

# Brushless DC-Servomotors

## 2 Pole Technology

19,5 mNm  
63,2 W

### Series 2057 ... B

Values at 22°C and nominal voltage		2057 S	012 B	024 B	
1	Nominal voltage	$U_N$	12	24	V
2	Terminal resistance, phase-phase	$R$	0,523	1,32	$\Omega$
3	Efficiency, max.	$\eta_{max}$	83	84	%
4	No-load speed	$n_0$	21 000	24 900	min <sup>-1</sup>
5	No-load current, typ. (with shaft $\varnothing$ 3 mm)	$I_0$	0,187	0,129	A
6	Stall torque	$M_H$	127	172	mNm
7	Friction torque, static	$C_0$	0,15	0,15	mNm
8	Friction torque, dynamic	$C_V$	$4,13 \cdot 10^{-5}$	$4,13 \cdot 10^{-5}$	mNm/min <sup>-1</sup>
9	Speed constant	$k_n$	1 720	1 010	min <sup>-1</sup> /V
10	Back-EMF constant	$k_E$	0,582	0,991	mV/min <sup>-1</sup>
11	Torque constant	$k_M$	5,55	9,46	mNm/A
12	Current constant	$k_I$	0,18	0,106	A/mNm
13	Slope of n-M curve	$\Delta n / \Delta M$	162	141	min <sup>-1</sup> /mNm
14	Terminal inductance, phase-phase	$L$	38,5	114	$\mu$ H
15	Mechanical time constant	$\tau_m$	6,78	5,9	ms
16	Rotor inertia	$J$	4	4	gcm <sup>2</sup>
17	Angular acceleration	$\alpha_{max}$	318	430	$\cdot 10^3$ rad/s <sup>2</sup>
18	Thermal resistance	$R_{th1} / R_{th2}$	2,5 / 12		K/W
19	Thermal time constant	$\tau_{w1} / \tau_{w2}$	7,3 / 720		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 3 000 min <sup>-1</sup> (5 mm from mounting flange)		28		N
	– axial at 3 000 min <sup>-1</sup> (push only)		17		N
	– axial at standstill (push only)		75		N
23	Shaft play:				
	– radial	$\leq$	0,015		mm
	– axial	$=$	0		mm
24	Housing material		aluminium, black anodized		
25	Mass		95		g
26	Direction of rotation		electronically reversible		
27	Speed up to	$n_{max}$	55 000		min <sup>-1</sup>
28	Number of pole pairs		1		
29	Hall sensors		digital		
30	Magnet material		NdFeB		
<b>Rated values for continuous operation</b>					
31	Rated torque	$M_N$	16,1	16,2	mNm
32	Rated current (thermal limit)	$I_N$	3,38	1,99	A
33	Rated speed	$n_N$	18 300	22 400	min <sup>-1</sup>

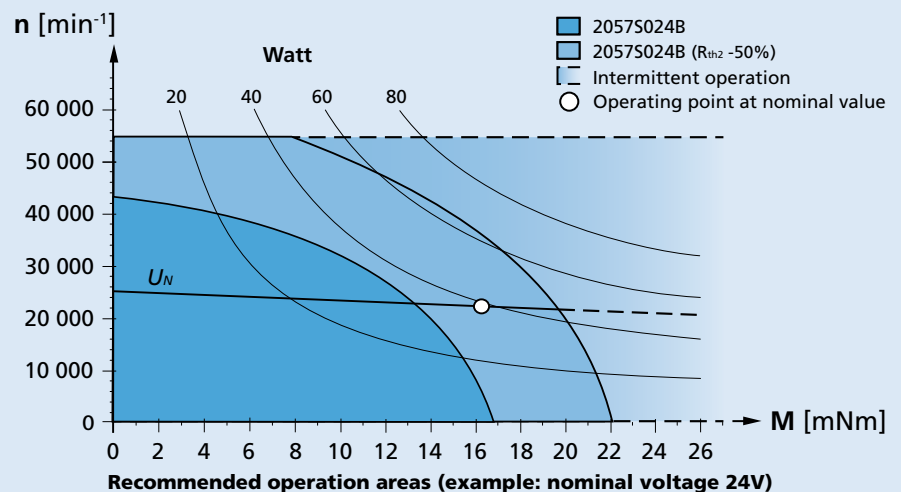
**Note:** Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The  $R_{th2}$  value has been reduced by 25%.

**Note:**

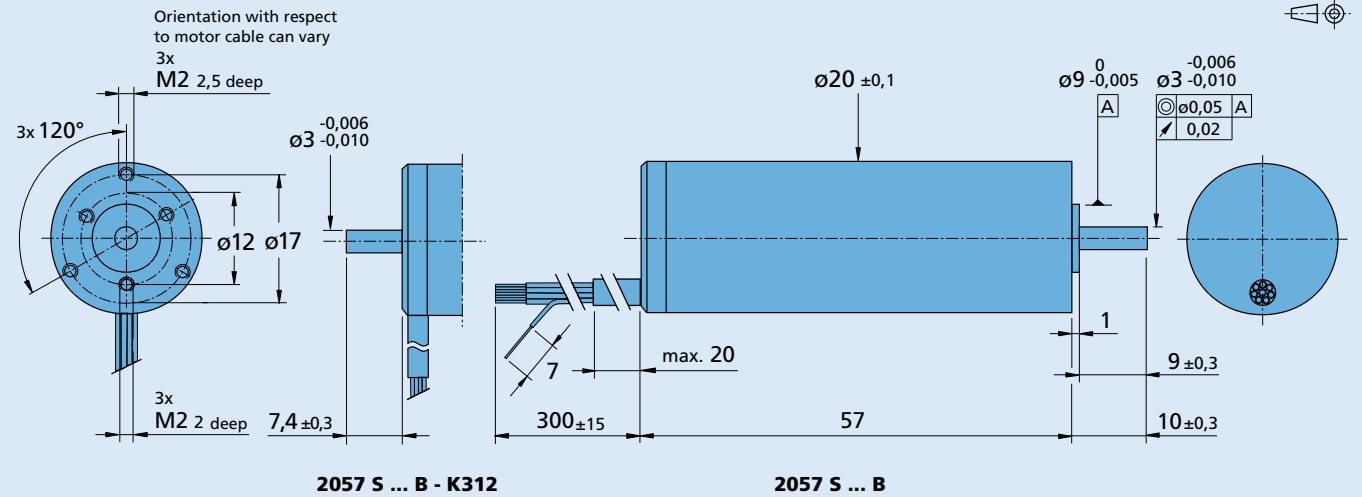
The diagram indicates the recommended speed in relation to the available torque at the output shaft for a given ambient temperature of 22°C.

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



### Option, cable and connection information

Example product designation: **2057S012B-K1155**

Option	Type	Description	Connection	
			Function	Colour
K1155	Controller combination	Analog Hall sensors for combination with Speed Controller SC or Motion Controller MC	Phase C	yellow
K313	Encoder combination	Motor with rear end shaft for combination with Encoder IE2	Phase B	orange
K312	Encoder combination	Motor with rear end shaft for combination with Encoder HEDS/HEDL/HEDM	Phase A	brown
K179	Bearing lubrication	For vacuum of 10 <sup>-5</sup> Pa @ 22°C	GND	black
			U <sub>DD</sub> (+5V)	red
			Hall sensor C	grey
			Hall sensor B	blue
			Hall sensor A	green
			<b>Standard cable</b>	
			Single wires, material PTFE	
			AWG 24: Phase A/B/C	
			AWG 26: Hall A/B/C, U <sub>DD</sub> , GND	

### Product combination

Precision Gearheads / Lead Screws	Encoders	Drive Electronics	Cables / Accessories
20/1R 22GPT 23/1 22L ... ML 22L ... SB 22L ... PB	IE2-1024 HEDS 5500 HEDL 5540	SC 2804 S SC 5004 P SC 5008 S MC 3603 S MC 5004 P MC 5005 S	To view our large range of accessory parts, please refer to the "Accessories" chapter.