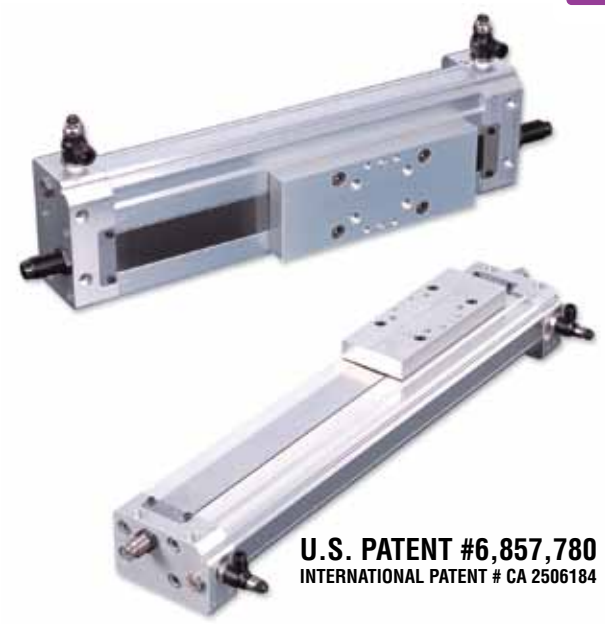
SFP

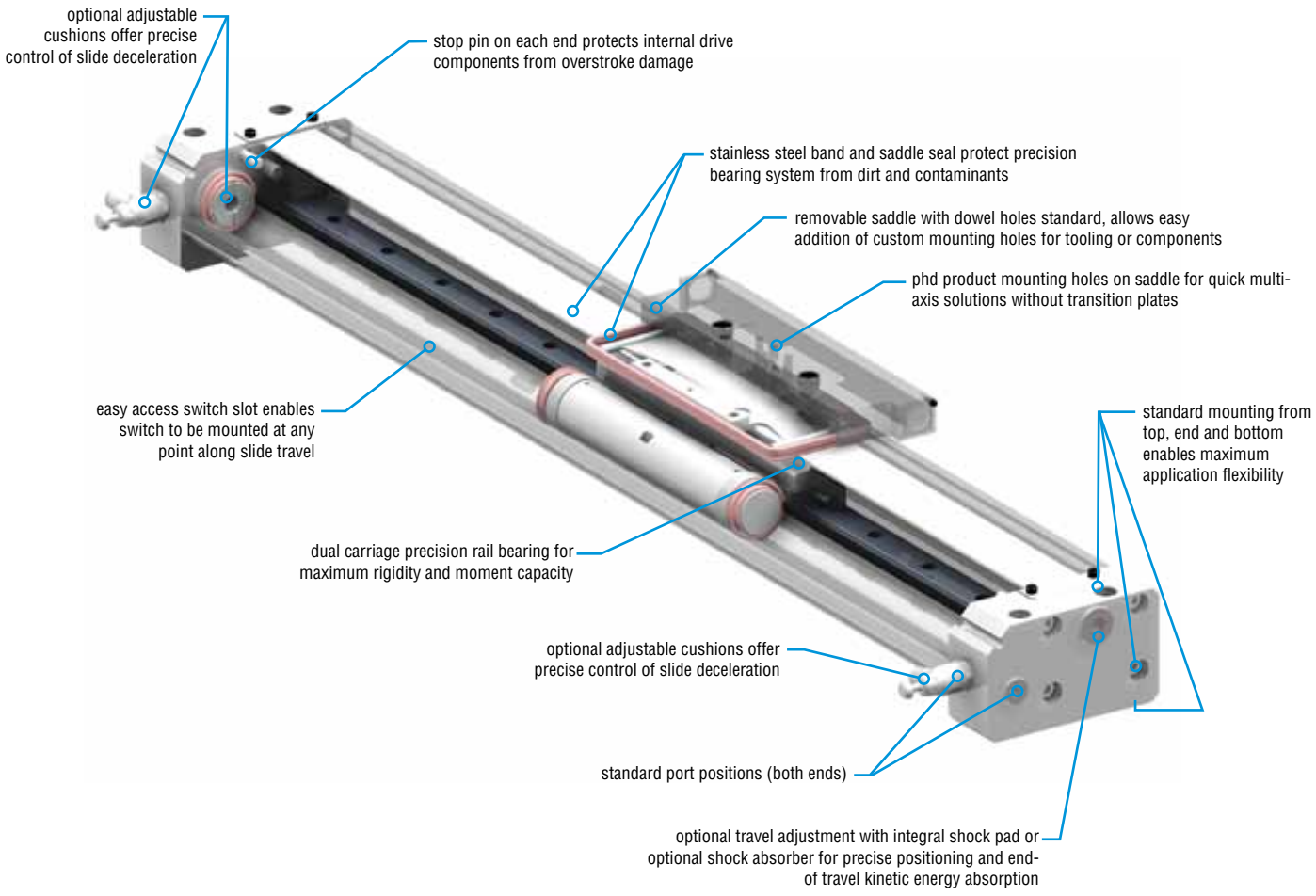
RODLESS GANTRY RAIL PNEUMATIC SLIDE

Major Benefits

- Space-saving design
- Smooth, precise movement
- High load capacity with very low deflection
- Improved moment capacity
- Two bore sizes offered (27 and 40 mm)
- Long travel lengths (27 mm bore up to 1800 mm, 40 mm bore up to 3400 mm)



U.S. PATENT #6,857,780
INTERNATIONAL PATENT # CA 2506184



ORDERING DATA: SERIES SFP SLIDES

TO ORDER SPECIFY:
Product, Series, Type, Design No., Package Size, Travel, and Options.

PRODUCT
S - Slide

TYPE
P - Ground Profile Rail

PACKAGE SIZE
BORE
27 mm
40 mm

SHOCK ABSORBERS
NBx - Shock installed both directions
NEx - Shock installed on extend
NRx - Shock installed on retract
"x" indicates shock absorber damping constant which must be specified by the customer. (See PHD Product Sizing Catalog) See Note 4.

EXTERNAL FLOW CONTROL
PB - Flow controls installed in both directions
PE - Flow controls installed on extend
PR - Flow controls installed on retract

S F P 6 27 x 25 – NRx – AE – DB – PB – M

SERIES
F - Pneumatic Rodless

DESIGN NO.
6 - Metric

METRIC TRAVEL STANDARD TRAVEL LENGTHS
(in 25 mm Increments)

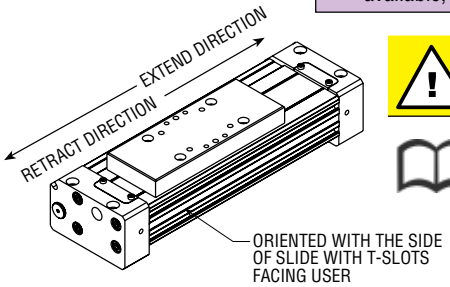
Size	Travel
27	25 mm - 1800 mm
40	25 mm - 3400 mm

(Longer travel lengths available, contact PHD)

TRAVEL ADJUSTMENT
(See Notes 1 & 4)
AB - Travel adjustment with shock pads installed in both directions
AE - Travel adjustment with shock pads installed on extend
AR - Travel adjustment with shock pads installed on retract

CUSHION CONTROL
(See Note 1)
DB - Cushion control both directions
DE - Cushion control on extend
DR - Cushion control on retract

SLIDE OPTIONS
M - Magnet for use with PHD 6790 & JC1 Switches
Z1 - Corrosion resistant plating on ferrous parts
L9 - NPT ports



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.

NOTES:
1) If travel adjustment AB, AE, or AR is ordered, corresponding cushion option DB, DE, or DR must also be ordered.
2) Switches and switch bracket kits must be ordered separately
3) Option -M required with Series 6790 & JC1 Switches.
4) Each direction of travel must have either a travel adjustment or shock absorber specified.
5) Saddle dowel holes are standard.
6) Modular mounting interface with PHD Series STP and SK/SLSlides is standard.
7) Mounting on top, bottom, ends, and t-slots is standard.

SERIES 6790 & JC1 SWITCHES

PART NO.	DESCRIPTION
67902-1-05	PNP (Source) or NPN (Sink) Reed, 4.5-30 VDC, 5 m cable
JC1SDN-5	NPN (Sink) Solid State, 10-30 VDC, 5 m cable
JC1SDP-5	PNP (Source) Solid State, 10-30 VDC, 5 m cable
67922-1	PNP (Source) or NPN (Sink) Reed, 4.5-30 VDC, Quick Connect
JC1SDN-K	NPN (Sink) Solid State, 10-30 VDC, Quick Connect
JC1SDP-K	PNP (Source) Solid State, 10-30 VDC, Quick Connect
67929-2	PNP (Source) or NPN (Sink) Reed, 65-120 VAC, Quick Connect

NOTE: See Switches and Sensors section for additional switch information and complete specification. Switches are ordered separately.

SERIES 6790 & JC1SDx CORDSET CHART

PART NO.	DESCRIPTION
63549-02	M8, 3 pin, Straight Female Connector, 2 m cable
63549-05	M8, 3 pin, Straight Female Connector, 5 m cable

Designer's Resource myphd®

CAD & Sizing Assistance

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

SPECIFICATIONS	SERIES SFP
OPERATING PRESSURE	2.5 bar min to 8 bar max [36 psi min to 116 psi max] air
OPERATING TEMPERATURE	5 to 60°C [41 to 140°F]
TRAVEL TOLERANCE	+3.0/-0.0 mm [+.12/-.00 in]
REPEATABILITY	.025 mm [.001 in] of original position
VELOCITY	.1 to 1.5 m/sec [4 to 60 in/sec]
LUBRICATION	Factory lubricated for life
MAINTENANCE	Field repairable

UNIT SIZE	MAXIMUM TRAVEL mm	MAXIMUM TRAVEL in	BORE DIAMETER mm	BORE DIAMETER in	EFFECTIVE AREA mm²	EFFECTIVE AREA in²	BASE WEIGHT kg	BASE WEIGHT lb	ADDER WEIGHT (per 25mm) kg	ADDER WEIGHT (per 25mm) lb	TYPICAL DYNAMIC LOAD N	TYPICAL DYNAMIC LOAD lb	MOVING SADDLE kg	MOVING SADDLE lb
27	1800	70.8	27	1.06	570	.88	3.27	7.20	0.17	0.37	0 - 440	0 - 100	1.04	2.3
40	3400	133.8	40	1.57	1260	1.95	9.12	20.1	0.32	0.71	89 - 1100	20 - 250	2.95	6.5

NOTE: Thrust capacity, allowable mass and dynamic moment capacity must be considered when selecting a slide.

MAXIMUM BEARING CAPACITY

SIZE	LOAD N	LOAD lb	PITCH MOMENT Nm	PITCH MOMENT in-lb	YAW MOMENT Nm	YAW MOMENT in-lb	ROLL MOMENT Nm	ROLL MOMENT in-lb
27	4208	946	52.0	460	52.0	460	33.8	299
40	8767	1971	173.4	1535	173.4	1535	102.9	911

FORCE TABLE

DIRECTION	SFP627 N/bar	SFP627 lb/psi	SFP640 N/bar	SFP640 lb/psi
Extend	57.3	.887	125.7	1.948
Retract	57.3	.887	125.7	1.948

CYLINDER FORCE CALCULATIONS

		METRIC F = 0.1 x P x A	IMPERIAL F = P x A
F =	Cylinder Force	N	lbs
P =	Operating Pressure	bar	psi
A =	Effective Area	mm²	in²
	(Extend or Retract)		

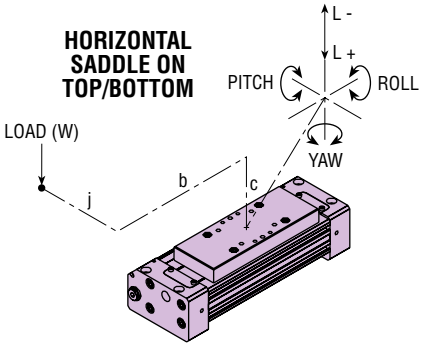
STATIC MOMENT CHART

HORIZONTAL SADDLE TOP OR BOTTOM	VERTICAL	HORIZONTAL SADDLE ON SIDE
Mp (Pitch) = Load x b	Mp = Load x e	Mp = 0
My (Yaw) = 0	My = Load x j	My = Load x b
Mr (Roll) = Load x j	Mr = 0	Mr = Load x e

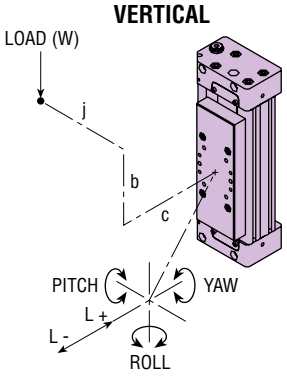
SIZE	"d" CONSTANT mm	"d" CONSTANT in
27	36.8	1.448
40	43.5	1.713

NOTE: e = c + d

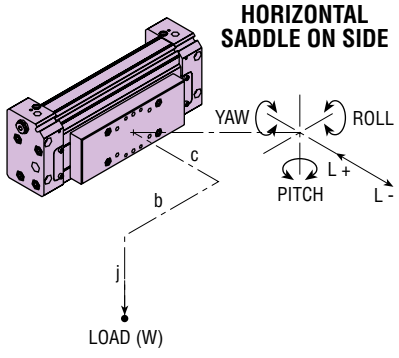
HORIZONTAL SADDLE ON TOP/BOTTOM



VERTICAL



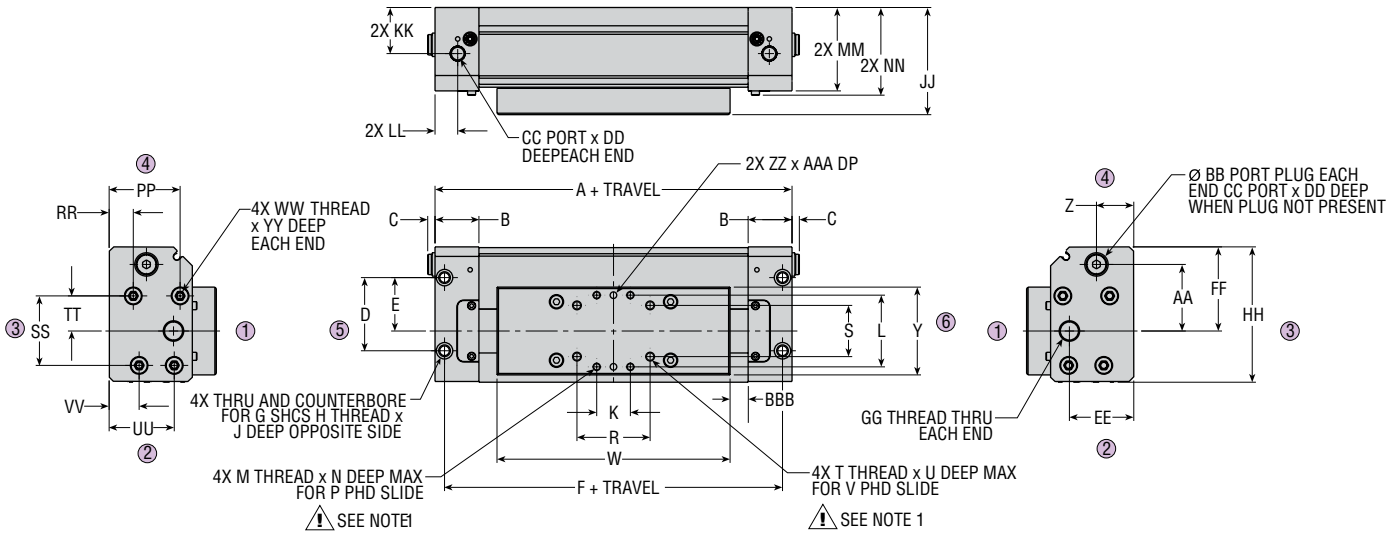
HORIZONTAL SADDLE ON SIDE



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 SFP SLIDES



SIZE	LETTER DIMENSION															
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
27	244.0	30.0	2.5	50.0	36.5	231.0	M6	M8 x 1.25	10.0	23.0	49.0	M5 x 0.8	9.0	STPD516	50.0	35.0
40	340.0	44.0	3.0	64.0	47.7	316.0	M8	M10 x 1.50	14.0	32.0	68.0	M6 x 1.0	9.5	STPD525	58.0	36.0

SIZE	LETTER DIMENSION														
	T	U	V	W	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	JJ
27	M6 X 1.0	9.3	SK / SLxxx2	159.3	60.0	25.5	45.5	15.0	1/8 BSPP	5.5	44.0	57.5	M14 x 1.5	92.5	73.3
40	M10 x 1.5	14.2	SK / SLxxx4	220.0	84.0	32.0	59.8	18.0	1/4 BSPP	10.0	62.0	79.4	M20 x 1.5	127.9	97.4

SIZE	LETTER DIMENSION															
	KK	LL	MM	NN	PP	RR	SS	TT	UU	VV	WW	YY	ZZ	ZZ TOL.	AAA	BBB
27	31.5	15.5	57.0	60.0	48.5	16.5	47.5	24.0	44.5	20.5	M5 x 0.8	15.0	5.0043	+.0075/-.0051	5.0	12.4
40	39.0	24.0	76.0	80.0	67.5	23.5	64.5	31.3	67.5	23.5	M6 x 1.0	18.0	6.0043	+.0075/-.0051	8.0	16

NOTES:

1) ⚠ CAUTION: THREADING FASTENERS DEEPER THAN SPECIFIED DEPTHS MAY ADVERSELY AFFECT UNIT PERFORMANCE.

All dimensions are reference only unless specifically toleranced.

PB PORT CONTROLS ON EXTEND AND RETRACT

PE PORT CONTROLS ON RETRACT

PR PORT CONTROLS ON EXTEND

The PHD Series SFP Slide utilizes external compact banjo flow control fittings to adjust the saddle velocity. The control fittings are unidirectional flow control valves where intake air flows freely through the flow control and exhaust air is metered out through an adjustment screw. Intake capacity is slightly greater than the full open exhaust capacity, enabling maximum variation of saddle speeds.

The PHD Series SFP flow control fittings are supplied for direct mounting to the caps and provide integral tube fitting connection. They also swivel 360 degrees around the ports, easing tube routing installation.

Note: Flow control fitting is effective throughout the Series SFP temperature and pressure range.

AB TRAVEL ADJUSTMENT WITH SHOCK PADS ON EXTEND AND RETRACT

AR TRAVEL ADJUSTMENT WITH SHOCK PADS ON RETRACT

AE TRAVEL ADJUSTMENT WITH SHOCK PADS ON EXTEND

A travel adjustment option and/or a shock absorber option must be ordered with all PHD Series SFP Slides. Both of these mechanical stops provide an adjustment range of 0.55 in [14 mm] from each end of travel.

The travel adjustment screw works in conjunction with its specified cushion and is supplied with a shock pad, which provides quiet actuator operation. In more demanding applications, shock absorbers handle the energy dissipation.

NOTE: Travel adjustment must be specified with corresponding cushion option, shown below.

Caution: Care should be taken to ensure that stopping is always accomplished with either Travel Adjustment Screws, Shock Absorbers, or customer applied tooling or fixturing.

Z1 CORROSION RESISTANT PLATING

This option provides corrosion resistant plating on all externally exposed ferrous parts. This optional plating can be used to protect the slide from severe or corrosive environments.

NOTE: Shock Absorbers are not plated with -Z1 option.

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.

L9 NPT PORTS

This option provides NPT ports instead of the standard BSPP ports. The NPT ports are located in the same location as the BSPP ports.

DB CUSHIONS ON EXTEND AND RETRACT

DE CUSHION ON RETRACT

DR CUSHION ON EXTEND

Optional adjustable cushions at each end of travel provide smooth deceleration of the applied load. Threaded cushion control needles, located on the side of the slide, provide a wide adjustment range making the cushion ideal for reduction of impact forces at the end of travel. **NOTE:** Cushion option must be specified with above corresponding travel adjustment option. See PHD Product Sizing Catalog for cushion capabilities.

CAUTION: The use of the travel adjustment screw will affect the kinetic energy capacity of the cushions. Therefore, to get the maximum capabilities from the cushion, specify the stroke of the slide to match the required travel of the application.

NBx SHOCK ABSORBER ON EXTEND AND RETRACT

NEx SHOCK ABSORBER ON EXTEND

NRx SHOCK ABSORBER ON RETRACT

The shock absorber option and/or travel adjustment option must be ordered with all PHD Series SFP Slides. Both of these mechanical stops provide an adjustment range of 0.55 in [14 mm] from each end of stroke.

The hydraulic shock absorber options are designed for the maximum deceleration control and load stopping ability. The -NBx, -NEx, and -NRx options provide the Series SFP actuator with the hydraulic shock absorber factory installed. See PHD Product Sizing Catalog for details on shock absorber stopping capacity and to determine proper damping constant value (Damping constant NBx, NEx, NRx).

Z1 MAGNET FOR PHD SERIES 6790 & JC1 SWITCHES

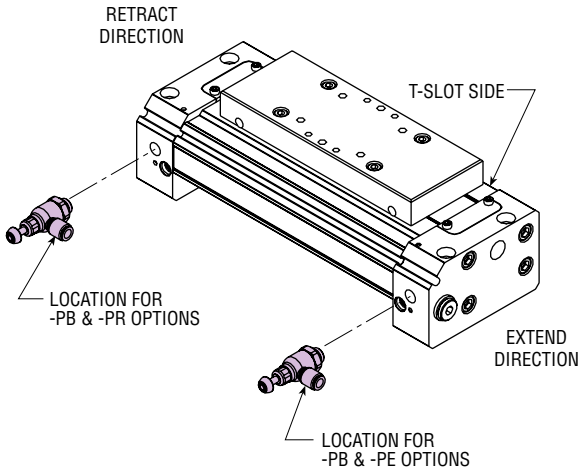
Series SFP Slides are optionally internally equipped with a magnet for use with PHD Series 6790 and JC1 Switches. These switches mount easily to the unit using the switch slot on the side of the tube.

PHD Series 6790 and JC1 Switches are designed specifically to provide an input signal to various types of programmable controllers or logic systems. See the Switches and Sensors section for complete switch specifications.

PB PORT CONTROLS ON EXTEND AND RETRACT

PR PORT CONTROLS ON RETRACT

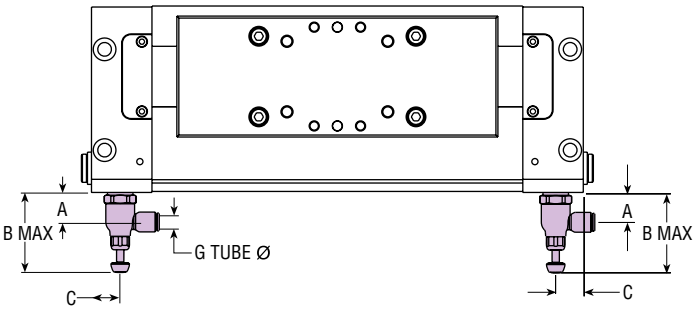
PE PORT CONTROLS ON EXTEND

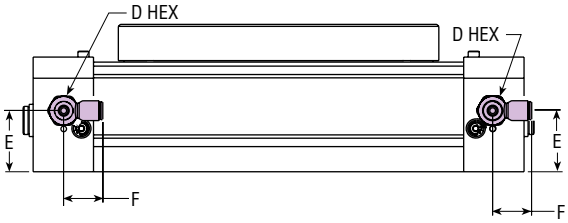


The PHD Series SFP Slide utilizes external compact banjo flow control fittings to adjust the saddle velocity. The control fittings are unidirectional flow control valves where intake air flows freely through the flow control and exhaust air is metered out through an adjustment screw. Intake capacity is slightly greater than the full open exhaust capacity, enabling maximum variation of saddle speeds.

The PHD Series SFP flow control fittings are supplied for direct mounting to the caps and provide integral tube fitting connection. They also swivel 360 degrees around the ports, easing tube routing installation. Saddle velocities are adjusted and maintained by the captivated fine adjustment screw with a locking nut, which ensures precise velocity control and repeatability.

Note: Flow control fitting is effective throughout the Series SFP temperature and pressure range.





SIZE	SPEED CONTROL REPLACEMENT KIT NO. METRIC	IMPERIAL
27	70696-03	70695-03
40	70696-06	70695-05

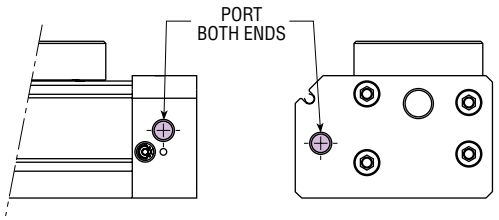
Kit includes flow control for one end.

SIZE	LETTER DIMENSIONS A	B MAX	C	D HEX
27	16.0	44.0	15.5	16.0
40	18.5	48.0	24.0	19.0

SIZE	E	F	STANDARD G	-L9 OPTION G
27	31.5	22.0	6.0	1/4
40	39.0	28.0	8.0	3/8

L9 NPT PORTS

This option provides NPT ports instead of the standard BSPP ports. The NPT ports are located in the same location as the BSPP ports.



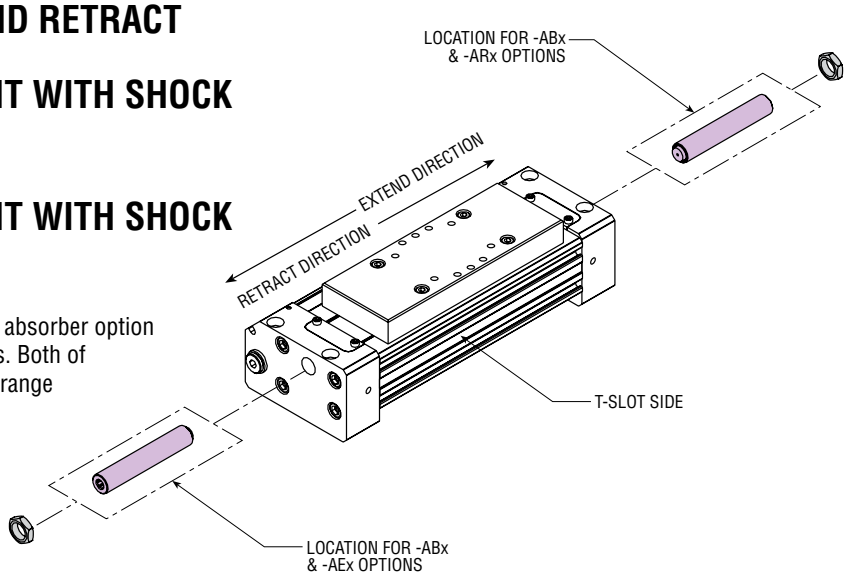
SIZE	PORT SIZE
27	1/8-27 NPT
40	1/4-18 NPT

NOTE: Port locations are the same as BSPP ports on dimension page.

AB TRAVEL ADJUSTMENT WITH SHOCK PADS ON EXTEND AND RETRACT

AR TRAVEL ADJUSTMENT WITH SHOCK PADS ON RETRACT

AE TRAVEL ADJUSTMENT WITH SHOCK PADS ON EXTEND

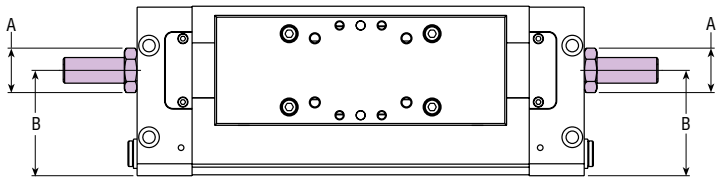


A travel adjustment option and/or a shock absorber option must be ordered with all PHD Series SFP Slides. Both of these mechanical stops provide an adjustment range of 14 mm from each end of travel.

The travel adjustment screw works in conjunction with its specified cushion and is supplied with a shock pad, which provides quiet actuator operation. In more demanding applications, shock absorbers handle the energy dissipation.

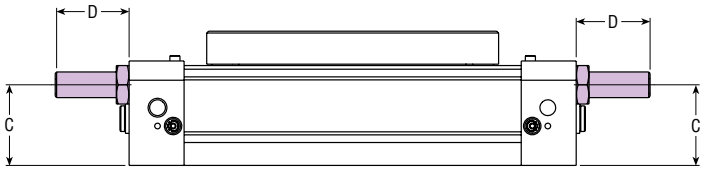
NOTE: Travel adjustment must be specified with corresponding cushion option, shown below.

Caution: Care should be taken to ensure that stopping is always accomplished with either Travel Adjustment Screws, Shock Absorbers, or customer applied tooling or fixturing.



SIZE	TRAVEL ADJUSTMENT REPLACEMENT KIT NO. -STD	-Z1 PLATING
27	72139-00	72139-03
40	72443-00	72443-03

Kit includes one travel adjustment screw and nut for one end.



SIZE	LETTER DIMENSIONS A	B	C	D
27	24.3	57.5	44.0	20.0
40	34.6	79.4	62.0	44.0

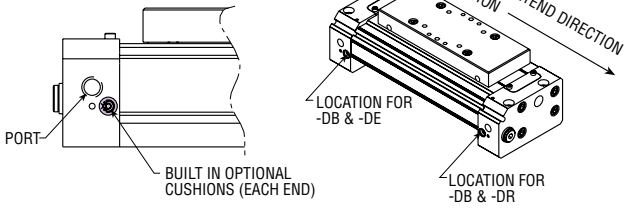
DB CUSHIONS ON EXTEND AND RETRACT

DR CUSHION ON RETRACT

DE CUSHION ON EXTEND

Optional adjustable cushions at each end of travel provide smooth deceleration of the applied load. Threaded cushion control needles, located on the side of the slide, provide a wide adjustment range making the cushion ideal for reduction of impact forces at the end of travel. **NOTE:** Cushion option must be specified with above corresponding travel adjustment option. See PHD Product Sizing Catalog for cushion capabilities.

CAUTION: The use of the travel adjustment screw will affect the kinetic energy capacity of the cushions. Therefore, to get the maximum capabilities from the cushion, specify the stroke of the slide to match the required travel of the application.

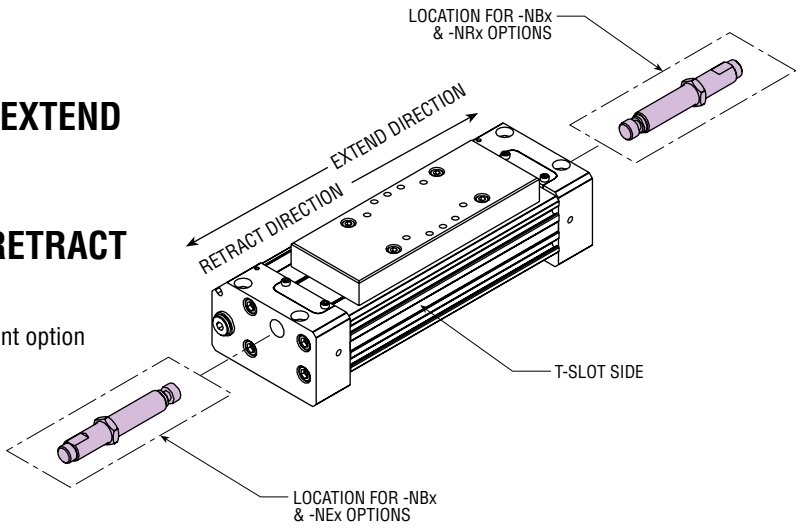


All dimensions are reference only unless specifically toleranced.

NBx SHOCK ABSORBER ON EXTEND AND RETRACT

NEx SHOCK ABSORBER ON EXTEND

NRx SHOCK ABSORBER ON RETRACT

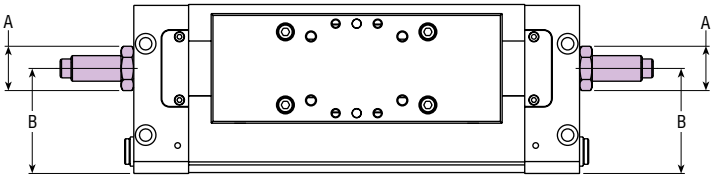


The shock absorber option and/or travel adjustment option must be ordered with all PHD Series SFP Slides. Both of these mechanical stops provide an adjustment range of 14 mm from each end of stroke.

The hydraulic shock absorber options are designed for the maximum deceleration control and load stopping ability. The -NBx, -NEx, and -NRx options provide the Series SFP actuator with the hydraulic shock absorber factory installed. See PHD Product Sizing Catalog for details on shock absorber stopping capacity and to determine proper damping constant value (Damping constant NBx, NEx, NRx).

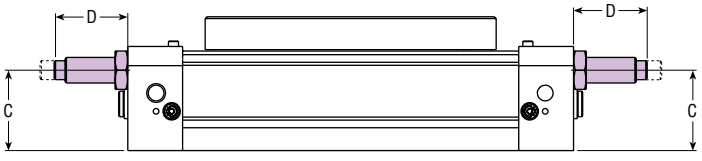
Caution: Care should be taken to ensure that stopping is always accomplished with either Travel Adjustment Screws, Shock Absorbers, or customer applied tooling or fixturing.

SIZE	AVAILABLE DAMPING CONSTANT NBx, NEx, NRx
27	2 = -02, 3 = -03, 5 = -05, 6 = -06
40	2 = -02, 3 = -03, 4 = -04



SIZE	SHOCK ABSORBER REPLACEMENT KIT NO.
27	63290-02-00-xx
40	63290-03-00-xx

Kit includes one shock and nut for one end.
-xx = Shock Damping Constant (See PHD Product Sizing Catalog)



SIZE	LETTER DIMENSIONS							
				D				
	A	B	C	-2	-3	-4	-5	-6
27	24.3	57.5	44.0	35.3	35.3	—	35.6	35.6
40	34.6	79.4	62.0	49.0	49.0	49.0	—	—

Z1 CORROSION RESISTANT PLATING

This option provides corrosion resistant plating on all externally exposed ferrous parts. This optional plating can be used to protect the slide from severe or corrosive environments.

NOTE: Shock Absorbers are not plated with -Z1 option.

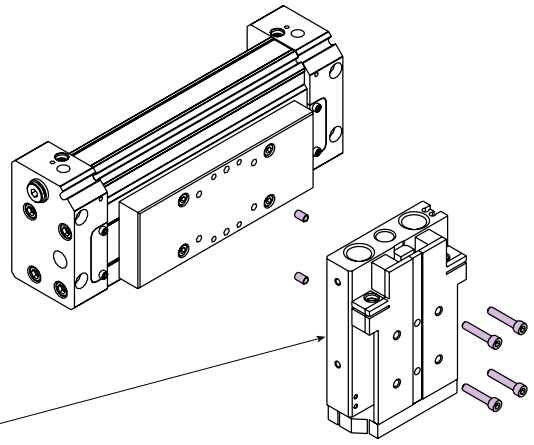
All dimensions are reference only unless specifically toleranced.

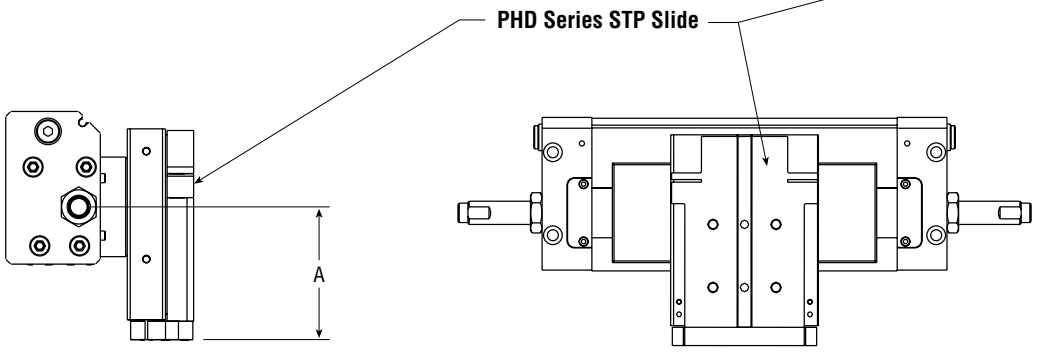
MODULAR MOUNTING KITS

Modular design of the Series SFP saddle allows units to bolt and dowel together without the need for a transition plate. See chart below for slide compatibility and hardware kits required. Each kit contains two dowel pins and four SHCS to mount the units together.

PRIMARY UNIT	SECONDARY UNIT	DOWEL PIN READY	FASTENER KIT	DIMENSION A (WITHOUT ADJUSTMENT)
SFP627	STPD516	YES	73234-xx	79
SFP640	STPD525	YES	73235-xx	101

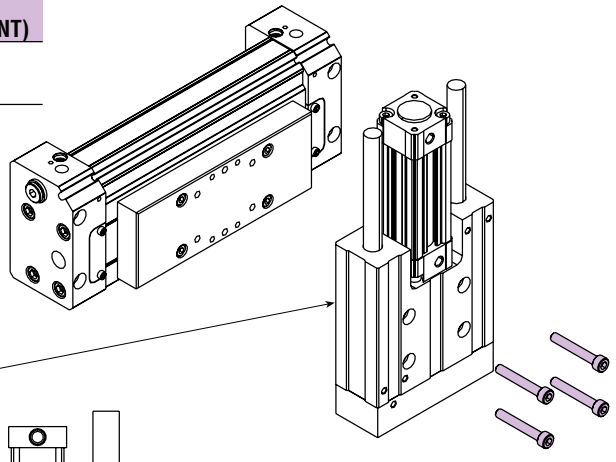
-xx = -00 = Standard Plating
-03 = Z1 Electroless Nickel Plating

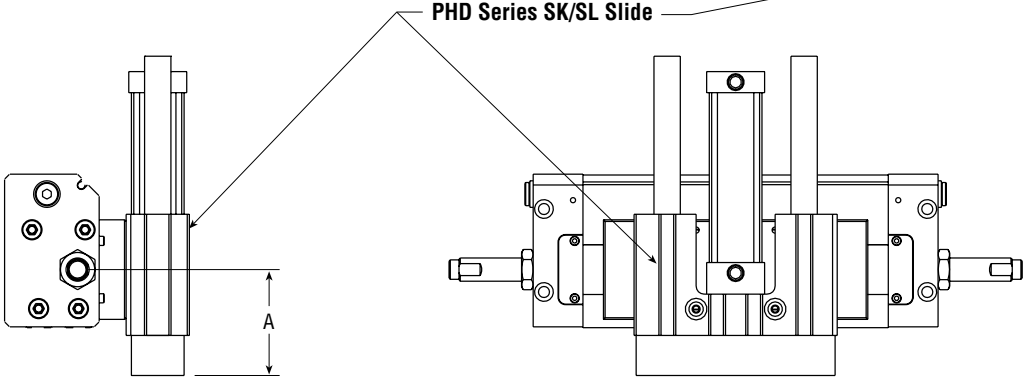




PRIMARY UNIT	SECONDARY UNIT	DOWEL PIN READY	FASTENER KIT	DIMENSION A (WITHOUT ADJUSTMENT)
SFP627	SK/SLxxx2	NO	73230-xx	64.5
SFP640	SK/SLxxx4	NO	73231-xx	65

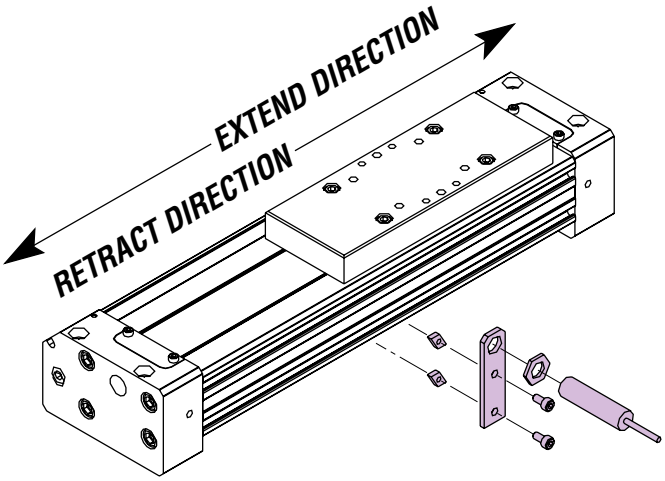
-xx = -00 = Standard Plating
-03 = Z1 Electroless Nickel Plating

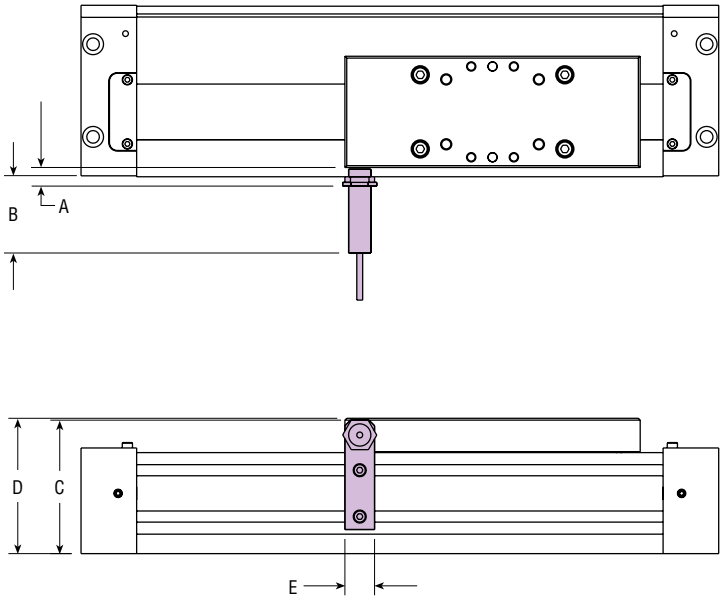




EXTERNAL PROXIMITY SWITCH READY BRACKETS

This accessory provides for external mounting of a 12 mm round metal sensing proximity switch. One switch mount kit is required per switch and includes the bracket with the required mounting hardware. The Series SFP Slide utilizes the t-slots on the side of the tube to attach the proximity mounting bracket. Proximity switches are ordered separately. 12 mm proximity switches are customer supplied.





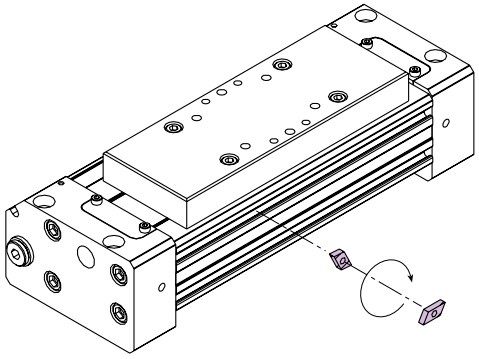
SIZE	LETTER DIMENSIONS				
	A	B	C	D	E
27	10.1	55.7	72.0	73.3	16.0
40	9.6	54.6	94.0	97.4	20.0

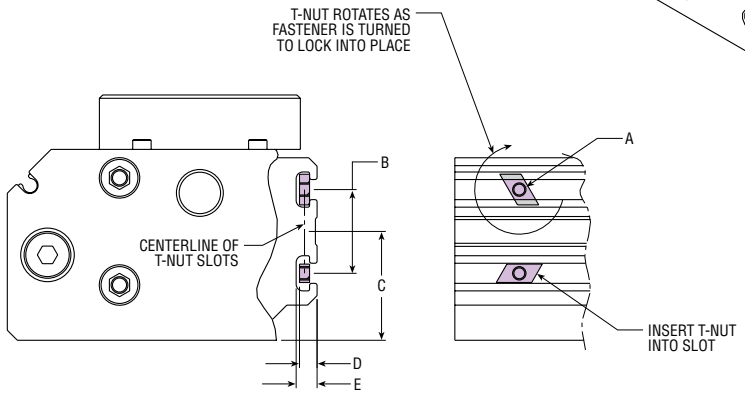
SIZE	PROXIMITY MOUNTING KIT (METRIC)
27	72137-xx
40	72441-xx

Kit includes hardware for one end.
Switches ordered separately.
-xx = -00 = Standard Plating
-03 = Z1 Electroless Nickel Plating

T-NUTS

T-nuts allow attachment of switches, cable carriers, or other accessories to be easily mounted to the actuator. T-nuts can be positioned at any point along the t-slot grooves. The swiveling t-nut design allows insertion from the top of the slot. When the nut is tightened, it rotates into the locking position and securely clamps the bolted part.





SIZE	LETTER DIMENSIONS				
	A	B	C	D	E
27	M3 x 0.5	25.0	32.5	5.0	6.3
40	M5 x 0.8	30.0	44.0	7.7	9.8

NOTE: Dimensions D and E are for minimum (D) and maximum (E) thread engagement.

SIZE	SWIVEL T-NUT (METRIC)
27	72128-xx
40	72129-xx

NOTE: Each number represents one T-Nut.
-xx = -00 = Standard Plating
-03 = Z1 Electroless Nickel Plating

SIZE	TORQUE	
	Kgf-m	in-lb
27	9.1	20
40	36.3	80

NOTE: Over torquing fastener may damage tube, t-nut, and/or fastener.

M MAGNET FOR PHD SERIES 6790 & JC1 SWITCHES

Series SFP Slides are optionally internally equipped with a magnet for use with PHD Series 6790 and JC1 Switches. These switches mount easily to the unit using the switch slot on the side of the tube.

PHD Series 6790 and JC1 Switches are designed specifically to provide an input signal to various types of programmable controllers or logic systems. See the Switches and Sensors section for complete switch specifications.

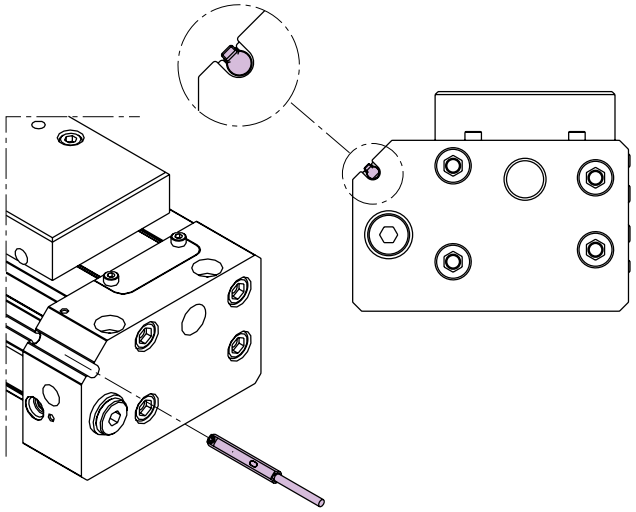
SERIES 6790 & JC1 SWITCHES

PART NO.	DESCRIPTION
67902-1-05	PNP (Source) or NPN (Sink) Reed, 4.5-30 VDC, 5 m cable
JC1SDN-5	NPN (Sink) Solid State, 10-30 VDC, 5 m cable
JC1SDP-5	PNP (Source) Solid State, 10-30 VDC, 5 m cable
67922-1	PNP (Source) or NPN (Sink) Reed, 4.5-30 VDC, Quick Connect
JC1SDN-K	NPN (Sink) Solid State, 10-30 VDC, Quick Connect
JC1SDP-K	PNP (Source) Solid State, 10-30 VDC, Quick Connect
67929-2	PNP (Source) or NPN (Sink) Reed, 65-120 VAC, Quick Connect

NOTE: See Switches and Sensors section for additional switch information and complete specification.

SERIES 6790 & JC1SDx CORDSET CHART

PART NO.	DESCRIPTION
63549-02	M8, 3 pin, Straight Female Connector, 2 m cable
63549-05	M8, 3 pin, Straight Female Connector, 5 m cable



TORQUE CHART

SWITCH	TORQUE
6790	16 in-oz
JC1SDx	Hand tighten clockwise until switch is securely retained. Do not overtighten.

All dimensions are reference only unless specifically toleranced.