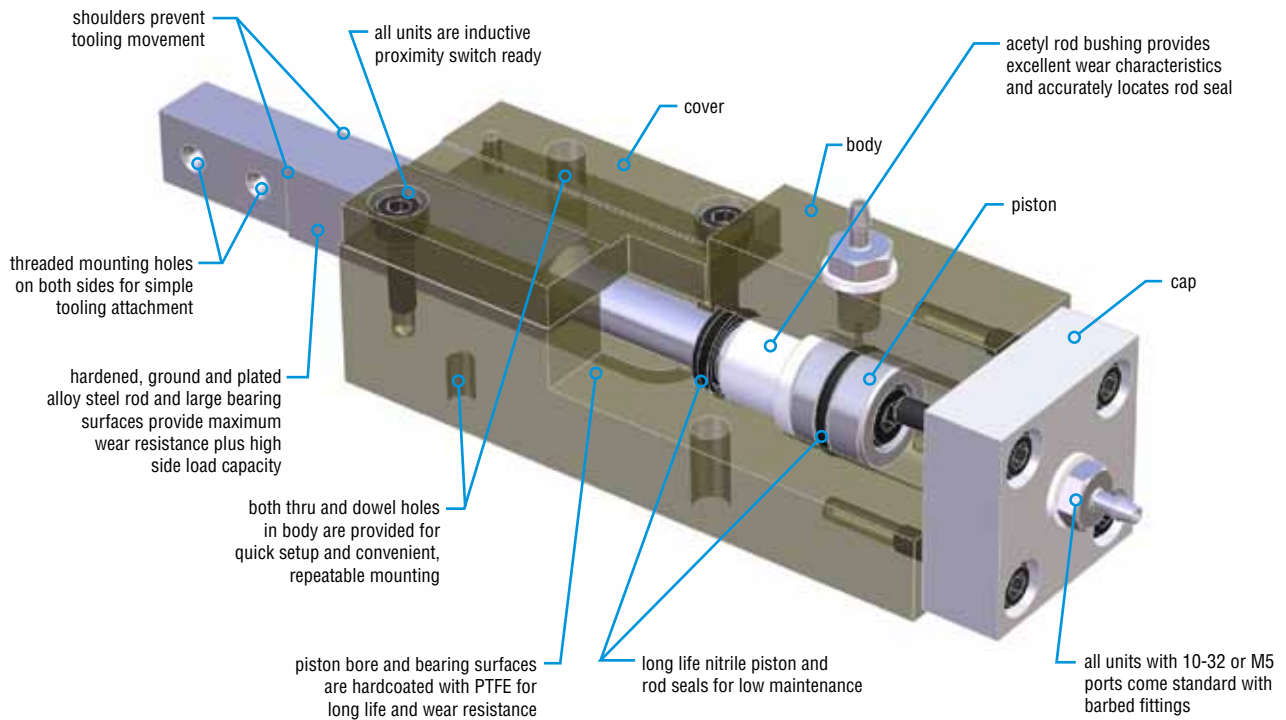
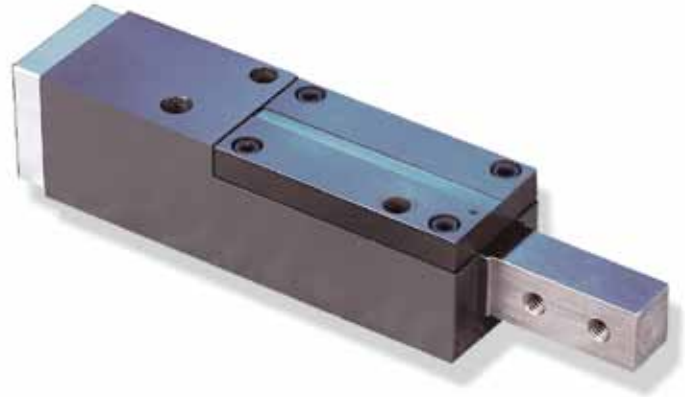




SINGLE ROD PNEUMATIC ESCAPEMENT

Major Benefits

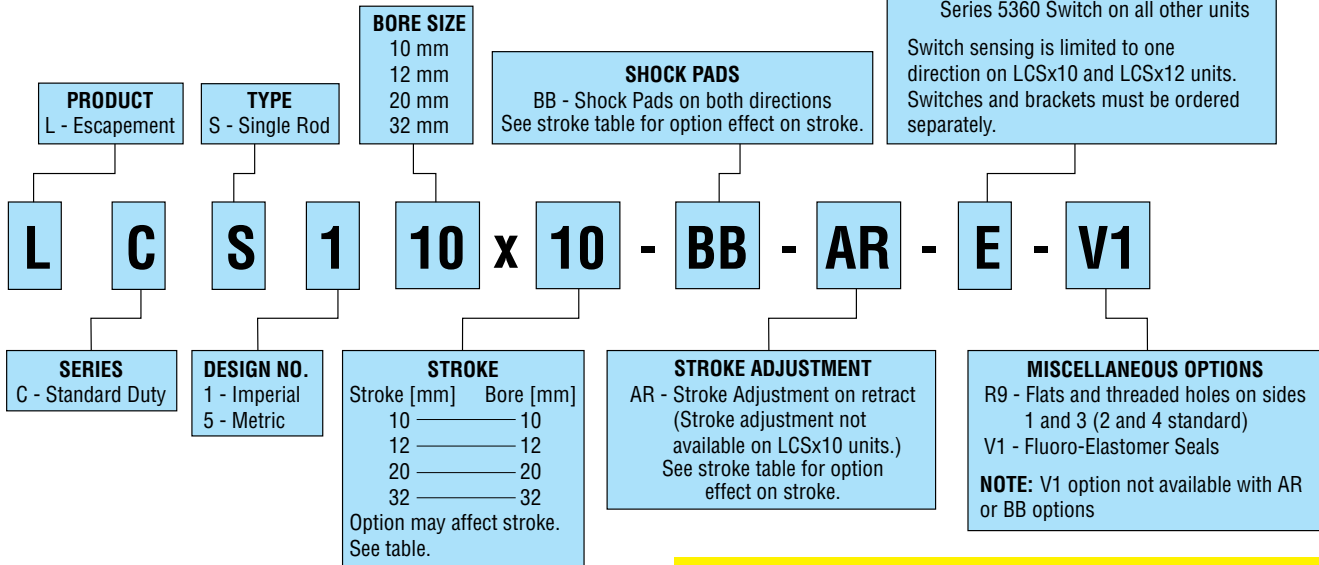
- Ideal for shot pin applications
- Shock pad options reduce noise and minimize end of stroke shock
- Imperial or metric versions available
- Simple construction for easy field maintenance
- Large rod bearing area ensures high side load capacity
- Next day delivery



ORDERING DATA: SERIES LC SINGLE ROD ESCAPEMENTS

TO ORDER SPECIFY:

Product, Series, Type, Design No.,
Bore Size, Stroke, and Options.



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

Refer to this product's online catalog in the product section for complete information including related dimensions and additional specifications. See link at bottom of this page.

4 mm SQUARE

INDUCTIVE PROXIMITY SWITCHES

PART NO.	DESCRIPTION
18430-001-02	NPN (Sink) 2 meter cable
18430-002-02	PNP (Source) 2 meter cable

6 mm SQUARE

INDUCTIVE PROXIMITY SWITCHES

PART NO.	DESCRIPTION
18431-001-02	NPN (Sink) 2 meter cable
18431-002-02	PNP (Source) 2 meter cable

INDUCTIVE SWITCH MOUNTING KITS

PROXIMITY SWITCH	KIT NUMBER
4 mm Round Inductive	57879
6 mm Square Inductive	57880

EACH PROXIMITY SWITCH MOUNTING KIT CONTAINS:
1 SWITCH BRACKET
1 BRACKET MOUNTING SCREW

SERIES 5360 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

SERIES 5580 HALL EFFECT SWITCHES

PART NO.	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



CAD & Sizing Assistance

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

ENGINEERING DATA: SERIES LC SINGLE ROD ESCAPEMENTS

SPECIFICATIONS	SERIES LC
OPERATING PRESSURE	20 to 150 psi [1.4 to 10 bar] air
OPERATING TEMPERATURE	-20° to 180°F [-28° to 82°C]
STANDARD TOLERANCE	+0.031/-0.000 [+0.08/-0.00]
RATED LIFE	5 million cycles*
VELOCITY	20 in/sec [0.5 m/sec] typical min, zero load at 100 psi [7 bar]
LUBRICATION	Factory lubricated for rated life
MAINTENANCE	Field repairable

*-V1 option may reduce life.

UNIT	BORE		ROD DIRECTION	EFFECTIVE AREA		WEIGHT TABLE			
	in	mm		in ²	mm ²	STANDARD		STROKE ADJUSTMENT	
LCSx10	.394	10	EXTEND	.122	78.5	.22	.1	-	-
			RETRACT	.094	60.5				
LCSx12	.472	12	EXTEND	.175	112.6	.45	.21	.51	.24
			RETRACT	.126	81.1				
LCSx20	.787	20	EXTEND	.487	313.4	.90	.42	1.1	.51
			RETRACT	.410	263.8				
LCSx32	1.260	32	EXTEND	1.247	802.4	2.80	1.3	3.4	1.6
			RETRACT	1.050	675.6				

CYLINDER THRUST CALCULATION

$$\begin{matrix} \text{IMPERIAL} & \text{METRIC} \\ F = P \times A & F = 0.1 \times P \times A \end{matrix}$$

F = Cylinder Force	lb	N
P = Operating Pressure	psi	bar
A = Effective Area	in ²	mm ²

STROKE TABLE

OPTION	LCSx10	LCSx12	LCSx20	LCSx32
STANDARD UNIT	.394 [10]	.472 [12]	.787 [20]	1.26 [32]
SHOCK PAD (-BB)	.354 [9]	.433 [11]	.787 [20]	1.26 [32]
STROKE ADJ (-AR)	—	.413 [10.5]	.728 [18.5]	1.20 [30.5]
-AR -BB	—	.374 [9.5]	.728 [18.5]	1.20 [30.5]

RESPONSE TIME

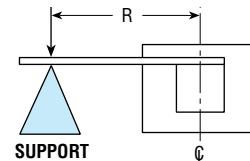
Following is a reference guide to response times of the piston rod for extend and retract based on a typical load at 87 psi [6 bar]. The response time for rod extension will be less than the response time for retraction. Varying the operating pressure, air line diameter, and the applied load will affect the response time. Response times shown do not include valve response time.

UNIT	TYPICAL LOAD		RETRACT TIME	EXTEND TIME
	lb	kg	sec	sec
LCSx10	1	.45	.03	.02
LCSx12	2	.91	.04	.03
LCSx20	5	2.3	.06	.04
LCSx32	10	4.5	.08	.06

MAXIMUM ROD TORQUE

MODEL NO.	STANDARD DUTY	
	in-lb	Nm
LCSx10	1.2	0.14
LCSx12	2.0	0.25
LCSx20	5.0	0.6
LCSx32	9.0	1.1

$$\text{MAX. ROD LOAD TORQUE} = (\text{LOAD}) \times R$$



For applications which exceed the maximum allowable rod torque, the tooling should be supported as shown.

Calculation without the support:

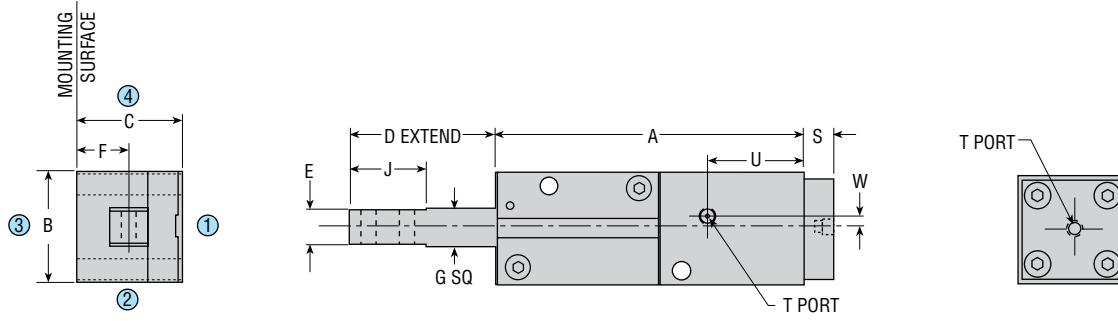
$$\text{Max. Rod Load Torque} = (\text{Load}) \times R$$



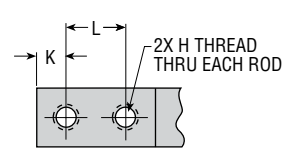
Sizing & Application Assistance

Use PHD's free online Product Sizing Application or view the Product Sizing Catalog at: www.phdinc.com/apps/sizing

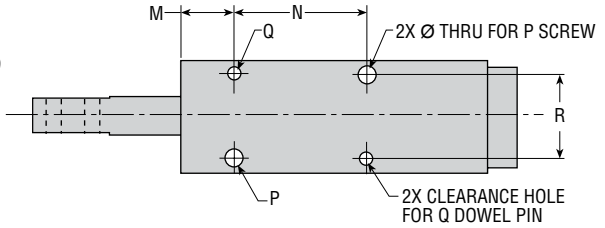
DIMENSIONS: SERIES LC SINGLE ROD ESCAPEMENTS



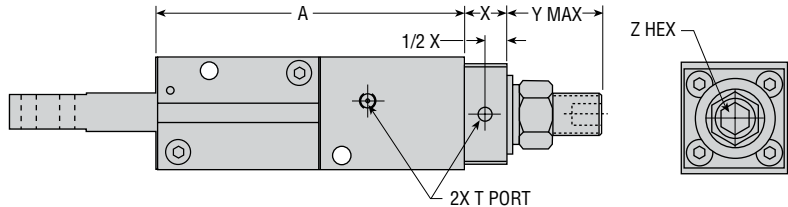
TOP VIEW



ROD MOUNTING DETAIL



BOTTOM VIEW



TOP VIEW WITH OPTIONAL STROKE ADJUSTMENT

(Not available on LCSx10 units)

LETTER DIM.	IMPERIAL MODEL NO.				METRIC MODEL NO.			
	LCS110x10	LCS112x12	LCS120x20	LCS132x32	LCS510x10	LCS512x12	LCS520x20	LCS532x32
PHD BORE	.394	.472	.787	1.260	10 mm	12 mm	20 mm	32 mm
A	2.480	3.012	3.937	6.142	63.0	76.5	100.0	156.0
B	.964	1.082	1.417	1.850	24.5	27.5	36.0	47.0
C	.807	1.024	1.339	1.811	20.5	26.0	34.0	46.0
D	1.043	1.358	1.890	3.406	26.5	34.5	48.0	86.5
E	.259	.310	.435	.768	6.6	7.9	11.0	19.5
F	.354	.512	.668	.904	9.0	13.0	17.0	23.0
G	.300	.364	.490	.860	7.6	9.2	12.4	21.8
H	4-40 UNC	6-32 UNC	10-32 UNC	5/16-18 UNC	M3 x 0.5	M3 x 0.5	M5 x 0.8	M8 x 1.25
J	.500	.750	1.000	2.000	12.7	19.0	25.4	50.8
K	.125	.187	.250	.500	3.2	4.7	6.4	12.7
L	.250	.375	.500	.875	6.4	9.5	12.7	22.2
M	.512	.512	.669	1.004	13.0	13.0	17.0	25.5
N	.984	1.339	1.713	2.874	25.0	34.0	43.5	73.0
P	#6	#6	#10	5/16	M3	M3	M5	M8
Q	3 mm	3 mm	4 mm	5 mm	3 mm	3 mm	4 mm	5 mm
R	.591	.748	1.063	1.338	15.0	19.0	27.0	34.0
S	.374	.374	.374	.472	9.5	9.5	9.5	12.0
T	10-32 THD	10-32 THD	10-32 THD	1/8 NPT	M5 x 0.8	M5 x 0.8	M5 x 0.8	1/8 BSP
U	.767	.787	1.220	1.792	19.5	20.0	31.0	45.5
W	.157	.157	.157	.472	4.0	4.0	4.0	12.0
X	—	.552	.552	.827	—	14.0	14.0	21.0
Y	—	.787	1.26	1.831	—	20.0	32.0	46.5
Z	—	4 mm	6 mm	8 mm	—	4 mm	6 mm	8 mm

NOTES:
 1) METRIC DIMENSIONS ARE IN MILLIMETERS.
 2) ALL DIMENSIONS ARE ABOUT THE CENTERLINE UNLESS OTHERWISE SPECIFIED.



CAD & Sizing Assistance

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

All dimensions are reference only unless specifically tolerated.

www.phdinc.com/lc • (800) 624-8511



OPTIONS: SERIES LC SINGLE ROD ESCAPEMENTS

BB

SHOCK PADS INSTALLED BOTH DIRECTIONS

Polyurethane shock pads for noise reduction and absorption of shock at ends of stroke are available on each end of Series LC Escapements. Shock pads permit higher piston velocities for shorter cycle times. Noise reduction is beneficial for the working environment.

NOTE: Shock pads reduce standard stroke by .039 [1 mm] on LCSx10 and LCSx12 units.

E

SWITCH READY

Series 5580 on LCSx10 units
Series 5360 on all other units

Switch Ready option includes magnets on the rod for PHD solid state switches. Units are equipped to sense in two directions, both extend and retract. Switches must be ordered separately. See chart below.

NOTE: LCSx10 and LCSx12 units will sense in one direction only.

INDUCTIVE PROXIMITY SWITCH READY

All units are inductive proximity switch ready as standard. A threaded hole is provided in the body cover to allow attachment of PHD bracket kits for 4 mm round or 6 mm square inductive proximity switches.

NOTE: Switch targets mounted on the rod end or on the rod tooling are to be provided by the end user. See Switches and Sensors section for complete switch specifications.

AR

STROKE ADJUSTMENT ON RETRACT

Stroke adjustment screws can be set for precise adjustment of the retracted position from 0" to full stroke. Stroke adjustment option reduces the standard stroke by .059 [1.5 mm].

NOTE: Not available on LCSx10 unit.

R9

ROD END OPTION

This option specifies flats and threaded holes on sides 1 and 3. Mounting holes and flats on sides 2 and 4 are standard.



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



Refer to this product's online catalog in the product section for complete information including related dimensions and additional specifications. See link at bottom of this page.

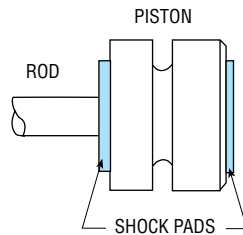
51

OPTIONS: SERIES LC SINGLE ROD ESCAPEMENTS

BB SHOCK PADS INSTALLED BOTH DIRECTIONS

Polyurethane shock pads for noise reduction and absorption of shock at ends of stroke are available on each end of Series LC Escapements. Shock pads permit higher piston velocities for shorter cycle times. Noise reduction is beneficial for the working environment.

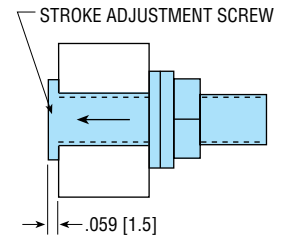
NOTE: Shock pads reduce standard stroke by .039 [1 mm] on LCSx10 and LCSx12 units.



AR STROKE ADJUSTMENT ON RETRACT

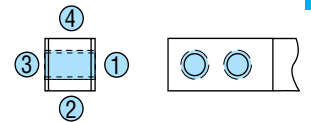
Stroke adjustment screws can be set for precise adjustment of the retracted position from 0" to full stroke. Stroke adjustment option reduces the standard stroke by .059 [1.5 mm].

NOTE: Not available on LCSx10 unit.



R9 ROD END OPTION

This option specifies flats and threaded holes on sides 1 and 3. Mounting holes and flats on sides 2 and 4 are standard.



E SWITCH READY Series 5580 on LCSx10 units Series 5360 on all other units

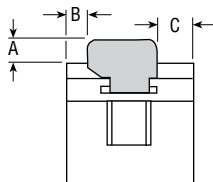
Switch Ready option includes magnets on the rod for PHD solid state switches. Units are equipped to sense in two directions, both extend and retract. Switches must be ordered separately. **See Switches and Sensors section for complete specifications.**

NOTE: LCSx10 and LCSx12 units will sense in one direction only.

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

PART NO.	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

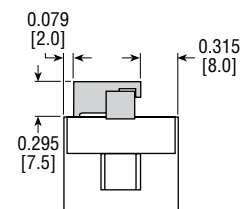
SERIES 5360 HALL EFFECT DIMENSIONS



MODEL NO.	DIM A	DIM B	DIM C
LCSx12	0.322 [8.2]	0.188 [4.8]	0.315 [8.0]
LCSx20	0.177 [4.5]	0.354 [9.0]	0.486 [12.3]
LCSx32	0.217 [5.5]	0.571 [14.5]	0.692 [17.6]

Switch information is continued on page 3-16.
Numbers in [] are for metric units and are in millimeters.

SERIES 5580 HALL EFFECT DIMENSIONS



SWITCH BRACKET KIT
(NUMBER 57880) MUST BE
ORDERED SEPARATELY.

SERIES 5580 IS AVAILABLE ON LCSx10 UNITS ONLY.

All dimensions are reference only unless specifically toleranced.

www.phdinc.com/lc • (800) 624-8511

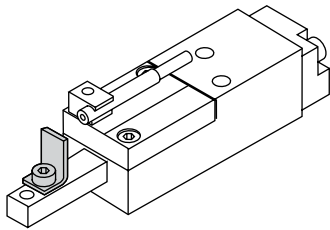
PROXIMITY SWITCHES: SERIES LC SINGLE ROD ESCAPEMENTS

INDUCTIVE PROXIMITY SWITCH READY

All units are inductive proximity switch ready as standard. A threaded hole is provided in the body cover to allow attachment of PHD bracket kits for 4 mm round or 6 mm square inductive proximity switches. **See Switches and Sensors section for complete specifications.**

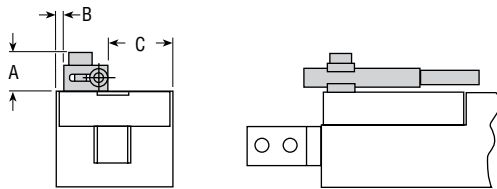
NOTE: Switch targets mounted on the rod end or on the rod tooling are to be provided by the end user.

Illustrated below are examples (showing the extended rod position) of how 4 mm round and 6 mm square inductive proximity switches are installed. The suggested maximum gap between target and switch is .032 [0.8].



**4 mm SQUARE
INDUCTIVE PROXIMITY SWITCHES**

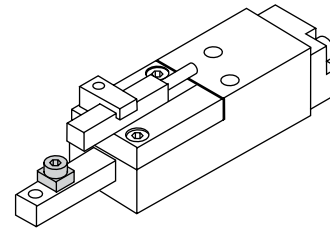
PART NO.	DESCRIPTION
18430-001-02	NPN (Sink) 2 meter cable
18430-002-02	PNP (Source) 2 meter cable



MODEL NO.	DIM A	DIM B	DIM C
LCSx10	0.335 [8.5]	0.059 [1.5]	0.524 [13.3]
LCSx12	0.21 [5.3]	0.118 [3.0]	0.583 [14.8]
LCSx20	0.315 [8.0]	0.283 [7.2]	0.748 [19.0]
LCSx32	0.315 [8.0]	0.500 [12.7]	0.966 [24.5]

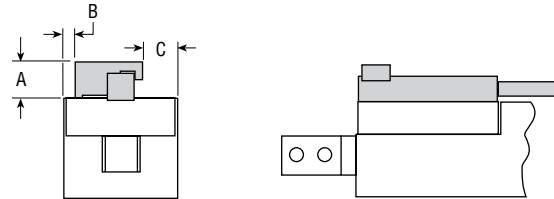
PROXIMITY SWITCH	KIT NUMBER
4 mm Round Inductive	57879
6 mm Square Inductive	57880

EACH PROXIMITY SWITCH MOUNTING KIT CONTAINS:
1 SWITCH BRACKET
1 BRACKET MOUNTING SCREW



**6 mm SQUARE
INDUCTIVE PROXIMITY SWITCHES**

PART NO.	DESCRIPTION
18431-001-02	NPN (Sink) 2 meter cable
18431-002-02	PNP (Source) 2 meter cable



MODEL NO.	DIM A	DIM B	DIM C
LCSx10	0.295 [7.5]	0.079 [2.0]	0.315 [8.0]
LCSx12	0.177 [4.5]	0.138 [3.5]	0.374 [9.5]
LCSx20	0.268 [6.8]	0.305 [7.7]	0.541 [13.7]
LCSx32	0.268 [6.8]	0.522 [13.3]	0.757 [19.2]

All dimensions are reference only unless specifically toleranced.

www.phdinc.com/lc • (800) 624-8511