

# DC-Micromotors

## 0,4 mNm

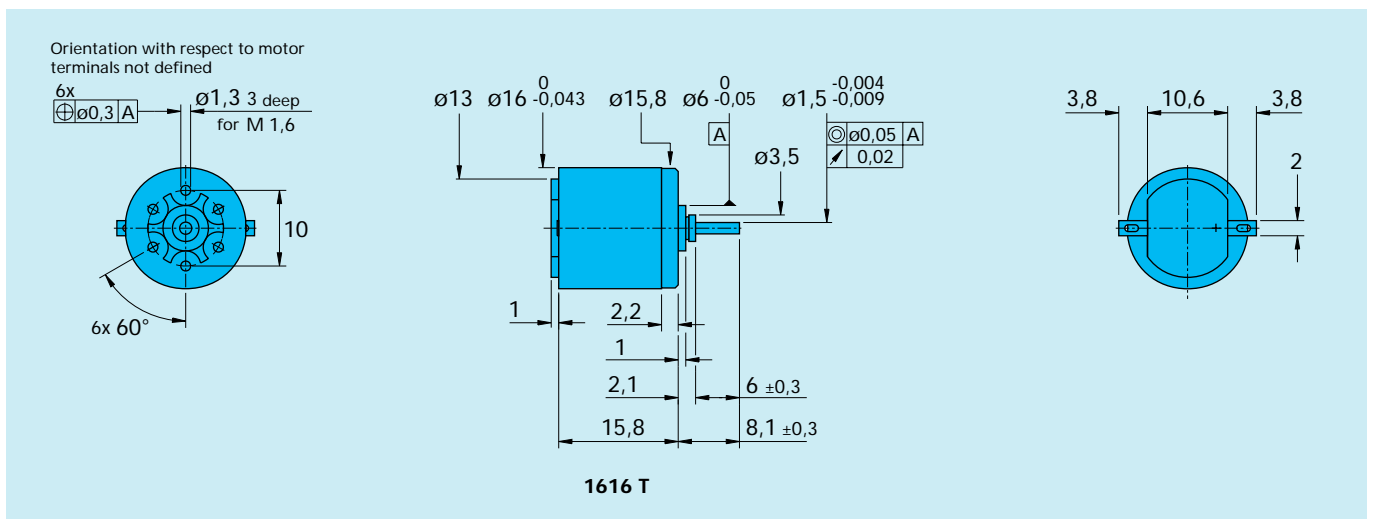
Precious Metal Commutation

For combination with:  
Gearheads: 16/7  
Encoders: 20/21B, 03B

### Series 1616 T ... S

|   | 1616 T                  | 003 S                                   | 004 S  | 006 S         | 008 S  | 012 S                    | 018 S  |                      |
|---|-------------------------|---|--------|---------------|--------|--------------------------|--------|----------------------|
| 1 Nominal voltage                                   | $U_N$                   | 3                                       | 4      | 6             | 8      | 12                       | 18     | Volt                 |
| 2 Terminal resistance                               | $R$                     | 4,4                                     | 8,6    | 24,3          | 44,8   | 85,4                     | 208    | $\Omega$             |
| 3 Output power                                      | $P_{2 \max.}$           | 0,41                                    | 0,36   | 0,28          | 0,27   | 0,32                     | 0,29   | W                    |
| 4 Efficiency  | $\eta_{\max.}$          | 52                                      | 48     | 47            | 46     | 47                       | 46     | %                    |
| 5 No-load speed                                     | $n_o$                   | 14 800                                  | 15 700 | 13 500        | 13 300 | 15 200                   | 14 500 | rpm                  |
| 6 No-load current (with shaft $\varnothing$ 1,5 mm) | $I_o$                   | 0,070                                   | 0,056  | 0,033         | 0,024  | 0,018                    | 0,012  | A                    |
| 7 Stall torque                                      | $M_H$                   | 1,06                                    | 0,88   | 0,79          | 0,77   | 0,80                     | 0,76   | mNm                  |
| 8 Friction torque                                   | $M_R$                   | 0,12                                    | 0,12   | 0,12          | 0,12   | 0,12                     | 0,12   | mNm                  |
| 9 Speed constant                                    | $k_n$                   | 5 500                                   | 4 460  | 2 600         | 1 920  | 1 450                    | 935    | rpm/V                |
| 10 Back-EMF constant                                | $k_E$                   | 0,182                                   | 0,224  | 0,385         | 0,521  | 0,688                    | 1,070  | mV/rpm               |
| 11 Torque constant                                  | $k_M$                   | 1,74                                    | 2,14   | 3,68          | 4,97   | 6,57                     | 10,20  | mNm/A                |
| 12 Current constant                                 | $k_I$                   | 0,576                                   | 0,467  | 0,272         | 0,201  | 0,152                    | 0,098  | A/mNm                |
| 13 Slope of n-M curve                               | $\Delta n / \Delta M$   | 14 000                                  | 17 900 | 17 100        | 17 300 | 18 900                   | 19000  | rpm/mNm              |
| 14 Rotor inductance                                 | $L$                     | 70                                      | 120    | 320           | 630    | 1 100                    | 2 600  | $\mu H$              |
| 15 Mechanical time constant                         | $\tau_m$                | 53                                      | 53     | 53            | 53     | 53                       | 53     | ms                   |
| 16 Rotor inertia                                    | $J$                     | 0,36                                    | 0,28   | 0,30          | 0,29   | 0,27                     | 0,27   | $gcm^2$              |
| 17 Angular acceleration                             | $\alpha_{\max.}$        | 29                                      | 31     | 27            | 26     | 30                       | 29     | $\cdot 10^3 rad/s^2$ |
| 18 Thermal resistance                               | $R_{th 1} / R_{th 2}$   | 13 / 48                                 |        |               |        |                          |        | K/W                  |
| 19 Thermal time constant                            | $\tau_{w1} / \tau_{w2}$ | 4,1 / 233                               |        |               |        |                          |        | s                    |
| 20 Operating temperature range:                     |                         |   |        |               |        |                          |        |                      |
| - motor   |                         | - 30 ... + 65 (optional - 55 ... + 125) |        |               |        |                          |        | $^{\circ}C$          |
| - rotor, max. permissible                           |                         | + 65 (optional + 125)                   |        |               |        |                          |        | $^{\circ}C$          |
| 21 Shaft bearings                                   |                         | sintered bronze sleeves                 |        | ball bearings |        | ball bearings, preloaded |        |                      |
| 22 Shaft load max.:                                 |                         | (standard)                              |        | (optional)    |        | (optional)               |        |                      |
| - with shaft diameter                               |                         | 1,5                                     |        | 1,5           |        | 1,5                      |        | mm                   |
| - radial at 3000 rpm (3 mm from bearing)            |                         | 1,2                                     |        | 5             |        | 5                        |        | N                    |
| - axial at 3000 rpm                                 |                         | 0,2                                     |        | 0,5           |        | 0,5                      |        | N                    |
| - axial at standstill                               |                         | 20                                      |        | 10            |        | 10                       |        | N                    |
| 23 Shaft play:                                      |                         |   |        |               |        |                          |        |                      |
| - radial  | $\leq$                  | 0,03                                    |        | 0,015         |        | 0,015                    |        | mm                   |
| - axial   | $\leq$                  | 0,2                                     |        | 0             |        | 0                        |        | mm                   |
| 24 Housing material                                 |                         | steel, zinc galvanized and passivated   |        |               |        |                          |        |                      |
| 25 Weight   |                         | 12                                      |        |               |        |                          |        | g                    |
| 26 Direction of rotation                            |                         | clockwise, viewed from the front face   |        |               |        |                          |        |                      |
| <b>Recommended values</b>                           |                         |   |        |               |        |                          |        |                      |
| 27 Speed up to                                      | $n_e \max.$             | 12 000                                  | 12 000 | 12 000        | 12 000 | 12 000                   | 12 000 | rpm                  |
| 28 Torque up to <sup>1)</sup>                       | $M_e \max.$             | 0,40                                    | 0,40   | 0,40          | 0,40   | 0,40                     | 0,40   | mNm                  |
| 29 Current up to (thermal limits)                   | $I_e \max.$             | 0,370                                   | 0,260  | 0,150         | 0,110  | 0,080                    | 0,052  | A                    |

<sup>1)</sup> Only with option + 125 $^{\circ}C$



For notes on technical data refer to "Technical Information" in the main catalogue

Specifications subject to change without notice