MB17 Series

Minibot Configurable: MB17 - T300 - PS01 - M112 - L22 - Options

Travel
Actuator Travel (xxx = travel in mm)... Txxx

Leadscrew Drives
Leadscrew: 1mm lead... Standard Preloaded LS01 LS05 LS01 PS01 PS05
Leadscrew: 5mm lead... LS05 PS05

Ballscrew Drives
Ballscrew: 1mm lead... Rolled Ground SR0801 SG0801
Ballscrew: 2mm lead... SR0802 SG0802
Ballscrew: 5mm lead... SR0805 SG0805
Ballscrew: 12mm lead... SR0812 SG0812

Motor Options
Standard Step Motor... M172
Integrated Step Motor/Drive/Control with USB... MJ172
Integrated Step Motor/Drive/Control with RS485... MK172

End of Travel Sensor Options
OEM Optical Slot Sensors... L11
Industrial Optical Slot Sensors... L22

MB17 Performance Specifications

<table>
<thead>
<tr>
<th></th>
<th>LS01</th>
<th>PS01</th>
<th>LS05</th>
<th>PS05</th>
<th>SR0801</th>
<th>SG0801</th>
<th>SR0802</th>
<th>SG0802</th>
<th>SR0805</th>
<th>SG0805</th>
<th>SR0812</th>
<th>SG0812</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw Lead (mm/rev)</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Max Travel (mm)2</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>300</td>
<td>150</td>
<td>300</td>
<td>150</td>
<td>300</td>
<td>150</td>
<td>300</td>
<td>150</td>
</tr>
<tr>
<td>Max Speed (mm/sec)2</td>
<td>10</td>
<td>10</td>
<td>50</td>
<td>50</td>
<td>10</td>
<td>10</td>
<td>20</td>
<td>20</td>
<td>50</td>
<td>50</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>Rated Thrust (N)</td>
<td>195</td>
<td>135</td>
<td>70</td>
<td>50</td>
<td>430</td>
<td>430</td>
<td>240</td>
<td>240</td>
<td>100</td>
<td>100</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>Lead Accuracy (µm/mm)</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.170</td>
<td>0.075</td>
<td>0.170</td>
<td>0.075</td>
<td>0.170</td>
<td>0.075</td>
<td>0.170</td>
<td>0.075</td>
</tr>
<tr>
<td>Repeatability (µm)</td>
<td>20</td>
<td>12</td>
<td>20</td>
<td>12</td>
<td>20</td>
<td>5</td>
<td>20</td>
<td>5</td>
<td>20</td>
<td>5</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Theoretical Resolution3</td>
<td>0.00031</td>
<td>0.00031</td>
<td>0.00156</td>
<td>0.00156</td>
<td>0.00031</td>
<td>0.00031</td>
<td>0.00063</td>
<td>0.00063</td>
<td>0.00156</td>
<td>0.00156</td>
<td>0.00375</td>
<td>0.00375</td>
</tr>
<tr>
<td>Straightness (µm)</td>
<td>Horizontal Plane: 25 µm Vertical Plane: 25 µm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Capacity</td>
<td>Normal Load: 520 N Side Load: 520 N Roll: 6.5 Nm Yaw: 2.5 Nm Pitch: 2.5 Nm</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

1) Based on 10 rps motor speed. Higher speed possible. 2) Consult factory for longer travels. 3) Based on 3200 steps/rev. Actual minimum step size will vary.
MB17 Series

MB17 Dimensions (mm)

6x M3x0.5 x 80
35.0

Travel + 157.0

98.0

48.4

10.5

22.5

46.0

Counterbored Mounting Holes for M4 Cap Screws, from other side

3D Models available at
www.linearpositioningsystems.com/cad
Minibot™ Series

Special Modifications

Especially for OEMs, sometimes the catalog product is not exactly what is needed due to space, environmental, or other reasons; and getting it exactly the way you need it is critical for optimizing cost, and minimizing time to market. In these instances, TPA is here to help. For OEMs with special requirements, we can modify our standard Minibot™ design or even design a completely new product to precisely fit your application.

The following are some of the modifications we have or can do for you. If you do not see what you need, let us know.

Motors
- Customer specified step motor
- Integrated motor/drive/control
- Special motor windings
- Servo or DC motors

Bearings
- High precision angular contact bearings
- Cleanroom grease

Drive Screws
- Special leadscrews
- Ultra fine leadscrews (0.2mm lead)
- Precision ground ballscrews
- Stainless steel ballscrews

Shaft Coupling
- High stiffness coupling
- Vibration damping coupling
- Stainless steel materials

Motor Mount
- Custom motor mount pattern
- Extra short motor block
- Special plating
- Stainless steel materials

Cables and Connectors
- Customer specified connectors
- Cable carriers
- Special wiring harnesses

Linear Bearings
- Extra long travel
- Dual linear bearings
- High precision crossed roller bearings
- Cleanroom lubrication
- Long bearing trucks

Carriage
- Dual carriages
- Special payload mounting features
- Dowel holes

Limit Sensors
- Customer specified sensors
- Custom length sensor flags
- Connectors

3D Models available at
www.linearpositioningsystems.com/cad
# Minibot™ Series

## L11 – OEM Slot Sensor Information
Ideal for OEMs that build their own control boards

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Optek OPB880-P51Z</th>
</tr>
</thead>
</table>
| Input LED           | Forward DC Current: 50mA Max  
Reverse DC Voltage: 2V Max  
Power Dissipation: 75mW Max  
\( V_I = 1.3V @ I_I = 20mA \) |
| Output Transistor   | Collector-Emitter Voltage: 30V Max  
Emitter-Collector Voltage: 5V Max  
Collector DC Current: 30mA Max  
Power Dissipation: 100mW Max  
\( V_{(BR)CEO}=30V \text{ MIN @ } I_C=1mA \)  
\( V_{(BR)EEO}=5V \text{ MIN @ } I_E=100\mu A \)  
\( I_{CEO}=100nA \text{ Max @ } V_{CE}=10V, I_E=0, E_E=0 \) |
| Coupled             | \( V_{(CE)(SAT)}=0.4V \text{ Max @ } I_C=400\mu A, I_E=20mA \)  
\( I_{ON}^{MAX}=0.5mA \text{ Min @ } V_{CE}=10V, I_E=20mA \) |
| Environmental       | -40 to +85°C  
Non-condensing Humidity |
| Leads               | 26 AWG, 24” Long |
| Material            | Polysulfone IR Transmissive Shell |
| Mounting Fastener   | M3x6 SHCS to Bracket  
M2x4 Phillips Cross Recess to Body |

## L22 – Industrial Slot Sensor Information
Ideal for wiring to motion controllers and PLCs

| Power               | 5 to 24VDC +/-10%  
15mA or less |
|---------------------|-------------------|
| Output              | NPN Open Collector Transistor  
Max Sink Current: 50mA  
Applied Voltage: 30VDC or less  
Residual Voltage (0.7V at 50mA)  
(0.4V at 16mA) |
| Repeatability       | Unidirectional: 0.03mm or better  
Bidirectional: 0.05mm or better  
Response Time: 10μs or less |
| Environmental       | -25 to +55°C, non-condensing humidity |
| Material            | PBT and Polycarbonate |
| Mounting Fastener   | M2x6 Socket Head Cap Screw |

### Wiring diagram

<table>
<thead>
<tr>
<th>Color</th>
<th>Output operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>Light-ON</td>
</tr>
<tr>
<td>White</td>
<td>Dark-ON</td>
</tr>
</tbody>
</table>
# Minibot™ Series

## M11x and M17x Step Motor Options

<table>
<thead>
<tr>
<th></th>
<th>M112</th>
<th>M111</th>
<th>M113</th>
<th>M172</th>
<th>M171</th>
<th>M173</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Current</td>
<td>0.67 A&lt;sub&gt; RMS &lt;/sub&gt;</td>
<td>0.67 A&lt;sub&gt; RMS &lt;/sub&gt;</td>
<td>0.67 A&lt;sub&gt; RMS &lt;/sub&gt;</td>
<td>1.68 A&lt;sub&gt; RMS &lt;/sub&gt;</td>
<td>1.33 A&lt;sub&gt; RMS &lt;/sub&gt;</td>
<td>1.68 A&lt;sub&gt; RMS &lt;/sub&gt;</td>
</tr>
<tr>
<td>Resistance</td>
<td>6.8 ohms ±10%</td>
<td>5.6 ohms ±10%</td>
<td>9.2 ohms ±10%</td>
<td>1.65 ohms ±10%</td>
<td>2.1 ohms ±10%</td>
<td>1.65 ohms ±10%</td>
</tr>
<tr>
<td>Inductance</td>
<td>4.9 mH ±20%</td>
<td>4.2 mH ±20%</td>
<td>7.2 mH ±20%</td>
<td>3.2 mH ±20%</td>
<td>2.5 mH ±20%</td>
<td>2.8 mH ±20%</td>
</tr>
<tr>
<td>Rated Voltage</td>
<td>4.56 V</td>
<td>3.8 V</td>
<td>6.2 V</td>
<td>2.8 V</td>
<td>2.8 V</td>
<td>2.8 V</td>
</tr>
<tr>
<td>Step Angle</td>
<td>1.8° ± 5%, Rotation CW from front</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>Ambient: -20°C to +50°C</td>
<td>Max Rise: 80°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotor Inertia</td>
<td>12E-7 Kg·m²</td>
<td>9E-7 Kg·m²</td>
<td>12E-7 Kg·m²</td>
<td>5.4E-8 Kg·m²</td>
<td>3.5E-8 Kg·m²</td>
<td>6.8E-8 Kg·m²</td>
</tr>
<tr>
<td>Weight</td>
<td>0.14 Kg</td>
<td>0.11 Kg</td>
<td>0.20 Kg</td>
<td>0.28 Kg</td>
<td>0.22 Kg</td>
<td>0.35 Kg</td>
</tr>
<tr>
<td>Length</td>
<td>44.5 mm</td>
<td>31.5 mm</td>
<td>50.5 mm</td>
<td>40 mm</td>
<td>34 mm</td>
<td>48 mm</td>
</tr>
<tr>
<td>Mounting Fastener</td>
<td>M2.5 x 12 SHCS</td>
<td>M3 x 14 SHCS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wires</td>
<td>4x Leads, AWG26, 300mm Long; A+ (RED), A- (BLUE), B+ (BLACK), B- (GREEN)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## MK112, MK172, MJ172 Integrated Controller/Drive Options

<table>
<thead>
<tr>
<th></th>
<th>MK112</th>
<th>MK172</th>
<th>MJ172</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications</td>
<td>RS485</td>
<td>RS485/RS232</td>
<td>USB 2.0</td>
</tr>
<tr>
<td>Power</td>
<td>12 to 24 VDC, 1.5 A max</td>
<td>12 to 35 VDC, 2.5 A max</td>
<td>12 to 24 VDC, 2.0 A max</td>
</tr>
<tr>
<td>Inputs</td>
<td>Limit+, Limit-, Home 12 to 24 VDC, NPN, 0.45 mA</td>
<td>Limit+, Limit-, Home, 6x Digital Inputs 12 to 24 VDC, NPN, 0.45 mA</td>
<td>Limit+, Limit-, Home, 2x Digital Inputs 12 to 24 VDC, NPN, 0.45 mA</td>
</tr>
<tr>
<td>Output</td>
<td>1x Opto-isolated PNP Output +24 VDC Max; 90 mA Max</td>
<td>3x Opto-isolated NPN Outputs +24 VDC Max; 90 mA Max</td>
<td>2x Opto-isolated NPN Outputs +24 VDC Max; 45 mA Max</td>
</tr>
<tr>
<td>Resolution</td>
<td>3200 Steps/rev max</td>
<td>3200 Steps/rev max</td>
<td>3200 Steps/rev max</td>
</tr>
<tr>
<td>Max Speed</td>
<td>15 rps</td>
<td>15 rps</td>
<td>15 rps</td>
</tr>
<tr>
<td>Encoder</td>
<td>Integrated 256 count/rev (Optional: Single Turn Absolute)</td>
<td>Integrated 4000 count/rev</td>
<td>N/A</td>
</tr>
<tr>
<td>Operating Temp</td>
<td>0°C to +70°C</td>
<td>0°C to +70°C</td>
<td>0°C to +85°C</td>
</tr>
<tr>
<td>Length</td>
<td>65.5 mm</td>
<td>65.5 mm</td>
<td>63 mm</td>
</tr>
<tr>
<td>Mounting Fastener</td>
<td>M2.5 x 12 SHCS</td>
<td>M3 x 14 SHCS</td>
<td>M3 x 14 SHCS</td>
</tr>
</tbody>
</table>

Contact TPA for additional details and product manuals.