

NEW



Thin Profile DC-Micromotors

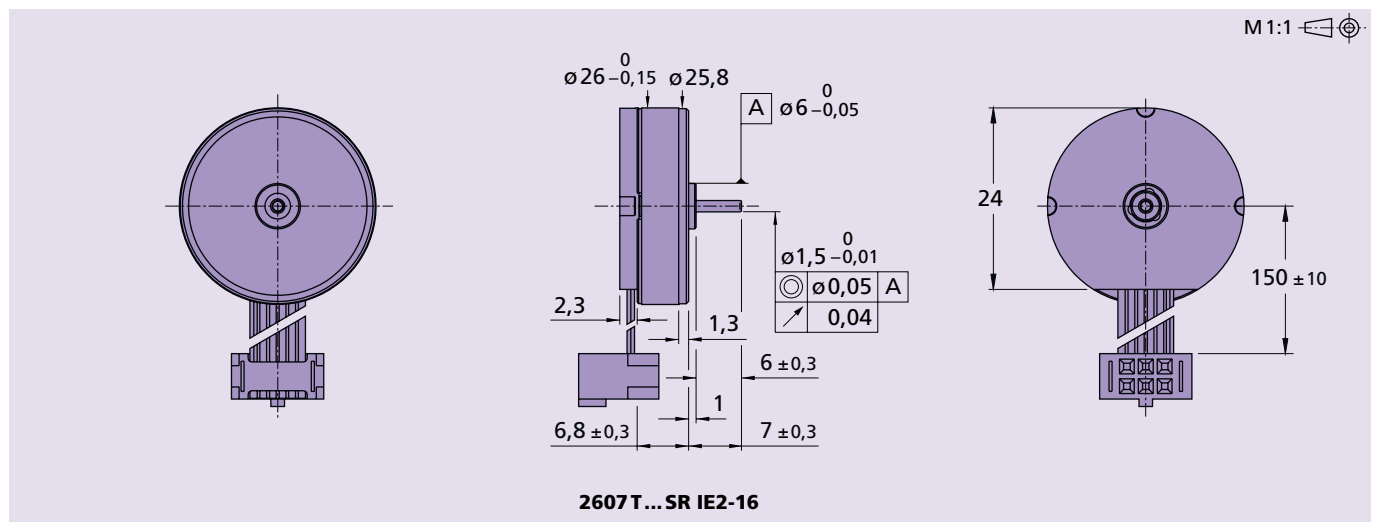
2 mNm

with optical Encoder
flat ironless rotor

For combination with
Drive Electronics:
SC 1801 (Speed Controller)

Series 2607 ... SR IE2-16

| | 2607 T | 003 SR IE2 | 006 SR IE2 | 012 SR IE2 | 024 SR IE2 | |
|--|---------------------------------------|---------------------------------------|---------------|------------|------------|-------------------------------------|
| Nominal voltage | U _N | 3 | 6 | 12 | 24 | Volt |
| Terminal resistance | R | 1,68 | 7,9 | 30,8 | 115 | Ω |
| Output power | P _{2 max.} | 1,31 | 1,11 | 1,14 | 1,22 | W |
| Efficiency | η _{max.} | 81 | 80 | 80 | 80 | % |
| No-load speed | n ₀ | 7 200 | 6 700 | 6 900 | 7 200 | rpm |
| No-load current (with shaft ø 1,5 mm) | I ₀ | 0,02 | 0,010 | 0,005 | 0,0025 | A |
| Stall torque | M _H | 6,95 | 6,33 | 6,31 | 6,48 | mNm |
| Friction torque | M _R | 0,08 | 0,08 | 0,08 | 0,08 | mNm |
| Speed constant | k _n | 2 430 | 1 130 | 582 | 304 | rpm/V |
| Back-EMF constant | k _E | 0,412 | 0,884 | 1,72 | 3,29 | mV/rpm |
| Torque constant | k _M | 3,93 | 8,44 | 16,4 | 31,4 | mNm/A |
| Current constant | k _I | 0,254 | 0,118 | 0,061 | 0,032 | A/mNm |
| Slope of n-M curve | Δn/ΔM | 1 040 | 1 060 | 1 090 | 1 110 | rpm/mNm |
| Rotor inductance | L | 90 | 420 | 1 600 | 5 800 | μH |
| Mechanical time constant | τ _m | 7,4 | 7,5 | 7,8 | 7,9 | ms |
| Rotor inertia | J | 0,68 | 0,68 | 0,68 | 0,68 | gcm ² |
| Angular acceleration | α _{max.} | 100 | 94 | 93 | 95 | ·10 ³ rad/s ² |
| Thermal resistance | R _{th 1} / R _{th 2} | 10 / 32 | | | | K/W |
| Thermal time constant | τ _{w1} / τ _{w2} | 6 / 250 | | | | s |
| Operating temperature range: | | | | | | |
| – motor | | – 30 ... + 70 | | | | °C |
| – rotor, max. permissible | | +100 | | | | °C |
| Shaft bearings | | sintered sleeves bearings | ball bearings | | | |
| Shaft load max.: | | (standard) | (optional) | | | |
| – with shaft diameter | | 1,5 | 1,5 | | | mm |
| – radial at 3000 rpm (3 mm from bearing) | | 1,2 | 5 | | | N |
| – axial at 3000 rpm | | 0,2 | 0,5 | | | N |
| – axial at standstill | | 20 | 10 | | | N |
| Shaft play: | | | | | | |
| – radial | ≤ | 0,03 | 0,015 | | | mm |
| – axial | ≤ | 0,2 | 0,2 | | | mm |
| Housing material | | plastic | | | | |
| Weight | | 18,6 | | | | g |
| Direction of rotation | | clockwise, viewed from the front face | | | | |
| Recommended values - mathematically independent of each other | | | | | | |
| Speed up to | n _{e max.} | 5 500 | 5 500 | 5 500 | 5 500 | rpm |
| Torque up to | M _{e max.} | 2 | 2 | 2 | 2 | mNm |
| Current up to (thermal limits) | I _{e max.} | 0,804 | 0,371 | 0,187 | 0,097 | A |



| Integrated optical Encoder | 2607 ... SR | IE2-16 | |
|---|------------------|-----------------|----------|
| Lines per revolution | N | 16 | |
| Signal output, square wave | | 2 | channels |
| Supply voltage | U _{DD} | 3,2 ... 5,5 | V DC |
| Current consumption, typical (U _{DD} = 5V 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 |
| Operating temperature range | | 0 ... +70 | °C |

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 16 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.

Order information

■ Ordering examples:

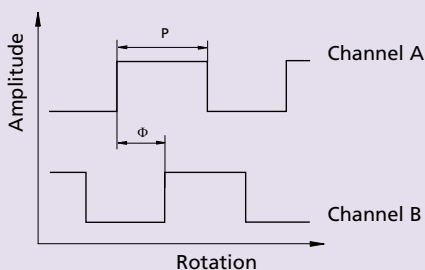
2607T003SR IE2-16

2607T024SR IE2-16

Output signals / Circuit diagram / Connector information

Output signals

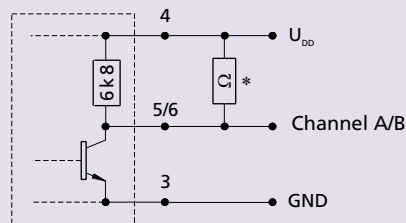
with clockwise rotation as seen from the shaft end



Admissible deviation of phase shift:

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

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!

