

The space-saving **KNOCK CYLINDERS**

The total length has been shortened as much as possible. The compact, lightweight Knock Cylinder demonstrates space-saving effectiveness in various mounting configurations.

Double Acting Type

Cylinder Specification

■ Standard cylinder



■ Cylinder with magnet

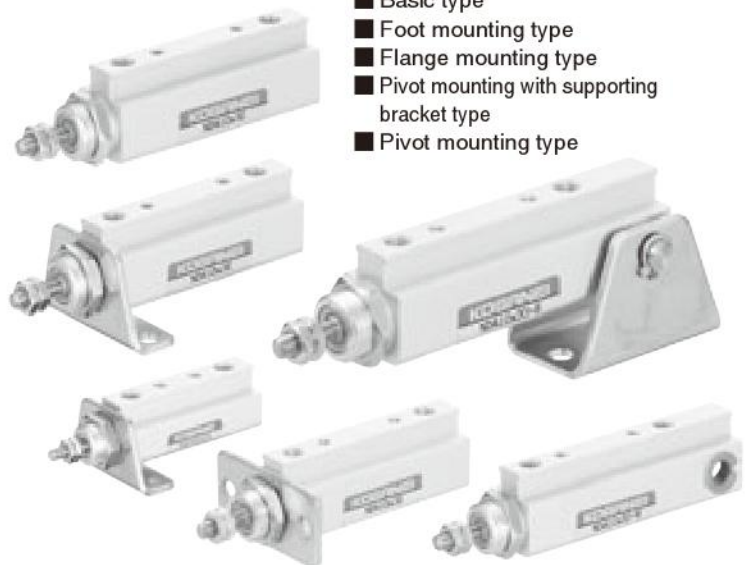


Non-ion Specification



Mounting Type

- Basic type
- Foot mounting type
- Flange mounting type
- Pivot mounting with supporting bracket type
- Pivot mounting type



Piston Rod Specification

- Male thread
- Plain rod



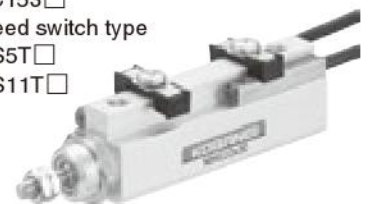
Knuckles

- I type knuckle
- Y type knuckle



Sensor Switches

- Solid state type
 - ZC130
 - ZC153
- Reed switch type
 - CS5T
 - CS11T



Double Acting Type Selection Chart

| Bore size mm [in.] | Cylinder specification | | Non-ion specification | Piston rod specification | | Mounting type | | | | Knuckles | |
|-----------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------------------------|---|--------------------------|--------------------------|
| | Standard cylinder | Cylinder with magnet | | Male thread | Plain rod | Basic type | Foot mounting type | Flange mounting type | Pivot mounting type (with mounting bracket) | I type | Y type |
| 6 [0.236] | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10 [0.394] | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 16 [0.630] | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Double Acting Type

- Finely tuned configurations capable of dealing even with non-ion specification offer compact, lightweight features.
- 4 types and 5 classes of mounting types allow for a large variety of mounting configurations.
- Capable of mounting □4mm [0.157in.] sensor switches for excellent performance in a compact size.

Single Acting Push Type

- A centering location on the body improves mounting precision.
- Wrench flats built into the body provide secure mounting.
- Drawing presentation for positioning not required.

Single Acting Push Type

Piston Rod Specification



Male thread specification



Plain rod

Mounting



Panel mount



Foot mount



Insert mount

The same cylinder body applies to panel mounting, foot mounting and insert mounting types.

Single Acting Push Type Selection Chart

| Bore size mm [in.] | Cylinder specification | | Mounting type | | |
|-----------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | Male thread | Plain rod | Panel mount | Foot mount | Insert mount |
| 6 [0.236] | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10 [0.394] | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 16 [0.630] | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

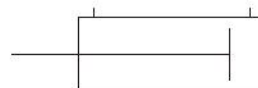
KNOCK CYLINDERS

Double Acting Type

Specifications

| Item | Bore size mm [in.] | | |
|-----------------------------|---|---------------------|----------------------|
| | 6 [0.236] | 10 [0.394] | 16 [0.630] |
| Operation type | Double acting type | | |
| Media | Air | | |
| Operating pressure range | 0.15~0.7 MPa [psi.] [22~102] | 0.1~0.7 [15~102] | 0.08~0.7 [12~102] |
| Proof pressure | 1.03 [149] MPa [psi.] | | |
| Operating temperature range | 0~60 [32~140] °C [°F] | | |
| Operating speed range | 50~500 [2.0~19.7] mm/s [in./sec.] | | |
| Cushion | Rubber bumper | | |
| Lubrication | Not required (If lubrication is required, use Turbine Oil Class 1 [ISO VG32] or equivalent.) | | |
| Port size | M5×0.8 | | |
| Stroke tolerance | mm [in.] +1 [+0.039] 0 [0] | | |
| Mounting type | Basic type, Foot mounting type, Flange mounting type, Pivot mounting type | | |

Symbol



Bore Size and Stroke

| Bore size | Standard strokes | |
|-----------|-----------------------|--|
| | mm | |
| 6 | 5, 10, 15, 20 | |
| 10 | 5, 10, 15, 20, 25, 30 | |
| 16 | 5, 10, 15, 20, 25, 30 | |

Cylinder Thrust

| Bore size mm [in.] | Piston rod dia. mm [in.] | Operation | Pressure area mm ² [in. ²] | 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] |
| 6 [0.236] | 3 [0.118] | Push side | 28.3 [0.0439] | — | 5.7 [1.28] | 8.5 [1.91] | 11.3 [2.54] | 14.2 [3.19] | 17 [3.82] | 19.8 [4.45] |
| | | Pull side | 21.2 [0.0329] | — | 4.2 [0.94] | 6.4 [1.44] | 8.5 [1.91] | 10.6 [2.38] | 12.7 [2.85] | 14.8 [3.33] |
| 10 [0.394] | 5 [0.197] | Push side | 78.5 [0.1216] | 7.8 [1.75] | 15.7 [3.53] | 23.6 [5.31] | 31.4 [7.06] | 39.3 [8.83] | 47.1 [10.59] | 55 [12.36] |
| | | Pull side | 58.9 [0.0913] | 5.9 [1.33] | 11.8 [2.65] | 17.7 [3.98] | 23.6 [5.31] | 29.5 [6.63] | 35.3 [7.94] | 41.2 [9.26] |
| 16 [0.630] | 6 [0.236] | Push side | 201 [0.312] | 20.1 [4.52] | 40.2 [9.04] | 60.3 [13.56] | 80.4 [18.07] | 100.5 [22.59] | 120.6 [27.11] | 140.7 [31.63] |
| | | Pull side | 172 [0.267] | 17.2 [3.87] | 34.4 [7.73] | 51.6 [11.60] | 68.8 [15.47] | 86 [19.33] | 103.2 [23.20] | 120.4 [27.07] |

Mass

| Bore size mm | Stroke mm | Basic type | | Pivot mounting type | Additional mass | | | | | | | | |
|-----------------|--------------|----------------------|----------------------------|---------------------------|---|--------|-------|--------|-----------------------------|-------------------------------|---|--------------------|----------------------------------|
| | | Standard cylinder | Cylinder with magnet | | With 1 sensor switch (Cylinder with magnet only) | | | | Foot mounting bracket | Flange mounting bracket | Pivot mount- ing bracket (with pin) | I type knuckles | Y type knuckles (with pin) |
| | | | | | ZC130□ | ZC153□ | CS5T□ | CS11T□ | | | | | |
| 6 | 5 | 15 [0.529] | 18 [0.635] | 18 [0.635] | 20 [0.705] | | | | 7 [0.247] | 5 [0.176] | 14 [0.494] | — | — |
| | 10 | 17 [0.600] | 20 [0.705] | 20 [0.705] | 20 [0.705] | | | | 7 [0.247] | 5 [0.176] | 14 [0.494] | — | — |
| | 15 | 19 [0.670] | 22 [0.776] | 22 [0.776] | 20 [0.705] | | | | 7 [0.247] | 5 [0.176] | 14 [0.494] | — | — |
| | 20 | 21 [0.741] | 24 [0.847] | 24 [0.847] | 20 [0.705] | | | | 7 [0.247] | 5 [0.176] | 14 [0.494] | — | — |
| 10 | 5 | 23 [0.811] | 29 [1.023] | 26 [0.917] | 20 [0.705] | | | | 9 [0.317] | 6 [0.212] | 24 [0.847] | 16 [0.564] | 23 [0.811] |
| | 10 | 26 [0.917] | 32 [1.129] | 29 [1.023] | 20 [0.705] | | | | 9 [0.317] | 6 [0.212] | 24 [0.847] | 16 [0.564] | 23 [0.811] |
| | 15 | 29 [1.023] | 35 [1.235] | 32 [1.129] | 20 [0.705] | | | | 9 [0.317] | 6 [0.212] | 24 [0.847] | 16 [0.564] | 23 [0.811] |
| | 20 | 32 [1.129] | 38 [1.340] | 35 [1.235] | 20 [0.705] | | | | 9 [0.317] | 6 [0.212] | 24 [0.847] | 16 [0.564] | 23 [0.811] |
| | 25 | 35 [1.235] | 41 [1.446] | 38 [1.340] | 20 [0.705] | | | | 9 [0.317] | 6 [0.212] | 24 [0.847] | 16 [0.564] | 23 [0.811] |
| 16 | 5 | 42 [1.481] | 50 [1.764] | 49 [1.728] | 20 [0.705] | | | | 24 [0.847] | 15 [0.529] | 55 [1.940] | 22 [0.776] | 18 [0.635] |
| | 10 | 46 [1.623] | 54 [1.905] | 53 [1.869] | 20 [0.705] | | | | 24 [0.847] | 15 [0.529] | 55 [1.940] | 22 [0.776] | 18 [0.635] |
| | 15 | 50 [1.764] | 58 [2.046] | 57 [2.011] | 20 [0.705] | | | | 24 [0.847] | 15 [0.529] | 55 [1.940] | 22 [0.776] | 18 [0.635] |
| | 20 | 54 [1.905] | 62 [2.187] | 61 [2.152] | 20 [0.705] | | | | 24 [0.847] | 15 [0.529] | 55 [1.940] | 22 [0.776] | 18 [0.635] |
| | 25 | 58 [2.046] | 66 [2.328] | 65 [2.293] | 20 [0.705] | | | | 24 [0.847] | 15 [0.529] | 55 [1.940] | 22 [0.776] | 18 [0.635] |

Calculation example: To add 2 sensor switches to the cylinder with magnet NDAS10×20: 38+(20×2)=78g [2.751oz.]

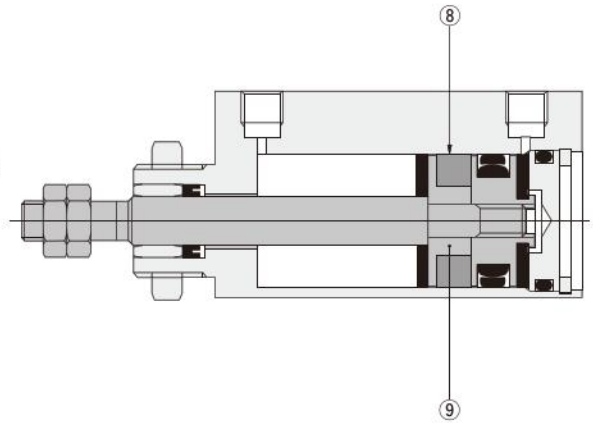
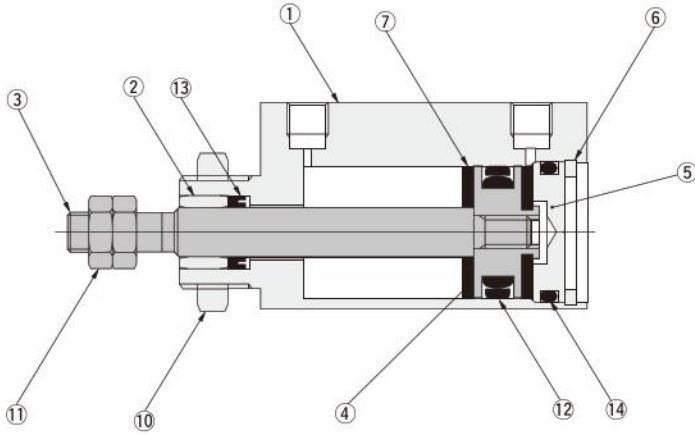
Remark: There are 2 types of sensor switch lead wire lengths.

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

Inner Construction and Major Parts

● Standard cylinder

● Cylinder with magnet



Major Parts and Materials

| No. | Parts | Materials | |
|-----|-------------|---------------------------|-----------------------|
| | | Standard specification | Non-ion specification |
| ① | Body | Aluminum alloy (anodized) | ← |
| ② | Rod bushing | Oil impregnated bronze | Special steel |
| ③ | Piston rod | Stainless steel | ← |
| ④ | Piston | Brass | Aluminum |
| ⑤ | Head cover | Aluminum alloy (anodized) | ← |
| ⑥ | Snap ring | Steel (nickel plated) | ← |
| ⑦ | Bumper | Synthetic rubber (NBR) | ← |

Note: The $\phi 6$ body cannot be disassembled.

| No. | Parts | Materials | |
|-----|----------------|--|-----------------------|
| | | Standard specification | Non-ion specification |
| ⑧ | Magnet | $\phi 6$: Sintered alloy magnet $\phi 10 \cdot \phi 16$: Plastic magnet | ← |
| ⑨ | Magnet support | Brass | Aluminum |
| ⑩ | Mounting nut | Steel (nickel plated) | ← |
| ⑪ | Rod end nut | Steel (nickel plated) | ← |
| ⑫ | Piston seal | Synthetic rubber (NBR) | ← |
| ⑬ | Rod seal | | |
| ⑭ | O-ring | | |

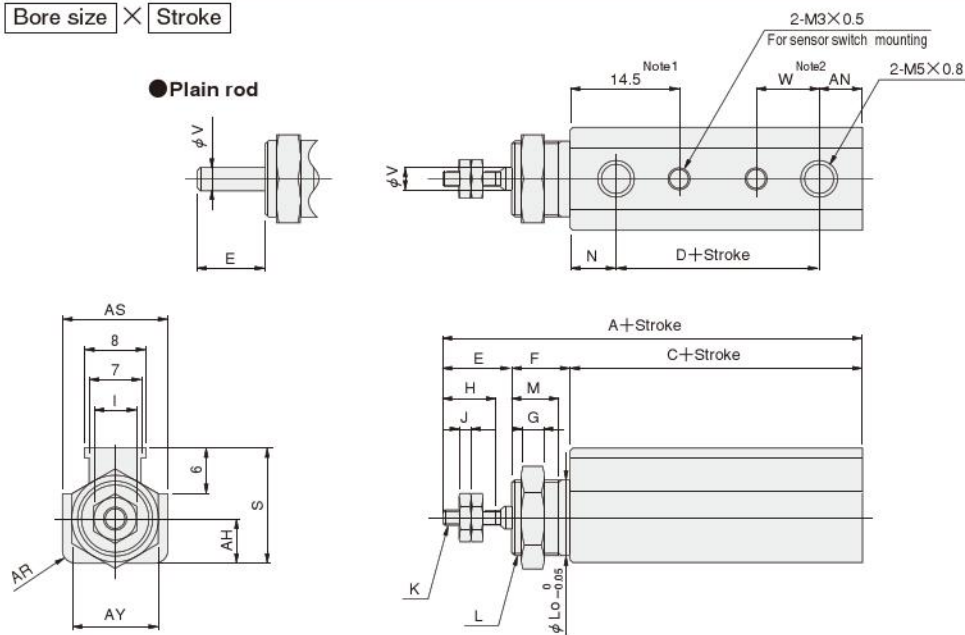
Seals

| Parts | Rod seal | Piston seal | O-ring |
|-------------------|----------|-------------|-------------|
| 6 [0.236] | MY-6×3×2 | COP-6L | 6.9×4.5×1.2 |
| 10 [0.394] | MY-8×5×2 | COP-10L | 12×9×1.5 |
| 16 [0.630] | MY-9×6×2 | COP-16L | 17.2×14×1.6 |

Dimensions of Basic Type (mm)

NDA Bore size Stroke

CAD ϕ 6 : NDA-06
 ϕ 10 : NDA-10
 ϕ 16 : NDA-16



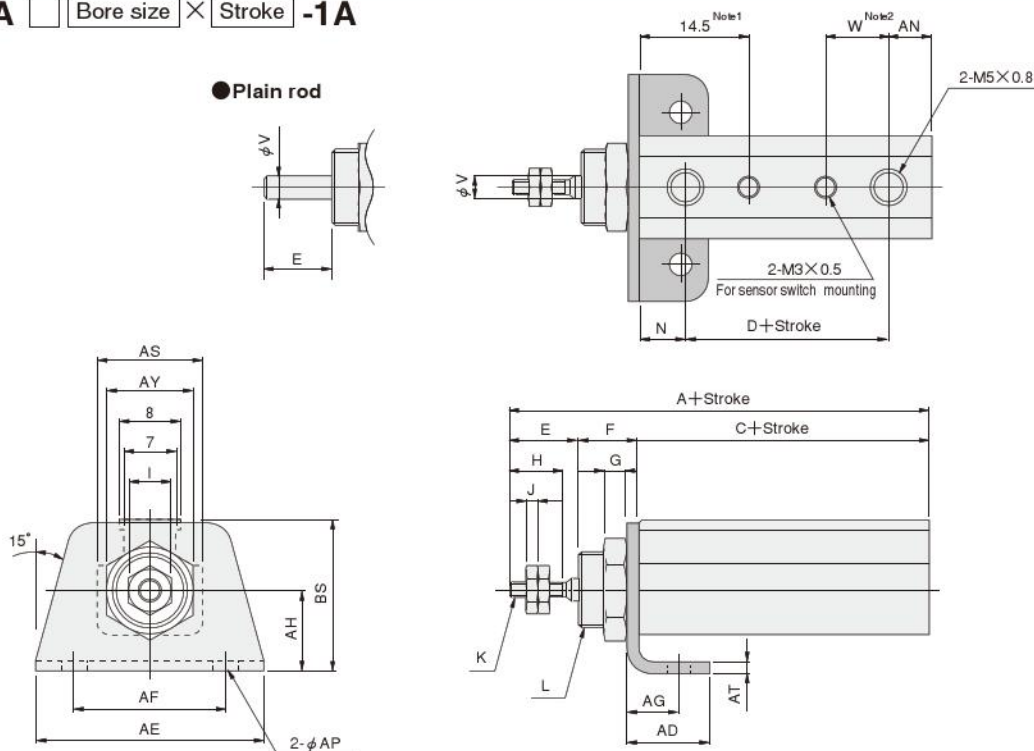
| Type | Standard cylinder | | | Cylinder with magnet | | | E | F | G | H | I | J | K | L | Lo | M | N | S | V | W | AH | AN | AR | AS | AY |
|------|-------------------|------|-----|----------------------|------|------|----|----|---|----|-----|-----|--------|----------|----|-----|---|------|---|-----|-----|----|----|----|----|
| Code | A | C | D | A | C | D | | | | | | | | | | | | | | | | | | | |
| 6 | 36 | 19 | 7 | 41 | 24 | 12 | 9 | 8 | 3 | 7 | 5.5 | 1.8 | M3×0.5 | M10×1 | 10 | 6.5 | 6 | 15.5 | 3 | 8.5 | 6 | 6 | R2 | 14 | 12 |
| 10 | 40 | 20 | 7 | 45 | 25 | 12 | 12 | 8 | 3 | 10 | 7 | 2.4 | M4×0.7 | M12×1 | 12 | 6.5 | 6 | 19 | 5 | 8.5 | 7 | 7 | R2 | 15 | 14 |
| 16 | 44.5 | 20.5 | 7.5 | 49.5 | 25.5 | 12.5 | 14 | 10 | 4 | 12 | 8 | 3.2 | M5×0.8 | M14×1.25 | 14 | 8.5 | 6 | 25.5 | 6 | 8.5 | 9.5 | 7 | R3 | 20 | 17 |

Notes: 1. Not available in the 5, 10, 15 stroke standard cylinder and the 5, 10 stroke cylinder with magnet.
 2. Not available in the 5 stroke standard cylinder.

Dimensions of Foot Mounting Type (mm)

NDA Bore size Stroke -1A

CAD ϕ 6 : NDA-06
 ϕ 10 : NDA-10
 ϕ 16 : NDA-16



| Type | Standard cylinder | | | Cylinder with magnet | | | E | F | G | H | I | J | K | L | N | V | W | AD | AE | AF | AG | AH | AN | AP | AS | AT | AY | BS |
|------|-------------------|------|-----|----------------------|------|------|----|----|---|----|-----|-----|--------|----------|---|---|-----|----|----|----|----|----|----|-----|----|-----|----|------|
| Code | A | C | D | A | C | D | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 36 | 19 | 7 | 41 | 24 | 12 | 9 | 8 | 3 | 7 | 5.5 | 1.8 | M3×0.5 | M10×1 | 6 | 3 | 8.5 | 11 | 28 | 20 | 7 | 11 | 6 | 3.4 | 14 | 1.6 | 12 | 20.5 |
| 10 | 40 | 20 | 7 | 45 | 25 | 12 | 12 | 8 | 3 | 10 | 7 | 2.4 | M4×0.7 | M12×1 | 6 | 5 | 8.5 | 12 | 33 | 24 | 7 | 13 | 7 | 4.5 | 15 | 1.6 | 14 | 25 |
| 16 | 44.5 | 20.5 | 7.5 | 49.5 | 25.5 | 12.5 | 14 | 10 | 4 | 12 | 8 | 3.2 | M5×0.8 | M14×1.25 | 6 | 6 | 8.5 | 16 | 43 | 30 | 10 | 18 | 7 | 5.5 | 20 | 2.3 | 17 | 34 |

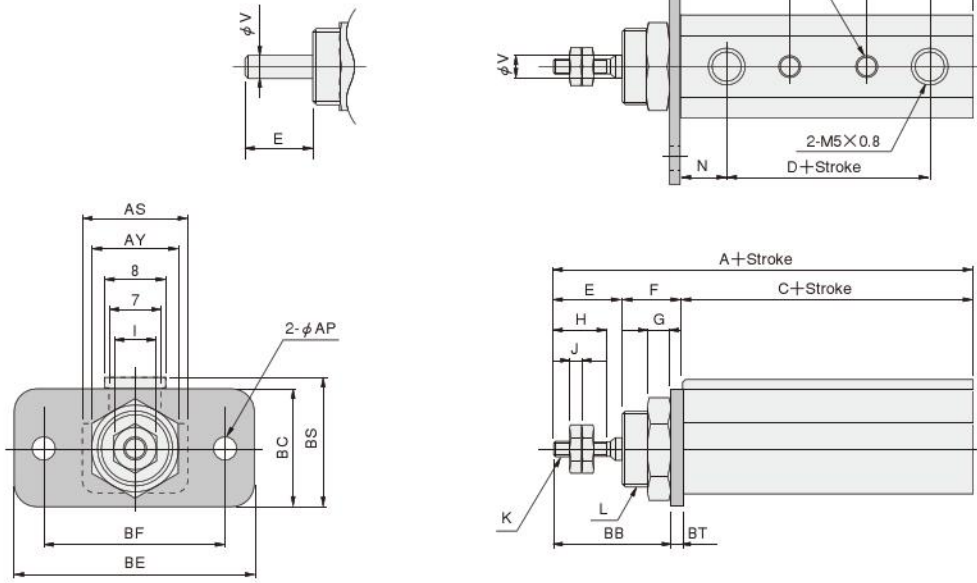
Notes: 1. Not available in the 5, 10, 15 stroke standard cylinder and the 5, 10 stroke cylinder with magnet.
 2. Not available in the 5 stroke standard cylinder.

Dimensions of Flange Mounting Type (mm)

NDA Bore size × Stroke -3

 ϕ 6 : NDA-06
 ϕ 10 : NDA-10
 ϕ 16 : NDA-16

● Plain rod



| Type Code Bore | Standard cylinder | | | Cylinder with magnet | | | E | F | G | H | I | J | K | L | N | V | W | AN | AP | AS | AY | BB | BC | BE | BF | BS | BT |
|----------------------|-------------------|------|-----|----------------------|------|------|----|----|---|----|-----|-----|--------|----------|---|---|-----|----|-----|----|----|------|----|----|----|------|-----|
| | A | C | D | A | C | D | | | | | | | | | | | | | | | | | | | | | |
| 6 | 36 | 19 | 7 | 41 | 24 | 12 | 9 | 8 | 3 | 7 | 5.5 | 1.8 | M3×0.5 | M10×1 | 6 | 3 | 8.5 | 6 | 3.4 | 14 | 12 | 15.4 | 16 | 32 | 24 | 17.5 | 1.6 |
| 10 | 40 | 20 | 7 | 45 | 25 | 12 | 12 | 8 | 3 | 10 | 7 | 2.4 | M4×0.7 | M12×1 | 6 | 5 | 8.5 | 7 | 4.5 | 15 | 14 | 18.4 | 18 | 37 | 28 | 21 | 1.6 |
| 16 | 44.5 | 20.5 | 7.5 | 49.5 | 25.5 | 12.5 | 14 | 10 | 4 | 12 | 8 | 3.2 | M5×0.8 | M14×1.25 | 6 | 6 | 8.5 | 7 | 5.5 | 20 | 17 | 21.7 | 22 | 49 | 36 | 27 | 2.3 |

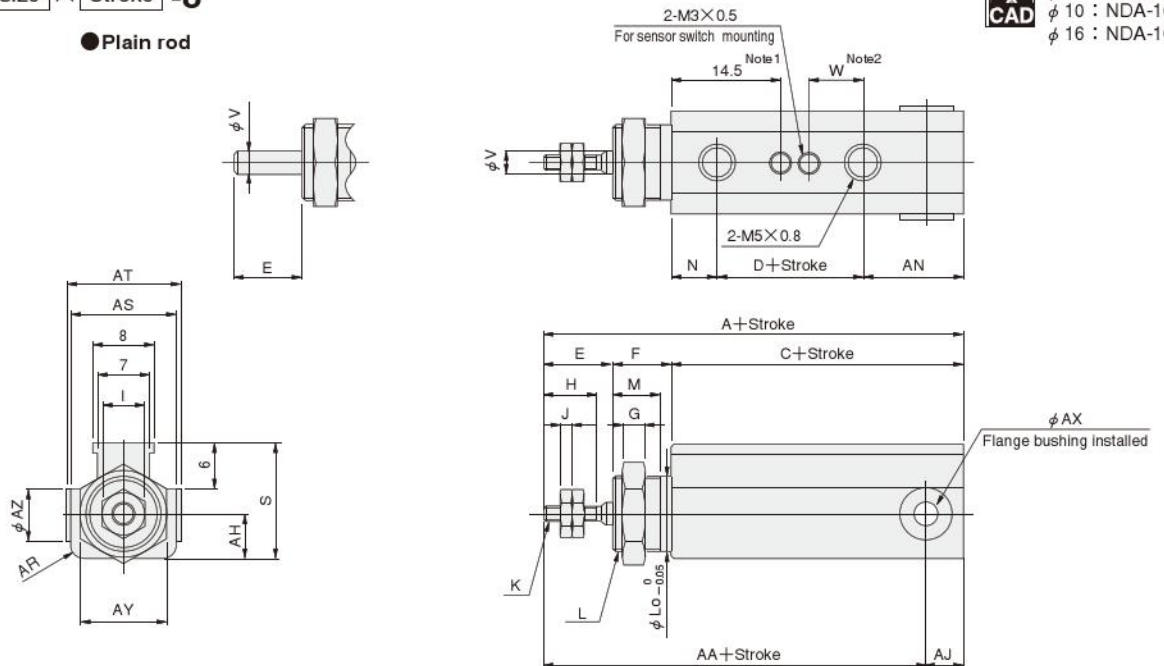
Notes: 1. Not available in the 5, 10, 15 stroke standard cylinder and the 5, 10 stroke cylinder with magnet.
 2. Not available in the 5 stroke standard cylinder.

Dimensions of Pivot Mounting Type (mm)

NDA Bore size × Stroke -8

 ϕ 6 : NDA-06
 ϕ 10 : NDA-10
 ϕ 16 : NDA-16

● Plain rod



| Type Code Bore | Standard cylinder | | | Cylinder with magnet | | | E | F | G | H | I | J | K | L | Lo | M | N | S | V | W | AH | AJ | AN | AR | AS | AT | AX | AY | AZ | | |
|----------------------|-------------------|------|-----|----------------------|------|------|------|------|----|----|---|----|-----|-----|--------|----------|----|-----|---|------|----|-----|-----|-----|------|----|----|------|----|----|----|
| | A | C | D | AA | A | C | | | | | | | | | | | | | | | | | | | | | | | | D | AA |
| 6 | 43.5 | 26.5 | 7 | 38.5 | 48.5 | 31.5 | 12 | 43.5 | 9 | 8 | 3 | 7 | 5.5 | 1.8 | M3×0.5 | M10×1 | 10 | 6.5 | 6 | 15.5 | 3 | 8.5 | 6 | 5 | 13.5 | R2 | 14 | 15.6 | 3 | 12 | 7 |
| 10 | 50 | 30 | 7 | 43.5 | 55 | 35 | 12 | 48.5 | 12 | 8 | 3 | 10 | 7 | 2.4 | M4×0.7 | M12×1 | 12 | 6.5 | 6 | 19 | 5 | 8.5 | 7 | 6.5 | 17 | R2 | 15 | 17 | 5 | 14 | 10 |
| 16 | 55.5 | 31.5 | 7.5 | 48.5 | 60.5 | 36.5 | 12.5 | 53.5 | 14 | 10 | 4 | 12 | 8 | 3.2 | M5×0.8 | M14×1.25 | 14 | 8.5 | 6 | 25.5 | 6 | 8.5 | 9.5 | 7 | 18 | R3 | 20 | 22 | 6 | 17 | 12 |

Notes: 1. Not available in the 5, 10, 15 stroke standard cylinder and the 5, 10 stroke cylinder with magnet.
 2. Not available in the 5 stroke standard cylinder.

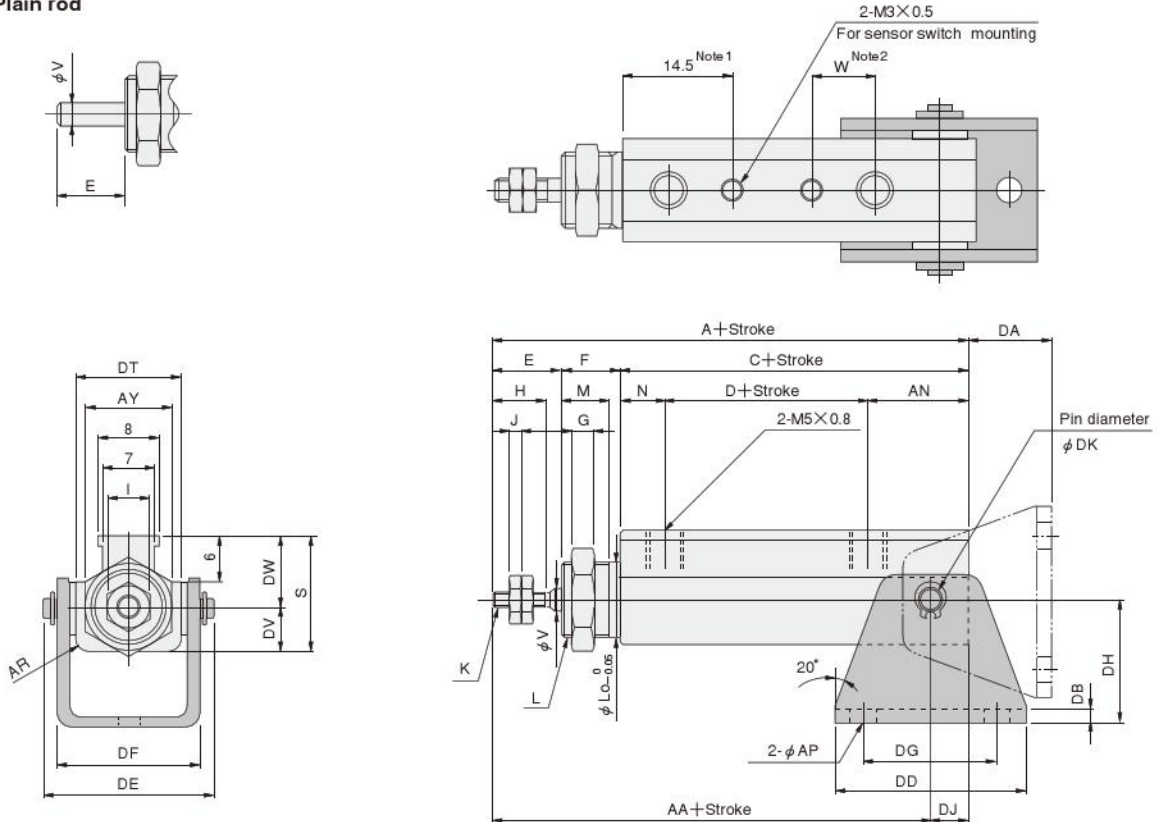
Dimensions of Pivot Mounting with Supporting Bracket Type (mm)

NDA Bore size Stroke **-8-8E**

CAD ϕ 6 : NDA-06
 ϕ 10 : NDA-10
 ϕ 16 : NDA-16

KNOCK CYLINDERS

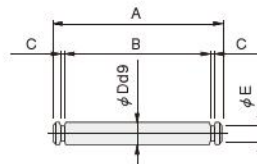
● Plain rod



| Type | Standard cylinder | | | Cylinder with magnet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------|-------------------|------|-----|----------------------|------|------|------|------|----|----|---|----|-----|-----|--------|----------|----------------|-----|---|------|---|-----|------|-----|----|----|------|-----|----|------|------|----|----|-----|----|----|-----|-----|
| | A | C | D | AA | A | C | D | AA | E | F | G | H | I | J | K | L | L ₀ | M | N | S | V | W | AN | AP | AR | AY | DA | DB | DD | DE | DF | DG | DH | DJ | DK | DT | DW | DV |
| 6 | 43.5 | 26.5 | 7 | 38.5 | 48.5 | 31.5 | 12 | 43.5 | 9 | 8 | 3 | 7 | 5.5 | 1.8 | M3×0.5 | M10×1 | 10 | 6.5 | 6 | 15.5 | 3 | 8.5 | 13.5 | 3.4 | R2 | 12 | 11 | 1.6 | 26 | 22.7 | 19 | 18 | 16 | 5 | 3 | 14 | 9.5 | 6 |
| 10 | 50 | 30 | 7 | 43.5 | 55 | 35 | 12 | 48.5 | 12 | 8 | 3 | 10 | 7 | 2.4 | M4×0.7 | M12×1 | 12 | 6.5 | 6 | 19 | 5 | 8.5 | 17 | 4.5 | R2 | 14 | 13.5 | 1.6 | 33 | 24.5 | 20.5 | 24 | 20 | 6.5 | 5 | 15 | 12 | 7 |
| 16 | 55.5 | 31.5 | 7.5 | 48.5 | 60.5 | 36.5 | 12.5 | 53.5 | 14 | 10 | 4 | 12 | 8 | 3.2 | M5×0.8 | M14×1.25 | 14 | 8.5 | 6 | 25.5 | 6 | 8.5 | 18 | 5.5 | R3 | 17 | 18 | 2.3 | 42 | 31.1 | 27 | 29 | 25 | 7 | 6 | 20 | 16 | 9.5 |

Notes: 1. Not available in the 5, 10, 15 stroke standard cylinder and the 5, 10 stroke cylinder with magnet.
 2. Not available in the 5 stroke standard cylinder.

● Dimensions of pin for pivot mounting bracket
 [With 2 snap rings]



| Bore size | A | B | C | ϕ D | ϕ E | Snap ring |
|----------------|------|------|------|--|----------|-----------|
| 6 [0.236 in.] | 22.7 | 19.7 | 0.68 | 3 $\begin{smallmatrix} -0.020 \\ -0.045 \end{smallmatrix}$ | 2.4 | E type |
| 10 [0.394 in.] | 24.5 | 21.1 | 0.7 | 5 $\begin{smallmatrix} -0.030 \\ -0.060 \end{smallmatrix}$ | 4.8 | C type |
| 16 [0.630 in.] | 31.1 | 27.5 | 0.8 | 6 $\begin{smallmatrix} -0.030 \\ -0.060 \end{smallmatrix}$ | 5.7 | C type |

BRACKETS (FOR DOUBLE ACTING TYPE)

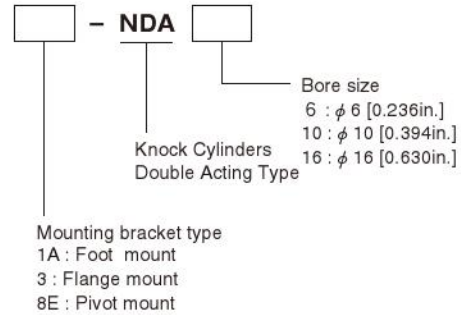
Mounting Brackets, Knuckles, Brackets with Pin

Mounting Brackets

| Bore size mm [in.] | Mounting brackets | Foot mounting bracket | Flange mounting bracket | Pivot mounting bracket (with pin and snap ring) |
|--------------------|-------------------|-----------------------|-------------------------|---|
| 6 [0.236] | | 1A-NDA6 | 3-NDA6 | 8E-NDA6 |
| 10 [0.394] | | 1A-NDA10 | 3-NDA10 | 8E-NDA10 |
| 16 [0.630] | | 1A-NDA16 | 3-NDA16 | 8E-NDA16 |

Remarks: 1. See p.84~86 for dimensions of the mounting brackets.
2. Pivot mounting bracket can be used only on the pivot mount type cylinder.

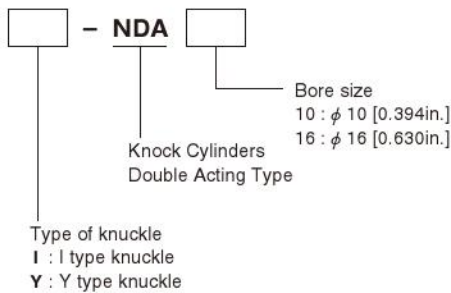
Order codes



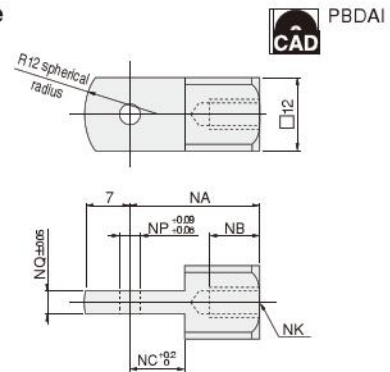
Knuckles

| Bore size mm [in.] | Mounting brackets | I type knuckle | Y type knuckle (With pin) |
|--------------------|-------------------|----------------|---------------------------|
| 10 [0.394] | | I-NDA10 | Y-NDA10 |
| 16 [0.630] | | I-NDA16 | Y-NDA16 |

Order codes

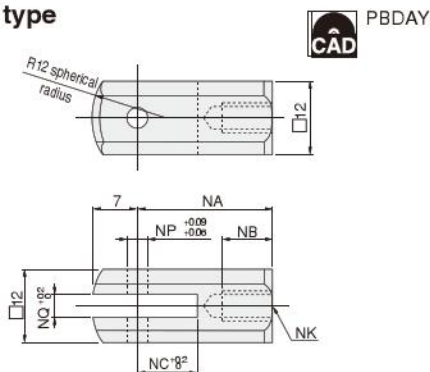


I type



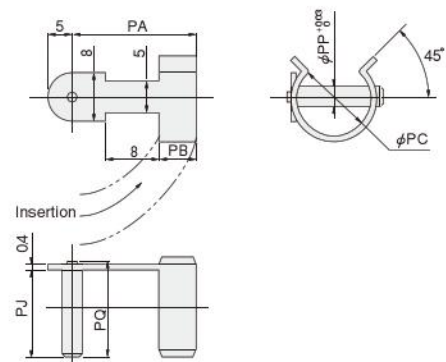
| Code | NA | NB | NC | NK | NP | NQ |
|------------|----|----|----|--------|-----|-----|
| 10 [0.394] | 21 | 8 | 9 | M4×0.7 | 3.2 | 3.1 |
| 16 [0.630] | 25 | 8 | 14 | M5×0.8 | 5 | 6.4 |

Y type



| Code | NA | NB | NC | NK | NP | NQ |
|------------|----|----|----|--------|-----|-----|
| 10 [0.394] | 21 | 8 | 10 | M4×0.7 | 3.2 | 3.2 |
| 16 [0.630] | 21 | 11 | 10 | M5×0.8 | 5 | 6.5 |

Pin and bracket for Y type knuckle

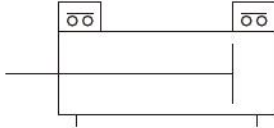


| Code | PA | PB | PC | PJ | PP | PQ |
|------------|----|----|----|------|-----|------|
| 10 [0.394] | 17 | 5 | 14 | 13.5 | 3.2 | (15) |
| 16 [0.630] | 17 | 5 | 14 | 13.5 | 5 | (15) |

SENSOR SWITCHES

Solid State Type, Reed Switch Type

Symbol



Order Codes (For Sensor Switches Only)

| | Sensor switch model | Option Lead wire length | With sensor holder |
|--|---------------------|----------------------------|--------------------|
| Solid state type With indicator lamp DC10~28V | ZC130 | A | -NDAS |
| Solid state type With indicator lamp DC4.5~28V | ZC153 | | |
| Reed switch type Without indicator lamp DC5~28V AC85~115V | CS5T | B | |
| Reed switch type With indicator lamp DC10~28V | CS11T | | |

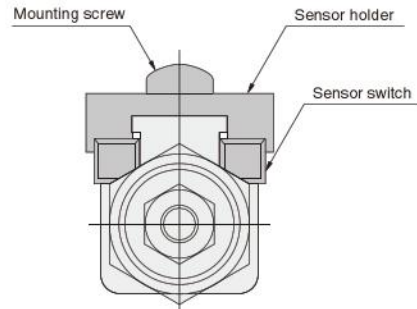
- A : 1000mm [39in.]
- B : 3000mm [118in.]

● The same sensor holder is used for $\phi 6$, $\phi 10$, and $\phi 16$.

- For sensor switch details, see p.1544.
- ★ Order code for the sensor holder only. C1-NDAS

Moving Sensor Switch

- Loosening mounting screw allows the sensor switch to be moved freely in the cylinder's axial direction.
- Tighten the mounting screw with a tightening torque of 19.6N·cm [1.73in·lbf] or less.



Minimum Cylinder Stroke When Using Sensor Switch

| Bore size | Solid state type sensor switch | | Reed switch type sensor switch | |
|------------|--------------------------------|----------------|--------------------------------|----------------|
| | Mounting 2 pcs. | Mounting 1 pc. | Mounting 2 pcs. | Mounting 1 pc. |
| 6 [0.236] | 5 | 5 | 10 | 5 |
| 10 [0.394] | [0.197] | [0.197] | [0.394] | [0.197] |
| 16 [0.630] | | | | |

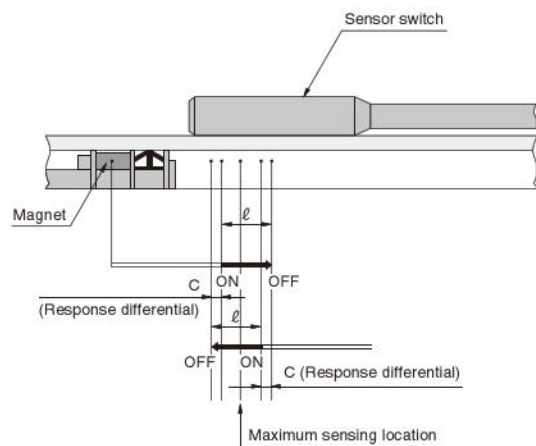
Remark: In the reed switch type sensor switch, 1 sensor switch installation is standard for the 5mm cylinder stroke.

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.

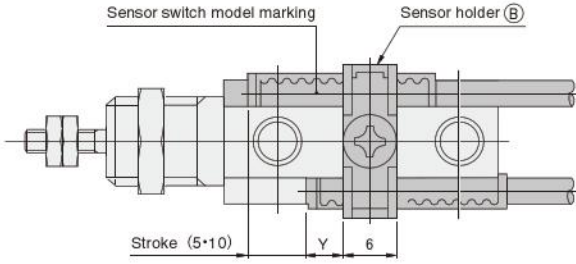
| Bore size | ZC130□, ZC153□ | | CS5T□, CS11T□ | |
|------------|--------------------------|------------------------|---------------------------|------------------------|
| | Operating range | Response differential | Operating range | Response differential |
| 6 [0.236] | 2.5~4.0 [0.098~0.157] | 0.3 [0.012] or less | 3.5~7.5 [0.138~0.295] | 1.3 [0.051] or less |
| 10 [0.394] | 2.0~4.0 [0.079~0.157] | 0.3 [0.012] or less | 3.5~8.5 [0.138~0.335] | 1.6 [0.063] or less |
| 16 [0.630] | 2.5~4.0 [0.098~0.157] | 0.3 [0.012] or less | 5.0~10.5 [0.197~0.413] | 1.9 [0.075] or less |

Remark: The above table shows reference values.

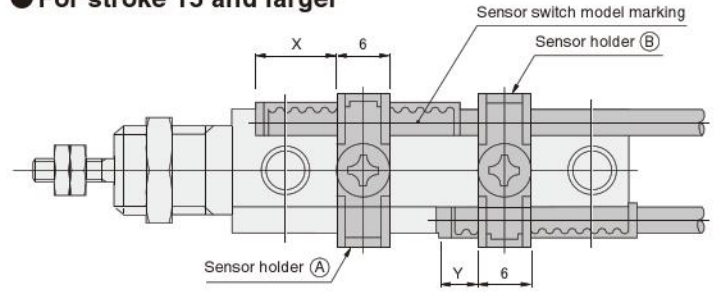


Mounting Location of End of Stroke Detection Sensor Switch

● For strokes 5 and 10



● For stroke 15 and larger



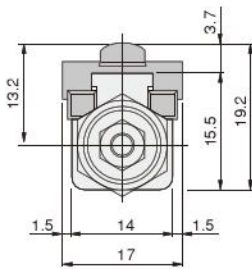
mm [in.]

| Bore size | Mounting location | Sensor switch model | | | |
|-------------------------|-------------------|---------------------|-------------|--------------|--------|
| | | ZC130□ | ZC153□ | CS5T□ | CS11T□ |
| 6, 10 [0.236, 0.394] | X | 10 [0.394] | 8.5 [0.335] | 12 [0.472] | |
| | Y | 5 [0.197] | 3.5 [0.138] | 7 [0.276] | |
| 16 [0.630] | X | 10.5 [0.413] | 9 [0.354] | 12.5 [0.492] | |
| | Y | 5.5 [0.217] | 4 [0.157] | 7.5 [0.295] | |

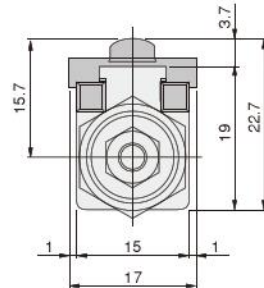
- Remarks:
1. The table at left gives reference values for the standard strokes. For the procedure to find-out the best position, see p.92.
 2. The above figures show the piping connection port when it has been turned to face upward.
 3. Mount the sensor switch so that the surface showing the model marking faces up.
 4. Sensor holder (A) is not available for the 5mm and 10mm strokes, and only sensor holder (B) is available. Two sensor switches can be mounted with a single sensor holder (B). In this case, the sensor switch mounting position on the rod side becomes the Y dimension (shown in the figure) + stroke.

Dimensions of Sensor Switch Mounting (mm)

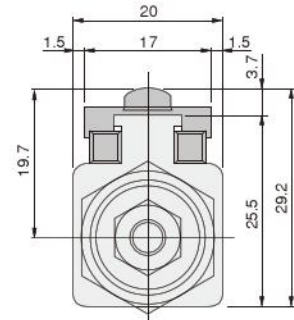
● φ 6 [0.236in.]



● φ 10 [0.394in.]



● φ 16 [0.630in.]





Mounting

Double acting type

- In applications with high load ratio or high speed, use an externally mounted stopper to prevent direct shock to the cylinder.
- Do not let the tightening torque for the mounting nut exceed the figures in the table below.

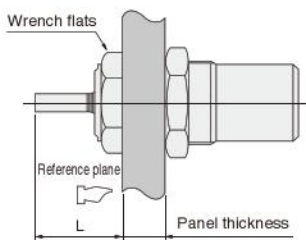
| Bore size | Maximum tightening torque |
|---------------|---------------------------|
| 6 [0.236in.] | 1079 [95.5] |
| 10 [0.394in.] | 1275 [113] |
| 16 [0.630in.] | 1961 [174] |

N·cm [in·lbf]

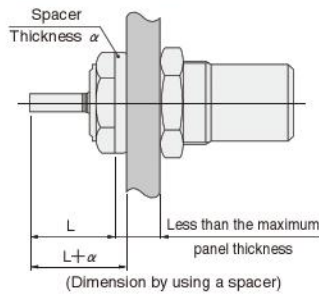
Single acting push type

- Using the centering location on the body can improve mounting precision on panel mounting. In addition, set the end face of the wrench flat as a reference plane does not need any adjustment of the rod end position. Moreover, the rod end position can be freely set through the use of cylindrical spacer matching the outer diameter of the cylinder body. For the maximum thickness of the panel, use the values in the table below as guidelines.

● Panel mounting



● Panel mounting



| Bore size | Maximum panel thickness |
|------------|-------------------------|
| 6 [0.236] | 8 [0.315] |
| 10 [0.394] | 9 [0.354] |
| 16 [0.630] | 10 [0.394] |

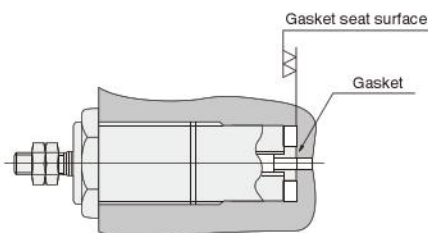
mm [in.]

- Do not let the tightening torque for the mounting nut exceed the figures in the table below.

| Bore size | Maximum tightening torque |
|---------------|---------------------------|
| 6 [0.236in.] | 1226 [109] |
| 10 [0.394in.] | 1716 [152] |
| 16 [0.630in.] | 4903 [434] |

N·cm [in·lbf]

- Let the surface roughness of the bottom of the insert mounting hole (gasket seat surface) be of medium finish (▽▽). Moreover, mounting without a gasket can be done by applying a sealing agent to the thread of the body.

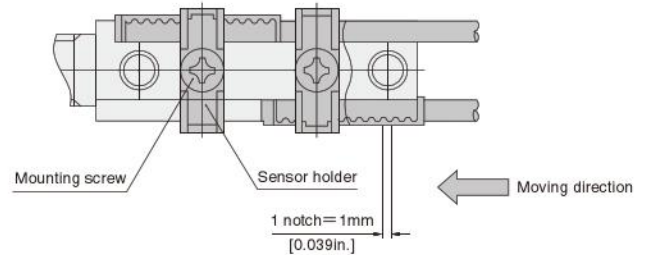


Sensor switches

Double acting type

● Setting the head side stroke end

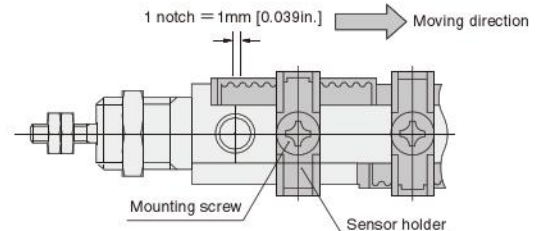
- Push piston rod to the fully retracted position.
- Install a sensor switch in a holder without tightening a mounting screw all the way, move the switch from head side to rod side until it turns ON (for **ZC130**, **ZC153**, **CS11T**, when the LED lights up), then move the switch 1 notch (= 1mm [0.039in.]) for **ZC130** and **ZC153**, or 2 notches (= 2mm [0.079in.]) for **CS5T** and **CS11T** toward the rod side, and tighten the mounting screw.



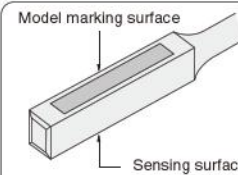
● Setting the rod side stroke end

Conduct the same procedure as the head side, but on the reversed way.

- Pull piston rod to the fully extended position.
- Install a sensor switch in a holder without tightening a mounting screw all the way, move the switch from rod side to head side until it turns ON, then move the switch 1 notch (=1mm [0.039in.]) for **ZC130**, **ZC153**, or 2 notches (=2mm [0.079in.]) for **CS5T** and **CS11T** toward head side and tighten the mounting screw.

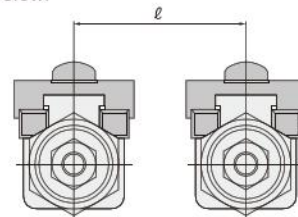


Caution when installing cylinder with sensor switch



In the ZC type sensor switches, the opposite side from the model marking surface is the sensing surface side. Mount it so that the cylinder magnet comes to the sensing surface side.

When installing 2 or more knock cylinders with magnets, which are located close to each other in parallel, follow the conditions shown below.



| Bore size | ℓ dimension |
|---------------|-------------------------|
| 6 [0.236in.] | 23mm [0.906in.] or more |
| 10 [0.394in.] | 24mm [0.945in.] or more |
| 16 [0.630in.] | 26mm [1.024in.] or more |