

# Brushless DC-Servomotors

## 2 Pole Technology

33 mNm  
71 W

### Series 3056 ... B

Values at 22°C and nominal voltage	3056 K	012 B	024 B	036 B	048 B	
1 Nominal voltage	$U_N$	12	24	36	48	V
2 Terminal resistance, phase-phase	$R$	1,5	6,4	12,3	23,6	$\Omega$
3 Efficiency, max.	$\eta_{max}$	76	77	77	76	%
4 No-load speed	$n_0$	8 800	8 100	8 900	8 900	$\text{min}^{-1}$
5 No-load current, typ. (with shaft $\varnothing$ 4 mm)	$I_0$	0,128	0,057	0,044	0,033	A
6 Stall torque	$M_H$	102	104	111	103	mNm
7 Friction torque, static	$C_0$	0,81	0,81	0,81	0,81	mNm
8 Friction torque, dynamic	$C_V$	$9,5 \cdot 10^{-5}$	$9,5 \cdot 10^{-5}$	$9,5 \cdot 10^{-5}$	$9,5 \cdot 10^{-5}$	$\text{mNm}/\text{min}^{-1}$
9 Speed constant	$k_n$	742	343	251	188	$\text{min}^{-1}/\text{V}$
10 Back-EMF constant	$k_E$	1,35	2,91	3,99	5,32	$\text{mV}/\text{min}^{-1}$
11 Torque constant	$k_M$	12,9	27,8	38,1	50,8	$\text{mNm}/\text{A}$
12 Current constant	$k_I$	0,078	0,036	0,026	0,02	$\text{A}/\text{mNm}$
13 Slope of n-M curve	$\Delta n/\Delta M$	87	79	81	87	$\text{min}^{-1}/\text{mNm}$
14 Terminal inductance, phase-phase	$L$	160	740	1 400	2 600	$\mu\text{H}$
15 Mechanical time constant	$\tau_m$	13,6	12,4	12,7	13,7	ms
16 Rotor inertia	$J$	15	15	15	15	$\text{gcm}^2$
17 Angular acceleration	$\alpha_{max}$	68	69	74	68	$\cdot 10^3 \text{rad}/\text{s}^2$
18 Thermal resistance	$R_{th1} / R_{th2}$	2,2 / 7,9				K/W
19 Thermal time constant	$\tau_{w1} / \tau_{w2}$	11,7 / 650				s
20 Operating temperature range:						
– motor		-30 ... +125				$^{\circ}\text{C}$
– winding, max. permissible		+125				$^{\circ}\text{C}$
21 Shaft bearings		ball bearings, preloaded				
22 Shaft load max.:						
– with shaft diameter		4				mm
– radial at 3 000 $\text{min}^{-1}$ (5 mm from mounting flange)		75				N
– axial at 3 000 $\text{min}^{-1}$ (push only)		18				N
– axial at standstill (push only)		62				N
23 Shaft play:						
– radial	$\leq$	0,015				mm
– axial	$=$	0				mm
24 Housing material		aluminium, black anodized				
25 Mass		192				g
26 Direction of rotation		electronically reversible				
27 Speed up to	$n_{max}$	35 000				$\text{min}^{-1}$
28 Number of pole pairs		1				
29 Hall sensors		digital				
30 Magnet material		SmCo				
<b>Rated values for continuous operation</b>						
31 Rated torque	$M_N$	28,5	30	29,4	28,3	mNm
32 Rated current (thermal limit)	$I_N$	2,4	1,17	0,838	0,605	A
33 Rated speed	$n_N$	5 340	4 820	5 600	5 450	$\text{min}^{-1}$

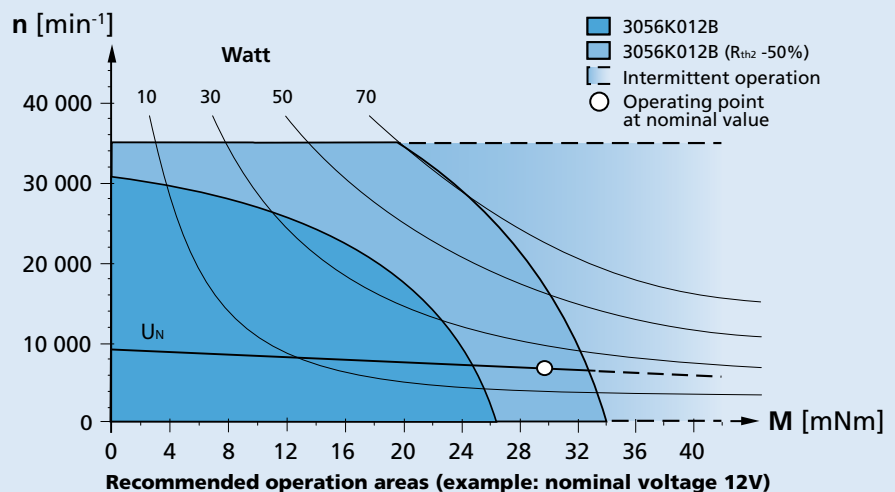
**Note:** Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The  $R_{th2}$  value has been reduced by 25%.

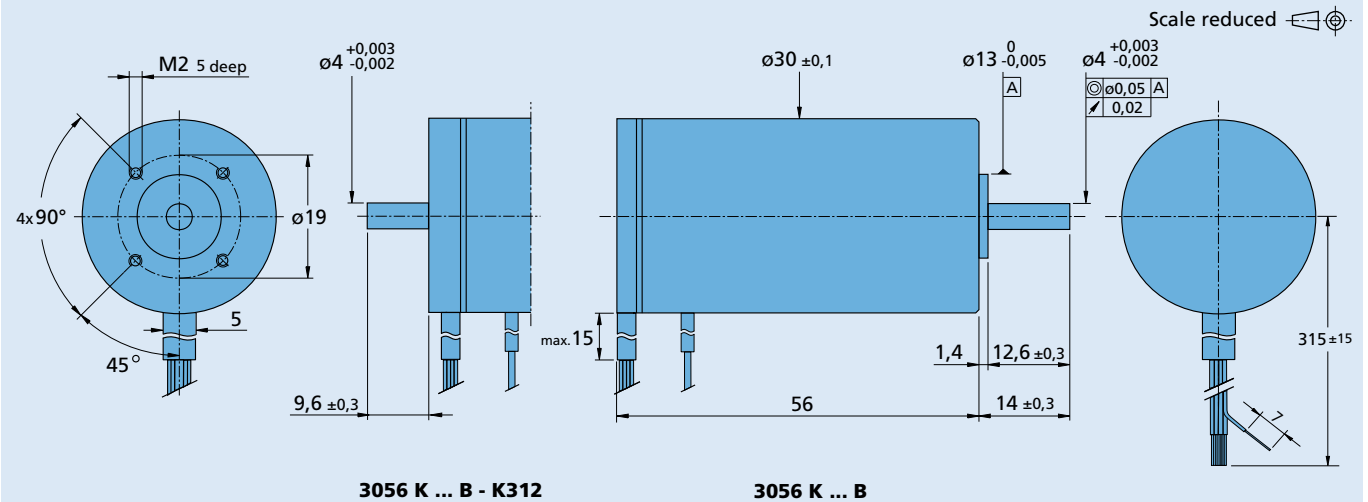
**Note:**

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.



**Dimensional drawing**

**Option, cable and connection information**

 Example product designation: **3056K012B-K1155**

Option	Type	Description	Connection	
			Function	Colour
K1155	Controller combination	Analog Hall sensors for combination with Motion Controller MCBL	Phase C	yellow
K1026	Sensorless	Motor without Hall sensors	Phase B	orange
K1555	Lead wires length	Single lead wires 750 mm long in PTFE	Phase A	brown
K1838	Encoder combination	Motor with rear end shaft for combination with Encoder IE3	GND	black
K312	Encoder combination	Motor with rear end shaft for combination with Encoder HEDS/HEDL/HEDM	U <sub>DD</sub> (+5V)	red
K3051	Encoder combination	Motor with rear end shaft for combination with Encoder AES	Hall sensor C	grey
K179	Bearing lubrication	For vacuum of 10 <sup>-5</sup> Pa @ 22°C	Hall sensor B	blue
			Hall sensor A	green
			<b>Standard cable</b>	
			Single wires, material PTFE	
			AWG 20: 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
30/1	HEDS 5500	SC 2402 P	MBZ  To view our large range of accessory parts, please refer to the "Accessories" chapter.
30/1 S	IE3-1024	SC 2804 S	
38/1	IE3-1024 L	SC 5004 P	
38/1 S	HEDL 5540	SC 5008 S	
38/2	AES-4096	MCBL 3002 P	
38/2 S		MCBL 3002 S	
		MCBL 3003 P	
		MCBL 3006 S	
		MC 5004 P	
		MC 5004 P STO	
		MC 5005 S	