

# DC-Micromotors

## Precious Metal Commutation

0,5 mNm  
1,4 W

### Series 1016 ... G

Values at 22°C and nominal voltage		1016 N	003 G	006 G	012 G	
1	Nominal voltage	$U_N$	3	6	12	V
2	Terminal resistance	$R$	8,7	19,3	95	$\Omega$
3	Output power	$P_{2nom.}$	0,24	0,44	0,36	W
4	Efficiency, max.	$\eta_{max.}$	63	68	68	%
5	No-load speed	$n_0$	14 200	18 400	16 500	min <sup>-1</sup>
6	No-load current, typ. (with shaft $\varnothing$ 0,8 mm)	$I_0$	0,015	0,01	0,004	A
7	Stall torque	$M_H$	0,64	0,9	0,82	mNm
8	Friction torque	$M_R$	0,03	0,03	0,03	mNm
9	Speed constant	$k_n$	4 948	3 173	1 419	min <sup>-1</sup> /V
10	Back-EMF constant	$k_E$	0,202	0,315	0,705	mV/min <sup>-1</sup>
11	Torque constant	$k_M$	1,93	3,01	6,73	mNm/A
12	Current constant	$k_I$	0,518	0,332	0,149	A/mNm
13	Slope of n-M curve	$\Delta n / \Delta M$	22 304	20 342	20 029	min <sup>-1</sup> /mNm
14	Rotor inductance	$L$	28	90	310	$\mu$ H
15	Mechanical time constant	$\tau_m$	9	12,8	10	ms
16	Rotor inertia	$J$	0,04	0,06	0,05	gcm <sup>2</sup>
17	Angular acceleration	$\alpha_{max.}$	159	151	165	$\cdot 10^3$ rad/s <sup>2</sup>
18	Thermal resistance	$R_{th1} / R_{th2}$	26 / 56			K/W
19	Thermal time constant	$\tau_{w1} / \tau_{w2}$	3,1 / 260			s
20	Operating temperature range:					
	– motor		-30 ... +85 (optional version -30 ... +125)			°C
	– winding, max. permissible		+85 (optional version +125)			°C
21	Shaft bearings		sintered bearings			
22	Shaft load max.:					
	– with shaft diameter		0,8			mm
	– radial at 3 000 min <sup>-1</sup> (1,5 mm from bearing)		0,5			N
	– axial at 3 000 min <sup>-1</sup>		0,1			N
	– axial at standstill		20			N
23	Shaft play:					
	– radial	$\leq$	0,03			mm
	– axial	$\leq$	0,2			mm
24	Housing material		steel, nickel plated			
25	Mass		6,5			g
26	Direction of rotation		clockwise, viewed from the front face			
27	Speed up to	$n_{max.}$	22 000			min <sup>-1</sup>
28	Number of pole pairs		1			
29	Magnet material		SmCo			
<b>Rated values for continuous operation</b>						
30	Rated torque	$M_N$	0,43	0,48	0,5	mNm
31	Rated current (thermal limit)	$I_N$	0,24	0,17	0,08	A
32	Rated speed	$n_N$	2 500	5 730	3 750	min <sup>-1</sup>

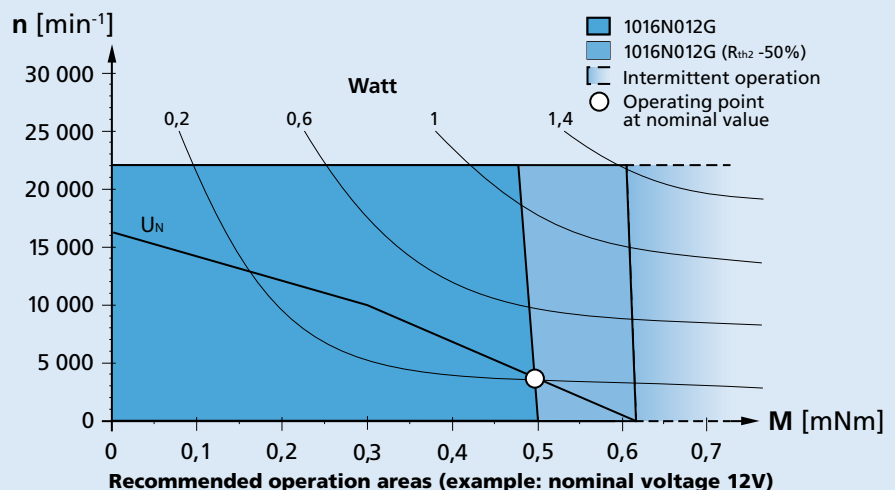
**Note:** Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The  $R_{th2}$  value has been reduced by 0%.

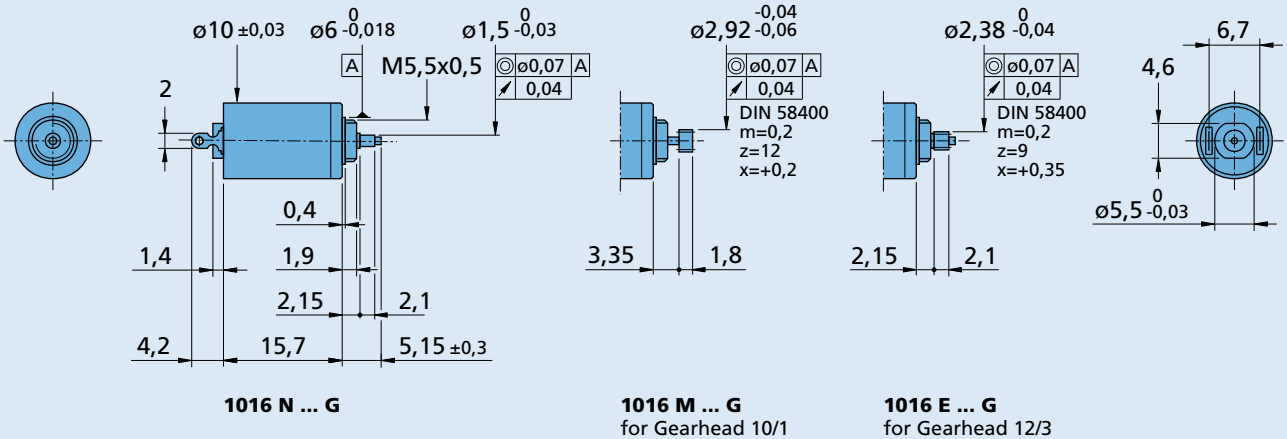
**Note:**

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.



**Dimensional drawing**

**Options**

 Example product designation: **1016N012G-K179**

Option	Type	Description
K179	Bearing lubrication	For vacuum of 10 <sup>-7</sup> Torr @ 20°C
K188	Temperature range	High temperature design (-30...+125°C)
K380	Second shaft end	Ø 1 mm x 3 mm
K440	Bearing	Front ball bearing
K1707	Encoder Combination	Motor with rear end shaft for combination with Encoder HEM3
K1752	Encoder Combination	Motor with rear end shaft for combination with Encoder PA2-100

**Product Combination**

Precision Gearheads / Lead Screws	Encoders	Drive Electronics	Cables / Accessories
10/1 12/3	PA2-100 HEM3-256 W	SC 1801 MCDC 3002	