

# Brushless DC-Gearmotors

penny-motor® Technology

## 5 mNm

For combination with  
Drive Electronics:  
Speed controller with adapter board

### Series 1309 ... BH

Integrated Motor	1309 C	004 BH	006 BH	
Nominal voltage	U <sub>N</sub>	4	6	V
Terminal resistance, phase-phase	R	16	70	Ω
Output power <sup>1)</sup>	P <sub>2 max.</sub>	0,206	0,157	W
Efficiency	η <sub>max.</sub>	52	43	%
No-load speed	n <sub>0</sub>	37 630	34 770	rpm
No-load current	I <sub>0</sub>	0,026	0,015	A
Stall torque	M <sub>H</sub>	0,249	0,136	mNm
Speed constant	k <sub>n</sub>	9 502	5 902	rpm/V
Back-EMF constant	k <sub>E</sub>	0,105	0,169	mV/rpm
Torque constant	k <sub>M</sub>	1,005	1,618	mNm/A
Current constant	k <sub>I</sub>	0,995	0,618	A/mNm
Slope of n-M curve	Δn/ΔM	151 272	255 336	rpm/mNm
Rotor inertia	J	0,16	0,16	gcm <sup>2</sup>

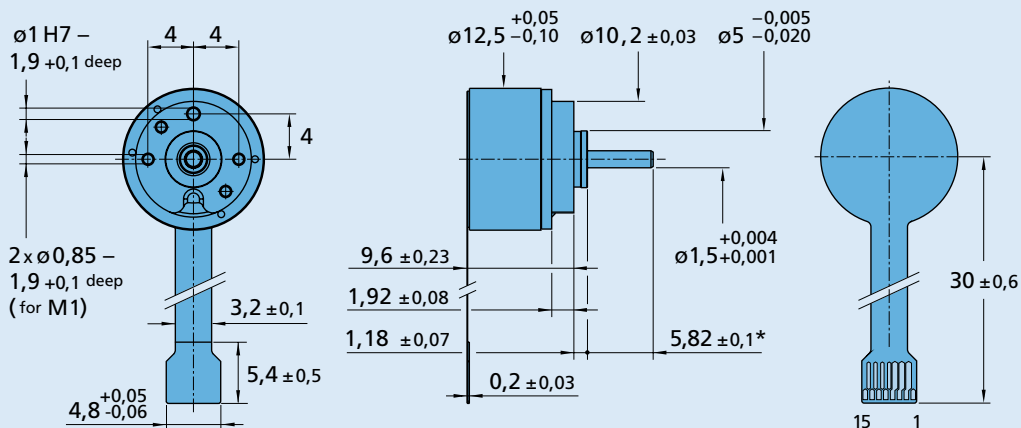
Drive system				
Housing material / Geartrain material	plastic / metal			
Shaft bearing	combination ball bearings + sleeve bearings			
Shaft load max.:				
– radial at 10 000 rpm (1,5 mm from bearing)	≤	0,5		N
– axial at 10 000 rpm	≤	0,1		N
– axial at standstill	≤	5		N
Shaft play:				
– radial (3 mm from bearing face)	≤	0,12		mm
– axial	≤	0,2		mm
Operating temperature range		0 ... + 85		°C

Recommended values - mathematically independent of each other					
Speed up to	n <sub>e max.</sub>		10 000	10 000	min <sup>-1</sup>
Current up to (thermal limits) <sup>2) 3)</sup>	I <sub>e max.</sub>		0,205	0,098	A

<sup>1)</sup> at 10 000 min<sup>-1</sup> <sup>2)</sup> thermal resistance R<sub>th2</sub> not reduced <sup>3)</sup> at standstill

reduction ratio (rounded)	output speed up to n <sub>max</sub> rpm	weight with motor g	004 BH		006 BH		direction of rotation (reversible)	efficiency %
			output torque		output torque			
			continuous operation M <sub>max.</sub> mNm	intermittent operation M <sub>max.</sub> mNm	continuous operation M <sub>max.</sub> mNm	intermittent operation M <sub>max.</sub> mNm		
17 : 1	592	2,6	2,5	5,0	2,0	3,9	≠	82
31 : 1	323	2,7	4,3	8,5	3,4	6,8	=	77
90 : 1	111	2,8	5,0	15,0	5,0	15,0	≠	72
259 : 1	39	2,9	5,0	15,0	5,0	15,0	=	68
749 : 1	13	2,9	5,0	15,0	5,0	15,0	≠	64
1 830 : 1	5	3,0	5,0	15,0	5,0	15,0	=	60

Scale enlarged



\* also available with 2,82 mm output shaft length

#### Connection

No.	Function
1	Star point
2	Phase A
3	Phase A
4	Phase B
5	Phase B
6	Phase C
7	Phase C
8	Hall sensor In+
9	Hall sensor In-
10	analog Hall A Out+
11	analog Hall A Out-
12	analog Hall B Out+
13	analog Hall B Out-
14	analog Hall C Out+
15	analog Hall C Out-

#### Connectors

15-pole; 0,3 mm pitch; e.g.: Hirose: FH23-15S-0.3SHAW (05)