# Air Cylinder Short Type

New

RoHS

## Compact with a new construction!
## New release with full functions

## Minimized with shorter total length!

**Space saving; contributes to downsizing of equipment.**

Up to **21%** lighter

Up to **66 mm** shorter

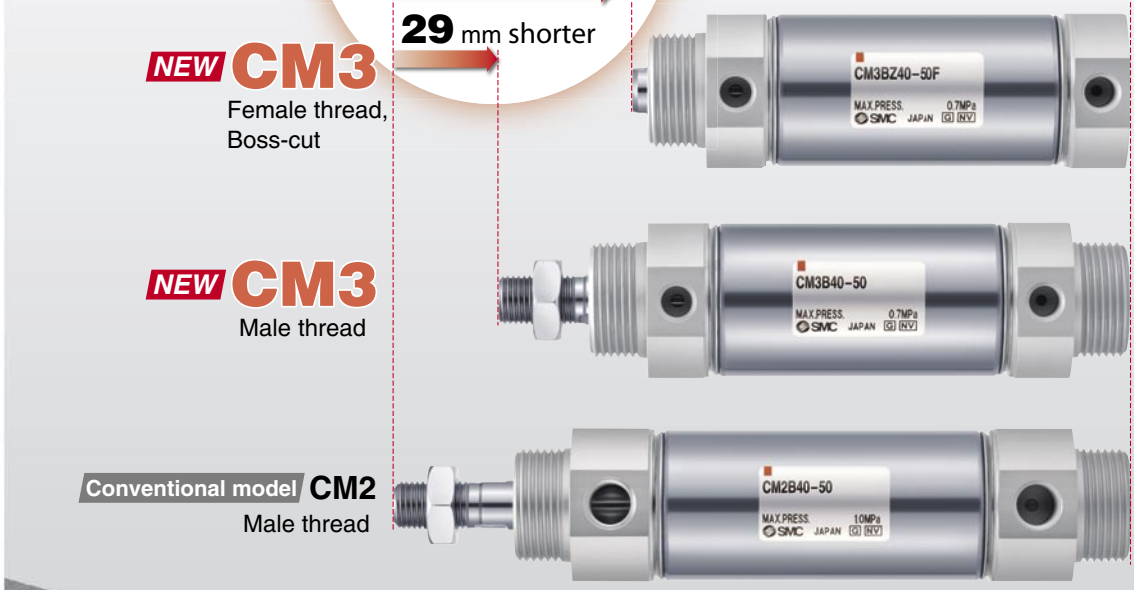
**29** mm shorter

**138** mm

NEW **CM3**
Female thread,
Boss-cut

NEW **CM3**
Male thread

Conventional model **CM2**
Male thread




**CM3B40-50□** stroke

# Series CM3

SMC

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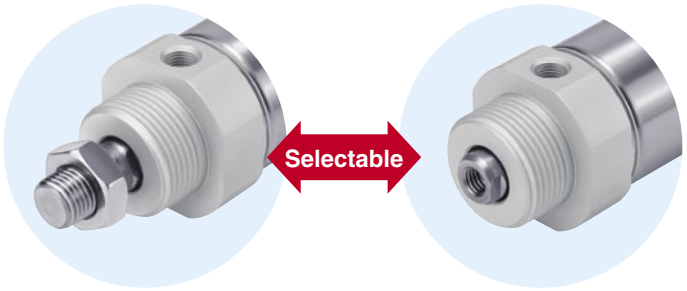
# Series CM3

## Female rod end available as standard

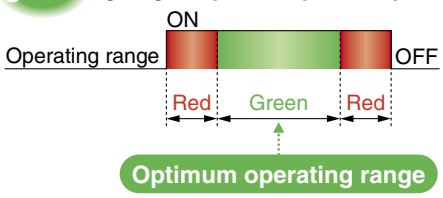
Applications expanded by making it possible to select either male or female thread within the standard model.




## 2-colour indication solid state auto switch mountable

Possible to confirm whether the position is appropriate at a glance.
Increases effectiveness of adjustment time.

A **green** light lights up at the optimum operating range.




## Shorter total length than CM2 series

| Bore size (mm) | Shortened by |
|---|---|
| 20 | 17 mm |
| 25 | 17 mm |
| 32 | 13 mm |
| 40 | 29 mm |

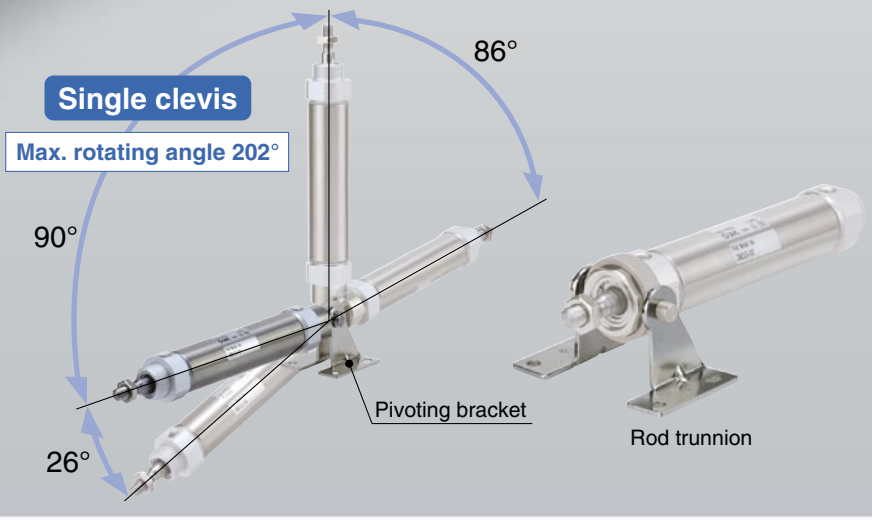

∗ Compared with the basic type with male thread



**Tube is resistant against external shock.**
Prevents deformation and damage by external shock.

**Small auto switches are mountable.**

**Pivoting single clevis and trunnion bracket are mountable.**
Rotation: Max. 202° (CM3C40)




## Series Variations

| Series | Bore size (mm) | Standard stroke (mm) | Action | Rod | Mounting | Built-in magnet for auto switch | Rubber bumper | Auto switch |
|---|---|---|---|---|---|---|---|---|
| **CM3** | **20, 25, 32, 40** | 25 to 300 | Double acting | Single rod | Basic, Foot, Flange, Clevis, Trunnion, etc. | ● | ● | D-M9□(W), D-A90 |

ALMOTION

# Air Cylinder Short Type
## Standard: Double Acting, Single Rod
# Series CM3
### ø20, ø25, ø32, ø40

RoHS

## How to Order

**CM3 L 40 – 150 [ ]**

**With auto switch** **CDM3 L 40 – 150 [ ] – M9BW [ ]**

**With auto switch**
(Built-in magnet)

**Mounting**

| | |
|---|---|
| B | Basic |
| L | Foot |
| F | Rod flange |
| G | Head flange |
| C | Single clevis |
| D | Double clevis |
| U | Rod trunnion |

| | |
|---|---|
| T | Head trunnion |
| E | Integral clevis |
| BZ | Boss-cut/Basic |
| FZ | Boss-cut/Rod flange |
| UZ | Boss-cut/Rod trunnion |

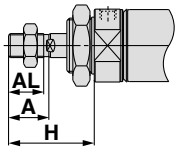
**Bore size**

| | |
|---|---|
| 20 | 20 mm |
| 25 | 25 mm |
| 32 | 32 mm |
| 40 | 40 mm |

**Rod end thread**

| | |
|---|---|
| — | Male thread |
| F | Female thread |
| G | Long male rod end* |

* G: Same rod end dimensions (A, AL, H) as CM2 series.




**Number of auto switches**

| | |
|---|---|
| — | 2 pcs. |
| S | 1 pc. |
| n | "n" pcs. |

**Auto switch**

| | |
|---|---|
| — | Without auto switch |

* For applicable auto switches, refer to the below table.

**Cylinder stroke (mm)**
Refer to the next page for standard strokes.

### Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CDM3F32-100

### Applicable Auto Switches/Refer to pages 1263 to 1371 in Best Pneumatics No. 2 for further information on auto switches.

| Type | Special function | Electrical entry | Indicator light | Wiring (Output) | Load voltage DC | Load voltage AC | Auto switch model | Lead wire length (m) 0.5 (Nil) | 1 (M) | 3 (L) | 5 (Z) | None (N) | Pre-wired connector | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Solid state auto switch | —— | Grommet | Yes | 3-wire (NPN) | 5 V, 12 V | | M9N | ● | ● | ● | ○ | — | ○ | IC circuit | Relay, PLC |
| | | | | 3-wire (PNP) | | | M9P | ● | ● | ● | ○ | — | ○ | | |
| | | | | 2-wire | 12 V | | M9B | ● | ● | ● | ○ | — | ○ | — | |
| | | Connector | | | | | H7C | ● | — | ● | ● | ● | — | | |
| | | Terminal conduit | | 3-wire (NPN) | 5 V, 12 V | | G39A | — | — | — | — | ● | — | IC circuit | |
| | | | | 2-wire | 12 V | — | K39A | — | — | — | — | ● | — | — | |
| | Diagnostic indication (2-colour indication) | Grommet | | 3-wire (NPN) | 5 V, 12 V | | M9NW | ● | ● | ● | ○ | — | ○ | IC circuit | |
| | | | | 3-wire (PNP) | | | M9PW | ● | ● | ● | ○ | — | ○ | | |
| | | | | 2-wire | 12 V | | M9BW | ● | ● | ● | ○ | — | ○ | — | |
| | Water resistant (2-colour indication) | | | | | | H7BA | — | — | ● | ○ | — | ○ | | |
| | With diagnostic output (2-colour indication) | | | 4-wire (NPN) | 5 V, 12 V | | H7NF | ● | — | ● | ○ | — | ○ | IC circuit | |
| Reed auto switch | —— | Grommet | Yes | 3-wire (NPN equivalent) | — | 5 V | — | A96 | ● | — | ● | — | — | — | IC circuit | — |
| | | | | 2-wire | 24 V | 100 V | | A93 | ● | — | ● | ● | — | — | — | Relay, PLC |
| | | | No | | | 100 V or less | | A90 | ● | — | ● | — | — | — | IC circuit | |
| | | | Yes | | | 100 V, 200 V | | B54 | ● | — | ● | ● | — | — | — | |
| | | | No | | | 200 V or less | | B64 | ● | — | ● | — | — | — | | |
| | | Connector | Yes | | | — | 12 V | C73C | ● | — | ● | ● | ● | — | | |
| | | | No | | | 24 V or less | | C80C | ● | — | ● | ● | ● | — | IC circuit | |
| | | Terminal conduit | Yes | | | — | | A33A | — | — | — | — | ● | — | — | PLC |
| | | | | | | 100 V, 200 V | | A34A | — | — | — | — | ● | — | | Relay, PLC |
| | | DIN terminal | | | | | | A44A | — | — | — | — | ● | — | | |
| | Diagnostic indication (2-colour indication) | Grommet | | | | — | — | B59W | ● | — | ● | — | — | — | | |

* Lead wire length symbols: 0.5 m ·····Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ
None ····· N (Example) H7CN

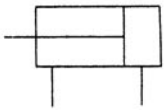
* Solid state auto switches marked with "○" are produced upon receipt of order.
* Do not indicate suffix "N" for no lead wire on the D-A3□A/A44A/G39A/K39A types.
* The D-G39A/K39A cannot be mounted on the bore size ø20.
* The D-A9□V/M9□V/M9□WV types and the D-M9□A(V)L type cannot be mounted.

* Since there are other applicable auto switches than listed above, refer to page 16 for details.
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329 in Best Pneumatics No. 2.
* The D-A9□/M9□/M9□W type auto switches are shipped together, (but not assembled). (However, auto switch mounting brackets are assembled when being shipped.)
* Water resistant type auto switch can be mounted to the models with the above mentioned part numbers, but this does not guarantee the water resistance of the cylinder. A water resistant type cylinder is recommended for use in an environment which requires water resistance.
* For other applicable auto switches, please contact SMC.

# Series CM3

## JIS Symbol

**Double acting, Single rod**



Refer to pages 13 to 16 for cylinders with auto switches.

- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Minimum stroke for auto switch mounting
- Operating range
- Auto switch mounting brackets/Part no.

## ⚠Warning

1. **Operate the cylinder within the specified cylinder speed, kinetic energy and lateral load at the rod end.**
2. **The allowable kinetic energy is different between the cylinders with male rod end and with female rod end due to the different thread sizes. Refer to page 4.**
3. **When female rod end is used, use a washer, etc. to prevent the contact part at the rod end from being deformed depending on the material of the workpiece.**

## ⚠Caution

1. **Use a thin wrench when tightening the piston rod.**

## Specifications

| Bore size (mm) | | 20 | 25 | 32 | 40 |
|---|---|---|---|---|---|
| **Type** | | Pneumatic | | | |
| **Action** | | Double acting, Single rod | | | |
| **Fluid** | | Air | | | |
| **Proof pressure** | | 1.0 MPa | | | |
| **Maximum operating pressure** | | 0.7 MPa | | | |
| **Minimum operating pressure** | | 0.05 MPa | | | |
| **Ambient and fluid temperature** | | Without auto switch: –10 to +70°C (No freezing)<br>With auto switch: –10 to +60°C (No freezing) | | | |
| **Lubrication** | | Not required (Non-lube) | | | |
| **Stroke length tolerance** | | $^{+1.4}_{0}$ mm | | | |
| **Piston speed** | | 50 to 750 mm/s | | | |
| **Cushion** | | Rubber bumper | | | |
| **Allowable kinetic energy** | **Male rod end** | 0.2 J | 0.29 J | 0.46 J | 0.84 J |
| | **Female rod end** | 0.11 J | 0.18 J | 0.29 J | 0.52 J |

∗ Operate the cylinder within the allowable kinetic energy. Refer to page 4 for details.

## Standard Strokes

| Bore size (mm) | Standard stroke (mm) Note) |
|---|---|
| **20** | 25, 50, 75, 100, 125, 150, 200, 250, 300 |
| **25** | |
| **32** | |
| **40** | |

∗ Other intermediate strokes can be manufactured upon receipt of order.
Manufacture of intermediate strokes in 1 mm intervals is possible. (Spacers are not used.)

## Boss-cut

Boss for the head cover bracket is eliminated and the total length of cylinder is shortened.

### Comparison of the Full Length Dimension (Versus CM3□-□ type)

(mm)

| ø20 | ø25 | ø32 | ø40 |
|---|---|---|---|
| –13 | –13 | –13 | –16 |

### Mounting

■ Boss-cut/Basic (BZ) ■ Boss-cut/Rod flange (FZ)
■ Boss-cut/Rod trunnion (UZ)

## Mounting Brackets/Part No.

| Mounting bracket | Min. order qty. | Bore size (mm) | | | | Contents (for minimum order quantity) |
|---|---|---|---|---|---|---|
| | | 20 | 25 | 32 | 40 | |
| Foot ∗ | 2 | CM-L020B | CM-L032B | | CM-L040B | 2 foots, 1 mounting nut |
| Flange | 1 | CM-F020B | CM-F032B | | CM-F040B | 1 flange |
| Single clevis ∗∗ | 1 | CM-C020B | CM-C032B | | CM-C040B | 1 single clevis, 3 liners |
| Double clevis ∗∗∗ (with pin) | 1 | CM-D020B | CM-D032B | | CM-D040B | 1 double clevis, 3 liners, 1 clevis pin, 2 retaining rings |
| Trunnion (with nut) | 1 | CM3-T020B | CM3-T032B | | CM3-T040B | 1 trunnion, 1 trunnion nut |

∗ Order 2 foots per cylinder.
∗∗ 3 liners are included with a clevis bracket for adjusting the mounting angle.
∗∗∗ A clevis pin and retaining rings (split pins for ø40) are included.

## Mounting and Accessories

| Mounting \ Accessories | Standard | | | Option | | |
|---|---|---|---|---|---|---|
| | Mounting nut | Rod end nut (male thread) | Clevis pin | Single knuckle joint | Double knuckle joint Note 3) | Pivoting clevis bracket Note 4) |
| Basic | ●(1 pc.) | ● | — | ● | ● | — |
| Foot | ●(2) | ● | — | ● | ● | — |
| Rod flange | ●(1) | ● | — | ● | ● | — |
| Head flange | ●(1) | ● | — | ● | ● | — |
| Integral clevis | — Note 1) | ● | — | ● | ● | ● |
| Single clevis | — Note 1) | ● | — | ● | ● | — |
| Double clevis Note 3) | — Note 1) | ● | ● Note 5) | ● | ● | — |
| Rod trunnion | ●(1) Note 2) | ● | — | ● | ● | — |
| Head trunnion | ●(1) Note 2) | ● | — | ● | ● | — |
| Boss-cut/Basic | ●(1) | ● | — | ● | ● | — |
| Boss-cut/Rod flange | ●(1) | ● | — | ● | ● | — |
| Boss-cut/Rod trunnion | ●(1) | ● | — | ● | ● | — |

Note 1) Mounting nuts are not attached to the integral clevis, single clevis and double clevis types.
Note 2) Trunnion nuts are attached to the rod trunnion and head trunnion types.
Note 3) A pin and retaining rings (split pins for ø40) are included with the double clevis and double knuckle joint.
Note 4) A pivoting clevis bracket pin and retaining rings are included with the pivoting clevis bracket.
Note 5) Retaining rings (split pins for ø40) are included with the clevis pin.

## Mounting Brackets, Accessories/Material, Surface Treatment

| Segment | Description | Material | Surface treatment |
|---|---|---|---|
| Mounting brackets | Foot | Iron | Nickel plated |
| | Flange | Iron | Nickel plated |
| | Single clevis | Iron | Nickel plated |
| | Double clevis | Iron | Nickel plated |
| | Trunnion | Iron | Electroless nickel plated |
| Accessories | Rod end nut (male thread) | Iron | Nickel plated |
| | Mounting nut | Iron | Nickel plated |
| | Trunnion nut | Iron | Nickel plated |
| | Pivoting clevis bracket | Iron | Nickel plated |
| | Pivoting clevis bracket pin | Iron | (None) |
| | Single knuckle joint | Iron | Electroless nickel plated |
| | Double knuckle joint | Iron | Electroless nickel plated<br>Metallic bronze colour painted for ø40 |
| | Double clevis pin | Iron | (None) |
| | Double knuckle joint pin | Iron | (None) |

## ⚠ Warning

**1. Do not rotate the cover.**
If a cover is rotated when installing a cylinder or screwing a fitting into the port, it is likely to damage the junction part with cover.

## ⚠ Caution

**1. Do not touch the cylinder during operation at a high speed and a high frequency.**
Use caution when handling a cylinder, which is running at a high speed and a high frequency, because the surface of a cylinder tube could get so hot enough as to cause you get burned.

**2. Do not use the air cylinder as an air-hydro cylinder.**
If it uses turbine oil in place of fluids for cylinder, it will result in oil leakage and damage the product.

## Weights

(kg)

| Bore size (mm) | | 20 | 25 | 32 | 40 |
|---|---|---|---|---|---|
| Basic weight | Basic | 0.12 | 0.18 | 0.25 | 0.45 |
| | Long male rod end (G) | 0.13 | 0.20 | 0.27 | 0.48 |
| | Female rod end (F) | 0.11 | 0.17 | 0.23 | 0.41 |
| | Boss-cut/Basic | 0.11 | 0.17 | 0.23 | 0.42 |
| | Boss-cut/Long male rod end | 0.12 | 0.18 | 0.25 | 0.45 |
| | Boss-cut/Female rod end | 0.10 | 0.15 | 0.22 | 0.38 |
| | Integral clevis | 0.12 | 0.18 | 0.26 | 0.46 |
| | Integral clevis/Long male rod end | 0.13 | 0.19 | 0.28 | 0.48 |
| | Integral clevis/Female rod end | 0.11 | 0.16 | 0.25 | 0.41 |
| Additional weight for bracket | Foot | 0.15 | 0.16 | 0.16 | 0.27 |
| | Flange | 0.06 | 0.09 | 0.09 | 0.12 |
| | Single clevis | 0.04 | 0.04 | 0.04 | 0.09 |
| | Double clevis | 0.05 | 0.06 | 0.06 | 0.13 |
| | Trunnion | 0.04 | 0.07 | 0.07 | 0.10 |
| Pivoting bracket | | 0.08 | 0.09 | 0.17 | 0.25 |
| Single knuckle joint | | 0.05 | 0.09 | 0.09 | 0.10 |
| Double knuckle joint (with pin) | | 0.05 | 0.09 | 0.09 | 0.13 |
| Additional weight per 50 mm of stroke | | 0.04 | 0.06 | 0.08 | 0.11 |
| Additional weight for switch magnet | | 0.01 | 0.01 | 0.01 | 0.01 |

Calculation: (Example) **CDM3F20-100G**
(Flange type, ø20, 100 mm stroke)

- Basic weight ····· 0.12 (Basic type G, ø20)
- Additional weight for bracket ···· 0.06 (Flange)
- Additional weight for stroke ····· 0.04/50 mm
- Air cylinder stroke ····· 100 mm
- Additional weight for switch magnet ···· 0.01

0.12 + 0.06 + 0.04 x (100/50) + 0.01 = 0.27 kg

## Allowable Kinetic Energy

### Table (1) Max. Allowable Kinetic Energy [J]

| Bore size (mm) | 20 | 25 | 32 | 40 |
|---|---|---|---|---|
| Male rod end | 0.2 | 0.29 | 0.46 | 0.84 |
| Female rod end | 0.11 | 0.18 | 0.29 | 0.52 |

**Kinetic energy E (J)** $= \dfrac{(m_1 + m_2)\,V^2}{2}$

$m_1$: Weight of cylinder movable parts kg
$m_2$: Load weight kg
$V$ : Piston speed at the end m/s

### Table (2) Weight of Cylinder Movable Parts: At Each Rod End/Without Built-in Magnet/0 Stroke [g]

| Bore size (mm) | 20 | 25 | 32 | 40 |
|---|---|---|---|---|
| Basic | 31.2 | 55.8 | 82.5 | 147.3 |
| Long male rod end (G) | 39.4 | 69.4 | 102.0 | 172.7 |
| Female rod end (F) | 22.4 | 38.5 | 66.5 | 102.3 |

∗ Weight of the rod end nut is included for the basic type and the long male rod end type (G).

### Table (3) Additional Weight [g]

| Bore size (mm) | 20 | 25 | 32 | 40 |
|---|---|---|---|---|
| Additional weight per 50 mm of stroke | 19.6 | 30.6 | 44.1 | 60.6 |
| Switch magnet | 3.5 | 4.0 | 5.0 | 6.0 |

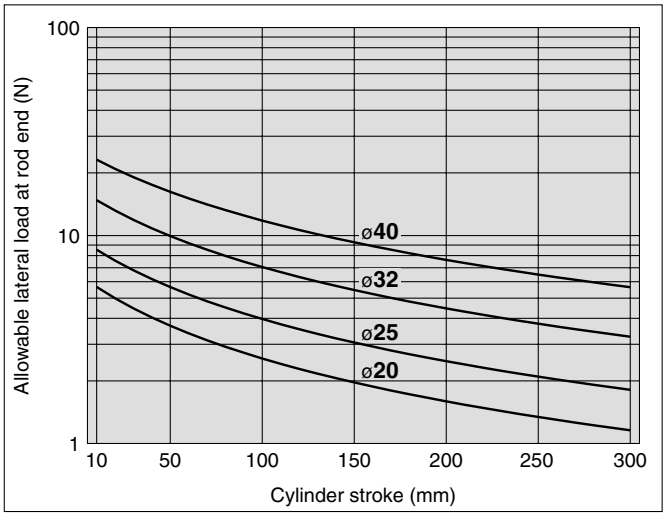
∗ Do not apply a lateral load over the allowable range to the rod end when it is mounted horizontally.

Calculation: (Example) **CDM3B40-175**

- Basic weight of movable parts: Table (2) Rod end [Basic], Bore size [40]····· 147.3 g
- Additional weight: Additional weight of stroke 60.6 x 175/50 = 212.1 g··· 212.1 g
  Switch magnet····· 6.0 g

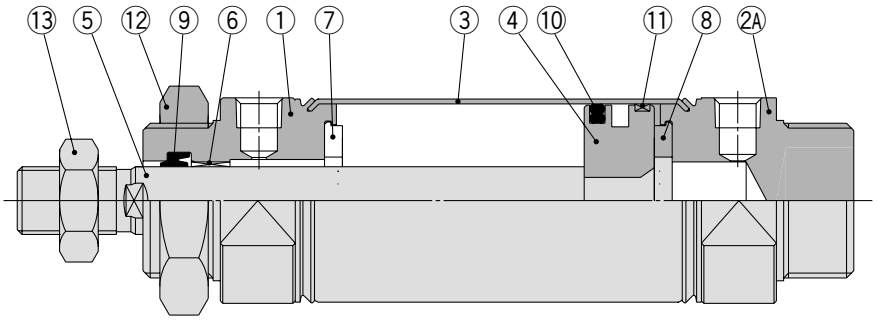
Total 365.4 g

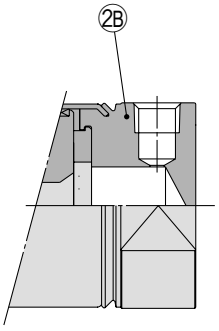
## Allowable Lateral Load at Rod End




## Construction

### With rubber bumper




**Boss-cut**

### Component Parts

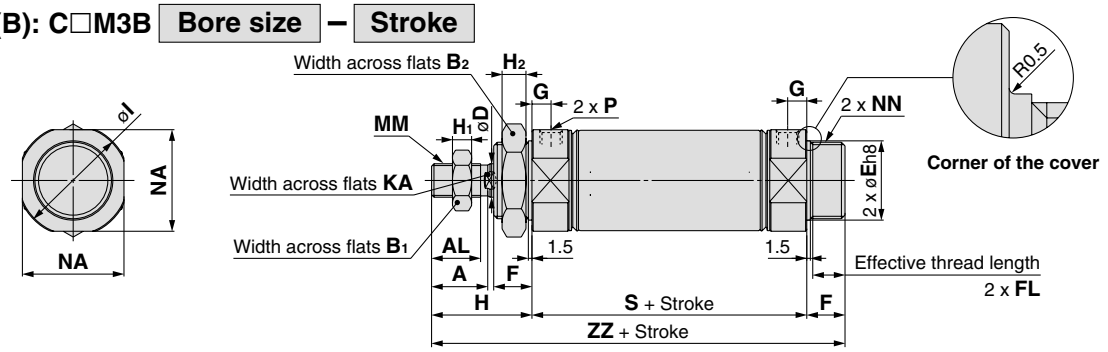
| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Rod cover** | Aluminum alloy | Anodized |
| 2A | **Head cover A** | Aluminum alloy | Anodized |
| 2B | **Head cover B** | Aluminum alloy | Anodized |
| 3 | **Cylinder tube** | Stainless steel | |
| 4 | **Piston** | Aluminum alloy | Chromated |
| 5 | **Piston rod** | Iron | Hard chrome plated |
| 6 | **Bushing** | Copper alloy | |
| 7 | **Bumper A** | Urethane | |
| 8 | **Bumper B** | Urethane | |
| 9 | **Rod seal** | NBR | |
| 10 | **Piston seal** | NBR | |
| 11 | **Wear ring** | Resin | |
| 12 | **Mounting nut** | Iron | Nickel plated |
| 13 | **Rod end nut** | Iron | Nickel plated |

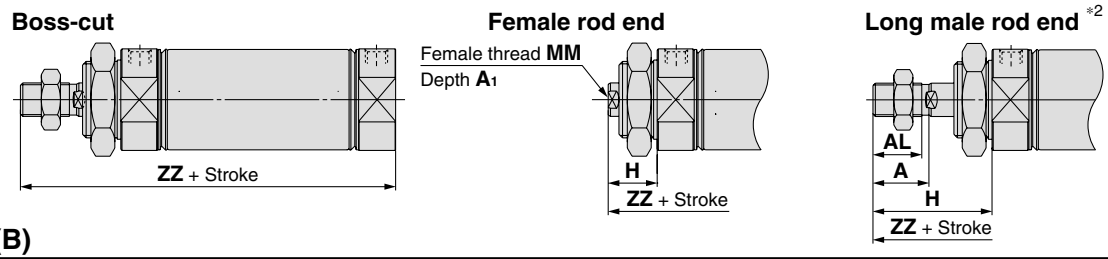
## ⚠ Caution

**1. Not able to disassemble.**
Cover and cylinder tube are connected to each other by crimping method, thus making it impossible to disassemble.

## Dimensions

### Basic (B): C□M3B Bore size – Stroke




**Basic (B)** (mm)

| Bore size | A | AL | $B_1$ | $B_2$ | D | E | F | FL | G | H | $H_1$ | $H_2$ | I | KA | MM | NA | NN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 14.5 | 12 | 13 | 26 | 8 | $20^{0}_{-0.033}$ | 13 | 10.5 | 6 | 31 | 5 | 8 | 27.9 | Width across flats 6 length 3.5 | M8 x 1.25 | 24 | M20 x 1.5 |
| **25** | 17.5 | 15 | 17 | 32 | 10 | $26^{0}_{-0.033}$ | 13 | 10.5 | 6 | 34 | 6 | 8 | 33.4 | Width across flats 8 length 3.5 | M10 x 1.25 | 30 | M26 x 1.5 |
| **32** | 17.5 | 15 | 17 | 32 | 12 | $26^{0}_{-0.033}$ | 13 | 10.5 | 8 | 34 | 6 | 8 | 37.4 | Width across flats 10 length 3.5 | M10 x 1.25 | 34.5 | M26 x 1.5 |
| **40** | 23.5 | 20.5 | 22 | 41 | 14 | $32^{0}_{-0.039}$ | 16 | 13.5 | 8 | 42 | 8 | 10 | 46.4 | Width across flats 12 length 3.5 | M14 x 1.5 | 42.5 | M32 x 2 |

| Bore size | P | S | ZZ |
|---|---|---|---|
| **20** | M5 x 0.8 | 55 | 99 |
| **25** | M5 x 0.8 | 56 | 103 |
| **32** | Rc1/8 | 62 | 109 |
| **40** | Rc1/8 | 67 | 125 |

**Boss-cut** (mm)

| Bore size | ZZ |
|---|---|
| **20** | 86 |
| **25** | 90 |
| **32** | 96 |
| **40** | 109 |

**Female Rod End** (mm)

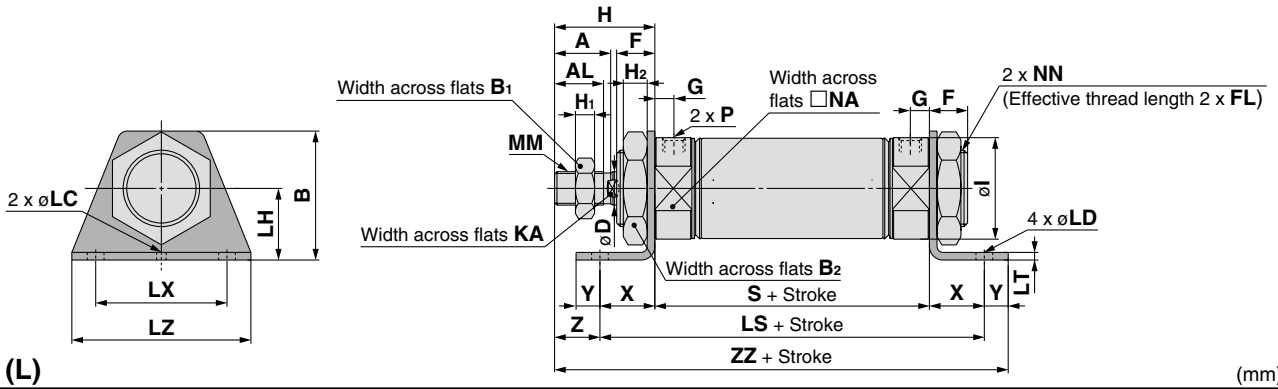
| Bore size | $A_1$ | H | MM | ZZ |
|---|---|---|---|---|
| **20** | 8 | 20 | M4 x 0.7 | 88 |
| **25** | 8 | 20 | M5 x 0.8 | 89 |
| **32** | 12 | 20 | M6 x 1 | 95 |
| **40** | 13 | 21 | M8 x 1.25 | 104 |

**Long Male Rod End** (mm)

| Bore size | A | AL | H | ZZ |
|---|---|---|---|---|
| **20** | 18 | 15.5 | 41 | 109 |
| **25** | 22 | 19.5 | 45 | 114 |
| **32** | 22 | 19.5 | 45 | 120 |
| **40** | 24 | 21 | 50 | 133 |

*1 Use a thin wrench when tightening the piston rod.
*2 The dimension from the rod cover to the male rod end of the long male rod end type is the same as the CM2 series.
*3 When female thread is used, use a washer, etc. to prevent the contact part at the rod end from being deformed depending on the material of the workpiece.

### Foot (L): C□M3L Bore size – Stroke




**Foot (L)** (mm)

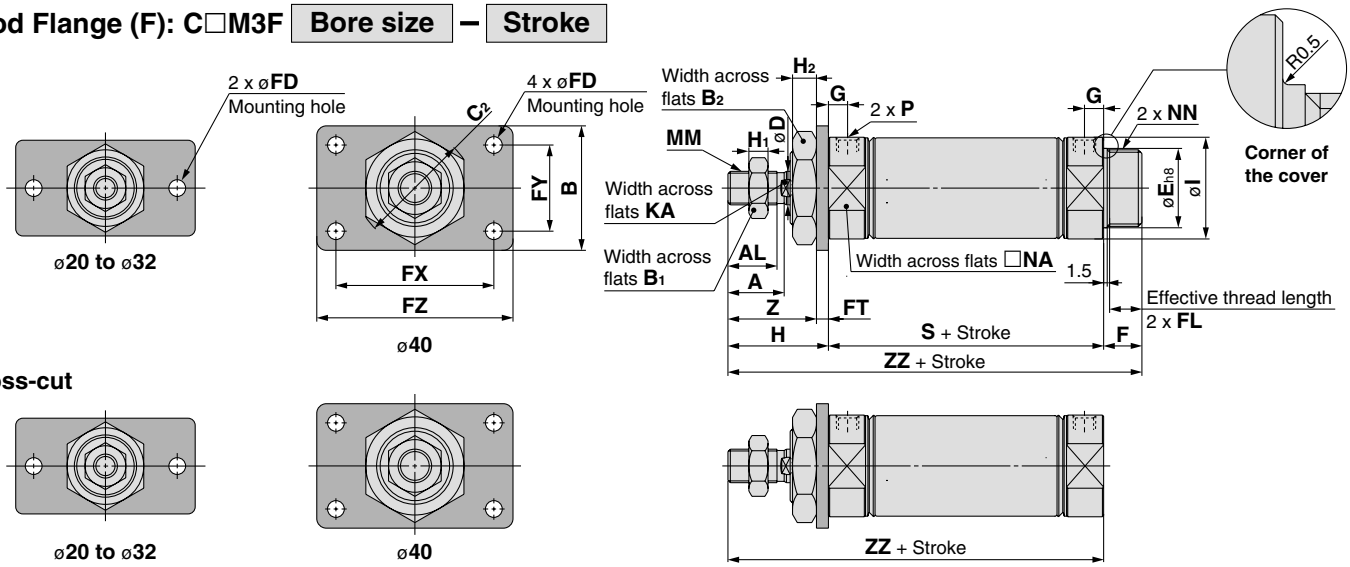
| Bore size | A | AL | B | $B_1$ | $B_2$ | D | F | FL | G | H | $H_1$ | $H_2$ | I | KA | LC | LD | LH | LS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 14.5 | 12 | 40 | 13 | 26 | 8 | 13 | 10.5 | 6 | 31 | 5 | 8 | 27.9 | Width across flats 6 length 3.5 | 4 | 6.8 | 25 | 95 |
| **25** | 17.5 | 15 | 47 | 17 | 32 | 10 | 13 | 10.5 | 6 | 34 | 6 | 8 | 33.4 | Width across flats 8 length 3.5 | 4 | 6.8 | 28 | 96 |
| **32** | 17.5 | 15 | 47 | 17 | 32 | 12 | 13 | 10.5 | 8 | 34 | 6 | 8 | 37.4 | Width across flats 10 length 3.5 | 4 | 6.8 | 28 | 102 |
| **40** | 23.5 | 20.5 | 54 | 22 | 41 | 14 | 16 | 13.5 | 8 | 42 | 8 | 10 | 46.4 | Width across flats 12 length 3.5 | 4 | 7 | 30 | 113 |

| Bore size | LT | LX | LZ | MM | NA | NN | P | S | X | Y | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 3.2 | 40 | 55 | M8 x 1.25 | 24 | M20 x 1.5 | M5 x 0.8 | 55 | 20 | 8 | 11 | 114 |
| **25** | 3.2 | 40 | 55 | M10 x 1.25 | 30 | M26 x 1.5 | M5 x 0.8 | 56 | 20 | 8 | 14 | 118 |
| **32** | 3.2 | 40 | 55 | M10 x 1.25 | 34.5 | M26 x 1.5 | Rc1/8 | 62 | 20 | 8 | 14 | 124 |
| **40** | 3.2 | 55 | 75 | M14 x 1.5 | 42.5 | M32 x 2 | Rc1/8 | 67 | 23 | 10 | 19 | 142 |

* Use a thin wrench when tightening the piston rod.
* Refer to the dimensions of the basic type for the female rod end type and the long male rod end type.

## Dimensions

### Rod Flange (F): C□M3F Bore size – Stroke




**Boss-cut**




### Rod Flange (F)

(mm)

| Bore size | A | AL | B | B1 | B2 | C2 | D | E | F | FD | FL | FT | FX | FY | FZ | G | H | H1 | H2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 14.5 | 12 | 34 | 13 | 26 | 30 | 8 | $20^{0}_{-0.033}$ | 13 | 7 | 10.5 | 4 | 60 | — | 75 | 6 | 31 | 5 | 8 |
| **25** | 17.5 | 15 | 40 | 17 | 32 | 37 | 10 | $26^{0}_{-0.033}$ | 13 | 7 | 10.5 | 4 | 60 | — | 75 | 6 | 34 | 6 | 8 |
| **32** | 17.5 | 15 | 40 | 17 | 32 | 37 | 12 | $26^{0}_{-0.033}$ | 13 | 7 | 10.5 | 4 | 60 | — | 75 | 8 | 34 | 6 | 8 |
| **40** | 23.5 | 20.5 | 52 | 22 | 41 | 47.3 | 14 | $32^{0}_{-0.039}$ | 16 | 7 | 13.5 | 5 | 66 | 36 | 82 | 8 | 42 | 8 | 10 |

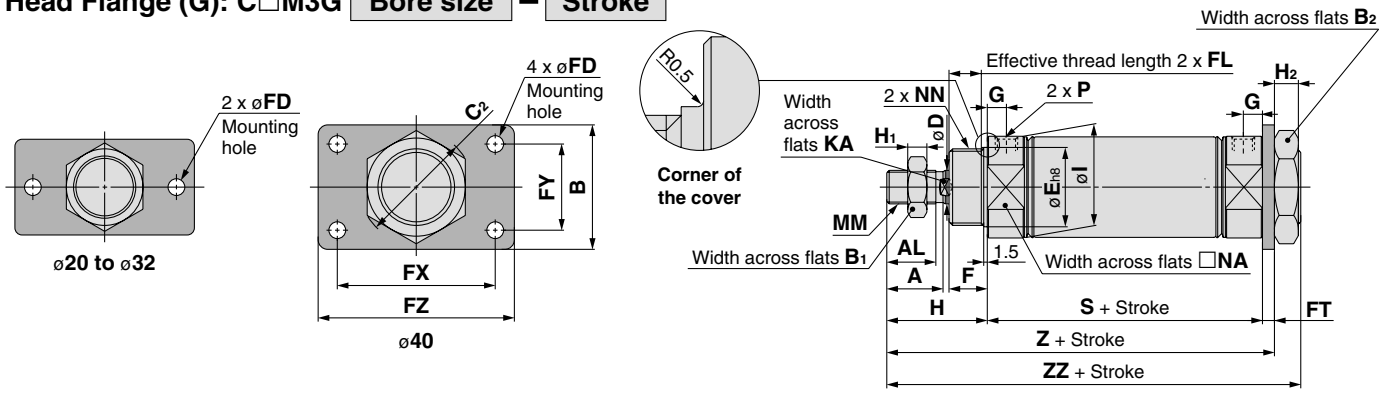
| Bore size | I | KA | MM | NA | NN | P | S | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|
| **20** | 27.9 | Width across flats 6 length 3.5 | M8 x 1.25 | 24 | M20 x 1.5 | M5 x 0.8 | 55 | 27 | 99 |
| **25** | 33.4 | Width across flats 8 length 3.5 | M10 x 1.25 | 30 | M26 x 1.5 | M5 x 0.8 | 56 | 30 | 103 |
| **32** | 37.4 | Width across flats 10 length 3.5 | M10 x 1.25 | 34.5 | M26 x 1.5 | Rc1/8 | 62 | 30 | 109 |
| **40** | 46.4 | Width across flats 12 length 3.5 | M14 x 1.5 | 42.5 | M32 x 2 | Rc1/8 | 67 | 37 | 125 |

∗ Use a thin wrench when tightening the piston rod.
∗ Refer to the dimensions of the basic type for the female rod end type and the long male rod end type.

**Boss-cut** (mm)

| Bore size | ZZ |
|---|---|
| **20** | 86 |
| **25** | 90 |
| **32** | 96 |
| **40** | 109 |

### Head Flange (G): C□M3G Bore size – Stroke




### Head Flange (G)

(mm)

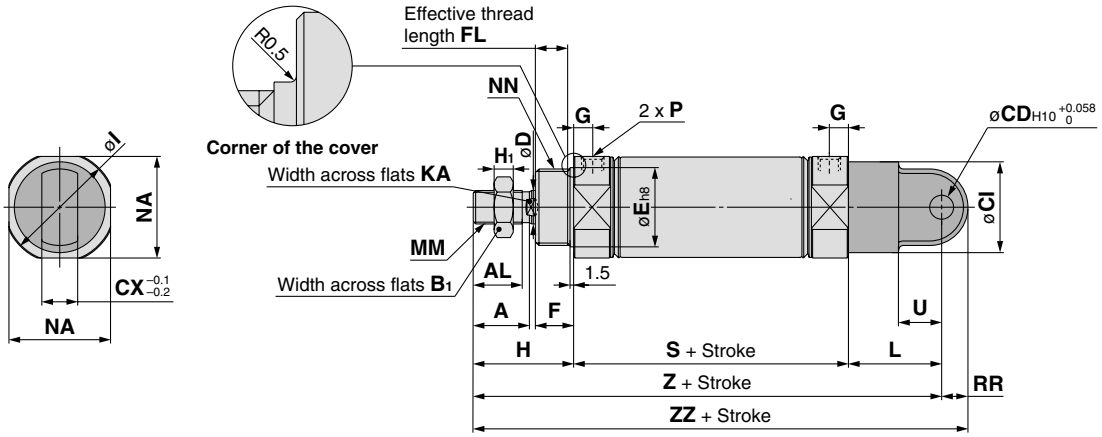
| Bore size | A | AL | B | B1 | B2 | C2 | D | E | F | FD | FL | FT | FX | FY | FZ | G | H | H1 | H2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 14.5 | 12 | 34 | 13 | 26 | 30 | 8 | $20^{0}_{-0.033}$ | 13 | 7 | 10.5 | 4 | 60 | — | 75 | 6 | 31 | 5 | 8 |
| **25** | 17.5 | 15 | 40 | 17 | 32 | 37 | 10 | $26^{0}_{-0.033}$ | 13 | 7 | 10.5 | 4 | 60 | — | 75 | 6 | 34 | 6 | 8 |
| **32** | 17.5 | 15 | 40 | 17 | 32 | 37 | 12 | $26^{0}_{-0.033}$ | 13 | 7 | 10.5 | 4 | 60 | — | 75 | 8 | 34 | 6 | 8 |
| **40** | 23.5 | 20.5 | 52 | 22 | 41 | 47.3 | 14 | $32^{0}_{-0.039}$ | 16 | 7 | 13.5 | 5 | 66 | 36 | 82 | 8 | 42 | 8 | 10 |

| Bore size | I | KA | MM | NA | NN | P | S | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|
| **20** | 27.9 | Width across flats 6 length 3.5 | M8 x 1.25 | 24 | M20 x 1.5 | M5 x 0.8 | 55 | 90 | 99 |
| **25** | 33.4 | Width across flats 8 length 3.5 | M10 x 1.25 | 30 | M26 x 1.5 | M5 x 0.8 | 56 | 94 | 103 |
| **32** | 37.4 | Width across flats 10 length 3.5 | M10 x 1.25 | 34.5 | M26 x 1.5 | Rc1/8 | 62 | 100 | 109 |
| **40** | 46.4 | Width across flats 12 length 3.5 | M14 x 1.5 | 42.5 | M32 x 2 | Rc1/8 | 67 | 114 | 125 |

∗ Use a thin wrench when tightening the piston rod.
∗ Refer to the dimensions of the basic type for the female rod end type and the long male rod end type.

## Dimensions

### Single Clevis (C): C□M3C Bore size – Stroke




### Single Clevis (C)

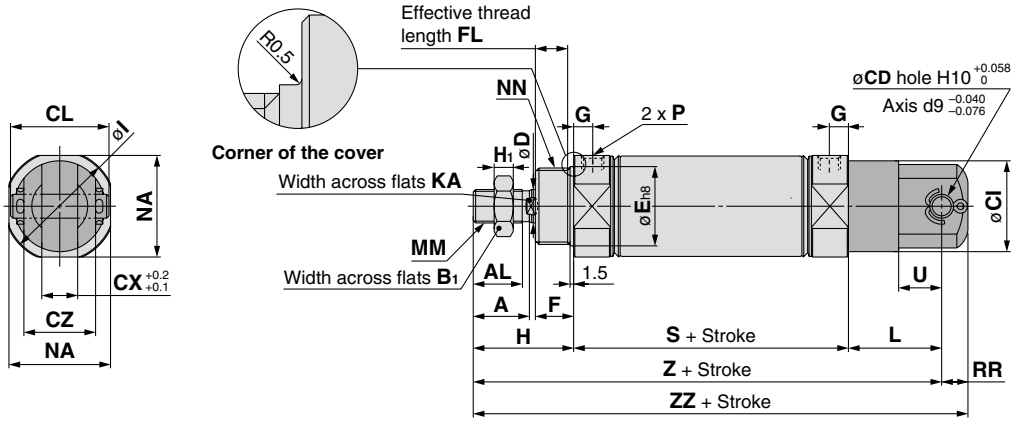
(mm)

| Bore size | A | AL | B1 | CD | CI | CX | D | E | F | FL | G | H | H1 | I | KA | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 14.5 | 12 | 13 | 9 | 24 | 10 | 8 | $20^{0}_{-0.033}$ | 13 | 10.5 | 6 | 31 | 5 | 27.9 | Width across flats 6 length 3.5 | 30 |
| **25** | 17.5 | 15 | 17 | 9 | 30 | 10 | 10 | $26^{0}_{-0.033}$ | 13 | 10.5 | 6 | 34 | 6 | 33.4 | Width across flats 8 length 3.5 | 30 |
| **32** | 17.5 | 15 | 17 | 9 | 30 | 10 | 12 | $26^{0}_{-0.033}$ | 13 | 10.5 | 8 | 34 | 6 | 37.4 | Width across flats 10 length 3.5 | 30 |
| **40** | 23.5 | 20.5 | 22 | 10 | 38 | 15 | 14 | $32^{0}_{-0.039}$ | 16 | 13.5 | 8 | 42 | 8 | 46.4 | Width across flats 12 length 3.5 | 39 |

| Bore size | MM | NA | NN | P | RR | S | U | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|
| **20** | M8 x 1.25 | 24 | M20 x 1.5 | M5 x 0.8 | 9 | 55 | 14 | 116 | 125 |
| **25** | M10 x 1.25 | 30 | M26 x 1.5 | M5 x 0.8 | 9 | 56 | 14 | 120 | 129 |
| **32** | M10 x 1.25 | 34.5 | M26 x 1.5 | Rc1/8 | 9 | 62 | 14 | 126 | 135 |
| **40** | M14 x 1.5 | 42.5 | M32 x 2 | Rc1/8 | 11 | 67 | 18 | 148 | 159 |

∗ Use a thin wrench when tightening the piston rod.
∗ Refer to the dimensions of the basic type for the female rod end type and the long male rod end type.

### Double Clevis (D): C□M3D Bore size – Stroke




### Double Clevis (D)

(mm)

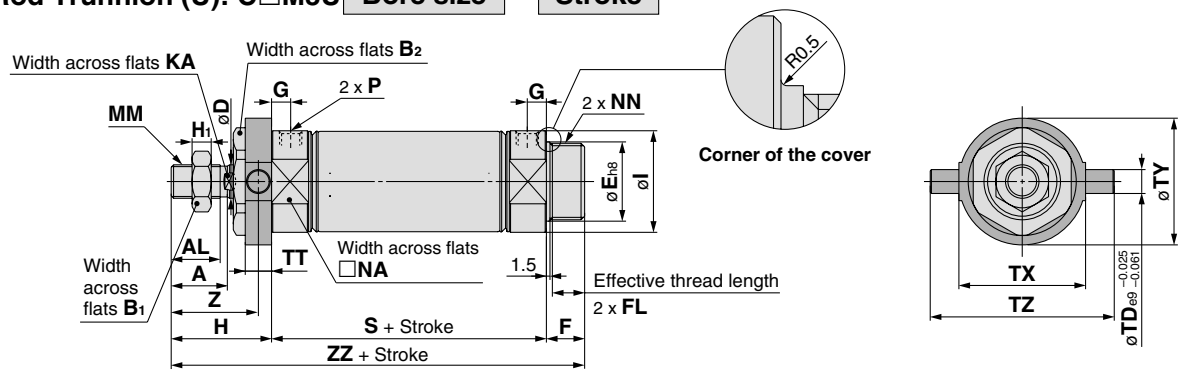
| Bore size | A | AL | B1 | CD | CI | CL | CX | CZ | D | E | F | FL | G | H | H1 | I | KA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 14.5 | 12 | 13 | 9 | 24 | 25 | 10 | 19 | 8 | $20^{0}_{-0.033}$ | 13 | 10.5 | 6 | 31 | 5 | 27.9 | Width across flats 6 length 3.5 |
| **25** | 17.5 | 15 | 17 | 9 | 30 | 25 | 10 | 19 | 10 | $26^{0}_{-0.033}$ | 13 | 10.5 | 6 | 34 | 6 | 33.4 | Width across flats 8 length 3.5 |
| **32** | 17.5 | 15 | 17 | 9 | 30 | 25 | 10 | 19 | 12 | $26^{0}_{-0.033}$ | 13 | 10.5 | 8 | 34 | 6 | 37.4 | Width across flats 10 length 3.5 |
| **40** | 23.5 | 20.5 | 22 | 10 | 38 | 41.2 | 15 | 30 | 14 | $32^{0}_{-0.039}$ | 16 | 13.5 | 8 | 42 | 8 | 46.4 | Width across flats 12 length 3.5 |

| Bore size | L | MM | NA | NN | P | RR | S | U | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 30 | M8 x 1.25 | 24 | M20 x 1.5 | M5 x 0.8 | 9 | 55 | 14 | 116 | 125 |
| **25** | 30 | M10 x 1.25 | 30 | M26 x 1.5 | M5 x 0.8 | 9 | 56 | 14 | 120 | 129 |
| **32** | 30 | M10 x 1.25 | 34.5 | M26 x 1.5 | Rc1/8 | 9 | 62 | 14 | 126 | 135 |
| **40** | 39 | M14 x 1.5 | 42.5 | M32 x 2 | Rc1/8 | 11 | 67 | 18 | 148 | 159 |

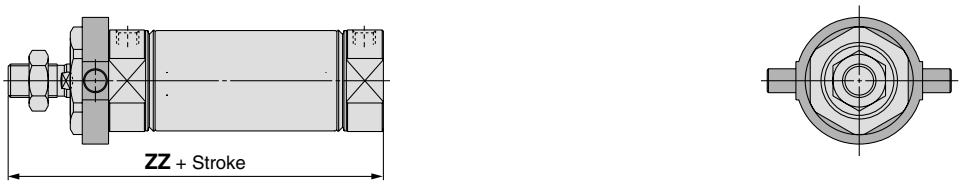
∗ A clevis pin and retaining rings (split pins for ø40) are shipped together.
∗ Use a thin wrench when tightening the piston rod.
∗ Refer to the dimensions of the basic type for the female rod end type and the long male rod end type.

## Dimensions

### Rod Trunnion (U): C□M3U Bore size – Stroke




**Boss-cut**




### Rod Trunnion (U)

(mm)

| Bore size | A | AL | B1 | B2 | D | E | F | FL | G | H | H1 | I | KA | MM | NA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 14.5 | 12 | 13 | 26 | 8 | $20^{0}_{-0.033}$ | 13 | 10.5 | 6 | 31 | 5 | 27.9 | Width across flats 6 length 3.5 | M8 x 1.25 | 24 |
| **25** | 17.5 | 15 | 17 | 32 | 10 | $26^{0}_{-0.033}$ | 13 | 10.5 | 6 | 34 | 6 | 33.4 | Width across flats 8 length 3.5 | M10 x 1.25 | 30 |
| **32** | 17.5 | 15 | 17 | 32 | 12 | $26^{0}_{-0.033}$ | 13 | 10.5 | 8 | 34 | 6 | 37.4 | Width across flats 10 length 3.5 | M10 x 1.25 | 34.5 |
| **40** | 23.5 | 20.5 | 22 | 41 | 14 | $32^{0}_{-0.039}$ | 16 | 13.5 | 8 | 42 | 8 | 46.4 | Width across flats 12 length 3.5 | M14 x 1.5 | 42.5 |

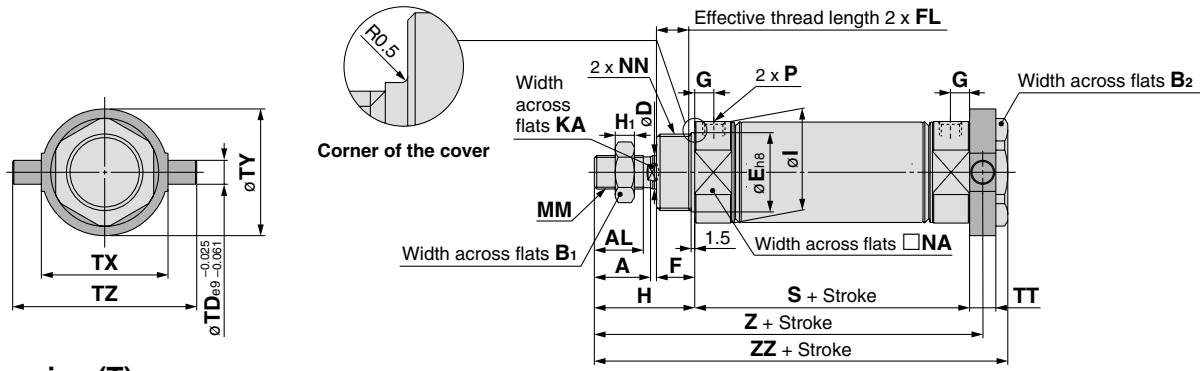
| Bore size | NN | P | S | TD | TT | TX | TY | TZ | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|
| **20** | M20 x 1.5 | M5 x 0.8 | 55 | 8 | 10 | 32 | 32 | 52 | 26 | 99 |
| **25** | M26 x 1.5 | M5 x 0.8 | 56 | 9 | 10 | 40 | 40 | 60 | 29 | 103 |
| **32** | M26 x 1.5 | Rc1/8 | 62 | 9 | 10 | 40 | 40 | 60 | 29 | 109 |
| **40** | M32 x 2 | Rc1/8 | 67 | 10 | 11 | 53 | 53 | 77 | 36.5 | 125 |

**Boss-cut** (mm)

| Bore size | ZZ |
|---|---|
| **20** | 86 |
| **25** | 90 |
| **32** | 96 |
| **40** | 109 |

∗ Use a thin wrench when tightening the piston rod.
∗ Refer to the dimensions of the basic type for the female rod end type and the long male rod end type.

### Head Trunnion (T): C□M3T Bore size – Stroke




### Head Trunnion (T)

(mm)

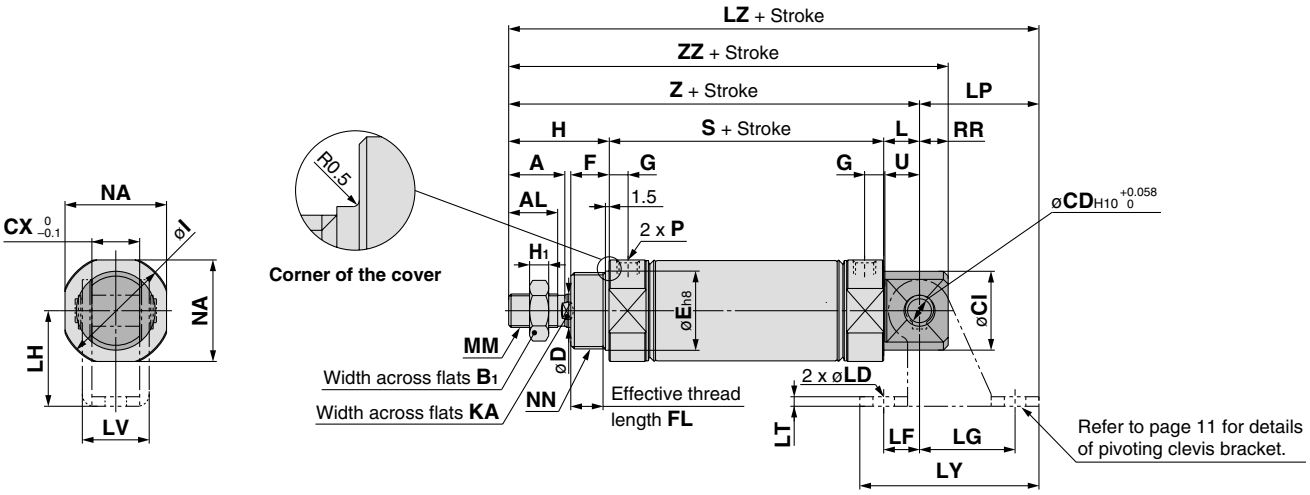
| Bore size | A | AL | B1 | B2 | D | E | F | FL | G | H | H1 | I | KA | MM | NA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 14.5 | 12 | 13 | 26 | 8 | $20^{0}_{-0.033}$ | 13 | 10.5 | 6 | 31 | 5 | 27.9 | Width across flats 6 length 3.5 | M8 x 1.25 | 24 |
| **25** | 17.5 | 15 | 17 | 32 | 10 | $26^{0}_{-0.033}$ | 13 | 10.5 | 6 | 34 | 6 | 33.4 | Width across flats 8 length 3.5 | M10 x 1.25 | 30 |
| **32** | 17.5 | 15 | 17 | 32 | 12 | $26^{0}_{-0.033}$ | 13 | 10.5 | 8 | 34 | 6 | 37.4 | Width across flats 10 length 3.5 | M10 x 1.25 | 34.5 |
| **40** | 23.5 | 20.5 | 22 | 41 | 14 | $32^{0}_{-0.039}$ | 16 | 13.5 | 8 | 42 | 8 | 46.4 | Width across flats 12 length 3.5 | M14 x 1.5 | 42.5 |

| Bore size | NN | P | S | TD | TT | TX | TY | TZ | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|
| **20** | M20 x 1.5 | M5 x 0.8 | 55 | 8 | 10 | 32 | 32 | 52 | 91 | 101 |
| **25** | M26 x 1.5 | M5 x 0.8 | 56 | 9 | 10 | 40 | 40 | 60 | 95 | 105 |
| **32** | M26 x 1.5 | Rc1/8 | 62 | 9 | 10 | 40 | 40 | 60 | 101 | 111 |
| **40** | M32 x 2 | Rc1/8 | 67 | 10 | 11 | 53 | 53 | 77 | 114.5 | 125 |

∗ Use a thin wrench when tightening the piston rod.
∗ Refer to the dimensions of the basic type for the female rod end type and the long male rod end type.

## Dimensions

### Integral Clevis (E): C□M3E Bore size – Stroke




### Integral Clevis (E)

(mm)

| Bore size | A | AL | B1 | CD | CI | CX | D | E | F | FL | G | H | H1 | I | KA | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 14.5 | 12 | 13 | 8 | 20 | 12 | 8 | $20^{0}_{-0.033}$ | 13 | 10.5 | 6 | 31 | 5 | 27.9 | Width across flats 6 length 3.5 | 12 |
| **25** | 17.5 | 15 | 17 | 8 | 22 | 12 | 10 | $26^{0}_{-0.033}$ | 13 | 10.5 | 6 | 34 | 6 | 33.4 | Width across flats 8 length 3.5 | 12 |
| **32** | 17.5 | 15 | 17 | 10 | 27 | 20 | 12 | $26^{0}_{-0.033}$ | 13 | 10.5 | 8 | 34 | 6 | 37.4 | Width across flats 10 length 3.5 | 15 |
| **40** | 23.5 | 20.5 | 22 | 10 | 33 | 20 | 14 | $32^{0}_{-0.039}$ | 16 | 13.5 | 8 | 42 | 8 | 46.4 | Width across flats 12 length 3.5 | 15 |

| Bore size | MM | NA | NN | P | RR | S | U | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|
| **20** | M8 x 1.25 | 24 | M20 x 1.5 | M5 x 0.8 | 9 | 55 | 11.5 | 98 | 107 |
| **25** | M10 x 1.25 | 30 | M26 x 1.5 | M5 x 0.8 | 9 | 56 | 11.5 | 102 | 111 |
| **32** | M10 x 1.25 | 34.5 | M26 x 1.5 | Rc1/8 | 12 | 62 | 14.5 | 111 | 123 |
| **40** | M14 x 1.5 | 42.5 | M32 x 2 | Rc1/8 | 12 | 67 | 14.5 | 124 | 136 |

### Pivoting Clevis Bracket

(mm)

| Bore size | LD | LF | LG | LH | LP | LT | LV | LY | LZ |
|---|---|---|---|---|---|---|---|---|---|
| **20** | 6.8 | 15 | 30 | 30 | 37 | 3.2 | 18.4 | 59 | 135 |
| **25** | 6.8 | 15 | 30 | 30 | 37 | 3.2 | 18.4 | 59 | 139 |
| **32** | 9 | 15 | 40 | 40 | 50 | 4 | 28 | 75 | 161 |
| **40** | 9 | 15 | 40 | 40 | 50 | 4 | 28 | 75 | 174 |

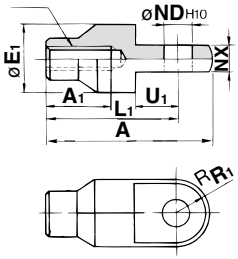
∗ Use a thin wrench when tightening the piston rod.
∗ Refer to the dimensions of the basic type for the female rod end type and the long male rod end type.

# Series CM3
# Dimensions of Accessories 1

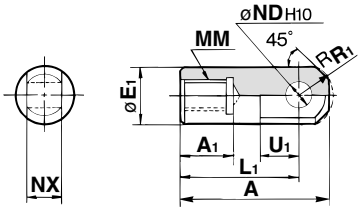
## Single Knuckle Joint

(mm)

**I-020B, I-032B** Material: Iron




**I-040B** Material: Iron




MM

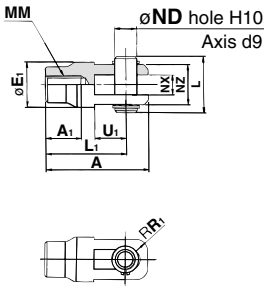
| Part no. | Applicable bore size | A | A1 | E1 | L1 | MM | NDH10 | NX | R1 | U1 |
|---|---|---|---|---|---|---|---|---|---|---|
| **I-020B** | **20** | 46 | 16 | 20 | 36 | M8 x 1.25 | $9^{+0.058}_{0}$ | $9^{-0.1}_{-0.2}$ | 10 | 14 |
| **I-032B** | **25, 32** | 48 | 18 | 20 | 38 | M10 x 1.25 | $9^{+0.058}_{0}$ | $9^{-0.1}_{-0.2}$ | 10 | 14 |
| **I-040B** | **40** | 69 | 22 | 24 | 55 | M14 x 1.5 | $12^{+0.070}_{0}$ | $16^{-0.1}_{-0.3}$ | 15.5 | 20 |

∗ Use a thin wrench when tightening the piston rod.

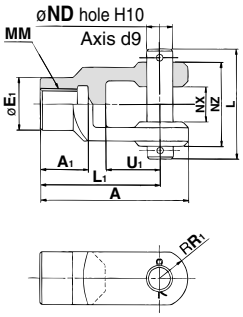
## Double Knuckle Joint

(mm)

**Y-020B, Y-032B** Material: Iron




**Y-040B** Material: Cast iron




| Part no. | Applicable bore size | A | A1 | E1 | L | L1 | MM | ND | NX | NZ | R1 | U1 | Included pin part no. | Retaining ring / Split pin size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Y-020B** | **20** | 46 | 16 | 20 | 25 | 36 | M8 x 1.25 | 9 | $9^{+0.2}_{+0.1}$ | 18 | 5 | 14 | CDP-1 | Type C9 for axis |
| **Y-032B** | **25, 32** | 48 | 18 | 20 | 25 | 38 | M10 x 1.25 | 9 | $9^{+0.2}_{+0.1}$ | 18 | 5 | 14 | CDP-1 | Type C9 for axis |
| **Y-040B** | **40** | 68 | 22 | 24 | 49.7 | 55 | M14 x 1.5 | 12 | $16^{+0.3}_{+0.1}$ | 38 | 13 | 25 | CDP-3 | ø3 x 18ℓ |

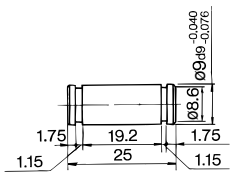
∗ A knuckle pin and retaining rings (split pins for ø40) are included.

## Double Clevis Pin

(mm)

**Bore size/ø20, ø25, ø32**

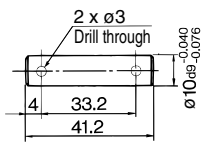
**CDP-1** Material: Iron




Retaining ring: Type C9 for axis

**Bore size/ø40**

**CDP-2** Material: Iron




Split pin: ø3 x 18ℓ

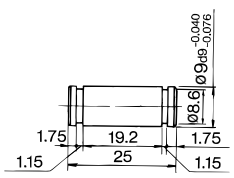
∗ Retaining rings (split pins for ø40) are included.

## Double Knuckle Joint Pin

(mm)

**Bore size/ø20, ø25, ø32**

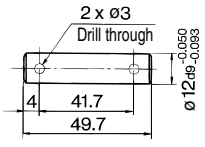
**CDP-1** Material: Iron




Retaining ring: Type C9 for axis

**Bore size/ø40**

**CDP-3** Material: Iron



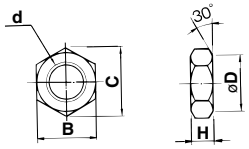

Split pin: ø3 x 18ℓ

∗ Retaining rings (split pins for ø40) are included.

## Rod End Nut

(mm)

Material: Iron

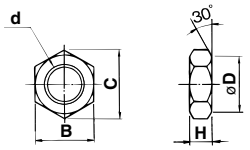



| Part no. | Applicable bore size | B | C | D | d | H |
|---|---|---|---|---|---|---|
| **NT-02** | **20** | 13 | 15.0 | 12.5 | M8 x 1.25 | 5 |
| **NT-03** | **25, 32** | 17 | 19.6 | 16.5 | M10 x 1.25 | 6 |
| **NT-04** | **40** | 22 | 25.4 | 21.0 | M14 x 1.5 | 8 |

## Mounting Nut

(mm)

Material: Iron

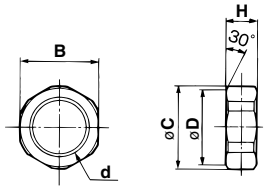



| Part no. | Applicable bore size | B | C | D | d | H |
|---|---|---|---|---|---|---|
| **SN-020B** | **20** | 26 | 30 | 25.5 | M20 x 1.5 | 8 |
| **SN-032B** | **25, 32** | 32 | 37 | 31.5 | M26 x 1.5 | 8 |
| **SN-040B** | **40** | 41 | 47.3 | 40.5 | M32 x 2.0 | 10 |

## Trunnion Nut

(mm)

Material: Iron

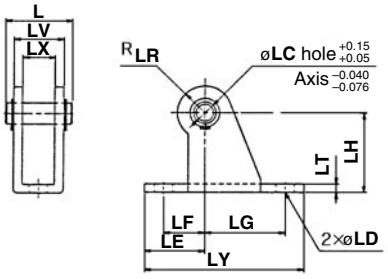



| Part no. | Applicable bore size | B | C | D | d | H |
|---|---|---|---|---|---|---|
| **TN-020B** | **20** | 26 | 28 | 25.5 | M20 x 1.5 | 10 |
| **TN-032B** | **25, 32** | 32 | 34 | 31.5 | M26 x 1.5 | 10 |
| **TN-040B** | **40** | 41 | 45 | 40.5 | M32 x 2 | 10 |

## Pivoting Clevis Bracket (For CM3E)

(mm)

Material: Iron




| Part no. | Applicable bore size | L | LC | LD | LE | LF | LG | LH | LR |
|---|---|---|---|---|---|---|---|---|---|
| **CM-E020B** | **20, 25** | 24.5 | 8 | 6.8 | 22 | 15 | 30 | 30 | 10 |
| **CM-E032B** | **32, 40** | 34 | 10 | 9 | 25 | 15 | 40 | 40 | 13 |

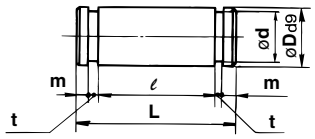
| Part no. | Applicable bore size | LT | LX | LY | LV | Included pin part no. |
|---|---|---|---|---|---|---|
| **CM-E020B** | **20, 25** | 3.2 | 12 | 59 | 18.4 | CD-S02 |
| **CM-E032B** | **32, 40** | 4 | 20 | 75 | 28 | CD-S03 |

Note 1) A pivoting clevis bracket pin and retaining rings are included.
Note 2) It cannot be used for the single clevis (CM3C) and double clevis (CM3D) types.

## Pivoting Clevis Bracket Pin (For CM3E)

(mm)

Material: Iron



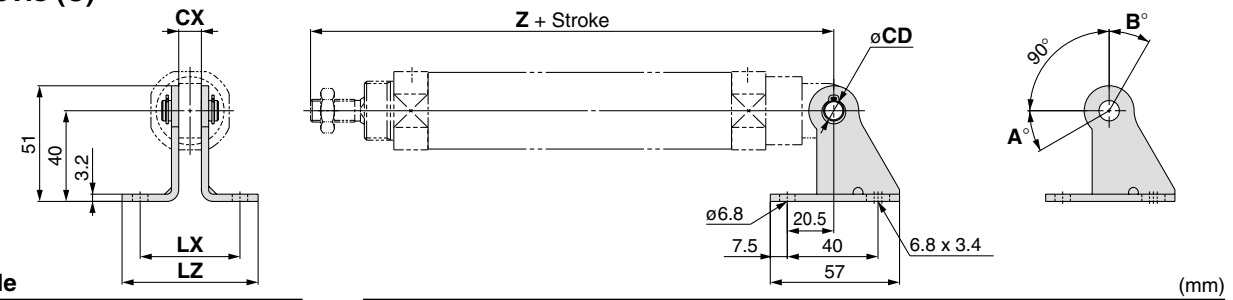

| Part no. | Applicable bore size | $D_{d9}$ | d | L | ℓ | m | t | Included retaining ring |
|---|---|---|---|---|---|---|---|---|
| **CD-S02** | **20, 25** | $8^{-0.040}_{-0.076}$ | 7.6 | 24.5 | 19.5 | 1.6 | 0.9 | Type C8 for axis |
| **CD-S03** | **32, 40** | $10^{-0.040}_{-0.076}$ | 9.6 | 34 | 29 | 1.35 | 1.15 | Type C10 for axis |

Note) Retaining rings are included.

# Series CM3
# Dimensions of Accessories 2

## Dimensions

### ■Single Clevis (C)




**Rotating Angle**

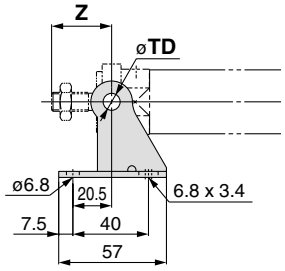
| Bore size (mm) | A° | B° | A° + B° + 90° |
|---|---|---|---|
| **20** | 25 | 85 | 200 |
| **25, 32** | 21 | 81 | 192 |
| **40** | 26 | 86 | 202 |

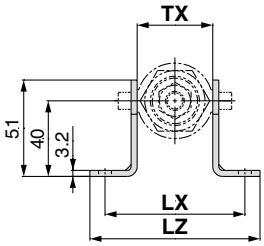
(mm)

| Mounting | Part no. | Applicable bore size | CX | Z + Stroke | CD | LX | LZ |
|---|---|---|---|---|---|---|---|
| **CM3C** (Single clevis) | **CM-B032** | **20** | 10 | 116 | 9 | 44 | 60 |
| | | **25** | | 120 | | | |
| | | **32** | | 126 | | | |
| | **CM-B040** | **40** | 15 | 148 | 10 | 49 | 65 |

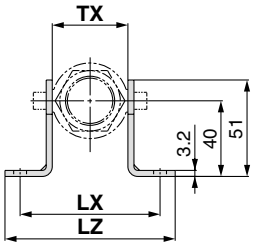
Note 1) A pivoting bracket pin and retaining rings are not included with the pivoting bracket.
Note 2) The above dimensions are for the male rod end type.

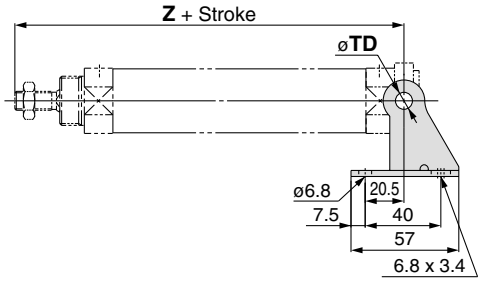
### ■Rod Trunnion (U)




### ■Head Trunnion (T)



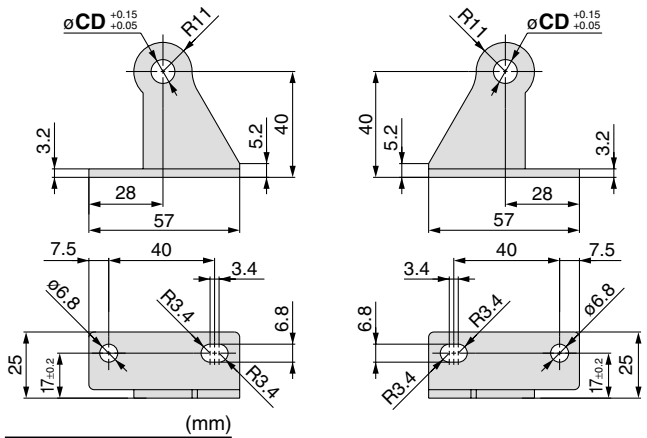

(mm)

| Mounting | Part no. | Applicable bore size | TX | Rod trunnion Z | Head trunnion Z + Stroke | TD | LX | LZ |
|---|---|---|---|---|---|---|---|---|
| **CM3U, CM3T** (Rod trunnion, Head trunnion) | **CM-B020** | **20** | 32 | 26 | 91 | 8 | 66 | 82 |
| | **CM-B032** | **25** | 40 | 29 | 95 | 9 | 74 | 90 |
| | | **32** | | | 101 | | | |
| | **CM-B040** | **40** | 53 | 36.5 | 114.5 | 10 | 87 | 103 |

Note 1) A pivoting bracket pin and retaining rings are not included with the pivoting bracket.
Note 2) The above dimensions are for the male rod end type.

## Pivoting Bracket

∗ Pivoting brackets consist of a set of two brackets.

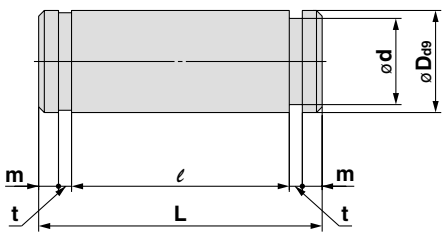



(mm)

| Part no. | CD |
|---|---|
| **CM-B020** | 8 |
| **CM-B032** | 9 |
| **CM-B040** | 10 |

Note) A pivoting bracket pin and retaining rings are not included with the pivoting bracket.

## Pivoting Bracket Pin




(mm)

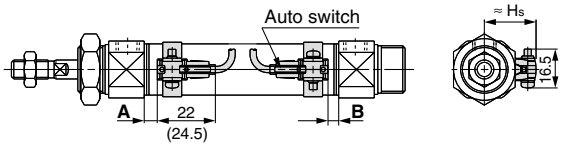
| Applicable bore size | Part no. | Dd9 | d | L | ℓ | m | t | Included retaining ring |
|---|---|---|---|---|---|---|---|---|
| **20, 25, 32** | **CDP-1** | $9^{-0.040}_{-0.076}$ | 8.6 | 25 | 19.2 | 1.75 | 1.15 | Type C9 for axis |
| **40** | **CD-S03** | $10^{-0.040}_{-0.076}$ | 9.6 | 34 | 29 | 1.35 | 1.15 | Type C10 for axis |

Note) Retaining rings are included with the pivoting bracket pin.

## Auto Switch Proper Mounting Position (Detection at stroke end) and Its Mounting Height

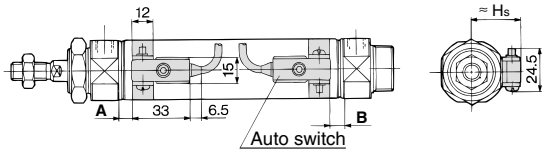
### Reed auto switch

#### D-A9□

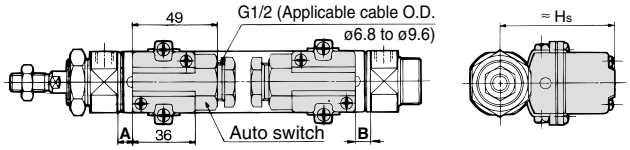



( ): Dimensions of D-A93 type

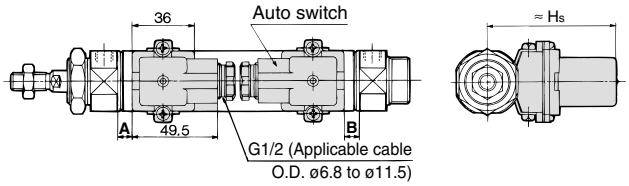
#### D-B54/B64/B59W



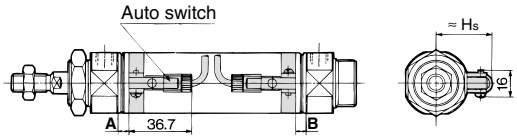

#### D-A33A/A34A




#### D-A44A

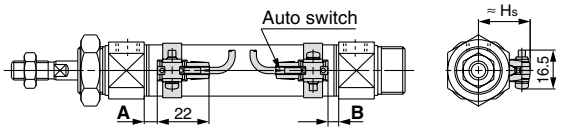



#### D-C73C/C80C

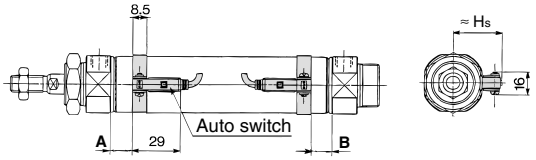



### Solid state auto switch

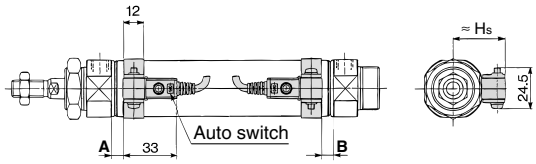
#### D-M9□
#### D-M9□W



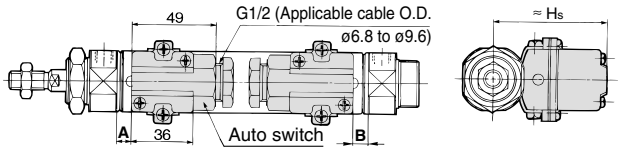

#### D-H7NF/H7BAL



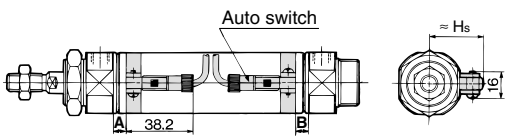

#### D-G5NTL




#### D-G39A/K39A




#### D-H7C



## Auto Switch Proper Mounting Position (Detection at stroke end) and Its Mounting Height

### Auto Switch Proper Mounting Position

(mm)

| Auto switch model / Bore size | D-M9□ D-M9□W | | D-A9□ | | D-B54 D-B64 | | D-C73C D-C80C | | D-B59W | | D-A3□A D-A44A D-G39A Note 2) D-K39A Note 2) | | D-H7C D-H7BAL D-H7NF | | D-G5NTL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| 20 | 10 | 9 | 6 | 5 | 0.5 | 0 | 6.5 | 5.5 | 3.5 | 2.5 | 0 | 0 | 5.5 | 4.5 | 2 | 1 |
| 25 | 10 | 10 | 6 | 6 | 0.5 | 0.5 | 6.5 | 6.5 | 3.5 | 3.5 | 0 | 0 | 5.5 | 5.5 | 2 | 2 |
| 32 | 10 | 10 | 6 | 6 | 0.5 | 0.5 | 6.5 | 6.5 | 3.5 | 3.5 | 0 | 0 | 5.5 | 5.5 | 2 | 2 |
| 40 | 12 | 12 | 8 | 8 | 2.5 | 2.5 | 8.5 | 8.5 | 5.5 | 5.5 | 2 | 2 | 7.5 | 7.5 | 4 | 4 |

Note 1) Adjust the auto switch after confirming the operating condition in the actual setting.
Note 2) The D-G39A/K39A cannot be mounted on the bore size ø20.
Note 3) For the combination of the following auto switches, bore sizes and mounting positions, the auto switch cannot be mounted to the port side.
- D-G5□ type: On the head side and the rod side of the bore size ø32
- D-B5□/B64 types (except B59W) ··· On the head side of the bore size ø20, ø32, On the rod side of the bore size ø32

### Auto Switch Mounting Height

(mm)

| Auto switch model / Bore size | D-M9□ D-M9□W D-A9□ | D-B54 D-B64 D-B59W D-G5NTL D-H7C | D-H7BAL D-H7NF | D-C73C D-C80C | D-A3□A D-G39A Note) D-K39A Note) | D-A44A |
|---|---|---|---|---|---|---|
| | Hs | Hs | Hs | Hs | Hs | Hs |
| 20 | 22 | 25.5 | 22.5 | 25 | 60 | 69.5 |
| 25 | 24.5 | 28 | 25 | 27.5 | 62.5 | 72 |
| 32 | 28 | 31.5 | 28.5 | 31 | 66 | 75.5 |
| 40 | 32 | 35.5 | 32.5 | 35 | 70 | 79.5 |

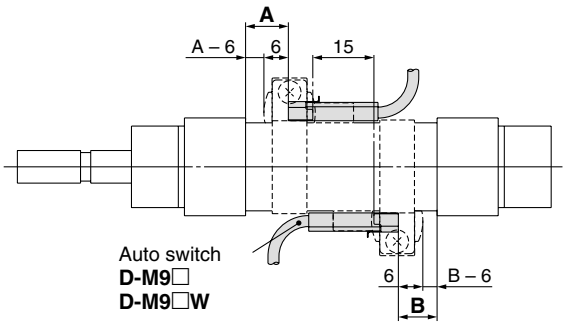
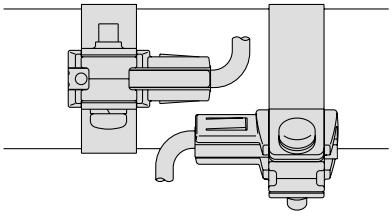
Note) The D-G39A/K39A cannot be mounted on the bore size ø20.

## Minimum Stroke for Auto Switch Mounting

n: Number of auto switches (mm)

| Auto switch model | Number of auto switches | | | | |
|---|---|---|---|---|---|
| | With 1 pc. | With 2 pcs. | | With n pcs. | |
| | | Different surfaces | Same surface | Different surfaces | Same surface |
| **D-M9□/M9□W**<br>**D-A9□** | 10 | 15 Note 1) | 45 Note 1) | $15 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6···) | 45 + 45 (n – 2) |
| **D-H7BAL/H7NF** | 10 | 15 | 60 | $15 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6···) | 60 + 45 (n – 2) |
| **D-C73C/C80C**<br>**D-H7C** | 10 | 15 | 65 | $15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···) | 65 + 50 (n – 2) |
| **D-B54/B64**<br>**D-G5NTL** | 10 | 15 | 75 | $15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···) | 75 + 55 (n – 2) |
| **D-B59W** | 15 | 20 | 75 | $20 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···) | 75 + 55 (n – 2) |
| **D-A3□A/A44A**<br>**D-G39A**<br>**D-K39A** | 10 | 35 | 100 | 35 + 30 (n – 2) | 100 + 100 (n – 2) |

Note 1) Auto switch mounting

| Auto switch model | With 2 auto switches | |
|---|---|---|
| | Different surfaces Note 1) | Same surface Note 1) |
| |  The auto switch proper mounting position is 6 mm inward from the switch holder edge. |  The auto switch is mounted by slightly displacing it in a direction (cylinder tube circumferential exterior) so that the auto switch and lead wire do not interfere with each other. |
| **D-M9□**<br>**D-M9□W** | Less than 20 mm stroke Note 2) | Less than 55 mm stroke Note 2) |
| **D-A93** | — | Less than 50 mm stroke Note 2) |

Note 2) Minimum stroke for auto switch mounting in styles other than those mentioned in Note 1

## Operating Range

(mm)

| Auto switch model | Bore size | | | |
|---|---|---|---|---|
| | **20** | **25** | **32** | **40** |
| **D-M9□**<br>**D-M9□W** | 3 | 3 | 4 | 3.5 |
| **D-A9□** | 6 | 6 | 6 | 6 |
| **D-C73C/C80C** | 7 | 8 | 8 | 8 |
| **D-B54/B64**<br>**D-A3□A/A44A** | 8 | 8 | 9 | 9 |
| **D-B59W** | 12 | 12 | 13 | 13 |
| **D-H7BAL**<br>**D-G5NTL/H7NF** | 4 | 4 | 4.5 | 5 |
| **D-H7C** | 7 | 8.5 | 9 | 10 |
| **D-G39A/K39A** | — | 9 | 9 | 9 |

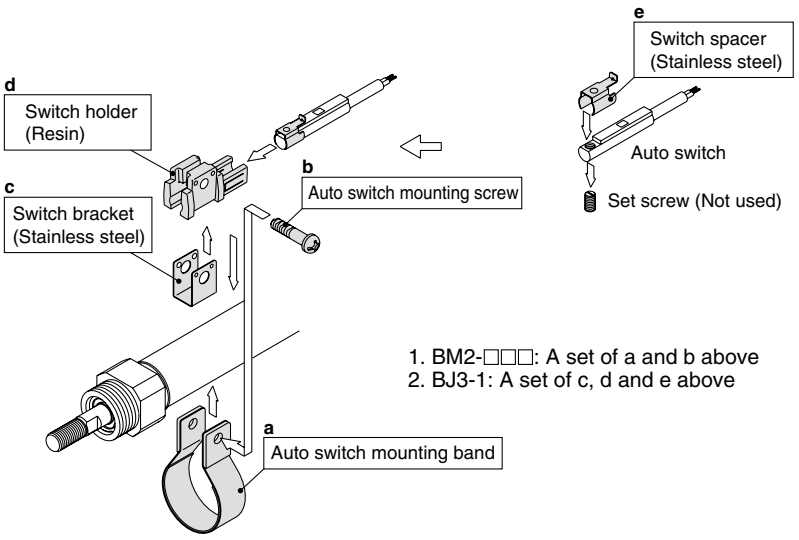
∗ Values which include hysteresis are for guideline purposes only, they are not a guarantee (assuming approximately ±30% dispersion) and may change substantially depending on the ambient environment.

## Auto Switch Mounting Brackets/Part No.

| Auto switch model | Bore size (mm) | | | |
|---|---|---|---|---|
| | ø20 | ø25 | ø32 | ø40 |
| **D-M9□**<br>**D-M9□W**<br>**D-A9□** | Note 1)<br>①BM2-020<br>②BJ3-1 | Note 1)<br>①BM2-025<br>②BJ3-1 | Note 1)<br>①BM2-032<br>②BJ3-1 | Note 1)<br>①BM2-040<br>②BJ3-1 |
| **D-C73C/C80C**<br>**D-H7BAL**<br>**D-H7NF** | BM2-020 | BM2-025 | BM2-032 | BM2-040 |
| **D-B54/B64**<br>**D-B59W**<br>**D-G5NTL**<br>**D-G5NBL** | BA2-020 | BA2-025 | BA2-032 | BA2-040 |
| **D-A3□A/A44A**<br>**D-G39A/K39A** | BM3-020 Note 2) | BM3-025 | BM3-032 | BM3-040 |

Note 1) Two kinds of auto switch mounting brackets are used as a set.
Note 2) The D-G39A/K39A cannot be mounted on the bore size ø20.

**[Stainless Steel Mounting Screw]**
The following stainless steel mounting screw is available. Use it in accordance with the operating environment. (Since auto switch mounting bracket is not included, order it separately.)
BBA4: For D-C7/C8/H7 types
Note 3) Refer to page 1358 in Best Pneumatics No. 2 for details of BBA4 screws.
The above stainless steel screws are used when a cylinder is shipped with the D-H7BAL auto switches. When only an auto switch is shipped independently, the BBA4 screw is attached.



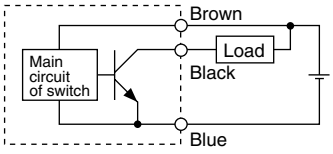

Other than the applicable auto switches listed in “How to Order,” the following auto switches are mountable.
Refer to pages 1263 to 1371 in Best Pneumatics No. 2 for detailed specifications.

* With pre-wired connector is also available for solid state auto switches. For details, refer to pages 1328 and 1329 in Best Pneumatics No. 2.
* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H) are also available. For details, refer to page 1290 in Best Pneumatics No. 2.
* Solid state auto switch with timer (D-G5NTL) is also available. For details, refer to page 1313 in Best Pneumatics No. 2.
* Wide range detection type, solid state auto switch (D-G5NBL) is also available. For details, refer to page 1320 in Best Pneumatics No. 2.

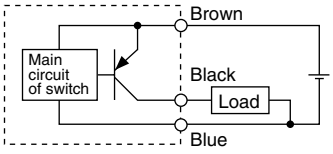
# Prior to Use
## Auto Switch Connection and Example

### Basic Wiring

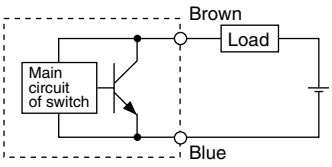
**Solid state 3-wire, NPN**



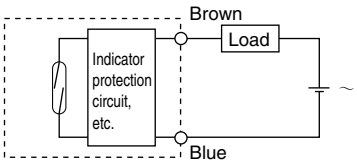

**Solid state 3-wire, PNP**



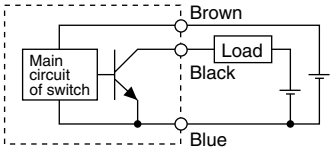

**2-wire (Solid state)**

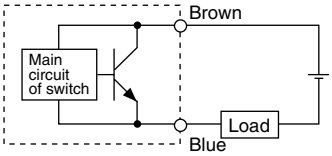


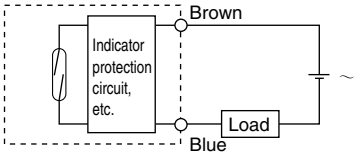

**2-wire (Reed)**




(Power supply for switch and load are separate.)



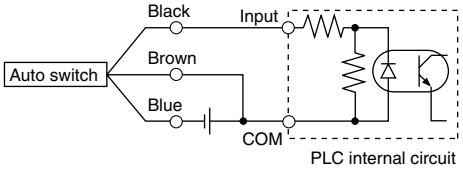



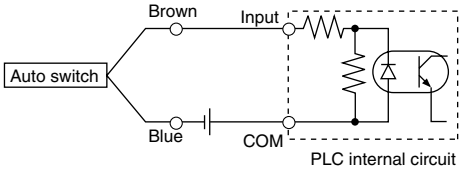

### Example of Connection with PLC (Programmable Logic Controller)

- **Sink input specifications**

**3-wire, NPN**

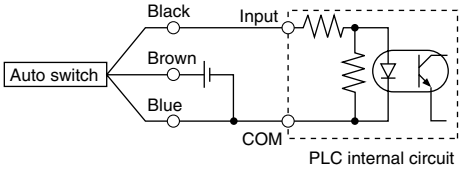



**2-wire**

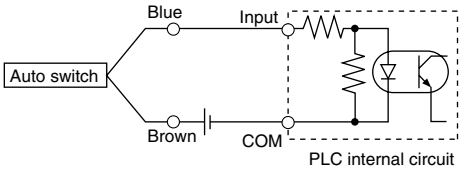



- **Source input specifications**

**3-wire, PNP**




**2-wire**

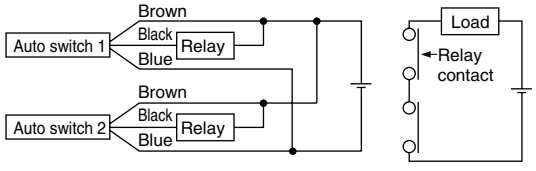



Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

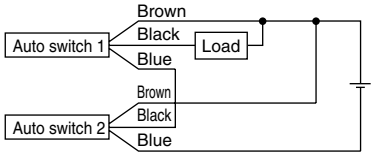
### Example of AND (Series) and OR (Parallel) Connection

- **3-wire**

**AND connection for NPN output (Using relays)**

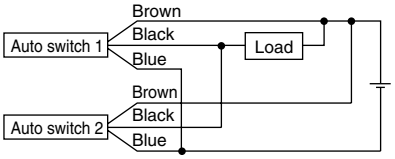



**AND connection for NPN output (Performed with auto switches only)**



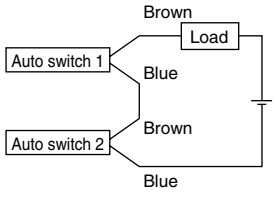

The indicator lights will light up when both of the auto switches are in the ON state.

**OR connection for NPN output**




- **2-wire**

**2-wire with 2-switch AND connection**

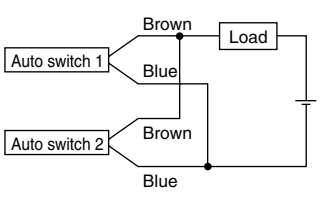



When two auto switches are connected in series, malfunction may occur because the load voltage will decrease in the ON state. The indicator lights will light up when both of the auto switches are in the ON state.

Load voltage at ON = Power supply voltage – Residual voltage x 2 pcs.
= 24 V – 4 V x 2 pcs.
= 16 V

Example: Power supply voltage 24 VDC
Auto switch internal voltage drop 4 V

**2-wire with 2-switch OR connection**




(Solid state)
When two auto switches are connected in parallel, malfunction may occur because the load voltage will increase in the OFF state.

Load voltage at OFF = Leakage current x 2 pcs. x Load impedance
= 1 mA x 2 pcs. x 3 kΩ
= 6 V

Example: Load impedance 3 kΩ
Auto switch leakage current 1 mA

(Reed)
Because there is no leakage current, the load voltage will not increase in the OFF state. However, depending on the number of auto switches in the ON state, the indicator lights may sometimes grow dim or not light up, due to the dispersion and reduction of the current flowing to the auto switches.

ALMOTION

# ⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

**⚠ Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

**⚠ Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

**⚠ Danger :** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots - Safety.
etc.

## ⚠ Warning

1. **The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.
2. **Only personnel with appropriate training should operate machinery and equipment.**
The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.
3. **Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
   1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
   2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
   3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.
4. **Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
   1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
   2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalogue.
   3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
   4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

## ⚠ Caution

1. **The product is provided for use in manufacturing industries.**
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

# Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

## Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

## Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

**⚠ Safety Instructions** | Be sure to read "Handling Precautions for SMC Products" (M-E03-3) before using.


**SMC Corporation (Europe)**

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