NEW

FAULHABER

Brushless DC-Servomotor

with integrated Motion Controller
and RS232 interface

35 mNm

For combination with
Gearheads:
22F

Series 2250 ... BX4 CSD

			2250 S		024 BX4 CSD	
1	Nominal voltage	U_N			24	Volt
2	Terminal resistance, phase-phase	R			5,9	Ω
3	Output power [1]	$P_{2\ max.}$			12,2	W
4	Efficiency	$\eta_{max.}$			75,1	%
5	No-load speed	n_o			5 900	rpm
6	No-load current	I_o			$7{,}20 \cdot 10^{-2}$	A
7	Stall torque at 3A	M_H			110	mNm
8	Friction torque, static	C_o			1,20	mNm
9	Friction torque, dynamic	C_v			$2{,}4 \cdot 10^{-4}$	mNm/rpm
10	Speed constant	k_n			259	rpm/V
11	Back-EMF constant	k_E			3,864	mV/rpm
12	Torque constant	k_M			36,90	mNm/A
13	Current constant	k_I			$2{,}71 \cdot 10^{-2}$	A/mNm
14	Slope of n-M curve	$\Delta n/\Delta M$			41,4	rpm/mNm
15	Terminal inductance, phase-phase	L			240	µH
16	Mechanical time constant	τ_m			4,3	ms
17	Rotor inertia	J			10	gcm^2
18	Angular acceleration	$\alpha_{max.}$			110	$\cdot 10^3 rad/s^2$
19	Thermal resistance	$R_{th\,1}$ / $R_{th\,2}$	1,2 / 14			K/W
20	Thermal time constant	τ_{w1} / τ_{w2}	4,2 / 566			s
21	Operating temperature range		– 25 ... + 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		117			g
27	Direction of rotation		electronically reversible			

Recommended values - mathematically independent of each other					
28	Speed up to	$n_{e\ max.}$		5 - 7 000	rpm
29	Torque up to [1] [2]	$M_{e\ max.}$		22 / 35	mNm
30	Current up to [1] [2]	$I_{e\ max.}$		0,7 / 1,1	A

[1] at 4 000 rpm
[2] thermal resistance $R_{th\,2}$ not reduced / thermal resistance $R_{th\,2}$ by 55% reduced

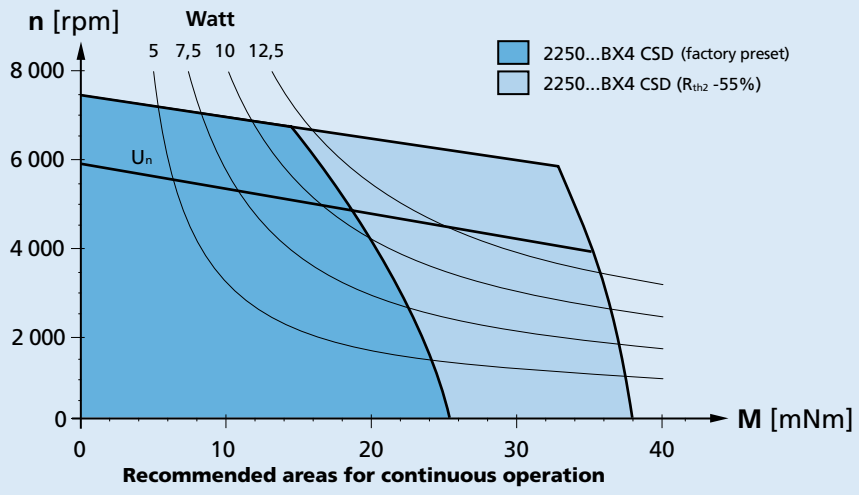
Note:

The diagram indicates the recommended speed in relation to the available torque at the output shaft for a given ambient temperature of 22°C.

The diagram shows the motor in a completely insulated as well as thermally coupled condition ($R_{th\,2}$ 55% reduced).

The motor is factory pre-configured to a continuous current for the thermally insulated condition. The controller must be reconfigured with the easy to use Motion Manager Software for use at higher continuous current.

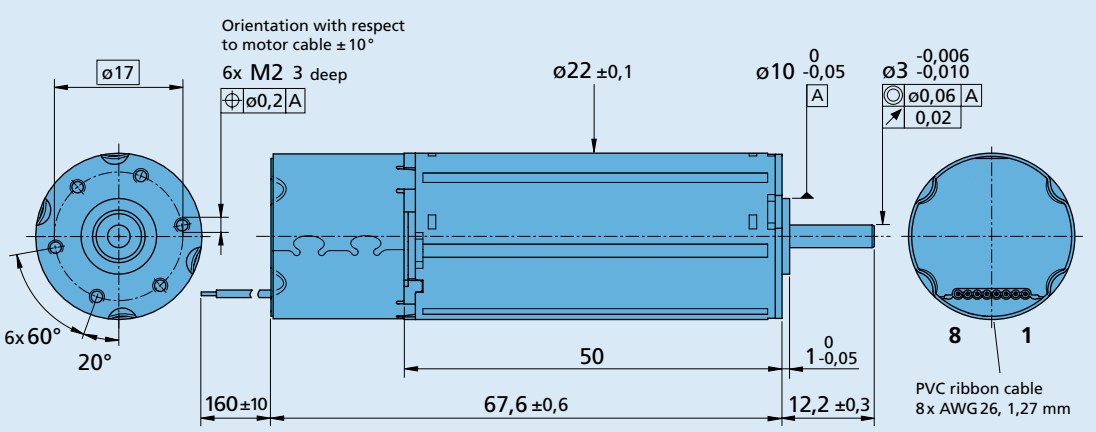
The nominal voltage (U_N) curve shows the operating point at nominal voltage in the insulated and thermally coupled condition. Any points of operation above the curve at nominal voltage will require a higher operating voltage. Any points below the nominal voltage curve will require less voltage.



For notes on technical data and lifetime performance refer to "Technical Information".

Specifications subject to change without notice

2250 ... BX4 CSD



2250 ... BX4 CSD

Connection

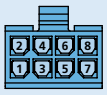
No.	Function
1	3.input
2	+24V
3	GND
4	Analog input
5	Analog GND
6	Fault output
7	RS232 RXD
8	RS232 TXD

Caution:
Incorrect lead connection will damage the motor electronics!

Options

Options

- Connector variant (Option no. 3830)
  AWG 26 / PVC ribbon cable
  with connector Micro-Fit



Full product description

- Example:
  2250S024 BX4 CSD

Motion Controller

Supply voltage [1]	U_B		5 ... 30	V DC
Peak current [2]	$I_{max.}$		3	A
Input/output (see connection No. 1, 2 and 3)			3	
Connection No. 1				
– Speed command analog input		voltage range	±10	V
– Speed command PWM input		frequency range	100 ... 2 000	Hz
		pulse duty factor 50%	0	rpm
– Digital input		input resistance (at 24V)	5	kΩ
– External encoder	$f_{max.}$		400	kHz
– Step frequency input	$f_{max.}$		400	kHz
Connection No. 2				
– Fault output		no error	switched to GND	
– Digital output		open collector	max. U_B / 30 mA	
– Digital input		input resistance	100	kΩ
Connection No. 3				
– Digital input		input resistance	22	kΩ
– Electronic supply voltage [1]	U_B		5 ... 30	V DC
Encoder:				
– Scanning rate			200	µs
– Resolution internal encoder			3 000	Inc./turn

The signal level of the digital inputs can be set using the above commands:
Standard (PLC): Low 0...4,5V / High 12,5V...U_B, TTL: Low 0...0,5V / High 2,5V...U_B

[1] A separate supply for motor and drive electronic is optional available (important for safety-relevant applications), here escapes the digital input, connection 3.
[2] Preset value. Can be changed over the interface.

Brushless DC-Servomotor with integrated Motion Controller

General description

The 2250 ... BX4 CSD combines an electronically commutated DC-Servomotor, a **high-resolution encoder** to determine actual position and a programmable position and speed controller, based on a high-capacity digital signal processor (DSP), within a complete drive unit.

This intelligent EC servomotor performs the following drive functions:

- **Speed control** from 5 to 7 000 rpm with superior performance specifications in respect of synchronous operation and minimal torque fluctuations. A PI controller ensures observance of set-point speeds.
- **Speed profiles** such as ramp, triangular or trapezoidal movements are possible. Gentle acceleration or deceleration can be implement ed without problem.
- **Positioning mode:** Positioning with a resolution of 1/3 000 revolutions. Acquisition of **reference marks and end position switches.**
- **Stepper motor mode, electronic gear** or operation with external **incremental encoder** for high-precision applications.
- **Torque control** through current regulation.
- **Self-protection** against excess temperature in the case of high loading, against over-voltage during generator operation and against under-voltage.
- **Storage** of the desired functions.
- **Storage** and execution of motion programs.

Various inputs and outputs are available for implementation of these functions:

- **Set-point input** for speed presetting.
  Analogue or PWM signal can be used. The input can also read in a reference mark signal. Depending on mode, a frequency signal or external incremental encoder can also be connected.
- **Error output** (Open Collector).
  Can also be reprogrammed as a rotational direction or reference mark input.
- **RS232 interface** for connection to a PC with a transfer rate of up to 115k baud. The information can be stored in the integrated memory (FLASH). The interface also offers the facility to retrieve online operating data and values.
- Additional **digital input**.

An extensive ASCII command set is available for **programming** and operation. This can be preset from the PC, e.g. via any terminal program, as contained in Windows, or via any other control computer.

For Windows 95/98/ME/NT/2000/XP, the **"Faulhaber Motion Manager"** program is available; this considerably simplifies operation and configuration of the units via the RS232 interface and also enables graphic online analysis of the operating data.

Once programmed as a speed or position controller via the analogue input, as a stepper motor or electronic gear, the drive can be operated independently of the RS232 interface.

Fields of application

Thanks to the integrated technology, the drive can be used in many different areas with minimal wiring effort. The flexible connection options open up a broad field of application in all areas, for example in decentralised systems of automation technology, as well as in pick-and-place machines and machine tools.

Options

Connector variant: AWG 26 / PVC ribbon cable with connector Molex Micro-Fit 3.0: 42025-0800

Separate supply of motor and control electronics is possible (important for safety-relevant applications); in this case the 3rd input is not required.

Special preconfiguration of modes and parameters is possible on request.

The Motion Manager program is available on request or on the Internet.

Note

A detailed instruction manual for installation and operation are provided with the brushless DC-Servomotor.

Position control