

190/191



MICRO PARALLEL PNEUMATIC GRIPPER

Major Benefits

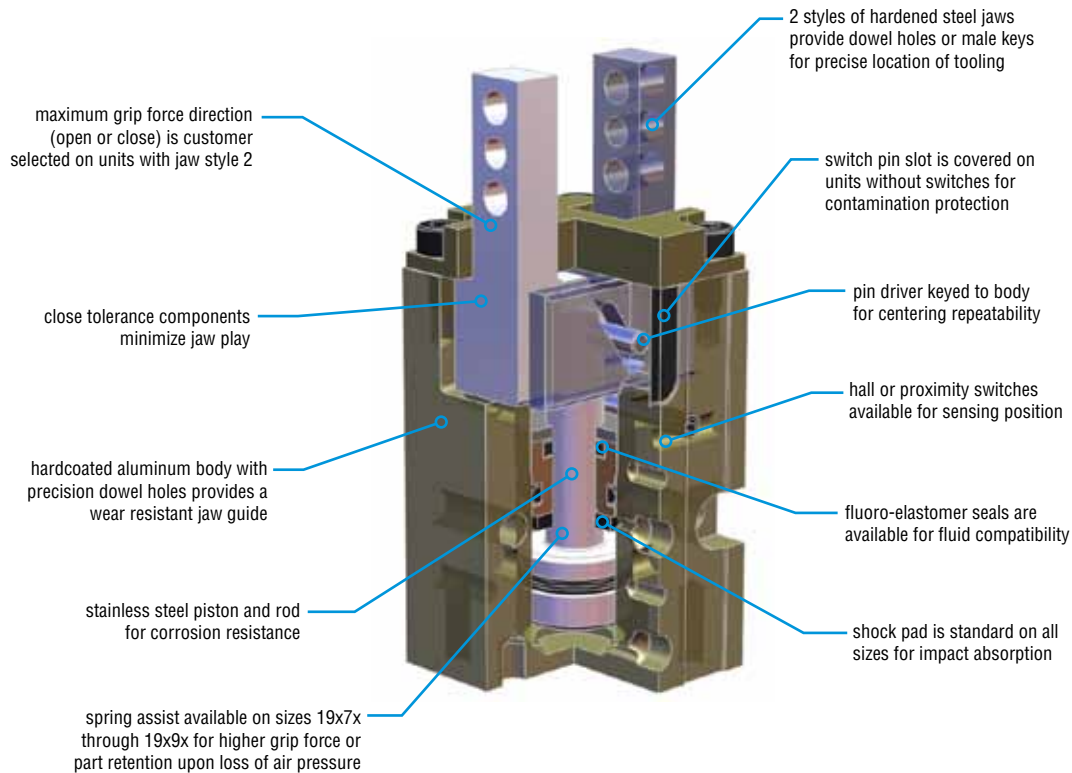
- Compact size
- Spring assist on open or close
Spring assist available on sizes 19x7x through 19x9x
Spring assist available in four sizes, two jaw styles, two jaw travels
- Mounting holes on one or three surfaces
- Jaw travel adjustment kits available
- 1 day shipping
- 10 million cycles minimum rated life with standard seals
(includes spring assist units)



JAW STYLE 1



JAW STYLE 2

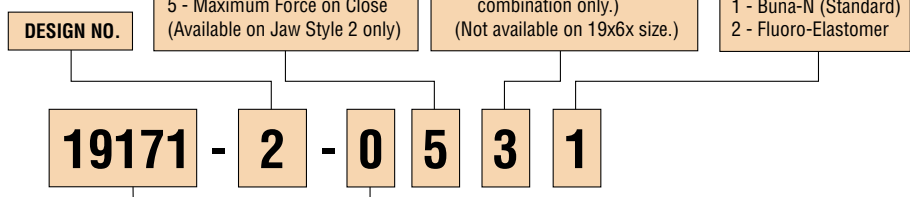
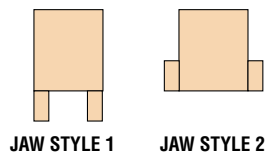


190, 191

ORDERING DATA: SERIES 190 & 191 PARALLEL GRIPPERS

TO ORDER SPECIFY:

Model, Design No., Sensor or Switch Ready Options, Maximum Force, Spring Options, and Seals.



SPRING OPTIONS
 0 - None
 3 - Spring Assist Close (Available with -x53x Option combination only)
 4 - Spring Assist Open (Available with -x04x Option combination only.) (Not available on 19x6x size.)

MAXIMUM FORCE REVERSED JAW MOVEMENT
 0 - Maximum Force on Open
 5 - Maximum Force on Close (Available on Jaw Style 2 only)

SEALS
 1 - Buna-N (Standard)
 2 - Fluoro-Elastomer

| MODEL | BORE SIZE | | 190 MODELS FULL MOUNTING | | 191 MODELS BOTTOM MOUNTING | |
|---------------------|-----------|------|--------------------------|---------------------|----------------------------|---------------------|
| | mm | in | IMPERIAL | METRIC | IMPERIAL | METRIC |
| JAW STYLE 1 | | | JAW STYLE 1 | JAW STYLE 1 | JAW STYLE 1 | JAW STYLE 1 |
| 19x6x | 8.7 | .343 | 19060 | 19065 | 19160 | 19165 |
| 19x7x | 12.7 | .500 | 19070 | 19075 | 19170 | 19175 |
| 19x8x | 19 | .750 | 19080 | 19085 | 19180 | 19185 |
| 19x9x | 25.4 | 1.00 | 19090 | 19095 | 19190 | 19195 |
| JAW STYLE 2 | | | JAW STYLE 2 | JAW STYLE 2 | JAW STYLE 2 | JAW STYLE 2 |
| SHORT TRAVEL | | | SHORT TRAVEL | SHORT TRAVEL | SHORT TRAVEL | SHORT TRAVEL |
| 19x6x | 8.7 | .343 | 19061 | 19066 | 19161 | 19166 |
| 19x7x | 12.7 | .500 | 19071 | 19076 | 19171 | 19176 |
| 19x8x | 19 | .750 | 19081 | 19086 | 19181 | 19186 |
| 19x9x | 25.4 | 1.00 | 19091 | 19096 | 19191 | 19196 |
| LONG TRAVEL | | | LONG TRAVEL | LONG TRAVEL | LONG TRAVEL | LONG TRAVEL |
| 19x6x | 8.7 | .343 | 19062 | 19067 | 19162 | 19167 |
| 19x7x | 12.7 | .500 | 19072 | 19077 | 19172 | 19177 |
| 19x8x | 19 | .750 | 19082 | 19087 | 19182 | 19187 |
| 19x9x | 25.4 | 1.00 | 19092 | 19097 | 19192 | 19197 |

SENSOR OR SWITCH OPTIONS
 0 - Plain
 4 - Hall Sensor Ready or JC1STP-x Switch Ready (See notes 1, 2 & 3.) (Not available with Spring Option)
 5 - Proximity Switch Ready (6 mm square or Hall Effect proximity switches. See notes 1 & 3.)

SWITCH BRACKETS & TARGETS FOR INDUCTIVE PROXIMITY SWITCHES

| GRIPPER MODEL | PART NUMBER | |
|---------------|-------------|--------|
| | IMPERIAL | METRIC |
| 19x6x | 59792-1 | 18432 |
| 19x7x | 59793-1 | 18437 |
| 19x8x | 18438 | 18438 |
| 19x9x | 18439 | 18439 |

Switches must be ordered separately. See Switches and Sensors section.

HALL SENSOR KITS

| GRIPPER MODEL | PART NUMBER | |
|---------------|-------------|----------|
| | IMPERIAL | METRIC |
| 19x6x | 18674-04 | 18057-04 |
| 19x7x | 18675-04 | 18058-04 |
| 19x8x | 18676-04 | 18059-04 |
| 19x9x | 18677-04 | 18060-04 |

Sensors must be ordered separately. See Switches and Sensors section.

SWITCH BRACKETS & TARGET KITS FOR USE WITH: PHD SERIES 5580 SWITCHES

| GRIPPER MODEL | PART NUMBER | |
|---------------|-------------|--------|
| | IMPERIAL | METRIC |
| 19x6x | 59794-1 | 55770 |
| 19x7x | 59795-1 | 55771 |
| 19x8x | 55772 | 55772 |
| 19x9x | 55773 | 55773 |

Switches must be ordered separately. See Switches and Sensors section.

NOTES:

- 1) Gripper with sensor option 4 or 5 is assembled with the internal components required to use the respective devices listed in each option. The sensor and any related devices and/or mounting kits must be ordered separately.
- 2) Hall Sensor must be used with a PHD Set Point Module which is ordered separately.
- 3) Switches and all kits must be ordered separately.

SERIES JC1ST TWO POSITION TEACHABLE MAGNETIC SWITCHES

| PART NO. | SWITCH DESCRIPTION |
|----------|---|
| JC1STP-2 | PNP (Source), Solid State, 12-30 VDC, 2 meter cable |
| JC1STP-K | PNP (Source), Solid State, 12-30 VDC, Quick Connect |

Includes one switch and installation directions

MATCHING CORDSET

| PART NO. | DESCRIPTION |
|-------------|---|
| 81284-1-001 | M8, 4 pin, Straight Female Connector, 5 meter cable |

SERIES JCSTP SENSOR MOUNTING KITS

| MODEL NO. | KIT PART NO. | |
|-----------|--------------|------------|
| | IMPERIAL | METRIC |
| 19x6x | 86944-05-1 | 86944-05-5 |
| 19x7x | 86944-06-1 | 86944-06-5 |
| 19x8x | 86944-07-1 | 86944-07-5 |
| 19x9x | 86944-08-1 | 86944-08-5 |

NOTE: See Switches and Sensors section for additional switch information and complete specification. Switches must be ordered separately.

Options may affect unit length. See dimensional pages and option information details.

Refer to this product's online catalog in the product section for complete information including related dimensions and additional specifications. See link at bottom of this page.



CAD & Sizing Assistance

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ENGINEERING DATA: SERIES 190 & 191 PARALLEL GRIPPERS

| SPECIFICATIONS | SERIES 190 & 191 |
|-----------------------|---|
| OPERATING PRESSURE | 30 psi min to 150 psi max [2 bar min to 10 bar max] air |
| OPERATING TEMPERATURE | -20° to +180°F [-28° to +82°C] |
| RATED LIFE | 10 million cycles minimum with standard seals (including spring assist units) |
| GRIP REPEATABILITY | Within ±0.002 in [±0.05 mm] of original centered position |
| LUBRICATION | Factory lubricated for rated life |
| MAINTENANCE | Field repairable |

| GRIPPER NO. | DISPLACEMENT | | GRIPPER WEIGHT | | | | GRIP FORCE FACTOR G_F | | | | SPRING ASSIST GRIP FORCE S_F | |
|---------------|--------------|-----|-----------------|-----------------|---------------|------|-------------------------|-------|----------------|---------|--------------------------------|--------|
| | | | STANDARD | | SPRING ASSIST | | MAX. DIRECTION | | MIN. DIRECTION | | Imperial | Metric |
| | | | in ³ | cm ³ | lb | kg | oz | g | Imperial* | Metric* | | |
| 19x60 & 19x65 | .012 | 0.2 | 0.11 | 0.05 | — | — | .061 | 3.93 | .049 | 3.16 | — | — |
| 19x61 & 19x66 | .012 | 0.2 | 0.11 | 0.05 | — | — | .061 | 3.93 | .049 | 3.16 | — | — |
| 19x62 & 19x67 | .012 | 0.2 | 0.13 | 0.06 | — | — | .037 | 2.39 | .029 | 1.87 | — | — |
| 19x70 & 19x75 | .036 | 0.6 | 0.24 | 0.11 | 0.26 | 0.12 | .122 | 7.87 | .092 | 5.93 | 2.230 | 9.99 |
| 19x71 & 19x76 | .036 | 0.6 | 0.25 | 0.11 | 0.26 | 0.12 | .122 | 7.87 | .092 | 5.93 | 2.230 | 9.99 |
| 19x72 & 19x77 | .036 | 0.6 | 0.27 | 0.12 | 0.28 | 0.12 | .093 | 6.00 | .069 | 4.45 | 1.690 | 7.57 |
| 19x80 & 19x85 | .110 | 1.8 | 0.64 | 0.29 | 0.65 | 0.29 | .250 | 16.13 | .210 | 13.55 | 4.280 | 19.17 |
| 19x81 & 19x86 | .110 | 1.8 | 0.67 | 0.30 | 0.68 | 0.31 | .250 | 16.13 | .210 | 13.55 | 4.280 | 19.17 |
| 19x82 & 19x87 | .110 | 1.8 | 0.71 | 0.32 | 0.73 | 0.33 | .150 | 9.68 | .130 | 8.39 | 2.630 | 11.78 |
| 19x90 & 19x95 | .250 | 4.1 | 1.44 | 0.65 | 1.47 | 0.67 | .490 | 31.61 | .370 | 23.87 | 8.700 | 38.98 |
| 19x91 & 19x96 | .250 | 4.1 | 1.46 | 0.66 | 1.48 | 0.67 | .490 | 31.61 | .370 | 23.87 | 8.700 | 38.98 |
| 19x92 & 19x97 | .250 | 4.1 | 1.62 | 0.73 | 1.64 | 0.74 | .270 | 17.42 | .200 | 12.90 | 4.760 | 21.32 |

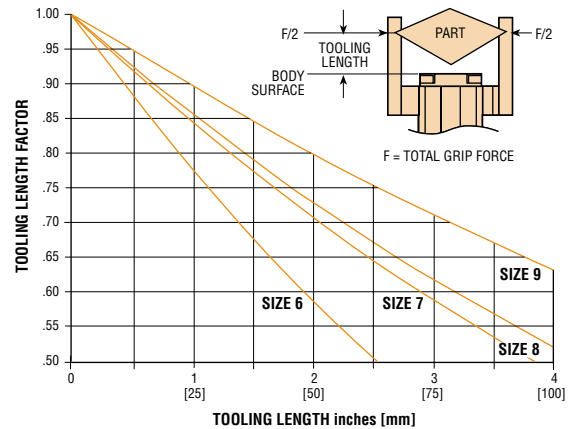
*Maximum grip force direction is always open (internal grip) on all Series 190 and 191 Jaw Style One units. (19x60, 19x65, 19x70, 19x75, 19x80, 19x85, 19x90, and 19x95)

190, 191

TOOLING LENGTH FACTOR

Jaw tooling should be designed so that the grip point is as close to the body surface as possible. As the grip point is moved away from the body surface, the applied moment causes jaw friction to increase, resulting in reduced effective grip force. The grip force factor (G_F) values given in the table above are for zero tooling length (body surface).

TOOLING LENGTH FACTOR



GRIP FORCE CALCULATION EQUATIONS:

IMPERIAL:

TOTAL GRIP FORCE [lb] = (Pressure [psi] x G_F) x Tooling Length Factor

TOTAL GRIP FORCE WITH SPRINGS [lb] = ((Pressure [psi] x G_F) ± S_F [lb]) x Tooling Length Factor

METRIC:

TOTAL GRIP FORCE [N] = (Pressure [bar] x G_F) x Tooling Length Factor

TOTAL GRIP FORCE WITH SPRINGS [N] = ((Pressure [bar] x G_F) ± S_F [N]) x Tooling Length Factor



Sizing & Application Assistance

Use PHD's free online Product Sizing Application or view the Product Sizing Catalog at: www.phdinc.com/apps/sizing

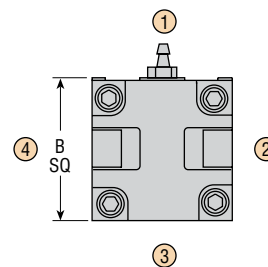
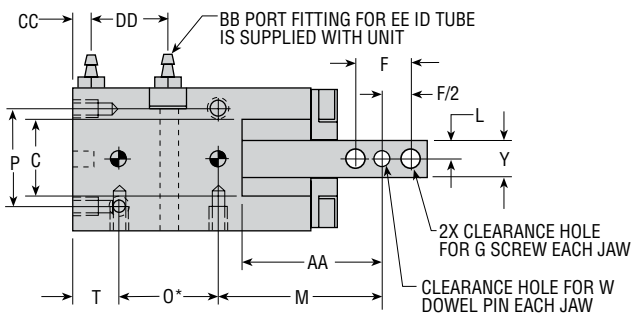
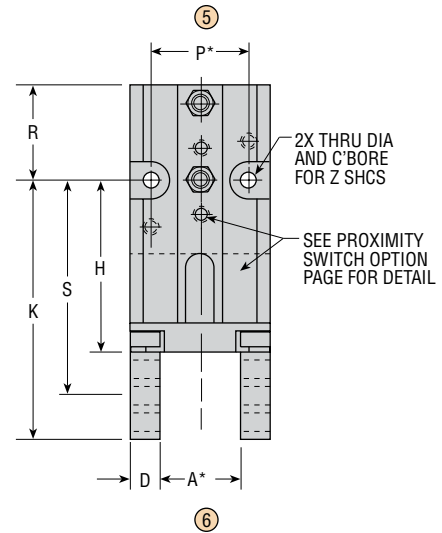
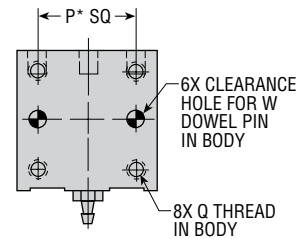
DIMENSIONS: SERIES 190 PARALLEL GRIPPERS - JAW STYLE 1

FULL MOUNTING IN POSITIONS 3 & 4

| LETTER DIM. | MODEL NUMBER | | | | | | | |
|--------------------|------------------|----------------------|------------------|----------------------|------------------|----------------------|-------------------|----------------------|
| | 19060 in | 19065 mm | 19070 in | 19075 mm | 19080 in | 19085 mm | 19090 in | 19095 mm |
| NOMINAL JAW TRAVEL | .157 | 4 | .276 | 7 | .394 | 10 | .512 | 13 |
| A CLOSED** | .315 | 7.75 | .345 | 8.75 | .581 | 14.75 | .700 | 17.75 |
| A OPEN** | .403 | 10.25 | .540 | 13.75 | .915 | 23.25 | 1.150 | 29.25 |
| B | .787 | 20.0 | 1.024 | 26.0 | 1.496 | 38.0 | 1.968 | 50.0 |
| C | .398 | 10.0 | .555 | 14.0 | .791 | 20.0 | 1.027 | 26.0 |
| D | .177 | 4.5 | .215 | 5.5 | .256 | 6.5 | .394 | 10.0 |
| F | .312 | 8.0 | .375 | 10.0 | .500 | 12.0 | .625 | 16.0 |
| G | #4 | M2.5 | #5 | M3 | #8 | M4 | #10 | M5 |
| H | 1.012 | 25.5 | 1.289 | 32.0 | 1.635 | 41.0 | 2.081 | 53.0 |
| K | 1.563 | 39.5 | 1.937 | 48.5 | 2.500 | 63.5 | 3.242 | 82.5 |
| L | .098 | 2.5 | .138 | 3.5 | .196 | 5.0 | .256 | 6.5 |
| M | 1.031 | 26.01 | 1.249 | 31.0 | 1.624 | 41.0 | 2.108 | 53.5 |
| O* | .5310 | 14.0 | .6875 | 18.0 | .8430 | 22.0 | 1.0940 | 28.0 |
| P* | .550 | 14.0 | .710 | 18.0 | 1.100 | 28.0 | 1.535 | 39.0 |
| Q | 4-40 x .19 DP | M3 x 0.5 x 4.5 DP | 6-32 x .22 DP | M3 x 0.5 x 4.5 DP | 8-32 x .28 DP | M4 x 0.7 x 6.0 DP | 10-24 x .38 DP | M5 x 0.8 x 7.5 DP |
| R | .601 | 15.5 | .681 | 18.0 | .785 | 20.5 | .870 | 22.0 |
| S | 1.312 | 33.0 | 1.624 | 40.0 | 2.062 | 52.0 | 2.655 | 67.5 |
| T | .351 | 8.5 | .367 | 9.0 | .380 | 9.5 | .322 | 8.0 |
| W | 3/32 | 2.5 | 1/8 | 3.0 | 1/8 | 4.0 | 3/16 | 5.0 |
| Y | .196 | 5.0 | .276 | 7.0 | .393 | 10.0 | .511 | 13.0 |
| Z | #4 | M3 | #6 | M3 | #8 | M4 | #10 | M5 |
| AA | .871 | 22.0 | 1.045 | 26.0 | 1.412 | 36.0 | 1.854 | 47.0 |
| BB | 10-32 | M3 x 0.5 | 10-32 | M3 x 0.5 | 10-32 | M5 x 0.8 | 10-32 | M5 x 0.8 |
| CC | .167 | 3.0 | .176 | 3.5 | .193 | 5.5 | .153 | 4.5 |
| DD | .465 | 12.5 | .505 | 14.5 | .592 | 15.0 | .750 | 19.5 |
| EE | 1/16 | 2.5 | 1/16 | 2.5 | 1/16 | 3.0 | 1/16 | 3.0 |

NOTES:

- 1) *TOLERANCE BETWEEN DOWEL PIN HOLES IS $\pm .0008$ [± 0.02]
- 2) NUMBERS IN [] ARE FOR METRIC UNITS AND ARE IN mm
- 3) CIRCLED NUMBERS INDICATE POSITIONS.
- 4) **A CLOSED REFLECTS THE LARGEST POSSIBLE CLOSED DIMENSION.
A OPEN REFLECTS THE SMALLEST POSSIBLE OPEN DIMENSION.



CAD & Sizing Assistance

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190, 191

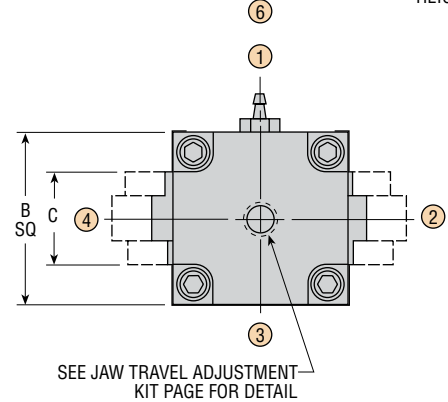
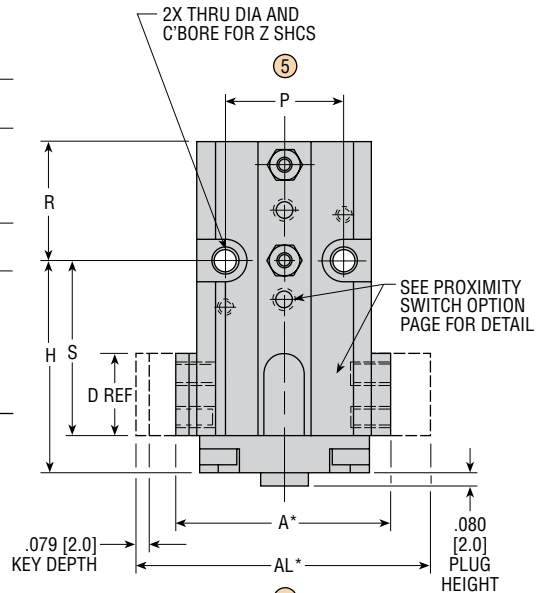
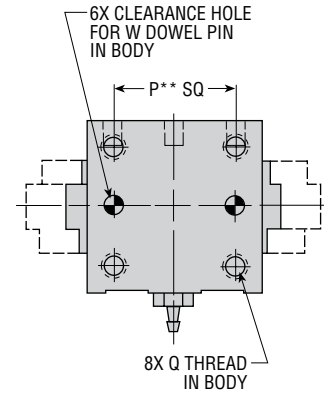
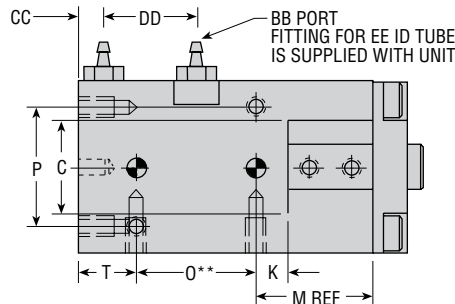
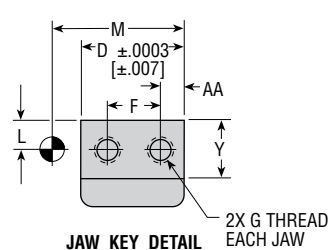
DIMENSIONS: SERIES 190 PARALLEL GRIPPERS - JAW STYLE 2

FULL MOUNTING IN POSITIONS 3 & 4

| LETTER DIM. | MODEL NUMBER | | | | | | | | | | | | | | | |
|--------------------|---------------------------------------|----------|------------------------------------|----------|------------------------------------|----------|--------------------------------------|----------|----------|----|----------|----|----------|----|----------|----|
| | 19061/62 | | 19066/67 | | 19071/72 | | 19076/77 | | 19081/82 | | 19086/87 | | 19091/92 | | 19096/97 | |
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| NOMINAL JAW TRAVEL | | | | | | | | | | | | | | | | |
| SHORT | .157 | 4 | .276 | 7 | .394 | 10 | .512 | 13 | | | | | | | | |
| LONG | .315 | 8 | .433 | 11 | .630 | 16 | .866 | 22 | | | | | | | | |
| A CLOSED* | 1.054 | 26.75 | 1.329 | 33.75 | 1.841 | 46.75 | 2.353 | 59.75 | | | | | | | | |
| A OPEN* | 1.151 | 29.25 | 1.545 | 39.25 | 2.175 | 55.25 | 2.805 | 71.25 | | | | | | | | |
| AL CLOSED* | 1.447 | 36.75 | 1.802 | 45.75 | 2.353 | 59.75 | 2.865 | 72.75 | | | | | | | | |
| AL OPEN* | 1.702 | 43.25 | 2.175 | 55.25 | 2.923 | 74.25 | 3.671 | 93.25 | | | | | | | | |
| B | .787 | 20.0 | 1.024 | 26.0 | 1.496 | 38.0 | 1.968 | 50.0 | | | | | | | | |
| C | .398 | 10.0 | .555 | 14.0 | .791 | 20.0 | 1.027 | 26.0 | | | | | | | | |
| D | .3937 | 10.0 | .4921 | 12.5 | .7480 | 19.0 | .9842 | 25.0 | | | | | | | | |
| F | .188 | 5.0 | .250 | 6.5 | .375 | 10.0 | .625 | 12.0 | | | | | | | | |
| G | 3-56 x M2.5 x 0.45 .18 DP x 5.0 DP | | 6-32 x M3 x 0.5 x .28 DP 6.0 DP | | 8-32 x M4 x 0.7 x .32 DP 8.0 DP | | 10-24 x M5 x 0.8 x .38 DP 10.0 DP | | | | | | | | | |
| H | 1.012 | 25.5 | 1.289 | 32.0 | 1.635 | 41.0 | 2.081 | 53.0 | | | | | | | | |
| K | .159 | 4.0 | .204 | 5.0 | .212 | 5.5 | .254 | 6.5 | | | | | | | | |
| L | .098 | 2.5 | .138 | 3.5 | .197 | 5.0 | .256 | 6.5 | | | | | | | | |
| M | .553 | 14.0 | .696 | 17.5 | .960 | 24.0 | 1.238 | 31.5 | | | | | | | | |
| O** | .5310 | 14.0 | .6875 | 18.0 | .8430 | 22.0 | 1.0940 | 28.0 | | | | | | | | |
| P** | .550 | 14.0 | .710 | 18.0 | 1.100 | 28.0 | 1.535 | 39.0 | | | | | | | | |
| Q | 4-40 x M3 x 0.5 x .19 DP 4.5 DP | | 6-32 x M3 x 0.5 x .22 DP 4.5 DP | | 8-32 x M4 x 0.7 x .28 DP 6.0 DP | | 10-24 x M5 x 0.8 x .38 DP 7.5 DP | | | | | | | | | |
| R | .601 | 15.5 | .681 | 18.0 | .785 | 20.5 | .870 | 22.0 | | | | | | | | |
| S | .834 | 21.0 | 1.071 | 26.5 | 1.398 | 35.0 | 1.785 | 45.5 | | | | | | | | |
| T | .351 | 8.5 | .367 | 9.0 | .380 | 9.5 | .322 | 8.0 | | | | | | | | |
| W | 3/32 | 2.5 | 1/8 | 3.0 | 1/8 | 4.0 | 3/16 | 5.0 | | | | | | | | |
| Y | .1970 | 5.0 | .2756 | 7.0 | .3940 | 10.0 | .5118 | 13.0 | | | | | | | | |
| | ±.0006 | ±0.015 | ±.0006 | ±0.015 | ±.0007 | ±0.018 | ±.0008 | ±0.020 | | | | | | | | |
| Z | #4 | M3 | #6 | M3 | #8 | M4 | #10 | M5 | | | | | | | | |
| AA | .103 | 2.5 | .121 | 3.0 | .186 | 4.5 | .180 | 6.5 | | | | | | | | |
| BB | 10-32 | M3 x 0.5 | 10-32 | M3 x 0.5 | 10-32 | M5 x 0.8 | 10-32 | M5 x 0.8 | | | | | | | | |
| CC | .167 | 3.0 | .176 | 3.5 | .193 | 5.5 | .153 | 4.5 | | | | | | | | |
| DD | .465 | 12.5 | .505 | 14.5 | .592 | 15.0 | .750 | 19.5 | | | | | | | | |
| EE | 1/16 | 2.5 | 1/16 | 2.5 | 1/16 | 3.0 | 1/16 | 3.0 | | | | | | | | |

NOTES:

- *A CLOSED & OPEN ARE FOR MODELS 19061, 71, 81, 91, 66, 76, 86, & 96
AL CLOSED & OPEN ARE FOR MODELS 19062, 72, 82, 92, 67, 77, 87, & 97
- **TOLERANCE BETWEEN DOWEL PIN HOLES IS ±.0008 [±0.02]
- CIRCLED NUMBERS INDICATE POSITIONS.
- *A OR AL CLOSED REFLECTS THE LARGEST POSSIBLE CLOSED DIMENSION.
A OR AL OPEN REFLECTS THE SMALLEST POSSIBLE OPEN DIMENSION.



CAD & Sizing Assistance

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All dimensions are reference only unless specifically tolerated.

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190, 191

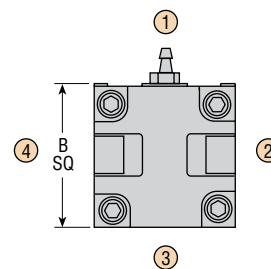
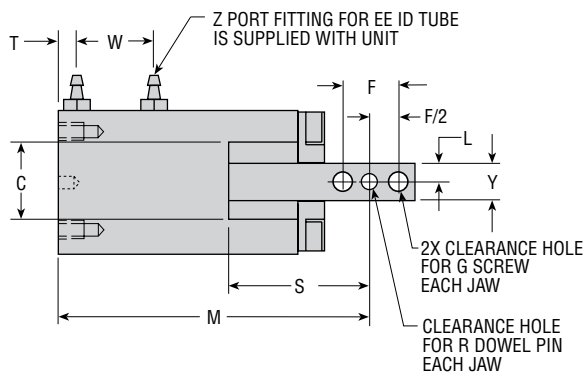
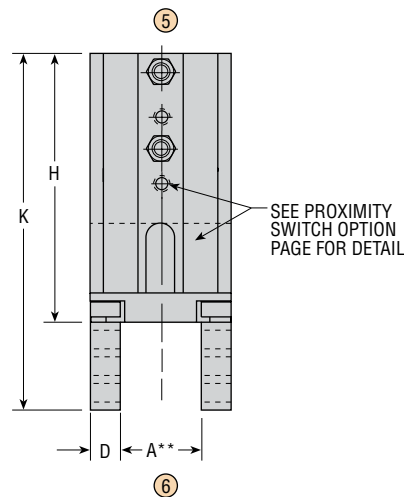
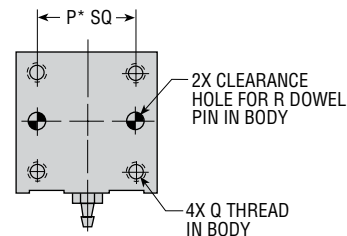
DIMENSIONS: SERIES 191 PARALLEL GRIPPERS - JAW STYLE 1

BOTTOM MOUNTING ONLY

| LETTER DIM. | MODEL NUMBER | | | | | | | |
|--------------------|---------------|-------------------|---------------|-------------------|---------------|-------------------|----------------|-------------------|
| | 19160 | 19165 | 19170 | 19175 | 19180 | 19185 | 19190 | 19195 |
| | in | mm | in | mm | in | mm | in | mm |
| NOMINAL JAW TRAVEL | .157 | 4 | .276 | 7 | .394 | 10 | .512 | 13 |
| A CLOSED** | .315 | 7.75 | .345 | 8.75 | .581 | 14.75 | .700 | 17.75 |
| A OPEN** | .403 | 10.25 | .540 | 13.75 | .915 | 23.25 | 1.150 | 29.25 |
| B | .787 | 20.0 | 1.024 | 26.0 | 1.496 | 38.0 | 1.968 | 50.0 |
| C | .398 | 10.0 | .555 | 14.0 | .791 | 20.0 | 1.027 | 26.0 |
| D | .177 | 4.5 | .215 | 5.5 | .256 | 6.5 | .394 | 10.0 |
| F | .312 | 8.0 | .375 | 10.0 | .500 | 12.0 | .625 | 16.0 |
| G | #4 | M2.5 | #5 | M3 | #8 | M4 | #10 | M5 |
| H | 1.613 | 41.0 | 1.970 | 50.0 | 2.420 | 61.5 | 2.951 | 75.0 |
| K | 2.164 | 55.0 | 2.618 | 66.5 | 3.285 | 83.5 | 4.112 | 104.5 |
| L | .098 | 2.5 | .138 | 3.5 | .196 | 5.0 | .256 | 6.5 |
| M | 1.913 | 48.5 | 2.305 | 58.5 | 2.847 | 72.5 | 3.525 | 89.5 |
| P* | .550 | 14.0 | .710 | 18.0 | 1.100 | 28.0 | 1.535 | 39.0 |
| Q | 4-40 x .19 DP | M3 x 0.5 x 4.5 DP | 6-32 x .22 DP | M3 x 0.5 x 4.5 DP | 8-32 x .28 DP | M4 x 0.7 x 6.0 DP | 10-24 x .38 DP | M5 x 0.8 x 7.5 DP |
| R | 3/32 | 2.5 | 1/8 | 3.0 | 1/8 | 4.0 | 3/16 | 5.0 |
| S | .871 | 22.0 | 1.045 | 26.0 | 1.412 | 36.0 | 1.854 | 47.0 |
| T | .167 | 3.0 | .176 | 3.5 | .193 | 5.5 | .153 | 4.5 |
| W | .465 | 12.5 | .505 | 14.5 | .592 | 15.0 | .750 | 19.5 |
| Y | .196 | 5.0 | .276 | 7.0 | .393 | 10.0 | .511 | 13.0 |
| Z | 10-32 | M3 x 0.5 | 10-32 | M3 x 0.5 | 10-32 | M5 x 0.8 | 10-32 | M5 x 0.8 |
| EE | 1/16 | 2.5 | 1/16 | 2.5 | 1/16 | 3.0 | 1/16 | 3.0 |

NOTES:

- *TOLERANCE BETWEEN DOWEL PIN HOLES IS $\pm .0008$ [± 0.02]
- NUMBERS IN [] ARE FOR METRIC UNITS AND ARE IN mm
- CIRCLED NUMBERS INDICATE POSITIONS.
- **A CLOSED REFLECTS THE LARGEST POSSIBLE CLOSED DIMENSION. A OPEN REFLECTS THE SMALLEST POSSIBLE OPEN DIMENSION.



CAD & Sizing Assistance

Use PHD's free online Product Sizing and CAD Configurator at www.phdinc.com/myphd

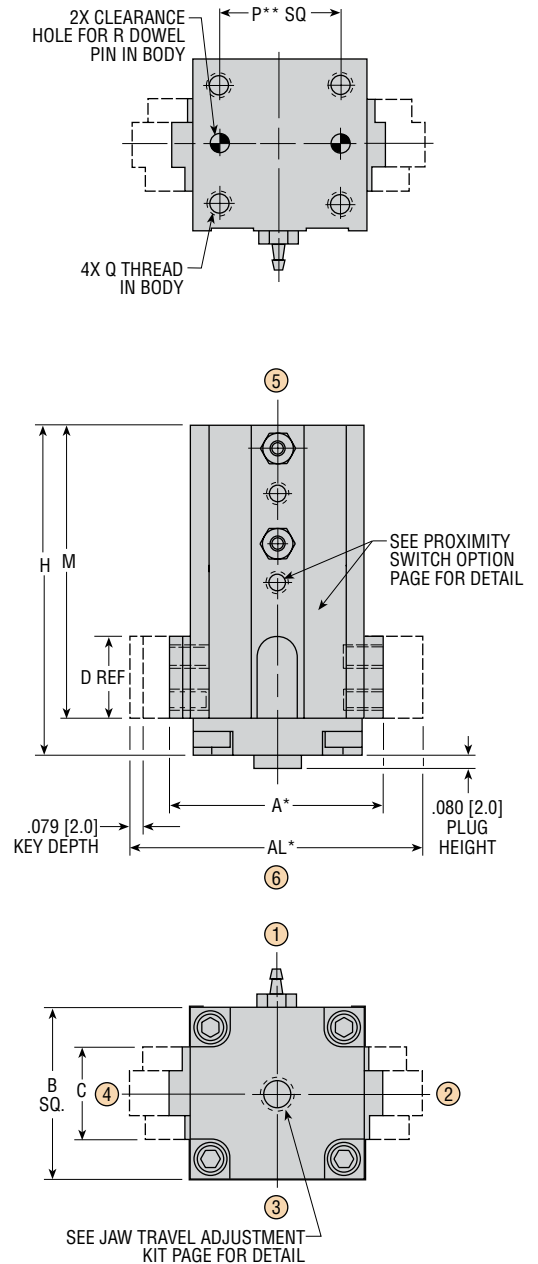
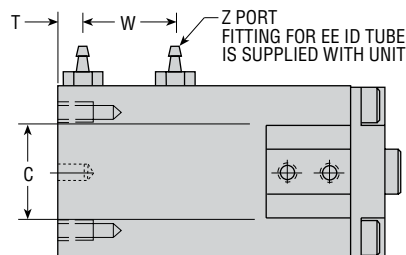
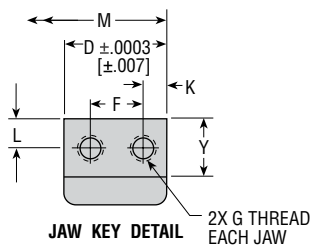
DIMENSIONS: SERIES 191 PARALLEL GRIPPERS - JAW STYLE 2

BOTTOM MOUNTING ONLY

| LETTER DIM. | MODEL NUMBER | | | | | | | |
|--------------------|-------------------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| | 19161/62 in mm | 19166/67 in mm | 19171/72 in mm | 19176/77 in mm | 19181/82 in mm | 19186/87 in mm | 19191/92 in mm | 19196/97 in mm |
| NOMINAL JAW TRAVEL | | | | | | | | |
| SHORT | .157 | 4 | .276 | 7 | .394 | 10 | .512 | 13 |
| LONG | .315 | 8 | .433 | 11 | .630 | 16 | .866 | 22 |
| A CLOSED* | 1.054 | 26.75 | 1.329 | 33.75 | 1.841 | 46.75 | 2.353 | 59.75 |
| A OPEN* | 1.151 | 29.25 | 1.545 | 39.25 | 2.175 | 55.25 | 2.805 | 71.25 |
| AL CLOSED* | 1.447 | 36.75 | 1.802 | 45.75 | 2.353 | 59.75 | 2.865 | 72.75 |
| AL OPEN* | 1.702 | 43.25 | 2.175 | 55.25 | 2.923 | 74.25 | 3.671 | 93.25 |
| B | .787 | 20.0 | 1.024 | 26.0 | 1.496 | 38.0 | 1.968 | 50.0 |
| C | .398 | 10.0 | .555 | 14.0 | .791 | 20.0 | 1.027 | 26.0 |
| D | .3937 | 10.0 | .4921 | 12.5 | .7480 | 19.0 | .9842 | 25.0 |
| F | .188 | 5.0 | .250 | 6.5 | .375 | 10.0 | .625 | 12.0 |
| G | 3-56 x .18 DP | M2.5 x 0.45 x 5.0 DP | 6-32 x .28 DP | M3 x 0.5 x 6.0 DP | 8-32 x .32 DP | M4 x 0.7 x 8.0 DP | 10-24 x .38 DP | M5 x 0.8 x 10.0 DP |
| H | 1.613 | 41.0 | 1.970 | 50.0 | 2.420 | 61.5 | 2.951 | 75.0 |
| K | .103 | 2.5 | .121 | 3.0 | .186 | 4.5 | .180 | 6.5 |
| L | .098 | 2.5 | .138 | 3.5 | .197 | 5.0 | .256 | 6.5 |
| M | 1.435 | 36.5 | 1.752 | 44.5 | 2.183 | 55.5 | 2.655 | 67.5 |
| P** | .550 | 14.0 | .710 | 18.0 | 1.100 | 28.0 | 1.535 | 39.0 |
| Q | 4-40 x .19 DP | M3 x 0.5 x 4.5 DP | 6-32 x .22 DP | M3 x 0.5 x 4.5 DP | 8-32 x .28 DP | M4 x 0.7 x 6.0 DP | 10-24 x .38 DP | M5 x 0.8 x 7.5 DP |
| R | 3/32 | 2.5 | 1/8 | 3.0 | 1/8 | 4.0 | 3/16 | 5.0 |
| T | .167 | 3.0 | .176 | 3.5 | .193 | 5.5 | .153 | 4.5 |
| W | .465 | 12.5 | .505 | 14.5 | .592 | 15.0 | .750 | 19.5 |
| Y | .1970 ±.0006 | 5.0 ±0.015 | .2756 ±.0006 | 7.0 ±0.015 | .3940 ±.0007 | 10.0 ±0.018 | .5118 | 13.0 |
| Z | 10-32 | M3 x 0.5 | 10-32 | M3 x 0.5 | 10-32 | M5 x 0.8 | 10-32 | M5 x 0.8 |
| EE | 1/16 | 2.5 | 1/16 | 2.5 | 1/16 | 3.0 | 1/16 | 3.0 |

NOTES:

- *A CLOSED AND OPEN ARE FOR MODELS 19161, 71, 81, 91, 66, 76, 86, & 96
AL CLOSED & OPEN ARE FOR MODELS 19162, 72, 82, 92, 67, 77, 87, & 97
- **TOLERANCE BETWEEN DOWEL PIN HOLES IS ±.0008 [±0.02]
- CIRCLED NUMBERS INDICATE POSITIONS.
- *A CLOSED REFLECTS THE LARGEST POSSIBLE CLOSED DIMENSION.
A OPEN REFLECTS THE SMALLEST POSSIBLE OPEN DIMENSION.



190, 191



CAD & Sizing Assistance

Use PHD's free online Product Sizing and CAD Configurator at www.phdinc.com/myphd

All dimensions are reference only unless specifically toleranced.

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OPTIONS & ACCESSORIES: SERIES 190 & 191 PARALLEL

4 HALL SENSOR READY/ JC1STP SWITCH READY

This option provides unit installed with magnet for use with PHD Hall Sensor. Kits must be ordered separately.



Options may affect unit length. See dimensional pages and option information details.



Refer to this product's online catalog in the product section for complete information including related dimensions and additional specifications. See link at bottom of this page.

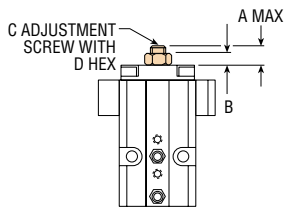
5 PROXIMITY SWITCH READY

This option provides the grippers with a pin to mount a switch target for 6 mm square inductive or Hall Effect proximity switch. See additional information online for details on switch bracket/target kits.

JAW TRAVEL ADJUSTMENT KIT

The Jaw Travel Adjustment Kit contains a screw and a lock nut used to limit the jaw opening on Jaw Style 2 parallel grippers. Jaw travel can be adjusted from zero opening to maximum opening.

If the option of maximum grip force on jaw closure is specified, (-x5xx option) the adjustment kit will limit the travel in the closing direction.



| MODEL NO. | KIT NO. | LETTER DIM. | | | |
|-----------|---------|----------------|---------------|--------------|---------------|
| | | A | B | C | D |
| 19x6x | 18433 | .197 [5.0] | .094 [2.4] | [M3 x 10.0] | .05 [1.3] |
| 19x7x | 18434 | .315 [8.0] | .157 [4.0] | [M5 x 14.0] | .094 [2.4] |
| 19x8x | 18435 | .394 [10.0] | .197 [5.0] | [M6 x 18.0] | .125 [3.2] |
| 19x9x | 18436 | .591 [15.0] | .315 [8.0] | [M10 x 22.0] | .188 [4.8] |

NUMBERS IN [] ARE FOR METRIC UNITS AND ARE IN mm

JAW TRAVEL ADJUSTMENT AVAILABLE ON STYLE 2 JAWS ONLY (19xx1, 19xx2, 19xx6, AND 19xx7 MODELS).

EACH JAW TRAVEL ADJUSTMENT KIT CONTAINS THE FOLLOWING ITEMS: ONE ADJUSTMENT SCREW AND NUT

TRAVEL CAN ONLY BE ADJUSTED IN THE MAX FORCE DIRECTION OF ANY MODEL.

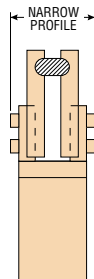
EXAMPLE 1: A MAX FORCE CLOSE GRIPPER; TRAVEL IS ONLY VARIED IN THE CLOSE DIRECTION, TRAVEL IN THE OPEN DIRECTION REMAINS UNCHANGED.

EXAMPLE 2: A MAX FORCE OPEN GRIPPER; TRAVEL IS ONLY VARIED IN THE OPEN DIRECTION, TRAVEL IN THE CLOSE DIRECTION REMAINS UNCHANGED.

JAW TOOLING

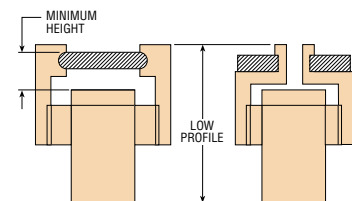
JAW STYLE 1

Jaw Style 1 is ideally suited for small parts. Simple tooling can provide a long narrowed profile for small parts or for reaching into confined areas.



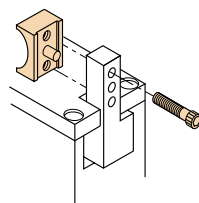
JAW STYLE 2

Jaw Style 2 allows simple tooling of wide parts. This type of tooling keeps the part close to the unit for a low profile package. Jaw Style 2 provides the lowest profile assembly for internal gripping by keeping the tooling close to the gripper.



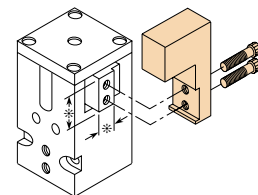
DOWEL PINS

Style 1 jaw is provided with a dowel pin hole as a means of orienting and locating jaw tooling.



MALE KEY

Style 2 jaws have a close tolerance* male key for orientation and precise location of jaw tooling. Jaw tooling can be readily machined to include a mating slot for the jaw key.



OPTIONS & ACCESSORIES: SERIES 190 & 191 PARALLEL

5

PROXIMITY SWITCH READY

This option provides the grippers with a pin to mount a switch target for 6 mm square inductive or Hall Effect proximity switch. See additional information below for details on switch bracket/target kits.

SERIES 5580 HALL EFFECT SWITCHES

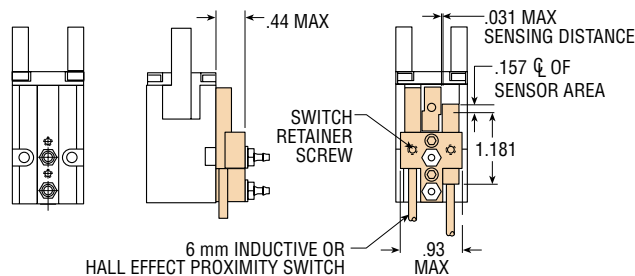
| MODEL NO. | DESCRIPTION |
|------------|-----------------------------------|
| 55803-1-02 | NPN 4.5-24 VDC with 2 meter cable |
| 55804-1-02 | PNP 4.5-24 VDC with 2 meter cable |
| 55823-1 | NPN 4.5-24 VDC with Quick Connect |
| 55824-1 | PNP 4.5-24 VDC with Quick Connect |

6 mm SQUARE INDUCTIVE PROXIMITY SWITCHES

| MODEL NO. | DESCRIPTION |
|--------------|----------------------------------|
| 18431-001-02 | NPN 10-30 VDC with 2 meter cable |
| 18431-002-02 | PNP 10-30 VDC with 2 meter cable |

SWITCH BRACKET AND TARGET KITS

FOR IMPERIAL MODELS 19x6x AND 19x7x ONLY



EACH SWITCH BRACKET & TARGET KIT CONTAINS THE FOLLOWING ITEMS:
 1 TARGET WITH SCREW
 BRACKET FOR 6 mm SQUARE SWITCH AND ALL MOUNTING COMPONENTS

SWITCHES ARE ORDERED SEPARATELY

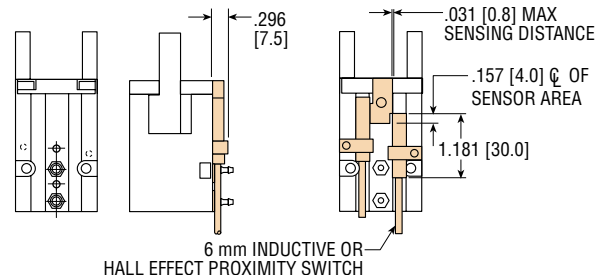
FOR USE WITH: SERIES 5580 SWITCHES

| GRIPPER MODEL | SWITCH BRACKET & TARGET KIT |
|---------------|-----------------------------|
| 19x6x | 59794-1 |
| 19x7x | 59795-1 |

FOR USE WITH: 6 mm SQUARE INDUCTIVE PROXIMITY SWITCHES

| GRIPPER MODEL | SWITCH BRACKET & TARGET KIT |
|---------------|-----------------------------|
| 19x6x | 59792-1 |
| 19x7x | 59793-1 |

FOR IMPERIAL MODELS 19x8x & 19x9x METRIC MODELS 19x6x, 19x7x, 19x8x, & 19x9x



EACH SWITCH BRACKET & TARGET KIT CONTAINS THE FOLLOWING ITEMS:
 1 TARGET WITH SCREW
 2 SENSOR BRACKETS WITH MOUNTING SCREWS

SWITCHES ARE ORDERED SEPARATELY
 NUMBERS IN [] ARE FOR METRIC UNITS AND ARE IN mm

FOR USE WITH: SERIES 5580 SWITCHES

| GRIPPER MODEL | SWITCH BRACKET & TARGET KIT |
|---------------|-----------------------------|
| 19x6x* | 55770 |
| 19x7x* | 55771 |
| 19x8x | 55772 |
| 19x9x | 55773 |

* METRIC UNITS ONLY

FOR USE WITH: 6 mm SQUARE INDUCTIVE PROXIMITY SWITCHES

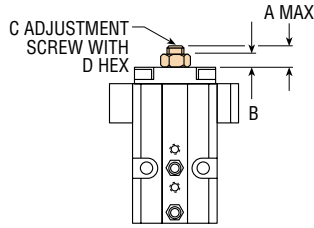
| GRIPPER MODEL | SWITCH BRACKET & TARGET KIT |
|---------------|-----------------------------|
| 19x6x* | 18432 |
| 19x7x* | 18437 |
| 19x8x | 18438 |
| 19x9x | 18439 |

* METRIC UNITS ONLY

190, 191

ACCESSORIES & JAW TOOLING: SERIES 190 & 191 PARALLEL

JAW TRAVEL ADJUSTMENT KIT



| MODEL NO. | KIT NO. | LETTER DIM. | | | |
|-----------|---------|----------------|---------------|--------------|---------------|
| | | A | B | C | D |
| 19x6x | 18433 | .197 [5.0] | .094 [2.4] | [M3 x 10.0] | .05 [1.3] |
| 19x7x | 18434 | .315 [8.0] | .157 [4.0] | [M5 x 14.0] | .094 [2.4] |
| 19x8x | 18435 | .394 [10.0] | .197 [5.0] | [M6 x 18.0] | .125 [3.2] |
| 19x9x | 18436 | .591 [15.0] | .315 [8.0] | [M10 x 22.0] | .188 [4.8] |

NUMBERS IN [] ARE FOR METRIC UNITS AND ARE IN mm

JAW TRAVEL ADJUSTMENT AVAILABLE ON STYLE 2 JAWS ONLY (19xx1, 19xx2, 19xx6, AND 19xx7 MODELS).

EACH JAW TRAVEL ADJUSTMENT KIT CONTAINS THE FOLLOWING ITEMS: ONE ADJUSTMENT SCREW AND NUT

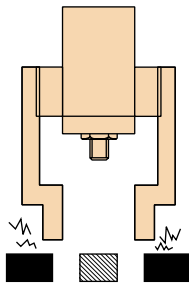
TRAVEL CAN ONLY BE ADJUSTED IN THE MAX FORCE DIRECTION OF ANY MODEL.

EXAMPLE 1: A MAX FORCE CLOSE GRIPPER; TRAVEL IS ONLY VARIED IN THE CLOSE DIRECTION, TRAVEL IN THE OPEN DIRECTION REMAINS UNCHANGED.

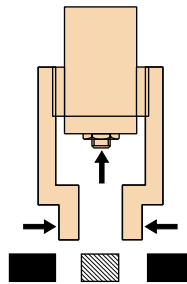
EXAMPLE 2: A MAX FORCE OPEN GRIPPER; TRAVEL IS ONLY VARIED IN THE OPEN DIRECTION, TRAVEL IN THE CLOSE DIRECTION REMAINS UNCHANGED.

The Jaw Travel Adjustment Kit contains a screw and a lock nut used to limit the jaw opening on Jaw Style 2 parallel grippers. Jaw travel can be adjusted from zero opening to maximum opening. Below is one application example showing how the jaw travel

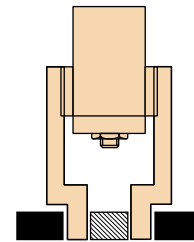
adjustment kit can be of benefit. If the option of maximum grip force on jaw closure is specified, (-x5xx option) the adjustment kit will limit the travel in the closing direction.



With jaws fully open, the tooling hits the obstruction and the part cannot be gripped.



Turning jaw travel adjustment screw inward reduces the maximum open position; allowing the tooling to clear the obstruction.

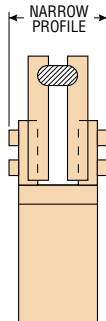


The part can now be gripped. (The jaw closed dimension is not affected by the jaw travel adjustment.)

JAW TOOLING

JAW STYLE 1

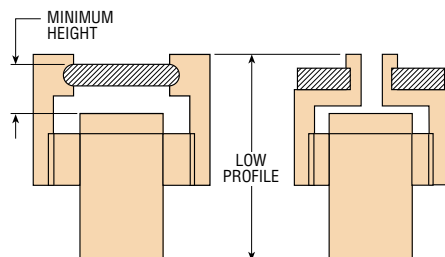
Jaw Style 1 is ideally suited for small parts. Simple tooling can provide a long narrowed profile for small parts or for reaching into confined areas.



JAW STYLE 2

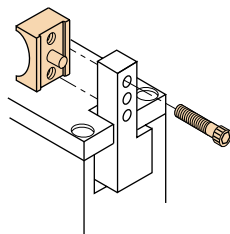
Jaw Style 2 allows simple tooling of wide parts. This type of tooling keeps the part close to the unit for a low profile package.

Jaw Style 2 provides the lowest profile assembly for internal gripping by keeping the tooling close to the gripper.



DOWEL PINS

Style 1 jaw is provided with a dowel pin hole as a means of orienting and locating jaw tooling.



MALE KEY

Style 2 jaws have a close tolerance* male key for orientation and precise location of jaw tooling.

Jaw tooling can be readily machined to include a mating slot for the jaw key.

