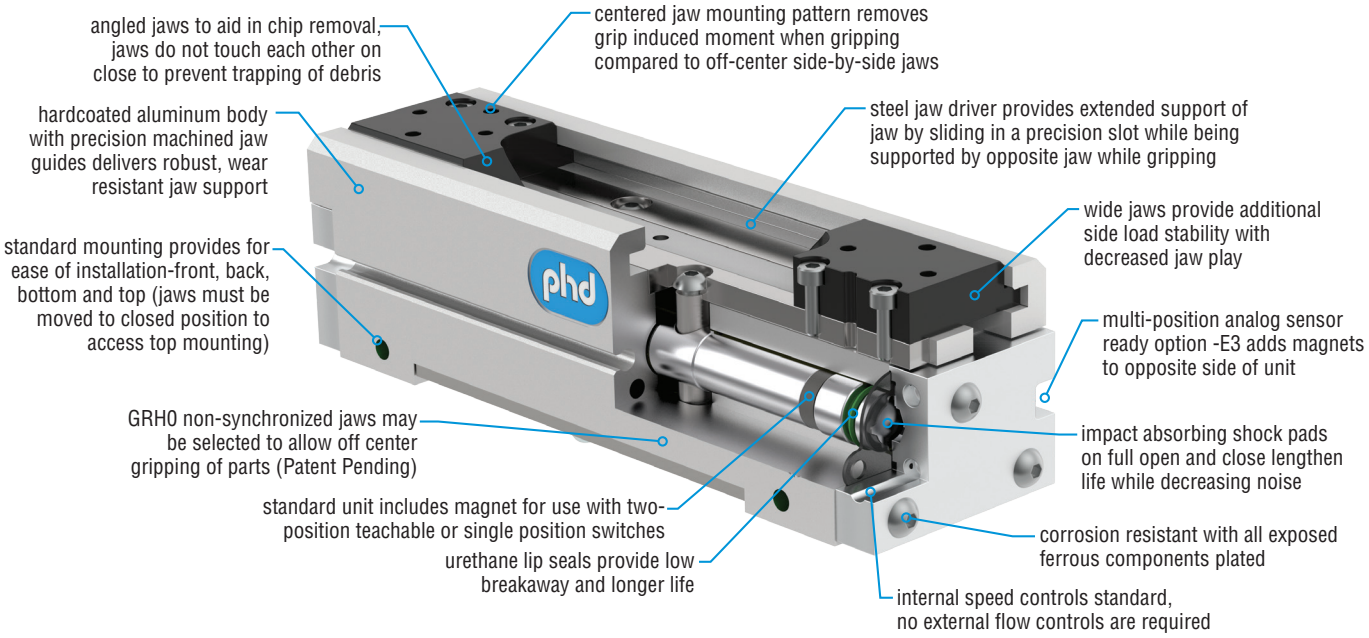
GRH

Major Benefits

- 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
- Available with metric and imperial ports
- H9-tolerance dowel pin holes included for easy, accurate alignment of tooling and gripper mounting
- Switch ready



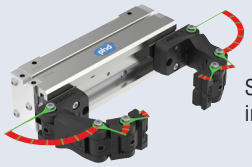
Available on GRH12-5-12x75

PNEU-CONNECT

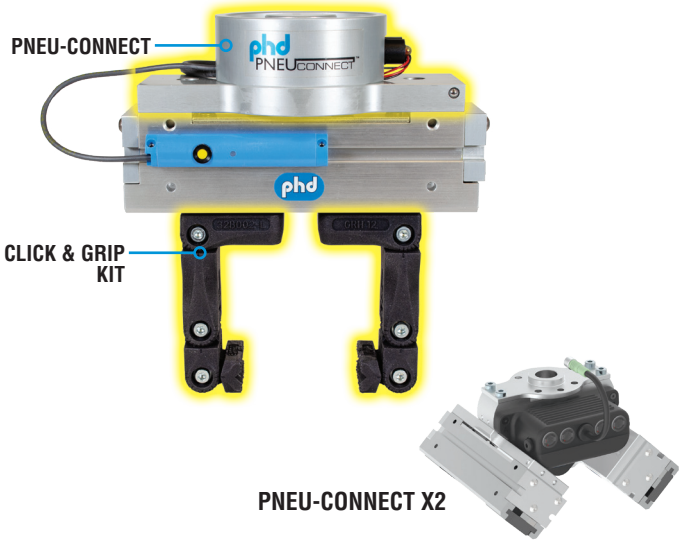
- Provides seamless, cost-effective, pneumatic end-effector integration for collaborative robots
- X2 Dual Gripper models are also available
- Kits with GRH Grippers are available with analog sensors that provide jaw position feedback

CLICK & GRIP

- Fast configuration and reconfiguration
- Flexibility with interchangeable components
- Ideal for cobot applications and proof of concept



Segments adjust in 15° increments and lock



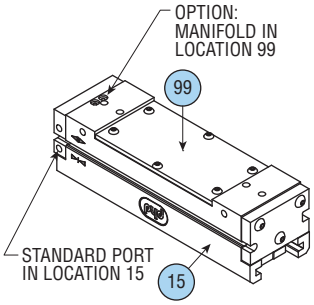
Go to phdinc.com/pneuconnect for more information.

TO ORDER SPECIFY:
Product, Design No., Size, Minimum Total Jaw Travel, and any options required.

SYNCHRONIZATION
0 - Non-synchronized jaws
1 - Synchronized jaws

DESIGN NO.
5 - Metric

OPTIONS (Omit if not required)
MANIFOLD OPTION
L11-UB99 - Manifold option in location 99
PORT OPTION
L9 - Imperial port (size 20 only, sizes 8-16 have interchangeable ports)
MAGNETS FOR SENSOR
E3 - Magnets added to piston for position feedback sensor (rectangular slot on side opposite of ports). See Note 2.
LUBRICATION
Y4 - Cleanroom Grade Lubricant



GRH 1 2 - 5 - 12 x 75 - L11-UB99

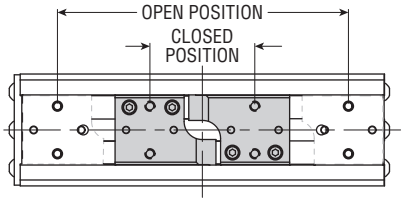
PRODUCT
Low Profile Extra Long Travel Parallel Gripper

JAW STYLE 2

PRODUCT SIZE	BORE SIZE mm	BORE SIZE inch	MINIMUM TOTAL JAW TRAVEL Total Travel Per Bore Size mm	MINIMUM TOTAL JAW TRAVEL Total Travel Per Bore Size in
8	8	0.315	**50**	1.969
12	12	0.472	**75**	2.953
16	16	0.630	**100**	3.937
20	20	0.787	**125**	4.921

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

TOTAL JAW TRAVEL =
OPEN POSITION - CLOSED POSITION



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

SERIES JC1SD MAGNETIC SWITCHES

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

Includes one switch and installation directions.

SERIES JC1ST TWO POSITION TEACHABLE MAGNETIC SWITCHES

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

NOTE: For additional switch information, go to phdinc.com. Switches must be ordered separately.

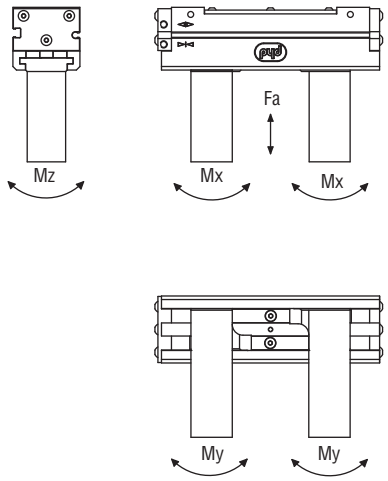
MATCHING CORDSET

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

CAD & Sizing Assistance

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

SPECIFICATIONS	SERIES GRH	
	METRIC	IMPERIAL
OPERATING PRESSURE (SIZE 12,16, 20)	1.4 bar min to 6.9 bar max	20 psi min to 100 psi max
(SIZE 8)	2.1 bar min to 6.9 bar max	30 psi min to 100 psi max
OPERATING TEMPERATURE	-28°C min to 82°C max	-20°F min to 180°F max
GRIP REPEATABILITY	±0.05 mm of original position	±0.002 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	Imperial
8	50	1.969	53	12	0.34	0.76	3.65	0.223	0.180	75	2.95	8.9	0.14
12	75	2.953	120	27	0.79	1.75	10.47	0.639	0.215	100	3.94	20.0	0.31
16	100	3.937	214	48	1.46	3.21	23.30	1.422	0.270	125	4.92	35.6	0.55
20	125	4.921	334	75	2.51	5.53	43.21	2.637	0.350	150	5.91	55.6	0.86

SIZE	AXIAL FORCE Fa		MAXIMUM INDIVIDUAL MOMENTS Mx		My		Mz	
	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

Fa: Total for both jaws
Mx: Maximum allowable moment per jaw, relative to the reference plane
My: Maximum allowable moment per jaw, relative to the geometric center of the jaw finger
Mz: Maximum allowable moment per jaw, relative to the reference plane

When calculating the value for Fa, include the tooling weight, part weight, external forces, and accelerations. When calculating values for Mx, My, and Mz, include the grip force per jaw, tooling weight, part weight, external forces, and accelerations as applicable.

RECOMMENDATIONS

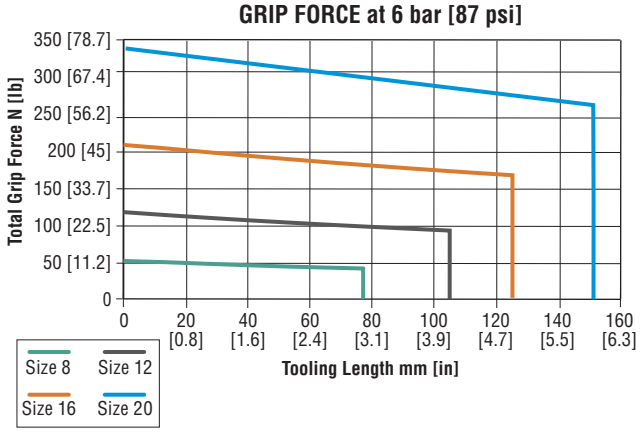
Design tooling so that the grip point is as close to the gripper surfaces as possible. The grip force factor (Gf) values given in the table above are for zero tooling length. As the grip point is moved away from the jaw surface, the applied moment causes jaw friction to increase, resulting in reduced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

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.



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.

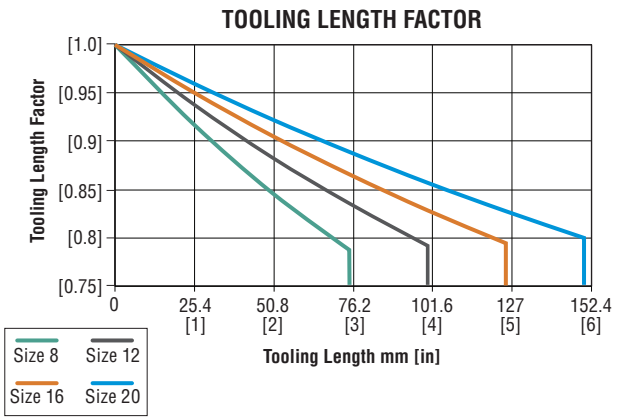
GRIP FORCE CALCULATION EQUATIONS:

METRIC:

Total Grip Force (N) = (Pressure [bar] x G_F) x Tooling Length Factor

IMPERIAL:

Total Grip Force (lb) = (Pressure [psi] x G_F) x Tooling Length Factor



LDA Solutions for Life
Hoge Buizen 53 -1980 EPPEGEM (BE)
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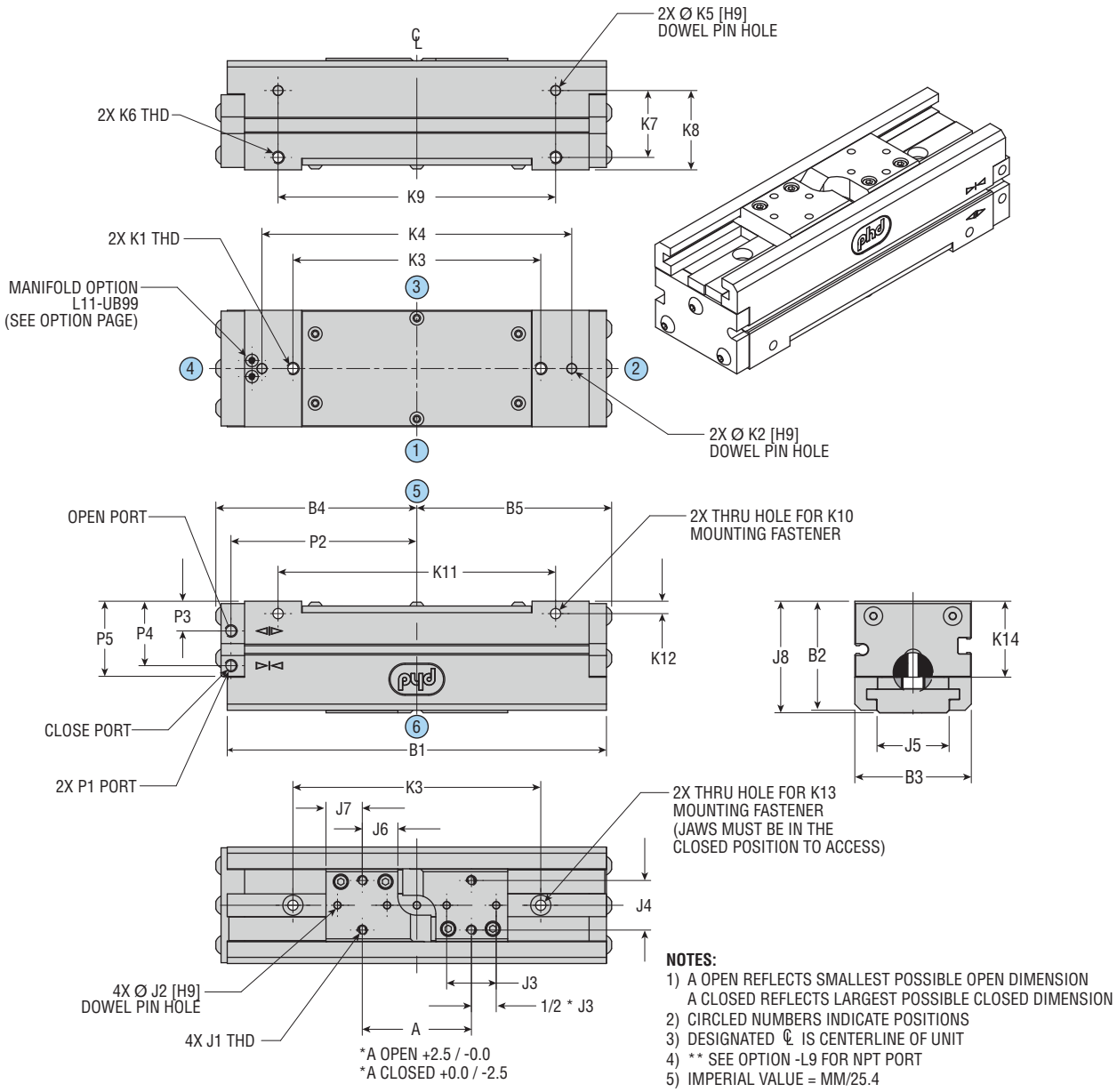
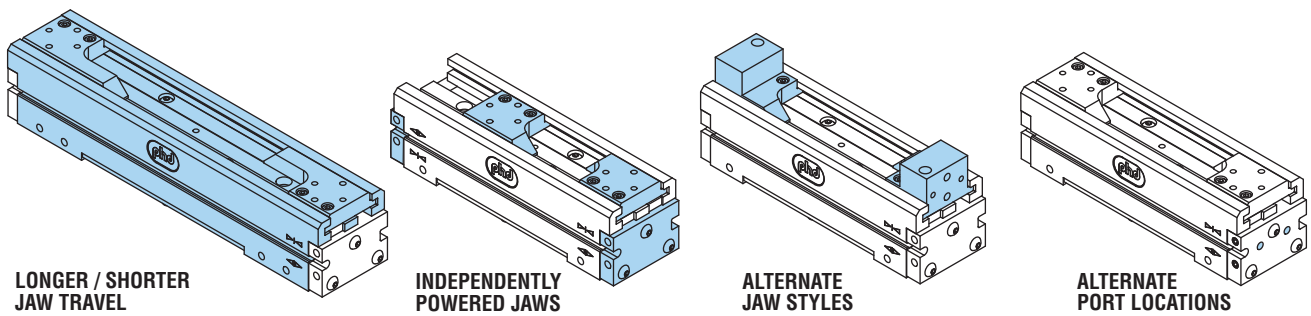


NOTES:

1) A OPEN REFLECTS SMALLEST POSSIBLE OPEN DIMENSION
   A CLOSED REFLECTS LARGEST POSSIBLE CLOSED DIMENSION
2) CIRCLED NUMBERS INDICATE POSITIONS
3) DESIGNATED ℄ IS CENTERLINE OF UNIT
4) ** SEE OPTION -L9 FOR NPT PORT
5) IMPERIAL VALUE = MM/25.4

CUSTOM SOLUTIONS

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

All dimensions are reference only unless specifically toleranced.

DIMENSIONS: Series GRH 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 6.5 mm DP	M4 X 0.7 x 8 mm DP	M5 x 0.8 x 9 mm DP	M6 x 1.0 x 12 mm DP
J2	2.5 mm x 2.5 mm DP	3 mm x 3 mm DP	4 mm x 4 mm DP	5 mm x 5 mm DP
J2 PIN SIZE	2.5 mm	3 mm	4 mm	5 mm
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 8 mm DP	M5 x 0.8 x 10 mm DP	M6 x 1.0 x 12 mm DP	M8 x 1.25 x 16 mm DP
K2	Ø 3 mm x 3 mm DP	Ø 4 mm x 4 mm DP	Ø 5 mm x 5 mm DP	Ø 6 mm x 6 mm DP
K2 PIN SIZE	3 mm	4 mm	5 mm	6 mm
K3	68.0	100.0	130.0	160.0
K4	82.0	125.0	160.0	200.0
K5	Ø 3 mm x 3 mm DP	Ø 4 mm x 4 mm DP	Ø 5 mm x 5 mm DP	Ø 6 mm x 6 mm DP
K5 PIN SIZE	3 mm	4 mm	5 mm	6 mm
K6	M4 x 0.7 x 8 mm DP	M5 x 0.8 x 10 mm DP	M6 x 1.0 x 12 mm DP	M8 x 1.25 x 16 mm 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

CAD & Sizing Assistance

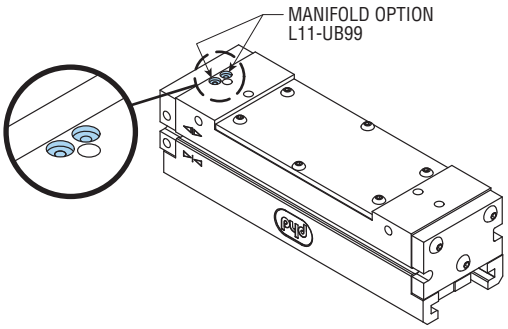
Use PHD's free online Product Sizing and CAD Configurator at **phdinc.com/myphd**

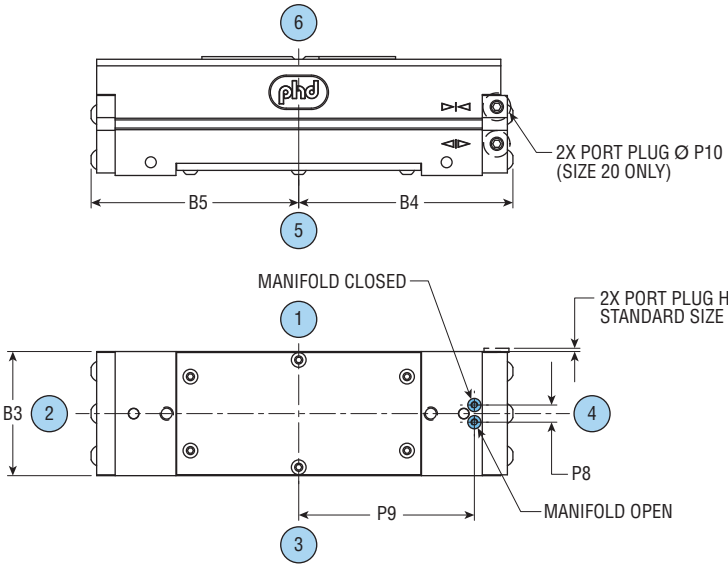
All dimensions are reference only unless specifically toleranced.

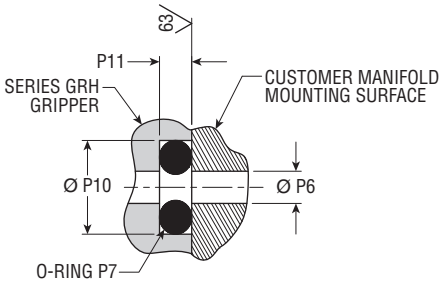
L11-UB99 MANIFOLD PORTS

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)

NOTES:
1) CIRCLED NUMBERS INDICATE POSITIONS
2) DESIGNATED ℄ IS CENTERLINE OF UNIT

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

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

All dimensions are reference only unless specifically toleranced.

Y4 CLEANROOM GRADE LUBRICANT

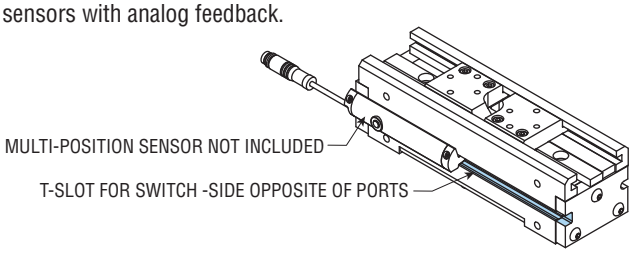
Cleanroom grade lubricant replaces all standard lubricants.

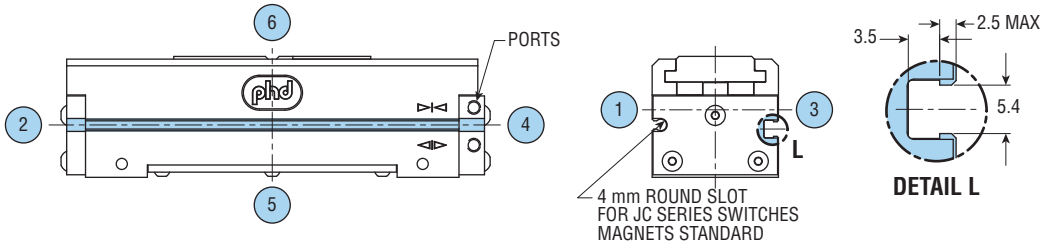
L9 IMPERIAL PORTS

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

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) CIRCLED NUMBERS INDICATE POSITIONS
2) DESIGNATED ℄ IS CENTERLINE OF UNIT

All dimensions are reference only unless specifically toleranced.

SERIES JC1SD SINGLE POSITION 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.	DESCRIPTION
JC1SDN-5	NPN (Sink), Solid State, 10-30 VDC, 5 meter cable
JC1SDP-5	PNP (Source), Solid State, 10-30 VDC, 5 meter cable
JC1SDN-K	NPN (Sink), Solid State, 10-30 VDC, Quick Connect
JC1SDP-K	PNP (Source), 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

NOTE: For additional switch information, go to phdinc.com. Switches must be ordered separately.

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). For additional switch information, go to phdinc.com.

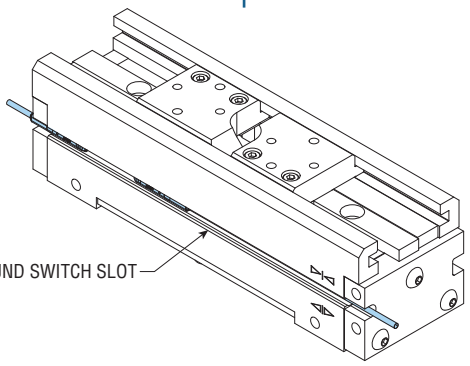
SERIES JC1ST TWO POSITION TEACHABLE MAGNETIC SWITCHES

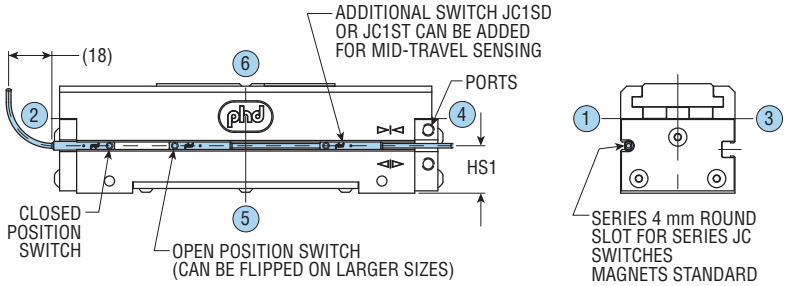
PART NO.	DESCRIPTION
JC1STP-2	PNP (Source), Solid State, 12-30 VDC, 2 meter cable
JC1STP-K	PNP (Source), Solid State, 12-30 VDC, Quick Connect

Includes one switch and installation directions.

MATCHING CORDSET

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





NOTES:
1) CIRCLED NUMBERS INDICATE POSITIONS
2) DESIGNATED ℄ IS CENTERLINE OF UNIT

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

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.

All dimensions are reference only unless specifically toleranced.