

## DC-Micromotors

### Graphite Commutation

40 mNm

For combination with  
Gearheads:  
30/1, 32/3, 38/1, 38/2  
Encoders:  
5500, 5540

### Series 3557 ... C

|                                                     | 3557 K                              | 006 C                                 | 009 C | 012 C | 020 C | 024 C | 032 C |                              |
|-----------------------------------------------------|-------------------------------------|---------------------------------------|-------|-------|-------|-------|-------|------------------------------|
| 1 Nominal voltage                                   | $U_N$                               | 6                                     | 9     | 12    | 20    | 24    | 32    | Volt                         |
| 2 Terminal resistance                               | $R$                                 | 0,6                                   | 1,3   | 2,4   | 6,6   | 10,5  | 18,0  | $\Omega$                     |
| 3 Output power                                      | $P_{2 \text{ max.}}$                | 14,5                                  | 15,0  | 14,5  | 14,7  | 13,2  | 13,7  | W                            |
| 4 Efficiency                                        | $\eta_{\text{max.}}$                | 77                                    | 77    | 76    | 77    | 75    | 76    | %                            |
| 5 No-load speed                                     | $n_0$                               | 4 700                                 | 5 000 | 4 800 | 4 600 | 4 800 | 4 700 | rpm                          |
| 6 No-load current (with shaft $\varnothing$ 4,0 mm) | $I_0$                               | 0,170                                 | 0,120 | 0,090 | 0,050 | 0,045 | 0,033 | A                            |
| 7 Stall torque                                      | $M_H$                               | 118                                   | 115   | 115   | 122   | 105   | 111   | mNm                          |
| 8 Friction torque                                   | $M_R$                               | 2,00                                  | 2,00  | 2,10  | 2,00  | 2,10  | 2,10  | mNm                          |
| 9 Speed constant                                    | $k_n$                               | 797                                   | 565   | 407   | 234   | 204   | 150   | rpm/V                        |
| 10 Back-EMF constant                                | $k_E$                               | 1,250                                 | 1,770 | 2,450 | 4,280 | 4,900 | 6,680 | mV/rpm                       |
| 11 Torque constant                                  | $k_M$                               | 12,00                                 | 16,90 | 23,40 | 40,80 | 46,80 | 63,80 | mNm/A                        |
| 12 Current constant                                 | $k_i$                               | 0,083                                 | 0,059 | 0,043 | 0,024 | 0,021 | 0,016 | A/mNm                        |
| 13 Slope of n-M curve                               | $\Delta n / \Delta M$               | 39,8                                  | 43,5  | 41,7  | 37,7  | 45,7  | 42,3  | rpm/mNm                      |
| 14 Rotor inductance                                 | $L$                                 | 65                                    | 130   | 230   | 650   | 940   | 1 200 | $\mu\text{H}$                |
| 15 Mechanical time constant                         | $\tau_m$                            | 15                                    | 14    | 13    | 13    | 13    | 13    | ms                           |
| 16 Rotor inertia                                    | $J$                                 | 36                                    | 31    | 30    | 33    | 27    | 29    | $\text{gcm}^2$               |
| 17 Angular acceleration                             | $\alpha_{\text{max.}}$              | 33                                    | 37    | 39    | 37    | 39    | 38    | $\cdot 10^3 \text{ rad/s}^2$ |
| 18 Thermal resistance                               | $R_{\text{th 1}} / R_{\text{th 2}}$ | 1,5 / 9                               |       |       |       |       |       | K/W                          |
| 19 Thermal time constant                            | $\tau_{w1} / \tau_{w2}$             | 8,5 / 1000                            |       |       |       |       |       | s                            |
| 20 Operating temperature range:                     |                                     |                                       |       |       |       |       |       |                              |
| – motor                                             |                                     | – 30 ... +125                         |       |       |       |       |       | °C                           |
| – rotor, max. permissible                           |                                     | +125                                  |       |       |       |       |       | °C                           |
| 21 Shaft bearings                                   |                                     | ball bearings, preloaded              |       |       |       |       |       |                              |
| 22 Shaft load max.:                                 |                                     |                                       |       |       |       |       |       |                              |
| – with shaft diameter                               |                                     | 4,0                                   |       |       |       |       |       | mm                           |
| – radial at 3 000 rpm (3 mm from bearing)           |                                     | 30                                    |       |       |       |       |       | N                            |
| – axial at 3 000 rpm                                |                                     | 5                                     |       |       |       |       |       | N                            |
| – axial at standstill                               |                                     | 50                                    |       |       |       |       |       | N                            |
| 23 Shaft play:                                      |                                     |                                       |       |       |       |       |       |                              |
| – radial                                            | $\leq$                              | 0,015                                 |       |       |       |       |       | mm                           |
| – axial                                             | $=$                                 | 0                                     |       |       |       |       |       | mm                           |
| 24 Housing material                                 |                                     | steel, zinc galvanized and passivated |       |       |       |       |       |                              |
| 25 Weight                                           |                                     | 275                                   |       |       |       |       |       | g                            |
| 26 Direction of rotation                            |                                     | clockwise, viewed from the front face |       |       |       |       |       |                              |

#### Recommended values - mathematically independent of each other

|                                   |                      |       |       |       |       |       |       |     |
|-----------------------------------|----------------------|-------|-------|-------|-------|-------|-------|-----|
| 27 Speed up to                    | $n_{e \text{ max.}}$ | 5 000 | 5 000 | 5 000 | 5 000 | 5 000 | 5 000 | rpm |
| 28 Torque up to <sup>1)</sup>     | $M_{e \text{ max.}}$ | 40    | 40    | 40    | 40    | 40    | 40    | mNm |
| 29 Current up to (thermal limits) | $I_{e \text{ max.}}$ | 3,400 | 2,300 | 1,700 | 1,000 | 0,810 | 0,620 | A   |

<sup>1)</sup> thermal resistance  $R_{\text{th 2}}$  by 40% reduced

