Series ESFX can be combined to create a multi-axis Cartesian robot system.

SERIES ESFX
Electric Linear Actuator Slides
with Ball Screw Drive
Easy 3 Step Actuator & Motor Sizing

Using PHD’s 3 step process, you can specify the actuator configured for your particular motor brand.

Major Benefits

- Highly rigid aluminum frame provides superior support and strength
- High allowable load/moment capacities
- Can be combined to create Cartesian robot systems
- Heavy duty versions ESFXH10 and ESFXH14 provide additional bearing support for high load and offset applications
- Your Motor, Your Way for configuration of motor mounting plates, with a database of electric motors from major manufacturers
### ORDERING DATA: SERIES ESFX ELECTRIC LINEAR ACTUATOR SLIDES

#### Example Ordering Data:

<table>
<thead>
<tr>
<th>E</th>
<th>S</th>
<th>FX</th>
<th>H</th>
<th>10</th>
<th>550</th>
<th>RB020</th>
<th>QL11</th>
<th>Wxxxx</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Duty</td>
<td></td>
<td></td>
<td>Ball Screw Configuration</td>
<td>In-Line Motor Mounting</td>
<td>Motor Code</td>
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<tr>
<td></td>
<td></td>
<td>Slide</td>
<td>Blank = Normal</td>
<td>Size</td>
<td>Travel</td>
<td></td>
<td></td>
<td>Wxxxx = Open Architecture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ball Screw</td>
<td>H = Heavy Duty (Size 10 &amp; 14 only)</td>
<td>10</td>
<td>14</td>
<td>17</td>
<td></td>
<td>W0000 = Blank Motor Mounting</td>
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#### Travel

<table>
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<th>14</th>
<th>17</th>
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</tr>
<tr>
<td>750</td>
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</tr>
<tr>
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<td>•</td>
</tr>
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<td>•</td>
<td>•</td>
</tr>
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</tr>
<tr>
<td>1250</td>
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#### OVERVIEW/SELECTION GUIDE:

<table>
<thead>
<tr>
<th>Model</th>
<th>Lead (mm)</th>
<th>Payload (kg)</th>
<th>Travel (mm) and maximum speed (mm/s)</th>
<th>Repeatability (mm)</th>
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</thead>
<tbody>
<tr>
<td>ESFX510</td>
<td>30 60 25</td>
<td>1800 1800 1440 1170 900 810</td>
<td>+/-.01</td>
<td></td>
</tr>
<tr>
<td>ESFX510</td>
<td>20 60 25</td>
<td>1200 1200 960 780 600 540</td>
<td>+/-.01</td>
<td></td>
</tr>
<tr>
<td>ESFX510</td>
<td>10 60 25</td>
<td>600 600 480 390 300 270</td>
<td>+/-.01</td>
<td></td>
</tr>
<tr>
<td>ESFX510</td>
<td>5 60 25</td>
<td>300 300 240 195 150 135</td>
<td>+/-.01</td>
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<td>+/-.01</td>
<td></td>
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<td>1200 1200 960 780 600 540</td>
<td>+/-.01</td>
<td></td>
</tr>
<tr>
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<td>600 600 480 390 300 270</td>
<td>+/-.01</td>
<td></td>
</tr>
<tr>
<td>ESFX514</td>
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<td>300 300 240 195 150 135</td>
<td>+/-.01</td>
<td></td>
</tr>
<tr>
<td>ESFX517</td>
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<td>1800 1800 1440 1170 900 810</td>
<td>+/-.01</td>
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</tr>
<tr>
<td>ESFX517</td>
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<td>1200 1200 960 780 600 540</td>
<td>+/-.01</td>
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</tr>
<tr>
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<td>600 600 480 390 300 270</td>
<td>+/-.01</td>
<td></td>
</tr>
<tr>
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<td>5 120 30</td>
<td>300 300 240 195 150 135</td>
<td>+/-.01</td>
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</tr>
<tr>
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<td>1200 960 840 720 600 480</td>
<td>+/-.01</td>
<td></td>
</tr>
<tr>
<td>ESFX517</td>
<td>10 150 50</td>
<td>600 480 420 360 300 240</td>
<td>+/-.01</td>
<td></td>
</tr>
</tbody>
</table>
DIMENSIONS: SERIES ESFX ELECTRIC LINEAR ACTUATOR SLIDES - SIZE 10

ENGINEERING DATA:

Specifications

Repeatability (+/-0.01 mm)
Drive system: Ball screw (Class C7)
Ball screw lead (mm): 30 20 10 5
Maximum speed (mm/sec): 1800 1200 600 300
Maximum payload (kg):
- Horizontal: 60 60 60 60
- Vertical: 25 25 25 25
Rated thrust (N):
- Horizontal: 469 287 348 281
Travel (mm):
- Effective Travel: 150 250 350 450 550 650 750 850 950 1050

Allowable Overhang

<table>
<thead>
<tr>
<th>Horizontal Mount</th>
<th>Wall Mount</th>
<th>Vertical Mount</th>
</tr>
</thead>
<tbody>
<tr>
<td>A B C</td>
<td>A B C</td>
<td>A C</td>
</tr>
<tr>
<td>5kg 900 300 300</td>
<td>5kg 230</td>
<td>2kg 600</td>
</tr>
<tr>
<td>10kg 500 140 130</td>
<td>10kg 120</td>
<td>3kg 200</td>
</tr>
<tr>
<td>15kg 300 80 80</td>
<td>15kg 60</td>
<td>6kg 150</td>
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<tr>
<td>20kg 250 50 50</td>
<td>20kg 30</td>
<td>8kg 120</td>
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<tr>
<td>30kg 420 20 20</td>
<td>30kg 10</td>
<td>10kg 60</td>
</tr>
<tr>
<td>40kg 120 10 10</td>
<td>10kg 10</td>
<td></td>
</tr>
</tbody>
</table>

Static Loading Moment

<table>
<thead>
<tr>
<th>MY</th>
<th>MP</th>
<th>MR</th>
</tr>
</thead>
<tbody>
<tr>
<td>121</td>
<td>131</td>
<td>115</td>
</tr>
</tbody>
</table>

Effective Travel (mm):
- 150: 368.5 468.5 568.5 668.5 768.5 868.5 968.5 1068.5 1168.5 1268.5
- A: 200 100 200 100 200 100 200 100 200 100
- M: 0 1 1 2 2 3 3 4 4 5
- N: 6 8 8 10 10 12 12 14 14 16
- K: 150 250 350 450 550 650 750 850 950 1050

Distance from the center of carriage top to the center of gravity of object being carried. Each overhang distance value, when applied individually, ensures a service life of 10,000 km of the guide system. Please refer to the unit sizing tool, when the application involves a combination of overhang distances.

Notes:
1. Positioning repeatability in one direction.
2. When the travel is longer than 700 mm, resonance of the ball screw may occur depending on the operation conditions (critical speed). In this case, reduce the speed setting on the program by referring to the maximum speeds shown in the selection guide on page 3.
3. For 10,000 km of unit life.
**DIMENSIONS:** SERIES ESFX ELECTRIC LINEAR ACTUATOR SLIDES - SIZE 10H

### ENGINEERING DATA:

**Specifications**

<table>
<thead>
<tr>
<th>Effective Travel</th>
<th>150</th>
<th>250</th>
<th>350</th>
<th>450</th>
<th>550</th>
<th>650</th>
<th>750</th>
<th>850</th>
<th>950</th>
<th>1050</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>445.5</td>
<td>545.5</td>
<td>645.5</td>
<td>745.5</td>
<td>845.5</td>
<td>945.5</td>
<td>1045.5</td>
<td>1145.5</td>
<td>1245.5</td>
<td>1345.5</td>
</tr>
<tr>
<td>A</td>
<td>200</td>
<td>100</td>
<td>200</td>
<td>100</td>
<td>200</td>
<td>100</td>
<td>200</td>
<td>100</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>M</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
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<tr>
<td>N</td>
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<td>8</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>14</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>K</td>
<td>250</td>
<td>350</td>
<td>450</td>
<td>550</td>
<td>650</td>
<td>750</td>
<td>850</td>
<td>950</td>
<td>1050</td>
<td>1150</td>
</tr>
</tbody>
</table>

**Allowable Overhang**

**Static Loading Moment**

**Distance from the center of carriage top to the center of gravity of object being carried. Each overhang distance value, when applied individually, ensures a service life of 10,000 km of the guide system. Please refer to the unit sizing tool, when the application involves a combination of overhang distances.**

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**Note 1.** Positioning-repeatability in one direction.

**Note 2.** When the travel is longer than 600mm, resonance of the ball screw may occur depending on the operation conditions (critical speed). In this case, reduce the speed setting in the program by referring to the maximum speeds shown in the selection guide on page 3.

**Note 3.** For 10,000 km of unit life.
DIMENSIONS: SERIES ESFX ELECTRIC LINEAR ACTUATOR SLIDES - SIZE 14

Effective Travel | 150 | 250 | 350 | 450 | 550 | 650 | 750 | 850 | 950 | 1050
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
L | 375 | 475 | 575 | 675 | 775 | 875 | 975 | 1075 | 1175 | 1275
A | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 100
M | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5
N | 4 | 6 | 6 | 8 | 8 | 10 | 10 | 12 | 12 | 14
K | 240 | 240 | 420 | 420 | 600 | 600 | 780 | 780 | 960 | 960

**ENGINEERING DATA:**

**Specifications**

- **Repeatability** (mm): ±0.01
- **Drive system**: Ball screw (Class C7)
- **Ball screw lead (mm)**: 30, 20, 10, 5
- **Maximum speed** (mm/sec): 1800, 1200, 600, 300
- **Maximum payload (kg)**
  - **Horizontal**: 100, 100, 100, 100
  - **Vertical**: 25, 25, 25, 25
- **Rated thrust (N)**: 469, 287, 348, 281
- **Travel (mm)**: 150 to 1050 (100mm pitch)
- **Overall length**: Horizontal: Travel x 2.5, Vertical: Travel x 2.5
- **Maximum dimensions of cross section of main unit (mm)**
- **Linear guide type**: 4 rows of circular arc grooves × 2 rail

**Allowable Overhang**

- **Horizontal Mount**
  - A | 2000 | 1800 | 1600 | 1500
  - B | 1200 | 1000 | 800 | 600
  - C | 800 | 600 | 400 | 200
- **Wall Mount**
  - A | 2000 | 1800 | 1600 | 1500
  - B | 1200 | 1000 | 800 | 600
  - C | 800 | 600 | 400 | 200
- **Vertical Mount**
  - A | 2000 | 1800 | 1600 | 1500
  - B | 1200 | 1000 | 800 | 600
  - C | 800 | 600 | 400 | 200

**Static Loading Moment**

- **MY, MP, MR**
  - 232, 233, 204

**Distance from the center of carriage top to the center of gravity of object being carried. Each overhang distance value, when applied individually, ensures a service life of 10,000 km of the guide system. Please refer to the unit sizing tool, when the application involves a combination of overhang distances.**

**Note 1.** Positioning repeatability in one direction.

**Note 2.** When the travel is longer than 750mm, resonance of the ball screw may occur depending on the operation conditions (critical speed). In this case, reduce the speed setting on the program by referring to the maximum speeds shown in the selection guide on page 3.

**Note 3.** For 10,000 km of unit life.
DIMENSIONS: SERIES ESFX ELECTRIC LINEAR ACTUATOR SLIDES - SIZE 14H

Repeatability (mm): +/−0.01

Drive system: Ball screw (Class C7)

Ball screw lead (mm): 30 20 10 5

Maximum speed (mm/sec): 1800 1200 600 300

Maximum payload (kg): Horiz 120 120 120 120

Vertical: 30 30 30 30

Rated thrust (N): Note 3 469 287 348 281

Travel (mm): 150 to 1050 (100mm pitch)

Overall length (mm): Horiz Travel+320

Vertical: Travel+320

Linear guide type: W136 × H83

Note 1. Positioning repeatability in one direction.

Note 2. When the travel is longer than 750mm, resonance of the ball screw may occur depending on the operation conditions (critical speed). In this case, reduce the speed setting in the program by referring to the maximum speeds shown in the selection guide on page 3.

Note 3. For 10,000 km of unit life.

Effective Travel | 150 | 250 | 350 | 450 | 550 | 650 | 750 | 850 | 950 | 1050 |
---|---|---|---|---|---|---|---|---|---|---|
L | 425 | 525 | 625 | 725 | 825 | 925 | 1025 | 1125 | 1225 | 1325 |
A | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 100 |
M | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
N | 4 | 6 | 6 | 8 | 8 | 10 | 10 | 12 | 12 | 14 |
K | 240 | 240 | 420 | 420 | 600 | 600 | 780 | 960 | 960 | 1140 |

Allowable Overhang

Horizontal Mount

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>10kg</td>
<td>2300</td>
<td>1950</td>
<td>1000</td>
</tr>
<tr>
<td>20kg</td>
<td>1900</td>
<td>1650</td>
<td>700</td>
</tr>
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<td>25kg</td>
<td>1600</td>
<td>1410</td>
<td>550</td>
</tr>
<tr>
<td>30kg</td>
<td>1550</td>
<td>1450</td>
<td>510</td>
</tr>
<tr>
<td>40kg</td>
<td>1450</td>
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<td>240</td>
</tr>
<tr>
<td>100kg</td>
<td>1300</td>
<td>1050</td>
<td>180</td>
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Wall Mount

<table>
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<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>10kg</td>
<td>1100</td>
<td>1300</td>
<td>1800</td>
</tr>
<tr>
<td>20kg</td>
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<td>1300</td>
</tr>
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<td>25kg</td>
<td>520</td>
<td>540</td>
<td>1300</td>
</tr>
<tr>
<td>30kg</td>
<td>420</td>
<td>380</td>
<td>1280</td>
</tr>
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<td>40kg</td>
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<td>290</td>
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</tr>
<tr>
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<td>80kg</td>
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<td>90</td>
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Vertical Mount

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<tr>
<td>6kg</td>
<td>880</td>
<td>540</td>
</tr>
<tr>
<td>10kg</td>
<td>760</td>
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<tr>
<td>30kg</td>
<td>410</td>
<td>285</td>
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</table>

Distance from the center of carriage top to the center of gravity of object being carried. Each overhang distance value, when applied individually, ensures a service life of 10,000 km of the guide system. Please refer to the unit sizing tool, when the application involves a combination of overhang distances.
**DIMENSIONS:** SERIES ESFX ELECTRIC LINEAR ACTUATOR SLIDES - SIZE 17

**Effective Travel:**

<table>
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<tr>
<th></th>
<th>200</th>
<th>250</th>
<th>350</th>
<th>450</th>
<th>550</th>
<th>650</th>
<th>750</th>
<th>850</th>
<th>950</th>
<th>1050</th>
<th>1150</th>
<th>1250</th>
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<tr>
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<td>511</td>
<td>561</td>
<td>661</td>
<td>761</td>
<td>861</td>
<td>961</td>
<td>1061</td>
<td>1161</td>
<td>1261</td>
<td>1361</td>
<td>1461</td>
<td>1561</td>
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<tr>
<td><strong>A</strong></td>
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<td>200</td>
</tr>
<tr>
<td><strong>M</strong></td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>6</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>14</td>
<td>14</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td><strong>K</strong></td>
<td>240</td>
<td>240</td>
<td>420</td>
<td>600</td>
<td>600</td>
<td>780</td>
<td>780</td>
<td>960</td>
<td>960</td>
<td>1140</td>
<td>1140</td>
<td>1320</td>
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</table>

**Specifications:**

<table>
<thead>
<tr>
<th>Repeatability ±0.01</th>
<th>Ball screw (Class C7)</th>
<th>Maximum speed (mm/sec)</th>
<th>Maximum payload (kg)</th>
<th>Rated thrust (N)</th>
<th>Linear guide type</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>40  50  10</td>
<td>2400 1000 800</td>
<td>150 120 130</td>
<td>100 50 20</td>
<td>4 rows of circular arc grooves + 2 Rail</td>
</tr>
</tbody>
</table>

Note 1. Positioning repeatability in one direction.

Note 2. When the travel exceeds 850mm, although depending on the moving range, the ball screw may resonate (critical speed). In that case, make a adjustment to lower the speed using the maximum speed given in the selection guide on page 3.

Note 3. For 10,000 km of unit life.

**Allowable Overhang**

**Static Loading Moment**

Distance from the center of carriage top to the center of gravity of object being carried. Each overhang distance value, when applied individually, ensures a service life of 10,000 km of the guide system. Please refer to the unit sizing tool, when the application involves a combination of overhang distances.
OPTIONS: SERIES ESFX ELECTRIC LINEAR ACTUATOR SLIDES

Wxxxx MOTOR CODE

Your Motor, Your Way customizable motor mounting is generated by PHD’s extensive motor database. PHD will select the compatible motor.

The tailored motor mounting components are included with the specified driver and shipped in kit form.

Contact PHD Application Department for sizing & W code.

Visit apps@phdinc.com or call 800-624-8511

MOTOR GEOMETRY

Specify from Motor:
- Maximum Motor Shaft Ø
- Shaft Type:

Keyed Shaft
Specify Key Slot Width

1 Flat

2 Flats, 180°

Round-Not Available for Use with Foldback (Option QF)

2 Flats, 90°

Flange Width

Bolt Hole Circle Ø

Flange Thickness

Overall Length: Primary and Secondary Motor Pilot Ø

Shaft Extension from Mounting Face

All dimensions are reference only unless specifically tolerated.

ESFX01

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Now Available!
Lower Cost
Lead Screw Models

with Your Motor, Your Way

- Electrically-driven units based on proven PHD Series CV designs
- High thrust and speed capabilities
- Choice of lower cost lead screw or precision ball screw models
- All ECV powered units are available with inline or foldback motor mounting

ESK/ESL

- Powered by Series ECV Cylinders
- Electrically driven cantilever slide
- Choice of lower cost lead screw or precision ball screw models
- Offered in long or short bodies for application flexibility
- Standard dowel pin holes with optional transitional and precision diameters
- High thrust and speed capability
- Travel lengths up to 700 mm
- Rigid construction with low backlash

ESG

- Powered by Series ECV Cylinders
- Long travel, high load
- Choice of lower cost lead screw or precision ball screw models
- Standard travel up to 900 mm
- High thrust and speed capability
- Rigid construction
- Very high degree of repeatability
- High precision ball screw assemblies with long service life

EGRK

- Ideal for assembly and robotics
- Long or short jaw travels with high force or high speed for maximum flexibility
- Precision jaw movement wear compensating over life of unit
- High moment capacity allows for long tooling and high part weights
- 3 sizes with total grip forces up to 380 lb [1703 N]
- Minimum total jaw travel from .256 to 1.024" [6.5 to 26 mm]
ML311373
Ball Screw Driven Gripper

ML220914
IP67 Slide

ML306079
Stepper Drive with Variable Pitch Pickhead

ML311179
Lead Screw Driven Stepper Cylinder

ML310629
Precision Guide Servo Gripper

ML310393
IP67 Belt Slide for Food Industry
APPLICATION SHEET

Date: ______________________  Completed By: ________________________________

Customer Name: __________________________________________________________
Address: _________________________________________________________________
City: __________________________  State: _______  Zip: _______________
Contact Name /Title: __________________________________________ Telephone __________________________
End Customer (if other than above): __________________________________________ Location: ___________________

APPLICATION DETAILS

General Robot Description:

Application Type (Check all that apply):
- Single Axis
- Multi Axis

Horizontal Installation or X Axis

Wall Installation or Y Axis

Vertical Installation or Z Axis

<table>
<thead>
<tr>
<th></th>
<th>X Load Offset (mm)</th>
<th>Y Load Offset (mm)</th>
<th>Z Load Offset (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel</td>
<td>mm =</td>
<td>A = mm =</td>
<td>A = mm =</td>
</tr>
<tr>
<td>Travel Time</td>
<td>sec =</td>
<td>B = sec =</td>
<td>B = sec =</td>
</tr>
<tr>
<td>Payload</td>
<td>kg = C =</td>
<td>kg = C =</td>
<td>C =</td>
</tr>
</tbody>
</table>

Duty Rate: Cycles/Minute  Hour/Day  Days/Week  Weeks/Year

Interpolation Move: YES  NO

Repeatability
- ± .04 mm
- ± .02 mm
- ± .01 mm
- ± .005 mm

Environment
- Standard
- Cleanroom
- Food/Medical
- Dusty
- Coolant
- Other

Describe motion sequence:

Complete this form, save the file, and send via email to:
apps@phdinc.com

It can also be printed and faxed to 260-747-6754, or call Customer Service at 800-624-8511 for assistance.