IMPORTANT INFORMATION
DO NOT DISCARD!

Use this information sheet to assist with gripper installation and setup.
File with maintenance or machine documentation.

ORDERING DATA

TO ORDER SPECIFY:
Product, Design No., Size, Minimum Total Jaw Opening, and any options required.

OPTIONS (Omit if not required)
MANIFOLD OPTION
L11-UB99 - Manifold option in location 99
MOUNTING OPTION
GR9 - Mounting flange in location 99
FLUID COMPATIBILITY
V1 - Fluoro-elastomer seals and lubricants
LUBRICATION
Y4 - Cleanroom grade lubricant

PRODUCT
Small Profile Precision Jaw Movement Angular Gripper

NOTES:
1) Design No. indicates metric mountings, dowel pin holes, and ports.
2) -V1 option may reduce gripper life. PHD recommends reducing tooling inertia to 60% of maximum values for optimal life.

MINIMUM JAW TRAVEL = MINIMUM OPEN ANGLE + MINIMUM CLOSED ANGLE

SERIES JC1SD MAGNETIC SWITCHES

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>SWITCH DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>JC1SDP-5</td>
<td>PNP (Source), Solid State, 10-30 VDC, 5 meter cable</td>
</tr>
<tr>
<td>JC1SDP-K</td>
<td>PNP (Source), Solid State, 10-30 VDC, Quick Connect</td>
</tr>
<tr>
<td>JC1SDN-5</td>
<td>NPN (Sink), Solid State, 10-30 VDC, 5 meter cable</td>
</tr>
<tr>
<td>JC1SDN-K</td>
<td>NPN (Sink), Solid State, 10-30 VDC, Quick Connect</td>
</tr>
</tbody>
</table>

Includes one switch and installation directions. Series JC1SD Switches only function on 16 and 20 mm units. Series 6790 Reed Switches are not applicable.

SERIES JC1ST 2 POSITION TEACHABLE MAGNETIC SWITCHES

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>SWITCH DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>JC1STP-2</td>
<td>PNP (Source), Solid State, 12-30 VDC, 2 meter cable</td>
</tr>
<tr>
<td>JC1STP-K</td>
<td>PNP (Source), Solid State, 12-30 VDC, Quick Connect</td>
</tr>
</tbody>
</table>

Includes one switch and installation directions.

For additional technical assistance, call or visit our website:
P.O. Box 9070, Fort Wayne, IN 46899
1-800-624-8511  www.phdinc.com
## ENGINEERING DATA: SERIES GRV GRIPPERS

### SPECIFICATIONS

| OPERATING AIR PRESSURE | 1 bar min. - 8.3 bar max. [15 psi min. - 120 psi max.] |
| OPERATING TEMPERATURE  | -28°C to +82°C [-20°F to 180°F] |
| GRIP REPEATABILITY     | 0.025 mm [± 0.001 inch] of original position |
| RATED LIFE             | 5 million cycles |
| LUBRICATION            | Factory lubricated for rated life |

### SERIES GRV ANGULAR GRIPPER

<table>
<thead>
<tr>
<th>SIZE</th>
<th>MINIMUM TOTAL JAW OPENING ANGLE</th>
<th>GRIP FORCE FACTOR INTERNAL AND EXTERNAL</th>
<th>GRIPPER WEIGHT</th>
<th>DISPLACEMENT</th>
<th>CLOSE OR OPEN TIME at 6 bar [87 psi]</th>
<th>MAXIMUM TOOLING LENGTH</th>
<th>MAXIMUM TOOLING INERTIA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>METRIC</td>
<td>IMPERIAL</td>
<td></td>
<td>sec</td>
<td>mm</td>
<td>kg-mm²</td>
</tr>
<tr>
<td>6</td>
<td>40°</td>
<td>13.7</td>
<td>0.078</td>
<td>0.034</td>
<td>0.12</td>
<td>0.008</td>
<td>0.025</td>
</tr>
<tr>
<td>10</td>
<td>40°</td>
<td>46</td>
<td>0.026</td>
<td>0.070</td>
<td>0.155</td>
<td>0.024</td>
<td>0.030</td>
</tr>
<tr>
<td>16</td>
<td>40°</td>
<td>179</td>
<td>0.102</td>
<td>0.141</td>
<td>0.311</td>
<td>0.080</td>
<td>0.040</td>
</tr>
<tr>
<td>20</td>
<td>40°</td>
<td>320</td>
<td>0.183</td>
<td>0.244</td>
<td>0.538</td>
<td>0.194</td>
<td>0.050</td>
</tr>
</tbody>
</table>

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>METRIC</th>
<th>IMPERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>kg</td>
<td>lb</td>
</tr>
<tr>
<td>cm³</td>
<td>in³</td>
</tr>
<tr>
<td>sec</td>
<td>mm</td>
</tr>
<tr>
<td>kg-mm²</td>
<td>lb-in²</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AXIAL FORCE</th>
<th>MAX. INDIVIDUAL MOMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fa</td>
<td>My</td>
</tr>
<tr>
<td>N</td>
<td>lb</td>
</tr>
<tr>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>10</td>
<td>44</td>
</tr>
<tr>
<td>16</td>
<td>89</td>
</tr>
<tr>
<td>20</td>
<td>133</td>
</tr>
</tbody>
</table>

- **Fa**: Total for both jaws
- **My**: Maximum allowable moment per jaw, relative to the pivot pin
- **Mz**: Maximum allowable moment per jaw, relative to the pivot pin

When calculating the value for **Fa**, include the tooling weight, part weight, external forces, and accelerations. When calculating values for **My** and **Mz**, include the grip force per jaw, tooling weight, part weight, external forces, and accelerations as applicable.

### MOUNTING RECOMMENDATIONS

- When mounting as shown below, PHD recommends relieving the material directly adjacent to the jaw slot.
- When installing dowel pins into the jaws, make sure the jaw is fully supported to prevent transfer of excessive force to the gripper.

### RECOMMENDATIONS

Design tooling so that the grip point is as close to the gripper surfaces as possible. The grip force factor (Gf) values given in the table above apply at 0° jaw angle only.

The maximum load that grippers can handle will vary based on: size of the part being picked up, shape of the part, texture of the part, speed at which the part is transferred, working pressure, shape of the fingers, etc.

### SEALS AND FLUIDS

Long life seals are standard on all Series GRV Grippers. These seals are compatible with standard paraffin-based lubrication oils used for pneumatic cylinders. For compatibility with other fluids, consult PHD.

### START UP PROCEDURES

The gripper should be securely mounted with all tooling and external flow control devices attached prior to applying pressure to the unit. Care should be taken to provide adequate clearance for the jaws to open and close. At initial start-up, apply pressure slowly to the unit.
SERIES JC1STP-x TEACHABLE SWITCH

1) Insert the switch into the switch slot.
2) Take note of the symbol on the switch and carefully align the symbol as shown in Figure 1.
3) Torque the socket set screw to 14 in-oz [0.1 Nm].
4) Consult the JC1STP-x Information Sheet for the appropriate programming instructions.

NOTE:
1) Assumes use of at least 75% of full thread depth
2) Assumes use of high strength steel socket head cap screws
3) PHD recommends use of threadlocker on mounting threads

SERIES JC1SDx-x SINGLE POSITION SWITCH

1) Insert the switch into the switch slot.
2) Adjust on/off position per your requirements, see Figure 3.
3) Torque the socket set screw to 14 in-oz [0.1 Nm].

MAXIMUM RECOMMENDED MOUNTING TORQUES

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>2X JAW THREADS (TOOLING ATTACHMENT)</th>
<th>2X BODY BACK THREADS (UNIT MOUNTING)</th>
<th>2X BODY BOTTOM THREADS</th>
<th>2X BODY FRONT THRU HOLES (UNIT MOUNTING)</th>
<th>2X FLANGE THRU HOLES (UNIT MOUNTING)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRV-5-6</td>
<td>2 in-lb 0.23 Nm 15 in-lb 1.7 Nm</td>
<td>8 in-lb 0.90 Nm 8 in-lb 0.90 Nm</td>
<td>8 in-lb 0.90 Nm</td>
<td>8 in-lb 0.90 Nm</td>
<td>8 in-lb 0.90 Nm</td>
</tr>
<tr>
<td>GRV-5-10</td>
<td>11 in-lb 1.2 Nm 15 in-lb 1.7 Nm</td>
<td>15 in-lb 1.7 Nm 8 in-lb 0.90 Nm</td>
<td>15 in-lb 1.7 Nm</td>
<td>15 in-lb 1.7 Nm</td>
<td>15 in-lb 1.7 Nm</td>
</tr>
<tr>
<td>GRV-5-16</td>
<td>15 in-lb 1.7 Nm 25 in-lb 2.8 Nm</td>
<td>15 in-lb 1.7 Nm 15 in-lb 1.7 Nm</td>
<td>15 in-lb 1.7 Nm</td>
<td>15 in-lb 1.7 Nm</td>
<td>15 in-lb 1.7 Nm</td>
</tr>
<tr>
<td>GRV-5-20</td>
<td>20 in-lb 2.3 Nm 40 in-lb 4.5 Nm</td>
<td>25 in-lb 2.8 Nm 25 in-lb 2.8 Nm</td>
<td>25 in-lb 2.8 Nm</td>
<td>25 in-lb 2.8 Nm</td>
<td>25 in-lb 2.8 Nm</td>
</tr>
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NOTES:
1) Assumes use of at least 75% of full thread depth
2) Assumes use of high strength steel socket head cap screws
3) PHD recommends use of threadlocker on mounting threads
KEY | DESCRIPTION | PART NUMBER
--- | --- | ---
1 | Finished Body | Full unit description followed by -H2410
2 | Rod Seal | Part of seal kit -H9000
3 | Rod Seal Retainer | Part of seal kit -H9000
4 | Driver | Full unit description followed by -H5610
5 | Shock Pad | Full unit description followed by -H1800
6 | Piston & Rod Assembly | Full unit description followed by -H1000
7 | Jaw | Full unit description followed by -H2600
8 | Dowel Pin (Jaw Pivot) | Full unit description followed by -H2621
9 | Piston Seal | Part of seal kit -H9000
10 | Bore Plug | Full unit description followed by -H3100
11 | Bore Plug Seal | Part of seal kit -H9000
12 | Retaining Ring | Full unit description followed by -H7101, or part of seal kit -H9000
13 | Set Screw (Manifold Plug) | ---
14 | Jaw Slot Cover | ---
15 | Metric Barb Washer | Part of fitting kit -H2800
16 | Metric Fitting Barb | Part of fitting kit -H2800
17 | Set Screw (Port Plug) | Part of conversion kit -H9091
18 | O-Ring Seal (Manifold) | Part of conversion kit -H9091, or part of seal kit -H9090
19 | Mounting Flange | Part of flange kit -H9055
20 | Mounting Flange To Body SFHCS | Part of flange kit -H9055
21 | O-Ring Seal (Mounting Flange) | Part of flange kit -H9055, or part of seal kit -H9090

KITS

| DESCRIPTION | GRV-X-6 x 40 | GRV-X-10 x 40 | GRV-X-16 x 40 | GRV-X-20 x 40 |
--- | --- | --- | --- | ---
Seal Kit | -H9000 |
Flange Mounting Kit | -H9055 |
Manifold Seal Replacement Kit | -H9090 |
Manifold Conversion Kit | -H9091 |
M3 Barb Fitting (Std) | -H2800 |
M3 Barb Fitting (-V1) | -H2800 |
M5 Barb Fitting (Std) | -H2800 |
M5 Barb Fitting (-V1) | -H2800 |

NOTE: -H codes must be used with full unit description. Example: GRV-5-10x40-V1-GR9-H9000
This ensures the correct configuration of components is provided.

PART NO.: 6441-651A