1000 Series

Brush, Rotary DC Servomotors

The 1000 series motors are Aerotech’s high-performance brush-type rotary DC servomotors. These motors are designed for a variety of general and high-performance motion control applications. Custom mechanical or electrical configurations are also available with minimal lead time.

Skewed Rotor
The 1000 series DC motors feature a dynamically-balanced skewed rotor and tachometer assembly for less cogging and smoother velocity control. The skewed laminations help reduce the effects of torque ripple that can cause velocity disturbance. The result is a much smoother velocity profile for such applications as machine tool, medical, semiconductor, and scanning.

Standard NEMA Frames
The 1000 series motors come in standard NEMA frame sizes including 23, 34, and 42. The standardized flange and shaft dimensions make it easy to mount to existing NEMA-based machines. Each motor is constructed from high-grade materials including a stainless-steel shaft, double-shielded bearings, and precision machined housing. Full burn-in of each motor ensures long-term reliable operation.

Wide Torque Range
The 1000 series DC motors cover a wide range of torque to meet virtually all high-end DC motor applications. Continuous output torque ranges from 0.25 N-m (35 oz-in) to 1.48 N-m (210 oz-in). Peak output torque ranges from 1.84 N-m (260 oz-in) to 7.1 N-m (1000 oz-in).

Customized Applications
Standard motor models are available with and without a DC tachometer in different voltage gradients. Options include alternate windings, metric shafts and flanges, encoders with line driver or amplified sine-wave output, rear housings with integral cables, or MS-style heavy-duty connectors.
### 1000 Series SPECIFICATIONS

#### Motor Model

<table>
<thead>
<tr>
<th>Performance Specifications</th>
<th>Units</th>
<th>1035</th>
<th>1050</th>
<th>1135</th>
<th>1210</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stall Torque, Continuous</td>
<td>N-m (oz-in)</td>
<td>0.25 (35)</td>
<td>0.35 (50)</td>
<td>0.95 (135)</td>
<td>1.48 (210)</td>
</tr>
<tr>
<td>Peak Torque</td>
<td>N-m (oz-in)</td>
<td>1.84 (260)</td>
<td>2.52 (355)</td>
<td>5.22 (736)</td>
<td>7.1 (1000)</td>
</tr>
<tr>
<td>Maximum Speed</td>
<td>rpm</td>
<td>6,000</td>
<td>6,000</td>
<td>5,000</td>
<td>3,000</td>
</tr>
<tr>
<td>Rated Power</td>
<td>W (hp)</td>
<td>129 (0.2)</td>
<td>146 (0.2)</td>
<td>200 (0.3)</td>
<td>220 (0.3)</td>
</tr>
</tbody>
</table>

#### Electrical Specifications

| Winding Designation | -01 | -01 | -01 | -01 |
| Continuous Stall Current | Amps | 4.1 | 5.4 | 5.5 | 6.0 |
| Torque Constant | N-m/Amp (oz-in/Amp) | 0.06 (8.5) | 0.07 (9.3) | 0.17 (24.5) | 0.25 (35.0) |
| Terminal Resistance | ohms | 0.9 | 0.7 | 1.4 | 1.8 |
| BEMF Constant | V/krpm | 6.3 | 6.9 | 18.2 | 25.9 |
| Armature Inductance | mH | 2.0 | 2.5 | 3.1 | 4.9 |
| Armature Moment of Inertia | kg-m² (oz-in-s²) | 3.8x10⁻³ (0.005) | 5.7x10⁻³ (0.008) | 3.5x10⁻³ (0.052) | 9.2x10⁻⁴ (0.13) |
| Recommended Bus Voltage | VDC | 40 | 40 | 80 | 80 |
| Maximum Terminal Voltage | VDC | 72 | 72 | 104 | 137 |
| Motor Constant | N-m/V/W (oz-in/V/W) | 0.063 (9.0) | 0.084 (11.1) | 0.14 (20.7) | 0.17 (26.1) |

#### Mechanical Specifications

| Frame Size | NEMA | 23 | 23 | 34 | 42 |
| Motor Weight Without Tach | kg (lb) | 1.2 (2.5) | 1.6 (3.5) | 3.7 (8.1) | 4.1 (9.0) |
| Motor Weight With Tach | kg (lb) | 1.8 (3.5) | 2.1 (4.5) | 4.6 (10.1) | 5.2 (11.5) |
| Shaft Radial Load (Max) at Max Speed | N (lb) | 44 (10) | 89 (20) | 134 (30) |
1000 Series PERFORMANCE

1035

Motor Speed (rpm)

Motor Torque

Peak
Continuous

1050

Motor Speed (rpm)

Motor Torque

Peak
Continuous

1135

Motor Speed (rpm)

Motor Torque

Peak
Continuous

1210

Motor Speed (rpm)

Motor Torque

Peak
Continuous
1000 Series DIMENSIONS

NEMA 23

![Diagram of NEMA 23 dimensions]

NEMA34

![Diagram of NEMA34 dimensions]

NEMA42

![Diagram of NEMA42 dimensions]
NEMA 23 Motor Cans

MS01: End-Exit Connector

Dimensions - millimeter [inches]

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>72.6 [2.86]</td>
<td>1035LT 1050LT</td>
</tr>
<tr>
<td>73.6 [2.91]</td>
<td>1035DC 1050DC</td>
</tr>
</tbody>
</table>

MSOF: Side-Exit Connector

Dimensions - millimeter [inches]

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>53.8 [2.12]</td>
<td>1035LT 1050LT</td>
</tr>
<tr>
<td>53.6 [2.11]</td>
<td>1035DC 1050DC</td>
</tr>
</tbody>
</table>
## NEMA 34 Motor Cans

**MSO1: Side-Exit Connector**

![Diagram of MSO1 Side-Exit Connector]

### Dimensions - millimeters [inches]

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>123.2</td>
<td>4.85</td>
</tr>
<tr>
<td>2.</td>
<td>120.0</td>
<td>4.73</td>
</tr>
<tr>
<td>3.</td>
<td>1135LT</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>1135DC</td>
<td></td>
</tr>
</tbody>
</table>

**MSOF: Side-Exit Connector**

![Diagram of MSOF Side-Exit Connector]

### Dimensions - millimeter [inches]

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>40.6</td>
<td>1.60</td>
</tr>
<tr>
<td>2.</td>
<td>39.6</td>
<td>1.56</td>
</tr>
<tr>
<td>3.</td>
<td>1135LT</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>1135DC</td>
<td></td>
</tr>
</tbody>
</table>
NEMA 42 Motor Cans

MSO1: Side-Exit Connector

<table>
<thead>
<tr>
<th>Dimensions - millimeters [inches]</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>110.5 [4.35]</td>
<td>1210LT</td>
<td></td>
</tr>
<tr>
<td>167.4 [6.59]</td>
<td>1210DC</td>
<td></td>
</tr>
</tbody>
</table>

Amphenol Bulkhead MS3102A-24-28P

MST: Side-Exit Conduit Fitting

<table>
<thead>
<tr>
<th>Dimensions - millimeters [inches]</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1210LT</td>
<td>154.7 [6.09]</td>
<td></td>
</tr>
<tr>
<td>1210DC</td>
<td>183.4 [7.22]</td>
<td></td>
</tr>
</tbody>
</table>
## 1000 Series ORDERING INFORMATION

### Ordering Example

<table>
<thead>
<tr>
<th>1</th>
<th>135</th>
<th>DC</th>
<th>MSOF</th>
<th>E2000</th>
<th>AS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Motor Size (continuous torque in oz-in)</td>
<td>Tachometer Option</td>
<td>Termination</td>
<td>Encoder Line Count Per Revolution</td>
<td>Encoder Output</td>
</tr>
<tr>
<td>035, 050, 135, 210</td>
<td>DC, LT</td>
<td>(none), MSO1, MSOF, MST, DC2, DC3, DCSE, W100</td>
<td>200, 500, 1000 (std), 1250, 2000</td>
<td>LD, AS</td>
<td></td>
</tr>
</tbody>
</table>

### 2 1/4" Diameter, NEMA 23 Models

- **1035LT**  
  Tcont = 0.25 N-m (35 oz-in) DC servomotor

- **1035DC**  
  Tcont = 0.25 N-m (35 oz-in) DC servomotor with 3V/krpm tachometer

- **1050LT**  
  Tcont = 0.35 N-m (50 oz-in) DC servomotor

- **1050DC**  
  Tcont = 0.35 N-m (50 oz-in) DC servomotor with 3V/krpm tachometer

### Options, NEMA 23 Models

- **-E200AS - E1000AS**  
  Encoder, 3 channel, amplified sine output

- **-E2000AS**  
  High density encoder, 3 channel, amplified sine output

- **-E200LD - E1000LD**  
  Encoder, 3 channel, line driver output

- **-E2000LD**  
  High density encoder, 3 channel, line driver output

- **-DC2**  
  Rear housing, side-exit integral cable with connector (LT motor only)

- **-DC2E**  
  Rear housing, end-exit integral cable with connector

- **-MSO1**  
  Rear housing, end-exit connector

- **-MSOF**  
  Rear housing, side-exit connector

- **-VAC**  
  Vacuum preparation of motor or motor-tach to 10^-6 Torr

- **-02 or -03**  
  Non-standard tachometer winding

### 3 1/4" Diameter, NEMA 34 Models

- **1135LT**  
  Tcont = 0.95 N-m (135 oz-in) DC servomotor

- **1135DC**  
  Tcont = 0.95 N-m (135 oz-in) DC servomotor with 3V/krpm tachometer

### Options, NEMA 34 Models

- **-E200AS - E1000AS**  
  Encoder, 3 channel, amplified sine output

- **-E2000AS**  
  High density encoder, 3 channel, amplified sine output

- **-E200LD - E1000LD**  
  Encoder, 3 channel, line driver output

- **-E2000LD**  
  High density encoder, 3 channel, line drive output

- **-DC3**  
  Rear housing, side-exit integral cable with connector

- **-MSO1**  
  Rear housing, side-exit connector

- **-MSOF**  
  Rear housing, right angle low-profile with side-exit connector (shorter than MSO1)

- **-VAC**  
  Vacuum preparation of motor or motor-tach to 10^-6 Torr

- **-02 or -03**  
  Non-standard tachometer winding

### 4" Diameter NEMA 42 Models

- **1210LT**  
  Tcont=1.48 N-m (210 oz-in) DC servomotor

- **1210DC**  
  Tcont=1.48 N-m (210 oz-in) DC servomotor with 3V/krpm tachometer

### Options (NEMA 42 Models)

- **E2000AS - E1000AS**  
  Encoder, 3 channel, amplified sine output

- **E2000AS**  
  High density encoder, 3 channel, amplified sine output

- **E200LD - E1000LD**  
  Encoder, 3 channel, line driver output

- **E2000LD**  
  High density encoder, 3 channel, line drive output

- **-MSO1**  
  Rear housing, side-exit connector

- **-MST**  
  Rear housing, side-exit conduit fitting

- **-VAC**  
  Vacuum preparation of motor or motor-tach to 10^-6 Torr

- **-02 or -03**  
  Non-standard tachometer winding