ElectroCraft RapidPower™ Xtreme Brushless DC Servo Motors

Product Datasheets for
RPX22
RPX32
RPX40
RPX52
ElectroCraft, Inc. is a global provider of dependable, application-engineered fractional-horsepower motor and motion products. ElectroCraft custom manufacturing services cover the following products: AC motors, PMDC motors, brushless DC motors, stepper motors, servo motors, gearboxes, gearmotors, linear actuators, drives, servo drives, integrated motor drives.

Our products are found in thousands of different applications within industrial, commercial, and consumer product markets. While ElectroCraft provides a wide array of standard products with many configurable options, we have built our brand on custom OEM solutions that meet the precise performance, cost and quality our customers require.

For OEM customers who are unsatisfied with having to design around inflexible off-the-shelf products, our technical knowledge and customizable product families provide for a design experience which results in motor and motion systems that provide superior reliability and performance at the lowest possible cost. To learn more, visit www.electrocraft.com
ElectroCraft's new RPX22 is a highly dynamic and controllable very small frame metric motor. With an advanced 8-pole encapsulated core, this compact DC motor offers high torque density at a very affordable price. The RPX22 is available in 12V, 24V and 48V versions and like all ElectroCraft motors is fully customizable. This versatile motor is highly energy efficient and ideal for embedded applications.

All versions of the RPX22 include hall sensor feedback and can be configured with an optional encoder (differential, optical encoder with up to 2048 lines)

Features:

- High torque density delivers class-leading torque from compact frame size.
- 8 pole motor; high torque at low speeds.
- High load capacity.
- Low heat generation.
- Up to IP65

### RPX22 BRUSHLESS DC MOTOR

<table>
<thead>
<tr>
<th>Size: 22 mm (0.86 in) diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Torque: 178.0 mNm (25.2 oz.in)</td>
</tr>
<tr>
<td>Continuous Stall Torque:</td>
</tr>
<tr>
<td>RPX22-042</td>
</tr>
<tr>
<td>42 mNm (6 oz.in)</td>
</tr>
<tr>
<td>Speed: up to 15,000 RPM</td>
</tr>
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</table>

**RPX Model Number**

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Frame Size</th>
<th>Torque</th>
<th>Voltage</th>
<th>Feedback</th>
<th>Rear Shaft</th>
<th>Front Shaft</th>
<th>Termination</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 mm</td>
<td>042 062</td>
<td>12 24 48</td>
<td></td>
<td>X - Hall Only</td>
<td>0 - None 1 - Yes</td>
<td>0 - Round 1 - Flat</td>
<td>0 - Flying Leads</td>
</tr>
</tbody>
</table>
**RPX22**

ElectroCraft RapidPower™ Xtreme Brushless DC Servo Motor

*High torque density. Excellent torque per frame size performance.*

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**Applications:**

- **Medical Science**
  - Automated Equipment
    - Fluid Pumps
    - Air / Ventilation Pumps
    - Blood Transfusers
    - Diagnostic and Imaging Systems
  - Surgical Robots and Robotic Assistants
    - Traction Motors for Mobile Systems
    - Arm/Gripper Positioning and Force Control
  - Lab Automation Equipment
    - Dispensing Systems
    - Sample Handling Systems
    - Analysis Systems
    - Centrifuges
  - Robotics
    - Traction Motors for Mobile Applications
    - Steering Systems for Mobile Applications
    - Arm/Gripper Positioning and Force Control

- **Industrial Automation**
  - Industrial Machinery
  - Material Handling and Conveyor Equipment
  - Automated Guided Vehicles (AGVs)
  - Sorting and Packing Systems
  - Dispensing Machines

- **Electronics / Semiconductor Manufacturing**
  - Wafer Handling and Processing Systems
  - Assembly, Test and Packaging Systems

- **Transportation**
  - Automotive & Commercial Vehicles
    - Power Seats
    - Fan & Pump Motors
    - Emission Control Systems
    - Drive by Wire and Driver Assist Systems
    - Autonomous Vehicle Camera & Sensor Controls
  - Aerospace
    - Flight Control Systems
    - Commercial UAV Flight Motors
    - Pumps / Actuators
  - Marine & Shipbuilding
    - Gyro Stabilization Systems
    - Steering Pumps

- **Military/Defense**
  - Military Robots
  - Mobile Radar and Communication Systems
  - Flight Control Systems
  - Military UAV Flight Motors
  - Guidance Systems

- **Agriculture**
  - Automated Planting Equipment
  - Automated Harvesting Equipment
  - Farm Machinery Control Systems
  - Agricultural Robots

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**RPX Series Stall Torque at elevated Ambient Temperatures**

- RPX40-325
- RPX40-250
- RPX40-125
- RPX32-150
- RPX32-090
- RPX22-062
- RPX22-042

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**Ambient operation temperature range for all the RPX models is -40 to 110°C (Hall sensor version)**
ElectroCraft RapidPower™ Xtreme Brushless DC Servo Motor

High torque density. Excellent torque per frame size performance.

**Electrical Ratings/Winding Data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Units</th>
<th>RPX22-042</th>
<th>RPX22-062</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Speed</td>
<td>—</td>
<td>rpm</td>
<td>8900</td>
<td>8600</td>
</tr>
<tr>
<td>No-Load Speed</td>
<td>—</td>
<td>rpm</td>
<td>15000</td>
<td>12000</td>
</tr>
<tr>
<td>Continuous Stall Torque*</td>
<td>Tc</td>
<td>mNm</td>
<td>42 (6.0)</td>
<td>62 (9.0)</td>
</tr>
<tr>
<td>Peak Torque</td>
<td>Tp</td>
<td>mNm</td>
<td>93 (13.2)</td>
<td>178 (25.2)</td>
</tr>
<tr>
<td>Motor Constant</td>
<td>Km</td>
<td>nMn/Watt (oz.in/Watt)</td>
<td>9.89 (1.4)</td>
<td>15.5 (2.2)</td>
</tr>
<tr>
<td>Elec. Time Constant</td>
<td>te</td>
<td>msec</td>
<td>0.37</td>
<td>0.39</td>
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<tr>
<td>Mech. Time Constant</td>
<td>tm</td>
<td>msec</td>
<td>1.23</td>
<td>1.17</td>
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<tr>
<td>Thermal Time Constant</td>
<td>Tth</td>
<td>sec</td>
<td>281</td>
<td>280</td>
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<tr>
<td>Rotor Inertia</td>
<td>J</td>
<td>g-cm²</td>
<td>1.2</td>
<td>2.4</td>
</tr>
<tr>
<td>Thermal Resistance With Heat Sink</td>
<td>Rth</td>
<td>C/Watt</td>
<td>5.6</td>
<td>4.32</td>
</tr>
<tr>
<td>Max Axial Load</td>
<td>—</td>
<td>N</td>
<td>4 (5mm from face)</td>
<td></td>
</tr>
<tr>
<td>Max Radial Load</td>
<td>—</td>
<td>N</td>
<td>12 (5mm from face)</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>W</td>
<td>g</td>
<td>72 (2.52)</td>
<td>108 (3.78)</td>
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<tr>
<td>Motor Length</td>
<td>L</td>
<td>mm</td>
<td>58 (2.3)</td>
<td>78 (3.1)</td>
</tr>
<tr>
<td>Number of Poles</td>
<td>—</td>
<td>—</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Design Voltage</td>
<td>V</td>
<td>volts DC</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Cont. Stall Current</td>
<td>lc</td>
<td>amperes</td>
<td>5.2</td>
<td>2.5</td>
</tr>
<tr>
<td>Peak Current</td>
<td>lp</td>
<td>amperes</td>
<td>12.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>—</td>
<td>C</td>
<td>-40 to 150</td>
<td></td>
</tr>
<tr>
<td>Voltage Constant ±10%</td>
<td>Ke</td>
<td>V/rad/sec (V/KRPM)</td>
<td>0.008 (0.8)</td>
<td>0.015 (1.6)</td>
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<tr>
<td>Torque Constant ±10%</td>
<td>Kt</td>
<td>mNm/amp (oz.in/amp)</td>
<td>8.2 (1.2)</td>
<td>15.6 (2.2)</td>
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<tr>
<td>Resistance ±10%</td>
<td>Rm</td>
<td>Ohms</td>
<td>0.56</td>
<td>2.39</td>
</tr>
<tr>
<td>Inductance ±30%</td>
<td>Ln</td>
<td>mH</td>
<td>0.288</td>
<td>0.900</td>
</tr>
</tbody>
</table>

*Continuous rating based on a 25ºC ambient temperature, winding temperature rise of 100ºC. Mounted on a 150 X 150 X 6 mm aluminum heat sink.
**ElectroCraft’s new RPX32** is a highly dynamic and controllable very small frame metric motor. With an advanced 8-pole encapsulated core, this compact DC motor offers high torque density at a very affordable price. The RPX32 is available in 12V, 24V and 48V versions and like all ElectroCraft motors is fully customizable. This versatile motor is highly energy efficient and ideal for embedded applications.

All versions of the RPX32 include hall sensor feedback and can be configured with an optional encoder (differential, optical encoder with up to 2048 lines)

**Features:**
- High torque density delivers class-leading torque from compact frame size.
- 8 pole motor; high torque at low speeds.
- High load capacity.
- Low heat generation
- Up to IP65

**ElectroCraft RapidPower™ Xtreme Brushless DC Servo Motor**

**High torque density. Excellent torque per frame size performance.**
RPX32
ElectroCraft RapidPower™ Xtreme Brushless DC Servo Motor

High torque density. Excellent torque per frame size performance.

Applications:

Medical Science
Automated Equipment
• Fluid Pumps
• Air / Ventilation Pumps
• Blood Transfusers
• Diagnostic Imaging Systems

Surgical Robots and Robotic Assistants
• Traction Motors for Mobile Systems
• Arm/Gripper Positioning and Force Control

Lab Automation Equipment
• Dispensing Systems
• Sample Handling Systems
• Analysis Systems
• Centrifuges

Robotics
• Traction Motors for Mobile Applications
• Steering Systems for Mobile Applications
• Arm/Gripper Positioning and Force Control

Industrial Automation
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• Dispensing Machines

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• Commercial UAV Flight Motors
• Pumps / Actuators

Marine & Shipbuilding
• Gyro Stabilization Systems
• Steering Pumps

Military/Defense
• Military Robots
• Mobile Radar and Communication Systems
• Flight Control Systems
• Military UAV Flight Motors
• Guidance Systems

Agriculture
• Automated Planting Equipment
• Automated Harvesting Equipment
• Farm Machinery Control Systems
• Agricultural Robots

RPX Series Stall Torque at elevated Ambient Temperatures

Ambient operation temperature range for all the RPX models is -40 to 110°C (hall sensor version)

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## Electrical Ratings/Winding Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Units</th>
<th>RPX32-090</th>
<th>RPX32-150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Speed</td>
<td>—</td>
<td>rpm</td>
<td>7000</td>
<td>7600</td>
</tr>
<tr>
<td>No-Load Speed</td>
<td>—</td>
<td>rpm</td>
<td>9600</td>
<td>10000</td>
</tr>
<tr>
<td>Continuous Stall Torque*</td>
<td>Tc</td>
<td>mNm (oz.in)</td>
<td>90 (13.0)</td>
<td>150 (21.0)</td>
</tr>
<tr>
<td>Peak Torque</td>
<td>Tp</td>
<td>mNm (oz.in)</td>
<td>282 (40)</td>
<td>438 (62)</td>
</tr>
<tr>
<td>Motor Constant</td>
<td>Km</td>
<td>nNm³/Watt (oz.in/Watt)</td>
<td>24.0 (3.4)</td>
<td>35.3 (5.0)</td>
</tr>
<tr>
<td>Elec. Time Constant</td>
<td>te</td>
<td>msec</td>
<td>0.60</td>
<td>0.62</td>
</tr>
<tr>
<td>Mech. Time Constant</td>
<td>tm</td>
<td>msec</td>
<td>1.35</td>
<td>1.15</td>
</tr>
<tr>
<td>Thermal Time Constant</td>
<td>θth</td>
<td>sec</td>
<td>413</td>
<td>480</td>
</tr>
<tr>
<td>Rotor Inertia</td>
<td>J</td>
<td>g-cm²</td>
<td>8</td>
<td>11.1</td>
</tr>
<tr>
<td>Thermal Resistance With Heat Sink</td>
<td>Rth</td>
<td>C/Watt</td>
<td>5.2</td>
<td>4.1</td>
</tr>
<tr>
<td>Max Axial Load</td>
<td>—</td>
<td>N</td>
<td>10 (5mm from face)</td>
<td></td>
</tr>
<tr>
<td>Max Radial Load</td>
<td>—</td>
<td>N</td>
<td>40 (5mm from face)</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>W</td>
<td>g (oz)</td>
<td>150 (5.25)</td>
<td>260 (9.10)</td>
</tr>
<tr>
<td>Motor Length</td>
<td>L</td>
<td>mm (in)</td>
<td>53 (2.1)</td>
<td>73 (2.9)</td>
</tr>
<tr>
<td>Number of Poles</td>
<td>—</td>
<td>—</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Design Voltage</td>
<td>V</td>
<td>volts DC</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Cont. Stall Current</td>
<td>lc</td>
<td>amperes</td>
<td>8.6</td>
<td>4.0</td>
</tr>
<tr>
<td>Peak Current</td>
<td>lp</td>
<td>amperes</td>
<td>18.0</td>
<td>12.0</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>—</td>
<td>C</td>
<td>-40 to 150</td>
<td></td>
</tr>
<tr>
<td>Voltage Constant ±10%</td>
<td>Ke</td>
<td>V/rd/sec (V/KRPM)</td>
<td>0.015 (1.3)</td>
<td>0.023 (2.5)</td>
</tr>
<tr>
<td>Torque Constant ±10%</td>
<td>Kt</td>
<td>mNm/amp (oz.in/amp)</td>
<td>12.2 (1.7)</td>
<td>23.5 (3.3)</td>
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<tr>
<td>Resistance ±10%</td>
<td>Rm</td>
<td>Ohms</td>
<td>0.22</td>
<td>0.96</td>
</tr>
<tr>
<td>Inductance ±30%</td>
<td>Ln</td>
<td>mH</td>
<td>0.193</td>
<td>0.600</td>
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</tbody>
</table>

*Continuous rating based on a 25ºC ambient temperature, winding temperature rise of 100ºC. Mounted on a 150 X 150 X 6 mm aluminum heat sink.
ElectroCraft’s new RPX40 is a highly dynamic and controllable very small frame metric motor. With an advanced 14-pole encapsulated core, this compact DC motor offers high torque density at a very affordable price. The RPX40 is available in 12V, 24V and 48V versions and like all ElectroCraft motors is fully customizable. This versatile motor is highly energy efficient and ideal for embedded applications.

All versions of the RPX40 include hall sensor feedback and can be configured with an optional encoder (differential, optical encoder with up to 2048 lines)

Features:
- High torque density delivers class-leading torque from compact frame size.
- 14 pole motor; high torque at low speeds.
- High load capacity.
- Low heat generation
- Up to IP65

**RPX40 BRUSHLESS DC MOTOR**

<table>
<thead>
<tr>
<th>Size:</th>
<th>41 mm (1.614 in) diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Torque:</td>
<td>991 mNm (140 oz.in)</td>
</tr>
<tr>
<td>Continuous Stall Torque:</td>
<td>RPX40-125 125 mNm (18.8 oz.in)</td>
</tr>
<tr>
<td></td>
<td>RPX40-250 250 mNm (36.1 oz.in)</td>
</tr>
<tr>
<td></td>
<td>RPX40-325 325 mNm (46.8 oz.in)</td>
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<tr>
<td>Speed:</td>
<td>up to 6,000 RPM</td>
</tr>
</tbody>
</table>

**RPX Model Number**

<table>
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<tr>
<th>R</th>
<th>P</th>
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<th>0</th>
<th>2</th>
<th>5</th>
<th>0</th>
<th>V</th>
<th>2</th>
<th>4</th>
<th>1</th>
<th>0</th>
<th>0</th>
<th>S</th>
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</thead>
<tbody>
<tr>
<td>Product Type</td>
<td>Frame Size</td>
<td>Torque mNm</td>
<td>Voltage</td>
<td>Rear Shaft</td>
<td>Front Shaft</td>
<td>Feedback</td>
<td>Termination</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>40 mm</td>
<td>125</td>
<td>250</td>
<td>325</td>
<td>12</td>
<td>24</td>
<td>48</td>
<td>0 - None</td>
<td>0 - Round</td>
<td>X - Hall Only</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 - Yes</td>
<td>1 - Flat</td>
<td>R - 1024 Line Diff. Encoder</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>S - 2048 Line Diff. Encoder</td>
<td></td>
<td></td>
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</tbody>
</table>

*All measurements in mm [inches]*

**Feedback**
- X - Hall Only
- R - 1024 Line Diff. Encoder
- S - 2048 Line Diff. Encoder

**Termination**
- 0 - Flying Leads
ElectroCraft RapidPower™ Xtreme Brushless DC Servo Motor

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Applications:

Medical Science
- Automated Equipment
  - Fluid Pumps
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  - Blood Transfusers
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- Pumps / Actuators

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- Steering Pumps

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- Mobile Radar and Communication Systems
- Flight Control Systems
- Military UAV Flight Motors
- Guidance Systems

Agriculture
- Automated Planting Equipment
- Automated Harvesting Equipment
- Farm Machinery Control Systems
- Agricultural Robots

Ambient operation temperature range for all the RPX models is -40 to 110°C (Hall sensor version)

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www.electrocraft.com

Your Genius. Our Drive.
RPX40
ElectroCraft RapidPower™ Xtreme Brushless DC Servo Motor

High torque density. Excellent torque per frame size performance.

RPX Series Stall Torque at elevated Ambient Temperatures

Electrical Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Units</th>
<th>RPX40-125</th>
<th>RPX40-250</th>
<th>RPX40-325</th>
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<tbody>
<tr>
<td>Rated Speed</td>
<td></td>
<td>rpm</td>
<td>4775</td>
<td>4075</td>
<td>2950</td>
</tr>
<tr>
<td>No-Load Speed</td>
<td></td>
<td>rpm</td>
<td>6230</td>
<td>4930</td>
<td>3590</td>
</tr>
<tr>
<td>Continuous Stall Torque*</td>
<td>Tc</td>
<td>mNm</td>
<td>125 (18.8)</td>
<td>250 (36.1)</td>
<td>325 (46.8)</td>
</tr>
<tr>
<td>Peak Torque</td>
<td>Tp</td>
<td>mNm</td>
<td>398 (56)</td>
<td>765 (108)</td>
<td>991 (140)</td>
</tr>
<tr>
<td>Motor Constant</td>
<td>Km</td>
<td>nMn/Watt</td>
<td>31.6 (4.5)</td>
<td>54.2 (7.7)</td>
<td>69.2 (9.8)</td>
</tr>
<tr>
<td>Elec. Time Constant</td>
<td>te</td>
<td>msec</td>
<td>0.33</td>
<td>0.40</td>
<td>0.45</td>
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<tr>
<td>Mech. Time Constant</td>
<td>tm</td>
<td>msec</td>
<td>1.11</td>
<td>0.51</td>
<td>0.19</td>
</tr>
<tr>
<td>Thermal Time Constant</td>
<td>Tth</td>
<td>sec</td>
<td>430</td>
<td>455</td>
<td>480</td>
</tr>
<tr>
<td>Rotor Inertia</td>
<td>J</td>
<td>g-cm²</td>
<td>7</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>Thermal Resistance With Heat Sink</td>
<td>Rth</td>
<td>C/Watt</td>
<td>4.77</td>
<td>4.02</td>
<td>3.69</td>
</tr>
<tr>
<td>Max Axial Load</td>
<td></td>
<td>N</td>
<td>7 (5mm from face)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Radial Load</td>
<td></td>
<td>N</td>
<td>30 (5mm from face)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>W</td>
<td>g</td>
<td>160 (5.60)</td>
<td>240 (8.40)</td>
<td>370 (12.95)</td>
</tr>
<tr>
<td>Motor Length</td>
<td>L</td>
<td>mm</td>
<td>29.4 (1.2)</td>
<td>39.4 (1.6)</td>
<td>59.4 (2.3)</td>
</tr>
<tr>
<td>Number of Poles</td>
<td></td>
<td>—</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
</tbody>
</table>

*Continuous rating based on a 29ºC ambient temperature, winding temperature rise of 100ºC. Mounted on a 150 X 150 X 6 mm aluminum heat sink.
## Winding Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Units</th>
<th>V12</th>
<th>V24</th>
<th>V48</th>
<th>V12</th>
<th>V24</th>
<th>V48</th>
<th>V12</th>
<th>V24</th>
<th>V48</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Voltage</td>
<td>V</td>
<td>volts DC</td>
<td>12</td>
<td>24</td>
<td>48</td>
<td>12</td>
<td>24</td>
<td>48</td>
<td>12</td>
<td>24</td>
<td>48</td>
</tr>
<tr>
<td>Cont. Stall Current</td>
<td>lc</td>
<td>amperes</td>
<td>6.6</td>
<td>3.3</td>
<td>1.6</td>
<td>10.9</td>
<td>5.5</td>
<td>2.7</td>
<td>10.3</td>
<td>5.2</td>
<td>2.6</td>
</tr>
<tr>
<td>Peak Current</td>
<td>lp</td>
<td>amperes</td>
<td>19.7</td>
<td>9.8</td>
<td>4.9</td>
<td>32.8</td>
<td>16.4</td>
<td>8.2</td>
<td>31.0</td>
<td>15.5</td>
<td>7.7</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>—</td>
<td>C</td>
<td>—40</td>
<td></td>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage Constant ± 10%</td>
<td>Ke</td>
<td>V/rad/sec(V/KRPM)</td>
<td>0.019</td>
<td>0.038</td>
<td>0.076</td>
<td>0.023</td>
<td>0.046</td>
<td>0.092</td>
<td>0.029</td>
<td>0.057</td>
<td>0.114</td>
</tr>
<tr>
<td>Torque Constant ±10%</td>
<td>Kt</td>
<td>mNm/amp (oz.in/amp)</td>
<td>19.1</td>
<td>38.1</td>
<td>76.3</td>
<td>22.9</td>
<td>45.8</td>
<td>91.5</td>
<td>31.5</td>
<td>63.9</td>
<td>126.8</td>
</tr>
<tr>
<td>Resistance ±10%</td>
<td>Rm</td>
<td>Ohms</td>
<td>0.36</td>
<td>1.45</td>
<td>5.83</td>
<td>0.37</td>
<td>0.81</td>
<td>2.30</td>
<td>0.17</td>
<td>0.68</td>
<td>2.74</td>
</tr>
<tr>
<td>Inductance ±30%</td>
<td>Ln</td>
<td>mH</td>
<td>0.118</td>
<td>0.474</td>
<td>1.890</td>
<td>0.074</td>
<td>0.341</td>
<td>1.360</td>
<td>0.077</td>
<td>0.309</td>
<td>1.230</td>
</tr>
</tbody>
</table>
ElectroCraft’s new RPX52 is a highly dynamic and controllable very small frame metric motor. With an advanced 14-pole encapsulated core, this compact DC motor offers high torque density at a very affordable price. The RPX52 is available in 12V, 24V and 48V versions and like all ElectroCraft motors is fully customizable. This versatile motor is highly energy efficient and ideal for embedded applications.

All versions of the RPX52 include hall sensor feedback and can be configured with an optional encoder (differential, optical encoder with up to 5000 lines)

**Features:**

- High torque density delivers class-leading torque from compact frame size.
- 14 pole motor; high torque at low speeds.
- High load capacity.
- Low heat generation
- Up to IP65

**RPX52 BRUSHLESS DC MOTOR**

<table>
<thead>
<tr>
<th>Size: 53mm (2.087 in) max diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Torque: 1300mNm (184 oz.in)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Continuous Stall Torque:</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPX52-270</td>
</tr>
<tr>
<td>270mNm (38.0 oz.in)</td>
</tr>
<tr>
<td>RPX52-450</td>
</tr>
<tr>
<td>450mNm (63.7 oz.in)</td>
</tr>
<tr>
<td>Speed: up to 4600 rpm</td>
</tr>
</tbody>
</table>

**RPX Model Number**

<table>
<thead>
<tr>
<th>R</th>
<th>P</th>
<th>X</th>
<th>5</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5</td>
<td>0</td>
<td>V</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>F</td>
<td></td>
</tr>
</tbody>
</table>

**Product Type**

- 52 mm

**Torque**

- 270 mNm
- 450 mNm

**Voltage**

- 12V
- 24V
- 48V

**Feedback**

- X - Hall Only
- F - 5000 Line Diff. Encoder

**Termination**

- 0 - Flying Leads
- 1 - Flat
- 2 - Round
- 3 - Flat

ElectroCraft RapidPower™ Xtreme Brushless DC Servo Motor

High torque density. Excellent torque per frame size performance.

Applications:

Medical Science
Automated Equipment
- Fluid Pumps
- Air / Ventilation Pumps
- Blood Transfusers
- Diagnostic and Imaging Systems

Surgical Robots and Robotic Assistants
- Traction Motors for Mobile Systems
- Arm/Gripper Positioning and Force Control

Lab Automation Equipment
- Dispensing Systems
- Sample Handling Systems
- Analysis Systems
- Centrifuges

Robotics
- Traction Motors for Mobile Applications
- Steering Systems for Mobile Applications
- Arm/Gripper Positioning and Force Control

Industrial Automation
- Industrial Machinery
- Material Handling and Conveyor Equipment
- Automated Guided Vehicles (AGVs)
- Sorting and Packaging Systems
- Dispensing Machines

Electronics / Semiconductor Manufacturing
- Wafer Handling and Processing Systems
- Assembly, Test and Packaging Systems

Transportation
Automotive & Commercial Vehicles
- Power Seats
- Fan & Pump Motors
- Emission Control Systems
- Drive by Wire and Driver Assist Systems
- Autonomous Vehicle Camera & Sensor Controls

Aerospace
- Flight Control Systems
- Commercial UAV/Flight Motors
- Pumps / Actuators

Marine & Shipbuilding
- Gyro Stabilization Systems
- Steering Pumps

Military/Defense
- Military Robots
- Mobile Radar and Communication Systems
- Flight Control Systems
- Military UAV/Flight Motors
- Guidance Systems

Agriculture
- Automated Planting Equipment
- Automated Harvesting Equipment
- Farm Machinery Control Systems
- Agricultural Robots

ElectroCraft, Inc.
2 Marin Way, Suite 3
Stratham, NH 03885-2578 USA
Tel: (844) 565-6144
Email: sales@electrocraft.com
www.electrocraft.com
## Electrical Ratings/Winding Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Units</th>
<th>RPX52-270</th>
<th>RPX52-450</th>
</tr>
</thead>
<tbody>
<tr>
<td><em><strong>Rated Speed</strong></em></td>
<td>—</td>
<td>rpm</td>
<td>3600</td>
<td>2500</td>
</tr>
<tr>
<td><em><strong>No-Load Speed</strong></em></td>
<td>—</td>
<td>rpm</td>
<td>4600</td>
<td>3200</td>
</tr>
<tr>
<td>Continuous Stall Torque*</td>
<td>Tc</td>
<td>mNm (oz.in)</td>
<td>270 (38.0)</td>
<td>450 (63.7)</td>
</tr>
<tr>
<td>Peak Torque</td>
<td>Tp</td>
<td>mNm (oz.in)</td>
<td>780 (110)</td>
<td>1300 (184)</td>
</tr>
<tr>
<td>Motor Constant</td>
<td>Km</td>
<td>mNm/Watt (oz.in/Watt)</td>
<td>49 (7.0)</td>
<td>90 (12.7)</td>
</tr>
<tr>
<td>Elect. Time Constant</td>
<td>te</td>
<td>msec</td>
<td>0.55</td>
<td>0.85</td>
</tr>
<tr>
<td>Mech. Time Constant</td>
<td>tm</td>
<td>msec</td>
<td>2.20</td>
<td>1.10</td>
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<tr>
<td>Thermal Time Constant</td>
<td>Tth</td>
<td>sec</td>
<td>580</td>
<td>620</td>
</tr>
<tr>
<td>Rotor Inertia</td>
<td>J</td>
<td>g-cm²</td>
<td>66</td>
<td>108</td>
</tr>
<tr>
<td>Thermal Resistance With Heat Sink</td>
<td>Rth</td>
<td>C/Watt</td>
<td>3.7</td>
<td>3.2</td>
</tr>
<tr>
<td>Max Axial Load</td>
<td>—</td>
<td>N</td>
<td>35 (5mm from face)</td>
<td></td>
</tr>
<tr>
<td>Max Radial Load</td>
<td>—</td>
<td>N</td>
<td>110 (5mm from face)</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>W</td>
<td>g (oz)</td>
<td>350 (12.40)</td>
<td>540 (19.10)</td>
</tr>
<tr>
<td>Motor Length</td>
<td>L</td>
<td>mm (in)</td>
<td>45 (1.8)</td>
<td>57 (2.3)</td>
</tr>
<tr>
<td>Number of Poles</td>
<td>—</td>
<td>—</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Design Voltage</td>
<td>V</td>
<td>volts DC</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Cont. Stall Current</td>
<td>lc</td>
<td>amperes</td>
<td>10.9</td>
<td>5.4</td>
</tr>
<tr>
<td>Peak Current</td>
<td>lp</td>
<td>amperes</td>
<td>32.7</td>
<td>16.3</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>—</td>
<td>C</td>
<td>-40 to 150</td>
<td></td>
</tr>
<tr>
<td>Voltage Constant ± 10%</td>
<td>Ke</td>
<td>V/ rad/sec (V/KRPM)</td>
<td>0.025 (2.6)</td>
<td>0.049 (5.1)</td>
</tr>
<tr>
<td>Torque Constant ± 10%</td>
<td>Kt</td>
<td>mNm/amp (oz.in/amp)</td>
<td>24.8 (3.5)</td>
<td>49.4 (7.0)</td>
</tr>
<tr>
<td>Resistance ± 10%</td>
<td>Rm</td>
<td>Ohms</td>
<td>0.20</td>
<td>0.80</td>
</tr>
<tr>
<td>Inductance ± 30%</td>
<td>Ln</td>
<td>mH</td>
<td>0.110</td>
<td>0.440</td>
</tr>
</tbody>
</table>

*Continuous rating based on a 25°C ambient temperature, winding temperature rise of 100°C. Mounted on a 150 x 150 x 6 mm aluminum heat sink.