

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⁾	$P_2 \text{ max.}$	0,31	0,30	W
4 Efficiency	$\eta \text{ max.}$	56	55	%
5 No-load speed	n_0	14 700	14 700	rpm
6 No-load current	I_0	0,0174	0,0087	A
7 Stall torque	M_H	0,97	0,92	mNm
8 Friction torque, static	C_0	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	$\alpha \text{ max.}$	14	13	$\cdot 10^3 \text{ rad/s}^2$
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		$^{\circ}\text{C}$
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	\leq	0,015		mm
– axial	\parallel	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	$n_e \text{ max.}$	16 000	16 000	rpm
29 Torque up to ^{1) 2)}	$M_e \text{ max.}$	0,52 / 0,60	0,51 / 0,58	mNm
30 Current up to ^{1) 2)}	$I_e \text{ max.}$	0,174 / 0,198	0,085 / 0,096	A

¹⁾ at 5 000 rpm

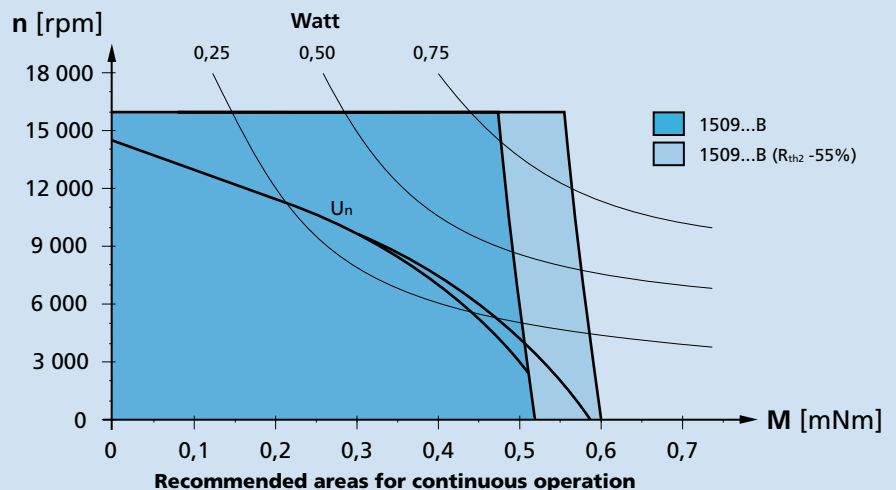
²⁾ thermal resistance $R_{th 2}$ not reduced / thermal resistance $R_{th 2}$ by 55% reduced

Note:


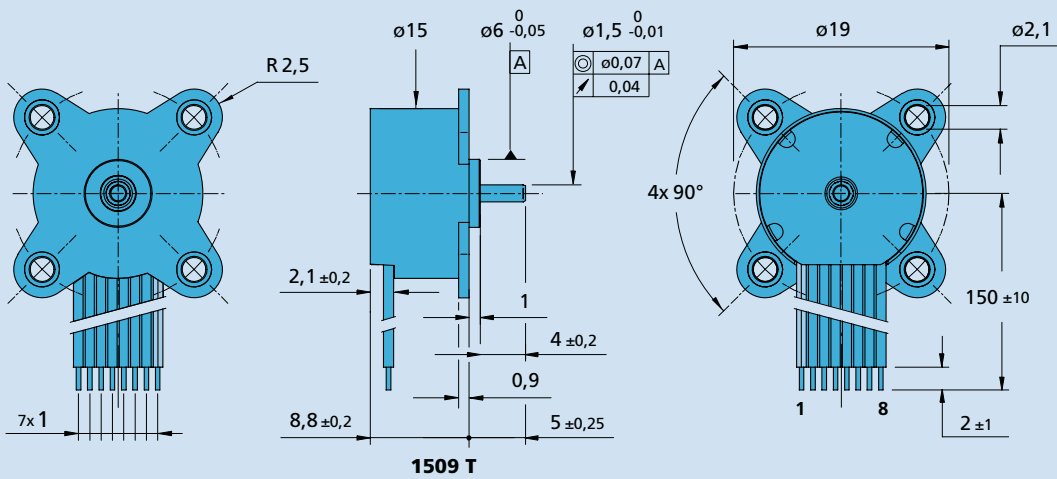
The diagram indicates the recommended speed in relation to the available torque at the output shaft for a given ambient temperature of 22°C.

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