

# DC-Micromotors

## Precious Metal Commutation

0,92 mNm  
2 W

### Series 1016 ... SR

Values at 22°C and nominal voltage	1016 K	003 SR	006 SR	009 SR	012 SR	
1 Nominal voltage	$U_N$	3	6	9	12	V
2 Terminal resistance	$R$	3,1	12,5	27,1	40,7	$\Omega$
3 Efficiency, max.	$\eta_{max}$	76	74	74	75	%
4 No-load speed	$n_0$	12 700	12 800	13 000	14 100	min <sup>-1</sup>
5 No-load current, typ. (with shaft $\varnothing$ 1 mm)	$I_0$	0,017	0,009	0,007	0,005	A
6 Stall torque	$M_H$	2,12	2,08	2,11	2,32	mNm
7 Friction torque	$M_R$	0,037	0,04	0,043	0,042	mNm
8 Speed constant	$k_n$	4 282	2 175	1 475	1 195	min <sup>-1</sup> /V
9 Back-EMF constant	$k_E$	0,234	0,46	0,678	0,837	mV/min <sup>-1</sup>
10 Torque constant	$k_M$	2,23	4,39	6,48	7,99	mNm/A
11 Current constant	$k_I$	0,448	0,228	0,154	0,125	A/mNm
12 Slope of n-M curve	$\Delta n / \Delta M$	5 953	6 166	6 177	6 085	min <sup>-1</sup> /mNm
13 Rotor inductance	$L$	42	168	363	547	$\mu$ H
14 Mechanical time constant	$\tau_m$	8	8	8	8	ms
15 Rotor inertia	$J$	0,12	0,12	0,12	0,12	gcm <sup>2</sup>
16 Angular acceleration	$\alpha_{max}$	175	171	172	189	$\cdot 10^3$ rad/s <sup>2</sup>
17 Thermal resistance	$R_{th1} / R_{th2}$	17 / 59				K/W
18 Thermal time constant	$\tau_{w1} / \tau_{w2}$	5,7 / 176				s
19 Operating temperature range:						
– motor		-30 ... +85 (optional version	-30 ... +125)			°C
– winding, max. permissible		+85 (optional version	+125)			°C
20 Shaft bearings		sintered bearings				
21 Shaft load max.:						
– with shaft diameter		1				mm
– radial at 3 000 min <sup>-1</sup> (1,5 mm from bearing)		0,9				N
– axial at 3 000 min <sup>-1</sup>		0,1				N
– axial at standstill		20				N
22 Shaft play:						
– radial	$\leq$	0,02				mm
– axial	$\leq$	0,15				mm
23 Housing material		steel, nickel plated				
24 Mass		6,5				g
25 Direction of rotation		clockwise, viewed from the front face				
26 Speed up to	$n_{max}$	16 000				min <sup>-1</sup>
27 Number of pole pairs		1				
28 Magnet material		NdFeB				
<b>Rated values for continuous operation</b>						
29 Rated torque	$M_N$	0,92	0,9	0,9	0,91	mNm
30 Rated current (thermal limit)	$I_N$	0,46	0,23	0,16	0,13	A
31 Rated speed	$n_N$	5 550	5 620	5 850	7 070	min <sup>-1</sup>

**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.



