MINERTIA MOTOR P Series
SMALL SIZE DC SERVOMOTORS
TYPE P09, P12
Miertia Motors P Series are disc-armature DC motors. The principle of disc armature DC motors was developed by SEA in France. They feature epoch-making armature construction: "flat" armature.

In 1964, Yaskawa made technological breakthroughs and gained success in manufacturing the highly-reliable, highly-durable armatures of stabilized performance in quantity. P Series motors incorporating these armatures have been widely used throughout the world for general industrial applications including robots, X-Y tables and computer peripherals.

**FEATURES**

- Strong permanent alnico magnets
- Quick response and accurate positioning
- Very low ripples and no cogging
- Compatible with conventional flat armature motors
- Ferrite type also available
- Available with analog tachometers and optical encoders
- Fast-reacting service centers in U.S.A. for maintenance and repair service
- Quality control testing performed on a 100% basis

The Deming Application Prize Medal
Awarded to Yaskawa in 1984 for Exceptional Achievement in Industrial Performance
RATINGS AND SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specifications</th>
<th>P09S</th>
<th>P12S</th>
<th>P12H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Rated Torque (N·m)</td>
<td>1.80</td>
<td>4.53</td>
<td>6.28</td>
</tr>
<tr>
<td>Rated Torque (N·m)</td>
<td>0.36</td>
<td>0.90</td>
<td>1.26</td>
</tr>
<tr>
<td>Torque Constant (N·m/A)</td>
<td>0.0463</td>
<td>0.110</td>
<td>0.170</td>
</tr>
<tr>
<td>Armature Winding Resistance (at 25°C) (Ω)</td>
<td>0.65</td>
<td>0.61</td>
<td>0.61</td>
</tr>
<tr>
<td>Armature Inductance (mH)</td>
<td>&lt; 0.1</td>
<td>&lt; 0.1</td>
<td>&lt; 0.1</td>
</tr>
<tr>
<td>Peak Current (A)</td>
<td>39.5</td>
<td>41</td>
<td>37.1</td>
</tr>
<tr>
<td>Voltage Constant (V/1000rpm)</td>
<td>4.85</td>
<td>11.55</td>
<td>17.80</td>
</tr>
<tr>
<td>Viscous Damping Coefficient (N·m/(rad/sec²))</td>
<td>7.06×10⁻⁵</td>
<td>2.25×10⁻⁵</td>
<td>4.03×10⁻⁵</td>
</tr>
<tr>
<td>Friction Torque (N·m)</td>
<td>0.0155</td>
<td>0.0245</td>
<td>0.0245</td>
</tr>
<tr>
<td>Inertia (kg·m²×10⁻⁶)</td>
<td>0.38</td>
<td>1.42</td>
<td>1.44</td>
</tr>
<tr>
<td>Mechanical Time Constant (ms)</td>
<td>11.3</td>
<td>7.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Electrical Time Constant (ms)</td>
<td>&lt; 0.15</td>
<td>&lt; 0.1</td>
<td>&lt; 0.16</td>
</tr>
<tr>
<td>Power Rate (kW/sec)</td>
<td>3.4</td>
<td>5.8</td>
<td>10.7</td>
</tr>
<tr>
<td>Torque Inertia Ratio (rad/sec²)</td>
<td>9400</td>
<td>6400</td>
<td>8900</td>
</tr>
<tr>
<td>Thermal Resistance (deg C/watt)</td>
<td>1.0</td>
<td>1.27</td>
<td>1.27</td>
</tr>
<tr>
<td>Max Allowable Armature Temperature (°C)</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Rated Speed (r/min)</td>
<td>3000</td>
<td>3000</td>
<td>3000</td>
</tr>
<tr>
<td>Max Safe Operating Speed (r/min)</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
</tr>
</tbody>
</table>

The data in the above table is obtained under the following conditions:

Time Rating: Continuous
Dielectric Strength: 500 V/AC
Enclosure: Totally-enclosed self-cooled type
Ambient Temperature: —10°C to 25°C

SPEED-TORQUE CHARACTERISTICS

TYPE P09S

TYPE P12S

TYPE P12H

ORDERING INFORMATION

- Application
- Type
- Ratings: output, voltage, current, torque, speed
- Environmental conditions: ambient temperature, location
- Others to be specified
MINERTIA MOTOR P Series
Type P09, P12

DIMENSIONS in inches

<table>
<thead>
<tr>
<th>Motor Type</th>
<th>&quot;A&quot; Tap</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>H</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>P09S</td>
<td>No. 8-32UNC-2B</td>
<td>3.656</td>
<td>.4995</td>
<td>3.311</td>
<td>4.37</td>
<td>1.752</td>
<td>1.850</td>
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<tr>
<td>P12S</td>
<td>No. 10-32UNF-2B</td>
<td>4.875</td>
<td>.4995</td>
<td>4.500</td>
<td>5.50</td>
<td>1.876</td>
<td>2.382</td>
</tr>
<tr>
<td>P12H</td>
<td>No. 10-32UNP-2B</td>
<td>4.875</td>
<td>.4995</td>
<td>4.500</td>
<td>5.50</td>
<td>2.067</td>
<td>2.382</td>
</tr>
</tbody>
</table>

Note:
1. Shaft dia : "A" runout not to exceed 0.001 inch per inch.
2. Pilot dia : "A" concentric to "A" within 0.003 inch T.I.R.
3. Mounting surface "B" perpendicular to "A" within 0.005" for Type P09S, 0.007" for Types P12S and P12H.
4. Shaft end play 0.001" max under a thrust in the direction shown of: 10 lb for Types P09S, P12S and P12H.
5. Maximum pure radial load 1" from surface "B" 25 lb for Type P09S; 60 lb for Types P12S and P12H at rated speed.
6. Maximum pure axial load is 11 lb for Type P09S; 55 lb for Types P12S and P12H.
7. Screw terminals are standard.

<table>
<thead>
<tr>
<th>M</th>
<th>N</th>
<th>P</th>
<th>Approx Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.311</td>
<td>2.69</td>
<td>1.339</td>
<td>4.1</td>
</tr>
<tr>
<td>4.500</td>
<td>3.31</td>
<td>1.654</td>
<td>6.8</td>
</tr>
<tr>
<td>4.500</td>
<td>3.31</td>
<td>1.654</td>
<td>7.9</td>
</tr>
</tbody>
</table>