

Winding types



-216P -216E -213E -110 -108 -107

Measured values

|   |                          |             |            |            |            |          |            |            |
|---|--------------------------|-------------|------------|------------|------------|----------|------------|------------|
| 1 | Measuring voltage        | V           | 2.0        | 4.5        | 6.0        | 12.0     | 15.0       | 24.0       |
| 2 | No-load speed            | rpm         | 9000       | 10800      | 12300      | 12400    | 12400      | 14100      |
| 3 | Stall torque             | mNm (oz-in) | 6.9 (0.98) | 7.2 (1.02) | 6.5 (0.93) | 8 (1.13) | 6.5 (0.91) | 8.4 (1.19) |
| 4 | Average no-load current  | mA          | 48.0       | 26.4       | 25.6       | 13.6     | 10.6       | 8.8        |
| 5 | Typical starting voltage | V           | 0.03       | 0.06       | 0.08       | 0.10     | 0.15       | 0.20       |

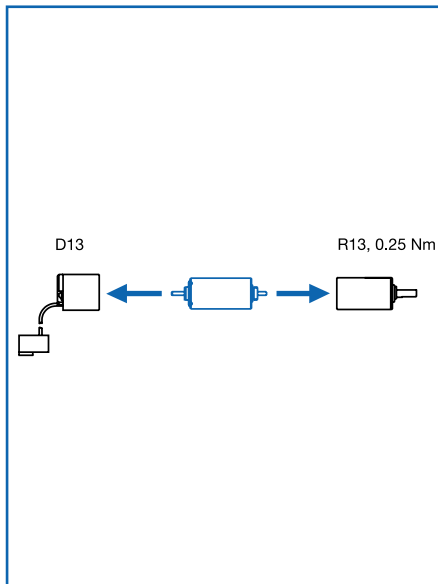
Max. recommended values

|   |                           |                                    |            |             |             |             |             |             |
|---|---------------------------|------------------------------------|------------|-------------|-------------|-------------|-------------|-------------|
| 6 | Max. continuous current   | A                                  | 1.50       | 0.90        | 0.69        | 0.38        | 0.27        | 0.21        |
| 7 | Max. continuous torque    | mNm (oz-in)                        | 3.0 (0.43) | 3.42 (0.48) | 3.03 (0.43) | 3.33 (0.47) | 2.99 (0.42) | 3.18 (0.45) |
| 8 | Max. angular acceleration | 10 <sup>3</sup> rad/s <sup>2</sup> | 242        | 225         | 271         | 252         | 288         | 274         |

Intrinsic parameters

|    |                                   |                                     |             |             |             |            |             |             |
|----|-----------------------------------|-------------------------------------|-------------|-------------|-------------|------------|-------------|-------------|
| 9  | Back-EMF constant                 | V/1000 rpm                          | 0.22        | 0.41        | 0.48        | 0.95       | 1.19        | 1.67        |
| 10 | Torque constant                   | mNm/A (oz-in/A)                     | 2.10 (0.30) | 3.92 (0.55) | 4.58 (0.65) | 9.1 (1.28) | 11.4 (1.61) | 15.9 (2.26) |
| 11 | Terminal resistance               | ohm                                 | 0.61        | 2.45        | 4.20        | 13.7       | 26.4        | 45.6        |
| 12 | Motor regulation R/k <sup>2</sup> | 10 <sup>3</sup> /Nms                | 138         | 160         | 200         | 166        | 204         | 179         |
| 13 | Rotor inductance                  | mH                                  | 0.01        | 0.05        | 0.07        | 0.25       | 0.40        | 0.80        |
| 14 | Rotor inertia                     | kgm <sup>2</sup> · 10 <sup>-7</sup> | 0.38        | 0.38        | 0.28        | 0.33       | 0.26        | 0.29        |
| 15 | Mechanical time constant          | ms                                  | 5           | 6           | 6           | 5          | 5           | 5           |

Availability: see enclosed document at the end of the catalogue



- Thermal resistance:  
rotor-body 10°C/W  
body-ambient 40°C/W
- Thermal time constant - rotor / stator:  
6 s / 300 s
- Max. rated coil temperature: 100°C (210°F)
- Recom. ambient temperature range:  
-30°C to +65°C (-22°F to +150°F)
- Viscous damping constant:  
0.04 x 10<sup>-6</sup> Nms
- Max. axial static force for press-fit: 150 N
- End play:  
Radial play: ≤ 150 µm  
Shaft runout: ≤ 30 µm
- Max. side load at 5 mm from mounting face:  
- sleeve bearings 1.5 N
- Motor fitted with sleeve bearings (ball bearings optional)

