

Compact Cylinder: Standard Type

Double Acting, Single Rod

Series CQS

ø12, ø16, ø20, ø25

How to Order

CQS B 20 - 30 D - **M9BW**

With auto switch **CDQS B 20 - 30 D** - **M9BW**

With auto switch
(Built-in magnet)

Mounting style

| | |
|----------|---|
| B | Through-hole/Both ends tapped common (Standard) |
| L | Foot style |
| F | Rod side flange style |
| G | Head side flange style |
| D | Double clevis style |

Bore size

| | |
|-----------|-------|
| 12 | 12 mm |
| 16 | 16 mm |
| 20 | 20 mm |
| 25 | 25 mm |

Cylinder stroke (mm)

| Bore size | Standard stroke | Long stroke |
|---------------|---------------------------------------|---|
| 12, 16 | 5, 10, 15, 20, 25, 30 | 35, 40, 45, 50, 75, 100, 125, 150, 175, 200 |
| 20 | 5, 10, 15, 20, 25, 30, 35, 40, 45, 50 | 75, 100, 125, 150, 175, 200 |
| 25 | | 75, 100, 125, 150, 175, 200, 250, 300 |

Number of auto switches

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

Auto switch

| | |
|------------|---------------------|
| Nil | Without auto switch |
|------------|---------------------|

Body option

<Standard stroke>

| | |
|------------|---------------------|
| Nil | Standard |
| C | With rubber bumper |
| M | Rod end male thread |
| F | Boss on head side |

<Long stroke>

| | |
|-----------|--|
| C | With rubber bumper Rod end female thread (Standard) |
| CM | With rubber bumper Rod end male thread |

Action

| | |
|----------|---------------|
| D | Double acting |
|----------|---------------|

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) CDQSL25-30D

Made to Order
Refer to page 552 for details.

For "Manufacture of Intermediate Strokes", refer to page 552.

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

| Type | Special function | Electrical entry | Indicator light | Wiring (Output) | Load voltage | | Auto switch model | | Lead wire length (m) | | | | Pre-wired connector | Applicable load | | |
|--------------------|--------------------------------------|------------------|-----------------|-------------------------|--------------|-----------|-------------------|---------------|----------------------|-----------|-------|-------|---------------------|-----------------|------------|------------|
| | | | | | DC | | AC | Perpendicular | In-line | 0.5 (Nil) | 1 (M) | 3 (L) | | 5 (Z) | | |
| Solid state switch | — | Grommet | Yes | 3-wire (NPN) | 24 V | 5 V, 12 V | — | M9NV | M9N | ● | ● | ● | ○ | ○ | IC circuit | Relay, PLC |
| | | | | 3-wire (PNP) | | 12 V | | M9PV | M9P | ● | ● | ● | ○ | ○ | | |
| | 2-wire | | | 12 V | | M9BV | | M9B | ● | ● | ● | ○ | ○ | | | |
| | 3-wire (NPN) | | | 5 V, 12 V | | M9NWV | | M9NW | ● | ● | ● | ○ | ○ | | | |
| | 3-wire (PNP) | | | 5 V, 12 V | | M9PWV | | M9PW | ● | ● | ● | ○ | ○ | | | |
| | 2-wire | | | 12 V | | M9BWV | | M9BW | ● | ● | ● | ○ | ○ | | | |
| | 3-wire (NPN) | | | 5 V, 12 V | | M9NAV | | M9NA | ○ | ○ | ● | ○ | ○ | | | |
| | 3-wire (PNP) | | | 5 V, 12 V | | M9PAV | | M9PA | ○ | ○ | ● | ○ | ○ | | | |
| | Water resistant (2-color indication) | Grommet | Yes | 2-wire | 12 V | M9BAV | M9BA | ○ | ○ | ● | ○ | ○ | ○ | ○ | | |
| | | | | | | | | | | | | | | | | |
| Reed switch | — | Grommet | Yes | 3-wire (NPN equivalent) | — | 5 V | — | A96V | A96 | ● | — | ● | — | — | IC circuit | — |
| | | | No | 2-wire | 24 V | 12 V | 100 V | A93V | A93 | ● | — | ● | — | — | — | Relay, PLC |
| | | | | | | | | | | | | | | | | |

* 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

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

* Since there are other applicable auto switches than listed, refer to page 597 for details.

* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.

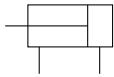
* Auto switches are shipped together (not assembled).

Note) There is the case A9□V/M9□V/M9□WV/M9□AVL type auto switches cannot be mounted on the port surface, depending on the cylinder's stroke and the fitting size for piping.
Consult with SMC for details.

Series CQS



JIS Symbol



Made to Order Specifications

(For details, refer to pages 1373 to 1565.)

| Symbol | Specifications |
|--------|--|
| -XA□ | Change of rod end shape |
| -XB6 | Heat-resistant cylinder (-10 to 150 °C) (without an auto switch) |
| -XB7 | Cold-resistant cylinder (-40 to 70 °C) (without an auto switch) |
| -XB9 | Low speed cylinder (10 to 50 mm/s) |
| -XB10 | Intermediate stroke (Using exclusive body) |
| -XB13 | Low speed cylinder (5 to 50 mm/s) |
| -XC6 | Piston rod, retaining ring, rod end nut made of stainless steel |
| -XC8 | Adjustable stroke cylinder/Adjustable extension type |
| -XC9 | Adjustable stroke cylinder/Adjustable retraction type |
| -XC10 | Dual stroke cylinder/Double rod type |
| -XC11 | Dual stroke cylinder/Single rod type |
| -XC36 | With boss in rod side |
| -X271 | Fluororubber seals |
| -X525 | Long stroke of adjustable extension stroke cylinder (-XC8) |
| -X526 | Long stroke of adjustable retraction stroke cylinder (-XC9) |
| -X636 | Long stroke of dual stroke single rod |
| -X1876 | With concave shape end boss on the cylinder tube head side |

Body Option

| Description | Application |
|---------------------|---|
| Rod end male thread | Available for all standard models of double acting, single rod. |
| Rubber bumper | |

* Rubber bumper is standard equipment for long stroke type.

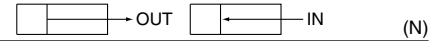
Specifications

| Bore size (mm) | | 12 | 16 | 20 | 25 |
|-------------------------------|--------------------|---|-------|----------|------|
| Action | | Double acting, Single rod | | | |
| Fluid | | Air | | | |
| Lubrication | | Not required (Non-lube) | | | |
| Proof pressure | | 1.5 MPa | | | |
| Maximum operating pressure | | 1.0 MPa | | | |
| Minimum operating pressure | | 0.07 MPa | | 0.05 MPa | |
| Ambient and fluid temperature | | Without auto switch: −10 to 70°C (No freezing) | | | |
| | | With auto switch: −10 to 60°C (No freezing) | | | |
| Cushion | | None, Rubber bumper * | | | |
| Rod end thread | | Female thread | | | |
| Stroke length tolerance | | Standard stroke: $^{+1.0}_0$ Long stroke: $^{+1.4}_0$ * | | | |
| Mounting | | Through-hole/Both ends tapped common | | | |
| Piston speed | | 50 to 500 mm/s | | | |
| Allowable kinetic energy (J) | Standard type | 0.022 | 0.038 | 0.055 | 0.09 |
| | With rubber bumper | 0.043 | 0.075 | 0.11 | 0.18 |

* Stroke length tolerance does not include the deflection of the bumper.

* Only rubber bumper is available for the long stroke type.

Theoretical Output



| Bore size (mm) | Rod size (mm) | Operating direction | Piston area (mm ²) | Operating pressure (MPa) | | |
|----------------|---------------|---------------------|--------------------------------|--------------------------|-----|-----|
| | | | | 0.3 | 0.5 | 0.7 |
| 12 | 6 | IN | 84.8 | 25 | 42 | 59 |
| | | OUT | 113 | 34 | 57 | 79 |
| 16 | 8 | IN | 151 | 45 | 75 | 106 |
| | | OUT | 201 | 60 | 101 | 141 |
| 20 | 10 | IN | 236 | 71 | 118 | 165 |
| | | OUT | 314 | 94 | 157 | 220 |
| 25 | 12 | IN | 378 | 113 | 189 | 264 |
| | | OUT | 491 | 147 | 245 | 344 |

Manufacture of Intermediate Stroke

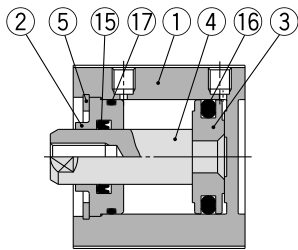
| Description | | Spacer is installed in the standard stroke body. | | Exclusive body (-XB10) | |
|-----------------|--------------|--|--------------|--|--------------|
| Part no. | | Refer to "How to Order" for the standard model no. (page 551). | | Suffix "-XB10" to the end of standard model no. (page 551). | |
| Standard stroke | Description | Intermediate strokes by the 1 mm interval are available by using spacers with standard stroke cylinders. | | Dealing with the stroke by the 1 mm interval by using an exclusive body with the specified stroke. | |
| | Stroke range | Bore size | Stroke range | Bore size | Stroke range |
| | | 12, 16 | 1 to 29 | 12, 16 | 6 to 29 |
| Long stroke | Stroke range | 20, 25 | 1 to 49 | 20, 25 | 6 to 49 |
| | | Bore size | Stroke range | Bore size | Stroke range |
| | | 12, 16 | 31 to 199 | 12, 16 | 31 to 199 |
| | | 20 | 51 to 199 | 20 | 51 to 199 |
| Example | | 25 | 51 to 299 | 25 | 51 to 299 |
| | | Part no.: CQSB25-47D CQSB25-50D with 3 mm width spacer inside. B dimension is 72.5 mm. | | Part no.: CQSB25-47D-XB10 Makes 47 stroke tube. B dimension is 69.5 mm. | |

Refer to pages 595 to 597 for cylinders with auto switches.

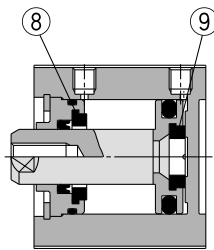
- Minimum auto switch mounting stroke
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket/Part no.

Construction

Basic style

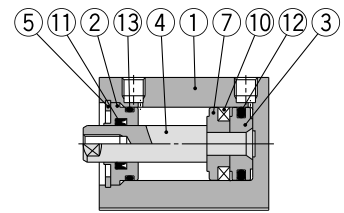


With rubber bumper

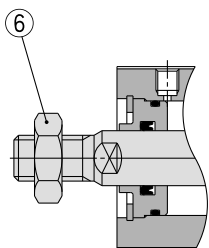


With auto switch (Built-in magnet)

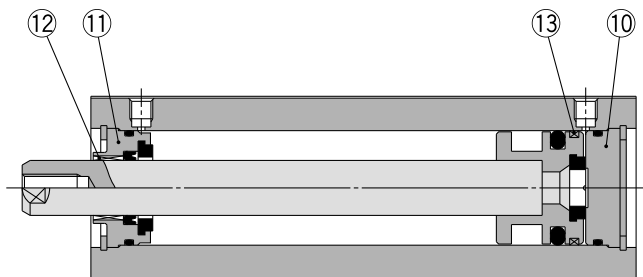
ø12, ø16



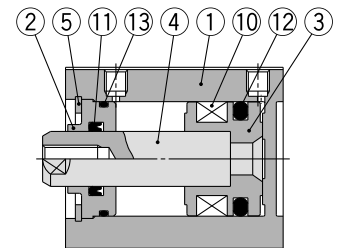
Rod end male thread



Long stroke



ø20, ø25



Component Parts

| No. | Description | Material | Note |
|-----|------------------------|-------------------|------------------|
| 1 | Cylinder tube | Aluminum alloy | Hard anodized |
| 2 | Collar | Aluminum alloy | Anodized |
| 3 | Piston | Aluminum alloy | Chromated |
| 4 | Piston rod | Stainless steel | |
| 5 | Retaining ring | Carbon tool steel | Phosphate coated |
| 6 | Rod end nut | Carbon steel | Nickel plated |
| 7 | Spacer for switch type | Aluminum alloy | Chromated |
| 8 | Bumper A | Urethane | |
| 9 | Bumper B | Urethane | |
| 10 | Bottom plate | Aluminum alloy | Anodized |

Component Parts

| No. | Description | Material | Note |
|------|-------------|--------------------------------|----------|
| 11 | Collar | Aluminum alloy | Anodized |
| 12 | Bushing | Oil-impregnated sintered alloy | |
| 13 | Wear ring | Resin | |
| 14 | Magnet | — | |
| 15 * | Rod seal | NBR | |
| 16 * | Piston seal | NBR | |
| 17 * | Tube gasket | NBR | |

Replacement Parts: Seal Kit (Basic style)

| Bore size (mm) | Kit no. | Contents |
|----------------|-----------|------------------------------|
| 12 | CQSB12-PS | Set of nos. above ⑮, ⑯, ⑰ |
| 16 | CQSB16-PS | |
| 20 | CQSB20-PS | |
| 25 | CQSB25-PS | |

Replacement Parts: Seal Kit (Long stroke)

| Bore size (mm) | Kit no. | Contents |
|----------------|-------------|------------------------------|
| 12 | CQSB12-L-PS | Set of nos. above ⑮, ⑯, ⑰ |
| 16 | CQSB16-L-PS | |
| 20 | CQSB20-L-PS | |
| 25 | CQSB25-L-PS | |

* Seal kit includes ⑮, ⑯, ⑰. Order the seal kit, based on each bore size. (The long stroke type includes 2 tube gaskets.)

* Since the seal kit does not include a grease pack, order it separately.

Grease pack part no.: GR-S-010 (10 g)

CUJ

CU

CQS

CQ2

RQ

CQM

MU

D-□

-X□

Individual

-X□

Technical data

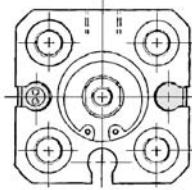
Series CQS

Dimensions: $\phi 12$ to $\phi 25$

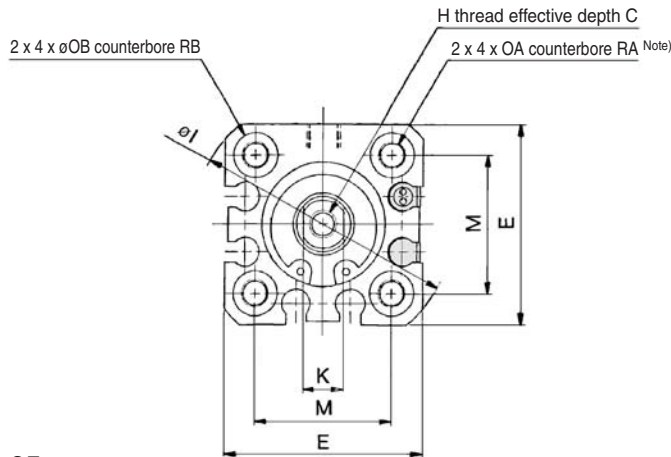
Basic style (Through-hole/Both ends tapped common): CQSB/CDQSB

* For the auto switch mounting position and its mounting height, refer to page 595.

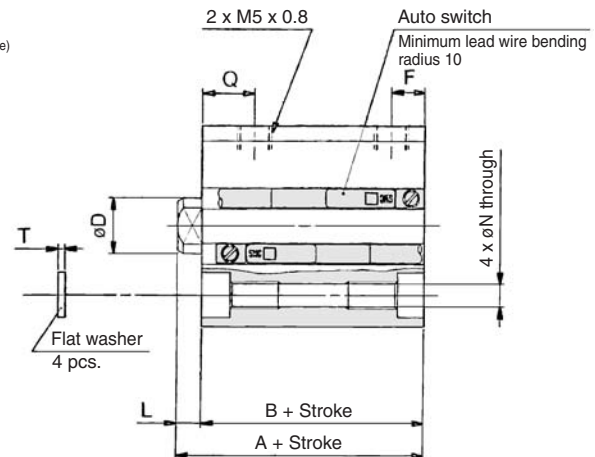
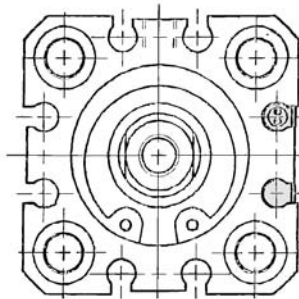
$\phi 12$



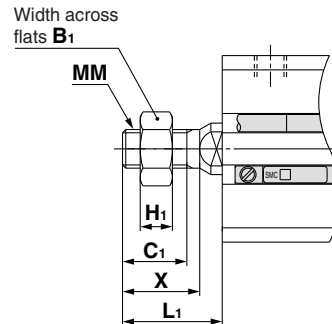
$\phi 16$



$\phi 20, \phi 25$



Rod end male thread



• Length with intermediate stroke

- (1) Spacer ... The dimensions will be identical to those of the nearest long stroke. Those that exceed the standard stroke will have the long stroke dimensions.
- (2) Exclusive body (-XB10) ... Add stroke. Also, the stroke length that exceeds the standard stroke would be the long stroke dimension.

Rod End Male Thread

| Bore size (mm) | B ₁ | C ₁ | H ₁ | Standard stroke | Long stroke | MM | X |
|----------------|----------------|----------------|----------------|-----------------|----------------|------------|------|
| | | | | L ₁ | L ₁ | | |
| 12 | 8 | 9 | 4 | 14 | 24 | M5 x 0.8 | 10.5 |
| 16 | 10 | 10 | 5 | 15.5 | 25.5 | M6 x 1.0 | 12 |
| 20 | 13 | 12 | 5 | 18.5 | 28.5 | M8 x 1.25 | 14 |
| 25 | 17 | 15 | 6 | 22.5 | 32.5 | M10 x 1.25 | 17.5 |

Basic Style

| Bore size (mm) | Standard stroke range (mm) | Standard stroke | | | | | | | | Long stroke range (mm) | Long stroke | | | | C | D | E | H | I | K | M | N | OA | OB | Q | RA | RB | T |
|-------------------|-------------------------------------|---------------------|------|-----|-----|------------------|------|-----|-----|---------------------------------|--------------------------|----|-----|------|----|----|----|----------|----|----|------|-----|----------|-----|-----|----|----|-----|
| | | Without auto switch | | | | With auto switch | | | | | With/Without auto switch | | | | | | | | | | | | | | | | | |
| | | A | B | F | L | A | B | F | L | | A | B | F | L | | | | | | | | | | | | | | |
| 12 | 5 to 30 | 20.5 | 17 | 5 | 3.5 | 25.5 | 22 | 5 | 3.5 | 35 to 200 | 45.5 | 32 | 7.5 | 13.5 | 6 | 6 | 25 | M3 x 0.5 | 32 | 5 | 15.5 | 3.5 | M4 x 0.7 | 6.5 | 7.5 | 7 | 4 | 0.5 |
| 16 | 5 to 30 | 20.5 | 17 | 5 | 3.5 | 25.5 | 22 | 5 | 3.5 | 35 to 200 | 45.5 | 32 | 7.5 | 13.5 | 8 | 8 | 29 | M4 x 0.7 | 38 | 6 | 20 | 3.5 | M4 x 0.7 | 6.5 | 7.5 | 7 | 4 | 0.5 |
| 20 | 5 to 50 | 24 | 19.5 | 5.5 | 4.5 | 34 | 29.5 | 5.5 | 4.5 | 75 to 200 | 55.5 | 41 | 9 | 14.5 | 7 | 10 | 36 | M5 x 0.8 | 47 | 8 | 25.5 | 5.4 | M6 x 1.0 | 9 | 9 | 10 | 7 | 1 |
| 25 | 5 to 50 | 27.5 | 22.5 | 5.5 | 5 | 37.5 | 32.5 | 5.5 | 5 | 75 to 300 | 59 | 44 | 11 | 15 | 12 | 12 | 40 | M6 x 1.0 | 52 | 10 | 28 | 5.4 | M6 x 1.0 | 9 | 11 | 10 | 7 | 1 |

Note 1) For the following bore/stroke sizes through-hole is threaded over the entire length: Basic style $\phi 12$ and $\phi 16$; 5 stroke, $\phi 20$; 5 to 15 stroke, $\phi 25$; 5 to 10 stroke, $\phi 20$ with auto switch built-in magnet; 5 stroke.

Note 2) Rubber bumper type has the same dimensions as those indicated above.

* For details about the rod end nut and accessory brackets, refer to page 620.