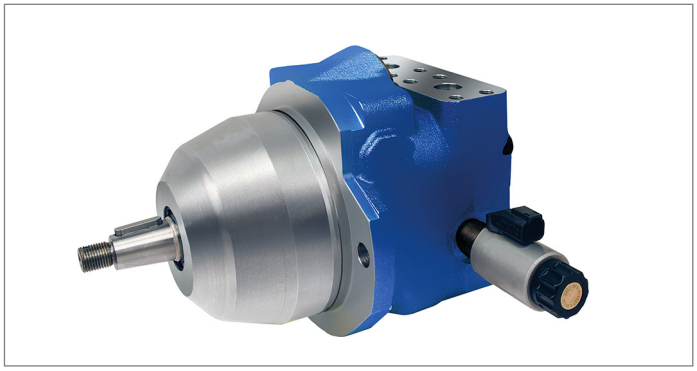
RE 91706/2023-11-02
Replaces: 2020-11-04

rexroth
A Bosch Company

Axial piston variable motor A10VER series 52



- Reversible axial piston motor for fan drives
- Sizes 18 to 45
- Nominal pressure 280 bar
- Maximum pressure 350 bar
- Open circuit

Features

- Variable motor with axial piston rotary group in swashplate design for hydrostatic fan drives in open circuits
- The output speed is proportional to the inlet flow
- The output torque increases proportionally with the pressure difference between the high- and low-pressure sides and increasing displacement
- Specially developed for hydrostatic fan drives
- The A10VER variable motor is equipped with an overcenter rotary group with a maximum displacement of +/-100% $V_{g\,max}$. This allows reversing operation without the need for costly additional components to reverse the air flow and to clean the cooler from contaminations which leads to fuel savings due to improved cooling performance.
- The energy efficiency of hydraulic fan drives is increased due to the elimination of external reversing valves.
- Stable bearing for long service life
- High maximum permissible output speed
- Favorable power-to-weight ratio – compact dimensions
- Low noise

Contents

Type code

01	02	03	04		05	06		07	08	09	10	11	12	13
A10V	**ER**			**/**	**52**	**R**	**–**	**V**		**F**				**P**

Axial piston unit

				18...45	
01	Swashplate design, variable, nominal pressure 280 bar, maximum pressure 350 bar			●	**A10V**

Operating mode

				18...45	
02	Motor, plug-in version, open circuit; reversible +/- 100%			●	**ER**

Size (NG)[1]

		18	23	28	37	45
03	For geometric displacement, see table of values, page 6					

Control device

				18...45	
04	Two-point control	U = 12 V	With shifting time orifice	●	**EZ6**
	Electric with switching solenoid	U = 24 V	With shifting time orifice	●	**EZ7**

Series

				18...45	
05	Series 5, index 2			●	**52**

Direction of rotation[2]

				18...45	
06	Viewed on drive shaft		Clockwise (cooling operation)	●	**R**

Sealing material

				18...45	
07	FKM (fluoroelastomer)			●	**V**

Drive shaft

				18...45	
08	Tapered shaft with shaft key and UNF threaded bolt			●	**C**
	Tapered shaft with shaft key and metric threaded bolt			●	**Y**

Mounting flange

				18	23	28	37	45	
09	Special flange similar to SAE J744 101-2 (B)		Version with bore	○	○	○	●	●	**F**
	Special flange similar to SAE J744 101-2 (B)		Version with slotted hole	●	●	●	○	○	**U**

Working port

				18	23	28	37	45	
10	SAE flange ports fastening thread, metric		Same side	●	●	●	●	●	**10N00**
	Threaded port, metric		Same side	○	○	○	○	○	**16N00**
	SAE flange ports fastening thread, UNF		Same side	●	●	●	●	●	**60N00**
	Threaded port, UNF		Same side	○	○	○	○	○	**66N00**

Valves

				18	23	28	37	45	
11	Without			●	●	●	●	●	**0**
	integrated anti cavitation valve			●	●	●	●	●	**2**
	integrated anti cavitation valve and pressure relief valve			○	○	○	○	○	**4**

Speed sensing

				18	23	28	37	45	
12	Without speed sensing (without code)			●	●	●	●	●	
	Prepared for DST or DSA sensor			●	●	●	●	●	**W**
	Sensor DSA**1**/20 mounted (**1** = one frequency and direction of rotation signal)			●	●	●	●	●	**C**[3]
	Sensor DSA**2**/20 mounted (**2** = two 90° phase-shifted frequency signals)			●	●	●	●	●	**K**[3]
	DST sensor mounted			●	●	●	●	●	**E**[3]

Connector for solenoids

				18...45	
13	DEUTSCH – molded connector, 2-pin – without suppressor diode (for electric controls)			●	**P**

● = Available ○ = On request – = Not available

1) Additional sizes available on request
2) Additional directions of rotation available on request
3) Type code, technical data, dimensions, information on the connector and safety instructions about the sensor can be found in the relevant data sheet 95131 (DST) or 95126 (DSAx/20).

Notices

Observe the project planning notes on page 18 In the project planning and commissioning instructions 90363.

Hydraulic fluids

The variable motor A10VER is designed for operation with HLP mineral oil according to DIN 51524.
Application instructions and requirements for hydraulic fluid selection, behavior during operation as well as disposal and environmental protection should be taken from the following data sheets before the start of project planning:

- 90220: Hydraulic fluids based on mineral oils and related hydrocarbons
- 90221: Environmentally acceptable hydraulic fluids

Selection of hydraulic fluid
Bosch Rexroth evaluates hydraulic fluids on the basis of the Fluid Rating according to the technical data sheet 90235. Hydraulic fluids with positive evaluation in the Fluid Rating are provided in the following technical data sheet:

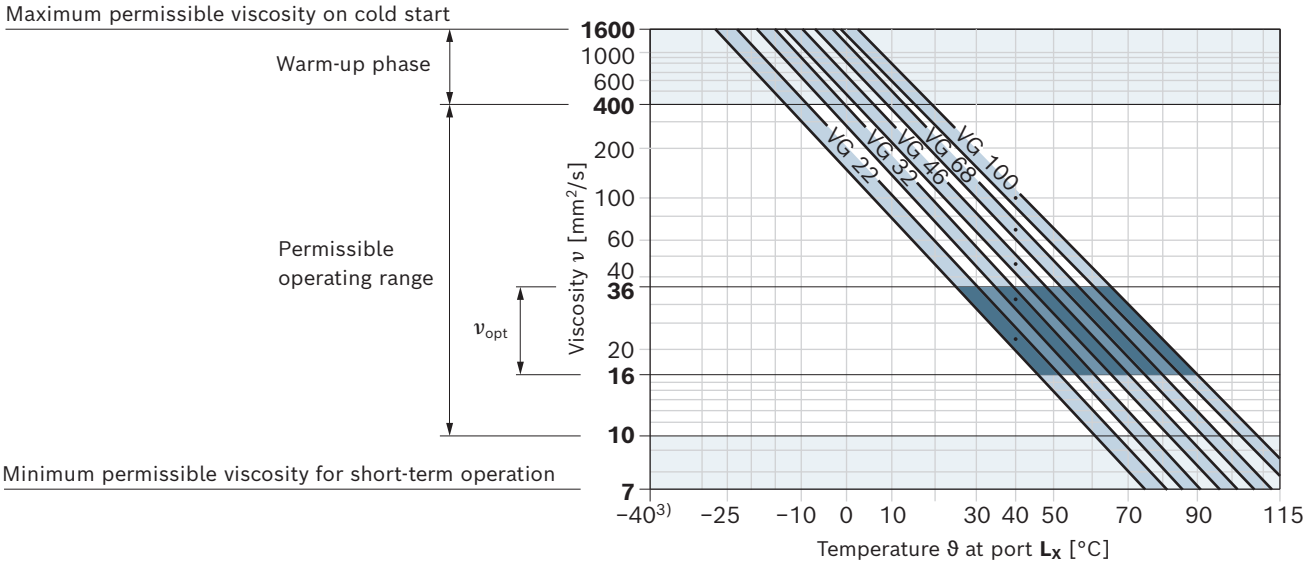
- 90245: Bosch Rexroth Fluid Rating List for Rexroth hydraulic components (pumps and motors)

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	Shaft seal	Temperature[2]	Comment
Cold start	v_{max} ≤ 1600 mm²/s	FKM	ϑ_{St} ≥ −25 °C	t ≤ 3 min, without load (p ≤ 50 bar), n ≤ 1000 rpm Permissible temperature difference between axial piston unit and hydraulic fluid in the system maximum 25 K
Warm-up phase	v = 1600 ... 400 mm²/s			t ≤ 15 min, p ≤ 0.7 × p_{nom} und n ≤ 0.5 × n_{nom}
Permissible operating range	v = 400 ... 10 mm²/s[1]	FKM	ϑ ≤ +110 °C	Measured at port **L_x**
	v_{opt} = 36 ... 16 mm²/s			Optimal operating viscosity and efficiency range
Short-term operation	v_{min} = 10 ... 7 mm²/s	FKM	ϑ ≤ +110 °C	t ≤ 3 min, p ≤ 0.3 × p_{nom}, measured at port **L_x**

▼ **Selection diagram**



1) This corresponds, for example on the VG 46, to a temperature range of +4°C to +85°C (see selection diagram)

2) If the temperature at extreme operating parameters cannot be adhered to, please contact us.

3) For applications in the low-temperature range, please contact us.

Filtration of the hydraulic fluid

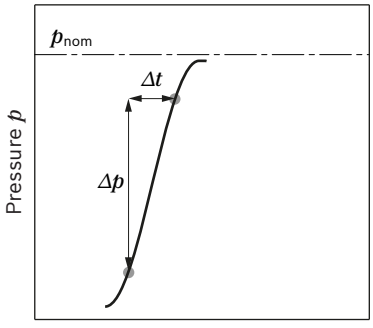
Finer filtration improves the cleanliness level of the hydraulic fluid, which increases the service life of the axial piston unit.
A cleanliness level of at least 20/18/15 under ISO 4406 should be maintained.
At a hydraulic fluid viscosity of less than 10 mm^2/s (e.g. due to high temperatures during short-term operation) at the drain port, a cleanliness level of at least 19/17/14 under ISO 4406 is required.
Examples of temperatures of hydraulic fluids at a viscosity of 10 mm^2/s:

- 73 °C at HLP 32
- 85 °C at HLP 46

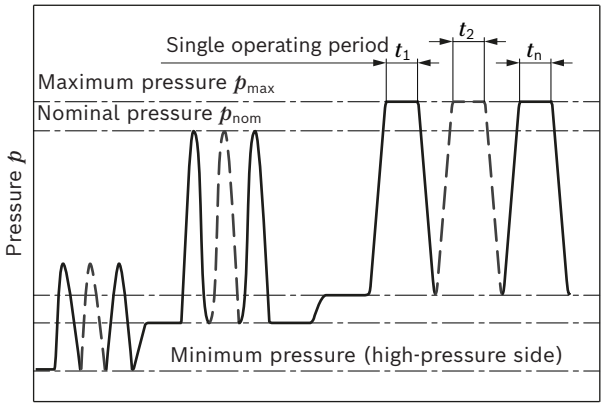
Working pressure range

Pressure at working port B		Definition
Nominal pressure p_{nom}	280 bar	The nominal pressure corresponds to the maximum design pressure. **The series control of motors is not permissible.**
Maximum pressure p_{max}	350 bar	The maximum pressure corresponds to the maximum working pressure within a single operating period. The sum of single operating periods must not exceed the total operating period.
Single operating period	2.5 ms	
Total operating period	300 h	
Minimum pressure $p_{MD\ abs}$ (high-pressure side)	20 bar	Minimum pressure on the high-pressure side (**B**) which is required in order to prevent damage to the axial piston unit.
Reversing pressure $p_{Rev\ abs}$ (high-pressure side)	<50 bar	The Δ pressure between **A** and **B** at which the system switches from fan operation to reversing operation and then from reversing operation back to fan mode is between 30 and 45 bar (relative). The pressure in **B** must be less than 50 bar.
Rate of pressure change $R_{A\ max}$	16000 bar/s	Maximum permissible speed of pressure build-up and reduction during a pressure change across the entire pressure range.
Pressure at low-pressure port A		
Minimum pressure $p_{ND\ min}$ Standard	2 bar absolute	Minimum pressure at low-pressure port **A** (outlet) that is required in order to avoid damage to the axial piston unit.
Maximum pressure $p_{ND\ max}$	30 bar absolute	
Case pressure at port L		
Maximum pressure $p_{L\ max}$ Operation as a motor, open circuit	2 bar absolute	

▼ **Rate of pressure change** $R_{A\ max}$



▼ **Pressure definition**



Total operating period = $t_1 + t_2 + ... + t_n$

Notice

- Working pressure range applies when using hydraulic fluids based on mineral oils. Please contact us for values for other hydraulic fluids.
- In addition to the hydraulic fluid and the temperature, the service life of the shaft seal is influenced by the rotational speed of the axial piston unit and the case pressure.
- The case pressure must be greater than the ambient pressure.

Flow direction

Motor direction of rotation with unchanged pressure side B	at $V_{g\ max+}$ **+ 100%**	$V_{g\ max-}$ **- 100%**
(De-energized) clockwise	**B** to **A**	
(Energized) counter-clockwise		**B** to **A**

Technical data

Size		NG		18	23	28	37	45
Displacement geometric, per revolution		+ 100% $V_{g\,max}$	cm^3	18	23	28	37	45
		– 100% $V_{g\,max}$	cm^3	18	23	28	37	45
Maximum rotational speed[1]	at $V_{g\,max}$	n_{nom}	rpm	3000	3000	3000	2200	2000
Minimum rotational speed[1]	at continuous operation	n_{nom}	rpm	250	250	250	250	250
Torque	at $V_{g\,max}$ and Δp = 280 bar	M	Nm	80	102	125	165	200
Rotary stiffness of drive shaft	C	c	Nm/rad	24160	24160	24160	32380	32380
	Y	c	Nm/rad	24160	24160	24160	32380	32380
Moment of inertia of the rotary group		J_{TW}	kgm^2	0.0017	0.0017	0.0017	0.0033	0.0033
Maximum angular acceleration[2]		α	rad/s^2	5500	5500	5500	4000	4000
Case volume		V	l	0.6	0.6	0.6	0.7	0.7
Weight without through drive (approx.)		m	kg	14	14	14	18	18

Determination of the characteristics				
Inlet flow	q_v	$= \frac{V_g \times n}{1000 \times \eta_v}$		[l/min]
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]
Output speed	n	$= \frac{q_v \times 1000 \times \eta_v}{V_g}$		[rpm]

Key

V_g	=	Displacement per revolution [cm^3]
Δp	=	Differential pressure [bar]
n	=	Rotational speed [rpm]
η_v	=	Volumetric efficiency
η_{hm}	=	Hydraulic-mechanical efficiency
η_t	=	Total efficiency ($\eta_t = \eta_v \times \eta_{hm}$)
M_K	=	Torque constant

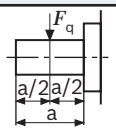
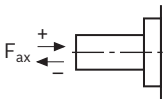
Notice

- Theoretical values, without efficiency and tolerances; values rounded
- Operation above the maximum values or below the minimum values may result in a loss of function, a reduced service life or in the destruction of the axial piston unit. Bosch Rexroth recommends checking the load by means of test or calculation / simulation and comparison with the permissible values.

1) The values are applicable:
– At absolute pressure p_{abs} = 2 bar at the low-pressure port **A**
– for the optimum viscosity range from v_{opt} = 36 to 16 mm^2/s
– with hydraulic fluid based on mineral oils

2) The data are valid for values between the minimum required and maximum permissible rotational speed. Valid for external excitation (e.g. diesel engine 2 to 8 times the rotary frequency; cardan shaft 2 times the rotary frequency). The limit value is only valid for a single pump. The load capacity of the connection parts must be considered.

Permissible radial and axial loading of the drive shaft

Size		NG		18	23	28	37	45
Maximum radial force at a/2		$F_{q\,max}$	N	1200	1200	1200	1500	1500
Maximum axial force		$\pm F_{ax\,max}$	N	1000	1000	1000	1500	1500

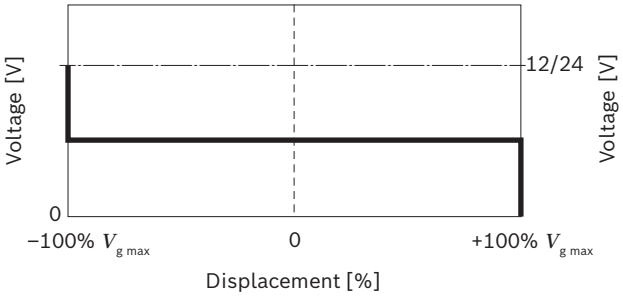
Notice

- The values given are maximum values and do not apply to continuous operation.
- For drives with radial loading (pinions, V-belt drives), please contact us!

EZ – Two-point control, electric

The variable motor is set to $V_{g\,max}$ +100% In $V_{g\,max}$ −100% by actuating the switching solenoid. When de-energized, the axial piston units swivels to $V_{g\,max}$ +100%, when energized to $V_{g\,max}$ −100%.
The response time is extended via the in-built orifice, thus enabling smooth swiveling.
With each direction of rotation of the motor, the control pressure is taken at the high-pressure side **B**.

▼ **Characteristic curve EZ**



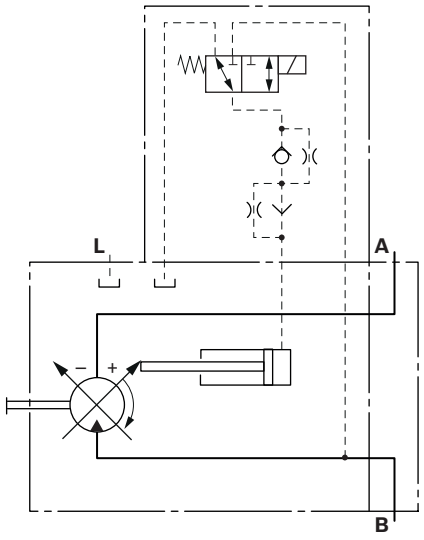
Influencing the swivel position

Swivel direction +100%		Swivel cradle position
De-energized	≙	$+V_{g\,max}$
Swivel direction −100%		
Energized	≙	$-V_{g\,max}$

Notice

- The A10VER variable motor can only be used for the reversing at -100% $V_{g\,max}$ in fan mode. Use at -100% $V_{g\,max}$ for an extended time period is not permissible. In case of any questions, please consult your contact person at Bosch Rexroth.
- Observe the project planning notes on page 18 In the project planning and commissioning instructions 90363.

▼ **EZ6/EZ7 circuit diagram**



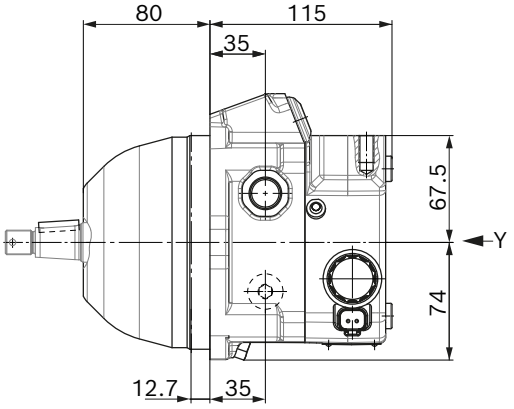
Solenoid data

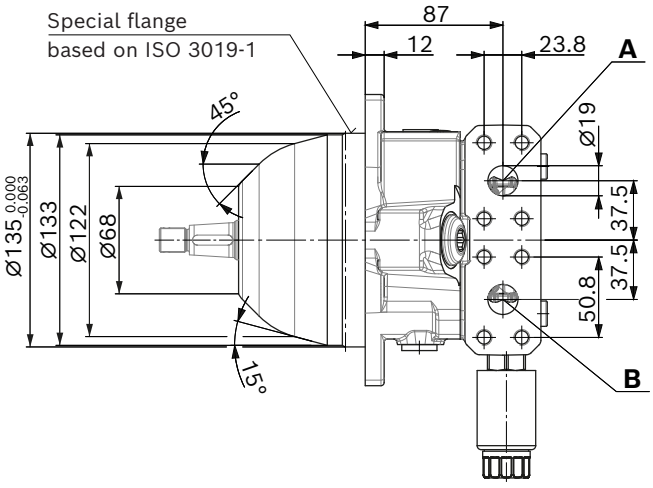
Technical data, solenoids	EZ6	EZ7
Nominal voltage	12 V DC	24 V DC
Nominal current (at 20 °C)	1.5 A	0.8 A
Duty cycle	100%	100%
Type of protection: see connector version page 15		
Ambient temperature range -20 °C to +60 °C Please contact us if these temperatures cannot be observed.		

Dimensions, sizes 18, 23, 28

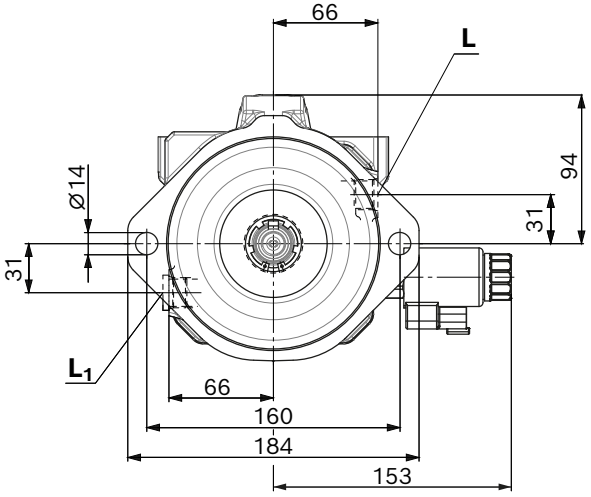
EZ6/EZ7 – Two-point control, electric with DEUTSCH connector, clockwise rotation, series 52

▼ **Port plate 10N00/60N00**

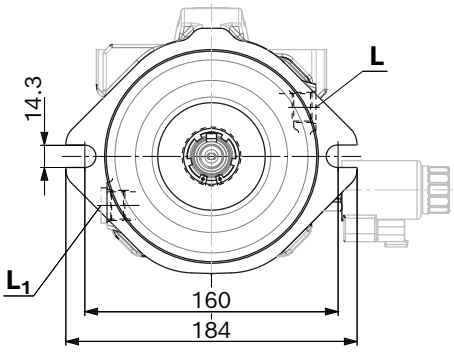




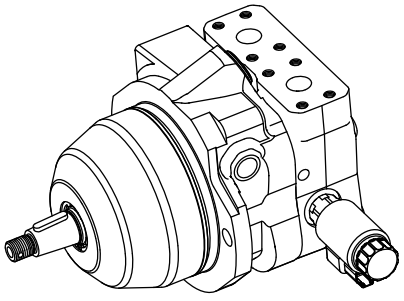
▼ **Mounting flange F**

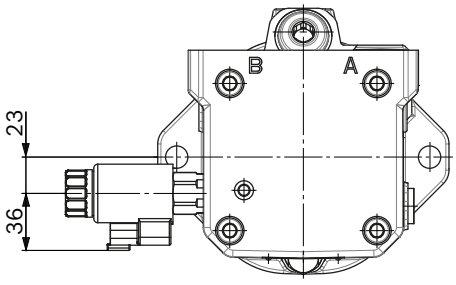


▼ **Mounting flange U**

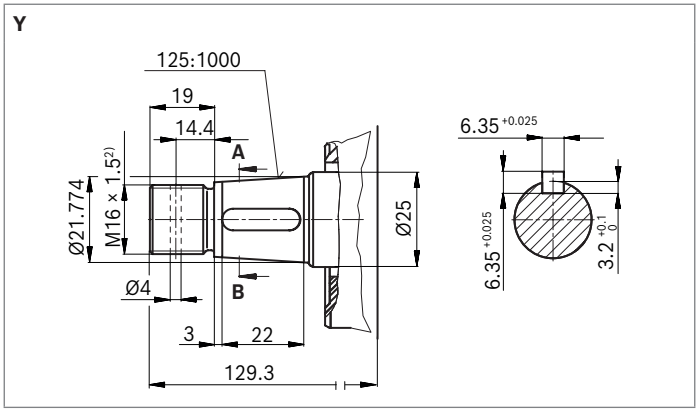


View Y

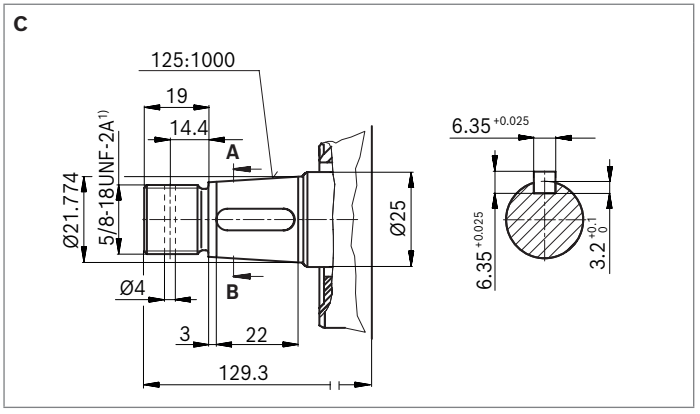




▼ **Tapered shaft with shaft key; metric threaded bolt**



▼ **Tapered shaft with shaft key; imperial threaded bolt**



Ports

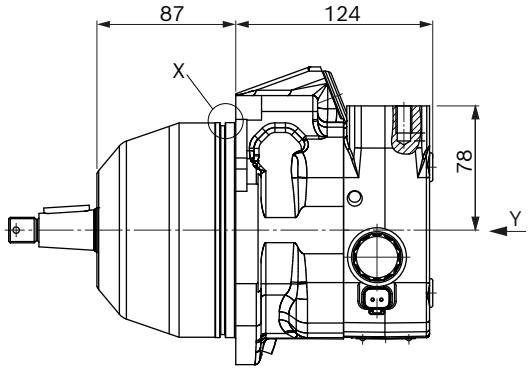
Port plate 10		**Standard**	**Size**	p_{max} **[bar]**[3]	**State**[5]
A	Working port (high-pressure series) Fastening thread	ISO 6162-2 DIN 13	3/4 in (P19M) M10 × 1.5; 17 deep	30	O
B	Working port (high-pressure series) Fastening thread	ISO 6162-2 DIN 13	3/4 in (P19M) M10 × 1.5; 17 deep	350	O
L	Drain port	ISO 11926[4]	3/4-16UNF-2B; 15 deep	2	O[6]
L_1	Drain port	ISO 11926[4]	3/4-16UNF-2B; 15 deep	2	X[6]
Port plate 60					
A	Working port (high-pressure series) Fastening thread	ISO 6162-2 ASME B1.1	3/4 in (P19) 3/8-16UNC-2B; 21 deep	30	O
B	Working port (high-pressure series) Fastening thread	ISO 6162-2 ASME B1.1	3/4 in (P19) 3/8-16UNC-2B; 21 deep	350	O
L	Drain port	ISO 11926[4]	3/4-16UNF-2B; 15 deep	2	O[6]
L_1	Drain port	ISO 11926[4]	3/4-16UNF-2B; 15 deep	2	X[6]

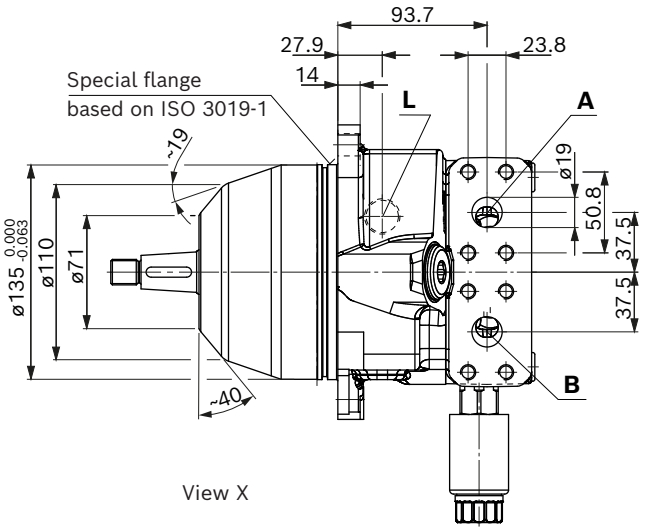
1) Thread according to ASME B1.1
2) Thread according to DIN 13
3) Depending on the application, momentary pressure peaks can occur. Keep this in mind when selecting measuring devices and fittings.
4) The countersink may be deeper than specified in the standard.
5) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)
6) Depending on the installation position, **L** or **L_1** must be connected (also see installation instructions page 16).

Dimensions, sizes 37 and 45

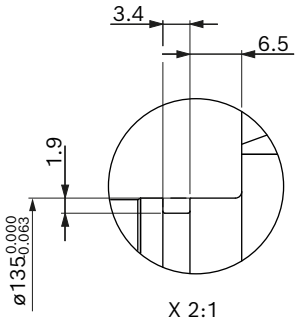
EZ6/EZ7 – Two-point control, electric with DEUTSCH connector, clockwise rotation, series 52

▼ **Port plate 10N00/60N00**

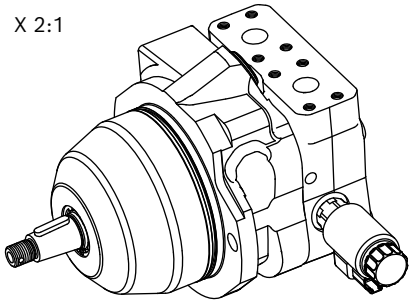




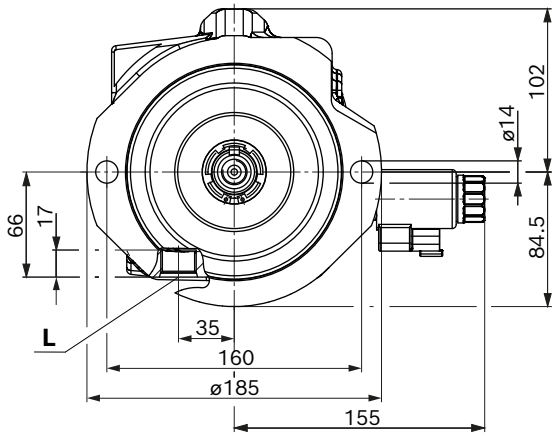
View X



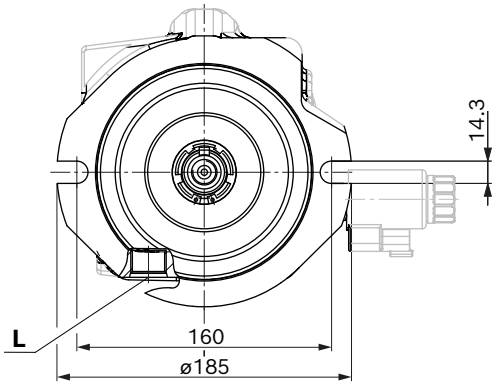
X 2:1



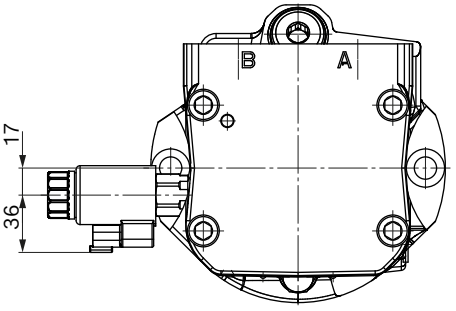
▼ **Mounting flange F**



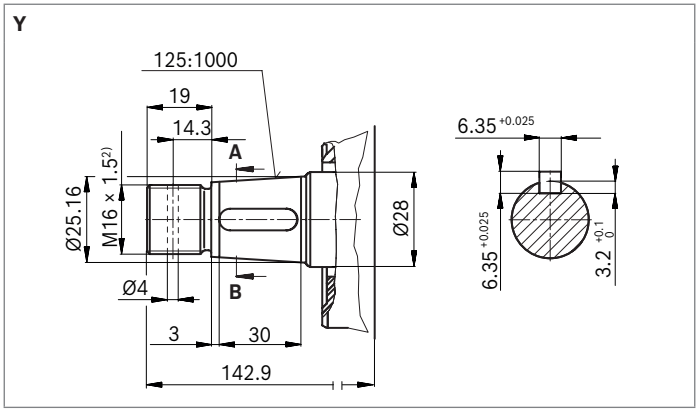
▼ **Mounting flange U**



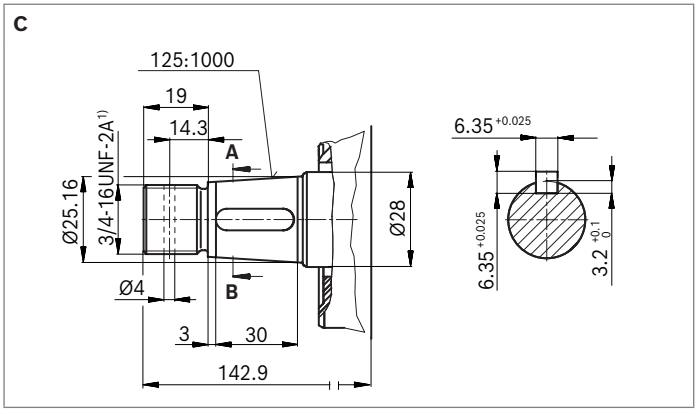
View Y



▼ **Tapered shaft with shaft key; metric threaded bolt**



▼ **Tapered shaft with shaft key; imperial threaded bolt**



Ports

Port plate 10		**Standard**	**Size**	p_{max} **[bar]**[3]	**State**[5]
A	Working port (high-pressure series) Fastening thread	ISO 6162-2 DIN 13	3/4 in (P19M) M10 × 1.5; 17 deep	30	O
B	Working port (high-pressure series) Fastening thread	ISO 6162-2 DIN 13	3/4 in (P19M) M10 × 1.5; 17 deep	350	O
L	Drain port	ISO 11926[4]	7/8-14UNF-2B; 17 deep	2	O
Port plate 60					
A	Working port (high-pressure series) Fastening thread	ISO 6162-2 ASME B1.1	3/4 in (P19) 3/8-16UNC-2B; 21 deep	30	O
B	Working port (high-pressure series) Fastening thread	ISO 6162-2 ASME B1.1	3/4 in (P19) 3/8-16UNC-2B; 21 deep	350	O
L	Drain port	ISO 11926[4]	7/8-14UNF-2B; 17 deep	2	O

1) Thread according to ASME B1.1
2) Thread according to DIN 13
3) Depending on the application, momentary pressure peaks can occur. Keep this in mind when selecting measuring devices and fittings.
4) The countersink may be deeper than specified in the standard.
5) O = Must be connected (plugged on delivery)
X = Plugged (in normal operation)

Anti cavitation valve

Without pressure cut-off
Order option ... N002

When switching off the system, the anti cavitation valve ensures the motor of heavy-duty drives (e.g., hydrostatic fan drives) is supplied with hydraulic fluid until it comes to a standstill.
The valve is integrated in the port plate.

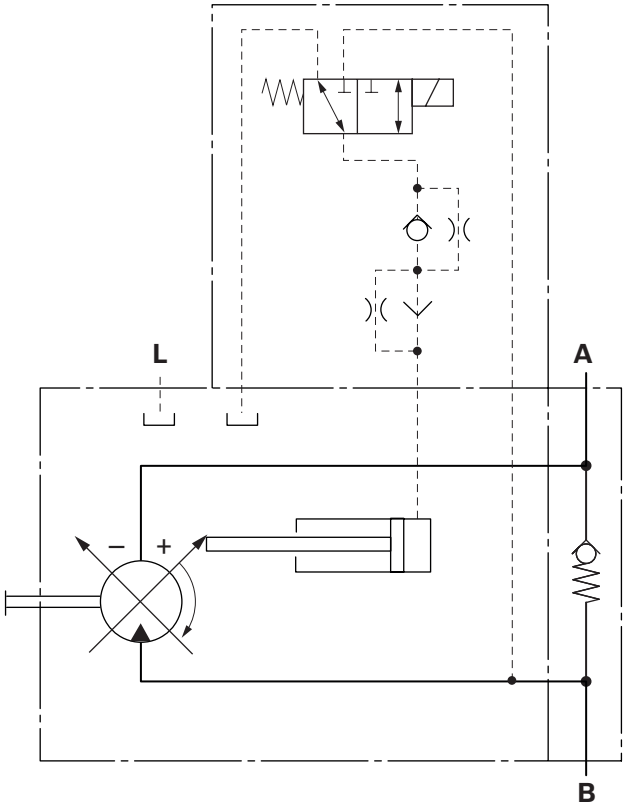
Notices

- Observe the direction of rotation of the unit during project planning.
- The standard direction of rotation of direction is clockwise. Please contact us regarding counter-clockwise rotation.

The external unit dimensions correspond to the standard version, see the unit dimensions for the length dimensions.

▼ **Circuit diagram**

Clockwise rotation, pressure in port **B**

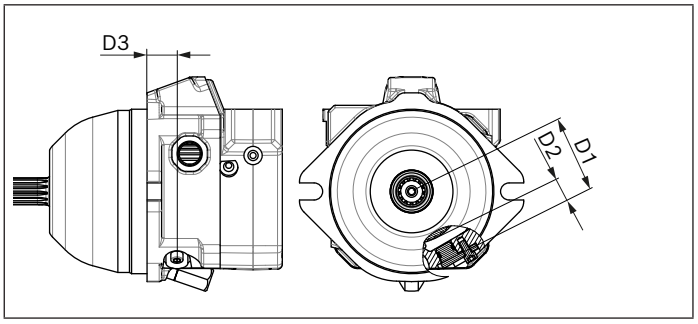


Speed sensing

Order option ... W

The version A10VER...W is prepared for the installation of a speed sensor DST or DSA1/20 and DSA2/20 and is equipped with a spline on the rotary group.

▼ **Dimension A10VE prepared for speed sensor**



A10VE				
Size		28	45	63
D1	mm	63	68.5	–
D2	mm	20.1	19.5	–
D3	mm	24.5	44.7	–

Order option ... E, C and K

The mounted speed sensor DST (E) or DSA1/20 (C), DSA2/20 (K) can record both the rotational speed and the direction of rotation of the motor.
Additionally, the sensors also feature an NTC thermistor, which enables measuring the temperature in the installation location of the sensor.
Type code, technical data, dimensions, information on the connector and safety instructions about the sensor can be found in the relevant data sheet 95131 (DST) or 95126 (DSAx).

Notices

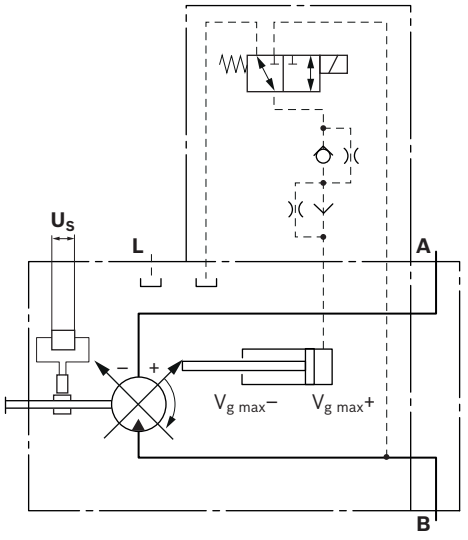
- Painting the sensor with electrostatic charge is not permitted (danger: ESD damage).

Electrostatic discharge

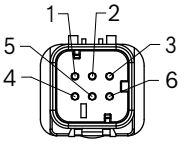
ISO 10605:2008

- Contact discharge (probe touches the sensor) ±8 kV (sensor operated actively and passively)
- Air discharge (electric arc between probe and sensor) ±15 kV (sensor operated actively and passively)

▼ **Circuit diagram**

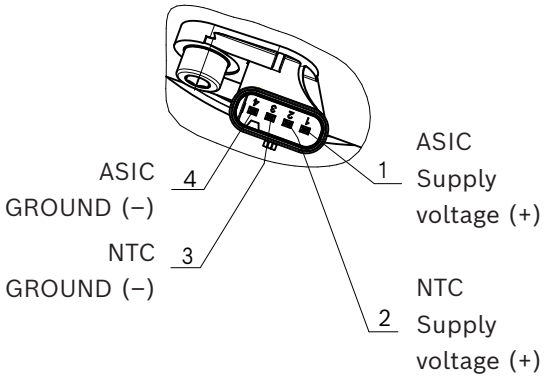


▼ **Pin assignment, speed sensor DSA1 and DSA2 Order option C and K**

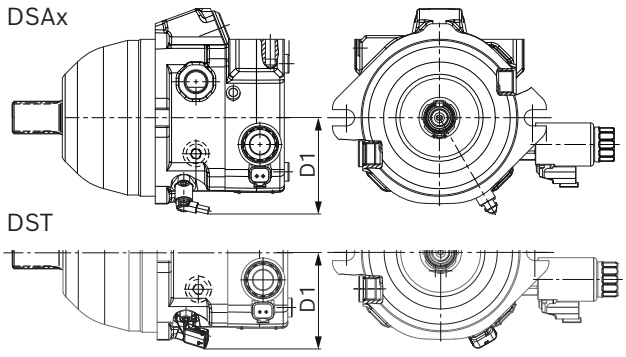


1 Supply voltage
2 Ground
3 S1 frequency
4 Direction of rotation
5 Temperature sensor
6 Temperature sensor

▼ **Pin assignment, speed sensor DST** (order option "E")



▼ **Dimension A10VER with speed sensor DSAx and DST**



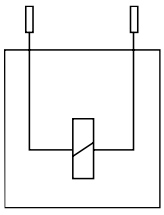
A10VER			
Size		18...28	37...45
D1 / DSAx (Code C, K)	mm	83	89
D1 / DST (Code E)	mm	81	87

Notice
For dimensions with mating connector, please contact us.

Connector for solenoids

DEUTSCH DT04-2P
Molded, 2-pin, without bidirectional suppressor diode
With correctly mounted mating connector, the following type of protection can be achieved:
- IP67 (DIN/EN 60529) and
- IP69K (DIN 40050-9)

▼ **Switching symbol**



▼ **Mating connector DEUTSCH DT06-2S-EP04**

Consisting of	DT designation
1 housing	DT06-2S-EP04
1 wedge	W2S
2 sockets	0462-201-16141

The mating connector is not included in the scope of delivery.
This can be supplied by Bosch Rexroth on request (material number R902601804).

Notice
- If necessary, you can change the position of the connector by turning the solenoid body.
  The procedure is defined in the instruction manual 91706-01-B.
- Only the dead weight (<1 N) of the connection cable with a length of 150 mm may act on the plug-in connection and the solenoid coil with coil nut.
  Other forces and vibrations are not permissible.
  For example, this can be realized by suspension of the cable at the same vibration system.

Installation instructions

General

The axial piston unit must be filled with hydraulic fluid and air bled during commissioning and operation.
This must also be observed following a longer standstill as the axial piston unit may empty via the hydraulic lines.
The leakage in the housing area must be directed to the reservoir via the highest positioned drain port (**L** or $\mathbf{L_1}$).
If this is not possible, separate drain line must be laid.
To prevent the transmission of structure-borne noise, use elastic elements to decouple all connecting lines from all vibration-capable components (e.g. reservoir, frame parts).
If a shared drain line is used for several units, make sure that the respective case pressure in each unit is not exceeded. The shared drain line must be dimensioned to ensure that the maximum permissible case pressure of all connected units is not exceeded in any operating condition, particularly at cold start. If this is not possible, separate drain line must be laid, if necessary.
To prevent the transmission of structure-borne noise, use elastic elements to decouple all connecting lines from all vibration-capable components (e.g., reservoir, frame parts).
Under all operating conditions, the drain line must flow into the reservoir below the minimum fluid level.
When designing the reservoir, ensure that there is adequate distance between the suction line and the drain line. We recommend using a baffle (baffle plate) between suction line and drain line. A baffle improves the air separation ability as it gives the hydraulic fluid more time for desorption. Apart from that, this prevents the heated return flow from being drawn directly back into the suction line. The suction port must be supplied with air-free, calmed and cooled hydraulic fluid.

Installation position

See the following examples **1** to **8**.
Further installation positions are available upon request.
Recommended installation position: **2** and **4**

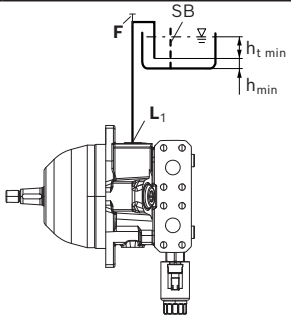
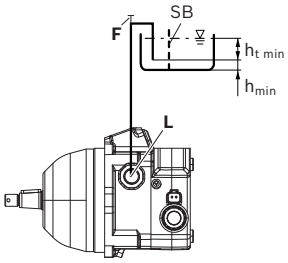
Key	
F	Filling / Air bleeding
L, $\mathbf{L_1}$	Drain port
SB	Baffle (baffle plate)
$h_{t\ min}$	Minimum required immersion depth (200 mm)
h_{min}	Minimum required distance to reservoir bottom (100 mm)

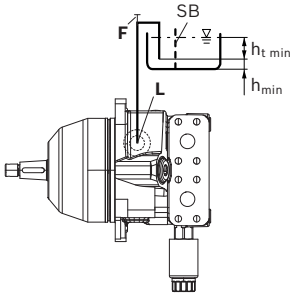
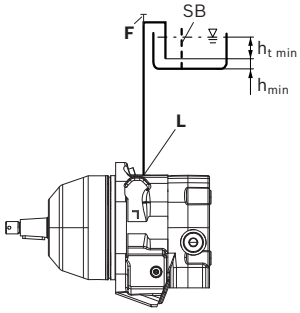
Notice

Port **F** is part of the external piping and must be provided on the customer side to make filling and air bleeding easier.

Below-reservoir installation (standard)

Below-reservoir installation means that the axial piston unit is installed outside of the reservoir below the minimum fluid level.

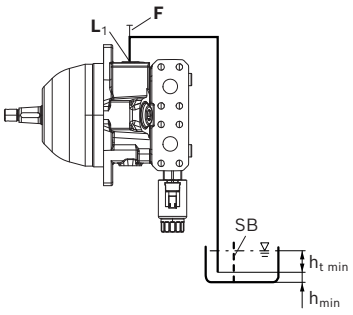
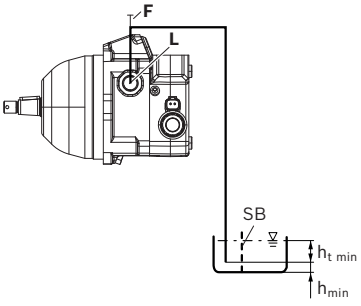
Installation position NG 18 to 28	Air bleed	Filling
1 	L_1 (F)	L_1 (F)
2 	L (F)	L (F)

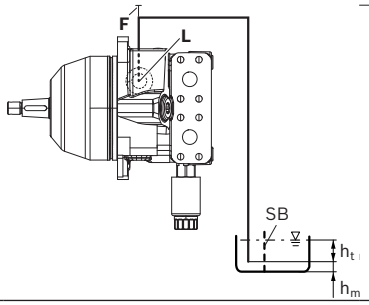
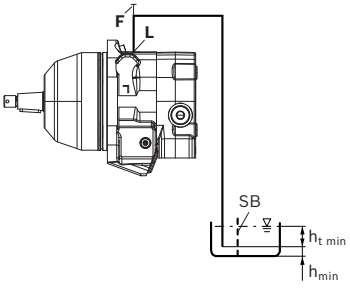
Installation position NG 37 to 45	Air bleed	Filling
3 	L (F)	L (F)
4 	L (F)	L (F)

For key, see page 16.

Above-reservoir installation

Above-reservoir installation means that the axial piston unit is installed above the minimum fluid level of the reservoir.

Installation position NG 18 to 28	Air bleed	Filling
5 	L_1 (F)	L_1 (F)
6 	L (F)	L (F)

Installation position NG 37 to 45	Air bleed	Filling
7 	L (F)	L (F)
8 	L (F)	L (F)

Project planning notes

- The axial piston variable motor A10VER is designed to be used in open circuit.
- The project planning, installation and commissioning of the axial piston unit requires the involvement of skilled personnel.
- Before using the axial piston unit, please read the corresponding instruction manual completely and thoroughly. If necessary, this can be requested from Bosch Rexroth.
- Before finalizing your design, request a binding installation drawing. If you need a 3D installation model, please consult the responsible contact person at Bosch Rexroth.
- The specified data and notes contained herein must be observed.
- Depending on the operating conditions of the axial piston unit (working pressure, fluid temperature), the characteristic curve may shift.
- The characteristic curve may also shift due to the dither frequency or control electronics.
- Preservation: Our axial piston units are supplied as standard with preservation protection for a maximum of 12 months. If longer preservation protection is required (maximum 24 months), please specify this in plain text when placing your order. The preservation periods apply under optimal storage conditions, details of which can be found in the data sheet 90312 or the instruction manual.
- Not all configuration variants of the product are approved for use in safety functions according to ISO 13849. Please consult the proper contact at Bosch Rexroth if you require reliability parameters (e.g., $MTTF_d$) for functional safety.
- Depending on the type of control used, electromagnetic effects can be produced when using solenoids. Applying a direct voltage signal (DC) to solenoids does not create electromagnetic interference (EMI) nor is the solenoid affected by EMI. Electromagnetic interference (EMI) potential exists when operating and controlling a solenoid with a modulated direct voltage signal (e.g. PWM signal). The machine manufacturer should conduct appropriate tests and take appropriate measures to ensure that other components or operators (e.g. with a pacemaker) are not affected by this potentiality.
- A pressure relief must be provided in the hydraulic system. In this connection, observe the technical limits of the pressure relief valve.
- Please note that a hydraulic system is an oscillating system. This can lead, for example, to the stimulation the natural frequency within the hydraulic system during operation at constant rotational speed over a long period of time. The excitation frequency of the pump is 9 times the rotational speed frequency. This can be prevented, for example, with suitably designed hydraulic lines.
- Please note the details regarding the tightening torques of port threads and other threaded joints in the instruction manual.
- The ports and fastening threads are designed for the p_{max} permissible pressures of the respective ports, see the connection tables. The machine or system manufacturer must ensure that the connecting elements and lines correspond to the specified application conditions (pressure, flow, hydraulic fluid, temperature) with the necessary safety factors.
- The service ports and function ports are only intended to accommodate hydraulic lines.

System solution for hydrostatic fan drives with reversing function

AFC30 software

The BODAS AFC30 is a standard software solution integrated in the RC4-5/30 control unit from Rexroth for controlling hydrostatic fan drives with fixed or variable hydraulic pumps. The AFC30 is designed to control a fan drive in an open hydraulic circuit. The performance requirement of the fan can be modified for up to 6 temperature signals (analog/J1939). The AFC30 can be used with 12 V and 24 V systems. As the AFC30 provides the cooling output according to requirements, fuel consumption is significantly reduced compared with fan drive systems that are not proportionally controlled. Further information on this can be found in data sheets

- 95362 (application software fan speed control AFC30) and
- 95205 (BODAS controller RC4-5, series 30)

Safety instructions

- During and shortly after operation, there is a risk of burning on the axial piston unit and especially on the solenoids. Take the appropriate safety measures (e.g. by wearing protective clothing).
- Moving parts in control equipment (e.g. valve spools) can, under certain circumstances, get stuck in position as a result of contamination (e.g. contaminated hydraulic fluid, abrasion, or residual dirt from components). As a result, the hydraulic fluid flow and the build-up of torque in the axial piston unit can no longer respond correctly to the operator's specifications. Even the use of various filter elements (external or internal flow filtration) will not rule out a fault but merely reduce the risk. The machine/system manufacturer must test whether remedial measures are needed on the machine for the application concerned in order to bring the driven consumer into a safe position (e.g., safe stop) and ensure any measures are properly implemented.