

GRH



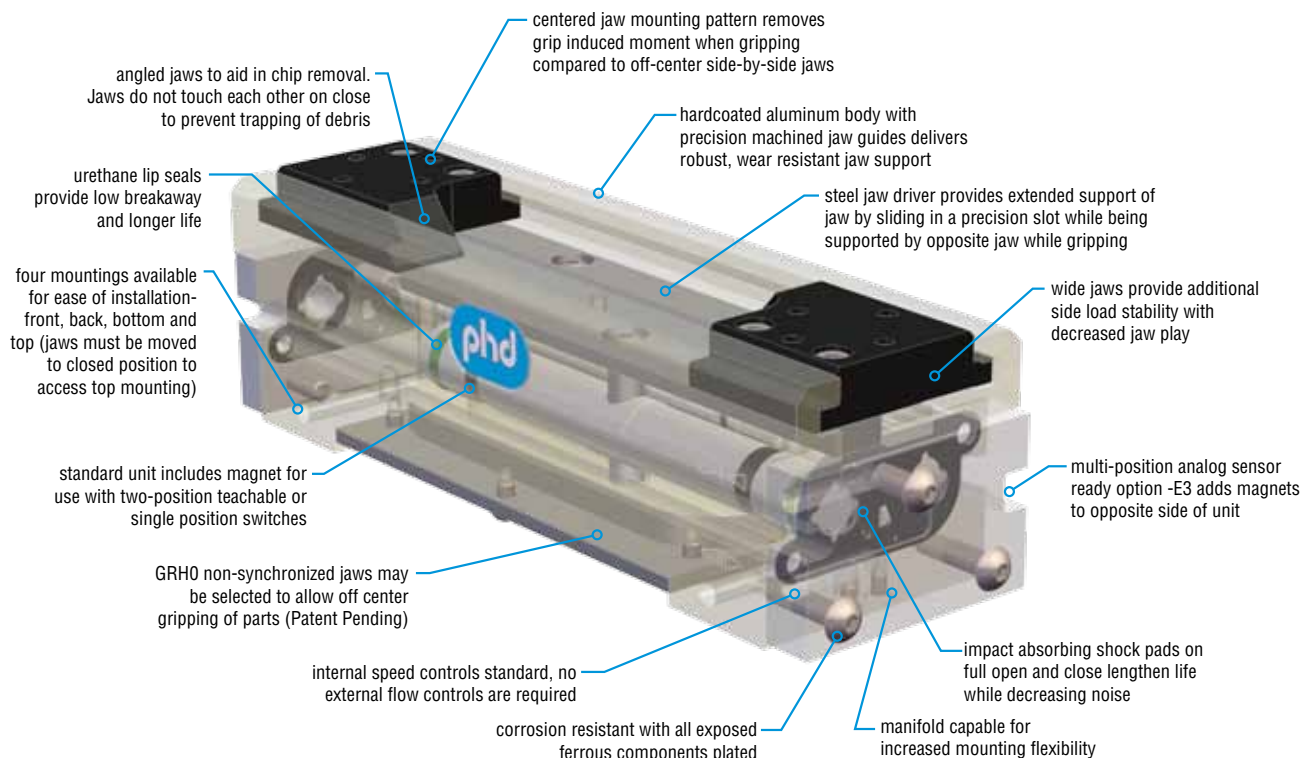
PARALLEL LONG TRAVEL PNEUMATIC GRIPPER



PATENT PENDING

Major Benefits

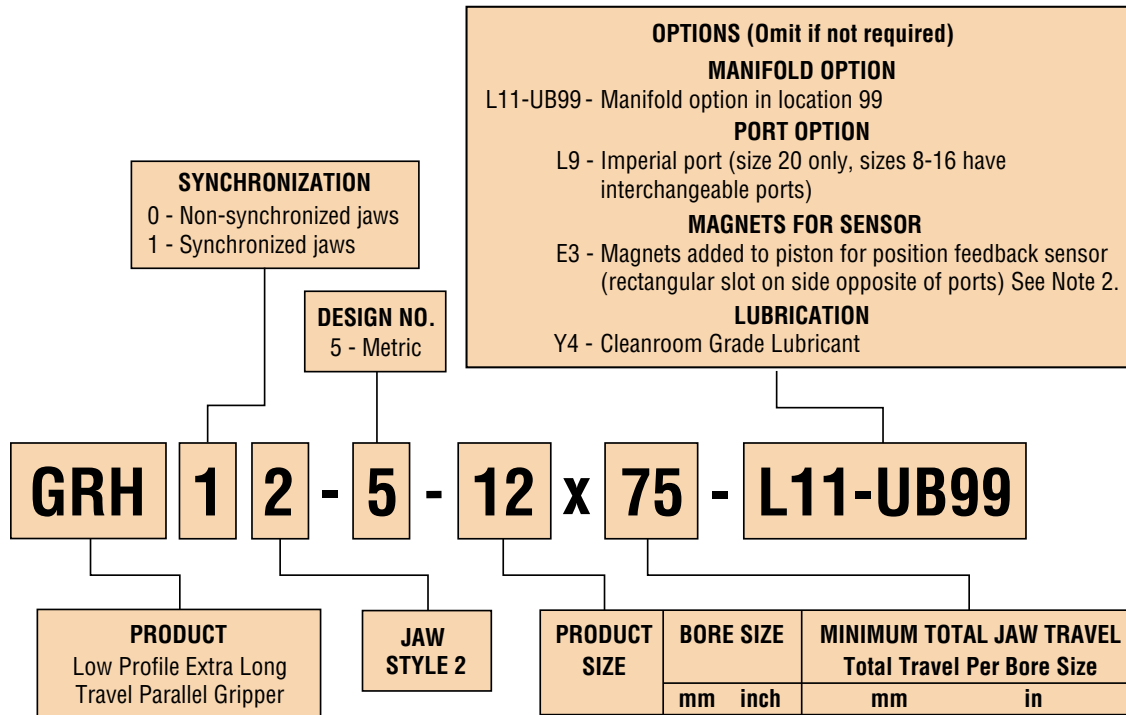
- Compact, low profile design with long jaw travel and large moment capacities
- Total jaw travels up to 125 mm (4.921 in) allows for larger parts, encapsulated tooling or gripping of multiple size parts
- Four sizes with dual bore provides high total grip force
- “Extended-support” guide system with “wide slot jaws” minimizes tooling deflection when gripping
- Low breakaway allows for gripping of delicate parts
- Manifold porting capability allows for nested gripper installation
- Mounting provided from top, bottom, front, and back of gripper
- Available with metric and imperial ports
- H9-tolerance dowel pin holes included for easy, accurate alignment of tooling and gripper mounting
- Integrated shock pads for quiet operation
- Switch ready



ORDERING DATA: SERIES GRH PARALLEL GRIPPERS

TO ORDER SPECIFY:

Product, Design No., Size, Minimum Total Jaw Travel, and any options required.



NOTES:

- 1) Corrosion resistant coating and material is standard.
- 2) Magnets for Series JC Switches, port side, are standard.

SERIES JC1SD MAGNETIC SWITCHES

PART NO.	SWITCH DESCRIPTION
JC1SDP-5	PNP (Source), Solid State, 10-30 VDC, 5 meter cable
JC1SDP-K	PNP (Source), Solid State, 10-30 VDC, Quick Connect
JC1SDN-5	NPN (Sink), Solid State, 10-30 VDC, 5 meter cable
JC1SDN-K	NPN (Sink), Solid State, 10-30 VDC, Quick Connect

Includes one switch and installation directions

MATCHING CORDSET

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

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

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

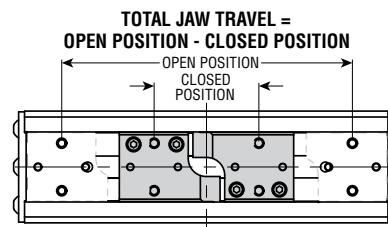
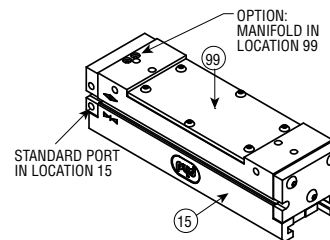
PRODUCT SIZE	BORE SIZE		MINIMUM TOTAL JAW TRAVEL Total Travel Per Bore Size	
	mm	inch	mm	in
8	8	(.315)	50	(1.969)
12	12	(.472)	75	(2.953)
16	16	(.630)	100	(3.937)
20	20	(.787)	125	(4.921)



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.

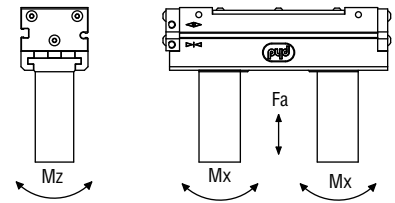


CAD & Sizing Assistance

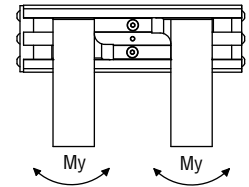
Use PHD's free online Product Sizing and CAD Configurator at www.phdinc.com/myphd

ENGINEERING DATA: SERIES GRH PARALLEL GRIPPERS

SPECIFICATIONS	SERIES GRH	
	METRIC	IMPERIAL
OPERATING PRESSURE (SIZE 12,16, 20) (SIZE 8)	1.4 bar min to 6.9 bar max	20 psi min to 100 psi max
OPERATING TEMPERATURE	-28°C min to 82°C max	-20°F min to 180°F max
GRIP REPEATABILITY	±.05 mm of original position	±.002 in of original position
RATED LIFE	5 million cycles	
LUBRICATION	Factory lubricated for rated life	



SIZE	MINIMUM TOTAL JAW TRAVEL		TOTAL GRIP FORCE AT 6 bar [87 psi]		GRIPPER WEIGHT		ONE DIRECTION DISPLACEMENT		CLOSE OR OPEN TIME AT 6 bar [87 psi]	MAX TOOLING LENGTH		GRIP FORCE FACTOR	
	mm	in	N	lb	kg	lb	cm ³	in ³	sec	mm	in	METRIC	IMP
8	50	1.969	53	12	0.34	.76	3.65	0.223	.180	75	2.95	8.9	0.14
12	75	2.953	120	27	0.79	1.75	10.47	0.639	.215	100	3.94	20.0	0.31
16	100	3.937	214	48	1.46	3.21	23.30	1.422	.270	125	4.92	35.6	0.55
20	125	4.921	334	75	2.51	5.53	43.21	2.637	.350	150	5.91	55.6	0.86



SIZE	AXIAL FORCE		MAXIMUM INDIVIDUAL MOMENTS					
	F_a		M_x		M_y		M_z	
	N	lb	N-m	in-lb	N-m	in-lb	N-m	in-lb
8	98	22	3	30	2	20	2	20
12	222	50	11	95	7	65	7	65
16	400	90	24	215	17	150	17	150
20	667	150	46	405	32	285	32	285

- F_a : Total for both jaws
- M_x : Maximum allowable moment per jaw, relative to the reference plane
- M_y : Maximum allowable moment per jaw, relative to the geometric center of the jaw finger
- M_z : Maximum allowable moment per jaw, relative to the reference plane

When calculating the value for F_a , include the tooling weight, part weight, external forces, and accelerations. When calculating values for M_x , M_y , and M_z , include the grip force per jaw, tooling weight, part weight, external forces, and accelerations as applicable.

RECOMMENDATIONS

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

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

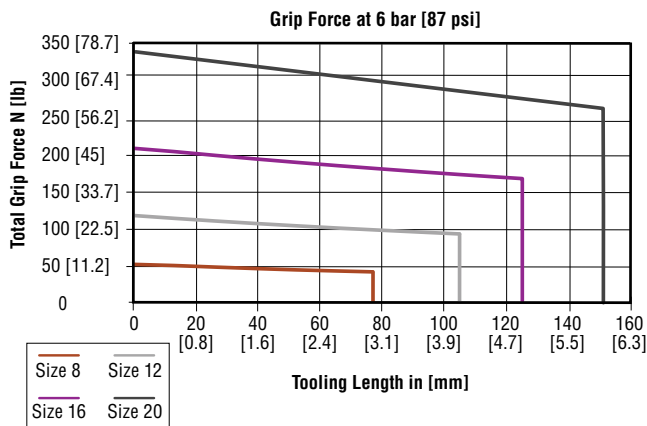
A synchronized unit is not recommended for use as a force multiplier for a single jaw.

TOOLING LENGTH FACTOR

As the grip point is moved away from the jaw surface the grip force is reduced due to additional friction generated by the grip induced moment. The tooling length factor allows calculation of the grip force at any grip point. The graph also indicates the maximum tooling length for each gripper size.

GRIP FORCE

Total gripping force relative to tooling length is shown below at 6 bar [87 psi] pressure. Grip force per jaw equals the total grip force divided by two. The graphs also indicate the maximum tooling length for each gripper size.



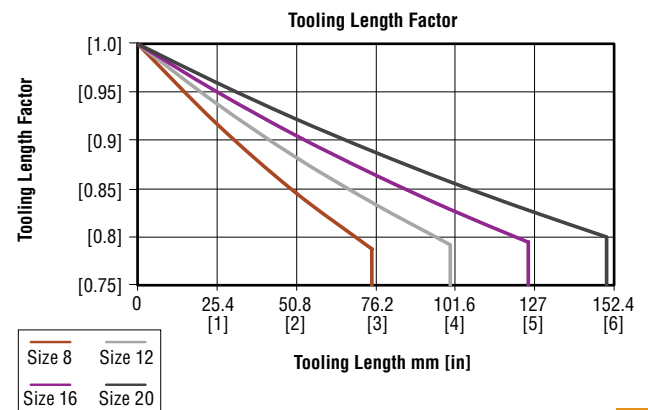
GRIP FORCE CALCULATION EQUATIONS:

METRIC:

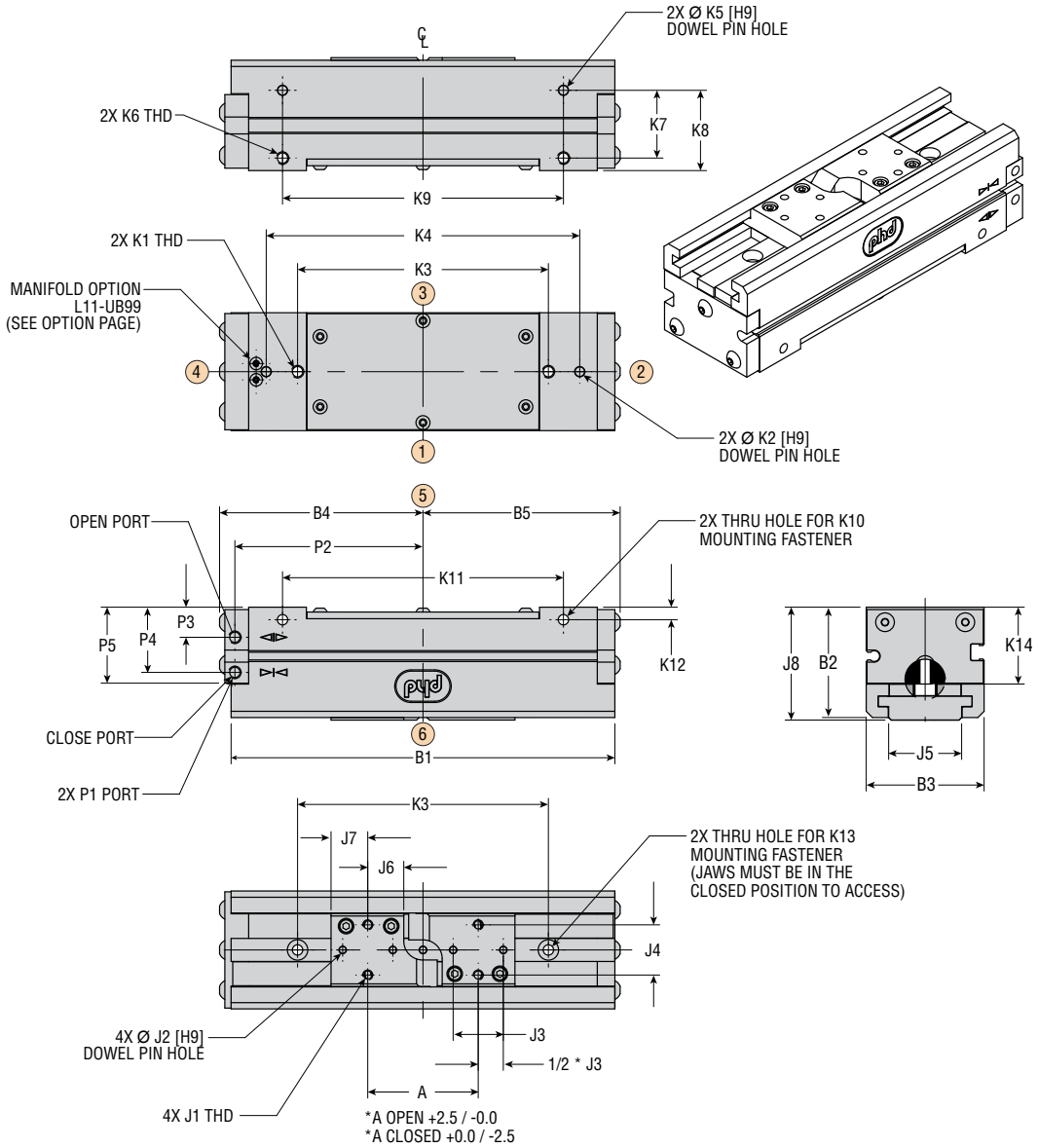
$$\text{Total Grip Force (N)} = (\text{Pressure [bar]} \times G_f) \times \text{Tooling Length Factor}$$

IMPERIAL:

$$\text{Total Grip Force (lb)} = (\text{Pressure [psi]} \times G_f) \times \text{Tooling Length Factor}$$



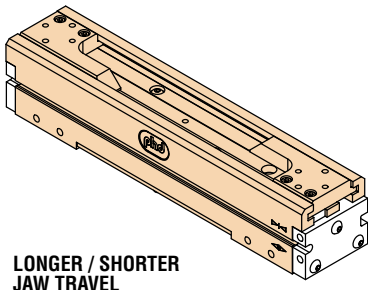
DIMENSIONS: SERIES GRH PARALLEL GRIPPERS



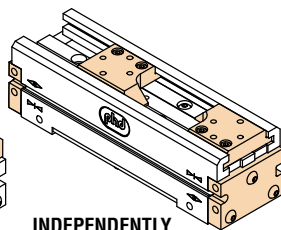
GRH



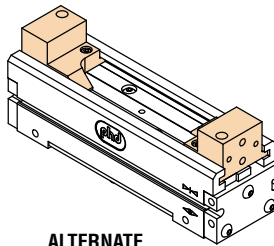
Illustrations are concept only. Contact your local PHD Distributor for more information.



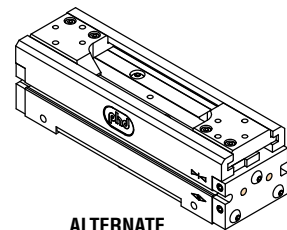
LONGER / SHORTER JAW TRAVEL



INDEPENDENTLY POWERED JAWS



ALTERNATE JAW STYLES



ALTERNATE PORT LOCATIONS

DIMENSIONS: SERIES GRH PARALLEL GRIPPERS

LETTER DIM	MODEL NUMBER			
	GRHx2-5-8 x 50	GRHx2-5-12 x 75	GRHx2-5-16 x 100	GRHx2-5-20 x 125
	mm	mm	mm	mm
MINIMUM TOTAL TRAVEL BOTH JAWS	50.0	75.0	100.0	125.0
A CLOSED *	35.0	45.0	60.0	70.0
A OPEN *	85.0	120.0	160.0	195.0
B1	109.0	153.0	195.0	237.5
B2	34.1	44.0	53.0	62.0
B3	38.0	47.0	57.0	68.0
B4	58.6	81.1	100.9	126.7
B5	56.1	78.6	99.9	121.7
J1	M3 x 0.5 x 6.5mm DP	M4 X 0.7 x 8mm DP	M5 x 0.8 x 9mm DP	M6 x 1.0 x 12mm DP
J2	2.5mm x 2.5mm DP	3mm x 3mm DP	4mm x 4mm DP	5mm x 5mm DP
J2 PIN SIZE	2.5mm	3mm	4mm	5mm
J3	15.0	20.0	22.0	25.0
J4	14.0	20.0	25.0	32.0
J5	20.6	29.1	37.0	45.5
J6	12.5	14.4	16.8	17.9
J7	10.9	14.6	15.7	20.1
J8	35.0	45.0	54.0	63.0
K1	M4 x 0.7 x 8mm DP	M5 x 0.8 x 10mm DP	M6 x 1.0 x 12mm DP	M8 x 1.25 x 16mm DP
K2	∅ 3mm x 3mm DP	∅ 4mm x 4mm DP	∅ 5mm x 5mm DP	∅ 6mm x 6mm DP
K2 PIN SIZE	3mm	4mm	5mm	6mm
K3	68.0	100.0	130.0	160.0
K4	82.0	125.0	160.0	200.0
K5	∅ 3mm x 3mm DP	∅ 4mm x 4mm DP	∅ 5mm x 5mm DP	∅ 6mm x 6mm DP
K5 PIN SIZE	3mm	4mm	5mm	6mm
K6	M4 x 0.7 x 8mm DP	M5 x 0.8 x 10mm DP	M6 x 1.0 x 12mm DP	M8 x 1.25 x 16mm DP
K7	22.0	27.0	32.0	36.0
K8	26.0	32.0	38.0	44.0
K9	75.0	112.0	145.0	180.0
K10	M3	M4	M5	M6
K11	75.0	112.0	145.0	180.0
K12	4.0	5.0	6.0	8.0
K13	M3	M4	M5	M6
K14	23.4	30.6	36.6	42.9
P1	M5 x 0.8	M5 x 0.8	M5 x 0.8	**1/8 BSPP
P2	53.0	75.0	94.8	116.4
P3	9.8	12.0	14.5	15.0
P4	21.3	26.0	31.5	34.5
P5	25.4	30.3	35.7	41.4

NOTES:

- 1) ALL DIMENSIONS ARE REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED
- 2) A OPEN REFLECTS SMALLEST POSSIBLE OPEN DIMENSION
A CLOSED REFLECTS LARGEST POSSIBLE CLOSED DIMENSION
- 3) CIRCLED NUMBERS INDICATE POSITIONS
- 4) DESIGNATED \varnothing IS CENTERLINE OF UNIT
- 5) ** SEE OPTION -L9 FOR NPT PORT
- 6) IMPERIAL VALUE = mm/25.4

All dimensions are reference only unless specifically toleranced.

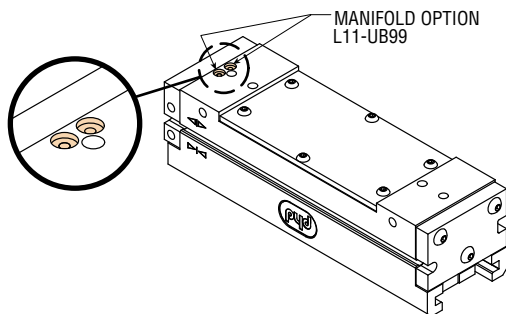
www.phdinc.com/grh • (800) 624-8511

OPTIONS: SERIES GRH PARALLEL GRIPPERS

L11-UB99 MANIFOLD PORTS

With this option the gripper is configured for manifold mounting on the indicated mounting face. The standard ports are plugged. O-ring seals are provided for mounting between the gripper and the manifold.

The manifold port option is also available in kit form. See the Manifold Conversion Kits chart.



REPLACEMENT MANIFOLD SEAL KITS

SIZE	KIT NUMBER
8	84791-08
12	84791-12
16	84791-16
20	84791-20

MANIFOLD KIT INCLUDES O-RINGS.

MANIFOLD CONVERSION KITS

SIZE	KIT NUMBER
8	84792-08-5
12	84792-12-5
16	84792-16-5
20*	84792-20-5

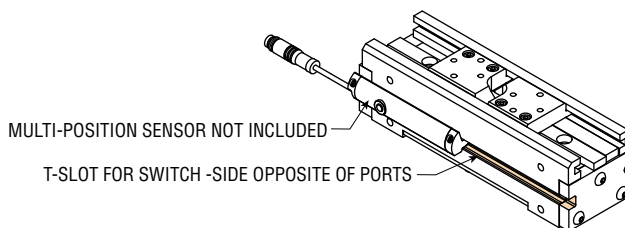
MANIFOLD KIT INCLUDES O-RINGS AND PORT PLUGS.
*SIZE 20 UNITS WITH L9 OPTION REQUIRE KIT 84791-20-1

L9 IMPERIAL PORTS

Replaces standard 1/8 BSPP with 1/8 NPT (Only available on size 20. Sizes 8, 12 & 16 have universal ports standard.)

E3 MAGNETS FOR SENSOR IN T-SLOT SIDE OPPOSITE OF PORTS

With this option magnets are added to the piston on the side opposite of the ports to allow use of the switch T-slot. The switch T-slot may be used with multi-position sensors with analog feedback.



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.

Y4 CLEANROOM GRADE LUBRICANT

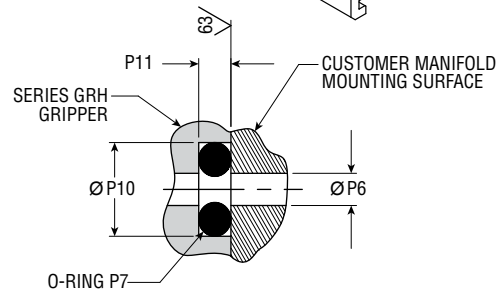
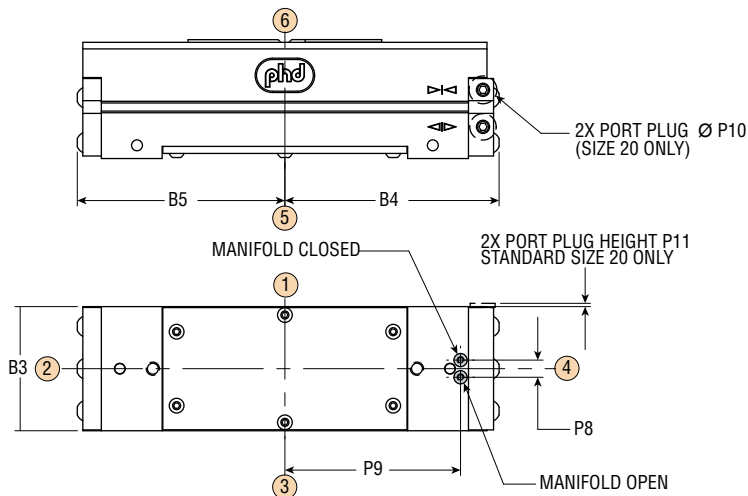
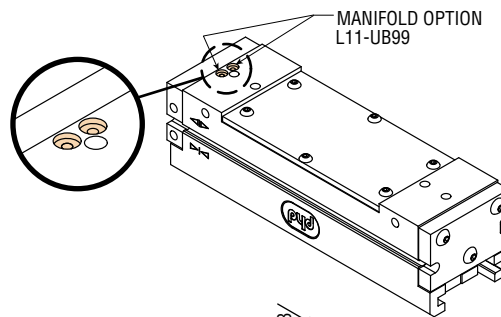
Cleanroom grade lubricant replaces all standard lubricants.

OPTIONS: SERIES GRH PARALLEL GRIPPERS

L11-UB99 MANIFOLD PORTS

With this option the gripper is configured for manifold mounting on the indicated mounting face. The standard ports are plugged. O-ring seals are provided for mounting between the gripper and the manifold.

The manifold port option is also available in kit form. See the Manifold Conversion Kits chart.



MANIFOLD PORTING
DIMENSIONS FOR CUSTOMER USE
(DIMENSIONS REQUIRED ON CUSTOMER MOUNTING SURFACE)

LETTER DIM	MODEL NUMBER			
	GRHx2-5-8 x 50	GRHx2-5-12 x 75	GRHx2-5-16 x 100	GRHx2-5-20 x 125
	mm	mm	mm	mm
(B3)	38.0	47.0	57.0	68.0
(B4)	58.6	81.1	100.9	126.7
(B5)	56.1	78.6	99.9	121.7
P6	1.6	2.0	2.0	2.0
P7 O-RING (I.D. X CROSS-SECTION)	2.5 mm x 1 mm	3.0 mm x 1 mm	3.5 mm x 1.5 mm	3.5 mm x 1.5 mm
P8	5.0	6.5	7.0	13.0
P9	44.5	66.5	85.0	103.0
P10	4.5	5.0	5.7	6.0
P11	0.8	0.8	1.2	1.2

NOTES:

- ALL DIMENSIONS ARE REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED
- CIRCLED NUMBERS INDICATE POSITIONS
- DESIGNATED ϕ IS CENTERLINE OF UNIT

REPLACEMENT MANIFOLD SEAL KITS

SIZE	KIT NUMBER
8	84791-08
12	84791-12
16	84791-16
20	84791-20

MANIFOLD KIT INCLUDES O-RINGS.

MANIFOLD CONVERSION KITS

SIZE	KIT NUMBER
8	84792-08-5
12	84792-12-5
16	84792-16-5
20*	84792-20-5

MANIFOLD KIT INCLUDES O-RINGS AND PORT PLUGS. *SIZE 20 UNITS WITH L9 OPTION REQUIRE KIT 84791-20-1

Y4 CLEANROOM GRADE LUBRICANT

Cleanroom grade lubricant replaces all standard lubricants.

L9 IMPERIAL PORTS

Replaces standard 1/8 BSPP with 1/8 NPT (Only available on size 20. Sizes 8, 12 & 16 have universal ports standard.)

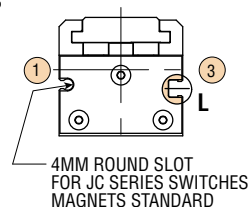
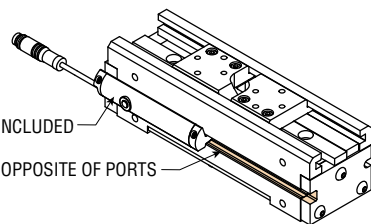
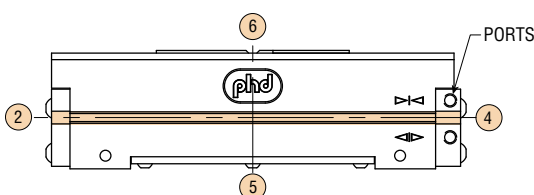
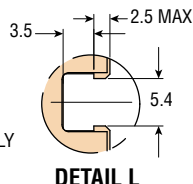
OPTIONS & ACCESSORIES: SERIES GRH PARALLEL GRIPPERS

E3 MAGNETS FOR SENSOR IN T-SLOT SIDE OPPOSITE OF PORTS

With this option magnets are added to the piston on the side opposite of the ports to allow use of the switch T-slot. The switch T-slot may be used with multi-position sensors with analog feedback.

NOTES:

- 1) ALL DIMENSIONS ARE REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED
- 2) CIRCLED NUMBERS INDICATE POSITIONS
- 3) DESIGNATED ϕ IS CENTERLINE OF UNIT



SERIES JC1SD MAGNET SWITCH

This switch provides the ability to identify a single jaw position. Solid State sensing technology provides a highly reliable switch. Elliptical housing allows for easy “drop-in” installation. Includes LED indicator for convenient means of positioning. Available with PNP or NPN output. Available with cable or 8 mm threaded Quick Connect.

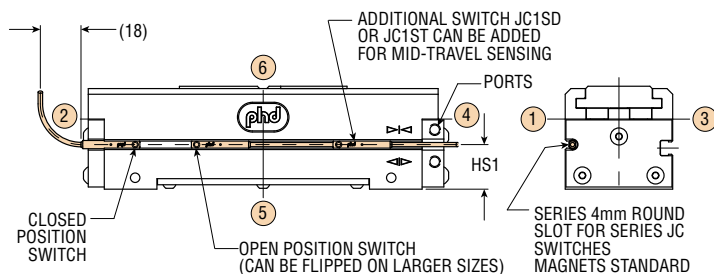
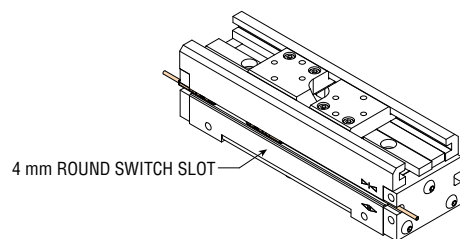
SERIES JC1SD MAGNETIC SWITCHES

PART NO.	SWITCH DESCRIPTION
JC1SDP-5	PNP (Source), Solid State, 10-30 VDC, 5 meter cable
JC1SDP-K	PNP (Source), Solid State, 10-30 VDC, Quick Connect
JC1SDN-5	NPN (Sink), Solid State, 10-30 VDC, 5 meter cable
JC1SDN-K	NPN (Sink), Solid State, 10-30 VDC, Quick Connect

Includes one switch and installation directions

MATCHING CORDSET

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



SERIES JC1ST TWO POSITION TEACHABLE MAGNETIC SWITCH

This switch provides the ability to identify two separately programmable jaw positions with a single switch. Programmable capability means no “fine-tuning.” With switch properly aligned, place jaws in desired position and program. Solid-state sensing technology provides a highly reliable switch. Elliptical housing allows for easy “drop-in” installation. Includes LED indicators for convenient means of positioning and programming. Available with cable or 8 mm threaded Quick Connect. 50 mm maximum travel sensing. **NOTE:** Individual piston movement = (1/2 * Total Jaw Travel + 2 mm) Refer to catalog JC01 for more information.

NOTE: Magnets are located on both ends of the piston, allowing the indicated switch positions to be placed on the opposite end. Switch locations shown for reference only. See ordering data page for ordering information.

LETTER DIM	MODEL NUMBER			
	GRH02-5-8 x 50	GRH02-5-12 x 75	GRH02-5-16 x 100	GRH02-5-20 x 125
HS1	mm	mm	mm	mm
	15.5	19.5	23.0	25.0

NOTES:

- 1) ALL DIMENSIONS ARE REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED
- 2) CIRCLED NUMBERS INDICATE POSITIONS
- 3) DESIGNATED ϕ IS CENTERLINE OF UNIT

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

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