### Motor data

<table>
<thead>
<tr>
<th>Values at nominal voltage</th>
<th>1213</th>
<th>2413</th>
<th>3613</th>
<th>4813</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage (V)</td>
<td>12</td>
<td>24</td>
<td>36</td>
<td>48</td>
</tr>
<tr>
<td>No load speed (rpm)</td>
<td>1373</td>
<td>1375</td>
<td>1378</td>
<td>1340</td>
</tr>
<tr>
<td>No load current (mA)</td>
<td>202</td>
<td>128</td>
<td>84</td>
<td>79</td>
</tr>
<tr>
<td>Nominal speed (rpm)</td>
<td>12232</td>
<td>12342</td>
<td>12432</td>
<td>11903</td>
</tr>
<tr>
<td>Nominal torque (mNm)</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Nominal current (A)</td>
<td>2.38</td>
<td>1.22</td>
<td>0.81</td>
<td>0.61</td>
</tr>
<tr>
<td>Stall torque (mNm)</td>
<td>164</td>
<td>175</td>
<td>184</td>
<td>181</td>
</tr>
<tr>
<td>Stall current (A)</td>
<td>20.1</td>
<td>10.8</td>
<td>7.53</td>
<td>4.87</td>
</tr>
<tr>
<td>Efficiency (%)</td>
<td>81</td>
<td>79.4</td>
<td>80</td>
<td>76.1</td>
</tr>
</tbody>
</table>

| Terminal resistance (Ω)  | 0.6  | 2.23 | 4.78 | 9.86 |
| Terminal inductance (mH) | 0.08 | 0.34 | 0.73 | 1.47 |
| Torque constant (mNm/A)  | 8.26 | 16.5 | 24.7 | 33.7 |
| Speed constant (rpm/V)   | 1156 | 580  | 387  | 284  |
| Speed/torque gradient (rpm/mNm) | 83.6  | 78.6 | 75   | 83.1 |
| Mechanical time constant (ms) | 4.5 | 4.3 | 4.1 | 4.5 |

### Operating Range

- **Thermal resistance housing-ambient**: 9.6 K/W
- **Thermal resistance winding-housing**: 6.3 K/W
- **Thermal time constant winding**: 37 s
- **Thermal time constant motor**: 584 s
- **Ambient temperature**: -30°C to +100°C
- **Max permissible winding temperature**: +150°C
- **Max. permissible speed**: 25000 rpm
- **Axial play at axial load**:
  - < 8 N: 0 mm
  - > 8 N: max. 0.3 mm
- **Radial play**: preloaded
- **Max. axial load (dynamic)**: 7.5 N
- **Max. force for press fits (static)**:
  - 100 N (static, shaft supported)
  - 2000 N (dynamic)
- **Max. radial loading, 5mm from flange**: 25 N
- **Number of pole pairs**: 1
- **Number of phases**: 3
- **Weight of motor**: 120 g

### Configuration

**Connection A (Sensor)**: PVC
- Pin 1 Vhll 3-18 VDC: AWG26 black
- Pin 2 Hall sensor HA: AWG28 black
- Pin 3 Hall sensor ID: AWG28 black
- Pin 4 Hall sensor HC: AWG28 black
- Pin 5 GND: AWG26 black
- Pin 6 Motor winding MA: AWG26 black
- Pin 7 Motor winding MD: AWG26 black
- Pin 8 Motor winding MC: AWG26 black
- Connector: JST PH2.0-8P

**Connection B (Sensorless)**: PVC
- Pin 1 Motor winding MA: AWG26 yellow
- Pin 2 Motor winding MB: AWG26 green
- Pin 3 Motor winding MC: AWG26 blue

**Performance**: Customized in the continuous operating range
- Ball bearing: Preload
- Flange: Standard flange front/back/customize the flange
- Shaft: Length/Diameter/Out face/double shaft/hollow shaft
- Leadwire: PVC/Silicon/Teflon/UL No/Dimension/length
- Connector: JST/MOLEX/TE

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