

# IMPORTANT INFORMATION DO NOT DISCARD!

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

## Ordering Data

### TO ORDER SPECIFY:

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

**SERIES**  
R - Regular Duty

**JAW VARIATION**  
1 - Non-locking

**DESIGN NO.**  
(See Note)  
2 - Imperial  
6 - Metric

**OPTIONS**  
(OMIT IF NOT REQUIRED)

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

**SWITCH OPTIONS**  
CU - Proximity switch ready  
M - Magnet for Series 6790  
& JC1 Switches

**G R B 1 1 - 2 - 12 x 180 - UB15-M**

**PRODUCT**  
G - Gripper

**TYPE**  
B - 180° Angular

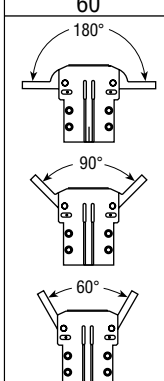
**JAW**  
1 - Style 1

**BORE SIZE**  
Diameter  
mm (in)

12	(.472)
16	(.630)
20	(.787)
32	(1.260)
40	(1.575)
50	(1.969)

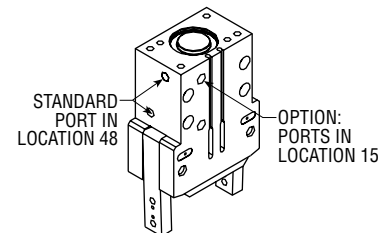
**TOTAL JAW ROTATION (DEGREES)**

180 (Standard)
90
60



**4 mm ROUND INDUCTIVE PROXIMITY SWITCHES**

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



STANDARD PORT IN LOCATION 48

OPTION: PORTS IN LOCATION 15

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



For additional technical assistance, call or visit our web site:

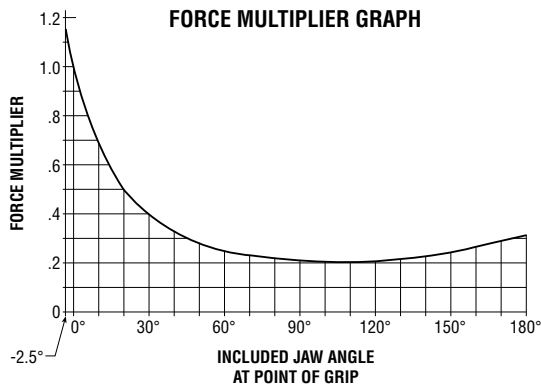
**phd, Inc.**

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# ENGINEERING DATA: SERIES GRB GRIPPERS

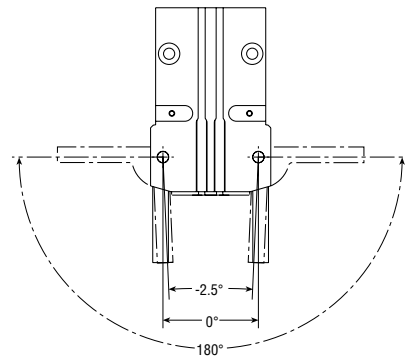
SPECIFICATIONS	SERIES GRB
OPERATING PRESSURE	30 psi min to 100 psi max [2 bar min to 7 bar max] air
STANDARD UNIT	
OPERATING TEMPERATURE	-20° to +180°F [-28° to +82°C]
RATED LIFE	5 million cycles minimum with standard seals
CYCLE TIME	See table below
LUBRICATION	Factory lubricated for rated life
MAINTENANCE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

SIZE	NOMINAL TOTAL JAW ROTATION	GRIP FORCE FACTOR $G_F$				GRIPPER WEIGHT		CLOSE TIME 87 psi [6 bar]	OPEN TIME 87 psi [6 bar]	DISPLACEMENT	
		EXTERNAL GRIP		INTERNAL GRIP							
		IMPERIAL	METRIC	IMPERIAL	METRIC	lb	kg	sec	sec	in³	cm³
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:

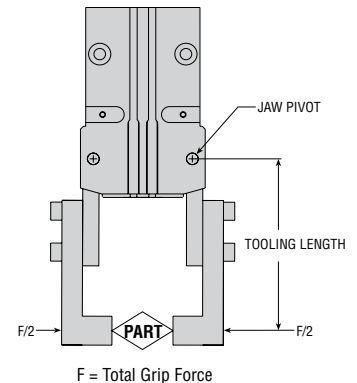
$$\frac{\text{PRESSURE (psi)} \times G_F}{\text{DISTANCE FROM JAW PIVOT (in)}} \times \text{FORCE MULTIPLIER} = \text{TOTAL GRIP FORCE (lb)}$$

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

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)



# ENGINEERING DATA: SERIES GRB GRIPPERS

## MAXIMUM ALLOWABLE FORCES & MOMENTS ON GRIPPER JAWS

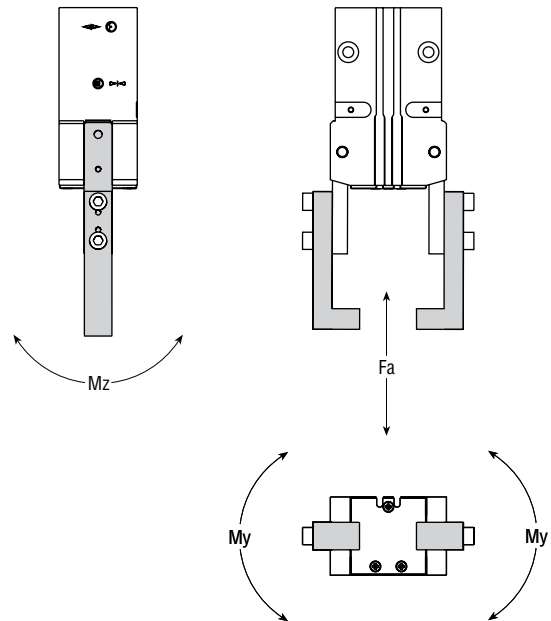
SIZE	MAX TOOLING LENGTH		Fa (TENSION OR COMPRESSION)		My		Mz	
	in	mm	lb	N	in-lb	Nm	in-lb	Nm
12	3	75	20	90	20	2.3	20	2.3
16	4	100	40	180	40	5	40	5
20	4.5	115	80	355	60	7	60	7
32	5	125	175	780	120	14	120	14
40	6	150	380	1690	300	34	300	34
50	8	200	700	3110	600	68	600	68

**My, Mz:** Allowable moments per jaw. Moments measured from the jaw pivot.

**Fa:** Allowable total force

**Max Tooling Length:** Measured from jaw pivot.

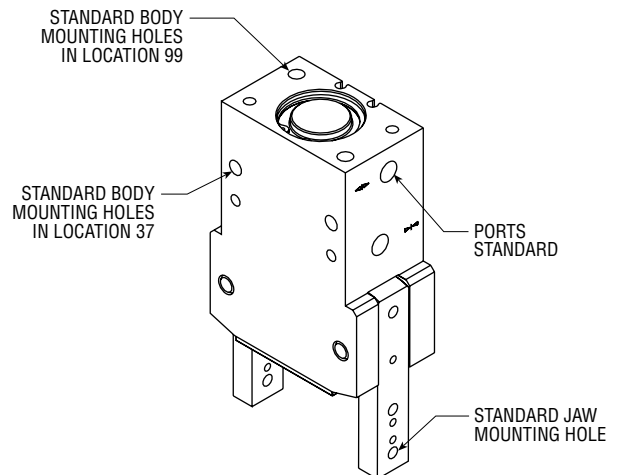
**Note:** When calculating values for **My**, **Mz**, and **Fa**, include the grip force per jaw, tooling weight, part weight, external forces, and acceleration, as applicable.



# MOUNTING TORQUES: SERIES GRB GRIPPERS

## RECOMMENDED MOUNTING TORQUES

GRIPPER MODEL	BODY MOUNTING HOLES IN LOCATION 99		BODY MOUNTING HOLES IN LOCATION 37		JAW MOUNTING HOLES	
	in-lb	Nm	in-lb	Nm	in-lb	Nm
GRB11-2-12	20	2.3	45	5.1	20	2.3
GRB11-2-16	45	5.1	110	12	35	4.0
GRB11-2-20	110	12	110	12	60	6.8
GRB11-2-32	230	26	230	26	110	12
GRB11-2-40	230	26	400	45	230	26
GRB11-2-50	400	45	600	68	400	45
GRB11-6-12	30	3.4	60	6.8	30	3.4
GRB11-6-16	60	6.8	100	11	30	3.4
GRB11-6-20	250	28	100	11	60	6.8
GRB11-6-32	250	28	250	28	100	11
GRB11-6-40	250	28	500	56	250	28
GRB11-6-50	500	56	600	68	500	56



- NOTES:**
- 1) Assumes use of 75% of full thread depth.
  - 2) Assumes use of high strength steel socket head cap screws.
  - 3) PHD recommends the use of threadlocker on mounting threads.

# START-UP PROCEDURES: SERIES GRB GRIPPERS

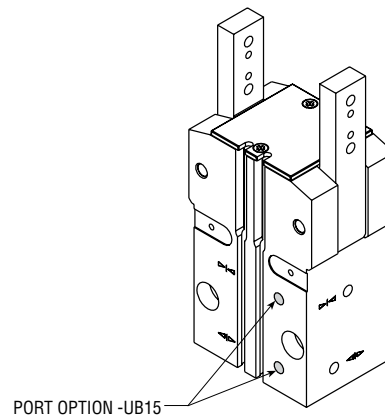
Gripper should be securely mounted with all tooling and external flow control devices attached prior to applying pressure to unit. Care should be taken to provide adequate clearance for jaws to open and close. At initial start-up, apply pressure slowly to unit.

# OPTIONS: SERIES GRB GRIPPERS

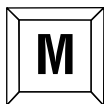


## UB15 PORT OPTION IN LOCATION 15

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



PORT OPTION -UB15



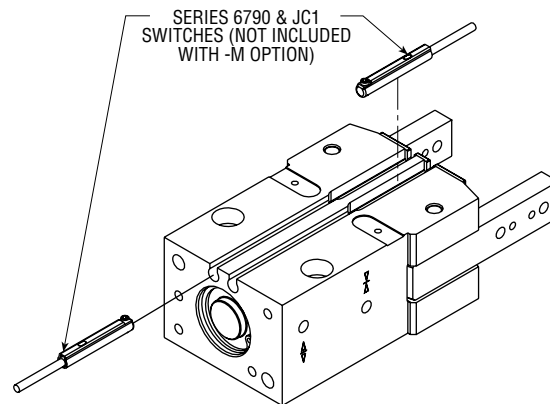
## M MAGNET FOR PHD SERIES 6790 & JC1 SWITCHES

This option equips the unit with a magnetic piston for use with PHD's Series 6790 and JC1 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 and JC1 Switches are required in addition to the -M option and are sold separately.

### SERIES 6790 & JC1 SWITCHES

PART NO.	DESCRIPTION
67902-1-05	PNP (Source) or NPN (Sink) Reed, 4.5-30 VDC, 5 m cable
JC1SDN-5	NPN (Sink) Solid State, 10-30 VDC, 5 m cable
JC1SDP-5	PNP (Source) Solid State, 10-30 VDC, 5 m cable
67922-1	PNP (Source) or NPN (Sink) Reed, 4.5-30 VDC, Quick Connect
JC1SDN-K	NPN (Sink) Solid State, 10-30 VDC, Quick Connect
JC1SDP-K	PNP (Source) Solid State, 10-30 VDC, Quick Connect
67929-2	PNP (Source) or NPN (Sink) Reed, 65-120 VDC, Quick Connect

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



SERIES 6790 & JC1 SWITCHES (NOT INCLUDED WITH -M OPTION)

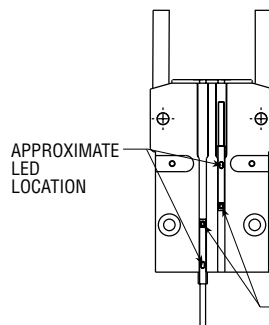
### TORQUE CHART

SWITCH	TORQUE
6790	16 in-oz
JC1SDx	Hand tighten clockwise until switch is securely retained. Do not overtighten.

### SERIES 6790 & JC1SDx CORDSET CHART

PART NO.	DESCRIPTION
63549-02	M8, 3 pin, Straight Female Connector, 2 m cable
63549-05	M8, 3 pin, Straight Female Connector, 5 m cable

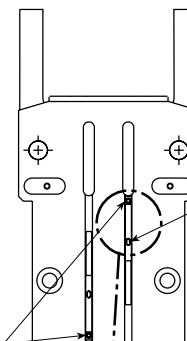
### TYPICAL SWITCH MOUNTING ORIENTATION SIZES 12, 16, & 20



APPROXIMATE LED LOCATION

SWITCH MOUNTING SCREW

### TYPICAL SWITCH MOUNTING ORIENTATION SIZES 32, 40, & 50

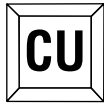


APPROXIMATE LED LOCATION

SWITCH MOUNTING SCREW

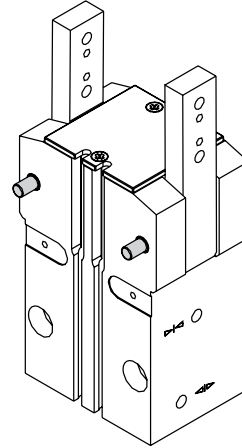
APPROXIMATE LED LOCATION

## OPTIONS: SERIES GRB GRIPPERS



### SENSOR READY

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



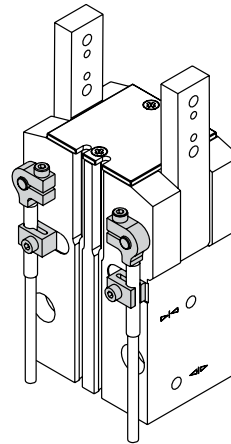
## ACCESSORIES: SERIES GRB GRIPPERS

### PROXIMITY SWITCHES (-CU OPTION REQUIRED)

See Switches and Sensors section for complete switch specifications.

#### 4 mm ROUND INDUCTIVE PROXIMITY SWITCHES

PART NO.	DESCRIPTION
18430-001-02	NPN (Sink) 2 meter cable
18430-002-02	PNP (Source) 2 meter cable



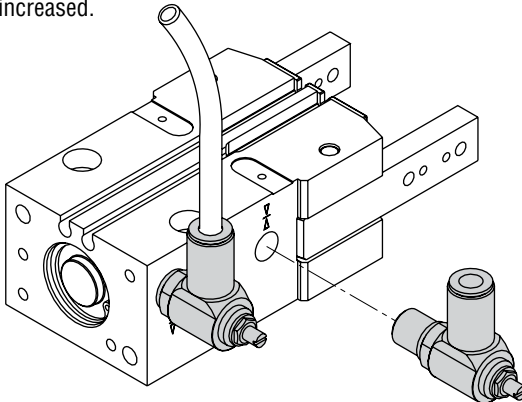
#### PROXIMITY SWITCH MOUNTING KITS

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.

### 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

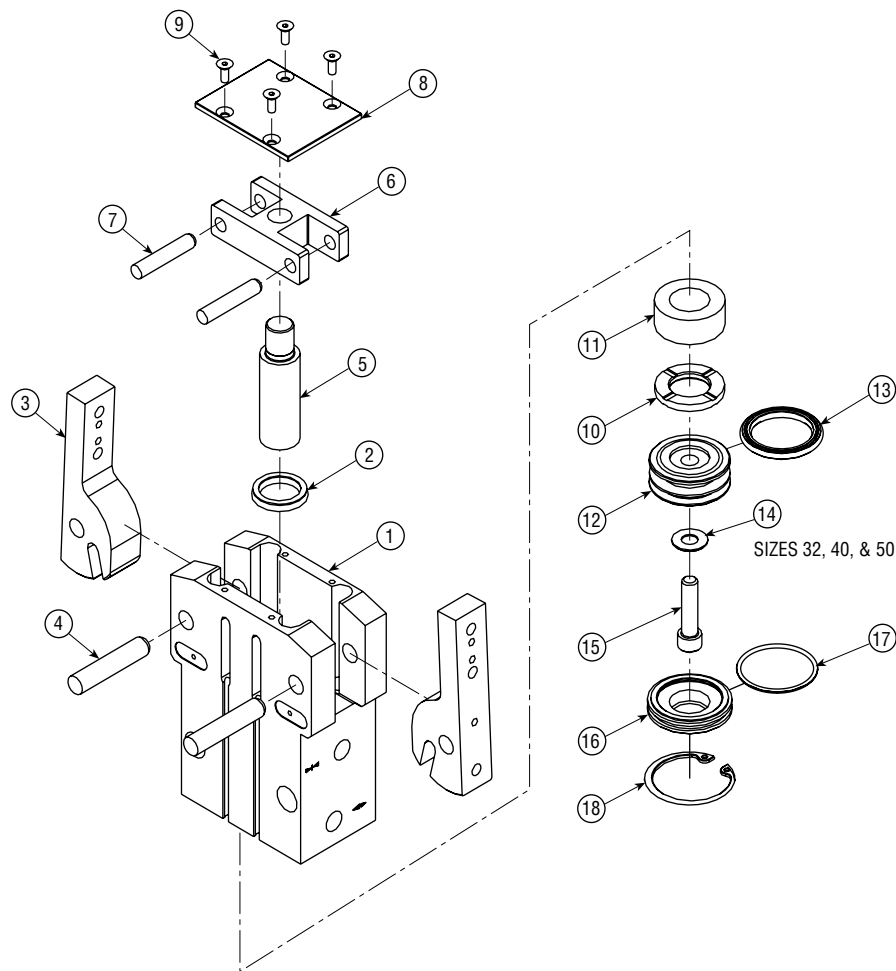
NOTE: EACH KIT CONTAINS 1 FLOW CONTROL

#### 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

# PARTS LIST & KITS: SERIES GRB GRIPPERS



KEY	PART DESCRIPTION	SIZE 12	SIZE 16	SIZE 20	SIZE 32	SIZE 40	SIZE 50
1	Body Assembly				Full unit description required -H2400		
3	Jaw				Full unit description required -H2600		
4	Pivot Pin For Jaws				Full unit description required -H2621		
5	Rod				Full unit description required -H5810		
6	Jaw Driver				Full unit description required -H5610		
7	Pivot Pin For Jaw Driver				Full unit description required -H2622		
8	Jaw Slot Cover				Full unit description required -H1200		
9	Jaw Slot Cover Assembly Fasteners				Full unit description required -H1440 for all fasteners, -H1441 for one fastener		
11	Angle Limiting Spacer				Full unit description required -H2100		
12	Piston				Full unit description required -H1005		
14	Washer (Sizes 32, 40, & 50)	—	—	—	6273-017	6273-015	6273-015
15	Piston Assembly Fastener				Full unit description required -H2050		
16	Bore Plug				Full unit description required -H3100		
18	Bore Plug Retainer				Full unit description required -H7101		
2	Rod Seal				Sold as part of Seal Kit		
10	Shock Pad				Sold as part of Seal Kit or available separately as -H1800 with full unit description		
13	Piston Seal				Sold as part of		
17	Bore Plug Seal				Seal Kit		

## KITS

KIT DESCRIPTION	SIZE 12		SIZE 16		SIZE 20		SIZE 32		SIZE 40		SIZE 50	
	IMPERIAL	METRIC	IMPERIAL	METRIC	IMPERIAL	METRIC	IMPERIAL	METRIC	IMPERIAL	METRIC	IMPERIAL	METRIC
Seal Kit												
	Full unit description required -H9000											
Port Control Kit	70695-01	70696-01	70695-01	70696-01	70695-01	70696-01	70695-03	70696-03	70695-03	70696-03	70695-03	70696-03
Proximity Switch Mounting Kit	18074		18090		18075		18091		18091		18091	



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