

# Brushless DC-Servomotors

## 4 Pole Technology

### 10 mNm

For combination with  
 Gearheads:  
 22F, 22/7, 26A  
 Encoders:  
 2232...BX4S + Encoder  
 Drive Electronics:  
 Speed Controller

### Series 2232 ... BX4 S

	2232 S	012 BX4 S	024 BX4 S	
1 Nominal voltage	$U_N$	12	24	Volt
2 Terminal resistance, phase-phase	R	3,5	12,4	$\Omega$
3 Output power <sup>1)</sup>	$P_{2 \text{ max.}}$	3,8	3,9	W
4 Efficiency	$\eta_{\text{ max.}}$	60,9	61,7	%
5 No-load speed	$n_o$	13 200	14 000	rpm
6 No-load current (with shaft $\varnothing$ 3,0 mm)	$I_o$	0,163	0,088	A
7 Stall torque	$M_H$	27,3	29,4	mNm
8 Friction torque, static	$C_o$	0,6	0,6	mNm
9 Friction torque, dynamic	$C_v$	$5,5 \cdot 10^{-5}$	$5,5 \cdot 10^{-5}$	mNm/rpm
10 Speed constant	$k_n$	1 173	616	rpm/V
11 Back-EMF constant	$k_E$	0,852	1,623	mV/rpm
12 Torque constant	$k_M$	8,14	15,50	mNm/A
13 Current constant	$k_I$	0,123	0,065	A/mNm
14 Slope of n-M curve	$\Delta n / \Delta M$	504	493	rpm/mNm
15 Terminal inductance, phase-phase	L	130	470	$\mu\text{H}$
16 Mechanical time constant	$\tau_m$	22	22	ms
17 Rotor inertia	J	4,2	4,2	$\text{gcm}^2$
18 Angular acceleration	$\alpha_{\text{ max.}}$	65	70	$\cdot 10^3 \text{ rad/s}^2$
19 Thermal resistance	$R_{\text{th} 1} / R_{\text{th} 2}$	2 / 17		K/W
20 Thermal time constant	$\tau_{w1} / \tau_{w2}$	4,1 / 360		s
21 Operating temperature range		- 40 ... + 100		$^{\circ}\text{C}$
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	$\leq$	0,015		mm
- axial	$=$	0		mm
25 Housing material		stainless steel		
26 Weight		70		g
27 Direction of rotation		electronically reversible		
28 Number of pole pairs		2		
<b>Recommended values - mathematically independent of each other</b>				
29 Speed up to	$n_e \text{ max.}$	34 000	34 000	rpm
30 Torque up to <sup>1) 2)</sup>	$M_e \text{ max.}$	6 / 10	6 / 10	mNm
31 Current up to <sup>1) 2)</sup>	$I_e \text{ max.}$	0,94 / 1,42	0,50 / 0,75	A

<sup>1)</sup> at 5 000 rpm

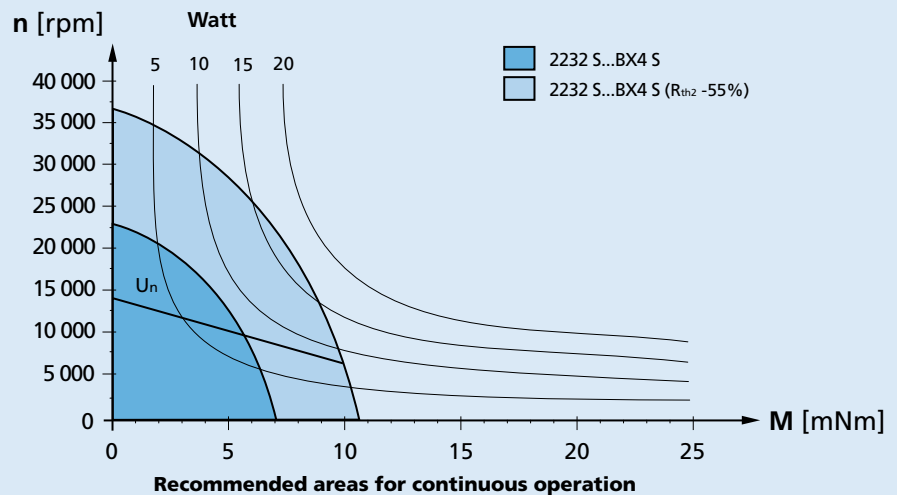
<sup>2)</sup> thermal resistance  $R_{\text{th} 2}$  not reduced / thermal resistance  $R_{\text{th} 2}$  by 55% reduced

#### 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.

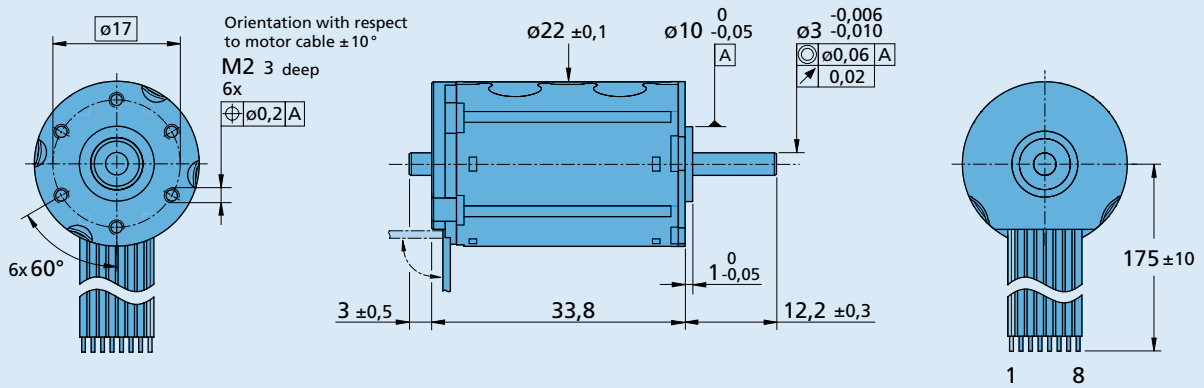
The diagram shows the motor in a completely insulated as well as thermally coupled condition ( $R_{\text{th} 2}$  55% reduced).

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**

M 1:1



**2232 S ... BX4 S**

**Options**

- Connector variant (Option no. 3830)

**Motor:**  
AWG 26 / PVC ribbon cable  
with connector Micro-Fit

- Analog Hall sensors (Option no. 3692)



**Full product description**

- Examples:  
**2232S012BX4S**

**Cable and connection information**

