Brushless DC-Servomotors

2 Pole Technology

15,9 mNm

96 W

Series 1660 ... BHS

Values at 22°C and nominal voltage		1660 S	024 BHS	036 BHS	048 BHS	
1 Nominal voltage	U_N		24	36	48	V
2 Terminal resistance, phase-phase	R		0,29	0,51	1,12	Ω
3 Efficiency, max.	$\eta_{max.}$		92	92	92	%
4 No-load speed	n_0		52 400	60 100	53 600	min^{-1}
5 No-load current, typ. (with shaft ø 3 mm)	I_0		0,147	0,123	0,076	A
6 Stall torque	M_H		385	442	394	mNm
7 Friction torque, static	C_0		0,16	0,16	0,16	mNm
8 Friction torque, dynamic	C_V		$9{,}43 \cdot 10^{-6}$	$9{,}43 \cdot 10^{-6}$	$9{,}43 \cdot 10^{-6}$	mNm/min^{-1}
9 Speed constant	k_n		2 038	1 527	1 037	min^{-1}/V
10 Back-EMF constant	k_E		0,491	0,655	0,964	mV/min^{-1}
11 Torque constant	k_M		4,69	6,26	9,21	mNm/A
12 Current constant	k_I		0,21	0,16	0,11	A/mNm
13 Slope of n-M curve	$\Delta n/\Delta M$		127	124	127	min^{-1}/mNm
14 Terminal inductance, phase-phase	L		29	52	112	µH
15 Mechanical time constant	τ_m		1,2	1,2	1,2	ms
16 Rotor inertia	J		0,9	0,9	0,9	gcm^2
17 Angular acceleration	$\alpha_{max.}$		4 278	4 914	4 372	$\cdot 10^3 rad/s^2$
18 Thermal resistance	R_{th1} / R_{th2}	2,1 / 18,2				K/W
19 Thermal time constant	τ_{w1} / τ_{w2}	6,3 / 638				s
20 Operating temperature range:						
– motor		-30 ... +125				°C
– winding, max. permissible		+125				°C
21 Shaft bearings		ball bearings, preloaded				
22 Shaft load max.:						
– with shaft diameter		3				mm
– radial at 40 000 min^{-1} (5 mm from mounting flange)		19				N
– axial at 40 000 min^{-1} (push only)		9				N
– axial at standstill (push only)		44				N
23 Shaft play:						
– radial	≤	0,01				mm
– axial	=	0				mm
24 Housing material		stainless steel				
25 Mass		78				g
26 Direction of rotation		electronically reversible				
27 Speed up to	$n_{max.}$	97 000				min^{-1}
28 Number of pole pairs		1				
29 Hall sensors		digital				
30 Magnet material		NdFeB				
Rated values for continuous operation						
31 Rated torque	M_N		11,6	10,3	11,4	mNm
32 Rated current (thermal limit)	I_N		2,94	1,98	1,48	A
33 Rated speed	n_N		52 370	59 530	53 400	min^{-1}

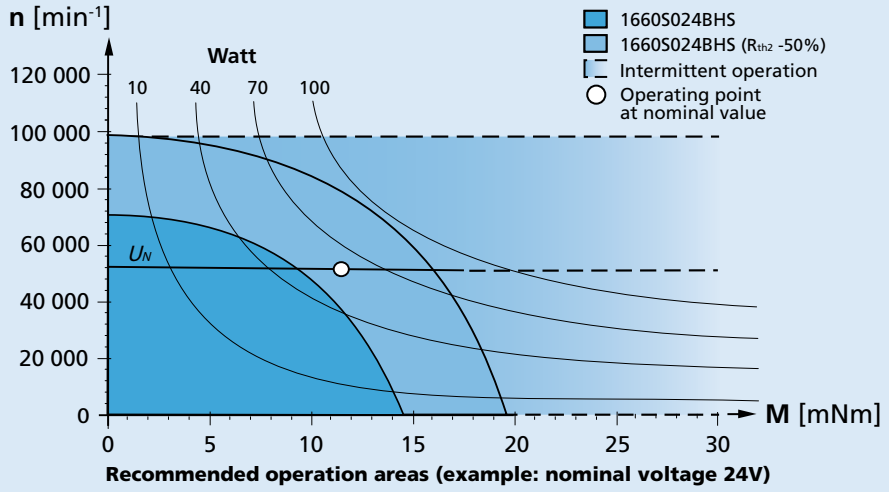
Note: Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The R_{th2} value has been reduced by 25%.

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.

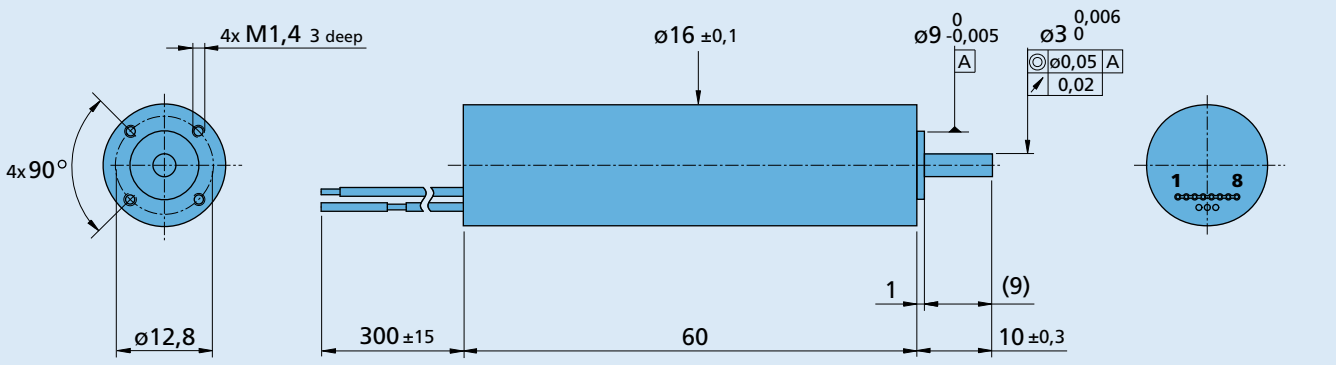


Recommended operation areas (example: nominal voltage 24V)

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

Edition 2023 Mar. 31

Dimensional drawing



1660 S ... BHS

Option, cable and connection information

Example product designation: **1660S024BHS**

Option	Type	Description

Connection

No.	Function	Colour
–	Phase C	yellow
–	Phase B	orange
–	Phase A	brown
1	GND	red
2	U_{DD} (4,5 ... 5,5V)	grey
3	Hall sensor C	grey
4	Hall sensor B	grey
5	Hall sensor A	grey
6	Reserved	grey
7	Reserved	grey
8	Reserved	grey

Standard cable

Single wires, material PTFE
AWG24, Phase A/B/C
Flat cable, material PVC
AWG28, Pitch 1,27 mm
Hall A,B,C, U_{DD}, GND

Product combination

Precision Gearheads / Lead Screws	Encoders	Drive Electronics	Cables / Accessories
15/10 17/1 20/1R	IEM3-1024	SC 5004 P SC 5008 S MC 3603 S	To view our large range of accessory parts, please refer to the "Accessories" chapter.