

# DC-Micromotors

## Precious Metal Commutation

0,59 mNm  
1,2 W

### Series 1516 ... S

Values at 22°C and nominal voltage	1516 T	1,5 S	002 S	4,5 S	006 S	012 S	
1 Nominal voltage	$U_N$	1,5	2	4,5	6	12	V
2 Terminal resistance	$R$	1,11	3,25	14,7	31,2	115	$\Omega$
3 Efficiency, max.	$\eta_{max}$	59	48	50	45	47	%
4 No-load speed	$n_0$	14 400	14 200	15 000	15 000	15 600	min <sup>-1</sup>
5 No-load current, typ. (with shaft $\varnothing$ 1,5 mm)	$I_0$	0,075	0,057	0,027	0,021	0,011	A
6 Stall torque	$M_H$	1,2	0,68	0,73	0,59	0,62	mNm
7 Friction torque	$M_R$	0,07	0,07	0,07	0,07	0,07	mNm
8 Speed constant	$k_n$	10 159	7 827	3 659	2 800	1 445	min <sup>-1</sup> /V
9 Back-EMF constant	$k_E$	0,098	0,128	0,273	0,357	0,692	mV/min <sup>-1</sup>
10 Torque constant	$k_M$	0,94	1,22	2,61	3,41	6,61	mNm/A
11 Current constant	$k_I$	1,064	0,82	0,383	0,293	0,151	A/mNm
12 Slope of n-M curve	$\Delta n / \Delta M$	12 000	20 800	20 600	25 600	25 100	min <sup>-1</sup> /mNm
13 Rotor inductance	$L$	16	27	140	240	900	$\mu$ H
14 Mechanical time constant	$\tau_m$	39	45	56	56	60	ms
15 Rotor inertia	$J$	0,31	0,21	0,26	0,21	0,23	gcm <sup>2</sup>
16 Angular acceleration	$\alpha_{max}$	39	32	28	28	27	$\cdot 10^3$ rad/s <sup>2</sup>
17 Thermal resistance	$R_{th1} / R_{th2}$	8 / 45					K/W
18 Thermal time constant	$\tau_{w1} / \tau_{w2}$	2 / 200					s
19 Operating temperature range:							
– motor		-30 ... +65 (optional version -55 ... +125)					°C
– winding, max. permissible		+65 (optional version +125)					°C
20 Shaft bearings		sintered bearings (standard)		ball bearings, preloaded (optional version)			
21 Shaft load max.:		1,5		1,5			mm
– with shaft diameter		1,2		5			N
– radial at 3 000 min <sup>-1</sup> (3 mm from bearing)		0,2		0,5			N
– axial at 3 000 min <sup>-1</sup>		20		10			N
– axial at standstill							
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		10					g
25 Direction of rotation		clockwise, viewed from the front face					
26 Speed up to	$n_{max}$	18 000					min <sup>-1</sup>
27 Number of pole pairs		1					
28 Magnet material		AlNiCo					

#### Rated values for continuous operation

29 Rated torque	$M_N$	0,59	0,47	0,49	0,41	0,43	mNm
30 Rated current (thermal limit)	$I_N$	0,7	0,45	0,21	0,14	0,077	A
31 Rated speed	$n_N$	6 290	2 500	2 980	2 500	2 500	min <sup>-1</sup>

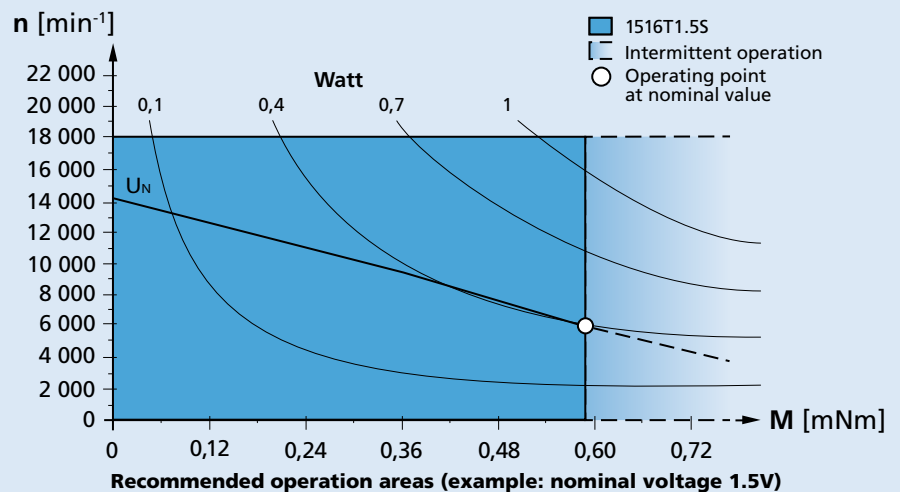
**Note:** Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The  $R_{th2}$  value has been reduced by 0%.

#### 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.

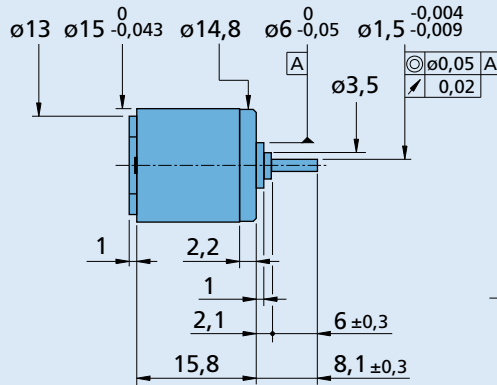
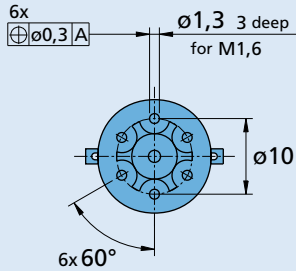
The diagram shows the motor in a completely insulated as well as thermally coupled condition ( $R_{th2}$  50% reduced).

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.

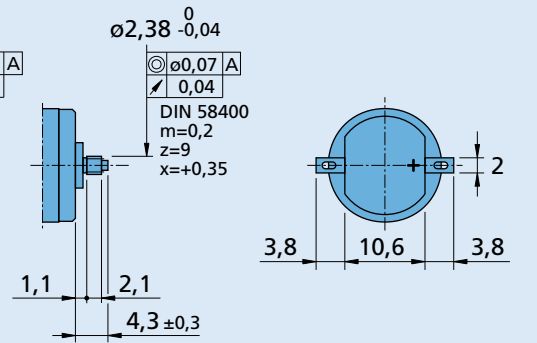


### Dimensional drawing

Orientation with respect to motor terminals not defined



1516 T ... S



1516 E ... S

### Options

Example product designation: **1516T0125-277**

Option	Type	Description
L	Twin Leads	For motors with twin leads (PVC), length 150 mm, red (+) / black (-)
4924	Twin Leads	For motors with twin leads (PVC), length 300 mm, red (+) / black (-)
X4924	Twin Leads	For motors with twin leads (PVC), length 600 mm, red (+) / black (-)
4925	Twin Leads	For motors with twin leads (PVC), length 150 mm, red (+) / black (-), with connector AMP 179228-2
X4925	Twin Leads	For motors with twin leads (PVC), length 300 mm, red (+) / black (-), with connector AMP 179228-2
Y4925	Twin Leads	For motors with twin leads (PVC), length 600 mm, red (+) / black (-), with connector AMP 179228-2
277	Bearings	2 preloaded ball bearings

### Product combination

Precision Gearheads / Lead Screws	Encoders	Drive Electronics	Cables / Accessories
15/5 15/5 S 16A		SC 1801 MCDC 3002	To view our large range of accessory parts, please refer to the "Accessories" chapter.