

Compact Cylinder: Standard Double Acting, Single Rod

CQ2 Series

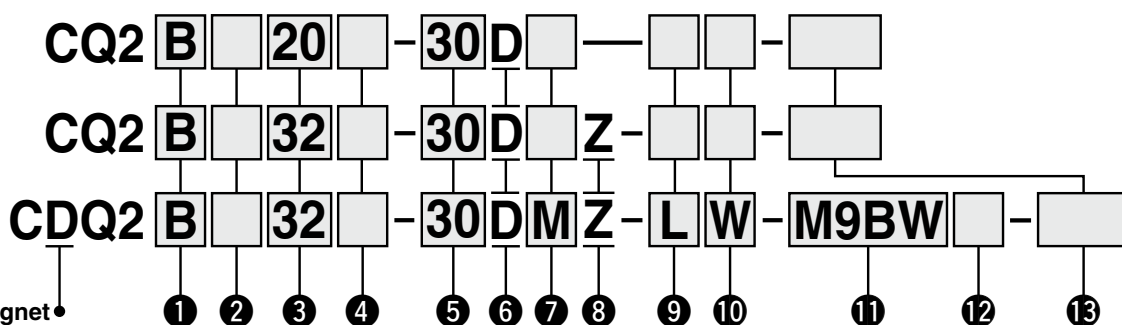
ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Without auto switch
ø12 to ø25

Without auto switch
ø32 to ø100

With auto switch



With auto switch magnet
The overall length of the cylinder with an auto switch magnet is longer than that of the cylinder without an auto switch magnet by the length of the built-in magnet. For details, refer to the dimensions of each size.

1 Mounting

B	Through-hole
A	Both ends tapped
L	Foot
LC	Compact foot
F	Rod flange
G	Head flange
D	Double clevis

- * Mounting brackets are shipped together with the product but do not come assembled.
- * Refer to 9 for the through-hole type mounting bolt.

2 Type

Nil	Pneumatic
H	Air-hydro*1

*1 The bore sizes available for the air-hydro type are ø20 to ø100.

3 Bore size

12	12 mm
16	16 mm
20	20 mm
25	25 mm
32	32 mm
40	40 mm
50	50 mm
63	63 mm
80	80 mm
100	100 mm

4 Port thread type

Nil	M thread	ø12 to ø25
	Rc	ø32 to ø100
TN	NPT	
TF	G	
F	Built-in One-touch fittings*1	

*1 The bore sizes available with One-touch fittings are ø32 to ø63. However, they cannot be selected for the air-hydro type.

- * "TF" is not selectable for the air-hydro type.
- * For cylinders without an auto switch magnet, M threads are compatible only with ø32-5 mm stroke.

5 Cylinder stroke (For details on the minimum stroke for auto switch mounting ⇨ p. 145)

Pneumatic type [mm]

Bore size	Standard stroke
12, 16	5, 10, 15, 20, 25, 30
20, 25	5, 10, 15, 20, 25, 30, 35, 40, 45, 50
32, 40	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
50, 63, 80, 100	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100

- * For long strokes exceeding the standard stroke range ⇨ p. 72
- * For details on the manufacturing of intermediate strokes ⇨ p. 10

Air-hydro type [mm]

Bore size	Standard stroke
20, 25	5, 10, 15, 20, 25, 30, 35, 40, 45, 50
32, 40	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
50, 63, 80, 100	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100

6 Action

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

7 Body option

Nil	Rod end female thread
F	With boss on head end
C	With rubber bumper*1
M	Rod end male thread

- *1 The type with a rubber bumper is not selectable for the air-hydro type.
- * Combined body options, such as "FC," "FM," "FCM," and "CM" can be selected.

8 Auto switch mounting groove

Z	ø12 to ø25	2 surfaces
	ø32 to ø100	4 surfaces

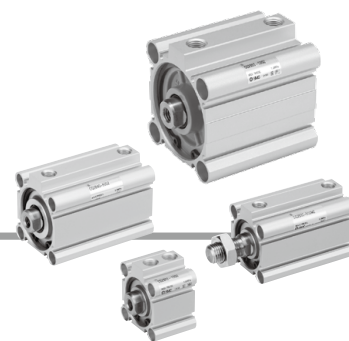
9 Through-hole type mounting bolt

Nil	None
L	Shipped together

* Mounting bolt is shipped together with the product only when the mounting bracket is "B" (Through-hole).

* When a made-to-order option is selected for 10, the mounting bolt is not shipped together with the product. Please order it separately. For details:

Without auto switch magnet ⇨ p. 13
With auto switch magnet ⇨ p. 14



10 Rod end bracket (⇒ p. 26, 27)

Nil	None
D	Simple joint A type + Joint
E	Simple joint B type + Joint
V	Single knuckle joint
W	Double knuckle joint

- * The single knuckle joint and double knuckle joint cannot be mounted on the rod end female thread type.
 - * A knuckle joint pin is not provided with the single knuckle joint.
 - * The simple joint A and B types cannot be mounted on the rod end male thread type.
 - * The rod end bracket is shipped together with the product.
 - * The bore sizes available with the simple joint (D and E) are ø32 to ø100.
 - * When a made-to-order option is selected, the rod end bracket cannot be selected. Please order it separately.
- For details ⇒ p. 26, 27

11 Auto switch

Nil	Without auto switch magnet
------------	----------------------------

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

13 Made to order common specifications

For details ⇒ p. 9

12 Number of auto switches

Nil	2
S	1
n	n

For details on **auto switch mounting** ⇒ p. 139 to 152

- Auto Switch Proper Mounting Position (Detection at stroke end) and Mounting Height
- Minimum Stroke for Auto Switch Mounting
- Operating Range
- Auto Switch Mounting Brackets/Part Nos.

Cylinder Model with Auto Switch Magnet

If a cylinder with an auto switch magnet and without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CDQ2L32-25DZ

Applicable Auto Switches / Refer to the **Web Catalog** 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)	None (N)				
Solid state auto 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			M9BV				M9B	●	●	●	○	—	○	—		
	3-wire (NPN)			M9NWV				M9NW	●	●	●	○	—	○	IC circuit		
	3-wire (PNP)			M9PWV				M9PW	●	●	●	○	—	○	—		
	2-wire			M9BWV				M9BW	●	●	●	○	—	○	—		
	3-wire (NPN)			M9NAV*1				M9NA*1	○	○	●	○	—	○	IC circuit		
	3-wire (PNP)			M9PAV*1				M9PA*1	○	○	●	○	—	○	—		
	2-wire			M9BAV*1				M9BA*1	○	○	●	○	—	○	—		
	Magnetic field resistant (2-color indicator)			2-wire (Non-polar)				—	—	P3DWA	●	—	●	●	—	○	
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96V	A96	●	—	●	—	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	A93V*2	A93	●	●	●	●	—	—	—	—
						5 V, 12 V	100 V or less	A90V	A90	●	—	●	—	—	—	IC circuit	Relay, PLC

*1 Water-resistant type auto switches can be mounted on the models on page 7, but SMC cannot guarantee water resistance.

A water-resistant type cylinder (⇒ p. 99) is recommended for use in environments which require water resistance.

*2 The 1 m lead wire is only applicable to the D-A93.

* 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

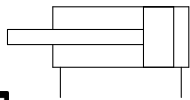
* Solid state auto switches marked with "○" are produced upon receipt of order.
* The D-P3DWA type is only available in sizes ø25 to ø100.

* There are applicable auto switches other than those listed above. For details ⇒ p. 152

CQ2 Series

Symbol

Without cushion



Made to Order Common Specifications
(For details ⇨ p. 155 to 188)

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat-resistant cylinder (−10 to 150°C) w/o auto switch only*1
-XB7	Cold-resistant cylinder (−40 to 70°C) w/o auto switch only
-XB9	Low-speed cylinder (10 to 50 mm/s)
-XB10	Intermediate stroke (Using exclusive body)
-XB10A	Intermediate stroke (Spacer-installed type)
-XB13	Low-speed cylinder (5 to 50 mm/s)
-XB14	Cylinder with heat-resistant auto switch*1
-XC2(A)	Rod end length increased by 10 mm (For foot and flange bracket)
-XC4	With heavy duty scraper
-XC6	Piston rod/Retaining ring/Rod end nut material: 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
-XC26	With split pins for double clevis pin/double knuckle joint pin and flat washers
-XC26□	Double clevis width/Double knuckle width 12.5 mm, 16.5 mm, or 19.5 mm: With double clevis and double knuckle joint
-XC27	Double clevis pin/Double knuckle joint pin material: Stainless steel 304
-XC35	With coil scraper
-XC36	With boss on rod end
-XC85	Grease for food processing equipment
-XC88	Spatter-resistant coil scraper, Lube-retainer, Grease for welding (Piston rod: Stainless steel 304)
-XC89	Spatter-resistant coil scraper, Lube-retainer, Grease for welding (Piston rod: S45C)
-XC91	Spatter-resistant coil scraper, Grease for welding (Piston rod: S45C)
-XC92	Dust-resistant actuator
-X144	Special port location, with auto switch
-X202	Same full length dimension as the CQ1 series
-X203	Same L dimension from the rod cover as the CQ1 series
-X271	Fluororubber seals*1
-X525	Long stroke for adjustable extension stroke cylinder (-XC8)
-X526	Long stroke for adjustable retraction stroke cylinder (-XC9)
-X636	Long stroke for dual stroke single rod cylinder
-X1876	Cylinder tube: With concave boss on head end

*1 Excludes the air-hydro type

Clean Series/Low Particle Generation

For details, refer to the **Web Catalog**.

* Stainless steel accessories are also available.
For details ⇨ p. 26

Moisture Control Tube IDK Series



When operating an actuator with a small bore size and a short stroke at a high frequency, dew condensation (water droplets) may occur inside the piping depending on the conditions. Simply connecting the moisture control tube to the actuator will prevent dew condensation from occurring. For details, refer to the **Web Catalog**.

⚠ Precautions

Refer to page 189 before handling the products.

Specifications

Pneumatic type

Bore size [mm]		12	16	20	25	32	40	50	63	80	100
Action		Double acting, Single rod									
Fluid		Air									
Proof pressure		1.5 MPa									
Maximum operating pressure		1.0 MPa									
Minimum operating pressure		0.07 MPa		0.05 MPa							
Ambient and fluid temperatures		Without auto switch magnet: −10 to 70°C With auto switch magnet: −10 to 60°C (No freezing)									
Lubrication		Not required (Non-lube)									
Piston speed		50 to 500 mm/s									
Allowable kinetic energy [J]	Standard	0.022	0.038	0.055	0.09	0.15	0.26	0.46	0.77	1.36	2.27
	With rubber bumper	0.043	0.075	0.11	0.18	0.29	0.52	0.91	1.54	2.71	4.54
Stroke length tolerance		+1.0 mm*1 0									

*1 Stroke length tolerance does not include the amount of bumper change.

Air-hydro type

Bore size [mm]	20	25	32	40	50	63	80	100
Action	Double acting, Single rod							
Fluid	Turbine oil* ¹							
Proof pressure	1.5 MPa							
Maximum operating pressure	1.0 MPa							
Minimum operating pressure	0.18 MPa			0.1 MPa				
Ambient and fluid temperatures	5 to 60°C							
Piston speed	5 to 50 mm/s							
Cushion	None							
Stroke length tolerance	+1.0 mm 0							

*1 Actuator Precautions 5 ⇨ Refer to the **Web Catalog**.

Mounting Bracket Part Nos.

Bore size [mm]	Foot*1	Compact foot*1	Flange	Double clevis	Double clevis pivot bracket
12	Without auto switch magnet	CQ-L012	CQ-LC012	CQ-F012	CQ-D012
	With auto switch magnet	CQ-LZ12	CQ-LCZ12	CQ-F012	CQ-D012
16	Without auto switch magnet	CQ-L016	CQ-LC016	CQ-F016	CQ-D016
	With auto switch magnet	CQ-LZ16	CQ-LCZ16	CQ-F016	CQ-D016
20	Without auto switch magnet	CQ-L020	CQ-LC020	CQ-F020	CQ-D020
	With auto switch magnet	CQ-LZ20	CQ-LCZ20	CQ-F020	CQ-D020
25	Without auto switch magnet	CQ-L025	CQ-LC025	CQ-F025	CQ-D025
	With auto switch magnet	CQ-LZ25	CQ-LCZ25	CQ-F025	CQ-D025
32	CQ-L032	CQ-LC032	CQ-F032	CQ-D032	CQ-C032
40	CQ-L040	CQ-LC040	CQ-F040	CQ-D040	CQ-C040
50	CQ-L050	CQ-LC050	CQ-F050	CQ-D050	CQ-C050
63	CQ-L063	CQ-LC063	CQ-F063	CQ-D063	CQ-C063
80	CQ-L080	CQ-LC080	CQ-F080	CQ-D080	CQ-C080
100	CQ-L100	CQ-LC100	CQ-F100	CQ-D100	CQ-C100

*1 When ordering foot and compact foot brackets, the required quantity will be different depending on the bore size.

ø12 to ø25:

• Without auto switch magnet: Order 2 pieces per cylinder.

• With auto switch magnet: Order 1 piece per cylinder. (Part number for a set of 2 foot brackets)

ø32 to ø100:

• Order 2 pieces per cylinder.

* Parts included with each type of bracket are as follows.

Foot, Compact foot, Flange: Body mounting bolts

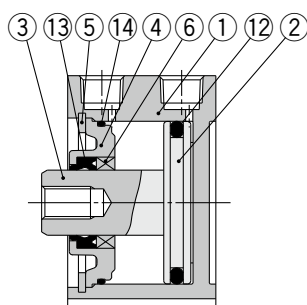
Double clevis: Clevis pin, Type C retaining rings for axis, Body mounting bolts

* For details on accessory brackets (Options) ⇨ p. 21 to 27

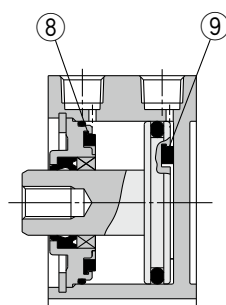
* Foot, compact foot, flange brackets, etc., cannot be retrofitted for through-hole mounting (B).

Construction

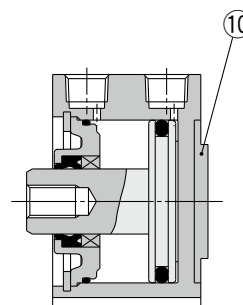
Without auto switch magnet



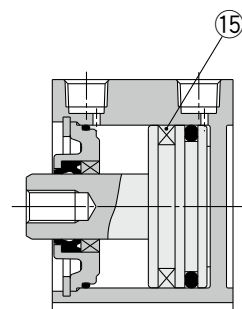
With rubber bumper



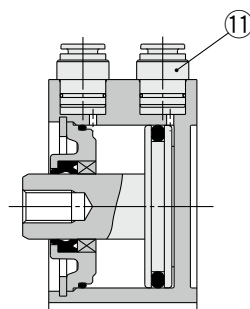
With boss on head end



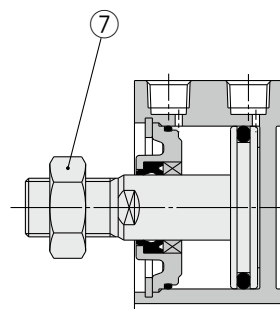
With auto switch magnet



Built-in One-touch fittings



Rod end male thread



Component Parts

No.	Description	Material	Note
1	Cylinder tube	Aluminum alloy	Hard anodized
2	Piston	Aluminum alloy	
3	Piston rod	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø100, Hard chrome plating
4	Collar	Aluminum alloy	ø12 to ø40, Anodized
		Aluminum alloy casted	ø50 to ø100, Chromated, Painted
5	Retaining ring	Carbon tool steel	Phosphate coated
6	Bushing	Bearing alloy	For ø50 or more only
7	Rod end nut	Carbon steel	Zinc chromated
8	Bumper A	Urethane	Pneumatic type only

No.	Description	Material	Note
9	Bumper B	Urethane	Pneumatic type only
10	Centering location ring	Aluminum alloy	ø20 to ø100, Hard anodized
11	One-touch fitting	—	ø32 to ø63
12	Piston seal	NBR	
13	Rod seal	NBR	
14	Gasket	NBR	
15	Magnet	—	

Replacement Parts/Seal Kit

Pneumatic Type

Bore size [mm]	Kit no.	Contents
12	CQ2B12-PS	Set of nos. 12, 13, 14
16	CQ2B16-PS	
20	CQ2B20-PS	
25	CQ2B25-PS	
32	CQ2B32-PS	
40	CQ2B40-PS	
50	CQ2B50-PS	
63	CQ2B63-PS	
80	CQ2B80-PS	
100	CQ2B100-PS	

* Seal kit includes 12, 13, 14. Order the seal kit based on each bore size.

* The seal kit does not include a grease pack. Order it separately.

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

Air-hydro Type

Bore size [mm]	Kit no.	Contents
20	CQ2BH20-PS	Set of nos. 12, 13, 14
25	CQ2BH25-PS	
32	CQ2BH32-PS	
40	CQ2BH40-PS	
50	CQ2BH50-PS	
63	CQ2BH63-PS	
80	CQ2BH80-PS	
100	CQ2BH100-PS	

* Seal kit includes 12, 13, 14. Order the seal kit based on each bore size.

* The seal kit does not include a grease pack. Order it separately.

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

Compact Cylinder with Stable Lubrication Function (Lube-retainer)

CDQ2

Mounting type

Bore size

M

Stroke

D

Body option

Z

Mounting bolt

Rod end thread

Auto switch

With auto switch magnet

With stable lubrication function (Lube-retainer)

* Available only for models with an auto switch magnet

Specifications

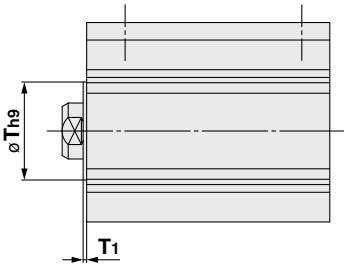
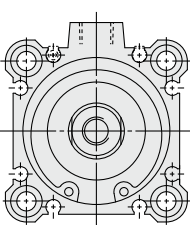
Bore size [mm]	32, 40, 50, 63, 80, 100
Action	Double acting, Single rod
Min. operating pressure	0.1 MPa
Piston speed	50 to 500 mm/s
Cushion	None

* Specifications other than those shown above are the same as the standard model.

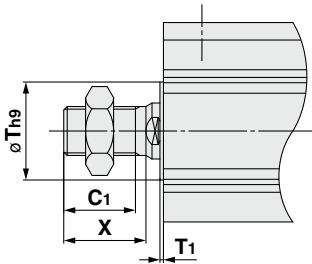


Dimensions (Dimensions other than those shown below are the same as those of the standard model.)

ø32 to ø100



Rod end male thread



Bore size	T	T ₁	C ₁	X
32	22	1	20.5	23.5
40	28	1	20.5	23.5
50	35	2	24	26.5
63	35	2	24	26.5
80	—	—	32.5	35.5
100	—	—	32.5	35.5

* The mounting dimensions of the mounting bracket are the same as the standard model.

For details, refer to the Web Catalog.

Double Acting, Single Rod	CQ2
Standard	CQ2W
Double Acting, Double Rod	CQ2
Single Acting, Spring Return-End	CQ2
Double Acting, Single Rod	CQ2
Double Acting, Double Rod	CQ2W
Large Bore Size	CQ2W
Double Acting, Single Rod	CQ2S
Anti-lateral Load	CQ2
Long Stroke	CQ2K
Double Acting, Single Rod	CQ2K
Non-rotating Rod	CQ2KW
Double Acting, Double Rod	CQ2-RV
Water Resistant	CQ2W-RV
Double Acting, Double Rod	CQ2
Double Acting, Single Rod	CQP2
Axial Piping	CQP2
Single Acting, Spring Return-End	CBQ2
With End Lock	CBQ2
Double Acting, Single Rod	Auto Switch
Auto Switch	Made to Order