

# DC-Micromotors

Precious Metal Commutation

0,7 mNm

1,2 W

## Series 0816 ... SR

| Values at 22°C and nominal voltage    |                                                           | 0816 K                  | 003 SR                                | 006 SR | 009 SR        | 012 SR |                                     |
|---------------------------------------|-----------------------------------------------------------|-------------------------|---------------------------------------|--------|---------------|--------|-------------------------------------|
| 1                                     | Nominal voltage                                           | $U_N$                   | 3                                     | 6      | 9             | 12     | V                                   |
| 2                                     | Terminal resistance                                       | $R$                     | 5,4                                   | 21,2   | 47            | 101,8  | $\Omega$                            |
| 3                                     | Efficiency, max.                                          | $\eta_{max}$            | 69                                    | 69     | 69            | 67     | %                                   |
| 4                                     | No-load speed                                             | $n_0$                   | 13 250                                | 13 500 | 13 500        | 12 600 | min <sup>-1</sup>                   |
| 5                                     | No-load current, typ. (with shaft ø 1 mm)                 | $I_0$                   | 0,016                                 | 0,0083 | 0,0057        | 0,0039 | A                                   |
| 6                                     | Stall torque                                              | $M_H$                   | 1,15                                  | 1,13   | 1,15          | 1      | mNm                                 |
| 7                                     | Friction torque                                           | $M_R$                   | 0,034                                 | 0,034  | 0,035         | 0,034  | mNm                                 |
| 8                                     | Speed constant                                            | $k_n$                   | 4 526                                 | 2 318  | 1 543         | 1 085  | min <sup>-1</sup> /V                |
| 9                                     | Back-EMF constant                                         | $k_E$                   | 0,221                                 | 0,431  | 0,648         | 0,922  | mV/min <sup>-1</sup>                |
| 10                                    | Torque constant                                           | $k_M$                   | 2,11                                  | 4,12   | 6,19          | 8,8    | mNm/A                               |
| 11                                    | Current constant                                          | $k_I$                   | 0,474                                 | 0,243  | 0,162         | 0,114  | A/mNm                               |
| 12                                    | Slope of n-M curve                                        | $\Delta n / \Delta M$   | 11 475                                | 11 904 | 11 714        | 12 553 | min <sup>-1</sup> /mNm              |
| 13                                    | Rotor inductance                                          | $L$                     | 53                                    | 217    | 507           | 1 033  | $\mu$ H                             |
| 14                                    | Mechanical time constant                                  | $\tau_m$                | 6,1                                   | 6,5    | 6,2           | 6,5    | ms                                  |
| 15                                    | Rotor inertia                                             | $J$                     | 0,051                                 | 0,052  | 0,051         | 0,049  | gcm <sup>2</sup>                    |
| 16                                    | Angular acceleration                                      | $\alpha_{max}$          | 229                                   | 219    | 227           | 203    | ·10 <sup>3</sup> rad/s <sup>2</sup> |
| 17                                    | Thermal resistance                                        | $R_{th1} / R_{th2}$     | 20 / 48                               |        |               |        | K/W                                 |
| 18                                    | Thermal time constant                                     | $\tau_{w1} / \tau_{w2}$ | 4,2 / 242                             |        |               |        | s                                   |
| 19                                    | Operating temperature range:                              |                         |                                       |        |               |        |                                     |
|                                       | – motor                                                   |                         | -30 ... +85 (optional version         |        | -30 ... +125) |        | °C                                  |
|                                       | – winding, max. permissible                               |                         | +85 (optional version                 |        | +125)         |        | °C                                  |
| 20                                    | Shaft bearings                                            |                         | sintered bearings                     |        |               |        |                                     |
| 21                                    | Shaft load max.:                                          |                         |                                       |        |               |        |                                     |
|                                       | – with shaft diameter                                     |                         | 1                                     |        |               |        | mm                                  |
|                                       | – radial at 3 000 min <sup>-1</sup> (1,5 mm from bearing) |                         | 0,7                                   |        |               |        | N                                   |
|                                       | – axial at 3 000 min <sup>-1</sup>                        |                         | 0,1                                   |        |               |        | N                                   |
|                                       | – axial at standstill                                     |                         | 20                                    |        |               |        | N                                   |
| 22                                    | Shaft play:                                               |                         |                                       |        |               |        |                                     |
|                                       | – radial                                                  | ≤                       | 0,02                                  |        |               |        | mm                                  |
|                                       | – axial                                                   | ≤                       | 0,2                                   |        |               |        | mm                                  |
| 23                                    | Housing material                                          |                         | steel, nickel plated                  |        |               |        |                                     |
| 24                                    | Mass                                                      |                         | 4,5                                   |        |               |        | g                                   |
| 25                                    | Direction of rotation                                     |                         | clockwise, viewed from the front face |        |               |        |                                     |
| 26                                    | Speed up to                                               | $n_{max}$               | 16 000                                |        |               |        | min <sup>-1</sup>                   |
| 27                                    | Number of pole pairs                                      |                         | 1                                     |        |               |        |                                     |
| 28                                    | Magnet material                                           |                         | NdFeB                                 |        |               |        |                                     |
|                                       |                                                           |                         |                                       |        |               |        |                                     |
|                                       |                                                           |                         |                                       |        |               |        |                                     |
|                                       |                                                           |                         |                                       |        |               |        |                                     |
| Rated values for continuous operation |                                                           |                         |                                       |        |               |        |                                     |
| 29                                    | Rated torque                                              | $M_N$                   | 0,7                                   | 0,69   | 0,69          | 0,61   | mNm                                 |
| 30                                    | Rated current (thermal limit)                             | $I_N$                   | 0,37                                  | 0,19   | 0,13          | 0,077  | A                                   |
| 31                                    | Rated speed                                               | $n_N$                   | 2 540                                 | 2 660  | 2 790         | 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.



