The Hollow Shaft Actuator With Concentrated Power.

PowerHub™ Harmonic Drive Servo Actuator

Harmonic Drive TECHNOLOGIES
Introducing the PowerHub hollow shaft servo actuator, one of the industry’s most compact axis drives for wafer handling. Despite its small size, the PowerHub actuator handles large loads and offers high torque, controllability and repeatability. With its hollow shaft for passing through everything from vacuum lines to lasers, the PowerHub actuator is an ideal, cost-effective solution for robotics and automation machinery.

Benefits of the PowerHub include:

- High torque
- Positional accuracy
- Fast response
- Smooth, repeatable performance
- More compact than competitive products
- Handles large thrust and moment loads

The PowerHub actuator is the kind of innovation customers have come to expect from Harmonic Drive Technologies, one of the world’s leading manufacturers of harmonic drive gearheads, component gear sets, and complete harmonic drive actuators. The PowerHub exemplifies Harmonic Drive Technologies’ dedication to developing and manufacturing lighter, smaller and stronger precision positioning products which provide maximum reliability, power and utility in the least amount of space.

**Simplicity in Design**
Low parts count
The PowerHub hollow shaft actuator is currently available in two sizes. Be on the lookout for three new PowerHub sizes to be introduced in the near future.

The PowerHub is one of the industry’s most compact axis drives. Yet despite its small size, the PowerHub handles large loads and offers high torque and repeatability. It is ideally suited for industrial robotics applications.
TORQUE/SPEED RANGE CHARTS

ACTUATOR SPECIFICATIONS

<table>
<thead>
<tr>
<th>Units</th>
<th>HKM-20-60</th>
<th>HKM-20-30</th>
<th>HKM-25-60</th>
<th>HKM-25-30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Power</td>
<td>Watts</td>
<td>100</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Rated Torque</td>
<td>in-lb</td>
<td>115</td>
<td>233</td>
<td>233</td>
</tr>
<tr>
<td></td>
<td>N·m</td>
<td>13</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Maximum Torque</td>
<td>in-lb</td>
<td>345</td>
<td>700</td>
<td>830</td>
</tr>
<tr>
<td></td>
<td>N·m</td>
<td>39</td>
<td>79</td>
<td>94</td>
</tr>
<tr>
<td>Rated Speed</td>
<td>r/min</td>
<td>60</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>Maximum Speed</td>
<td>r/min</td>
<td>80</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>Current, rated</td>
<td>A</td>
<td>1.8</td>
<td>1.4</td>
<td>4.8</td>
</tr>
<tr>
<td>Current, max.</td>
<td>A</td>
<td>5</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>Thermal Time Constant</td>
<td>min.</td>
<td>~25</td>
<td>~30</td>
<td></td>
</tr>
<tr>
<td>Gear Reduction Ratio</td>
<td>R:1</td>
<td>50</td>
<td>100</td>
<td>50</td>
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<tr>
<td>Output Resolution</td>
<td>P/rev.</td>
<td>50,000</td>
<td>100,000</td>
<td>75,000</td>
</tr>
<tr>
<td></td>
<td>arc sec</td>
<td>26</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>Absolute accuracy</td>
<td>+/- arc sec</td>
<td>75</td>
<td>40</td>
<td>60</td>
</tr>
</tbody>
</table>

Motor Type: 3 Phase Brushless

Number of poles | 8
Torque Constant | in-lb/A | 2.8 | 1.7
Back EMF | V/kRPM | 33.3 | 20.2
Motor Inductance mH | 10.3 | 1.8
Inertia kg-cm^2 | 0.35 | 1.91

Encoder Type: Optical Incremental

Output Circuit Type: Line Driver
Resolution (Encoder Only) | P/rev. | 1000 | 1500
Output Signal | 3 Channels | A - A B - B I - I
Power | +5VDC +/-10% & 250 mA Max.

Drive Consult factory for options
The output flange of all PowerHub actuators is supported by precision bearings which allow combinations of axial and moment loads. The maximum allowable combination of these external loads is shown in Example 2. A moment load applied to the output flange will create a deflection as shown in Example 1. It is not recommended to exceed 1.5 arc minutes. Axial impact loads on the end of the shaft should be avoided.

**Example 1**

Axial Force \( F_a = W_1 \times L_1 + W_2 \times L_2 + W_3 \times L_3 + ... \)

Moment Load = \( W_1 \times L_1^{\text{ax}} + W_2 \times L_2^{\text{ax}} + ... \)

**Example 2**

Axial Force \( F_a = W_1 \times L_1^{\text{ax}} \)

Moment Load = \( W_1 \times L_1^{\text{ax}} + W_2 \times L_2^{\text{ax}} + ... \)
Harmonic Drive Technologies is a world leader in the design and manufacture of harmonic drive gearheads, component gear sets, and complete harmonic drive actuators. But to our customers, we are much more than that – we are a partner. Our customers, who span industries ranging from semiconductor and factory automation to medical and aerospace, count on us to help them meet their unique needs. They count on our engineering innovation, our project support, and the many other resources that we provide. They count on us for solutions.

Harmonic Drive Technologies’ complete line of products includes gear systems, gearheads, servo actuators, vacuum actuators, electronics, and specialty items.

We've been supplying motion control products to industry for over 40 years. All of our design and manufacturing is done at our Peabody, Massachusetts plant. We have a complete engineering and technical sales staff on hand to assist you with any motion control problem with which you may be confronted.