

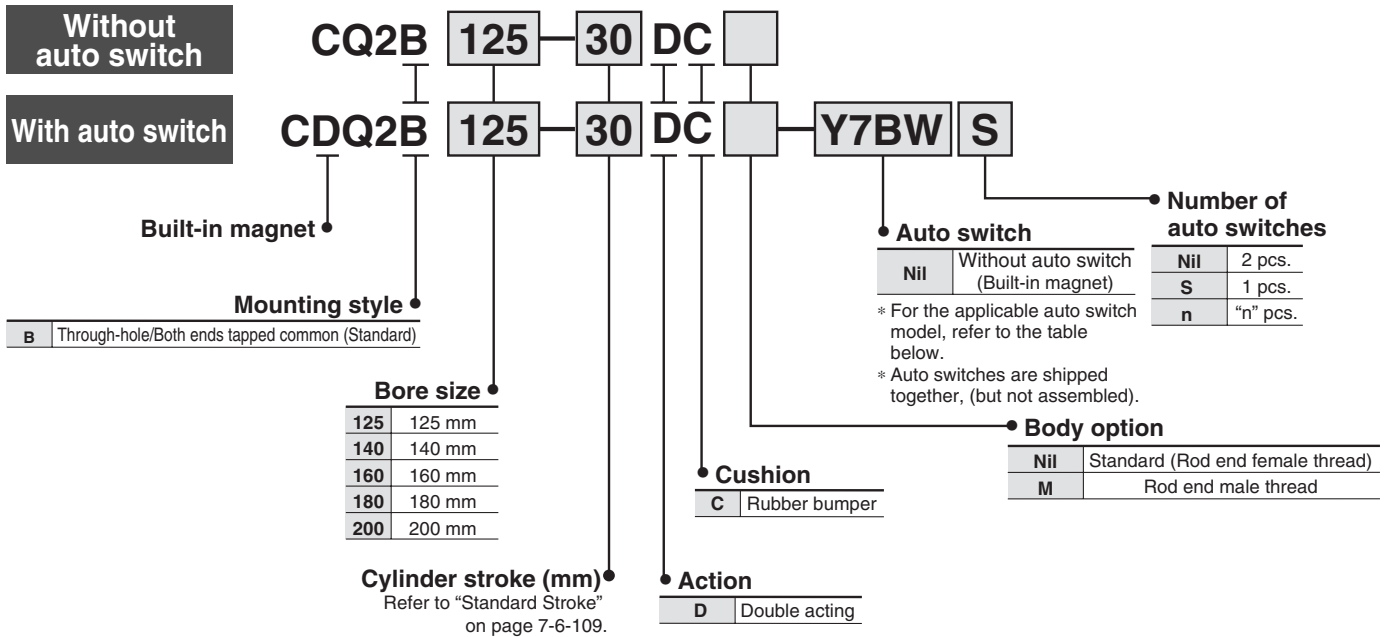


# Compact Cylinder: Large Bore Size Type Double Acting, Single Rod

## Series CQ2

ø125, ø140, ø160, ø180, ø200

### How to Order



### Applicable Auto Switch/Refer to page 7-9-1 for further information on auto switches.

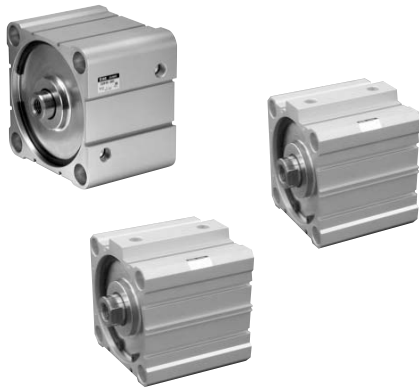
Type	Special function	Electrical entry	Indicator/light	Wiring (Output)	Load voltage		Rail mounting		Direct mounting		Lead wire length (m) *				Pre-wire connector	Applicable load		
					DC	AC	ø125 to ø160		ø125 to ø200		0.5 (Nil)	3 (L)	5 (Z)	None (N)		IC circuit	Relay, PLC	
							Perpendicular	In-line	Perpendicular	In-line								
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A76H	—	Z76	●	●	—	—	—	IC circuit	—	
				—	—	200 V	A72	A72H	—	—	●	●	—	—	—	—	—	—
	Diagnostic indication (2-color indication)	Connector		2-wire	24 V	12 V	100 V	A73	A73H	—	Z73	●	●	●	—	—	—	—
				—	—	12 V	—	A73C	—	—	—	—	●	●	●	●	—	—
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	F7NV	F79	Y69A	Y59A	●	●	○	—	○	IC circuit	PLC	
				3-wire (PNP)							F7PV	F7P	Y7PV	Y7P	●	●		○
	Diagnostic indication (2-color indication)	Connector		2-wire	12 V	F7BV	J79	Y69B	Y59B	●	●	○	—	○	—	—	—	—
				—		J79C	—	—	●	●	●	●	—	—	—	—	—	
	Water resistant (2-color indication)	Grommet		3-wire (NPN)	24 V	5 V, 12 V	—	F7NWV	F79W	Y7NWV	Y7NW	●	●	○	—	○	IC circuit	PLC
				3-wire (PNP)				—	F7PW	Y7PWV	Y7PW	●	●	○	—	○		
				2-wire				12 V	F7BWV	J79W	Y7BWV	Y7BW	●	●	○	—	○	
				—				—	—	—	—	—	—	—	—	—	—	
				—				—	—	—	—	—	—	—	—	—	—	
				—				—	—	—	—	—	—	—	—	—	—	
With diagnostic output (2-color indication)	Grommet	4-wire (NPN)	5 V, 12 V	—	—	F7BAV	—	—	—	●	●	○	—	○	IC circuit	—		
—		—	—	—	—	—	—	—	—	—	—	—	—	—	—			

\* Lead wire length symbols: 0.5 m.....Nil (Example) A73C  
 3 m.....L (Example) A73CL  
 5 m.....Z (Example) A73CZ  
 None.....N (Example) A73CN

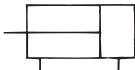
\* Solid state switches marked with "○" are produced upon receipt of order.

- Since there are other applicable auto switches than listed, refer to page 7-6-23 for details.
- For details about auto switches with pre-wire connector, refer to page 7-9-36.

# Compact Cylinder: Large Bore Size Type Double Acting, Single Rod Series CQ2



**JIS Symbol**  
Double acting,  
Single rod



**Made to Order Specifications**  
(For details, refer to page 7-10-1.)

Symbol	Specifications
-XB10	Intermediate stroke (Using exclusive body)
-XC18	NPT finish piping port
-X271	Fluoro rubber for seals

## ⚠ Precautions

Be sure to read before handling.  
For Safety Instructions and  
Actuator Precautions, refer to  
pages 7-13-3 to 7-13-6.

## ⚠ Caution

### Snap Ring Installation/Removal

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

## Type

Bore size (mm)		125	140	160	180	200
Pneumatic	Mounting Through-hole/Both ends tapped (Common)	●	●	●	●	●
	Built-in magnet	●	●	●	●	●
	Piping Screw-in type	Rc 3/8	Rc 3/8	Rc 3/8	Rc 1/2	Rc 1/2
	Rod end male thread	●	●	●	●	●
	Rubber bumper (Standard)	●	●	●	●	●

## Specifications

Bore size (mm)	125	140	160	180	200
Type	Pneumatic (Non-lube)				
Fluid	Air				
Proof pressure	1.5 MPa			1.05 MPa	
Maximum operating pressure	1.0 MPa			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	Rubber bumper (Standard)				
Rod end thread	Female thread				
Rod end thread tolerance	JIS Class 2				
Stroke length tolerance	$\begin{matrix} +1.4 \\ 0 \end{matrix}$				
Mounting	Through-hole/Both ends tapped (Common)				
Piston speed	50 to 500 mm/s			20 to 400 mm/s	

## Minimum Operating Pressure

Bore size (mm)	125	140	160	180	200
Minimum operating pressure	0.05				

## Allowable Kinetic Energy

Bore size (mm)	125	140	160	180	200
Allowable kinetic energy	7.4	9.8	12.4		

## Standard Stroke

Bore size (mm)	Standard stroke
125, 140, 160, 180, 200	10, 20, 30, 40, 50, 75, 100, 125, 150, 175, 200, 250, 300

## 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. on page 7-6-108.	Suffix "-XB10" to the end of standard model no. on page 7-6-108.								
Description	Dealing with the stroke by the 5 mm interval is available by installing spacer with standard stroke cylinder.	Dealing with the stroke by the 1 mm interval by using an exclusive body with the specified stroke.								
Stroke range	<table border="1"> <thead> <tr> <th>Bore size</th> <th>Stroke range</th> </tr> </thead> <tbody> <tr> <td>125 to 200</td> <td>5 to 295</td> </tr> </tbody> </table>	Bore size	Stroke range	125 to 200	5 to 295	<table border="1"> <thead> <tr> <th>Bore size</th> <th>Stroke range</th> </tr> </thead> <tbody> <tr> <td>125 to 160</td> <td>11 to 299</td> </tr> </tbody> </table>	Bore size	Stroke range	125 to 160	11 to 299
Bore size	Stroke range									
125 to 200	5 to 295									
Bore size	Stroke range									
125 to 160	11 to 299									
Example	Part no.: CQ2B160-165DC CQ2B160-175DC with 10 mm width spacer. B dimension is 266 mm.	Part no.: CQ2B160-165DC-XB10 Makes 165 stroke tube. B dimension is 256 mm.								

## Minimum Stroke for Auto Switch Mounting

No. of auto switches mounted	D-F7□/F7□V D-J79/J79C D-Y59□/Y69□ D-Y7P/Y7PV	D-A7□, D-A80 D-A73C, D-A80C D-A7□H, D-Z7□ D-Z80, D-A80H	D-F7□W/F7□WV D-J79W D-F7BAL/F7BAVL D-F7NTL/F79F D-F7□W/Y7□WV D-Y7BAL	D-A79W
1 pc.	5	5	10	15
2 pcs.	5	10	15	20

CUJ

CU

CQS

CQM

CQ2

RQ

MU

D-

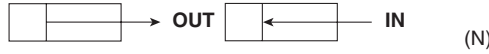
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Data

# Series CQ2

## Theoretical Output



Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
125	IN	3376	5627	7878
	OUT	3682	6136	8590
140	IN	4313	7188	10063
	OUT	4618	7697	10776
160	IN	5655	9425	13195
	OUT	6032	10053	14074
180	IN	7257	12095	16933
	OUT	7634	12724	17813
200	IN	9048	15080	21112
	OUT	9425	15708	21991

## Weight

### Without Auto Switch

(kg)

Bore size (mm)	Cylinder stroke (mm)												
	10	20	30	40	50	75	100	125	150	175	200	250	300
125	5.48	5.74	6.00	6.26	6.52	7.17	7.81	8.46	9.11	9.76	10.41	11.71	13.01
140	6.49	6.78	7.08	7.38	7.68	8.42	9.17	9.91	10.66	11.40	12.15	13.64	15.13
160	8.96	9.31	9.67	10.03	10.39	11.29	12.19	13.09	13.99	14.89	15.79	17.59	19.38
180	11.97	12.39	12.81	13.24	13.67	14.73	15.80	16.87	17.93	18.99	20.05	22.18	24.31
200	15.30	15.87	16.35	16.84	17.33	18.55	19.77	20.99	22.21	23.43	24.74	27.08	29.52

### Built-in Magnet

(kg)

Bore size (mm)	Cylinder stroke (mm)												
	10	20	30	40	50	75	100	125	150	175	200	250	300
125	5.54	5.80	6.06	6.32	6.58	7.23	7.87	8.52	9.17	9.82	10.47	11.77	13.07
140	6.56	6.85	7.15	7.45	7.75	8.49	9.24	9.98	10.73	11.47	12.22	13.71	15.20
160	9.04	9.39	9.75	10.11	10.47	11.37	12.27	13.17	14.07	14.97	15.87	17.67	19.46
180	12.05	12.47	12.89	13.32	13.75	14.81	15.88	16.95	18.01	19.07	20.13	22.26	24.39
200	15.38	15.95	16.43	16.92	17.41	18.63	19.85	21.07	22.29	23.51	24.82	27.16	29.60

## Mounting Bolt for CQ2

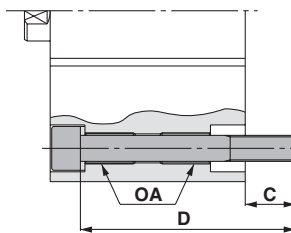
Mounting method: Mounting bolt for through-hole mounting style of CQ2B is available as an option.

Ordering: Add the word "Bolt" in front of the bolts to be used.

Example) Bolt M12 x 100ℓ 4 pcs.

Note 1) To install a through-hole type mounting bolt, make sure to use the flat washer that is provided.

Note 2) Please consult with SMC regarding mounting bolts for strokes that exceed 100 mm. Use the OA screw provided on the cylinder tube to secure the cylinder.



Model	C	D	Mounting bolt	Model	C	D	Mounting bolt
C□Q2B125/140-10DC	22.9	100	M12 x 100ℓ	C□Q2B180-10DC	36	125	M18 x 125ℓ
-20DC		110	x 110ℓ	-20DC		135	x 135ℓ
-30DC		120	x 120ℓ	-30DC		145	x 145ℓ
-40DC		130	x 130ℓ	-40DC		155	x 155ℓ
-50DC		140	x 140ℓ	-50DC		165	x 165ℓ
-75DC		165	x 165ℓ	-75DC		190	x 190ℓ
-100DC		190	x 190ℓ	-100DC	215	x 215ℓ	
C□Q2B160-10DC	27.7	110	M14 x 110ℓ	C□Q2B200-10DC	39	135	M18 x 135ℓ
-20DC		120	x 120ℓ	-20DC		145	x 145ℓ
-30DC		130	x 130ℓ	-30DC		155	x 155ℓ
-40DC		140	x 140ℓ	-40DC		165	x 165ℓ
-50DC		150	x 150ℓ	-50DC		175	x 175ℓ
-75DC		175	x 175ℓ	-75DC		200	x 200ℓ
-100DC		200	x 200ℓ	-100DC		225	x 225ℓ

# Compact Cylinder: Large Bore Size Type Double Acting, Single Rod Series CQ2

## Additional Weight

(kg)

Bore size (mm)		125	140	160, 180, 200
Rod end male thread	Male thread	0.31	0.31	0.48
	Nut	0.16	0.16	0.26

Calculation: (Example) CDQ2B125-30DCM Add the weight of auto switches  
 • Cylinder weight: CDQ2B125-30DC.....6.06 kg and mounting brackets.  
 • Option weight: Rod end male thread.....0.47 kg  
 6.53 kg

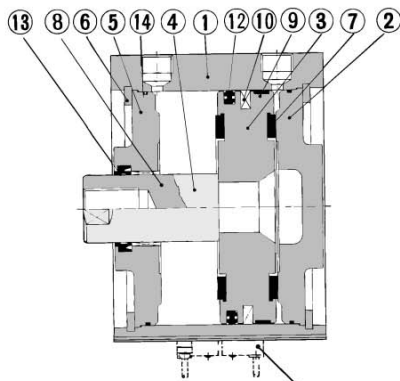
## Auto Switch Mounting Bracket Weight

Mounting bracket part no.	Applicable bore size (mm)	Weight (g)
<b>BQ-2</b>	125 to 160	1.5

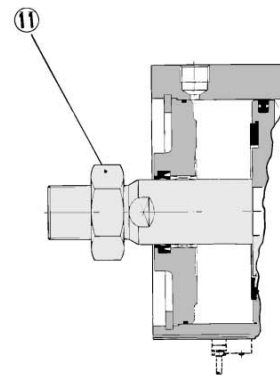
For auto switch weight, refer to page 7-9-1.

## Construction

Double acting, Single rod



Rod end male thread



Auto switch (D-A7□, D-A80)  
For only ø125, ø140, ø160

## Component Parts

No.	Description	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②	Head cover	Cast iron	Nickel plated
③	Piston	Aluminum alloy	Chromated
④	Piston rod	Carbon steel	Hard chrome plated
⑤	Rod cover	Cast iron	Nickel plated
⑥	Snap ring	Carbon tool steel	Phosphate coated
⑦	Bumper	Urethane	
⑧	Bushing	Lead-bronze casted	
⑨	Wear ring	Resin	
⑩	Magnet	—	For only CDQ2B□
⑪	Rod end nut	Carbon steel	Nickel plated
⑫	Piston seal	NBR	
⑬	Rod seal	NBR	
⑭	Tube gasket	NBR	

## Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
125	CQ2B125-PS	Set of left nos. ⑫, ⑬, ⑭
140	CQ2B140-PS	
160	CQ2B160-PS	
180	CQ2B180-PS	
200	CQ2B200-PS	

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

## Auto Switch Mounting Bracket Part No.

Bore size (mm)	Mounting bracket part no.	Note	Applicable auto switch	
			Reed switch	Solid state switch
125 140 160	BQ-2	<ul style="list-style-type: none"> <li>Switch mounting screw (M3 x 0.5 x 10<math>\phi</math>)</li> <li>Switch spacer</li> <li>Switch mounting nut</li> </ul>	D-A7□/A80 D-A73C/A80C D-A7□H/A80H D-A79W	D-F7□/J79 D-F7□V D-J79C D-F7□W/J79W D-F7□WV D-F7BAL/F7BAVL D-F79F, D-F7NTL

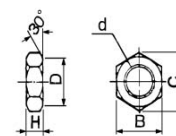
[Mounting screws set made of stainless steel]

The set of stainless steel mounting screws (with nuts) described below is available and can be used depending on the operating environment. (Please order the auto switch spacer, since it is not included.)

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

"D-F7BAL/F7BAVL" switch is set on the cylinder with the stainless steel screws above when shipped. When only a switch is shipped independently, "BBA2" screws are attached.

## Rod End Nut



Material: Carbon steel

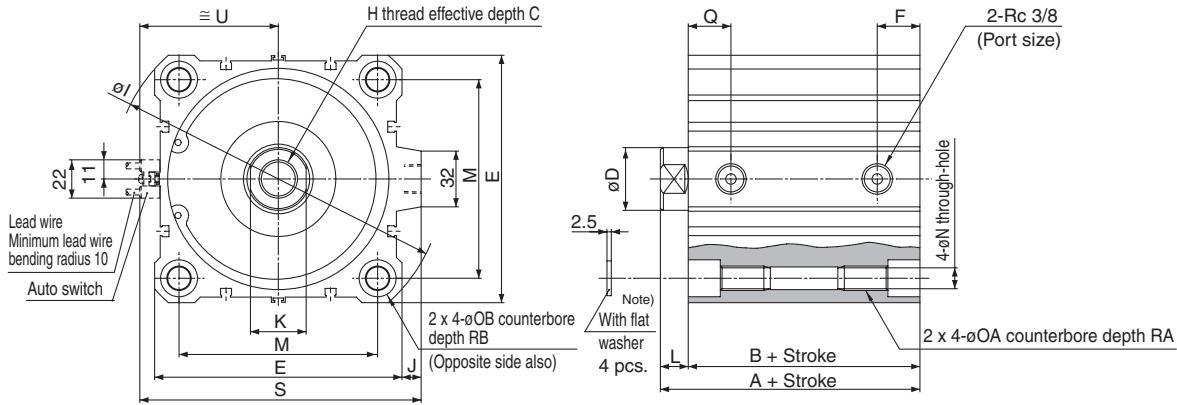
Part no.	Applicable bore size (mm)	d	H	B	C	D
NT-12	125, 140	M30 x 1.5	18	46	53.1	44
NT-16	160, 180, 200	M36 x 1.5	21	55	63.5	53

# Series CQ2

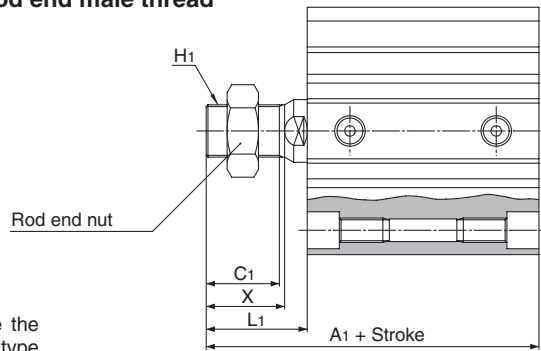
Dimensions:  $\phi 125$ ,  $\phi 140$ ,  $\phi 160$

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

Basic style (Through-hole): C□Q2B



### Rod end male thread



### Rod End Male Thread

Bore size (mm)	A1	C1	H1	L1	X
125	141	42	M30 x 1.5	58	45
140	141	42	M30 x 1.5	58	45
160	155	47	M36 x 1.5	64	50

Switches in the above figure are the case for the reed switches D-A73 type and D-A80 type.

Bore size (mm)	Standard stroke range	A	B	C	D	E	F	H	I	J	K	L	M	N	OA	OB	Q	RA	RB	S	U
125	10, 20, 30, 40, 50	99	83	30	36	142	24.5	M22 x 2.5	190	11	32	16	114	12.5	M14 x 2	21.2	24.5	25	18.4	162	80
140	75, 100, 125, 150	99	83	30	36	158	24.5	M22 x 2.5	210	10	32	16	128	12.5	M14 x 2	21.2	24.5	25	18.4	177	88
160	175, 200, 250, 300	108	91	33	40	178	27.5	M24 x 3	238	10	36	17	144	14.5	M16 x 2	24.2	27.5	28	21.2	197	98

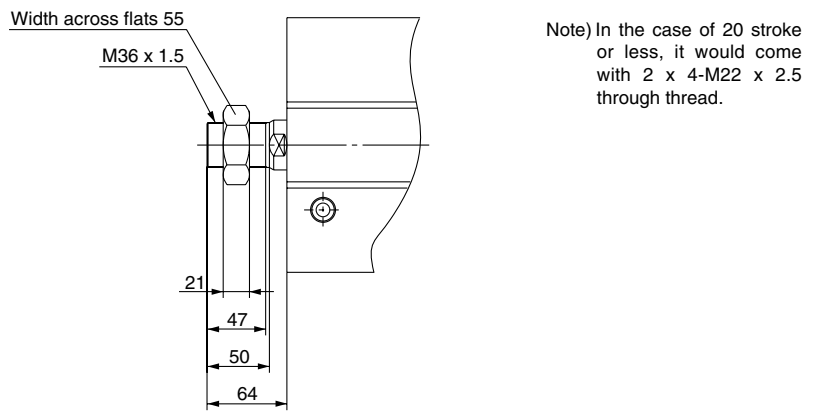
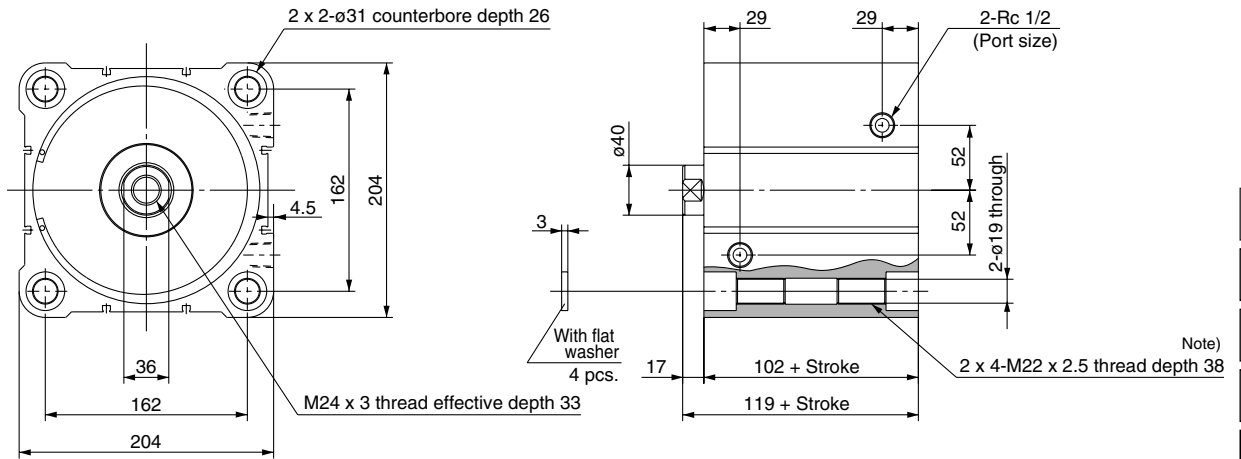
Note) Be sure to use the attached plain washer for mounting, cylinder with through-holes.

# Compact Cylinder: Large Bore Size Type Double Acting, Single Rod Series CQ2

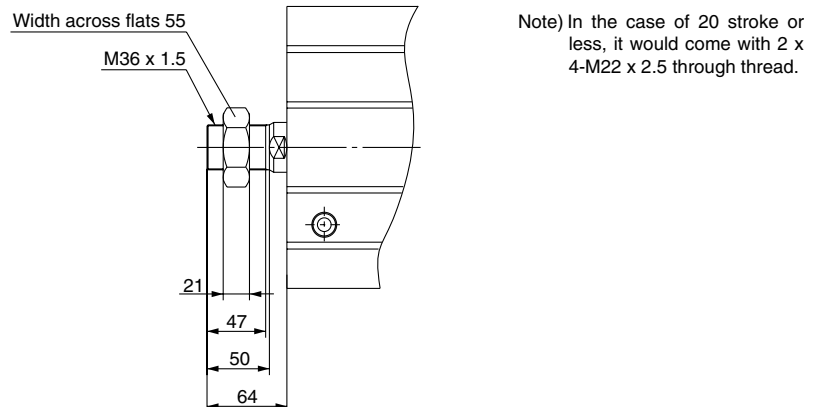
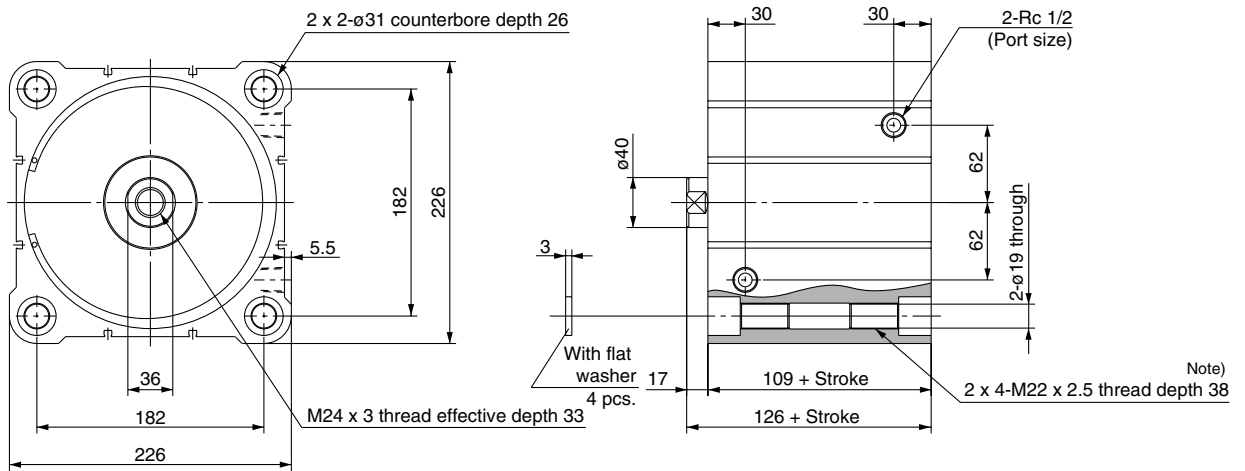
## Dimensions: $\phi 180$ , $\phi 200$

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

### $\phi 180$



### $\phi 200$



CUJ

CU

CQS

CQM

**CQ2**

RQ

MU

D-

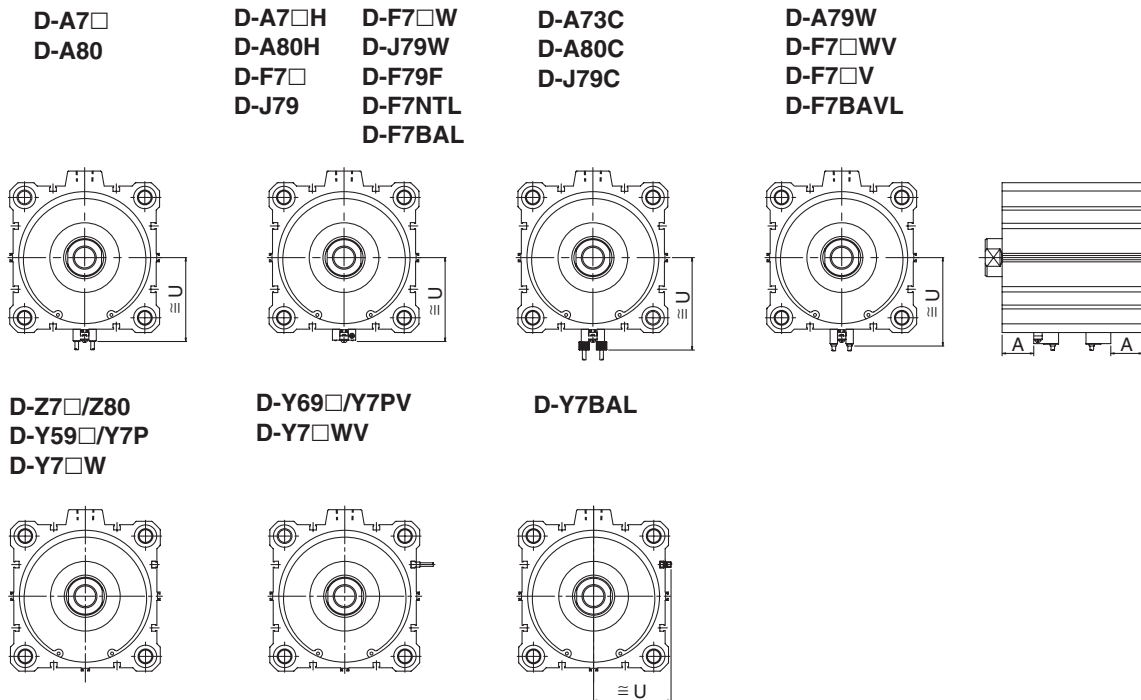
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Data

# Series CQ2

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



### Proper Auto Switch Mounting Position

Bore size (mm)	D-A7□ D-A80	D-A7□H/A80H D-A73C/A80C D-F□/F7□V/F79F D-F7□W/F7□WV D-J79/J79W D-J79C D-F7BAL/F7BAVL	D-A79W	D-F7NNTL	D-Z7□/Z80 D-Y59□/Y69□ D-F7P/Y7PV D-Y7□W/Y7□WV D-Y7BAL
		A	A	A	A
125	32.5	33	30	38	29
140	32.5	33	30	38	29
160	36.5	37	34	42	33
180	—	—	—	—	38.5
200	—	—	—	—	42

### Auto Switch Mounting Height

(mm)

D-A7□ D-A80	D-A7□H, D-A80H D-F7□, D-J79, D-F7□W D-J79W, D-F7BAL D-F79F, D-F7NNTL	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAVL	D-J79C	D-A79W	D-Y7BAL
U	U	U	U	U	U	U
80	81	87	83.5	85.5	82.5	74
88	89	95	91.5	93.5	90.5	82
98	99	105	101.5	103.5	100.5	92
—	—	—	—	—	—	103.5
—	—	—	—	—	—	113.5