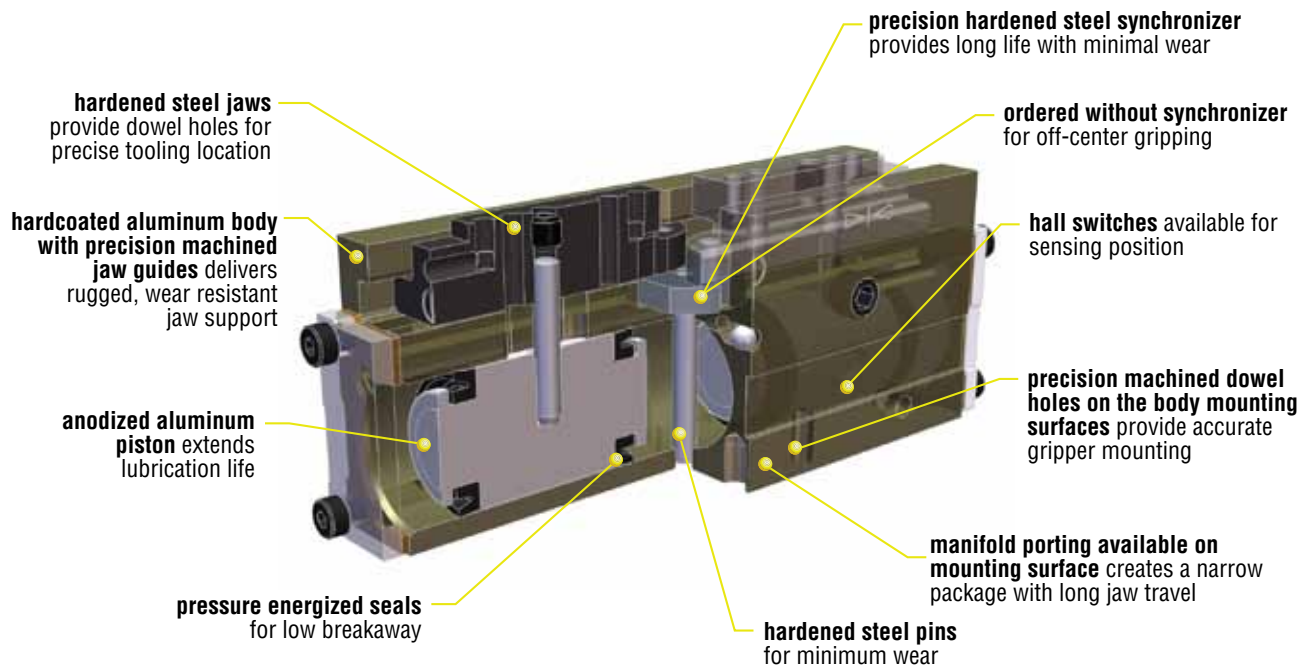


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NARROW WIDTH WITH LONG TRAVELS



Major Benefits

- Synchronous jaw motion (may be ordered without synchronizer for offset gripping)
- Narrow width, low profile and long travel lengths
- Manifold porting option
- Two jaw travels per bore size
- Two sizes available in both imperial and metric versions
- 1-2 day shipping
- 6 million cycles minimum rated life

Industry Uses

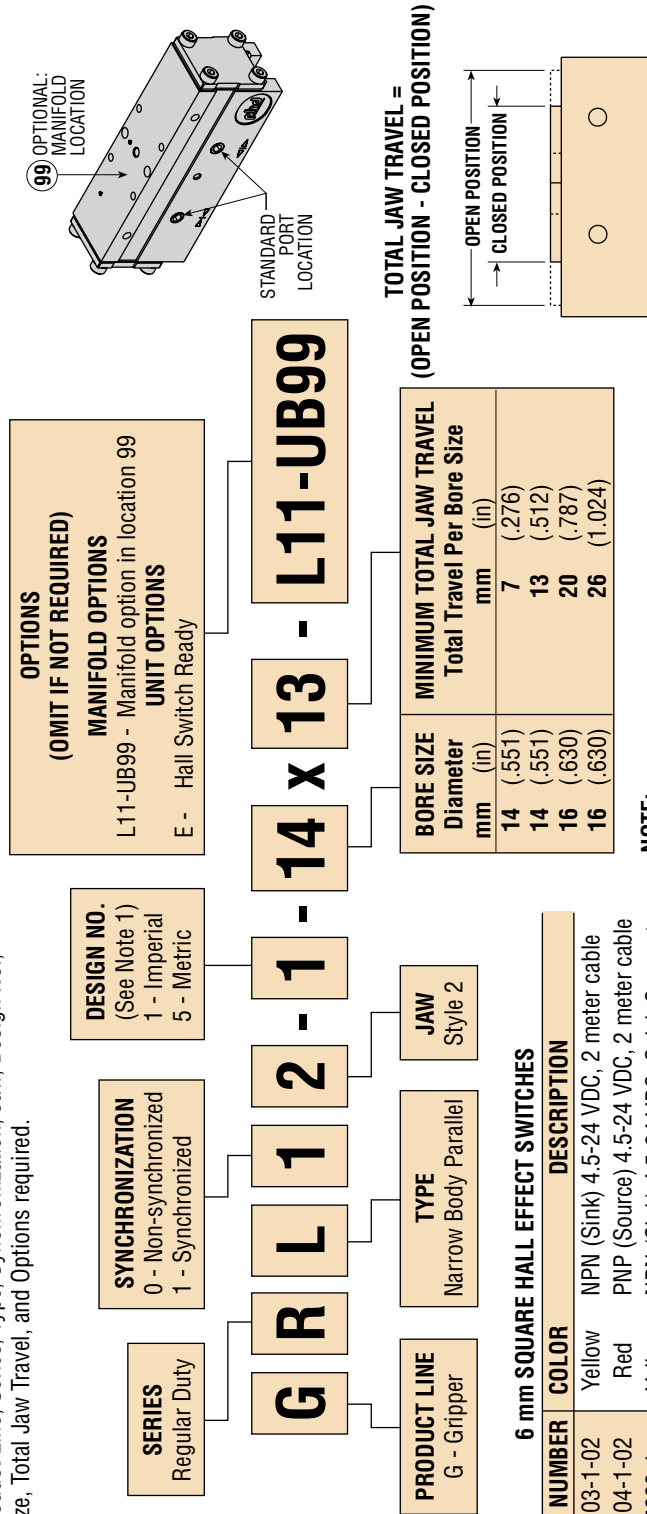
- Assembly machine builders
- Light bulb manufacturing
- Cosmetics
- Bearing manufacturing
- Packaging
- Golf equipment
- Semiconductor

ORDERING DATA: SERIES GRL GRIPPERS

GRL

TO ORDER SPECIFY:

Product Line, Series, Type, Synchronization, Jaw, Design No., Size, Total Jaw Travel, and Options required.



NOTE:

1) Design number indicates imperial or metric mounting holes, dowel pin holes, and ports.

6 mm SQUARE HALL EFFECT SWITCHES

PART NUMBER	COLOR	DESCRIPTION
55803-1-02	Yellow	PNP (Sink) 4.5-24 VDC, 2 meter cable
55804-1-02	Red	PNP (Source) 4.5-24 VDC, 2 meter cable
55823-1	Yellow	PNP (Sink) 4.5-24 VDC, Quick Connect
55824-1	Red	PNP (Source) 4.5-24 VDC, Quick Connect

HALL EFFECT SWITCH MOUNTING KIT

PART NUMBER	DESCRIPTION
68487-1	Switch Mounting Kit

Each mounting kit contains:

- 1 6 mm square switch bracket
- 1 mounting screw



UNIQUE GRIPPERS ARE AVAILABLE.
SEE PAGES 4-179 TO 4-204.

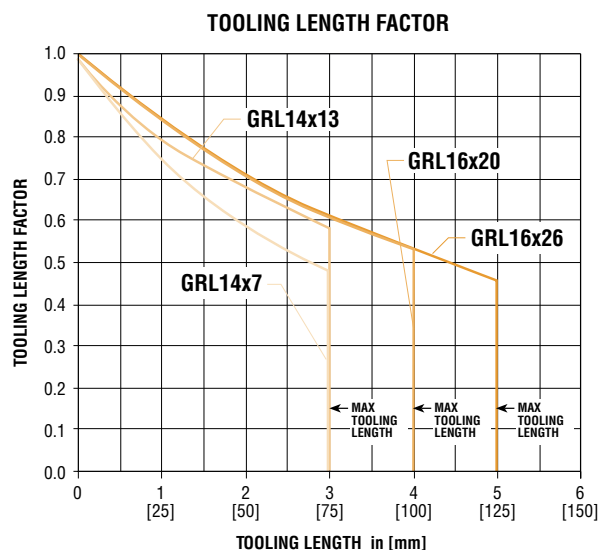
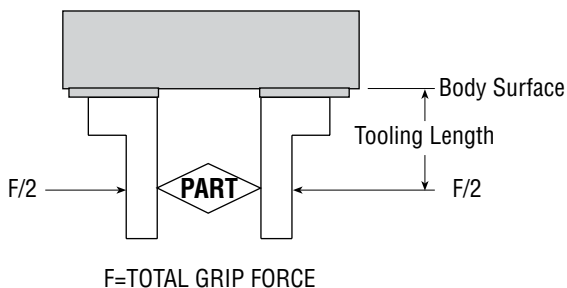
ENGINEERING DATA: SERIES GRL GRIPPERS

SPECIFICATIONS	SERIES GRL
OPERATING PRESSURE	5 psi min to 100 psi max [4 bar min to 7 bar max] air
STANDARD UNIT	
OPERATING TEMPERATURE	-20° to +180°F [-28° to +82°C]
RATED LIFE	6 million cycles minimum
GRIP REPEATABILITY	Within ±0.002 in [±0.05 mm] of original centered position
CYCLE TIME	See table below
LUBRICATION	Factory lubricated for rated life
MAINTENANCE	Field repairable

SIZE	MINIMUM TOTAL JAW TRAVEL		TOTAL CLOSE GRIP FORCE AT 87 psi [6 bar]		GRIPPER WEIGHT		CLOSE OR OPEN TIME 87 psi [6 bar] sec	DISPLACEMENT		GRIP FORCE FACTOR G _F			
	in	mm	lb	N	lb	kg		in ³	cm ³	EXTERNAL GRIP		INTERNAL GRIP	
	IMPERIAL	METRIC	IMPERIAL	METRIC	IMPERIAL	METRIC	IMPERIAL	METRIC	IMPERIAL	METRIC	IMPERIAL	METRIC	
GRL 14x7	0.28	7	28	124	0.18	0.08	0.085	.067	1.1	0.32	21	0.32	21
GRL 14x13	0.51	13	30	132	0.24	0.11	0.100	.128	2.1	0.34	22	0.34	22
GRL 16x20	0.79	20	41	182	0.39	0.18	0.110	.245	4.0	0.47	30	0.47	30
GRL 16x26	1.02	26	41	182	0.47	0.21	0.120	.319	5.2	0.47	30	0.47	30

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).



GRIP FORCE CALCULATION EQUATIONS:

IMPERIAL:

$$\text{TOTAL GRIP FORCE [lb]} = (\text{Pressure [psi]} \times G_F) \times \text{Tooling Length Factor}$$

METRIC:

$$\text{TOTAL GRIP FORCE [N]} = (\text{Pressure [bar]} \times G_F) \times \text{Tooling Length Factor}$$

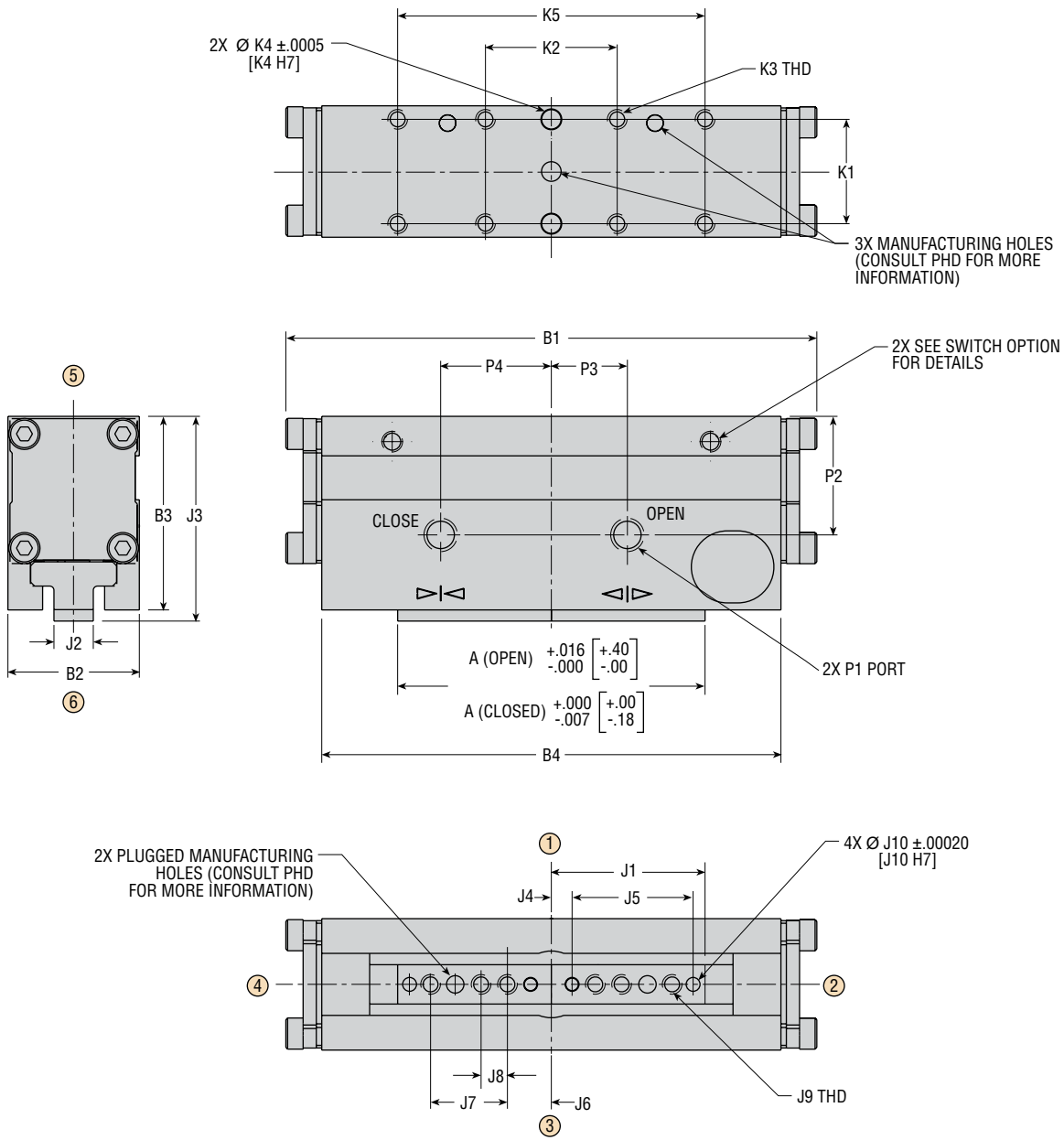
SIZING AND APPLICATION ASSISTANCE

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

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DIMENSIONS: SERIES GRL GRIPPERS

GRL



- NOTES:**
- 1) NUMBERS IN [] ARE mm.
 - 2) CIRCLED NUMBERS INDICATE POSITIONS.
 - 3) ALL DIMENSIONS ARE CENTERED ON CENTERLINE OF UNIT UNLESS OTHERWISE SPECIFIED.

DIMENSIONS: SERIES GRL GRIPPERS

LETTER DIM	MODEL NUMBER							
	GRLx2-x-14x7		GRLx2-x-14x13		GRLx2-x-16x20		GRLx2-x-16x26	
	in	mm	in	mm	in	mm	in	mm
MIN TRAVEL PER JAW	.138	3.5	.256	6.5	.394	10.0	.512	13.0
A CLOSED	1.500	38.1	1.750	44.5	2.250	57.2	2.625	66.7
A OPEN	1.778	45.2	2.264	57.5	3.042	77.3	3.653	92.8
B1	2.316	58.8	3.022	76.8	3.905	99.2	4.614	117.2
B2	.748	19.0	.748	19.0	.874	22.2	.874	22.2
B3	1.102	28.0	1.102	28.0	1.230	31.2	1.230	31.2
B4	1.908	48.5	2.614	66.4	3.497	88.8	4.206	106.8
J1	.750	19.1	.875	22.2	1.125	28.6	1.313	33.3
J2	.2240	5.69	.2240	5.69	.2240	5.69	.2240	5.69
J3	1.162	29.5	1.162	29.5	1.281	32.5	1.281	32.5
J4	.118	3.0	.118	3.0	.118	3.0	.118	3.0
J5	.5709	14.50	.6890	17.50	.9055	23.00	1.1024	28.00
J6	.250	6.4	.250	6.4	.250	6.4	.250	6.4
J7	.312	7.92	.438	11.11	.625	15.88	.750	19.05
J8	—	—	—	—	.250	6.35	.250	6.35
J9	4 x 4-40 x .190 DP	4 x M3 x 0.5 x 4.8 DP	4 x 4-40 x .190 DP	4 x M3 x 0.5 x 4.8 DP	6 x 5-40 x .190 DP	6 x M3 x 0.5 x 4.8 DP	6 x 5-40 x .190 DP	6 x M3 x 0.5 x 4.8 DP
J10	.07893 x .118 DP	2.0 x 3.0 DP	.07893 x .118 DP	2.0 x 3.0 DP	.07893 x .118 DP	2.0 x 3.0 DP	.07893 x .118 DP	2.0 x 3.0 DP
K1	.594	15.1	.594	15.1	.656	16.7	.656	16.7
K2	.750	19.1	.750	19.1	1.000	25.4	1.000	25.4
K3	4 x 4-40 x .150 DP	4 x M3 x 0.5 x 3.8 DP	4 x 4-40 x .150 DP	4 x M3 x 0.5 x 3.8 DP	8 x 5-40 x .197 DP	8 x M3 x 0.5 x 5.0 DP	8 x 5-40 x .197 DP	8 x M3 x 0.5 x 5.0 DP
K4	.0947 x .157 DP	3.0 x 4.0 DP	.0947 x .157 DP	3.0 x 4.0 DP	.1259 x .157 DP	3.0 x 4.0 DP	.1259 x .157 DP	3.0 x 4.0 DP
K5	—	—	—	—	1.772	45.0	1.772	45.0
P1	10-32	M5 x 0.8	10-32	M5 x 0.8	10-32	M5 x 0.8	10-32	M5 x 0.8
P2	.675	17.1	.675	17.1	.778	19.8	.778	19.8
P3	.296	7.5	.433	11.0	.512	13.0	.689	17.5
P4	.354	9.0	.630	16.0	1.220	31.0	1.575	40.0

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All dimensions are reference only unless specifically toleranced.

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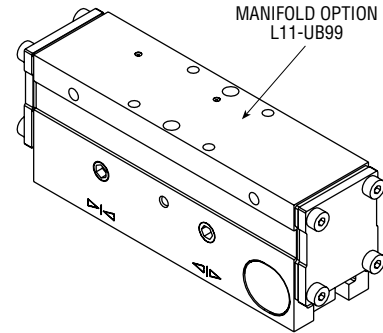
OPTIONS & ACCESSORIES: SERIES GRL GRIPPERS

L11-UB99

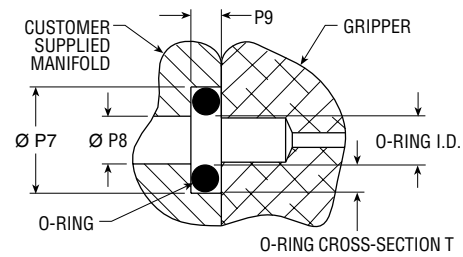
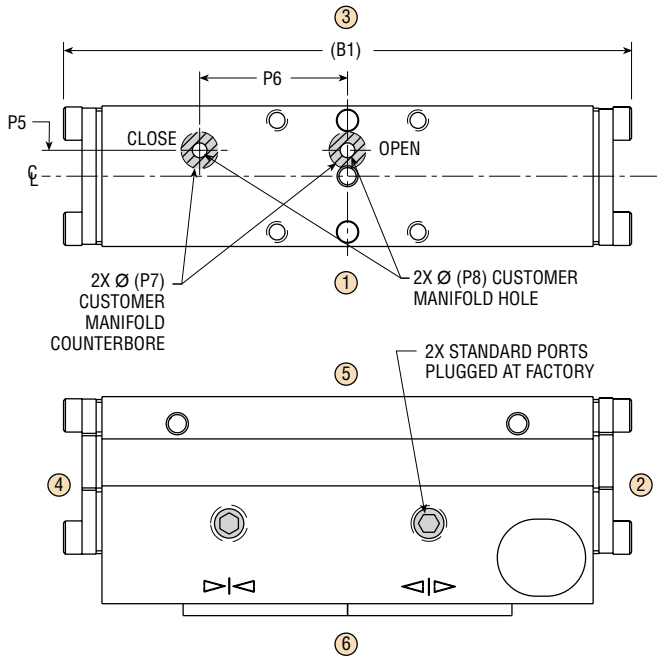
This option configures the gripper for manifold mounting on the standard mounting surface. The standard ports are plugged. O-rings are provided for sealing between the gripper and the manifold.

TYPE	MANIFOLD REPLACEMENT KIT NUMBER			
	GRLx2-x-14x7	GRLx2-x-14x13	GRLx2-x-16x20	GRLx2-x-16x26
IMPERIAL	68221-14-1-1	68221-14-1-1	68221-16-1-1	68221-16-1-1
METRIC	68221-14-5-1	68221-14-5-1	68221-16-5-1	68221-16-5-1

Manifold kit includes port plugs and o-rings.



MANIFOLD OPTION L11-UB99



MANIFOLD PORTING DIMENSIONS

FOR CUSTOMER USE
(DIMENSIONS REQUIRED
ON CUSTOMER MOUNTING SURFACE)

LETTER DIM	MODEL NUMBER							
	GRLx2-x-14x7		GRLx2-x-14x13		GRLx2-x-16x20		GRLx2-x-16x26	
	in	mm	in	mm	in	mm	in	mm
(B1)	2.316	58.8	3.022	76.8	3.905	99.2	4.614	117.2
P5	.138	3.5	.138	3.5	.157	4.0	.157	4.0
P6	.787	20.0	.787	20.0	1.378	35.0	1.378	35.0
P7	.197	5.0	.197	5.0	.197	5.0	.197	5.0
P7 O-RING (I.D. X T)	2 mm x 1.5 mm		2 mm x 1.5 mm		2 mm x 1.5 mm		2 mm x 1.5 mm	
P8	.078	2.0	.078	2.0	.078	2.0	.078	2.0
P9	.048	1.2	.048	1.2	.048	1.2	.048	1.2

NOTES:

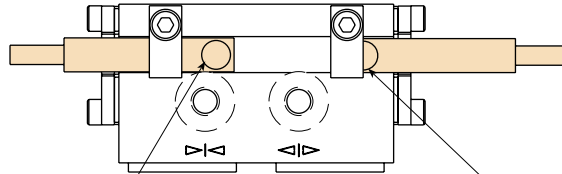
- 1) ALL DIMENSIONS ARE CENTERED ON CENTERLINE OF UNIT UNLESS OTHERWISE SPECIFIED.
- 2) CIRCLED NUMBERS INDICATE POSITIONS.

OPTIONS & ACCESSORIES: SERIES GRL GRIPPERS

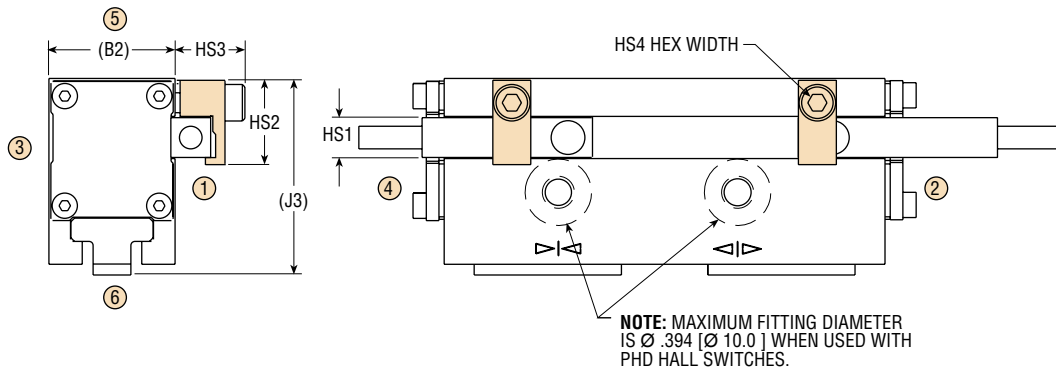
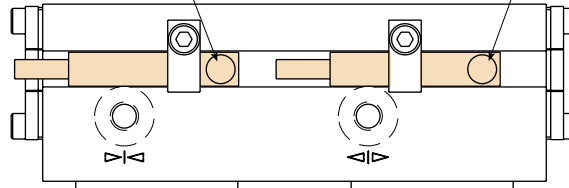


The -E option is comprised of Hall Effect magnets installed in the pistons to actuate PHD 6 mm square Hall Effect Switches. PHD Hall Effect Switches and mounting kits are required in addition to the -E option and are sold separately. See charts below for switches and mountings.

GRL 14 mm BORE UNITS



GRL 16 mm BORE UNITS



-E HALL SWITCH READY

LETTER DIM	MODEL NUMBER							
	GRLx2-x-14x7		GRLx2-x-14x13		GRLx2-x-16x20		GRLx2-x-16x26	
	in	mm	in	mm	in	mm	in	mm
(B2)	.748	19.0	.748	19.0	.874	22.2	.874	22.2
(J3)	1.162	29.5	1.162	29.5	1.281	32.5	1.281	32.5
HS1	6 mm SQUARE		6 mm SQUARE		6 mm SQUARE		6 mm SQUARE	
HS2	.511	13.0	.511	13.0	.611	15.5	.611	15.5
HS3	.420	10.7	.420	10.7	.420	10.7	.420	10.7
HS4 HEX	2.5 mm		2.5 mm		2.5 mm		2.5 mm	

6 mm SQUARE HALL EFFECT SWITCHES

PART NO.	COLOR	DESCRIPTION
55803-1-02	Yellow	NPN (Sink) 4.5-24 VDC, 2 meter cable
55804-1-02	Red	PNP (Source) 4.5-24 VDC, 2 meter cable
55823-1	Yellow	NPN (Sink) 4.5-24 VDC, Quick Connect
55824-1	Red	PNP (Source) 4.5-24 VDC, Quick Connect

HALL EFFECT SWITCH MOUNTING KIT

PART NO.	DESCRIPTION
68487-1	Switch Mounting Kit

Each mounting kit contains:
 1 6 mm square switch bracket
 1 mounting screw

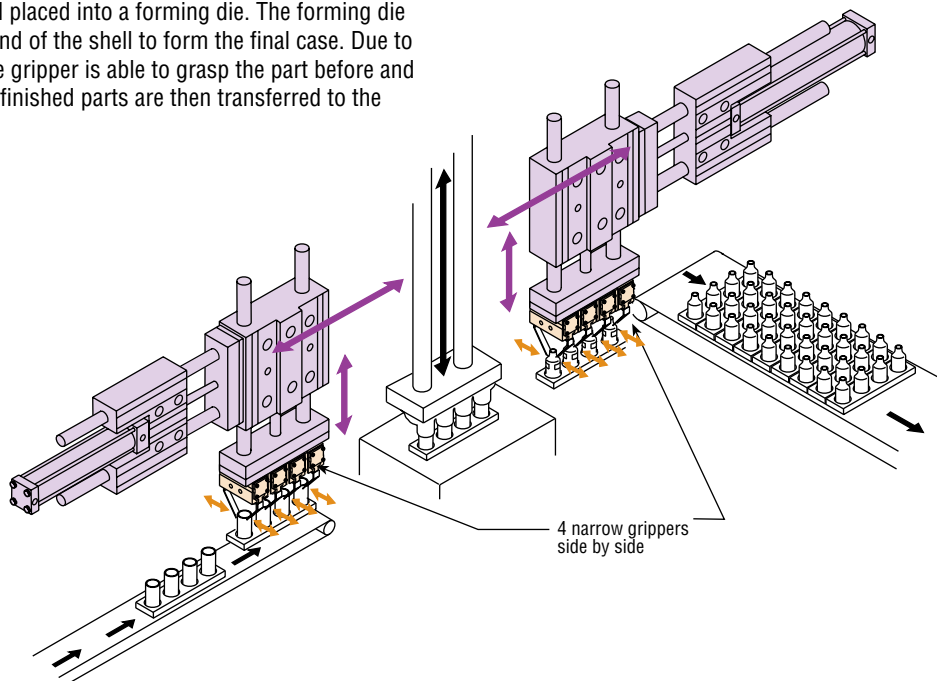
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APPLICATIONS & CONCEPTS: SERIES GRL GRIPPERS

MULTIPLE PART TRANSFER

In this application example the narrow profile long stroke capability of this gripper allows for multiple parts to be transferred simultaneously. Four of the preformed cosmetic case shells are grasped and placed into a forming die. The forming die coins and tapers the end of the shell to form the final case. Due to the long jaw travel, the gripper is able to grasp the part before and after it is formed. The finished parts are then transferred to the next operation.



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PHD UNLIMITED™ UNIQUE SOLUTIONS

Illustrations shown are for concept only. Other variations include:

- Smaller or larger bore sizes and strokes
- Stroke adjustment on open
- Fluid compatibility
- Alternate materials

Contact PHD, Inc. with your product requirements.

