

# DC-Micromotors

## Precious Metal Commutation

1,4 mNm  
3,5 W

### Series 1319 ... SR

| Values at 22°C and nominal voltage           |                                                         | 1319 T                  | 006 SR                                      | 012 SR                   | 024 SR |                                 |
|----------------------------------------------|---------------------------------------------------------|-------------------------|---------------------------------------------|--------------------------|--------|---------------------------------|
| 1                                            | Nominal voltage                                         | $U_N$                   | 6                                           | 12                       | 24     | V                               |
| 2                                            | Terminal resistance                                     | $R$                     | 8,26                                        | 34,6                     | 119    | $\Omega$                        |
| 3                                            | Efficiency, max.                                        | $\eta_{max}$            | 66                                          | 65                       | 66     | %                               |
| 4                                            | No-load speed                                           | $n_0$                   | 13 100                                      | 12 800                   | 14 600 | min <sup>-1</sup>               |
| 5                                            | No-load current, typ. (with shaft $\varnothing$ 1,5 mm) | $I_0$                   | 0,031                                       | 0,015                    | 0,009  | A                               |
| 6                                            | Stall torque                                            | $M_H$                   | 2,91                                        | 2,84                     | 2,89   | mNm                             |
| 7                                            | Friction torque                                         | $M_R$                   | 0,13                                        | 0,13                     | 0,13   | mNm                             |
| 8                                            | Speed constant                                          | $k_n$                   | 2 280                                       | 1 110                    | 637    | min <sup>-1</sup> /V            |
| 9                                            | Back-EMF constant                                       | $k_E$                   | 0,438                                       | 0,897                    | 1,57   | mV/min <sup>-1</sup>            |
| 10                                           | Torque constant                                         | $k_M$                   | 4,19                                        | 8,57                     | 15     | mNm/A                           |
| 11                                           | Current constant                                        | $k_I$                   | 0,239                                       | 0,117                    | 0,067  | A/mNm                           |
| 12                                           | Slope of n-M curve                                      | $\Delta n / \Delta M$   | 4 500                                       | 4 510                    | 5 050  | min <sup>-1</sup> /mNm          |
| 13                                           | Rotor inductance                                        | $L$                     | 130                                         | 530                      | 1 600  | $\mu$ H                         |
| 14                                           | Mechanical time constant                                | $\tau_m$                | 19                                          | 19                       | 19     | ms                              |
| 15                                           | Rotor inertia                                           | $J$                     | 0,4                                         | 0,4                      | 0,36   | gcm <sup>2</sup>                |
| 16                                           | Angular acceleration                                    | $\alpha_{max}$          | 72                                          | 71                       | 80     | $\cdot 10^3$ rad/s <sup>2</sup> |
| 17                                           | Thermal resistance                                      | $R_{th1} / R_{th2}$     | 8 / 35                                      |                          |        | K/W                             |
| 18                                           | Thermal time constant                                   | $\tau_{w1} / \tau_{w2}$ | 3,8 / 175                                   |                          |        | 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 |        |                                 |
| 21                                           | Shaft load max.:                                        |                         | (standard)                                  | (optional version)       |        |                                 |
|                                              | – with shaft diameter                                   |                         | 1,5                                         | 1,5                      |        | mm                              |
|                                              | – radial at 3 000 min <sup>-1</sup> (3 mm from bearing) |                         | 1,2                                         | 5                        |        | N                               |
|                                              | – axial at 3 000 min <sup>-1</sup>                      |                         | 0,2                                         | 0,5                      |        | N                               |
|                                              | – axial at standstill                                   |                         | 20                                          | 10                       |        | N                               |
| 22                                           | Shaft play:                                             |                         |                                             |                          |        |                                 |
|                                              | – radial                                                | $\leq$                  | 0,03                                        | 0,015                    |        | mm                              |
|                                              | – axial                                                 | $\leq$                  | 0,2                                         | 0                        |        | mm                              |
| 23                                           | Housing material                                        |                         | steel, black coated                         |                          |        |                                 |
| 24                                           | Mass                                                    |                         | 12                                          |                          |        | g                               |
| 25                                           | Direction of rotation                                   |                         | clockwise, viewed from the front face       |                          |        |                                 |
| 26                                           | Speed up to                                             | $n_{max}$               | 17 000                                      |                          |        | min <sup>-1</sup>               |
| 27                                           | Number of pole pairs                                    |                         | 1                                           |                          |        |                                 |
| 28                                           | Magnet material                                         |                         | NdFeB                                       |                          |        |                                 |
| <b>Rated values for continuous operation</b> |                                                         |                         |                                             |                          |        |                                 |
| 29                                           | Rated torque                                            | $M_N$                   | 1,4                                         | 1,4                      | 1,3    | mNm                             |
| 30                                           | Rated current (thermal limit)                           | $I_N$                   | 0,4                                         | 0,2                      | 0,11   | A                               |
| 31                                           | Rated speed                                             | $n_N$                   | 4 140                                       | 3 790                    | 5 400  | min <sup>-1</sup>               |

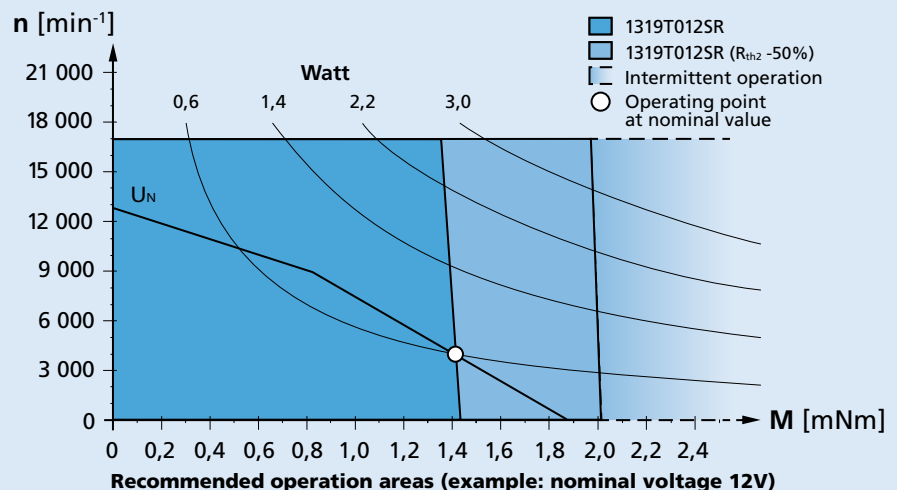
**Note:** Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The  $R_{th2}$  value has been reduced by 0%.

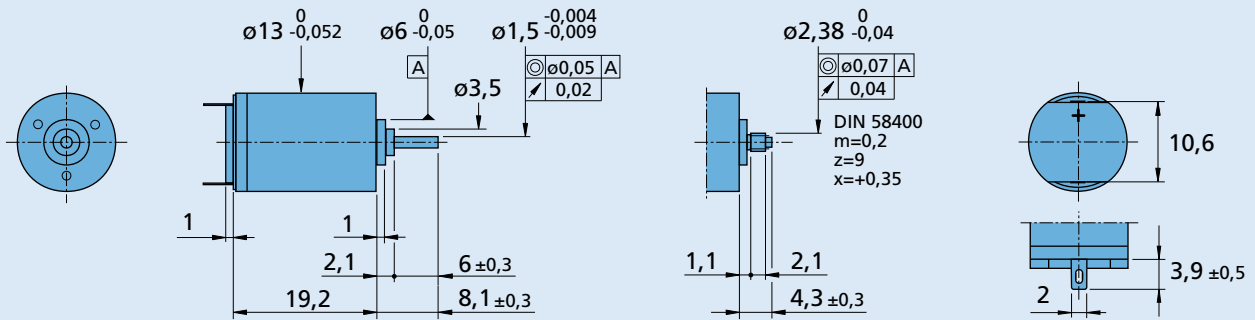
**Note:**

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**

**1319 T ... SR**
**1319 E ... SR**
**Options**

 Example product designation: **1319T012SR-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                                                                         |
|        |              |                                                                                                   |
|        |              |                                                                                                   |
|        |              |                                                                                                   |
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|        |              |                                                                                                   |

**Product combination**

| Precision Gearheads / Lead Screws | Encoders | Drive Electronics                                                 | Cables / Accessories                                                                   |
|-----------------------------------|----------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 13A<br>14/1<br>15/5<br>15/5 S     | IE2-400  | SC 1801 P<br>SC 1801 S<br>MCDC 3002 P<br>MCDC 3002 S<br>MC 5004 P | To view our large range of accessory parts, please refer to the "Accessories" chapter. |