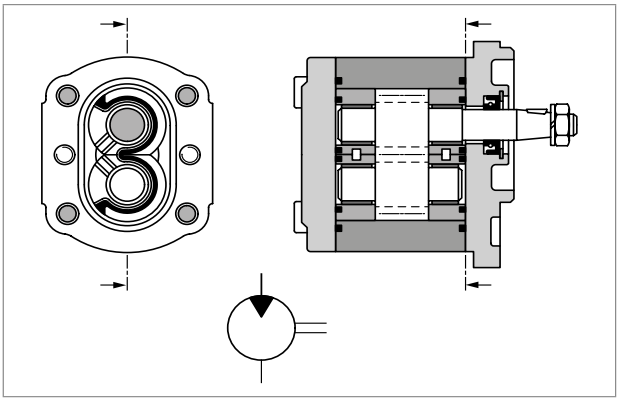
The key task of external gear motors is to convert hydraulic energy (flow and pressure) into mechanical energy (torque and rotational speed). To reduce heat loss, Rexroth external gear motors are designed to be extremely efficient. This efficiency is achieved through pressure-dependent gap sealing and high-precision manufacturing technology. Rexroth external gear motors are available in four platforms: Platforms B, F, N and G, with different gear wheel widths within a platform for different displacements. Additional versions with different flanges, shafts and valve attachments are also available.

At external gear motors, you distinguish between motors for one direction of rotation and reversible motors.

Gear motor for one direction of rotation

These gear motors are designed asymmetrically, i.e., fixed high-pressure and low-pressure sides. This means reversing operation is not possible. Motors require a special start-up sequence to ensure good efficiency. Any leakage oil is drained internally. The shaft seal limits drainage pressure.

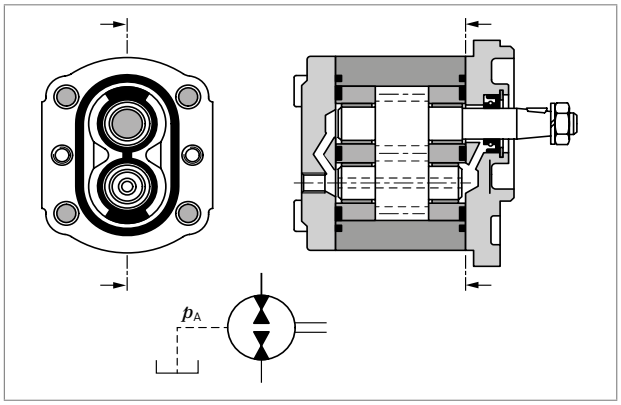
▼ **Gear motor for one direction of rotation**



Gear motor, reversible

Due to their symmetrical layout, the high-pressure and low-pressure chambers are separate from the bearing and shaft seal chambers. Any leakage oil is drained through a separate drain port in the housing cover. This drainage allows the motor to run in reverse, making series connections possible. Standard motors and pumps can only withstand up to approx. 3 bar abs. due to the connection between the shaft seal and the low-pressure side.
The figure shows a reversible motor for 4-quadrant operation, i.e., output drive torque and drive torque in both directions (motor functions as a pump when the load is reversed).

▼ **Gear motor, reversible**



Product overview AZMN preferred types

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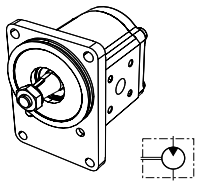	12

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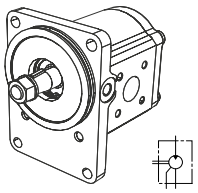	13

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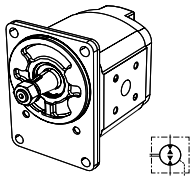	14

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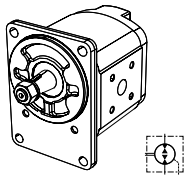	15

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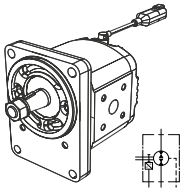	16

Type code

01	02		03	04		05	06	07	08	09	10	11		12
AZM	**N**	**–**			**–**								**–**	

External gear unit

01	External gear motor	**AZM**

Series

02	20 cm³/rev to 36 cm³/rev, high performance, platform N	**N**

Series

03	Housing width 92 mm	**1**
	Housing width 110 mm (reinforced housing)	**2**

Version

04	Phosphated, pinned	**1**
	Corrosion-resistant, pinned	**2**

Size (NG)

05		**020**	**022**	**025**	**028**	**032**	**036**

Direction of rotation

06	Viewed on drive shaft	clockwise	**R**
		counter-clockwise	**L**
		reversible	**U**

Drive shaft			Suitable front cover	
07	Tapered shaft	1 : 5	B	**C**

Front cover

08	Rectangular flange	Ø 100 mm	**B**

Line connection

09	Square flange		**20**

Sealing material

10	NBR (nitrile rubber)	**M**
	FKM (fluoroelastomer)	**P**

End cover

11	Without valve (standard)	**B**

Special version

12	1:5 tapered shaft with rectangular flange Ø100 mm and drain port in the end cover	**S0077**
	1:5 tapered shaft with rectangular flange Ø100 mm and drain port in the end cover (size 36)	**S0582**
	1:5 tapered shaft with rectangular flange Ø100 mm and drain port in the front cover	**S0097**
	1:5 tapered shaft with rectangular flange Ø100 mm and dust protection for shaft seal, radial drain port in the end cover	**S0592**
	1:5 tapered shaft with rectangular flange Ø100 mm with speed sensor and DPS (dual protection system)	**S0786**

Technical data

▼ **Table of values**

Size					**25**	**28**	**32**
Series						Series 1x	
Displacement			V_g	cm^3	25	28	32
Motor inlet pressure		maximum continuous pressure	p_1	bar	230	210	180
		maximum start-up pressure	p_2	bar	250	230	200
		maximum pressure peak	p_3	bar	270	250	220
		minimum inlet pressure absolute[2]	p_{min}	bar	0.7	0.7	0.7
Motor output pressure for	reversible motors		p_A	bar	≤ continuous pressure		
	non-reversible motors	abs.	p_A	bar	3	3	3
		upon start-up	p_A	bar	10	10	10
Pressure in the drain port maximum[1]		abs.	p_L	bar	3	3	3
		upon start-up	p_L	bar	10	10	10
Rotational speed minimum with	ν = 12 mm^2/s	p < 100 bar	n_{min}	rpm	500	500	500
		p = 100 ... 180 bar	n_{min}	rpm	600	600	600
		p = 180 bar ... p_2	n_{min}	rpm	800	800	800
	ν = 25 mm^2/s	at p_2	n_{min}	rpm	500	500	500
Rotational speed maximum		at p_2	n_{max}	rpm	3000	2800	2800

Size					**20**	**22**	**25**	**28**	**32**	**36**
Series							Series 2x			
Displacement			V_g	cm^3	20	22.5	25	28	32	36
Motor inlet pressure		maximum continuous pressure	p_1	bar	250	250	250	230	210	180
		maximum start-up pressure	p_2	bar	280	280	280	260	240	210
		maximum pressure peak	p_3	bar	300	300	300	280	260	230
		minimum inlet pressure absolute[2]	p_{min}	bar	0.7	0.7	0.7	0.7	0.7	0.7
Motor output pressure for	reversible motors		p_A	bar	≤ continuous pressure					
	non-reversible motors	abs.	p_A	bar	3	3	3	3	3	3
		upon start-up	p_A	bar	10	10	10	10	10	10
Pressure in the drain port maximum[1]		abs.	p_L	bar	3	3	3	3	3	3
		upon start-up	p_L	bar	10	10	10	10	10	10
Rotational speed minimum with	ν = 12 mm^2/s	p < 100 bar	n_{min}	rpm	500	500	500	500	500	500
		p = 100 ... 180 bar	n_{min}	rpm	600	600	600	600	600	600
		p = 180 bar ... p_2	n_{min}	rpm	800	800	800	800	800	800
	ν = 25 mm^2/s	at p_2	n_{min}	rpm	500	500	500	500	500	500
Rotational speed maximum		at p_2	n_{max}	rpm	3000	3000	3000	2800	2800	2800

1) For reversible motors

2) To avoid low inlet pressures with fast reduction of the inlet amount and large flywheel mass of the consumer, an anti-cavitation valve with correspondingly low pressure drop is to be provided.

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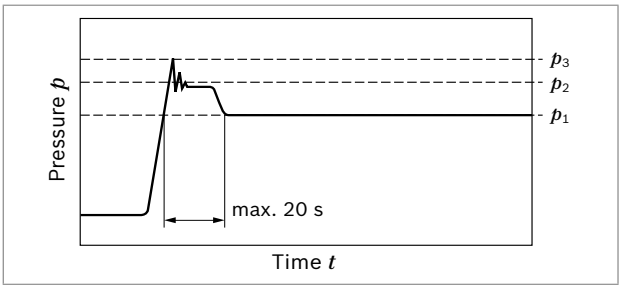
General data	
Installation position	No restrictions
Type of mounting	See offer drawing
Line connections	See chapter "Dimensions – line connection"
Direction of rotation viewed on drive shaft	One direction of rotation (motor rotation is only admissible in the indicated direction) or reversible.
Drive shaft loading	Axial and radial forces on request only

▼ Pressure definition

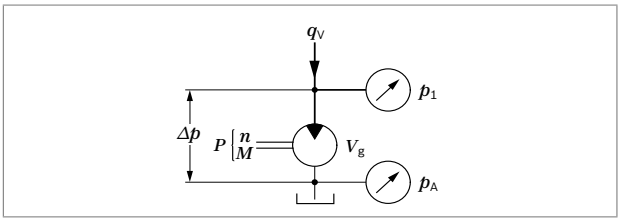


p_1 Maximum continuous pressure
p_2 Maximum start-up pressure
p_3 Maximum pressure peak

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

Key

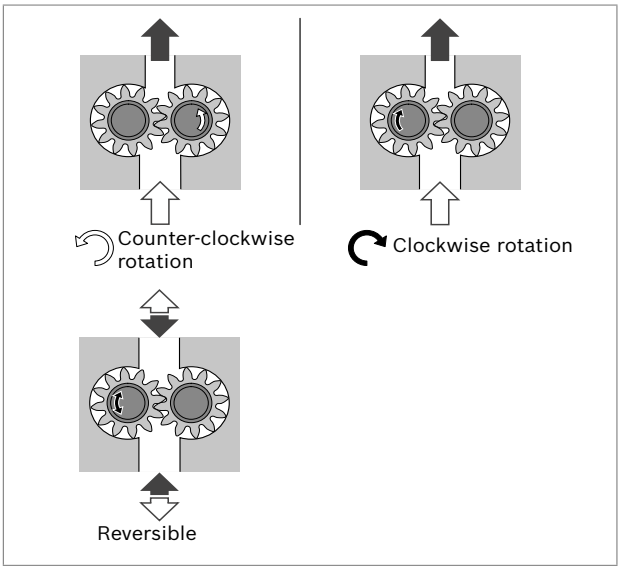
V_g Displacement per revolution [cm³]
Δp Differential pressure [bar] ($\Delta p = p_1 - p_A$)
n Rotational speed [rpm]
q_v Inlet flow [l/min]
M Torque [Nm]
P Power [kW]
η_v Volumetric efficiency[1)]
η_{hm} Hydraulic-mechanical efficiency[1)]
η_t Total efficiency ($\eta_t = \eta_v \times \eta_{hm}$)[1)]



Notice

- Please observe the safety requirements for the overall system.
- Please contact us regarding applications with frequent load cycles.
- In the "Diagrams/characteristic curves" chapter, you can find diagrams for a rough calculation.

▼ Direction of rotation viewed on drive shaft



1) Parameter as a decimal, e.g. 0.9

Hydraulic fluid

The external gear unit is designed for operation with HLP mineral oil according to DIN 51524 1–3. For higher loading, Bosch Rexroth recommends HLP according to DIN 51524 Part 2 as a minimum.[1)]
See the following data sheets for application instructions and requirements for selecting hydraulic fluid, behavior during operation as well as disposal and environmental protection before you begin project planning:

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

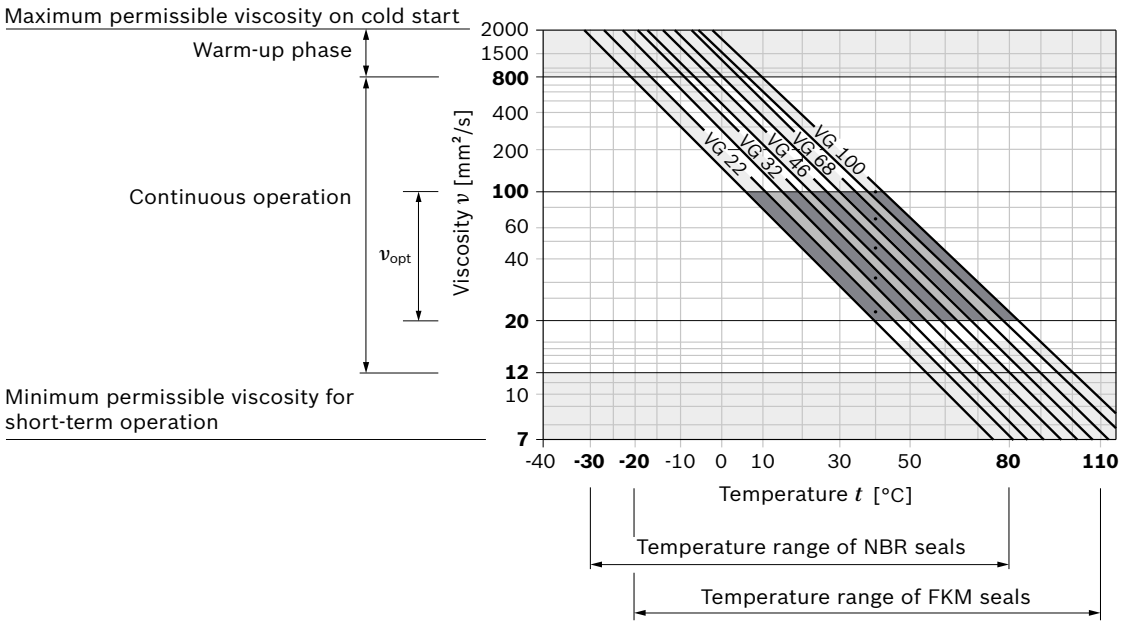
Explanation regarding the selection of hydraulic fluid
Selection of hydraulic fluid shall make sure that the operating viscosity in the operating temperature range is within the optimal range (ν_{opt}; see selection diagram).

Viscosity and temperature of hydraulic fluids

Viscosity range	
Permissible in continuous operation	ν = 12 ... 800 mm²/s
Recommended in continuous operation	ν_{opt} = 20 ... 100 mm²/s
Permissible for cold start	ν_{max} ≤ 2000 mm²/s

Temperature range	
With NBR seals (NBR = nitrile rubber)	t = -30 °C ... +80 °C
With FKM seals (FKM = fluoroelastomer)	t = -20 °C ... +110 °C

▼ **Selection diagram**

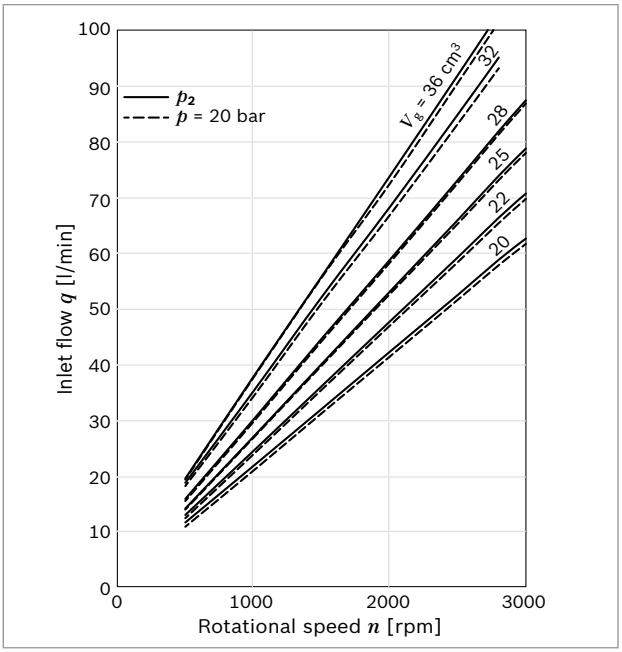


1) Other hydraulic fluids on request.

Diagrams/characteristic curves

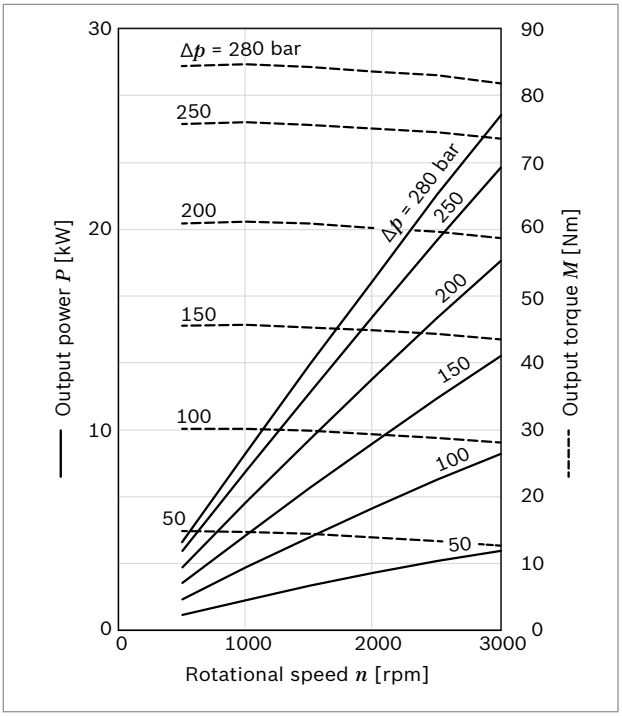
Inlet flow characteristic curves

▼ **Inlet flow**

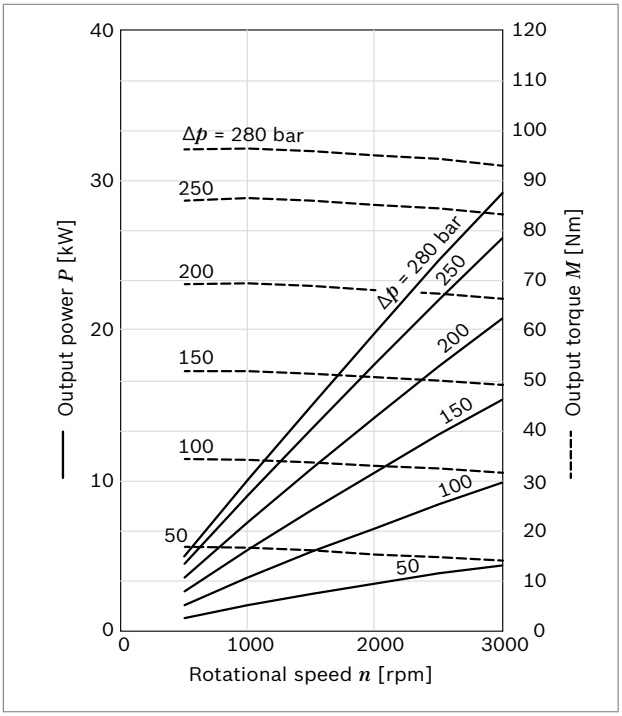


Performance charts

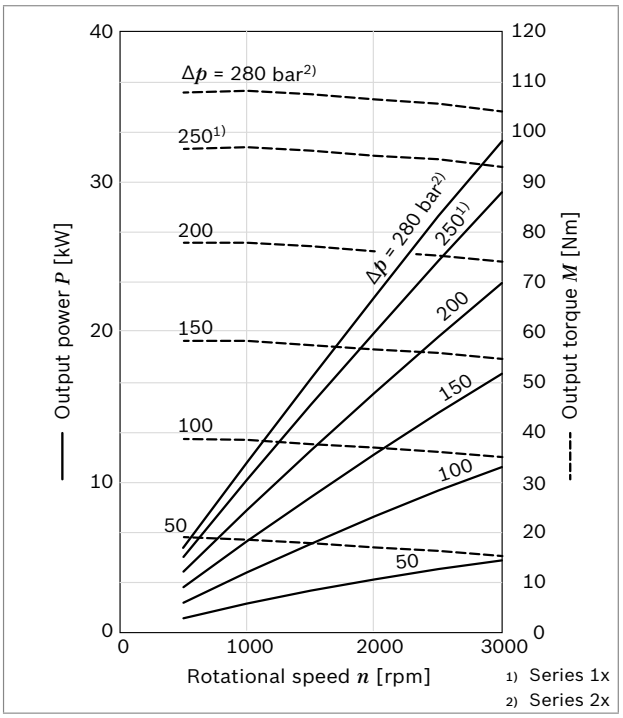
▼ **Size 20**



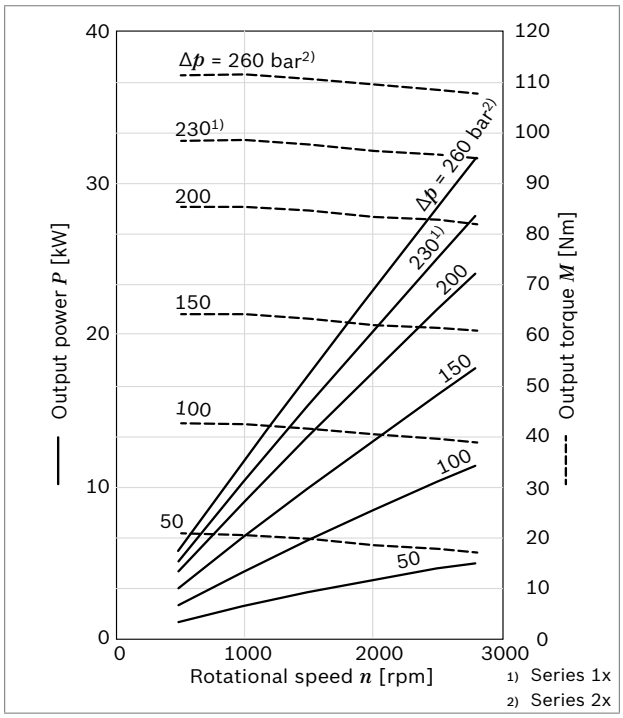
▼ **Size 22**



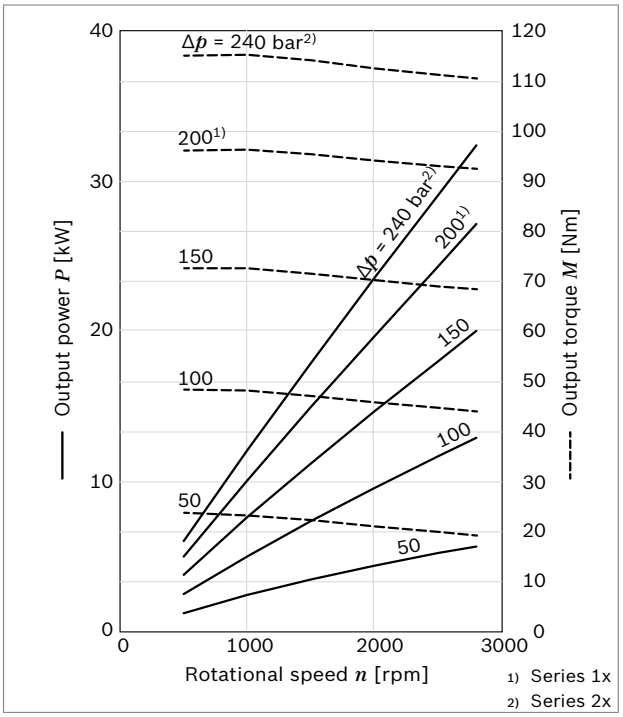
▼ **Size 25**



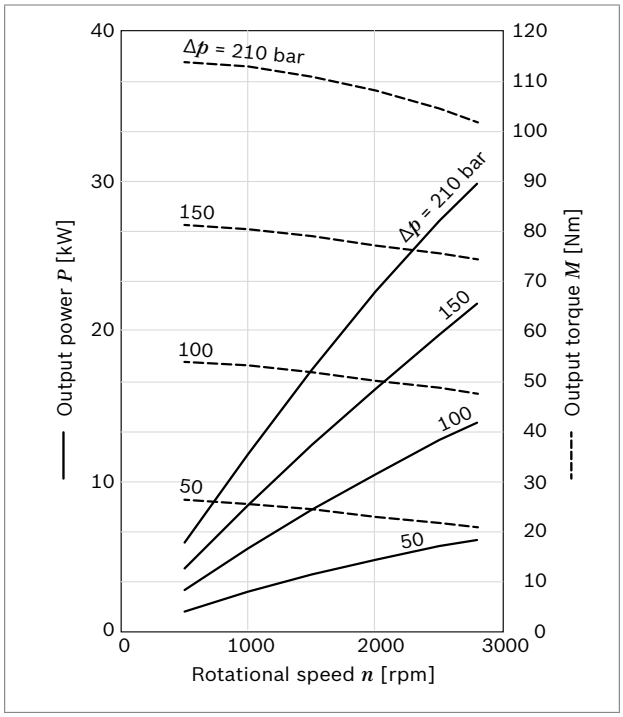
▼ **Size 28**



▼ **Size 32**



▼ **Size 36**



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

$P = f(n, p)$ incl. η_t ——————
$M = f(n, p)$ incl. η_{hm} - - - - - -

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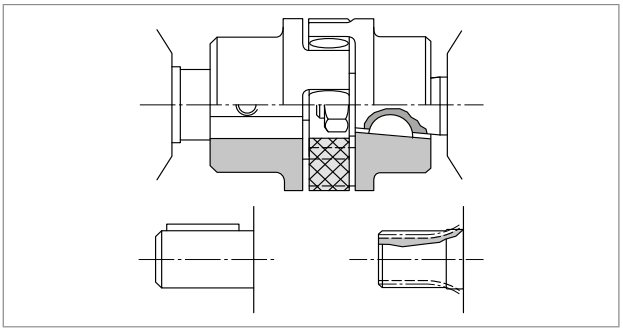
Output drives

1. Elastic couplings

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



Max. transmissible output torques

Tapered shaft series 1x

Drive shaft		Front cover	M_{max}	Size	$p_{2\ max}$
Code	Designation	Code	Nm		bar
C	1:5	B	200	25	250
				28	230
				32	200

Tapered shaft series 2x (reinforced housing)

Drive shaft		Front cover	M_{max}	Size	$p_{2\ max}$
Code	Designation	Code	Nm		bar
C	1:5	B	200	20...25	280
				28	260
				32	240
				36	210

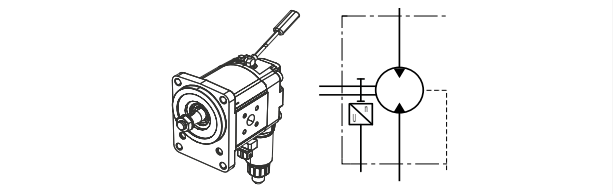
Gear motors with integrated sensor

Gear motor with integrated speed sensor

The Hall effect-based DSM1-10 speed sensor has been specially developed for use under harsh conditions in mobile working machines. The sensor detects the rotational speed signal of ferromagnetic gear wheels. As an active sensor, he delivers a signal with a constant amplitude that is independent of the rotational speed.

Due to its compact and robust design, the external gear motor with integrated speed sensor is particularly suitable for

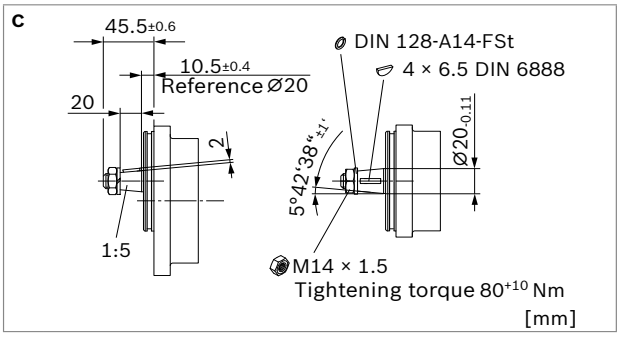
- Fan drives in buses, trucks and construction machinery from 7 to 20 kW
- As vibration drive for road rollers and pavers.



For further information see:
Speed sensor data sheet 95132.

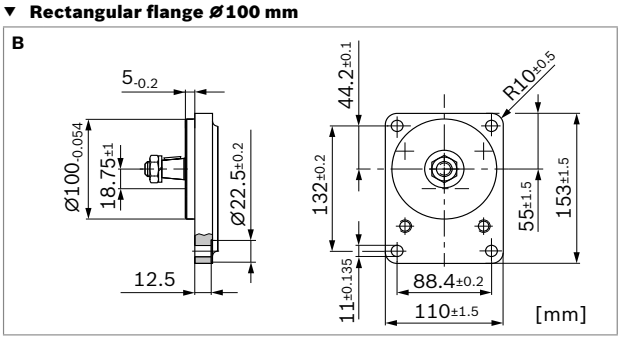
Dimensions – drive shaft [1)]

▼ **1:5 tapered shaft**



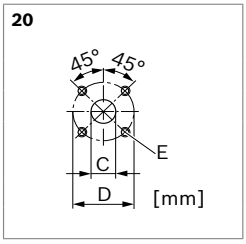
Dimensions – front cover [1)]

▼ **Rectangular flange Ø100 mm**



Dimensions – standard line connection [2)]

▼ **Square flange**



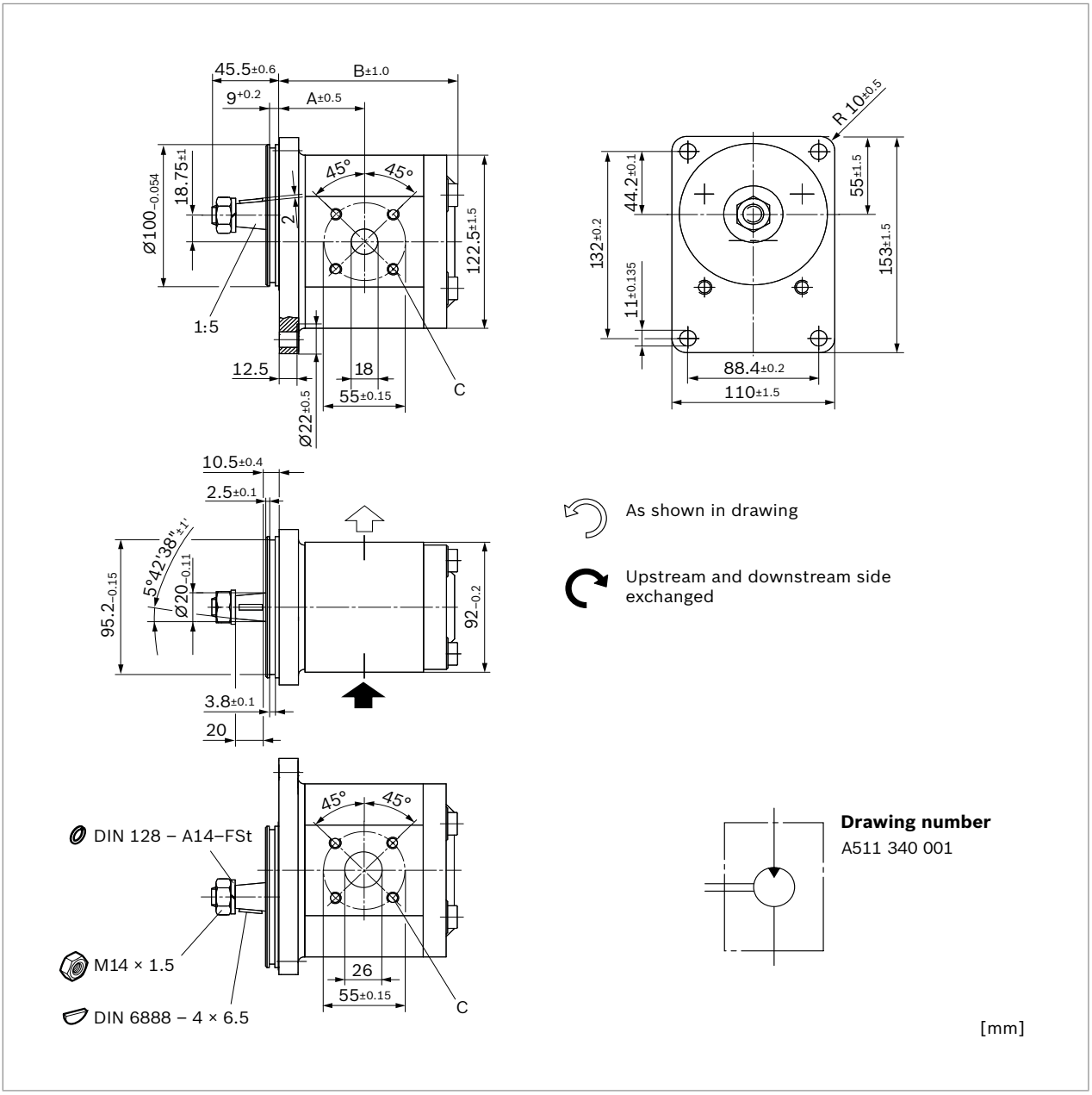
Direction of rotation	Series	Size	Upstream side			Downstream side		
			C	D	E	C	D	E
right/left	1x	25, 28	18	55	M8; 13 deep	26	55	M8; 13 deep
Direction of rotation	**Series**	**Size**	**Line connections**					
			C	D	E			
reversible	2x	30 ... 36	18	55	M8; 13 deep			

1) For other version, see offer drawing

2) Customer-specific versions may differ (see offer drawing)

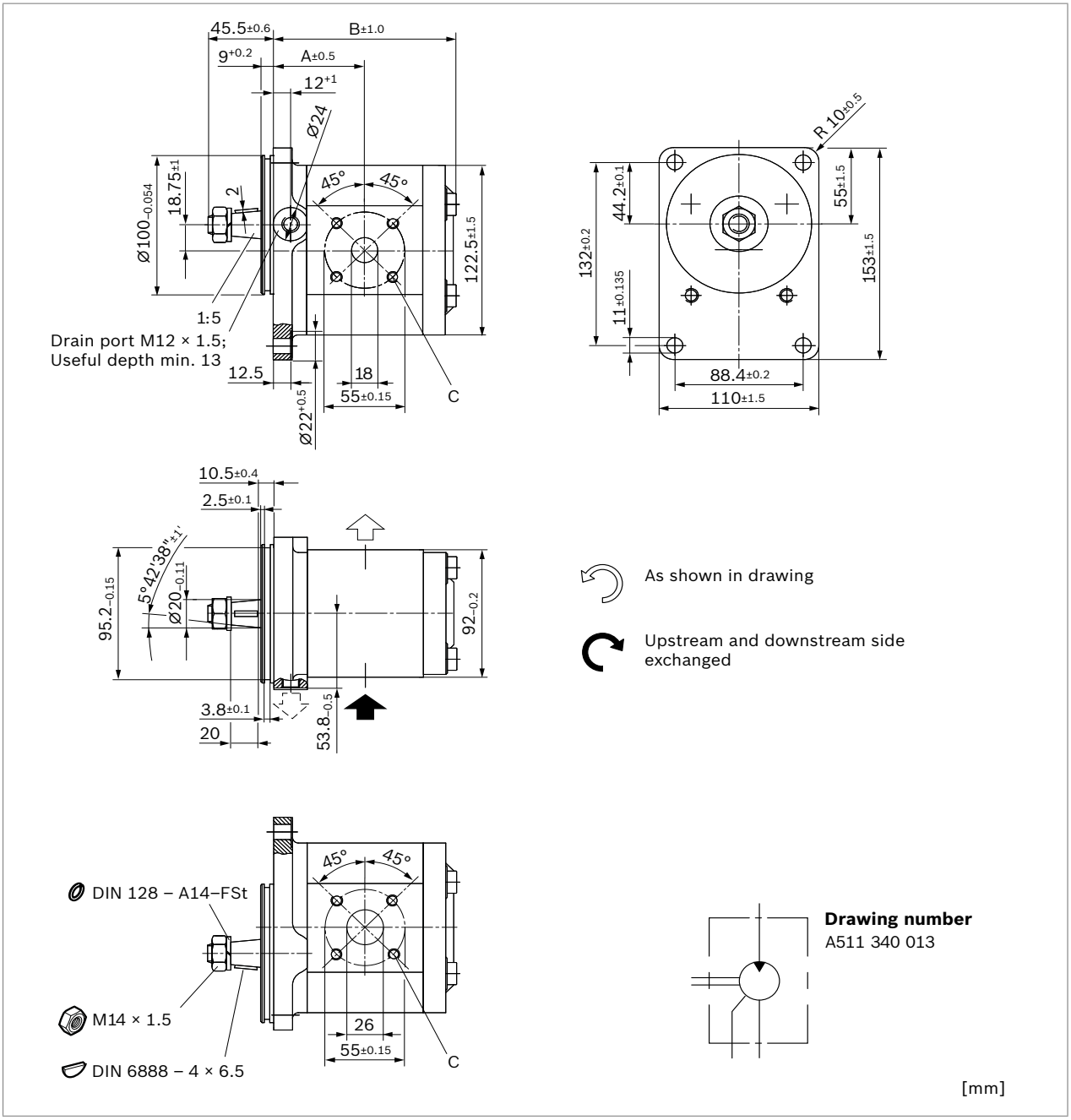
Dimensions – preferred series

▼ **1:5 tapered shaft with rectangular flange Ø100 mm**
AZMN–...–xCB20MB



NG	Order number Direction of rotation Counter-clockwise	Maximum start-up pressure p_2 [bar]	Maximum rotational speed [rpm]	Dimensions A	B	C
25	0511725307	210	3000	55	116.1	M8; min. 13 deep
28	0511725309	200	3000	56.6	119.1	

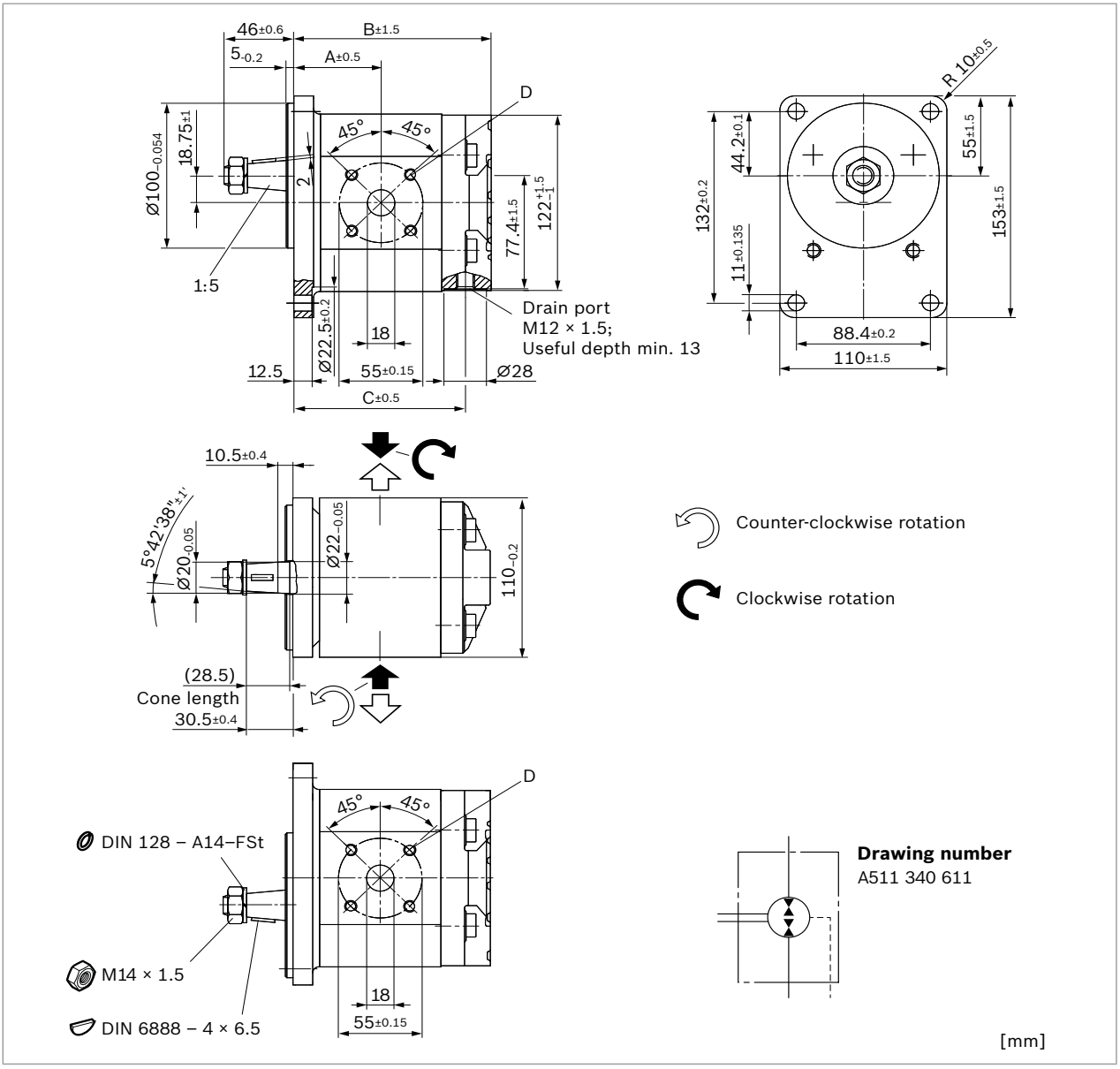
▼ **1:5 tapered shaft with rectangular flange ⌀100 mm and drain port in the front cover**
AZMN–...–xCB20PB–S0097



NG	Order number Direction of rotation Counter-clockwise	 Clockwise	Maximum start-up pressure p_2 [bar]	Maximum rotational speed [rpm]	Dimensions A	 B	 C
25		0511725024	210	3000	60.5	120.8	M8; min. 13 deep
28	0511725312		210	2800	62	123.8	

Dimensions [mm]

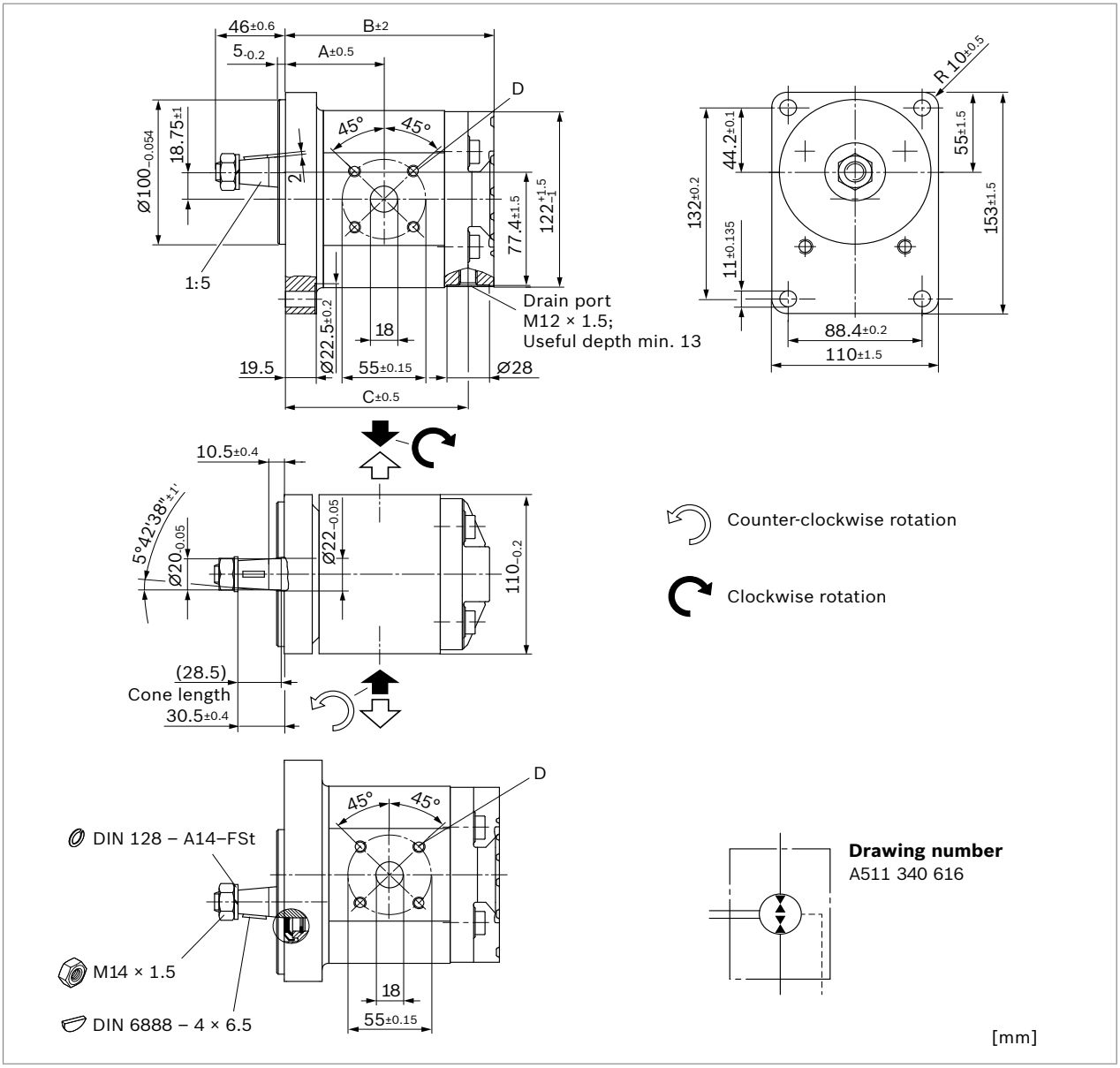
▼ **1:5 tapered shaft with rectangular flange Ø100 mm and drain port in the end cover**
AZMN–...–UCB20Px–S0077 (...-S0582 with size 36)



NG	Order number Direction of rotation Reversible	Maximum start-up pressure p_2 [bar]	Maximum rotational speed [rpm]	Dimensions A	 B	 C	 D
20	0511625611	280	3000	52.0	120.6	102.1	M8; min. 13 deep
22	0511725605	280	3000	53.5	123.6	105.1	
25	0511725604	280	3000	55.0	126.6	108.1	
28	0511725607	250	2800	56.5	129.6	111.1	
32	0511725613	250[1)]	2800	59.0	134.1	115.6	
36	0511725608	250[1)]	2500	61.0	137.0	120.1	

1) Short-term, in case of fan application

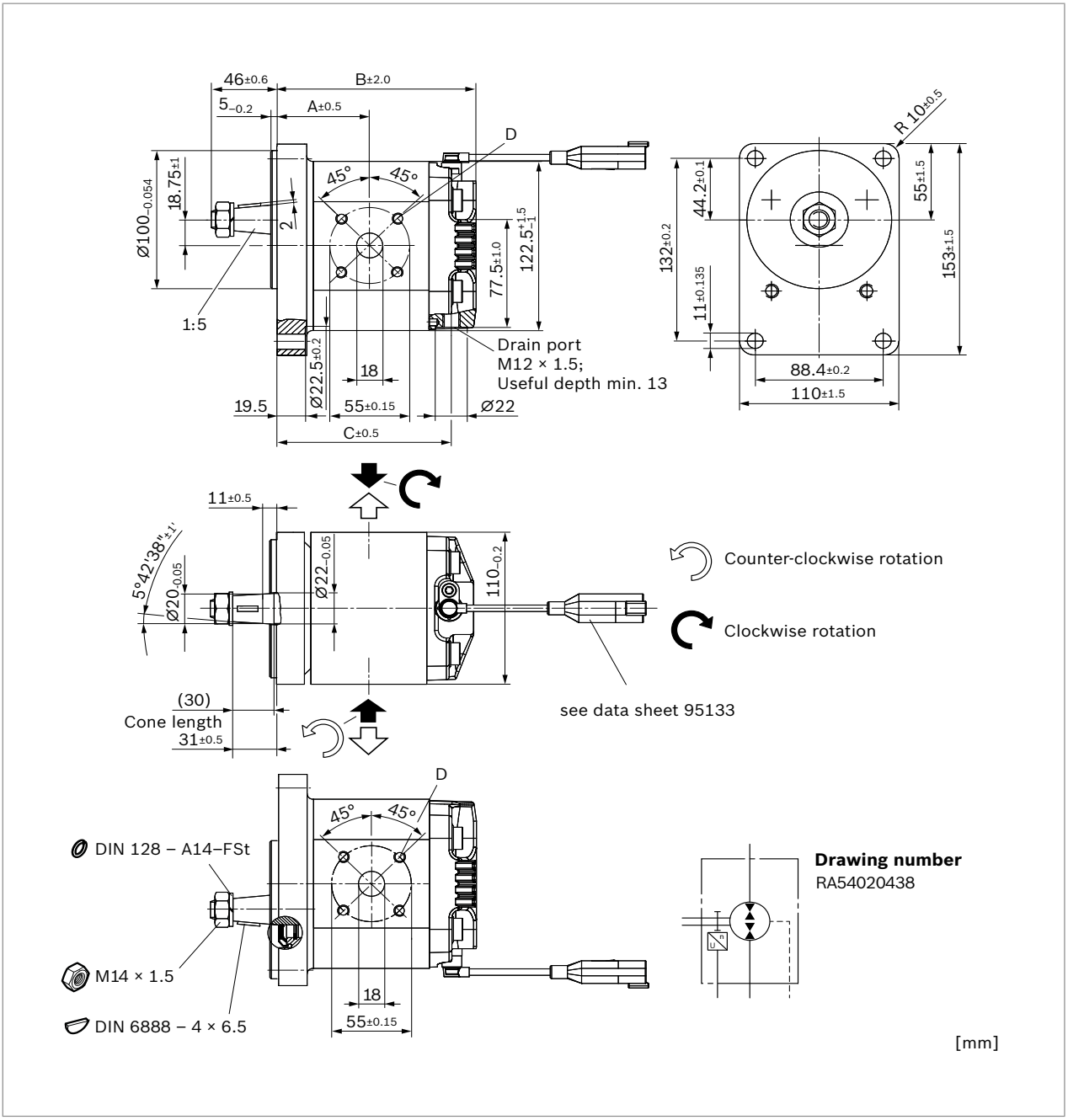
▼ **1:5 tapered shaft with rectangular flange ⌀100 mm and dust protection for shaft seal, radial drain port in the end cover**
AZMN-...-UCB20Px-S0592



NG	Order number Direction of rotation Reversible	Maximum start-up pressure p_2 [bar]	Maximum rotational speed [rpm]	Dimensions A	 B	 C	 D
20	0511625613	250	3000	59.5	128.1	109.6	M8; min. 13 deep
22	0511725609	250	3000	61.0	131.1	112.6	
25	0511725610	250	3000	62.5	134.1	115.6	
28	0511725611	250	2800	64.0	137.1	118.6	
32	0511725614	250[1)]	2800	66.5	141.6	123.1	
36	0511725612	250[1)]	2500	68.5	146.1	127.6	

1) Short-term, in case of fan application

▼ **1:5 tapered shaft with rectangular flange Ø100 mm with speed sensor and DPS (dual protection system)**
AZMN-...-UCB20Px-S0786

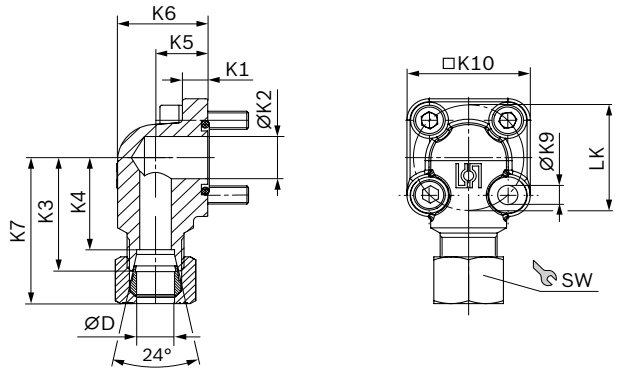


NG	Order number Direction of rotation Reversible	Maximum start-up pressure p_2 [bar]	Maximum rotational speed [rpm]	Dimensions A	 B	 C	 D
22	0511725625	280	3000	61.0	131.1	112.5	M8; min. 13 deep

Accessories

▼ **90° angle flange, for square flange 20 (see chapter "Line connection")**

Complete fitting with
O-ring, metric screw set,
nut and cutting ring.



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
55	20	S	1515702004	250	13	18.2	45	34.5	24	38	57.0	8.4	58	36	M8 × 25	M8 × 50	32 × 2.5	0.62
55	30	S	1515702006	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	1515702005	100	12	26.5	49	38.5	32	52	61.0	8.4	58	50	M8 × 25	M8 × 60	32 × 2.5	0.77
55	42	L	1515702019	100	12	26.5	49	38.0	40	64	61.5	8.4	58	60	M8 × 25	M8 × 70	32 × 2.5	1.04

1) See DIN EN ISO 8434-1

Project planning notes

Technical data

All specified technical data is based on manufacturing tolerances and apply with certain constraints.
Note that this makes certain deviations possible and that technical data may vary with certain constraints (e.g., viscosity).
Motors delivered by Bosch Rexroth are tested for function and performance.
The motor should only be operated with the permissible data (see page chapter "Technical data").

Characteristic curves

When dimensioning the gear motor, observe the maximum possible application data based on the characteristic curves.

Filtration of the hydraulic fluid

Since the majority of premature failures in gear motors occur due to contaminated hydraulic fluid, filtration should at least maintain a cleanliness level of 20/18/15 as defined by ISO 4406.
This can reduce contamination to a permissible degree in terms of particle size and concentration.

Bosch Rexroth generally recommends full-flow filtration. Basic contamination of the hydraulic fluid used may not exceed level 20/18/15 according to ISO 4406. Experience has shown that even new fluids are often above this value. In this case, a filling device with a special filter should be used.
Bosch Rexroth does not accept any warranty for wear due to contamination.

Drain line

For reversible motors and/or motors that can be loaded by the return flow, a drain line is to be connected directly at the reservoir. Ensure adequate dimensioning.

Further information

Installation drawings and dimensions are valid at date of publication, subject to modifications.
Further information and notes on project planning can be found in the "General instruction manual for external gear units" (07012-B1, Chapter 5.5).

Order number overview

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0511725307	AZMN–11–025LCB20MB	12
0511725309	AZMN–11–028LCB20MB	12
0511725024	AZMN–11–025RCB20PB–S0097	13
0511725312	AZMN–11–028LCB20PB–S0097	13
0511625611	AZMN–22–020UCB20Px–S0077	14
0511725605	AZMN–22–020UCB22Px–S0077	14
0511725604	AZMN–22–020UCB25Px–S0077	14
0511725607	AZMN–22–020UCB28Px–S0077	14
0511725613	AZMN–22–020UCB32Px–S0077	14
0511725608	AZMN–22–020UCB36Px–S0077	14
0511625613	AZMN–22–020UCB20PX-S0592	15
0511725609	AZMN–22–022UCB20PX-S0592	15
0511725610	AZMN–22–025UCB20PX-S0592	15
0511725611	AZMN–22–028UCB20PX-S0592	15
0511725614	AZMN–22–032UCB20PX-S0592	15
0511725612	AZMN–22–036UCB20PX-S0592	15
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