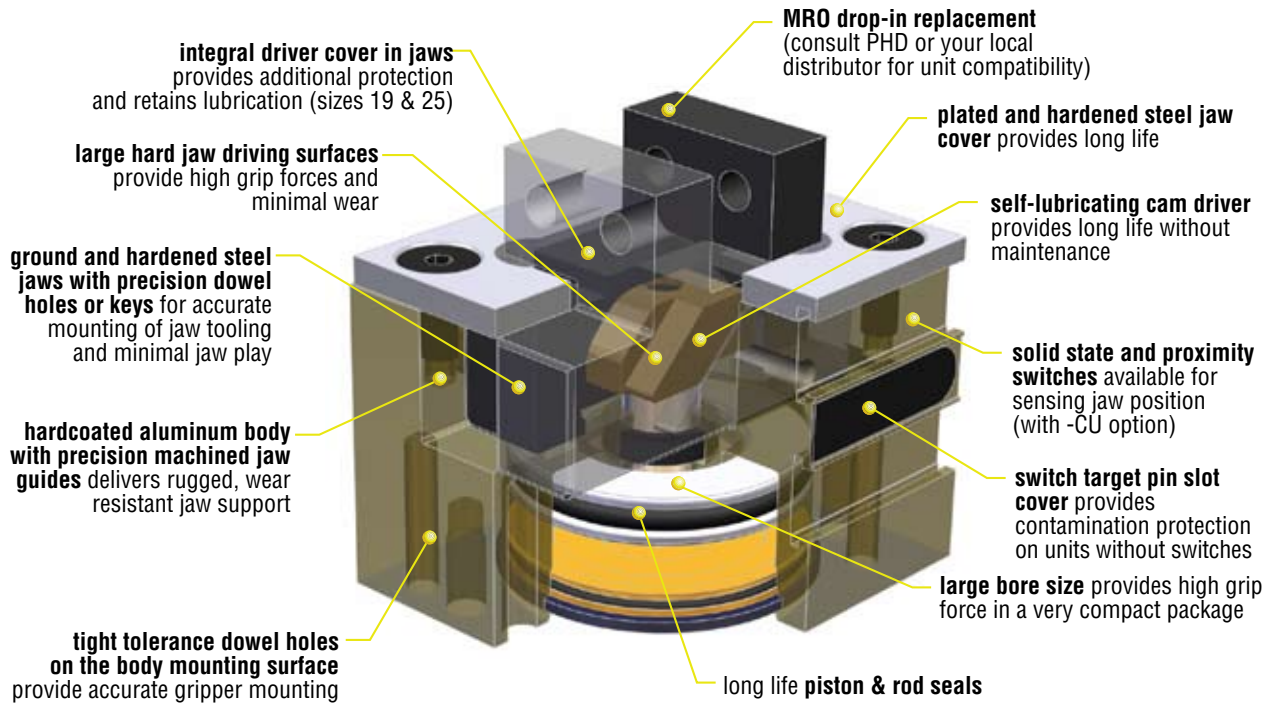


GRF



LOW PROFILE, HIGH FORCE



GRF

Major Benefits

- Competitive interchange opportunity
- Jaw covers help prevent contamination and maintain lubrication by covering jaw working mechanisms at all times
- One or two jaw travels per size available
- Four total sizes available in both imperial and metric versions
- Low profile
- 1-2 day shipping
- 6 million cycles minimum rated life

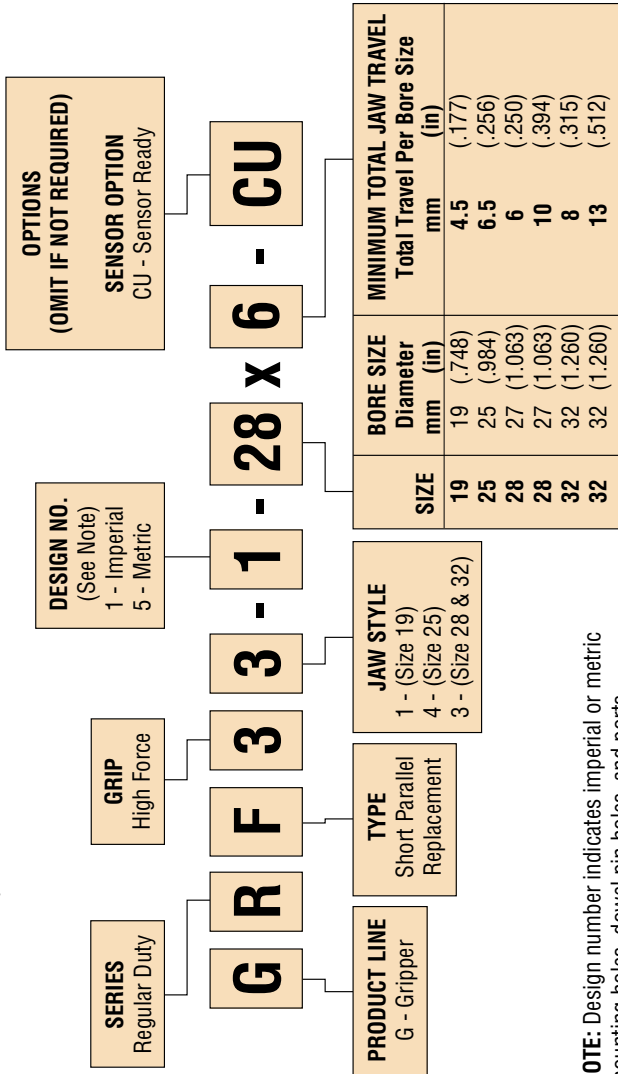
Industry Uses

- Assembly machine builders
- Light bulb manufacturing
- Powdered metal
- Medical
- Cosmetics
- Semiconductor
- Vehicle lighting equipment

ORDERING DATA: SERIES GRF GRIPPERS

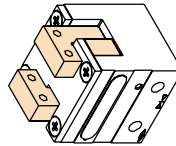
TO ORDER SPECIFY:

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

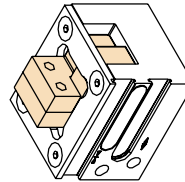


NOTE: Design number indicates imperial or metric mounting holes, dowel pin holes, and ports.

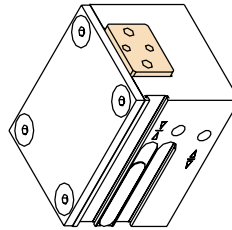
Please refer to the Accessories section for switch and kit information.



SIZE 19
JAW STYLE 1



SIZE 25
JAW STYLE 4

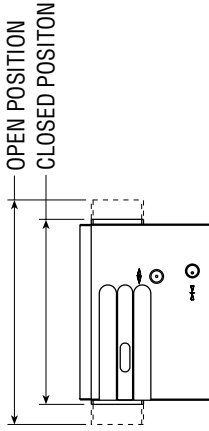


SIZE 28/32
JAW STYLE 3



UNIQUE GRIPPERS ARE AVAILABLE.
SEE PAGES 4-139 TO 4-164.

TOTAL JAW TRAVEL =
OPEN POSITION - CLOSED POSITION



6 mm SQUARE INDUCTIVE PROXIMITY SWITCHES (SIZE 19)

PART NUMBER	DESCRIPTION
18431-001-02	NPN (Sink) 10-30 VDC, 2 meter cable
18431-002-02	PNP (Source) 10-30 VDC, 2 meter cable

4 mm ROUND INDUCTIVE PROXIMITY SWITCHES (SIZE 25, 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

SERIES 5580 HALL EFFECT SWITCHES (SIZE 19)

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

SERIES 6790 SOLID STATE & REED SWITCHES (SIZE 25, 28, & 32)

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
63549-02	2 meter Cordset with Quick Connect
63549-05	5 meter Cordset with Quick Connect
67929-2	AC Reed, Current Limited, Quick Connect

ENGINEERING DATA: SERIES GRF GRIPPERS

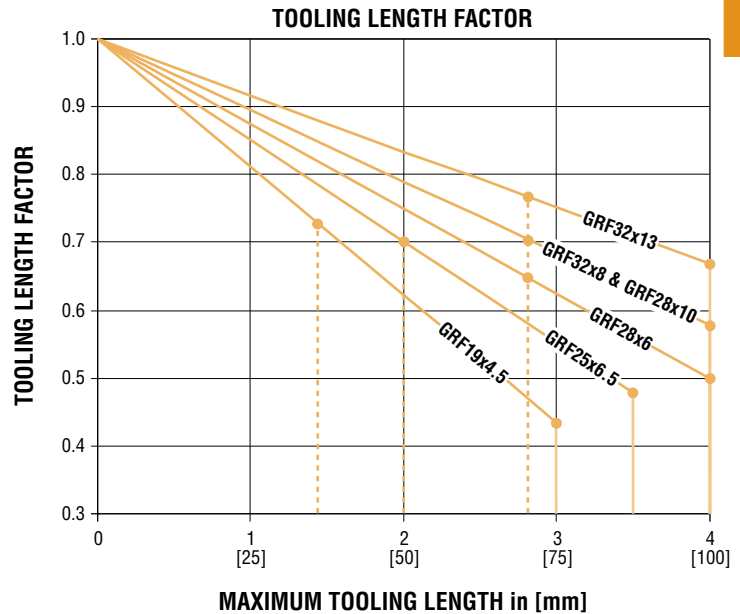
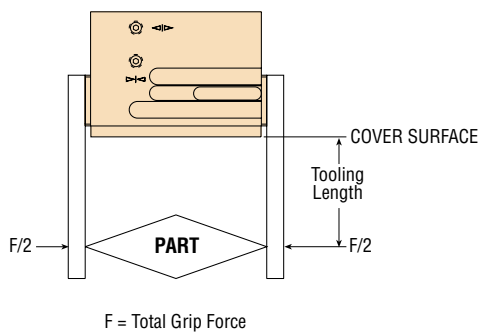
SPECIFICATIONS	SERIES GRF
OPERATING PRESSURE	
STANDARD UNIT	30 psi min to 100 psi max [2 bar min to 7 bar max] air
OPERATING TEMPERATURE	-20° to +180°F [-28° to +82°C]
RATED LIFE	6 million cycles minimum
GRIP REPEATABILITY	Within ±0.002 in [±0.05 mm] of original centered position
CYCLE TIME	See table 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]	DISPLACEMENT		GRIP FORCE FACTOR G_F			
	in	mm	lb	N	lb	kg		in ³	cm ³	EXTERNAL GRIP		INTERNAL GRIP	
										IMPERIAL	METRIC	IMPERIAL	METRIC
19 x 4.5	0.177	4.5	30	135	0.19	0.09	0.08	0.068	1.1	0.35	23	0.38	25
25 x 6.5	0.256	6.5	35	156	0.28	0.13	0.11	0.134	2.2	0.40	26	0.43	28
28 x 6	0.250	6	77	341	0.54	0.24	0.13	0.182	3.0	0.88	57	0.93	60
28 x 10	0.394	10	48	213	0.54	0.24	0.13	0.182	3.0	0.55	36	0.59	38
32 x 8	0.315	8	116	516	1.0	0.45	0.16	0.335	5.5	1.33	86	1.42	92
32 x 13	0.512	13	85	378	1.0	0.45	0.16	0.335	5.5	0.98	63	1.04	67

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 table above are for zero tooling length (cover surface).

The Tooling Length Factor graph shows maximum tooling lengths at 40 psi and 100 psi. Refer to sizing software for maximum tooling lengths at other pressures.



NOTE:
 - - - - - At 100 psi [7 bar]
 ————— At 40 psi [2.76 bar]

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

GRIP FORCE CALCULATION EQUATIONS:

IMPERIAL:

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

METRIC:

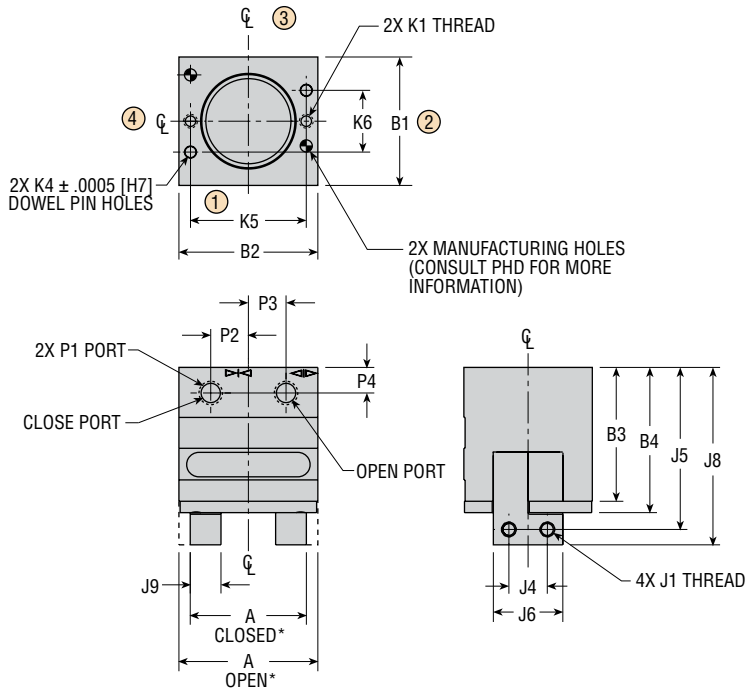
$$\text{TOTAL GRIP FORCE [N]} = (\text{Pressure [bar]} \times G_F) \times \text{Tooling Length Factor}$$

GRF

CAT-08

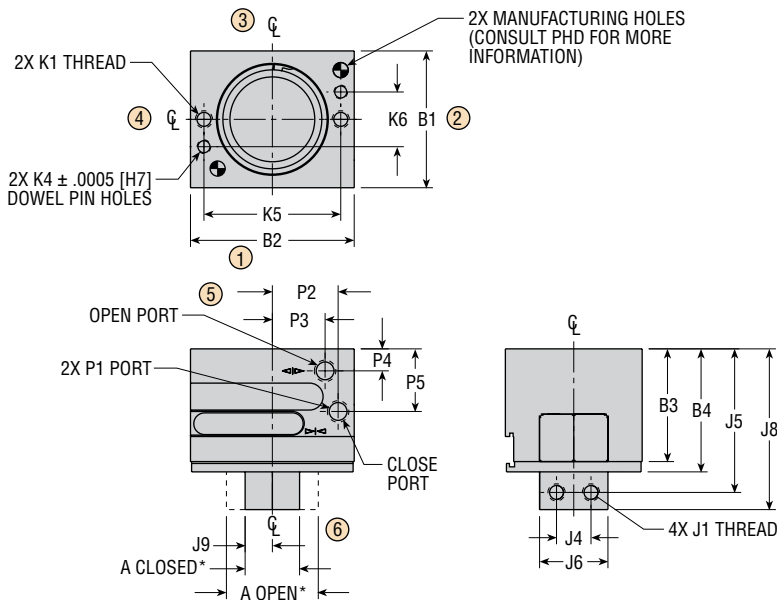
DIMENSIONS: SERIES GRF GRIPPERS

GRF31-x-19



LETTER DIMENSION	MODEL GRF31-x-19x4.5	
	in	mm
MIN. TRAVEL PER JAW	.088	2.25
A CLOSED*	.960	24.4
A OPEN*	1.130	28.7
B1	1.042	26.5
B2	1.127	28.6
B3	1.086	27.6
B4	1.178	29.9
J1	6-32	M3 x .5
J4	.313	7.94
J5	1.314	33.4
J6	.5615	14.26
J8	1.439	36.6
J9	.2490	6.32
K1	4-40 x .375 DP	M3 x .5 x 9.5 DP
K4	.0943 x .250 DP	3.0 x 6.0 DP
K5	.9375	23.81
K6	.5000	12.70
P1	10-32	M5 x .8
P2	.305	7.7
P3	.305	7.7
P4	.207	5.3

GRF34-x-25



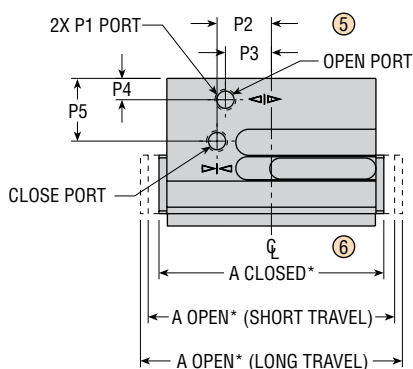
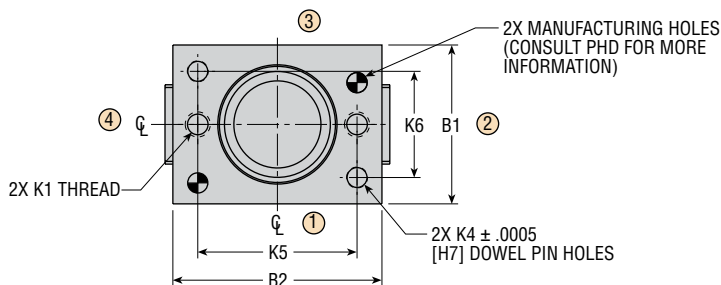
LETTER DIMENSION	MODEL GRF34-x-25x6.5	
	in	mm
MIN. TRAVEL PER JAW	.128	3.25
A CLOSED*	.500	12.7
A OPEN*	.750	19.1
B1	1.252	31.8
B2	1.498	38.0
B3	1.032	26.2
B4	1.126	28.6
J1	6-32	M4 x .7
J4	.315	8.00
J5	1.314	33.4
J6	.6245	15.86
J8	1.471	37.4
J9	.2490	6.32
K1	6-32 x .375 DP	M4 x .7 x 9.5 DP
K4	.1255 x .250 DP	3.0 x 6.0 DP
K5	1.2500	31.75
K6	.5000	12.70
P1	10-32	M5 x .8
P2	.601	15.3
P3	.482	12.2
P4	.202	5.1
P5	.573	14.6

NOTES:

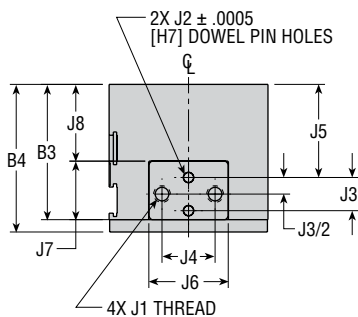
- 1) DESIGNATED ϕ IS CENTERLINE OF UNIT
- 2) METRIC INFORMATION SHOWN IN []
- 3) * A OPEN REFLECTS THE SMALLEST POSSIBLE OPEN DIMENSION
A CLOSED REFLECTS THE LARGEST POSSIBLE CLOSED DIMENSION
- 4) CIRCLED NUMBERS INDICATE POSITIONS

DIMENSIONS: SERIES GRF GRIPPERS

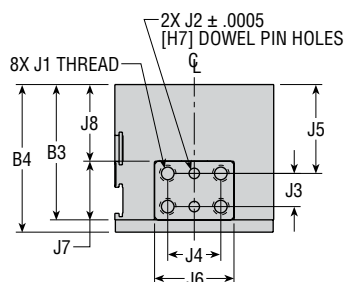
GRF33-x-28 & GRF33-x-32



SIZE 28



SIZE 32



NOTES:

- 1) DESIGNATED ϕ IS CENTERLINE OF UNIT
- 2) METRIC INFORMATION SHOWN IN []
- 3) * A OPEN REFLECTS THE SMALLEST POSSIBLE OPEN DIMENSION
A CLOSED REFLECTS THE LARGEST POSSIBLE CLOSED DIMENSION
- 4) CIRCLED NUMBERS INDICATE POSITIONS

LETTER DIMENSION	MODEL GRF33-x-28		MODEL GRF33-x-32	
	in	mm	in	mm
MIN. TRAVEL PER JAW (SHORT TRAVEL)	.118	3.0	.157	4.0
MIN. TRAVEL PER JAW (LONG TRAVEL)	.197	5.0	.256	6.5
A CLOSED*	2.126	54.0	2.690	68.3
A OPEN SHORT*	2.370	60.2	3.000	76.2
A OPEN LONG*	2.500	63.5	3.190	81.0
B1	1.498	38.0	1.616	41.0
B2	1.968	50.0	2.522	64.1
B3	1.276	32.4	1.705	43.3
B4	1.392	35.4	1.866	47.4
J1	8-32 x .315 DP	M4 x .7 x 8.0 DP	10-32 x .394 DP	M5 x .8 x 10 DP
J2	.0947 x .197 DP	2.5 x 5.0 DP	.1283 x .236 DP	4.0 x 6.0 DP
J3	.3125	7.94	.375	9.5
J4	.500	12.7	.6875	17.46
J5	.878	22.3	1.121	28.5
J6	.7477	19.0	.9840	25.0
J7	.5509	14.0	.7477	19.0
J8	.724	18.4	.956	24.3
K1	1/4-20 x .500 DP	M6 x 1.0 x 12.5 DP	1/4-20 x .591 DP	M6 x 1.0 x 15.0 DP
K4	.1880 x .374 DP	5.0 x 9.5 DP	.1880 x .256 DP	5.0 x 6.5 DP
K5	1.5000	38.1	2.0000	50.8
K6	1.000	25.4	.7500	19.05
P1	10-32	M5 x .8	10-32	M5 x .8
P2	.512	13.0	.591	15.0
P3	.433	11.0	.591	15.0
P4	.202	5.1	.236	6.0
P5	.592	15.0	.807	20.5

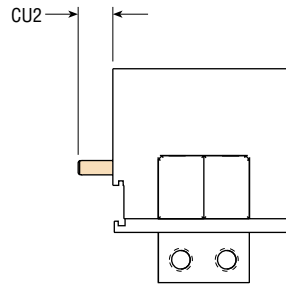
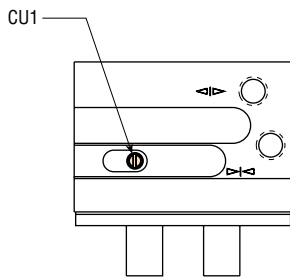
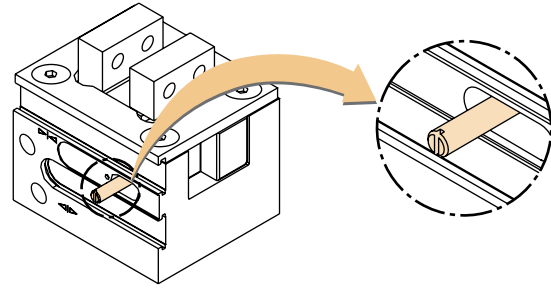
All dimensions are reference only unless specifically tolerated.

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OPTIONS: SERIES GRF GRIPPERS

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 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.



LETTER DIM	MODEL NUMBER							
	GRF31-x-19x4.5		GRF34-x-25x6.5		GRF33-x-28x6 or 10		GRF33-x-32x8 or 13	
	in	mm	in	mm	in	mm	in	mm
CU1	.098	2.5	.098	2.5	.098	2.5	.098	2.5
CU2	.321	8.2	.238	6.0	.185	4.7	.256	6.5

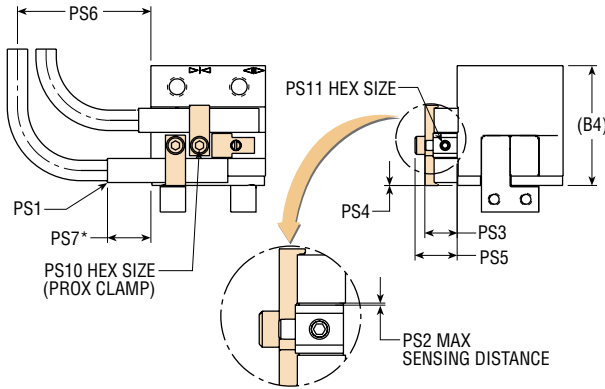
ACCESSORIES: SERIES GRF GRIPPERS

PROXIMITY SWITCHES (-CU OPTION REQUIRED)

6 mm SQUARE INDUCTIVE PROXIMITY SWITCHES (SIZE 19)

PART NUMBER	DESCRIPTION
18431-001-02	NPN (Sink) 10-30 VDC, 2 meter cable
18431-002-02	PNP (Source) 10-30 VDC, 2 meter cable

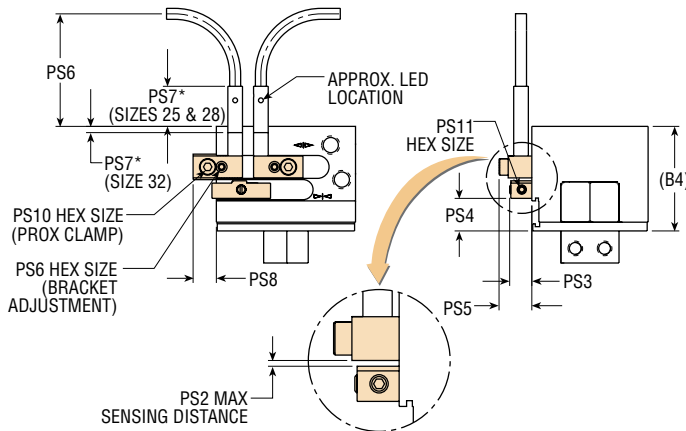
GRF SIZE 19



4 mm ROUND INDUCTIVE PROXIMITY SWITCHES (SIZE 25, 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

GRF SIZES 25, 28 & 32



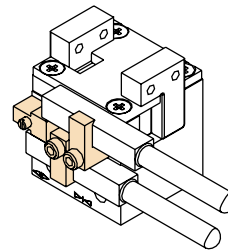
PROXIMITY SWITCH MOUNTING KITS

SIZE	KIT NUMBER
19	73722-19
25	73722-25
28	73722-28
32	73722-32

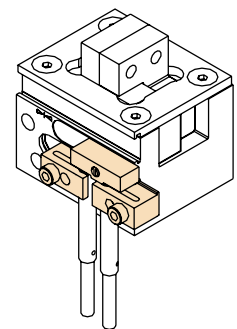
NOTES:

- Each kit includes 1 target, 2 switch mounting brackets, and fasteners for mounting. Switches sold separately.
- See switches and sensors section for additional switch information and complete specification.

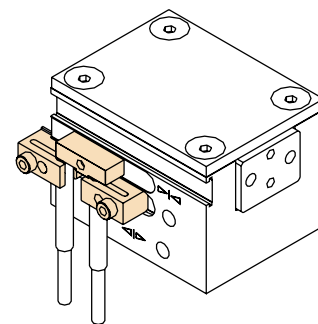
GRF SIZE 19



GRF SIZE 25



GRF SIZE 28 & 32



LETTER	SIZE							
	19		25		28		32	
DIM	in	mm	in	mm	in	mm	in	mm
PS1	6 mm SQUARE		4 mm ROUND		4 mm ROUND		4 mm ROUND	
PS2	.031	.8	.020	.5	.020	.5	.020	.5
PS3	.340	8.6	.236	6.0	.236	6.0	.276	7.0
PS4	.001	.0	.354	9.0	.454	11.5	.551	14.0
PS5	.440	11.2	.393	10.0	.393	10.0	.393	10.0
PS6	1.370	34.8	1.377	35.0	1.218	30.9	.860	21.8
PS7*	.450	11.4	.435	11.0	.276	7.0	.082	2.1
PS8	—	—	.256	6.5	.165	4.2	.050	1.3
PS9	—	—	.051	1.3	.051	1.3	.051	1.3
PS10	.079	2.0	.079	2.0	.079	2.0	.079	2.0
PS11	.051	1.3	.051	1.3	.051	1.3	.051	1.3
(B4)	1.178	29.9	1.130	28.7	1.395	35.4	1.847	46.9

NOTES:

- * INDICATES BOTTOM OF PROXIMITY SWITCH BARREL OR END OF 6 mm SQUARE PROXIMITY SWITCH, DOES NOT INCLUDE CABLE.
- KITS REQUIRE THE -CU OPTION.

All dimensions are reference only unless specifically tolerated.

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ACCESSORIES: SERIES GRF GRIPPERS

SERIES 6790 & 5580 SWITCHES (-CU OPTION REQUIRED)

SERIES 5580 HALL EFFECT SWITCHES (SIZE 19)

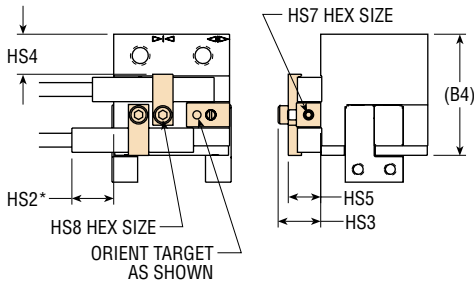
PART NUMBER	DESCRIPTION
55803-1-02	NPN (Sink) 4.5-24 VDC, 2 meter cable
55804-1-02	PNP (Source) 4.5-24 VDC, 2 meter cable
55823-1	NPN (Sink) 4.5-24 VDC, Quick Connect
55824-1	PNP (Source) 4.5-24 VDC, Quick Connect

SERIES 6790 SOLID STATE & REED SWITCHES (SIZE 25, 28, & 32)

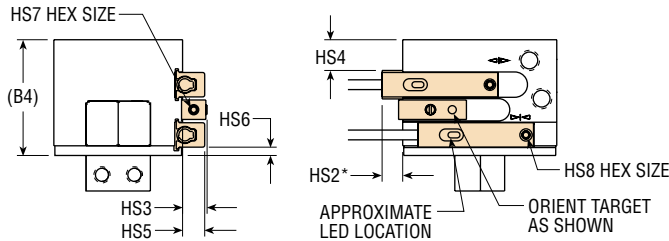
PART NUMBER	DESCRIPTION
67923-1	NPN (Sink) Solid State 4.5-30 VDC, Quick Connect
67903-1-02	NPN (Sink) Solid State 4.5-30 VDC, 2 meter cable
67903-1-05	NPN (Sink) Solid State 4.5-30 VDC, 5 meter cable
67924-1	PNP (Source) Solid State 4.5-30 VDC, Quick Connect
67904-1-02	PNP (Source) Solid State 4.5-30 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
63549-02	2 meter Cordset with Quick Connect
63549-05	5 meter Cordset with Quick Connect
67929-2	AC Reed, Current Limited, Quick Connect

NOTE: Switch set screw torque to 16 in-oz [.11 Nm] max.

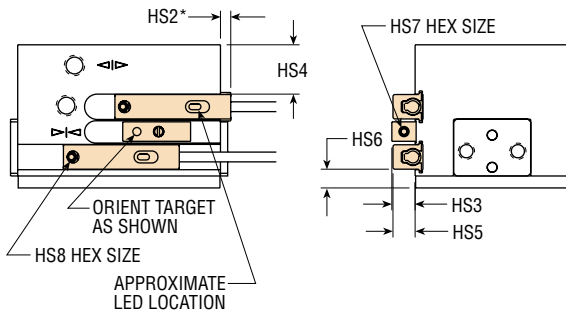
GRF SIZE 19



GRF SIZE 25



GRF SIZES 28 & 32

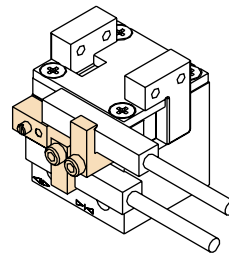


SWITCH MOUNTING KITS

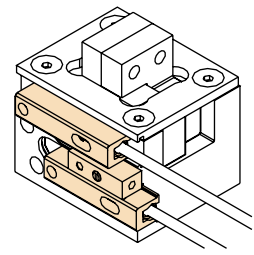
SIZE	HALL	REED	SOLID STATE
19	73723-19	-	-
25	-	76113-25	76112-25
28	-	76113-28	76112-28
32	-	76113-32	76112-32

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

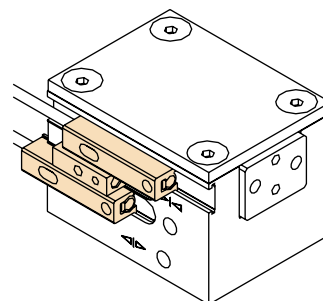
GRF SIZE 19



GRF SIZE 25



GRF SIZE 28 & 32



LETTER DIM	SIZE							
	19		25		28		32	
	in	mm	in	mm	in	mm	in	mm
HS1	Series 5580		Series 6790		Series 6790		Series 6790	
HS2	.430	10.9	.220	5.6	.040	1.0	.040	1.0
HS3	.435	11.0	.236	6.0	.236	6.0	.266	6.8
HS4	.380	9.7	.315	8.0	.483	12.3	.835	21.2
HS5	.340	8.6	.260	6.6	.246	6.2	.214	5.4
HS6	-	-	.060	1.5	.185	4.7	.282	7.2
HS7 HEX	.051	1.3	.051	1.3	.051	1.3	.051	1.3
HS8 HEX	.079	2.0	.051	1.3	.051	1.3	.051	1.3
(B4)	1.178	28.7	1.126	28.7	1.395	35.4	1.847	46.9

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