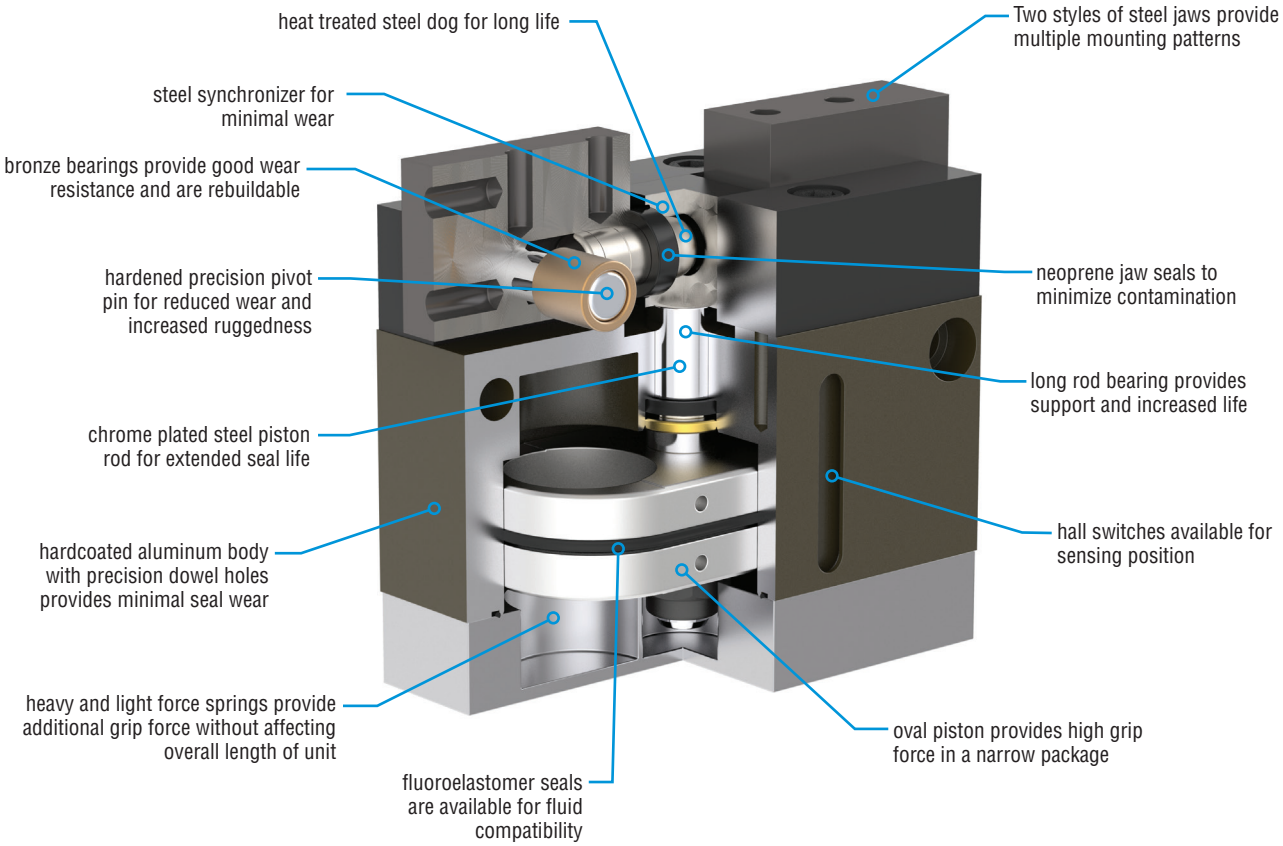
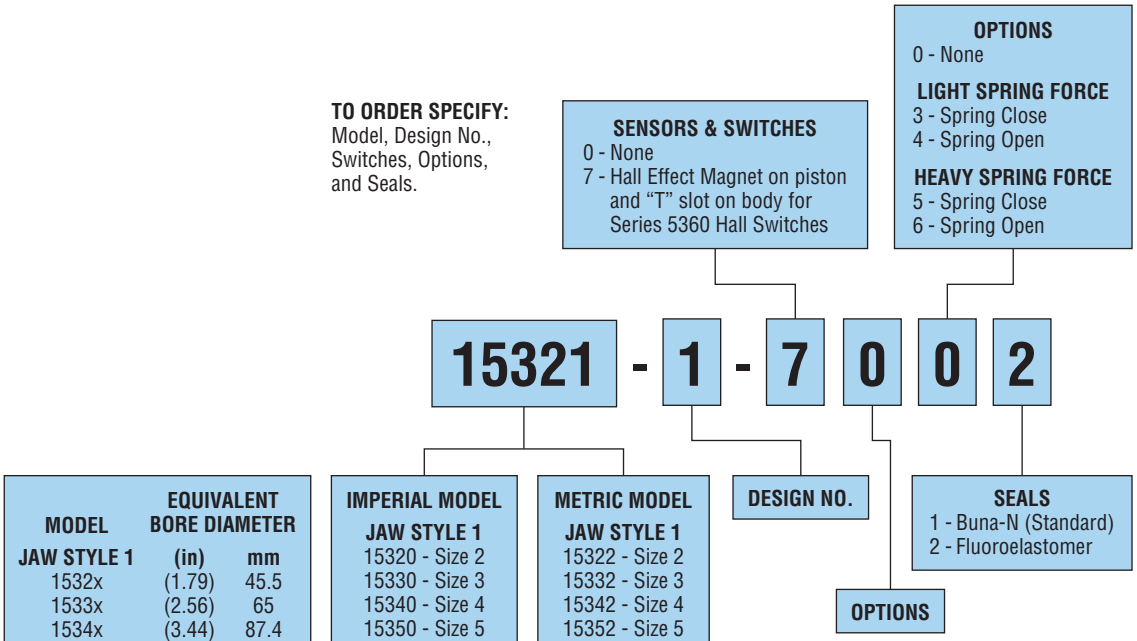
5300

Major Benefits

- Spring assist on open or close available in different forces
- High grip force to weight ratio
- Hardened steel pivot mechanism
- Close tolerance jaw mechanism minimizes jaw play
- Four sizes available in both imperial and metric versions
- 5 million cycles minimum rated life with standard seals (includes spring assist units)



TO ORDER SPECIFY:
Model, Design No., Switches, Options, and Seals.



MODEL	EQUIVALENT BORE DIAMETER	
JAW STYLE 1	**(in)**	**mm**
1532x	(1.79)	45.5
1533x	(2.56)	65
1534x	(3.44)	87.4
1535x	(4.85)	123
JAW STYLE 2		
1532x	(1.79)	45.5
1533x	(2.56)	65
1534x	(3.44)	87.4
1535x	(4.85)	123

NOTE:
Proximity Switches must be ordered separately.

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

SERIES 5360 MINIATURE HALL EFFECT SWITCHES

PART NO.	DESCRIPTION
53603-1-02	NPN (Sink) 4.5-24 VDC, 2 meter cable
53604-1-02	PNP (Source) 4.5-24 VDC, 2 meter cable
53623-1	NPN (Sink) 4.5-24 VDC, Quick Connect
53624-1	PNP (Source) 4.5-24 VDC, Quick Connect

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

CAD & Sizing Assistance

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

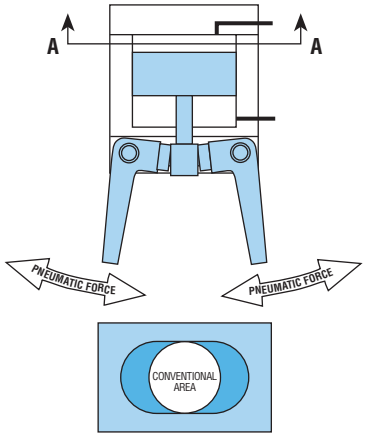
SPECIFICATIONS	SERIES 5300 ANGULAR
OPERATING PRESSURE	
STANDARD UNIT	25 psi min to 150 psi max [1.7 bar min to 10 bar max] air
LIGHT SPRING ASSIST UNIT	35 psi min to 150 psi max [2.4 bar min to 10 bar max] air
HEAVY SPRING ASSIST UNIT	65 psi min to 150 psi max [4.5 bar min to 10 bar max] air
OPERATING TEMPERATURE	-20°F to +180°F [-28°C to +82°C]
RATED LIFE	5 million cycles minimum with standard seals
GRIP BACKLASH	Within 0.2° per jaw
GRIP REPEATABILITY	Within ±0.002 in [±0.05 mm] of original centered position
LUBRICATION	Factory lubricated for rated life
MAINTENANCE	Field repairable

MODEL NO.	DISPLACEMENT		GRIP FORCE FACTOR G_F				SPRING GRIP FORCE S_F			
			EXTERNAL GRIP		INTERNAL GRIP		LIGHT SPRING		HEAVY SPRING	
	in^3	cm^3	IMPERIAL	METRIC	IMPERIAL	METRIC	lb	N	lb	N
1532x	0.59	9.6	1.87	3058.0	2.03	3323.0	34.50	154	49.50	221
1533x	1.78	29.2	5.56	9085.0	6.08	9938.0	93.00	414	157.50	701
1534x	4.29	70.3	14.14	23109.0	14.85	24255.0	221.00	984	366.50	1631
1535x	12.66	207.5	41.85	68355.0	43.70	71382.0	590.00	2625	1275.00	5672

NOTE: Maximum load that grippers can handle will vary based on size of part being picked up, shape of part, texture of part, speed at which part is transferred, working pressure, shape of fingers, etc. PHD recommends that the fingers of jaws be tooled or machined to conform to the shape of the part being gripped.

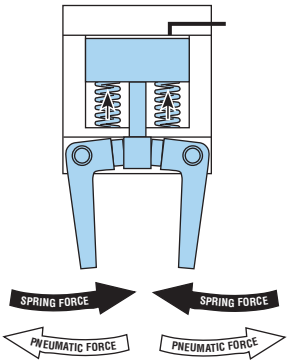
MODEL NO.	GRIPPER WEIGHT					
	STANDARD		SPRING ASSIST			
			LIGHT		HEAVY	
	lb	kg	lb	kg	lb	kg
1532x	2.40	1.08	2.5	1.11	2.5	1.12
1533x	4.87	2.2	5.0	2.28	5.1	2.32
1534x	9.58	4.35	10.0	4.53	10.2	4.63
1535x	27.73	12.57	29.5	13.37	29.8	13.53

DOUBLE ACTING
Without Springs



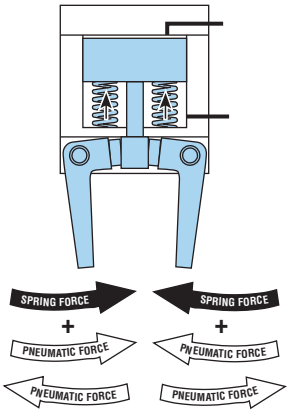
SECTION A-A TYPICAL

SINGLE ACTING
With Spring Close or Spring Open



Guards against failure due to unforeseen pneumatic pressure loss.

DOUBLE ACTING
With Spring Assist Open or Close



Provides up to four times the gripping force of conventional grippers of the same size.

Application & Sizing Assistance

Use PHD's free online Product Sizing and Application at **www.phdinc.com/apps/sizing**

GRIP FORCE CALCULATION EQUATIONS:

IMPERIAL:

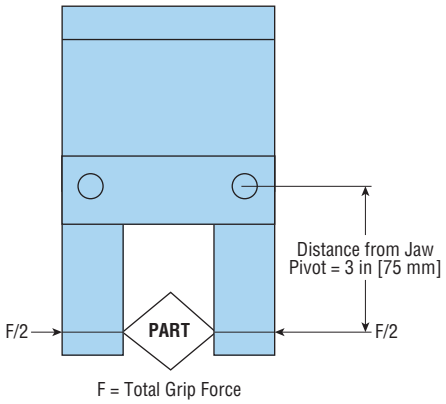
$$\text{Total Grip Force [lb]} = \frac{\text{Pressure (psi)} \times G_F}{\text{Distance from Jaw Pivot (in)}}$$

$$\text{Total Grip Force with Springs [lb]} = \frac{(\text{Pressure (psi)} \times G_F) \pm S_F \text{ (lb)}}{\text{Distance from Jaw Pivot (in)}}$$

METRIC:

$$\text{Total Grip Force [N]} = \frac{\text{Pressure (bar)} \times G_F}{\text{Distance from Jaw Pivot (mm)}}$$

$$\text{Total Grip Force with Springs [N]} = \frac{(\text{Pressure (bar)} \times G_F) \pm S_F \text{ (N)}}{\text{Distance from Jaw Pivot (mm)}}$$



GRIP FORCE CALCULATION EXAMPLE:

Gripper: Series 5300 Angular bore size 2.56 in [65 mm]

Operating Pressure = 87 psi [6 bar]
Distance from Jaw Pivot = 3 in [75 mm]

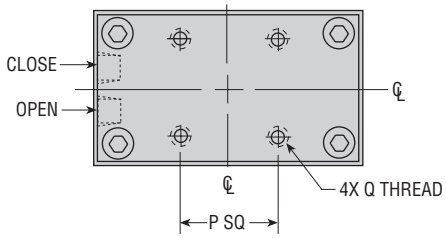
1. **Determine Grip Force Factor G_F =** 5.56 [9085] (from table on previous page)

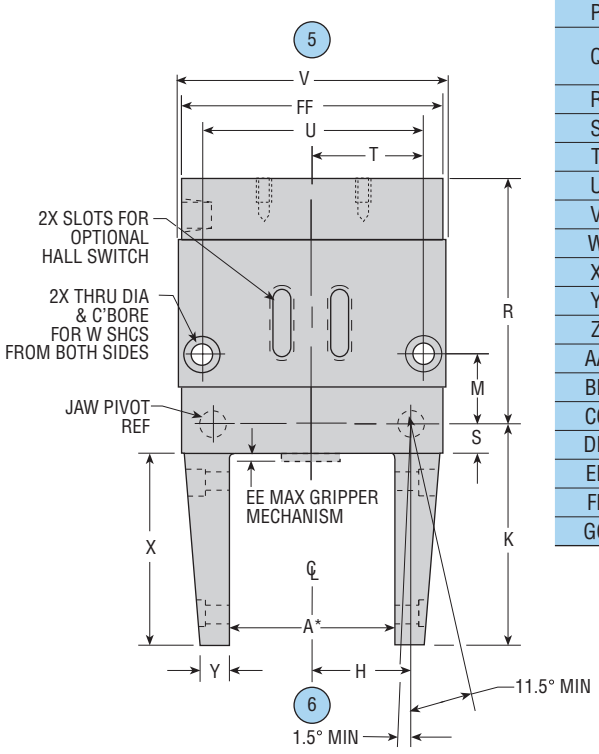
2. **Determine Distance from Jaw Pivot =** 3 in [75 mm]

3. **Total Grip Force Calculations:**
   For Standard Unit: 15330-1-0000 [15332-1-0000]

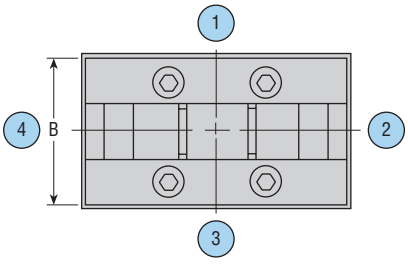
$$\text{Total Grip Force} = \frac{87 \text{ psi} \times 5.56}{3 \text{ in}} = 161 \text{ lb} \left[\frac{6 \text{ bar} \times 9085}{75 \text{ mm}} = 726 \text{ N} \right]$$

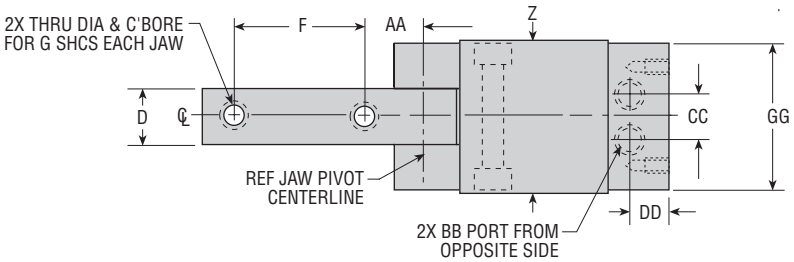
DIMENSIONS: Series 5300 Grippers - Jaw Style 1





LETTER DIM	MODEL NUMBER							
	15320	15322	15330	15332	15340	15342	15350	15352
	in	mm	in	mm	in	mm	in	mm
A*	1.812	46.0	2.500	63.5	3.500	88.9	5.125	130.2
B	1.750	44.5	2.250	57.2	2.750	69.9	4.000	101.6
D	0.750	19.1	0.875	22.2	1.000	25.4	1.500	38.1
F	1.500	38.1	2.000	50.8	2.750	69.9	3.500	88.9
G	#10	5	1/4	M6	5/16	M8	3/8	M10
H	1.062	27.0	1.500	38.1	2.000	50.8	2.875	73.0
K	2.438	61.9	3.390	86.1	4.587	116.5	5.734	145.6
M	0.875	22.2	1.062	27.0	1.187	30.1	1.625	41.3
P	1.250	31.8	1.500	38.1	1.750	44.5	2.750	69.9
Q	10-24 x 0.38 DP	M5 x 0.8 x 9.7 DP	1/4-20 x 0.38 DP	M6 x 1 x 9.7 DP	5/16-18 x 0.44 DP	M8 x 1.25 x 11.2 DP	3/8-16 x 0.56 DP	M10 x 1.5 x 14.2 DP
R	3.063	77.8	3.749	95.2	4.312	109.5	5.875	149.2
S	0.312	7.9	0.438	11.1	0.562	14.3	0.845	21.5
T	1.156	29.4	1.687	42.8	2.375	60.3	3.250	82.6
U	2.312	58.7	3.375	85.7	4.750	120.7	6.500	165.1
V	2.843	72.2	4.031	102.4	5.531	140.5	7.531	191.3
W	1/4	M6	5/16	M8	3/8	M10	1/2	M12
X	2.126	54.0	2.952	75.0	4.025	102.2	4.859	123.4
Y	0.285	7.2	0.450	11.4	0.598	15.2	0.688	17.5
Z	1.781	45.2	2.281	57.9	2.781	70.6	4.031	102.4
AA	0.688	17.5	0.900	22.9	1.312	33.3	1.750	44.5
BB	10-32	M5 x 0.8	1/8 NPT	1/8 BSP	1/8 NPT	1/8 BSP	1/4 NPT	1/4 BSP
CC	0.562	14.3	0.750	19.1	0.937	23.8	1.625	41.3
DD	0.440	11.2	0.500	12.7	0.590	15.1	0.760	19.3
EE	0.125	3.2	0.160	4.1	0.200	5.1	0.250	6.4
FF	2.810	71.4	4.000	101.6	5.500	139.7	7.500	190.5
GG	1.75	44.5	2.25	57.2	2.75	69.9	3.96	100.5





***GRIPPER JAWS:** SHOWN AT PARALLEL POSITION

JAW MOVEMENT SHOWS MINIMUM AMOUNT OF JAW ROTATION. JAWS MAY OPEN 3° OR CLOSE 3° BEYOND STATED MINIMUM ROTATION.

CAD & Sizing Assistance

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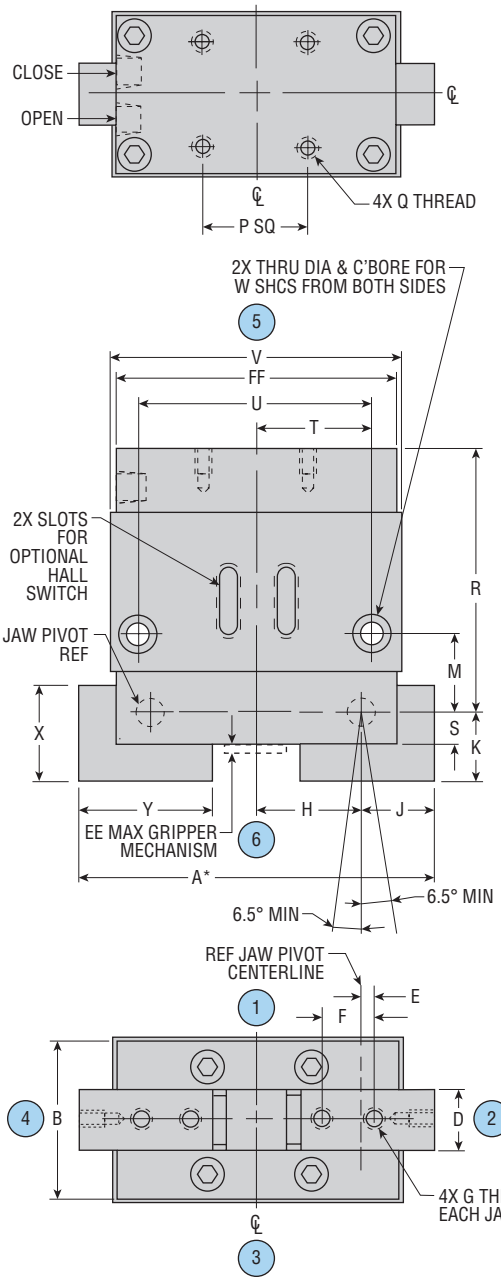

LETTER DIM	MODEL NUMBER							
	15321	15323	15331	15333	15341	15343	15351	15353
	in	mm	in	mm	in	mm	in	mm
A*	3.937	100.0	5.000	127.0	6.236	158.4	8.610	218.7
B	1.750	44.5	2.250	57.2	2.750	69.9	4.000	101.6
D	0.750	19.1	0.875	22.2	1.000	25.4	1.500	38.1
E	0.231	5.9	0.187	4.7	0.063	1.6	0.00	0.0
F	0.625	15.9	0.750	19.1	1.000	25.4	1.500	38.1
G	1/4-20 x 0.38 DP	M6 x 1 x 9.7 DP	5/16-18 x 0.44 DP	M8 x 1.25 x 11.2 DP	3/8-16 x 0.56 DP	M10 x 1.5 x 14.2 DP	1/2-13 x 0.75 DP	M12 x 1.75 x 19.0 DP
H	1.062	27.0	1.500	38.1	2.000	50.8	2.875	73.0
J	0.906	23.0	1.000	25.4	1.118	28.4	1.430	36.3
K	0.813	20.7	0.968	24.6	1.200	30.5	1.680	42.7
M	0.875	22.2	1.062	27.0	1.187	30.1	1.625	41.3
P	1.250	31.8	1.500	38.1	1.750	44.5	2.750	69.9
Q	10-24 x 0.38 DP	M5 x 0.8 x 9.7 DP	1/4-20 x 0.38 DP	M6 x 1 x 9.7 DP	5/16-18 x 0.44 DP	M8 x 1.25 x 11.2 DP	3/8-16 x 0.56 DP	M10 x 1.5 x 14.2 DP
R	3.063	77.8	3.749	95.2	4.312	109.5	5.875	149.2
S	0.312	7.9	0.438	11.1	0.562	14.3	0.845	21.5
T	1.156	29.4	1.687	42.8	2.375	60.3	3.250	82.6
U	2.312	58.7	3.375	85.7	4.750	120.7	6.500	165.1
V	2.843	72.2	4.031	102.4	5.531	140.5	7.531	191.3
W	1/4	M6	5/16	M8	3/8	M10	1/2	M12
X	1.125	28.6	1.375	34.9	1.700	43.2	2.430	61.7
Y	1.500	38.1	1.875	47.6	2.430	61.7	3.430	87.1
Z	1.781	45.2	2.281	57.9	2.781	70.6	4.031	102.4
AA	0.062	1.6	0.095	2.4	0.150	3.8	0.300	7.6
BB	10-32	M5 x 0.8	1/8 NPT	1/8 BSP	1/8 NPT	1/8 BSP	1/4 NPT	1/4 BSP
CC	0.562	14.3	0.750	19.1	0.937	23.8	1.625	41.3
DD	0.440	11.2	0.500	12.7	0.590	15.1	0.760	19.3
EE	0.125	3.2	0.160	4.1	0.200	5.1	0.250	6.4
FF	2.810	71.4	4.00	101.6	5.500	139.7	7.500	190.5
GG	1.75	44.5	2.25	57.2	2.75	69.9	3.96	100.5

***GRIPPER JAWS:** SHOWN AT PARALLEL POSITION

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All dimensions are reference only unless specifically toleranced.

7 HALL EFFECT MAGNET

Equips piston with magnet and “T” slot on body for Series 5360 Switches.

SERIES 5360 MINIATURE HALL EFFECT SWITCHES

PART NO.	DESCRIPTION
53603-1-02	NPN (Sink) 4.5-24 VDC, 2 meter cable
53604-1-02	PNP (Source) 4.5-24 VDC, 2 meter cable
53623-1	NPN (Sink) 4.5-24 VDC, Quick Connect
53624-1	PNP (Source) 4.5-24 VDC, Quick Connect

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