

# DC-Micromotors

## Graphite Commutation

# 12 mNm

For combination with  
 Gearheads:  
 22/7, 22F, 23/1, 26A  
 Encoders:  
 IE3-1024, IE3-1024 L

### Series 2237 ... CXR

Values at 22°C and nominal voltage	2237 S	006 CXR	012 CXR	018 CXR	024 CXR	036 CXR	048 CXR	
1 Nominal voltage	$U_N$	6	12	18	24	36	48	V
2 Terminal resistance	R	0,85	3,92	8,5	15,7	33	62,8	$\Omega$
3 Output power	$P_{2nom.}$	8,6	8,1	8,7	8,5	9,2	8,6	W
4 Efficiency, max.	$\eta_{max.}$	68,1	70,8	72,2	72,6	73,6	73,5	%
5 No-load speed	$n_0$	6 900	6 800	7 000	6 900	7 200	7 000	rpm
6 No-load current, typ. (with shaft $\varnothing$ 3 mm)	$I_0$	0,124	0,058	0,039	0,029	0,02	0,015	A
7 Stall torque	$M_H$	47,2	45,7	47,1	46,6	48,7	47,1	mNm
8 Friction torque	$M_R$	0,92	0,92	0,92	0,92	0,92	0,92	mNm
9 Speed constant	$k_n$	1 283	601	409	301	207	150	rpm/V
10 Back-EMF constant	$k_E$	0,78	1,66	2,44	3,33	4,83	6,65	mV/rpm
11 Torque constant	$k_M$	7,44	15,9	23,3	31,8	46,2	63,5	mNm/A
12 Current constant	$k_I$	0,134	0,063	0,043	0,032	0,022	0,016	A/mNm
13 Slope of n-M curve	$\Delta n/\Delta M$	146	148	149	149	148	149	rpm/mNm
14 Rotor inductance	L	35	150	320	590	1 240	2 340	$\mu$ H
15 Mechanical time constant	$\tau_m$	5	5	5	5	5	5	ms
16 Rotor inertia	J	3,1	3,1	3,1	3,1	3,1	3,1	gcm <sup>2</sup>
17 Angular acceleration	$\alpha_{max.}$	152	147	152	150	157	152	$\cdot 10^3$ rad/s <sup>2</sup>
18 Thermal resistance	$R_{th1} / R_{th2}$	8 / 17						K/W
19 Thermal time constant	$\tau_{w1} / \tau_{w2}$	13 / 500						s
20 Operating temperature range:								
– motor		-30 ... +100						°C
– winding, max. permissible		+125						°C
21 Shaft bearings		sintered bearings (standard)			ball bearings, preloaded (optional version)			
22 Shaft load max.:								
– with shaft diameter		3			3			mm
– radial at 3 000 rpm (3 mm from bearing)		2,5			15			N
– axial at 3 000 rpm		0,3			2			N
– axial at standstill		20			20			N
23 Shaft play								
– radial	$\leq$	0,03			0,015			mm
– axial	$\leq$	0,15			0			mm
24 Housing material		steel, zinc galvanized and passivated						
25 Mass		68						g
26 Direction of rotation		clockwise, viewed from the front face						
27 Speed up to	$n_{max.}$	8 000						rpm
28 Number of pole pairs		1						
29 Magnet material		NdFeB						
<b>Rated values for continuous operation</b>								
30 Rated torque	$M_N$	11	12	12	12	12	12	mNm
31 Rated current (thermal limit)	$I_N$	1,9	0,9	0,61	0,46	0,31	0,23	A
32 Rated speed	$n_N$	4 750	4 450	4 700	4 560	4 880	4 630	rpm

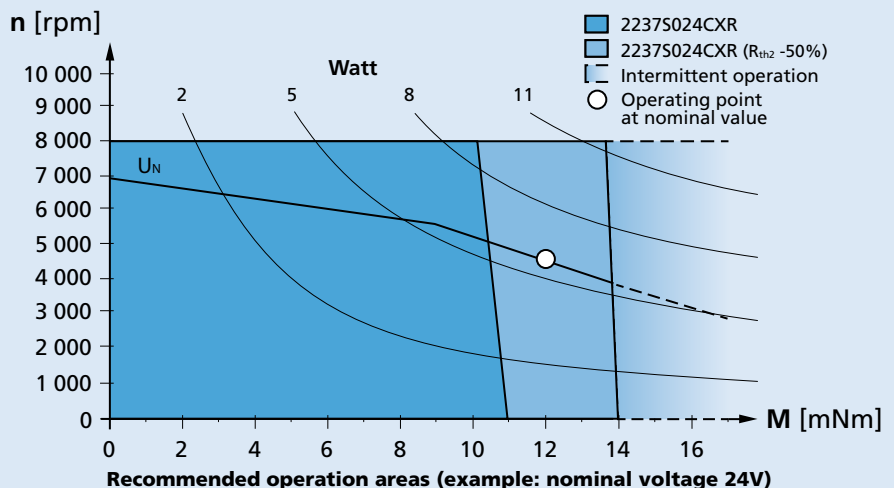
**Note:** Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The  $R_{th2}$  value has been reduced by 25%.

**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).

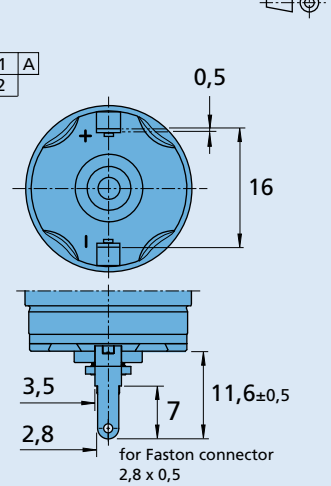
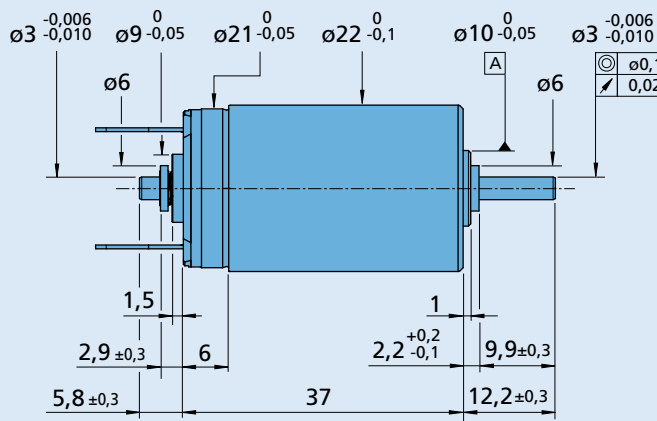
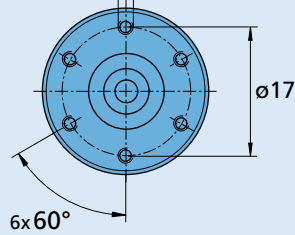
The nominal voltage ( $U_N$ ) curve shows the operating point at nominal voltage in the insulated and thermally coupled condition. Any points of operation above the curve at nominal voltage will require a higher operating voltage. Any points below the nominal voltage curve will require less voltage.



**Dimensional drawing**

Orientation with respect to motor terminals not defined

6x  $\begin{matrix} \oplus \\ \ominus \end{matrix} \begin{matrix} \text{Ø}0,3 \\ \text{A} \end{matrix}$  M2 2,5 deep



**2237 S ... CXR**