Precision Pneumatic Grippers

Advanced Parallel & Angular Jaw Motion Designs
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"SPG" Series Parallel Grippers

Five steps to building the finest grippers available. . .

1. Start with a pair of symmetrical jaws

   Integral Jaw/Guide Shaft/Piston Assembly
   A pair of ground, stainless steel guide shafts (which double as air pistons) are press fit and pinned to each gripper jaw. Jaws can be aluminum or steel. Shafts are placed diagonally and spaced far apart for maximum jaw stability.

2. Couple the mating internal parts

   Only Three Moving Parts
   Two jaw units are linked by a rocker arm that synchronizes jaw motion. The arm does not drive the jaws so wear is minimal.
   The shaft/pistons of each jaw pass freely through enlarged holes in its mate. "C" in the photo indicates the opposing piston faces to which air pressure is applied for jaw closing. "O" targets the opposing "jaw open" faces.

3. Add one symmetrical cylinder block

   Four Cylinders in Each Block are connected by internal air passages to the "C" and "O" piston faces shown in the step 2 photo. Each cylinder incorporates permanently lubricated, high-performance linear bearings that provide clean, drip-proof operation and allow use of a non-lubricated air supply. Opening and closing forces are equal, allowing the grippers to be used for both OD & ID gripping.

4. Add the other cylinder block and dowel the porting block on top

   No Troublesome Gibs to Wear or Adjust.
   Four dowel pins align the porting block perfectly with the cylinder blocks. Eight high-performance linear bearings guide the four pistons through the entire length of the gripper body. Centering accuracy is maintained to .002" and side play is .0015" or less per jaw. Most applications can expect extended gripper life to 15 million cycles — and even more!

5. Apply this patented design to a wide range of sizes, strokes and grip forces. Then, offer all the convenient options that cannot be found on other grippers.
“SPG” Series Parallel Grippers

Problem #1: Conventional grippers place the power cylinder some distance above the jaw. The jaw is driven by a “linkage” that creates a “bending moment” which results in loss of force and creates wear points for future maintenance headaches.

Solution: SPG Gripper jaws are powered directly by air pressure applied to the ends of the guide shafts which act as pistons. Four equal pistons power the jaws inward; four equal pistons power the jaws outward.

Problem #2: Many grippers have “metal on metal” sliding gib in a “T” slot.

Solution: SPG Gripper jaws are guided by four stainless steel guide shafts supported by eight high-performance linear bearings.

Long Term Performance
SPG guide shafts are placed far apart for sturdy “play free” jaw support. Gib type designs have metal-to-metal sliding contact and a narrow support area that can deflect and cause play.

Problem #3: It is difficult to attach tooling to competitive gripper jaws.

Solution: SPG Grippers offer a choice of jaw styles for easy attachment of tooling. Note that all SPG Gripper jaws have three rows of tapped mounting holes and dowel holes for increased versatility. SPG Gripper jaws are available in steel or aluminum.

Reduced Jaw Deflection
SPG Grippers have eliminated complex piston-to-jaw linkages and gibs. Bending moments are significantly reduced because force is applied directly to the jaw units at a distance very close to the gripping surface. Loss of force is minimized. Opening & closing forces are equal for use with either ID or OD gripping.

(b) Angle Jaws (J2-Aluminum or J4-Steel) have a slip fit dowel hole and a slip fit dowel slot, assuring precise slip fit attachment of end tooling without the expense of maintaining perfect dowel centerlines.

Problem #4: Competitive grippers do not hold tolerances close enough that a replacement gripper can be installed without major readjustment and realignment.

Solution: SPG Grippers are very precisely machined on a specially tooled 4-axis CNC machining center.

Fabco-Air does 100% of the gripper manufacturing in-house, insuring that SPG Grippers interchange perfectly with each other. SPG Gripper jaws close completely together.

(c) Interface blocks (“Option H”) can be attached to J2/J4 angle jaws allowing tooling to be mounted on any side of the block. Below, option “H” Interface Blocks have been utilized to provide side tapped holes for mounting offset blade type gripping fingers.
Solving conventional gripper problems with only 3 moving parts!

Problem #5: Competitive grippers are difficult to repair – lots of parts, etc.
Solution: SPG Grippers have only three moving parts, and six total!

Problem #6: Competitive grippers are difficult to attach to their mating actuator arm.
Solution: SPG Grippers can be easily doweled into mounting surfaces with either of the following approaches:

1) Use SPG Gripper "Option A" which provides a center locating dowel on top of the gripper. Machine a slip fit channel .030" deep into customer’s tooling to accept Gripper dimension "B". "B" is machined to a tolerance of ±.001 on all SPG Models. Mounting the gripper is accomplished by "slipping" the gripper's dowel into a slip fit dowel hole and pushing the gripper into the machined channel. Removal is easy and does not require "prying" the gripper off of two "stuck" dowel holes.

2) The second method utilizes the slip fit dowel slot that is included with the center locating dowel pin "Option A". The center dowel pin establishes gripper centerline on an X–Y plane. The end dowel locates the X Axis preventing rotation. The "Q" dimension is not critical. It can be held to ±.005 and still provide precision engagement in the gripper dowel slot.

Fabco-Air SPG Grippers are very versatile and can be modified to suit special applications as described in the following examples.

Special Example #1
Verifying parts presence and/or gauging

The symmetrical nature of the SPG Gripper allows a pair of prox sensors to be installed on each side. Two sensors on one side of the gripper are used to verify full open and full close jaw positions.

The two sensors on the opposite side can be set so that each sensor is "just made" when a part is gripped. An oversize, undersize, or missing part will cause enough jaw travel that one of the two sensors will "drop out", indicating a "no go" situation. If both sensors are "made", a gripped part is present and within tolerance.

Special Example #2
Three position jaws

Fabco-Air has made three-position grippers by modifying the booster piston of a High Force SPG Gripper and installing it at one end of the gripper. Line pressure applied to this booster piston overrides "Jaw Open" pressure – and will position the jaws in a "mid" location. From this "mid" position, the jaws can be either opened or closed allowing I.D. or O.D. gripping if a family of parts is to be handled with the same gripper.

Special Example #3
Application tip – Escapement Device

The SPG Gripper can be used as a programmable escapement device by simply specifying option "Q", non-synchronous motion. In this configuration each jaw can be operated independently with its own 4-way air valve. "Tick-tock" tooling fingers can be attached to the jaws and two sets of sensors added to provide "open/close" verification for each jaw.

Typical Escapement Sequence:
1) Left jaw closes
2) Right jaw opens (part escapes)
3) Right jaw closes
4) Left jaw opens (letting another part in)
**“SPG” Series Parallel Grippers**

The extremely tough grippers that never need adjusting!

Specifications subject to change without notice or incurring obligations.

Other Options – See page 14 & 15

Choice of Sensors – See page 12 & 13

Choice of Jaw Styles

- **J1** – Aluminum
- **J2** – Aluminum
- **J3** – Steel
- **J4** – Steel

*Note: Steel jaws are required on all high force models*

Choice of Stroke & Grip Force

<table>
<thead>
<tr>
<th>Model</th>
<th>Stroke (Open)</th>
<th>Grip Force Per Jaw at 100 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPG 100</td>
<td>0.25&quot;</td>
<td>5.5 lbs</td>
</tr>
<tr>
<td>SPG 200</td>
<td>0.40&quot;</td>
<td>9.8 lbs</td>
</tr>
<tr>
<td>SPG 300</td>
<td>0.54&quot;</td>
<td>22 lbs</td>
</tr>
<tr>
<td>SPG 300LS</td>
<td>1.16&quot;</td>
<td>22 lbs</td>
</tr>
<tr>
<td>SPG 300HF</td>
<td>0.54&quot;</td>
<td>100 lbs</td>
</tr>
<tr>
<td>SPG 300LSHF</td>
<td>1.16&quot;</td>
<td>100 lbs</td>
</tr>
<tr>
<td>SPG 600</td>
<td>1.38&quot;</td>
<td>88 lbs</td>
</tr>
<tr>
<td>SPG 600LS</td>
<td>3.75&quot;</td>
<td>88 lbs</td>
</tr>
<tr>
<td>SPG 600HF</td>
<td>1.38&quot;</td>
<td>402 lbs</td>
</tr>
<tr>
<td>SPG 600LSHF</td>
<td>3.75&quot;</td>
<td>402 lbs</td>
</tr>
</tbody>
</table>

Long Stroke, High Force Models

- Incorporate both booster pistons and extended cylinder blocks

Electronic or Reed Switches, Front Face Mount

Electronic sensors or magnetic reed switches are mounted in a dovetail slotted extrusion on the gripper face and actuated by a magnet on one jaw. Cost effective and compact.

(Model SPG200 shown)

Spring Open Option “F” & Spring Close Option “G”

Can be used to maintain grip force with loss of air pressure (fail safe) or as single acting grippers (single supply line to port).

Interface Blocks – Option “H”

Blocks provide a convenient way to attach end tooling to J2 and J4 style jaws. (Application shown on page 4, Problem #3C.)

Ports Front & Rear – Option “B”

Note: End ports plugged Not available on SPG100 Models, SPG600 Models, or Long Stroke Models.

Strain Relief – Option “R”

Air tubing is held by slotted clamps attached to the gripper face. Not available on High Force Models or SPG600 Models.

Center Locating Dowel Pin – Option “A”

Dowel pin option establishes gripper centerline and includes an outboard dowel slot for precise alignment.

(Model SPG300HF shown)

Bumper Options "C", "D" & "E"

The SPG is the only gripper in its class to offer urethane bumper pads for quiet, high-speed cycling. Available on SPG200 and larger models for “open”, “closed” or both positions. Can be “stacked” to limit stroke.

Non-Synchronous Fixed Reference Type – Option “P”

(J2 & J4 Jaw Styles Only)

Jaws operate completely independently thru 2 sets of ports (2 air valves required). One jaw is fitted with an adjustable stop for fixed reference point, and operates at 50% more psi.

SPG 600HF

Jaw closing force is increased by integral booster pistons.

Note:

Jaw opening force is not increased.

SPG 300HF

Jaw opening is increased with greater guide shaft travel through longer cylinder blocks

Long Stroke Models

Long Stroke, High Force Models

- Incorporate both booster pistons and extended cylinder blocks

SPG 300LSHF

SPG 600LSHF

Proximity Switches, Front Face Mount

Uses rectangular body proximity switches mounted in a T-slot bracket on the gripper face. Switches are actuated by a pin on one jaw. Very precise sensing.

(Model SPG300LS shown)

SPG 100 SPG 200 SPG 300 SPG 600

Standard Stroke Models

High Force Models

Jaw closing force is increased by integral booster pistons.

Note:

Jaw opening force is not increased.
**How to Order**

### Gripper Sizing Guide
Select a model based on stroke & grip force

<table>
<thead>
<tr>
<th>Model</th>
<th>Stroke (Open)</th>
<th>Grip Force Per Jaw at 100 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPG 100</td>
<td>0.25&quot;</td>
<td>5.5 lbs Closing, 5.5 lbs Opening</td>
</tr>
<tr>
<td>SPG 200</td>
<td>0.40&quot;</td>
<td>9.8 lbs Closing, 9.8 lbs Opening</td>
</tr>
<tr>
<td>SPG 300</td>
<td>0.54&quot;</td>
<td>22 lbs Closing, 22 lbs Opening</td>
</tr>
<tr>
<td>SPG 300LS</td>
<td>1.16&quot;</td>
<td>100 lbs Closing, 100 lbs Opening</td>
</tr>
<tr>
<td>SPG 300HF</td>
<td>0.54&quot;</td>
<td>22 lbs Closing, 22 lbs Opening</td>
</tr>
<tr>
<td>SPG 300LSHF</td>
<td>1.16&quot;</td>
<td>100 lbs Closing, 100 lbs Opening</td>
</tr>
<tr>
<td>SPG 600</td>
<td>1.38&quot;</td>
<td>88 lbs Closing, 88 lbs Opening</td>
</tr>
<tr>
<td>SPG 600LS</td>
<td>3.75&quot;</td>
<td>88 lbs Closing, 88 lbs Opening</td>
</tr>
<tr>
<td>SPG 600HF</td>
<td>1.38&quot;</td>
<td>402 lbs Closing, 402 lbs Opening</td>
</tr>
<tr>
<td>SPG 600LSHF</td>
<td>3.75&quot;</td>
<td>402 lbs Closing, 402 lbs Opening</td>
</tr>
</tbody>
</table>

### Jaw Styles

- **J1** ...... Straight jaw – aluminum
- **J2** ...... Angle jaw – aluminum
- **J3** ...... Straight jaw – steel
- **J4** ...... Angle jaw – steel
- **J1/J2** ...... Combination jaws – aluminum
- **J2/J1** ...... Combination jaws – aluminum
- **J3/J4** ...... Combination jaws – steel
- **J4/J3** ...... Combination jaws – steel

*Note: J1 and J2 not available with high force models.

*Note: First jaw listed is closest to end ports

### Sensing Option Packages (Pages 12 & 13)
Use “SOO” if NO Sensors desired

#### Proximity Switch Mounted On Front Face Of Gripper
- **S01** Single switch (PNP) sourcing
- **S02** Single switch (NPN) sinking
- **S03** Dual switch (PNP) sourcing
- **S04** Dual switch (NPN) sinking
- **S05** Switch package without switches

#### 5mm Threaded Prox Switch Mounted On End Opposite Ports
- **S11** Switch package without switches
- **S12** Single switch (PNP) sourcing
- **S13** Single switch (NPN) sinking
- **S14** Dual switch (PNP) sourcing
- **S15** Dual switch (NPN) sinking

#### 5mm Threaded Prox Switch Mounted On Same End As Ports
- **S16** Switch package without switches
- **S17** Single switch (PNP) sourcing
- **S18** Single switch (NPN) sinking
- **S19** Dual switch (PNP) sourcing
- **S20** Dual switch (NPN) sinking

#### Electronic Sensor Mounted On Front Face
- **E20** – E21 Available on all models with J1 – J4 style jaws.
- **E21** Single sensor (PNP) sourcing
- **E22** Single sensor (NPN) sinking
- **E23** Dual sensor (PNP) sourcing
- **E24** Dual sensor (NPN) sinking

#### Magnetic Reed Switch Mounted On Front Face
- **E20** Switch package without switches
- **E25** Single switch, No LED, 0-120 VDC/VAC
- **E27** Single switch, LED, 0-120 VDC/VAC, 0.03 Amp Max, 4 Watt Max, 2.0 Voltage Drop
- **E28** Dual switch, No LED, 0-120 VDC/VAC, 0.5 Amp Max, 5 Watt Max, 0 Voltage Drop
- **E30** Dual switch, LED, 5-120 VDC/VAC, 0.03 Amp Max, 4 Watt Max, 2.0 Voltage Drop

When using “S” suffix:

- Use Suffix ‘C’ for Quick Disconnect
- Available on all models with J1 – J4 style jaws.
- E20, E25 – E30

### Adjustable Stops Using Bumper Pads

| Example C3 | Quantity (3) Bumpers in each open position reduce open motion by 3 times bumper thickness |

### Quick Disconnect Cordsets for Electronic Sensors and Reed Switches

**Codes E21C - E30C**
Quick disconnect style switches are supplied with 6 inch pigtail with male connector. Order female connector cordsets separately as follows:
- **CFC-1M**......1 meter
- **CFC-2M**......2 meters
- **CFC-5M**......5 meters

*Note: Prewired styles are supplied with nine foot leadwire.

### Ordering Example

**SPG300LS - J1 - S04 - S02 - NV**
Specifies a non-synchronous, compliant type, long stroke gripper with straight aluminum jaws, three face-mounted sinking proximity sensors (2 front/1 back), and Viton seals.

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**Fabco-Air welcomes your "specials!"**
See special example numbers 1 – 3 on page 5.

**How to Order**

The extremely tough grippers that never need adjusting!

---

**Electrical characteristics – LED, 6-24 VDC, 0.20 Amp Max, 0.5 Volt Drop**

**E20 – E24 Available on all models with J1 – J4 style jaws. Use Suffix ‘C’ for Quick Disconnect**

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8/2/99A Specifications subject to change without notice or incurring obligations.
# “SPG” Series Parallel Grippers

## SPG 100, SPG 200 & SPG 300

### Gripper Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>Stroke</th>
<th>A</th>
<th>AA</th>
<th>B</th>
<th>BB</th>
<th>C</th>
<th>CC</th>
<th>D</th>
<th>DD</th>
<th>E</th>
<th>EE</th>
<th>F</th>
<th>FF</th>
<th>G</th>
<th>GG</th>
<th>H</th>
<th>HH</th>
<th>J</th>
<th>JJ</th>
<th>K</th>
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</thead>
<tbody>
<tr>
<td>SPG 100</td>
<td>0.25</td>
<td>1.75</td>
<td>3.75</td>
<td>0.75</td>
<td>0.81</td>
<td>1.87</td>
<td>5.94</td>
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<td>2.25</td>
<td>0.72</td>
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<td>1.15</td>
<td>1.56</td>
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<td>1.05</td>
<td>1.05</td>
<td>2.62</td>
<td>8.75</td>
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<td>3.75</td>
<td>1.46</td>
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<td>1.25</td>
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</tr>
<tr>
<td>SPG 300</td>
<td>0.54</td>
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<td>1.12</td>
<td>3.62</td>
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<td>SPG 300LS</td>
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<td>SPG 300HF</td>
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<td>5.31</td>
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<tr>
<td>SPG 300LSHF</td>
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<td>6.00</td>
<td>12.00</td>
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<td>2.50</td>
<td>6.00</td>
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<td>2.50</td>
<td>6.00</td>
<td>12.00</td>
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</tr>
</tbody>
</table>

### Option "H" Interface Blocks – Dimensions

- *W* tappd x *X* Deep (Mounting Hole – 2)
- *L* Tapped x "M" Deep (1) per Jaw
- Slip Fit Slot for "T" Dowel x "V" Deep
- Slip Fit Dowel Slot for "R" Dowel x "S" Deep (1) per Jaw
- Slip Fit Slot for "T" Dowel x "U" Deep
- Slip Fit Thru Hole for "R" Dowel (3) per Jaw
- 10-32 Port (2)
- Slip Fit Slot for "T" Dowel x "V" Deep

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*Note: Jaws close fully on gripper centerline as shown in this bottom view.*

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Specifications subject to change without notice or incurring obligations.
**SPG 300HF** High Force Models

Note: Jaw detail dimensions on this page are identical to SPG300 dimensions shown on page 8.

**SPG 300LS** Long Stroke Models

**SPG 300LSHF** Long Stroke, High Force Models

<table>
<thead>
<tr>
<th>Models SPG 100, SPG 200, SPG 300, SPG 300LS, SPG 300HF, SPG 300LSHF</th>
<th>Weight with Aluminum Jaws</th>
<th>for Steel Jaws add</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPG 100</td>
<td>0.2 lbs</td>
<td>.08 lbs</td>
<td>SPG 100</td>
</tr>
<tr>
<td>SPG 200</td>
<td>0.5 lbs</td>
<td>.18 lbs</td>
<td>SPG 200</td>
</tr>
<tr>
<td>SPG 300</td>
<td>1.2 lbs</td>
<td>.40 lbs</td>
<td>SPG 300</td>
</tr>
<tr>
<td>SPG 300LS</td>
<td>1.4 lbs</td>
<td>&quot;</td>
<td>SPG 300LS</td>
</tr>
<tr>
<td>SPG 300HF</td>
<td>1.6 lbs</td>
<td>&quot;</td>
<td>SPG 300HF</td>
</tr>
<tr>
<td>SPG 300LSHF</td>
<td>1.9 lbs</td>
<td>&quot;</td>
<td>SPG 300LSHF</td>
</tr>
</tbody>
</table>
Large Size Models

SPG 600HF High Force Models

Note: Jaw detail dimensions on this page are identical to jaw dimensions shown on page 10.

SPG 600LS Long Stroke Models

Use J3 or J4 steel jaws only.

J3 Jaw Style Shown Dotted.

SPG 600LSHF Long Stroke, High Force Models

Use J3 or J4 steel jaws only.

J3 Jaw Style Shown Dotted.

Gripper Weights

<table>
<thead>
<tr>
<th>Model</th>
<th>Weight with Aluminum Jaws</th>
<th>for Steel Jaws add</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPG600</td>
<td>10.5 lbs</td>
<td>5.1 lbs</td>
</tr>
<tr>
<td>SPG600LS</td>
<td>13.7 lbs</td>
<td>5.1 lbs</td>
</tr>
<tr>
<td>SPG600HF</td>
<td>13.3 lbs</td>
<td>5.1 lbs</td>
</tr>
<tr>
<td>SPG600LSHF</td>
<td>20.3 lbs</td>
<td>5.1 lbs</td>
</tr>
</tbody>
</table>
“SPG” Series Parallel Grippers

Long Stroke Model SPG300LS shown with face mounted proximity switches. Mounting bracket has convenient slot to channel wiring to the side of gripper.

Proximity Switches – Option Codes S01 - S04
All SPG Gripper models are available with rectangular body proximity sensors attached to the face of the gripper by a tee slot bracket. Switches are actuated by sensing a pin on one jaw. Single and dual position sensors are available for verifying open/close/both jaw positions.

Specials – Because SPG Grippers are symmetrical, a third switch can be added on the opposite side to detect parts presence. If jaws “overtavel” the grip point, the third switch is actuated signaling that no part was present to “stop” the jaw travel. (Call our applications department for details.)

Note: These sensors are extremely sensitive and can make and break dual switches with as little as .025” jaw travel!

Sensors can be mounted with the leadwires adjacent to the port, allowing the air supply tubing and sensor wires to be neatly bundled together. Or, the wires can be routed to exit on the side opposite the ports.

Proximity Switches – Option Codes S11 - S20
SPG 200 and 300 models (except High Force) with “J2” or “J4” jaw styles can be ordered with an alternate prox switch option utilizing a 5mm threaded body. Switches are mounted on either end of the gripper and are actuated by sensing the head of cap screws attached to the jaw end(s).

Code S19 or S20 – Dual 5mm threaded body prox switches shown on Model SPG200

<table>
<thead>
<tr>
<th>Sensing Options</th>
<th>S01 – S05</th>
</tr>
</thead>
<tbody>
<tr>
<td>5mm Proximity switches are not available on the Model SPG 100</td>
<td></td>
</tr>
<tr>
<td>5mm Proximity switches are not available on the Model SPG 600</td>
<td></td>
</tr>
<tr>
<td>5mm Proximity switches are not available on Model SPG 600LS</td>
<td></td>
</tr>
</tbody>
</table>
The unique grippers offering an extensive choice of sensors!

<table>
<thead>
<tr>
<th>S11 – S20</th>
<th>Sensing Options</th>
<th>E20– E30</th>
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<tbody>
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<tr>
<td>300LS</td>
<td>SPG300LS &amp;</td>
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<tr>
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<td>SPG300LSHF</td>
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<td></td>
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<tr>
<td></td>
<td>SPG300LSHF</td>
<td></td>
</tr>
</tbody>
</table>

Model SPG300 shown with Code E23C or E24C face mounted, quick-disconnect, electronic sensors.

**Electronic Sensors – Option Codes E20–E24**

**Magnetic Reed Switches – Option Codes E25–E30**

All SPG Grippers are available with electronic sensors or reed switches that are clamped on a bracket mounted on either face of the gripper. These are actuated by a magnet attached to one jaw. Single and dual position sensors are available for verifying open/close/both jaw positions.

Specials – Brackets can be mounted on both faces to accommodate three or four sensors or switches. See “Special Examples 1 & 3” on page 5.

**Prewired Style Switches: Codes E21 - E30**

Prewired styles are supplied with 9 foot leadwire.

**Quick Disconnect Style Switches: Codes E21C - E30C**

Quick disconnect style switches are supplied with 6" pigtail with male connector. Order female connector cordsets separately as follows:

- CFC-1M .......... 1 meter
- CFC-2M .......... 2 meters
- CFC-5M .......... 5 meters

See “How to Order” guide on page 7.
**Center Locating Dowel Pin – Option "A"**

Dowel pin facilitates precision mounting.

*Mounting method (1)*

Machine a slip fit channel .030" deep into customer’s tooling to accept Gripper dimension “B”. Mounting the gripper is accomplished by “slipping” the gripper’s dowel into a slip fit dowel hole and pushing the gripper into the machined channel. Removal is easy and does not require “prying” the gripper off two “stuck dowel holes. (See dimensions pages 8-11)

*Mounting Method (2)* Utilizes the slip fit dowel slot that is included with the center locating dowel pin. The center dowel pin establishes gripper centerline on an X–Y plane. The end dowel locates the X Axis preventing rotation. The ‘Q’ dimension is not critical. It can be held to ±.005 and still provide precision engagement in the gripper dowel slot.

**Ports Front & Rear – Option "B"**

End ports are plugged. Not available on SPG100, SPG600, or Long Stroke Models.

**Bumper Options "C", "D" & "E" (Not available on SPG100 Models)**

*For quiet, high speed cycling – or for Adjustable Stops*

Quiet, high speed cycling – The SPG is the only gripper in its class to offer bumpers (both extend and retract) for quiet, high-speed cycling. Urethane pads (1/32" thick, except SPG600 1/16" thick) can be installed against the outside of the jaws for cushioning at the “open” position – or one pad in the center can be used to cushion the “closed” position. Available on SPG200 and larger models for “open”, "closed" or "both" positions.

Adjustable Stops – By simply “stacking” the bumper pads, custom strokes can be achieved in 1/32” increments (1/16" on SPG600). This is an ideal way of limiting stroke length when high speed cycling is desired with the minimum amount of time consuming stroke.

To order, specify the number of pads to be "stacked" at the open and/or closed position as follows:

- **C3** = three pads on each side for open
- **D2** = two pads in between jaws for close.

**Non-Synchronous Grippers Compliant Type – Option "N"**

This configuration is provided by simply removing the rocker arm that normally provides synchronization. Jaws will comply to the centerline established by the part to be gripped. The combination of equal piston forces and internal friction prevents jaw drift.

Not available on SPG100 or High Force models.
Spring Options – "F" & "G" (Not available on SPG100, Long Stroke, or High Force Models)  
For "Failsafe" or "Single Acting" Operation

Spring options can be used to maintain grip force with loss of air pressure (fail safe) or as single acting grippers (single air supply line to port).

Also, springs can be used to "assist" gripping force.

Example: SPG 300 with "G" option would have a standard closing grip force of 22 pounds per jaw (at 100 psi as shown in the Gripper Selection Guide, page 6), plus a spring assist of 12 pounds per jaw at full open (reference the chart below), for a total of approximately 34 pounds per jaw gripping force.

<table>
<thead>
<tr>
<th>Model</th>
<th>Spring Force @ Full Open</th>
<th>Spring Force @ Full Close</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPG200</td>
<td>3.8 lbs</td>
<td>4.9 lbs</td>
</tr>
<tr>
<td>SPG300</td>
<td>7.4 lbs</td>
<td>12.0 lbs</td>
</tr>
<tr>
<td>SPG600</td>
<td>35.0 lbs</td>
<td>70.0 lbs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Spring Force @ Full Close</th>
<th>Spring Force @ Full Open</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPG200</td>
<td>3.5 lbs</td>
<td>5.3 lbs</td>
</tr>
<tr>
<td>SPG300</td>
<td>7.1 lbs</td>
<td>12.0 lbs</td>
</tr>
<tr>
<td>SPG600</td>
<td>33.0 lbs</td>
<td>63.0 lbs</td>
</tr>
</tbody>
</table>

Non-Synchronous Grippers

Fixed Reference Type – Option "P" (J2 & J4 Jaw Styles Only)

Jaws operate completely independently thru 2 sets of ports (2 air valves required). One jaw is fitted with an adjustable stop for fixed reference point. Fixed reference jaw requires 50% more pressure than its mating jaw.  
Not available on SPG100 or High Force models.

Interface Blocks
– Option "H"

Interface blocks can be attached to J2/J4 jaws allowing tooling to be mounted on any side of the block. See "problem #2, solution C" on page 4. Dimensions are on pages 8 & 10.

Strain Relief – Option "R"

Air tubing is held by slotted clamps attached to the face of the gripper. Not available on SPG600 or High Force models.

Viton Seals – Option "V"

High temperature seals

Escapement Device
– Option "Q"

(J2 & J4 Jaw Styles Only)

Same as Option "P" except that both jaws have adjustable stops and operate on equal pressure. See "Special Example #3 on page 5 for details. Not available on SPG100 or High Force models.
**Operational Features**

- Grip force easily adjusted by varying input pressure.
- External adjustment of final "Jaw Open" and "Jaw Close" positions can be made while the gripper is mounted, pressurized and operational. Disassembly is not required.
- Gripper body is marked "0" at open adjustment screw and marked "1" at close adjustment screw.
- Hardened parts and locking threads provide "stay put" adjustment.
- Operating pressure 15 to 150 psi
- Air or hydraulic service

**Selection Guide**

**GS Series – Miniature Style**

- GS21: 2-Jaw Angular Gripper
- Blank Rectangular Jaws 1", 1 1/2" and 2" long
- Mounting Hole Jaws
- Side mount (2 surfaces)
- Options: Viton Seals

**GR Series – Round Body Style**

- GR21: 2-Jaw Angular Gripper
- GR22: 2-Jaw Angular Gripper with Indicator Rod
- Blank Rectangular Jaws 1" to 5" long
- Mounting Hole Jaws
- Make your own, or
- Custom Jaws from Fabco-Air to your specs.
- Mounting: Face Mount (Only)
- Options: Sensors • Viton Seals • PTFE Seals

**GS Series – Square Body Style**

- GS21: 2-Jaw Angular Gripper
- GS22: 2-Jaw Angular Gripper w/Indicator Rod
- Blank Rectangular Jaws
- Mounting Hole Jaws
- Make your own, or
- Custom Jaws from Fabco-Air to your specs.
- Mounting: Face & Side Mount (Both Included Standard)
- Options: Sensors • Viton Seals • Flange Mount

---

**To Determine Grip Force**

Use the formula and chart data shown below

\[
\text{Grip Length (Inches –Grip Point to Jaw Pivot)} \times \text{ (Power Factor from Chart)} = \text{Force (Pounds)}
\]

Chart shows power factors for gripping the part from its outside – and from its inside. The result is theoretical static grip force.

---

**Gripper Power Factors**

<table>
<thead>
<tr>
<th>Gripper Model</th>
<th>Grip Force On Part</th>
<th>Mini-Style -01 (3/8&quot;)</th>
<th>-02 (1/2&quot;)</th>
<th>-04 (3/4&quot;)</th>
<th>-06 (7/8&quot;)</th>
<th>Standard Round Body &amp; Square Body Styles -10 (1 1/8&quot;)</th>
<th>-20 (1 5/8&quot;)</th>
<th>-30 (2&quot;)</th>
<th>-50 (2 1/2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GR21 Outside</td>
<td>—</td>
<td>.045</td>
<td>.144</td>
<td>—</td>
<td>.396</td>
<td>1.386</td>
<td>2.727</td>
<td>5.022</td>
<td></td>
</tr>
<tr>
<td>GR21 Inside</td>
<td>—</td>
<td>.063</td>
<td>.171</td>
<td>—</td>
<td>.504</td>
<td>1.629</td>
<td>3.177</td>
<td>5.517</td>
<td></td>
</tr>
<tr>
<td>GR22 Outside or Inside</td>
<td>—</td>
<td>.045</td>
<td>.144</td>
<td>—</td>
<td>.396</td>
<td>1.386</td>
<td>2.727</td>
<td>5.022</td>
<td></td>
</tr>
<tr>
<td>GS21 Outside</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.207</td>
<td>.396</td>
<td>1.188</td>
<td>2.430</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>GS21 Inside</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.243</td>
<td>.504</td>
<td>1.395</td>
<td>2.790</td>
<td>—</td>
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<tr>
<td>GS22 Outside or Inside</td>
<td>Not Available</td>
<td>—</td>
<td>—</td>
<td>.207</td>
<td>.396</td>
<td>1.188</td>
<td>2.430</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

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### Specifications subject to change without notice or incurring obligations.

#### How to Order

<table>
<thead>
<tr>
<th>Series</th>
<th>Model</th>
<th>Jaw style</th>
<th>Sensor options</th>
<th>Other options</th>
</tr>
</thead>
<tbody>
<tr>
<td>GR</td>
<td>21 – Air Open; Air Close</td>
<td>– 000 None - Customer to furnish Jaws.</td>
<td>– E21</td>
<td>– V Flange Kit (GS Series only)</td>
</tr>
<tr>
<td></td>
<td>22 – Air Open; Air Close w/Indicator Rod</td>
<td>– 110 Blank Rectangular Jaws</td>
<td>– 130</td>
<td>– E21C Two flange styles for size –30 GS grippers.</td>
</tr>
<tr>
<td></td>
<td>23 – Spring Open; Air Close (Requires additional body length. Please consult factory for details.)</td>
<td>– 110 Blank Rectangular Jaws</td>
<td>– E22</td>
<td>– E22C Consult table on page 19 for dimensions and specify either F8 or F9.</td>
</tr>
<tr>
<td></td>
<td>24 – Spring Open; Air Close w/Indicator rod</td>
<td>– 120 Blank Rectangular Jaws</td>
<td>– E23</td>
<td>– E23C To order flange kits separately, see kit numbers in the same table.</td>
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<tr>
<td></td>
<td>25 – Air Open; Spring Close</td>
<td>– 130 Blank Rectangular Jaws</td>
<td>– E24</td>
<td>– E24C T – PTFE Seals (GR Series only)</td>
</tr>
<tr>
<td></td>
<td>26 – Air Open; Spring Close w/Indicator rod</td>
<td>– 150 Blank Rectangular Jaws</td>
<td>– V</td>
<td>– V9 Viton Seals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Series</th>
<th>Model</th>
<th>Jaw style</th>
<th>Sensor options</th>
<th>Other options</th>
</tr>
</thead>
<tbody>
<tr>
<td>GS</td>
<td>21 – Air Open; Air Close</td>
<td>– 000 None - Customer to furnish Jaws.</td>
<td>– E21</td>
<td>– V Flange Kit (GS Series only)</td>
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<tr>
<td></td>
<td>22 – Air Open; Air Close w/Indicator Rod</td>
<td>– 110 Blank Rectangular Jaws</td>
<td>– 130</td>
<td>– E21C Two flange styles for size –30 GS grippers.</td>
</tr>
</tbody>
</table>

#### Jaw Styles

- **000** None - Customer to furnish Jaws. Pivot details shown on next page.
- **110** Blank Rectangular Jaws
  - Length: 1”
- **115** Blank Rectangular Jaws
  - Length: 1 1/2”
- **120** Blank Rectangular Jaws
  - Length: 2”
- **130** Blank Rectangular Jaws
  - Length: 3”
- **140** Blank Rectangular Jaws
  - Length: 4”
- **150** Blank Rectangular Jaws
  - Length: 5”
- **200** Jaws with Mounting Holes
- **xxx** Custom Jaws - Fabco-Air will build to your specs – or design and build to your requirements

#### Sensing Options

**Electronic Sensor Package**

- **LED, 6-24 VDC, 0.20 Amp Max, 0.5 Voltage Drop**
- **E20 Sensor Package without sensors**
- **E21, E21C - Single sensor (PNP) sourcing**
- **E22, E22C - Single sensor (NPN) sinking**
- **E23, E23C - Dual sensor (PNP) sourcing**
- **E24, E24C - Dual sensor (NPN) sinking**

**Gripper sizes GR-04, GS-06 and larger are available with electronic sensors actuated by a magnet on the cylinder piston. Requires additional body length. Please consult factory for details.**

**Codes E21 - E24** prewired styles are supplied with nine foot leadwire.

**Codes E21C - E24C** quick disconnect styles are supplied with 6 inch pigtail with male connector. **Order female connector cordsets separately as follows:**

- CFC-1M ......................... 1 meter
- CFC-2M ......................... 2 meters
- CFC-5M ......................... 5 meters

#### Ordering Examples

**Example 1:**

- **GR21 – 04 – 130**
  - (Code – 04) Cylinder Bore 3/4”
  - (Code – 130) Blank Rectangular 3” Jaws
  - (GR21) Round Body 2 Jaws Angular

**Example 2:**

- **GS22 – 06 – 110 – V**
  - (GS22) Square Body 2 Jaws Angular with Indicator Rod
  - (Code – 06) Cylinder Bore 7/8”
  - (Code – 110) Blank Rectangular 1” Jaws
  - (Code – V) Viton Seals

---

**Series**

**GR**
- Round Body
  - 21 – Air Open; Air Close
  - 22 – Air Open; Air Close w/Indicator Rod
  - 23 – Spring Open; Air Close
  - 24 – Spring Open; Air Close w/Indicator rod
  - 25 – Air Open; Spring Close
  - 26 – Air Open; Spring Close w/Indicator rod

**GS**
- Square Body
  - 21 – Air Open; Air Close
  - 22 – Air Open; Air Close w/Indicator Rod

---

**Gripper Size Code**

<table>
<thead>
<tr>
<th>Round Body Code Bore</th>
<th>Square Body Code Bore</th>
</tr>
</thead>
<tbody>
<tr>
<td>– 02 1/2”</td>
<td>– 01 3/8”</td>
</tr>
<tr>
<td>– 04 3/4”</td>
<td>– 06 7/8”</td>
</tr>
<tr>
<td>– 10 1 1/8”</td>
<td>– 10 1 1/8”</td>
</tr>
<tr>
<td>– 20 1 5/8”</td>
<td>– 20 1 5/8”</td>
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<tr>
<td>– 30 2”</td>
<td>– 30 2”</td>
</tr>
<tr>
<td>– 50 2 1/2”</td>
<td>– 50 2 1/2”</td>
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</tbody>
</table>
"GR" & "GS" Series Angular Grippers

"GR" Round Body Series

Note: Model GR23 requires additional body length. Please consult factory for details.

Gripper Jaws – Round Body dimensions charted below; Square Body Dimensions charted below opposite page

"GR" Series Dimensions

<table>
<thead>
<tr>
<th>Size</th>
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<th>EE</th>
<th>II</th>
<th>JJ</th>
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<tr>
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"GR" Round Body Gripper Dimensions

<table>
<thead>
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<th>Size</th>
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"GR & GS" Rectangular Jaw & Pivot Details

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<th>CC</th>
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<th>FF</th>
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GR Mounting Hole Details

Mounting Holes on 'O' B.C. 4 Places

Mounting Holes on 'O' B.C. 2 Places

Mounting Holes on 'O' B.C. 2 Places

Mounting Holes on 'O' B.C. 2 Places

Mounting Holes on 'O' B.C. 4 Places

Mounting Holes on 'O' B.C. 2 Places

Specifications subject to change without notice or incurring obligations.

5-2-02A
Air Operated Open & Close for External or Internal Gripping

"GS" Square Body Series

Custom Jaws –
Fabco-Air will build to your specs – or will design and build to your application requirements.

"GS" Series Dimensions

<table>
<thead>
<tr>
<th>GS Series – Miniature Style</th>
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<tr>
<td>Part No: BRK-201</td>
</tr>
<tr>
<td>Part No: BRK-202</td>
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</table>

- Weight = 2.3 ounces without jaws

- **Note:** 4 Mounting Holes on side surfaces are 6-32 x .16 deep

- **Part No:** BRK-202
- **Part No:** BRK-201

- 4/16/02A

“GS” Series Dimensions

<table>
<thead>
<tr>
<th>GS – Square Body Mounting Hole Jaw Dimensions</th>
<th>GS – Square Body Rectangular Jaw and Pivot Details</th>
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</tr>
<tr>
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<td>---------</td>
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<tr>
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<td><strong>3/8</strong></td>
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<th><strong>Weight per pair</strong></th>
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GS – Square Body Gripper Flange Kits

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<th><strong>FB</strong></th>
<th><strong>FB2</strong></th>
<th><strong>H</strong></th>
<th><strong>R</strong></th>
<th><strong>TF</strong></th>
<th><strong>TF2</strong></th>
<th><strong>TF4</strong></th>
<th><strong>UF</strong></th>
<th><strong>X</strong></th>
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<td>1.50</td>
<td>NA</td>
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<td>1.50</td>
<td>NA</td>
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<td>NA</td>
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<td>1.43</td>
<td>2.50</td>
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<td>3.75</td>
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<td>G7-06</td>
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<td>G9-321</td>
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<td>2.50</td>
<td>3.75</td>
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Flange Kit Style 7

- **Flange Kit**
  - G7-06

Flange Kit Style 8 & 9

- **Flange Kit**
  - G8-321

GS – Square Body Gripper Flanges

- **Weight per pair**

- **Grip Flange Style 8 & 9**

- **Grip Flange Style 9**

- **Grip Flange Style 10**

Specifications subject to change without notice or incurring obligations.

Page 19
“LPG” Series Parallel Grippers

Operational Features

Toolbars extend toward and retract away from each other while maintaining absolute parallelism.

Cross Tapped Holes on each toolbar allows tooling mounting on any surface of the toolbars.

How it works
The LPG Gripper shown above is an adaptation of Fabco-Air’s EZ Series linear slides. Its jaws are a pair of toolbars which extend to the front away from the gripper mechanism (TBF tooling style). An integral, double acting air cylinder drives the shorter toolbar and inboard pair of guide shafts. A double rack and pinion arrangement transfers force to the outboard guide shafts holding the wider toolbar. The toolbars (jaws) extend toward and retract away from each other with absolute parallelism and precise synchronous motion.

High Load Carrying Capacity
Bearings in the LPG Gripper have a very high load carrying capacity so that load is only limited by the strength of the guide shafts to resist deflection. Centering is accurate to within .002" repeatability, providing virtually “play free” gripping. Side-to-side play is less than .002".

Choice of Mounting Styles
The LPG Gripper can be mounted with the port side up or down because the end caps are machined on both the top and bottom surfaces. The end caps are available with through holes (Code MH1) or tapped mounting holes (Code MH2).

Mounting Note:
The LPG Gripper should be mounted to a flat plate at least as wide and as long as the gripper end caps. All four bolt holes must be used to secure the unit and maintain end cap alignment. Covers are mounted on the side opposite the mounting surface. Mounting surface shields the bottom side of the rack and pinion.

Sensors
The LPG Gripper is available with a magnetic band on the piston and several types of magnetically operated tie rod mounted sensors. Reed switches and electronic sensors are offered in pre-wired and quick disconnect styles.

Sensors

Optional Dowel Holes for End Cap and Toolbar Mounting Surfaces
Dowel hole & slot option provides convenient and precise mounting of LPG Gripper end caps as well as attachment of tooling to the toolbars.

Adjustable Stops
The stop (Figure 1) consists of a single threaded rod with flange and lock nuts at each end. When both toolbars are up front (TBF tooling style), a clamp bar is added to the inboard guide shafts at the rear to stop against the flange nuts.

When a toolbar is mounted at both ends (TFR tooling style), the threaded rod is placed through a clearance hole in the center of the rear toolbar.

Positioning toolbars front and rear allows large parts to be gripped and/or centered.

Bumpers
LPG Series Grippers are available with urethane bumpers for quieter operation. Bumpers must be used in conjunction with adjustable stops. A urethane washer is placed against each flange nut.
The exciting parallel gripper for large parts, long strokes

How to Order

<table>
<thead>
<tr>
<th>Model</th>
<th>Guide Shaft Diameter</th>
<th>Bore</th>
<th>Stroke (Min)</th>
<th>Standard Stroke Lengths</th>
<th>Grip Force Per Jaw at 100 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPG50</td>
<td>1/2&quot;</td>
<td>1-1/8&quot;</td>
<td>2&quot;</td>
<td>2&quot; to 12&quot; by 2&quot; increments</td>
<td>99 lbs, 310 lbs</td>
</tr>
<tr>
<td>LPG75</td>
<td>3/4&quot;</td>
<td>2&quot;</td>
<td>4&quot;</td>
<td>4&quot; to 12&quot; by 2&quot; increments</td>
<td>88 lbs, 280 lbs</td>
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</table>

Stop Options
- 00 – No stop options desired
- 01 – Threaded rod with extend & retract flange stop nuts
- U1 – Type 01 Stop Package with Urethane Bumpers

EXAMPLE

LPG50 – 8 – MH1 – V – J73B – TBF – B – 00

End Cap Mounting Style
- MH1 – Through Mounting Holes
- MH2 – Tapped Mounting Holes

Integral Options
- D – Dowel hole & slot in endcaps
- V – Viton seals

Sensor Codes
(Use “S000” if NO Sensors are desired)

Select a code for sensor type and indicate position in the box ( □ ).

Example: J73 B

Electronic sensors & magnetic reed switches are actuated by a magnetic band on the piston.

Magnetic Piston & Clamp-On Sensors (“J”)
Single sensor – 2" stroke minimum; Dual sensors – 4" stroke minimum.

Magnetic Piston & Dovetail Style Sensors (“E”)
For 2" Stroke & longer on all models

Magnetic Piston
- J800
- E800

Customer supplies the sensors and mounting clamps
Includes Dovetail Mounting Rail; customer supplies sensors

Electrical Characteristics
5-120 VDC/VAC, 0.03 Amp Max, 4 Watt Max, 2.0 Voltage Drop
Sourcing PNP 6-24 VDC, 0.20 Amp Max, 0.5 Voltage Drop

For 2" Stroke & longer on all models

Electrical Characteristics
5-120 VDC/VAC, 0.03 Amp Max, 4 Watt Max, 2.0 Voltage Drop
Sourcing PNP 6-24 VDC, 0.20 Amp Max, 0.5 Voltage Drop

Sinking NPN 6-24 VDC, 0.50 Amp Max, 1.0 Voltage Drop

Magnetic Piston
LPG’S Cantilevered Jaw Arrangement avoids interference

In this application an LPG Gripper is attached to a pick and place mechanism. "L shaped* fingers attached to the gripper jaws are positioned over a product conveyor in an automated shipping system. As each product passes under the gripper, the "L-shaped" fingers stop it. The fingers then grasp the product by clamping on its island area on top. Next the product is lifted, carried over to the carton positioned on the adjacent shipping conveyor, and placed inside.

Because the jaws must open perpendicular to the direction of conveyor travel, a conventional gripper (shown in blue) could not be used. It would interfere with the wall next to the carton conveyor. Only the LPG’S cantilevered design permits the gripper jaws to be positioned as required without interference.
"LPG" Series Parallel Grippers

TBF Configurations (Toolbars Both in Front)

The TBF Configuration places the toolbars (jaws) in a cantilevered, or overhung arrangement, allowing the gripper jaws to be placed over the part to be gripped, while the body of the gripper is positioned clear of the part and its travel path.

Drawings show the LPG in its shortest possible stroke. In both TBF & TFR configurations these grippers cannot be manufactured with less stroke than shown in the charts below.

Gripper Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>Stroke</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>DD</th>
<th>E</th>
<th>EE</th>
<th>F</th>
<th>FF</th>
<th>G</th>
<th>GG</th>
<th>H</th>
<th>HH</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
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<th>O</th>
<th>P</th>
<th>R</th>
<th>S</th>
<th>T</th>
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<td>50</td>
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<td>.50</td>
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<td>1/4</td>
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<td>2.750</td>
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<td>.44</td>
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<td>.406</td>
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</table>
Offering new levels of parts gripping versatility

**TFR Configurations** *(Toolbars at Front & Rear)*

The **TFR** Configuration places one toolbar (jaw) at the front and the other toolbar (jaw) at the rear, providing a “wide stance” jaw arrangement for gripping larger parts.

View C–C, Integral Option “D”

View A–A

**Toolbar Option D**

Pictured above is a special, dual-purpose LPG Gripper. The addition of a special rear toolbar provides “wide stance jaws (TFR)” for gripping the large carton shown. Standard “cantilevered jaws (TBF)” for smaller parts gripping can be seen beneath the carton to the left.

View D–D

**Toolbar Option D**

Model LPG 50 Standard Stroke Lengths

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Model LPG 75 Standard Stroke Lengths

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</table>
**Cylinders, Valves & Accessories**

Catalog CV9 details Pancake®, Square 1®, Multi-power®, Hi-Power™ and Longstroke™ air cylinder lines. Describes valves, air-over-oil tanks, boosters & accessories.

**Stainless Steel Body Air Cylinders**

Catalog SSB-03

Exact interchange in bores from 5/16” to 3”, strokes to 32”. Popular options includes magnetic piston, non-rotating, and position feedback.

**Pancake® II Cylinders**

Catalog Pan2-2

The direct industrial interchange. High strength composite cylinder barrel. 4 popular styles: Standard, Nonrotating, Multi-Power® and 3-position.

**Air Preparation - FRLs**

Catalog #FRL-06

Broad line with port sizes from 1/8 NPT to 1 NPT. Includes 3-way slide valves, modular assembly and 3-way lock out/tag out valves for safe equipment maintenance.

**Linear Slides**

Catalog # LS-03

Line includes 6 families of slides, pick & place units, and thin parts plachers. 5/16” to 4” bores. Guide shafts 1/4” to 1-1/2”.

**Global Series™ Air Cylinders**

Catalog # GC-15

Widest choice of models and options. Features non-lube service to 150 psi. Bores 12mm to 100mm. Strokes 5mm to 150mm. NPT or Metric ports.

**Multi-Power® Air Presses**

Catalog FP16

Details the powerful line of precision, force-multiplying air presses. Deliver forces to 11,000 pounds.

**New Linear Thrusters**

Bulletin GB-JA02

Features longer strokes to 10” – and 4mm round profile sensors with surge suppression and polarity protection.

**Dual Function Slides**

Bulletin EDF-10

Either of two slide styles (gantry or thruster) can be made from a single set of parts. Users can inventory less parts and assemble styles as needed.

**Stopper Cylinders**

Bulletin #ST-DIX04

Standard magnetic piston and a wide selection of styles. Roller direction is adjustable. Magnetic sensors can be mounted on body.

**Specialty Valves and Control Valves**

Bulletin #14CAN

Composite body solenoid valves in 2 or 3-way, N/O or N/C, and manifoldable configurations. Process Solenoid valves. 5 Ported, 3 position, 1/4 NPT 4-way air valves.

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