

# Brushless DC-Servomotors

sensorless, with optional Hall Sensors  
SMARTSHELL® Technology

## 15,5 mNm

For combination with  
Gearheads:  
20/1, 22/2, 22/5, 22/7, 23/1, 26/1(S), 30/1(S), 38/3  
Drive Electronics:  
Speed Controller

### Series 2248 ... BSL

	2248 S	012 BSL	024 BSL	048 BSL	
1 Nominal voltage	$U_N$	12	24	48	Volt
2 Terminal resistance, phase-phase	R	1,15	4,20	17,00	$\Omega$
3 Output power <sup>1)</sup>	$P_{2 \text{ max.}}$	32	33	31	W
4 Efficiency	$\eta_{\text{ max.}}$	74	75	74	%
5 No-load speed	$n_o$	13 700	14 100	14 600	rpm
6 No-load current (with shaft $\varnothing$ 3,0 mm)	$I_o$	0,217	0,114	0,060	A
7 Stall torque	$M_H$	85	90	86	mNm
8 Friction torque, static	$C_o$	0,640	0,640	0,640	mNm
9 Friction torque, dynamic	$C_v$	$8,31 \cdot 10^{-5}$	$8,31 \cdot 10^{-5}$	$8,31 \cdot 10^{-5}$	mNm/rpm
10 Speed constant	$k_n$	1 167	599	311	rpm/V
11 Back-EMF constant	$k_E$	0,857	1,668	3,215	mV/rpm
12 Torque constant	$k_M$	8,18	15,93	30,70	mNm/A
13 Current constant	$k_i$	0,122	0,063	0,033	A/mNm
14 Slope of n-M curve	$\Delta n / \Delta M$	164	158	172	rpm/mNm
15 Terminal inductance, phase-phase	L	71	276	1 048	$\mu\text{H}$
16 Mechanical time constant	$\tau_m$	6	5	6	ms
17 Rotor inertia	J	3,36	3,36	3,36	gcm <sup>2</sup>
18 Angular acceleration	$\alpha_{\text{ max.}}$	252	269	256	$10^3 \text{ rad/s}^2$
19 Thermal resistance	$R_{\text{th} 1} / R_{\text{th} 2}$	4,5 / 12,6			K/W
20 Thermal time constant	$\tau_{w1} / \tau_{w2}$	7 / 710			s
21 Operating temperature range		- 30 ... +125			°C
22 Shaft bearings		ball bearings, preloaded			
23 Shaft load max.:					
- radial at 3 000/20 000 rpm (6 mm from mounting flange)		31 / 23	for series 2248 S ... B ..		N
- radial at 3 000/20 000 rpm (4,5 mm from mounting flange)		32 / 24	for series 2248 U ... B ..		N
- axial at 3 000/20 000 rpm (push-on only)		18 / 13			N
- axial at standstill (push-on only)		45			N
24 Shaft play:					
- radial	$\leq$	0,015			mm
- axial	$=$	0			mm
25 Housing material		mounting face in aluminium, housing in plastic			
26 Weight		95			g
27 Direction of rotation		electronically reversible			

#### Recommended values - mathematically independent of each other

28 Speed up to <sup>2)</sup>	$n_{e \text{ max.}}$	32 000	32 000	32 000	rpm
29 Torque up to <sup>1) 2)</sup>	$M_{e \text{ max.}}$	15,2	15,5	14,8	mNm
30 Current up to <sup>1) 2)</sup>	$I_{e \text{ max.}}$	2,14	1,12	0,56	A

<sup>1)</sup> at 20 000 rpm

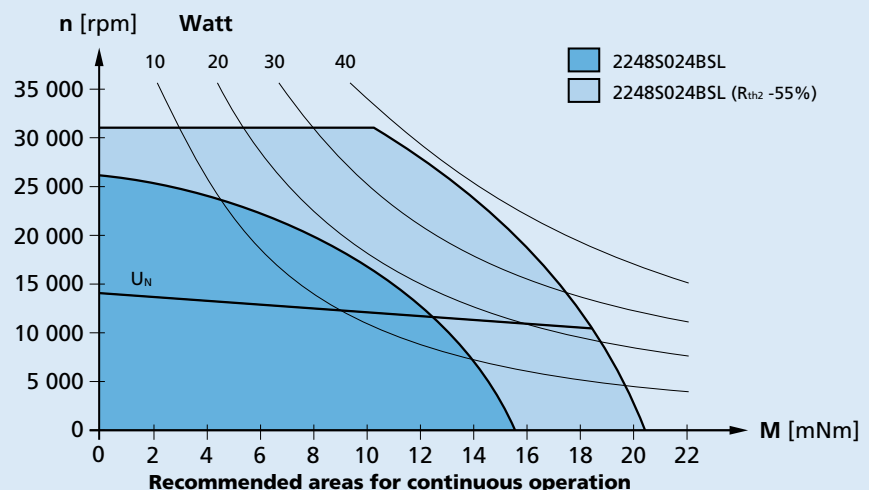
<sup>2)</sup> thermal resistance  $R_{\text{th} 2}$  by 55% reduced

#### 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.

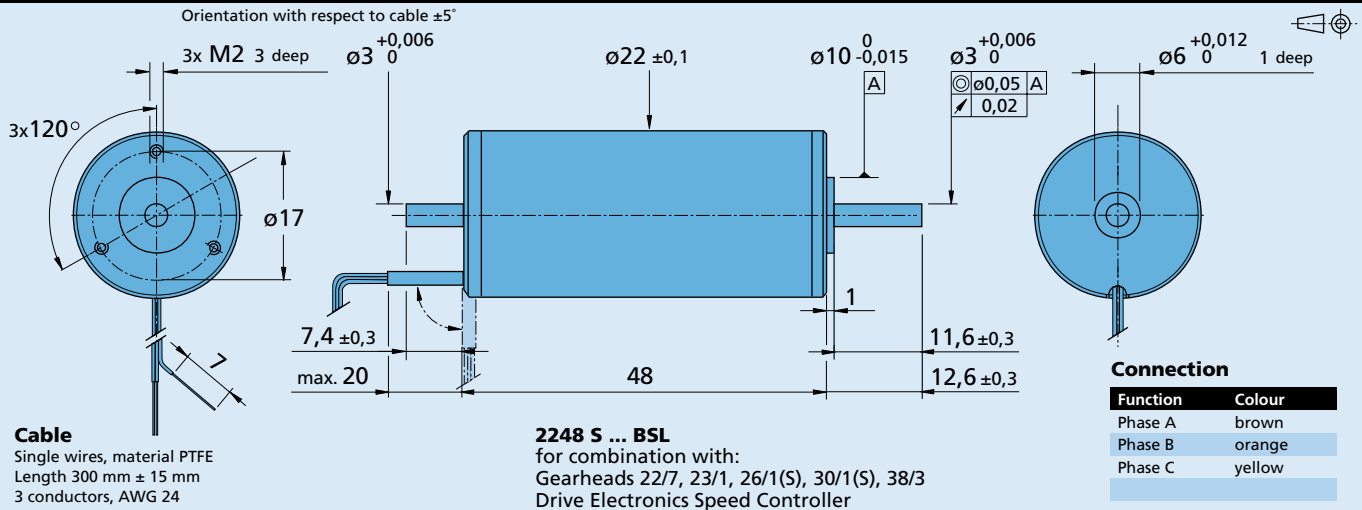
The diagram shows the motor in a completely insulated as well as thermally coupled condition ( $R_{\text{th} 2}$  55% reduced).

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.

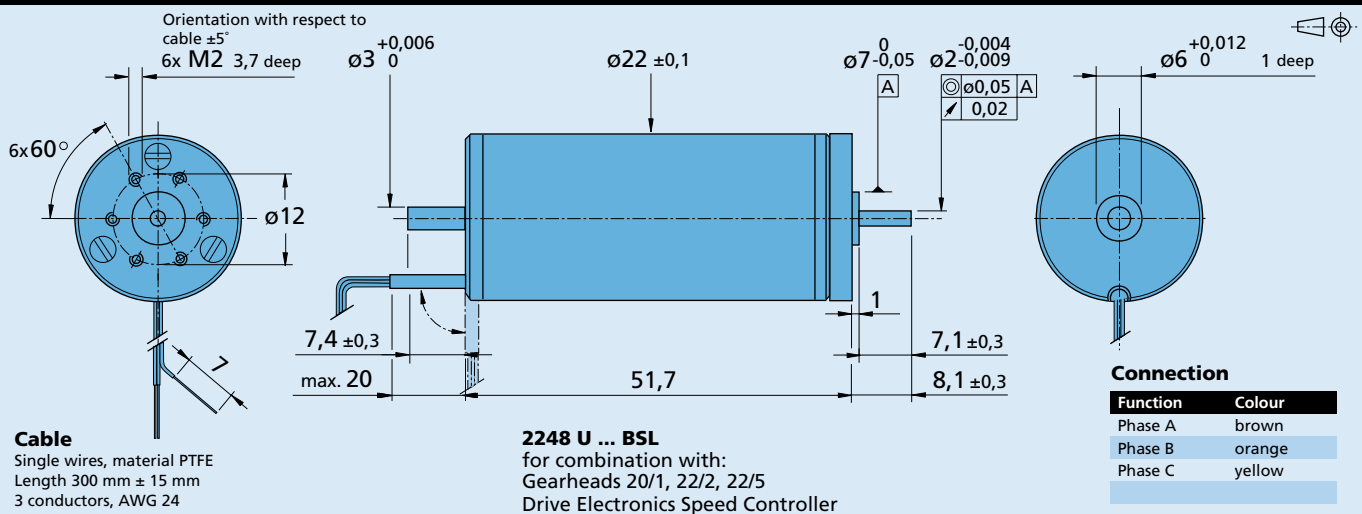


**Options**  
 Motors with digital sensors:  
**2248 S ... BDS, 2248 U ... BDS**  
 Motors with analog sensors:  
**2248 S ... BAS, 2248 U ... BAS**

**2248 S ... BSL sensorless**



**2248 U ... BSL sensorless**



**2248 S ... BAS, 2248 S ... BDS, 2248 U ... BAS, 2248 U ... BDS with Hall sensors**

