

# DC-Micromotors

Precious Metal Commutation

0,918 mNm

2 W

## Series 1516 ... SR

Values at 22°C and nominal voltage	1516 T	006 SR	009 SR	012 SR	
Nominal voltage	$U_N$	6	9	12	V
Terminal resistance	$R$	14,1	32,5	60,5	$\Omega$
Rotor inductance	$L$	99,1	229	406	$\mu\text{H}$
Efficiency, max.	$\eta_{max}$	54	54	53	%
No-load current, typ.	$I_0$	0,0294	0,0193	0,0145	A
No-load speed	$n_0$	13 000	12 900	12 800	$\text{min}^{-1}$
Stall torque	$M_H$	1,63	1,61	1,53	mNm
Rotor inertia	$J$	0,4	0,42	0,4	$\text{gcm}^2$
Friction torque	$M_R$	0,12	0,12	0,12	mNm
Torque constant	$k_M$	4,12	6,25	8,33	$\text{mNm/A}$
Speed constant	$k_n$	2 320	1 530	1 150	$\text{min}^{-1}/\text{V}$
Slope of n-M curve	$\Delta n/\Delta M$	7 970	7 950	8 330	$\text{min}^{-1}/\text{mNm}$
Thermal resistance:					
- winding to housing	$R_{th1}$	15			K/W
- housing to ambient (external plastic flange)	$R_{th2p}$	38			K/W
- housing to ambient (external metal flange)	$R_{th2m}$	1,8			K/W
Thermal time constant:					
- winding	$\tau_{w1}$	4,8			s
- housing (external plastic flange)	$\tau_{w2p}$	210			s
- housing (external metal flange)	$\tau_{w2m}$	10			s
Operating temperature range:					
- motor		-30 ... +85 (optional version -30 ... +125)			$^{\circ}\text{C}$
- winding, max. permissible		+125			$^{\circ}\text{C}$
Shaft bearings		sintered bearings	ball bearings, preloaded		
Shaft diameter		1,5	1,5		mm
Radial shaft load max.:					
- dynamic at 3 000 $\text{min}^{-1}$ (3 mm from bearing)		1,2	5		N
Axial shaft load max.:					
- dynamic at 3 000 $\text{min}^{-1}$		0,2	0,5		N
- static (shaft unsupported)		20	10		N
Shaft play, max.:					
- radial		0,03	0,015		mm
- axial		0,2	0		mm
Speed up to	$n_{max}$	15 000			$\text{min}^{-1}$
Number of pole pairs		1			
Mass		13			g
Housing material		steel, nickel plated			
Magnet material		NdFeB			

Rated values for continuous operation						
Rated torque	$M_N$		0,918	0,912	0,876	mNm
Rated current (thermal limit)	$I_N$		0,275	0,18	0,13	A
Rated speed	$n_N$		2 500	2 500	2 500	$\text{min}^{-1}$

**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 different conditions of thermal coupling, i.e. mounted respectively on a plastic flange and a metal flange.

The nominal voltage ( $U_N$ ) curve shows, up to the thermal limit, the operating point at nominal voltage for the motor mounted on a plastic flange. Higher torque can be achieved by further reducing the thermal resistance.

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.



