Brushless Flat DC-Micromotors

0,6 mNm

For combination with
Drive Electronics:
Speed Controller

Series 1509 ... B

			1509 T		006 B	012 B	
1	Nominal voltage	U_N			6	12	Volt
2	Terminal resistance, phase-phase	R			22,0	92,8	Ω
3	Output power [1]	$P_{2\ max.}$			0,31	0,30	W
4	Efficiency	$\eta_{max.}$			56	55	%
5	No-load speed	n_o			14 700	14 700	rpm
6	No-load current	I_o			0,0174	0,0087	A
7	Stall torque	M_H			0,97	0,92	mNm
8	Friction torque, static	C_o			0,025	0,025	mNm
9	Friction torque, dynamic	C_v			$2{,}6 \cdot 10^{-6}$	$2{,}6 \cdot 10^{-6}$	mNm/rpm
10	Speed constant	k_n			2 623	1 312	rpm/V
11	Back-EMF constant	k_E			0,381	0,762	mV/rpm
12	Torque constant	k_M			3,64	7,28	mNm/A
13	Current constant	k_I			0,275	0,137	A/mNm
14	Slope of n-M curve	$\Delta n/\Delta M$			15 856	16 721	rpm/mNm
15	Terminal inductance, phase-phase	L			590	2 350	µH
16	Mechanical time constant	τ_m			115	121	ms
17	Rotor inertia	J			0,69	0,69	gcm^2
18	Angular acceleration	$\alpha_{max.}$			14	13	$\cdot 10^3 rad/s^2$
19	Thermal resistance	$R_{th\,1}$ / $R_{th\,2}$	65 / 45				K/W
20	Thermal time constant	τ_{w1} / τ_{w2}	10 / 130				s
21	Operating temperature range		-25 ... +80				°C
22	Shaft bearings		ball bearing, preloaded				
23	Shaft load max.:						
	– radial at 3 000/16 000 rpm (3 mm from mounting flange)		2,0 / 0,5				N
	– axial at 3 000/16 000 rpm (push-on only)		2,0 / 1,7				N
	– axial at standstill (push-on only)		15				N
24	Shaft play:						
	– radial	≤	0,015				mm
	– axial	=	0				mm
25	Housing material		plastic				
26	Weight		6,9				g
27	Direction of rotation		electronically reversible				
Recommended values - mathematically independent of each other							
28	Speed up to	$n_{e\ max.}$			16 000	16 000	rpm
29	Torque up to [1] [2]	$M_{e\ max.}$			0,52 / 0,60	0,51 / 0,58	mNm
30	Current up to [1] [2]	$I_{e\ max.}$			0,174 / 0,198	0,085 / 0,096	A

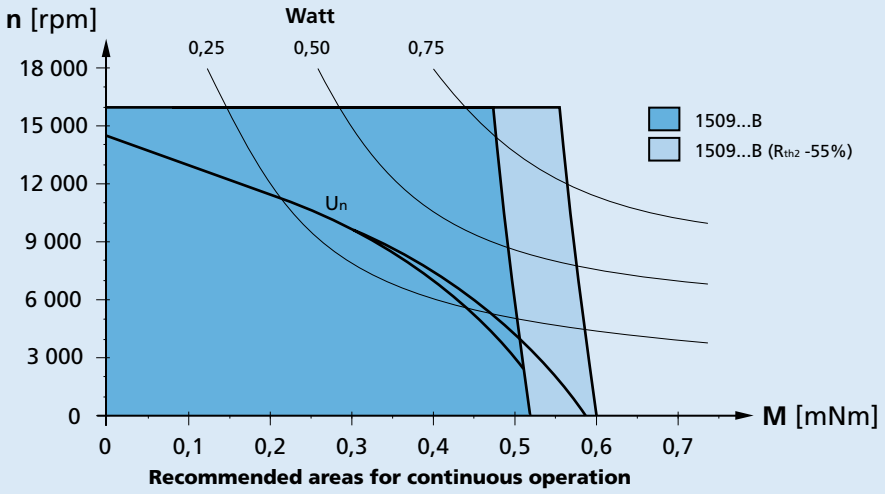
[1] at 5 000 rpm
[2] thermal resistance $R_{th\,2}$ not reduced / thermal resistance $R_{th\,2}$ by 55% reduced

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.

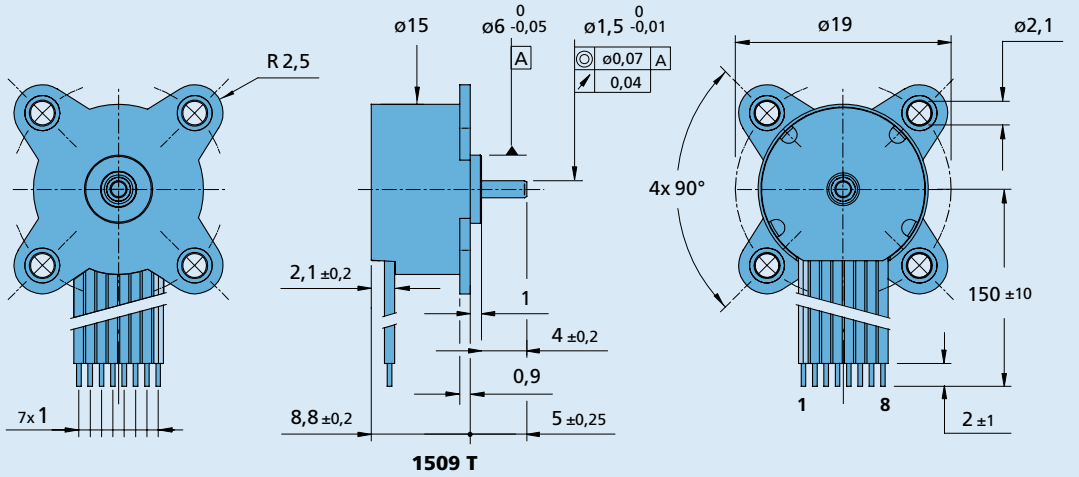
The diagram shows the motor in a completely insulated as well as thermally coupled condition ($R_{th\,2}$ 55% reduced).

The nominal voltage 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.



1509 T ... B

Scale enlarged



Connection

No.	Function
1	Phase C
2	Phase B
3	Phase A
4	GND
5	+ 5V
6	Hall sensor C
7	Hall sensor B
8	Hall sensor A