

KOGANEI TWIN ROD CYLINDERS

B SERIES



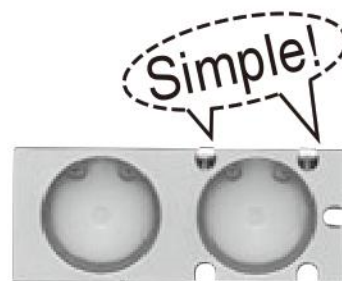
SQUARE

A slender, square form offering direct mounting, a compact design that eliminates the need for guides, and a sensor switch magnet as standard!



FLAT

This horizontal lead wire type compact sensor switch does not protrude from the body, promoting further space-saving of the mechanical device. In addition, 5 mounting locations on 3 different surfaces facilitate detection of various applications.

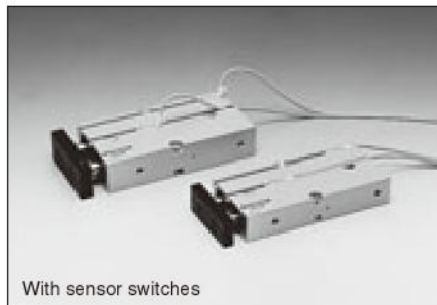
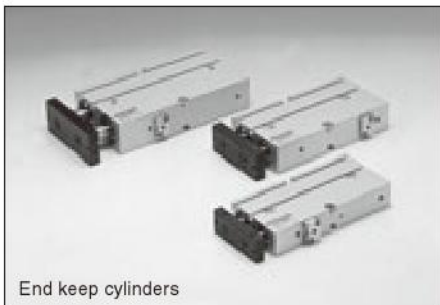
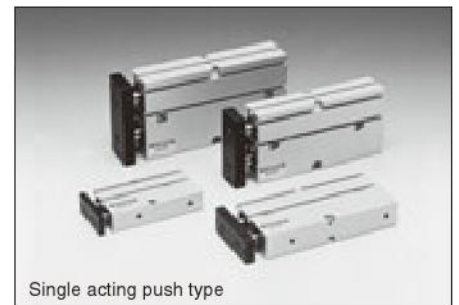
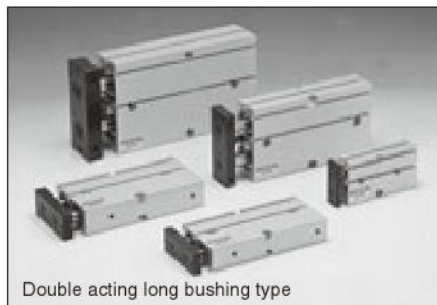
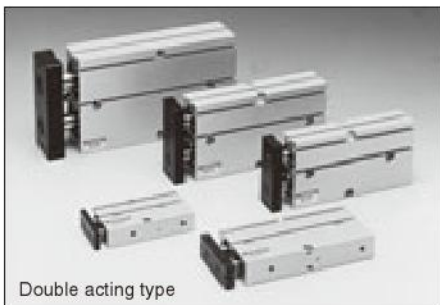
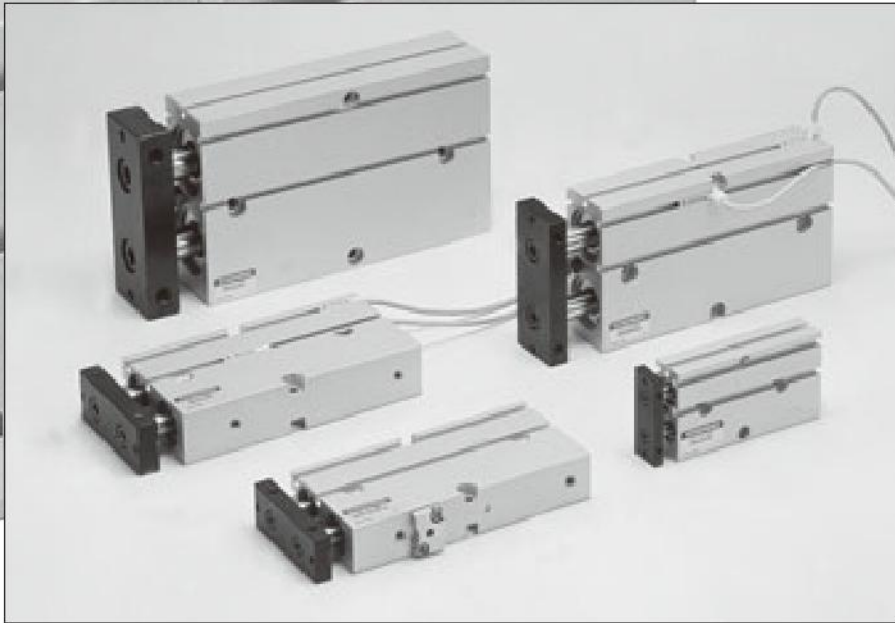


POWERFUL

Excellent non-rotating accuracy, while a double piston structure doubles the cylinder's thrust.

In addition, the Twin Rod cylinder B series helps save space and man-hours, plus it lowers costs.





Selection chart

| | Cylinder bore size mm | Strokes mm | Sensor switch | | Non-Ion Specification |
|---------------------------------|-----------------------|------------|----------------------------------|----------------------------------|-----------------------|
| | | | Solid state type | Reed switch type | |
| Double acting type | | | ZE135 ZE235 ZE155 ZE255 | ZE101 ZE102 ZE201 ZE202 | Available |
| Double acting long bushing type | | | ZE135 ZE235 ZE155 ZE255 | ZE101 ZE102 ZE201 ZE202 | None |
| Single acting push type | | | ZE135 ZE235 ZE155 ZE255 | ZE101 ZE102 ZE201 ZE202 | None |
| End keep cylinders | | | ZE135 ZE235 ZE155 ZE255 | ZE101 ZE102 ZE201 ZE202 | None |

Cylinder Thrust

Select a suitable cylinder bore size considering the load and air pressure to obtain the required thrust.

Since the figures in the table are calculated values, select a bore size that results in a load ratio (load ratio = $\frac{\text{Load}}{\text{Calculated value}}$) of 70% or less (50% or less for high speed application).

| Bore size mm [in.] | Rod dia. mm [in.] | Operation | | Pressure area mm ² [in. ²] | Air pressure MPa [psi.] | | | | | | N [lbf.] |
|-----------------------|----------------------|-------------------------|-----------|---|-------------------------|---------------|----------------|----------------|----------------|----------------|-----------------|
| | | | | | 0.1 [15] | 0.2 [29] | 0.3 [44] | 0.4 [58] | 0.5 [73] | 0.6 [87] | |
| 10 [0.394] | 6 [0.236] | Double acting type | Push side | 157 [0.243] | — | 31.4 [7.06] | 47.1 [10.59] | 62.8 [14.12] | 78.5 [17.65] | 94.2 [21.18] | 109.9 [24.71] |
| | | | Pull side | 100 [0.155] | — | 20 [4.5] | 30 [6.7] | 40 [9.0] | 50 [11.2] | 60 [13.5] | 70 [15.7] |
| | | Single Acting Push Type | | 157 [0.243] | — | — | 5.5 [1.24] | 21.2 [4.77] | 36.9 [8.30] | 52.6 [11.82] | 68.3 [15.35] |
| 16 [0.630] | 8 [0.315] | Double acting type | Push side | 402 [0.623] | 40.2 [9.04] | 80.4 [18.07] | 120.6 [27.11] | 160.8 [36.15] | 201 [45.18] | 241.2 [54.22] | 281.4 [63.26] |
| | | | Pull side | 301 [0.467] | 30.1 [6.77] | 60.2 [13.53] | 90.3 [20.30] | 120.4 [27.07] | 150.5 [33.83] | 180.6 [40.60] | 210.7 [47.37] |
| | | Single Acting Push Type | | 402 [0.623] | — | 39.3 [8.83] | 79.5 [17.87] | 119.7 [26.91] | 159.9 [35.95] | 200.1 [44.98] | 240.3 [54.02] |
| 20 [0.787] | 10 [0.394] | Double acting type | Push side | 628 [0.973] | 62.8 [14.12] | 125.6 [28.23] | 188.4 [42.35] | 251.2 [56.47] | 314 [70.59] | 376.8 [84.70] | 439.6 [98.82] |
| | | | Pull side | 471 [0.730] | 47.1 [10.59] | 94.2 [21.18] | 141.3 [31.76] | 188.4 [42.35] | 235.5 [52.94] | 282.6 [63.53] | 329.7 [74.12] |
| | | Single Acting Push Type | | 628 [0.973] | — | 78.2 [17.58] | 141 [31.70] | 203.8 [45.81] | 266.6 [59.93] | 329.4 [74.05] | 392.2 [88.17] |
| 25 [0.984] | 12 [0.472] | Double acting type | Push side | 981 [1.521] | 98.1 [22.05] | 196.2 [44.11] | 294.3 [66.16] | 392.4 [88.21] | 490.5 [110.26] | 588.6 [132.32] | 686.7 [154.37] |
| | | | Pull side | 755 [1.170] | 75.5 [16.97] | 151 [33.94] | 226.5 [50.92] | 302 [67.89] | 377.5 [84.86] | 453 [101.83] | 528.5 [118.81] |
| | | Single Acting Push Type | | 981 [1.521] | — | 115.8 [26.03] | 213.9 [48.08] | 312 [70.14] | 410.1 [92.19] | 508.2 [114.24] | 606.3 [136.30] |
| 32 [1.260] | 16 [0.630] | Double acting type | Push side | 1607 [2.491] | 160.7 [36.13] | 321.4 [72.25] | 482.1 [108.38] | 642.8 [144.50] | 803.5 [180.63] | 964.2 [216.75] | 1124.9 [252.88] |
| | | | Pull side | 1205 [1.868] | 120.5 [27.09] | 241 [54.18] | 361.5 [81.27] | 482 [108.35] | 602.5 [135.44] | 723 [162.53] | 843.5 [189.62] |
| | | Single Acting Push Type | | | | | | | | | |

Note: The values of the single acting push type show the thrust at the end of the 60mm stroke.

The Spring Return Force (Only for the Single Acting Type)

| Bore size mm [in.] | Stroke mm | N [lbf.] | |
|-----------------------|--------------|-------------------|-------------------------|
| | | At zero stroke | At the end of stroke |
| 10 [0.394] | 10 | 16.5 [3.71] | 20.6 [4.63] |
| | 20 | 12.4 [2.79] | |
| | 30 | 8.2 [1.84] | |
| | 40 | 25.1 [5.64] | 41.6 [9.35] |
| | 50 | 21.0 [4.72] | |
| | 60 | 16.9 [3.80] | |
| 16 [0.630] | 10 | 15.9 [3.57] | 20.4 [4.59] |
| | 20 | 11.1 [2.50] | |
| | 30 | 6.3 [1.42] | |
| | 40 | 22.3 [5.01] | 41.1 [9.24] |
| | 50 | 17.6 [3.96] | |
| | 60 | 12.8 [2.88] | |
| 20 [0.787] | 10 | 19.6 [4.41] | 23.5 [5.28] |
| | 20 | 15.7 [3.53] | |
| | 30 | 11.8 [2.65] | |
| | 40 | 31.7 [7.13] | 47.4 [10.66] |
| | 50 | 27.8 [6.25] | |
| | 60 | 23.8 [5.35] | |
| 25 [0.984] | 10 | 32.9 [7.40] | 39.5 [8.88] |
| | 20 | 26.2 [5.89] | |
| | 30 | 19.5 [4.38] | |
| | 40 | 53.7 [12.07] | 80.4 [18.07] |
| | 50 | 47.1 [10.59] | |
| | 60 | 40.4 [9.08] | |

- Notes: 1. The values are for 2 springs.
2. Avoid application that applies a load on the spring return side.

Air Flow Rate and Air Consumption

While the Twin Rod cylinder's air flow rate and air consumption can be found through the following calculations, the quick reference chart to the right provides the answers more conveniently.

$$\text{Air flow rate } Q_1 = \frac{\pi D^2}{4} \times L \times \frac{60}{t} \times \frac{P+0.101}{0.101} \times 10^{-6} \times 2$$

$$\text{Air consumption } Q_2 = \frac{\pi D^2}{4} \times L \times 2 \times n \times \frac{P+0.101}{0.101} \times 10^{-6} \times 2$$

- Q₁: Required air flow rate for cylinder ℓ /min (ANR)
- Q₂: Air consumption of cylinder ℓ /min (ANR)
- D: Cylinder bore diameter mm
- L: Cylinder stroke mm
- t: Time required for cylinder to travel 1 stroke s
- n: Number of cylinder reciprocations per minute times/min
- P: Air pressure MPa

$$\text{Air flow rate } Q_1' = \frac{\pi D'^2}{4} \times L' \times \frac{60}{t'} \times \frac{P'+14.7}{14.7} \times \frac{1}{1728} \times 2$$

$$\text{Air consumption } Q_2' = \frac{\pi D'^2}{4} \times L' \times 2 \times n' \times \frac{P'+14.7}{14.7} \times \frac{1}{1728} \times 2$$

- Q₁': Required air flow rate for cylinder ft.³/min. (ANR)**
- Q₂': Air consumption of cylinder ft.³/min. (ANR)**
- D': Cylinder bore diameter in.
- L': Cylinder stroke in.
- t': Time required for cylinder to travel 1 stroke sec.
- n': Number of cylinder reciprocations per minute times/min.
- P': Air pressure psi.

※ Refer to p.54 for an explanation of ANR.

Air consumption for each 1 mm [0.0394in.] stroke cm³ [in.³]/Reciprocation (ANR)

| Bore size mm | Air pressure MPa [psi.] | | | | | | |
|--------------|-------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | 0.1 [15] | 0.2 [29] | 0.3 [44] | 0.4 [58] | 0.5 [73] | 0.6 [87] | 0.7 [102] |
| 10 | (0.620 [0.03783]) | 0.924 [0.05639] | 1.228 [0.07494] | 1.534 [0.09361] | 1.838 [0.11216] | 2.146 [0.13096] | 2.450 [0.14951] |
| 16 | 1.584 [0.09666] | 2.364 [0.14426] | 3.146 [0.19198] | 3.926 [0.23958] | 4.704 [0.28706] | 5.486 [0.33478] | 6.266 [0.38238] |
| 20 | 2.48 [0.1513] | 3.72 [0.2270] | 4.90 [0.2990] | 6.14 [0.3747] | 7.36 [0.4491] | 8.58 [0.5236] | 9.80 [0.5980] |
| 25 | 3.88 [0.2368] | 5.78 [0.3527] | 7.66 [0.4674] | 9.58 [0.5846] | 11.50 [0.7018] | 13.42 [0.8189] | 15.34 [0.9361] |
| 32 | 6.36 [0.3881] | 9.46 [0.5773] | 12.56 [0.7665] | 15.70 [0.9581] | 18.82 [1.1485] | 21.96 [1.3401] | 25.10 [1.5317] |

The figures in the table show the air flow rate and air consumption when an air cylinder makes 1 reciprocation with stroke of 1mm [0.0394in.].

The air flow rate and air consumption actually required is found by the following calculations.

- Finding the air flow rate (for selecting F.R.L., valves, etc.)

Example 1. When operating a Twin Rod cylinder with bore size of 20mm [0.787in.] at speed of 300mm/s [11.8in./sec.] and under air pressure of 0.5MPa [73psi.]

$$7.36 \times \frac{1}{2} \times 300 \times 10^{-3} = 1.10 \text{ ℓ /s [0.0388ft.³/sec.]} \text{ (ANR)}$$

(At this time, the flow rate per minute is $7.36 \times \frac{1}{2} \times 300 \times 60 \times 10^{-3} = 66.24 \text{ ℓ /min [2.338ft.³/min.]} \text{ (ANR)}$)

- Finding the air consumption

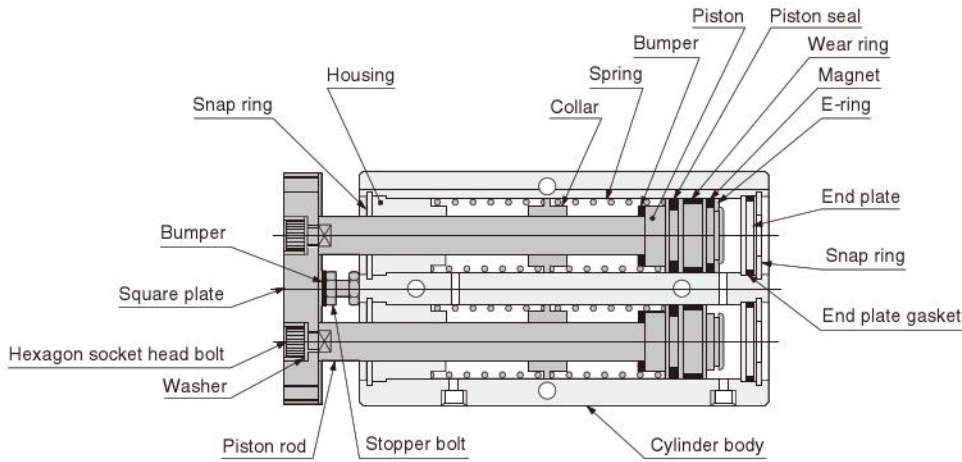
Example 1. When operating a Twin Rod cylinder with bore size of 20mm [0.787in.], stroke of 50mm [1.97in.], and under air pressure of 0.5Mpa [73psi.], for 1 reciprocation.

$$7.36 \times 50 \times 10^{-3} = 0.368 \text{ ℓ /Reciprocation [0.0130ft.³/Reciprocation]} \text{ (ANR)}$$

Example 2. When operating a Twin Rod cylinder with a bore size of 20mm [0.787in.], a stroke of 50mm [1.97in.], and under air pressure of 0.5MPa [73psi.], for 10 reciprocations per minute.

$$7.36 \times 50 \times 10 \times 10^{-3} = 3.68 \text{ ℓ /min [0.130ft.³/min.]} \text{ (ANR)}$$

Inner Construction and Major Parts



TWIN ROD CYLINDERS B SERIES

Major Parts and Materials

| Parts | Materials |
|------------------------|--|
| Cylinder body | Aluminum alloy (anodized) |
| Piston | Aluminum alloy (chromic acid anodic oxide coating) |
| Wear ring | Plastic |
| Piston rod | Steel (chrome plated) |
| Gasket | Synthetic rubber (NBR) |
| Housing | Aluminum alloy (special wear-resistant treatment) |
| End plate | Plastic |
| Seal | Synthetic rubber (NBR) |
| Snap ring | Steel (nickel plated) |
| Magnet | Plastic magnet |
| Spring | Piano wire |
| Collar | Plastic |
| E-ring | Stainless steel |
| Washer | Steel (nickel plated) |
| Square plate | Mild steel (nickel plated) |
| Bumper ^{Note} | Synthetic rubber (NBR) |
| Stopper bolt | Mild steel (zinc plated) |

Note: For the 10mm [0.394in.] bore size, piston side bumper is not available.

Seals

| Item | Piston seal | End plate gasket |
|----------|-------------|------------------|
| Quantity | 2 | 2 |
| Bore mm | | |
| 10 | COP-10L | 1.5×9 |
| 16 | PWP-16 | 1.5×14.5 |
| 20 | PWP-20 | 1.5×18 |
| 25 | PWP-25 | 1.5×23 |

Mass

| Bore size mm [in.] | Basic mass ^{Note1} | | | | | | Additional mass | |
|-----------------------|-----------------------------|-------------|-------------|-------------|-------------|-------------|--|-----------|
| | Stroke mm | | | | | | Mass of 1 sensor switch ^{Note2} | |
| | 10 | 20 | 30 | 40 | 50 | 60 | ZE□□□A | ZE□□□B |
| 10 [0.394] | 117 [4.13] | 137 [4.83] | 157 [5.54] | 197 [6.95] | 217 [7.65] | 237 [8.36] | 15 [0.53] | 35 [1.23] |
| 16 [0.630] | 230 [8.11] | 257 [9.07] | 288 [10.16] | 344 [12.13] | 369 [13.02] | 394 [13.90] | | |
| 20 [0.787] | 372 [13.12] | 407 [14.36] | 442 [15.59] | 521 [18.38] | 556 [19.61] | 591 [20.85] | | |
| 25 [0.984] | 557 [19.65] | 603 [21.27] | 649 [22.89] | 760 [26.81] | 814 [28.71] | 868 [30.62] | | |

Notes: 1. The above table is for the standard strokes.

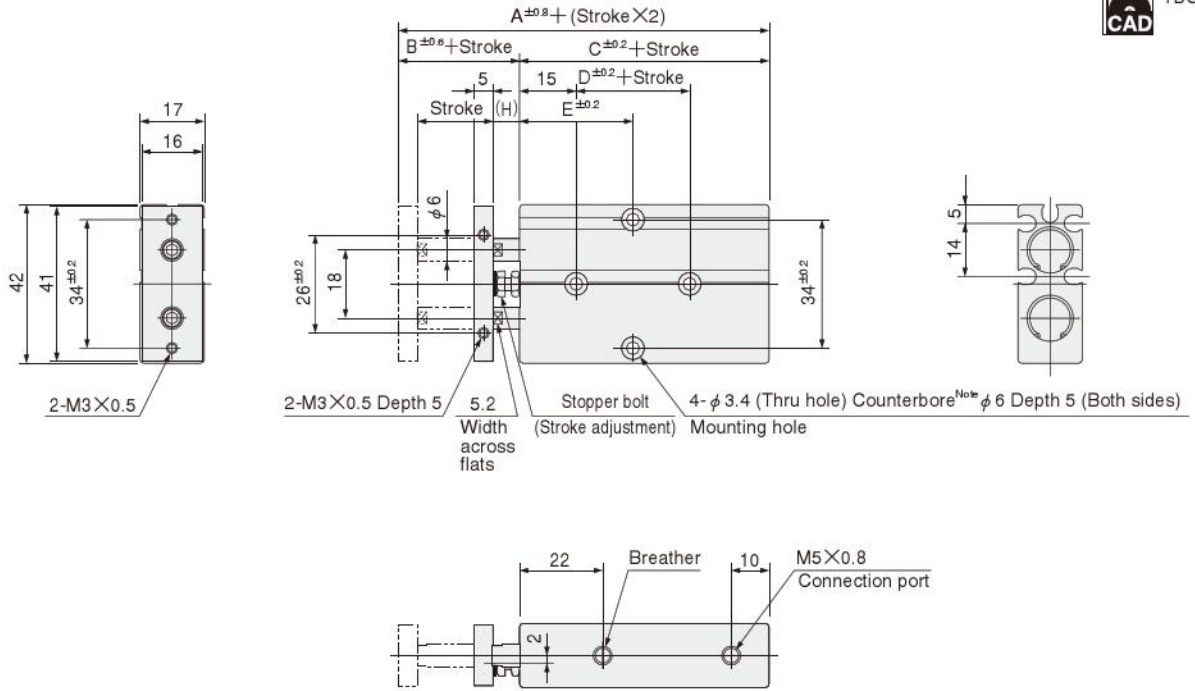
2. There are 2 types of sensor switch lead wire lengths.

A : 1000mm [39in.], B : 3000mm [118in.]

Calculation example: The mass for bore size of 20mm, and stroke of 60mm, with 2 sensor switches (ZE135A),
 $591 + (15 \times 2) = 621\text{g}$ [21.90oz.]

Dimensions of Single Acting Push Type (mm)

● $\phi 10$



| Stroke mm [in.] | Code | | A | | B | | C | | D | | E | | | | H | |
|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|----|----|----|----|----|----|-------|-------|
| | 10~30 | 40~60 | 10~30 | 40~60 | 10~30 | 40~60 | 10~30 | 40~60 | 10 | 20 | 30 | 40 | 50 | 60 | 10~30 | 40~60 |
| 10 [0.394] | 58 | 66 | 12 | 10 | 46 | 56 | 10 | 20 | 30 | 30 | 35 | 45 | 50 | 55 | 7 | 5 |

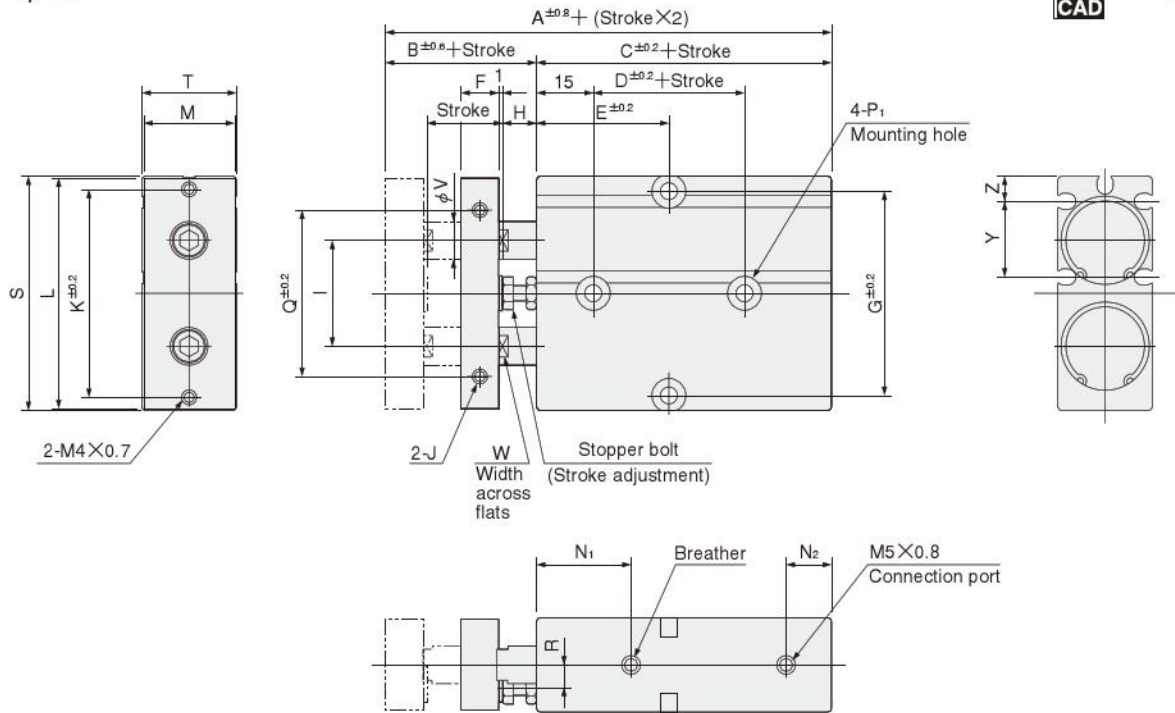
Note: The counterbore depth is measured from the upper surface of the body.

Dimensions of Rod End (mm)



Dimensions of Single Acting Push Type (mm)

● $\phi 16 \sim \phi 25$



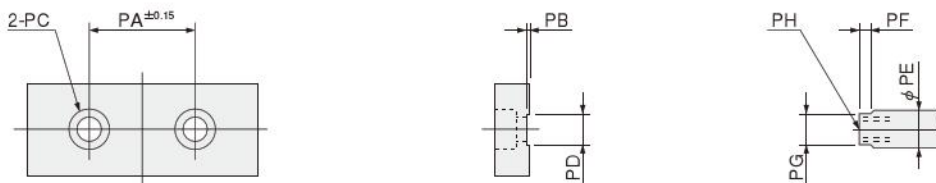
TWIN ROD CYLINDERS B SERIES

| Stroke Bore mm [in.] | Code | | B | C | | D | | E | | | | F | G | H | I | J | | |
|----------------------------|-------|-------|----|-------|-------|-------|-------|----|----|----|----|----|----|----|----|---|----|----------------|
| | 10~30 | 40~60 | | 10~30 | 40~60 | 10~30 | 40~60 | 10 | 20 | 30 | 40 | | | | | | 50 | 60 |
| 16 [0.630] | 68 | 78 | 15 | 53 | 63 | 20 | 30 | 30 | 35 | 40 | 50 | 55 | 60 | 8 | 47 | 6 | 24 | M4×0.7 Depth 5 |
| 20 [0.787] | 78 | 88 | 20 | 58 | 68 | 20 | 30 | 35 | 35 | 40 | 50 | 55 | 60 | 10 | 55 | 9 | 28 | M4×0.7 Depth 5 |
| 25 [0.984] | 81 | 91 | 19 | 62 | 72 | 30 | 40 | 40 | 40 | 45 | 55 | 60 | 65 | 10 | 66 | 8 | 34 | M5×0.8 Depth 6 |

| Bore mm [in.] | Code | K | L | M | N ₁ | N ₂ | P ₁ ^{Note} | | | | Q | R | S | T | V | W | Y | Z |
|-------------------|------|----|----|----|----------------|----------------|--------------------------------|-----------------|-----------|--------------|----|---|----|----|----|------|------|-----|
| | | | | | | | φ 4.5 (Thru hole) | Counterbore φ 8 | Depth 5.5 | (Both sides) | | | | | | | | |
| 16 [0.630] | | 47 | 53 | 20 | 22 | 10 | φ 4.5 (Thru hole) | Counterbore φ 8 | Depth 5.5 | (Both sides) | 34 | 4 | 54 | 21 | 8 | 6.2 | 18.5 | 5.7 |
| 20 [0.787] | | 55 | 61 | 24 | 25 | 12 | φ 4.5 (Thru hole) | Counterbore φ 8 | Depth 5.5 | (Both sides) | 44 | 6 | 62 | 25 | 10 | 8.2 | 20 | 6.8 |
| 25 [0.984] | | 66 | 72 | 29 | 30 | 12 | φ 4.5 (Thru hole) | Counterbore φ 9 | Depth 6 | (Both sides) | 56 | 7 | 73 | 30 | 12 | 10.2 | 22.5 | 8.3 |

Note: The counterbore depth is measured from the upper surface of the body.

Dimensions of Rod End (mm)

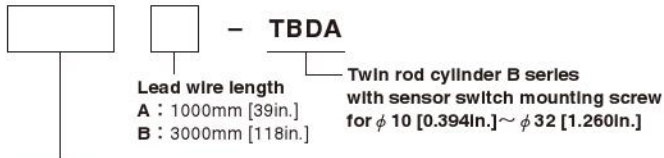


| Bore mm [in.] | Code | PA | PB | PC | PD | PE | PF | PG | PH |
|-------------------|------|----|----------------------------------|-------------------------------------|----|----|--|----------------|----|
| | | | | | | | | | |
| 20 [0.787] | 28 | 1 | φ 6.5 Counterbore φ 11 Depth 6.8 | 8.2 ^{+0.1} / ₀ | 10 | 3 | 8.2 ^{-0.05} / _{-0.15} | M6 × 1 Depth 8 | |
| 25 [0.984] | 34 | 1 | φ 6.5 Counterbore φ 11 Depth 6.8 | 10.2 ^{+0.1} / ₀ | 12 | 3 | 10.2 ^{-0.05} / _{-0.15} | M6 × 1 Depth 8 | |

SENSOR SWITCHES

Solid State Type, Reed Switch Type

Order Codes



Sensor switch

| | | | | | |
|---|----------------------|----------------------|--|-----------------------|----------------------|
| ZE135 — 2-lead wire, Solid state type with indicator lamp | DC10~28V | Horizontal lead wire | ZE155 — 3-lead wire, Solid state type with indicator lamp | DC4.5~28V | Horizontal lead wire |
| ZE235 — 2-lead wire, Solid state type with indicator lamp | DC10~28V | Vertical lead wire | ZE255 — 3-lead wire, Solid state type with indicator lamp | DC4.5~28V | Vertical lead wire |
| ZE101 — 2-lead wire, Reed switch type without indicator lamp | DC5~28V AC85~115V | Horizontal lead wire | ZE102 — 2-lead wire, Reed switch type with indicator lamp | DC10~28V AC85~115V | Horizontal lead wire |
| ZE201 — 2-lead wire, Reed switch type without indicator lamp | DC5~28V AC85~115V | Vertical lead wire | ZE202 — 2-lead wire, Reed switch type with indicator lamp | DC10~28V AC85~115V | Vertical lead wire |

● For details of the sensor switches, see p.1544.

Sensor Switch Operating Range, Response Differential, and Maximum Sensing Location

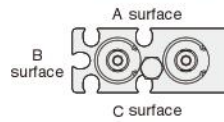
● Operating range: ℓ

The distance the piston travels in one direction, while the switch is in the ON position.

● Response differential: C

The distance between the point where the piston turns the switch ON and the point where the switch is turned OFF as the piston travels in the opposite direction.

● Sensor switch mounting surface



● Solid state type

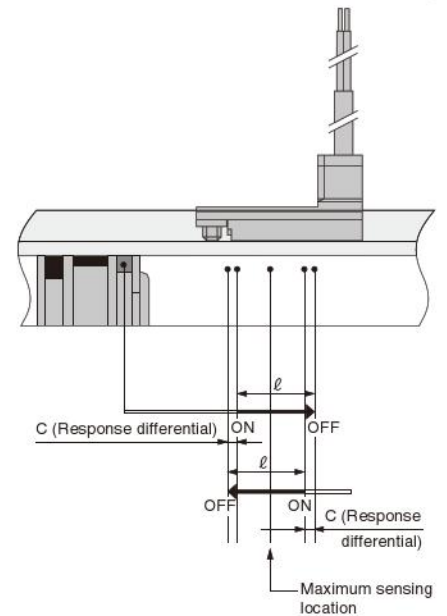
| Item | Mounting surface | Bore size mm [in.] | | | | |
|---|------------------|---------------------|---------------------|-----------------------|-----------------------|--------------------|
| | | 10 [0.394] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] |
| Operating range : ℓ | A and C surface | 2.5~6 [0.098~0.236] | | | 2.5~6.5 [0.098~0.256] | 5~12 [0.197~0.472] |
| | B surface | 2.5~4 [0.098~0.157] | 2~4.5 [0.079~0.177] | 2.5~5.5 [0.098~0.217] | 4~9 [0.157~0.354] | |
| Response differential : C | — | 1.0 [0.039] or less | 1.2 [0.047] or less | 1.5 [0.059] or less | 2.0 [0.079] or less | |
| Maximum sensing location ^{req} | — | 6 [0.236] | | | | |

Note: The above table shows reference values.

● Reed switch type

| Item | Bore size mm [in.] | Bore size mm [in.] | | | |
|---|--------------------|---------------------|-------------------|---------------------|-----------------------|
| | | 10 [0.394] | 16 [0.630] | 20 [0.787] | 25 [0.984] |
| Operating range : ℓ | | 6~8.5 [0.236~0.335] | 6~8 [0.236~0.315] | 7~9.5 [0.276~0.374] | 12~16.5 [0.472~0.650] |
| Response differential : C | | 1.5 [0.059] or less | | | 2.5 [0.098] or less |
| Maximum sensing location ^{req} | | 10 [0.394] | | | |

Note: The above table shows reference values.

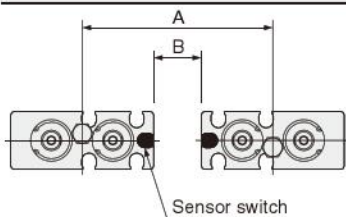


When Mounting Cylinders with Sensor Switches in Close Proximity

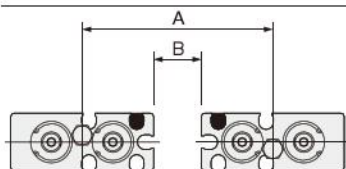
When mounting cylinders in close proximity, install the cylinder so that it should not be at or below the values in the following table.

mm [in.]

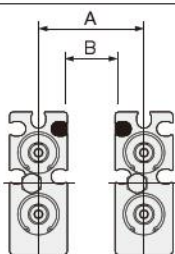
| Status of mounting in close proximity | Code | Bore size Type | 10 [0.394] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] |
|---------------------------------------|------------------|-------------------|------------|------------------|------------|------------|------------|
| | | | A | Solid state type | 53 [2.09] | 66 [2.60] | 73 [2.87] |
| | | Reed switch type | 48 [1.89] | 60 [2.36] | 68 [2.68] | 81 [3.19] | 109 [4.29] |
| B | Solid state type | 11 [0.43] | 12 [0.47] | 11 [0.43] | 14 [0.55] | 23 [0.91] | |
| | | Reed switch type | 6 [0.24] | | 8 [0.31] | | 13 [0.51] |



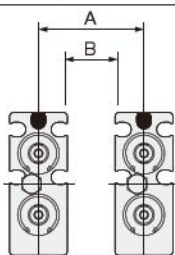
| | | | | | | |
|----------|------------------|-----------|-----------|-----------|-----------|------------|
| A | Solid state type | 47 [1.85] | 59 [2.32] | 65 [2.56] | 77 [3.03] | 107 [4.21] |
| | Reed switch type | 42 [1.65] | 54 [2.13] | 62 [2.44] | 73 [2.87] | 96 [3.78] |
| B | Solid state type | 5 [0.20] | | 3 [0.12] | 4 [0.16] | 11 [0.43] |
| | Reed switch type | 0 | | | | |



| | | | | | | |
|----------|------------------|-----------|-----------|-----------|-----------|-----------|
| A | Solid state type | 28 [1.10] | 33 [1.30] | 36 [1.42] | 44 [1.73] | 65 [2.56] |
| | Reed switch type | 22 [0.87] | 27 [1.06] | 30 [1.18] | 37 [1.46] | 53 [2.09] |
| B | Solid state type | 11 [0.43] | 12 [0.47] | 11 [0.43] | 14 [0.55] | 25 [0.98] |
| | Reed switch type | 5 [0.20] | 6 [0.24] | 5 [0.20] | 7 [0.28] | 13 [0.51] |



| | | | | | | |
|----------|------------------|-----------|-----------|-----------|-----------|-----------|
| A | Solid state type | 21 [0.83] | 24 [0.94] | 25 [0.98] | 30 [1.18] | 44 [1.73] |
| | Reed switch type | 17 [0.67] | 21 [0.83] | 25 [0.98] | 30 [1.18] | 40 [1.57] |
| B | Solid state type | 4 [0.16] | 3 [0.12] | 0 | | 4 [0.16] |
| | Reed switch type | 0 | | | | |



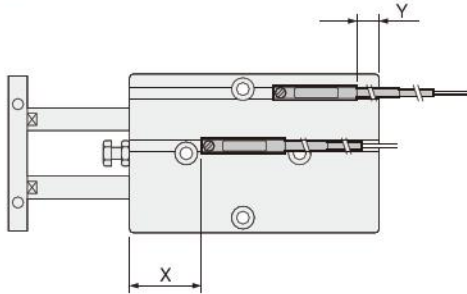
Remark: For mounting in configurations other than the above, consult us.

Mounting Location of End of Stroke Detection Sensor Switch

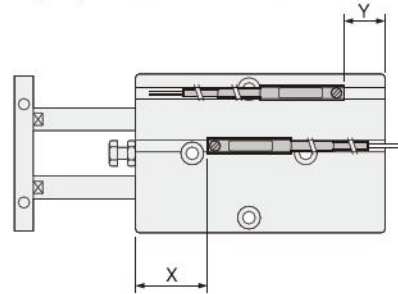
When the sensor switch is mounted in the locations shown below (the figures in the tables are reference values), the magnet comes to the maximum sensing location of the sensor switch at the end of the stroke.

● Double acting type

■ When the lead wires are pulled from the head side.



■ When the lead wire of the head side detection sensor switch only is pulled from the rod side.



Standard cylinder

● Solid state type mm [in.]

| Code \ Bore | 10 [0.394] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] |
|-------------|--------------|--------------|--------------|--------------|------------|
| X | 27.5 [1.083] | 33.5 [1.319] | 37.5 [1.476] | 42.5 [1.673] | 52 [2.047] |
| Y | 3.5 [0.138] | 4.5 [0.177] | 5.5 [0.217] | 4.5 [0.177] | 11 [0.433] |

● Reed switch type mm [in.]

| Code \ Bore | 10 [0.394] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] |
|-------------|--------------|--------------|--------------|--------------|------------|
| X | 23.5 [0.925] | 29.5 [1.161] | 33.5 [1.319] | 38.5 [1.516] | 48 [1.890] |
| Y | 0.5 [0.020] | 1.5 [0.059] | 2.5 [0.098] | 1.5 [0.059] | 8 [0.315] |

● Solid state type mm [in.]

| Code \ Bore | 10 [0.394] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] |
|-------------|--------------|--------------|--------------|--------------|------------|
| X | 27.5 [1.083] | 33.5 [1.319] | 37.5 [1.476] | 42.5 [1.673] | 52 [2.047] |
| Y | 6.5 [0.256] | 7.5 [0.295] | 8.5 [0.335] | 7.5 [0.295] | 14 [0.551] |

● Reed switch type mm [in.]

| Code \ Bore | 10 [0.394] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] |
|-------------|--------------|--------------|--------------|--------------|------------|
| X | 23.5 [0.925] | 29.5 [1.161] | 33.5 [1.319] | 38.5 [1.516] | 48 [1.890] |
| Y | 2.5 [0.098] | 3.5 [0.138] | 4.5 [0.177] | 3.5 [0.138] | 10 [0.394] |

Double acting long bushing type

● Solid state type mm [in.]

| Code \ Bore | 10 [0.394] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] |
|-------------|--------------|--------------|--------------|--------------|------------|
| X | 37.5 [1.476] | 43.5 [1.713] | 47.5 [1.870] | 52.5 [2.067] | 62 [2.441] |
| Y | 3.5 [0.138] | 4.5 [0.177] | 5.5 [0.217] | 4.5 [0.177] | 11 [0.433] |

● Reed switch type mm [in.]

| Code \ Bore | 10 [0.394] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] |
|-------------|--------------|--------------|--------------|--------------|------------|
| X | 33.5 [1.319] | 39.5 [1.555] | 43.5 [1.713] | 48.5 [1.909] | 58 [2.283] |
| Y | 0.5 [0.020] | 1.5 [0.059] | 2.5 [0.098] | 1.5 [0.059] | 8 [0.315] |

● Solid state type mm [in.]

| Code \ Bore | 10 [0.394] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] |
|-------------|--------------|--------------|--------------|--------------|------------|
| X | 37.5 [1.476] | 43.5 [1.713] | 47.5 [1.870] | 52.5 [2.067] | 62 [2.441] |
| Y | 6.5 [0.256] | 7.5 [0.295] | 8.5 [0.335] | 7.5 [0.295] | 14 [0.551] |

● Reed switch type mm [in.]

| Code \ Bore | 10 [0.394] | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] |
|-------------|--------------|--------------|--------------|--------------|------------|
| X | 33.5 [1.319] | 39.5 [1.555] | 43.5 [1.713] | 48.5 [1.909] | 58 [2.283] |
| Y | 2.5 [0.098] | 3.5 [0.138] | 4.5 [0.177] | 3.5 [0.138] | 10 [0.394] |

End keep cylinder

● Solid state type mm [in.]

| End keep position | Code \ Bore | | | | |
|--------------------------|-------------|--------------|--------------|--------------|--|
| | 16 [0.630] | 20 [0.787] | 25 [0.984] | | |
| -HL : Head side end keep | X | 33.5 [1.319] | 37.5 [1.476] | 42.5 [1.673] | |
| | Y | 24.5 [0.965] | 25.5 [1.004] | 24.5 [0.965] | |
| -RL : Rod side end keep | X | 53.5 [2.106] | 57.5 [2.264] | 62.5 [2.461] | |
| | Y | 4.5 [0.177] | 5.5 [0.217] | 4.5 [0.177] | |

● Reed switch type mm [in.]

| End keep position | Code \ Bore | | | | |
|--------------------------|-------------|--------------|--------------|--------------|--|
| | 16 [0.630] | 20 [0.787] | 25 [0.984] | | |
| -HL : Head side end keep | X | 29.5 [1.161] | 33.5 [1.319] | 38.5 [1.516] | |
| | Y | 21.5 [0.846] | 22.5 [0.886] | 21.5 [0.846] | |
| -RL : Rod side end keep | X | 49.5 [1.949] | 53.5 [2.106] | 58.5 [2.303] | |
| | Y | 1.5 [0.059] | 2.5 [0.098] | 1.5 [0.059] | |

● Solid state type mm [in.]

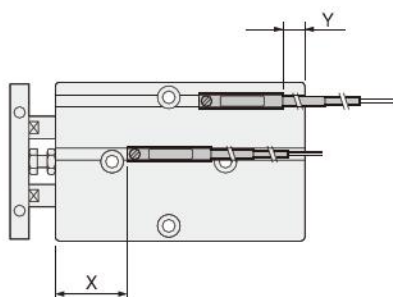
| End keep position | Code \ Bore | | | |
|--------------------------|-------------|--------------|--------------|--------------|
| | 16 [0.630] | 20 [0.787] | 25 [0.984] | |
| -HL : Head side end keep | X | 33.5 [1.319] | 37.5 [1.476] | 42.5 [1.673] |
| | Y | 27.5 [1.083] | 28.5 [1.122] | 27.5 [1.083] |
| -RL : Rod side end keep | X | 53.5 [2.106] | 57.5 [2.264] | 62.5 [2.461] |
| | Y | 7.5 [0.295] | 8.5 [0.335] | 7.5 [0.295] |

● Reed switch type mm [in.]

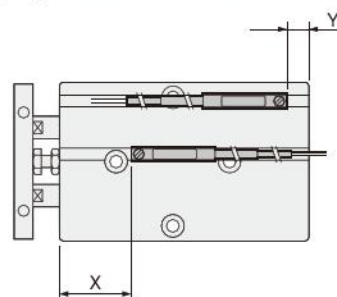
| End keep position | Code \ Bore | | | |
|--------------------------|-------------|--------------|--------------|--------------|
| | 16 [0.630] | 20 [0.787] | 25 [0.984] | |
| -HL : Head side end keep | X | 29.5 [1.161] | 33.5 [1.319] | 38.5 [1.516] |
| | Y | 23.5 [0.925] | 24.5 [0.965] | 23.5 [0.925] |
| -RL : Rod side end keep | X | 49.5 [1.949] | 53.5 [2.106] | 58.5 [2.303] |
| | Y | 3.5 [0.138] | 4.5 [0.177] | 3.5 [0.138] |

● **Single acting push type**

■ When the lead wires are pulled from the head side.



■ When the lead wire of the head side detection sensor switch only is pulled from the rod side.



● **Solid state type**

mm [in.]

| Stroke | Code | Bore | | | |
|------------|------|--------------|--------------|--------------|--------------|
| | | 10 [0.394] | 16 [0.630] | 20 [0.787] | 25 [0.984] |
| 10, 20, 30 | X | 27.5 [1.083] | 33.5 [1.319] | 37.5 [1.476] | 42.5 [1.673] |
| | Y | 3.5 [0.138] | 4.5 [0.177] | 5.5 [0.217] | 4.5 [0.177] |
| 40, 50, 60 | X | 39.5 [1.555] | 43.5 [1.713] | 47.5 [1.870] | 52.5 [2.067] |
| | Y | 1.5 [0.059] | 4.5 [0.177] | 5.5 [0.217] | 4.5 [0.177] |

● **Solid state type**

mm [in.]

| Stroke | Code | Bore | | | |
|------------|------|--------------|--------------|--------------|--------------|
| | | 10 [0.394] | 16 [0.630] | 20 [0.787] | 25 [0.984] |
| 10, 20, 30 | X | 27.5 [1.083] | 33.5 [1.319] | 37.5 [1.476] | 42.5 [1.673] |
| | Y | 6.5 [0.256] | 7.5 [0.295] | 8.5 [0.335] | 7.5 [0.295] |
| 40, 50, 60 | X | 39.5 [1.555] | 43.5 [1.713] | 47.5 [1.870] | 52.5 [2.067] |
| | Y | 4.5 [0.177] | 7.5 [0.295] | 8.5 [0.335] | 7.5 [0.295] |

● **Reed switch type**

mm [in.]

| Stroke | Code | Bore | | | |
|------------|------|---------------|--------------|--------------|--------------|
| | | 10 [0.394] | 16 [0.630] | 20 [0.787] | 25 [0.984] |
| 10, 20, 30 | X | 23.5 [0.925] | 29.5 [1.161] | 33.5 [1.319] | 38.5 [1.516] |
| | Y | 0.5 [0.020] | 1.5 [0.059] | 2.5 [0.098] | 1.5 [0.059] |
| 40, 50, 60 | X | 35.5 [1.398] | 39.5 [1.555] | 43.5 [1.713] | 48.5 [1.909] |
| | Y | -1.5 [-0.059] | 1.5 [0.059] | 2.5 [0.098] | 1.5 [0.059] |

● **Reed switch type**

mm [in.]

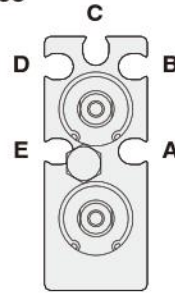
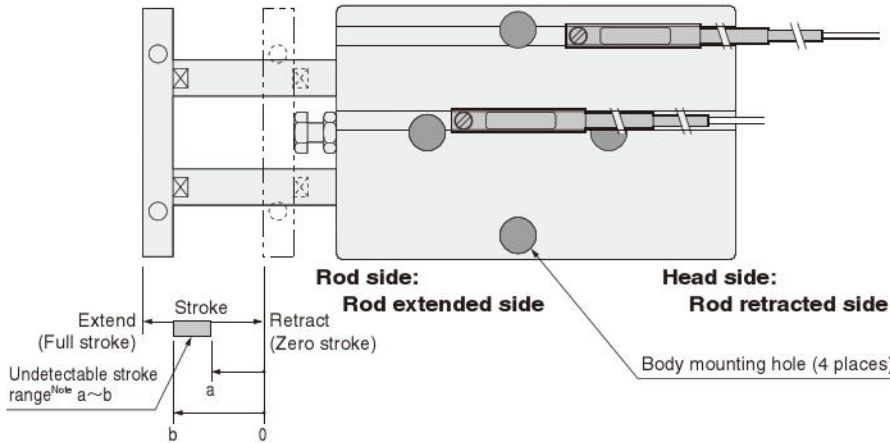
| Stroke | Code | Bore | | | |
|------------|------|--------------|--------------|--------------|--------------|
| | | 10 [0.394] | 16 [0.630] | 20 [0.787] | 25 [0.984] |
| 10, 20, 30 | X | 23.5 [0.925] | 29.5 [1.161] | 33.5 [1.319] | 38.5 [1.516] |
| | Y | 2.5 [0.098] | 3.5 [0.138] | 4.5 [0.177] | 3.5 [0.138] |
| 40, 50, 60 | X | 35.5 [1.398] | 39.5 [1.555] | 43.5 [1.713] | 48.5 [1.909] |
| | Y | 0.5 [0.020] | 3.5 [0.138] | 4.5 [0.177] | 3.5 [0.138] |

Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Double acting type (TBDA), single acting push type (TBSA)

■ In the case of using 4 mounting holes on the body

● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Caution

When mounting a sensor switch in the A or E groove's rod extended side (the rod side of the body), ensure that the sensor switch is installed inside the groove between body mounting holes before tightening body mounting bolts, to avoid interference between the sensor switch and the bolts.

This procedure is not necessary for $\phi 25$ [0.984in.] and $\phi 32$ [1.260in.], however, where no interference occurs.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

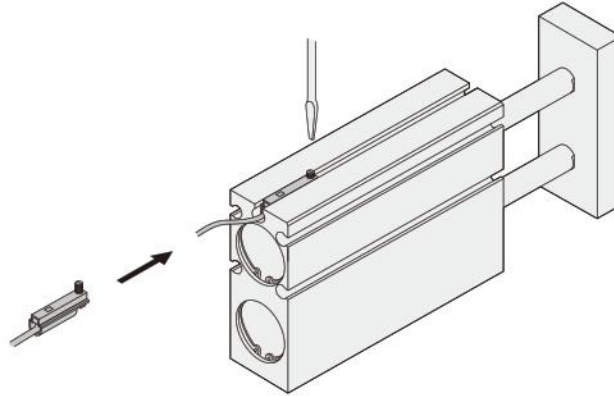
○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

| Bore size | | $\phi 10$ | | | $\phi 16$ | | | $\phi 20$ | | | $\phi 25$ | | | $\phi 32$ | | |
|-----------|-----------------|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|
| Stroke | Mounting groove | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C |
| | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | |
| 10 | Head side | ○ | ○ | ○ | × | △ | △ | ○ | ○ | △ | ○ | △ | △ | × | △ | △ |
| | Rod side | × | × | × | × | △ | △ | × | × | × | ○ | △ | △ | × | △ | △ |
| 20 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | △ | ○ | △ | △ | × | ○ | △ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | △ | △ | ○ | × | △ |
| 30 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × |
| 40 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × |
| 50 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | × | ○ | ○ | ○ | ○ | × | ○ |
| 60 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 70 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 170 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 180 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 190 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 200 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

(mm)

| Bore size | Mounting groove | φ 10 | | | φ 16 | | | φ 20 | | | φ 25 | | | φ 32 | | |
|-----------|-----------------|------|---|---|------|---|---|------|---|---|------|---|---|------|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C |
| 10 | Head side | × | ○ | ○ | × | × | △ | × | ○ | ○ | △ | ○ | △ | × | △ | △ |
| | Rod side | × | × | × | × | × | △ | × | × | × | △ | × | △ | × | △ | △ |
| 20 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | △ | ○ | ○ | △ | × | ○ | △ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | △ | ○ | × | △ |
| 30 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × |
| 40 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × |
| 50 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | × | × | × | ○ | × | × | ○ | × | × |
| 60 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 70 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 170 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 180 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 190 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 200 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

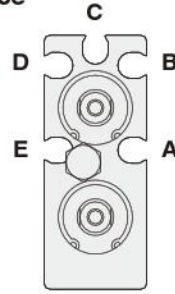
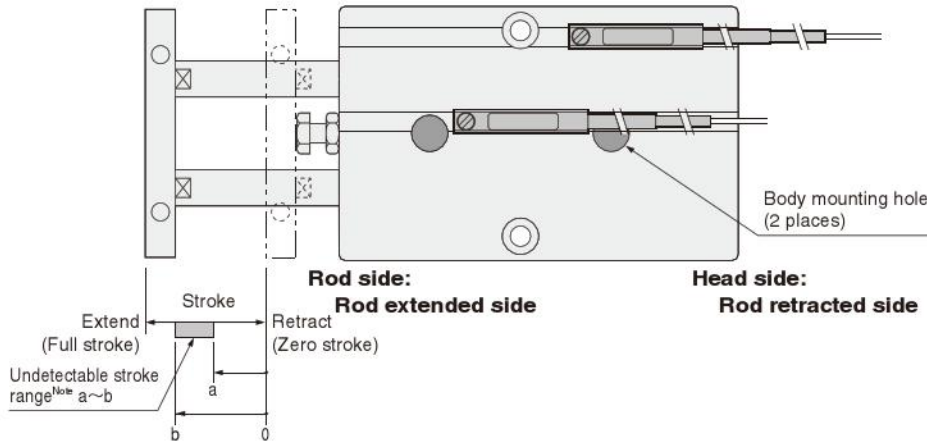
Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Double acting type (TBDA), single acting push type (TBSA)

■ In the case of using 2 center mounting holes on the body

● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Caution

When mounting a sensor switch in the A or E groove's rod extended side (the rod side of the body), ensure that the sensor switch is installed inside the groove between body mounting holes before tightening body mounting bolts, to avoid interference between the sensor switch and the bolts.

This procedure is not necessary for $\phi 25$ [0.984in.] and $\phi 32$ [1.260in.], however, where no interference occurs.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

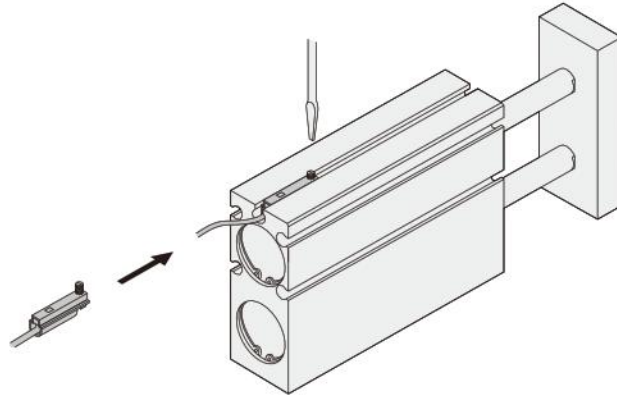
(mm)

| Bore size | Mounting groove | $\phi 10$ | | | $\phi 16$ | | | $\phi 20$ | | | $\phi 25$ | | | $\phi 32$ | | |
|-----------|-----------------|-----------|---|---|-----------|---|---|-----------|---|---|-----------|---|---|-----------|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C |
| 10 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| 20 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 30 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 40 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 50 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 60 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 70 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 170 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 180 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 190 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 200 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

(mm)

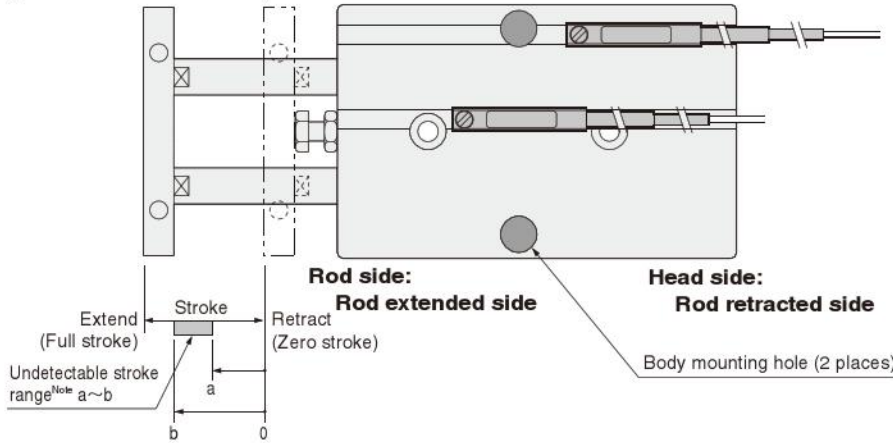
| Bore size | Mounting groove | φ 10 | | | φ 16 | | | φ 20 | | | φ 25 | | | φ 32 | | | |
|-----------|-----------------|------|---|---|--|---|---|------|--|---|------|---|---|------|---|---|--|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | |
| 10 | Head side | × | △ | △ | Groove A (E) : 0~10 Groove B (D), C : — | × | △ | △ | Groove A (E) : 0~10 Groove B (D), C : — | × | △ | △ | Groove A (E) : — Groove B (D), C : — | × | △ | △ | Groove A (E) : 0~10 Groove B (D), C : — |
| | Rod side | × | △ | △ | | × | △ | △ | | × | △ | △ | | × | △ | △ | |
| 20 | Head side | × | ○ | ○ | Groove A (E) : 0~18 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | |
| 30 | Head side | × | ○ | ○ | Groove A (E) : 0~18 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | |
| 40 | Head side | × | ○ | ○ | Groove A (E) : 0~18 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | |
| 50 | Head side | × | ○ | ○ | Groove A (E) : 0~18 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | |
| 60 | Head side | × | ○ | ○ | Groove A (E) : 0~18 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | |
| 70 | Head side | × | ○ | ○ | Groove A (E) : 0~18 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | |
| 80 | Head side | × | ○ | ○ | Groove A (E) : 0~18 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | |
| 90 | Head side | × | ○ | ○ | Groove A (E) : 0~18 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | |
| 100 | Head side | × | ○ | ○ | Groove A (E) : 0~18 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | |
| 110 | Head side | × | ○ | ○ | Groove A (E) : 0~18 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | |
| 120 | Head side | × | ○ | ○ | Groove A (E) : 0~18 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | |
| 130 | Head side | × | ○ | ○ | Groove A (E) : 0~18 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | |
| 140 | Head side | × | ○ | ○ | Groove A (E) : 0~18 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | | |
| 150 | Head side | | | | | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | | | | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | | | |
| 160 | Head side | | | | | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | | | | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | | | |
| 170 | Head side | | | | | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | | | | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | | | |
| 180 | Head side | | | | | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | | | | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | | | |
| 190 | Head side | | | | | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | | | | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | | | |
| 200 | Head side | | | | | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | × | ○ | ○ | Groove A (E) : — Groove B (D), C : — | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — |
| | Rod side | | | | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | | | |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

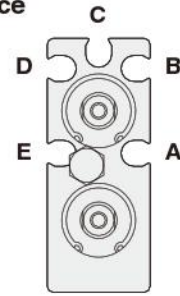
Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Double acting type (TBDA), single acting push type (TBSA)

In the case of using 2 mounting holes on the body (one on each side)



● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

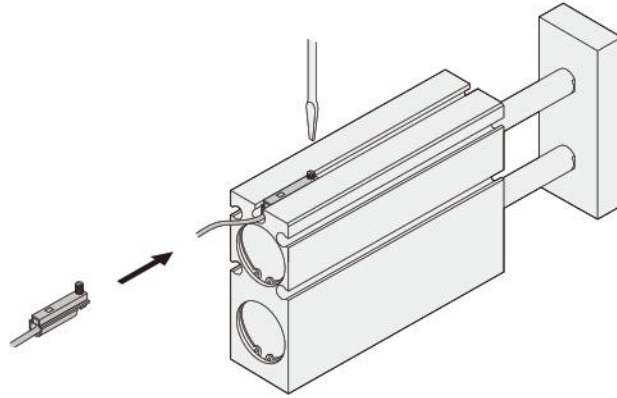
(mm)

| Bore size | Mounting groove | φ 10 | | | φ 16 | | | φ 20 | | | φ 25 | | | φ 32 | | | |
|-----------|-----------------|------|---|---|------|---|---|------|---|---|------|---|---|------|---|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | |
| 10 | Head side | ○ | ○ | ○ | ○ | △ | △ | △ | ○ | △ | △ | ○ | △ | △ | ○ | △ | △ |
| | Rod side | ○ | × | × | ○ | △ | △ | △ | ○ | × | × | ○ | △ | △ | ○ | △ | △ |
| 20 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ | △ | ○ | △ | △ | ○ | △ | △ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ |
| 30 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ |
| 40 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ |
| 50 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | × | ○ | ○ | ○ | ○ | × | ○ |
| 60 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 70 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 170 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 180 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 190 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 200 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

(mm)

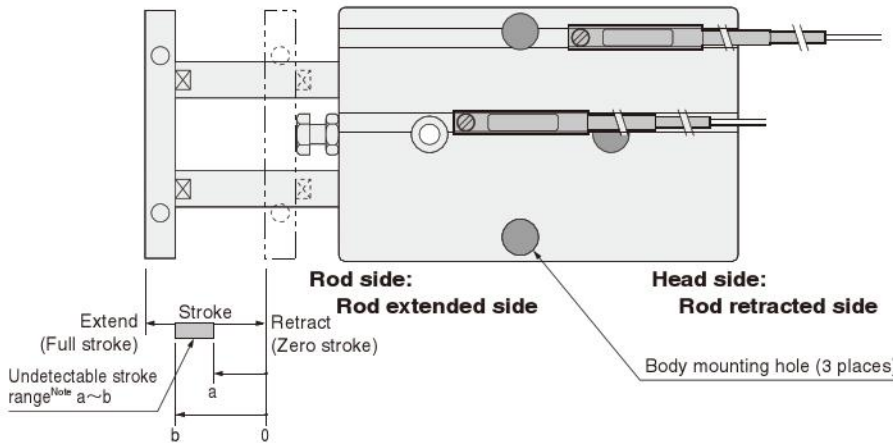
| Bore size | Mounting groove | φ 10 | | | φ 16 | | | φ 20 | | | φ 25 | | | φ 32 | | | |
|-----------|-----------------|------|---|---|------|---|---|------|---|---|------|---|---|------|---|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | |
| 10 | Head side | △ | ○ | ○ | △ | × | △ | △ | ○ | ○ | △ | ○ | △ | △ | △ | △ | △ |
| | Rod side | △ | × | × | △ | × | △ | △ | × | × | △ | × | △ | △ | △ | △ | △ |
| 20 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ | ○ | △ | ○ | ○ | △ | ○ | △ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | ○ | × | × | ○ | × |
| 30 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | ○ | × | × | ○ | × |
| 40 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | ○ | × | × | ○ | × |
| 50 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | × | ○ | × | ○ | × | × | ○ | × |
| 60 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 70 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 170 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 180 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 190 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 200 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

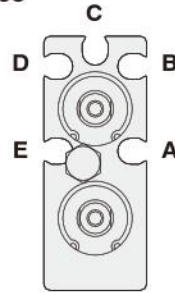
Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Double acting type (TBDA), single acting push type (TBSA)

■ In the case of using 3 head side mounting holes on the body



● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

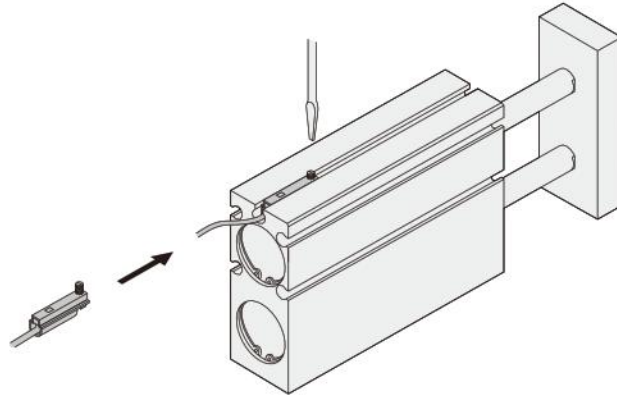
(mm)

| Bore size | Mounting groove | φ 10 | | | φ 16 | | | φ 20 | | | φ 25 | | | φ 32 | | |
|-----------|-----------------|------|---|---|------|---|---|------|---|---|------|---|---|------|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C |
| 10 | Head side | ○ | ○ | ○ | × | △ | △ | ○ | ○ | △ | ○ | △ | △ | × | △ | △ |
| | Rod side | × | × | × | × | △ | △ | × | × | × | ○ | △ | △ | × | △ | △ |
| 20 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | △ | ○ | △ | △ | × | ○ | △ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | △ | △ | ○ | × | × |
| 30 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × |
| 40 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × |
| 50 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | × | ○ | ○ | ○ | ○ | × | ○ |
| 60 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 70 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 170 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 180 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 190 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 200 | Head side | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

(mm)

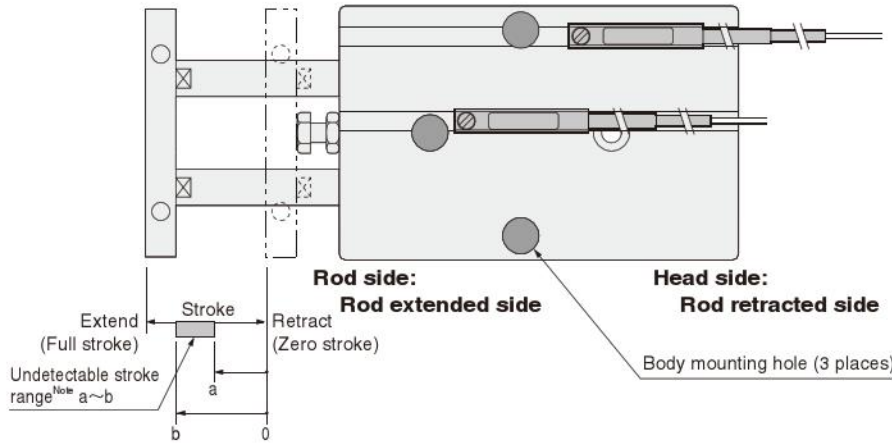
| Bore size Stroke | Mounting groove | φ 10 | | | φ 16 | | | φ 20 | | | φ 25 | | | φ 32 | | |
|---------------------|-----------------|------|---|---|------|---|---|------|---|---|------|---|---|------|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C |
| 10 | Head side | × | ○ | ○ | × | × | △ | × | ○ | ○ | △ | ○ | △ | × | △ | △ |
| | Rod side | × | × | × | × | × | △ | × | × | × | △ | × | △ | × | △ | △ |
| 20 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | △ | ○ | ○ | △ | × | ○ | △ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | △ | ○ | × | △ |
| 30 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | △ | ○ | × | △ |
| 40 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | △ | ○ | × | △ |
| 50 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | × | ○ | × | △ | ○ | × | △ |
| 60 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ |
| 70 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ |
| 80 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ |
| 90 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ |
| 100 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ |
| 110 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ |
| 120 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ |
| 130 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ |
| 140 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ |
| 150 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ |
| 160 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ |
| 170 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ |
| 180 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ |
| 190 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ |
| 200 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | △ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

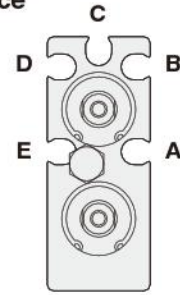
Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Double acting type (TBDA), single acting push type (TBSA)

In the case of using 3 rod side mounting holes on the body



● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

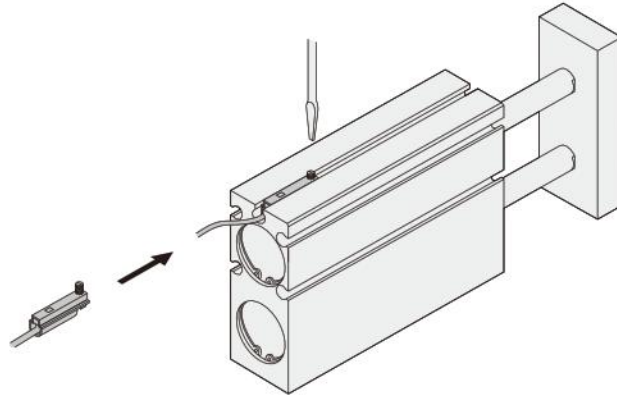
○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke (mm)

| Bore size | Mounting groove | φ 10 | | | φ 16 | | | φ 20 | | | φ 25 | | | φ 32 | | | |
|-----------|-----------------|------|---|---|------|---|---|------|---|---|------|---|---|------|---|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | |
| 10 | Head side | ○ | ○ | ○ | ○ | △ | △ | △ | ○ | △ | △ | ○ | △ | △ | ○ | △ | △ |
| | Rod side | ○ | × | × | ○ | △ | △ | △ | ○ | × | × | ○ | △ | △ | ○ | △ | △ |
| 20 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ | △ | ○ | △ | △ | ○ | △ | △ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | ○ | △ | △ | ○ | × | × |
| 30 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ |
| 40 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ |
| 50 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | × | ○ | ○ | ○ | ○ | × | ○ |
| 60 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 70 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 170 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 180 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 190 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 200 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

(mm)

| Bore size | Mounting groove | φ 10 | | | φ 16 | | | φ 20 | | | φ 25 | | | φ 32 | | | |
|-----------|-----------------|------|---|---|------|---|---|------|---|---|------|---|---|------|---|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | |
| 10 | Head side | △ | ○ | ○ | △ | × | △ | △ | ○ | ○ | △ | △ | △ | △ | △ | △ | △ |
| | Rod side | △ | × | × | △ | × | △ | △ | × | × | △ | × | △ | △ | △ | △ | △ |
| 20 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ | △ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ |
| 30 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ |
| 40 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ |
| 50 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | × | ○ | × | × | ○ | × | × | ○ |
| 60 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 70 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 170 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 180 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 190 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 200 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

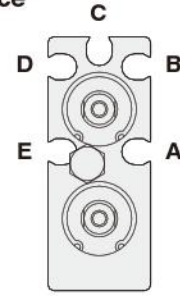
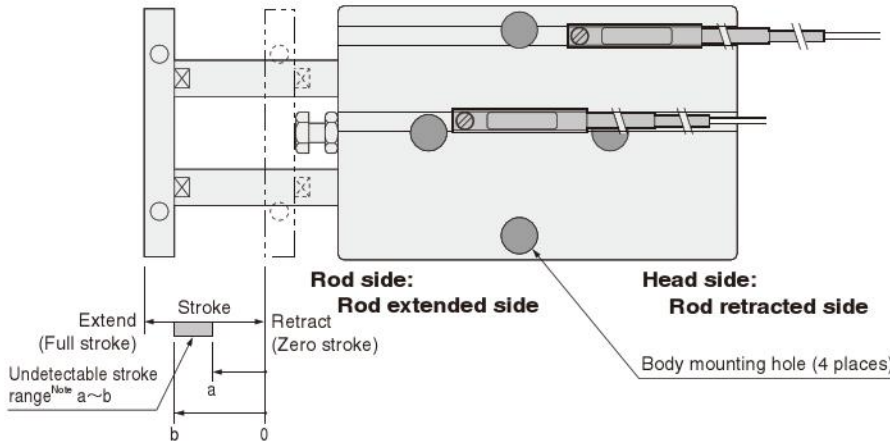
Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Double acting long bushing type (TBDAM)

■ In the case of using 4 mounting holes on the body

● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Caution

When mounting a sensor switch in the A or E groove's rod extended side (the rod side of the body), ensure that the sensor switch is installed inside the groove between body mounting holes before tightening body mounting bolts, to avoid interference between the sensor switch and the bolts.

This procedure is not necessary for $\phi 25$ [0.984in.] and $\phi 32$ [1.260in.], however, where no interference occurs.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

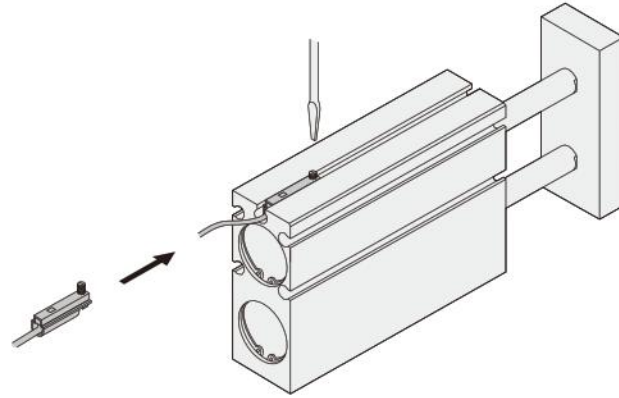
○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke (mm)

| Stroke | Mounting groove | $\phi 10$ | | | $\phi 16$ | | | $\phi 20$ | | | $\phi 25$ | | | $\phi 32$ | | |
|--------|-----------------|-----------|---|---|-----------|---|---|-----------|---|---|-----------|---|---|-----------|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C |
| 10 | Head side | × | △ | ○ | × | △ | △ | ○ | ○ | △ | ○ | △ | △ | × | △ | △ |
| | Rod side | × | △ | ○ | × | △ | △ | × | × | × | ○ | △ | △ | × | △ | △ |
| 20 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | △ | ○ | △ | △ | × | ○ | △ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | △ | △ | ○ | × | × |
| 30 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | △ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | ○ | ○ | ○ | × | × |
| 40 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × |
| 50 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | × | ○ | × | × | ○ | × | × |
| 60 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | × | ○ | ○ | ○ | ○ | ○ | ○ |
| 70 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 170 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 180 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 190 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 200 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

(mm)

| Bore size | Stroke | φ 10 | | | φ 16 | | | φ 20 | | | φ 25 | | | φ 32 | | | |
|-----------|-----------|------|---|---|--|---|---|------|---|---|------|---|---|------|---|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | |
| 10 | Head side | × | △ | △ | Undetectable stroke range of sensor switch | × | × | △ | × | × | ○ | △ | △ | × | △ | △ | △ |
| | Rod side | × | × | △ | | × | × | △ | × | × | × | × | △ | △ | × | △ | △ |
| 20 | Head side | × | ○ | ○ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | △ | △ |
| | Rod side | ○ | × | ○ | | ○ | × | × | ○ | × | × | × | ○ | △ | ○ | × | ○ |
| 30 | Head side | × | ○ | ○ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | ○ | × | ○ | | ○ | × | × | ○ | × | × | × | ○ | △ | ○ | × | × |
| 40 | Head side | × | ○ | ○ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | ○ | × | ○ | | ○ | × | × | ○ | × | × | × | ○ | △ | ○ | × | × |
| 50 | Head side | × | ○ | ○ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | × | × | × | × | ○ | △ | ○ | × | × |
| 60 | Head side | × | ○ | ○ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | × | × | × | × | ○ | △ | ○ | ○ | ○ |
| 70 | Head side | × | ○ | ○ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | × | × | × | × | ○ | △ | ○ | ○ | ○ |
| 80 | Head side | × | ○ | ○ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | × | × | × | × | ○ | △ | ○ | ○ | ○ |
| 90 | Head side | × | ○ | ○ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | × | × | × | × | ○ | △ | ○ | ○ | ○ |
| 100 | Head side | × | ○ | ○ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | × | × | × | × | ○ | △ | ○ | ○ | ○ |
| 110 | Head side | × | ○ | ○ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | × | × | × | × | ○ | △ | ○ | ○ | ○ |
| 120 | Head side | × | ○ | ○ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | × | × | × | × | ○ | △ | ○ | ○ | ○ |
| 130 | Head side | × | ○ | ○ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | × | × | × | × | ○ | △ | ○ | ○ | ○ |
| 140 | Head side | × | ○ | ○ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | × | × | × | × | ○ | △ | ○ | ○ | ○ |
| 150 | Head side | △ | △ | △ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | △ | △ | △ | | ○ | ○ | ○ | × | × | × | × | ○ | △ | ○ | ○ | ○ |
| 160 | Head side | △ | △ | △ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | △ | △ | △ | | ○ | ○ | ○ | × | × | × | × | ○ | △ | ○ | ○ | ○ |
| 170 | Head side | △ | △ | △ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | △ | △ | △ | | ○ | ○ | ○ | × | × | × | × | ○ | △ | ○ | ○ | ○ |
| 180 | Head side | △ | △ | △ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | △ | △ | △ | | ○ | ○ | ○ | × | × | × | × | ○ | △ | ○ | ○ | ○ |
| 190 | Head side | △ | △ | △ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | △ | △ | △ | | ○ | ○ | ○ | × | × | × | × | ○ | △ | ○ | ○ | ○ |
| 200 | Head side | △ | △ | △ | Undetectable stroke range of sensor switch | × | ○ | ○ | × | ○ | △ | ○ | △ | × | ○ | ○ | ○ |
| | Rod side | △ | △ | △ | | ○ | ○ | ○ | × | × | × | × | ○ | △ | ○ | ○ | ○ |

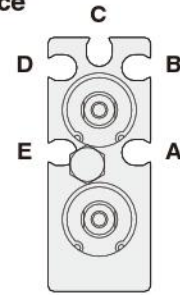
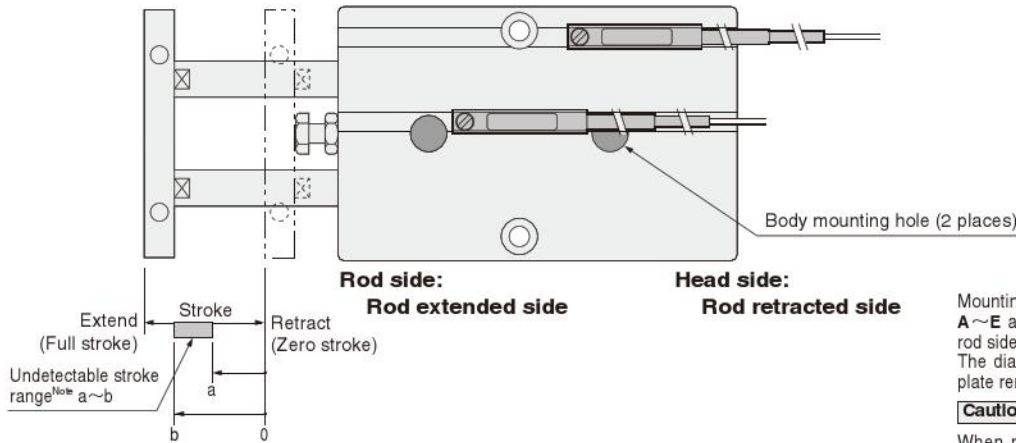
Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Double acting long bushing type (TBDAM)

■ In the case of using 2 center mounting holes on the body

● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Caution

When mounting a sensor switch in the A or E groove's rod extended side (the rod side of the body), ensure that the sensor switch is installed inside the groove between body mounting holes before tightening body mounting bolts, to avoid interference between the sensor switch and the bolts.

This procedure is not necessary for $\phi 25$ [0.984in.] and $\phi 32$ [1.260in.], however, where no interference occurs.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke (mm)

| Bore size | Mounting groove | $\phi 10$ | | | $\phi 16$ | | | $\phi 20$ | | | $\phi 25$ | | | $\phi 32$ | | |
|-----------|-----------------|-----------|---|---|-----------|---|---|-----------|---|---|-----------|---|---|-----------|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C |
| 10 | Head side | × | △ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | × | △ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| 20 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 30 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 40 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 50 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 60 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 70 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | △ | △ | △ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | △ | △ | △ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 170 | Head side | △ | △ | △ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 180 | Head side | △ | △ | △ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 190 | Head side | △ | △ | △ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 200 | Head side | △ | △ | △ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

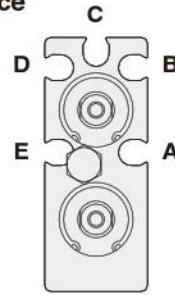
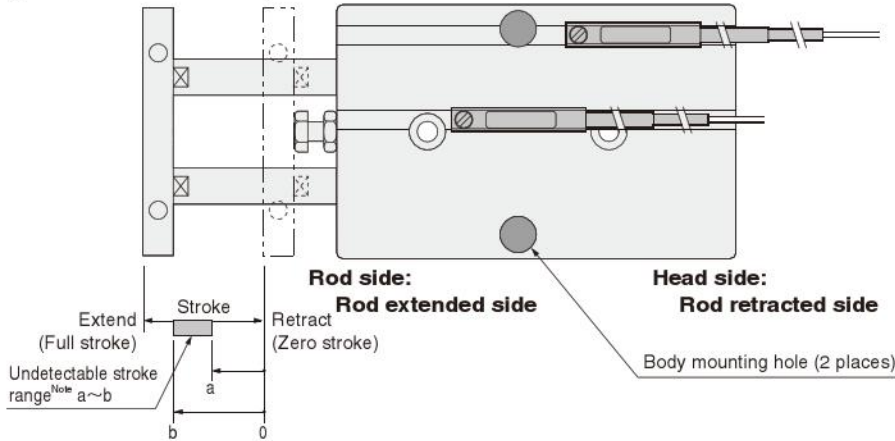
Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Double acting long bushing type (TBDAM)

■ In the case of using 2 mounting holes on the body (one on each side)

● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

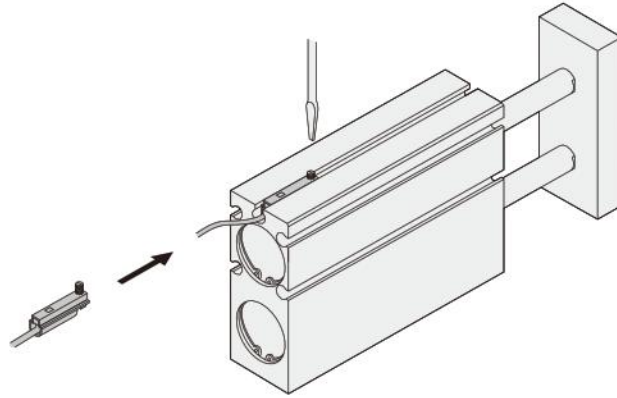
○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke (mm)

| Stroke | Mounting groove | φ 10 | | | φ 16 | | | φ 20 | | | φ 25 | | | φ 32 | | |
|--------|-----------------|------|---|---|------|---|---|------|---|---|------|---|---|------|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C |
| 10 | Head side | ○ | △ | ○ | ○ | △ | △ | △ | △ | △ | ○ | △ | △ | ○ | △ | △ |
| | Rod side | ○ | △ | ○ | ○ | △ | △ | △ | × | △ | ○ | △ | △ | ○ | △ | △ |
| 20 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ | △ | |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × |
| 30 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ | △ | |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × |
| 40 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × |
| 50 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | × | ○ | × | × | ○ | × | × |
| 60 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | × | ○ | ○ | ○ | ○ | ○ | |
| 70 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 80 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 90 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 100 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 110 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 120 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 130 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 140 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 150 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 160 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 170 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 180 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 190 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 200 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

(mm)

| Stroke | Mounting groove | φ 10 | | | φ 16 | | | φ 20 | | | φ 25 | | | φ 32 | | |
|--------|-----------------|------|---|---|------|---|---|------|---|---|------|---|---|------|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C |
| 10 | Head side | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ |
| | Rod side | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ |
| 20 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × |
| 30 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × |
| 40 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × |
| 50 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | × | ○ | × | × | ○ | × | × |
| 60 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | × | ○ | × | × | ○ | ○ | ○ |
| 70 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 170 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 180 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 190 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 200 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

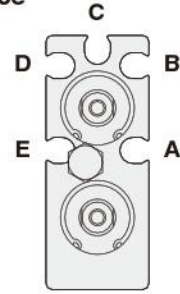
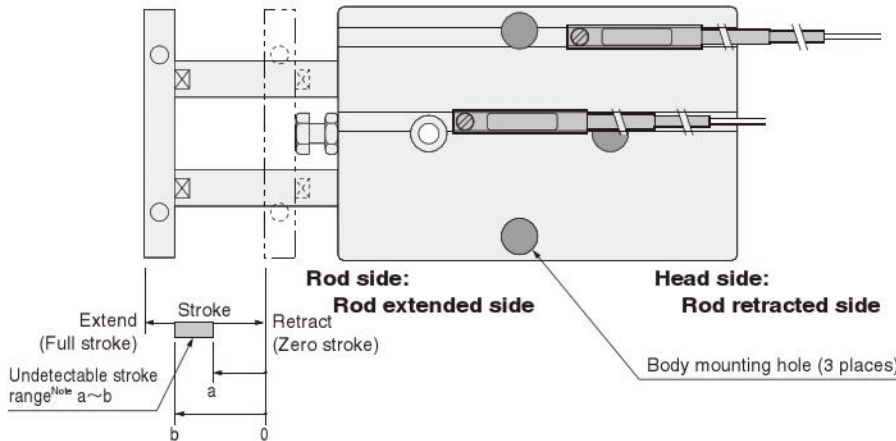
Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Double acting long bushing type (TBDAM)

In the case of using 3 head side mounting holes on the body

● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

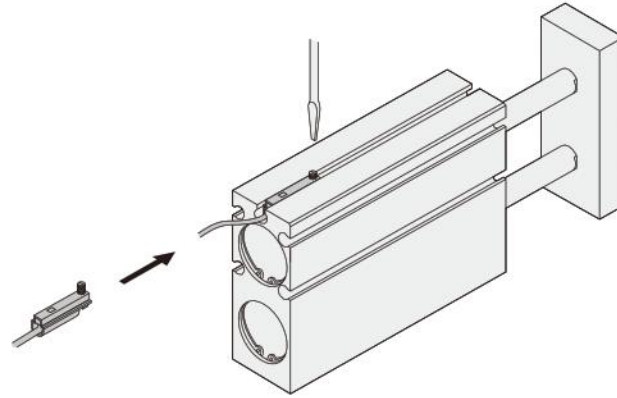
○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke (mm)

| Stroke | Mounting groove | φ 10 | | | φ 16 | | | φ 20 | | | φ 25 | | | φ 32 | | |
|--------|-----------------|------|---|---|------|---|---|------|---|---|------|---|---|------|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C |
| 10 | Head side | × | △ | ○ | × | △ | △ | ○ | ○ | △ | ○ | △ | △ | × | △ | △ |
| | Rod side | × | × | ○ | × | × | △ | × | × | × | ○ | △ | △ | × | △ | △ |
| 20 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | △ | ○ | △ | △ | × | ○ | △ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | △ | △ | × | × | × |
| 30 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | × | × | × |
| 40 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | × | × | × |
| 50 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | × | ○ | ○ | ○ | × | × | × |
| 60 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 70 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 170 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 180 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 190 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 200 | Head side | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke (mm)

| Stroke | Mounting groove | φ 10 | | | φ 16 | | | φ 20 | | | φ 25 | | | φ 32 | | |
|--------|-----------------|------|---|---|------|---|---|------|---|---|------|---|---|------|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C |
| 10 | Head side | × | △ | △ | × | × | △ | × | × | ○ | △ | ○ | △ | × | × | △ |
| | Rod side | × | × | △ | × | × | △ | × | × | × | △ | × | △ | × | × | △ |
| 20 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | △ | ○ | △ | × | × | △ | |
| | Rod side | ○ | × | ○ | ○ | × | ○ | ○ | × | △ | ○ | × | ○ | × | ○ | |
| 30 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | ○ | × | ○ | ○ | × | ○ | ○ | × | ○ | × | ○ | × | ○ | × | |
| 40 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | ○ | × | ○ | ○ | ○ | ○ | ○ | × | ○ | × | ○ | × | ○ | × | |
| 50 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | × | ○ | × | ○ | × | |
| 60 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 70 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 80 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 90 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 100 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 110 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 120 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 130 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 140 | Head side | × | ○ | ○ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 150 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 160 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 170 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 180 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 190 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 200 | Head side | △ | △ | △ | × | ○ | ○ | × | ○ | ○ | ○ | ○ | × | × | ○ | |
| | Rod side | △ | △ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |

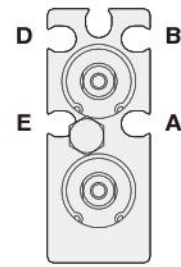
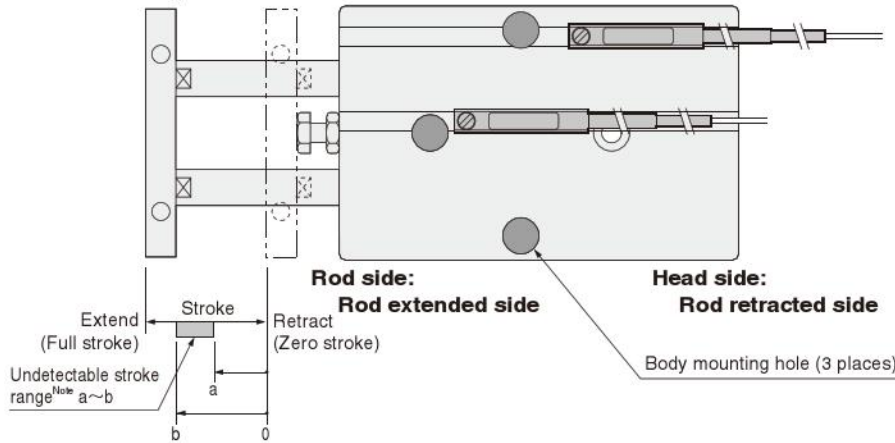
Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Double acting long bushing type (TBDAM)

In the case of using 3 rod side mounting holes on the body

● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

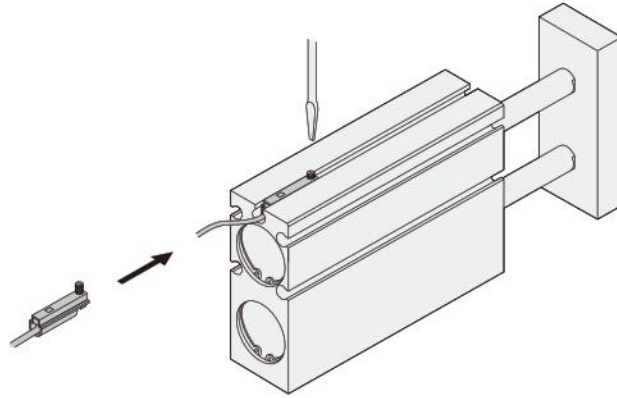
○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke (mm)

| Stroke | Mounting groove | φ 10 | | | φ 16 | | | φ 20 | | | φ 25 | | | φ 32 | | | |
|--------|-----------------|------|---|---|------|---|---|------|---|---|------|---|---|------|---|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | |
| 10 | Head side | ○ | △ | ○ | ○ | △ | △ | △ | △ | △ | ○ | △ | △ | ○ | △ | △ | △ |
| | Rod side | ○ | △ | ○ | ○ | △ | △ | △ | △ | △ | ○ | △ | △ | ○ | △ | △ | △ |
| 20 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ |
| 30 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ |
| 40 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ |
| 50 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | × | ○ | ○ | ○ | ○ | × | × | ○ |
| 60 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 70 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 170 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 180 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 190 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 200 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke (mm)

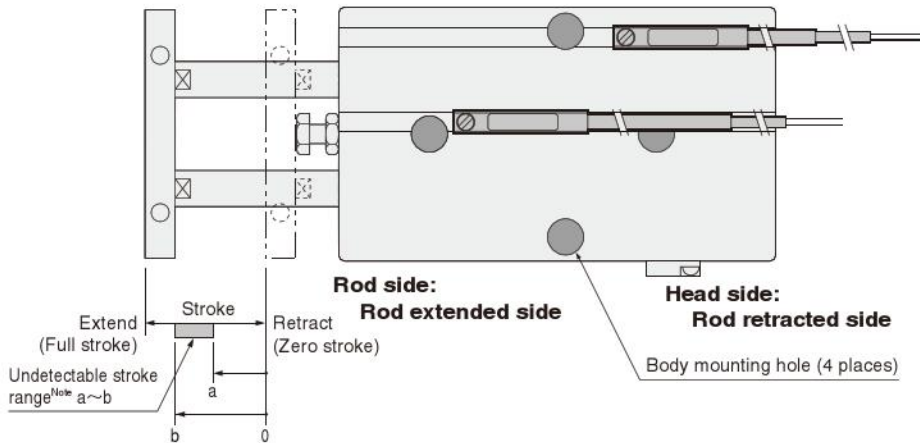
| Bore size | Mounting groove | φ 10 | | | φ 16 | | | φ 20 | | | φ 25 | | | φ 32 | | | |
|-----------|-----------------|------|---|---|------|---|---|------|---|---|------|---|---|------|---|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | |
| 10 | Head side | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ |
| | Rod side | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ | △ |
| 20 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ |
| 30 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ |
| 40 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ | × | × | ○ |
| 50 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | × | × | ○ | × | × | ○ | × | × | ○ |
| 60 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 70 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 170 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 180 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 190 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 200 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

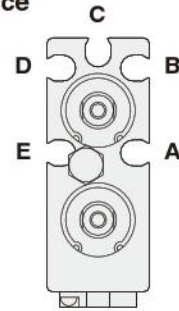
Head side end keep cylinder (TBD-DAK-HL)

■ In the case of using 4 mounting holes on the body



Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Caution

When mounting a sensor switch in the A or E groove's rod extended side (the rod side of the body), ensure that the sensor switch is installed inside the groove between body mounting holes before tightening body mounting bolts, to avoid interference between the sensor switch and the bolts.

This procedure is not necessary for $\phi 25$ [0.984in.], however, where no interference occurs.

● Solid state type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

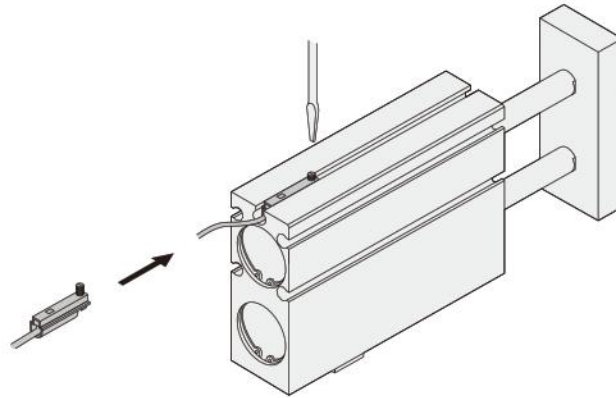
(mm)

| Bore size | Mounting groove | $\phi 16$ | | | $\phi 20$ | | | $\phi 25$ | | |
|-----------|-----------------|-----------|---|---|-----------|---|---|-----------|---|---|
| | | A | B | C | A | B | C | A | B | C |
| 10 | Head side | △ | ○ | ○ | △ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | △ | × | × | △ | × | × | ○ | × | × |
| 20 | Head side | △ | ○ | ○ | △ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | △ | × | × | △ | × | × | ○ | × | × |
| 30 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | × | × | ○ | ○ | ○ |
| 40 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 50 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 60 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 70 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

(mm)

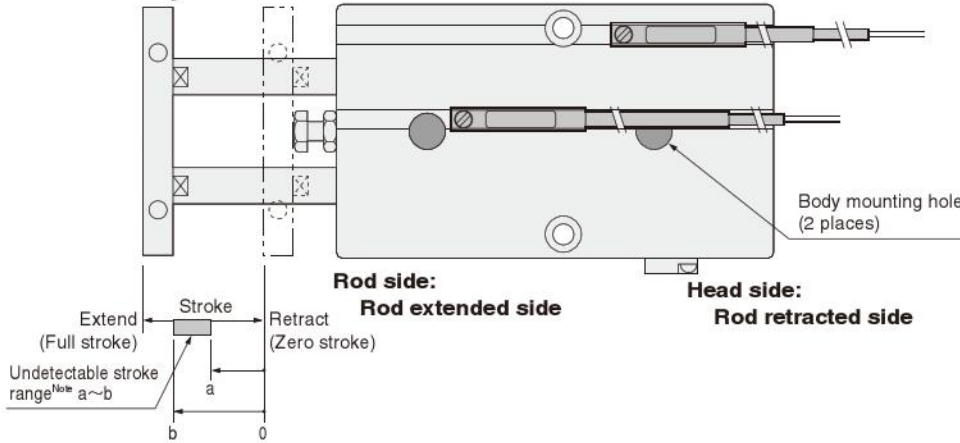
| Bore size | Mounting groove | φ 16 | | | φ 20 | | | φ 25 | | |
|-----------|-----------------|------|---|---|------|---|---|------|---|---|
| | | A | B | C | A | B | C | A | B | C |
| 10 | Head side | △ | × | ○ | △ | ○ | ○ | △ | ○ | ○ |
| | Rod side | △ | × | × | △ | × | × | △ | × | × |
| 20 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × |
| 30 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | × | × | ○ | × | × |
| 40 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 50 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 60 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 70 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

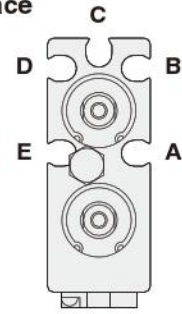
Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Head side end keep cylinder (TBD-DAK-HL)

In the case of using 2 center mounting holes on the body



● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Caution

When mounting a sensor switch in the A or E groove's rod extended side (the rod side of the body), ensure that the sensor switch is installed inside the groove between body mounting holes before tightening body mounting bolts, to avoid interference between the sensor switch and the bolts.

This procedure is not necessary for $\phi 25$ [0.984in.], however, where no interference occurs.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

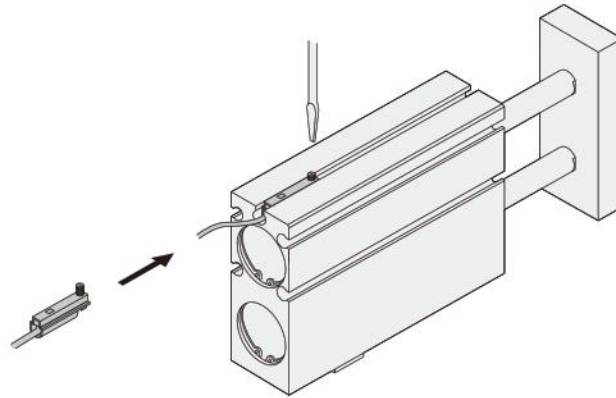
○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke (mm)

| Bore size | Stroke | Mounting groove | | | $\phi 16$ | | | $\phi 20$ | | | $\phi 25$ | | |
|-----------|-----------|-----------------|---|---|--|---|---|--|--|---|--|---|---|
| | | A | B | C | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | |
| | | E | D | C | A | B | C | A | B | C | A | B | C |
| 10 | Head side | △ | ○ | ○ | Groove A (E) : 0~10 Groove B (D), C : — | △ | ○ | ○ | Groove A (E) : 2~10 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | △ | ○ | ○ | | △ | ○ | ○ | | △ | ○ | ○ | |
| 20 | Head side | △ | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | △ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | △ | ○ | ○ | | △ | ○ | ○ | | △ | ○ | ○ | |
| 30 | Head side | ○ | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 40 | Head side | ○ | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 50 | Head side | ○ | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 60 | Head side | ○ | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 70 | Head side | ○ | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 80 | Head side | ○ | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 90 | Head side | ○ | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 100 | Head side | ○ | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 110 | Head side | ○ | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 120 | Head side | ○ | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 130 | Head side | ○ | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 140 | Head side | ○ | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 150 | Head side | ○ | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 160 | Head side | ○ | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke (mm)

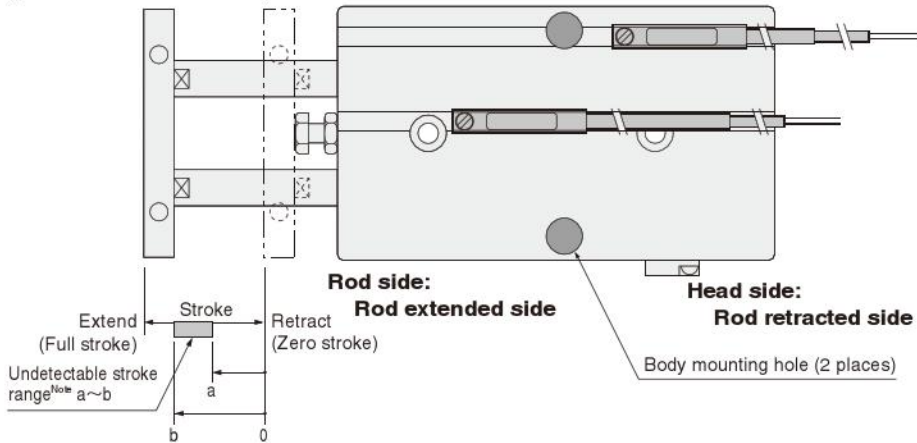
| Bore size | Stroke | Mounting groove | φ 16 | | | | φ 20 | | | | φ 25 | | | |
|-----------|-----------|-----------------|------|---|---|--|------|---|---|--|------|---|---|--|
| | | | A | B | C | Undetectable stroke range of sensor switch | A | B | C | Undetectable stroke range of sensor switch | A | B | C | Undetectable stroke range of sensor switch |
| 10 | Head side | | △ | △ | △ | Groove A (E) : 0~10 Groove B (D), C : — | △ | △ | △ | Groove A (E) : 0~10 Groove B (D), C : — | △ | △ | △ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | | △ | △ | △ | | △ | △ | △ | | △ | △ | △ | |
| 20 | Head side | | ○ | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 0~17 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 30 | Head side | | ○ | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 0~17 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 40 | Head side | | ○ | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 0~17 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 50 | Head side | | ○ | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 0~17 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 60 | Head side | | ○ | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 0~17 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 70 | Head side | | ○ | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 0~17 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 80 | Head side | | ○ | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 0~17 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 90 | Head side | | ○ | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 0~17 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 100 | Head side | | ○ | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 0~17 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 110 | Head side | | ○ | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 0~17 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 120 | Head side | | ○ | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 0~17 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 130 | Head side | | ○ | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 0~17 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 140 | Head side | | ○ | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 0~17 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 150 | Head side | | ○ | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 0~17 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 160 | Head side | | ○ | ○ | ○ | Groove A (E) : 0~14 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 0~17 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

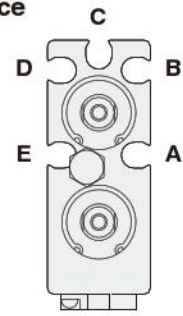
Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Head side end keep cylinder (TBD AK-HL)

In the case of using 2 mounting holes on the body (one on each side)



● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

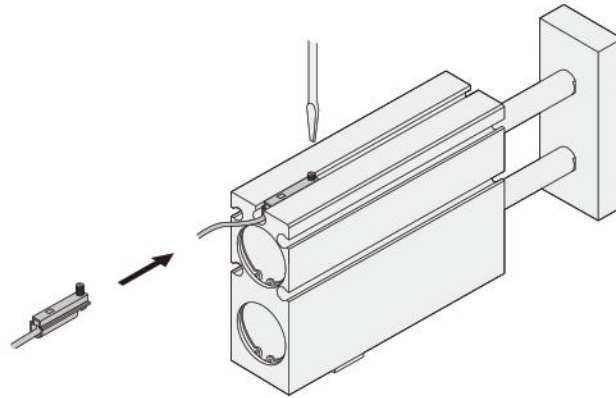
(mm)

| Bore size | Stroke | Mounting groove | | | φ 16 | | | φ 20 | | | φ 25 | | |
|-----------|-----------|-----------------|---|---|--|---|---|--|--|---|--|---|---|
| | | A | B | C | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | |
| | | E | D | C | E | D | C | E | D | C | E | D | C |
| 10 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 2~10 Groove C : 4~10 | △ | ○ | ○ | Groove A (E) : — Groove B (D) : 6~10 Groove C : 8~10 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 7~10 |
| | Rod side | ○ | × | × | | △ | × | × | | ○ | × | × | |
| 20 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 7~20 Groove C : 9~20 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 11~20 Groove C : 13~20 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 12~20 |
| | Rod side | ○ | × | × | | ○ | × | × | | ○ | × | × | |
| 30 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 12~26 Groove C : 14~24 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 16~30 Groove C : 18~30 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 17~29 |
| | Rod side | ○ | ○ | ○ | | ○ | × | × | | ○ | ○ | ○ | |
| 40 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 17~31 Groove C : 19~29 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 21~37 Groove C : 28~35 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 22~34 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 50 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 22~36 Groove C : 24~34 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 26~42 Groove C : 28~40 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 27~39 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 60 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 27~41 Groove C : 29~39 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 31~47 Groove C : 33~45 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 32~44 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 70 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 32~46 Groove C : 34~44 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 36~52 Groove C : 38~50 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 37~49 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 80 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 37~51 Groove C : 39~49 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 41~57 Groove C : 43~55 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 42~54 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 90 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 42~56 Groove C : 44~54 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 46~62 Groove C : 48~60 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 47~59 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 100 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 47~61 Groove C : 49~59 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 51~67 Groove C : 53~65 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 52~64 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 110 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 52~66 Groove C : 54~64 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 56~72 Groove C : 58~70 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 57~69 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 120 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 57~71 Groove C : 59~69 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 61~77 Groove C : 63~75 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 62~74 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 130 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 62~76 Groove C : 64~74 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 66~82 Groove C : 68~80 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 67~79 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 140 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 67~81 Groove C : 69~79 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 71~87 Groove C : 73~85 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 72~84 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 150 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 72~86 Groove C : 74~84 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 76~92 Groove C : 78~90 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 77~89 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 160 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 77~91 Groove C : 79~89 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 81~97 Groove C : 83~95 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 82~94 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

(mm)

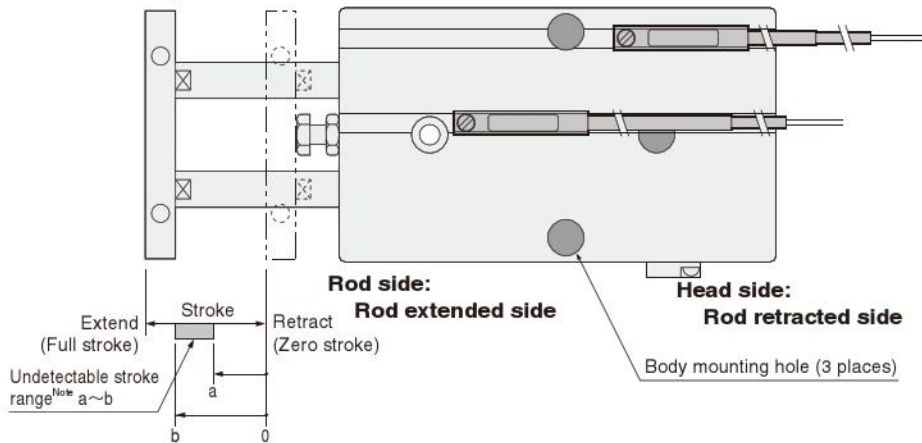
| Bore size | Stroke | Mounting groove | φ 16 | | | φ 20 | | | φ 25 | | | | | |
|-----------|-----------|-----------------|--|---|---|--|---|---|--|--|---|---|---|---|
| | | | A | B | C | A | B | C | A | B | C | | | |
| | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | | | | |
| 10 | Head side | | △ | × | ○ | Groove A (E) : — Groove B (D) : 0~10 Groove C : 2~10 | △ | ○ | ○ | Groove A (E) : — Groove B (D) : 4~10 Groove C : 6~10 | △ | ○ | ○ | Groove A (E) : — Groove B (D), C : 6~10 |
| | Rod side | | △ | × | × | | △ | × | × | | △ | × | × | |
| 20 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 5~20 Groove C : 7~20 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 9~20 Groove C : 11~20 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 11~20 |
| | Rod side | | ○ | × | × | | ○ | × | × | | ○ | × | × | |
| 30 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 10~29 Groove C : 12~27 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 14~30 Groove C : 16~30 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 16~30 |
| | Rod side | | ○ | ○ | ○ | | ○ | × | × | | ○ | × | × | |
| 40 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 15~34 Groove C : 17~32 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 19~39 Groove C : 21~37 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 21~36 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 50 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 20~39 Groove C : 22~37 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 24~44 Groove C : 26~42 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 26~41 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 60 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 25~44 Groove C : 27~42 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 29~49 Groove C : 31~47 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 31~46 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 70 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 30~49 Groove C : 32~47 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 34~54 Groove C : 36~52 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 36~51 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 80 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 35~54 Groove C : 37~52 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 39~59 Groove C : 41~57 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 41~56 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 90 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 40~59 Groove C : 42~57 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 44~64 Groove C : 46~62 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 46~61 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 100 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 45~64 Groove C : 47~62 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 49~69 Groove C : 51~67 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 51~66 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 110 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 50~69 Groove C : 52~67 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 54~74 Groove C : 56~72 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 56~71 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 120 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 55~74 Groove C : 57~72 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 59~79 Groove C : 61~77 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 61~76 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 130 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 60~79 Groove C : 62~77 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 64~84 Groove C : 66~82 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 66~81 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 140 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 65~84 Groove C : 67~82 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 69~89 Groove C : 71~87 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 71~86 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 150 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 70~89 Groove C : 72~87 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 74~94 Groove C : 76~92 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 76~91 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 160 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 75~94 Groove C : 77~92 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 79~99 Groove C : 81~97 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 81~96 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

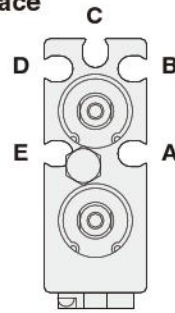
Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Head side end keep cylinder (TBD AK-HL)

■ In the case of using 3 head side mounting holes on the body



● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

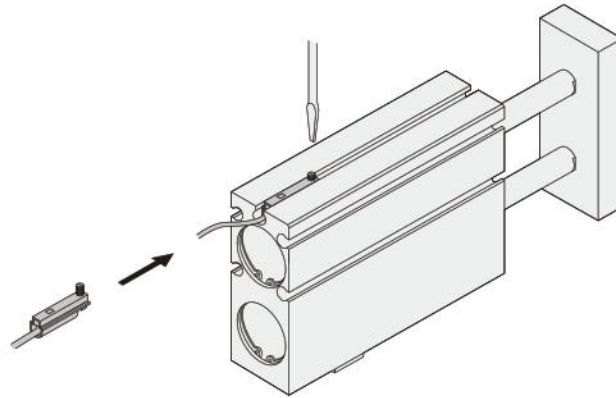
○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke (mm)

| Bore size | Mounting groove | φ 16 | | | φ 20 | | | φ 25 | | |
|-----------|-----------------|------|---|---|------|---|---|------|---|---|
| | | A | B | C | A | B | C | A | B | C |
| 10 | Head side | △ | ○ | ○ | △ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | △ | × | × | △ | × | × | ○ | × | × |
| 20 | Head side | △ | ○ | ○ | △ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | △ | × | × | △ | × | × | ○ | × | × |
| 30 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | × | × | ○ | ○ | ○ |
| 40 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 50 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 60 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 70 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 80 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

(mm)

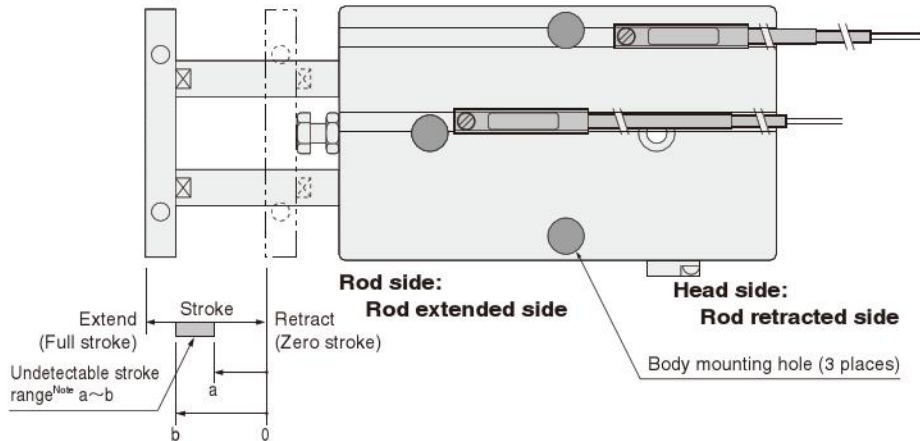
| Bore size | Mounting groove | φ 16 | | | φ 20 | | | φ 25 | | | | |
|-----------|-----------------|------|---|---|--|---|---|------|--|---|---|---|
| | | A | B | C | A | B | C | A | B | C | | |
| 10 | Head side | △ | × | ○ | Undetectable stroke range of sensor switch | △ | ○ | ○ | Undetectable stroke range of sensor switch | △ | ○ | ○ |
| | Rod side | △ | × | × | | △ | × | × | | △ | × | × |
| 20 | Head side | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ |
| | Rod side | ○ | × | × | | ○ | × | × | | ○ | × | × |
| 30 | Head side | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | × | × | | ○ | × | × |
| 40 | Head side | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ |
| 50 | Head side | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ |
| 60 | Head side | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ |
| 70 | Head side | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ |
| 80 | Head side | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ |
| 90 | Head side | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ |
| 100 | Head side | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ |
| 110 | Head side | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ |
| 120 | Head side | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ |
| 130 | Head side | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ |
| 140 | Head side | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ |
| 150 | Head side | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ |
| 160 | Head side | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ | Undetectable stroke range of sensor switch | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

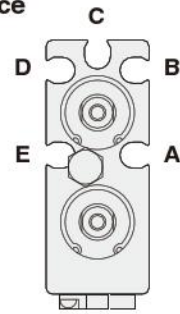
Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Head side end keep cylinder (TBD AK-HL)

In the case of using 3 rod side mounting holes on the body



● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves **A~E** allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

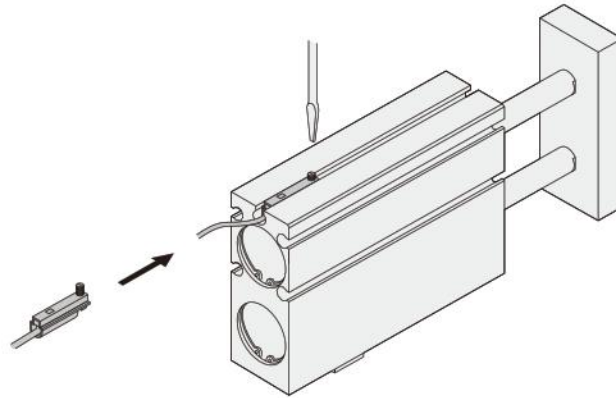
○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke (mm)

| Bore size | Stroke | Mounting groove | | | φ 16 | | | φ 20 | | | φ 25 | | |
|-----------|-----------|-----------------|---|---|--|---|---|--|--|---|--|---|---|
| | | A | B | C | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | |
| | | E | D | C | E | D | C | E | D | C | E | D | C |
| 10 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 2~10 Groove C : 4~10 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 6~10 Groove C : 8~10 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 7~10 |
| | Rod side | ○ | × | × | | ○ | × | × | | ○ | × | × | |
| 20 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 7~20 Groove C : 9~20 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 11~20 Groove C : 13~20 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 12~20 |
| | Rod side | ○ | × | × | | ○ | × | × | | ○ | × | × | |
| 30 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 12~26 Groove C : 14~24 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 16~30 Groove C : 18~30 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 17~29 |
| | Rod side | ○ | ○ | ○ | | ○ | × | × | | ○ | ○ | ○ | |
| 40 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 17~31 Groove C : 19~29 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 21~37 Groove C : 23~35 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 22~34 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 50 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 22~36 Groove C : 24~34 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 26~42 Groove C : 28~40 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 27~39 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 60 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 27~41 Groove C : 29~39 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 31~47 Groove C : 33~45 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 32~44 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 70 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 32~46 Groove C : 34~44 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 36~52 Groove C : 38~50 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 37~49 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 80 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 37~51 Groove C : 39~49 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 41~57 Groove C : 43~55 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 42~54 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 90 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 42~56 Groove C : 44~54 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 46~62 Groove C : 48~60 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 47~59 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 100 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 47~61 Groove C : 49~59 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 51~67 Groove C : 53~65 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 52~64 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 110 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 52~66 Groove C : 54~64 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 56~72 Groove C : 58~70 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 57~69 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 120 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 57~71 Groove C : 59~69 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 61~77 Groove C : 63~75 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 62~74 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 130 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 62~76 Groove C : 64~74 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 66~82 Groove C : 68~80 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 67~79 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 140 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 67~81 Groove C : 69~79 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 71~87 Groove C : 73~85 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 72~84 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 150 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 72~86 Groove C : 74~84 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 76~92 Groove C : 78~90 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 77~89 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 160 | Head side | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 77~91 Groove C : 79~89 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 81~97 Groove C : 83~95 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 82~94 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

(mm)

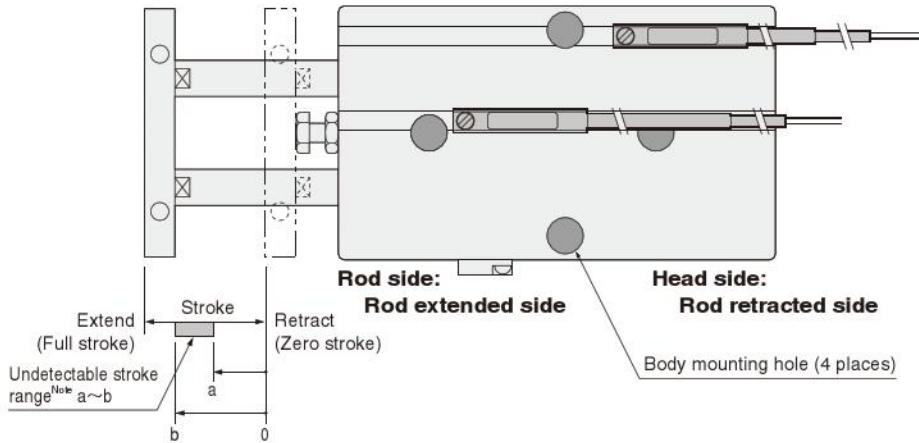
| Bore size | Stroke | Mounting groove | φ 16 | | | φ 20 | | | φ 25 | | | | | |
|-----------|-----------|-----------------|--|---|---|--|---|---|--|--|---|---|---|---|
| | | | A | B | C | A | B | C | A | B | C | | | |
| | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | | | | |
| 10 | Head side | | △ | × | ○ | Groove A (E) : — Groove B (D) : 0~10 Groove C : 2~10 | △ | ○ | ○ | Groove A (E) : — Groove B (D) : 4~10 Groove C : 6~10 | △ | ○ | ○ | Groove A (E) : — Groove B (D), C : 6~10 |
| | Rod side | | △ | × | × | | △ | × | × | | △ | × | × | |
| 20 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 5~20 Groove C : 7~20 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 9~20 Groove C : 11~20 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 11~20 |
| | Rod side | | ○ | × | × | | ○ | × | × | | ○ | × | × | |
| 30 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 10~29 Groove C : 12~27 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 14~30 Groove C : 16~30 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 16~30 |
| | Rod side | | ○ | ○ | ○ | | ○ | × | × | | ○ | × | × | |
| 40 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 15~34 Groove C : 17~32 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 19~39 Groove C : 21~37 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 21~36 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 50 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 20~39 Groove C : 22~37 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 24~44 Groove C : 26~42 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 26~41 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 60 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 25~44 Groove C : 27~42 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 29~49 Groove C : 31~47 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 31~46 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 70 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 30~49 Groove C : 32~47 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 34~54 Groove C : 36~52 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 36~51 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 80 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 35~54 Groove C : 37~52 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 39~59 Groove C : 41~57 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 41~56 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 90 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 40~59 Groove C : 42~57 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 44~64 Groove C : 46~62 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 46~61 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 100 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 45~64 Groove C : 47~62 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 49~69 Groove C : 51~67 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 51~66 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 110 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 50~69 Groove C : 52~67 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 54~74 Groove C : 56~72 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 56~71 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 120 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 55~74 Groove C : 57~72 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 59~79 Groove C : 61~77 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 61~76 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 130 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 60~79 Groove C : 62~77 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 64~84 Groove C : 66~82 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 66~81 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 140 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 65~84 Groove C : 67~82 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 69~89 Groove C : 71~87 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 71~86 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 150 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 70~89 Groove C : 72~87 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 74~94 Groove C : 76~92 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 76~91 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 160 | Head side | | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 75~94 Groove C : 77~92 | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 79~99 Groove C : 81~97 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 81~96 |
| | Rod side | | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

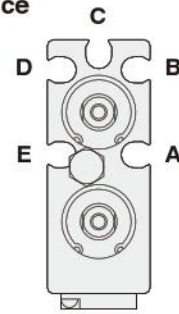
Rod side end keep cylinder (TBD-RL)

■ In the case of using 4 mounting holes on the body



Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Caution

When mounting a sensor switch in the A or E groove's rod extended side (the rod side of the body), ensure that the sensor switch is installed inside the groove between body mounting holes before tightening body mounting bolts, to avoid interference between the sensor switch and the bolts.

This procedure is not necessary for $\phi 25$ [0.984in.], however, where no interference occurs.

● Solid state type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

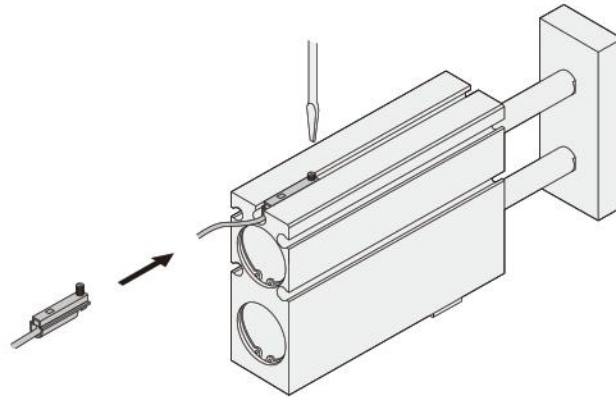
(mm)

| Bore size | Stroke | $\phi 16$ | | | $\phi 20$ | | | $\phi 25$ | | |
|-----------|-----------|-----------|---|---|-----------|---|---|-----------|---|---|
| | | A | B | C | A | B | C | A | B | C |
| 10 | Head side | × | △ | △ | ○ | △ | ○ | ○ | ○ | ○ |
| | Rod side | × | △ | △ | × | △ | ○ | ○ | ○ | ○ |
| 20 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 30 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 40 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | ○ | ○ | ○ | ○ | ○ |
| 50 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × |
| 60 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × |
| 70 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | × | × | ○ | ○ | ○ |
| 80 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

(mm)

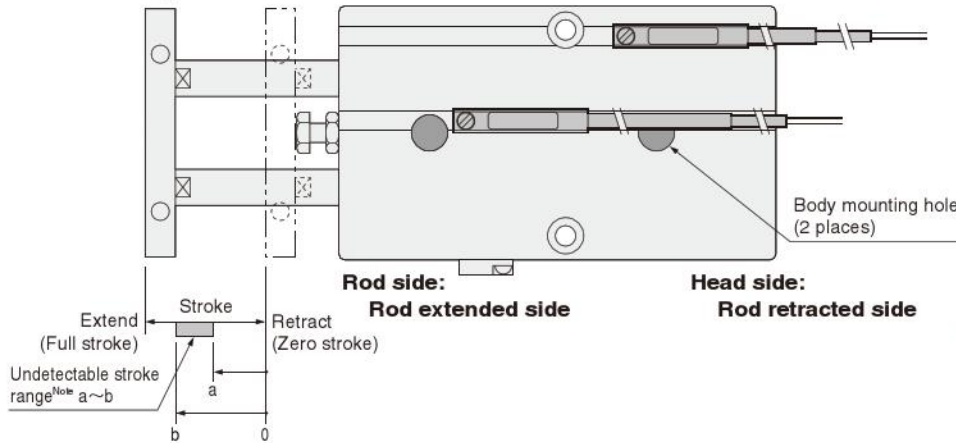
| Bore size | Stroke | Mounting groove | | | φ 16 | | | φ 20 | | | φ 25 | | |
|-----------|-----------|-----------------|---|---|---|---|---|--|--|---|--|---|---|
| | | A | B | C | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | |
| | | E | D | C | E | D | C | E | D | C | E | D | C |
| 10 | Head side | × | △ | △ | Groove A (E) : 0~10 Groove B (D) : — Groove C : — | × | △ | △ | Groove A (E) : 0~10 Groove B (D) : — Groove C : — | △ | △ | △ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | × | △ | △ | | × | △ | △ | | △ | △ | △ | |
| 20 | Head side | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D) : — Groove C : — | × | ○ | ○ | Groove A (E) : 0~17 Groove B (D) : — Groove C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 30 | Head side | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D) : 29~30 Groove C : — | × | ○ | ○ | Groove A (E) : 0~17 Groove B (D) : — Groove C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | × | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 40 | Head side | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D) : 35~40 Groove C : 37~40 | × | ○ | ○ | Groove A (E) : 0~17 Groove B (D) : 39~40 Groove C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | × | × | | ○ | × | × | | ○ | ○ | ○ | |
| 50 | Head side | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D) : 40~50 Groove C : 42~50 | × | ○ | ○ | Groove A (E) : 0~17 Groove B (D) : 44~50 Groove C : 46~50 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 46~60 |
| | Rod side | ○ | × | × | | ○ | × | × | | ○ | × | × | |
| 60 | Head side | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D) : 45~60 Groove C : 47~60 | × | ○ | ○ | Groove A (E) : 0~17 Groove B (D) : 49~60 Groove C : 51~60 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 51~60 |
| | Rod side | ○ | × | × | | ○ | × | × | | ○ | × | × | |
| 70 | Head side | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D) : 50~69 Groove C : 52~67 | × | ○ | ○ | Groove A (E) : 0~17 Groove B (D) : 54~70 Groove C : 56~70 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 56~70 |
| | Rod side | ○ | ○ | ○ | | ○ | × | × | | ○ | × | × | |
| 80 | Head side | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D) : 55~74 Groove C : 57~72 | × | ○ | ○ | Groove A (E) : 0~17 Groove B (D) : 59~79 Groove C : 61~77 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 61~76 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 90 | Head side | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D) : 60~79 Groove C : 62~77 | × | ○ | ○ | Groove A (E) : 0~17 Groove B (D) : 64~84 Groove C : 66~82 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 66~81 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 100 | Head side | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D) : 65~84 Groove C : 67~82 | × | ○ | ○ | Groove A (E) : 0~17 Groove B (D) : 69~89 Groove C : 71~87 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 71~86 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 110 | Head side | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D) : 70~89 Groove C : 72~87 | × | ○ | ○ | Groove A (E) : 0~17 Groove B (D) : 74~94 Groove C : 76~92 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 76~91 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 120 | Head side | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D) : 75~94 Groove C : 77~92 | × | ○ | ○ | Groove A (E) : 0~17 Groove B (D) : 79~99 Groove C : 81~97 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 81~96 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 130 | Head side | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D) : 80~99 Groove C : 82~97 | × | ○ | ○ | Groove A (E) : 0~17 Groove B (D) : 84~104 Groove C : 86~102 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 86~101 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 140 | Head side | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D) : 85~104 Groove C : 87~102 | × | ○ | ○ | Groove A (E) : 0~17 Groove B (D) : 89~109 Groove C : 91~107 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 91~106 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 150 | Head side | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D) : 90~109 Groove C : 92~107 | × | ○ | ○ | Groove A (E) : 0~17 Groove B (D) : 94~114 Groove C : 96~112 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 96~111 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 160 | Head side | × | ○ | ○ | Groove A (E) : 0~14 Groove B (D) : 95~114 Groove C : 97~112 | × | ○ | ○ | Groove A (E) : 0~17 Groove B (D) : 99~119 Groove C : 101~117 | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 101~116 |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

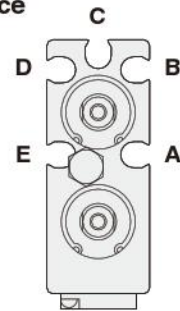
Rod side end keep cylinder (TBD-RL)

In the case of using 2 center mounting holes on the body



Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves **A~E** allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Caution

When mounting a sensor switch in the **A** or **E** groove's rod extended side (the rod side of the body), ensure that the sensor switch is installed inside the groove between body mounting holes before tightening body mounting bolts, to avoid interference between the sensor switch and the bolts.

This procedure is not necessary for $\phi 25$ [0.984in.], however, where no interference occurs.

● Solid state type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke (mm)

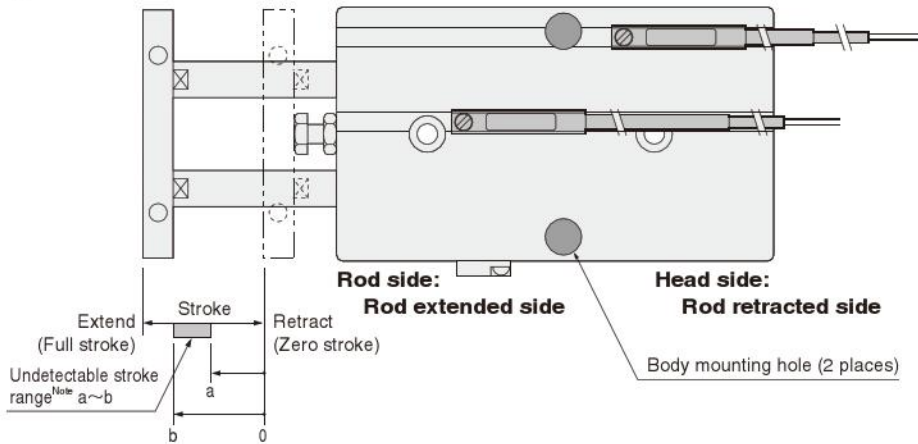
| Bore size | Stroke | Mounting groove | | | $\phi 16$ | | | $\phi 20$ | | | $\phi 25$ | | |
|-----------|-----------|-----------------|---|---|--|---|---|--|--|---|--|---|---|
| | | A | B | C | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | |
| | | E | D | C | E | D | C | E | D | C | E | D | C |
| 10 | Head side | × | ○ | ○ | Groove A (E) : 0~10 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~10 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | × | ○ | ○ | | × | ○ | ○ | | ○ | ○ | ○ | |
| 20 | Head side | × | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 30 | Head side | × | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 40 | Head side | × | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 50 | Head side | × | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 60 | Head side | × | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 70 | Head side | × | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 80 | Head side | × | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 90 | Head side | × | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 100 | Head side | × | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 110 | Head side | × | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 120 | Head side | × | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 130 | Head side | × | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 140 | Head side | × | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 150 | Head side | × | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |
| 160 | Head side | × | ○ | ○ | Groove A (E) : 0~12 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : 2~15 Groove B (D), C : — | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| | Rod side | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | ○ | ○ | |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

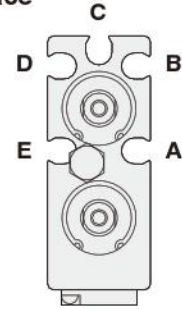
Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Rod side end keep cylinder (TBD-RL)

In the case of using 2 mounting holes on the body (one on each side)



● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

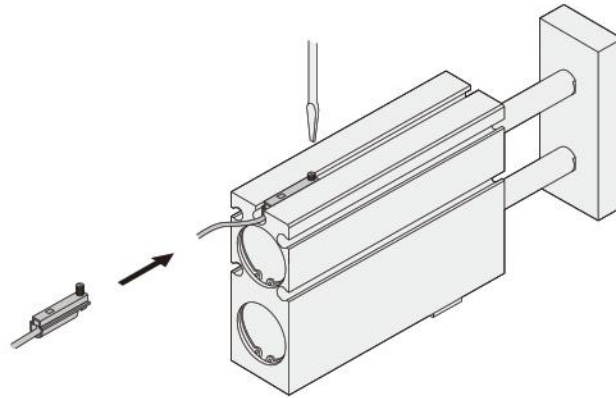
(mm)

| Bore size | Mounting groove | φ 16 | | | φ 20 | | | φ 25 | | |
|-----------|-----------------|------|---|---|------|---|---|------|---|---|
| | | A | B | C | A | B | C | A | B | C |
| 10 | Head side | ○ | △ | △ | △ | △ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | △ | △ | △ | △ | ○ | ○ | ○ | ○ |
| 20 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 30 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 40 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | ○ | ○ | ○ | ○ | ○ |
| 50 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × |
| 60 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × |
| 70 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | × | × | ○ | ○ | ○ |
| 80 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

(mm)

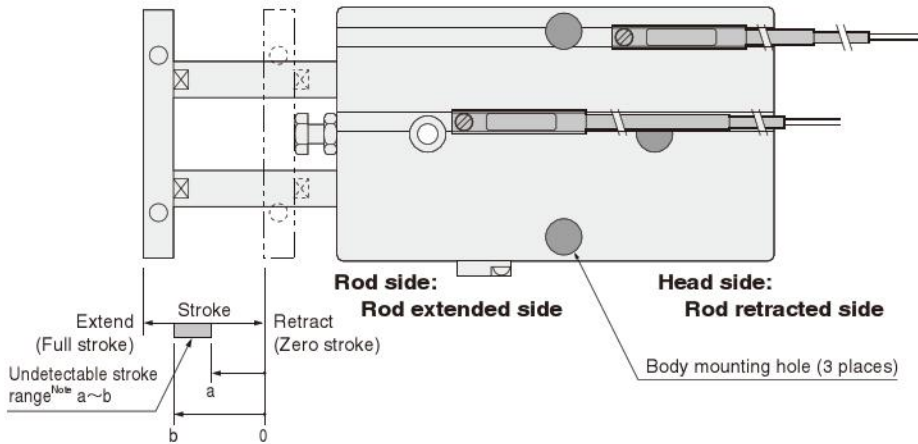
| Bore size | Stroke | Mounting groove | φ 16 | | | φ 20 | | | φ 25 | | | |
|-----------|-----------|-----------------|--|---|---|--|---|---|--|---|---|--|
| | | | A | B | C | A | B | C | A | B | C | |
| | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | | |
| 10 | Head side | | △ | △ | △ | △ | △ | △ | △ | △ | △ | Groove A (E) : — Groove B (D) : 8~10 Groove C : 10 |
| | Rod side | | △ | △ | △ | △ | △ | △ | △ | △ | △ | Groove A (E) : — Groove B (D), C : — |
| 20 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : — Groove C : — |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| 30 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 29~30 Groove C : 22~30 |
| | Rod side | | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| 40 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 35~40 Groove C : 37~40 |
| | Rod side | | ○ | × | × | ○ | × | × | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : — |
| 50 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 40~50 Groove C : 42~50 |
| | Rod side | | ○ | × | × | ○ | × | × | ○ | × | × | Groove A (E) : — Groove B (D), C : 46~50 |
| 60 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 45~60 Groove C : 47~60 |
| | Rod side | | ○ | × | × | ○ | × | × | ○ | × | × | Groove A (E) : — Groove B (D), C : 51~60 |
| 70 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 50~69 Groove C : 52~67 |
| | Rod side | | ○ | ○ | ○ | ○ | × | × | ○ | × | × | Groove A (E) : — Groove B (D), C : 56~70 |
| 80 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 55~74 Groove C : 57~72 |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 61~76 |
| 90 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 60~79 Groove C : 62~77 |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 66~81 |
| 100 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 65~84 Groove C : 67~82 |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 71~86 |
| 110 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 70~89 Groove C : 72~87 |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 76~91 |
| 120 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 75~94 Groove C : 77~92 |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 81~96 |
| 130 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 80~99 Groove C : 82~97 |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 86~101 |
| 140 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 85~104 Groove C : 87~102 |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 91~106 |
| 150 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 90~109 Groove C : 92~107 |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 96~111 |
| 160 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D) : 95~114 Groove C : 97~112 |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Groove A (E) : — Groove B (D), C : 101~116 |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

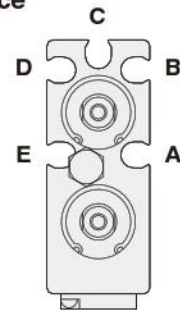
Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Rod side end keep cylinder (TBD-RL)

In the case of using 3 head side mounting holes on the body



● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

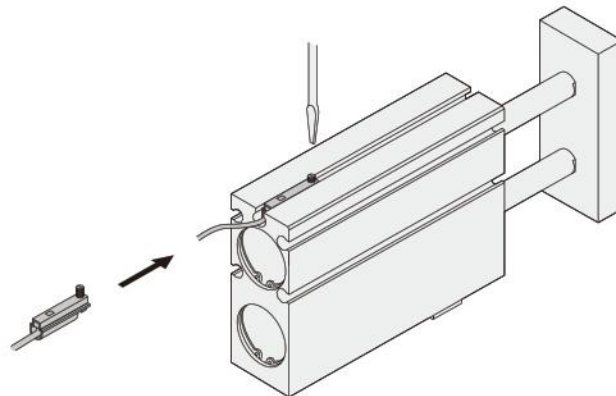
○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke (mm)

| Bore size | Mounting groove | φ 16 | | | φ 20 | | | φ 25 | | |
|-----------|-----------------|------|---|---|------|---|---|------|---|---|
| | | A | B | C | A | B | C | A | B | C |
| 10 | Head side | × | △ | △ | ○ | △ | ○ | ○ | ○ | ○ |
| | Rod side | × | △ | △ | × | △ | ○ | ○ | ○ | ○ |
| 20 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 30 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 40 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | ○ | ○ | ○ | ○ | ○ |
| 50 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × |
| 60 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × |
| 70 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | × | × | ○ | ○ | ○ |
| 80 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

(mm)

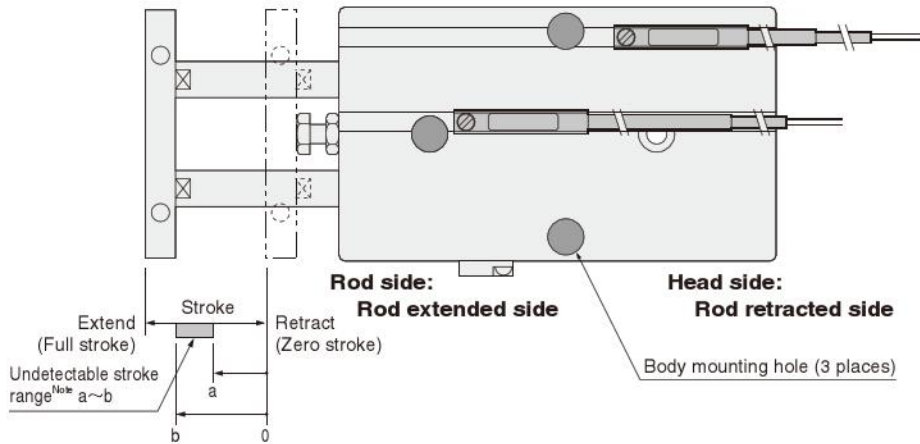
| Bore size | Stroke | Mounting groove | φ 16 | | | φ 20 | | | φ 25 | | |
|-----------|-----------|-----------------|--|---|---|--|---|---|--|---|---|
| | | | A | B | C | A | B | C | A | B | C |
| | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | |
| 10 | Head side | | × | △ | △ | × | △ | △ | △ | △ | △ |
| | Rod side | | × | △ | △ | × | △ | △ | △ | △ | △ |
| 20 | Head side | | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 30 | Head side | | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 40 | Head side | | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | × | × | ○ | × | × | ○ | ○ | ○ |
| 50 | Head side | | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | × | × | ○ | × | × | ○ | × | × |
| 60 | Head side | | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | × | × | ○ | × | × | ○ | × | × |
| 70 | Head side | | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | × | × | ○ | × | × |
| 80 | Head side | | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | | × | ○ | ○ | × | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

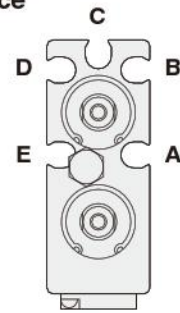
Mountable or Unmountable Sensor Switch and Undetectable Stroke Range at End of Stroke

Rod side end keep cylinder (TBD-RL)

In the case of using 3 rod side mounting holes on the body



● Sensor switch mounting surface



Mounting a sensor switch in any of the grooves A~E allows detection at either the head side or rod side stroke end, and intermediate positions. The diagram shows the rod side with the square plate removed.

Note: The undetectable stroke range is the value measured from the zero stroke with 1 sensor switch installation.

● Solid state type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke

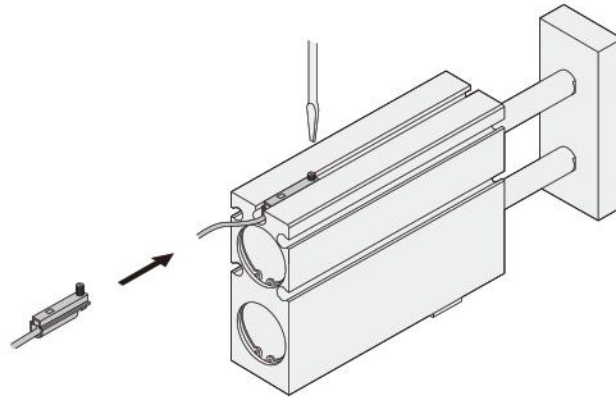
(mm)

| Bore size | Mounting groove | φ 16 | | | φ 20 | | | φ 25 | | |
|-----------|-----------------|------|---|---|------|---|---|------|---|---|
| | | A | B | C | A | B | C | A | B | C |
| 10 | Head side | ○ | △ | △ | △ | △ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | △ | △ | △ | △ | ○ | ○ | ○ | ○ |
| 20 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 30 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 40 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | ○ | ○ | ○ | ○ | ○ |
| 50 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × |
| 60 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | × | × | ○ | × | × | ○ | × | × |
| 70 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | × | × | ○ | ○ | ○ |
| 80 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

■ Moving sensor switch

- Loosening the mounting screw allows the sensor switch to be moved along the switch mounting groove of the cylinder body.
- Tighten the mounting screw with a tightening torque of 0.1~0.2N·m [0.9~1.8in·lbf].



● Reed switch type

○ : Mountable △ : Either head side or rod side × : Unmountable — : Fully detectable within stroke (mm)

| Bore size | Stroke | Mounting groove | φ 16 | | | φ 20 | | | φ 25 | | |
|-----------|-----------|-----------------|--|---|---|--|---|---|--|---|---|
| | | | A | B | C | A | B | C | A | B | C |
| | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | | Undetectable stroke range of sensor switch | | |
| 10 | Head side | | △ | △ | △ | △ | △ | △ | △ | △ | △ |
| | Rod side | | △ | △ | △ | △ | △ | △ | △ | △ | △ |
| 20 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 30 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 40 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | × | × | ○ | × | ○ | ○ | ○ | ○ |
| 50 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | × | × | ○ | × | × | ○ | × | × |
| 60 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | × | × | ○ | × | × | ○ | × | × |
| 70 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | × | ○ | × | × |
| 80 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 90 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 100 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 110 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 120 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 130 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 140 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 150 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 160 | Head side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Rod side | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note: The undetectable stroke range appears due to interference between the sensor switch and the body mounting bolts.

Handling Instructions and Precautions

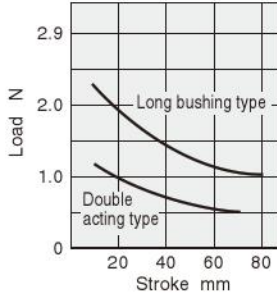


Mounting and adjustment

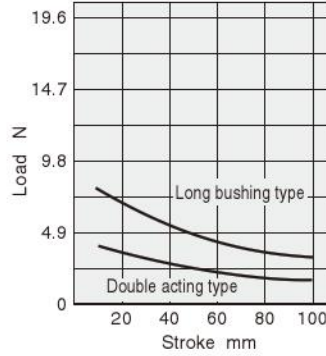
Allowable lateral load

The lateral (side) load on the rod end should be at or below the graph values listed below.

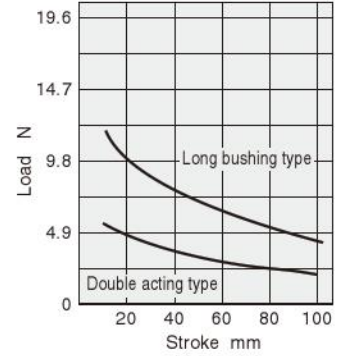
φ 10 [0.394In.]



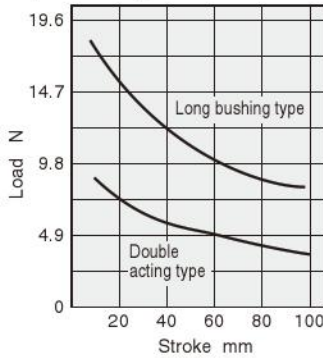
φ 16 [0.630In.]



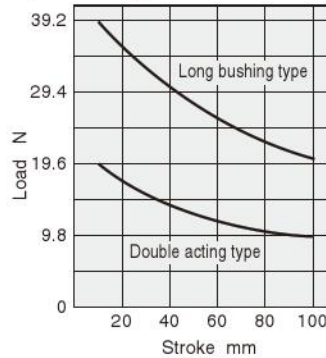
φ 20 [0.787In.]



φ 25 [0.984In.]



φ 32 [1.260In.]



Remark: The φ 16~φ 25 double acting standard types also include end keep cylinders.

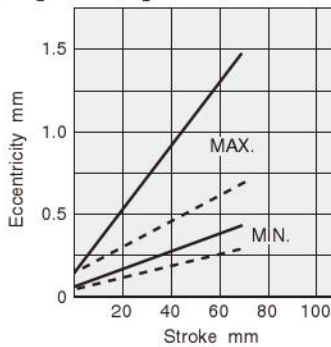
1N = 0.2248lbf.
1mm = 0.0394in.

Square plate eccentricity

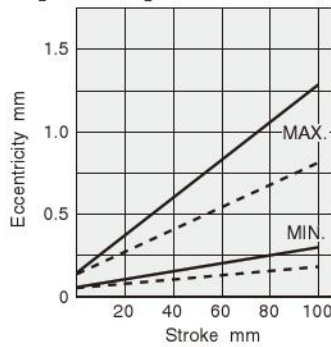
For the eccentricity of the square plate without load, use the graph values listed below as guides.

———— Double acting type - - - - - Long bushing type

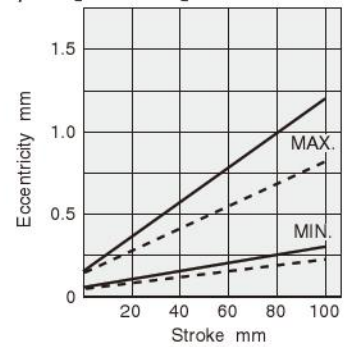
φ 10 [0.394In.]



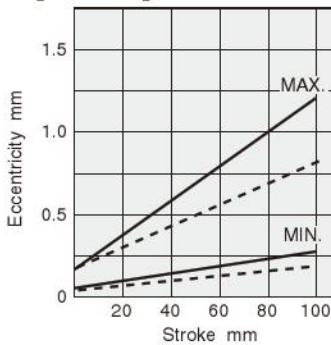
φ 16 [0.630In.]



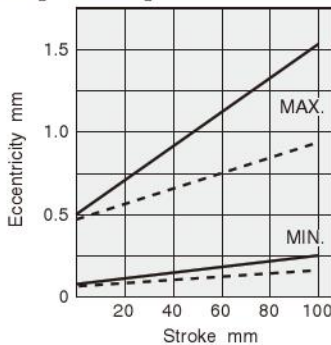
φ 20 [0.787In.]



φ 25 [0.984In.]



φ 32 [1.260In.]



Remark: The φ 16~φ 25 double acting standard types also include end keep cylinders.

1mm = 0.0394in.



Mounting and adjustment

Mounting

1. While any mounting direction is allowed, the mounting surface should always be flat. Twisting or bending during mounting may disturb the accuracy and may also result in air leaks or improper operation.
2. Care should be taken that scratches or dents on the cylinder's mounting surface may damage its flatness.
3. The hexagon socket head bolt on the rod end square plate has been mounted with a conical washer. Always confirm that the rod end square plate and hexagon socket head bolts are secured before using the cylinder.

Stroke adjustment

On the Twin Rod cylinder, stroke adjusting is easy within a range of $-5\sim 0\text{mm}$ [$-0.197\sim 0\text{in.}$] (with the exception of -HL: Head side end keep cylinder). Turn the stopper bolt to the left (counterclockwise) to shorten the stroke. Use a lock nut to tighten and secure the stopper in place after adjustment. Do not tighten the bolt to the right (clockwise) beyond the standard position. The stroke at shipping is set to the standard stroke. Do not adjust it to larger than the standard stroke. On the end keep cylinder, avoid application using an external stopper installed on the lock side to adjust the stroke, because it could cause the lock to be incapable of operating.

Cylinder speed

Use the cylinder at a speed of 500mm/s [19.7in./sec.] or less (use a speed controller for adjustment). For high speeds (500mm/s [19.7in./sec.]), install an external stopper, etc., to prevent direct shocks to the cylinder. Consult us if the situation will not permit installation of an external stopper, etc.



Control circuit for the end keep cylinder

1. For control of the twin rod end keep cylinder, we recommend the use of 2-position, 4-, 5-port valves. Avoid the use of control circuit with ABR connection (exhaust center) 3-position valves that exhaust air from 2 delivery ports.
2. Always use meter-out control for speed control. Meter-in control may result in failure of the locking mechanism to release.
3. Always set the air pressure to 0.15MPa [22psi.] or larger.

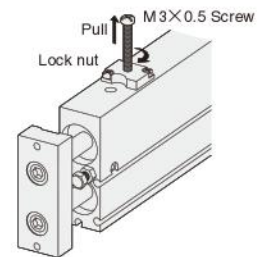
Notes: 1. It is dangerous to supply air to a connection port on a side with a locking mechanism while the cylinder has already been exhausted, because the piston rod may suddenly extend (or retract). In addition, since the lock piston could also cause galling of the lock piston and piston rod, resulting in defective operation, always supply air to the connection port on the opposite the one adjacent to the locking mechanism to ensure applying back pressure.

2. When restarting operations after air has been exhausted from the cylinder due to completion of operations or to an emergency stop, always start by supplying air to a connection port on the opposite the one adjacent to the locking mechanism.
3. Connect the valve port A (NC) to the connection port on the side with the locking mechanism.



Manual operation of locking mechanism

While the locking mechanism is normally released automatically through cylinder operations, it can also be released manually. For manual release, insert an $\text{M}3\times 0.5$ screw that has 30mm [1.18in.] screw length into the opening for manual override, thread it in about 3 turns into the internal lock piston, and then pull up the screw. To maintain the manual override for adjustment, etc., thread the locknut onto the screw and, with the locking mechanism in a released state, tighten the locknut against the cylinder.



- Notes: 1. It is dangerous to release the lock when load (weight) is present on the piston rod, because it may cause the unintended piston rod's extension (or retraction). In this case, always supply air to the connection port opposite the one adjacent to the locking mechanism before releasing the locking mechanism.
2. If the locking mechanism cannot easily be released even with manual override, it could be the result of galling of the lock piston and piston rod. In this case, supply air to the connection port opposite the one adjacent to the locking mechanism before releasing the locking mechanism.
 3. Water, oil, dust, etc., intruding through the opening for manual override may be a cause of defective locks or other erratic operation. If using in locations subject to dripping water, dripping oil, etc., or large amounts of dust, use a cover to protect the unit.



Sensor switch

1. In the standard cylinder, the magnet for sensor switch is built-in. Mounting a sensor switch will enable use in sensor switch applications.
2. Do not use a sensor switch mounting screw to secure the sensor switch into the body mounting hole. The sensor switch mounting screw could fall out.



General precautions

Media

1. Always thoroughly blow off (use compressed air) the tubing before piping. Entering chips, sealing tape, rust, etc., generated during piping work could result in air leaks or other defective operation.
2. Use air for the media. For the use of any other media, consult us.
3. Air used for the cylinder should be clean air that contains no deteriorated compressor oil, etc. Install an air filter (filtration of a minimum 40 μm) near the cylinder or valve to remove collected liquid or dust. In addition, drain the air filter periodically. Collected liquid or dust entering the cylinder may cause improper operation.

Lubrication

The product can be used without lubrication, if lubrication is required, use Turbine Oil Class 1 (ISO VG32) or equivalent. Avoid using spindle oil or machine oil.

Atmosphere

1. If using in locations subject to dripping water, dripping oil, etc., or to large amounts of dust, use a cover to protect the unit.
2. The product cannot be used when the media or ambient atmosphere contains any of the substances listed below.
Organic solvents, phosphate ester type hydraulic oil, sulphur dioxide, chlorine gas, or acids, etc.

Criteria for selection

Select the cylinder bore according to the allowable load at the maximum cylinder operating speed.

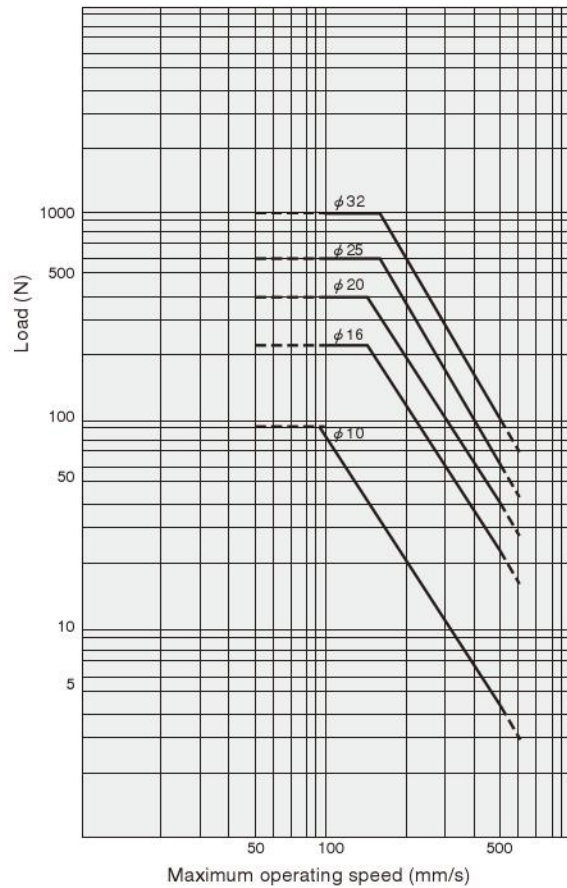
<Precautions>

- ① Always use a speed controller for the cylinder, and control the speed to within a range of 100~500mm/s [3.9~19.7in./sec.].
- ② When a lateral (side) load is applied to the piston rod, select a bore size within the allowable lateral load range (see the graphs on p.821).

When the load has exceeded the allowable value during use, always install an external stopper (shock absorber, etc.) to prevent direct shocks to the cylinder.

<Precautions>

- ① For the external stopper (shock absorber, etc.), select a stopper with sufficient absorbing capacity.
- ② Consult us if the situation will not permit the installation of an external stopper.
- ③ When a lateral (side) load is applied to the piston rod, limit within the allowable lateral load range (see the graphs on p.821).

<Allowable load>**<How to read the graph>**

When a 59N [13.2lb.] load is carried with $\phi 20$ [0.787in.], the maximum operating speed must be set to 400mm/s [15.7in./sec.] or less.

※ The maximum load in the graph is when air pressure of 0.7MPa [102psi.] is applied to the cylinder push side. The load will decrease in applications such as retracted side operations and lower air pressure applications.

1N = 0.2248lbf.
1mm/s = 0.0394in./sec.

