

# Brushless DC-Servomotors

## 2 Pole Technology

66 mNm  
126 W

### Series 3564 ... B

Values at 22°C and nominal voltage	3564 K	012 B	024 B	036 B	048 B		
1 Nominal voltage	$U_N$		12	24	36	48	V
2 Terminal resistance, phase-phase	$R$		0,56	1,1	2,61	4,1	$\Omega$
3 Efficiency, max.	$\eta_{max}$		82	83	83	83	%
4 No-load speed	$n_0$		8 300	11 500	11 600	12 800	$\text{min}^{-1}$
5 No-load current, typ. (with shaft $\varnothing$ 4 mm)	$I_0$		0,198	0,166	0,112	0,099	A
6 Stall torque	$M_H$		293	432	408	418	mNm
7 Friction torque, static	$C_0$		1,2	1,2	1,2	1,2	mNm
8 Friction torque, dynamic	$C_V$		$1,8 \cdot 10^{-4}$	$1,8 \cdot 10^{-4}$	$1,8 \cdot 10^{-4}$	$1,8 \cdot 10^{-4}$	$\text{mNm}/\text{min}^{-1}$
9 Speed constant	$k_n$		696	481	323	266	$\text{min}^{-1}/\text{V}$
10 Back-EMF constant	$k_E$		1,44	2,08	3,1	3,75	$\text{mV}/\text{min}^{-1}$
11 Torque constant	$k_M$		13,7	19,9	29,6	35,8	$\text{mNm}/\text{A}$
12 Current constant	$k_I$		0,073	0,05	0,034	0,028	$\text{A}/\text{mNm}$
13 Slope of n-M curve	$\Delta n/\Delta M$		28	27	28	31	$\text{min}^{-1}/\text{mNm}$
14 Terminal inductance, phase-phase	$L$		90	190	410	640	$\mu\text{H}$
15 Mechanical time constant	$\tau_m$		10,4	9,7	10,4	11,1	ms
16 Rotor inertia	$J$		34,9	34,9	34,9	34,9	$\text{gcm}^2$
17 Angular acceleration	$\alpha_{max}$		84	124	117	120	$\cdot 10^3 \text{rad}/\text{s}^2$
18 Thermal resistance	$R_{th1} / R_{th2}$	1,6 / 6,2					K/W
19 Thermal time constant	$\tau_{w1} / \tau_{w2}$	15,4 / 820					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		4					mm
– radial at 3 000 $\text{min}^{-1}$ (5 mm from mounting flange)		112					N
– axial at 3 000 $\text{min}^{-1}$ (push only)		50					N
– axial at standstill (push only)		131					N
23 Shaft play:							
– radial	$\leq$	0,015					mm
– axial	$=$	0					mm
24 Housing material		aluminium, black anodized					
25 Mass		311					g
26 Direction of rotation		electronically reversible					
27 Speed up to	$n_{max}$	29 000					$\text{min}^{-1}$
28 Number of pole pairs		1					
29 Hall sensors		digital					
30 Magnet material		SmCo					
<b>Rated values for continuous operation</b>							
31 Rated torque	$M_N$		56,2	55,3	53,5	50,4	mNm
32 Rated current (thermal limit)	$I_N$		4,43	3,04	1,98	1,55	A
33 Rated speed	$n_N$		6 160	9 620	9 640	10 800	$\text{min}^{-1}$

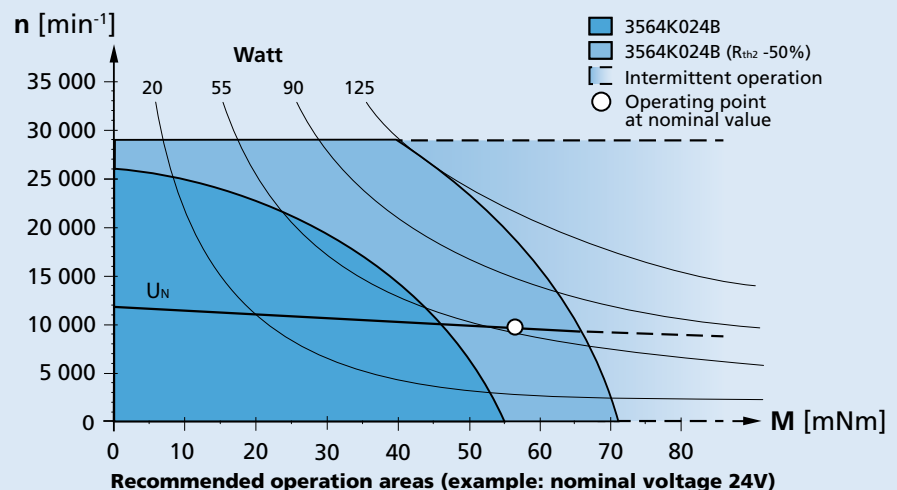
**Note:** Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The  $R_{th2}$  value has been reduced by 25%.

#### Note:


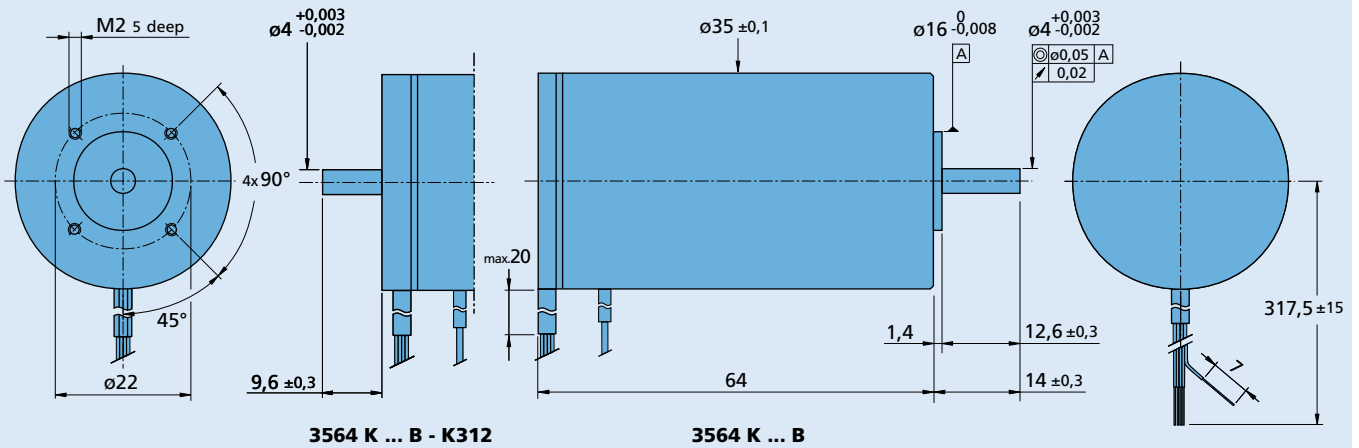
The diagram indicates the recommended speed in relation to the available torque at the output shaft for a given ambient temperature of 22°C.

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**

 Scale reduced 

**Option, cable and connection information**

 Example product designation: **3564K012B-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
K1838	Encoder combination	Motor with rear end shaft for combination with Encoder IE3	Phase A	brown
K312	Encoder combination	Motor with rear end shaft for combination with Encoder HEDS/HEDL/HEDM	GND	black
K3051	Encoder combination	Motor with rear end shaft for combination with Encoder AES	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 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 2804 S	MBZ  To view our large range of accessory parts, please refer to the "Accessories" chapter.
30/1 S	IE3-1024	SC 5004 P	
32/3	IE3-1024 L	SC 5008 S	
32/3 R	HEDL 5540	MCBL 3003 P	
38A	AES-4096	MCBL 3006 S	
38/1		MC 5005 S	
38/1 S		MC 5010 S	
38/2			
38/2 S			