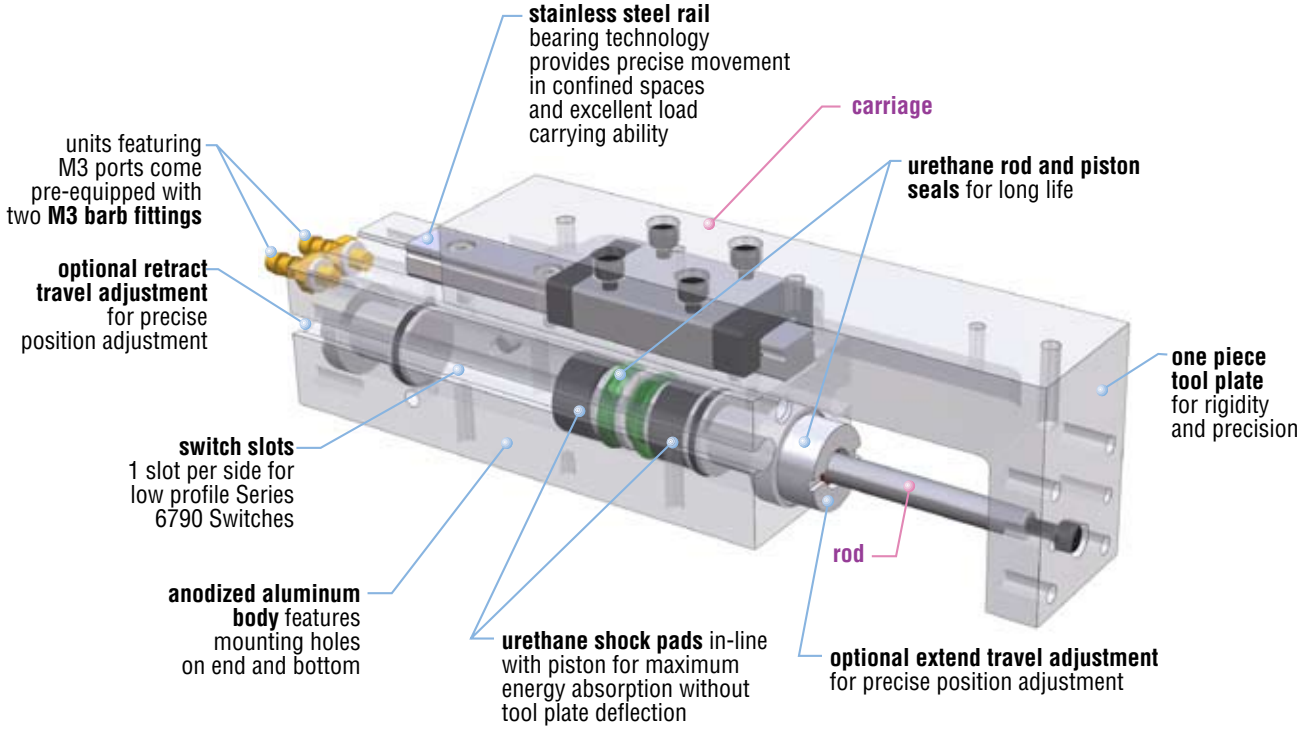
# SIP

## *COMPACT PRECISION RAIL BEARING TECHNOLOGY*






## Major Benefits

- Compact, low-profile design
- High load carrying capability
- 3 bore sizes (12, 16, and 20 mm)
- Optional travel adjustment
- Profile ground rail bearing technology
- One piece tool plate
- Large internal shock pads for high speeds

## Industry Uses

- Assembly machine builders
- Precision assembly equipment
- Testing equipment
- Life science
- Semiconductor
- Medical
- Optical
- Light bulb
- Material handling
- Automotive

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

| BORE SIZE* | | TRAVEL* |
|---|---|---|
| 12 | 12 mm [.472 in] | 10 mm [.394 in], 25 mm [.984 in], 50 mm [1.969 in] |
| 16 | 16 mm [.630 in] | 25 mm [.984 in], 50 mm [1.969 in], 75 mm [2.953 in] |
| 20 | 20 mm [.787 in] | 25 mm [.984 in], 50 mm [1.969 in], 75 mm [2.953 in] |

**PRODUCT**
S - Slide

**TYPE**
P - Precision Rail

**S I P 5 12 x 25 – AE – M**

**SERIES**
I - Low profile miniature

**DESIGN NO.**
5 - Metric - Ports and mounting holes are metric**

**OPTIONS**
AE - Extend travel adjustment
AR - Retract travel adjustment

**OPTION**
M - Magnetic piston for PHD Series 6790 switches

**SERIES 6790 PROXIMITY SWITCHES**

| PART NO. | DESCRIPTION |
|---|---|
| 67902-1-02 | NPN (Sink) or PNP (Source) DC Reed, 2 m cable |
| 67902-1-05 | NPN (Sink) or PNP (Source) DC Reed, 5 m cable |
| 67903-1-02 | NPN (Sink) DC Solid State, 2 m cable |
| 67903-1-05 | NPN (Sink) DC Solid State, 5 m cable |
| 67904-1-02 | PNP (Source) DC Solid State, 2 m cable |
| 67904-1-05 | PNP (Source) DC Solid State, 5 m cable |
| 67922-1 | NPN (Sink) or PNP (Source) DC Reed, Quick Connect |
| 67929-2 | AC Reed, Current Limited, Quick Connect |
| 67923-1 | NPN (Sink) DC Solid State, Quick Connect |
| 67924-1 | PNP (Source) DC Solid State, Quick Connect |
| 63549-02 | 2 m Cordset with Quick Connect |
| 63549-05 | 5 m Cordset with Quick Connect |

**NOTES:**
1)*Consult PHD for additional bore sizes and travel increments.
2)**Port also accepts #10-32 fitting on bore sizes 16 and 20.


UNIQUE SLIDES ARE AVAILABLE. PLEASE CONSULT PHD.

| SPECIFICATIONS | SERIES SIP |
|---|---|
| OPERATING PRESSURE | 20 psi min to 100 psi max [1.4 bar min to 9 bar max] air |
| OPERATING TEMPERATURE | -20° to + 180°F [-29° to + 82°C] |
| TRAVEL TOLERANCE | Nominal travel, +.039/- .000 in [+ 1.0/- 0.0] |
| REPEATABILITY | ± 0.001 [± .025] of original position and regulated pressure |
| VELOCITY | 30 in/sec [0.76 m/sec] max (zero load at 100 psi [6.9 bar]) |
| LUBRICATION | Factory lubricated for life |
| MAINTENANCE | Field repairable |

| SIZE | TRAVEL in | TRAVEL mm | TRAVEL TIME sec | ROD DIAMETER in | ROD DIAMETER mm | BORE DIAMETER in | BORE DIAMETER mm | EXTEND PISTON AREA in² | EXTEND PISTON AREA mm² | RETRACT PISTON AREA in² | RETRACT PISTON AREA mm² | BASE WEIGHT lb | BASE WEIGHT kg | MAX DYNAMIC LOAD lb | MAX DYNAMIC LOAD N | TYPICAL DYNAMIC LOAD lb | TYPICAL DYNAMIC LOAD N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 0.39 | 10 | 0.03 | .157 | 4 | .472 | 12 | .17 | 110 | .16 | 100 | 0.30 | 0.14 | 2.25 | 10 | 0 - 2.03 | 0 - 9 |
| | 0.98 | 25 | 0.07 | | | | | | | | | 0.35 | 0.16 | | | | |
| | 1.97 | 50 | 0.14 | | | | | | | | | 0.46 | 0.21 | | | | |
| 16 | 0.98 | 25 | 0.07 | .236 | 6 | .630 | 16 | .31 | 200 | .27 | 170 | 0.71 | 0.32 | 3.38 | 15 | .68 - 3.38 | 3 - 15 |
| | 1.97 | 50 | 0.14 | | | | | | | | | 0.88 | 0.40 | | | | |
| | 2.95 | 75 | 0.21 | | | | | | | | | 1.04 | 0.47 | | | | |
| 20 | 0.98 | 25 | 0.07 | .315 | 8 | .787 | 20 | .49 | 310 | .41 | 260 | 1.04 | 0.47 | 4.50 | 20 | .90 - 4.5 | 4 - 20 |
| | 1.97 | 50 | 0.14 | | | | | | | | | 1.26 | 0.57 | | | | |
| | 2.95 | 75 | 0.21 | | | | | | | | | 1.48 | 0.67 | | | | |

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

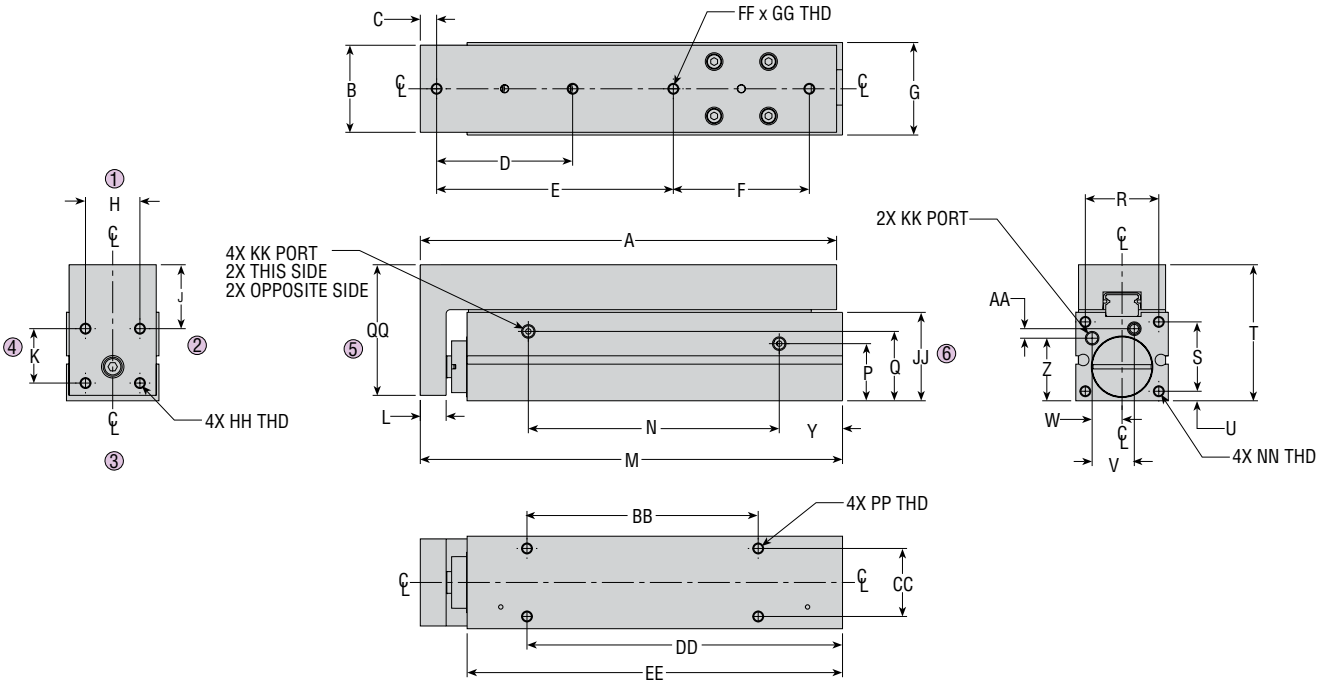
## CYLINDER FORCE CALCULATIONS

| | | IMPERIAL | METRIC |
|---|---|---|---|
| | | F = P x A | F = 0.1 x P x A |
| F | = Cylinder Force | lbs | N |
| P | = Operating Pressure | psi | bar |
| A | = Effective Area | $in^2$ | $mm^2$ |
| | (Extend or Retract) | | |

***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***

# DIMENSIONS: SERIES SIP RAIL BEARING SLIDES




| LETTER | SIPx12 TRAVEL, in [mm] | | | | | | SIPx16 TRAVEL, in [mm] | | | | | | SIPx20 TRAVEL, in [mm] | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DIM | .394 | [10.0] | .984 | [25.0] | 1.969 | [50.0] | .984 | [25.0] | 1.969 | [50.0] | 2.953 | [75.0] | .984 | [25.0] | 1.969 | [50.0] | 2.953 | [75.0] |
| A | 2.953 | [75.0] | 3.543 | [90.0] | 4.528 | [115.0] | 4.016 | [102.0] | 5.000 | [127.0] | 5.984 | [152.0] | 4.055 | [103.0] | 5.039 | [128.0] | 6.024 | [153.0] |
| B | | | .827 | [21.0] | | | | | 1.063 | [27.0] | | | | | 1.260 | [32.0] | | |
| C | | | .197 | [5.0] | | | | | .236 | [6.0] | | | | | .236 | [6.0] | | |
| D | | — | | | .787 | [20.0] | | — | | 1.654 | [42.0] | | | — | | | 1.969 | [50.0] |
| E | .827 | [21.0] | 1.417 | [36.0] | 2.402 | [61.0] | 1.614 | [41.0] | 2.598 | [66.0] | 3.583 | [91.0] | 1.457 | [37.0] | 2.441 | [62.0] | 3.425 | [87.0] |
| F | | | 1.417 | [36.0] | | | | | 1.654 | [42.0] | | | | | 1.969 | [50.0] | | |
| G | | | .906 | [23.0] | | | | | 1.142 | [29.0] | | | | | 1.339 | [34.0] | | |
| H | | | .551 | [14.0] | | | | | .709 | [18.0] | | | | | .787 | [20.0] | | |
| J | | | .591 | [15.0] | | | | | .748 | [19.0] | | | | | .925 | [23.5] | | |
| K | | | .551 | [14.0] | | | | | .709 | [18.0] | | | | | .787 | [20.0] | | |
| L | | | .276 | [7.0] | | | | | .295 | [7.5] | | | | | .374 | [9.5] | | |
| M | 3.031 | [77.0] | 3.622 | [92.0] | 4.606 | [117.0] | 4.094 | [104.0] | 5.079 | [129.0] | 6.063 | [154.0] | 4.134 | [105.0] | 5.118 | [130.0] | 6.102 | [155.0] |
| N | .776 | [19.7] | 1.366 | [34.7] | 2.350 | [59.7] | 1.764 | [44.8] | 2.748 | [69.8] | 3.732 | [94.8] | 1.661 | [42.2] | 2.646 | [67.2] | 3.630 | [92.2] |
| P | | | .256 | [6.5] | | | | | .197 | [5.0] | | | | | .827 | [21.0] | | |
| Q | | | .673 | [17.1] | | | | | .866 | [22.0] | | | | | 1.004 | [25.5] | | |
| R | | | .669 | [17.0] | | | | | .827 | [21.0] | | | | | 1.063 | [27.0] | | |
| S | | | .591 | [15.0] | | | | | .827 | [21.0] | | | | | .984 | [25.0] | | |
| T | | | 1.299 | [33.0] | | | | | 1.693 | [43.0] | | | | | 1.969 | [50.0] | | |
| U | | | .138 | [3.5] | | | | | .157 | [4.0] | | | | | .157 | [4.0] | | |
| V | | | .276 | [7.0] | | | | | .413 | [10.5] | | | | | .610 | [15.5] | | |
| W | | | .098 | [2.5] | | | | | .256 | [6.5] | | | | | .433 | [11.0] | | |
| Y | | | .839 | [21.3] | | | | | .913 | [23.2] | | | | | .917 | [23.3] | | |
| Z | | | .674 | [17.1] | | | | | .846 | [21.5] | | | | | .906 | [23.0] | | |
| AA | | | 0.00 | | | | | | .070 | [1.8] | | | | | .138 | [3.5] | | |
| BB | .787 | [20.0] | 1.378 | [35.0] | 2.362 | [60.0] | 1.339 | [34.0] | 2.323 | [59.0] | 3.307 | [84.0] | 1.378 | [35.0] | 2.362 | [60.0] | 3.346 | [85.0] |
| CC | | | .669 | [17.0] | | | | | .866 | [22.0] | | | | | .984 | [25.0] | | |
| DD | 1.890 | [48.0] | 2.480 | [63.0] | 3.465 | [88.0] | 2.677 | [68.0] | 3.661 | [93.0] | 4.646 | [118.0] | 2.598 | [66.0] | 3.583 | [91.0] | 4.567 | [116.0] |
| EE | 2.461 | [62.5] | 3.051 | [77.5] | 4.035 | [102.5] | 3.504 | [89.0] | 4.488 | [114.0] | 5.472 | [139.0] | 3.465 | [88.0] | 4.449 | [113.0] | 5.433 | [138.0] |
| FF | 3 | | 3 | | 4 | | 3 | | 4 | | 4 | | 3 | | 3 | | 4 | |
| GG | | | [M3 x 0.5 x 4.6] | | | | | | [M4 x 0.7 x 6] | | | | | | [M4 x 0.7 x 6] | | | |
| HH | | | [M3 x 0.5 x 7] | | | | | | [M4 x 0.7 x 7.5] | | | | | | [M4 x 0.7 x 9.5] | | | |
| JJ | | | .827 | [21.0] | | | | | 1.102 | [28.0] | | | | | 1.280 | [32.5] | | |
| KK | | | [M3 x 0.5 x 3.5] | | | | | | [M5 x 0.8 x 4] | | | | | | [M5 x 0.8 x 4.0] | | | |
| NN | | | [M3 x 0.5 x 5.5] | | | | | | [M4 x 0.7 x 8] | | | | | | [M4 x 0.7 x 8] | | | |
| PP | | | [M3 x 0.5 x 5.5] | | | | | | [M4 x 0.7 x 6] | | | | | | [M4 x 0.7 x 6] | | | |
| QQ | | | 1.260 | [32.0] | | | | | 1.614 | [41.0] | | | | | 1.890 | [48.0] | | |

**NOTES:**
1) DESIGNATED ℄ IS CENTERLINE OF UNIT
2) METRIC INFORMATION SHOWN IN [ ]
3) CIRCLED NUMBERS INDICATE POSITION

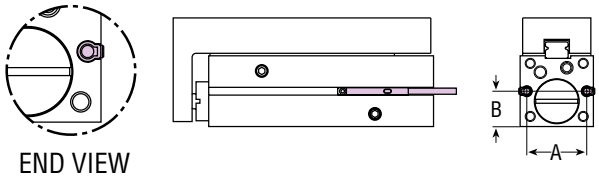


All dimensions are reference only unless specifically toleranced.

## M MAGNET FOR PHD SERIES 6790 REED AND SOLID STATE SWITCHES

This option equips the unit with a magnetic piston for use with PHD's Series 6790 Switch. The switch housing is contained by the slide housing and provides a very compact switch design. The switches mount easily into two small grooves located on the side of the slide housing and are locked into place with a set screw.

| LETTER DIM | SIZE 12 | | SIZE 16 | | SIZE 20 | |
|---|---|---|---|---|---|---|
| | in | mm | in | mm | in | mm |
| A | 0.689 | 17.5 | 0.933 | 23.7 | 1.122 | 28.5 |
| B | 0.492 | 12.5 | 0.551 | 14 | 0.591 | 15 |




END VIEW

| PART NO. | DESCRIPTION |
|---|---|
| 67902-1-02 | NPN (Sink) or PNP (Source) DC Reed, 2 m cable |
| 67902-1-05 | NPN (Sink) or PNP (Source) DC Reed, 5 m cable |
| 67903-1-02 | NPN (Sink) DC Solid State, 2 m cable |
| 67903-1-05 | NPN (Sink) DC Solid State, 5 m cable |
| 67904-1-02 | PNP (Source) DC Solid State, 2 m cable |
| 67904-1-05 | PNP (Source) DC Solid State, 5 m cable |
| 67922-1 | NPN (Sink) or PNP (Source) DC Reed, Quick Connect |
| 67929-2 | AC Reed, Current Limited, Quick Connect |
| 67923-1 | NPN (Sink) DC Solid State, Quick Connect |
| 67924-1 | PNP (Source) DC Solid State, Quick Connect |
| 63549-02 | 2 m Cordset with Quick Connect |
| 63549-05 | 5 m Cordset with Quick Connect |

**NOTES:**

1) Switch set screw torque to 16 in-oz [.11 Nm] max.
2) See Switches and Sensors section for additional switch information and complete specification.

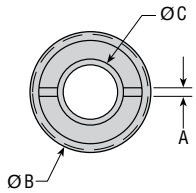
## AE AR TRAVEL ADJUSTMENT

The AE and AR options provide travel adjustment by reducing the extend or retract travel respectively. Normal shock pad operation is maintained regardless of travel adjustment setting. Travel adjustments have internal stops to prevent loss of components. Both options may be used together to provide adjustment at both ends of travel.

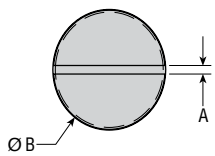
AE- Travel Adjustment on Extend
This option provides up to 5 mm of travel reduction on extend. Travel adjustment is made using a spanner wrench or similar tool to engage the slots in the cartridge. Rotating the cartridge clockwise reduces the travel.

AR- Travel Adjustment on Retract
This option provides up to 5 mm of travel reduction on retract. Travel adjustment is made using a flat-bladed screwdriver to engage the slot in the bore plug. Rotating the bore plug clockwise reduces the travel.

### AE
**CARTRIDGE SLOT DETAIL**




### AR
**BORE PLUG SLOT DETAIL**




| SIZE | A SLOT WIDTH | | B MAX TOOL DIA | | C ROD CLEARANCE DIA | | SLOT DEPTH | |
|---|---|---|---|---|---|---|---|---|
| | in | mm | in | mm | in | mm | in | mm |
| 12 | .062 | 1.6 | .450 | 11.4 | .215 | 5.5 | .030 | .8 |
| 16 | .062 | 1.6 | .600 | 15.2 | .362 | 9.2 | .060 | 1.5 |
| 20 | .062 | 1.6 | .817 | 20.8 | .478 | 12.1 | .060 | 1.5 |