

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) | | | | M9PV | M9P | ● | ● | ● | ○ | ○ | | | |
| | 2-wire | | | 12 V | | M9BV | | M9B | ● | ● | ● | ○ | ○ | | | | |
| | 3-wire (NPN) | | | 5 V, 12 V | | M9NWV | | M9NW | ● | ● | ● | ○ | ○ | | | | |
| | 3-wire (PNP) | | | | | M9PWV | | M9PW | ● | ● | ● | ○ | ○ | | | | |
| | 2-wire | | | 12 V | | M9BWV | | M9BW | ● | ● | ● | ○ | ○ | | | | |
| | 3-wire (NPN) | | | 5 V, 12 V | | M9NAV | | M9NA | ○ | ○ | ● | ○ | ○ | | | | |
| | 3-wire (PNP) | | | | | M9PAV | | M9PA | ○ | ○ | ● | ○ | ○ | | | | |
| | Water resistant (2-color indication) | Grommet | No | 2-wire | 12 V | M9BAV | M9BA | ○ | ○ | ● | ○ | ○ | ○ | — | | | |
| | | | | | | | | | | | | | | | | | |
| Reed switch | — | Grommet | Yes | 3-wire (NPN equivalent) | — | 5 V | — | A96V | A96 | ● | — | ● | — | — | IC circuit | — | |
| | | | | 2-wire | 24 V | 12 V | 100 V | A93V | A93 | ● | — | ● | — | — | — | — | Relay, PLC |
| | | | | | | 100 V or less | A90V | A90 | ● | — | ● | — | — | — | IC circuit | | |

* 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.

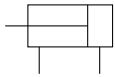
* Auto switches are shipped together (not assembled).

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.

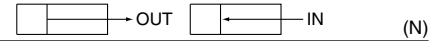
Specifications

| 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 |
| | | 20, 25 | 1 to 49 | 20, 25 | 6 to 49 |
| Long 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 | 31 to 199 | 12, 16 | 31 to 199 |
| | | 20 | 51 to 199 | 20 | 51 to 199 |
| | | 25 | 51 to 299 | 25 | 51 to 299 |
| Example | | 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.

Mass/Without Auto Switch

(g)

| Bore size (mm) | Cylinder stroke (mm) | | | | | | | | | | | | | | | | | |
|----------------|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 250 | 300 |
| 12 | 29 | 36 | 42 | 49 | 56 | 63 | 93 | 100 | 107 | 113 | 147 | 180 | 213 | 246 | 279 | 312 | — | — |
| 16 | 38 | 47 | 56 | 64 | 73 | 82 | 119 | 128 | 136 | 145 | 187 | 229 | 271 | 313 | 355 | 397 | — | — |
| 20 | 63 | 75 | 88 | 101 | 114 | 127 | 140 | 153 | 166 | 178 | 306 | 370 | 434 | 498 | 562 | 627 | — | — |
| 25 | 91 | 107 | 123 | 139 | 155 | 171 | 186 | 202 | 218 | 234 | 399 | 478 | 557 | 636 | 715 | 794 | 952 | 1110 |

For standard stroke

Calculation: (Example) CQSD20-20DCM

- Cylinder mass: CQSB20-20D..... 101 g
- Option mass: Rod end male thread..... 10 g
- Option mass: Rubber bumper..... -2 g
- Option mass: Double clevis style..... 92 g

201 g

Mass/With Auto Switch (Built-in magnet)

(g)

| Bore size (mm) | Cylinder stroke (mm) | | | | | | | | | | | | | | | | | |
|----------------|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 250 | 300 |
| 12 | 37 | 43 | 50 | 57 | 63 | 70 | 94 | 101 | 108 | 114 | 148 | 181 | 214 | 247 | 280 | 313 | — | — |
| 16 | 48 | 57 | 66 | 74 | 83 | 92 | 121 | 129 | 137 | 146 | 188 | 231 | 273 | 315 | 357 | 399 | — | — |
| 20 | 93 | 106 | 119 | 132 | 144 | 157 | 170 | 182 | 195 | 208 | 311 | 375 | 439 | 503 | 567 | 632 | — | — |
| 25 | 134 | 150 | 166 | 182 | 197 | 213 | 229 | 245 | 261 | 277 | 406 | 485 | 564 | 643 | 721 | 800 | 958 | 1116 |

Additional Mass

(g)

| Bore size (mm) | | 12 | 16 | 20 | 25 |
|------------------------------------------------------|-------------|---------|---------|-----------|-----------|
| Rod end male thread | Male thread | 1.5 | 3 | 6 | 12 |
| | Nut | 1 | 2 | 4 | 8 |
| Rubber bumper * (No need to add for long stroke) | | 0 | 1 | -2 | -3 |
| Foot style (Including mounting bolt) | | 55 (53) | 65 (61) | 159 (153) | 181 (172) |
| Rod side flange style (Including mounting bolt) | | 58 (56) | 70 (66) | 143 (137) | 180 (171) |
| Head side flange style (Including mounting bolt) | | 56 | 66 | 137 | 171 |
| Double clevis style (Including pin, snap ring, bolt) | | 34 | 40 | 92 | 127 |

(): denotes the values of long stroke model.

Mounting Bracket Part No.

| Bore size (mm) | Foot (1) | Flange | Double clevis |
|----------------|----------|----------|---------------|
| 12 | CQS-L012 | CQS-F012 | CQS-D012 |
| 16 | CQS-L016 | CQS-F016 | CQS-D016 |
| 20 | CQS-L020 | CQS-F020 | CQS-D020 |
| 25 | CQS-L025 | CQS-F025 | CQS-D025 |



Note1) When ordering foot bracket, order 2 pieces per cylinder.

Note2) Parts belonging to each bracket are as follows.

Foot or Flange style: Body mounting bolt

Double clevis style: Clevis pin, Type C

snap ring for axis, Body mounting bolt.

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

20—C(D)QS **Mounting** **Bore size** **Stroke** D(C)(M)

• Copper and Fluorine-free Series • $\varnothing 12$, $\varnothing 16$, $\varnothing 20$, $\varnothing 25$

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

Specifications

| | |
|----------------------------|--------------------------------------|
| Action | Double acting, Single rod |
| Bore size (mm) | 12, 16, 20, 25 |
| Proof pressure | 1.5 MPa |
| Maximum operating pressure | 1.0 MPa |
| Cushion | None, Rubber bumper |
| Mounting | Through-hole/Both ends tapped common |
| Piston speed | 50 to 500 mm/s |

CUJ

CU

CQS

CQ2

RQ

CQM

MU

D-□

-X□

Individual
-X□

Technical
data

Series CQS

Clean Series (Standard stroke is only available.)

10 — C(D)QSB Bore size — Stroke D(M)

Clean Series

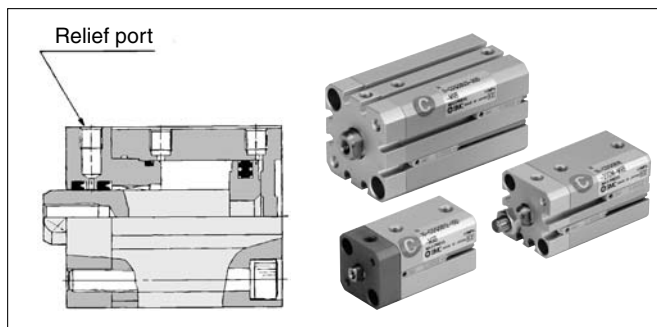
| | |
|----|-------------|
| 10 | Relief type |
| 11 | Vacuum type |

The type which is applicable for using inside the clean room graded Class 100 by making an actuator's rod section a double seal construction and discharging by relief port directly to the outside of clean room.

Specifications

| | |
|----------------------------|--------------------------------------|
| Action | Double acting, Single rod |
| Bore size (mm) | ø12, ø16, ø20, ø25 |
| Proof pressure | 1.5 MPa |
| Maximum operating pressure | 1.0 MPa |
| Rubber bumper | None |
| Piping | Screw-in piping |
| Piston speed | 30 to 400 mm/s |
| Mounting | Through-hole/Both ends tapped common |
| Auto switch | Mountable |

Note) For details, please contact SMC.



For details, refer to the separate catalog "Pneumatic Clean Series".

Smooth Cylinder

CQS Y Mounting Bore size — Stroke D(C)(M)

Smooth Cylinder

Smooth operation with a little sticking and slipping at low speed.

Dual-side low friction operation is possible.



Refer to Best Pneumatics No. 3.

Specifications

| Bore size (mm) | 12 | 16 | 20 | 25 |
|-------------------------------|------------------------------------------------|----|----|----|
| Type | Pneumatic (Non-lube) | | | |
| Action | Double acting, Single rod | | | |
| Fluid | Air | | | |
| Proof pressure | 1.05 MPa | | | |
| Maximum operating pressure | 0.7 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 | +1.0* 0 | | | |
| Mounting | Through-hole/Both ends tapped common | | | |
| Piston speed | 50 to 500 mm/s | | | |
| Allowable leakage | 0.5L/min (ANR) or less | | | |

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

Minimum operating pressure (MPa)

| Bore size (mm) | 12 | 16 | 20 | 25 |
|----------------------------|------|----|------|----|
| Minimum operating pressure | 0.03 | | 0.02 | |

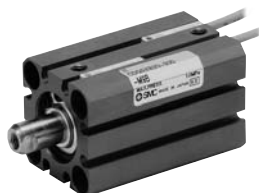
Low-speed Cylinder

CQS X Mounting Bore size — Stroke D(C)(M)

Low-speed Cylinder

Smooth operation with a little sticking and slipping at low speed.

Can start smoothly with a little ejection even after being rendered for hours.



Refer to Best Pneumatics No. 3.

Specifications

| Bore size (mm) | 12 | 16 | 20 | 25 |
|-------------------------------|------------------------------------------------|----|----|----|
| Type | Pneumatic (Non-lube) | | | |
| Action | Double acting, Single rod | | | |
| Fluid | Air | | | |
| Proof pressure | 1.5 MPa | | | |
| Maximum operating pressure | 1.0 MPa | | | |
| Ambient and fluid temperature | Without auto switch: -10 to 70°C (No freezing) | | | |
| | With auto switch: -10 to 60°C (No freezing) | | | |
| Rubber bumper | None, Rubber bumper* | | | |
| Rod end thread | Female thread | | | |
| Stroke length tolerance | Standard stroke +1.0 0 | | | |
| Mounting | Through-hole/Both ends tapped common | | | |
| Piston speed | ø12, ø16: 1 to 300 mm/s | | | |
| | ø20, ø25: 0.5 to 300 mm/s | | | |

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

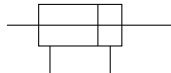
Minimum operating pressure (MPa)

| Bore size (mm) | 12 | 16 | 20 | 25 |
|----------------------------|------|------|-------|-------|
| Minimum operating pressure | 0.03 | 0.03 | 0.025 | 0.025 |

Compact Cylinder: Standard Type Double Acting, Double Rod *Series CQSW*



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 |
| -XC36 | With boss in rod side |
| -X235 | Change of piston rod end of double rod cylinder |
| -X271 | Fluororubber seals |
| -X633 | Intermediate stroke of double rod cylinder |

Body Option

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

Mounting Bracket Part No.

| Bore size (mm) | Foot ⁽¹⁾ | Flange |
|----------------|---------------------|----------|
| 12 | CQS-L012 | CQS-F012 |
| 16 | CQS-L016 | CQS-F016 |
| 20 | CQS-L020 | CQS-F020 |
| 25 | CQS-L025 | CQS-F025 |



Note 1) When ordering foot bracket, order 2 pieces per cylinder.

Note 2) Parts belonging to each bracket are as follows.

Foot or Flange style: Body mounting bolt

Specifications

| Bore size (mm) | | 12 | 16 | 20 | 25 |
|-------------------------------|--------------------|------------------------------------------------|-------|----------|------|
| Action | | Double acting, Double 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 | | +1.0 mm * 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.

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 | | | | |
| 16 | 8 | IN | 151 | 45 | 75 | 106 |
| | | OUT | | | | |
| 20 | 10 | IN | 236 | 71 | 118 | 165 |
| | | OUT | | | | |
| 25 | 12 | IN | 378 | 113 | 189 | 264 |
| | | OUT | | | | |

CUJ

CU

CQS

CQ2

RQ

CQM

MU

Manufacture of Intermediate Stroke

| Description | Spacer is installed in the standard stroke body. | Exclusive body (-XB10) |
|--------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Part no. | Suffix "-X633" to the end of standard model no. (page 560). | Suffix "-XB10" to the end of standard model no. (page 560). |
| 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 | Bore size |
| | Stroke range | Stroke range |
| | 12, 16 20, 25 | 1 to 29 1 to 49 |
| Example | Part no.: CQSWB25-47D-X633 CQSWB25-50D with 3 mm width spacer inside. B dimension is 79 mm. | Part no.: CQSWB25-47D-XB10 Makes 47 stroke tube. B dimension is 76 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.

D-□

-X□

Individual
-X□

Technical
data