NEW

FAULHABER BX4

Brushless DC-Servomotors

with magnetic Encoders and Line Driver
Electronic Commutation

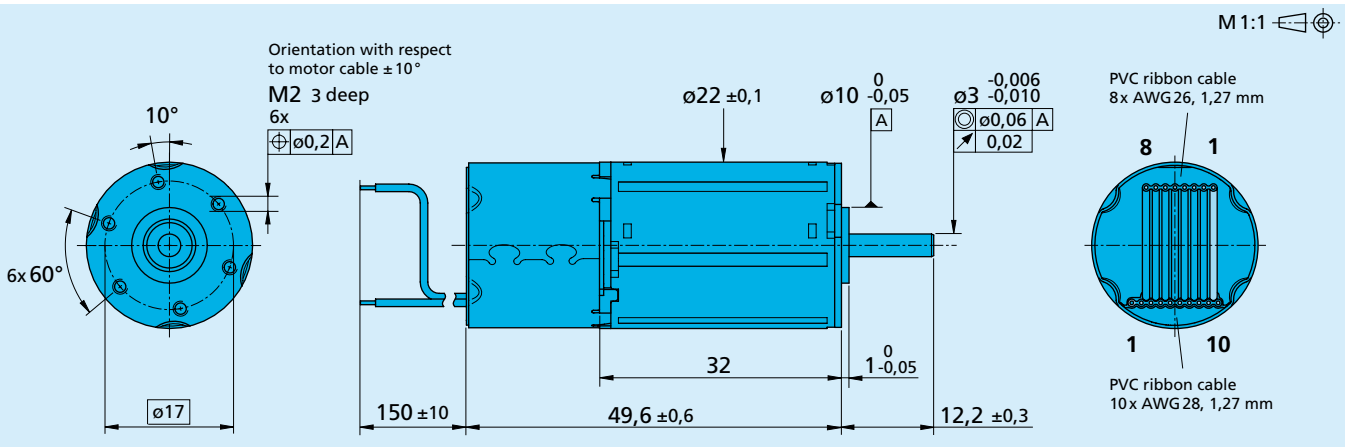
6 / 10 mNm

For combination with
Gearheads:
22F

Series 2232 ... BX4 IE3 L

		2232 S		012 BX4 S	024 BX4 S	012 BX4	024 BX4	IE3 L
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) 2)	$P_{2\ max.}$		3,1	3,1	5,7	5,8	W
4	Efficiency	$\eta_{max.}$		60,9	61,7	66,1	66,8	%
5	No-load speed	n_o		13 180	13 980	6 840	7 250	rpm
6	No-load current (with shaft ø 3,0 mm)	I_o		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_o		0,6	0,6	0,85	0,85	mNm
9	Friction torque, dynamic	C_v		$5,5 \cdot 10^{-5}$	$5,5 \cdot 10^{-5}$	$1,5 \cdot 10^{-4}$	$1,5 \cdot 10^{-4}$	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	$\Delta n/\Delta M$		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	$\alpha_{max.}$		65	70	103	111	$\cdot 10^3 rad/s^2$
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		76					g
27	Direction of rotation		electronically reversible					
28	Number of pole paires		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	6	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



2232 ... BX4(S) IE3 L

For notes on warranty and technical data refer to "Instruction Manual".
Edition 14.04.2008

Specifications subject to change without notice.

www.faulhaber-group.com

Magnetic Encoder		IE3-32 L	IE3-64 L	IE3-128 L	IE3-256 L	
Lines per revolution	N	32	64	128	256	
Frequency range [1], up to	f	15	30	60	120	kHz
Signal output, square wave		2+1 index and complementary outputs				channels
Supply voltage	$U_{DD\ Enc}$	4,5 ... 5,5				V DC
Current consumption, typical [2]	$I_{DD\ Enc}$	typ. 17, max. 25				mA
Pulse width [3]	P	180±45				°e
Index Pulse width [3]	P_0	90±45				°e
Phase shift, channal A to B [3]	Φ	90±45				°e
Inertia of encoder magnet	J	0,08				gcm^2

[1] velocity (rpm) = f (Hz) x 60/N
[2] $U_{DD\ Enc}$ = 5 V: with unloaded outputs
[3] at 5 000 rpm

Notes: The output signals are TIA-422 compatible.
Examples of Line driver Receivers: ST26C32ABD (STM), ST26C32IP16 (EXAR), DS26C32AT (NSC).

Features

In this version, the brushless DC servomotors have an encoder with 3 output channels. A permanent magnet on the shaft creates a moving magnetic field which is captured using a single-chip angular sensor and further processed. At the encoder outputs, two 90° phase-shifted rectangular signals are available with up to 256 impulses and an index impulse per motor revolution.

The Line Driver version has differential signal outputs according to TIA-422. With this symmetrical interface, synchronism faults can be suppressed and longer leads are possible. On the connection side, these differential signals must be brought together again with a receiver module.

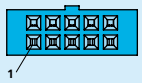
The encoder is available with various impulse figures and is suitable for the monitoring and regulation of the speed and direction of rotation and for positioning the drive shaft. The motor and encoder are connected via separate ribbon cables.

A detailed instruction manual for installation and operation is enclosed.

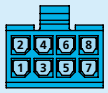
Options

- connector variants

Encoder:
AWG 28 / PVC ribbon cable (10-conductors), with connector DIN-41651 (pitch 2,54 mm)



Motor:
AWG 26 / PVC ribbon cable (8-conductors), with connector MicroFit



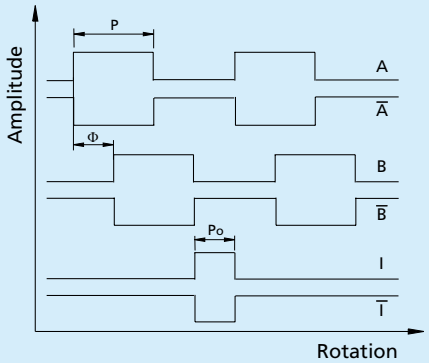
Order information

- Ordering examples:

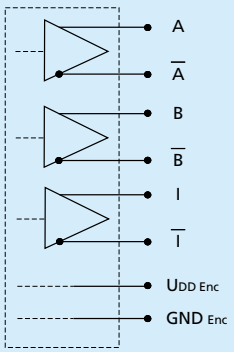
2232S024BX4 IE3-256 L
2232S012BX4S IE3-32 L

Output signals / Circuit diagram / Connector information

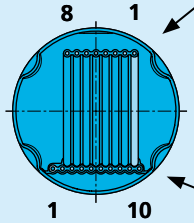
Output signals
with clockwise rotation as seen from the shaft end



Output circuit



Connection Motor



Connection Encoder

No.	Function
1	Phase C
2	Phase B
3	Phase A
4	GND
5	U_{DD} (2,2 ... 18V DC)
6	Hall sensor C
7	Hall sensor B
8	Hall sensor A

No.	Function
1	n.c.
2	$U_{DD\ Enc}$
3	GND_{Enc}
4	n.c.
5	Channel Ā
6	Channel A
7	Channel B̄
8	Channel B
9	Channel Ī (Index)
10	Channel I (Index)

Caution:
Incorrect lead connection will damage the motor electronics!