

# DC-Micromotors

## Precious Metal Commutation

1,7 mNm  
3,4 W

### Series 1224 ... SR

Values at 22°C and nominal voltage	1224 N	006 SR	012 SR	015 SR	
1 Nominal voltage	$U_N$	6	12	15	V
2 Terminal resistance	$R$	4,6	18,2	29,4	$\Omega$
3 Efficiency, max.	$\eta_{max}$	82	83	83	%
4 No-load speed	$n_0$	13 800	13 700	13 400	min <sup>-1</sup>
5 No-load current, typ. (with shaft $\varnothing$ 1 mm)	$I_0$	0,011	0,005	0,004	A
6 Stall torque	$M_H$	5,31	5,43	5,36	mNm
7 Friction torque	$M_R$	0,05	0,05	0,05	mNm
8 Speed constant	$k_n$	2 323	1 151	901	min <sup>-1</sup> /V
9 Back-EMF constant	$k_E$	0,43	0,869	1,11	mV/min <sup>-1</sup>
10 Torque constant	$k_M$	4,11	8,3	10,6	mNm/A
11 Current constant	$k_I$	0,243	0,12	0,094	A/mNm
12 Slope of n-M curve	$\Delta n / \Delta M$	2 600	2 523	2 499	min <sup>-1</sup> /mNm
13 Rotor inductance	$L$	55	220	350	$\mu$ H
14 Mechanical time constant	$\tau_m$	5	5	5	ms
15 Rotor inertia	$J$	0,18	0,18	0,18	gcm <sup>2</sup>
16 Angular acceleration	$\alpha_{max}$	295	302	298	$\cdot 10^3$ rad/s <sup>2</sup>
17 Thermal resistance	$R_{th1} / R_{th2}$	17 / 37			K/W
18 Thermal time constant	$\tau_{w1} / \tau_{w2}$	6,5 / 371			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)		0,5			N
– axial at 3 000 min <sup>-1</sup>		0,1			N
– axial at standstill		20			N
22 Shaft play:					
– radial	$\leq$	0,03			mm
– axial	$\leq$	0,2			mm
23 Housing material		steel, black coated			
24 Mass		13,5			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	$M_N$	1,5	1,7	1,7	mNm
30 Rated current (thermal limit)	$I_N$	0,4	0,22	0,18	A
31 Rated speed	$n_N$	9 680	8 580	8 270	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.



