Power Lift® Actuator

Series 5

Synchronized Rack & Pinion Lifters

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Made in U.S.A.
U.S. patent 5125290
Introduction

Dependable Synchronized Rack & Pinion Lifters

For more than 35 years, Power Components Inc., (PCI) has manufactured products used in automation. Among these products is a family of rack and pinion lifter units known as "Power Lift® Actuators."

Power Lift® Actuators convert linear to rotary or rotary to linear motion when connected with a power source, such as an air cylinder or motor.

Designed for limited space applications, the Power Lift® Actuator provides synchronized multi-point motion to raise, lower, clamp, push, pull, check, position, or actuate any unit load or fixture.

Series Five Lifters are metric, lube-free, round rack units manufactured on the latest CNC equipment to ensure dimensional accuracy.

Our patented lifters are the result of CAD/CAM design efforts, extensive research and development, as well as continuous testing. Their value as a reliable and durable automation tool is well known.

To facilitate installation layouts, Series Five Lifters are available on CD-ROM. Components are in-stock and available for quick shipment.

<table>
<thead>
<tr>
<th>LOAD UNIT</th>
<th>Max. Load Capacity</th>
<th>Max. Shear Load</th>
<th>Load Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Unit Model 5A, 5B</td>
<td>180 Kg. (400 lb.)</td>
<td>317 Kg. (700 lb.)</td>
<td>• All general lifting</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Long runs</td>
</tr>
<tr>
<td>Premium Unit Model 5A, 5B</td>
<td>272 Kg. (600 lb.)</td>
<td>475 Kg. (1050 lb.)</td>
<td>• High-volume, long runs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Heavy power drive units</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GEAR UNIT</th>
<th>Gear Hub</th>
<th>Gear Pitch Diameter</th>
<th>Module Pressure Angle</th>
<th>Gear Force (width)</th>
<th>Ratio</th>
<th>Rack Travel 360° Gear Rotation</th>
<th>Maximum Torque Limits</th>
<th>Recommended Torque Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Unit Model 5A, 5B</td>
<td>SQ (Square)</td>
<td>40mm (1.575&quot;)</td>
<td>2.5-20 (10 Pitch)</td>
<td>25,(97&quot;)</td>
<td>1:1</td>
<td>125(4.95&quot;)</td>
<td>66 Nm. (551 in. lb.)</td>
<td>35.6 Nm (315 in. lb.)</td>
</tr>
<tr>
<td>Premium Unit Model 5A, 5B</td>
<td>SQ (Square)</td>
<td>40mm (1.575&quot;)</td>
<td>2.5-20 (10 Pitch)</td>
<td>25,(97&quot;)</td>
<td>1:1</td>
<td>125(4.95&quot;)</td>
<td>93.4 Nm. (827 in. lb.)</td>
<td>53.3 Nm (472 in. lb.)</td>
</tr>
</tbody>
</table>
**Unique Design Features**

**Lifting Capacity**
All Series Five Power Lift® Actuators are designed for trouble-free operation with minimal service and wear. PCI Single (5A) and Double (5B) Units are available in two lifting capacities: Basic Unit (*X*), and the Premium Unit (*Z*).

**Basic Unit** – The Basic Unit meets the requirements of most all-purpose, general lifting applications and has a maximum load capacity of 180 Kg. (400 lb.).

**Premium Unit** – For extreme load conditions, such as the master unit in a drive chain, the Premium Unit has a 272 Kg. (600 lb.) load capacity. The Premium rack is recommended for use with the Premium Unit to obtain optimum load capacity.

**Permanent Lubrication & Superior Wear Resistance**
Permanent lubrication is used with every working component of the Series Five to minimize friction and wear.

**Hub Bearings** – The Series Five is the only lifter available with high-quality sealed ball bearings as a standard component on the gear hub. These bearings are sealed on both faces to prevent contamination. The grease within reduces friction, and tests have shown it is the best bearing to prolong the life and durability of the unit.

**Gear Lubrication** – PCI’s Series Five is the only non-lube lifter available with a graphite assembly transmitting lubrication directly to the pinion, where the work is performed. This exclusive feature dramatically extends the life of the unit.

**Rack Lubrication** – Racks are supported by threaded rack bushings with graphite-filled grooves for reduced friction and wear. Locating the graphite inside the bushing, instead of outside, assures that lubrication is always present on the wear surface.

**Simplified Rack Timing**
**SQ-“Floating” Gear & Hub Assembly** – Power Components, Inc., originated the “floating” gear and hub assembly which simplifies the timing of multiple lifting units. Our horizontal and vertical racks in the 5B Double Units can be adjusted independently by disengaging a square (SQ) drive shaft from a hollow gear and hub assembly. If timing is not a concern, solid (SDH) drive shafts are also available. For rack information see page 8.

**Lifetime Warranty**
**Minimal Service & Maintenance** – The Series Five carries an exclusive Lifetime Warranty on its rugged ductile iron casting. Absolutely no part of the casting is used as a wear surface. Series Five Lifters also offer the following advantages.

1. The O.D. of the rack bearing is threaded for easy installation.
2. Rack bearing life can be extended by simply rotating the bushing 180°.
3. No special tools are required for installation or adjustment.
4. Rack bearings are interchangeable in both 5A and 5B Units.

**Improved Debris Protection**
**Rack Cover** – For lifters operating in hostile environments, we recommend using a bellows boot cover to ensure maximum contamination protection from debris. See page 10 for more information.

**LIFETIME WARRANTY on Casting**
POWER COMPONENTS, INC. (PCI) warrants that the casting on any Series Five Power Lift Actuator delivered after January 1, 1990 (the “Product”) will never fail or need replacement under normal usage. If the casting fails under normal usage, PCI will, at its option, repair or replace the casting upon return of the Product to PCI. PCI shall not be liable for any incidental or consequential damages or loss caused by any failure of the Product, or any costs incurred in connection with removal and/or reinstallation of the Product.
**Single Unit**

Available in a Basic Unit or Premium Unit, the 5A Single Model features two mounting faces and may be positioned horizontally, vertically or inverted.

**Alternative Gear & Hub Types**—Model 5A-SQ (top photo) has the standard “floating” or suspended gear and hub design. To operate, a 19mm (.75") square drive shaft must be installed through the entire gear and hub assembly. The SQ gear simplifies timing by allowing racks and gears to be positioned independently while the square drive shaft is retracted.

Model 5A-SDH one piece solid gear (bottom photo) has extended round hubs.

**Alignment**—Two sets of dowel holes are supplied on each mounting face. The original set is compatible with earlier Series Five versions. The alternative set of dowel holes offers greater drilling convenience for dowling and alignment at assembly.

**Racks**—Unit 5A has a single rack location and can be operated in a vertical or horizontal position depending on the application. Racks are sold separately.
Double Unit

PCI 5B Double Unit has one mounting face and operates with two pieces of round rack. Choose from the Basic Unit or Premium Unit. The unit may be mounted horizontally, vertically or inverted.

Alternative Gear & Hub Types—Model 5B-SQ (top photo) features the standard “floating” gear and hub design. To operate, a 19mm (.75”) square drive shaft must be installed through the entire gear and hub assembly. The SQ gear simplifies timing by allowing racks and gears to be positioned independently while the square drive shaft is retracted.

Model 5B-SDH one piece solid gear (bottom photo) has extended round hubs.

Alignment—Two pairs of dowel holes are supplied on the mounting face. The original set is compatible with earlier Series Five Units. The alternative set of dowel holes offers greater drilling convenience for dowling and alignment at assembly.

Racks—Model 5B has two vertical rack locations and is assembled with the rack bearing in standard location, “R”. However, by specifying rack location “L” in the part number when ordering (see page 11), the unit is assembled with the rack bearing in the alternate location. When using both rack positions, specify “RL” when ordering. Racks are sold separately.
**Installation Guidelines**

**Dowel Lifts**—When positioning units, use the dowel pins as a guide to ensure proper unit and rack alignment.

**Vertical Rack Connection**—To prevent binding of the bushings and gears during operation, rack connections must have adequate clearance. This allows for freedom of movement, rotation, misalignment, tolerance stack-up and out of parallel motion.

**Rack Timing**—To time the vertical racks in each unit, the distance between lifting units coupled with a single rack should be positioned apart, in tooth pitch increments. However, if units are far enough apart but still require a precise location, two R100 style racks coupled with a tube could be used. The coupling tube can be adjusted and pinned to the racks.

For installation help, contact Power Component’s Engineering Department at (734) 207-2200
Applications

The following are a few examples of Power Lift® Actuator applications. In some cases, the networks need to be routed around obstructions or arranged to deliver lifting forces at inaccessible locations. Where loads require, PCI recommends the Premium lifter as the master unit in a drive chain, as this unit receives the most force. PCI recommends whenever possible pull-to-lift applications. If you have a special requirement, contact the factory to discuss your specific needs.

Consider Power Lift® Actuators for these and other lifting needs:
• Lift loads for forklift pickup
• Rotate objects in welding fixtures
• Raise for pallet and warehouse stacking
• Lift workpieces from metal stamping presses
• Manipulate conveyorized products during assembly
Rack Specifications

The rack is an essential component of the Power Lift® Actuator unit. PCI’s racks are made from a high-grade alloy steel, available in standard lengths, and are designed to withstand maximum load and wear in all applications. Non-standard rack lengths may be manufactured upon request; see ordering information below.

Basic — The Basic rack is suitable for typical applications and is available in four styles.

Premium — PCI’s Premium rack is suitable for heavy-duty applications (i.e. when maximum durability of a drive unit is required for excessive loads) and is also available in four styles. PCI recommends using the Premium Rack with the Premium Unit for optimum lifting capacity.

<table>
<thead>
<tr>
<th>STYLE R100 RACK</th>
<th>Furnished with one machined end.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX. STROKE</td>
<td>PART NO.</td>
</tr>
<tr>
<td>100(3.94&quot;)</td>
<td>R110</td>
</tr>
<tr>
<td>160(6.30&quot;)</td>
<td>R116</td>
</tr>
<tr>
<td>200(7.87&quot;)</td>
<td>R120</td>
</tr>
<tr>
<td>250(9.84&quot;)</td>
<td>R125</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STYLE R200 RACK</th>
<th>Furnished with two machined ends.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX. STROKE</td>
<td>PART NO.</td>
</tr>
<tr>
<td>100(3.94&quot;)</td>
<td>R210</td>
</tr>
<tr>
<td>160(6.30&quot;)</td>
<td>R216</td>
</tr>
<tr>
<td>200(7.87&quot;)</td>
<td>R220</td>
</tr>
<tr>
<td>250(9.84&quot;)</td>
<td>R225</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STYLE R300 RACK</th>
<th>Furnished with two machined ends. One end is milled flat for a setting pin when units are timed for multipoint lift application.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX. STROKE</td>
<td>PART NO.</td>
</tr>
<tr>
<td>100(3.94&quot;)</td>
<td>R310</td>
</tr>
<tr>
<td>160(6.30&quot;)</td>
<td>R316</td>
</tr>
<tr>
<td>200(7.87&quot;)</td>
<td>R320</td>
</tr>
<tr>
<td>250(9.84&quot;)</td>
<td>R325</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STYLE R400 RACK</th>
<th>Rack is not furnished with machined ends.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX. STROKE</td>
<td>PART NO.</td>
</tr>
<tr>
<td>100(3.94&quot;)</td>
<td>R410</td>
</tr>
<tr>
<td>160(6.30&quot;)</td>
<td>R416</td>
</tr>
<tr>
<td>200(7.87&quot;)</td>
<td>R420</td>
</tr>
<tr>
<td>250(9.84&quot;)</td>
<td>R425</td>
</tr>
</tbody>
</table>

To order non-standard rack lengths; specify quantity, rack style, rack grade (Basic or Premium), and length. (i.e. (12)-R100-B-600mm).

Ordering Example:

Quantity | Rack Style | Rack Grade (Basic or Premium) | Length
---------|------------|-------------------------------|--------
12       | R100       | B                             | 600mm  

Power Components, Inc.
Phone: (734) 207-2200
**Accessories**

**Stop Collar**—PCI’s SC-75 stop collar prevents the 19mm (.75") square drive shaft from “walking out” of the Power Lift® unit. Two set screws aligned at 90° firmly lock the stop collar onto the shaft.

**Square Drive Shaft**—The SDS-“L” drive shaft is used to link the Power Lift® Actuator with the 19mm (.75") square hub. The shaft allows the vertical and horizontal racks to be adjusted independently for simplified timing and set-up. Shaft length may be manufactured to customer’s specifications.

**SQ to SDH Hub Couplers**

**Female** — With the SC-5 female coupler, an SQ square shaft can be joined to an SDH solid round shaft. Two set screws aligned at 90° firmly lock the female connector onto the shaft.

**Male** — With the SC-6 male coupler, an SQ square shaft can be joined to an SDH solid round shaft. Two set screws aligned at 90° firmly lock the male connector onto the shaft.
Accessories

**Cylinder to Rack Connector**—In a drive application, the cylinder to rack connector provides added stability by accommodating the slight misalignment between the cylinder and the rack.

In the diagram:
- Cylinder Nut
- Rack Sleeve
- Set Screw
- Cylinder to Rack Connector
- 5/16" Ream
- 65 (2.56")
- 78 (3.07")

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>A (internal thread)</th>
<th>B</th>
<th>C</th>
<th>D (across flats)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRC-20</td>
<td>Blank</td>
<td>63 (2.48&quot;)</td>
<td>42 (1.65&quot;)</td>
<td>36 (1.42&quot;)</td>
</tr>
<tr>
<td>CRC-21</td>
<td>3/4&quot; - 16</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>CRC-22</td>
<td>7/8&quot; - 14</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>CRC-23</td>
<td>1&quot; - 14</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>CRD-24</td>
<td>M16 x 1.5</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>CRC-25</td>
<td>M20 x 1.5</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>CRC-26</td>
<td>M27 x 2.0</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>CRC-30</td>
<td>Blank</td>
<td>80 (3.15&quot;)</td>
<td>57 (2.24&quot;)</td>
<td>50 (1.97&quot;)</td>
</tr>
<tr>
<td>CRC-31</td>
<td>1 1/4&quot; - 12</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>CRC-32</td>
<td>1 1/2&quot; - 12</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>CRC-33</td>
<td>M30 X 2.0</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>CRC-34</td>
<td>M36 X 2.0</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

**Rack Cover**—Constructed from an advanced neoprene-cotton material, the PCI rack cover protects rack teeth by preventing metal chips and other foreign materials from jamming in the teeth. A volute spring style rack cover is also available.

In the diagram:
- Rack Cover
- hose clamps
- Length measurements

**Hose Clamp**—Recommended for use with rack covers, hose clamps secure the cover at both ends.

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>TRAVEL</th>
<th>L1 (minimum)</th>
<th>L2 (maximum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCG-6</td>
<td>152.4&quot; (6')</td>
<td>55.4 (2.18&quot;)</td>
<td>207.8 (8.18&quot;)</td>
</tr>
<tr>
<td>HCG-8</td>
<td>203.2&quot; (8')</td>
<td>57.9 (2.28&quot;)</td>
<td>261.1 (10.28&quot;)</td>
</tr>
<tr>
<td>HCG-10</td>
<td>254.0&quot; (10')</td>
<td>60.5 (2.38&quot;)</td>
<td>314.5 (12.38&quot;)</td>
</tr>
</tbody>
</table>

Rack covers, which include all mounting hardware, (rack cover, two hose clamps and bushing) can be ordered as listed above. Lengths not listed may be manufactured upon request, contact the factory for more information.
**Ordering Information**

*Power Components, Inc. is committed to producing innovative, quality products with superior customer service.*

Phone: (734) 207-2200
Fax: (734) 207-2222

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### Power Lift® Actuator Unit

**Quantity**
Specify the number of Power Lift® Actuators

**Series**
Series 5

**Model**
A—Single
B—Double

**Unit Type**
X—Basic Unit
Z—Premium Unit

**Alternative Gear Type**
Determine style of hub (SQ or SDH). If not specified when ordered, the standard SQ hub is supplied.

**Optional Rack Location**
Double units are assembled with the rack in the standard position “R”. If the alternative location will be used, specify “L” when ordering. If using both vertical rack positions, specify “RL” when ordering.

**Accessories**
Stop Collar
Square Drive Shaft
Hub Coupler M (Male)
Hub Coupler F (Female)
Rack Connector
Rack Cover

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### Racks

**Quantity**

**Product Description**

**Accessories**

**Quantity**

**Product Description**

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*All illustrations and drawings accurately represent the product at the time this catalog was printed. In order to maintain our high quality standards and customer expectations, product changes may occur during the life of this catalog without prior notice.*
• Series One-Limited Space Applications
• Series Two-Optimal Lifting Capacity
• Series Three-1:1 or 2:1 Ratio Capability
• Series Four-Universal Mounting/Heavy-Duty/Lube-Free
• Series Five-Metric Dimensions/Round Rack/Lube-Free