DC-Micromotors

Precious Metal Commutation

10 mNm

For combination with
Gearheads:
20/1, 22/2, 22/5, 22/7, 22E, 22EKV, 22F, 23/1, 26A
Encoders:
IE2-1024, IE2-16, IEH2-4096

Series 2232 ... SR

Values at 22°C and nominal voltage		2232 U	006 SR	009 SR	012 SR	015 SR	018 SR	024 SR	
1	Nominal voltage	U_N	6	9	12	15	18	24	V
2	Terminal resistance	R	0,81	2,14	4,09	6,61	9,04	16,4	Ω
3	Output power	$P_{2nom.}$	11	9,35	8,7	8,41	8,86	8,68	W
4	Efficiency, max.	$\eta_{max.}$	87	86	86	85	86	86	%
5	No-load speed	n_0	7 100	7 400	7 100	7 100	7 100	7 100	rpm
6	No-load current, typ. (with shaft ø 2 mm)	I_0	0,035	0,0241	0,0175	0,0139	0,0116	0,0087	A
7	Stall torque	M_H	59,2	48,3	46,8	45,2	47,6	46,7	mNm
8	Friction torque	M_R	0,28	0,28	0,28	0,28	0,28	0,28	mNm
9	Speed constant	k_n	1 190	827	595	476	397	298	rpm/V
10	Back-EMF constant	k_E	0,84	1,21	1,68	2,1	2,52	3,36	mV/rpm
11	Torque constant	k_M	8,03	11,5	16	20,1	24,1	32,1	mNm/A
12	Current constant	k_I	0,125	0,087	0,062	0,05	0,042	0,031	A/mNm
13	Slope of n-M curve	$\Delta n/\Delta M$	120	153	152	157	149	152	rpm/mNm
14	Rotor inductance	L	45	90	180	280	400	710	µH
15	Mechanical time constant	τ_m	6	6	6	6	6	6	ms
16	Rotor inertia	J	4,8	3,8	3,8	3,8	3,8	3,8	gcm²
17	Angular acceleration	$\alpha_{max.}$	120	120	120	120	120	120	$\cdot 10^3$rad/s²
18	Thermal resistance	R_{th1} / R_{th2}	4 / 13						K/W
19	Thermal time constant	τ_{w1} / τ_{w2}	7 / 340						s
20	Operating temperature range:								
	– motor		-30 ... +85 (optional version -55 ... +125)						°C
	– winding, max. permissible		+125						°C
21	Shaft bearings		sintered bearings		ball bearings		ball bearings, preloaded		
22	Shaft load max.:		(standard)		(optional version)		(optional version)		
	– with shaft diameter		2		2		2		mm
	– radial at 3 000 rpm (3 mm from bearing)		1,5		8		8		N
	– axial at 3 000 rpm		0,2		0,8		0,8		N
	– axial at standstill		20		10		10		N
23	Shaft play								
	– radial	≤	0,03		0,015		0,015		mm
	– axial	≤	0,2		0,2		0		mm
24	Housing material		steel, black coated						
25	Mass		62						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						
Rated values for continuous operation									
30	Rated torque	M_N	10	10	10	10	10	10	mNm
31	Rated current (thermal limit)	I_N	1,3	0,93	0,67	0,53	0,44	0,33	A
32	Rated speed	n_N	5 900	5 810	5 510	5 420	5 530	5 490	rpm

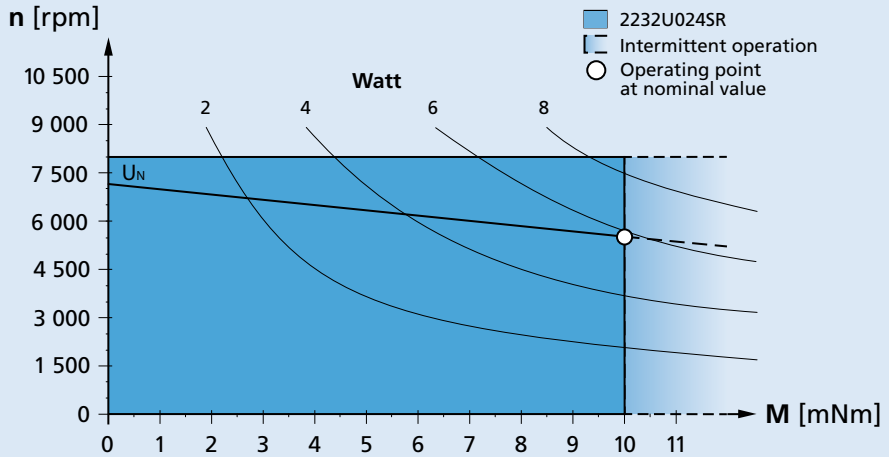
Note: Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The R_{th2} value has been reduced by 0%.

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.

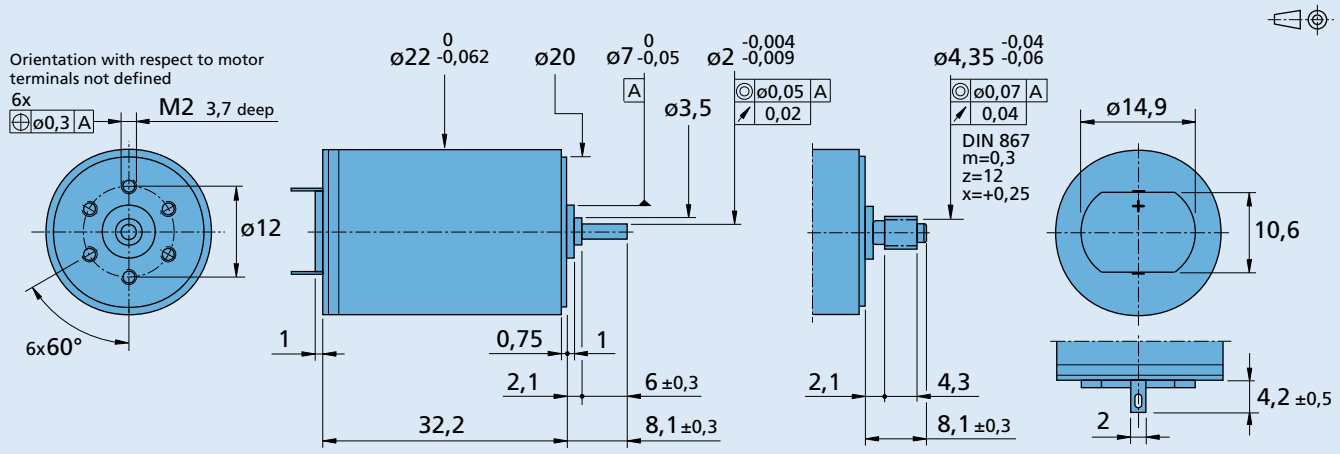
The diagram shows the motor in a completely insulated as well as thermally coupled condition (R_{th2} 50% reduced).

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.



Recommended operation areas (example: nominal voltage 24V)

Dimensional drawing



2232 U ... SR **2232 R ... SR**