

Compact Cylinder: Long Stroke Double Acting, Single Rod

CQ2 Series

ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Without auto switch

CQ2 A [] 32 [] - 200 DC [] Z - []

With auto switch

CDQ2 A [] 32 [] - 200 DC [] Z - M9BW [] - []

With auto switch
(Built-in magnet)

Mounting

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

* Mounting brackets are shipped together (but not assembled).

Type

Nil	Pneumatic
H	Air-hydro

Bore size

32	32 mm
40	40 mm
50	50 mm
63	63 mm
80	80 mm
100	100 mm

Port thread type

Nil	Rc
TN	NPT
TF	G
F	Built-in One-touch fittings <small>(Note)</small>

(Note) Bore sizes available with One-touch fittings are ø32 to ø63. Besides, it is not possible to use for air-hydro type.

Cylinder stroke (mm)

Refer to page 857 for standard strokes.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch. (Example) CDQ2L40-200DCZ

Number of auto switches

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

Auto switch

Nil Without auto switch

* Refer to the below table for applicable auto switches.

Auto switch mounting groove

Z 4 surfaces

Body option

Nil	Standard (Rod end female thread)
M	Rod end male thread

Cushion

Nil	Without rubber bumper
C	With rubber bumper

* Pneumatic type: With rubber bumper only, Air-hydro type: Without rubber bumper only

Action

D Double acting

Made to Order

Refer to page 857 for details.

Refer to pages 1575 to 1701 for further information on auto switches.

Applicable Auto Switches

Refer to pages 1630 and 1631 for the D-P3DW type.

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	Diagnostic indication (2-color indicator)	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)				M9NVW	M9NW	●	●	○	○	○			○
	Water resistant (2-color indicator)	Grommet	Yes	3-wire (PNP)	24 V	5 V, 12 V	—	M9PWV	M9PW	●	●	○	○	○	IC circuit		
				2-wire				M9BWV	M9BW	●	●	○	○	○			○
				3-wire (NPN)				M9NAV ^{*1}	M9NA ^{*1}	○	○	●	●	○			○
				3-wire (PNP)				M9PAV ^{*1}	M9PA ^{*1}	○	○	○	○	●			●
Magnetic field resistant (2-color indicator)	Grommet	No	2-wire	24 V	12 V	100 V or less	M9BAV ^{*1}	M9BA ^{*1}	○	○	○	○	○	—			
			2-wire (Non-polar)				—	P3DWA	●	—	●	●	—		—		
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	24 V	5 V, 12 V	100 V or less	A96V	A96	●	●	○	○	○	IC circuit	—	
				2-wire				A93V ^{*2}	A93	●	●	●	●	○			○
Reed auto switch	—	Grommet	No	2-wire	24 V	5 V, 12 V	100 V or less	A90V	A90	●	—	●	—	○	IC circuit	Relay, PLC	
				2-wire				—	—	—	—	—	—	—			—

*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance.

Consult with SMC regarding water resistant types with the above model numbers.

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

* Lead wire length symbols: 0.5 m Nil (Example) M9NW
1 m M (Example) M9NW
3 m L (Example) M9NW
5 m Z (Example) M9NWZ

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

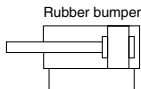
* There are other applicable auto switches other than the listed above. For details, refer to page 970.

* For details about auto switches with pre-wired connector, refer to pages 1648 and 1649.

Specifications



Symbol



Made to Order: Individual Specifications
(For details, refer to page 975.)

Symbol	Specifications
-X271	Fluororubber seals

Made to Order

[Click here for details](#)

Symbol	Specifications
-XA□	Change of rod end shape
-XB10	Intermediate stroke (Exclusive body type)
-XC4	With heavy-duty scraper
-XC6	Piston rod/Retaining ring/Rod end nut material: Stainless steel
-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, 19.5 mm: With double clevis and double knuckle joint
-XC35	With coil scraper
-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)

Refer to pages 964 to 970 for the specifications of cylinders with auto switches.

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

Pneumatic

Bore size (mm)	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	0.05 MPa					
Ambient and fluid temperature	Without auto switch: -10 to 70°C (No freezing) With auto switch: -10 to 60°C (No freezing)					
Lubrication	Not required (Non-lube)					
Piston speed	50 to 500 mm/s					
Allowable kinetic energy (J)	0.29	0.52	0.91	1.54	2.71	4.54
Stroke length tolerance	+1.4 mm (Note) 0					

Note) Stroke length tolerance does not include the amount of bumper change.

Air-hydro

Bore size (mm)	32	40	50	63	80	100
Action	Double acting, Single rod					
Fluid	Turbine oil (Note 1)					
Proof pressure	1.5 MPa					
Maximum operating pressure	1.0 MPa					
Minimum operating pressure	0.18 MPa	0.1 MPa				
Ambient and fluid temperature	5 to 60°C					
Piston speed	5 to 50 mm/s					
Cushion	None					
Stroke length tolerance	+1.4 mm (Note 2) 1					

Note 1) Refer to page 7 for Actuator Precautions (5).

Note 2) The air-hydro type has no bumper.

Standard Strokes

Bore size	Standard stroke (mm)
32, 40, 50 63, 80, 100	125, 150, 175, 200, 250, 300

Manufacture of Intermediate Strokes (Except air-hydro type)

Type	A spacer is installed in the standard stroke body.	Exclusive body (-XB10)
Part no.	Refer to "How to Order" for the standard model number. (P. 856)	Suffix "-XB10" to the end of standard model number. (P. 856)
Description	Strokes in 1 mm increments are available by installing a spacer in the standard stroke cylinder.	Strokes in 1 mm increments are available by using an exclusive body with the specified stroke.
Stroke range	101 to 299	101 to 299
Example	Part no.: CQ2A50-166DCZ CQ2A50-175DCZ with 9 mm width spacer inside The B dimension is 230.5 mm.	Part no.: CQ2A50-166DCZ-XB10 Makes 166 mm stroke tube. The B dimension is 221.5 mm.

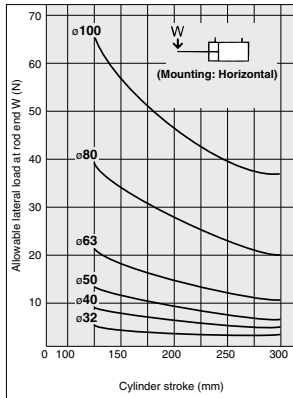
Type

		Bore size (mm)						
		32	40	50	63	80	100	
Pneumatic	Built-in magnet	●	●	●	●	●	●	
	Piping	Pipe thread	—	Rc1/8	Rc1/8	Rc1/4	Rc1/4	Rc3/8
			TN	NPT1/8	NPT1/8	NPT1/4	NPT1/4	NPT3/8
		Built-in One-touch fittings (Note)	—	G1/8	G1/8	G1/4	G1/4	G3/8
	Rod end male thread	●	●	●	●	●	—	
Air-hydro	Built-in magnet	●	●	●	●	●	●	
	Piping	Pipe thread	—	Rc1/8	Rc1/8	Rc1/4	Rc1/4	Rc3/8
			TN	NPT1/8	NPT1/8	NPT1/4	NPT1/4	NPT3/8
		Rod end male thread	●	●	●	●	●	●

Note) One-touch fittings cannot be replaced.

CQ2 Series

Allowable Lateral Load at Rod End



Mounting Brackets/ Part No.

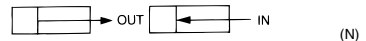
Bore size (mm)	Foot ^{Note 1)}	Compact foot ^{Note 1)}	Flange	Double clevis
32	CQ-L032	CQ-LC032	CQ-F032	CQ-D032
40	CQ-L040	CQ-LC040	CQ-F040	CQ-D040
50	CQ-L050	CQ-LC050	CQ-F050	CQ-D050
63	CQ-L063	CQ-LC063	CQ-F063	CQ-D063
80	CQ-L080	CQ-LC080	CQ-F080	CQ-D080
100	CQ-L100	CQ-LC100	CQ-F100	CQ-D100

Note 1) When ordering foot and compact foot brackets, order 2 pieces per cylinder.

Note 2) Parts belonging to each bracket are as follows.
Foot, Compact foot, Flange: Body mounting bolts
Double clevis: Clevis pin, Body mounting bolts, Type C retaining rings for axis

Note 3) For details about accessories (options), refer to pages 796 to 798.

Theoretical Output



Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
32	IN	181	302	422
	OUT	241	402	563
40	IN	317	528	739
	OUT	377	628	880
50	IN	495	825	1155
	OUT	589	982	1374

Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
63	IN	841	1402	1962
	OUT	935	1559	2182
80	IN	1361	2268	3175
	OUT	1508	2513	3519
100	IN	2144	3574	5003
	OUT	2356	3927	5498

Weight

Without Auto Switch

Bore size (mm)	Cylinder stroke (mm)					
	125	150	175	200	250	300
32	708	817	918	1017	1215	1415
40	888	997	1107	1217	1438	1657
50	1352	1517	1682	1841	2177	2507
63	1706	1900	2095	2292	2676	3065
80	2832	3130	3429	3725	4324	4921
100	4540	4906	5270	5634	6367	7096

With Auto Switch

Bore size (mm)	Cylinder stroke (mm)					
	125	150	175	200	250	300
32	726	826	927	1026	1224	1424
40	902	1012	1121	1231	1451	1671
50	1367	1532	1697	1856	2192	2522
63	1730	1924	2119	2316	2700	3089
80	2856	3154	3453	3749	4348	4945
100	4578	4944	5308	5672	6405	7134

Additional Weight

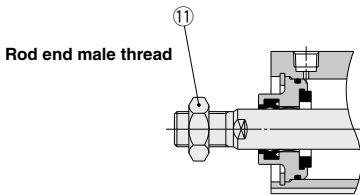
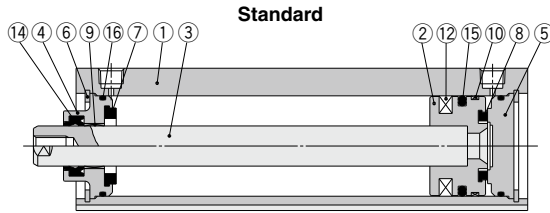
Bore size (mm)		32	40	50	63	80	100
Rod end male thread	Male thread	26	27	53	53	120	175
	Nut	17	17	32	32	49	116
Foot (Including mounting bolts)		146	158	253	349	672	1113
Compact foot (Including mounting bolts)		99	114	177	241	501	770
Rod flange (Including mounting bolts)		165	198	348	534	1017	1309
Head flange (Including mounting bolts)		165	198	348	534	1017	1309
Double clevis (Including pin, retaining rings, bolts)		151	196	393	554	1109	1887

Calculation: (Example) **CQ2D32-200DCMZ**

- Basic weight: CQ2A32-200DCZ.....1017 g
 - Additional weight: Rod end male thread43 g
 - Double clevis.....151 g
- 1211 g

Add each weight of auto switches when auto switches are mounted.

Construction



Built-in One-touch fittings

Component Parts

No.	Description	Material	Note
1	Cylinder tube	Aluminum alloy	Hard anodized
2	Piston	Aluminum alloy	
3	Piston rod	Carbon steel	Hard chrome plated
4	Collar	Aluminum alloy	Anodized
5	Bottom plate	Aluminum alloy	Anodized
6	Retaining ring	Carbon tool steel	Phosphate coated
7	Bumper A	Urethane	Pneumatic type only
8	Bumper B	Urethane	Pneumatic type only
9	Bushing	Bearing alloy	
10	Wear ring	Resin	
11	Rod end nut	Carbon steel	Zinc chromated
12	Magnet	—	For CDQ2A□ only
13	One-touch fitting	—	ø32 to ø63
14*	Rod seal	NBR	
15*	Piston seal	NBR	
16*	Tube gasket	NBR	

Retaining Ring Installation/Removal

⚠ Caution

- For installation and removal, use an appropriate pair of pliers (tool for installing a type C retaining ring).
- Even if a proper plier (tool for installing a type C retaining ring) is used, it is likely to inflict damage to a human body or peripheral equipment, as a retaining ring may be flown out of the tip of a plier (tool for installing a type C retaining ring). Be much careful with the popping of a retaining ring. Besides, be certain that a retaining ring is placed firmly into the groove of rod cover before supplying air at the time of installment.

Replacement Parts/Seal Kit

Bore size (mm)	Kit no.	Contents
32	CQ2A32-L-PS	Kits include items 14, 15, 16 from the table.
40	CQ2A40-L-PS	
50	CQ2A50-L-PS	
63	CQ2A63-L-PS	
80	CQ2A80-L-PS	
100	CQ2A100-L-PS	

- * Seal kit includes 14, 15, 16. Order the seal kit, based on each bore size.
- * Since the seal kit does not include a grease pack, order it separately.
Grease pack part no.: GR-S-010 (10 g)

Air-hydro

Bore size (mm)	Kit no.	Contents
32	CQ2AH32-L-PS	Kits include items 14, 15, 16 from the table.
40	CQ2AH40-L-PS	
50	CQ2AH50-L-PS	
63	CQ2AH63-L-PS	
80	CQ2AH80-L-PS	
100	CQ2AH100-L-PS	

- * Seal kit includes 14, 15, 16. Order the seal kit, based on each bore size.
- * Since the seal kit does not include a grease pack, order it separately.
Grease pack part no.: GR-S-010 (10 g)

CJ

CU

CQS

JCQ

CQ2

RQ

CQM

CQU

MU

D-□

-X□

Technical Data

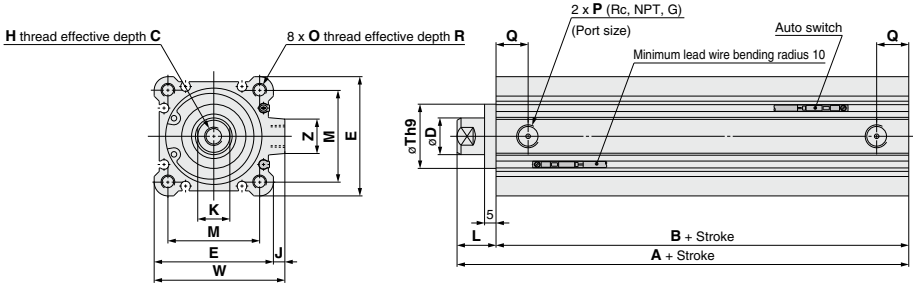
CQ2 Series

Dimensions

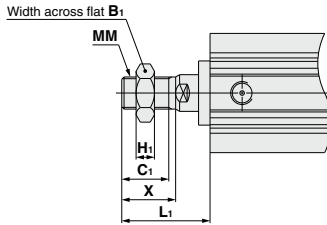
∅32 to ∅50

The dimensions are the same with or without an auto switch.

Both ends tapped: C□Q2A



Rod end male thread



Rod End Male Thread (mm)

Bore size (mm)	B ₁	C ₁	H ₁	L ₁	MM	X
32	22	20.5	8	38.5	M14 x 1.5	23.5
40	22	20.5	8	38.5	M14 x 1.5	23.5
50	27	26	11	43.5	M18 x 1.5	28.5

The dimensions with built-in One-touch fittings are equivalent to those of the CQ2 series, double acting, single rod. Refer to page 790.

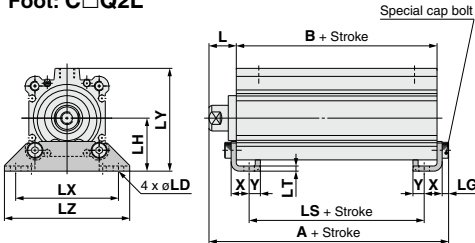
Both Ends Tapped For auto switch proper mounting position and its mounting height, refer to pages 964 to 970. (mm)

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	H	J	K	L	M	O	P	Q	R	Th9	W	Z
32	125 to 200 (Note 1)	62.5	45.5	13	16	45	M8 x 1.25	4.5	14	17	34	M6 x 1.0	1/8	10	10	22 ^{0.002}	49.5	14
		72	55	13	16	52	M8 x 1.25	5	14	17	40	M6 x 1.0	1/8	12.5	10	28 ^{0.002}	57	15
50	250, 300	73.5	55.5	15	20	64	M10 x 1.5	7	17	18	50	M8 x 1.25	1/4	14	14	35 ^{0.002}	71	19

Note 1) For 125 to 200 strokes, strokes are available in 25 mm increments.

Note 2) For calculation on the longitudinal dimension of intermediate strokes, refer to page 857.

Foot: C□Q2L



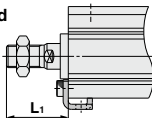
Foot (mm)

Bore size (mm)	A	B	L	L ₁	LD	LG	LH	LS	LT	LX	LY	LZ	X	Y
32	69.7	45.5	17	38.5	6.6	4	30	29.5	3.2	57	57	71	11.2	5.8
40	79.2	55	17	38.5	6.6	4	33	39	3.2	64	64	78	11.2	7
50	81.7	55.5	18	43.5	9	5	39	32.5	3.2	79	78	95	14.7	8

Foot bracket material: Carbon steel
Surface treatment: Nickel plated

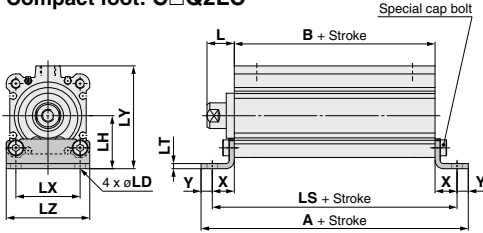
* For details about the rod end nut and accessory brackets, refer to pages 796 to 798.

Rod end male thread



The dimensions are the same with or without an auto switch.

Compact foot: C□Q2LC



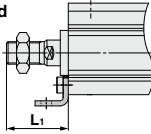
Compact Foot

(mm)

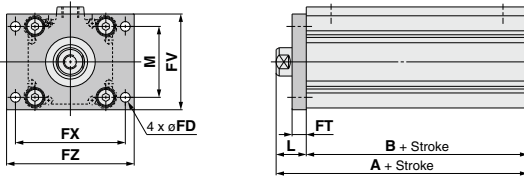
Bore size (mm)	A	B	L	L ₁	LD	LH	LS	LT	LX	LY	LZ	X	Y
32	84.5	45.5	17	38.5	6.6	30	72.9	3.2	34	57	45	13.7	5.8
40	96.4	55	17	38.5	6.6	33	82.4	3.2	40	64	52	13.7	7
50	104.9	55.5	18	43.5	9	39	88.9	3.2	50	78	64	16.7	8

Compact foot bracket material: Carbon steel
Surface treatment: Zinc chromated

Rod end male thread



Rod flange: C□Q2F



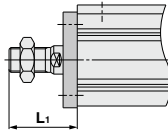
Rod Flange

(mm)

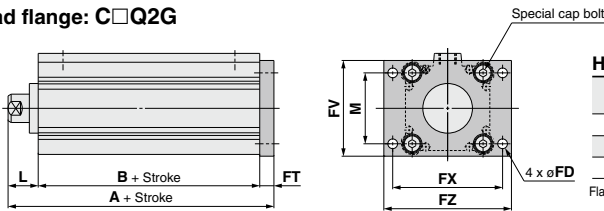
Bore size (mm)	A	B	FD	FT	FV	FX	FZ	L	L ₁	M
32	62.5	45.5	5.5	8	48	56	65	17	38.5	34
40	72	55	5.5	8	54	62	72	17	38.5	40
50	73.5	55.5	6.6	9	67	76	89	18	43.5	50

Flange bracket material: Carbon steel
Surface treatment: Nickel plated

Rod end male thread



Head flange: C□Q2G



Head Flange

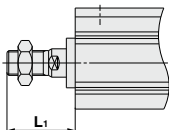
(mm)

Bore size (mm)	A
32	70.5
40	80
50	82.5

(≠ The dimensions except A are the same as those of the rod flange.)

Flange bracket material: Carbon steel
Surface treatment: Nickel plated

Rod end male thread



* For details about the rod end nut and accessory brackets, refer to pages 796 to 798.

CJ

CU

CQS

JCQ

CQ2

RQ

CQM

CQU

MU

D-□

-X□

Technical Data

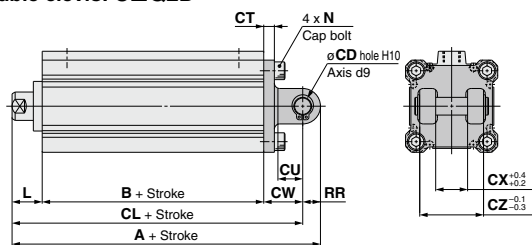
CQ2 Series

Dimensions

Ø32 to Ø50

The dimensions are the same with or without an auto switch.

Double clevis: C□Q2D



Double Clevis

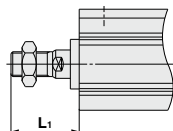
Bore size (mm)	A	B	CD	CL	CT	CU	CW	CX	CZ
32	92.5	45.5	10	82.5	5	14	20	18	36
40	104	55	10	94	6	14	22	18	36
50	115.5	55.5	14	101.5	7	20	28	22	44

Bore size (mm)	L	L ₁	N	RR
32	17	38.5	M6 x 1.0	10
40	17	38.5	M6 x 1.0	10
50	18	43.5	M8 x 1.25	14

Double clevis bracket material: Cast iron
Surface treatment: Painted

- * For details about the rod end nut and accessory brackets, refer to pages 796 to 798.
- * Double clevis pin and retaining rings are shipped together.

Rod end male thread

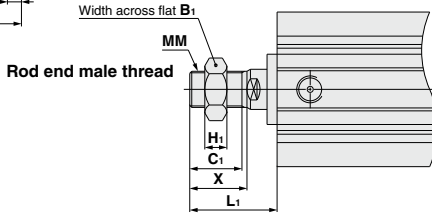
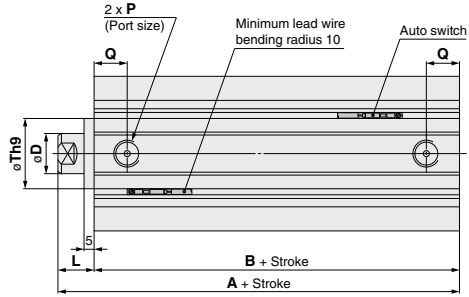
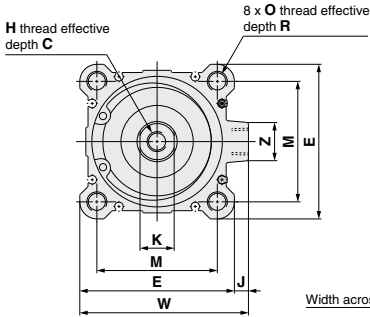


Dimensions

Ø63 to Ø100

Both ends tapped: C□Q2A

The dimensions are the same with or without an auto switch.



Rod End Male Thread

Bore size (mm)	B ₁	C ₁	H ₁	L ₁	MM	X
63	27	26	11	43.5	M18 x 1.5	28.5
80	32	32.5	13	53.5	M22 x 1.5	35.5
100	41	32.5	16	53.5	M26 x 1.5	35.5

The dimensions with built-in One-touch fittings are equivalent to those of the CQ2 series, double acting, single rod. Refer to page 793.

Both Ends Tapped

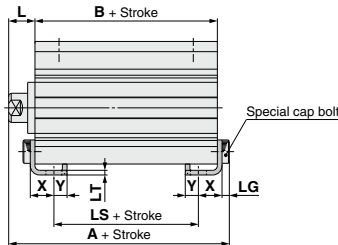
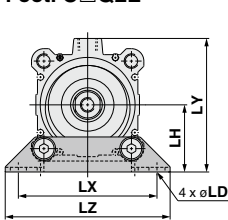
For auto switch proper mounting position and its mounting height, refer to pages 964 to 970.

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	H	J	K	L	M	O	P	Q	R	Th9	W	Z
63	125 to 200 (Note 1) 250, 300	75	57	15	20	77	M10 x 1.5	7	17	18	60	M10 x 1.5	1/4	16.5	18	35 ⁰ _{-0.062}	84	19
80		86	66	21	25	98	M16 x 2.0	6	22	20	77	M12 x 1.75	3/8	19	22	43 ⁰ _{-0.062}	104	25
100		97.5	75.5	27	30	117	M20 x 2.5	6.5	27	22	94	M12 x 1.75	3/8	23	22	59 ⁰ _{-0.074}	123.5	25

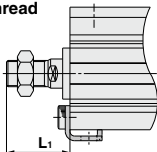
Note 1) For 125 to 200 strokes, strokes are available in 25 mm increments.

Note 2) For calculation on the longitudinal dimension of intermediate strokes, refer to page 857.

Foot: C□Q2L



Rod end male thread



Foot

Bore size (mm)	A	B	L	L ₁	LD	LG	LH	LS	LT	LX	LY	LZ	X	Y
63	83.2	57	18	43.5	11	5	46	31	3.2	95	91.5	113	16.2	9
80	97.5	66	20	53.5	13	7	59	36	4.5	118	114	140	19.5	11
100	110.5	75.5	22	53.5	13	7	71	41.5	6	137	136	162	23	12.5

Foot bracket material: Carbon steel
Surface treatment: Nickel plated

= For details about the rod end nut and accessory brackets, refer to pages 796 to 798.

- CUJ
- CU
- CQS
- JCQ
- CQ2**
- RQ
- QQM
- QQU
- MU

- D-□
- X□
- Technical Data

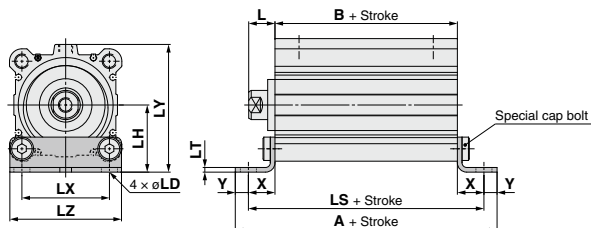
CQ2 Series

Dimensions

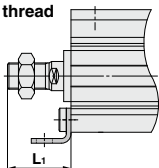
∅63 to ∅100

The dimensions are the same with or without an auto switch.

Compact foot: C□Q2LC



Rod end male thread

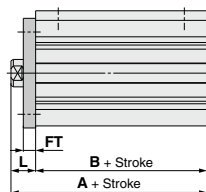
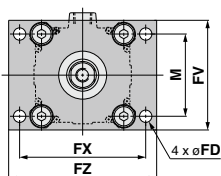


Compact Foot

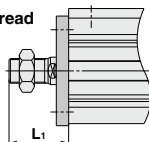
Bore size (mm)	A	B	L	L ₁	LD	LH	LS	LT	LX	LY	LZ	X	Y
63	111.4	57	18	43.5	11	46	93.4	3.2	60	91.5	77	18.2	9
80	133	66	20	53.5	13	59	111	4.5	77	114	98	22.5	11
100	148.5	75.5	22	53.5	13	71	123.5	6	94	136	117	24	12.5

Compact foot bracket material: Carbon steel
Surface treatment: Zinc chromated

Rod flange: C□Q2F



Rod end male thread

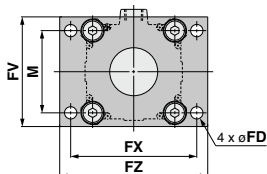
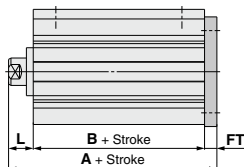


Rod Flange

Bore size (mm)	A	B	FD	FT	FV	FX	FZ	L	L ₁	M
63	75	57	9	9	80	92	108	18	43.5	60
80	86	66	11	11	99	116	134	20	53.5	77
100	97.5	75.5	11	11	117	136	154	22	53.5	94

Flange bracket material: Carbon steel
Surface treatment: Nickel plated

Head flange: C□Q2G



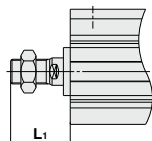
Head Flange

Bore size (mm)	A
63	84
80	97
100	108.5

(* The dimensions except A are the same as those of the rod flange.)

Flange bracket material: Carbon steel
Surface treatment: Nickel plated

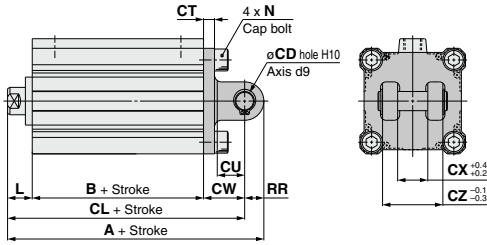
Rod end male thread



* For details about the rod end nut and accessory brackets, refer to pages 796 to 798.

The dimensions are the same with or without an auto switch.

Double clevis: C□Q2D



Double Clevis

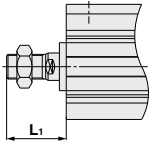
Bore size (mm)	A	B	CD	CL	CT	CU	CW	CX	CZ
63	119	57	14	105	8	20	30	22	44
80	142	66	18	124	10	27	38	28	56
100	164.5	75.5	22	142.5	13	31	45	32	64

Bore size (mm)	L	L ₁	N	RR
63	18	43.5	M10 x 1.5	14
80	20	53.5	M12 x 1.75	18
100	22	53.5	M12 x 1.75	22

Double clevis bracket material: Cast iron
Surface treatment: Nickel plated

- * For details about the rod end nut and accessory brackets, refer to pages 796 to 798.
- * Double clevis pin and retaining rings are shipped together.

Rod end male thread



CJ

CU

CQS

JCQ

CQ2

RQ

CQM

CQU

MU

D-□

-X□

Technical Data