

# DC-Micromotors

## Precious Metal Commutation

# 0,97 mNm

For combination with

Gearheads:

15/10, 15/5, 15/5 S, 15/8, 15A, 16/7, 16A

Encoders:

IE2-1024, IE2-16, IEH2-4096

### Series 1516 ... SR

Values at 22°C and nominal voltage		1516 T	006 SR	009 SR	012 SR	
1	Nominal voltage	$U_N$	6	9	12	V
2	Terminal resistance	R	15,2	32,5	60	$\Omega$
3	Output power	$P_{2nom.}$	0,51	0,54	0,52	W
4	Efficiency, max.	$\eta_{max.}$	57	58	58	%
5	No-load speed	$n_0$	12 800	12 800	12 900	rpm
6	No-load current, typ. (with shaft $\varnothing$ 1,5 mm)	$I_0$	0,029	0,019	0,014	A
7	Stall torque	$M_H$	1,52	1,61	1,53	mNm
8	Friction torque	$M_R$	0,12	0,12	0,12	mNm
9	Speed constant	$k_n$	2 300	1 530	1 160	rpm/V
10	Back-EMF constant	$k_E$	0,434	0,655	0,865	mV/rpm
11	Torque constant	$k_M$	4,15	6,25	8,26	mNm/A
12	Current constant	$k_I$	0,241	0,16	0,121	A/mNm
13	Slope of n-M curve	$\Delta n/\Delta M$	8 420	7 950	8 430	rpm/mNm
14	Rotor inductance	L	100	230	400	$\mu H$
15	Mechanical time constant	$\tau_m$	35	35	35	ms
16	Rotor inertia	J	0,4	0,42	0,4	gcm <sup>2</sup>
17	Angular acceleration	$\alpha_{max.}$	38	38	39	$\cdot 10^3 \text{rad/s}^2$
18	Thermal resistance	$R_{th1} / R_{th2}$	10 / 33			K/W
19	Thermal time constant	$\tau_{w1} / \tau_{w2}$	2,9 / 190			s
20	Operating temperature range:					
	– motor		-30 ... +85 (optional version -55 ... +125)			°C
	– winding, max. permissible		+125			°C
21	Shaft bearings		sintered bearings	ball bearings	ball bearings, preloaded	
22	Shaft load max.:		(standard)	(optional version)	(optional version)	
	– with shaft diameter		1,5	1,5	1,5	mm
	– radial at 3 000 rpm (3 mm from bearing)		1,2	5	5	N
	– axial at 3 000 rpm		0,2	0,5	0,5	N
	– axial at standstill		20	10	10	N
23	Shaft play					
	– radial	$\leq$	0,03	0,015	0,015	mm
	– axial	$\leq$	0,2	0,2	0	mm
24	Housing material		steel, black coated			
25	Mass		13			g
26	Direction of rotation		clockwise, viewed from the front face			
27	Speed up to	$n_{max.}$	15 000			rpm
28	Number of pole pairs		1			
29	Magnet material		NdFeB			
<b>Rated values for continuous operation</b>						
30	Rated torque	$M_N$	0,92	0,97	0,93	mNm
31	Rated current (thermal limit)	$I_N$	0,27	0,19	0,14	A
32	Rated speed	$n_N$	2 500	2 500	2 500	rpm

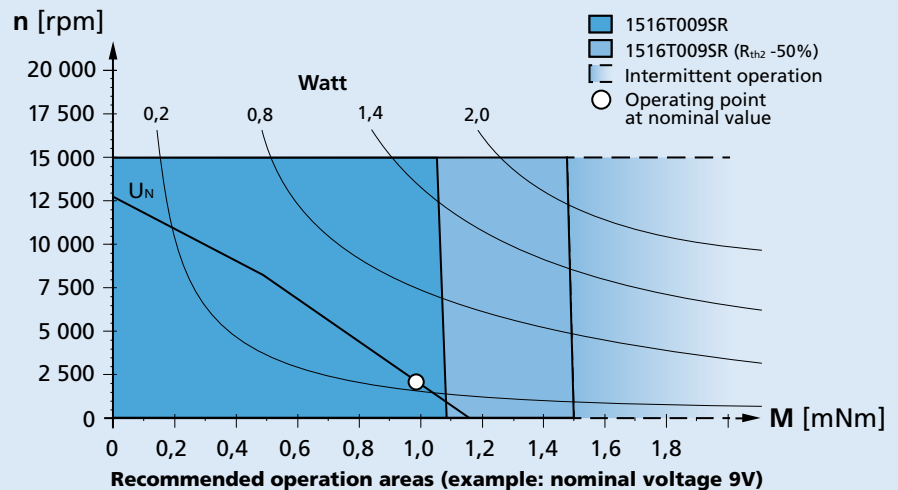
**Note:** Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The  $R_{th2}$  value has been reduced by 0%.

**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.

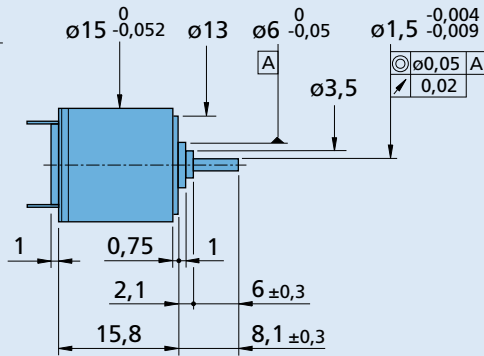
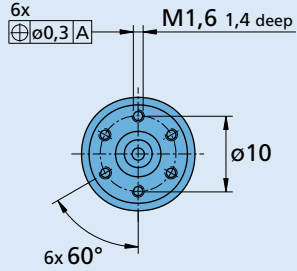
The diagram shows the motor in a completely insulated as well as thermally coupled condition ( $R_{th2}$  50% reduced).

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.

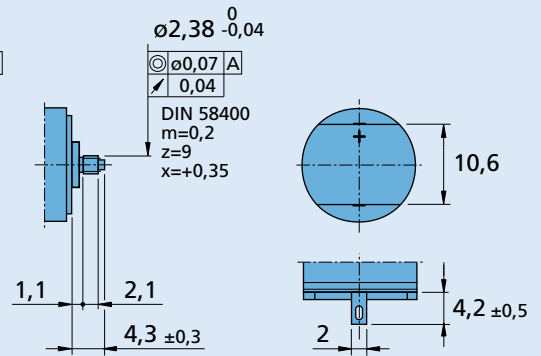


**Dimensional drawing**

Orientation with respect to motor terminals not defined



1516 T ... SR



1516 E ... SR