

NEW

Brushless DC-Servomotors
with Speed Controller
Electronic Commutation

6 / 10 mNm

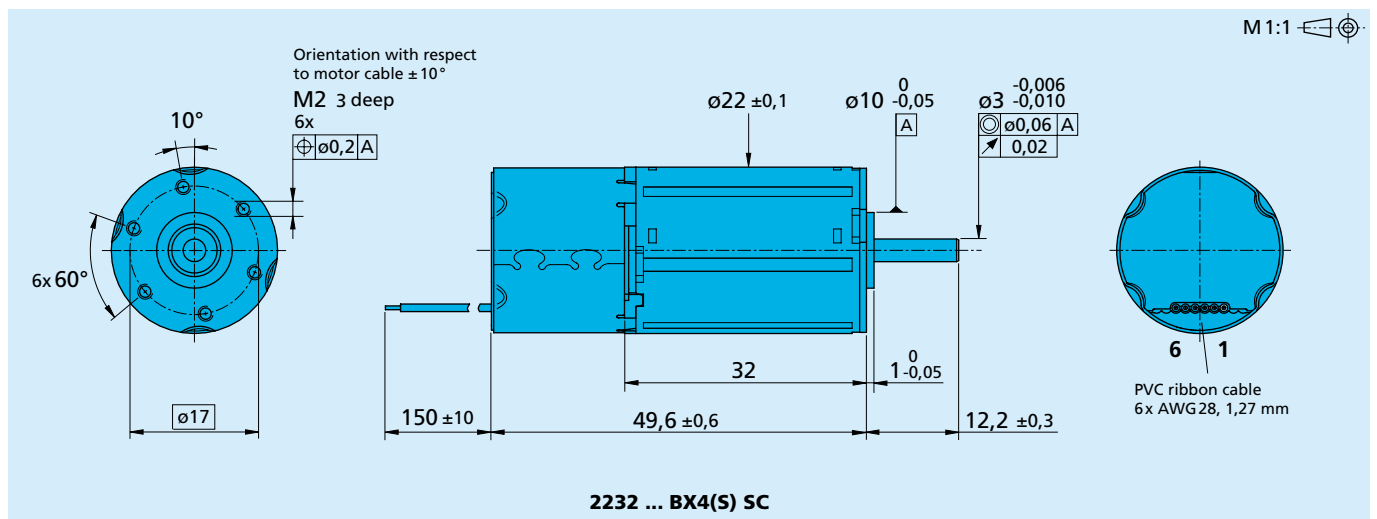
For combination with
Gearheads:
22F

Series 2232 ... BX4 SC

	2232 S	012 BX4 S	024 BX4 S	012 BX4	024 BX4	SC
1 Nominal voltage	U _N	12	24	12	24	Volt
2 Terminal resistance, phase-phase	R	3,5	12,4	3,5	12,4	Ω
3 Output power ¹⁾	P _{2 max.}	3,1	3,1	5,7	5,8	W
4 Efficiency	η _{max.}	60,9	61,7	66,1	66,8	%
5 No-load speed	n ₀	13 180	13 980	6 840	7 250	rpm
6 No-load current (with shaft ø 3,0 mm)	I ₀	0,163	0,088	0,118	0,064	A
7 Stall torque	M _H	27,3	29,4	53,6	57,7	mNm
8 Friction torque, static	C ₀	0,6	0,6	0,85	0,85	mNm
9 Friction torque, dynamic	C _v	5,5 · 10 ⁻⁵	5,5 · 10 ⁻⁵	1,5 · 10 ⁻⁴	1,5 · 10 ⁻⁴	mNm/rpm
10 Speed constant	k _n	1 174	616	601	315	rpm/V
11 Back-EMF constant	k _E	0,852	1,623	1,664	3,170	mV/rpm
12 Torque constant	k _M	8,14	15,50	15,89	30,27	mNm/A
13 Current constant	k _I	0,123	0,065	0,063	0,033	A/mNm
14 Slope of n-M curve	Δn/ΔM	505	493	132	129	rpm/mNm
15 Terminal inductance, phase-phase	L	130	470	120	440	μH
16 Mechanical time constant	τ _m	22	22	7	7	ms
17 Rotor inertia	J	4,2	4,2	5,2	5,2	gcm ²
18 Angular acceleration	α _{max.}	65	70	103	111	· 10 ³ rad/s ²
19 Thermal resistance	R _{th 1} / R _{th 2}	2 / 17		2 / 17		K/W
20 Thermal time constant	τ _{w1} / τ _{w2}	4 / 510		4 / 527		s
21 Operating temperature range		- 40 ... + 85		- 40 ... + 85		°C
22 Shaft bearings		ball bearings, preloaded				
23 Shaft load max.:						
– radial at 3 000 rpm (4 mm from mounting flange)		20				N
– axial at 3 000 rpm		2				N
– axial at standstill		20				N
24 Shaft play:						
– radial	≤	0,015				mm
– axial	=	0				mm
25 Housing material		stainless steel				
26 Weight		71				g
27 Direction of rotation		electronically reversible				
28 Number of pole pairs		2				
Recommended values - mathematically independent of each other						
29 Speed up to ²⁾	n _{e max.}	14 100	14 100	8 900	8 900	rpm
30 Torque up to ^{1) 2)}	M _{e max.}	6,0	6,0	10	10	mNm
31 Current up to ^{1) 2)}	I _{e max.}	0,85	0,45	0,80	0,43	A

¹⁾ at 5 000 rpm

²⁾ thermal resistance R_{th 2} not reduced



Speed Controller		012 BX4 S	024 BX4 S	012 BX4	024 BX4	SC
PWM switching frequency	f_{PWM}	96	96	96	96	kHz
Efficiency	η	95	95	95	95	%
Max. continuous output current ¹⁾	I_{max}	1	0,5	1	0,5	A
Max. peak output current	I_{el}	2	1	2	1	A
Total standby current		0,020				A
Speed range electronic	n_{el}	400 ... 50 000 ²⁾				rpm
Scanning range	T_A	500				μs

¹⁾ at 22°C ambient temperature and max. 60°C motor temperature respectively

²⁾ speed depend on motor operating voltage

Connection information		012 BX4 S	024 BX4 S	012 BX4	024 BX4	SC
Connection 1 "U _P ":	power supply electronic	U _P = 5 ... 28 V				
Connection 2 "U _{mot} ":	power supply electronic coil	U _{mot} = 6 ... 28 V				
Connection 3 "GND":	ground	ground				
Connection 4 "U _{nsoll} ":						
- analog input	input voltage	U _{in} = 0 ... 10 V				
	input resistance	R _{in} ≥ 5 kΩ				
	set speed value	per 1 V	2 000	2 000	1 000	1 000 rpm
		U _{in} < 0,15 V » motor stops				
		U _{in} > 0,3 V » motor starts				
Connection 5 "DIR":						
- analog input	direction of rotation	to ground or level < 0,5V » counterclockwise				
		open or level > 3V » clockwise				
	input resistance	R _{in} ≥ 10 kΩ				
Connection 6 "FG":						
- digital output	frequency output	with max. U _P » I _{max} = 15 mA; open collector with 22 kΩ pull-up resistor				
		6 lines per revolution				

Features

In this variant, the brushless DC servomotors have an integrated Speed Controller. The motor is commutated using Hall sensors integrated into the motor. Speed control is via a PI regulator. The Speed Controller has a current limiting device which limits the maximum motor current if the thermal load is too high. Twice the continuous current is possible over a short time.

Using the "FAULHABER Motion Manager" software, the customer can modify the Speed Controller to special conditions of use. The

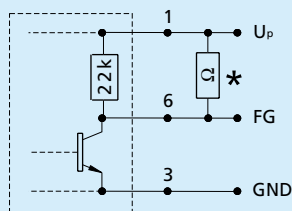
following parameters can be changed: current limit and regulator parameters.

Order information

- Ordering examples:
2232S024BX4 SC
2232S012BX4S SC

Circuit diagram / Connection information

Output circuit



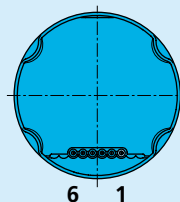
* An additional external pull-up resistor can be added to improve the rise time.
Caution: I_{OUT} max. 15 mA must not be exceeded!

Options

- connector variant
AWG 26 / PVC ribbon cable with connector Molex Micro-Fit 3.0: 43025-0600
connector pin assignment:



Cable connection



Connection

No.	Function
1	U _P
2	U _{mot}
3	GND
4	U _{nsoll}
5	DIR
6	FG

Caution:

Incorrect lead connection will damage the motor electronics!