

# DC-Micromotors

## Precious Metal Commutation

# 2,5 mNm

### For combination with

Gearheads:

20/1, 22/2, 22/5, 22/7, 22E, 22EKV, 23/1, 38/3

Encoders:

HEDL 5540, HEDM 5500, HEDS 5500, HEDS 5540

## Series 2230 ... S

	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	$\Omega$
3 Output power	$P_{2 \max}$	3,69	2,94	3,27	2,63	2,82	2,01	W
4 Efficiency, max.	$\eta_{\max}$	83	82	83	82	81	78	%
5 No-load speed	$n_0$	9 600	9 300	9 500	8 400	9 000	8 200	rpm
6 No-load current (with shaft $\varnothing$ 1,5 mm)	$I_0$	0,04	0,019	0,01	0,007	0,005	0,003	A
7 Stall torque	$M_H$	14,7	12,1	13,2	11,9	12	9,37	mNm
8 Friction torque	$M_R$	0,12	0,12	0,12	0,12	0,13	0,14	mNm
9 Speed constant	$k_n$	3 230	1 560	799	566	379	208	rpm/V
10 Back-EMF constant	$k_E$	0,31	0,639	1,25	1,77	2,64	4,81	mV/rpm
11 Torque constant	$k_M$	2,96	6,1	12	16,9	25,2	45,9	mNm/A
12 Current constant	$k_i$	0,338	0,164	0,084	0,059	0,04	0,022	A/mNm
13 Slope of n-M curve	$\Delta n / \Delta M$	653	769	720	706	750	875	rpm/mNm
14 Rotor inductance	L	35	150	420	900	2 200	8 000	$\mu$ H
15 Mechanical time constant	$\tau_m$	25	20	20	20	19	22	ms
16 Rotor inertia	J	3,7	2,5	2,7	2,7	2,4	2,4	gcm <sup>2</sup>
17 Angular acceleration	$\alpha_{\max}$	40	49	50	44	50	39	$\cdot 10^3$ rad/s <sup>2</sup>
18 Thermal resistance	$R_{th1} / R_{th2}$	4 / 28						K/W
19 Thermal time constant	$\tau_{w1} / \tau_{w2}$	4,5 / 602						s
20 Operating temperature range:		-30 ... +85 (optional version -55 ... +125)						°C
- motor								
- rotor, 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		1,5		2		2		mm
- radial at 3 000 rpm (3 mm from bearing)		1,2		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	$\leq$	0,03		0,015		0,015		mm
- axial	$\leq$	0,2		0,2		0		mm
24 Housing material		steel, zinc galvanized and passivated						
25 Weight		50						g
26 Direction of rotation		clockwise, viewed from the front face						

### Recommended values - mathematically independent of each other

27 Speed up to	$n_{e \max}$	8 000	8 000	8 000	8 000	8 000	8 000	rpm
28 Torque up to	$M_{e \max}$	2,5	2,5	2,5	2,5	2,5	2,5	mNm
29 Current up to (thermal limits)	$I_{e \max}$	1,94	0,87	0,45	0,32	0,21	0,1	A

