

SERIES GRS GRIPPERS

Low Profile, High Force



**ISO-9001
CERTIFIED**

Quality Management
System Certified

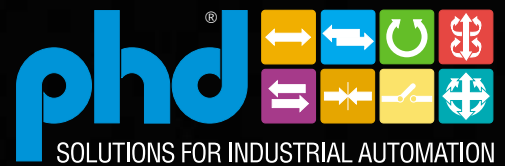


Series 6790 Switches



Proximity Switches

GRS01



SOLUTIONS FOR INDUSTRIAL AUTOMATION

PHD, Inc. • P.O. Box 9070 • Fort Wayne, IN 46899 • (219) 747-6151 • FAX (219) 747-6754
www.phdinc.com • phdinfo@phdinc.com

ORDERING DATA: SERIES GRS GRIPPERS

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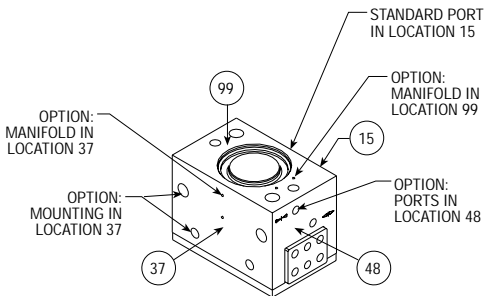
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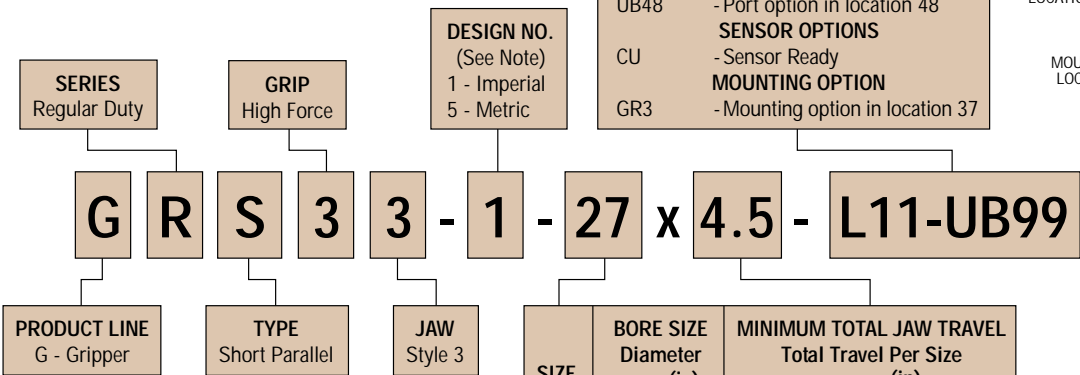
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TO ORDER SPECIFY:

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



OPTIONS (OMIT IF NOT REQUIRED)

PORTING OPTIONS
 L11-UB99 - Manifold option in location 99
 L11-UB37 - Manifold option in location 37 (includes GR3 option)
 UB48 - Port option in location 48

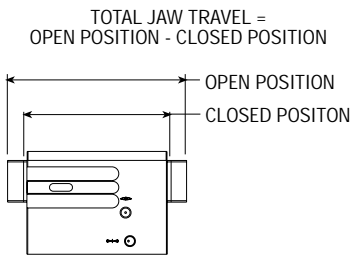
SENSOR OPTIONS
 CU - Sensor Ready

MOUNTING OPTION
 GR3 - Mounting option in location 37

SIZE	BORE SIZE Diameter mm (in)	MINIMUM TOTAL JAW TRAVEL	
		Total Travel Per Size mm	(in)
27	27 (1.063)	4.5	(.177)
27	27 (1.063)	7	(.276)
28	27 (1.063)	6	(.250)
28	27 (1.063)	10	(.394)
32	32 (1.260)	8	(.315)
32	32 (1.260)	13	(.512)
50	50 (1.969)	19	(.750)
50	50 (1.969)	28	(1.102)
63	63 (2.480)	32	(1.260)
63	63 (2.480)	44	(1.732)

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

Please refer to pages 13 & 14 for switch and kit information.



CUSTOM GRIPPERS ARE AVAILABLE. PLEASE CONSULT PHD.

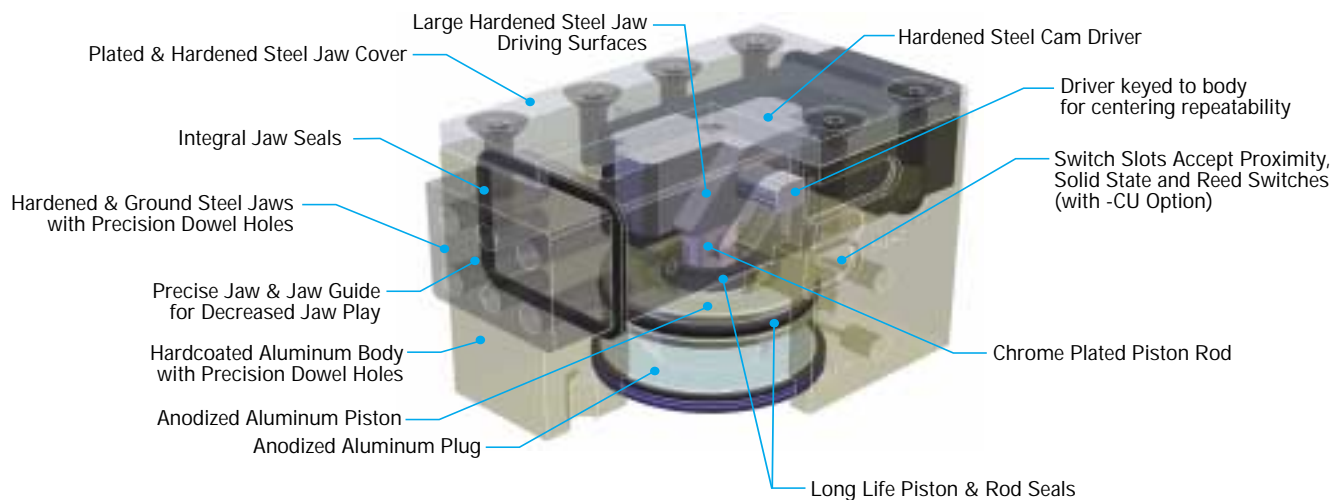
BENEFITS: SERIES GRS GRIPPERS

BENEFITS

- GRS grippers feature an angled cam drive mechanism for higher grip forces.
- Precision ground jaws deliver smooth operation and minimal jaw play.
- Low profile to fit limited space applications.
- Rugged jaw support, hardened jaws and hardcoated bearing surfaces ensure long service life.
- Two jaw travels per size provide superb adaptability to meet a wide variety of applications.
- All units include internal jaw seals to resist contaminants.
- Parallel jaw motion simplifies jaw tooling and is ideal for gripping parts of varying size.
- Double acting for use in both internal and external gripping applications.
- Jaws and body feature dowel pin holes for accurate tooling alignment.
- Optional manifold ports allow elimination of external air lines.



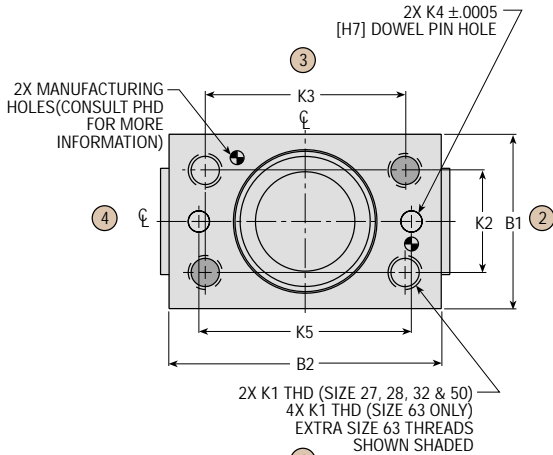
- Optional mounting threads, dowel pin holes and port positions provide added application flexibility.
- Optional 4 mm and 8 mm round inductive proximity switches, as well as Series 6790 Solid State and Reed switches, are available for indication of jaw position and simple interfacing with electronic system controls.



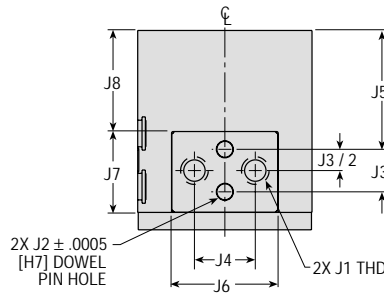
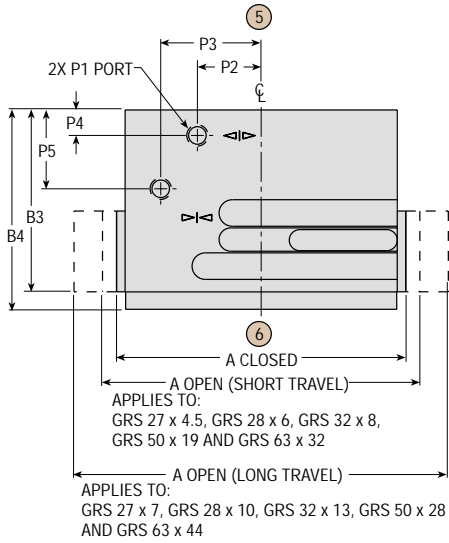
SPECIFICATIONS	27 x 4.5	27 x 7	28 x 6	28 x 10	32 x 8
WORKING AIR PRESSURE	30 psi min. to 100 psi max. [2 bar min. to 7 bar max.]				
TOTAL GRIP FORCE AT 87 psi [6 bar]	68 lb [302 N]	48 lb [214 N]	77 lb [342 N]	48 lb [214 N]	109 lb [484 N]
TOTAL JAW TRAVEL	0.177 in [4.5 mm]	0.276 in [7.0 mm]	0.250 in [6.0 mm]	0.394 in [10 mm]	0.315 in [8.0 mm]
BORE DIAMETER	1.06 in [27 mm]	1.06 in [27 mm]	1.06 in [27 mm]	1.06 in [27 mm]	1.26 in [32 mm]
UNIT WEIGHT	0.29 lb [0.13 kg]	0.29 lb [0.13 kg]	0.54 lb [0.24 kg]	0.54 lb [0.24 kg]	1.00 lb [0.45 kg]
MAXIMUM TOOLING LENGTH	3.0 in [75 mm]	3.0 in [75 mm]	4.0 in [100 mm]	4.0 in [100 mm]	4.0 in [100 mm]

SPECIFICATIONS	32 x 13	50 x 19	50 x 28	63 x 32	63 x 44
WORKING AIR PRESSURE	30 psi min. to 100 psi max. [2 bar min. to 7 bar max.]				
TOTAL GRIP FORCE AT 87 psi [6 bar]	70 lb [311 N]	235 lb [1045 N]	157 lb [698 N]	444 lb [1975 N]	348 lb [1548 N]
TOTAL JAW TRAVEL	0.512 in [13 mm]	0.750 in [19 mm]	1.102 in [28 mm]	1.260 in [32 mm]	1.732 in [44 mm]
BORE DIAMETER	1.26 in [32 mm]	1.97 in [50 mm]	1.97 in [50 mm]	2.48 in [63 mm]	2.48 in [63 mm]
UNIT WEIGHT	1.00 lb [0.45 kg]	2.40 lb [1.09 kg]	2.40 lb [1.09 kg]	7.80 lb [3.54 kg]	7.80 lb [3.54 kg]
MAXIMUM TOOLING LENGTH	4.0 in [100 mm]	6.0 in [150 mm]	6.0 in [150 mm]	9.0 in [225 mm]	9.0 in [225 mm]

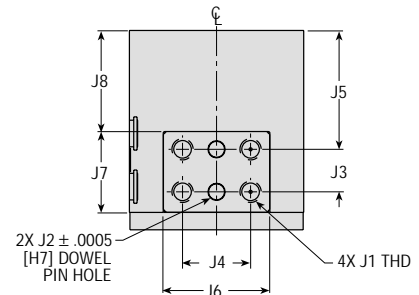
DIMENSIONS: SERIES GRS GRIPPERS



LETTER DIM	SIZE									
	27		28		32		50		63	
	in	mm	in	mm	in	mm	in	mm	in	mm
SHORT TRAVEL MIN TRAVEL PER JAW	.084	2.125	.125	3.000	.157	4.000	.375	9.500	.630	16.000
LONG TRAVEL MIN TRAVEL PER JAW	.138	3.500	.197	5.000	.256	6.500	.551	14.000	.875	22.000
A CLOSED*	1.614	41.0	2.125	54.0	2.677	68.0	3.500	88.9	5.748	146.0
A OPEN SHORT*	1.790	45.5	2.370	60.2	3.000	76.2	4.250	108.0	7.000	177.8
A OPEN LONG*	1.890	48.0	2.500	63.5	3.190	81.0	4.606	117.0	7.500	190.5
B1	1.378	35.0	1.496	38.0	1.614	41.0	2.283	58.0	2.953	75.0
B2	1.496	38.0	1.969	50.0	2.520	64.0	3.386	86.0	5.236	133.0
B3	1.036	26.3	1.279	32.5	1.686	42.8	2.253	57.2	3.408	86.6
B4	1.130	28.7	1.395	35.4	1.847	46.9	2.438	61.9	3.658	92.9
J1	8-32 x .236 DP	M4 x 0.7 x 6.0 DP	10-32 x .315 DP	M5 x 0.8 x 8 DP	10-32 x .394 DP	M5 x 0.8 x 10.0 DP	1/4-28 x .512 DP	M6 x 1.0 x 13.0 DP	3/8-24 x .768 DP	M10 x 1.5 x 19.5 DP
J2	.0658 x .197 DP	2.0 x 5.0 DP	.1283 x .197 DP	3.0 x 5.0 DP	.1595 x .236 DP	4.0 x 6.0 DP	.1908 x .394 DP	5.0 x 10.0 DP	.3158 x .512 DP	8.0 x 13.0 DP
J3	2.559	6.5	.315	8.0	.3937	10.0	.5510	14.0	.8661	22.0
J4	.354	9.0	.413	10.5	.630	16.0	.787	20.0	1.063	27.0
J5	.6889	17.5	.8464	21.5	1.1023	28.0	1.4563	37.0	2.1653	55.0
J6	.6301	16.0	.7482	19.0	.9845	25.0	1.2600	32.0	1.7719	45.0
J7	.4333	11.0	.5514	14.0	.7482	19.0	1.0238	26.0	1.6144	41.0
J8	.602	15.3	.727	18.5	.938	23.8	1.228	31.2	1.793	45.5
K1	8-32 x .375 DP	M5 x 0.8 x 9.5 DP	1/4-20 x .512 DP	M6 x 1.0 x 13.0 DP	5/16-18 x .591 DP	M8 x 1.25 x 15.0 DP	3/8-16 x .768 DP	M10 x 1.5 x 19.5 DP	1/2-13 x 1.024 DP	M12 x 1.75 x 26.0 DP
K2	1.024	26.0	.984	25.0	.945	24.0	1.457	37.0	1.969	50.0
K3	1.142	29.0	1.457	37.0	1.850	47.0	2.559	65.0	4.134	105.0
K4	.1283 x .250 DP	3.0 x 6.0 DP	.1908 x .256 DP	5.0 x 6.5 DP	.1908 x .256 DP	5.0 x 6.5 DP	.3158 x .512 DP	8.0 x 13.0 DP	.3783 x .512 DP	10.0 x 13 DP
K5	1.3386	34.0	1.5748	40.0	1.9685	50.0	2.6378	67.0	4.1340	105.0
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	1/8 NPT	1/8 BSPP
P2	.482	12.2	.433	11.0	.591	15.0	1.016	25.8	1.181	30.0
P3	.601	15.3	.512	13.0	.591	15.0	.965	24.5	1.181	30.0
P4	.201	5.1	.201	5.1	.236	6.0	.389	9.9	.413	10.5
P5	.572	14.5	.591	15.0	.728	18.5	1.151	29.2	1.437	36.5



JAW MOUNTING PATTERN APPLIES TO: SIZE 27 & 28



JAW MOUNTING PATTERN APPLIES TO: SIZE 32, 50 & 63

NOTES:

- 1) DESIGNATED ϕ IS CENTERLINE OF UNIT
- 2) ALL DIMENSIONS ARE REFERENCE ONLY UNLESS SPECIFICALLY TOLERANCED
- 3) METRIC INFORMATION SHOWN IN [] OR SHOWN IN COLUMNS DESIGNATED mm
- 4) CIRCLED NUMBERS INDICATE POSITIONS

* A OPEN REFLECTS THE SMALLEST POSSIBLE OPEN DIMENSION
A CLOSED REFLECTS THE LARGEST POSSIBLE CLOSED DIMENSION

ENGINEERING DATA: SERIES GRS GRIPPERS

SPECIFICATIONS

SIZE	MINIMUM TOTAL JAW TRAVEL		TOTAL CLOSE GRIP FORCE AT 87 psi [6 bar]				CLOSE OR OPEN TIME 87 psi [6 bar]				GRIP FORCE FACTOR (G _r)				
			GRIPPER WEIGHT		DISPLACEMENT		EXTERNAL GRIP		INTERNAL GRIP						
	in	mm	lb	N	lb	kg	sec	in ³	cm ³	Imperial	Metric	Imperial	Metric	Imperial	Metric
27	0.177	4.5	68	302	0.29	0.13	0.11	0.133	2.2	0.78	50	0.83	54		
	0.276	7	48	213	0.29	0.13	0.11	0.133	2.2	0.55	36	0.59	38		
28	0.250	6	77	341	0.54	0.24	0.13	0.182	3.0	0.88	57	0.93	60		
	0.394	10	48	213	0.54	0.24	0.13	0.182	3.0	0.55	36	0.59	38		
32	0.315	8	104	464	1.0	0.45	0.16	0.335	5.5	1.25	81	1.33	86		
	0.512	13	70	310	1.0	0.45	0.16	0.335	5.5	0.80	52	0.86	56		
50	0.750	19	235	1045	2.4	1.1	0.18	1.570	26	2.7	174	2.8	181		
	1.102	28	157	697	2.4	1.1	0.18	1.570	26	1.8	116	1.9	123		
63	1.260	32	444	1974	7.8	3.5	0.22	4.397	72	5.1	329	5.3	342		
	1.732	44	348	1548	7.8	3.5	0.22	4.397	72	4.0	258	4.2	271		

SEALS AND FLUIDS

Long life seals are standard on all Series GRS Grippers. These seals are compatible with standard paraffin-based lubrication oils used for pneumatic cylinders. For compatibility with other fluids, consult PHD.

TEMPERATURE LIMITS

Seals and gripper mechanism are designed for use in temperatures from -20° to 180°F [-30° to 82°C]. For temperatures outside this range, consult PHD.

LIFE EXPECTANCY

All standard units have been designed and tested for a minimum of 5 million trouble free cycles. Life may be extended by periodic lubrication of moving components.

LUBRICATION

Seals and gripper mechanism are prelubricated at the factory for service with dry filtered air under normal operating conditions.

MATERIAL

Gripper body is hardcoated aluminum. Cover, jaws and cam driver are hardened steel.

SPECIAL GRIPPERS

Grippers for special applications, severe duty, or constructed of special materials are available. Consult PHD. See page 16 for examples of custom products and solutions.

REPEATABILITY

Grip repeatability is within ± .001 in [± .025 mm] of the original position.

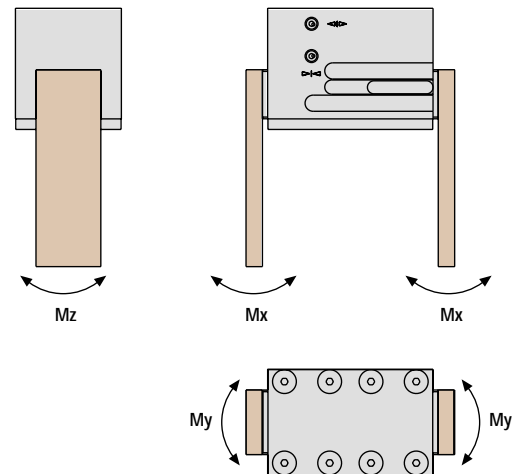
MAXIMUM ALLOWABLE MOMENTS ON GRIPPER JAWS

	SIZE 27		SIZE 28		SIZE 32		SIZE 50		SIZE 63	
	in-lb	Nm	in-lb	Nm	in-lb	Nm	in-lb	Nm	in-lb	Nm
Mx Per Jaw	50	5.6	80	9	150	17	380	43	1140	129
Total Both Jaws (2 x Mx)	100	11	160	18	300	34	760	86	2280	258
My Per Jaw	50	5.6	80	9	150	17	380	43	1140	129
Total Both Jaws (2 x My)	100	11	160	18	300	34	760	86	2280	258
Mz Per Jaw	50	5.6	80	9	150	17	380	43	1140	129
Total Both Jaws (2 x Mz)	100	11	160	18	300	34	760	86	2280	258

Mx, My: Allowable moments per jaw. Moments measured from the body surface.

Mz: Allowable moment per jaw. Moments measured from the jaw center.

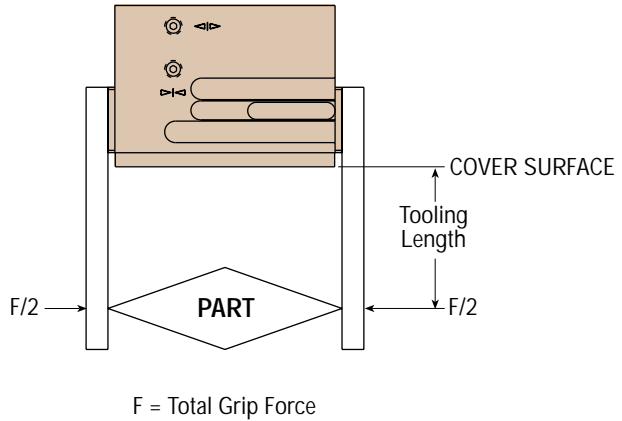
Note: When calculating values for Mx, My and Mz, include the grip force per jaw, tooling weight, part weight, external forces, and acceleration, as applicable.



ENGINEERING DATA: SERIES GRS GRIPPERS

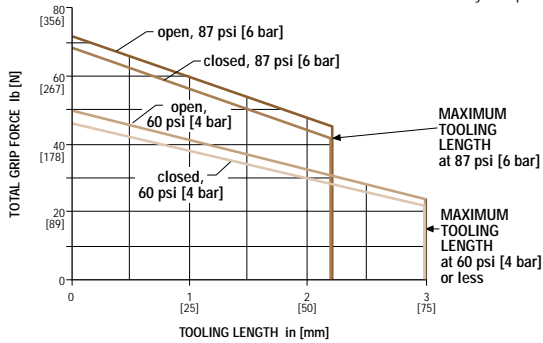
GRIP FORCE

Total gripping force relative to tooling length is shown below at the stated actuating 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.



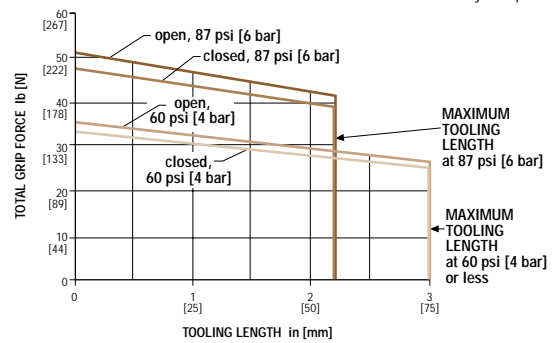
SIZE 27 x 4.5

NOTE: Maximum tooling length varies linearly with pressure.



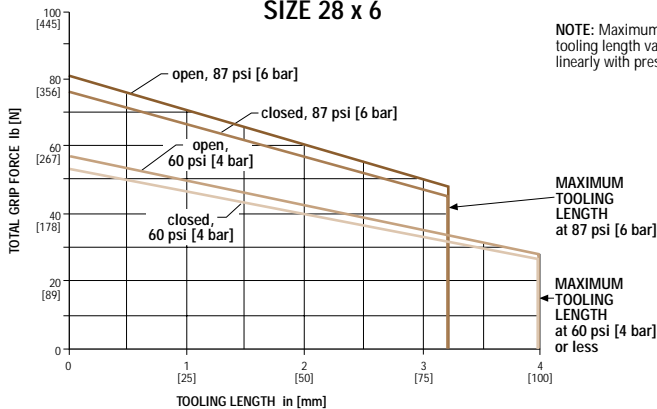
SIZE 27 x 7

NOTE: Maximum tooling length varies linearly with pressure.



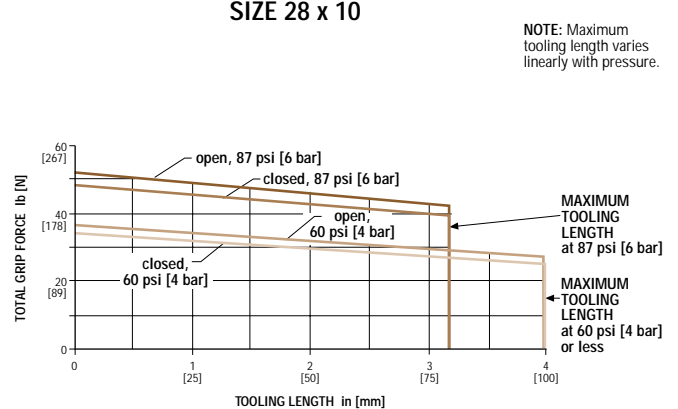
SIZE 28 x 6

NOTE: Maximum tooling length varies linearly with pressure.



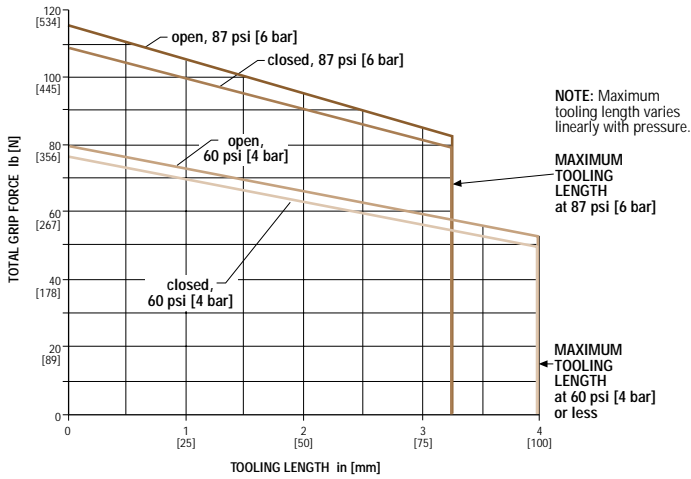
SIZE 28 x 10

NOTE: Maximum tooling length varies linearly with pressure.

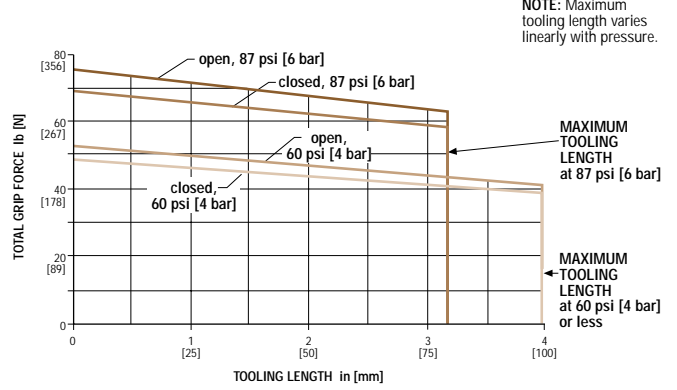


ENGINEERING DATA: SERIES GRS GRIPPERS

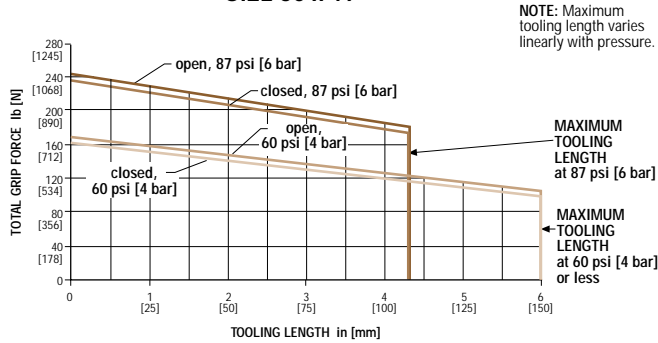
SIZE 32 x 8



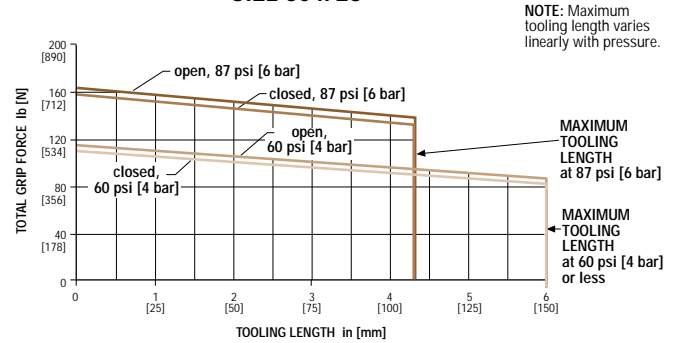
SIZE 32 x 13



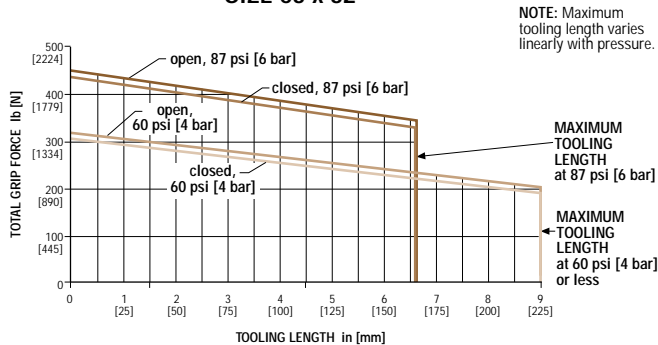
SIZE 50 x 19



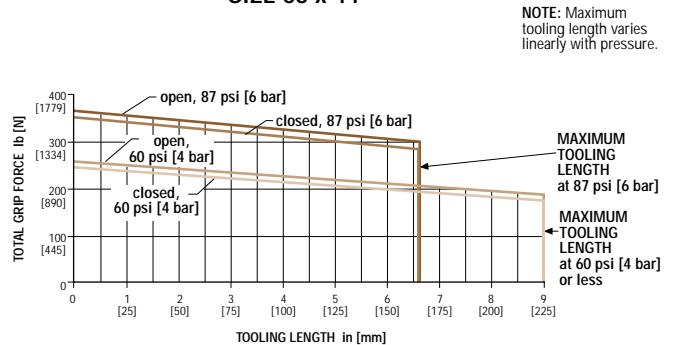
SIZE 50 x 28



SIZE 63 x 32



SIZE 63 x 44

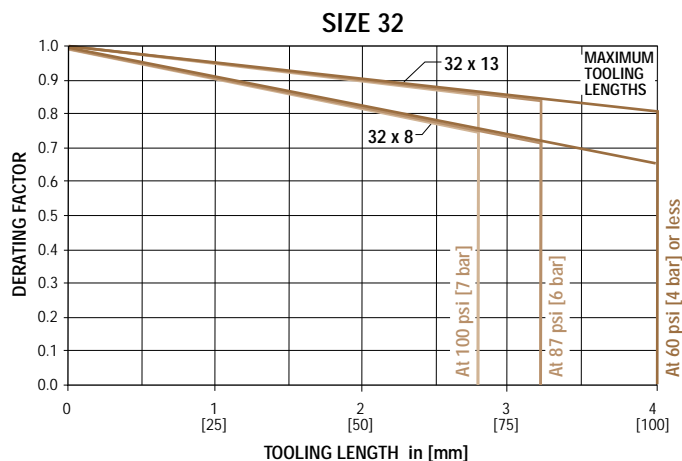
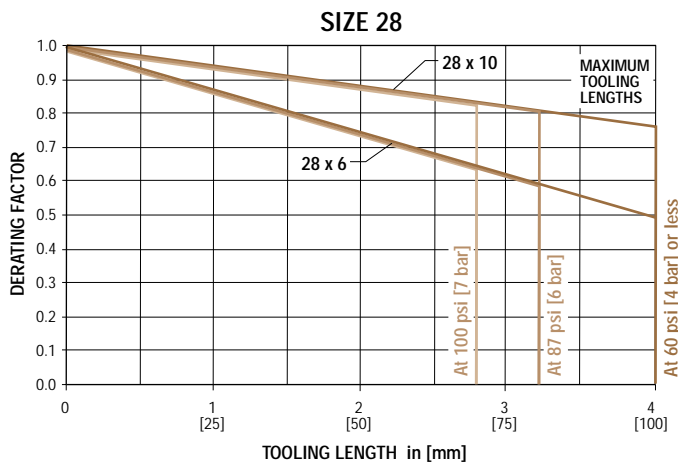
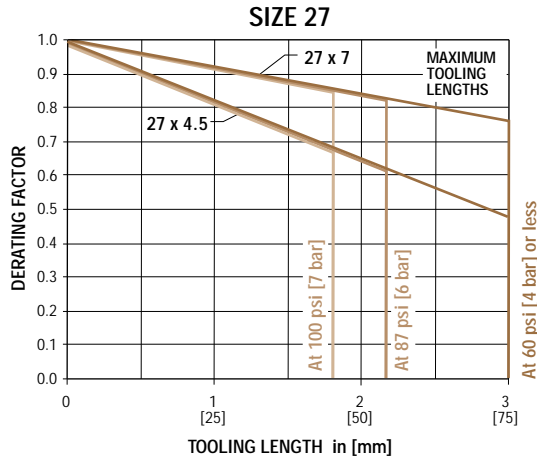


ENGINEERING DATA: SERIES GRS GRIPPERS

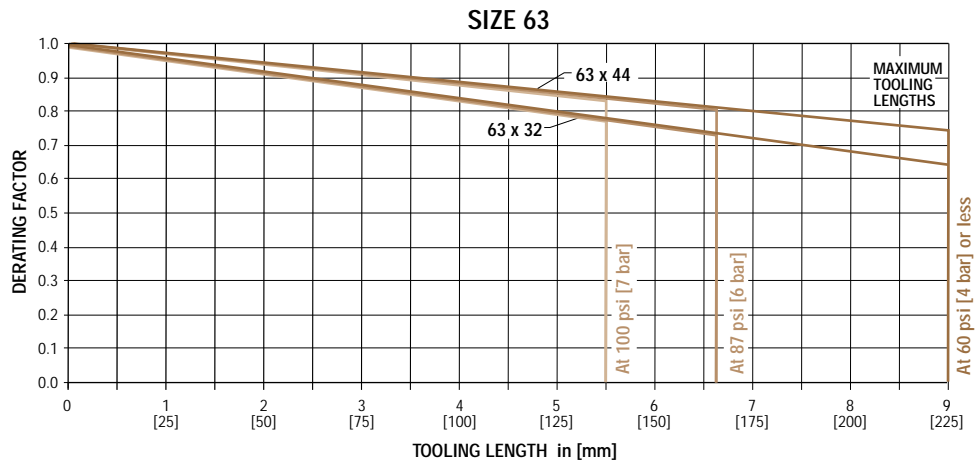
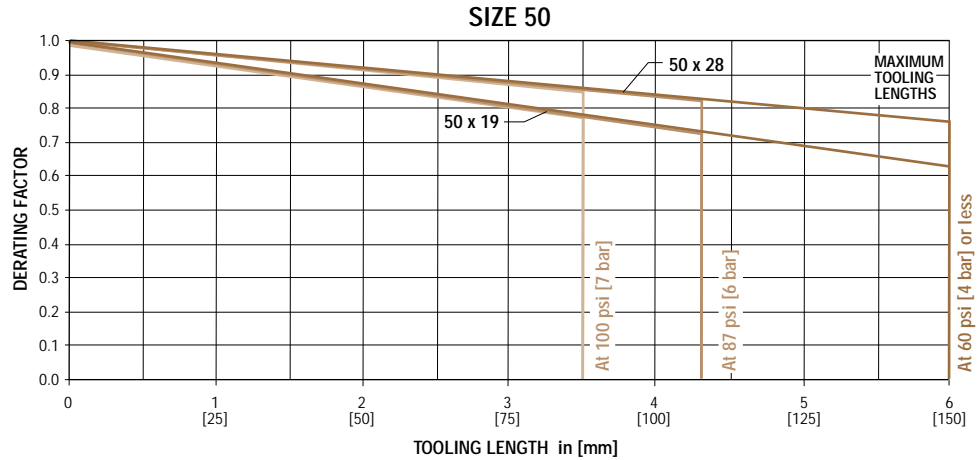
TOOLING LENGTH FACTOR

Jaw tooling should be designed so that the grip point is as close to the cover surface as possible. As the grip point is moved away from the cover 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 specifications table on

page 5 are for zero tooling length (cover surface). The grip force graphs on the previous pages show how grip force decreases as the grip point is moved from the cover surface. The derating factors and maximum tooling lengths are included in the grip force graphs.



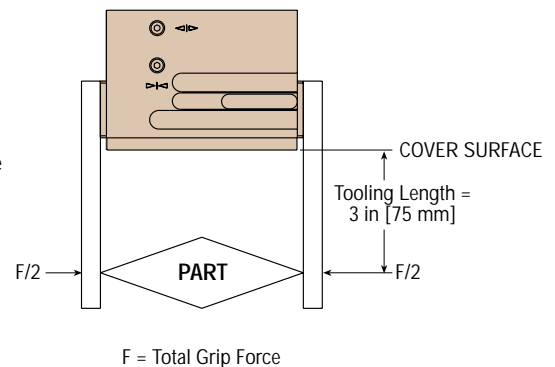
ENGINEERING DATA: SERIES GRS GRIPPERS



GRIPPER CALCULATION EXAMPLE

TOTAL GRIP FORCE lb [N] = Pressure psi [bar] x G_r x Tooling Length Factor

- Example: GRS33-1-32x8 [GRS33-5-32x8]
- Operating Pressure = 87 psi [6 bar]
- Max Tooling Length: Desired tooling length of 3 in [75 mm] is within acceptable limits since it is less than the maximum tooling length of 3.2 in [81 mm] at 87 psi [6 bar] (from Tooling Length Factor graph).
- Find Grip Force Factor G_r = 1.25 [81] (from Specifications Table on page 5)
- Find Tooling Length Factor = 0.74 [0.74] (See Tooling Length Factor graph) (Tooling Length of 3 in [75 mm] → 0.74 [0.74])
- Total Grip Force = 87 psi x 1.25 x .74 = 80 lb [6 bar x 81 x .74 = 360 N]



OPTIONS: SERIES GRS GRIPPERS

L11-UB99

L11-UB37

MANIFOLD PORTS

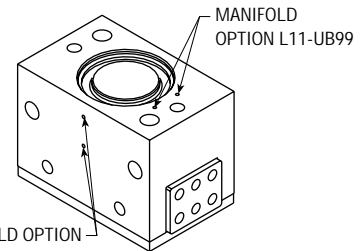
With these options the gripper is configured for manifold mounting on either the standard or optional mounting face, according to the selected option code. The standard ports are plugged. O-ring seals are provided for mounting between the gripper and the manifold. See page 12 for GR3 mounting information.

When the L11-UB37 option is specified, the GR3 option is automatically included to provide mountings on the manifold surface.

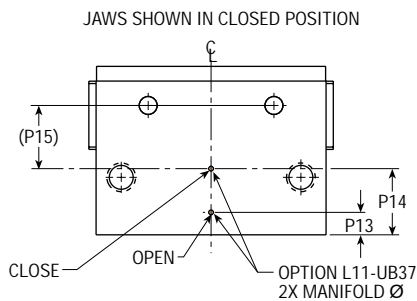
REPLACEMENT MANIFOLD SEAL KITS

SIZE	KIT NUMBER
27 & 28	70247-27-1
32	70247-32-1
50	70247-50-1
63	70247-63-1

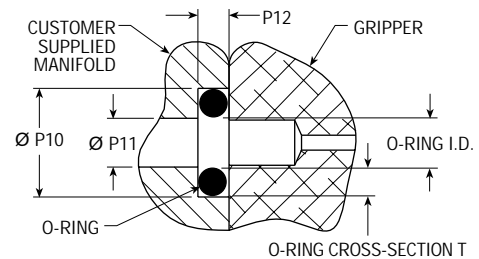
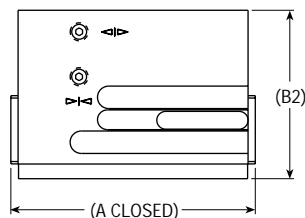
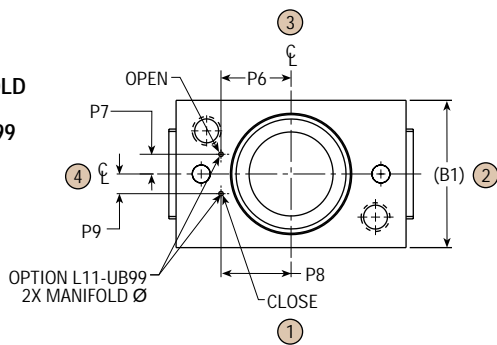
Manifold kit includes o-rings.



MANIFOLD OPTION L11-UB37



MANIFOLD OPTION L11-UB99



MANIFOLD PORTING DIMENSIONS

FOR CUSTOMER USE
(DIMENSIONS REQUIRED FOR CUSTOMER MOUNTING SURFACE)

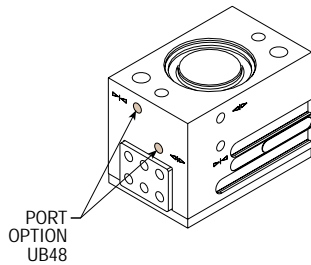
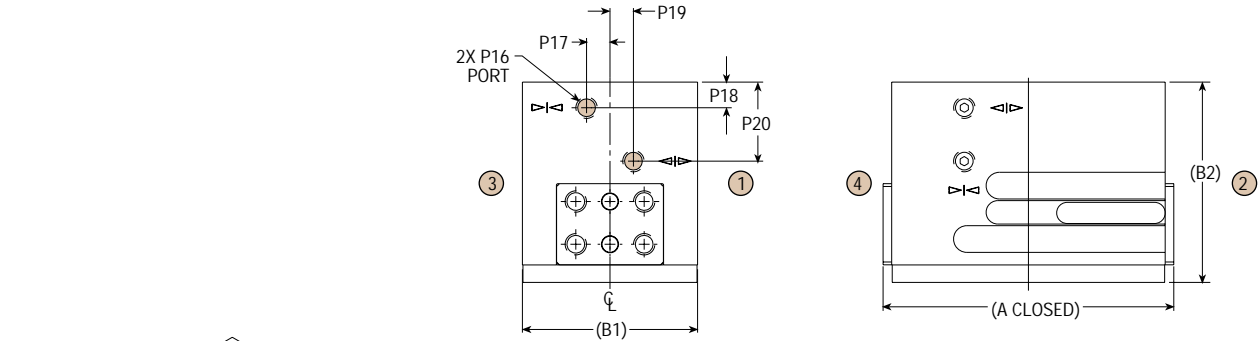
LETTER DIM	SIZE									
	27		28		32		50		63	
	in	mm	in	mm	in	mm	in	mm	in	mm
P6	.608	15.4	.650	16.5	.768	19.5	1.181	30.0	1.811	46.0
P7	.236	6.0	.177	4.5	.138	3.5	.276	7.0	.472	12.0
P8	.591	15.0	.650	16.5	.768	19.5	1.437	37.0	1.811	46.0
P9	.295	7.5	.236	6.0	.216	5.5	.276	7.0	.472	12.0
P10	.197	5.0	.197	5.0	.197	5.0	.236	6.0	.236	6.0
P10 O-RING (I.D. x T)	2 mm x 1.5 mm		2 mm x 1.5 mm		2 mm x 1.5 mm		3 mm x 1.5 mm		3 mm x 1.5 mm	
P11	.078	2.0	.078	2.0	.078	2.0	.098	2.5	.098	2.5
P12	.048	1.2	.048	1.2	.048	1.2	.048	1.2	.048	1.2
P13	.191	4.9	.190	4.8	.246	6.2	.290	7.4	.343	8.7
P14	.489	12.4	.545	13.8	.725	18.4	1.060	26.9	1.504	38.2
(P15)	.380	9.7	.518	13.2	.692	17.6	.830	21.1	1.213	30.8
(B1)	1.378	35.0	1.496	38.0	1.614	41.0	2.283	58.0	2.953	75.0
(B2)	1.496	38.0	1.969	50.0	2.520	64.0	3.386	86.0	5.236	133.0

- NOTES
1) DESIGNATED ϕ IS CENTERLINE OF UNIT
2) CIRCLED NUMBERS INDICATE POSITIONS

OPTIONS: SERIES GRS GRIPPERS

UB48 PORT OPTION IN LOCATION 48

This option provides ports in location 48. The standard ports are plugged.



LETTER DIM	SIZE									
	27		28		32		50		63	
	in	mm	in	mm	in	mm	in	mm	in	mm
P16	10-32	M5	10-32	M5	10-32	M5	10-32	M5	1/8 NPT	1/8 BSPP
P17	.276	7.0	.236	6.0	.216	5.5	.295	7.5	.472	12.0
P18	.201	5.1	.201	5.1	.236	6.0	.295	7.5	.394	10.0
P19	.433	11.0	.236	6.0	.216	5.5	.787	20.0	.472	12.0
P20	.446	11.3	.531	13.5	.728	18.5	1.060	26.9	1.407	35.7
(B1)	1.378	35.0	1.496	38.0	1.614	41.0	2.283	58.0	2.953	75.0
(B2)	1.496	38.0	1.969	50.0	2.520	64.0	3.386	86.0	5.236	133.0
(A CLOSED)	1.614	41.0	2.125	54.0	2.677	68.0	3.500	88.9	5.748	146.0

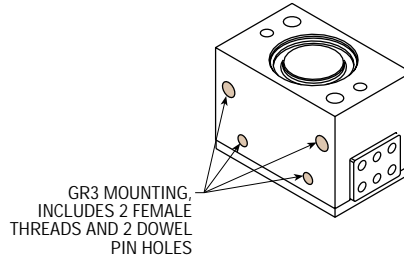
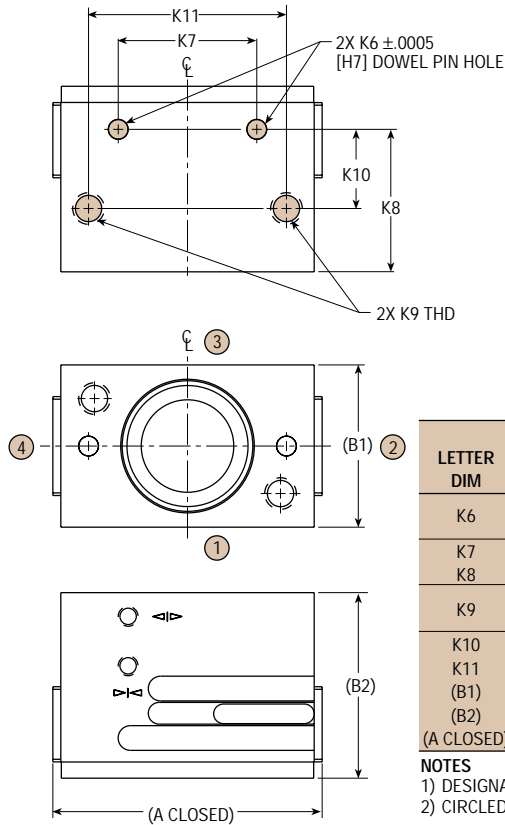
NOTES

- 1) DESIGNATED CL IS CENTERLINE OF UNIT
- 2) CIRCLED NUMBERS INDICATE POSITIONS

OPTIONS: SERIES GRS GRIPPERS

GR3 MOUNTING OPTION IN LOCATION 37

This option provides mounting threads and dowel holes on the side opposite the standard ports.

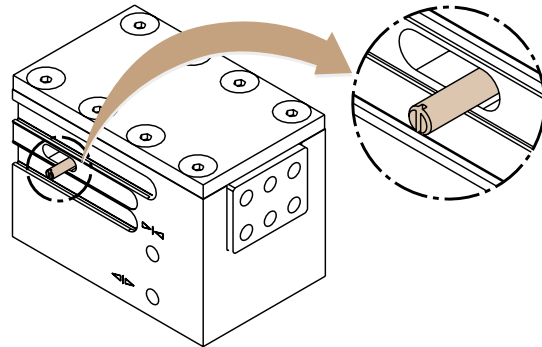


LETTER DIM	SIZE									
	27		28		32		50		63	
	in	mm	in	mm	in	mm	in	mm	in	mm
K6	.1283	3.0	.1908	5.0	.1908	5.0	.3158	8.0	.3783	10.0
	x .236 DP	x 6.0 DP	x .236 DP	x 6.0 DP	x .197 DP	x 5.0 DP	x .315 DP	x 8.0 DP	x .394 DP	x 10.0 DP
K7	.7480	19.0	.9449	24.0	1.3780	35.0	1.9685	50.0	3.1496	80.0
K8	.866	22.0	1.063	27.0	1.417	36.0	1.890	48.0	2.717	69.0
K9	8-32	M5 x 0.8	1/4-20	M6 x 1.0	5/16-18	M8 x 1.25	3/8-16	M10 x 1.5	1/2-13	M12 x 1.75
	x .315 DP	x 8.0 DP	x .512 DP	x 13.0 DP	x .591 DP	x 15.0 DP	x .630 DP	x 16.0 DP	x 1.024 DP	x 26.0 DP
K10	.433	11.0	.551	14.0	.787	20.0	1.024	26.0	1.378	35.0
K11	1.220	31.0	1.496	38.0	1.969	50.0	2.559	65.0	4.134	105.0
(B1)	1.378	35.0	1.496	38.0	1.614	41.0	2.283	58.0	2.953	75.0
(B2)	1.496	38.0	1.969	50.0	2.520	64.0	3.386	86.0	5.236	133.0
(A CLOSED)	1.614	41.0	2.125	54.0	2.677	68.0	3.500	88.9	5.748	146.0

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

CU SENSOR READY

With this option the gripper includes a target pin attached to the jaw for use with inductive proximity switches as well as the Series 6790 Solid State and Reed switches. Switches and switch mounting kits are required in addition to the CU option and are sold separately. See Accessories pages for switches and mounting kits.



ACCESSORIES: SERIES GRS GRIPPERS

PROXIMITY SWITCHES (-CU OPTION REQUIRED)

4 mm ROUND INDUCTIVE PROXIMITY SWITCHES (SIZE 27, 28, & 32)

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

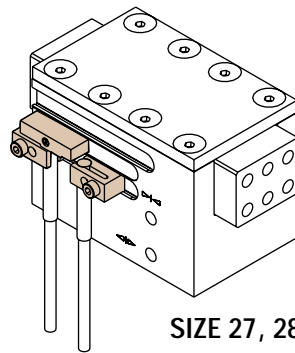
8 mm THREADED INDUCTIVE PROXIMITY SWITCHES (SIZE 50 & 63)

PART NUMBER	DESCRIPTION
51422-005-02	NPN (Sink) 5-30 VDC, 2 meter cable
51422-006-02	PNP (Source) 5-30 VDC, 2 meter cable

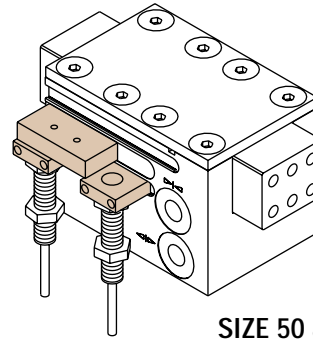
PROXIMITY SWITCH MOUNTING KITS

SIZE	KIT NUMBER
27 & 28	70663-27
32	70663-32
50	70663-50
63	70663-63

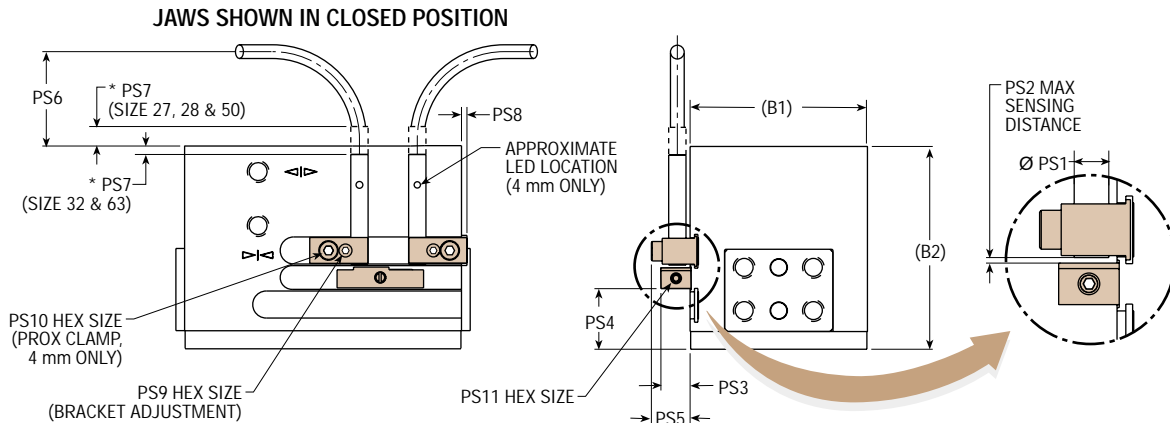
Each kit includes 1 target, 2 switch mounting brackets, and fasteners for mounting. Switches sold separately.



SIZE 27, 28, & 32



SIZE 50 & 63



LETTER DIM	SIZE									
	27		28		32		50		63	
	in	mm	in	mm	in	mm	in	mm	in	mm
PS1	4 mm ROUND		4 mm ROUND		4 mm ROUND		8 mm THREADED		8 mm THREADED	
PS2	.020	.5	.020	.5	.020	.5	.030	.8	.030	.8
PS3	.236	6.0	.236	6.0	.276	7.0	.680	17.3	.680	17.3
PS4	.354	9.0	.454	11.5	.551	14.0	.630	16.0	1.337	34.0
PS5	.393	10.0	.393	10.0	.393	10.0	.690	17.5	.690	17.5
PS6	1.377	35.0	1.218	30.9	.860	21.8	1.260	32.0	.753	19.1
*PS7	.435	11.0	.276	7.0	.082	2.1	.310	7.9	.189	4.8
PS8	.256	6.5	.165	4.2	.050	1.3	N/A	N/A	N/A	N/A
PS9	.051	1.3	.051	1.3	.051	1.3	.051	1.3	.051	1.3
PS10	.079	2.0	.079	2.0	.079	2.0	N/A	N/A	N/A	N/A
PS11	.051	1.3	.051	1.3	.051	1.3	.061	1.5	.061	1.5
(B1)	1.378	35.0	1.496	38.0	1.614	41.0	2.283	58.0	2.953	75.0
(B2)	1.496	38.0	1.969	50.0	2.520	64.0	3.386	86.0	5.236	133.0

NOTE: * INDICATES BOTTOM OF PROXIMITY SWITCH BARREL, DOES NOT INCLUDE CABLE.

All dimensions are reference only unless specifically tolerated.

ACCESSORIES: SERIES GRS GRIPPERS

SERIES 6790 SWITCHES (-CU OPTION REQUIRED)

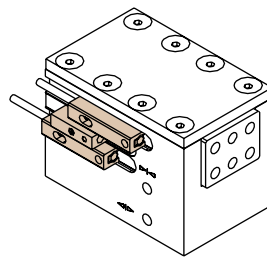
SERIES 6790 SOLID STATE & REED SWITCHES (ALL UNITS)

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

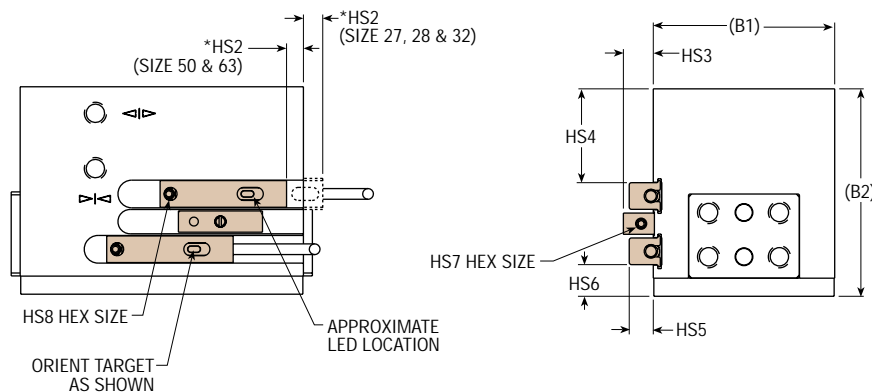
SERIES 6790 SWITCH MOUNTING KITS

SIZE	KIT NUMBER
27 & 28	70664-27
32	70664-32
50	70664-50
63	70664-63

Each kit includes 1 target, 2 switch mounting brackets, and fasteners for mounting. Switches sold separately.



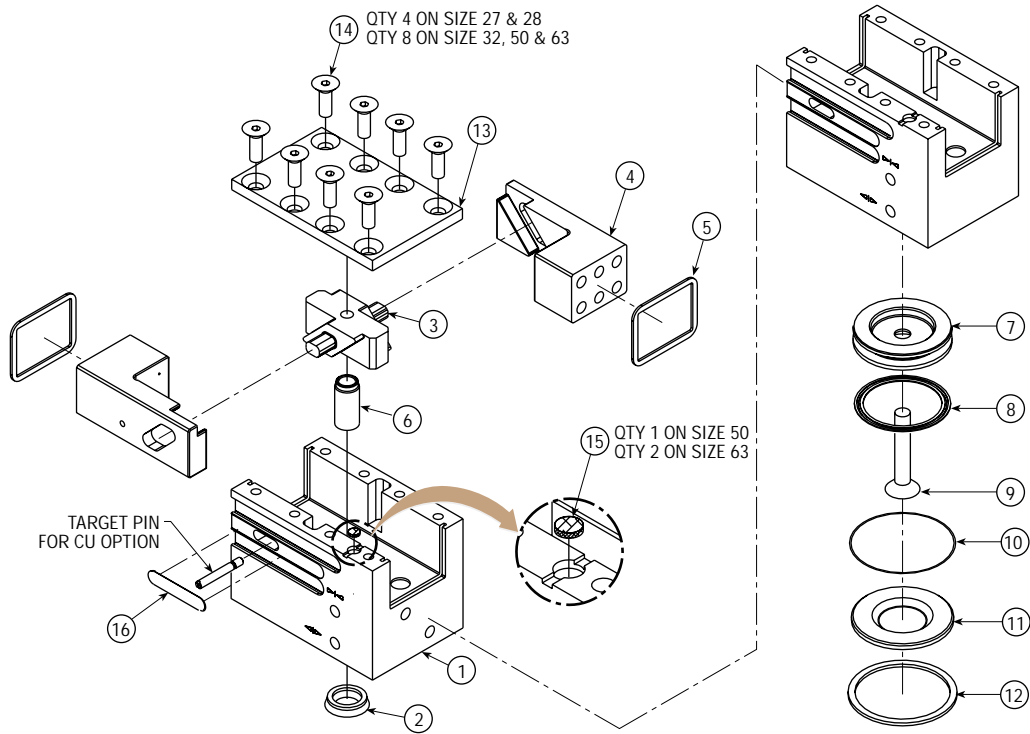
JAWS SHOWN IN CLOSED POSITION



LETTER DIM	SIZE									
	27		28		32		50		63	
	in	mm	in	mm	in	mm	in	mm	in	mm
*HS2	.197	5.0	.040	1.0	.040	1.0	.560	14.2	1.298	33.0
HS3	.236	6.0	.236	6.0	.266	6.8	.236	6.0	.236	6.0
HS4	.315	8.0	.483	12.3	.835	21.2	1.194	30.3	1.707	43.4
HS5	.246	6.2	.246	6.2	.214	5.4	.296	7.5	.236	6.0
HS6	.084	2.1	.185	4.7	.282	7.2	.325	8.3	1.032	26.2
HS7 HEX	.051	1.3	.051	1.3	.051	1.3	.061	1.5	.061	1.5
HS8 HEX	.051	1.3	.051	1.3	.051	1.3	.051	1.3	.051	1.3
(B1)	1.378	35.0	1.496	38.0	1.614	41.0	2.283	58.0	2.953	75.0
(B2)	1.496	38.0	1.969	50.0	2.520	64.0	3.386	86.0	5.236	133.0

NOTE: * INDICATES END OF 6790 SWITCH BRACKET, DOES NOT INCLUDE CABLE.

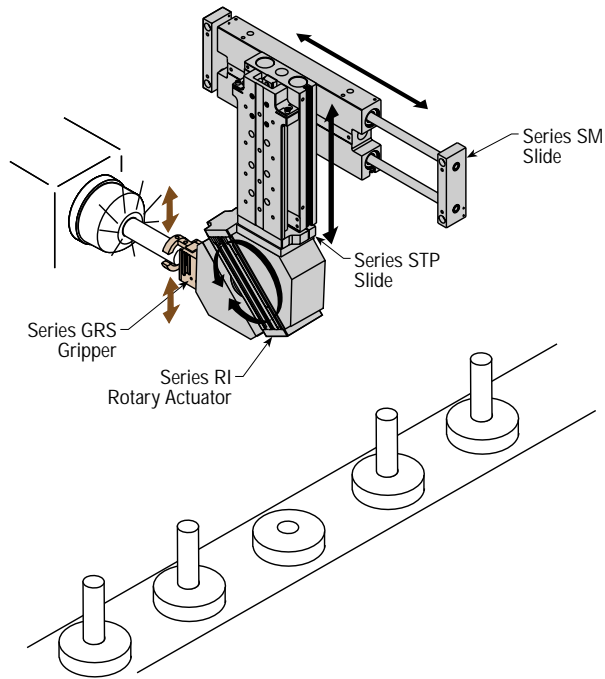
PARTS LIST & KITS: SERIES GRS GRIPPERS



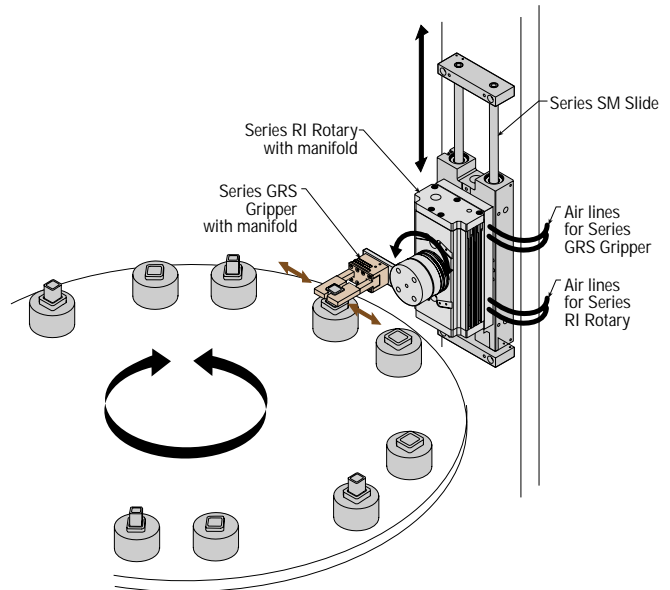
KEY	PART DESCRIPTION	PART NUMBER									
		SIZE 27		SIZE 28		SIZE 32		SIZE 50		SIZE 63	
		IMPERIAL	METRIC	IMPERIAL	METRIC	IMPERIAL	METRIC	IMPERIAL	METRIC	IMPERIAL	METRIC
1	Body Assembly	SPECIFY FULL UNIT DESCRIPTION WITH -H2400									
3	Jaw Driver For Short Travel (27 x 4.5, 28 x 6, 32 x 8, 50 x 19 and 63 x 32)	70241		70242		70243		70677		70679	
3	Jaw Driver For Long Travel (27 x 7, 28 x 10, 32 x 13, 50 x 28 and 63 x 44)	70156		70226		70236		70678		70680	
4	Jaw For Short Travel (27 x 4.5, 28 x 6, 32 x 8, 50 x 19 and 63 x 32)	70154-1	70154-5	70224-1	70224-5	70234-1	70234-5	70184-1	70184-5	70164-1	70164-5
4	Jaw For Long Travel (27 x 7, 28 x 10, 32 x 13, 50 x 28 and 63 x 44)	70155-1	70155-5	70225-1	70225-5	70235-1	70235-5	70185-1	70185-5	70165-1	70165-5
6	Rod	70658		70659		70660		70661		70662	
7	Piston	64538		64538		70218		61584		61585	
9	Piston Assembly Fastener	14308-576		14308-578		14308-591		14308-603		14308-617	
11	Bore Plug	64534		64534		70239		61598		61599	
12	Bore Plug Retainer	1980-118		1980-118		1980-037		57618-053		57618-066	
13	Jaw Cover	70158		70228		70238		70188		70168	
14	Jaw Cover Assembly Fasteners	14308-570		14308-584		14308-572		14308-599		14308-002	
2	Rod Seal										
5	Jaw Seal										
8	Piston Seal	70666-27-07-1		70666-28-10-1		70666-32-13-1		70666-50-28-1		70666-63-44-1	
10	Bore Plug Seal										
15	Air Filter										
-	Target Pin Replacement	70171		70171		70171		70176		70176	
16	Sensor Slot Cover	6441-445		6441-445		6441-445		6441-446		6441-446	

APPLICATIONS & CONCEPTS: SERIES GRS GRIPPERS

The combination of a PHD Series RI Rotary Actuator, GRS Gripper, STP Slide and SM Slide creates an automated part handler capable of complex part movements. The high grip force of the PHD Series GRS Gripper assures secure product retention in this conveyor fed lathe loading operation.



Working in conjunction, a PHD Series GRS Gripper and PHD Series RI Rotary Actuator provide the ability to grip and rotate products for further processing. The PHD Series SM Slide eliminates the need for a lift table during the vertical movement of the products. With the use of manifolding between the Series GRS Gripper and the Series RI Rotary Actuator, simplified plumbing of air lines is achieved.

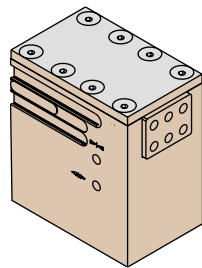


CUSTOM PRODUCTS & SOLUTIONS

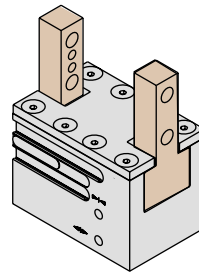
Illustrations shown are for concept only. Other variations include:

- Smaller or larger bore sizes
- Shorter or longer strokes
- Fluid compatibility
- Alternate port locations
- Alternate mounting locations

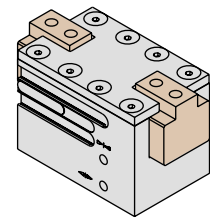
Contact phd, inc. with your product requirements.



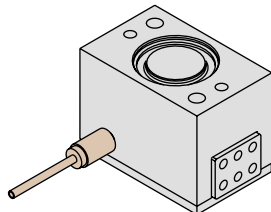
SPRING ASSIST
(AVAILABLE AS STANDARD IN 2002)



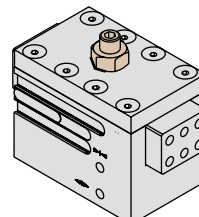
ALTERNATE JAW STYLE



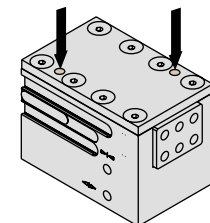
ALTERNATE JAW STYLE



PRESSURE / VACUUM PORT



STROKE ADJUSTMENT



ADDITIONAL DOWEL HOLES FOR FIXTURING OR NESTING OF PART

PHD, Inc.
9009 Clubridge Drive
P.O. Box 9070, Fort Wayne, Indiana 46899 U.S.A.
Phone (219) 747-6151 • Fax (219) 747-6754

PHD GmbH
Arnold-Sommerfeld-Ring 2
D-52499 Baesweiler GERMANY
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