

DC-Micromotors

Precious Metal Commutation

4,7 mNm
7,5 W

Series 2230 ... S

Values at 22°C and nominal voltage	2230 T	003 S	006 S	012 S	015 S	024 S	040 S		
1 Nominal voltage	U_N	3	6	12	15	24	40	V	
2 Terminal resistance	R	0,6	3	10,8	21	50	193	Ω	
3 Efficiency, max.	η_{max}	83	82	83	82	81	78	%	
4 No-load speed	n_0	9 600	9 300	9 500	8 400	9 000	8 200	min ⁻¹	
5 No-load current, typ. (with shaft \varnothing 1,5 mm)	I_0	0,04	0,019	0,01	0,007	0,005	0,003	A	
6 Stall torque	M_H	14,7	12,1	13,2	11,9	12	9,37	mNm	
7 Friction torque	M_R	0,12	0,12	0,12	0,12	0,13	0,14	mNm	
8 Speed constant	k_n	3 230	1 560	799	566	379	208	min ⁻¹ /V	
9 Back-EMF constant	k_E	0,31	0,639	1,25	1,77	2,64	4,81	mV/min ⁻¹	
10 Torque constant	k_M	2,96	6,1	12	16,9	25,2	45,9	mNm/A	
11 Current constant	k_I	0,338	0,164	0,084	0,059	0,04	0,022	A/mNm	
12 Slope of n-M curve	$\Delta n / \Delta M$	653	769	720	706	750	875	min ⁻¹ /mNm	
13 Rotor inductance	L	35	150	420	900	2 200	8 000	μ H	
14 Mechanical time constant	τ_m	25	20	20	20	19	22	ms	
15 Rotor inertia	J	3,7	2,5	2,7	2,7	2,4	2,4	gcm ²	
16 Angular acceleration	α_{max}	40	49	50	44	50	39	$\cdot 10^3$ rad/s ²	
17 Thermal resistance	R_{th1} / R_{th2}	4 / 28						K/W	
18 Thermal time constant	τ_{w1} / τ_{w2}	4,5 / 602						s	
19 Operating temperature range:									
– motor		-30 ... +85 (optional version -55 ... +125)						°C	
– winding, max. permissible		+125						°C	
20 Shaft bearings		sintered bearings			ball bearings, preloaded				
21 Shaft load max.:		(standard)			(optional version)				
– with shaft diameter		1,5			2				mm
– radial at 3 000 min ⁻¹ (3 mm from bearing)		1,2			8				N
– axial at 3 000 min ⁻¹		0,2			0,8				N
– axial at standstill		20			10				N
22 Shaft play:									
– radial	\leq	0,03			0,015		mm		
– axial	\leq	0,2			0		mm		
23 Housing material		steel, zinc galvanized and passivated							
24 Mass		50						g	
25 Direction of rotation		clockwise, viewed from the front face							
26 Speed up to	n_{max}	11 000						min ⁻¹	
27 Number of pole pairs		1							
28 Magnet material		AlNiCo							
Rated values for continuous operation									
29 Rated torque	M_N	2	4,1	4,6	4,7	4,5	4,2	mNm	
30 Rated current (thermal limit)	I_N	0,7	0,7	0,4	0,29	0,18	0,094	A	
31 Rated speed	n_N	8 260	5 370	5 210	4 160	4 650	3 490	min ⁻¹	

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.



