

# Brushless DC-Servomotors

## 4 Pole Technology

18 mNm  
23 W

### Series 2250 ... BX4 S

Values at 22°C and nominal voltage	2250 S	012 BX4 S	018 BX4 S	024 BX4 S	
1 Nominal voltage	$U_N$	12	18	24	V
2 Terminal resistance, phase-phase	$R$	1,55	3,17	5,9	$\Omega$
3 Efficiency, max.	$\eta_{max}$	71	71	72	%
4 No-load speed	$n_0$	10 700	11 400	10 900	$\text{min}^{-1}$
5 No-load current, typ. (with shaft $\varnothing$ 3 mm)	$I_0$	0,188	0,139	0,095	A
6 Stall torque	$M_H$	82,6	85,8	85,7	mNm
7 Friction torque, static	$C_0$	0,54	0,54	0,54	mNm
8 Friction torque, dynamic	$C_V$	$1,3 \cdot 10^{-4}$	$1,3 \cdot 10^{-4}$	$1,3 \cdot 10^{-4}$	$\text{mNm}/\text{min}^{-1}$
9 Speed constant	$k_n$	890	628	448	$\text{min}^{-1}/\text{V}$
10 Back-EMF constant	$k_E$	1,124	1,593	2,231	$\text{mV}/\text{min}^{-1}$
11 Torque constant	$k_M$	10,7	15,2	21,3	$\text{mNm}/\text{A}$
12 Current constant	$k_I$	0,093	0,066	0,047	$\text{A}/\text{mNm}$
13 Slope of n-M curve	$\Delta n/\Delta M$	128	131	124,8	$\text{min}^{-1}/\text{mNm}$
14 Terminal inductance, phase-phase	$L$	64,3	129	250	$\mu\text{H}$
15 Mechanical time constant	$\tau_m$	6,9	7	6,7	ms
16 Rotor inertia	$J$	5,1	5,1	5,1	$\text{gcm}^2$
17 Angular acceleration	$\alpha_{max}$	162	168	168	$\cdot 10^3 \text{rad}/\text{s}^2$
18 Thermal resistance	$R_{th1} / R_{th2}$	3,7 / 15,1			K/W
19 Thermal time constant	$\tau_{w1} / \tau_{w2}$	13 / 550			s
20 Operating temperature range:					
– motor		-40 ... +100			$^{\circ}\text{C}$
– winding, max. permissible		+125			$^{\circ}\text{C}$
21 Shaft bearings		ball bearings, preloaded			
22 Shaft load max.:					
– with shaft diameter		3			mm
– radial at 3 000 $\text{min}^{-1}$ (5 mm from mounting flange)		20			N
– axial at 3 000 $\text{min}^{-1}$ (push / pull)		2			N
– axial at standstill (push / pull)		20			N
23 Shaft play:					
– radial	$\leq$	0,015			mm
– axial	$=$	0			mm
24 Housing material		stainless steel			
25 Mass		88			g
26 Direction of rotation		electronically reversible			
27 Speed up to	$n_{max}$	26 000			$\text{min}^{-1}$
28 Number of pole pairs		2			
29 Hall sensors		digital			
30 Magnet material		NdFeB			
<b>Rated values for continuous operation</b>					
31 Rated torque	$M_N$	13,6	13	13,7	mNm
32 Rated current (thermal limit)	$I_N$	1,59	1,09	0,81	A
33 Rated speed	$n_N$	8 580	9 310	8 720	$\text{min}^{-1}$

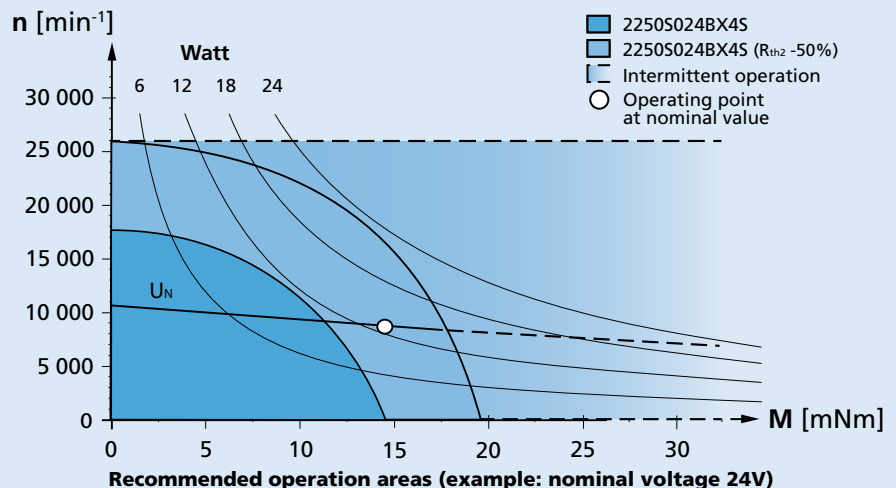
**Note:** Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The  $R_{th2}$  value has been reduced by 25%.

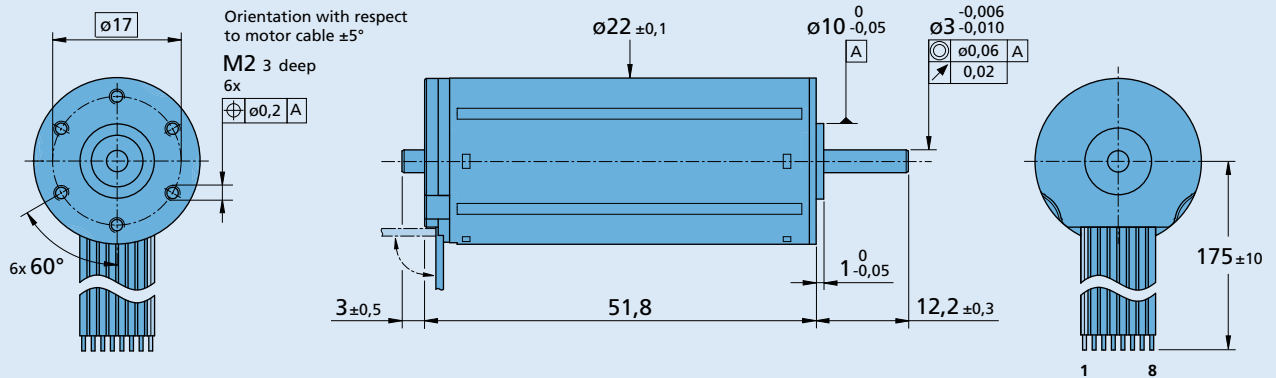
**Note:**

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 ( $R_{th2}$  50% reduced).

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.



**Dimensional drawing**

**2250 S ... BX4 S**
**Option, cable and connection information**

 Example product designation: **2250S024BX4S-3830**

Option	Type	Description	Connection standard	
			No.	Function
3830	Connector 	AWG 26 / PVC ribbon cable with connector MOLEX Microfit 3.0, 43025-0800, recommended mating connector 43020-0800	1	Phase C
4935	Single wires	Motor with single wires (PTFE), length 175 mm, AWG26	2	Phase B
X4935	Single wires	Motor with single wires (PTFE), length 300 mm, AWG26	3	Phase A
Y4935	Single wires	Motor with single wires (PTFE), length 600 mm, AWG26	4	GND
Y158	Shaft end	Motor without second shaft end	5	U <sub>DD</sub> (+5V)
			6	Hall sensor C
			7	Hall sensor B
			8	Hall sensor A

Option: 4935	
Function	Colour
Phase C	yellow
Phase B	orange
Phase A	brown
GND	black
U <sub>DD</sub> (+5V)	red
Hall sensor C	grey
Hall sensor B	blue
Hall sensor A	green

**Standard cable**  
 Insulation: PVC  
 8 conductors, AWG 26  
 pitch 1,27 mm, wires tinned

**Product combination**

Precision Gearheads / Lead Screws	Encoders	Drive Electronics	Cables / Accessories
22/7 26A	IE3-1024 IE3-1024 L IER3-10000 IER3-10000 L AEMT-12/16 L AES-4096 L	SC 2402 P SC 2804 S SC 5004 P SC 5008 S MC 3001 B MC 3001 P MC 5004 P MC 5004 P STO MC 5005 S	To view our large range of accessory parts, please refer to the "Accessories" chapter.