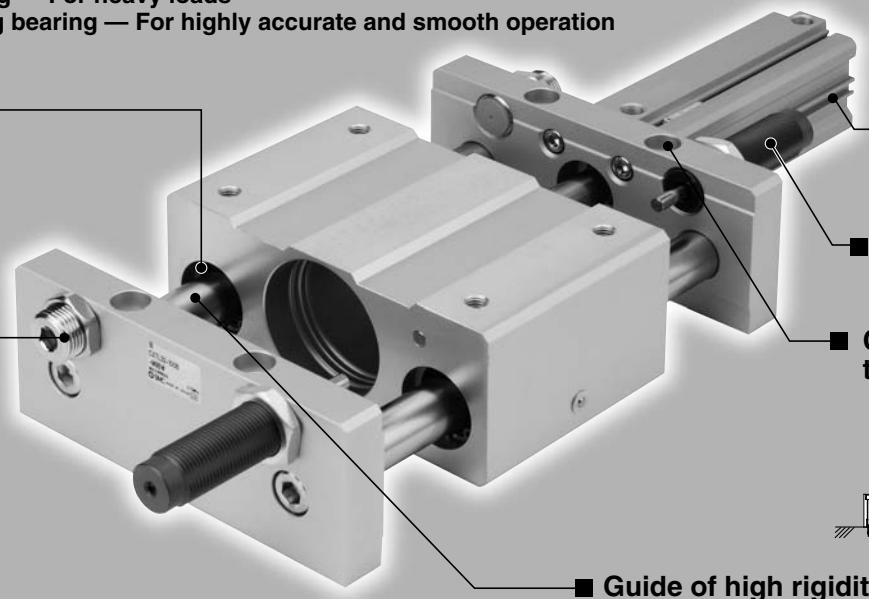
# Platform Cylinder

## *Series CXT*

## ø12, ø16, ø20, ø25, ø32, ø40

## A highly rigid and highly accurate slide table integrated with an actuator.

■ **Two styles of guide rod bearings to accommodate your application**
**Slide bearing — For heavy loads**
**Ball bushing bearing — For highly accurate and smooth operation**

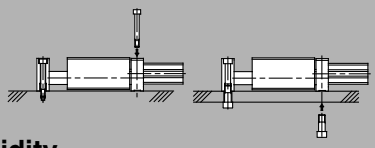


■ **Auto switch can be mounted.**

■ **A shock absorber can be installed (option).**

■ **Can be mounted on two sides.**

**Mounting from the upper side** | **Mounting from the bottom side**

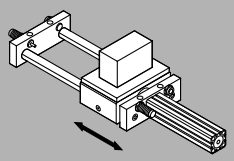


■ **Guide of high rigidity**

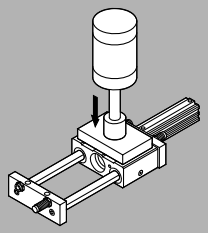
■ **Adjusting bolt with bumper is standard.**

Performs the function of a cushion and adjusts the stroke 5 mm on each side, or 10 mm for both sides.

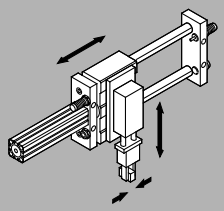
For moving and transferring workpieces.



For moving the receptacle for workpieces used in stamping or press-fitting processes.

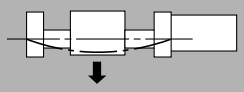


For using as a Pick & Place unit in combination with other actuators.



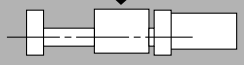
| Series | Maximum load mass (kg) | CXTM (Slide bearing) | | CXTL (Ball bushing bearing) | |
|---|---|---|---|---|---|
| | | Table(1) displacement (mm) | Allowable(2) static mass (kg) | Table(1) displacement (mm) | Allowable(2) static mass (kg) |
| **CXT□12** | 3 | 0.002 | 350 | 0.015 | 60 |
| **CXT□16** | 7 | 0.004 | 500 | 0.019 | 70 |
| **CXT□20** | 12 | 0.007 | 900 | 0.044 | 125 |
| **CXT□25** | 20 | 0.030 | 900 | 0.180 | 125 |
| **CXT□32** | 30 | 0.032 | 1100 | 0.123 | 140 |
| **CXT□40** | 50 | 0.025 | 1900 | 0.109 | 170 |

**Note 1) Table displacement**



"Table displacement" is the amount of deflection of the guide rod that occurs when a maximum load mass is placed on the maximum stroke table while the table is at the center of the stroke (the amount of looseness is not included).

**Note 2) Allowable static mass**



An "allowable stationary mass" is the allowable amount of stationary mass that can be applied vertically to the workpiece mounting surface of the table while the table is at the stroke end.

## ■ Series Variations

| Bearing type | | Bore size (mm) | Stroke (mm) |
|---|---|---|---|
| Slide bearing | Ball bushing bearing | | 15 25 50 75 100 125 150 175 200 250 300 |
| **CXTM12** | **CXTL12** | **12** | ● ● ○ ○ ○ |
| **CXTM16** | **CXTL16** | **16** | ● ● ○ ○ ○ |
| **CXTM20** | **CXTL20** | **20** | ● ● ○ ○ ○ ○ ○ ○ ○ |
| **CXTM25** | **CXTL25** | **25** | ● ● ○ ○ ○ ○ ○ ○ ○ ○ ○ |
| **CXTM32** | **CXTL32** | **32** | ● ● ● ● ○ ○ ○ ○ ○ ○ ○ |
| **CXTM40** | **CXTL40** | **40** | ● ● ● ● ○ ○ ○ ○ ○ ○ ○ |

● ·····Standard stroke ○ ·····Long stroke

# Model Selection

## Selection Step

**Setting Conditions**

1. Mounting (Horizontal, Inclined, Vertical)
2. Load mass W (kg)
3. Operating pressure P (MPa)
   $P \leq 0.7$ MPa
4. Speed V (mm/s)
   $V \leq 500$ mm/s

↓

**Selection of bearing type**

↓

**Provisional selection of cylinder bore size**

↓

**Confirmation of sum of load ratio to the guide unit**
$\Sigma\alpha n \leq 1$

NO → Provisional selection of cylinder bore size

YES ↓

**Calculation of resistance force f**

↓

**Calculation of theoretical output F**

↓ Refer to "Theoretical Output" on page 525.

**Calculation of load ratio β to the theoretical output of cylinder**
$\beta = f / F$

$\beta > 0.5$ → Provisional selection of cylinder bore size

$\beta \leq 0.5$ ↓

**Confirmation of adjusting bolt capacity**
$W \leq W_A$

NO → Determine the movable mass $W_A$ which can be operated only by adjusting bolts.

YES ↓

**Model selected Without shock absorber**

**Model selected With shock absorber**

### Guideline for Selection of Bearing Type

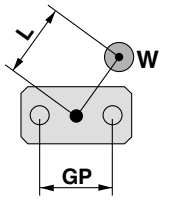
| Bearing type | Required conditions |
|---|---|
| **Slide bearing** | • Impact load and vibration load are added.<br>• Change in load is large.<br>• Long life span is required. |
| **Ball bushing bearing** | • High accuracy (Little rattle is allowed.)<br>• Smooth operation |

$$\Sigma\alpha n = \frac{\text{Load mass [W]}}{\text{Maximum load mass [Wmax]}} + \frac{\text{Moment [mn]}}{\text{Allowable moment [Mn]}}$$

**Load mass [W] are as follows in compliance to the mounting way.**
**Horizontal mounting**: W
**Inclined mounting**: $W\cos\theta$ ($\theta$: Angle of inclination, refer to the figure below.)
**Vertical mounting: 0 (None)**

The moment load rate must be calculated in accordance with the above formula for all types, **M1** to **M3**.
As for **Wmax** and **Mn**, refer to the maximum load mass and allowable moment table in the next section.
The moment for the inclined mounting must be calculated taking the moment caused by the load into consideration.
Note) Make sure that the distance between the guide shaft center to the center of gravity of the load does not exceed the distance **GP** between the guide shafts given in the table below. If the distance must be exceeded due to unavoidable circumstances, decrease the load rate that is applied to the guide as indicated below in order to determine the distance.

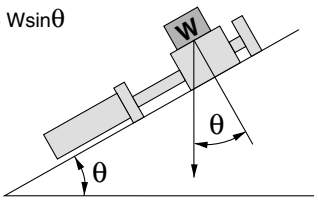
$$\Sigma\alpha n \leq \frac{1}{(L/GP)^2} \quad \text{(Provided that } L > GP\text{)}$$



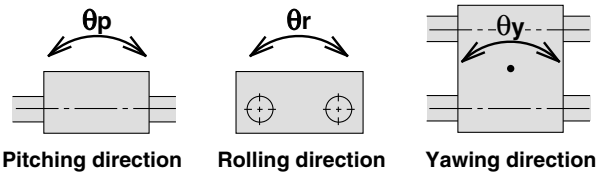

(mm)

| Bore size | 12 | 16 | 20 | 25 | 32 | 40 |
|---|---|---|---|---|---|---|
| Distance between guide rods **GP** | 50 | 65 | 80 | 90 | 110 | 130 |

**Horizontal mounting: f** = $\mu$ x W
**Inclined mounting: f** = $\mu$ x $W\cos\theta + W\sin\theta$
(Refer to the figure on the right.)
**Vertical mounting: f** = W
$\mu$ = 0.3 (Slide bearing)
$\mu$ = 0.1 (Ball bushing bearing)



## Non-rotating Accuracy of Slide Block

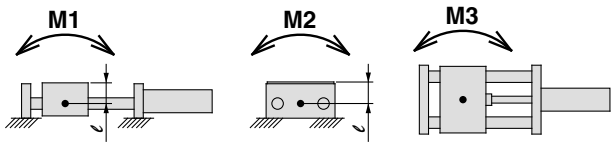



Pitching direction　Rolling direction　Yawing direction

| Bore size (mm) | CXTM (Slide bearing) | | CXTL (Ball bushing bearing) | |
|---|---|---|---|---|
| | θp (= θy) | θr | θp (= θy) | θr |
| 12 | ± 0.09° | ± 0.12° | ± 0.05° | ± 0.05° |
| 16 | ± 0.08° | ± 0.10° | ± 0.05° | ± 0.04° |
| 20 | ± 0.07° | ± 0.08° | ± 0.04° | ± 0.03° |
| 25 | ± 0.07° | ± 0.07° | ± 0.04° | ± 0.03° |
| 32 | ± 0.08° | ± 0.07° | ± 0.04° | ± 0.03° |
| 40 | ± 0.06° | ± 0.06° | ± 0.03° | ± 0.03° |

## Maximum Load Mass and Allowable Moment

| Bore size (mm) | Bearing | Maximum load mass **Wmax** (kg) | Allowable moment (N·m) | |
|---|---|---|---|---|
| | | | M1 (= M3) | M2 |
| 12 | Slide bearing | 3 | 1.25 | 1.68 |
| | Ball bushing bearing | | 0.53 | 0.70 |
| 16 | Slide bearing | 7 | 3.34 | 4.25 |
| | Ball bushing bearing | | 1.53 | 2.11 |
| 20 | Slide bearing | 12 | 11.4 | 17.1 |
| | Ball bushing bearing | | 5.60 | 7.28 |
| 25 | Slide bearing | 20 | 11.4 | 19.3 |
| | Ball bushing bearing | | 5.60 | 8.19 |
| 32 | Slide bearing | 30 | 19.8 | 23.3 |
| | Ball bushing bearing | | 10.1 | 14.8 |
| 40 | Slide bearing | 50 | 37.3 | 46.2 |
| | Ball bushing bearing | | 21.3 | 27.5 |




Note) For the purpose of calculating the moment, the length of the arm is the distance that is measured from the guide shaft center ("●" mark). Dimension ℓ from the guide shaft center to the top surface of the table is indicated below.

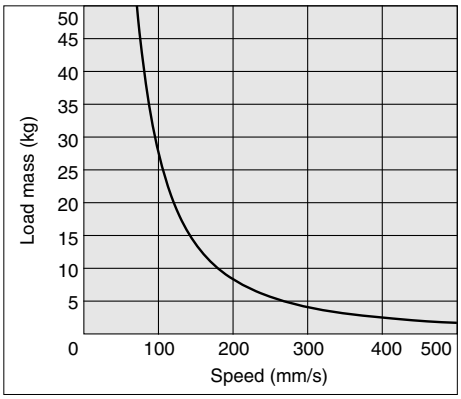
(mm)

| Bore size | 12 | 16 | 20 | 25 | 32 | 40 |
|---|---|---|---|---|---|---|
| ℓ dimension | 19.5 | 24 | 28 | 31 | 39.5 | 47.5 |

## Allowable Load Only by Adjusting Bolt

If only the adjusting bolt is used for stopping the load, make sure that the load mass and the speed will be below the curve in the graph on the right, taking into consideration the durability of the rubber bumper that is attached to the end of the adjusting bolt and the vibration and noise that are created when stopping (provided that the maximum load mass is not exceeded).

In conditions in which the load mass and the speed will be above the curve, use a shock absorber (provided that the maximum load mass is not exceeded).




### ⚠ Caution

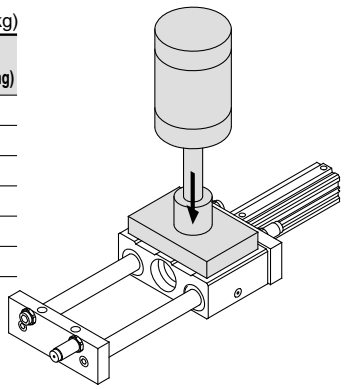
In the case of the ball bushing type, the service life could be drastically shortened if shocks or excessive moments are applied. Therefore, even if the conditions given above are not exceeded, the use of a shock absorber is recommended.

## Static Movable Mass when Stopped

When Series CXT cylinder is used for moving the workpiece receptacle, such as in a stamping or press-fitting process, a vertical load will be applied to the top surface of the stopped slide block (refer to the figure on the right). In this case, the allowable mass is greater than the maximum load mass, as given in the table on the right.

**Allowable Static Mass** (kg)

| Bore size (mm) | CXTM (Slide bearing) | CXTL (Ball bushing bearing) |
|---|---|---|
| 12 | 350 | 60 |
| 16 | 500 | 70 |
| 20 | 900 | 125 |
| 25 | 900 | 125 |
| 32 | 1100 | 140 |
| 40 | 1900 | 170 |



### ⚠ Caution

1. Make sure that the slide block is stopped at the stroke end.
2. Match the center of the mass to be applied with the center of the slide block. The direction of the mass must be vertically downward in relation to the surface on which the workpiece is mounted, as shown in the figure on the right.
3. Do not apply a load that involves shocks such as those caused by pounding (particularly with the ball bushing style).
4. If this mass is applied, the deflection of the guide shaft will also have a large value.

# Platform Cylinder
# *Series CXT*
## ø12, ø16, ø20, ø25, ø32, ø40

## How to Order

**Port thread type**

| | | |
|---|---|---|
| **Nil** | M thread | ø12 to ø25 |
| | Rc | ø32, ø40 |
| **TN** | NPT | |
| **TF** | G | |

**CXT M 20 □ – 100 B – M9BW □ – □**

**Platform cylinder**

**Bearing type**

| | |
|---|---|
| **M** | Slide bearing |
| **L** | Ball bushing bearing |

**Bore size/Stroke (mm)**

| Bore size (mm) | Stroke (mm) 15 25 50 75 100 125 150 175 200 250 300 |
|---|---|
| 12 | ● ● ○ ○ ○ ○ |
| 16 | ● ● ○ ○ ○ ○ |
| 20 | ● ● ○ ○ ○ ○ ○ ○ |
| 25 | ● ● ○ ○ ○ ○ ○ ○ |
| 32 | ● ● ● ○ ○ ○ ○ ○ |
| 40 | ● ● ● ○ ○ ○ ○ ○ |

● ·····Standard stroke ○ ·····Long stroke

∗ For minimum strokes for auto switch equipped style, refer to page 530.

**Auto switch**

| | |
|---|---|
| **Nil** | Without auto switch (Built-in magnet) |

∗ For the applicable auto switch model, refer to the table below.

**Option**

| | |
|---|---|
| **Nil** | Adjusting bolt with bumper only (Standard) |
| **B** | With 2 shock absorbers (Set on the driving cylinder side only when packed.) |
| **BS** | With 1 shock absorber (Set on the driving cylinder side when packed.) |

**Number of auto switches**

| | |
|---|---|
| **Nil** | 2 pcs. |
| **S** | 1 pc. |
| **n** | "n" pcs. |

**Made to Order**
Refer to page 525 for details.

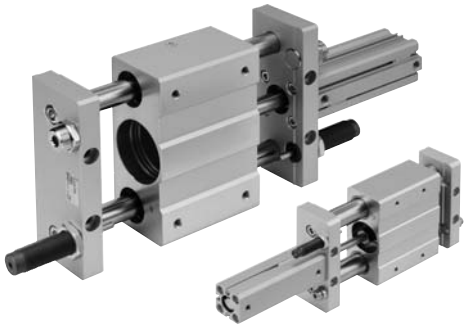
## Applicable Auto Switch/Refer to pages 1719 to 1827 for further information on auto switches.

| Type | Special function | Electrical entry | | Wiring (Output) | Load voltage DC | | Load voltage AC | Auto switch part no. Perpendicular ø12 to ø25 | Perpendicular ø32, ø40 | In-line ø12 to ø25 | In-line ø32, ø40 | Lead wire length (m) 0.5 (Nil) | 1 (M) | 3 (L) | 5 (Z) | None (N) | Pre-wired connector | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Solid state switch | — | Grommet | Yes | 3-wire (NPN) | 24V | 5V, 12V | — | M9NV | | M9N | | ● | ● | ● | ○ | — | ○ | IC circuit | Relay, PLC |
| | | | | 3-wire (PNP) | | | | M9PV | | M9P | | ● | ● | ● | ○ | — | ○ | | |
| | | | | 2-wire | | 12V | | M9BV | | M9B | | ● | ● | ● | ○ | — | ○ | — | |
| | | Connector | | | | | | — | J79C | — | | ● | — | ● | ● | ● | — | | |
| | Diagnostic indication (2-color indication) | Grommet | | 3-wire (NPN) | | 5V, 12V | | M9NWV | | M9NW | | ● | ● | ● | ○ | — | ○ | IC circuit | |
| | | | | 3-wire (PNP) | | | | M9PWV | | M9PW | | ● | ● | ● | ○ | — | ○ | | |
| | | | | 2-wire | | 12V | | M9BWV | | M9BW | | ● | ● | ● | ○ | — | ○ | — | |
| | Water resistant (2-color indication) | | | 3-wire (NPN) | | 5V, 12V | | M9NAV | | M9NA | | ○ | ○ | ● | ○ | — | ○ | IC circuit | |
| | | | | 3-wire (PNP) | | | | M9PAV | | M9PA | | ○ | ○ | ● | ○ | — | ○ | | |
| | | | | 2-wire | | 12V | | M9BAV | | M9BA | | ○ | ○ | ● | ○ | — | ○ | — | |
| | With diagnostic output (2-color indication) | | | 4-wire | | 5V,12V | | — | | — | F79F | ● | — | ● | ○ | — | ○ | IC circuit | |
| Reed switch | — | Grommet | Yes | 3-wire (NPN equivalent) | — | 5V | — | A96V | | A96 | | ● | — | ● | — | — | — | IC circuit | — |
| | | | | 2-wire | | — | 200V | — | A72 | — | A72H | ● | — | ● | — | — | — | — | Relay, PLC |
| | | | No | | 24V | 12V | 100V | A93V | | A93 | | ● | — | ● | — | — | — | | |
| | | | No | | | 5V,12V | 100 V or less | A90V | | A90 | | ● | — | ● | — | — | — | IC circuit | |
| | | Connector | Yes | | | 12V | — | — | A73C | — | | ● | — | ● | ● | ● | — | — | |
| | | | No | | | 5V,12V | 24 V or less | — | A80C | — | | ● | — | ● | ● | ● | — | IC circuit | |
| | Diagnostic indication (2-color indication) | Grommet | Yes | | | — | — | — | A79W | — | | ● | — | ● | — | — | — | — | |

∗ 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) J79CN

∗ Solid state auto switches marked with "○" are produced upon receipt of order.

∗ Since there are other applicable auto switches than listed, refer to page 532 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1784 and 1785.
∗ When D-A9□/M9□ types with ø32 to ø40 are mounted on a side other than the port side, order auto switch mounting brackets separately. Refer to page 532 for details.



## Specifications

| Bore size (mm) | 12 | 16 | 20 | 25 | 32 | 40 |
|---|---|---|---|---|---|---|
| **Fluid** | Air | | | | | |
| **Action** | Double acting | | | | | |
| **Proof pressure** | 1.5 MPa | | | | | |
| **Maximum operating pressure** | 0.7 MPa Note) | | | | | |
| **Minimum operating pressure** | 0.15 MPa | | | | | |
| **Ambient and fluid temperature** | –10 to 60°C (No freezing) | | | | | |
| **Piston speed** | 50 to 500 mm/s | | | | | |
| **Cushion** | Bumper (Both ends/Standard), Shock absorber (Option) | | | | | |
| **Lubrication** | Not required (Non-lube) | | | | | |
| **Stroke adjusting range** | –10 mm (Extension end, Retraction end: –5 mm each) | | | | | |

Note) Maximum operating pressure for this product with the bumper feature.
The maximum operating pressure for the cylinder alone is 1 MPa.

## Shock Absorber Specifications

For detailed specifications about shock absorber, /refer to page 1673

| Model | | CXT□12 16 | CXT□20 | CXT□25 | CXT□32 40 |
|---|---|---|---|---|---|
| **Shock absorber model** | | RB0806 | RB1007 | RB1411 | RB2015 |
| **Max. energy absorption (J)** | | 2.94 | 5.88 | 14.7 | 58.8 |
| **Stroke absorption (mm)** | | 6 | 7 | 11 | 15 |
| **Collision speed** | | 0.05 to 5 m/s | | | |
| **Max. operating frequency* (cycle/min)** | | 80 | 70 | 45 | 25 |
| **Ambient temperature** | | —10 to 80°C | | | |
| **Spring force (N)** | **Extended** | 1.96 | 4.22 | 6.86 | 8.34 |
| | **Retracted** | 4.22 | 6.86 | 15.30 | 20.50 |
| **Mass (g)** | | 15 | 25 | 65 | 150 |

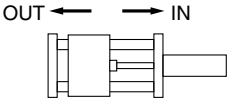
* It denotes the values at the maximum energy absorption per one cycle. Therefore, the operating frequency can be increased according to the energy absorption.

The shock absorber service life is different from that of the CXT cylinder depending on the operating conditions. Refer to the Specific Product Precautions for the replacement period.

## Theoretical Output

(N)

| Bore size (mm) | Operating direction | Piston area (mm²) | Operating pressure (MPa) 0.3 | 0.5 | 0.7 |
|---|---|---|---|---|---|
| 12 | IN | 84.8 | 25 | 42 | 59 |
| | OUT | 113 | 34 | 57 | 79 |
| 16 | IN | 151 | 45 | 75 | 106 |
| | OUT | 201 | 60 | 101 | 141 |
| 20 | IN | 236 | 71 | 118 | 165 |
| | OUT | 314 | 94 | 157 | 220 |
| 25 | IN | 378 | 113 | 189 | 264 |
| | OUT | 491 | 147 | 245 | 344 |
| 32 | IN | 603 | 181 | 302 | 422 |
| | OUT | 804 | 241 | 402 | 563 |
| 40 | IN | 1056 | 317 | 528 | 739 |
| | OUT | 1257 | 377 | 628 | 880 |




Made to Order

### Made to Order Specifications

(For details, refer to pages 1865 and 1993.)

| Symbol | Specifications |
|---|---|
| **XB13** | Low speed cylinder (5 to 50 mm/s) |
| **X138** | Adjustable stroke type |
| **X777** | Fluororubber seals (Actuating cylinder unit only) |

## Mass

### CXTM (Slide bearing)

(kg)

| Bore size (mm) \ Stroke (mm) | 15 | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 250 | 300 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **12** | 0.85 (0.35) | 0.90 (0.35) | 1.02 (0.35) | 1.13 (0.36) | 1.25 (0.37) | — | — | — | — | — | — |
| **16** | 1.18 (0.50) | 1.24 (0.50) | 1.39 (0.51) | 1.54 (0.52) | 1.68 (0.53) | — | — | — | — | — | — |
| **20** | — | 2.35 (0.85) | 2.61 (0.87) | 2.89 (0.88) | 3.15 (0.90) | 3.41 (0.91) | 3.66 (0.93) | 3.92 (0.94) | 4.18 (0.96) | — | — |
| **25** | — | 2.76 (1.09) | 3.03 (1.11) | 3.34 (1.14) | 3.62 (1.16) | 3.89 (1.18) | 4.16 (1.21) | 4.43 (1.23) | 4.70 (1.25) | 5.25 (1.30) | 5.79 (1.34) |
| **32** | — | 4.62 (2.06) | 4.98 (2.10) | 5.34 (2.14) | 5.70 (2.17) | 6.00 (2.21) | 6.35 (2.25) | 6.69 (2.29) | 7.04 (2.33) | 7.73 (2.41) | 8.43 (2.49) |
| **40** | — | 8.30 (3.71) | 8.82 (3.75) | 9.32 (3.79) | 9.83 (3.83) | 10.40 (3.87) | 10.91 (3.91) | 11.43 (3.95) | 11.95 (3.99) | 12.98 (4.07) | 14.02 (4.15) |

### CXTL (Ball bushing bearing)

(kg)

| Bore size (mm) \ Stroke (mm) | 15 | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 250 | 300 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **12** | 0.75 (0.41) | 0.78 (0.42) | 0.85 (0.42) | 0.92 (0.42) | 0.98 (0.43) | — | — | — | — | — | — |
| **16** | 1.05 (0.57) | 1.08 (0.57) | 1.18 (0.58) | 1.27 (0.59) | 1.35 (0.60) | — | — | — | — | — | — |
| **20** | — | 2.00 (1.02) | 2.15 (1.04) | 2.32 (1.05) | 2.46 (1.07) | 2.60 (1.08) | 2.75 (1.10) | 2.89 (1.11) | 3.03 (1.13) | — | — |
| **25** | — | 2.41 (1.25) | 2.57 (1.28) | 2.77 (1.30) | 2.92 (1.33) | 3.08 (1.35) | 3.24 (1.37) | 3.40 (1.39) | 3.56 (1.42) | 3.78 (1.46) | 4.19 (1.50) |
| **32** | — | 4.23 (2.26) | 4.47 (2.30) | 4.71 (2.34) | 4.95 (2.38) | 5.13 (2.42) | 5.36 (2.46) | 5.59 (2.50) | 5.82 (2.54) | 6.27 (2.62) | 6.73 (2.70) |
| **40** | — | 7.55 (4.31) | 7.86 (4.35) | 8.16 (4.39) | 8.46 (4.43) | 8.82 (4.47) | 9.13 (4.51) | 9.44 (4.55) | 9.75 (4.59) | 10.37 (4.67) | 10.99 (4.74) |

Note 1) ( ): Denotes the values of the movable parts mass. (Movable parts mass of a cylinder is included, too.)
Note 2) The mass indicated above does not include a shock absorber.

## Copper and Fluorine-free (For CRT manufacturing process)

To prevent the influence of copper ions or halogen ions during the CRT manufacturing process, copper and fluorine materials are not used in the component parts.

**20-CXT** | **Bearing type** | **Bore size** | **—** | **Stroke** | **Option** | **Auto Swith**

Copper and fluorine-free

## Specifications

| Bore size (mm) | **12, 16, 20, 25, 32, 40** |
|---|---|
| **Fluid** | Air |
| **Action** | Double acting |
| **Proof pressure** | 1.5 MPa |
| **Maximum operating pressure** | 0.7 MPa Note) |
| **Minimum operating pressure** | 0.15 MPa |
| **Ambient and fluid temperature** | 50 to 500 mm/s |

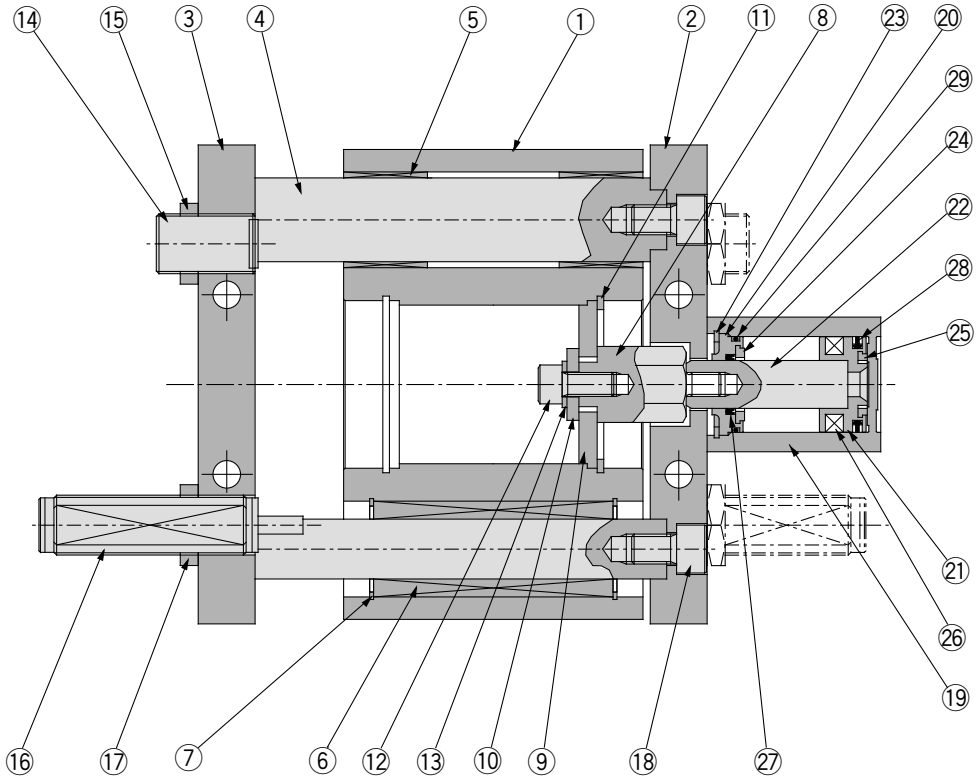
∗ Refer to page 525 for the specifications above and pages 528 and 529 for dimensions.
∗ Auto switches can be mounted.

Note) The maximum operating pressure for this product taking into account the cushioning ability, etc. The maximum operating pressure for the cylinder alone is 1 MPa.

## Construction

**CXTM**
**Guide rod/bearing**

**CXTL**
**Guide rod/bearing**




### Component Parts

| No. | Description | Material | | Note |
|---|---|---|---|---|
| 1 | **Slide block** | Aluminum alloy | | Hard anodized |
| 2 | **Plate A** | Aluminum alloy | | Hard anodized |
| 3 | **Plate B** | Aluminum alloy | | Hard anodized |
| 4 | **Guide rod** | **CXTM** | Carbon steel | Hard chromium electroplated |
| | | **CXTL** | Bearing steel | High frequency quenching, Hard chrome plated |
| 5 | **Slide bearing** | Bearing alloy, Carbon steel | | |
| 6 | **Ball bushing bearing** | — | | |
| 7 | **Type C retaining ring** | Carbon tool steel | | Nickel plated |
| 8 | **Adapter** | Carbon steel | | Nickel plated |
| 9 | **Connected disk** | Carbon steel | | Nickel plated |
| 10 | **Flat washer** | Carbon steel | | Zinc chromated |
| 11 | **Type C retaining ring** | Carbon tool steel | | Nickel plated |
| 12 | **Hexagon socket head cap screw** | Chromium molybdenum steel | | Nickel plated |
| 13 | **Spring washer** | Steel wire | | Nickel plated |
| 14 | **Adjusting bolt (With bumper)** | Carbon steel, Elastomer | | Nickel plated |
| 15 | **Nut** | Carbon steel | | Nickel plated |

### Component Parts

| No. | Description | Material | Note | |
|---|---|---|---|---|
| 16 | **Shock absorber** | — | Option | |
| 17 | **Nut** | Carbon steel | Shock absorber accessory | |
| 18 | **Hexagon socket head cap screw** | Chromium molybdenum steel | Nickel plated | |
| 19 | **Cylinder tube** | Aluminum alloy | Hard anodized | |
| 20 | **Collar** | Aluminum alloy | Clear anodized | |
| 21 | **Piston** | Aluminum alloy | Chromated | |
| 22 | **Piston rod** | Stainless steel | — | ø12 to 25 |
| | | Carbon steel | Hard chromium electroplated | ø32, 40 |
| 23 | **Type C retaining ring** | Carbon tool steel | Phosphate coated | |
| 24 | **Bumper A** | Polyurethane | | |
| 25 | **Bumper B** | Polyurethane | | |
| 26 | **Magnet** | — | | |
| 27 | **Rod seal** | NBR | | |
| 28 | **Piston seal** | NBR | | |
| 29 Note) | **Tube gasket** | NBR | | |

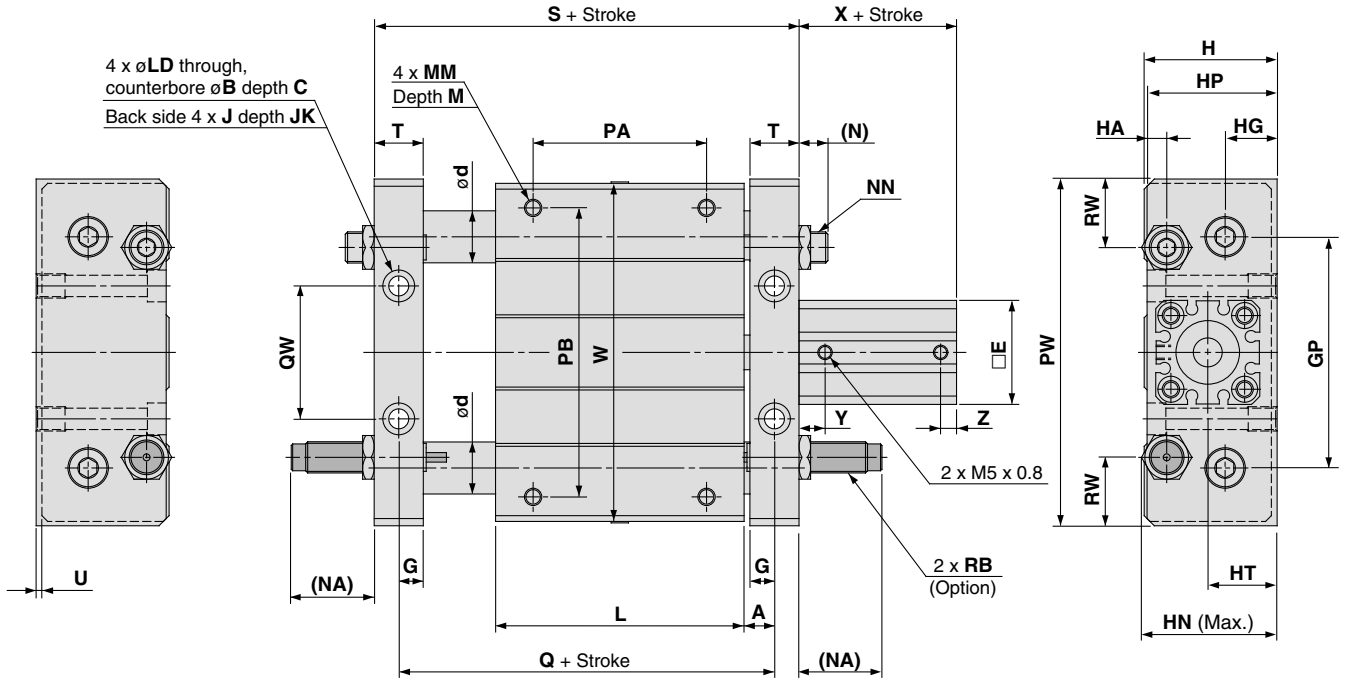
Note) The same type of the part is equipped to the head side for the long stroke type.

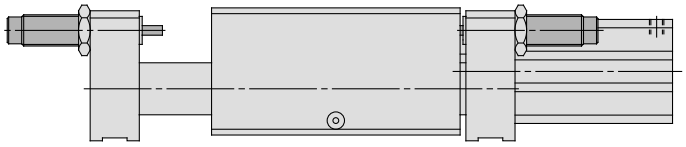
### Replacement Parts/Seal Kit

| Model / Cylinder / Stroke | Kit no. | | | | | |
|---|---|---|---|---|---|---|
| | **CXT□12** | **CXT□16** | **CXT□20** | **CXT□25** | **CXT□32** | **CXT□40** |
| | CDQSB12 | CDQSB16 | CDQSB20 | CDQSB25 | CDQ2A32 | CDQ2A40 |
| Standard stroke | CQSB12-PS | CQSB16-PS | CQSB20-PS | CQSB25-PS | CQ2B32-PS | CQ2B40-PS |
| Long stroke | CQSB12-L-PS | CQSB16-L-PS | CQSB20-L-PS | CQSB25-L-PS | CQ2A32-L-PS | CQ2A40-L-PS |

∗ Seal kit includes ㉗, ㉘ and ㉙. Order the seal kit with the kit number.
∗ Since the seal kit does not include a grease pack, order it separately.
**Grease pack part no.: GR-S-010** (10 g)

## Dimensions: ø12 to ø25



**Cylinder form**

**ø12**

**ø16**

(mm)

| Bore size (mm) | Standard stroke (mm) | A | B | C | d | | E | G | GP | H | HA | HG | HN | HP | HT | J | JK | L | LD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Slide | Ball bushing | | | | | | | | | | | | | |
| **12** | 15, 25 | 8.5 | 8 | 4 | 16 | 10 | 25 | 7.5 | 50 | 34 | 6 | 14.5 | 34 | 33 | 18 | M5 x 0.8 | 9.5 | 68 | 4.3 |
| **16** | 15, 25 | 7.5 | 9.5 | 5 | 18 | 12 | 29 | 6.5 | 65 | 40 | 6.5 | 16 | 39.5 | 39 | 21 | M6 x 1 | 9.5 | 75 | 5.2 |
| **20** | 25, 50 | 9.5 | 11 | 6.5 | 25 | 16 | 36 | 8.5 | 80 | 46 | 9 | 18 | 44.1 | 45 | 24 | M8 x 1.25 | 10 | 86 | 6.9 |
| **25** | 25, 50 | 9.5 | 11 | 6.5 | 25 | 16 | 40 | 8.5 | 90 | 54 | 9 | 23 | 55 | 53 | 28 | M8 x 1.25 | 10 | 86 | 6.9 |

| Bore size (mm) | MM | M | (N) | (NA) | NN | PA* | PB | PW | Q | QW | RB | RW | S | T | U | W | X | Y | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **12** | M4 x 0.7 | 6 | 8 | 27 | M8 x 1.0 | 30 | 60 | 80 | 85 | 26 | RB0806 | 17.5 | 96 | 13 | 1 | 77 | 22 | 7.5 | 5 |
| **16** | M5 x 0.8 | 8 | 8 | 27 | M8 x 1.0 | 45 | 70 | 95 | 90 | 40 | RB0806 | 15 | 103 | 13 | 2 | 92 | 22 | 7.5 | 5 |
| **20** | M6 x 1 | 10 | 10 | 29 | M10 x 1.0 | 60 | 100 | 120 | 105 | 46 | RB1007 | 26 | 122 | 17 | 2 | 117 | 29.5 | 9 | 5.5 |
| **25** | M6 x 1 | 10 | 12 | 50 | M14 x 1.5 | 60 | 100 | 130 | 105 | 50 | RB1411 | 22 | 122 | 17 | 2 | 127 | 32.5 | 11 | 5.5 |

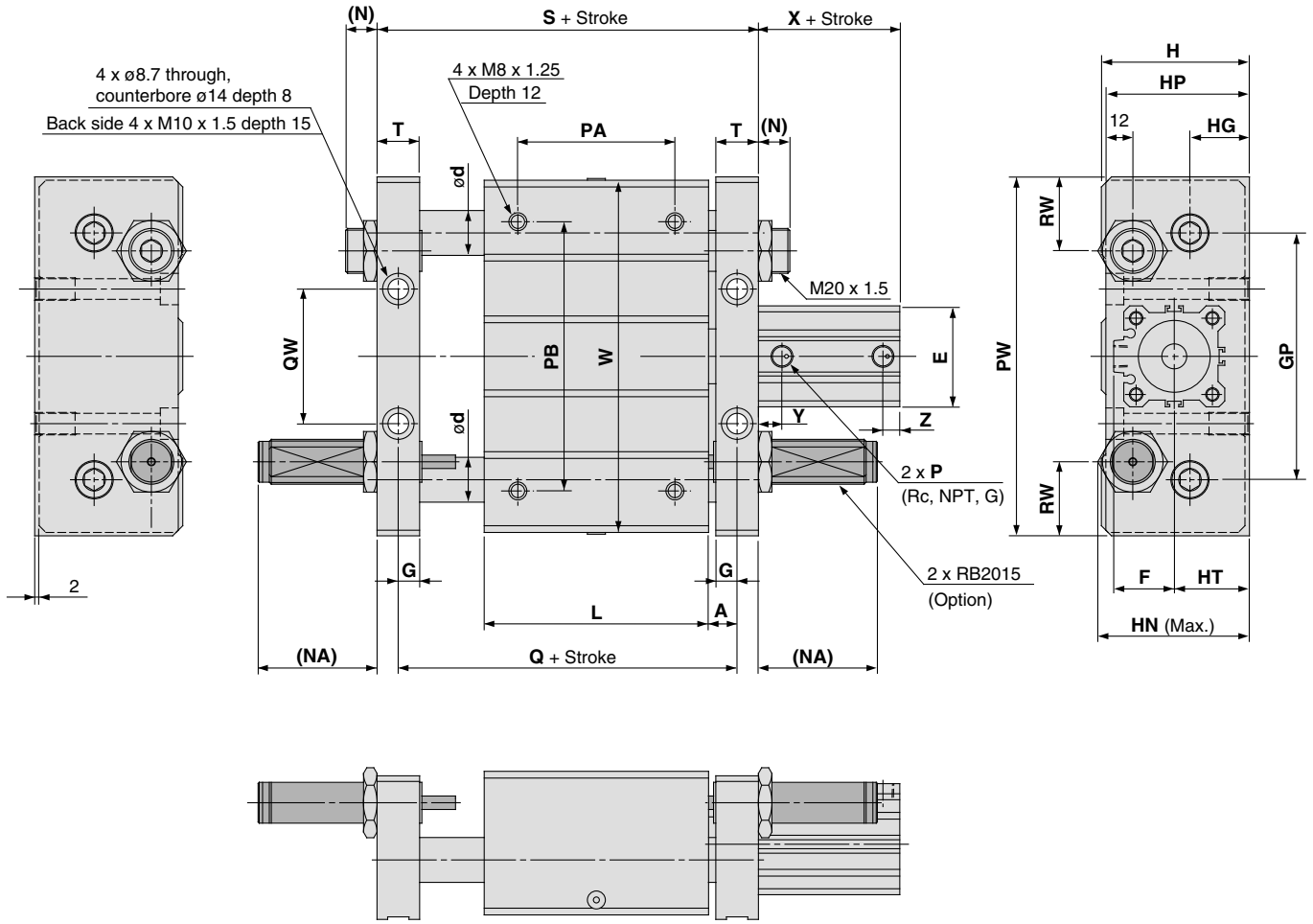
∗ PA dimension is the center sorted factor of the L dimension.

### Long Stroke

(mm)

| Bore size (mm) | Stroke range (mm) | X | Y | Z |
|---|---|---|---|---|
| **12** | 50, 75, 100 | 32 | 7.5 | 7.5 |
| **16** | 50, 75, 100 | 32 | 7.5 | 7.5 |
| **20** | 75, 100, 125, 150, 175, 200 | 41 | 9 | 9 |
| **25** | 75, 100, 125, 150, 175, 200, 250, 300 | 44 | 11 | 11 |

## Dimensions: ø32, ø40




(mm)

| Bore size (mm) | Standard stroke (mm) | A | d | | E | F | G | GP | H | HG | HN | HP | HT | L | (N) | (NA) | P[Note] | PA* | PB | PW | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Slide | Ball bushing | | | | | | | | | | | | | | | | | |
| **32** | 25, 50, 75, 100 | 10.5 | 28 | 20 | 45 | 27 | 9.5 | 110 | 66 | 26.5 | 67.6 | 64 | 33.5 | 100 | 14 | 53 | 1/8 | 70 | 120 | 160 | 121 |
| **40** | 25, 50, 75, 100 | 11.5 | 36 | 25 | 52 | 31 | 10.5 | 130 | 78 | 30.5 | 77.6 | 74 | 40.5 | 136 | 12 | 51 | 1/8 | 90 | 140 | 190 | 159 |

| Bore size (mm) | QW | RW | S | T | W | X | Y | Z |
|---|---|---|---|---|---|---|---|---|
| **32** | 60 | 33 | 140 | 19 | 157 | 33 | 10.5 | 7.5 |
| **40** | 84 | 35 | 180 | 21 | 187 | 39.5 | 11 | 8 |

∗ PA dimension is the center sorted factor of the L dimension.

Note) Rc, NPT and G ports can be selected.

### Long Stroke

(mm)

| Bore size (mm) | Stroke range (mm) | X | Y | Z |
|---|---|---|---|---|
| **32** | 125, 150, 175, 200, 250, 300 | 45.5 | 12.5 | 12.5 |
| **40** | 125, 150, 175, 200, 250, 300 | 55 | 14 | 14 |

## Minimum Stroke for Mounting of Auto Switch

(mm)

| Application | No. of auto switches mounted \ Auto switch model | D-M9□V | D-A9□V | D-A9□ | D-M9□WV<br>D-M9□AVL | D-M9□ | D-M9□W<br>D-M9□AL |
|---|---|---|---|---|---|---|---|
| CXT□12 to CXT□25 | 1 | 5 | 5 | 10 | 10 | 15 | 20 |
| | 2 | 5 | 10 | 10 | 10 | 15 | 20 |
| CXT□ 32 40 | 1 | 5 | 5 | 10 | 10 | 10 | 15 |
| | 2 | 5 | 10 | 10 | 15 | 10 | 15 |

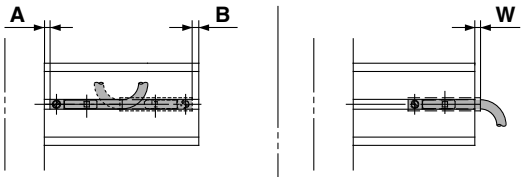
(mm)

| Application | No. of auto switches mounted \ Auto switch model | D-F7□V<br>D-J79C | D-A7□<br>D-A8□<br>D-A73C<br>D-A80C | D-F7□WV<br>D-F7BAVL | D-A7□H<br>D-A80H<br>D-F7□<br>D-J79 | D-A79W | D-F7□W<br>D-J79W<br>D-F7BAL<br>D-F7NTL<br>D-F79F |
|---|---|---|---|---|---|---|---|
| CXT□ 32 40 | 1 | 5 | 5 | 10 | 15 | 15 | 20 |
| | 2 | 5 | 10 | 15 | 15 | 20 | 20 |

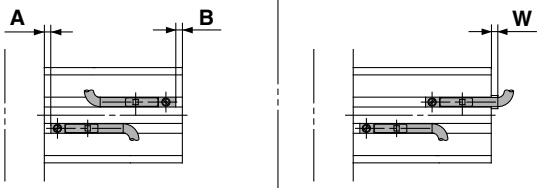
## Proper Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height

**D-A9□ D-M9□ D-M9□W D-M9□AL**

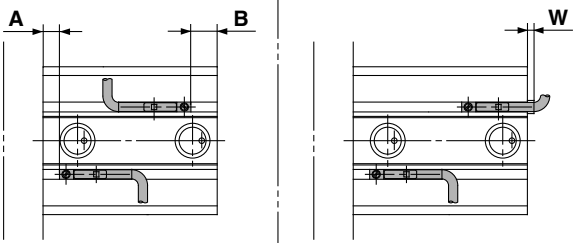
ø12



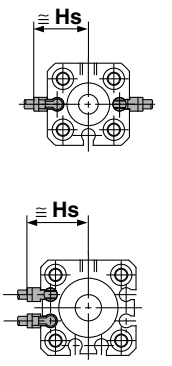

ø16, 20, 25




ø32, 40




**D-A9□V D-M9□V D-M9□WV D-M9□AVL**




### Proper Auto Switch Mounting Position/Standard Stroke

(mm)

| Auto switch model / Bore size | D-A9□<br>D-A9□V | | | D-M9□/M9□V<br>D-M9□W/M9□WV | | | D-M9□AL<br>D-M9□AVL | | |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | W | A | B | W | A | B | W |
| 12 | 1.5 | 0 | 1.5 (4) | 5.5 | 4.5 | 5.5 | 5.5 | 4.5 | 7.5 |
| 16 | 2 | 0 | 2 (4.5) | 6 | 4 | 6 | 6 | 4 | 8 |
| 20 | 6 | 3.5 | −1.5 (1) | 10 | 7.5 | 2.5 | 10 | 7.5 | 4.5 |
| 25 | 7 | 5.5 | −3.5 (−1) | 11 | 9.5 | 0.5 | 11 | 9.5 | 2.5 |
| 32 | 8 | 5 | −3 (−0.5) | 12 | 9 | 1 | 12 | 9 | 3 |
| 40 | 12 | 7.5 | −5.5 (−3) | 16 | 11.5 | −1.5 | 16 | 11.5 | 0.5 |

### Proper Auto Switch Mounting Position/Long Stroke

(mm)

| Auto switch model / Bore size | D-A9□<br>D-A9□V | | | D-M9□/M9□V<br>D-M9□W/M9□WV | | | D-M9□AL<br>D-M9□AVL | | |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | W | A | B | W | A | B | W |
| 12 | 5 | 7 | −5 (−2.5) | 9 | 11 | −1 | 9 | 11 | 1 |
| 16 | 5.5 | 6 | −4.5 (−2) | 9.5 | 10.5 | −0.5 | 9.5 | 10.5 | 1.5 |
| 20 | 9 | 11.5 | −10 (−7.5) | 13 | 16 | −6 | 13 | 16 | −4 |
| 25 | 10 | 13.5 | −12 (−9.5) | 14 | 18 | −8 | 14 | 18 | −6 |
| 32 | 8.5 | 16.5 | −14.5 (−12) | 12.5 | 20.5 | −10.5 | 12.5 | 20.5 | −8.5 |
| 40 | 12 | 22.5 | −20.5 (−18) | 16 | 26.5 | −16.5 | 16 | 26.5 | −14.5 |

Note 1) ( ): Denotes the values of D-A93.
Note 2) W is applicable when mounting D-A9□, D-M9□, D-M9□W and D-M9□AL.
Note 3) Adjust the auto switch after confirming the operating conditions in the actual setting.

### Auto Switch Mounting Height/ Standard Stroke, Long Stroke

(mm)

| Auto switch model / Bore size | D-A9□V | D-M9□V<br>D-M9□WV<br>D-M9□AVL |
|---|---|---|
| | Hs | Hs |
| 12 | 17 | 19 |
| 16 | 19 | 21 |
| 20 | 22.5 | 24 |
| 25 | 24.5 | 26 |
| 32 | 27 | 29 |
| 40 | 30.5 | 32.5 |

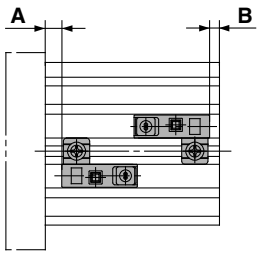
## Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

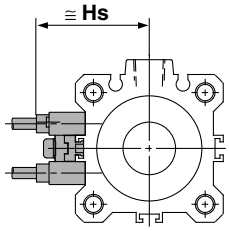
**D-A7□**
**D-A80**
**D-A73C**
**D-A80C**
**D-A79W**
**D-A7□H**
**D-A80H**

**D-F7□**
**D-J79**
**D-F7□W**
**D-J79W**
**D-F7BAL**
**D-F79F**
**D-F7NTL**

**D-F7□V**
**D-J79C**
**D-F7□WV**
**D-F7BAVL**

**ø32, 40**




### Auto Switch Proper Mounting Position/Standard Stroke

(mm)

| Auto switch model / Bore size | D-A73 D-A80 | | D-A72/A7□H D-A80H/A73C D-A80C/F7□/J79 D-F7□W/J79W D-F7□V/F7□WV D-F79F/J79C D-F7BAL/F7BAVL | | D-A79W | | D-F7NTL | |
|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B |
| 32 | 9 | 6 | 9.5 | 6.5 | 6.5 | 3.5 | 14.5 | 10.5 |
| 40 | 13 | 8.5 | 13.5 | 9 | 10.5 | 6 | 18.5 | 13 |

### Auto Switch Proper Mounting Position/Long Stroke

(mm)

| Auto switch model / Bore size | D-A73 D-A80 | | D-A72/A7□H D-A80H/A73C D-A80C/F7□/J79 D-F7□W/J79W D-F7□V/F7□WV D-F79F/J79C D-F7BAL/F7BAVL | | D-A79W | | D-F7NTL | |
|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B |
| 32 | 9.5 | 17.5 | 10 | 18 | 7 | 15 | 15 | 23 |
| 40 | 13 | 23.5 | 13.5 | 24 | 10.5 | 21 | 18.5 | 29 |

Note ) Adjust the auto switch after confirming the operating conditions in the actual setting.

### Auto Switch Mounting Height/Standard Stroke, Long Stroke

(mm)

| Auto switch model / Bore size | D-A7□ D-A80 | D-A7□H D-A80H D-F7□ D-J79 D-F7□W D-J79W D-F79F D-F7BAL D-F7NTL | D-A73C D-A80C | D-A79W | D-F7□V D-F7□WV D-F7BVL | D-J79C |
|---|---|---|---|---|---|---|
| | Hs | Hs | Hs | Hs | Hs | Hs |
| 32 | 31.5 | 32.5 | 38.5 | 34 | 35 | 38 |
| 40 | 35 | 36 | 42 | 37.5 | 38.5 | 41.5 |

## Operating Range

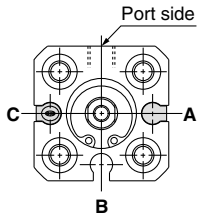
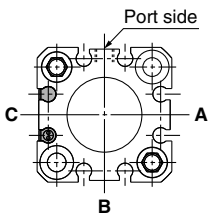
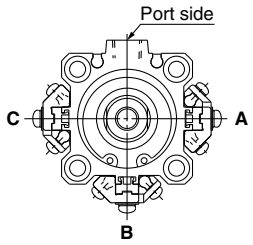
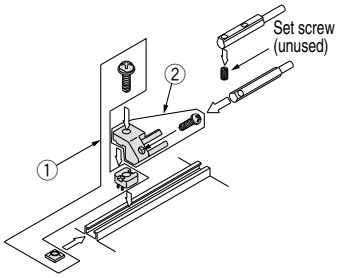
(mm)

| Auto switch model | Bore size | | | | | |
|---|---|---|---|---|---|---|
| | 12 | 16 | 20 | 25 | 32 | 40 |
| D-A9□/A9□V | 6 | 7.5 | 10 | 10 | 9.5 | 9.5 |
| D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL | 2.5 | 4 | 5.5 | 5.5 | 6 | 5.5 |
| D-F7□/F7□V D-J79/J79C D-F7□W/F7□WV D-J79W D-F7BAL/F7BAVL D-F7NTL/F79F | — | — | — | — | 6 | 6 |
| D-A7□/A80 | — | — | — | — | 12 | 11 |
| D-A79W | — | — | — | — | 13 | 14 |

∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion)
There may be the case it will vary substantially depending on an ambient environment.

∗ Auto switch mounting brackets BQ2-012 are not used for sizes over ø32 of D-A9□(V)/M9□(V)/M9□W(V)/M9□A(V)L types. The above values indicate the operating range when mounted with the conventional auto switch installation groove.

## Auto Switch Mounting Bracket: Part No.

| Auto switch mounting surface / Auto switch model | Bore size (mm) | | | |
|---|---|---|---|---|
| | ø12 | ø16, ø20, ø25 | ø32, ø40 | |
| |  |  |  | |
| | Auto switch mounting surface | Auto switch mounting surface | Auto switch mounting surface | |
| | A, B and C sides | Port A, B and C sides | Port side | A, B and C sides |
| **D-A9□**<br>**D-A9□V**<br>**D-M9□**<br>**D-M9□V**<br>**D-M9□W**<br>**D-M9□WV**<br>**D-M9□AL**<br>**D-M9□AVL** | Auto switch mounting bracket not required. | Auto switch mounting bracket not required. | Auto switch mounting bracket not required. | ①BQ-2<br>②BQ2-012<br>2 kinds of auto switch mounting brackets are available as a set.<br>  |

Note 1) For each cylinder series, when a compact auto switch is mounted on the three sides (A, B and C above) other than the port side of bore sizes ø32 and ø40, the auto switch mounting brackets above are required. Order them separately from cylinders.
Order example
CXTM32-50-M9BW·····1
BQ-2·····2 pcs.
BQ2-012·····2 pcs.

Note 2) When shipping cylinders, auto switch mounting brackets and auto switches are shipped together.

| Auto switch model | Bore size (mm) | |
|---|---|---|
| | 32 | 40 |
| **D-A7□/A80**<br>**D-A73C/A80C**<br>**D-A7□H/A80H**<br>**D-A79W**<br>**D-F7□/J79**<br>**D-F7□V**<br>**D-J79C**<br>**D-F7□W/J79W**<br>**D-F7□WV**<br>**D-F7BAL/F7BAVL**<br>**D-F79F/F7NTL** | BQ-2 | |

Note ) When shipping cylinders, auto switch mounting brackets and auto switches are shipped together.

**[Mounting screw set made of stainless steel]**

The following set of mounting screws made of stainless steel (including nuts) is available. Use it in accordance with the operating environment. (Please order the auto switch mounting bracket separately, since it is not included.)

BBA2: For D-A7/A8/F7/J7 types

D-F7BAL and F7BAVL auto switches are set on the cylinder with the stainless steel screws above when shipped. When an auto switch is shipped independently, BBA2 is attached.

Note 4) Refer to page 1817 for the details of BBA2.

Note 5) When D-M9□A(V)L type is mounted on a side other than ø32 and ø40 port sides, order auto switch mounting brackets BQ2-012S and BQ-2, and a stainless steel screw set BBA2.

### Auto Switch Mounting Bracket Mass

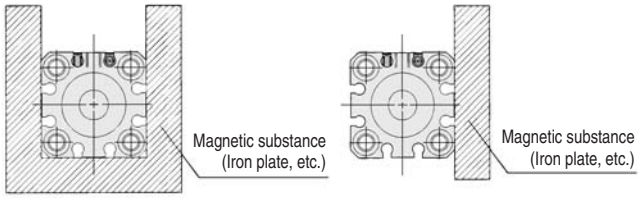
| Auto switch mounting bracket part no. | Mass (g) |
|---|---|
| BQ-2 | 1.5 |
| BQ2-012 | 5 |

**Other Applicable Auto Switches** /Refer to pages 1719 to 1827 for the detailed specifications of auto switches.

| Auto switch type | Model | Electrical entry (Fetching direction) | Features |
|---|---|---|---|
| **Reed** | D-A73 | Grommet (Perpendicular) | — |
| | D-A80 | | Without indicator light |
| | D-A73H, A76H | Grommet (In-line) | — |
| | D-A80H | | Without indicator light |
| **Solid state** | D-F7NV, F7PV, F7BV | Grommet (Perpendicular) | — |
| | D-F7NWV, F7BWV | | Diagnostic indication (2-color indication) |
| | D-F7BAVL | | Water resistant (2-color indication) |
| | D-F79, F7P, J79 | Grommet (In-line) | — |
| | D-F79W, F7PW, J79W | | Diagnostic indication (2-color indication) |
| | D-F7BAL | | Water resistant (2-color indication) |
| | D-F7NTL | | With timer |

∗ For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 1784 and 1785 for details.
∗ Normally closed (NC = b contact), solid state auto switch (D-F9G/F9H type) are also available. For details, refer to page 1746.
∗ D-A7/A8/F7/J7 types cannot be mounted on ø12 to ø25.

- If the cylinder is used in an application in which a magnetic material is placed in close contact around the cylinder as shown in the graph on the below (including cases in which even one of the sides is in close contact) the operation of auto switches could become unstable. Therefore, please check with SMC for this type of application.



# Series CXT
# Specific Product Precautions

**Be sure to read before handling.**
**Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.**

## Operating Precautions

### ⚠Caution

1. **Make sure not to apply to the slide block a load that exceeds the value that has been calculated in the selection procedures.**
2. **Operate the cylinder securing it by its plates, not by securing it by its slide block.**
3. **The clearance between the slide block and the plate at the stroke end is approximately 1 mm to 6 mm. It could be extremely dangerous, as there is the risk of getting your fingers caught.**
   Install a cover as necessary.
4. **At both stroke ends, adjust the damper portion at the end of the adjusting bolt so that it comes in contact with the slide block. (The clearance between the slide block and the plate must be 1 mm or more.)**
   If it is operated without making any contact, the piston rod of the actuating cylinder or the connecting hardware (adapter) could become damaged by an excessive impact, or the slide block could collide with the plate and create an abnormal noise.
5. **The load mass or operating speed will be limited if only the adjusting bolt is used.**
   Refer to the section on “Allowable load when only the adjusting bolt is used” on page 523
6. **Please contact SMC if this product will be used in an environment in which the piston rod and the guide shaft surfaces will be exposed to water (hot water), coolant, cutting chips, or dust.**
7. **The slide block bearings must be greased periodically. Inject grease (Class 1 or 2 lithium soap grease consistency) through the grease inlet.**
   Note) On those with a cylinder bore of ø12, apply grease to the guide shaft.
8. **To operate the cylinder, use a non-lubricating air supply.**
   Use turbine oil Class 1 (ISO VG32), if lubricated. (Using machine oil or spindle oil are not allowed.)

## Mounting

### ⚠Caution

1. **While a high level of flatness is desired for the surface on which the cylinder is to be mounted, if sufficient flatness cannot be attained, use shims to adjust the installation of the cylinder so that the slide block can operate throughout its stroke under the minimum operating pressure.**
2. **Do not scratch or gouge the piston rod of the actuating cylinder, as this could damage the rod seal and lead to air leaks.**
   The same applies to the guide shaft.
3. **Make sure not to apply shocks or excessive moment to the slide block of the ball bushing type.**
4. **The port direction of the actuating cylinder can be changed in 90° increments by removing the four bolts that secure the cylinder in place.**
   After changing the direction, verify the operation at the minimum operating pressure.
5. **Before the installation, thoroughly flush out the piping to prevent dust or cutting chips from entering the cylinder.**
6. **The mounting position of the adjusting bolt and the shock absorber cannot be inverted due to the constraints imposed by the locating pin for the shock absorber that is provided on the slide block.**
   To invert the position, please contact SMC.

## Handling on Shock Absorber

### ⚠Caution

1. **Series RB (SMC made) shock absorbers can absorb a wide range of energy without requiring adjustment. (No adjustment screw is provided.)**
2. **The screw at the bottom is not for adjustment.**
   Never turn this screw as it could cause an oil leak (lowered performance).
3. **Do not scratch the surface of the shock absorber rod because doing so could affect the shock absorber’s durability or lead to poor retraction.**

∗ For detailed specifications about the shock absorber, refer to page 1673.

## Service Life and Replacement Period of Shock Absorber

### ⚠Caution

1. **Allowable operating cycle under the specifications set in this catalog is shown below.**

1.2 million cycles RB08□□
2 million cycles RB10□□ to RB2725

Note) Specified service life (suitable replacement period) is the value at room temperature (20 to 25°C). The period may vary depending on the temperature and other conditions. In some cases the absorber may need to be replaced before the allowable operating cycle above.