

# DC-Micromotors

## 3,8 mNm

Precious Metal Commutation

For combination with  
Gearheads:  
13A, 14/1, 15/5, 15/5 S  
Encoders:  
IE2-400

### Series 1331 ... SR

Values at 22°C and nominal voltage		1331 T	006 SR	012 SR	024 SR	
1	Nominal voltage	$U_N$	6	12	24	V
2	Terminal resistance	R	2,83	13,7	52,9	$\Omega$
3	Output power	$P_{2nom.}$	3,11	2,57	2,66	W
4	Efficiency, max.	$\eta_{max.}$	81	80	80	%
5	No-load speed	$n_0$	10 600	9 900	10 400	rpm
6	No-load current, typ. (with shaft $\varnothing$ 1,5 mm)	$I_0$	0,022	0,0105	0,0055	A
7	Stall torque	$M_H$	11,2	9,9	9,76	mNm
8	Friction torque	$M_R$	0,12	0,12	0,12	mNm
9	Speed constant	$k_n$	1 790	835	439	rpm/V
10	Back-EMF constant	$k_E$	0,56	1,2	2,28	mV/rpm
11	Torque constant	$k_M$	5,35	11,4	21,8	mNm/A
12	Current constant	$k_I$	0,187	0,087	0,046	A/mNm
13	Slope of n-M curve	$\Delta n/\Delta M$	946	1 000	1 070	rpm/mNm
14	Rotor inductance	L	70	310	1 100	$\mu H$
15	Mechanical time constant	$\tau_m$	7	7	7	ms
16	Rotor inertia	J	0,71	0,67	0,63	gcm <sup>2</sup>
17	Angular acceleration	$\alpha_{max.}$	160	150	160	$\cdot 10^3 \text{rad/s}^2$
18	Thermal resistance	$R_{th1} / R_{th2}$	6 / 25			K/W
19	Thermal time constant	$\tau_{w1} / \tau_{w2}$	5 / 190			s
20	Operating temperature range:					
	- motor		-30 ... +85 (optional version -55 ... +125)			°C
	- winding, max. permissible		+125			°C
21	Shaft bearings		sintered bearings			
22	Shaft load max.:					
	- with shaft diameter		1,5			mm
	- radial at 3 000 rpm (3 mm from bearing)		1,2			N
	- axial at 3 000 rpm		0,2			N
	- axial at standstill		20			N
23	Shaft play					
	- radial	$\leq$	0,03			mm
	- axial	$\leq$	0,2			mm
24	Housing material		steel, black coated			
25	Mass		19			g
26	Direction of rotation		clockwise, viewed from the front face			
27	Speed up to	$n_{max.}$	12 000			rpm
28	Number of pole pairs		1			
29	Magnet material		NdFeB			
<b>Rated values for continuous operation</b>						
30	Rated torque	$M_N$	2	3,8	3,7	mNm
31	Rated current (thermal limit)	$I_N$	0,4	0,37	0,19	A
32	Rated speed	$n_N$	8 710	4 900	5 260	rpm

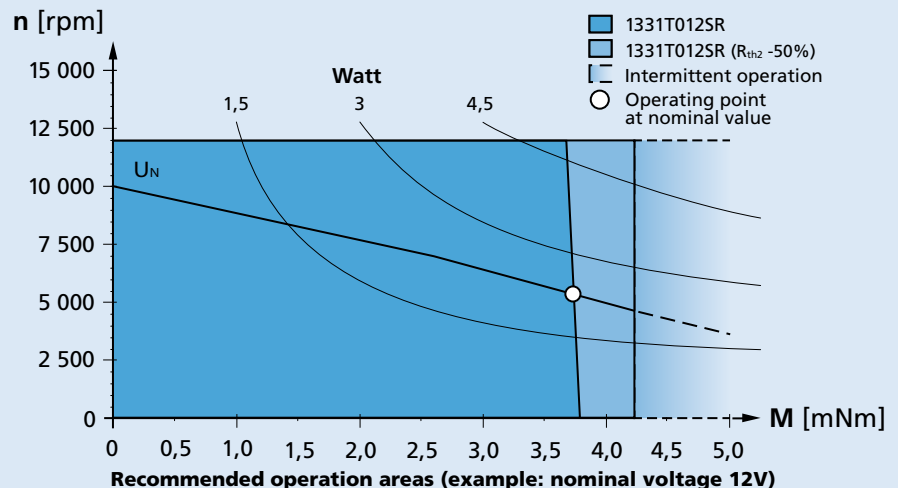
**Note:** Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The  $R_{th2}$  value has been reduced by 0%.

**Note:**

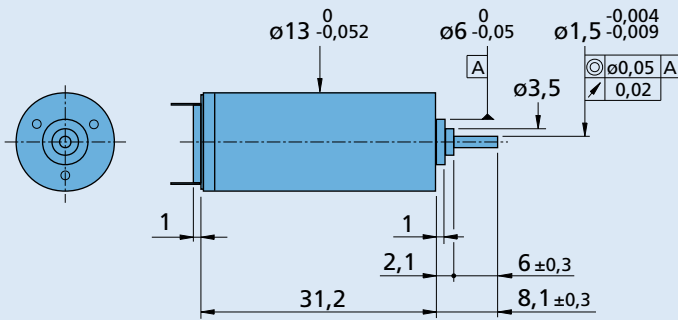
The diagram indicates the recommended speed in relation to the available torque at the output shaft for a given ambient temperature of 22°C.

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

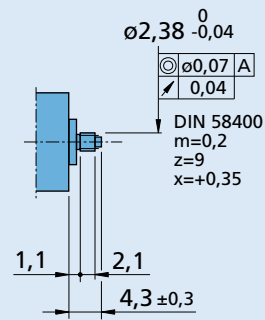
The nominal voltage ( $U_N$ ) curve shows the operating point at nominal voltage in the insulated and thermally coupled condition. Any points of operation above the curve at nominal voltage will require a higher operating voltage. Any points below the nominal voltage curve will require less voltage.



Dimensional drawing



1331 T ... SR



1331 E ... SR