

# DC-Micromotors

## Precious Metal Commutation

### 0,5 mNm

For combination with  
Gearheads:  
10/1, 12/3  
Encoders:  
HEM3-256-W, PA2-100

### 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	rpm
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	rpm/V
10	Back-EMF constant	$k_E$	0,202	0,315	0,705	mV/rpm
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	rpm/mNm
14	Rotor inductance	L	28	60	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	$\cdot 10^3 \text{rad/s}^2$
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	ball bearings		
22	Shaft load max.:		(standard)	(optional version)		
	– with shaft diameter		0,8	1		mm
	– radial at 3 000 rpm (1,5 mm from bearing)		0,5	5		N
	– axial at 3 000 rpm		0,1	0,5		N
	– axial at standstill		20	5		N
23	Shaft play					
	– radial	$\leq$	0,03	0,02		mm
	– axial	$\leq$	0,2	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			rpm
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	rpm

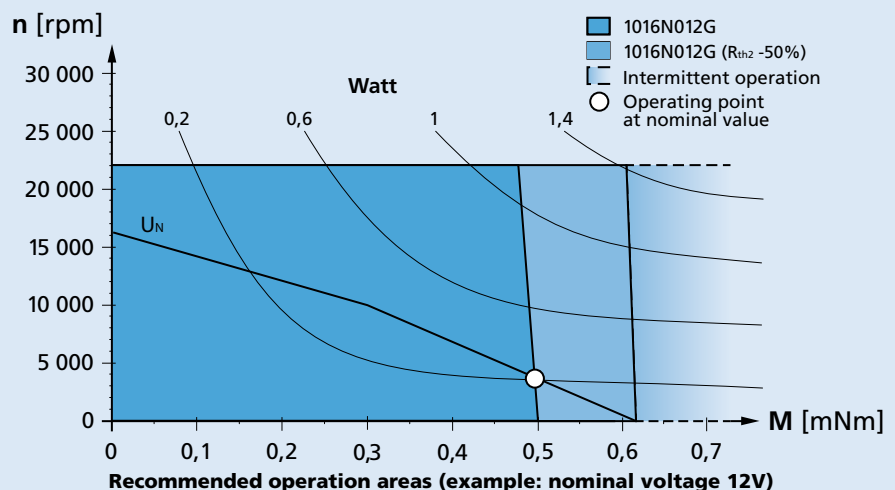
**Note:** Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The  $R_{th2}$  value has been reduced by 0%.

**Note:**

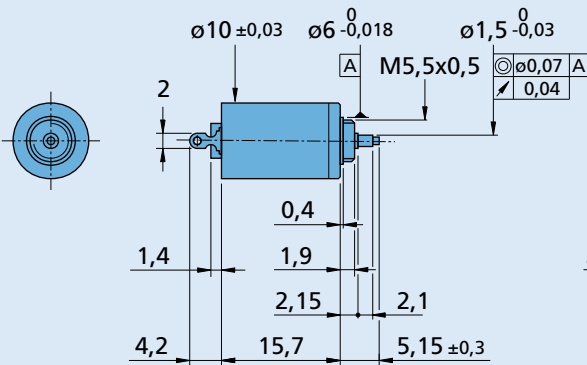
The diagram indicates the recommended speed in relation to the available torque at the output shaft for a given ambient temperature of 22°C.

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

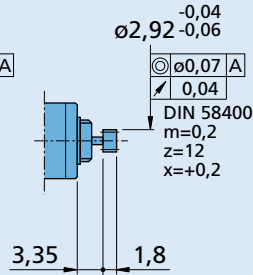
The nominal voltage ( $U_N$ ) curve shows the operating point at nominal voltage in the insulated and thermally coupled condition. Any points of operation above the curve at nominal voltage will require a higher operating voltage. Any points below the nominal voltage curve will require less voltage.



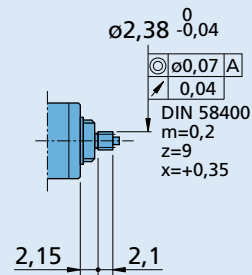
Dimensional drawing



1016 N ... G



1016 M ... G  
for Gearhead 10/1



1016 E ... G  
for Gearhead 12/3

