

Flat DC-Micromotors

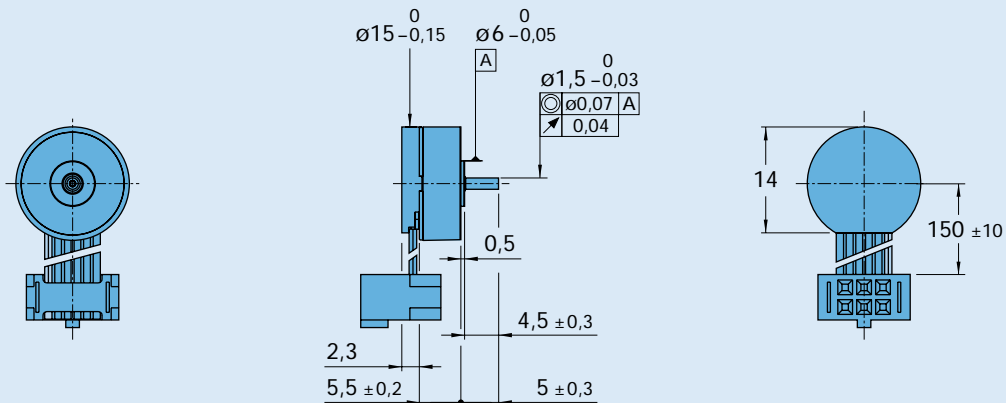
Precious Metal Commutation
with integrated Encoder

0,3 mNm

For combination with
Drive Electronics:
SC 1801

Series 1506 ... SR IE2-8

	1506 N	003 SR	006 SR	012 SR	IE2-8
Nominal voltage	U_N	3	6	12	Volt
Terminal resistance	R	10,4	50,5	130	Ω
Output power	$P_{2 \text{ max.}}$	0,19	0,17	0,26	W
Efficiency	$\eta \text{ max.}$	68	66	70	%
No-load speed	n_0	13 400	14 300	15 500	rpm
No-load current (with shaft \varnothing 0,8 mm)	I_0	0,010	0,005	0,003	A
Stall torque	M_H	0,54	0,46	0,64	mNm
Friction torque	M_R	0,02	0,02	0,02	mNm
Speed constant	k_n	4 640	2 480	1 340	rpm/V
Back-EMF constant	k_E	0,216	0,403	0,749	mV/rpm
Torque constant	k_M	2,06	3,84	7,15	mNm/A
Current constant	k_I	0,486	0,260	0,140	A/mNm
Slope of n-M curve	$\Delta n / \Delta M$	24 700	31 400	24 200	rpm/mNm
Rotor inductance	L	175	720	2 100	μH
Mechanical time constant	τ_m	24	30	23	ms
Rotor inertia	J	0,09	0,09	0,09	gcm^2
Angular acceleration	$\alpha \text{ max.}$	58	50	71	$\cdot 10^3 \text{ rad/s}^2$
Thermal resistance	R_{th1} / R_{th2}	36 / 61			K/W
Thermal time constant	τ_{w1} / τ_{w2}	5,4 / 190			s
Operating temperature range:		0 ... + 70			$^{\circ}\text{C}$
Shaft bearings		sintered sleeves bearings			
Shaft load max.:					
- with shaft diameter		0,8			mm
- radial at 3000 rpm (3 mm from bearing)		0,5			N
- axial at 3000 rpm		0,1			N
- axial at standstill		10			N
Shaft play:					
- radial	\leq	0,03			mm
- axial	\leq	0,2			mm
Housing material		plastic			
Weight		7,1			g
Direction of rotation		clockwise, viewed from the front face			
Recommended values - mathematically independent of each other					
Speed up to	$n_{e \text{ max.}}$	10 000	10 000	10 000	rpm
Torque up to	$M_{e \text{ max.}}$	0,3	0,3	0,3	mNm
Current up to (thermal limits)	$I_{e \text{ max.}}$	0,206	0,098	0,060	A



1506 N ... SR IE2-8

Integrated optical Encoder		IE2-8	
Lines per revolution	N	8	
Signal output, square wave		2	channels
Supply voltage	U _{DD}	3,2 ... 5,5	V DC
Current consumption, typical (U _{DD} = 5 V DC)	I _{DD}	typ. 8, max. 15	mA
Output current, max. allowable (at U _{out} < 1,5V)	I _{OUT}	5	mA
Pulse width ¹⁾	P	180 ± 45	°e
Phase shift, channel A to B ¹⁾	Φ	90 ± 45	°e
Signal rise/fall time, max. (C _{LOAD} = 50 pF)	tr/tf	2,5/0,3	µs
Frequency range ²⁾ , up to	f	4,5	kHz

¹⁾ Ambient temperature 22°C (tested at 1kHz)

²⁾ Velocity (rpm) = f (Hz) x 60/N

Features

In this version, the DC-Micromotors have an optical encoder with two output channels. A code wheel on the shaft is optically captured and further processed. At the encoder outputs, two 90° phase-shifted rectangular signals are available with 8 impulses per motor revolution.

The encoder is suitable for the monitoring and regulation of the speed and direction of rotation and for positioning the drive shaft.

The supply voltage for the encoder and the DC-Micromotor as well as the two channel output signals are interfaced through a ribbon cable with connector.

Full product description

■ Examples:

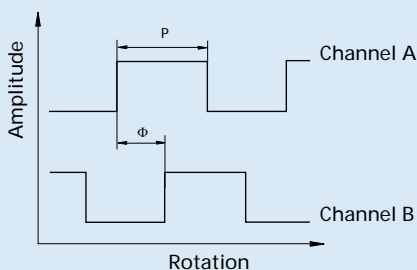
1506N003SR IE2-8

1506N012SR IE2-8

Output signals / Circuit diagram / Connector information

Output signals

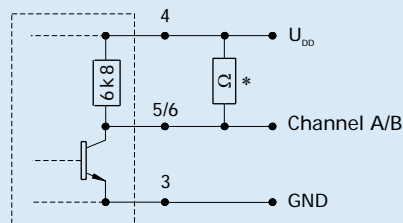
with clockwise rotation as seen from the shaft end



Admissible deviation of phase shift:

$$\Delta\Phi = \left| 90^\circ - \frac{\Phi}{P} * 180^\circ \right| < 45^\circ$$

Output circuit



* An additional external pull-up resistor can be added to improve the rise time. Caution: I_{OUT} max. 5 mA must not be exceeded!

