

# DC-Micromotors

## Precious Metal Commutation

0,97 mNm  
2,4 W

### Series 1516 ... SR

Values at 22°C and nominal voltage		1516 T	006 SR	009 SR	012 SR	
1	Nominal voltage	$U_N$	6	9	12	V
2	Terminal resistance	$R$	15,2	32,5	60	$\Omega$
3	Efficiency, max.	$\eta_{max}$	57	58	58	%
4	No-load speed	$n_0$	12 800	12 800	12 900	min <sup>-1</sup>
5	No-load current, typ. (with shaft $\varnothing$ 1,5 mm)	$I_0$	0,029	0,019	0,014	A
6	Stall torque	$M_H$	1,52	1,61	1,53	mNm
7	Friction torque	$M_R$	0,12	0,12	0,12	mNm
8	Speed constant	$k_n$	2 300	1 530	1 160	min <sup>-1</sup> /V
9	Back-EMF constant	$k_E$	0,434	0,655	0,865	mV/min <sup>-1</sup>
10	Torque constant	$k_M$	4,15	6,25	8,26	mNm/A
11	Current constant	$k_I$	0,241	0,16	0,121	A/mNm
12	Slope of n-M curve	$\Delta n / \Delta M$	8 420	7 950	8 430	min <sup>-1</sup> /mNm
13	Rotor inductance	$L$	100	230	400	$\mu$ H
14	Mechanical time constant	$\tau_m$	35	35	35	ms
15	Rotor inertia	$J$	0,4	0,42	0,4	gcm <sup>2</sup>
16	Angular acceleration	$\alpha_{max}$	38	38	39	$\cdot 10^3$ rad/s <sup>2</sup>
17	Thermal resistance	$R_{th1} / R_{th2}$	10 / 33			K/W
18	Thermal time constant	$\tau_{w1} / \tau_{w2}$	2,9 / 190			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		
			(standard)	(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, black coated			
24	Mass		13			g
25	Direction of rotation		clockwise, viewed from the front face			
26	Speed up to	$n_{max}$	15 000			min <sup>-1</sup>
27	Number of pole pairs		1			
28	Magnet material		NdFeB			
<b>Rated values for continuous operation</b>						
29	Rated torque	$M_N$	0,92	0,97	0,93	mNm
30	Rated current (thermal limit)	$I_N$	0,27	0,19	0,14	A
31	Rated speed	$n_N$	2 500	2 500	2 500	min <sup>-1</sup>

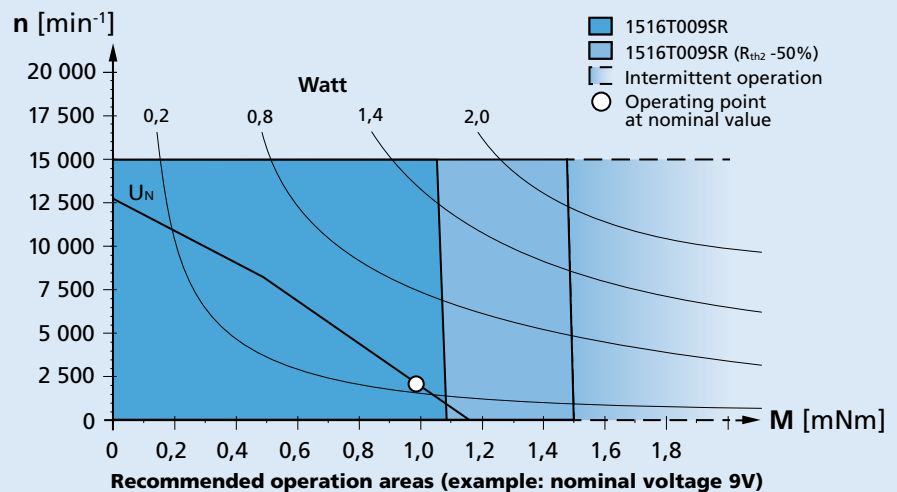
**Note:** Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The  $R_{th2}$  value has been reduced by 0%.

**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.

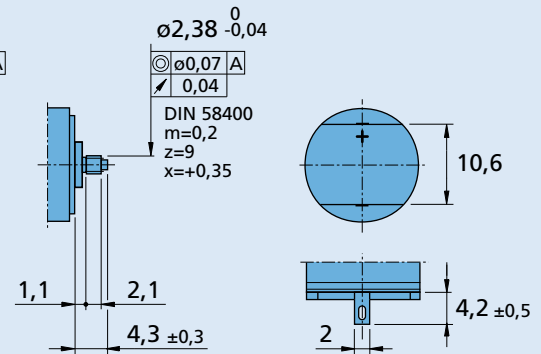
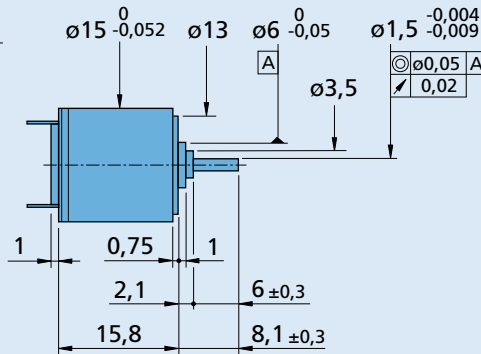
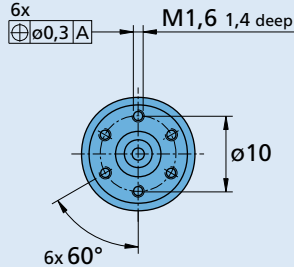
The diagram shows the motor in a completely insulated as well as thermally coupled condition ( $R_{th2}$  50% reduced).

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 ... SR

1516 E ... SR

### Options

Example product designation: **1516T012SR-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
F	Single Leads	For motors with single leads (PTFE), length 150 mm, red (+) / black (-)
277	Bearings	2 preloaded ball bearings

### Product combination

Precision Gearheads / Lead Screws	Encoders	Drive Electronics	Cables / Accessories
15A 15/5 15/5 S 15/8 15/10 16A 16/7	IE2-16 IE2-1024 IEH2-4096 IEH3-4096 IEH3-4096L	SC 1801 P SC 1801 S MCDC 3002 P MCDC 3002 S MC 5004 P	To view our large range of accessory parts, please refer to the "Accessories" chapter.