

# Brushless DC-Servomotors

## 2 Pole Technology

7,2 mNm  
25 W

### Series 2036 ... B

Values at 22°C and nominal voltage	2036 U	012 B	024 B	036 B	048 B		
1 Nominal voltage	$U_N$		12	24	36	48	V
2 Terminal resistance, phase-phase	$R$		3,24	13,4	26,4	62,3	$\Omega$
3 Efficiency, max.	$\eta_{max}$		71	72	71	69	%
4 No-load speed	$n_0$		18 800	18 400	20 300	18 500	$\text{min}^{-1}$
5 No-load current, typ. (with shaft $\varnothing$ 2 mm)	$I_0$		0,089	0,043	0,033	0,022	A
6 Stall torque	$M_H$		21,9	21,6	22,4	18,4	mNm
7 Friction torque, static	$C_0$		0,22	0,22	0,22	0,22	mNm
8 Friction torque, dynamic	$C_V$		$1,64 \cdot 10^{-5}$	$1,64 \cdot 10^{-5}$	$1,64 \cdot 10^{-5}$	$1,64 \cdot 10^{-5}$	$\text{mNm}/\text{min}^{-1}$
9 Speed constant	$k_n$		1 602	783	575	396	$\text{min}^{-1}/\text{V}$
10 Back-EMF constant	$k_E$		0,624	1,28	1,74	2,52	$\text{mV}/\text{min}^{-1}$
11 Torque constant	$k_M$		5,96	12,2	16,6	24,1	$\text{mNm}/\text{A}$
12 Current constant	$k_I$		0,168	0,082	0,06	0,042	$\text{A}/\text{mNm}$
13 Slope of n-M curve	$\Delta n/\Delta M$		871	860	915	1 024	$\text{min}^{-1}/\text{mNm}$
14 Terminal inductance, phase-phase	$L$		145	613	1 132	2 390	$\mu\text{H}$
15 Mechanical time constant	$\tau_m$		17,8	17,6	18,7	20,9	ms
16 Rotor inertia	$J$		1,95	1,95	1,95	1,95	$\text{gcm}^2$
17 Angular acceleration	$\alpha_{max}$		112	111	115	94	$\cdot 10^3 \text{rad}/\text{s}^2$
18 Thermal resistance	$R_{th1} / R_{th2}$	4,1 / 16,6					K/W
19 Thermal time constant	$\tau_{w1} / \tau_{w2}$	6 / 397					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		2					mm
– radial at 3 000 $\text{min}^{-1}$ (4 mm from mounting flange)		14,5					N
– axial at 3 000 $\text{min}^{-1}$ (push only)		8					N
– axial at standstill (push only)		30					N
23 Shaft play:							
– radial	$\leq$	0,015					mm
– axial	$=$	0					mm
24 Housing material		aluminium, black anodized					
25 Mass		56					g
26 Direction of rotation		electronically reversible					
27 Speed up to	$n_{max}$	55 000					$\text{min}^{-1}$
28 Number of pole pairs		1					
29 Hall sensors		digital					
30 Magnet material		SmCo					
<b>Rated values for continuous operation</b>							
31 Rated torque	$M_N$		6,08	6,14	5,87	5,62	mNm
32 Rated current (thermal limit)	$I_N$		1,14	0,559	0,396	0,26	A
33 Rated speed	$n_N$		11 430	11 010	12 810	10 450	$\text{min}^{-1}$

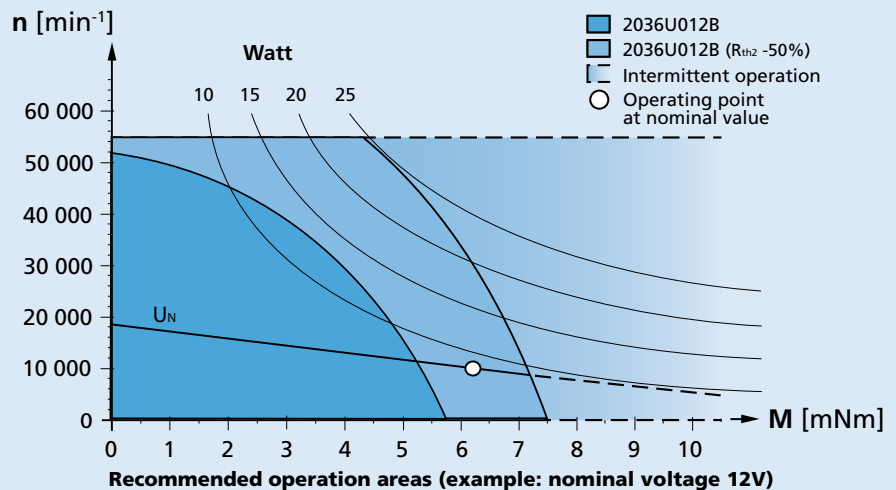
**Note:** Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The  $R_{th2}$  value has been reduced by 25%.

**Note:**

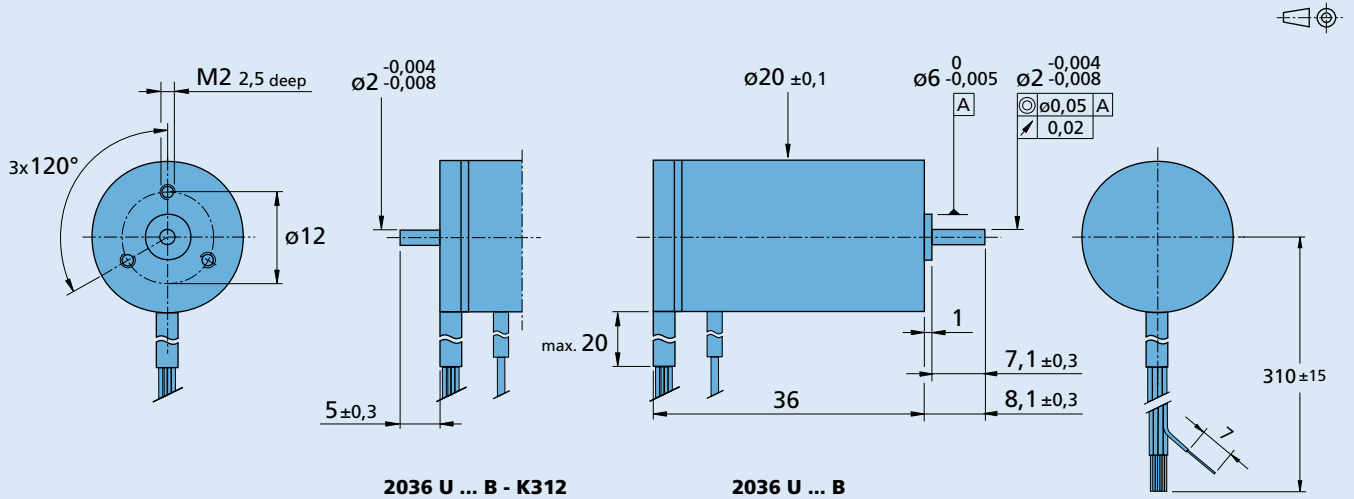
The diagram indicates the recommended speed in relation to the available torque at the output shaft for a given ambient temperature of 22°C.

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: **2036U012B-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
K1026	Sensorless	Motor without Hall sensors	Phase B	orange
K903	Lead wires length	Single lead wires 1000 mm long in PTFE	Phase A	brown
K313	Encoder combination	Motor with rear end shaft for combination with Encoder IE2	GND	black
K312	Encoder combination	Motor with rear end shaft for combination with Encoder HEDS/HEDL/HEDM	U <sub>DD</sub> (+5V)	red
K179	Bearing lubrication	For vacuum of 10 <sup>-5</sup> Pa @ 22°C	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 22L ... ML 22L ... SB 22L ... PB	IE2-1024 HEDS 5500 HEDL 5540	SC 1801 P SC 1801 S SC 2402 P SC 2804 S SC 5004 P MC 3001 B MC 3001 P MC 3602 B MC 3603 S MC 5004 P MC 5005 S	To view our large range of accessory parts, please refer to the "Accessories" chapter.