TYPICAL APPLICATIONS
- Robotics
- Factory automation
- Medical equipment
- Computer peripherals and office equipment
- Portable, battery-operated equipment
- Textile machinery
- Packaging machinery
- Actuators

FEATURES
- Long-life, replaceable metal graphite brushes
- Stainless steel shafts, 0.125 and 0.187 inch diameters, single and double extensions
- Permanently lubricated ball bearings, ABEC 5 standard
- Polyester resin impregnated insulated windings for reliable high speed and high voltage operation
- Rare earth magnets for high power density
- Diamond turned commutator for quiet operation and long brush life
- 13 bar commutator for superior servo performance
- High torque in a “small package” size
- Low noise and backlash

BENEFITS
- High torque-to-inertia ratio
- Up to 1274 oz-in peak starting torque
- Highly resistant to demagnetization
- Weighs only 6.8 oz
- High energy / high power in small packages

OPTIONS AVAILABLE
- Custom endcaps and mounting configurations are available
- Skewed rotors available for minimum cogging torque
- Encoder and tachometer packages
- Custom shaft and end cap configurations

* Previously the AS–780D Series

MINIATURE HIGH-TORQUE, DC SERVOMOTORs AND DC GEARMOTORS

Series C13 Samarium Cobalt*

Available with integrated tachometers or encoders for closed-loop control

The series C13 high energy rare earth servomotors provide fast response and high starting torque, but are priced significantly less than comparable rare earth motors. They offer high coercivity and high flux density for greater mechanical output.

Permanent magnet DC rare earth motors are lightweight, yet are highly reliable. They will not demagnetize under severe conditions.

A series of high precision gearmotors is obtained by matching high precision planetary gearheads with the C13 rare earth motors. We offers a wide range of output torque and speed options with standard and custom gear ratios.

Custom modified shaft designs, mounting configurations, speed variations, and various DC input voltages are available. Consult our engineering department to help you develop a motor that is tailored to your application.
**C13 SERIES SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Part Number*</th>
<th>C13-L19-</th>
<th>C13-L25-</th>
<th>C13-L28-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winding Code**</td>
<td>10</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>L = Length inches</td>
<td>1.902</td>
<td>2.45</td>
<td>2.802</td>
</tr>
<tr>
<td>millimeters</td>
<td>48.3</td>
<td>62.2</td>
<td>71.2</td>
</tr>
<tr>
<td>Peak Torque oz-in</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Nm</td>
<td>0.353</td>
<td>0.353</td>
<td>0.353</td>
</tr>
<tr>
<td>Continuous Stall Torque oz-in</td>
<td>7.5</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>Nm</td>
<td>0.053</td>
<td>0.053</td>
<td>0.053</td>
</tr>
<tr>
<td>Rated Terminal Voltage volts DC</td>
<td>6 - 18</td>
<td>6 - 24</td>
<td>12 - 36</td>
</tr>
<tr>
<td>Terminal Voltage volts DC</td>
<td>12</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Rated Speed RPM</td>
<td>3000</td>
<td>1880</td>
<td>2875</td>
</tr>
<tr>
<td>rad/sec</td>
<td>314</td>
<td>197</td>
<td>301</td>
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<tr>
<td>Rated Torque oz-in</td>
<td>5.8</td>
<td>6.9</td>
<td>6.4</td>
</tr>
<tr>
<td>Nm</td>
<td>0.04</td>
<td>0.05</td>
<td>0.05</td>
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<tr>
<td>Rated Current Amps</td>
<td>2.05</td>
<td>1.8</td>
<td>1.4</td>
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<tr>
<td>Rated Power Watts</td>
<td>12.9</td>
<td>9.6</td>
<td>13.6</td>
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<tr>
<td>Horsepower</td>
<td>0.02</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>Torque Sensitivity oz-in/amp</td>
<td>3.42</td>
<td>4.35</td>
<td>5.45</td>
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<tr>
<td>Nm/amp</td>
<td>0.0242</td>
<td>0.0307</td>
<td>0.0385</td>
</tr>
<tr>
<td>Back EMF volts/KRPM</td>
<td>2.53</td>
<td>3.21</td>
<td>4.03</td>
</tr>
<tr>
<td>volts/rad/sec</td>
<td>0.0242</td>
<td>0.0307</td>
<td>0.0385</td>
</tr>
<tr>
<td>Terminal Resistance ohms</td>
<td>1.55</td>
<td>2.30</td>
<td>3.35</td>
</tr>
<tr>
<td>Terminal Inductance mH</td>
<td>0.52</td>
<td>0.84</td>
<td>1.30</td>
</tr>
<tr>
<td>Motor Constant oz-in/watt*1/2</td>
<td>2.7</td>
<td>2.9</td>
<td>3.0</td>
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<tr>
<td>Nm/watt</td>
<td>0.019</td>
<td>0.020</td>
<td>0.021</td>
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<tr>
<td>Rotor Inertia oz-in-sec²</td>
<td>0.0026</td>
<td>0.0026</td>
<td>0.0026</td>
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<tr>
<td>g-cm²</td>
<td>18.4</td>
<td>18.4</td>
<td>18.4</td>
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<tr>
<td>Friction Torque oz-in</td>
<td>0.75</td>
<td>0.75</td>
<td>0.75</td>
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<tr>
<td>Nm</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
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<tr>
<td>Thermal Resistance °C/watt</td>
<td>11.0</td>
<td>11.0</td>
<td>11.0</td>
</tr>
<tr>
<td>Damping Factor oz-in/KRPM</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
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<tr>
<td>Nm/KRPM</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Weight oz</td>
<td>6.8</td>
<td>6.8</td>
<td>6.8</td>
</tr>
<tr>
<td>g</td>
<td>193</td>
<td>193</td>
<td>193</td>
</tr>
<tr>
<td>Electrical Time Constant milliseconds</td>
<td>0.3355</td>
<td>0.3652</td>
<td>0.3881</td>
</tr>
</tbody>
</table>

Notes:
1. For MS (military style) connector, please specify connector housing and terminal.
2. Data for informational purposes only. Should not be considered a binding performance agreement. For specific applications, please contact the factory.

*Many other custom mechanical options are available – consult factory.
**Many other winding options are available – consult factory.

**IMPORTANT**

Typical performance characteristics at 25°C.
The operational life of any motor is dependent upon individual operating parameters, environment, temperature and other factors. Your specific application results may vary. Please consult the factory to discuss your requirements.
C13 Series Performance Curves

**Typical Outline Drawing**

**Torque/Speed Curves**

**C13-L19: 12 Volt input**

- Torque (oz-in)
- Speed (rpm X 100)
- Current (amp)

**C13-L19: 24 Volt input**

- Torque (oz-in)
- Speed (rpm X 100)
- Current (amp)

**C13-L19: 35 Volt input**

- Torque (oz-in)
- Speed (rpm X 100)
- Current (amp)

**C13-L25/L28: 12 Volt input**

- Torque (oz-in)
- Speed (rpm X 100)
- Current (amp)

**C13-L25/L28: 24 Volt input**

- Torque (oz-in)
- Speed (rpm X 100)
- Current (amp)

Dimensions are in inches
INTEGRAL FEEDBACK DEVICES FOR CLOSED-LOOP CONTROL

All feedback devices are pre-assembled, aligned and fully tested, with output requirements matched (even custom designed) to your application. They are ideal for sensing rotary speed and angular position where space is a premium and low inertia is required.

Encoders
High resolution, high reliability, and state-of-the-art technology in a small package.
• Bidirectional incremental code
• Up to 1024 cycles standard
• Up to 3 channels: A, B, and index
• TTL / CMOS compatible
• Other configurations and resolutions available

C13G Series – DC Gearmotors – 27 - 637 oz-in

Our gearboxes are assembled in a modular configuration from one, two or three planetary gear stages connected in series.

All planetary gearboxes conform to protection class IP 44. The output shaft ball bearings are protected by sealing washers, the input side is sealed from the motor as well.

FEATURES
• Coaxial input and output
• Small size
• High tooth efficiency
• Small rotating mass
• Power distributed among several planet gears
• Low noise and backlash
• Reduction ratios from 4:1 to 308:1 in standard range (other ratios available, please consult factory)