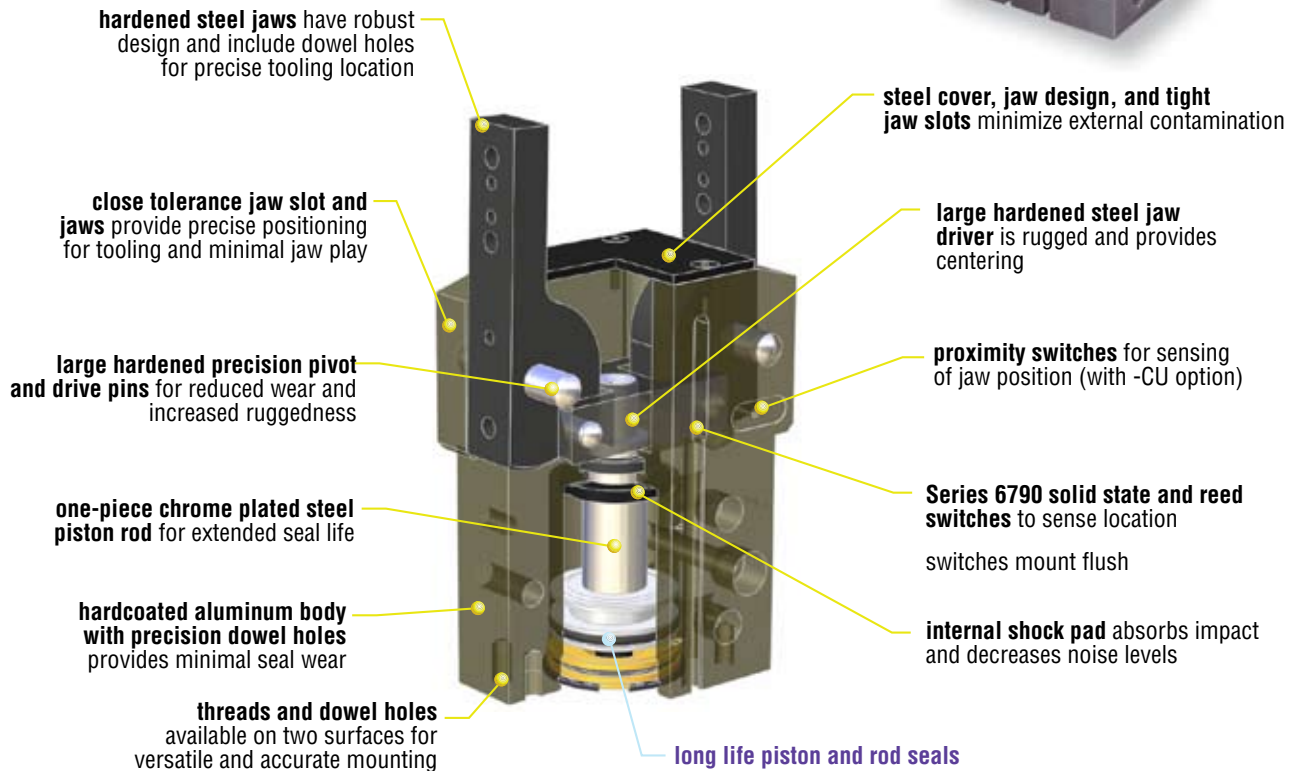


# GRB



## LONG LIFE COMPACT ANGULAR GRIPPER SHIPS IN 1-2 DAYS



GRB

### Major Benefits

- Jaws rotate completely clear of work area eliminating an otherwise required axis of travel
- Three standard jaw rotations available: 60°, 90°, and 180°
- One piece body minimizes jaw play
- Internal speed restriction removes the need for external speed controls in standard applications
- All units incorporate twin switch slots for flush switch mounting
- Two mounting surfaces
- Six sizes available
- 1-2 day shipping
- 5 million cycles minimum rated life

### Industry Uses

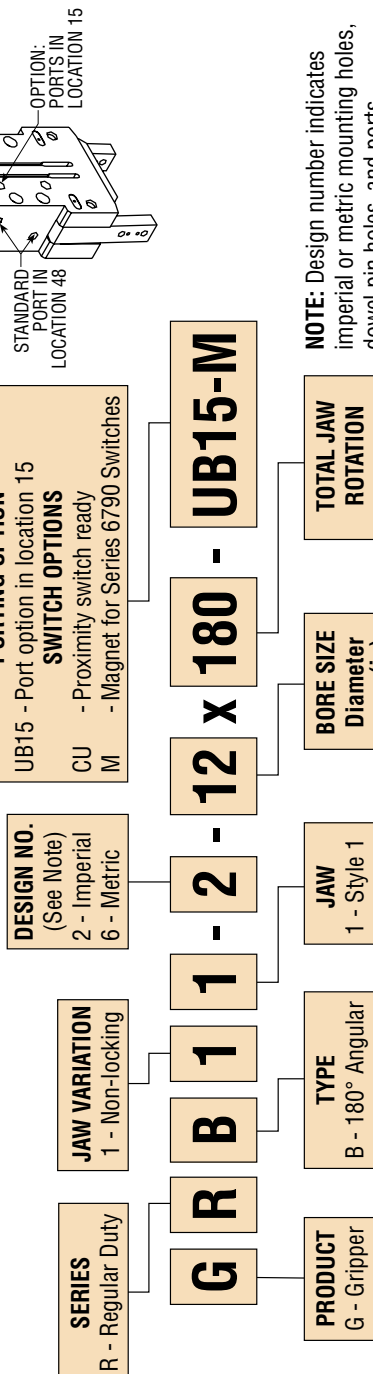
- Assembly machine builders
- Light bulb manufacturing
- Batteries
- Medical
- Bearing manufacturing
- Semiconductor
- Optical
- Golf equipment
- Material handling
- Robotics

# ORDERING DATA: SERIES GRB GRIPPERS

GRB

## TO ORDER SPECIFY:

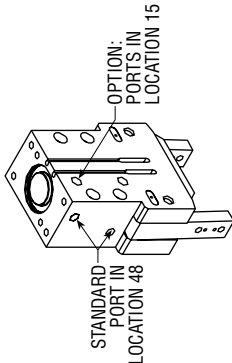
Product, Series, Type, Jaw Variation, Jaw, Design No., Bore Size, Total Jaw Rotation, and Options required.



**OPTIONS (OMIT IF NOT REQUIRED)**

**PORTING OPTION**  
UB15 - Port option in location 15

**SWITCH OPTIONS**  
CU - Proximity switch ready  
M - Magnet for Series 6790 Switches



**NOTE:** Design number indicates imperial or metric mounting holes, dowel pin holes, and ports.

**TOTAL JAW ROTATION (DEGREES)**

180 (Standard)
90
60

### 4 mm ROUND INDUCTIVE PROXIMITY SWITCHES

PART NUMBER	DESCRIPTION
18430-001-02	NPN (Sink) 10-30 VDC, 2 meter cable
18430-002-02	PNP (Source) 10-30 VDC, 2 meter cable

### SERIES 6790 SOLID STATE & REED SWITCHES

PART NUMBER	DESCRIPTION
67923-1	NPN (Sink) Solid State, 4.5-30 VDC, Quick Connect
67903-1-02	NPN (Sink) Solid State, 4.5-30 VDC, 2 Meter Cable
67903-1-05	NPN (Sink) Solid State, 4.5-30 VDC, 5 Meter Cable
67924-1	PNP (Source) Solid State, 4.5-30 VDC, Quick Connect
67904-1-02	PNP (Source) Solid State, 4.5-30 VDC, 2 Meter Cable
67904-1-05	PNP (Source) Solid State, 4.5-30 VDC, 5 Meter Cable
67922-1	PNP (Source) or NPN (Sink) DC Reed, 4.5-30 VDC, Quick Connect
67902-1-02	PNP (Source) or NPN (Sink) DC Reed, 4.5-30 VDC, 2 Meter Cable
67902-1-05	PNP (Source) or NPN (Sink) DC Reed, 4.5-30 VDC, 5 Meter Cable
67929-2	AC Reed, Current Limited, Quick Connect



Refer to option pages for switch kit information.

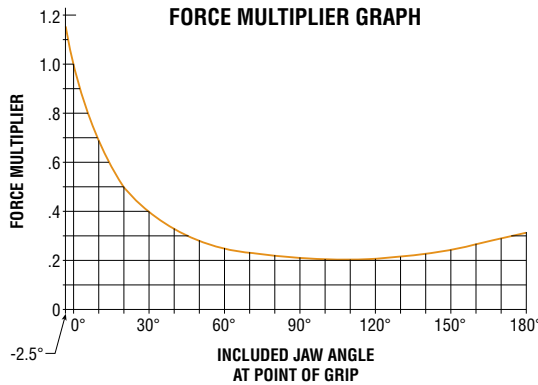


UNIQUE GRIPPERS ARE AVAILABLE.  
SEE PAGES 4-139 TO 4-164.

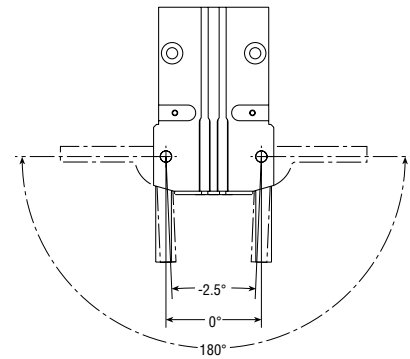
# ENGINEERING DATA: SERIES GRB GRIPPERS

SPECIFICATIONS	SERIES GRB
OPERATING PRESSURE	
STANDARD UNIT	30 psi min to 100 psi max [2 bar min to 7 bar max] air
OPERATING TEMPERATURE	-20° to +180°F [-28° to +82°C]
RATED LIFE	5 million cycles minimum with standard seals
CYCLE TIME	See table below
LUBRICATION	Factory lubricated for rated life
MAINTENANCE	Field repairable

SIZE	NOMINAL TOTAL JAW ROTATION	GRIP FORCE FACTOR $G_F$				GRIPPER WEIGHT		CLOSE TIME	OPEN TIME	DISPLACEMENT	
		EXTERNAL GRIP	 METRIC	INTERNAL GRIP	 METRIC	lb	kg	87 psi [6 bar]	87 psi [6 bar]	in <sup>3</sup>	cm <sup>3</sup>
		IMPERIAL		IMPERIAL				sec	sec		
12	180°	0.065	106	0.083	136	0.28	0.13	0.12	0.07	0.09	1.4
16	180°	0.18	299	0.21	346	0.55	0.25	0.25	0.13	0.21	3.5
20	180°	0.61	994	0.75	1221	0.98	0.45	0.26	0.13	0.38	6.2
32	180°	1.9	3170	2.4	3951	2.2	0.98	0.41	0.19	1.33	22
40	180°	3.7	6089	4.3	7049	4.3	2.0	0.55	0.30	2.84	47
50	180°	12	19964	14	22864	11.5	5.2	0.56	0.32	7.00	115



- NOTES:
- 1) The force multiplier is a function of the jaw position at point of grip.
  - 2) Force multiplier with the jaws parallel (0°) is 1.



## GRIP FORCE CALCULATION EQUATIONS:

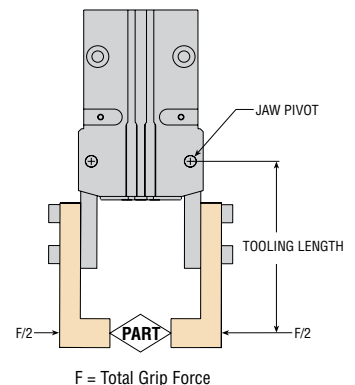
**IMPERIAL:**  $\frac{\text{PRESSURE (psi)} \times G_F}{\text{DISTANCE FROM JAW PIVOT (in)}} \times \text{FORCE MULTIPLIER} = \text{TOTAL GRIP FORCE (lb)}$

**METRIC:**  $\frac{\text{PRESSURE [bar]} \times G_F}{\text{DISTANCE FROM JAW PIVOT [mm]}} \times \text{FORCE MULTIPLIER} = \text{TOTAL GRIP FORCE [N]}$

For complete sizing information including jaw tooling and inertia, see online sizing guide or sizing catalog.

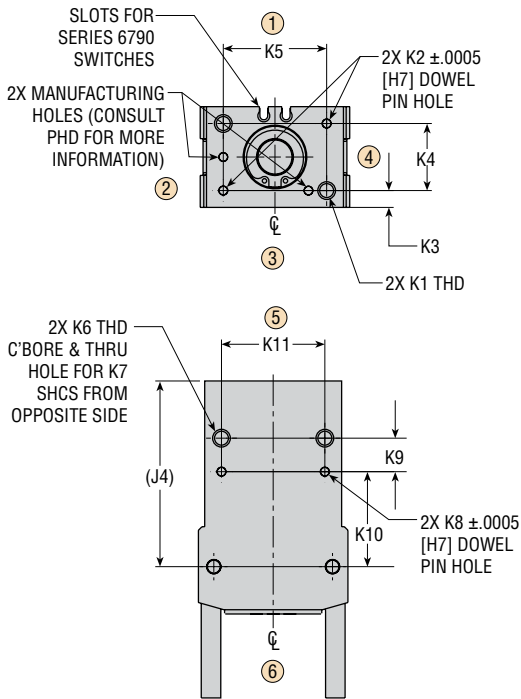
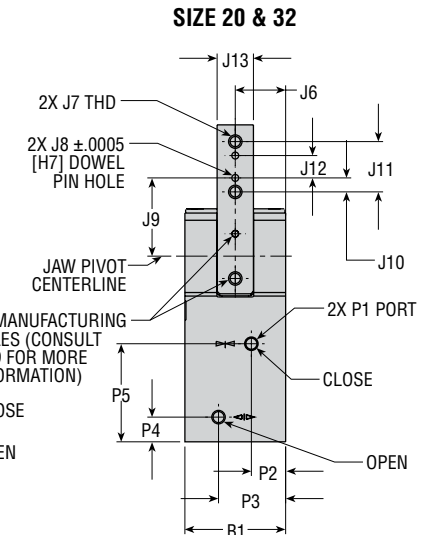
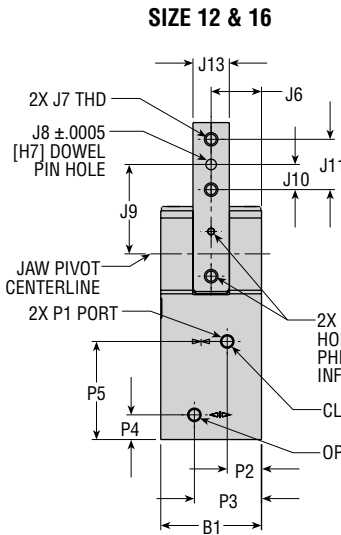
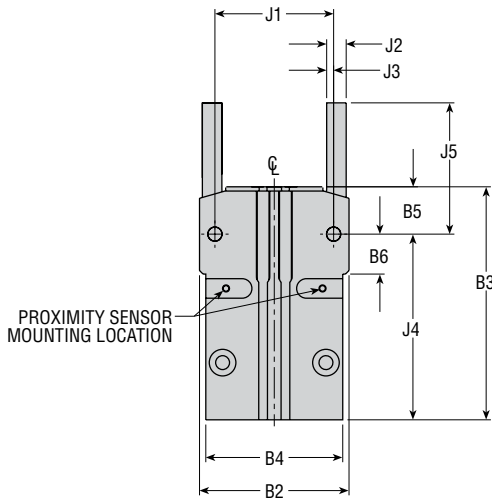
### SIZING AND APPLICATION ASSISTANCE

See PHD Product Sizing Catalog for specific and complete sizing information. Online sizing assistance is available at: [www.phdinc.com/apps/sizing](http://www.phdinc.com/apps/sizing)



# DIMENSIONS: SERIES GRB GRIPPERS

## SIZE 12, 16, 20, & 32

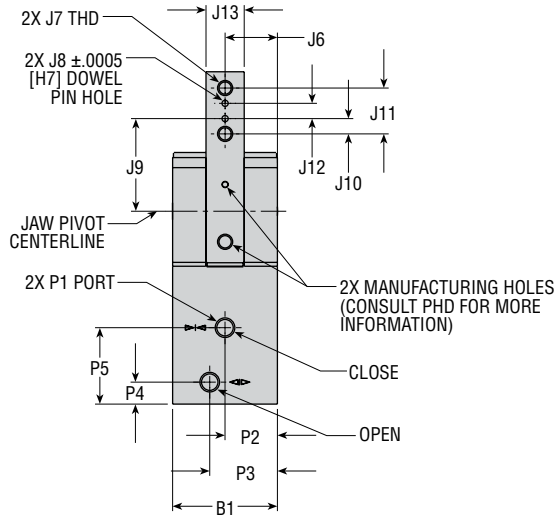
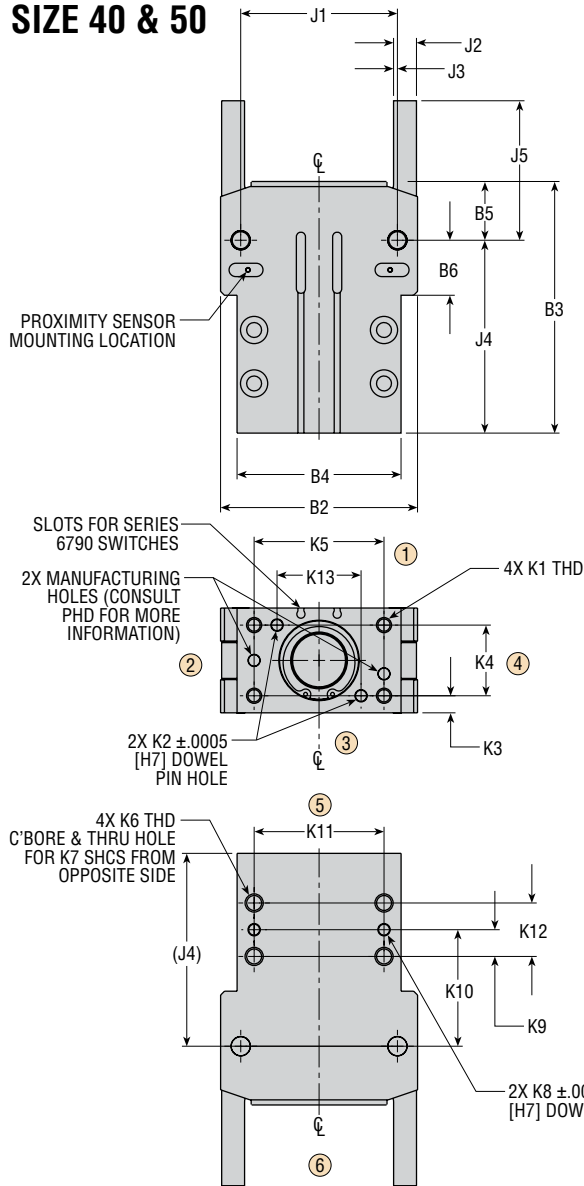


LETTER DIM	SIZE							
	12		16		20		32	
	in	mm	in	mm	in	mm	in	mm
B1	.966	24.5	1.142	29.0	1.422	36.1	1.635	41.5
B2	1.420	36.1	1.810	46.0	2.107	53.5	3.070	78.0
B3	2.197	55.8	2.709	68.8	3.286	83.5	4.210	106.9
B4	1.102	28.0	1.654	42.0	1.930	49.0	2.600	66.0
B5	.444	11.3	.562	14.3	.668	17.0	.923	23.4
B6	.386	9.8	.523	13.3	.564	14.3	.869	22.1
J1	1.063	27.0	1.417	36.0	1.673	42.5	2.400	61.0
J2	.196	5.0	.216	5.5	.275	7.0	.394	10.0
J3	.019	.5	.059	1.5	.098	2.5	.0790	2.0
J4	1.752	44.5	2.146	54.5	2.618	66.5	3.287	83.5
J5	1.142	29.0	1.575	40.0	1.850	47.0	2.402	61.0
J6	.452	11.5	.550	14.0	.710	18.0	.7870	20.0
J7	6-32 THRU	M4 x 0.7 THRU	8-32 THRU	M4 x 0.7 THRU	10-24 THRU	M5 x 0.8 THRU	1/4-20 THRU	M6 x 1.0 THRU
J8	.0971 THRU	2.5 THRU	.0971 THRU	2.5 THRU	.0971 THRU	2.5 THRU	.1283 THRU	3.0 THRU
J9	.8270	21.0	1.0820	27.5	1.1024	28.0	1.5355	39.0
J10	.177	4.5	.256	6.5	.197	5.0	.236	6.0
J11	.354	9.0	.512	13.0	.709	18.0	.787	20.0
J12	—	—	—	—	.315	8.0	.315	8.0
J13	.3150	8.0	.3937	10.0	.5120	13.0	.6500	16.5
K1	8-32 x .296 DP	M4 x 0.7 x 7.5 DP	10-24 x .300 DP	M5 x 0.8 x 7.6 DP	1/4-20 x .375 DP	M6 x 1.0 x 9.5 DP	5/16-18 x .551 DP	M8 x 1.25 x 14.0 DP
K2	.0947 x .187 DP	2.5 x 4.75 DP	.1283 x .200 DP	3.0 x 5.0 DP	.1283 x .200 DP	3.0 x 5.0 DP	.1908 x .354 DP	5.0 x 9.0 DP
K3	.216	5.5	.215	5.5	.239	6.1	.295	7.5
K4	.4724	12.0	.6694	17.0	.9450	24.0	.9844	25.0
K5	.7480	19.0	1.2206	31.0	1.4568	37.0	2.0080	51.0
K6	10-24 x .400 DP	M5 x 0.8 x 10.0 DP	1/4-20 x .500 DP	M6 x 1.0 x 12.7 DP	1/4-20 x .551 DP	M6 x 1.0 x 14.0 DP	5/16-18 x .630 DP	M8 x 1.25 x 16.0 DP
K7	#6	M4	#10	M5	#10	M5	1/4	M6
K8	.0947 x .187 DP	2.5 x 4.75 DP	.1283 x .200 DP	3.0 x 5.0 DP	.1283 x .200 DP	3.0 x 5.0 DP	.1908 x .354 DP	5.0 x 9.0 DP
K9	.256	6.5	.354	9.0	.472	12.0	.591	15.0
K10	.906	23.0	1.123	28.5	1.339	34.0	1.634	41.5
K11	.7480	19.0	1.2206	31.0	1.4568	37.0	2.0080	51.0
P1	10-32	M5 x 0.8	10-32	M5 x 0.8	10-32	M5 x 0.8	1/8 NPT	1/8 BSPP
P2	.433	11.0	.472	12.0	.710	18.0	.728	18.5
P3	.511	13.0	.669	17.0	.946	24.0	.905	23.0
P4	.236	6.0	.256	6.5	.348	8.8	.433	11.0
P5	.886	22.5	1.142	29.0	1.378	35.0	1.673	42.5

- NOTES:**  
 1) DESIGNATED  $\phi$  IS CENTERLINE OF UNIT  
 2) METRIC INFORMATION SHOWN IN [ ] OR SHOWN IN COLUMNS DESIGNATED mm  
 3) CIRCLED NUMBERS INDICATE POSITIONS

# DIMENSIONS: SERIES GRB GRIPPERS

## SIZE 40 & 50

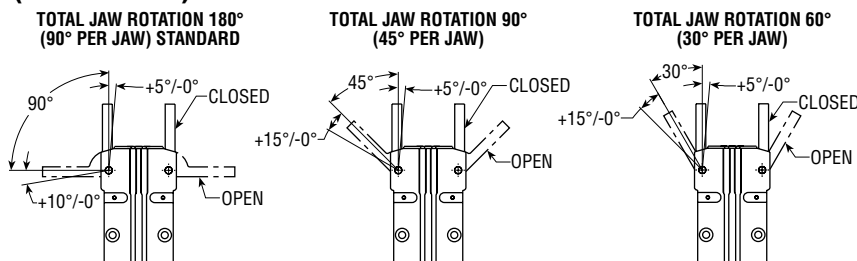


LETTER DIM	SIZE			
	40		50	
	in	mm	in	mm
B1	2.160	54.9	2.560	65.0
B2	4.060	103.1	6.220	158.0
B3	5.188	131.8	7.609	193.3
B4	3.380	85.9	4.880	124.0
B5	1.213	30.8	1.901	48.3
B6	1.134	28.8	1.676	42.6
J1	3.230	82.0	5.040	128.0
J2	.472	12.0	.708	18.0
J3	.079	2.0	.196	5.0
J4	3.975	101.0	5.708	145.0
J5	2.875	73.0	4.133	105.0
J6	1.080	27.4	1.280	32.5
J7	5/16-18 THRU	M8 x 1.25 THRU	3/8-16 THRU	M10 x 1.5 THRU
J8	.1283 THRU	3.0 THRU	.2533 THRU	6.0 THRU
J9	1.9094	48.5	2.9528	75.0
J10	.315	8.0	.394	10.0
J11	.945	24.0	1.181	30.0
J12	.3150	8.0	.3937	10.0
J13	.7875	20.0	.9840	25.0
K1	5/16-18 x .551 DP	M8 x 1.25 x 14.0 DP	3/8-16 x .787 DP	M10 x 1.5 x 20.0 DP
K2	.2533 x .397 DP	6.0 x 10.0 DP	.3158 x .590 DP	8.0 x 15.0 DP
K3	.352	8.9	.434	11.0
K4	1.4567	37.0	1.6930	43.0
K5	2.6772	68.0	4.0160	102.0
K6	3/8-16 x .787 DP	M10 x 1.5 x 20.0 DP	1/2-13 x .984 DP	M12 x 1.75 x 25.0 DP
K7	5/16	M8	3/8	M10
K8	.2533 x .397 DP	6.0 x 10.0 DP	.3158 x .590 DP	8.0 x 15.0 DP
K9	.551	14.0	.729	18.5
K10	2.401	61.0	3.485	88.5
K11	2.6772	68.0	4.0160	102.0
K12	1.102	28.0	1.457	37.0
K13	1.7323	44.0	2.8740	73.0
P1	1/8 NPT	1/8 BSPP	1/8 NPT	1/8 BSPP
P2	1.080	27.4	.414	10.5
P3	1.395	35.4	1.654	42.0
P4	.453	11.5	.551	14.0
P5	1.575	40.0	3.484	88.5

### NOTES:

- DESIGNATED  $\phi$  IS CENTERLINE OF UNIT
- METRIC INFORMATION SHOWN IN [ ] OR SHOWN IN COLUMNS DESIGNATED mm
- CIRCLED NUMBERS INDICATE POSITIONS

## ANGULAR JAW ROTATION TOLERANCE (ALL SIZES)



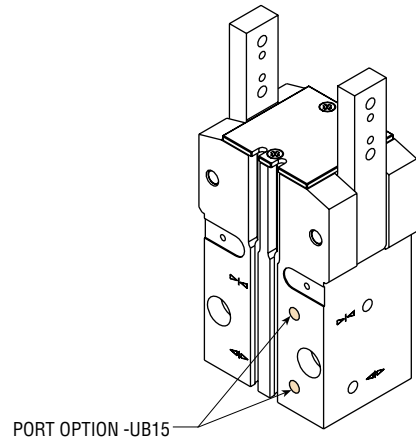
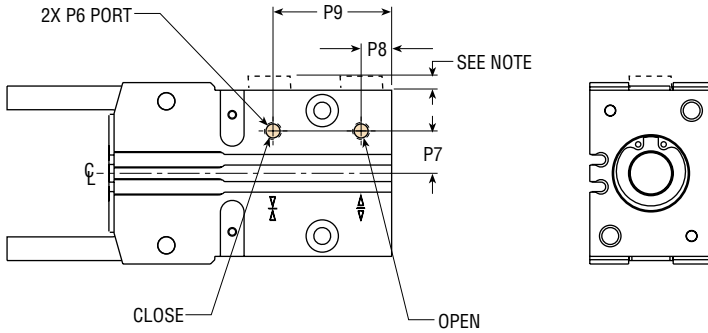
All dimensions are reference only unless specifically toleranced.

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# OPTIONS: SERIES GRB GRIPPERS

## UB15 PORT OPTION IN LOCATION 15

This option provides ports in Location 15. The standard ports are plugged.

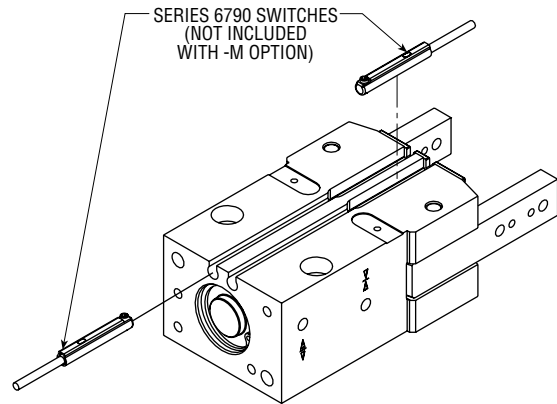


LETTER	SIZE											
	12		16		20		32		40		50	
DIM	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
P6	10-32	M5 x 0.8	10-32	M5 x 0.8	10-32	M5 x 0.8	1/8 NPT	1/8 BSPP	1/8 NPT	1/8 BSPP	1/8 NPT	1/8 BSPP
P7	.296	7.5	.374	9.5	.492	12.5	.728	18.5	.925	23.5	1.321	33.6
P8	.315	8.0	.256	6.5	.354	9.0	.571	14.5	.453	11.5	.551	14.0
P9	.906	23.0	1.122	28.5	1.378	35.0	1.730	43.9	1.575	40.0	3.484	88.5

NOTE: .098 [2.5 mm] PORT PLUG HEAD FOR SIZE 32, 40, & 50 METRIC UNITS ONLY

## M MAGNET FOR PHD SERIES 6790 REED AND SOLID STATE SWITCHES

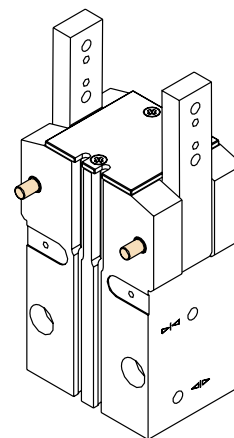
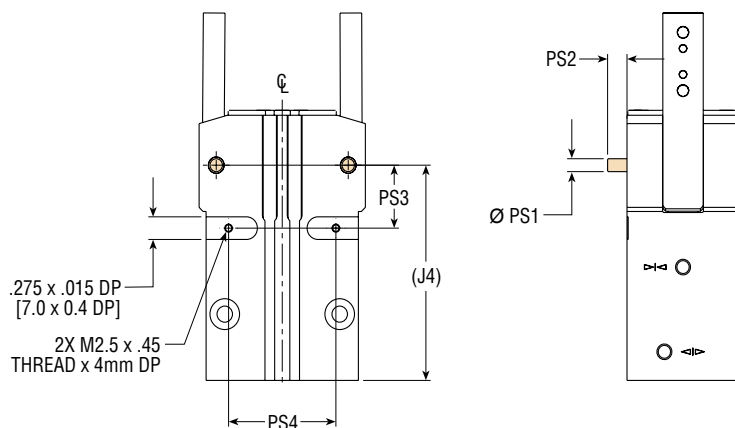
This option equips the unit with a magnetic piston for use with PHD's Series 6790 Reed and Solid State Switches. The switches mount easily into two small grooves located on the front of the gripper body and are locked into place with a set screw. PHD's Series 6790 switches are required in addition to the -M option and are sold separately. See accessories page for switch information.



# OPTIONS: SERIES GRB GRIPPERS

## CU SENSOR READY

With this option the gripper is assembled with extended jaw pivot pins for use with PHD inductive proximity switch mounting kits. Switches and switch mounting kits are required in addition to the -CU option and are sold separately. See next page for switches and mounting kits.



LETTER DIM	SIZE											
	12		16		20		32		40		50	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
Ø PS1	.079	2.0	.118	3.0	.157	4.0	.196	5.0	.196	5.0	.196	5.0
PS2	.236	6.0	.236	6.0	.295	7.5	.295	7.5	.295	7.5	.295	7.5
PS3	.523	13.3	.671	17.0	.765	19.4	.612	15.5	.612	15.5	.612	15.5
PS4	.828	21.0	1.060	26.9	1.360	34.5	2.100	53.3	2.930	74.4	4.740	120.4
(J4)	1.752	44.5	2.146	54.5	2.618	66.5	3.287	83.5	3.975	101.0	5.708	145.0

All dimensions are reference only unless specifically toleranced.

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# ACCESSORIES: SERIES GRB GRIPPERS

## PROXIMITY SWITCHES (-CU OPTION REQUIRED)

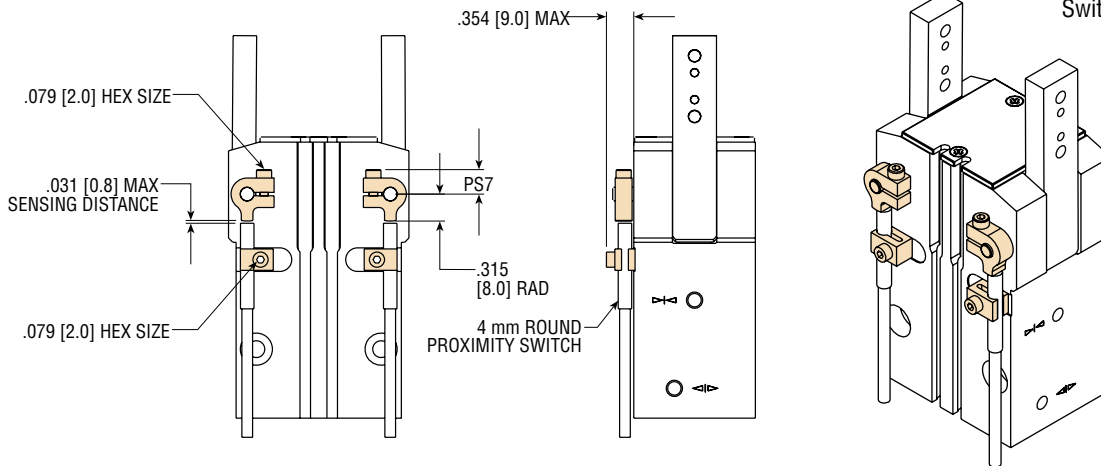
### 4 mm ROUND INDUCTIVE PROXIMITY SWITCHES

PART NUMBER	DESCRIPTION
18430-001-02	NPN (Sink) 10-30 VDC, 2 meter cable
18430-002-02	PNP (Source) 10-30 VDC, 2 meter cable

### PROXIMITY SWITCH MOUNTING KITS

SIZE	KIT NUMBER
12	18074
16	18090
20	18075
32	18091
40	18091
50	18091

Each kit contains 1 target, 1 switch mounting bracket, and fasteners for mounting. Switches sold separately.



LETTER DIM	SIZE											
	12		16		20		32		40		50	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
PS7	.236	6.0	.236	6.0	.295	7.5	.295	7.5	.295	7.5	.295	7.5



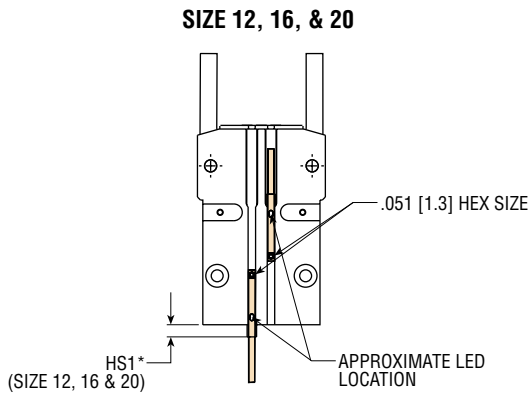
# ACCESSORIES: SERIES GRB GRIPPERS

## SERIES 6790 SWITCHES (-M OPTION REQUIRED)

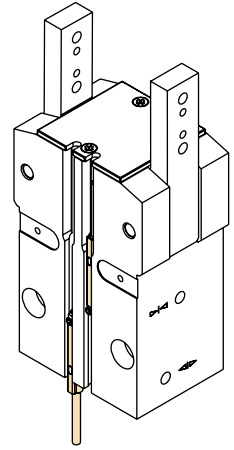
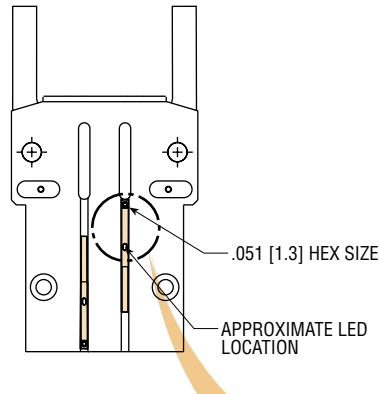
See Switches and Sensors section for additional switch information and complete specification.

### SERIES 6790 SOLID STATE & REED SWITCHES

PART NUMBER	DESCRIPTION
67923-1	NPN (Sink) Solid State, 4.5-30 VDC, Quick Connect
67903-1-02	NPN (Sink) Solid State, 4.5-30 VDC, 2 Meter Cable
67903-1-05	NPN (Sink) Solid State, 4.5-30 VDC, 5 Meter Cable
67924-1	PNP (Source) Solid State, 4.5-30 VDC, Quick Connect
67904-1-02	PNP (Source) Solid State, 4.5-30 VDC, 2 Meter Cable
67904-1-05	PNP (Source) Solid State, 4.5-30 VDC, 5 Meter Cable
67922-1	PNP (Source) or NPN (Sink) DC Reed, 4.5-30 VDC, Quick Connect
67902-1-02	PNP (Source) or NPN (Sink) DC Reed, 4.5-30 VDC, 2 Meter Cable
67902-1-05	PNP (Source) or NPN (Sink) DC Reed, 4.5-30 VDC, 5 Meter Cable
67929-2	AC Reed, Current Limited, Quick Connect

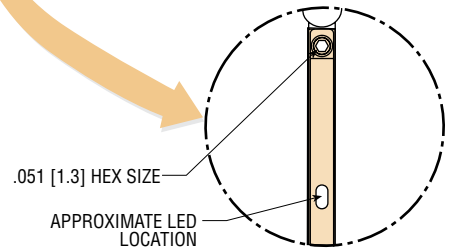


### SIZE 32, 40, & 50



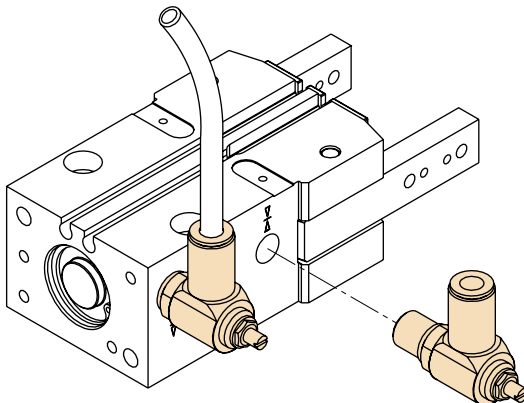
LETTER DIM	SIZE											
	12		16		20		32		40		50	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
HS1*	.350	8.9	.300	7.6	.200	5.1	—	—	—	—	—	—

NOTE: \* INDICATES END OF SERIES 6790 SWITCH HOUSING, DOES NOT INCLUDE CABLE.



## FLOW CONTROLS

This accessory may be used to control the jaw actuation speed of the gripper. By decreasing the jaw actuation speed, the tooling inertia may be increased.



### IMPERIAL FLOW CONTROLS

GRIPPER SIZE	PORT SIZE	TUBE OD	KIT NUMBER
12	10-32 UNC-2B	5/32"	70695-01
16	10-32 UNC-2B	5/32"	70695-01
20	10-32 UNC-2B	5/32"	70695-01
32	1/8 NPT	1/4"	70695-03
40	1/8 NPT	1/4"	70695-03
50	1/8 NPT	1/4"	70695-03

NOTE: EACH KIT CONTAINS 1 FLOW CONTROL

### METRIC FLOW CONTROLS

GRIPPER SIZE	PORT SIZE	TUBE OD	KIT NUMBER
12	M5 x 0.8	4.0 mm	70696-01
16	M5 x 0.8	4.0 mm	70696-01
20	M5 x 0.8	4.0 mm	70696-01
32	1/8 BSP	6.0 mm	70696-03
40	1/8 BSP	6.0 mm	70696-03
50	1/8 BSP	6.0 mm	70696-03

NOTE: EACH KIT CONTAINS 1 FLOW CONTROL

All dimensions are reference only unless specifically toleranced.

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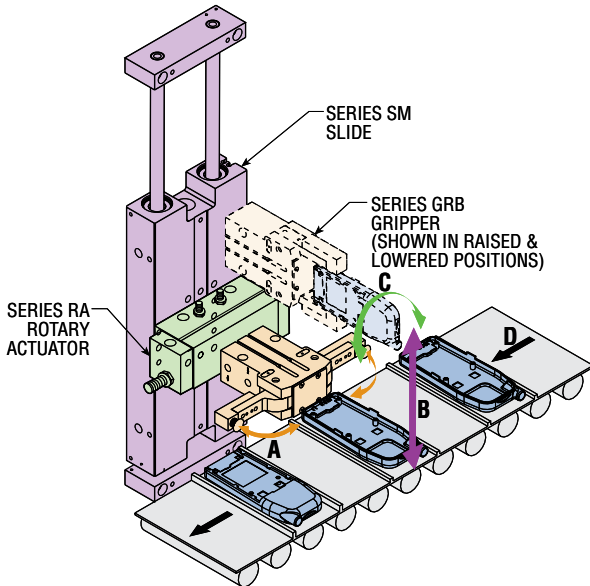
# APPLICATIONS & CONCEPTS: SERIES GRB GRIPPERS

The Series GRB 180° Angular Grippers are ideal for applications where the jaws or fingers must rotate completely clear of the work area. In this application, a Series GRB 180° Angular Gripper is used in conjunction with a PHD Series RA Rotary Actuator and a PHD Series SM Slide to grasp, lift, and rotate a part 180°. The Series GRB Gripper's jaws rotate clear of the work area when not in use, eliminating the need for an additional horizontal axis of movement. The use of a typical gripper would require an actuator to move the gripper back out of the way after the part has been rotated. The Series GRB 180°

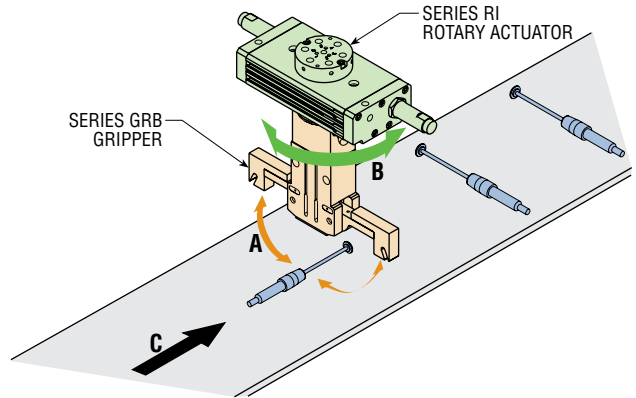
Angular Gripper saves money by eliminating a linear actuator from this application.

This application shows the Series GRB 180° Angular Gripper used in conjunction with a PHD Series RI Rotary Actuator to grasp a part and rotate it 90°. The gripper is able to grasp the object, change its position 90°, and replace the object without the use of a vertical axis. Once the object has been replaced, the Series GRB jaws rotate completely clear of the work area, allowing normal work flow. As in the other example, an axis of motion is eliminated, saving money.

GRB



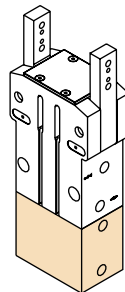
ACTIONS: A- CLOSE, B- UP, C- ROTATE 180°, B- DOWN, A- OPEN, D- MOVE



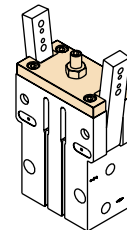
ACTIONS: A- CLOSE, B- ROTATE 90°, A- OPEN, C- MOVE

## PHD UNLIMITED™ UNIQUE SOLUTIONS

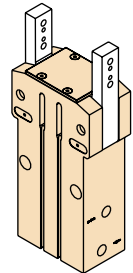
- Smaller or larger bore sizes
- Alternate angles of rotation
- Fluid compatibility
- Alternate port locations
- Alternate mounting locations
- Manifold ports



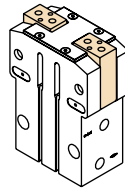
TANDEM



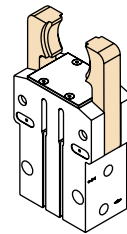
ROTATION ADJUSTMENT



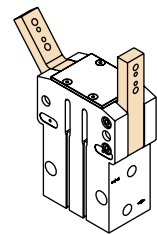
SPRING ASSIST



ALTERNATE JAW



ALTERNATE JAW



SINGLE JAW ROTATION