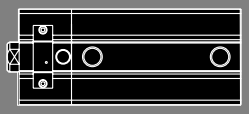
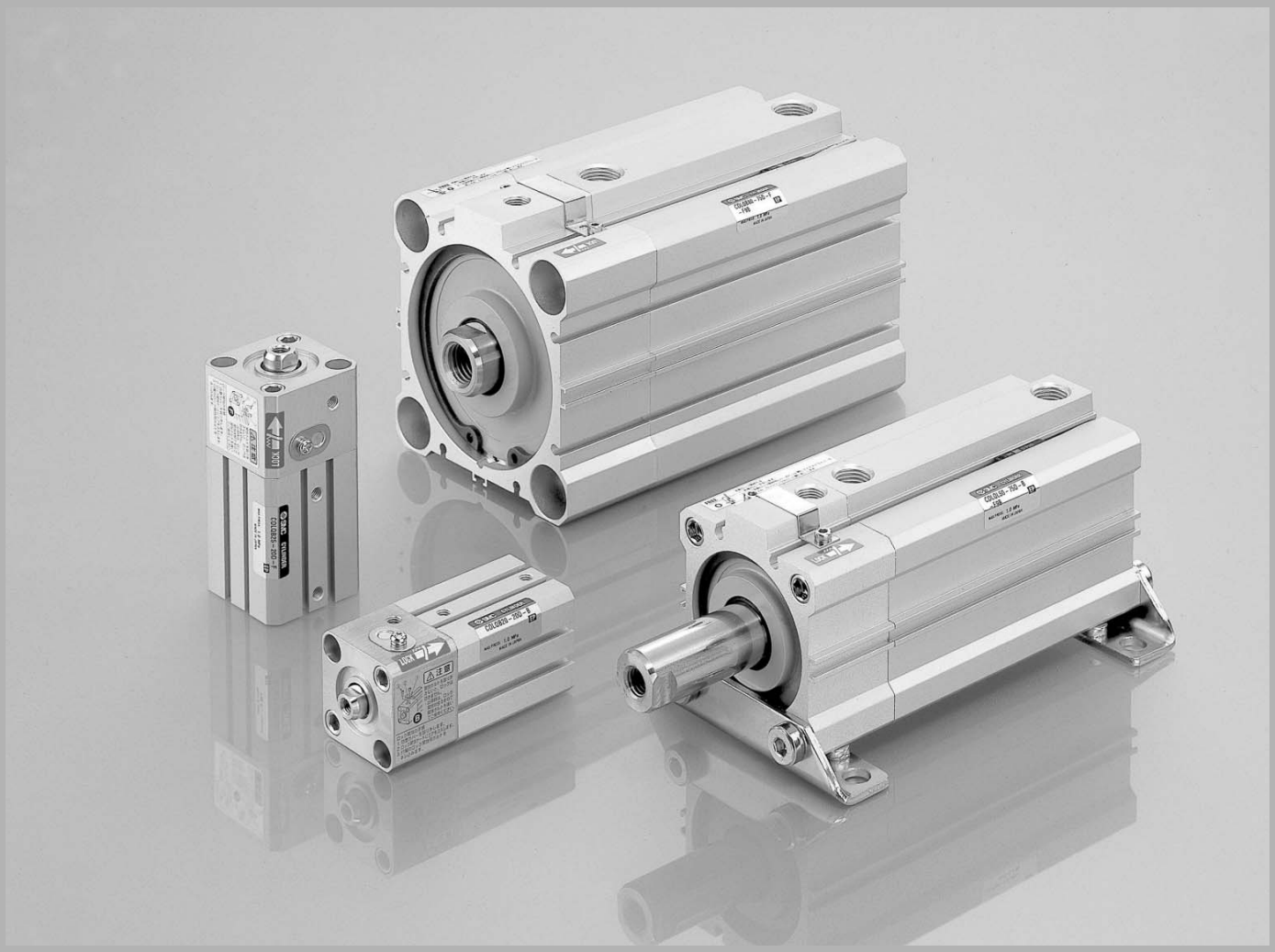


Compact Cylinder with Lock

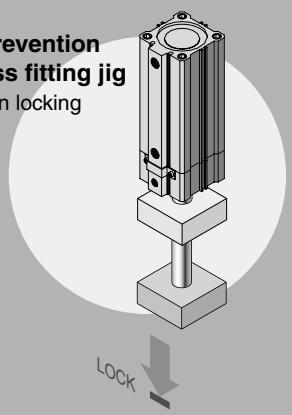
Series CLQ

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

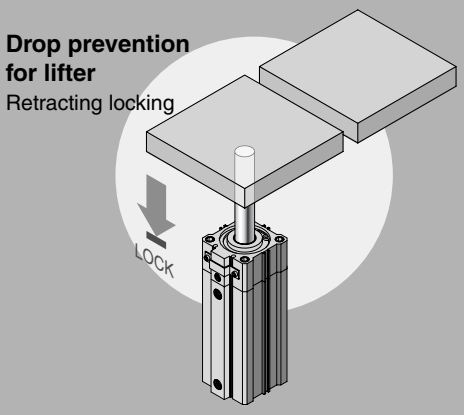


Drop prevention when the pressure of air source is decreased or the residual pressure is released.

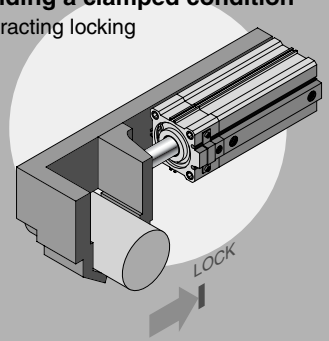
Drop prevention for press fitting jig
Extension locking



Drop prevention for lifter
Retracting locking



Holding a clamped condition
Retracting locking

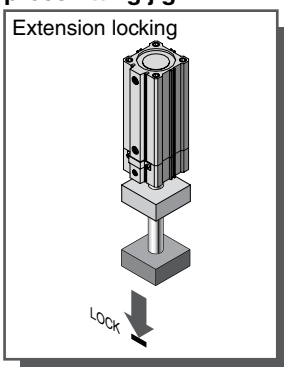


Drop prevention is possible within the entire stroke at any position.

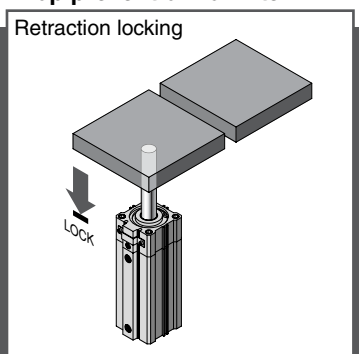
Can be locked at any desired position

- **Drop prevention in the middle of stroke**
- **Locking position can be changed in accordance with the external stopper position and the thickness of clamped workpieces.**

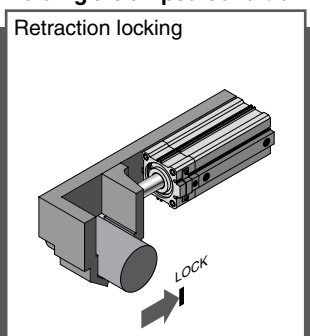
Drop prevention for press fitting jig



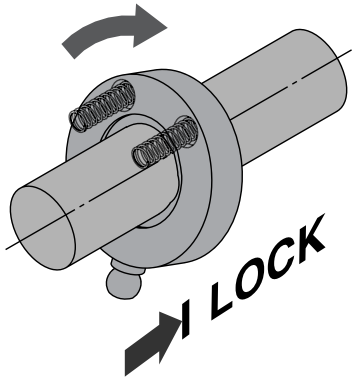
Drop prevention for lifter

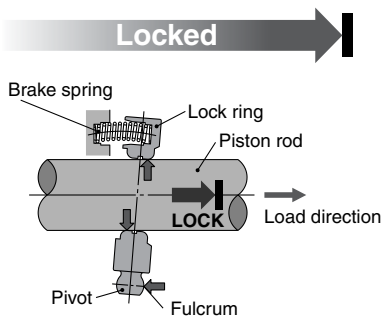


Holding a clamped condition



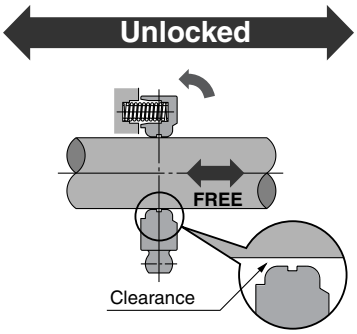
Simple Construction/Simple and reliable locking type





Unlocking port: Air exhausted

1. The lock ring is tilted by the spring force.
2. The tilting is increased by the load and the piston rod is securely locked.



Unlocking port: Air supplied

1. The lock ring becomes perpendicular to the piston, creating clearance between the piston rod and lock ring, which allows the piston rod to move freely.

Low profile with compact lock unit

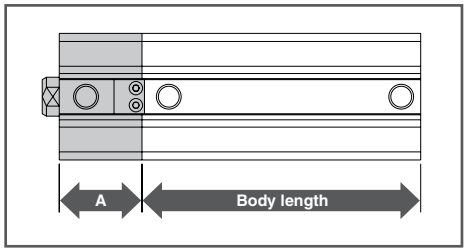
- Lock unit length

  27 mm to 50 mm

- The lock unit does not project beyond the cylinder's external dimensions

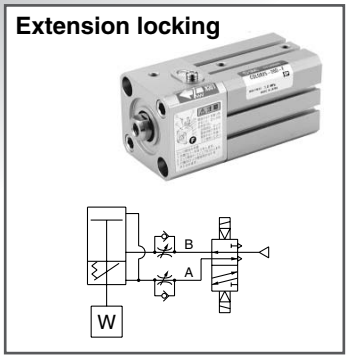
Thickness of Lock Unit

Bore size (mm)	A
20	27
25	31
32	32
40	34
50	35
63	38
80	43
100	50

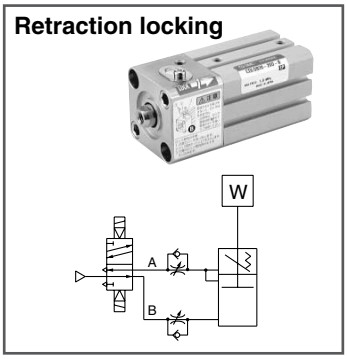


Locking direction is selectable

Extension locking

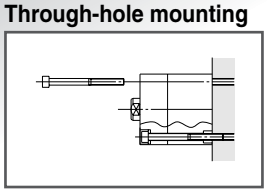


Retraction locking

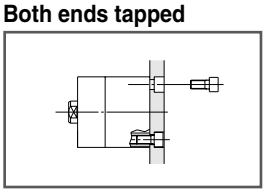


Two types of mounting

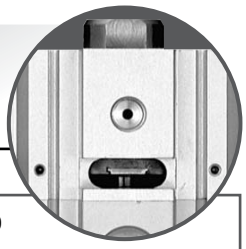
Through-hole mounting



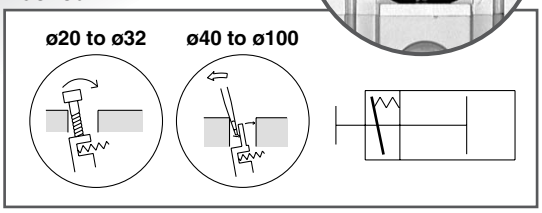
Both ends tapped



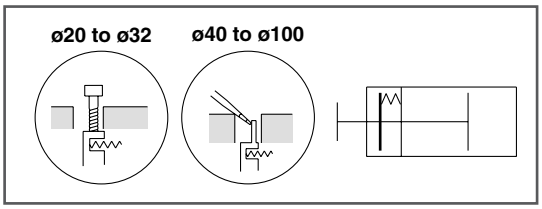
Easy manual unlocking



Locked



Unlocked



Wide Size Variations from ø20 to ø100

Series	Mounting	Locking direction	Bore size (mm)	Standard stroke (mm)											
				5	10	15	20	25	30	35	40	45	50	75	100
CLQ	Through-hole/ Both ends tapped common	Extension locking	20	●	●	●	●	●	●	●	●	●	●		
			25	●	●	●	●	●	●	●	●	●	●		
	Through-hole / Both ends tapped style		32		●	●	●	●	●	●	●	●	●	●	●
			40		●	●	●	●	●	●	●	●	●	●	●
		Retraction locking	50		●	●	●	●	●	●	●	●	●	●	●
			63		●	●	●	●	●	●	●	●	●	●	●
			80		●	●	●	●	●	●	●	●	●	●	●
			100		●	●	●	●	●	●	●	●	●	●	●

Specific Product Precautions 1

Be sure to read before handling.

Selection

⚠ Warning

1. Do not use for intermediate cylinder stops.
This cylinder is designed for locking against inadvertent movement from a stationary condition. Do not perform intermediate stops while the cylinder is operating, as this will shorten its service life.

2. Select the correct locking direction, as this cylinder does not generate holding force opposite to the locking direction.
The extension locking does not generate holding force in the cylinder's retracting direction, and the retraction lock does not generate holding force in the cylinder's extension direction (free).

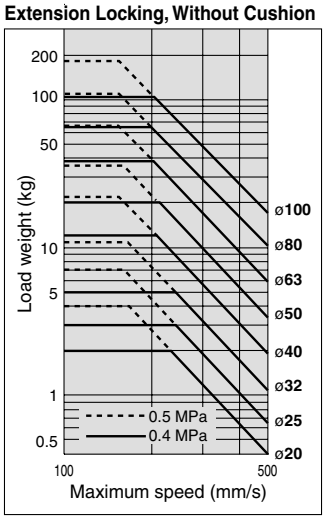
3. Even when locked, there may be stroke movement of about 1 mm in the locking direction due to external forces such as the weight of the workpiece.
Even when locked, if air pressure drops, stroke movement of about 1 mm may be generated in the locking direction of the lock mechanism due to external forces such as the workpiece weight.

4. When in the locked state, do not apply a load accompanied by an impact shock, strong vibration or turning force, etc.
It will lead to damage the lock mechanism or reduce service life.

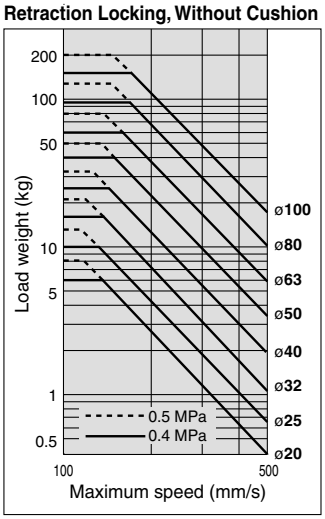
5. Operate so that load weight, maximum speed and eccentric distance are within the limiting ranges in the graphs below.
If the products are used beyond the limiting range, it may lead to a reduced service life or cause damage to the machinery.

Allowable Kinetic Energy

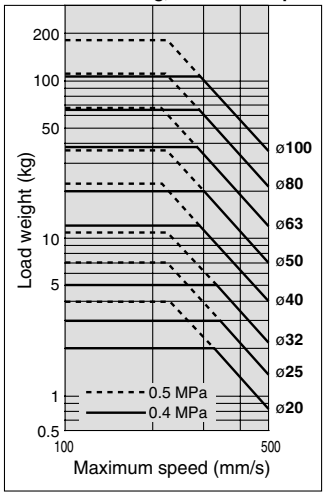
Extension Locking, Without Cushion



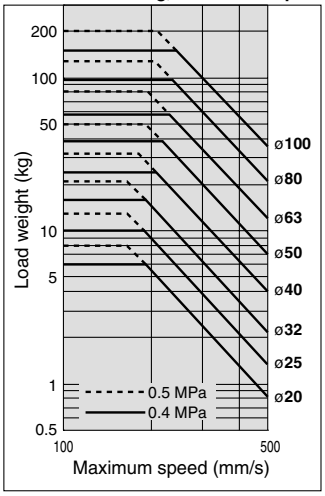
Retraction Locking, Without Cushion



Extension Locking, Rubber Bumper



Retraction Locking, Rubber Bumper

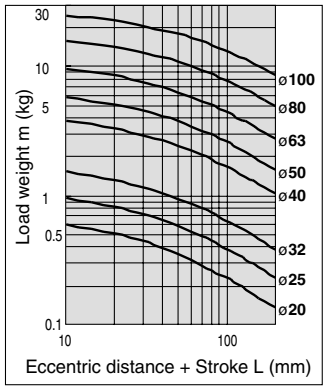


Selection

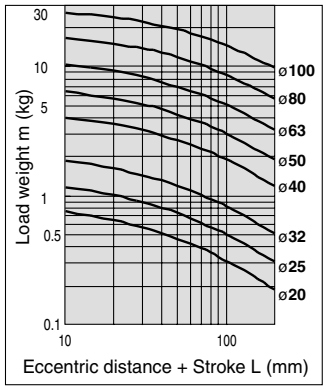
⚠ Warning

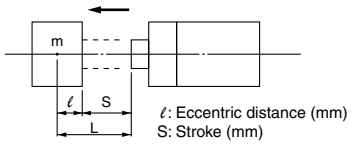
Allowable Load Weight

Horizontal (Without switch)



Horizontal (With switch)





Pneumatic Circuit

⚠ Warning

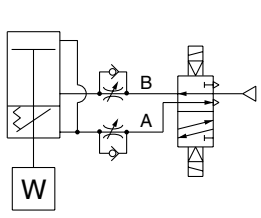
1. Do not use 3 position valves.
The lock may be released due to inflow of the unlocking pressure.

2. Install speed controllers for meter-out control.
If it used in meter-in control, it may result in malfunction.

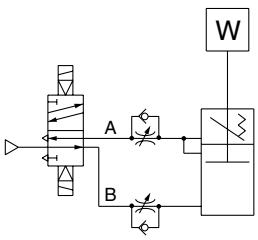
3. Be careful of reverse exhaust pressure flow from a common exhaust type valve manifold.
Since the lock may be released due to reverse exhaust pressure flow, use an individual exhaust type manifold or single type valve.

4. Branch off the compressed air piping for the lock unit between the cylinder and the speed controller.
Use of an external branch may cause a reduction in service life.

5. Perform piping so that the side going from the piping junction to the lock unit is short.
If it is long, this may cause unlocking malfunction and reduce the lock's service life, etc.



F: Extension locking



B: Retraction locking

Specific Product Precautions 2

Be sure to read before handling.

Mounting

⚠ Caution

1. Be sure to connect the load to the rod end with the cylinder in an unlocked condition.
If this is done in the locked state, it may cause damage to the lock mechanism.

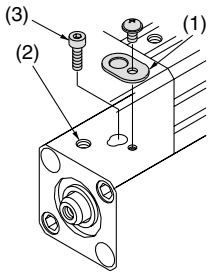
Preparing for Operation

⚠ Warning

1. When starting operation from the locked position, be sure to restore air pressure to the B line in the pneumatic circuit.
It is very dangerous to apply pressure to the A line with the B line in an unpressurized state, because the cylinder will move suddenly when unlocked.

2. Size ø20 to ø 32 are shipped in the unlocked condition maintained by the unlocking bolt. Be sure to remove the unlocking bolt following the steps below before operation.
The unlocking mechanism will not be effective without the removal of the unlocking bolt.

Only ø20 to ø32



1) Confirm that there is no air pressure inside the cylinder, and remove the dust cover (1).
2) Supply air pressure of 0.2 MPa or more to unlocking port (2) shown in the drawing on the left.
3) Remove the unlocking bolt (3) with a hexagon wrench (width across flats 2.5).

Since a holding function for the unlocked state is not available for sizes ø40 through ø100, they can be used as shipped.

Manually Unlocking

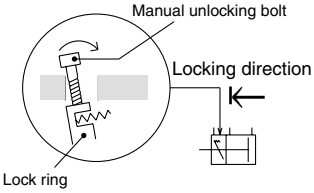
⚠ Warning

1. Do not perform unlocking while an external force such as a load or spring force is being applied.
This is very dangerous because the cylinder will move suddenly. Take the following steps.
1) Release the lock after restoring the air pressure in the B line of the pneumatic circuit to the operating pressure, and then reduce the pressure gradually.
2) When air pressure cannot be used, release the lock after preventing cylinder movement with a lifting device such as a jack.

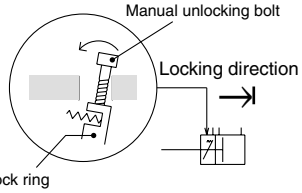
2. After confirming safety, operate the manual release following the steps shown below.
Confirm that there are no personnel inside the load movement range, etc., and that there is no danger even if the load moves suddenly.

Manually unlocking

ø20 to ø32

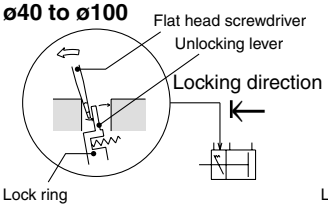


Extension locking
1) Remove the dust cover.
2) Screw a manual unlocking bolt (a bolt of M3 x 0.5 x 15ℓ or more commercially available) into the lock ring threads as shown above, and lightly push the bolt in the direction of the arrow (head side) to unlock.

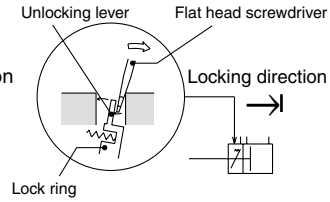


Retraction locking
1) Remove the dust cover.
2) Screw a manual unlocking bolt (a bolt of M3 x 0.5 x 15ℓ or more commercially available) into the lock ring threads as shown above, and lightly push the bolt in the direction of the arrow (rod side) to unlock.

ø40 to ø100



Extension locking
1) Remove the dust cover.
2) Insert a flat head screwdriver on the rod side of the manual unlocking lever as shown in the figure above, and lightly push the screwdriver in the direction of the arrow (rod side) to unlock.



Retraction locking
1) Remove the dust cover.
2) Insert a flat head screwdriver on the head side of the manual unlocking lever as shown in the figure above, and lightly push the screwdriver in the direction of the arrow (head side) to unlock.

Specific Product Precautions 3

Be sure to read before handling.

Maintenance

⚠ Caution

1. In order to maintain good performance, operate with clean unlubricated air.
If lubricated air, compressor oil or drainage, etc., enters the cylinder, there is a danger of sharply reducing the locking performance.

2. Do not apply grease to the piston rod.
There is a danger of sharply reducing the locking performance.

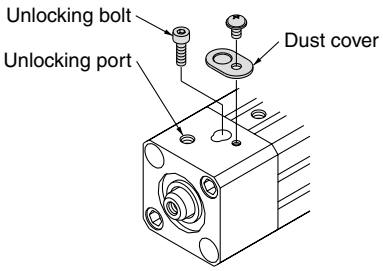
3. Never disassemble the lock unit.
It contains a heavy duty spring which is dangerous and there is also a danger of reducing the locking performance.

4. Never remove the pivot seal and disassemble the internal unit.
As for ø20 to ø32, a ø12 silver seal (pivot seal) is labeled on the one surface of the lock body (on the surface opposite from the unlocking port). The seal is meant for dust prevention, but even if it's peeled off, there would be no problem functionally. However, never disassemble the internal parts.

Holding the Unlocked State

⚠ Warning

1. ø20 to ø32 can hold the unlocked condition.
<Holding the unlocked state>
1) Remove the dust cover.
2) Supply air pressure of 0.2 MPa or more to the unlocking port, and set the lock ring to the perpendicular position.
3) Screw the attached bolt for unlocking (hexagon socket head cap screw/ø20, ø25: M3 x 5ℓ, ø32: M3 x 10ℓ) into the lock ring to hold the unlocked condition.



2. To use the lock mechanism again, be sure to remove the unlocking bolt.
When the unlocking bolt is screwed in, the lock mechanism does not function. Remove the unlocking bolt according to the steps prescribed in the section of "Preparing for Operation".

Compact Cylinder with Lock
Double Acting, Single Rod
Series CLQ
ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Without auto switch CLQ **B** **40** **□** — **30** **D** **□** — **F**

With auto switch CDLQ **B** **40** **□** **30** **D** **□** **F** **F9BW** **S**

Built-in magnet

Mounting style

ø20, ø25		ø32 to ø100	
B	Through-hole/ Both ends tapped common (Standard)	**B**	Through-hole (Standard)
L	Foot style	**A**	Both ends tapped style
F	Rod side flange style	**L**	Foot style
G	Head side flange style	**F**	Rod side flange style
D	Double clevis style	**G**	Head side flange style
		D	Double clevis style

∗ Mounting bracket is shipped together, (but not assembled).

Thread type

Nil	Rc
TN	NPT

Number of auto switches

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

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled).

Bore size

20	20 mm	**50**	50 mm
25	25 mm	**63**	63 mm
32	32 mm	**80**	80 mm
40	40 mm	**100**	100 mm

Locking direction

F	Extension locking
B	Retraction locking

Body option

Nil	Standard (Rod end female thread)
C	With rubber bumper
M	Rod end male thread
CM	With rubber bumper, Rod end male thread

Cylinder stroke (mm)
For "Standard strokes" and "Manufacture of Intermediate of Stroke", refer to page 9-10-9.

Action

D	Double acting

Applicable Auto Switch/Refer to page 9-15-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Rail mounting ø32 to ø100 Perpendicular	Rail mounting ø32 to ø100 In-line	Direct mounting ø20 to ø100 Perpendicular	Direct mounting ø20 to ø100 In-line	Lead wire length (m)∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	**A76H**	**A96V**	**A96**	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200 V	**A72**	**A72H**	—	—	●	●	—	—	—		
					24 V	12 V	100 V	**A73**	**A73H**	—	—	●	●	●	—	—	—	Relay, PLC
								—	—	**A93V**	**A93**	●	●	—	—	—		
		Connector					—	**A73C**	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	**A79W**	—	—	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**F7NV**	**F79**	**M9NV**	**M9N**	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				**F7PV**	**F7P**	**M9PV**	**M9P**	●	●	○	—	○		
				2-wire		12 V		**F7BV**	**J79**	**M9BV**	**M9B**	●	●	○	—	○	—	
		Connector						**J79C**	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		**F7NWV**	**F79W**	**F9NWV**	**F9NW**	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	**F7PW**	**F9PWV**	**F9PW**	●	●	○	—	○		
				2-wire		12 V		**F7BWV**	**J79W**	**F9BWV**	**F9BW**	●	●	○	—	○	—	
	With diagnostic output (2-color indication)							—	**F7BA**	—	**F9BA**	—	●	○	—	○		
								F7BAV	—	—	—	—	●	○	—	—		
	With diagnostic output (2-color indication)			4-wire(NPN)		5 V, 12 V		—	**F79F**	—	—	●	●	○	—	○	IC circuit	

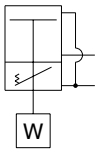
∗ Lead wire length symbols: 0.5 m····· Nil (Example) A73C 5 m····Z (Example) A73CZ
3 m····· L (Example) A73CL None···· N (Example) A73CN

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

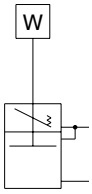
• Since there are other applicable auto switches than listed, refer to page 9-10-28 for details.
• For details about auto switches with pre-wire connector, refer to page 9-15-66.

JIS Symbol

Extension locking



Retraction locking



Made to Order Specifications (For details, refer to page 9-16-1.)

Symbol	Specifications
-XA□	Change of rod end shape

Cylinder Specifications

Bore size (mm)	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	0.2 MPa Note)							
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)							
Lubrication	Non-lube							
Piston speed	50 to 500 mm/s							
Stroke length tolerance	$^{+0.1}_{0}$ mm							
Cushion	None or rubber bumper							
Rod end thread tolerance	JIS Class 2							
Port size	M5 x 0.8		Rc 1/8		Rc 1/4		Rc 3/8	

Note) The minimum operating pressure of the cylinder is 0.1 MPa when the cylinder and lock are connected to separate ports.

Lock Specifications

Bore size (mm)	20	25	32	40	50	63	80	100
Locking action	Spring locking (Exhaust locking)							
Unlocking pressure	0.2 MPa or more							
Lock starting pressure	0.05 MPa or less							
Locking direction	One direction (Either extension locking or retraction locking)							
Unlocking port size	M5 x 0.8		Rc 1/8					Rc 1/4
Holding force (N)	157	245	402	629	982	1559	2513	3927
(Maximum static load)	Equivalent to 0.5 MPa							

Standard Stroke

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

Manufacture of Intermediate Stroke

Description	Spacer is installed in the standard stroke body.	
Part no.	Refer to "How to Order" for the standard model no. on page 9-10-8.	
Method	Dealing with the stroke by the 1 mm interval is available by installing spacer with standard stroke cylinder.	
Stroke range	Bore size (mm)	Stroke range (mm)
	20, 25	1 to 50
	32, 40, 50, 63, 80, 100	1 to 100
Example	Part no.: CLQB40-47D-B A 3 mm spacer is installed in standard cylinder CLQB40-50D-B. B dimension is 79.5 mm.	

Note) Please consult with SMC regarding intermediate strokes for sizes ø40 through ø100 with rubber bumpers.

Mounting Bracket Part No.

Bore size (mm)	Foot (1)	Flange	Double clevis (3)
20	CLQ-L020	CLQ-F020	CLQ-D020
25	CLQ-L025	CLQ-F025	CLQ-D025
32	CLQ-L032	CLQ-F032	CLQ-D032
40	CLQ-L040	CLQ-F040	CLQ-D040
50	CLQ-L050	CLQ-F050	CLQ-D050
63	CLQ-L063	CLQ-F063	CLQ-D063
80	CLQ-L080	CLQ-F080	CLQ-D080
100	CLQ-L100	CLQ-F100	CLQ-D100

Note 1) When ordering foot bracket, order 2 pieces per cylinder.
Note 2) Parts belonging to each bracket are as follows. Foot, Flange: Body mounting screws, Double clevis: Clevis pin, C type snap ring for shaft, Body mounting screws, Flat washer.
Note 3) Clevis pin and snap ring are included with the double clevis style.

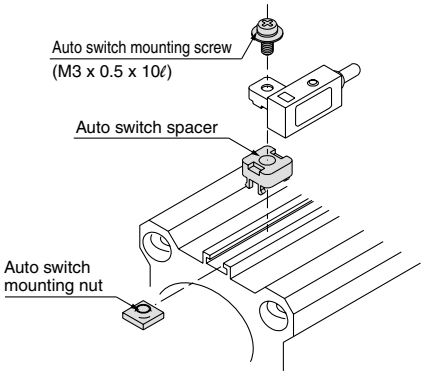
Auto Switch Mounting Bracket/ Part No. (Rail mounting style)

Bore size (mm)	Mounting bracket part no.	Note
32, 40 50, 63 80, 100	BQ-2	• Switch mounting screw (M3 x 0.5 x 10ℓ) • Switch spacer • Switch mounting nut

Applicable auto switch	
Reed switch	Solid state switch
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. (Since the spacer is not included, order it separately.) **BBA2**: For D-A7/A8/F7/J7

The above stainless steel screw kit is used for water resistant auto switch types D-F7BAL and F7BAVL when they are shipped mounted on a cylinder.
When only a switch is shipped independently, "BBA2" screws are attached.



Theoretical Output

(N)

Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
20	IN	71	118	165
	OUT	94	157	220
25	IN	113	189	264
	OUT	147	245	344
32	IN	181	302	422
	OUT	241	402	563
40	IN	317	528	739
	OUT	377	628	880
50	IN	495	825	1150
	OUT	589	982	1370
63	IN	841	1400	1960
	OUT	935	1560	2180
80	IN	1360	2270	3170
	OUT	1510	2510	3520
100	IN	2140	3570	5000
	OUT	2360	3930	5500

Weight

Basic Weight: Mounting/Through-hole (Type B)

(g)

Bore size (mm)	Standard stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
20 *	184	199	213	227	241	255	270	284	298	312	—	—
25 *	260	278	295	312	329	346	364	381	398	415	—	—
32	—	407	430	453	475	498	521	544	566	589	754	867
40	—	514	537	560	583	606	630	653	676	699	883	1003
50	—	838	874	910	947	983	1019	1055	1092	1128	1421	1609
63	—	1202	1242	1283	1324	1365	1406	1447	1488	1529	1877	2088
80	—	2229	2297	2364	2432	2500	2568	2636	2704	2771	3344	3678
100	—	3770	3860	3951	4041	4132	4223	4313	4404	4495	5299	5759

* Through-hole and both ends tapped are common for sizes ø20 and ø25.

Basic Weight: Mounting/Both Ends Tapped (Type A)

(g)

Bore size (mm)	Standard stroke (mm)										
	10	15	20	25	30	35	40	45	50	75	100
32	405	429	453	475	499	523	546	569	593	763	879
40	542	568	593	619	644	670	695	721	746	947	1079
50	883	922	962	1002	1041	1081	1121	1161	1200	1517	1723
63	1330	1377	1424	1471	1518	1565	1613	1660	1707	2099	2341
80	2468	2545	2623	2700	2778	2856	2933	3011	3089	3729	4113
100	4054	4154	4254	4355	4455	4556	4656	4757	4857	5730	6239

Additional Weight

(g)

Bore size (mm)		**20**	**25**	**32**	**40**	**50**	**63**	**80**	**100**
Magnet		35	45	64	77	118	158	261	380
Rod end male thread	Thread	6	12	26	27	53	53	120	175
	Nut	4	8	17	17	32	32	49	116
With rubber bumper		–2	–3	–3	–7	–9	–18	–31	–56
Foot style (Including mounting bolt)		152	174	137	149	221	288	638	1009
Rod side flange style (Including mounting bolt)		127	149	174	208	351	523	998	1307
Head side flange style (Including mounting bolt)		121	140	159	192	326	498	959	1251
Double clevis style (Including pin, snap ring, bolt and flat washer)		76	111	145	190	373	518	1064	1839

Calculation: (Example) CDLQD32-20DCM-B
• Basic weight : CLQA32-20D-*·····453 g
• Additional weight: Magnet·····64 g
Rod end male thread·····43 g
With rubber bumper·····–3 g
Double clevis·····145 g
702 g

When auto switches are mounted, add the weight of the auto switch and mounting bracket multiplied by the quantity.

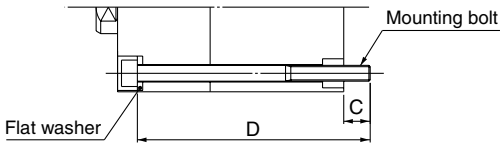
Auto Switch Mounting Bracket Weight

Mounting bracket part no.	Applicable bore size (mm)	Weight (g)
BQ-2	32 to 100	1.5

For the auto switch weight, refer to page 9-15-1.

Mounting Bolt for C□LQB

Mounting method: Mounting bolt for through-hole mounting style of C□LQB is available as an option.
Ordering: Add the word "Bolt" in front of the bolts to be used.
Example) Bolt M6 x 90ℓ 4 pcs.



Note) When mounting ø50 to ø100 cylinders from the rod side, be sure to use the attached flat washers because the bearing surface is limited.

CLQB: Without Built-in Magnet

Model	C	D	Mounting bolt
CLQB20-5D	10.5	55	M5 x 55ℓ
-10D		60	x 60ℓ
-15D		65	x 65ℓ
-20D		70	x 70ℓ
-25D		75	x 75ℓ
-30D		80	x 80ℓ
-35D		85	x 85ℓ
-40D		90	x 90ℓ
-45D		95	x 95ℓ
-50D		100	x 100ℓ
CLQB25-5D	8.5	60	M5 x 60ℓ
-10D		65	x 65ℓ
-15D		70	x 70ℓ
-20D		75	x 75ℓ
-25D		80	x 80ℓ
-30D		85	x 85ℓ
-35D		90	x 90ℓ
-40D		95	x 95ℓ
-45D		100	x 100ℓ
-50D		105	x 105ℓ

Model	C	D	Mounting bolt
CLQB32-10D	7	65	M5 x 65ℓ
-15D		70	x 70ℓ
-20D		75	x 75ℓ
-25D		80	x 80ℓ
-30D		85	x 85ℓ
-35D		90	x 90ℓ
-40D		95	x 95ℓ
-45D		100	x 100ℓ
-50D		105	x 105ℓ
-75D		140	x 140ℓ
-100D		165	x 165ℓ
CLQB40-10D	8.5	75	M5 x 75ℓ
-15D		80	x 80ℓ
-20D		85	x 85ℓ
-25D		90	x 90ℓ
-30D		95	x 95ℓ
-35D		100	x 100ℓ
-40D		105	x 105ℓ
-45D		110	x 110ℓ
-50D		115	x 115ℓ
-75D		150	x 150ℓ
-100D		175	x 175ℓ

Model	C	D	Mounting bolt
CLQB50-10D	12.5	80	M6 x 80ℓ
-15D		85	x 85ℓ
-20D		90	x 90ℓ
-25D		95	x 95ℓ
-30D		100	x 100ℓ
-35D		105	x 105ℓ
-40D		110	x 110ℓ
-45D		115	x 115ℓ
-50D		120	x 120ℓ
-75D		155	x 155ℓ
-100D		180	x 180ℓ
CLQB63-10D	16.5	90	M8 x 90ℓ
-15D		95	x 95ℓ
-20D		100	x 100ℓ
-25D		105	x 105ℓ
-30D		110	x 110ℓ
-35D		115	x 115ℓ
-40D		120	x 120ℓ
-45D		125	x 125ℓ
-50D		130	x 130ℓ
-75D		165	x 165ℓ
-100D		190	x 190ℓ

Model	C	D	Mounting bolt
CLQB80-10D	17	100	M10 x 100ℓ
-15D		105	x 105ℓ
-20D		110	x 110ℓ
-25D		115	x 115ℓ
-30D		120	x 120ℓ
-35D		125	x 125ℓ
-40D		130	x 130ℓ
-45D		135	x 135ℓ
-50D		140	x 140ℓ
-75D		175	x 175ℓ
-100D		200	x 200ℓ
CLQB100-10D	15.5	115	M10 x 115ℓ
-15D		120	x 120ℓ
-20D		125	x 125ℓ
-25D		130	x 130ℓ
-30D		135	x 135ℓ
-35D		140	x 140ℓ
-40D		145	x 145ℓ
-45D		150	x 150ℓ
-50D		155	x 155ℓ
-75D		190	x 190ℓ
-100D		215	x 215ℓ

CDLQB: With Built-in Magnet

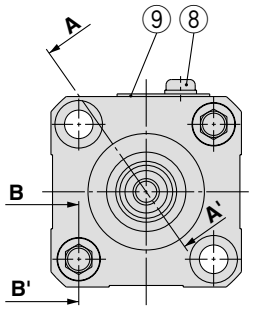
Model	C	D	Mounting bolt
CDLQB20-5D	10.5	65	M5 x 65ℓ
-10D		70	x 70ℓ
-15D		75	x 75ℓ
-20D		80	x 80ℓ
-25D		85	x 85ℓ
-30D		90	x 90ℓ
-35D		95	x 95ℓ
-40D		100	x 100ℓ
-45D		105	x 105ℓ
-50D		110	x 110ℓ
CDLQB25-5D	8.5	70	M5 x 70ℓ
-10D		75	x 75ℓ
-15D		80	x 80ℓ
-20D		85	x 85ℓ
-25D		90	x 90ℓ
-30D		95	x 95ℓ
-35D		100	x 100ℓ
-40D		105	x 105ℓ
-45D		110	x 110ℓ
-50D		115	x 115ℓ

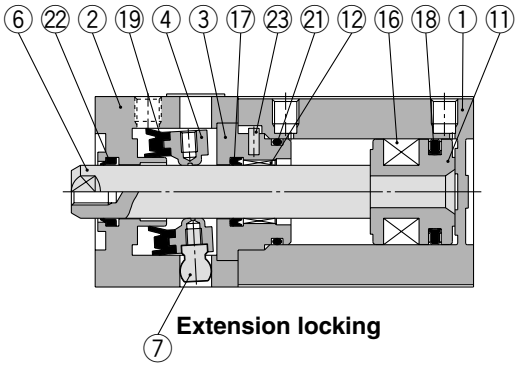
Model	C	D	Mounting bolt
CDLQB32-10D	7	75	M5 x 75ℓ
-15D		80	x 80ℓ
-20D		85	x 85ℓ
-25D		90	x 90ℓ
-30D		95	x 95ℓ
-35D		100	x 100ℓ
-40D		105	x 105ℓ
-45D		110	x 110ℓ
-50D		115	x 115ℓ
-75D		140	x 140ℓ
-100D		165	x 165ℓ
CDLQB40-10D	8.5	85	M5 x 85ℓ
-15D		90	x 90ℓ
-20D		95	x 95ℓ
-25D		100	x 100ℓ
-30D		105	x 105ℓ
-35D		110	x 110ℓ
-40D		115	x 115ℓ
-45D		120	x 120ℓ
-50D		125	x 125ℓ
-75D		150	x 150ℓ
-100D		175	x 175ℓ

Model	C	D	Mounting bolt
CDLQB50-10D	12.5	90	M6 x 90ℓ
-15D		95	x 95ℓ
-20D		100	x 100ℓ
-25D		105	x 105ℓ
-30D		110	x 110ℓ
-35D		115	x 115ℓ
-40D		120	x 120ℓ
-45D		125	x 125ℓ
-50D		130	x 130ℓ
-75D		155	x 155ℓ
-100D		180	x 180ℓ
CDLQB63-10D	16.5	100	M8 x 100ℓ
-15D		105	x 105ℓ
-20D		110	x 110ℓ
-25D		115	x 115ℓ
-30D		120	x 120ℓ
-35D		125	x 125ℓ
-40D		130	x 130ℓ
-45D		135	x 135ℓ
-50D		140	x 140ℓ
-75D		165	x 165ℓ
-100D		190	x 190ℓ

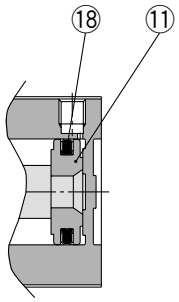
Model	C	D	Mounting bolt
CDLQB80-10D	17	110	M10 x 110ℓ
-15D		115	x 115ℓ
-20D		120	x 120ℓ
-25D		125	x 125ℓ
-30D		130	x 130ℓ
-35D		135	x 135ℓ
-40D		140	x 140ℓ
-45D		145	x 145ℓ
-50D		150	x 150ℓ
-75D		175	x 175ℓ
-100D		200	x 200ℓ
CDLQB100-10D	15.5	125	M10 x 125ℓ
-15D		130	x 130ℓ
-20D		135	x 135ℓ
-25D		140	x 140ℓ
-30D		145	x 145ℓ
-35D		150	x 150ℓ
-40D		155	x 155ℓ
-45D		160	x 160ℓ
-50D		165	x 165ℓ
-75D		190	x 190ℓ
-100D		215	x 215ℓ

Construction: ø20 to ø32

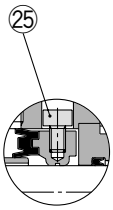




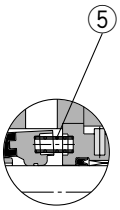
Extension locking



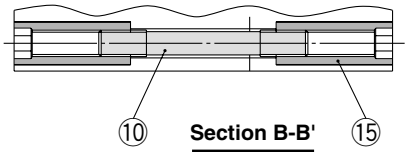
Without magnet



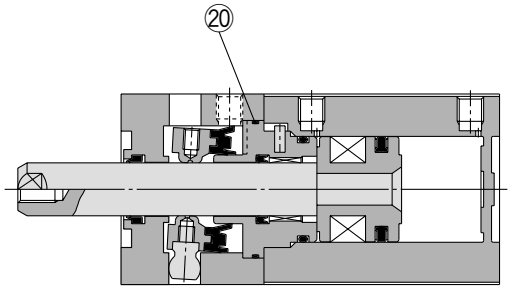
When shipped



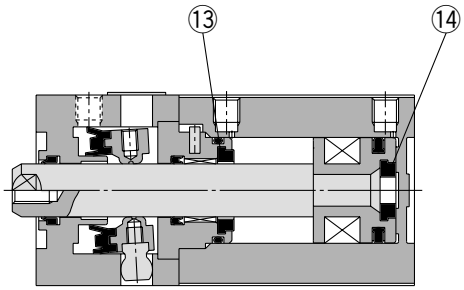
Section A-A'



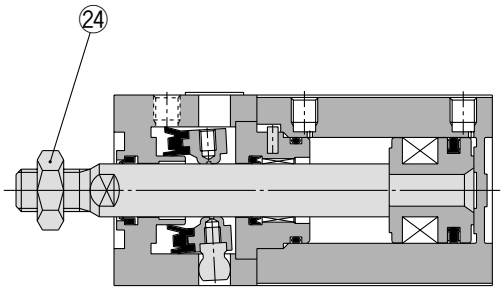
Section B-B'



Retraction locking



With bumper



Rod end male thread

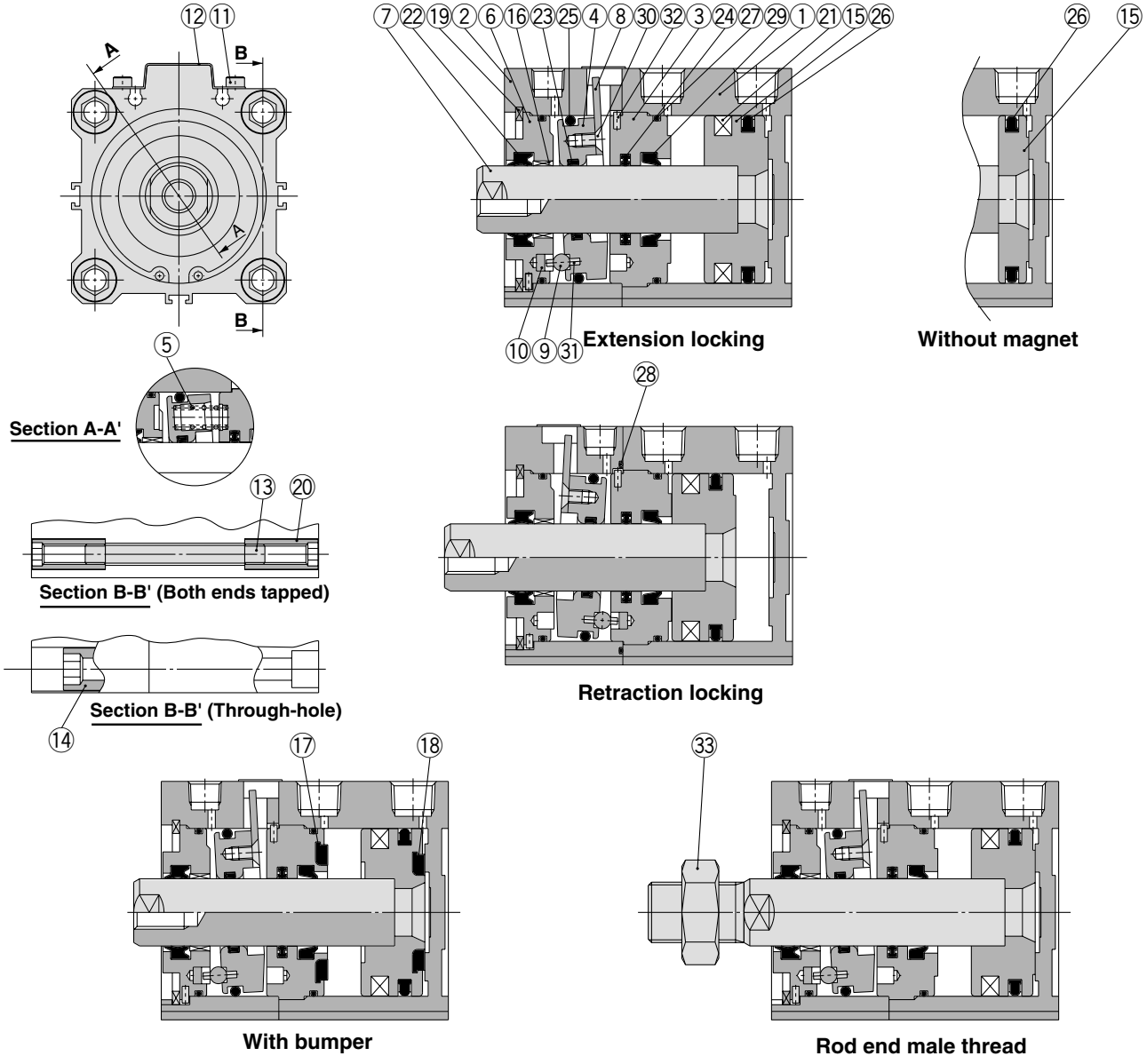
Note) The sectional drawing above shows the locked condition. (A bolt is used to maintain the cylinder in the unlocked condition when shipped.)

Component Parts

No.	Description	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②	Lock body	Aluminum alloy	Hard anodized
③	Intermediate collar	Aluminum alloy	Extension locking: Chromated
			Retraction locking: Hard anodized
④	Lock ring	Carbon steel	Heat treated
⑤	Brake spring	Steel wire	Zinc chromated
⑥	Piston rod	Stainless steel	ø20, 25: Hard chrome plated
		Carbon steel	ø32: Hard chrome plated
⑦	Pivot	Chromium molybdenum steel	Electroless nickel plated
⑧	Dust cover holding bolt	Carbon steel	Nickel plated
⑨	Dust cover	Stainless steel	
⑩	Tie-rod	Rolled steel	ø20: Nickel plated
			ø25: Zinc chromated
			ø32: Black zinc chromated
⑪	Piston	Aluminum alloy	Chromated

No.	Description	Material	Note
⑫	Bushing	Oil-impregnated sintered alloy	ø20, 25
		Lead-bronze casted	ø32
⑬	Bumper A	Urethane	
⑭	Bumper B	Urethane	
⑮	Tie-rod nut	Carbon steel	Nickel plated
⑯	Magnet	—	
⑰	Rod seal	NBR	
⑱	Piston seal	NBR	
⑲	Lock ring seal	NBR	
⑳	Tube gasket A	NBR	
㉑	Tube gasket B	NBR	
㉒	Scraper	NBR	
㉓	Parallel pin	Stainless steel	JIS B 1354
㉔	Rod end nut	Carbon steel	Nickel plated
㉕	Unlocking bolt	Chromium molybdenum steel	Nickel plated

Construction: ø40 to ø100



Note) The sectional drawing above shows the locked condition.

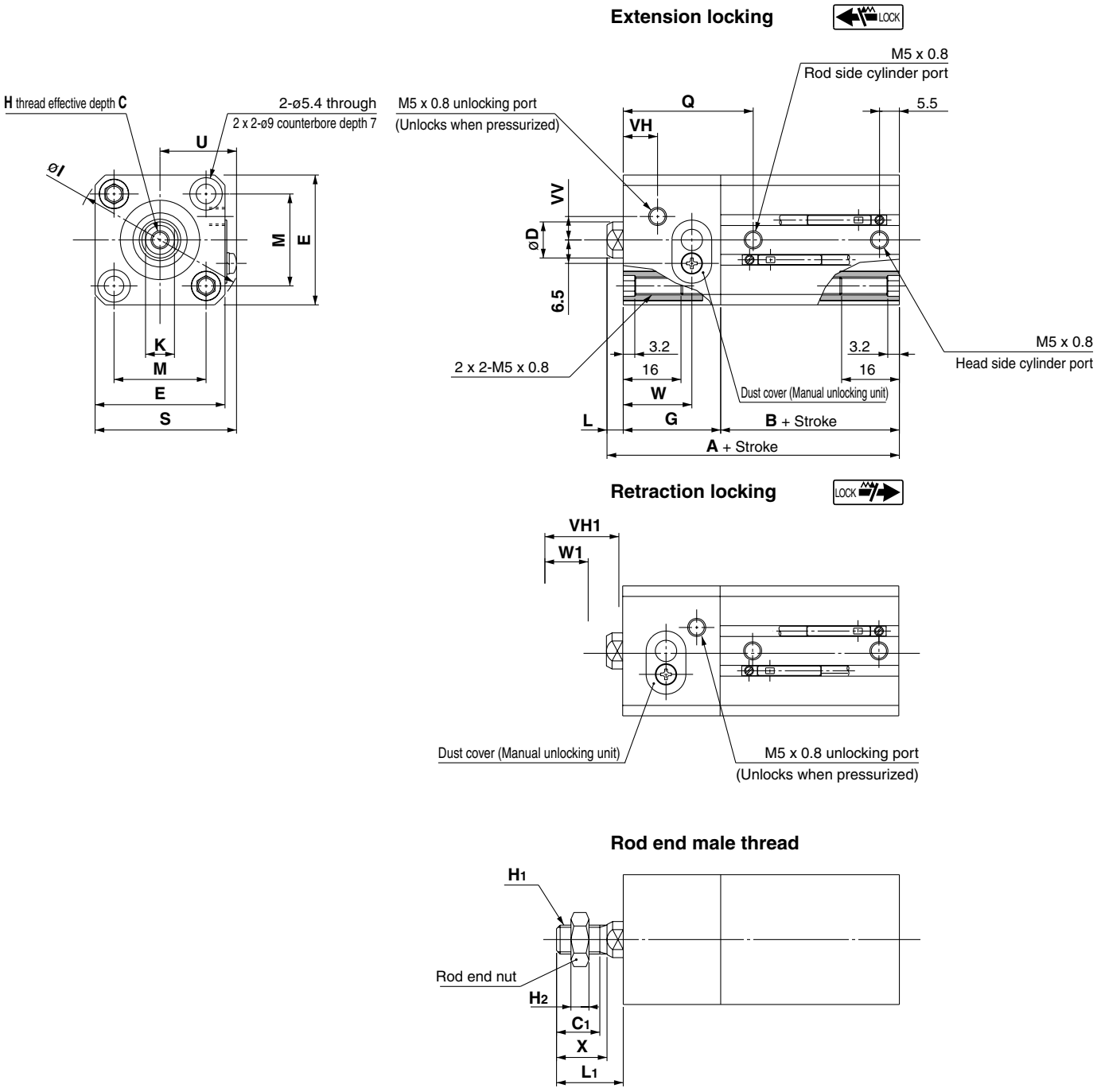
Component Parts

No.	Description	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②	Lock body	Aluminum alloy	Hard anodized
③	Intermediate collar	Aluminum alloy	Chromated
④	Lock ring	Carbon steel	Heat treated
⑤	Brake spring	Steel wire	Zinc chromated
⑥	Collar	Aluminum bearing alloy	ø40: Hard anodized
		Aluminum alloy casted	ø50 to ø100: Chromated, painted
⑦	Piston rod	Carbon steel	Hard chrome plated
⑧	Lever	Stainless steel	
⑨	Pivot pin	Carbon steel	Zinc chromated
⑩	Pivot key	Carbon steel	Zinc chromated
⑪	Dust cover holding bolt	Chromium molybdenum steel	Nickel plated
⑫	Dust cover	Rolled steel	Nickel plated
⑬	Tie-rod	Rolled steel	ø40, Chromated
		Carbon steel	ø50 or larger, Chromated
⑭	Unit holding bolt	Carbon steel	Nickel plated
⑮	Piston	Aluminum alloy	Chromated
⑯	Bushing	Lead-bronze casted	For ø50 or larger only

No.	Description	Material	Note
⑰	Bumper A	Urethane	
⑱	Bumper B	Urethane	
⑲	Snap ring	Carbon tool steel	Phosphate coated
⑳	Tie-rod nut	Carbon steel	Nickel plated
㉑	Magnet	—	
㉒	Rod seal A	NBR	
㉓	Rod seal B	NBR	
㉔	Rod seal C	NBR	
㉕	Piston seal A	NBR	
㉖	Piston seal B	NBR	
㉗	Tube gasket A	NBR	
㉘	Tube gasket B	NBR	
㉙	Scraper	NBR	
㉚	Hexagon socket countersunk head screw	Chromium molybdenum steel	Nickel plated
㉛	Spring pin	Carbon steel	JIS B 2808
㉜	Parallel pin	Stainless steel	JIS B 1354
㉝	Rod end nut	Carbon steel	Nickel plated

Dimensions: ø20, ø25

Basic style (Through-hole/Both ends tapped common): C□LQB20/25



Bore size (mm)	Stroke range	Without auto switch		With auto switch		C	D	E	G	H	I	K	L	M	Q	S	U	VH	VV	W
		A	B	A	B															
20	5 to 50	51	19.5	61	29.5	7	10	36	27	M5 x 0.8	47	8	4.5	25.5	36	39.2	21.2	9.5	6.5	19
25	5 to 50	58.5	22.5	68.5	32.5	12	12	40	31	M6 x 1.0	52	10	5	28	42	43.2	23.2	10	7	21.5

Retraction Locking

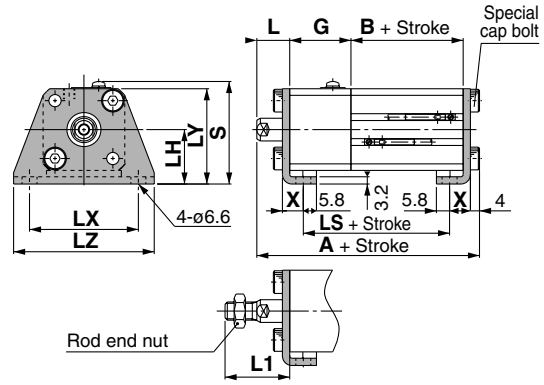
Bore size (mm)	VH1	W1
20	20.5	12
25	23	14.5

Rod End Male Thread

Bore size (mm)	C1	X	H1	H2	L1
20	12	14	M8 x 1.25	5	18.5
25	15	17.5	M10 x 1.25	6	22.5

Dimensions: ø20, ø25

Foot style: CLQL/CDLQL

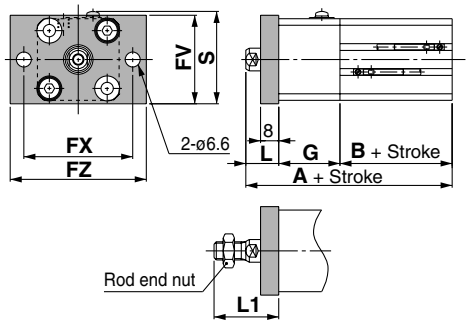


Foot Style

Bore size (mm)	Stroke range	Without auto switch			With auto switch		
		A	B	LS	A	B	LS
20	5 to 50	68.2	19.5	34.5	78.2	29.5	44.5
25	5 to 50	75.7	22.5	38.5	85.7	32.5	48.5

Bore size (mm)	G	L	L1	LH	LX	LY	LZ	S	X
20	27	14.5	28.5	24	48	42	62	45.2	9.2
25	31	15	32.5	26	52	46	66	49.2	10.7

Rod side flange style: CLQF/CDLQF

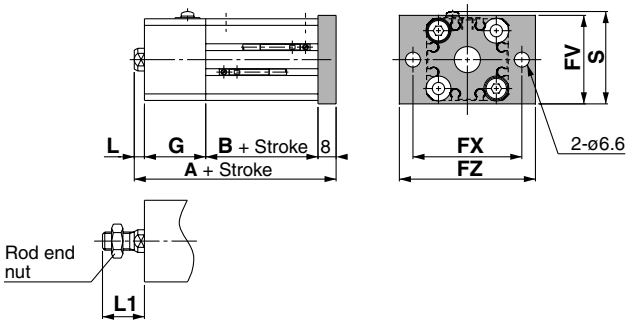


Rod Side Flange Style

Bore size (mm)	Stroke range	Without auto switch		With auto switch	
		A	B	A	B
20	5 to 50	61	19.5	71	29.5
25	5 to 50	68.5	22.5	78.5	32.5

Bore size (mm)	FV	FX	FZ	G	L	L1	S
20	39	48	60	27	14.5	28.5	40.7
25	42	52	64	31	15	32.5	44.2

Head side flange style: CLQG/CDLQG

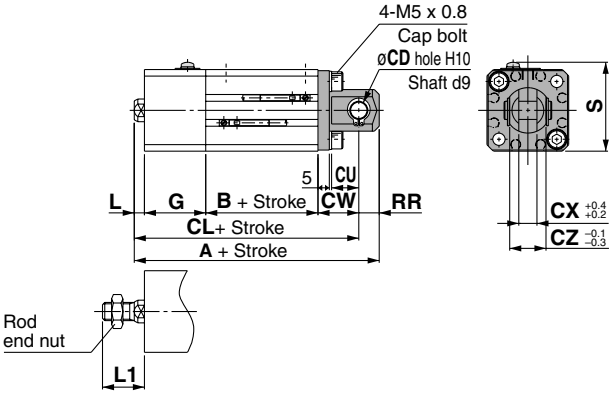


Head Side Flange Style

Bore size (mm)	Stroke range	Without auto switch		With auto switch	
		A	B	A	B
20	5 to 50	59	19.5	69	29.5
25	5 to 50	66.5	22.5	76.5	32.5

Bore size (mm)	FV	FX	FZ	G	L	L1	S
20	39	48	60	27	4.5	18.5	40.7
25	42	52	64	31	5	22.5	44.2

Double clevis style: CLQD/CDLQD



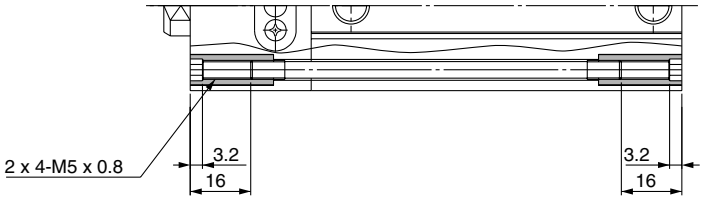
Double Clevis Style

Bore size (mm)	Stroke range	Without auto switch			With auto switch		
		A	B	CL	A	B	CL
20	5 to 50	78	19.5	69	88	29.5	79
25	5 to 50	88.5	22.5	78.5	98.5	32.5	88.5

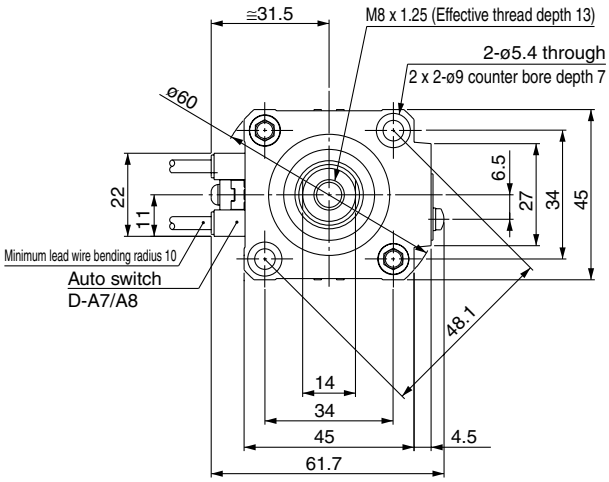
Bore size (mm)	CD	CU	CW	CX	CZ	G	L	L1	RR	S
20	8	12	18	8	16	27	4.5	18.5	9	39.2
25	10	14	20	10	20	31	5	22.5	10	43.2

Dimensions: ø32

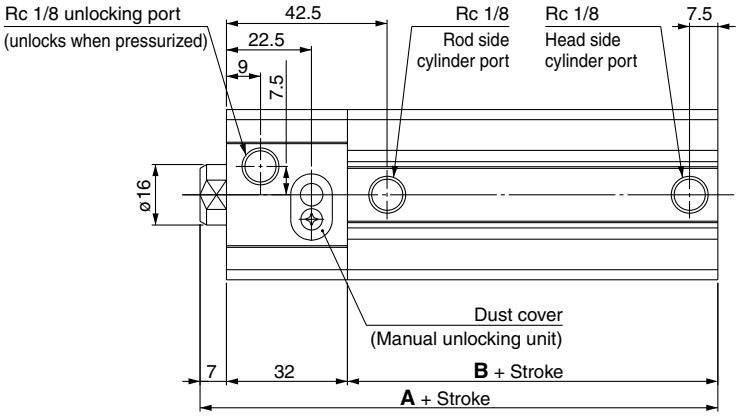
Both ends tapped style: C□LQA32



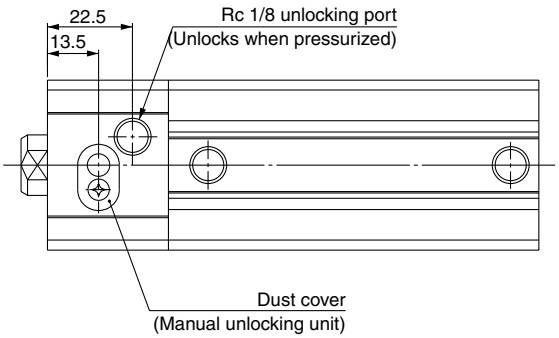
Basic style (Through-hole): C□LQB32



Extension locking



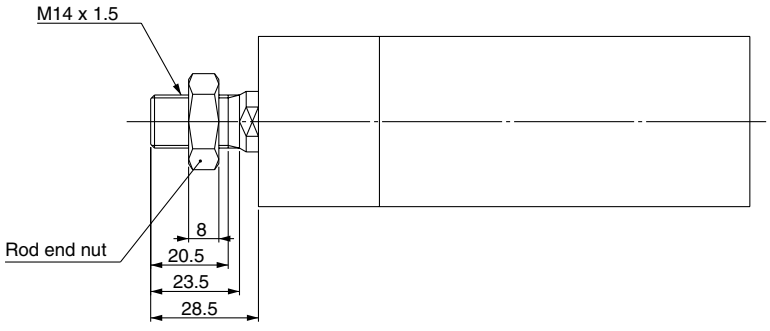
Retraction locking



A, B Dimensions

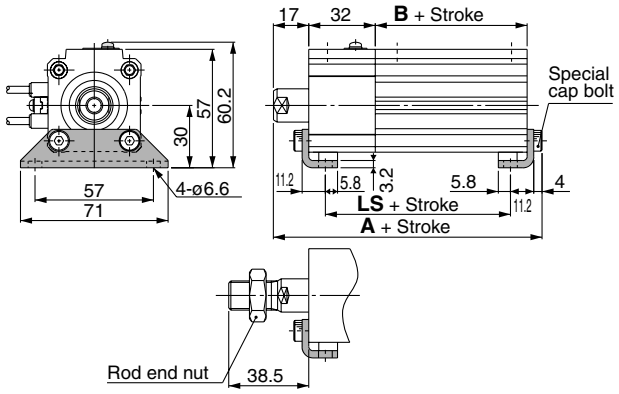
Bore size (mm)	Stroke range	Without auto switch		With auto switch	
		A	B	A	B
32	10 to 50	62	23	72	33
	75, 100	72	33		

Rod end male thread



Dimensions: ø32

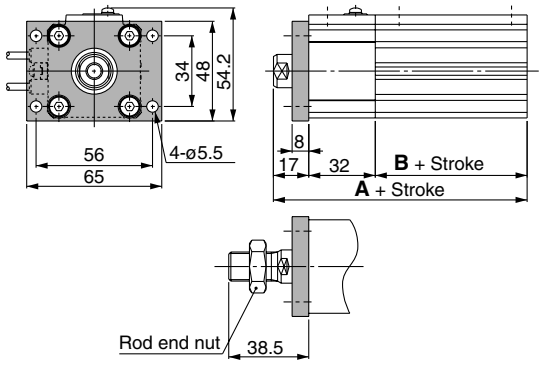
Foot style: C□LQL32



Foot Style

Bore size (mm)	Stroke range	Without auto switch			With auto switch		
		A	B	LS	A	B	LS
32	10 to 50	79.2	23	39	89.2	33	49
	75, 100	89.2	33	49			

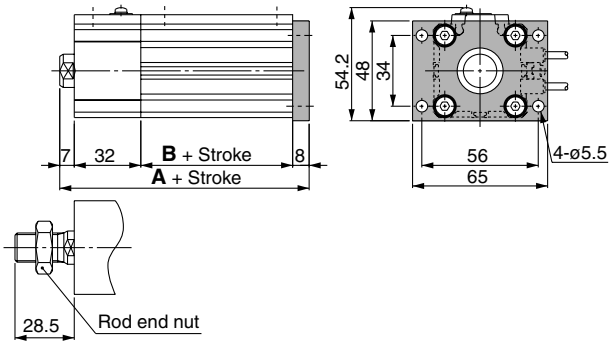
Rod side flange style: C□LQF32



Rod Side Flange Style

Bore size (mm)	Stroke range	Without auto switch		With auto switch	
		A	B	A	B
32	10 to 50	72	23	82	33
	75, 100	82	33		

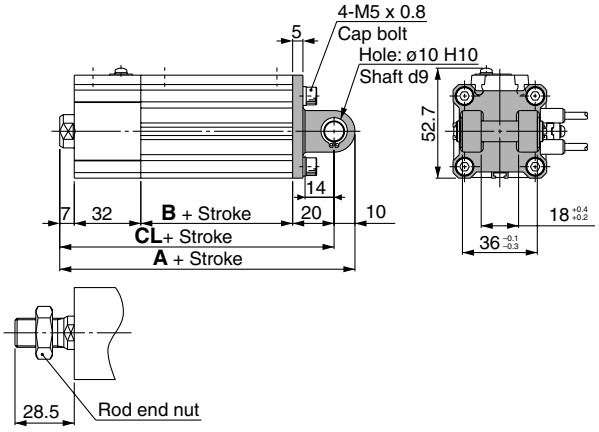
Head Side flange style: C□LQG32



Head Side Flange Style

Bore size (mm)	Stroke range	Without auto switch		With auto switch	
		A	B	A	B
32	10 to 50	70	23	80	33
	75, 100	80	33		

Double clevis style: C□LQD32

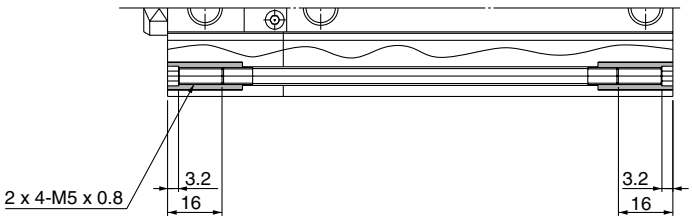


Double Clevis Style

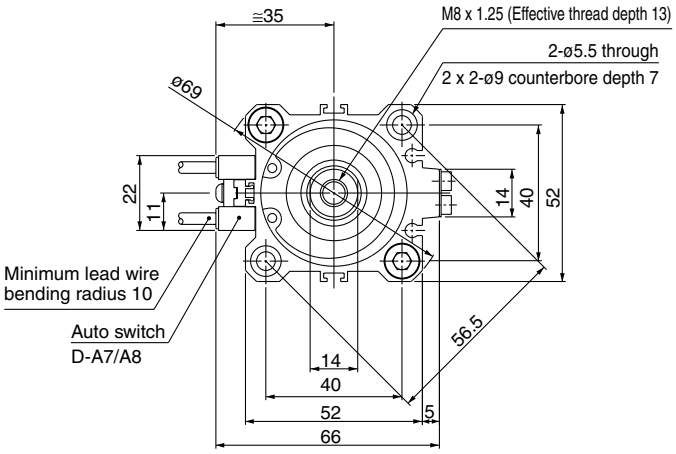
Bore size (mm)	Stroke range	Without auto switch			With auto switch		
		A	B	CL	A	B	CL
32	10 to 50	92	23	82	102	33	92
	75, 100	102	33	92			

Dimensions: ø40

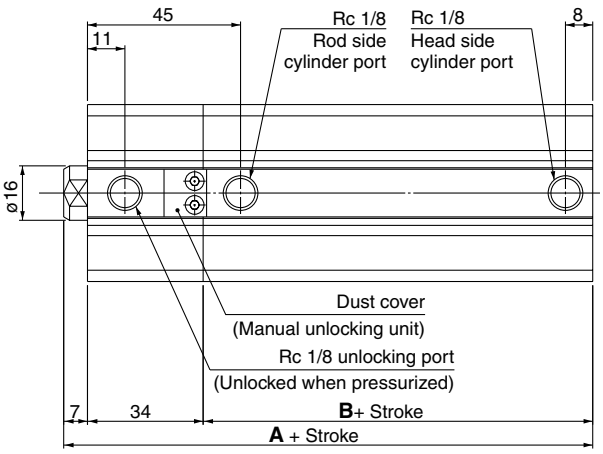
Both ends tapped style: C□LQA40



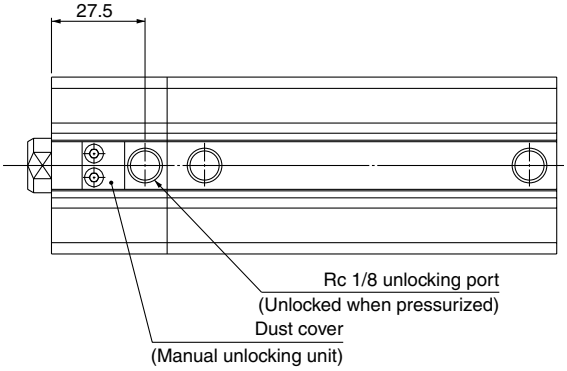
Basic style (Through-hole): C□LQB40



Extension locking



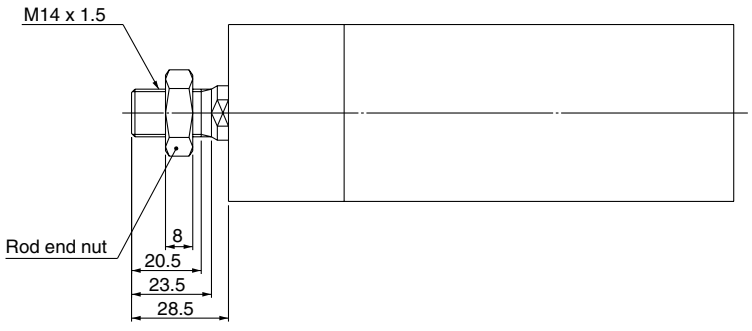
Retraction locking



A, B Dimensions

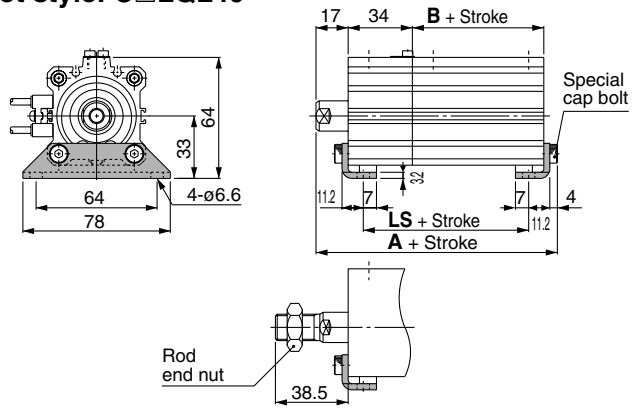
Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch	
		A	B	A	B
40	10 to 50	70.5	29.5	80.5	39.5
	75, 100	80.5	39.5		

Rod end male thread



Dimensions: ø40

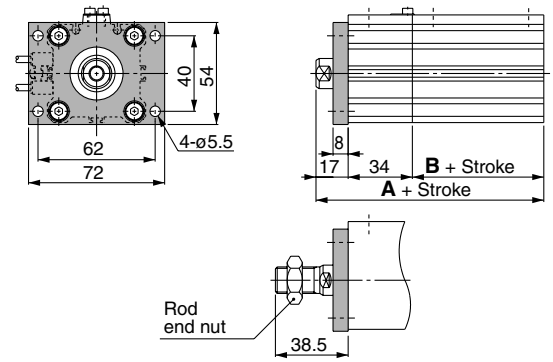
Foot style: C□LQL40



Foot Style

Bore size (mm)	Stroke range	Without auto switch			With auto switch		
		A	B	LS	A	B	LS
40	10 to 50	87.7	29.5	47.5	97.7	39.5	57.5
	75, 100	97.7	39.5	57.5			

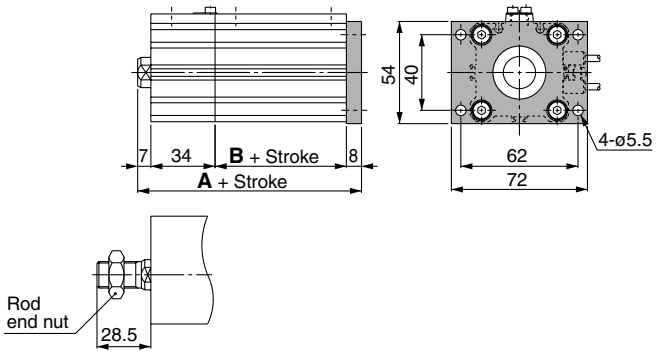
Rod side flange style: C□LQF40



Rod Side Flange Style

Bore size (mm)	Stroke range	Without auto switch		With auto switch	
		A	B	A	B
40	10 to 50	80.5	29.5	90.5	39.5
	75, 100	90.5	39.5		

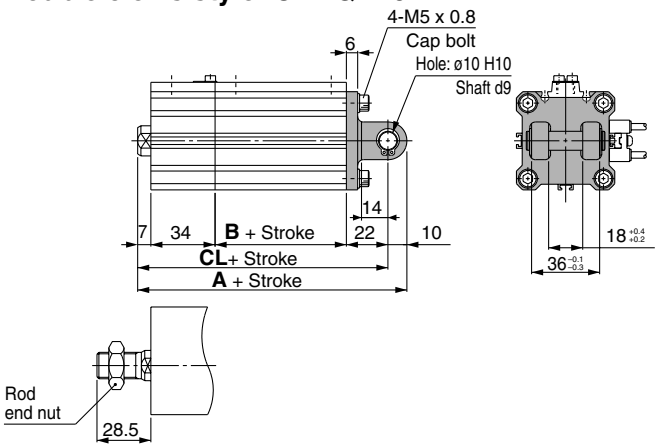
Head Side flange style: C□LQG40



Head Side Flange Style

Bore size (mm)	Stroke range	Without auto switch		With auto switch	
		A	B	A	B
40	10 to 50	78.5	29.5	88.5	39.5
	75, 100	88.5	39.5		

Double clevis style: C□LQD40

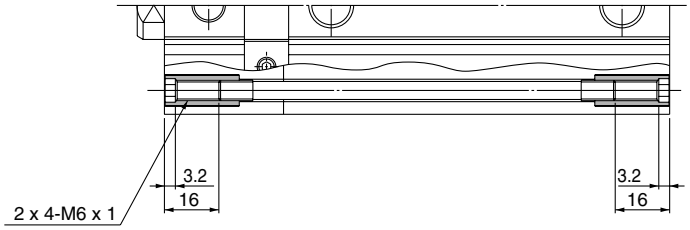


Double Clevis Style

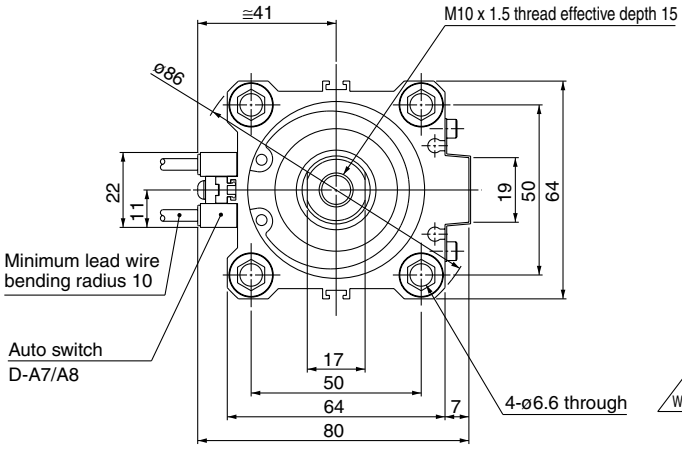
Bore size (mm)	Stroke range	Without auto switch			With auto switch		
		A	B	CL	A	B	CL
40	10 to 50	102.5	29.5	92.5	112.5	39.5	102.5
	75, 100	112.5	39.5	102.5			

Dimensions: ø50

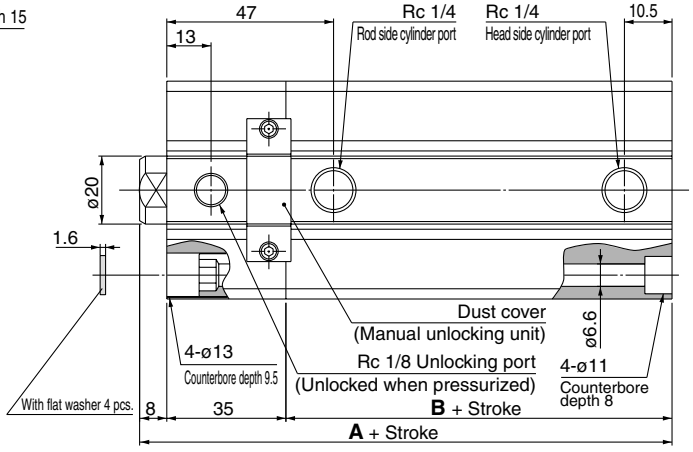
Both ends tapped style: C□LQA50



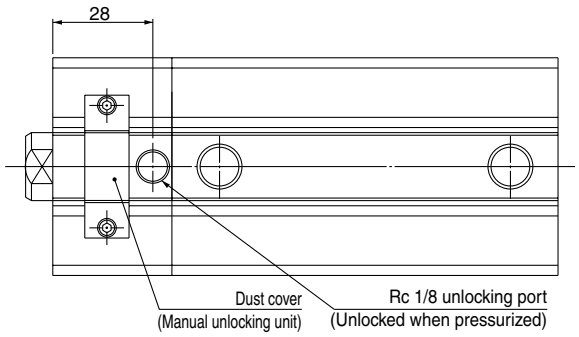
Basic style (Through-hole): C□LQB50



Extension locking



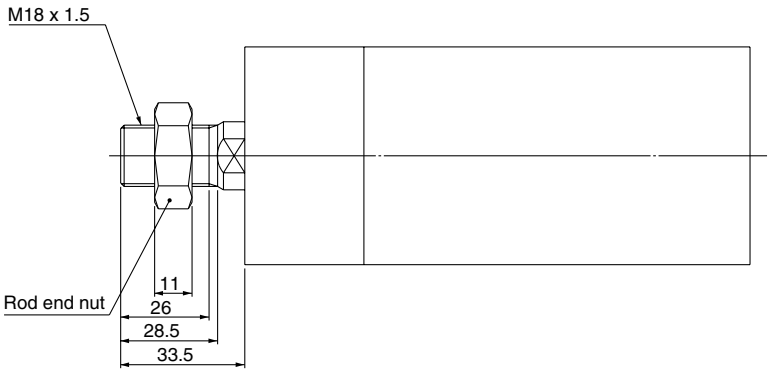
Retraction locking



A, B Dimensions

Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch	
		A	B	A	B
50	10 to 50	73.5	30.5	83.5	40.5
	75, 100	83.5	40.5		

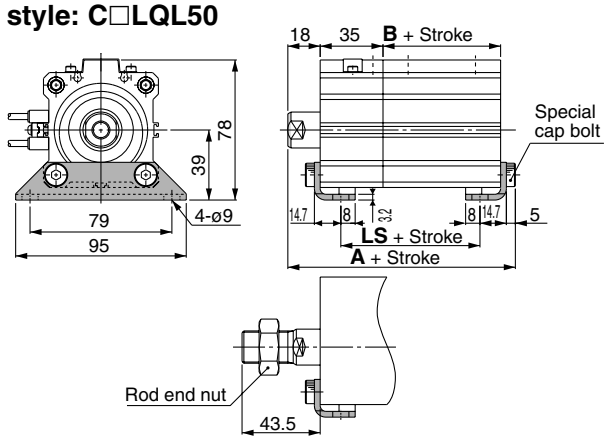
Rod end male thread



Note) Be sure to use the attached flat washers when mounting a cylinder from the rod side.

Dimensions: ø50

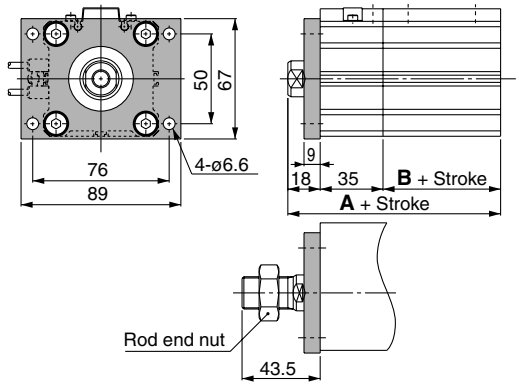
Foot style: C□LQL50



Foot Style

Bore size (mm)	Stroke range	Without auto switch			With auto switch		
		A	B	LS	A	B	LS
50	10 to 50	91.7	30.5	42.5	101.7	40.5	52.5
	75, 100	101.7	40.5	52.5			

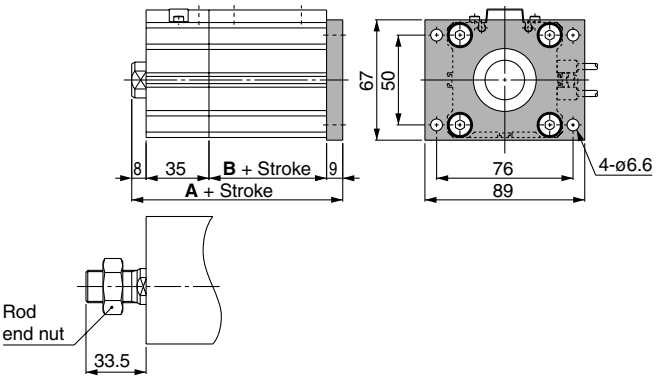
Rod side flange style: C□LQF50



Rod Side Flange Style

Bore size (mm)	Stroke range	Without auto switch		With auto switch	
		A	B	A	B
50	10 to 50	83.5	30.5	93.5	40.5
	75, 100	93.5	40.5		

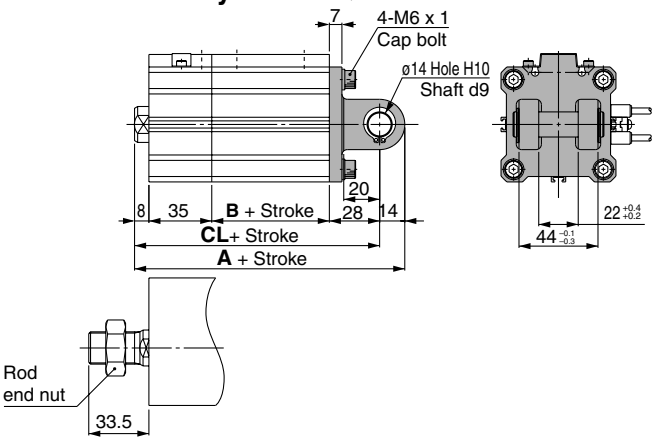
Head Side flange style: C□LQG50



Head Side Flange Style

Bore size (mm)	Stroke range	Without auto switch		With auto switch	
		A	B	A	B
50	10 to 50	82.5	30.5	92.5	40.5
	75, 100	92.5	40.5		

Double clevis style: C□LQD50

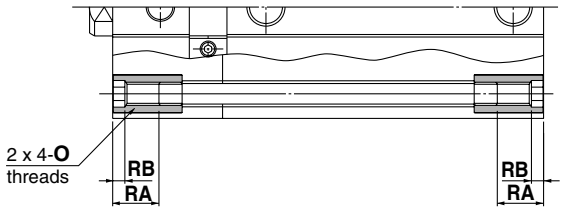


Double Clevis Style

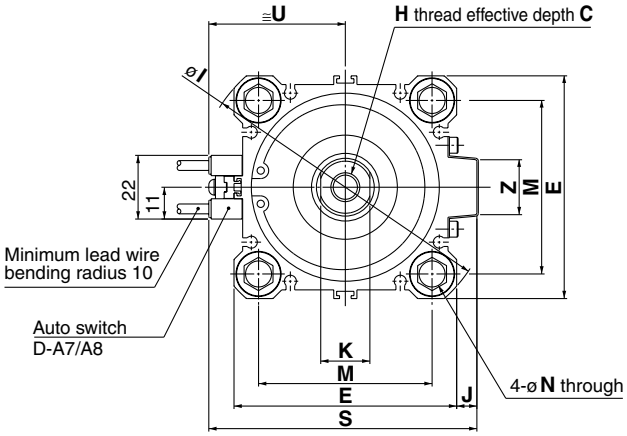
Bore size (mm)	Stroke range	Without auto switch			With auto switch		
		A	B	CL	A	B	CL
50	10 to 50	115.5	30.5	101.5	125.5	40.5	111.5
	75, 100	125.5	40.5	111.5			

Dimensions: ø63, ø80, ø100

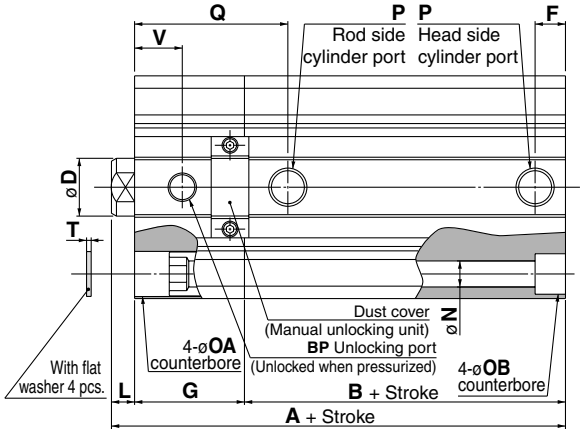
Both ends tapped style: C□LQA63/80/100



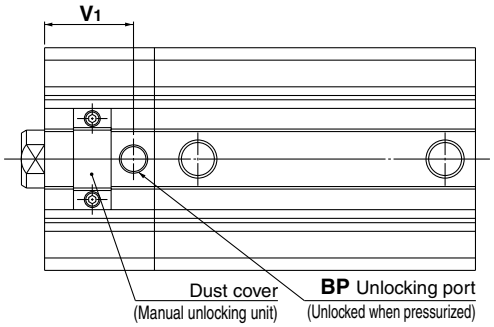
Basic style (Through-hole): C□LQB63/80/100



Extension locking



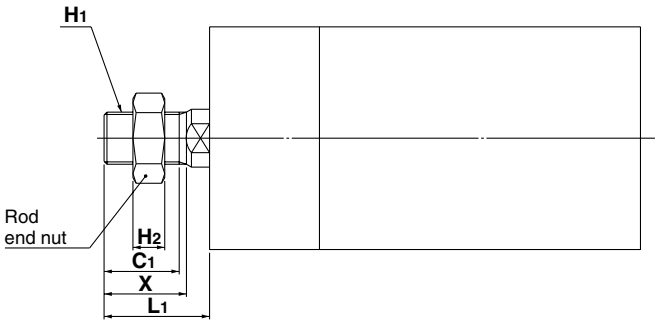
Retraction locking



Retraction Locking

Bore size (mm)	V1
63	30.5
80	35.5
100	40.5

Rod end male thread



Rod End Male Thread

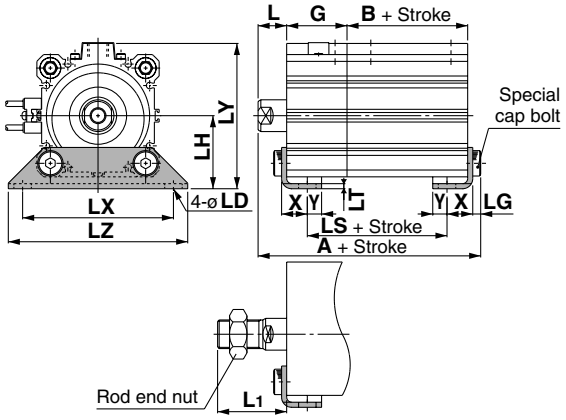
Bore size (mm)	C1	X	H1	H2	L1
63	26	28.5	M18 x 1.5	11	33.5
80	32.5	35.5	M22 x 1.5	13	43.5
100	32.5	35.5	M26 x 1.5	16	43.5

Note) Be sure to use the attached flat washers when mounting a cylinder from the rod side.

Bore size (mm)	Stroke range	Without auto switch A	Without auto switch B	With auto switch A	With auto switch B	BP	C	D	E	F	G	H	I	J	K	L	M	N	O	OA	OB	P	Q	RA	RB	S	T	U	V	Z
63	10 to 50	82	36	92	46	Rc 1/8	15	20	77	10.5	38	M10 x 1.5	103	7	17	8	60	9	M8 x 1.25	15.6 depth 12	14 depth 10.5	Rc 1/4	53	16	4.2	93	1.6	47.5	16.5	19
	75, 100	92	46																												
80	10 to 50	96.5	43.5	106.5	53.5	Rc 1/4	21	25	98	12.5	43	M16 x 2.0	132	6	22	10	77	11	M10 x 1.5	19.6 depth 15.5	17.5 depth 13.5	Rc 3/8	59	16	4.2	112.5	2	57.5	18.5	26
	75, 100	106.5	53.5																												
100	10 to 50	115	53	125	63	Rc 1/8	27	30	117	13	50	M20 x 2.5	156	6.5	27	12	94	11	M10 x 1.5	19.6 depth 15.5	17.5 depth 13.5	Rc 3/8	73	16	4.2	132.5	2	67.5	23	26
	75, 100	125	63																												

Dimensions: ø63, ø80, ø100

Foot style: CLQL/CDLQL

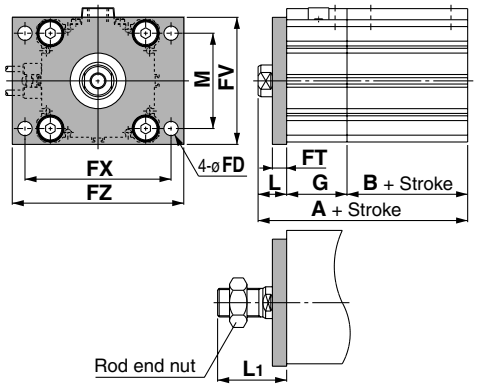


Foot Style

Bore size (mm)	Stroke range	Without auto switch A	B	LS	With auto switch A	B	LS	G	L
63	10 to 50	100.2	36	48	110.2	46	58	38	18
	75, 100	110.2	46	58					
80	10 to 50	118	43.5	56.5	128	53.5	66.5	43	20
	75, 100	128	53.5	66.5					
100	10 to 50	138	53	69	148	63	79	50	22
	75, 100	148	63	79					

Bore size (mm)	L1	LD	LG	LH	LT	LX	LY	LZ	X	Y
63	43.5	11	5	46	3.2	95	91.5	113	16.2	9
80	53.5	13	7	59	4.5	118	114	140	19.5	11
100	53.5	13	7	71	6	137	136	162	23	12.5

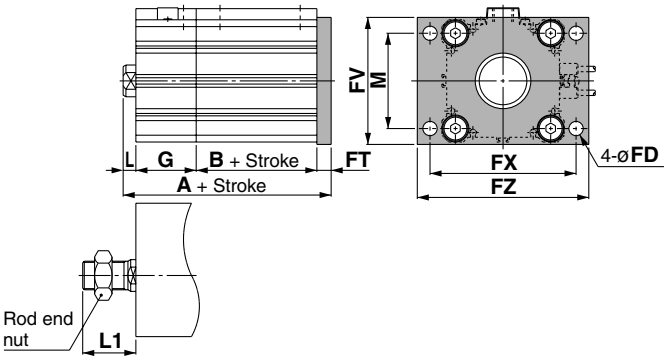
Rod side flange style: CLQF/CDLQF



Rod Side Flange Style

Bore size (mm)	Stroke range	Without auto switch A	B	With auto switch A	B	FD	FT	FV	FX	FZ	G	L	L1	M
63	10 to 50	92	36	102	46	9	9	80	92	108	38	18	43.5	60
	75, 100	102	46											
80	10 to 50	106.5	43.5	116.5	53.5	11	11	99	116	134	43	20	53.5	77
	75, 100	116.5	53.5											
100	10 to 50	125	53	135	63	11	11	117	136	154	50	22	53.5	94
	75, 100	135	63											

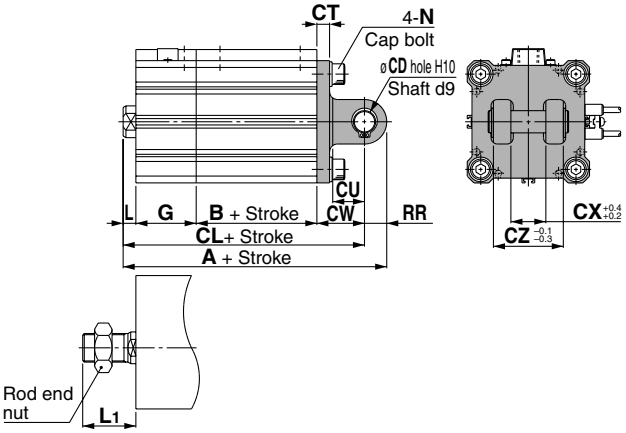
Head Side flange style: CLQG/CDLQG



Head Side Flange Style

Bore size (mm)	Stroke range	Without auto switch A	B	With auto switch A	B	FD	FT	FV	FX	FZ	G	L	L1	M
63	10 to 50	91	36	101	46	9	9	80	92	108	38	8	33.5	60
	75, 100	101	46											
80	10 to 50	107.5	43.5	117.5	53.5	11	11	99	116	134	43	10	43.5	77
	75, 100	117.5	53.5											
100	10 to 50	126	53	136	63	11	11	117	136	154	50	12	43.5	94
	75, 100	136	63											

Double clevis style: CLQD/CDLQD



Double Clevis Style

Bore size (mm)	Stroke range	Without auto switch A	B	CL	With auto switch A	B	CL	CD	CT
63	10 to 50	126	36	112	136	46	122	14	8
	75, 100	136	46	122					
80	10 to 50	152.5	43.5	134.5	162.5	53.5	144.5	18	10
	75, 100	162.5	53.5	144.5					
100	10 to 50	182	53	160	192	63	170	22	13
	75, 100	192	63	170					

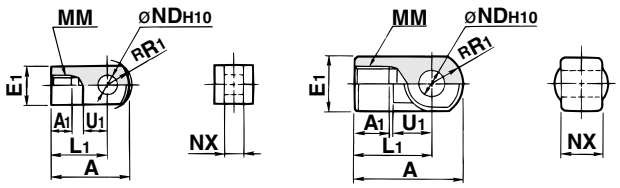
Bore size (mm)	CU	CW	CX	CZ	G	L	L1	N	RR
63	20	30	22	44	38	8	33.5	M8 x 1.25	14
80	27	38	28	56	43	10	43.5	M10 x 1.5	18
100	31	45	32	64	50	12	43.5	M10 x 1.5	22

Accessory Bracket Dimensions

Single Knuckle Joint

I-G02, I-G03

I-G04, I-G05
I-G08, I-G10



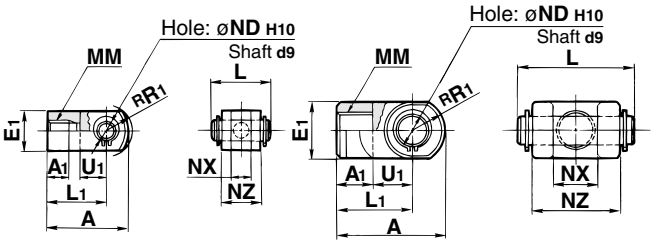
Material: Rolled steel　　Material: Cast iron

Part no.	Applicable bore size (mm)	A	A1	E1	L1	MM	RR1	U1	ND	NX
I-G02	20	34	8.5	□16	25	M8 x 1.25	10.3	11.5	$8^{+0.058}_{0}$	$8^{-0.2}_{-0.4}$
I-G03	25	41	10.5	□20	30	M10 x 1.25	12.8	14	$10^{+0.058}_{0}$	$10^{-0.2}_{-0.4}$
I-G04	32, 40	42	14	ø22	30	M14 x 1.5	12	14	$10^{+0.058}_{0}$	$18^{-0.3}_{-0.5}$
I-G05	50, 63	56	18	ø28	40	M18 x 1.5	16	20	$14^{+0.070}_{0}$	$22^{-0.3}_{-0.5}$
I-G08	80	71	21	ø38	50	M22 x 1.5	21	27	$18^{+0.070}_{0}$	$28^{-0.3}_{-0.5}$
I-G10	100	79	21	ø44	55	M26 x 1.5	24	31	$22^{+0.084}_{0}$	$32^{-0.3}_{-0.5}$

Double Knuckle Joint

Y-G02, Y-G03

Y-G04, Y-G05
Y-G08, Y-G10

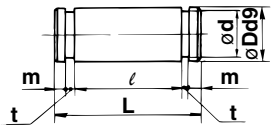


Material: Rolled steel　　Material: Cast iron

Part no.	Applicable bore size (mm)	A	A1	E1	L1	MM	RR1	U1	ND	NX	NZ	L	Applicable pin part no.
Y-G02	20	34	8.5	□16	25	M8 x 1.25	10.3	11.5	$8^{+0.058}_{0}$	$8^{+0.4}_{+0.2}$	16	21	IY-G02
Y-G03	25	41	10.5	□20	30	M10 x 1.25	12.8	14	$10^{+0.058}_{0}$	$10^{+0.4}_{+0.2}$	20	25.6	IY-G03
Y-G04	32, 40	42	16	ø22	30	M14 x 1.5	12	14	$10^{+0.058}_{0}$	$18^{+0.5}_{+0.3}$	36	41.6	IY-G04
Y-G05	50, 63	56	20	ø28	40	M18 x 1.5	16	20	$14^{+0.070}_{0}$	$22^{+0.5}_{+0.3}$	44	50.6	IY-G05
Y-G08	80	71	23	ø38	50	M22 x 1.5	21	27	$18^{+0.070}_{0}$	$28^{+0.5}_{+0.3}$	56	64	IY-G08
Y-G10	100	79	24	ø44	55	M26 x 1.5	24	31	$22^{+0.084}_{0}$	$32^{+0.5}_{+0.3}$	64	72	IY-G10

∗ Knuckle pin and snap ring are included.

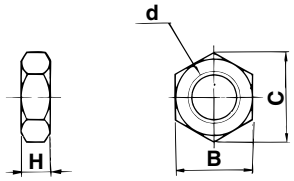
Knuckle Pin (Common with double clevis pin)



Material: Carbon steel

Part no.	Applicable bore size (mm)	D	L	d	ℓ	m	t	Applicable snap ring
IY-G02	20	$8^{-0.040}_{-0.076}$	21	7.6	16.2	1.5	0.9	Type C 8 for axis
IY-G03	25	$10^{-0.040}_{-0.076}$	25.6	9.6	20.2	1.55	1.15	Type C 10 for axis
IY-G04	32, 40	$10^{-0.040}_{-0.076}$	41.6	9.6	36.2	1.55	1.15	Type C 10 for axis
IY-G05	50, 63	$14^{-0.050}_{-0.093}$	50.6	13.4	44.2	2.05	1.15	Type C 14 for axis
IY-G08	80	$18^{-0.050}_{-0.093}$	64	17	56.2	2.55	1.35	Type C 18 for axis
IY-G10	100	$22^{-0.065}_{-0.117}$	72	21	64.2	2.55	1.35	Type C 22 for axis

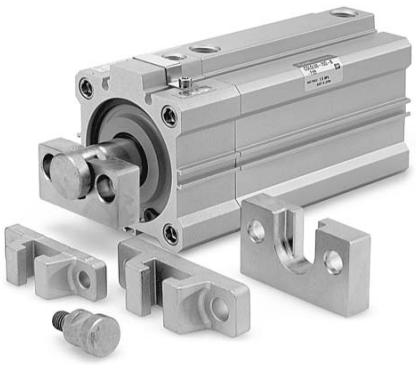
Rod End Nut



Material: Rolled steel

Part no.	Applicable bore size (mm)	d	H	B	C
NT-02	20	M8 x 1.25	5	13	15.0
NT-03	25	M10 x 1.25	6	17	19.6
NT-04	32, 40	M14 x 1.5	8	22	25.4
NT-05	50, 63	M18 x 1.5	11	27	31.2
NT-08	80	M22 x 1.5	13	32	37.0
NT-10	100	M26 x 1.5	16	41	47.3

Simple Joint: ø32 to ø100



Joint and Mounting Bracket (Type A, Type B) Part No.

YA — **03**

- **03**: Applicable air cylinder bore
- **YA**: Mounting bracket

YA	Type A mounting bracket
YB	Type B mounting bracket
YU	Joint

03	ø32, ø40
05	ø50, ø63
08	ø80
10	ø100

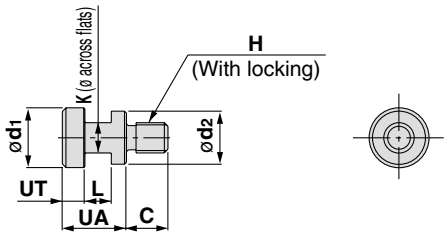
Bore size (mm)	Joint	Applicable mounting bracket	
		Type A mounting bracket	Type B mounting bracket
32, 40	**YU-03**	**YA-03**	**YB-03**
50, 63	**YU-05**	**YA-05**	**YB-05**
80	**YU-08**	**YA-08**	**YB-08**
100	**YU-10**	**YA-10**	**YB-10**

Allowable Eccentricity

Bore size (mm)	**32**	**40**	**50**	**63**	**80**	**100**
Eccentricity tolerance	±1				±1.5	±2
Backlash	0.5					

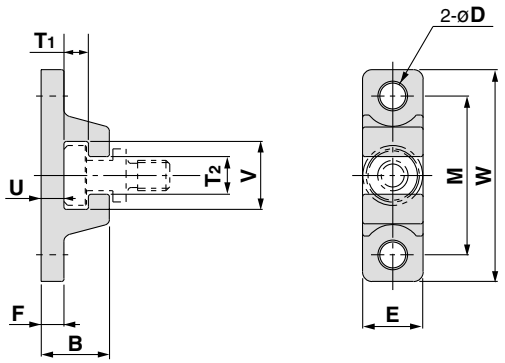
<Ordering>
• Joints are not included with the A or B type mounting brackets. Order them separately.
(Example)
Bore size ø40 Part no.
• Type A mounting bracket part number·····YA-03
• Joint·····YU-03

Joint



Part no.	Applicable bore size (mm)	UA	C	d_1	d_2	H	K	L	UT	Weight (g)
YU-03	32, 40	17	11	15.8	14	M8 x 1.25	8	7	6	25
YU-05	50, 63	17	13	19.8	18	M10 x 1.5	10	7	6	40
YU-08	80	22	20	24.8	23	M16 x 2	13	9	8	90
YU-10	100	26	26	29.8	28	M20 x 2.5	14	11	10	160

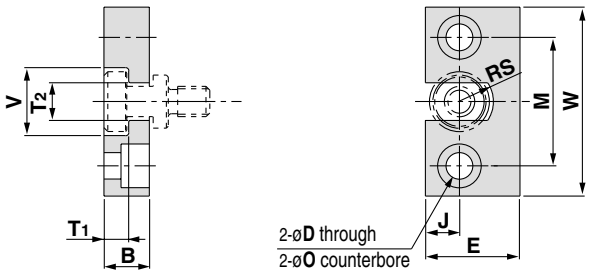
Type A Mounting Bracket



Part no.	Bore size (mm)	B	D	E	F	M	T_1	T_2
YA-03	**32, 40**	18	6.8	16	6	42	6.5	10
YA-05	**50, 63**	20	9	20	8	50	6.5	12
YA-08	**80**	26	11	25	10	62	8.5	16
YA-10	**100**	31	14	30	12	76	10.5	18

Part no.	Bore size (mm)	U	V	W	Weight (g)
YA-03	**32, 40**	6	18	56	55
YA-05	**50, 63**	8	22	67	100
YA-08	**80**	10	28	83	195
YA-10	**100**	12	36	100	340

Type B Mounting Bracket



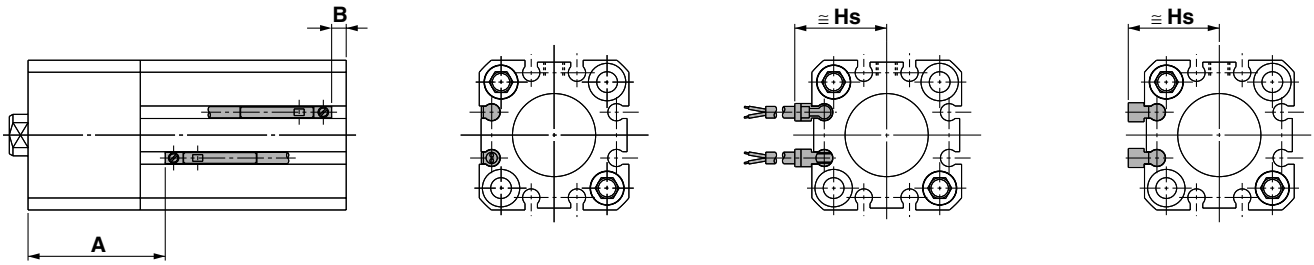
Material: Precision die-casting material equivalent to stainless steel 304

Part no.	Bore size (mm)	B	D	E	J	M	O
YB-03	**32, 40**	12	7	25	9	34	11.5 depth 7.5
YB-05	**50, 63**	12	9	32	11	42	14.5 depth 8.5
YB-08	**80**	16	11	38	13	52	18 depth 12
YB-10	**100**	19	14	50	17	62	21 depth 14

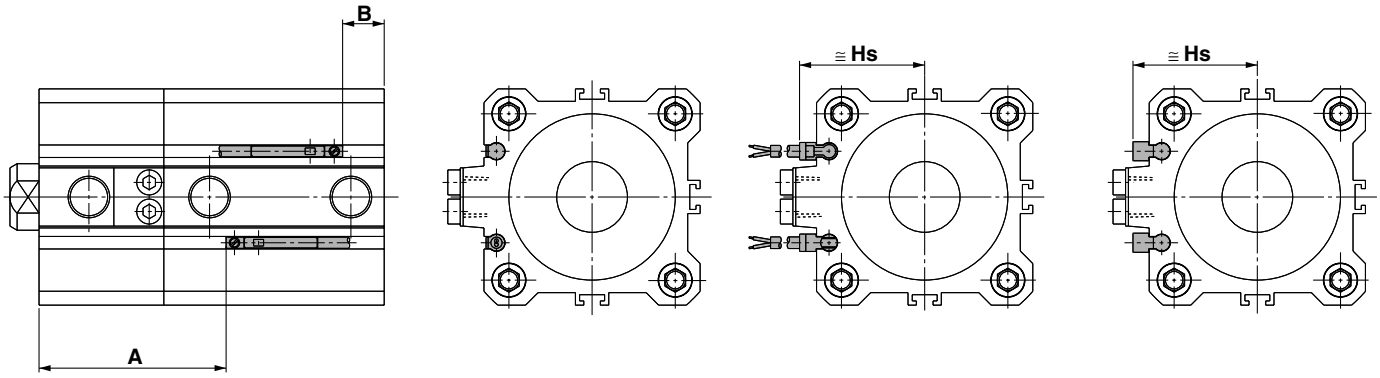
Part no.	Bore size (mm)	RS	T_1	T_2	V	W	Weight (g)
YB-03	**32, 40**	9	6.5	10	18	50	80
YB-05	**50, 63**	11	6.5	12	22	60	120
YB-08	**80**	14	8.5	16	28	75	230
YB-10	**100**	18	10.5	18	36	90	455

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

ø20, ø25



ø32 to ø100



Proper Auto Switch Mounting Position

Bore size (mm)	D-A9□ D-A9□V		D-M9□ D-M9□V D-F9□W D-F9□WV		D-F9BAL	
	A	B	A	B	A	B
20	33	3.5	37	7.5	36	6.5
25	38	5.5	42	9.5	41	8.5
32	40	5	44	9	43	8
40	46	7.5	50	11.5	49	10.5
50	45	10.5	49	14.5	48	13.5
63	50.5	13.5	54.5	17.5	53.5	16.5
80	59.5	17	63.5	21	62.5	20
100	70	23	74	27	73	26

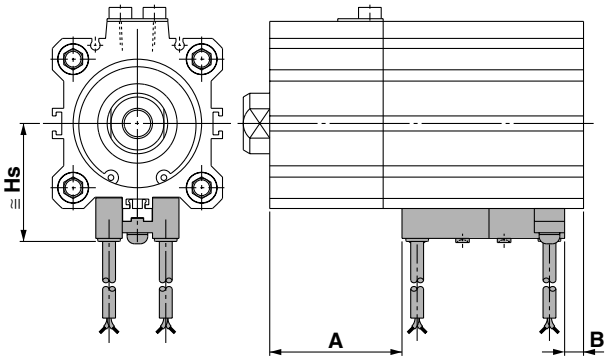
Auto Switch Mounting Height

Bore size (mm)	D-A9□V	D-M9□V D-F9□WV	D-F9BAL
	Hs	Hs	Hs
20	22.5	25	22
25	24.5	27	24
32	27	29	26.5
40	30.5	32.5	30
50	36.5	38.5	36
63	40	42	39.5
80	50	52	49.5
100	60	62	59.5

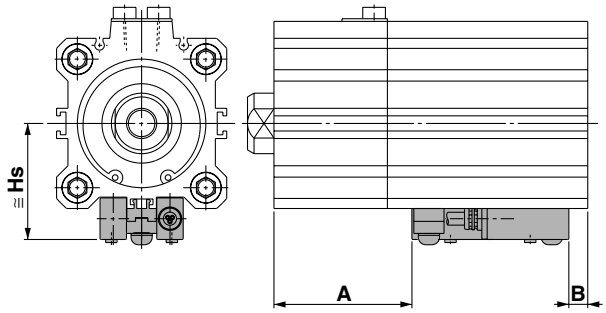
Proper Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height

ø32 to ø100

D-A7□
D-A80

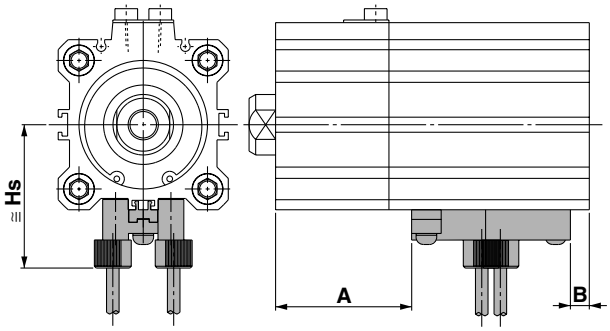


D-A7□H
D-A80H
D-F7□
D-J79
D-F7□W
D-J79W
D-F79F
D-F7NTL
D-F7BAL

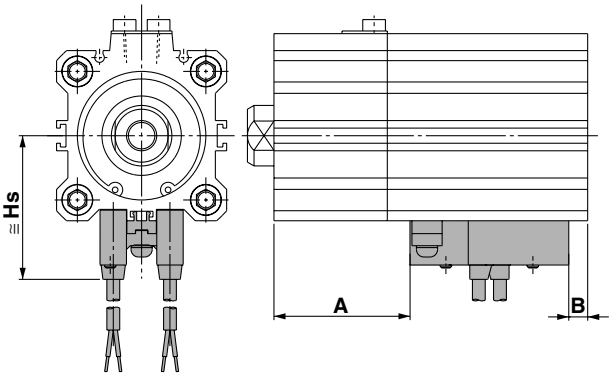


ø32 to ø100

D-A73C
D-A80C
D-J79C



D-A79W
D-F7□WV
D-F7□V
D-F7BAVL



Proper Auto Switch Mounting Position

Bore size (mm)	D-A7□/A80		D-A7□H/A80H D-A73C/A80C D-F7BAVL D-F7BAL/F79F D-F7□W D-F7□/J79 D-F7□V/J79C D-J79W D-F7□WV		D-A79W	
	A	B	A	B	A	B
20	—	—	—	—	—	—
25	—	—	—	—	—	—
32	41	6	41.5	6.5	38.5	3.5
40	47	8.5	47.5	9	44.5	6
50	46	11.5	46.5	12	43.5	9
63	51.5	14.5	52	15	49	12
80	60.5	18	61	18.5	58	15.5
100	71	24	71.5	24.5	68.5	21.5

Auto Switch Mounting Height

Bore size (mm)	D-A7□ D-A80	D-A7□H D-A80H D-F7□ D-J79 D-F7□W D-J79W D-F7BAL D-F79F D-F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAVL	D-J79C	D-A79W
	Hs	Hs	Hs	Hs	Hs	Hs
20	—	—	—	—	—	—
25	—	—	—	—	—	—
32	31.5	32.5	38.5	35	38	34
40	35	36	42	38.5	41.5	37.5
50	41	42	48	44.5	47.5	43.5
63	47.5	48.5	54.5	51	54	50
80	57.5	58.5	64.5	61	64	60
100	67.5	68.5	74.5	71	74	70

Operating Range

Auto switch model	Bore size (mm)							
	20	25	32	40	50	63	80	100
D-A7□/F7□H D-A73C D-A80/A80H D-A80C	—	—	12	11	10	12	12	13
D-A79W	—	—	13	14	14	16	15	17
D-A9□/A9□V	10	10	9.5	9.5	9.5	11.5	9	11.5
D-F7□/F7□V D-J79/J79C D-F7□W/F7□WV D-J79W D-F7BAL/F7BAVL D-F7NTL	—	—	6	6	6	6.5	6.5	7
D-F7LF/F79F	—	—	7.5	7.5	7.5	8	8	8.5
D-M9□/M9□V	3.5	3.5	3	4	4	4	4.5	5
D-F9□W/F9□WV D-F9BAL	5	5.5	5.5	5.5	5.5	6.5	5.5	6.5

∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion)
There may be the case it will vary substantially depending on an ambient environment.

Minimum Stroke For Auto Switch Mounting

(mm)

No. of auto switches mounted	D-F7□V D-J79C D-M9□V	D-A7□ D-A80 D-A73C D-A80C D-A9□V	D-F7□WV D-F9□WV D-F7BAVL	D-A7□H D-A80H D-F7□ D-J79 D-F9□W	D-A79W	D-F7□W D-J79W D-F7BAL D-F79F D-F9BAL	D-A9□ D-M9□
1 pc.	5	5	10	15	15	20	10
2 pcs.	5	10	15	15	20	20	10

Other than the applicable auto switches listed in “How to Order”, the following auto switches can be mounted. For details, refer to page 9-15-1.

Type	Model	Electrical entry (Fetching direction)	Features	Applicable bore size (mm)
Reed switch	D-A80	Grommet (Perpendicular)	Without indicator light	32 to 100
	D-A80H	Grommet (In-line)		
	D-A80C	Connector (Perpendicular)		
	D-A90	Grommet (In-line)		20 to 100
	D-A90V	Grommet (Perpendicular)		
Solid state switch	D-F7NTL	Grommet (In-line)	With timer	32 to 100

∗ With pre-wire connector is available for D-F7NTL type, too. For details, refer to page 9-15-66.
∗ Normally closed (NC = b contact), solid state switch (D-F9G/F9H type) are also available. For details, refer to page 9-15-39.

Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of **"Caution", "Warning"** or **"Danger"**. To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.

⚠ **Caution :** Operator error could result in injury or equipment damage.

⚠ **Warning :** Operator error could result in serious injury or loss of life.

⚠ **Danger :** In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414: Pneumatic fluid power--General rules relating to systems.
Note 2) JIS B 8370: General Rules for Pneumatic Equipment

⚠ Warning

1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

2. Only trained personnel should operate pneumatically operated machinery and equipment.

Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.

1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driver objects have been confirmed.
2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc.

4. Contact SMC if the product is to be used in any of the following conditions:

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuits in press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

Actuator Precautions 1

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Caution on Design

⚠ Warning

1. There is a possibility of dangerous sudden action by air cylinders if sliding parts of machinery are twisted due to external forces, etc.

In such cases, human injury may occur; e.g., by catching hands or feet in the machinery, or damage to the machinery itself may occur. Therefore, the machine should be adjusted to operate smoothly and designed to avoid such dangers.

2. A protective cover is recommended to minimize the risk of personal injury.

If a stationary object and moving parts of a cylinder are in close proximity, personal injury may occur. Design the structure to avoid contact with the human body.

3. Securely tighten all stationary parts and connected parts so that they will not become loose.

Especially when a cylinder operates with high frequency or is installed where there is a lot of vibration, ensure that all parts remain secure.

4. A deceleration circuit or shock absorber may be required.

When a driven object is operated at high speed or the load is heavy, a cylinder's cushion will not be sufficient to absorb the impact. Install a deceleration circuit to reduce the speed before cushioning, or install an external shock absorber to relieve the impact.

In this case, the rigidity of the machinery should also be examined.

5. Consider a possible drop in circuit pressure due to a power outage, etc.

When a cylinder is used in a clamping mechanism, there is a danger of workpieces dropping if there is a decrease in clamping force due to a drop in circuit pressure caused by a power outage, etc. Therefore, safety equipment should be installed to prevent damage to machinery and human injury. Suspension mechanisms and lifting devices also require consideration for drop prevention.

6. Consider a possible loss of power source.

Measures should be taken to protect against bodily injury and equipment damage in the event that there is a loss of power to equipment controlled by pneumatics, electricity, or hydraulics.

7. Design circuitry to prevent sudden lurching of driven objects.

When a cylinder is driven by an exhaust center type directional control valve or when starting up after residual pressure is exhausted from the circuit, etc., the piston and its driven object will lurch at high speed if pressure is applied to one side of the cylinder because of the absence of air pressure inside the cylinder. Therefore, equipment should be selected and circuits designed to prevent sudden lurching, because there is a danger of human injury and/or damage to equipment when this occurs.

8. Consider emergency stops.

Design so that human injury and/or damage to machinery and euqipment will not be caused when machinery is stopped by a safety device under abnormal conditions, a power outage or a manual emergency stop.

Caution on Design

9. Consider the action when operation is restarted after an emergency stop or abnormal stop.

Design the machinery so that human injury or equipment damage will not occur upon restart of operation.

When the cylinder has to be reset at the starting position, install manual safely equipment.

Selection

⚠ Warning

1. Confirm the specifications.

The products featured in this catalog are designed for use in industrial compressed air systems. If the products are used in conditions where pressure and/or temperature are outside the range of specifications, damage and/or malfunctions may occur. Do not use in these conditions. (Refer to the specifications.)

Please consult with SMC if you use a fluid other than compressed air.

2. About intermediate stop

In the case of 3 position closed center of a valve, it is difficult to make a piston stop at the required position as acurately and precisely as with hydraulic pressure due to compressibility of air.

Furthermore, since valves and cylinders, etc. are not guaranteed for zero air leakage, it may not be possible to hold a stopped position for an extended period of time. Please contact SMC in the case it is necessary to hold a stopped position for an extended period.

⚠ Caution

1. Operate within the limits of the maximum usable stroke.

Refer to the selection procedures for the air cylinder to be used for the maximum usable stroke.

2. Operate the piston within a range such that collision damage will not occur at the stroke end.

The operation range should prevent damage from occurring when a piston, having inertial force, stops by striking the cover at the stroke end. Refer to the cylinder model selection procedure for the maximum usable stroke.

3. Use a speed controller to adjust the cylinder drive speed, gradually increasing from a low speed to the desired speed setting.

4. Provide intermediate supports for long stroke cylinders.

An intermediate support should be provided in order to prevent damage to a cylinder having a long stroke, due to problems such as sagging of the rod, deflection of the cylinder tube, vibration and external load.

Actuator Precautions 2

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Mounting

⚠ Caution

1. Be certain to match the rod shaft center with the load and direction of movement when connecting.

When not properly matched, problems may arise with the rod and tube, and damage may be caused due to friction on areas such as the inner tube surface, bushings, rod surface, and seals.

2. When an external guide is used, connect the rod end and the load in such a way that there is no interference at any point within the stroke.

3. Do not scratch or gouge the sliding portion of the cylinder tube or the piston rod by striking it with an object, or squeezing it.

The tube bore is manufactured under precise tolerances. Thus, even a slight deformation could lead to a malfunction.
Moreover, scratches or gouges, etc. in the piston rod may lead to damaged seals and cause air leakage.

4. Prevent the seizure of rotating parts.

Prevent the seizure of rotating parts (pins, etc.) by applying grease.

5. Do not use until you verify that the equipment can operate properly.

After mounting, repairs, or modification, etc., connect the air supply and electric power, and then confirm proper mounting by means of appropriate function and leak tests.

6. Instruction manual

Install the products and operate them only after reading the instruction manual carefully and understanding its contents. Also keep the manual where it can be referred to as necessary.

Piping

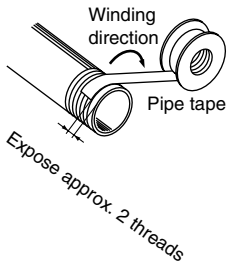
⚠ Caution

1. Before piping

Before piping, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

2. Wrapping of pipe tape

When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not get inside the piping.
Also, when the pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



Cushion

⚠ Caution

1. Readjust with the cushion needle.

Cushions are adjusted at the time of shipment, however, the cushion needle on the cover should be readjusted when the product is put into service, based upon factors such as the size of the load and the operating speed. When the cushion needle is turned clockwise, the restriction becomes smaller and the cushion's effectiveness is increased. Tighten the lock nut securely after adjustment is performed.

2. Do not operate the actuator with the cushion needle fully closed.

This could damage the seals.

Lubrication

⚠ Caution

1. Lubricating the lube style cylinder.

Install a lubricator in the circuit, and use Class 1 turbine oil (with no additive) ISO VG32.
Do not use machine oil or spindle oil.

2. Lubrication of cylinder

The cylinder has been lubricated for life at the factory and can be used without any further lubrication.
However, in the event that it is lubricated additionally, be sure to use Class 1 turbine oil (with no additive) ISO VG32.
Stopping lubrication later may lead to malfunctions because the new lubricant will cancel out the original lubricant. Therefore, lubrication must be continued once it has been started.

Air Supply

⚠ Warning

1. Use clean air.

Do not use compressed air which contains chemicals, synthetic oils containing organic solvents, salts or corrosive gases, etc., as this can cause damage or malfunction.

⚠ Caution

1. Install air filters.

Install air filters close to valves at their upstream side. A filtration degree of 5 m or less should be selected.

2. Install an aftercooler, air dryer, or water separator (Drain Catch).

Air that includes excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an air dryer, aftercooler or water separator, etc.

3. Use the product within the specified range of fluid and ambient temperature.

Take measures to prevent freezing when below 5°C, since moisture in circuits can freeze and cause damage to seals and lead to malfunctions.

For compressed air quality, refer to "Air Preparation Equipment" catalog.

Actuator Precautions 3

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Operating Environment

⚠ Warning

1. Do not use in atmospheres or locations where corrosion hazards exist.
Refer to the construction drawings regarding cylinder materials.

2. In dusty locations or where water or oil, etc., splash on the equipment, take suitable measures to protect the rod.
Use the heavy duty scraper type (-XC4) in situations where there is a lot of dust. Use a water resistant cylinder when there is splash or spray of liquids.

3. When using auto switches, do not operate in an environment with strong magnetic fields.

Maintenance

⚠ Warning

1. Perform maintenance procedures as shown in the instruction manual.
If it is handled improperly, malfunction or damage of machinery or equipment may occur.

2. Removal of equipment, and supply/exhaust of compressed air
Before any machinery or equipment is removed, first ensure that the appropriate measures are in place to prevent the fall or erratic movement of driven objects and equipment, then cut off the electric power and reduce the pressure in the system to zero. Only then should you proceed with the removal of any machinery and equipment.
When machinery is restarted, proceed with caution after confirming that appropriate measures are in place to prevent cylinders from sudden movement.

⚠ Caution

1. Drain flushing
Remove drainage from air filters regularly. (Refer to the specifications.)

Air-hydro

Caution on Design

⚠ Warning

1. Do not use air-hydro cylinder near flames, or in equipment or machinery that exceeds an ambient temperatures of 60°C.
There is a danger of causing a fire because the air-hydro cylinder uses a flammable hydraulic fluid.

⚠ Caution

1. Do not use it in an environment, equipment, or machine that is not compatible with oil mist.
Air-hydro cylinders generate an oil mist during operation which may affect the environment.

2. Be sure to install an exhaust cleaner on the directional control valve for the air-hydro cylinder.
A very small amount of hydraulic fluid is discharged from the exhaust port of the air-hydro cylinder's directional control valve, and this may contaminate the surrounding area.

3. Install an air-hydro cylinder in locations where it can be serviced easily.
Since the air-hydro cylinder requires maintenance, such as refilling of hydraulic fluid and bleeding of air, ensure sufficient space for these activities.

Selection

⚠ Caution

1. Select an air-hydro cylinder in combination with an air-hydro unit.
Since good operation of an air-hydro cylinder depends on combination with an air-hydro unit, be sure to select an appropriate air-hydro unit.

2. Set the load of the air-hydro cylinder to be 50% or less of the theoretical force.
For an air-hydro cylinder to obtain constant speed and stopping accuracy close to that of a hydraulic cylinder, it is necessary to keep the load at 50% or less of the theorectical output.

Piping

⚠ Caution

1. For air-hydro cylinder piping, use self-aligning fittings.
Do not use One-touch fittings in the piping for an air-hydro cylinder, as oil leakage may occur.

2. For air-hydro cylinder piping, use hard nylon tubing or copper piping.
As in the case of hydraulic circuits, surge pressures greater than the operating pressure may occur in an air-hydro cylinder's piping, making it necessary to use safer piping materials.

Lubrication

⚠ Warning

1. Make sure to completely discharge the compressed air in the system before filling the air-hydro unit with hydraulic oil.
When supplying hydraulic fluid to the air-hydro unit, first confirm that safety measures are implemented to prevent dropping of driven objects and release of clamped objects, etc. Then, shut off the air supply and the equipment's electric power, and exhaust the compressed air in the system.
If the air-hydro unit is supply port is opened with compressed air still remaining in the system, there is a danger of hydraulic fluid being blown out.

Maintenance

⚠ Caution

1. Bleed air from the air-hydro cylinder on a regular basis.
Since air may accumulate inside an air-hydro cylinder, bleed air from it at times such as before starting work. Bleed air from a bleeder valve provided on the air-hydro cylinder or the piping.

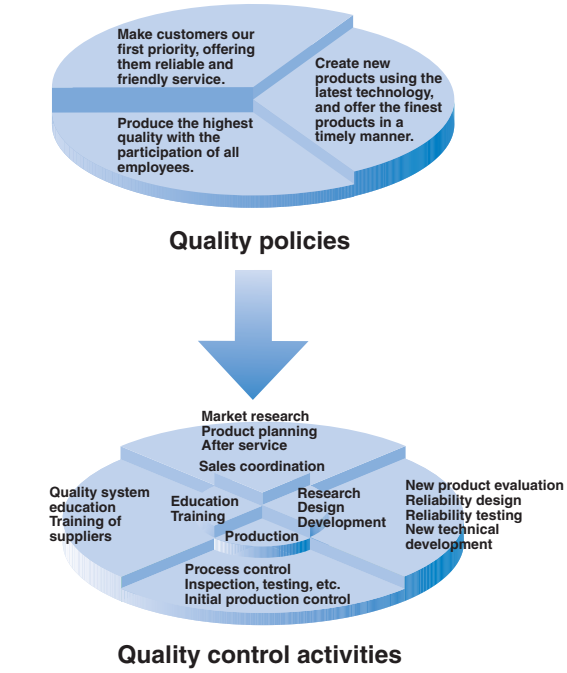
2. Verify the oil level of the air hydro system on a regular basis.
Since a very small amount of hydraulic fluid is discharged from the air-hydro cylinder and air-hydro unit circuit, the fluid will gradually decrease. Therefore, check the fluid regularly and refill as necessary.
The oil level can be checked with a level gauge in the air-hydro converter.

Quality Assurance Information (ISO 9001, ISO 14001)

Reliable quality of products in the global market

To enable our customers throughout the world to use our products with even greater confidence, SMC has obtained certification for international standards “ISO 9001” and “ISO 14001”, and created a complete structure for quality assurance and environmental controls. SMC products pursue to meet its customers’ expectations while also considering company’s contribution in society.

SMC’s quality control system



Quality management system

ISO 9001

This is an international standard for quality control and quality assurance. SMC has obtained a large number of certifications in Japan and overseas, providing assurance to our customers throughout the world.



Environmental management system

ISO 14001

This is an international standard related to environmental management systems and environmental inspections. While promoting environmentally friendly automation technology, SMC is also making diligent efforts to preserve the environment.



SMC Product Conforming to Inter

SMC products complying with EN/ISO, CSA/UL standards are supporting

CE Mark

The CE mark indicates that machines and components meet essential requirements of all the EC Directives applied.
It has been obligatory to apply CE marks indicating conformity with EC Directives when machines and components are exported to the member Nations of the EU.
Once “A manufacturer himself” declares a product to be safe by means of CE marking (declaration of conformity by manufacturer), free distribution inside the member Nations of the EU is permissible.

■ CE Mark

SMC provides CE marking to products to which EMC and Low Voltage Directives have been applied, in accordance with CETOP (European hydraulics and pneumatics committee) guide lines.

■ As of February 1998, the following 18 countries will be obliged to conform to CE mark legislation

Iceland, Ireland, United Kingdom, Italy, Austria, Netherlands, Greece, Liechtenstein, Sweden, Spain, Denmark, Germany, Norway, Finland, France, Belgium, Portugal, Luxembourg

■ EC Directives and Pneumatic Components

• Machinery Directive

The Machinery Directive contains essential health and safety requirements for machinery, as applied to industrial machines e.g. machine tools, injection molding machines and automatic machines. Pneumatic equipment is not specified in Machinery Directive. However, the use of SMC products that are certified as conforming to EN Standards, allows customers to simplify preparation work of the Technical Construction File required for a Declaration of Conformity.

• Electromagnetic Compatibility (EMC) Directive

The EMC Directive specifies electromagnetic compatibility. Equipment which may generate electromagnetic interference or whose function may be compromised by electromagnetic interference is required to be immune to electromagnetic affects (EMS/immunity) without emitting excessive electromagnetic affects (EMI/emission).

• Low Voltage Directive

This directive is applied to products, which operate above 50 VAC to 1000 VAC and 75 VDC to 1500 VDC operating voltage, and require electrical safety measures to be introduced.

• Simple Pressure Vessels Directive

This directive is applied to welded vessels whose maximum operating pressure (PS) and volume of vessel (V) exceed 50 bar/L. Such vessels require EC type examination and then CE marking.

national Standards

you to comply with EC directives and CSA/UL standards.

Mark of compliance for CSA/UL

Mark of compliance for CSA

NRTL /C

■ CSA Standards & UL Standards

UL and CSA standards have been applied in North America (U.S.A. and Canada) symbolizing safety of electric products, and are defined to mainly prevent danger from electric shock or fire, resulting from trouble with electric products. Both UL and CSA standards are acknowledged in North America as the first class certifying body. They have a long experience and ability for issuing product safety certificate. Products approved by CSA or UL standards are accepted in most states and governments beyond question.
Since CSA is a test certifying body as the National Recognized Testing Laboratory (NRTL) within the jurisdiction of Occupational Safety and Health Administration (OSHA), SMC was tested for compliance with CSA Standards and UL Standards at the same time and was approved for compliance with the two Standards. The above CSA NRTL/C logo is described on a product label in order to indicate that the product is approved by CSA and UL Standards.

■ TSSA (MCCR) Registration Products

TSSA is the regulation in Ontario State, Canada. The products that the operating pressure is more than 5 psi (0.03 MPa) and the piping size is bigger than 1 inch. fall into the scope of TSSA regulation.

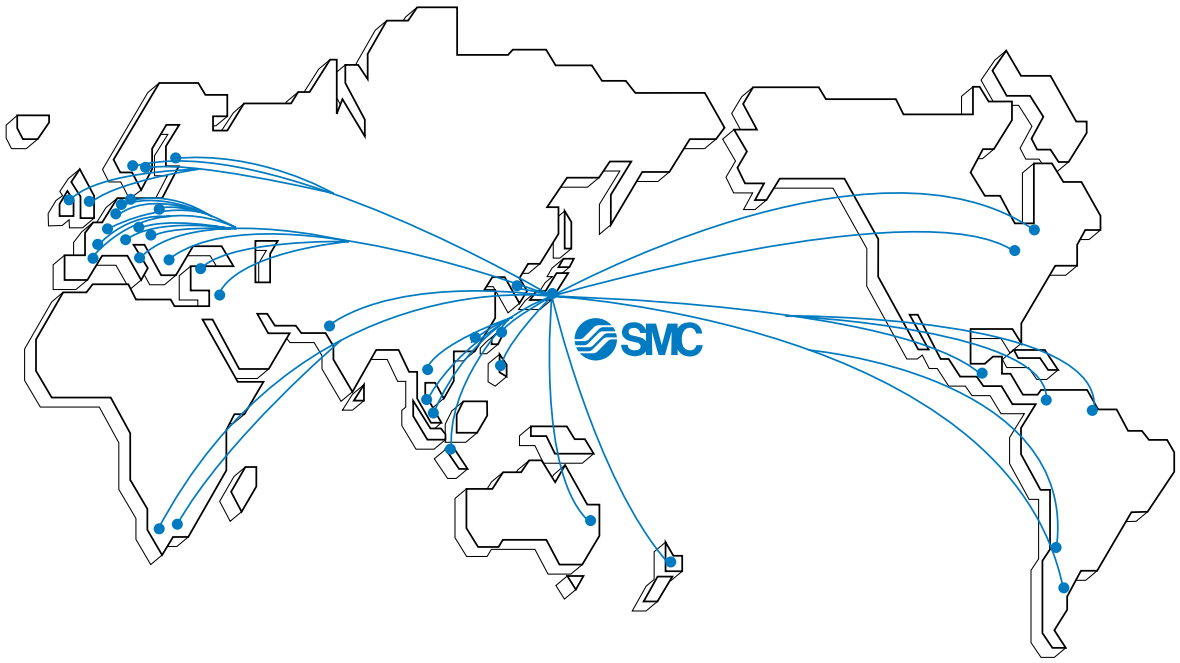
Products conforming to CE Standard

With CE symbol for simple visual recognition

In this catalog each accredited product series is indicated with a CE mark symbol. However, in some cases, every available models may not meet CE compliance. Please visit our web site for the latest selection of available models with CE mark.

http://www.smcworld.com

SMC's Global Service Network



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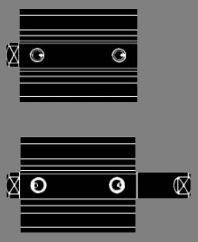


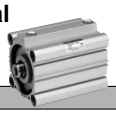
Compact Cylinder

Series CQ2

ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100, ø125, ø140, ø160, ø180, ø200

With a short overall length, the space-saving cylinder helps to make various jigs and equipment more compact.

Series Variations

Series	Action	Rod	Basic	Built-in magnet	Mounting female thread (A)	Rod end male thread	With rubber bumper	With boss in head side	Bore size (mm)	Standard stroke (mm)	Page
Standard 	Double acting	Single rod ***CQ2***	●	●	●	●	●	●	12, 16, 20, 25, 32, 40, 50, 63, 80, 100	ø12, ø16/5 to 30 ø20, ø25/5 to 50 ø32, ø40/5 to 100 ø50 to ø100/10 to 100	7-6-2
		Double rod ***CQ2W***	●	●	●	●	●	●	12, 16, 20, 25, 32, 40, 50, 63, 80, 100	ø12, ø16/5 to 30 ø20, ø40/5 to 50 ø32, ø40/5 to 100 ø50 to ø100/10 to 100	7-6-25
	Single acting	Spring return/ Spring extend ***CQ2***	●	●	●	●	●	●	12, 16, 20, 25, 32, 40, 50	ø12 to ø40/5, 10 ø50/10, 20	7-6-42
Non-rotating Rod 	Double acting	Single rod ***CQ2K***	●	●	●	●	●	●	12, 16, 20, 25, 32, 40, 50, 63	ø12, ø16/5 to 30 ø20, ø25/5 to 50 ø32, ø40/5 to 100 ø50, ø63/10 to 100	7-6-62
		Double rod ***CQ2KW***	●	●	●	●	●	●	12, 16, 20, 25, 32, 40, 50, 63	ø12, ø16/5 to 30 ø20, ø40/5 to 50 ø50, ø63/10 to 50	7-6-76
Axial Piping (Centralized Piping Type) 	Double acting	Single rod ***CQP2***	●	●	●	●	●	●	12, 16, 20, 25, 32, 40, 50, 63, 80, 100	ø12, ø16/5 to 30 ø20, ø25/5 to 50 ø32, ø40/5 to 100 ø50 to ø100/10 to 100	7-6-88
	Single acting	Spring return/ Spring extend ***CQP2***	●	●	●	●	●	●	12, 16, 20, 25, 32, 40, 50	ø12 to ø40/5, 10 ø50/10, 20	7-6-98
Large Bore Size 	Double acting	Single rod ***CQ2***	●	●	●	●	●	●	125, 140, 160, 180, 200	10 to 300	7-6-108
		Double rod ***CQ2W***	●	●	●	●	●	●	125, 140, 160, 180, 200	10 to 300	7-6-115
Long Stroke 	Double acting	Single rod ***CQ2***	●	●	●	●	●	●	32, 40, 50, 63, 80, 100	125 to 300	7-6-121
Anti-lateral Load 	Double acting	Single rod ***CQ2□S***	●	●	●	●	●	●	32, 40, 50, 63, 80, 100	ø32 to ø40/5 to 100 ø50 to ø100/10 to 100	7-6-132
With End Lock 	Double acting	Single rod ***CBQ2***	●	●	●	●	●	●	20, 25, 32, 50, 63, 80, 100	ø20 to ø63/10 to 100 ø80, ø100/25 to 100	7-6-142

Built-in One-touch fittings (Bore size ø32 to ø63)
Foot/Flange style
Double clevis style
Copper-free
Air-hydro (Bore size ø20 to ø100)
Clean Series (Bore size ø12 to ø63)

Compact Cylinder: Standard Type
Double Acting, Single Rod
Series CQ2
ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Without auto switch CQ2 B □ 20 □ – 30 D □

With auto switch CDQ2 B □ 20 □ – 30 D □ – J79W S

Built-in magnet

Mounting style

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

∗ Mounting brackets are shipped together, (but not assembled).

Type

Nil	Pneumatic
H	Air-hydro Note)

Note) Bore sizes available for air-hydro type are ø20 to ø100.

Bore size

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

Piping

Nil	Screw-in piping
F	Built-in One-touch fittings Note)

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

Cylinder stroke (mm)

For "Standard Stroke" and "Manufacture of intermediate of Stroke", refer to page 7-6-3.

Action

D	Double acting

Body option

Nil	Standard (Rod end female thread)
F	With boss in head side
C	With rubber bumper
M	Rod end male thread Note)

∗ Combination of body options ("CM", "FC", "FM", "FCM") is available.
Note) Air-hydro type with rubber bumper is not available.

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.

Number of auto switches

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

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

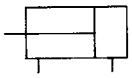
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Rail mounting ø12 to ø100 Perpendicular	Rail mounting ø12 to ø100 In-line	Direct mounting ø32 to ø100 Perpendicular	Direct mounting ø32 to ø100 In-line	Lead wire length (m) ∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	—	A76H	A96V	A96	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200 V	A72	A72H	—	—	●	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	A73	A73H	—	—	●	●	●	—	—		
								—	—	A93V	A93	●	●	—	—	—		
		Connector					—	A73C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	A79W	—	—	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NV	F79	M9NV	M9N	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				F7PV	F7P	M9PV	M9P	●	●	○	—	○		
				2-wire		12 V		F7BV	J79	M9BV	M9B	●	●	○	—	○	—	
		Connector						J79C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		F7NWV	F79W	F9NWV	F9NW	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	F7PW	F9PWV	F9PW	●	●	○	—	○		
				2-wire		12 V		F7BWV	J79W	F9BWV	F9BW	●	●	○	—	○		
	Water resistant (2-color indication)							—	F7BA	—	F9BA	—	●	○	—	○	—	
								F7BAV	—	—	—	—	●	○	—	—		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		—	F79F	—	—	●	●	○	—	○	IC circuit	
	Magnetic field resistant (2-color indication)			2-wire		—		—	P5DW	—	—	—	●	●	—	○	—	

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

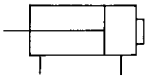
∗ Solid state switches marked with "○" are produced upon receipt of order.

• D-P5DWL type is available from ø40 up to ø100 only.
• There are other applicable auto switches other than the listed above. For details, refer to page 7-6-23.
• For details about auto switches with pre-wire connector, refer to page 7-9-36.

JIS Symbol
Double acting, Single rod



JIS Symbol
With boss in head side



Standard Stroke

Pneumatic

Bore size (mm)	Standard stroke (mm)
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 to 100	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100

● When stroke exceeds the standard range, refer to page 7-6-121.

Air-hydro

Bore size (mm)	Standard stroke (mm)
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

Mounting Bracket Part No.

Bore size (mm)	Foot (4)	Flange	Double clevis (5)
12	CQ-L012	CQ-F012	CQ-D012
16	CQ-L016	CQ-F016	CQ-D016
20	CQ-L020	CQ-F020	CQ-D020
25	CQ-L025	CQ-F025	CQ-D025
32	CQ-L032	CQ-F032	CQ-D032
40	CQ-L040	CQ-F040	CQ-D040
50	CQ-L050	CQ-F050	CQ-D050
63	CQ-L063	CQ-F063	CQ-D063
80	CQ-L080	CQ-F080	CQ-D080
100	CQ-L100	CQ-F100	CQ-D100

Note 4) When ordering foot bracket, order 2 pieces per cylinder.
Note 5) Parts belonging to each bracket are as follows. Foot, Flange: Body mounting bolt/Double clevis: Clevis pin, Type C snap ring for axis, body mounting bolt

Type

Bore size (mm)			12	16	20	25	32	40	50	63	80	100
Pneumatic	Mounting	Through-hole (Standard)	●	●	●	●	●	●	●	●	●	●
		Both ends tapped style	●	●	●	●	●	●	●	●	●	●
	Built-in magnet		●	●	●	●	●	●	●	●	●	●
	Piping	Screw-in type	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8	(1) M5 x 0.8 Rc 1/8	Rc 1/8	Rc 1/4	Rc 1/4	Rc 3/8	Rc 3/8
		Built-in One-touch fittings	—	—	—	—	ø6/4(2)	ø6/4	ø8/6	ø8/6	—	—
	Rod end male thread		●	●	●	●	●	●	●	●	●	●
	With rubber bumper		●	●	●	●	●	●	●	●	●	●
	With boss in head side		●	●	●	●	●	●	●	●	●	●
Air-hydro	Mounting	Through-hole (Standard)	—	—	●	●	●	●	●	●	●	●
		Both ends tapped style	—	—	●	●	●	●	●	●	●	●
	Built-in magnet		—	—	●	●	●	●	●	●	●	●
	Piping	Screw-in type	—	—	M5 x 0.8	M5 x 0.8	(1) M5 x 0.8 Rc 1/8	Rc 1/8	Rc 1/4	Rc 1/4	Rc 3/8	Rc 3/8
	Rod end male thread		—	—	●	●	●	●	●	●	●	●
	With boss in head side		—	—	●	●	●	●	●	●	●	●

Note 1) In the case of without auto switch, M5 x 0.8 is used for 5 stroke only.
Note 2) In the case of built-in fitting, the 5 mm stroke with ø32 bore is the same external dimensions as 10 mm stroke.

Specifications

Type	Pneumatic (Non-lube)	Air-hydro	
Fluid	Air	Turbine oil (3)	
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)		Air-hydro 5 to 60°C
Rubber bumper	None	——	
Rod end thread	Female thread		
Rod end thread tolerance	JIS class 2		
Stroke length tolerance	$^{+1.0}_{0}$		
Mounting	Through-hole		
Piston speed	50 to 500 mm/s	5 to 50 mm/s	

Note 3) For caution on handling, refer to page 7-13-6.
∗ For applications involving lateral loads, refer to anti-lateral load type on page 7-13-132.

Minimum Operating Pressure

(MPa)

Bore size (mm)	12	16	20	25	32	40	50	63	80	100
Pneumatic (Non-lube)	0.07		0.05							
Air-hydro	—		0.18			0.10				

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 7-6-2.		Suffix "-XB10" to the end of standard model no. on page 7-6-2.	
Description	Dealing with intermediate stroke by the 1 mm interval is available by using 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	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
	32 to 100	1 to 99	32, 40	6 to 99
			50 to 100	11 to 99
Example	Part No.: CQ2B50-57D 18 mm width spacer is installed in the standard CQ2B50-75D. B dimension is 115.5 mm.		Part no. CQ2B50-57D-XB10 Makes 57 stroke tube. B dimension is 97.5 mm.	

- Air-hydro type is excluded.
- In the case of spacer type, intermediate stroke with damper for ø40 to ø100, it can be manufactured by 5 mm intervals in 5 mm and 55 to 95 mm.
- In the case of an exclusive body with ø32 to ø100 (-XB10) with the stroke length exceeding 50 mm, the reference values of the longitudinal dimension will be changed. Calculate length dimensions by deducting from those of 75 or 100 mm stroke models.
- Regarding the long stroke which exceeds the stroke range, refer to page 7-6-121 for the long stroke type of either CQ2 or CQS.

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

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat resistant cylinder (150°C) w/o auto switch only
-XB7	Cold resistant cylinder w/o auto switch only
-XB9	Low speed cylinder (10 to 50 mm/s)
-XB10	Intermediate stroke (Using exclusive body)
-XB11	Long stroke type, Air-hydro type only
-XB13	Low speed cylinder (5 to 50 mm/s)
-XB14	Cylinder with heat resistant auto switch ø16 to 63 only
-XB18	Low friction cylinder, ø32 to 100 only
-XC4	With heavy duty scraper, ø20 to 100 only
-XC6	Piston rod and 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
-XC18	NPT finish piping port
-XC35	With coil scraper, ø32 to 100 only
-XC36	With boss in rod side
-XC58	Water resistance improved type/Built-in hard plastic magnet, ø20 to 100 only
-XC59	Fluoro rubber for seal/Built-in hard plastic magnet, ø20 to 100 only
-X202	Same overall length dimension as Series CQ1, Except ø16, 25
-X203	Same L dimension from rod cover as Series CQ1, ø20, 32 only
-X293	Same overall length as Series CQ1W, Except ø16, 25
-X144	Change of port location, ø12 to 25 only
-X271	Fluoro rubber for seals
-X525	Long stroke of adjustable extension stroke cylinder (-XC8)
-X526	Long stroke of adjustable retraction stroke cylinder (-XC9)
-X636	Intermediate stroke of double rod type

⚠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

1. For installation and removal, use an appropriate pair of pliers (tool for installing a type C snap ring).

2. 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 installment.

Allowable Kinetic Energy

Table (1) Load Weight and Piston Speed (J)

Bore size (mm)	12	16	20	25	32	40	50	63	80	100
Standard Allowable kinetic energy: Ea	0.022	0.038	0.055	0.09	0.15	0.26	0.46	0.77	1.36	2.27
With rubber bumper Allowable kinetic energy: Eb	0.043	0.075	0.110	0.18	0.29	0.52	0.91	1.54	2.71	4.54

Kinetic energy $E\ (J) = \dfrac{(m1+m2)\ V^2}{2}$

m1: Weight of cylinder operating part kg
m2: Load weight kg
V: Piston speed m/s

Table (2) Weight of Cylinder Movable Parts/Without Built-in Magnet (g)

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	5	6	7	8	10	11	—	—	—	—	—	—
16	9	11	13	15	17	19	—	—	—	—	—	—
20	15	18	21	24	27	31	34	37	40	44	—	—
25	24	28	33	37	42	46	51	55	60	64	—	—
32	45	52	60	68	76	84	92	100	107	115	170	209
40	64	72	80	88	96	104	112	119	127	135	190	229
50	—	117	129	141	153	166	178	190	202	214	300	361
63	—	153	165	177	190	202	214	226	239	251	337	398
80	—	270	289	308	327	347	366	385	404	423	557	653
100	—	487	515	543	570	598	625	653	681	708	901	1038

Table (3) Weight of Cylinder Movable Parts/With Built-in Magnet (g)

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	8	9	10	11	12	13	—	—	—	—	—	—
16	16	18	20	22	24	26	—	—	—	—	—	—
20	28	31	34	37	40	44	47	50	53	56	—	—
25	44	48	53	57	62	66	71	75	80	84	—	—
32	78	86	93	101	109	117	125	133	140	148	187	227
40	109	117	125	133	140	148	156	164	172	180	219	258
50	—	187	199	211	223	236	248	260	272	285	346	407
63	—	254	266	278	290	303	315	327	339	352	413	474
80	—	433	453	472	491	510	530	549	568	587	683	778
100	—	741	768	796	823	851	879	906	934	962	1099	1236

Table (4) (g)

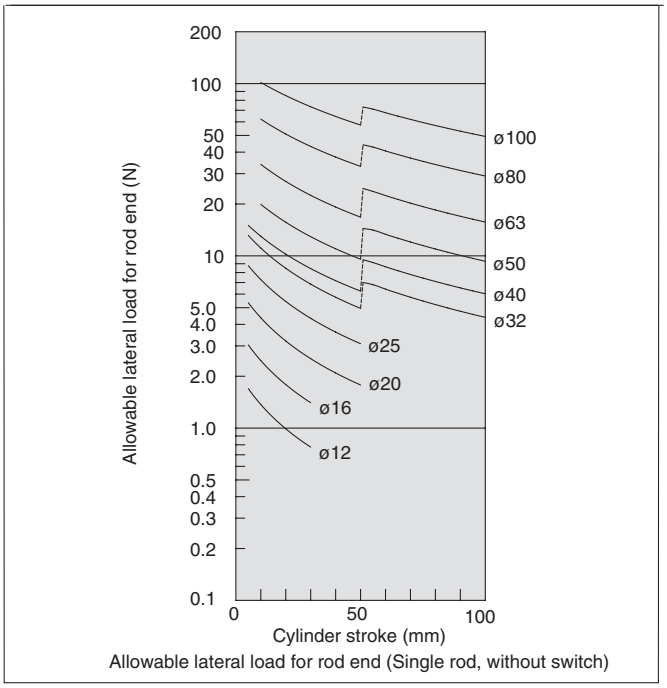
Bore size (mm)		12	16	20	25	32	40	50	63	80	100
Rod end male thread	Thread	1.5	3	6	12	26	27	53	53	120	175
	Nut	1	2	4	8	17	17	32	32	49	116
With rubber bumper		0	0	–2	–3	–3	–7	–9	–18	–31	–56

Calculation: (Example) CDQ2B32-20DCM
- Cylinder weight: CDQ2B32-20D·····101 g
- Option weight: Rod end male thread····· 43 g
  Rubber bumper·····–3 g

141 g

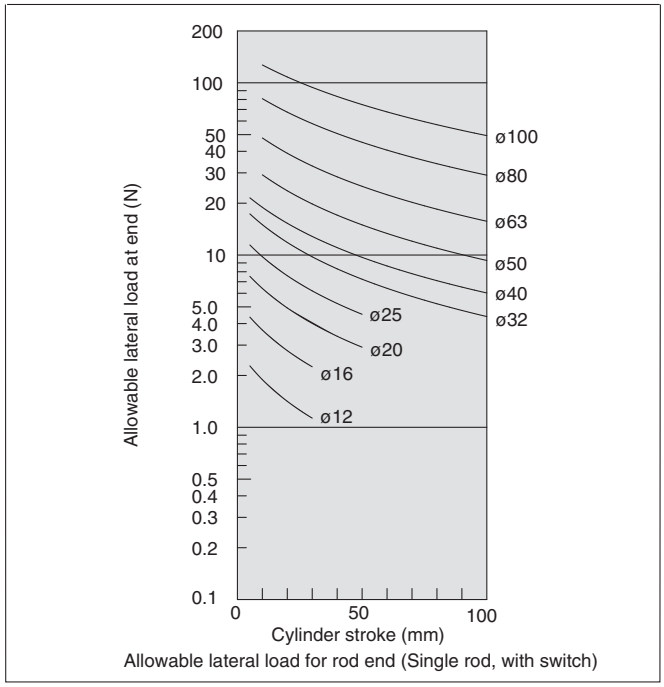
Allowable Lateral Load at Rod End

Without Auto Switch



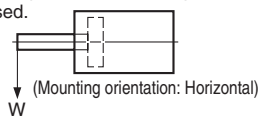
Allowable lateral load for rod end (Single rod, without switch)

With Auto Switch



Allowable lateral load for rod end (Single rod, with switch)

If an allowable lateral load at rod end is exceeding the value in the graph, we recommend anti-lateral load type cylinder be used.



Theoretical Output

(N)

Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
12	IN	25	42	59
	OUT	34	57	79
16	IN	45	75	106
	OUT	60	101	141
20	IN	71	118	165
	OUT	94	157	220
25	IN	113	189	264
	OUT	147	245	344
32	IN	181	302	422
	OUT	241	402	563
40	IN	317	528	739
	OUT	377	628	880
50	IN	495	825	1150
	OUT	589	982	1370
63	IN	841	1400	1960
	OUT	935	1560	2180
80	IN	1360	2270	3170
	OUT	1510	2510	3520
100	IN	2140	3570	5000
	OUT	2360	3930	5500

Weight

(g)

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	29	35	41	47	54	60	—	—	—	—	—	—
16	42	50	59	67	76	84	—	—	—	—	—	—
20	63	75	88	101	114	127	140	152	165	178	—	—
25	86	100	115	129	144	158	173	187	202	216	—	—
32	131	152	173	193	214	235	256	277	297	318	471	576
40	206	229	252	275	298	321	344	367	390	413	597	717
50	—	369	405	441	477	514	550	586	622	659	951	1139
63	—	538	579	620	661	702	742	783	824	865	1213	1424
80	—	997	1064	1132	1200	1268	1336	1404	1471	1539	2111	2446
100	—	1738	1829	1920	2011	2101	2192	2283	2374	2464	3269	3729

Additional Weight

(g)

Bore size (mm)		12	16	20	25	32	40	50	63	80	100
Both ends tapped style		2	2	6	6	6	6	6	19	45	45
Rod end male thread	Thread	1.5	3	6	12	26	27	53	53	120	175
	Nut	1	2	4	8	17	17	32	32	49	116
With boss in head side		0.7	1.3	2	3	5	7	13	25	45	96
With rubber bumper		0	0	–2	–3	–3	–7	–9	–18	–31	–56
Built-in One-touch fittings		—	—	—	—	12	12	21	21	—	—
Foot style (Including mounting bolt)		55	67	164	186	143	155	243	324	696	1062
Rod side flange style (Including mounting bolt)		57	69	139	161	180	214	373	559	1056	1365
Rear flange style (Including mounting bolt)		54	65	133	152	165	198	348	534	1017	1309
Double clevis style (Including pin, snap ring, bolt)		32	39	88	123	151	196	393	554	1109	1887

Calculation: (Example) CQ2D32-20DCM

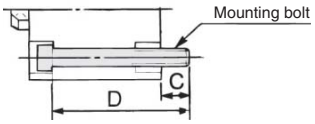
- Cylinder weight: CQ2B32-20D ····· 193 g
- Option weight: Both ends tapped style ····· 6 g
  Rod end male thread ····· 43 g
  Rubber bumper ····· –3 g
  Double clevis style ····· 151 g

390 g

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 M3 x 25ℓ 4 pcs.

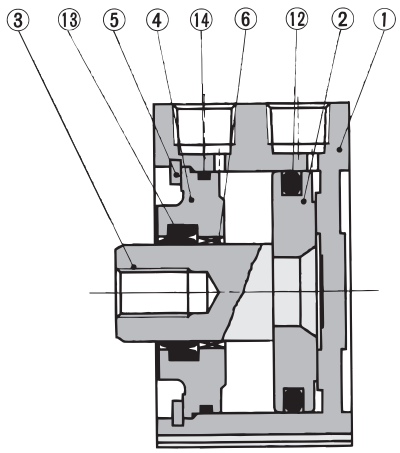


Model	C	D	Mounting bolt
CQ2B12-5D	6.5	25	M3 x 25ℓ
-10D		30	x 30ℓ
-15D		35	x 35ℓ
-20D		40	x 40ℓ
-25D		45	x 45ℓ
-30D		50	x 50ℓ
CQ2B16-5D	5	25	M3 x 25ℓ
-10D		30	x 30ℓ
-15D		35	x 35ℓ
-20D		40	x 40ℓ
-25D		45	x 45ℓ
-30D		50	x 50ℓ
CQ2B20-5D	7.5	25	M5 x 25ℓ
-10D		30	x 30ℓ
-15D		35	x 35ℓ
-20D		40	x 40ℓ
-25D		45	x 45ℓ
-30D		50	x 50ℓ
-35D		55	x 55ℓ
-40D		60	x 60ℓ
-45D		65	x 65ℓ
-50D		70	x 70ℓ
CQ2B25-5D	9.5	30	M5 x 30ℓ
-10D		35	x 35ℓ
-15D		40	x 40ℓ
-20D		45	x 45ℓ
-25D		50	x 50ℓ
-30D		55	x 55ℓ
-35D		60	x 60ℓ
-40D		65	x 65ℓ
-45D		70	x 70ℓ
-50D		75	x 75ℓ

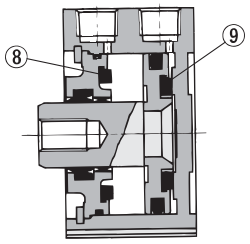
Model	C	D	Mounting bolt
CQ2B32-5D	9	30	M5 x 30ℓ
-10D		35	x 35ℓ
-15D		40	x 40ℓ
-20D		45	x 45ℓ
-25D		50	x 50ℓ
-30D		55	x 55ℓ
-35D		60	x 60ℓ
-40D		65	x 65ℓ
-45D		70	x 70ℓ
-50D		75	x 75ℓ
-75D		110	x 110ℓ
-100D		135	x 135ℓ
CQ2B40-5D	7.5	35	M5 x 35ℓ
-10D		40	x 40ℓ
-15D		45	x 45ℓ
-20D		50	x 50ℓ
-25D		55	x 55ℓ
-30D		60	x 60ℓ
-35D		65	x 65ℓ
-40D		70	x 70ℓ
-45D		75	x 75ℓ
-50D		80	x 80ℓ
-75D		115	x 115ℓ
-100D		140	x 140ℓ
CQ2B50-10D	12.5	45	M6 x 45ℓ
-15D		50	x 50ℓ
-20D		55	x 55ℓ
-25D		60	x 60ℓ
-30D		65	x 65ℓ
-35D		70	x 70ℓ
-40D		75	x 75ℓ
-45D		80	x 80ℓ
-50D		85	x 85ℓ
-75D		120	x 120ℓ
-100D		145	x 145ℓ

Model	C	D	Mounting bolt
CQ2B63-10D	14.5	50	M8 x 50ℓ
-15D		55	x 55ℓ
-20D		60	x 60ℓ
-25D		65	x 65ℓ
-30D		70	x 70ℓ
-35D		75	x 75ℓ
-40D		80	x 80ℓ
-45D		85	x 85ℓ
-50D		90	x 90ℓ
-75D		125	x 125ℓ
-100D		150	x 150ℓ
CQ2B80-10D	15	55	M10 x 55ℓ
-15D		60	x 60ℓ
-20D		65	x 65ℓ
-25D		70	x 70ℓ
-30D		75	x 75ℓ
-35D		80	x 80ℓ
-40D		85	x 85ℓ
-45D		90	x 90ℓ
-50D		95	x 95ℓ
-75D		130	x 130ℓ
-100D		155	x 155ℓ
CQ2B100-10D	15.5	65	M10 x 65ℓ
-15D		70	x 70ℓ
-20D		75	x 75ℓ
-25D		80	x 80ℓ
-30D		85	x 85ℓ
-35D		90	x 90ℓ
-40D		95	x 95ℓ
-45D		100	x 100ℓ
-50D		105	x 105ℓ
-75D		140	x 140ℓ
-100D		165	x 165ℓ

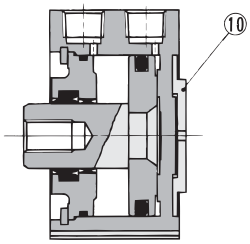
Construction



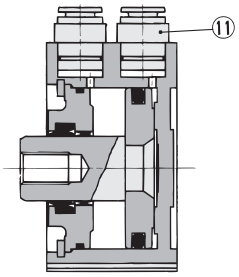
Basic style



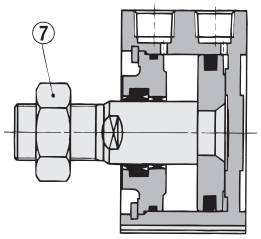
With rubber bumper



With boss in head side



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	Chromated
③	Piston rod *	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø100, Hard chrome plated
④	Collar	Aluminum alloy	ø12 to ø40, Anodized
		Aluminum alloy casted	ø50 to ø100, Chromated, painted
⑤	Snap ring	Carbon tool steel	Phosphate coated
⑥	Bushing	Lead-bronze casted	For ø50 or larger only
⑦	Rod end nut	Carbon steel	Nickel plated
⑧	Bumper A	Urethane	

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

* On bore size ø12 to ø25 with rubber bumper style, piston and piston rod are integrated (Stainless steel).

Replacement Parts: Seal Kit

Series	Bore size (mm)	Kit no.	Contents
Pneumatic	12	CQ2B12-PS	Set of nos. above 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	

Series	Bore size (mm)	Kit no.	Contents
Air-hydro	20	CQ2BH20-PS	Set of nos. above 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.

Auto Switch Mounting Bracket Part No.

Bore size (mm)	Mounting bracket part no.	Note	Applicable auto switch	
			Reed switch	Solid state switch
12, 16 20, 25	BQ-1	• Switch mounting screw (M3 x 0.5 x 8ℓ) • Square nut	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
32, 40 50, 63 80, 100	BQ-2	• Switch mounting screw (M3 x 0.5 x 10ℓ) • Switch spacer • Switch mounting nut		
40 to 100	BQP1-050	• Switch mounting bracket • Switch mounting nut • Hexagon hole cap bolt (M3 x 0.5 x 14ℓ spring washer 2 pcs.) • Round head Phillips screw (M3 x 0.5 x 16ℓ springwasher 2 pcs.)	—	D-P5DWL

[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.
(Since the spacer is not included, order it separately.)
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.

Clean Series

10 — **CQ2B** **Bore size** — **Stroke** **D(M)**

- **Clean Series**
  - **10**-Relief type
  - **11**-Vacuum type
- **ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63**

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)	12, 16, 20, 25, 32, 40, 50, 63
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Rubber bumper	None Note)
Piping	Screw-in piping
Piston speed	50 to 500 mm/s
Mounting	Through-hole
Auto switch	Mountable

Note) ø12 with switch: With rubber bumper (Standard)

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

Copper-free (For CRT manufacturing process)

20 — **CQ2B** **Bore size** — **Stroke** **D(C)(M)**

- **Copper-free**
- **ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100**

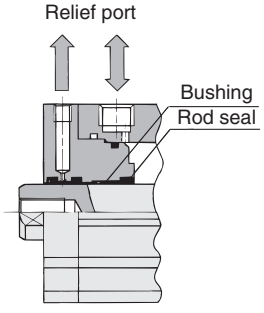
To prevent the influence of copper ions or halogen ions during CRT manufacturing processes, copper and fluorine materials are not used in the component parts.

Specifications

Action	Double acting, Single rod
Bore size (mm)	12, 16, 20, 25, 32, 40, 50, 63, 80, 100
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Rubber bumper	With, None
Piping	Screw-in piping
Piston speed	50 to 500 mm/s
Mounting	Both ends tapped style
Auto switch	Mountable

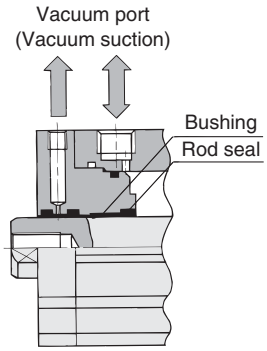
Construction

Series 10-CQ2 (Double seal type)



A relief port is provided in the area between the double rod seals to discharge the exhaust air outside of the clean room. Thus, the amount of dust generated has been reduced to 1/20 of that of an ordinary cylinder.

Series 11-CQ2 (Single seal, Vacuume suction)



Structurally identical to the "10-" series, the outer rod seal has been removed to evacuate through the vacuum port. This draws out any external air from the clearance between the rod and the cover to practically eliminate the generation of external dust. This should be used in an application that requires an even higher level of cleanliness than the 10- series.

Water Resistant

CDQ2 **Mounting** **Bore size** **R** — **Stroke** **D** **Option** **F7BAL** **-XC6**

- With auto switch (Built-in magnet)
- Water resistant 2-color indication solid state switch
- Made to Order specifications

Water resistant cylinder

R	NBR seals (Nitrile rubber)
V	FKM seals (Fluoro rubber)

Ideal for use under the atmosphere having coolant for machine tools, etc. Compatible for the environment, where waterdrops are splashed around the food processing machinery and the car washers, etc.

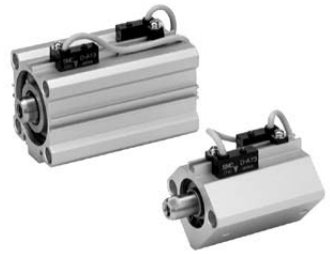
Specifications

Action	Double acting, Single rod
Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100
Cushion	None
Auto switch mounting	Rail mounting (D-F7BAL)
Made to order	Piston rod/Rod end nut material: Stainless steel (-XC6)

∗ Specifications other than above are the same as standard, basic style.

For detailed specifications, refer to the separate catalog.

* Refer to page 7-9-1 for further information on auto switches.



Minimum Stroke for Auto Switch Mounting

(mm)

No. of auto switches mounted	D-F7□V D-J79C D-F9□V	D-A7□ D-A80 D-A73C D-A80C D-A9□V	D-F7□WV D-F9□WV D-F7BAVL	D-A7□H D-A80H D-F7□ D-J79 D-M9□ D-F9□W	D-A79W	D-F7□W D-J79W D-F7BAL D-F79F D-F9BAL	D-A9□	D-P5DWL
1 pc.	5	5	10	15	15	20	10	30
2 pcs.	5	10	15	15	20	20	10	30

Weight

(g)

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	47	54	60	67	74	80	—	—	—	—	—	—
16	73	82	92	101	110	119	—	—	—	—	—	—
20	109	122	136	150	164	178	191	205	219	233	—	—
25	144	161	178	195	211	228	245	262	278	295	—	—
32	190	211	232	252	273	294	315	335	356	377	482	587
40	282	305	328	351	375	398	421	444	467	490	610	730
50	—	487	523	559	595	632	668	704	740	777	965	1153
63	—	696	737	778	819	860	901	941	982	1023	1235	1446
80	—	1258	1325	1393	1461	1529	1597	1665	1732	1800	2135	2469
100	—	2118	2209	2299	2390	2481	2572	2662	2753	2844	3304	3764

Additional Weight

(g)

Bore size (mm)		12	16	20	25	32	40	50	63	80	100
Both ends tapped style		1	1	3	3	6	6	6	19	45	45
Rod end male thread	Male thread	1.5	3	6	12	26	27	53	53	120	175
	Nut	1	2	4	8	17	17	32	32	49	116
With boss in head side		0.7	1.3	2	3	5	7	13	25	45	96
With rubber bumper		0	–1	–2	–3	–3	–7	–9	–18	–31	–56
Built-in One-touch fittings		—	—	—	—	12	12	21	21	—	—
Foot style (Including mounting bolt)		49	62	147	169	143	155	243	324	696	1062
Rod side flange style (Including mounting bolt)		54	67	131	153	180	214	373	559	1056	1365
Rear flange style (Including mounting bolt)		52	63	124	144	165	198	348	534	1017	1309
Double clevis style (Including pin, snap ring, bolt)		29	35	78	114	151	196	393	554	1109	1887

Calculation: (Example) CDQ2D32-20DCM

- Cylinder weight: CDQ2B32-20D·····252 g
- Option weight: Both ends tapped style·····6 g
  Rod end male thread·····43 g
  Rubber bumper·····–3 g
  Double clevis style·····151 g

449 g

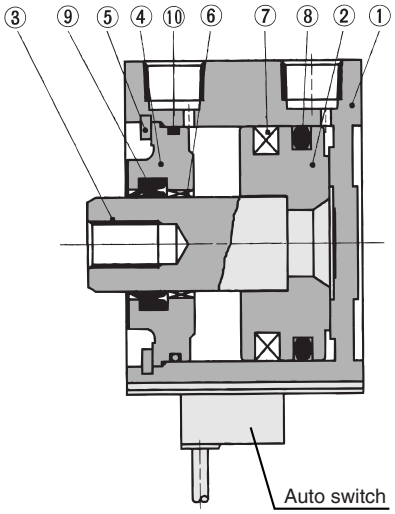
Add each weight of auto switches and mounting brackets.

Auto Switch Mounting Bracket Weight

Mounting bracket part no.	Applicable bore (mm)	Weight (g)
BQ-1	12 to 25	1.5
BQ-2	32 to 100	1.5

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

Construction



Component Parts

No.	Description	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②	Piston	Aluminum alloy	Chromated
③	Piston rod	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø100, Hard chrome plated
④	Collar	Aluminum alloy	ø12 to ø40, Anodized
		Aluminum alloy casted	ø50 to ø100, Chromated, painted
⑤	Snap ring	Carbon tool steel	Phosphate coated
⑥	Bushing	Lead-bronze casted	For ø50 or larger only
⑦	Magnet	—	
⑧	Piston seal	NBR	
⑨	Rod seal	NBR	
⑩	Gasket	NBR	

Replacement Parts: Seal Kit

Series	Bore size (mm)	Kit no.	Contents
Pneumatic	12	CQ2B12-PS	Set of nos. above ⑧, ⑨, ⑩.
	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	

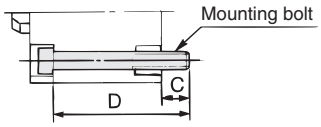
Replacement Parts: Seal Kit

Series	Bore size (mm)	Kit no.	Contents
Air-hydro	20	CQ2BH20-PS	Set of nos. above ⑧, ⑨, ⑩.
	25	CQ2BH25-PS	
	32	CQ2BH32-PS	
	40	CQ2BH40-PS	
	50	CQ2BH50-PS	
	63	CQ2BH63-PS	
	80	CQ2BH80-PS	
	100	CQ2BH100-PS	

∗ Seal kits includes ⑧ ⑨ ⑩. Order the seal kit, based on each bore size.

Mounting Bolt for CDQ2 with Auto Switch

Mounting method: Mounting bolt for through-hole mounting style of CDQ2B is available as an option.
Ordering: Add the word "Bolt" in front of the bolts to be used.
Example) Bolt M3 x 35ℓ 2 pcs.



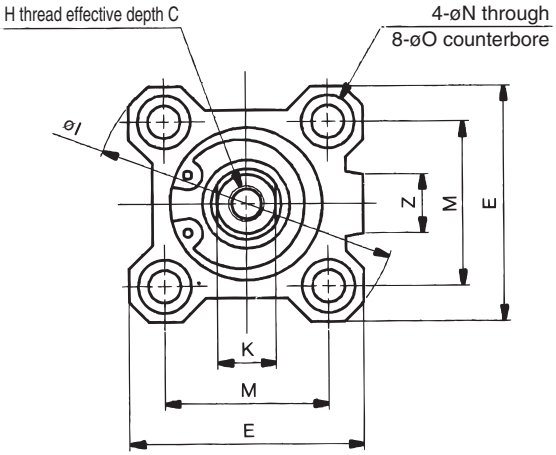
Model	C	D	Mounting bolt
CDQ2B12-5D	5.5	35	M3 x 35ℓ
-10D		40	x 40ℓ
-15D		45	x 45ℓ
-20D		50	x 50ℓ
-25D		55	x 55ℓ
-30D		65	x 60ℓ
CDQ2B16-5D	8	40	M3 x 40ℓ
-10D		45	x 45ℓ
-15D		50	x 50ℓ
-20D		55	x 55ℓ
-25D		60	x 60ℓ
-30D		65	x 65ℓ
CDQ2B20-5D	10.5	40	M5 x 40ℓ
-10D		45	x 45ℓ
-15D		50	x 50ℓ
-20D		55	x 55ℓ
-25D		60	x 60ℓ
-30D		65	x 65ℓ
-35D		70	x 70ℓ
-40D		75	x 75ℓ
-45D		80	x 80ℓ
-50D		85	x 85ℓ
CDQ2B25-5D	9.5	40	M5 x 40ℓ
-10D		45	x 45ℓ
-15D		50	x 50ℓ
-20D		55	x 55ℓ
-25D		60	x 60ℓ
-30D		65	x 65ℓ
-35D		70	x 70ℓ
-40D		75	x 75ℓ
-45D		80	x 80ℓ
-50D		85	x 85ℓ

Model	C	D	Mounting bolt
CDQ2B32-5D	9	40	M5 x 40ℓ
-10D		45	x 45ℓ
-15D		50	x 50ℓ
-20D		55	x 55ℓ
-25D		60	x 60ℓ
-30D		65	x 65ℓ
-35D		70	x 70ℓ
-40D		75	x 75ℓ
-45D		80	x 80ℓ
-50D		85	x 85ℓ
-75D		110	x 110ℓ
-100D		135	x 135ℓ
CDQ2B40-5D	7.5	45	M5 x 45ℓ
-10D		50	x 50ℓ
-15D		55	x 55ℓ
-20D		60	x 60ℓ
-25D		65	x 65ℓ
-30D		70	x 70ℓ
-35D		75	x 75ℓ
-40D		80	x 80ℓ
-45D		85	x 85ℓ
-50D		90	x 90ℓ
-75D		115	x 115ℓ
-100D		140	x 140ℓ
CDQ2B50-10D	12.5	55	M6 x 55ℓ
-15D		60	x 60ℓ
-20D		65	x 65ℓ
-25D		70	x 70ℓ
-30D		75	x 75ℓ
-35D		80	x 80ℓ
-40D		85	x 85ℓ
-45D		90	x 90ℓ
-50D		95	x 95ℓ
-75D		120	x 120ℓ
-100D		145	x 145ℓ

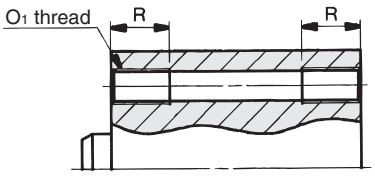
Model	C	D	Mounting bolt
CDQ2B63-10D	14.5	60	M8 x 60ℓ
-15D		65	x 65ℓ
-20D		70	x 70ℓ
-25D		75	x 75ℓ
-30D		80	x 80ℓ
-35D		85	x 85ℓ
-40D		90	x 90ℓ
-45D		95	x 95ℓ
-50D		100	x 100ℓ
-75D		125	x 125ℓ
-100D		150	x 150ℓ
CDQ2B80-10D	15	65	M10 x 65ℓ
-15D		70	x 70ℓ
-20D		75	x 75ℓ
-25D		80	x 80ℓ
-30D		85	x 85ℓ
-35D		90	x 90ℓ
-40D		95	x 95ℓ
-45D		100	x 100ℓ
-50D		105	x 105ℓ
-75D		130	x 130ℓ
-100D		155	x 155ℓ
CDQ2B100-10D	15.5	75	M10 x 75ℓ
-15D		80	x 80ℓ
-20D		85	x 85ℓ
-25D		90	x 90ℓ
-30D		95	x 95ℓ
-35D		100	x 100ℓ
-40D		105	x 105ℓ
-45D		110	x 110ℓ
-50D		115	x 115ℓ
-75D		140	x 140ℓ
-100D		165	x 165ℓ

Dimensions: ø12 to ø25

Basic style (Through-hole): CQ2B

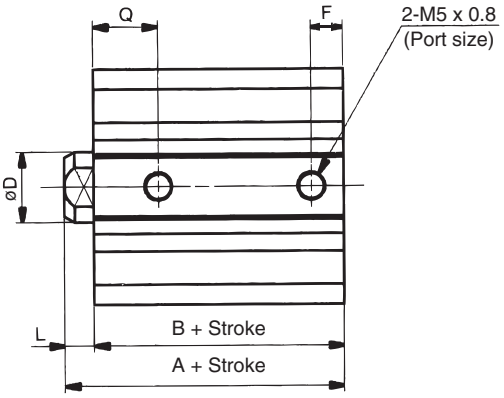


Both ends tapped style: CQ2A

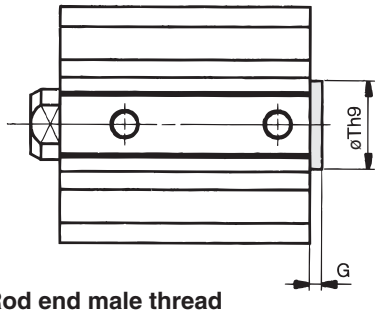


Both Ends Tapped Style

Bore size (mm)	O_1	R
12	M4 x 0.7	7
16	M4 x 0.7	7
20	M6 x 1.0	10
25	M6 x 1.0	10



With boss in head side

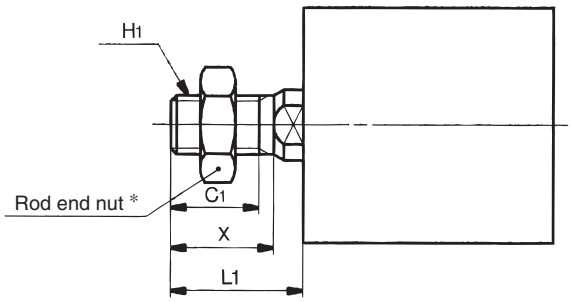


With Boss in Head Side

Bore size (mm)	G	Th9
12	1.5	$15^{0}_{-0.043}$
16	1.5	$20^{0}_{-0.052}$
20	2	$13^{0}_{-0.043}$
25	2	$15^{0}_{-0.043}$

Note) With boss in rod side: Option
(Suffix "-XC36" to the end of part number.)

Rod end male thread



Rod End Male Thread

Bore size (mm)	C_1	X	H_1	L_1
12	9	10.5	M5 x 0.8	14
16	10	12	M6 x 1.0	15.5
20	12	14	M8 x 1.25	18.5
25	15	17.5	M10 x 1.25	22.5

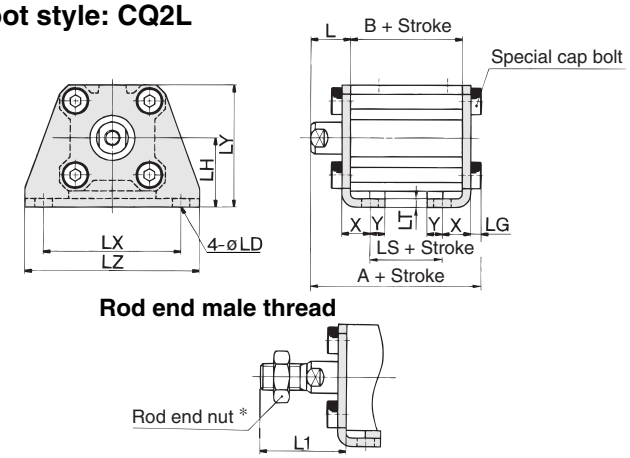
Basic Style

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	H	I	K	L	M	N	O	Q	Z
12	5 to 30	20.5	17	6	6	25	5	M3 x 0.5	32	5	3.5	15.5	3.5	6.5 depth 3.5	7.5	—
16	5 to 30	22	18.5	8	8	29	5.5	M4 x 0.7	38	6	3.5	20	3.5	6.5 depth 3.5	8	10
20	5 to 50	24	19.5	7	10	36	5.5	M5 x 0.8	47	8	4.5	25.5	5.5	9 depth 7	9	10
25	5 to 50	27.5	22.5	12	12	40	5.5	M6 x 1.0	52	10	5	28	5.5	9 depth 7	11	10

Note) External dimensions with rubber bumper are same as standard type as shown above.
* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

For calculation on the longitudinal dimension of the intermediate strokes, refer to page 7-6-3.

Foot style: CQ2L

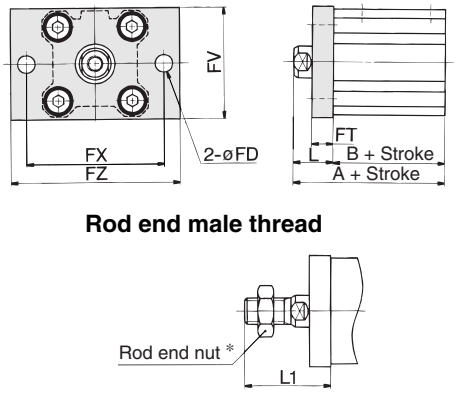


Foot Style

Bore size (mm)	Stroke range (mm)	A	B	L	L1	LD	LG	LH	LS	LT	LX	LY	LZ	X	Y
12	5 to 30	35.3	17	13.5	24	4.5	2.8	17	5	2	34	29.5	44	8	4.5
16	5 to 30	36.8	18.5	13.5	25.5	4.5	2.8	19	6.5	2	38	33.5	48	8	5
20	5 to 50	41.2	19.5	14.5	28.5	6.6	4	24	7.5	3.2	48	42	62	9.2	5.8
25	5 to 50	44.7	22.5	15	32.5	6.6	4	26	7.5	3.2	52	46	66	10.7	5.8

Foot bracket material: Carbon steel

Rod side flange style: CQ2F

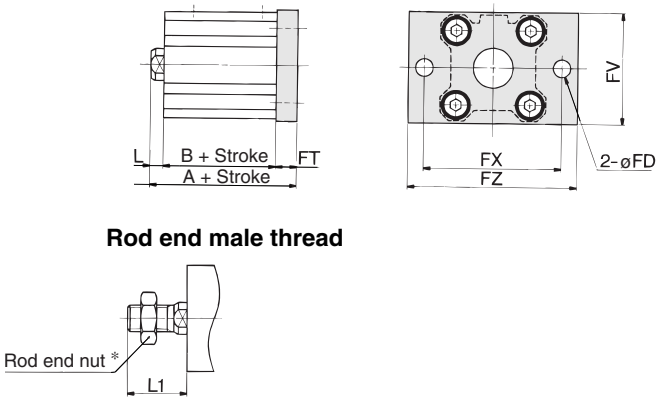


Rod Side Flange Style

Bore size (mm)	Stroke range (mm)	A	B	FD	FT	FV	FX	FZ	L	L1
12	5 to 30	30.5	17	4.5	5.5	25	45	55	13.5	24
16	5 to 30	32	18.5	4.5	5.5	30	45	55	13.5	25.5
20	5 to 50	34	19.5	6.6	8	39	48	60	14.5	28.5
25	5 to 50	37.5	22.5	6.6	8	42	52	64	15	32.5

Flange bracket material: Carbon steel

Head side flange style: CQ2G



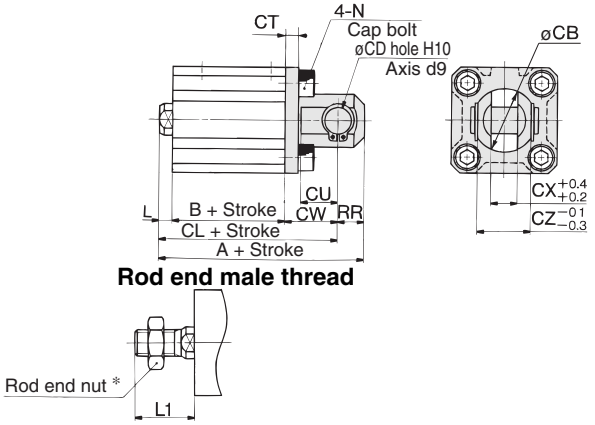
Head Side Flange Style

Bore size (mm)	Stroke range (mm)	A	L	L1
12	5 to 30	26	3.5	14
16	5 to 30	27.5	3.5	15.5
20	5 to 50	32	4.5	18.5
25	5 to 50	35.5	5	22.5

Flange bracket material: Carbon steel

(* Dimensions except A, L and L1 are the same as rod side flange style.)

Double clevis style: CQ2D



Double Clevis Style

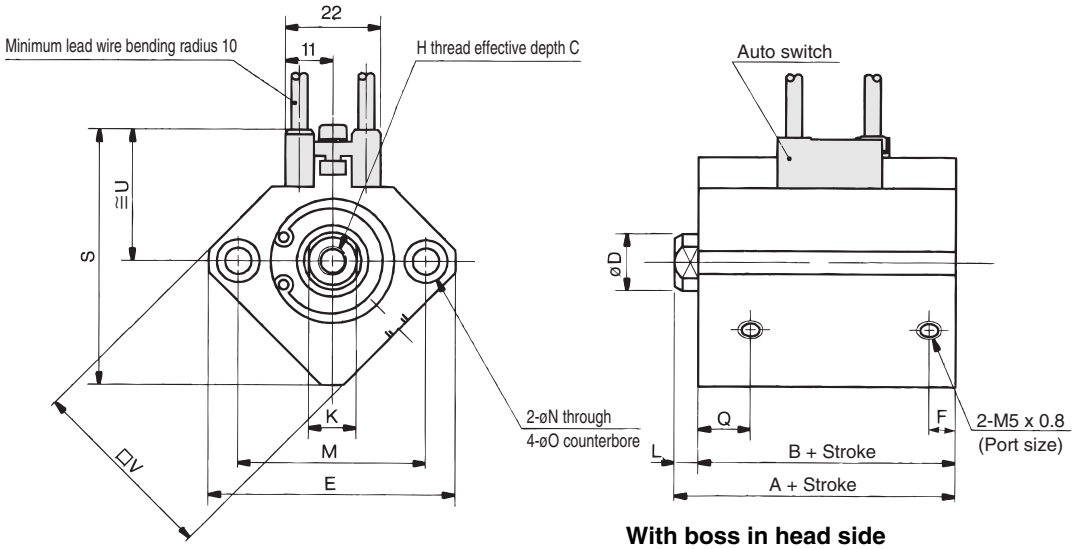
Bore size (mm)	Stroke range (mm)	A	B	CB	CD	CL	CT	CU	CW	CX	CZ	L	L1	N	RR
12	5 to 30	40.5	17	12	5	34.5	4	7	14	5	10	3.5	14	M4 x 0.7	6
16	5 to 30	43	18.5	14	5	37	4	10	15	6.5	12	3.5	15.5	M4 x 0.7	6
20	5 to 50	51	19.5	20	8	42	5	12	18	8	16	4.5	18.5	M6 x 1.0	9
25	5 to 50	57.5	22.5	24	10	47.5	5	14	20	10	20	5	22.5	M6 x 1.0	10

Double clevis bracket material: Carbon steel

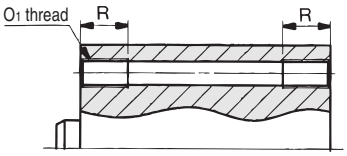
* For details about the rod end nut and accessory brackets, refer to page 7-6-20.
** Clevis pin and snap ring are shipped together.

Dimensions: ø12 to ø25/With Auto Switch

Basic style (Through-hole): CDQ2B



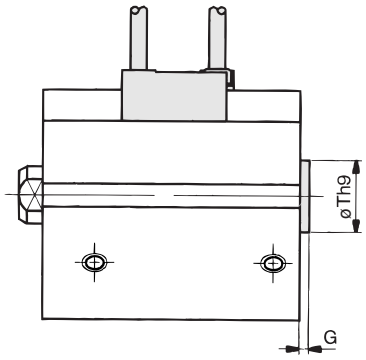
Both ends tapped style: CDQ2A



Both Ends Tapped Style

Bore size (mm)	O_1	R
12	M4 x 0.7	7
16	M4 x 0.7	7
20	M6 x 1.0	10
25	M6 x 1.0	10

With boss in head side

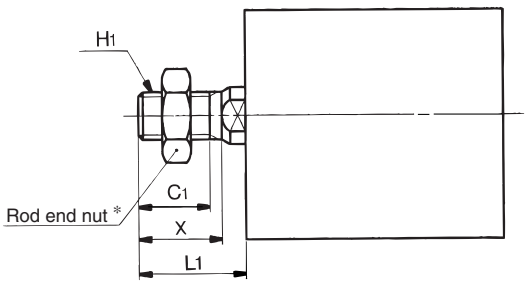


With Boss in Head Side

Bore size (mm)	G	Th9
12	1.5	$15^{\ 0}_{-0.043}$
16	1.5	$20^{\ 0}_{-0.052}$
20	2	$13^{\ 0}_{-0.043}$
25	2	$15^{\ 0}_{-0.043}$

Note 1) With boss in rod side: Option
(Suffix "-XC36" to the end of part number.)

Rod end male thread



Rod End Male Thread

Bore size (mm)	C_1	X	H_1	L1
12	9	10.5	M5 x 0.8	14
16	10	12	M6 x 1.0	15.5
20	12	14	M8 x 1.25	18.5
25	15	17.5	M10 x 1.25	22.5

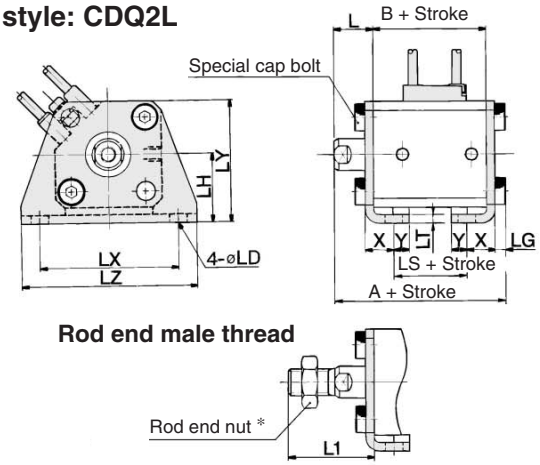
Auto switch shown above is D-A73 type and D-A80 type.
For the auto switch mounting position and its mounting height, refer to page 7-6-22.

Basic Style

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	H	K	L	M	N	O	Q	S	U	V
12	5 to 30	31.5	28	6	6	32	6.5	M3 x 0.5	5	3.5	22	3.5	6.5 depth 3.5	11	35.5	19.5	25
16	5 to 30	34	30.5	8	8	38	5.5	M4 x 0.7	6	3.5	28	3.5	6.5 depth 3.5	10	41.5	22.5	29
20	5 to 50	36	31.5	7	10	47	5.5	M5 x 0.8	8	4.5	36	5.5	9 depth 7	10.5	48	24.5	36
25	5 to 50	37.5	32.5	12	12	52	5.5	M6 x 1.0	10	5	40	5.5	9 depth 7	11	53.5	27.5	40

Note 2) External dimensions with rubber bumper are same as standard type as shown above.
* For details about the rod end nut and accessory brackets, refer to page 7-6-20.
Note 3) For calculation on the longitudinal dimension of the intermediate strokes, refer to page 7-6-3.

Foot style: CDQ2L

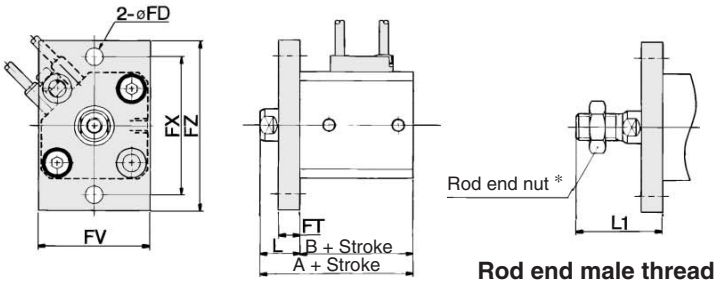


Foot Style

Bore size (mm)	Stroke range (mm)	A	B	L	L1	LD	LG	LH	LS	LT	LX	LY	LZ	X	Y
12	5 to 30	46.3	28	13.5	24	4.5	2.8	17	16	2	34	29.5	44	8	4.5
16	5 to 30	48.8	30.5	13.5	25.5	4.5	2.8	19	18.5	2	38	33.5	48	8	5
20	5 to 50	53.2	31.5	14.5	28.5	6.6	4	24	19.5	3.2	48	42	62	9.2	5.8
25	5 to 50	54.7	32.5	15	32.5	6.6	4	26	17.5	3.2	52	46	66	10.7	5.8

Foot bracket material: Carbon steel

Rod side flange style: CDQ2F

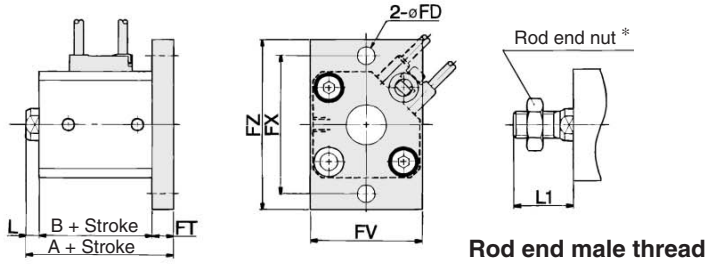


Rod Side Flange Style

Bore size (mm)	Stroke range (mm)	A	B	FD	FT	FV	FX	FZ	L	L1
12	5 to 30	41.5	28	4.5	5.5	25	45	55	13.5	24
16	5 to 30	44	30.5	4.5	5.5	30	45	55	13.5	25.5
20	5 to 50	46	31.5	6.6	8	39	48	60	14.5	28.5
25	5 to 50	47.5	32.5	6.6	8	42	52	64	15	32.5

Flange bracket material: Carbon steel

Head side flange style: CDQ2G



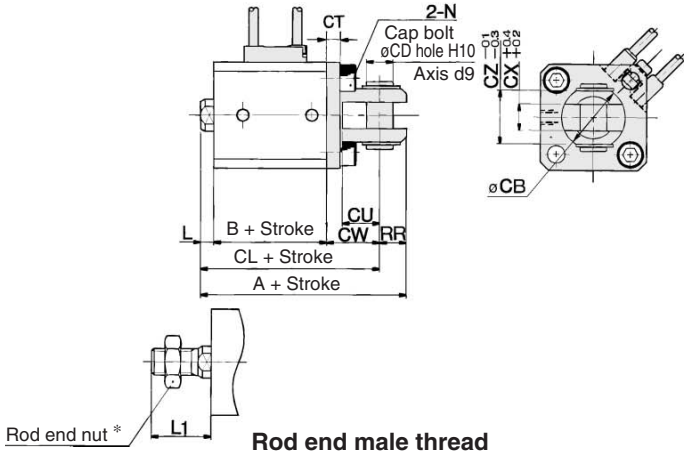
Head Side Flange Style

Bore size (mm)	Stroke range (mm)	A	L	L1
12	5 to 30	37	3.5	14
16	5 to 30	39.5	3.5	15.5
20	5 to 50	44	4.5	18.5
25	5 to 50	45.5	5	22.5

Flange bracket material: Carbon steel

(* Dimensions except A, L and L1 are the same as rod side flange style.)

Double clevis style: CDQ2G



Double Clevis Style

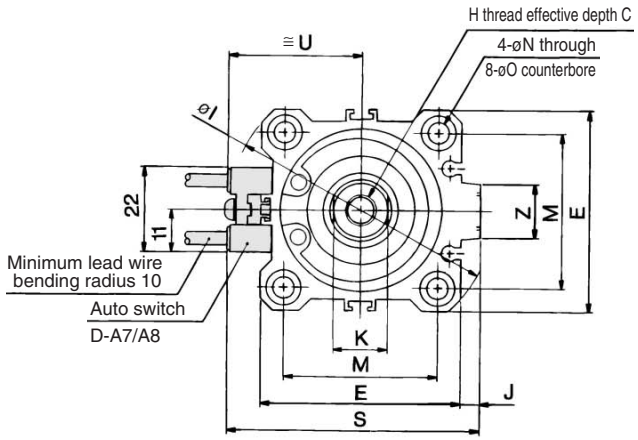
Bore size (mm)	Stroke range (mm)	A	B	CB	CD	CL	CT	CU	CW	CX	CZ	L	L1	N	RR
12	5 to 30	51.5	28	12	5	45.5	4	7	14	5	10	3.5	14	M4 x 0.7	6
16	5 to 30	55	30.5	14	5	49	4	10	15	6.5	12	3.5	15.5	M4 x 0.7	6
20	5 to 50	63	31.5	20	8	54	5	12	18	8	16	4.5	18.5	M6 x 1.0	9
25	5 to 50	67.5	32.5	24	10	57.5	5	14	20	10	20	5	22.5	M6 x 1.0	10

Double clevis bracket material: Carbon steel

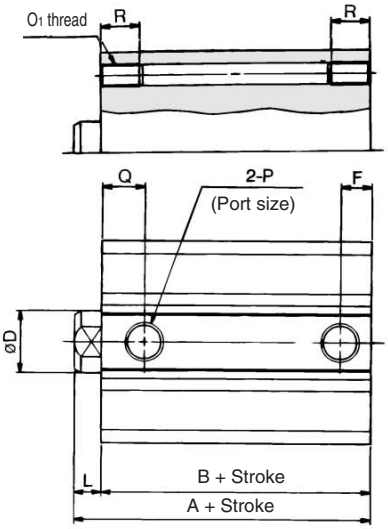
∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.
∗∗ Clevis pin and snap ring are shipped together.

Dimensions: ø32 to ø50

Basic style (Through-hole): CQ2B/CDQ2B



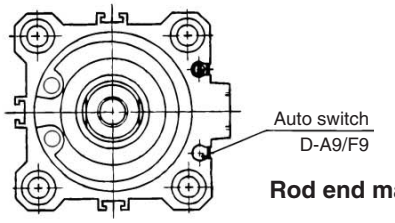
Both ends tapped style: CDQ2A

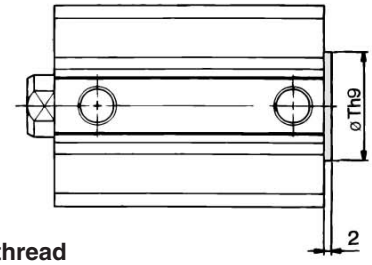


Both Ends Tapped Style

Bore size (mm)	O_1	R
32	M6 x 1.0	10
40	M6 x 1.0	10
50	M8 x 1.25	14

With boss in head side

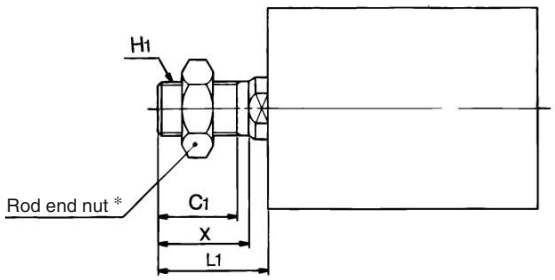




With Boss in Head Side

Bore size (mm)	Th9
32	$21^{\ 0}_{-0.052}$
40	$28^{\ 0}_{-0.052}$
50	$35^{\ 0}_{-0.062}$

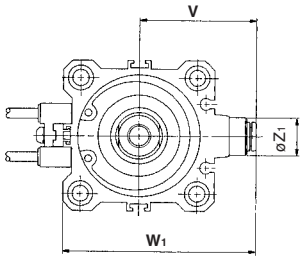
Rod end male thread

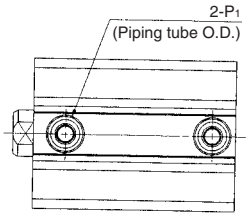


Rod End Male Thread

Bore size (mm)	C_1	X	H_1	L1
32	20.5	23.5	M14 x 1.5	28.5
40	20.5	23.5	M14 x 1.5	28.5
50	26	28.5	M18 x 1.5	33.5

Built-in One-touch fittings: ø32 to ø50





Built-in One-touch Fittings

Bore size (mm)	Z_1	P_1	V	W_1
32	13	6	36.5	59
40	13	6	40.5	66
50	16	8	50	82

Basic Style

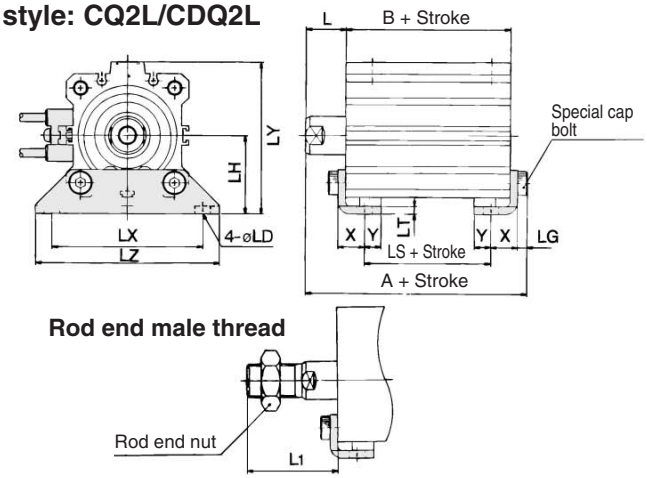
Auto switch shown above is D-A73 type and D-A80 type. For the auto switch mounting position and its mounting height, refer to page 7-6-22.

Bore size (mm)	Stroke range (mm)	Without auto switch					With auto switch					C	D	E	H	I	J	K	L	M
		A	B	F	P	Q	A	B	F	P	Q									
32	5	30	23	5.5	M5 x 0.8	11.5	40	33	7.5	Rc 1/8	10.5	13	16	45	M8 x 1.25	60	4.5	14	7	34
	10 to 50			7.5	Rc 1/8	10.5														
	75, 100	40	33																	
40	5 to 50	36.5	29.5	8	Rc 1/8	11	46.5	39.5	8	Rc 1/8	11	13	16	52	M8 x 1.25	69	5	14	7	40
	75, 100	46.5	39.5																	
50	10 to 50	38.5	30.5	10.5	Rc 1/4	10.5	48.5	40.5	10.5	Rc 1/4	10.5	15	20	64	M10 x 1.5	86	7	17	8	50
	75, 100	48.5	40.5																	

Bore size (mm)	N	O	S	U	Z
32	5.5	9 depth 7	58.5	31.5	14
40	5.5	9 depth 7	66	35	14
50	6.6	11 depth 8	80	41	19

Note 1) External dimensions with rubber bumper are same as standard type as shown above.
* For details about the rod end nut and accessory brackets, refer to page 7-6-20.
Note 2) For calculation on the longitudinal dimension of the intermediate strokes, refer to page 7-6-3. Because we have the spacer-installed type and the exclusive body type (-X10).

Foot style: CQ2L/CDQ2L



Rod end male thread

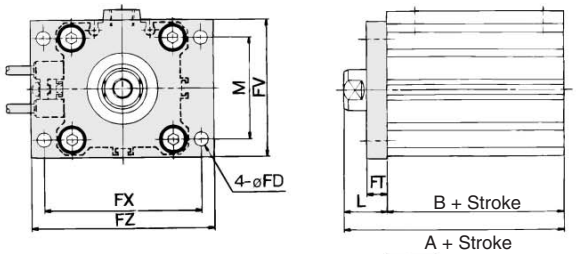
Foot Style

Bore size (mm)	Stroke range (mm)	Without auto switch A	B	LS	With auto switch A	B	LS	L	L1	LD	LG	LH	LT	LX	LY
32	5 to 50	47.2	23	7	57.2	33	17	17	38.5	6.6	4	30	3.2	57	57
	75, 100	57.2	33	17											
40	5 to 50	53.7	29.5	13.5	63.7	39.5	23.5	17	38.5	6.6	4	33	3.2	64	64
	75, 100	63.7	39.5	23.5											
50	10 to 50	56.7	30.5	7.5	66.7	40.5	17.5	18	43.5	9	5	39	3.2	79	78
	75, 100	66.7	40.5	17.5											

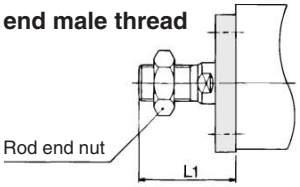
Foot bracket material: Carbon steel

Bore size (mm)	LZ	X	Y
32	71	11.2	5.8
40	78	11.2	7
50	95	14.7	8

Rod side flange style: C□Q2F



Rod end male thread

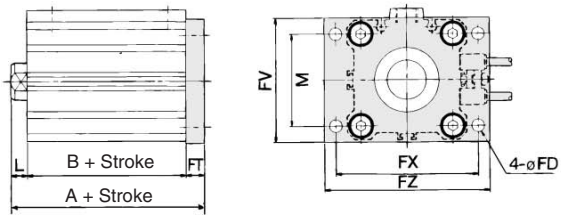


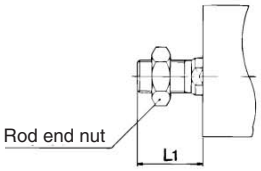
Rod Side Flange Style

Bore size (mm)	Stroke range (mm)	Without auto switch A	B	With auto switch A	B	FD	FT	FV	FX	FZ	L	L1	M
32	5 to 50	40	23	50	33	5.5	8	48	56	65	17	38.5	34
	75, 100	50	33										
40	5 to 50	46.5	29.5	56.5	39.5	5.5	8	54	62	72	17	38.5	40
	75, 100	56.5	39.5										
50	10 to 50	48.5	30.5	58.5	40.5	6.6	9	67	76	89	18	43.5	50
	75, 100	58.5	40.5										

Flange bracket material: Carbon steel

Head side flange style: CD2G/CDQ2G





Applicable to { Head side flange style / Double clevis style

Rod end male thread

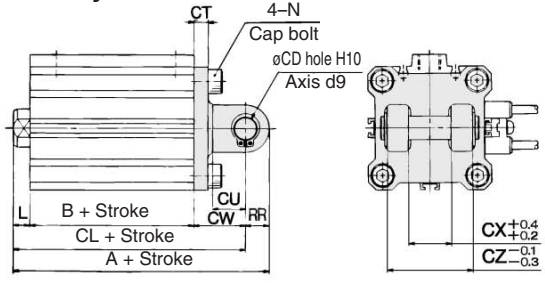
Head Side Flange Style

Bore size (mm)	Stroke range (mm)	Without auto switch A	With auto switch A	L	L1
32	5 to 50	38	48	7	28.5
	75, 100	48			
40	5 to 50	44.5	54.5	7	28.5
	75, 100	54.5			
50	10 to 50	47.5	57.5	8	33.5
	75, 100	57.5			

∗ Dimensions except A, L and L1 are the same as rod side flange style.

Flange bracket material: Carbon steel

Double clevis style: CQ2D/CPQ2D



Double Clevis Style

Bore size (mm)	Stroke range (mm)	Without auto switch A	B	CL	With auto switch A	B	CL	CD	CT	CU	CW	CX	CZ	L	L1
32	5 to 50	60	23	50	70	33	60	10	5	14	20	18	36	7	28.5
	75, 100	70	33	60											
40	5 to 50	68.5	29.5	58.5	78.5	39.5	68.5	10	6	14	22	18	36	7	28.5
	75, 100	78.5	39.5	68.5											
50	10 to 50	80.5	30.5	66.5	90.5	40.5	76.5	14	7	20	28	22	44	8	33.5
	75, 100	90.5	40.5	76.5											

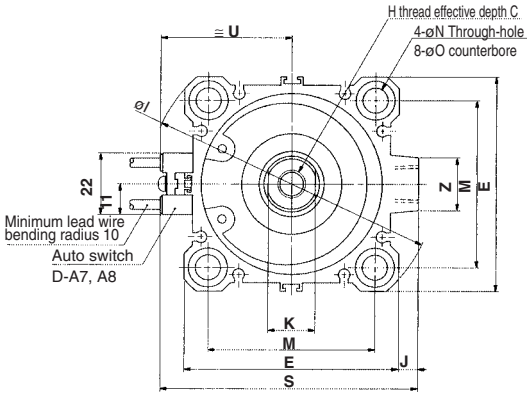
Double clevis bracket material: Cast iron

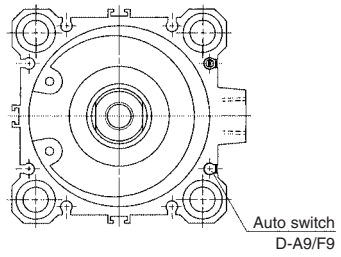
Bore size (mm)	N	RR
32	M6 x 1.0	10
40	M6 x 1.0	10
50	M8 x 1.25	14

∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.
∗∗ Clevis pin and snap ring are shipped together.

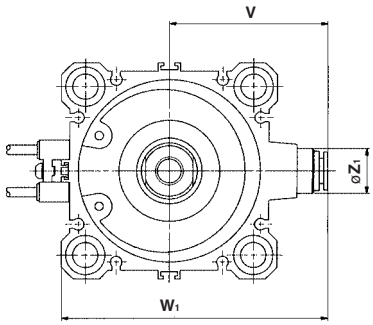
Dimensions: ø63 to ø100

Basic style (Through-hole)

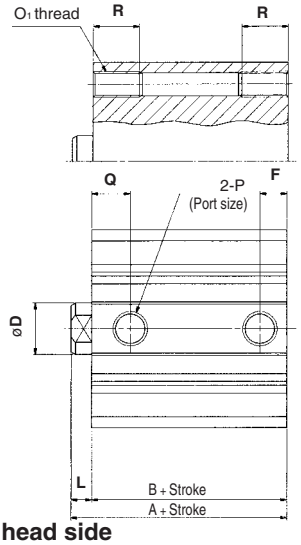




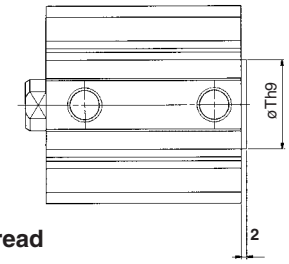
Basic style (Through-hole)



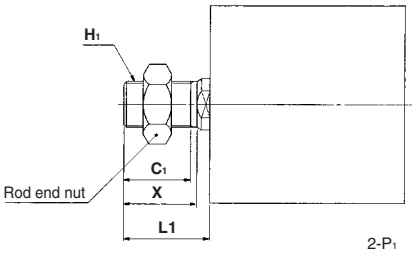
Both ends tapped style: CQ2A/CDQ2A

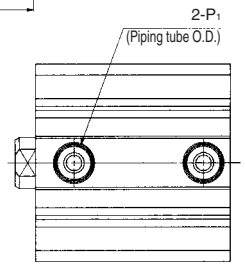


With boss in head side



Rod end male thread





Both Ends Tapped Style

Bore size (mm)	O_1	R
63	M10 x 1.5	18
80	M12 x 1.75	22
100	M12 x 1.75	22

With Boss in Head Side

Bore size (mm)	Th9
63	$35^{\ 0}_{-0.062}$
80	$43^{\ 0}_{-0.062}$
100	$59^{\ 0}_{-0.074}$

Note 1) With boss in rod side: Option
(Suffix "-XC36" to the end of part number.)

Rod End Male Thread

Bore size (mm)	C_1	X	H_1	L1
63	26	28.5	M18 x 1.5	33.5
80	32.5	35.5	M22 x 1.5	43.5
100	32.5	35.5	M26 x 1.5	43.5

Built-in One-touch Fittings

Bore size (mm)	Z_1	P_1	V	W_1
63	16	8	56.5	95

Basic Style

Auto switch shown above is D-A73 type and D-A80 type. For the auto switch mounting position and its mounting height, refer to page 7-6-22.

Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch		C	D	E	F	H	I	J	K	L	M	N	O	P	Q	S
		A	B	A	B															
63	10 to 50	44	36	54	46	15	20	77	10.5	M10 x 1.5	103	7	17	8	60	9	14 depth 10.5	Rc 1/4	15	93
	75, 100	54	46																	
80	10 to 50	53.5	43.5	63.5	53.5	21	25	98	12.5	M16 x 2.0	132	6	22	10	77	11	17.5 depth 13.5	Rc 3/8	16	112.5
	75, 100	63.5	53.5																	
100	10 to 50	65	53	75	63	27	30	117	13	M20 x 2.5	156	6.5	27	12	94	11	17.5 depth 13.5	Rc 3/8	23	132.5
	75, 100	75	63																	

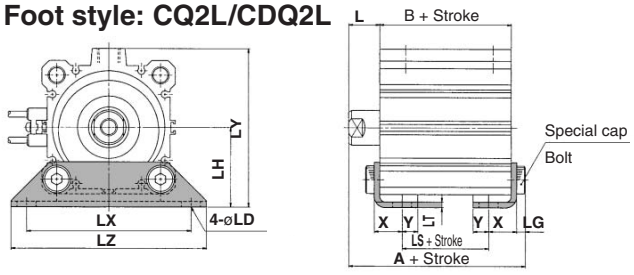
Bore size (mm)	U	Z
63	47.5	19
80	57.5	26
100	67.5	26

Note 2) External dimensions with rubber bumper are same as standard type as shown above.

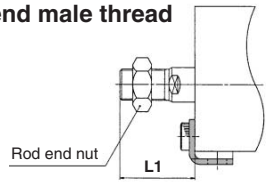
∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Note 3) For calculation on the longitudinal dimension of the intermediate strokes, refer to page 7-6-3.

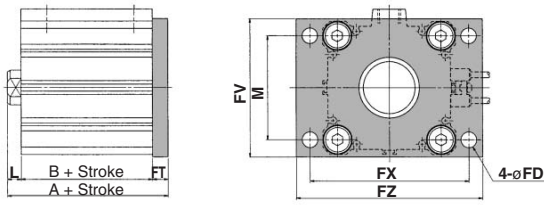
Foot style: CQ2L/CDQ2L



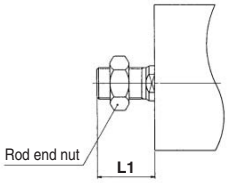
Rod end male thread



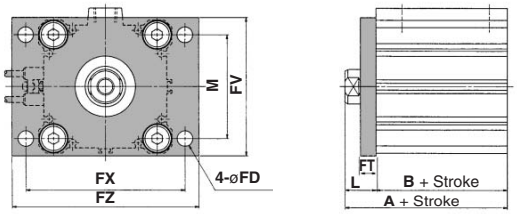
Head side flange style: CQ2G/CDQ2G



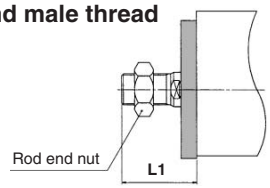
Rod end male thread



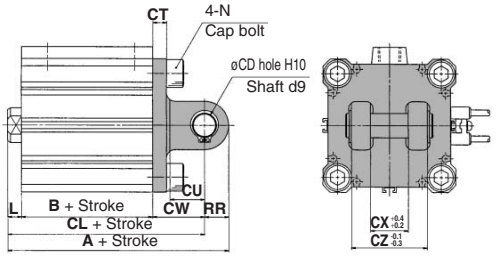
Rod side flange style: CQ2F/CDQ2F



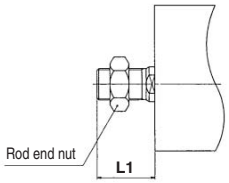
Rod end male thread



Double clevis style: CQ2D/CDQ2D



Rod end male thread



Foot Style

Bore size (mm)	Stroke range (mm)	Without auto switch A	B	LS	With auto switch A	B	LS	L	L1	LD	LG	LH	LT
63	10 to 50	62.2	36	10	72.2	46	20	18	43.5	11	5	46	3.2
	75, 100	72.2	46	20									
80	10 to 50	75	43.5	13.5	85	53.5	23.5	20	53.5	13	7	59	4.5
	75, 100	85	53.5	23.5									
100	10 to 50	88	53	19	98	63	29	22	53.5	13	7	71	6
	75, 100	98	63	29									

Foot bracket material: Carbon steel

Bore size (mm)	Stroke range (mm)	LX	LY	LZ	X	Y
63	10 to 50 75, 100	95	91.5	113	16.2	9
80	10 to 50 75, 100	118	114	140	19.5	11
100	10 to 50 75, 100	137	136	162	23	12.5

Head Side Flange Style

Bore size (mm)	Stroke range (mm)	Without auto switch A	With auto switch A	L	L1
63	10 to 50	53	63	8	33.5
	75, 100	63			
80	10 to 50	64.5	74.5	10	43.5
	75, 100	74.5			
100	10 to 50	76	86	12	43.5
	75, 100	86			

Flange bracket material: Carbon steel

∗ Dimensions except A, L and L1 are the same as rod side flange style.

Double Clevis Style

Bore size (mm)	Stroke range (mm)	Without auto switch A	B	With auto switch A	B	CD	CL	CT	CU	CW	CX	CZ	L
63	10 to 50	88	36	98	46	14	84	8	20	30	22	44	8
	75, 100	98	46										
80	10 to 50	109.5	43.5	119.5	53.5	18	101.5	10	27	38	28	56	10
	75, 100	119.5	53.5										
100	10 to 50	132	53	142	63	22	120	13	31	45	32	64	12
	75, 100	142	63										

Double clevis bracket material: Cast iron

Rod Side Flange Style

Bore size (mm)	Stroke range (mm)	Without auto switch A	B	With auto switch A	B	FD	FT	FV	FX	FZ	L	L1	M
63	10 to 50	54	36	64	46	9	9	80	92	108	18	43.5	60
	75, 100	64	46										
80	10 to 50	63.5	43.5	73.5	53.5	11	11	99	116	134	20	53.5	77
	75, 100	73.5	53.5										
100	10 to 50	75	53	85	63	11	11	117	136	154	22	53.5	94
	75, 100	85	63										

Flange bracket material: Carbon steel

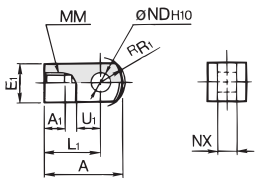
Bore size (mm)	Stroke range (mm)	L1	N	RR
63	10 to 50 75, 100	33.5	M10 x 1.5	14
80	10 to 50 75, 100	43.5	M12 x 1.75	18
100	10 to 50 75, 100	43.5	M12 x 1.75	22

∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.
∗ Clevis pin and set ring are shipped together.

Accessory Bracket

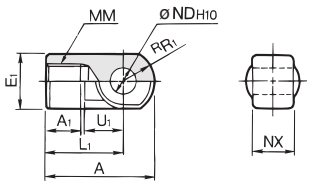
Single Knuckle Joint

For I-G012, I-Z015A
I-G02, I-G03



Material: Carbon steel

For I-G04, I-G05
I-G08, I-G10

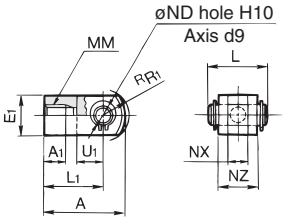


Material: Cast iron

Part no.	Applicable bore size (mm)	A	A_1	E_1	L_1	MM	$^{R}R_1$	U_1	ND_{H10}	NX
I-G012	**12**	21.5	6	□10	16	M5 x 0.8	6.3	7	$5^{+0.048}_{0}$	$5^{-0.2}_{-0.4}$
I-Z015A	**16**	32	8	□12	25	M6 x 1	8.1	14	$5^{+0.048}_{0}$	$6.4^{-0.1}_{-0.3}$
I-G02	**20**	34	8.5	□16	25	M8 x 1.25	10.3	11.5	$8^{+0.058}_{0}$	$8^{-0.2}_{-0.4}$
I-G03	**25**	41	10.5	□20	30	M10 x 1.25	12.8	14	$10^{+0.058}_{0}$	$10^{-0.2}_{-0.4}$
I-G04	**32, 40**	42	14	ø22	30	M14 x 1.5	12	14	$10^{+0.058}_{0}$	$18^{-0.3}_{-0.5}$
I-G05	**50, 63**	56	18	ø28	40	M18 x 1.5	16	20	$14^{+0.070}_{0}$	$22^{-0.3}_{-0.5}$
I-G08	**80**	71	21	ø38	50	M22 x 1.5	21	27	$18^{+0.070}_{0}$	$28^{-0.3}_{-0.5}$
I-G10	**100**	79	21	ø44	55	M26 x 1.5	24	31	$22^{+0.084}_{0}$	$32^{-0.3}_{-0.5}$

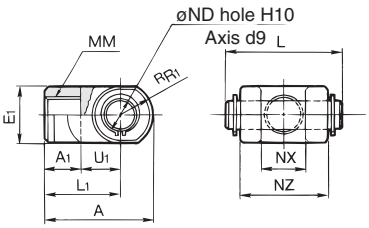
Double Knuckle Joint

For Y-G012, Y-Z015A
Y-G02, Y-G03



Material: Carbon steel

For Y-G04, Y-G05
Y-G08, Y-G10

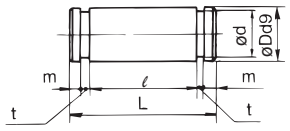


Material: Cast iron

Part no.	Applicable bore size (mm)	A	A_1	E_1	L_1	MM	$^{R}R_1$	U_1	ND_{H10}	NX	NZ	L	Applicable pin part no.
Y-G012	**12**	21.5	6	□10	16	M5 x 0.8	6.3	7	$5^{+0.048}_{0}$	$5^{+0.4}_{+0.2}$	10	14.6	IY-G012
Y-Z015A	**16**	28	11	□12	21	M6 x 1	8.1	10	$5^{+0.048}_{0}$	$6.5^{+0.2}_{0}$	12	16.6	IY-J015
Y-G02	**20**	34	8.5	□16	25	M8 x 1.25	10.3	11.5	$8^{+0.058}_{0}$	$8^{+0.4}_{+0.2}$	16	21	IY-G02
Y-G03	**25**	41	10.5	□20	30	M10 x 1.25	12.8	14	$10^{+0.058}_{0}$	$10^{+0.4}_{+0.2}$	20	25.6	IY-G03
Y-G04	**32, 40**	42	16	ø22	30	M14 x 1.5	12	14	$10^{+0.058}_{0}$	$18^{+0.5}_{+0.3}$	36	41.6	IY-G04
Y-G05	**50, 63**	56	20	ø28	40	M18 x 1.5	16	20	$14^{+0.070}_{0}$	$22^{+0.5}_{+0.3}$	44	50.6	IY-G05
Y-G08	**80**	71	23	ø38	50	M22 x 1.5	21	27	$18^{+0.070}_{0}$	$28^{+0.5}_{+0.3}$	56	64	IY-G08
Y-G10	**100**	79	24	ø44	55	M26 x 1.5	24	31	$22^{+0.084}_{0}$	$32^{+0.5}_{+0.3}$	64	72	IY-G10

∗ Knuckle pin and snap ring are included.

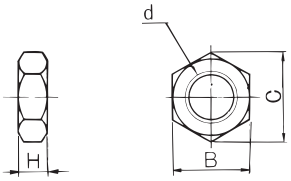
Knuckle Pin (Common with double clevis pin)



Material: Carbon steel

Part no.	Applicable bore size (mm)	Dd9	L	d	ℓ	m	t	Applicable snap ring
IY-G012	**12**	$5^{-0.030}_{-0.060}$	14.6	4.8	10.2	1.5	0.7	Type C 5 for axis
IY-J015	**16**	$5^{-0.030}_{-0.060}$	16.6	4.8	12.2	1.5	0.7	Type C 5 for axis
IY-G02	**20**	$8^{-0.040}_{-0.076}$	21	7.6	16.2	1.5	0.9	Type C 8 for axis
IY-G03	**25**	$10^{-0.040}_{-0.076}$	25.6	9.6	20.2	1.55	1.15	Type C 10 for axis
IY-G04	**32, 40**	$10^{-0.040}_{-0.076}$	41.6	9.6	36.2	1.55	1.15	Type C 10 for axis
IY-G05	**50, 63**	$14^{-0.050}_{-0.093}$	50.6	13.4	44.2	2.05	1.15	Type C 14 for axis
IY-G08	**80**	$18^{-0.050}_{-0.093}$	64	17	56.2	2.55	1.35	Type C 18 for axis
IY-G10	**100**	$22^{-0.065}_{-0.117}$	72	21	64.2	2.55	1.35	Type C 22 for axis

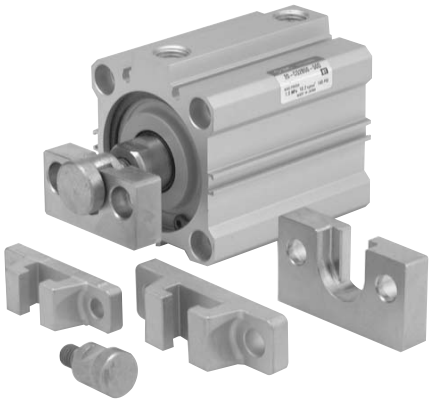
Rod End Nut



Material: Carbon steel

Part no.	Applicable bore size (mm)	d	H	B	C
NTJ-015A	**12**	M5 x 0.8	4	8	9.2
NT-015A	**16**	M6 x 1	5	10	11.5
NT-02	**20**	M8 x 1.25	5	13	15.0
NT-03	**25**	M10 x 1.25	6	17	19.6
NT-04	**32, 40**	M14 x 1.5	8	22	25.4
NT-05	**50, 63**	M18 x 1.5	11	27	31.2
NT-08	**80**	M22 x 1.5	13	32	37.0
NT-10	**100**	M26 x 1.5	16	41	47.3

Simple Joint: ø32 to ø100



Joint and Mounting Bracket (Type A, Type B) Part No.

YA — **03**

Mounting bracket

YA	Type A mounting bracket
YB	Type B mounting bracket
YU	Joint

Applicable air cylinder bore

03	For ø32, ø40
05	For ø50, ø63
08	ø80
10	ø100

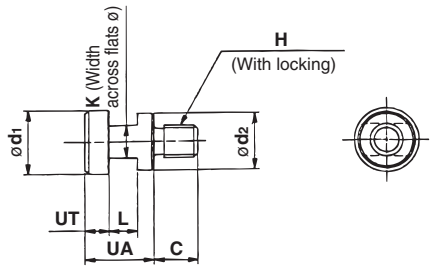
Allowable Eccentricity

Bore size (mm)	**32**	**40**	**50**	**63**	**80**	**100**
Eccentricity tolerance	±1				±1.5	±2
Backlash	0.5					

<Ordering>
• Joints are not included with the A or B type mounting brackets. Order them separately.
(Example)
Bore size ø40 Part no.
• Type A mounting bracket part no.····· YA-03
• Joint····· YU-03

Joint Part No.

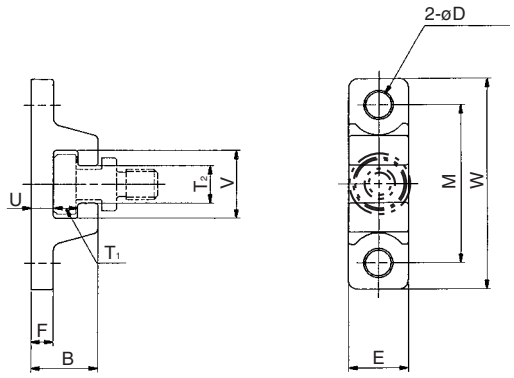
Bore size (mm)	Joint part no.	Applicable mounting bracket		Weight (g)
		Type A mounting bracket	Type B mounting bracket	
32, 40	**YU-03**	**YA-03**	**YB-03**	25
50, 63	**YU-05**	**YA-05**	**YB-05**	40
80	**YU-08**	**YA-08**	**YB-08**	90
100	**YU-10**	**YA-10**	**YB-10**	160



Material: Chromium molybdenum steel (Nickel plated)

Part no.	Applicable bore size (mm)	UA	C	d_1	d_2	H	K	L	UT	Weight (g)
YU-03	**32, 40**	17	11	15.8	14	M8 x 1.25	8	7	6	25
YU-05	**50, 63**	17	13	19.8	18	M10 x 1.5	10	7	6	40
YU-08	**80**	22	20	24.8	23	M16 x 2	13	9	8	90
YU-10	**100**	26	26	29.8	28	M20 x 2.5	14	11	10	160

Type A Mounting Bracket

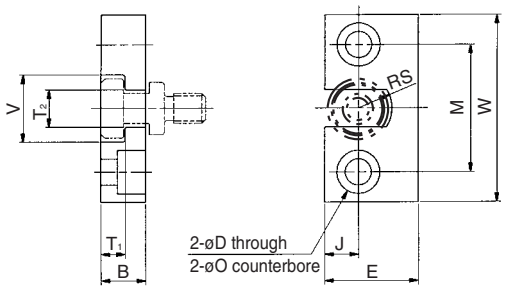


Material: Chromium molybdenum steel (Nickel plated)

Part no.	Bore size (mm)	B	D	E	F	M	T_1	T_2
YA-03	**32, 40**	18	6.8	16	6	42	6.5	10
YA-05	**50, 63**	20	9	20	8	50	6.5	12
YA-08	**80**	26	11	25	10	62	8.5	16
YA-10	**100**	31	14	30	12	76	10.5	18

Part no.	Bore size (mm)	U	V	W	Weight (g)
YA-03	**32, 40**	6	18	56	55
YA-05	**50, 63**	8	22	67	100
YA-08	**80**	10	28	83	195
YA-10	**100**	12	36	100	340

Type B Mounting Bracket



Material: Precision die-casting material equivalent to stainless steel 304

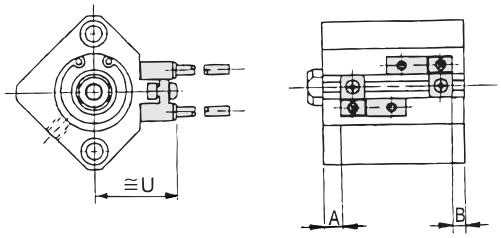
Part no.	Bore size (mm)	B	D	E	J	M	øO
YB-03	**32, 40**	12	7	25	9	34	11.5 depth 7.5
YB-05	**50, 63**	12	9	32	11	42	14.5 depth 8.5
YB-08	**80**	16	11	38	13	52	18 depth 12
YB-10	**100**	19	14	50	17	62	21 depth 14

Part no.	Bore size (mm)	T_1	T_2	V	W	RS	Weight (g)
YB-03	**32, 40**	6.5	10	18	50	9	80
YB-05	**50, 63**	6.5	12	22	60	11	120
YB-08	**80**	8.5	16	28	75	14	230
YB-10	**100**	10.5	18	36	90	18	455

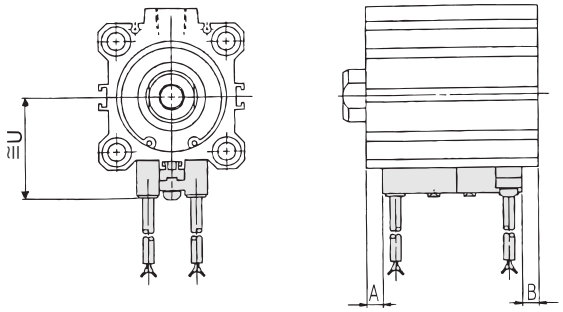
Proper Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height

D-A7□
D-A80

ø12 to ø25

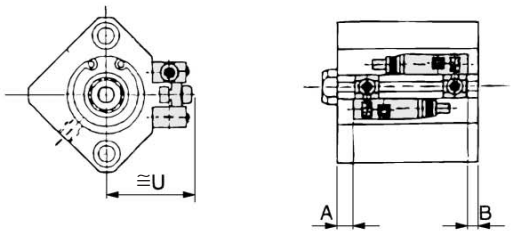


ø32 to ø100

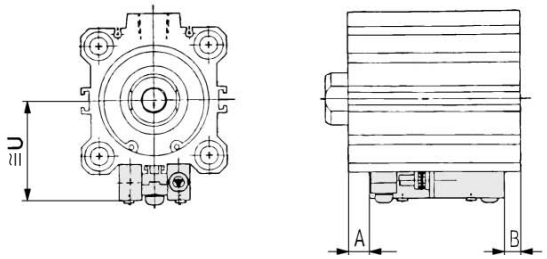


D-A7□H
D-A80H
D-F7□
D-J79
D-F7□W
D-J79W
D-F79F
D-F7NTL
D-F7BAL

ø12 to ø25

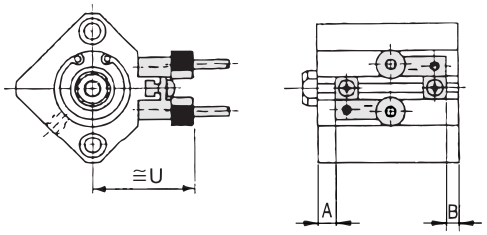


ø32 to ø100

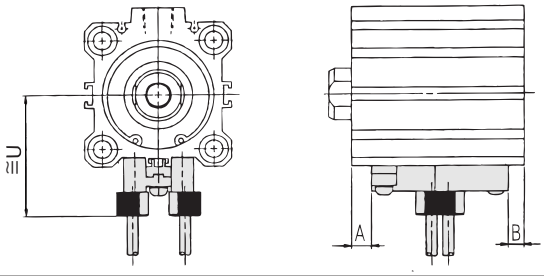


D-A73C
D-A80C
D-J79C

ø12 to ø25

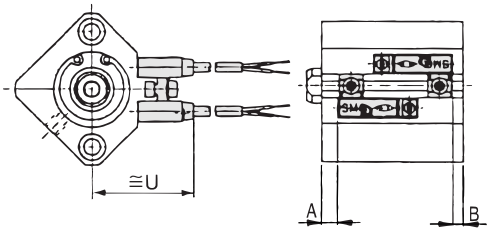


ø32 to ø100

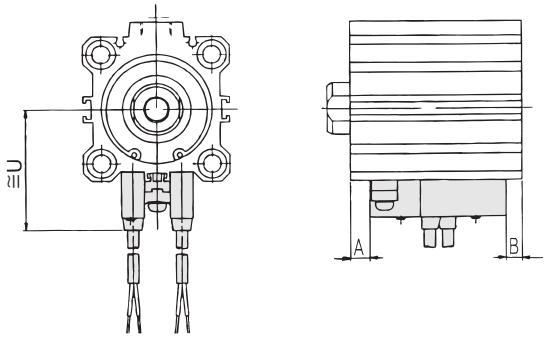


D-A79W
D-F7□WV
D-F7□V
D-F7BAVL

ø12 to ø25

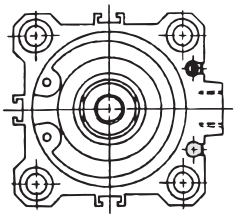


ø32 to ø100

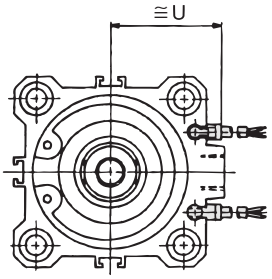


ø32 to ø100

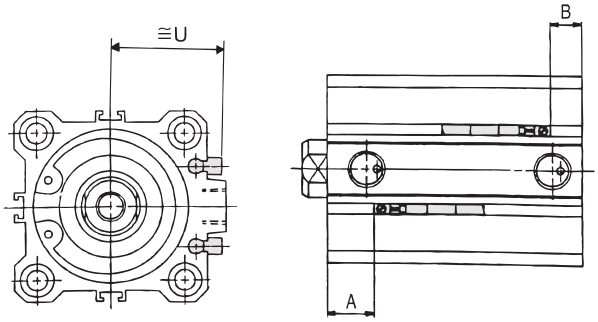
D-A9□
D-M9□
D-F9□W



D-A9□V
D-M9□V
D-F9□WV



D-F9BAL



Operating Range

Auto switch model	Bore size (mm)														
	12	**16**	**20**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**	**140**	**160**	**180**	**200**
D-A7□(H)(C) **D-A80□(H)(C)**	10	12	12	12	12	11	10	12	12	13	13	13	13	—	—
D-A9□(V)	—	—	—	—	9.5	9.5	9.5	11.5	9	11.5	—	—	—	—	—
D-Z7□ **D-Z80**	—	—	—	—	—	—	—	—	—	—	14	14	14	15	15.5
D-F7□(V) **D-J79(C)** **D-F7□W(V)** **D-F7BA(V)L** **D-F7NTL** **D-F79F**	5.5	6	5.5	5	6	6	6	6.5	6.5	7	9	9	8.5	—	—
D-F9□(V) **D-F9□W(V)** **D-F9BA(V)L** **D-Y59□**	—	—	—	—	5.5	5.5	5.5	6.5	5.5	6.5	—	—	—	—	—
D-Y69□ **D-Y7P(V)** **D-Y7□W(V)**	—	—	—	—	—	—	—	—	—	—	11.5	11.5	11.5	12	12
D-Y7BAL	—	—	—	—	—	—	—	—	—	—	5.5	5.5	5.5	6	6
D-P5DW	—	—	—	—	—	5	5	5	5	5.5	—	—	—	—	—

∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion)
There may be the case to change substantially depending on an ambient environment.

Other than the applicable auto switches listed in “How to Order”, the following auto switches can be mounted. For detailed specifications, refer to page 7-9-1.

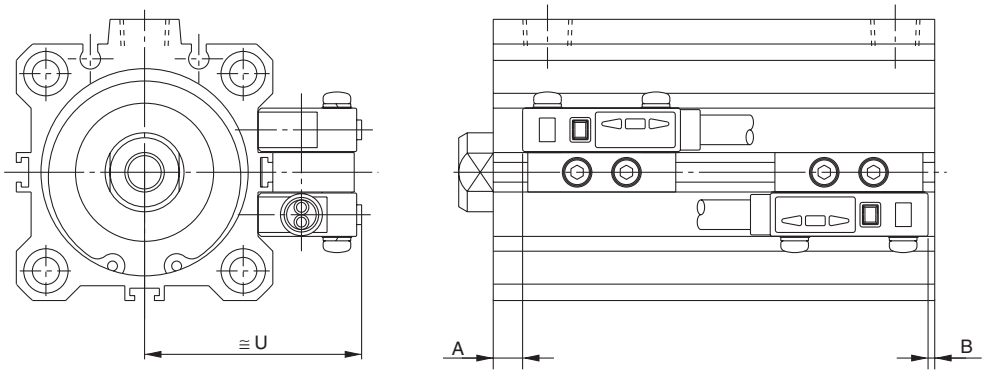
Type	Model	Electrical entry (Fetching direction)	Features	Applicable bore size (mm)
Reed switch	D-A80	Grommet (Perpendicular)	Without indicator light	12 to 160
	D-A80H	Grommet (In-line)		
	D-A80C	Connector (Perpendicular)		
	D-Z80	Grommet (In-line)		125 to 200
	D-A90	Grommet (In-line)		32 to 100
	D-A90V	Grommet (Perpendicular)		
Solid state switch	D-F7NTL	Grommet (In-line)	With timer	12 to 160

∗ With pre-wire connector is available for D-F7NTL type, too. For details, refer to page 7-9-36.
∗ Normally closed (NC = b contact), solid state switches (D-F9G/F9H/Y7G/Y7H type) are available, too. For details, refer to page 7-9-23 and 24.

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

ø40 to ø100

D-P5DWL



Proper Auto Switch Mounting Position

Bore size (mm)	D-A7□/A80		D-A7□H/A80H D-A73C/A80C D-F7□/J79/J79W D-F7□V/J79C D-F7□W/F7□WV D-F7BAL/F7BAVL D-F79F		D-A79W		D-A9□ D-A9□V		D-M9□ D-M9□V D-F9□W D-F9□WV		D-F9BAL		D-P5DWL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
12	4.5	5.5	5	6	2	3	—	—	—	—	—	—	—	—
16	7.5	5	8	5.5	5	2.5	—	—	—	—	—	—	—	—
20	7.5	6.5	8	7	5	4	—	—	—	—	—	—	—	—
25	7.5	7	8	7.5	5	4.5	—	—	—	—	—	—	—	—
32	9.0	6	9.5	6.5	6.5	3.5	8	5	12	9	11	8	—	—
40	13	8.5	13.5	9	10.5	6	12	7.5	16	11.5	15	10.5	9	4.5
50	11	11.5	11.5	12	8.5	9	10	10.5	14	14.5	13	13.5	7	7.5
63	13.5	14.5	14	15	11	12	12.5	13.5	16.5	17.5	15.5	16.5	9.5	10.5
80	17.5	18	18	18.5	15	15.5	16.5	17	20.5	21	19.5	20	13.5	14
100	21	24	21.5	24.5	18.5	21.5	20	23	24	27	23	26	17	20

Auto Switch Mounting Height

Bore size (mm)	D-A7□ D-A80	D-A7□H D-A80H D-F7□ D-J79 D-F7□W D-J79W D-F7BAL D-F79F D-F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAVL	D-J79C	D-A79W	D-A9□V	D-M9□V D-F9□WV	D-F9BAL	D-P5DWL
	U	U	U	U	U	U	U	U	U	U
12	19.5	20.5	26.5	23	26	22	—	—	—	—
16	22.5	23.5	29.5	26	29	25	—	—	—	—
20	24.5	25.5	31.5	28	31	27	—	—	—	—
25	27.5	28.5	34.5	31	34	30	—	—	—	—
32	31.5	32.5	38.5	35	38	34	27	29	26.5	—
40	35	36	42	38.5	41.5	37.5	30.5	32.5	30	44
50	41	42	48	44.5	47.5	43.5	36.5	38.5	36	50
63	47.5	48.5	54.5	51	54	50	40	42	39.5	56.5
80	57.5	58.5	64.5	61	64	60	50	52	49.5	66.5
100	67.5	68.5	74.5	71	74	70	60	62	59.5	76.5

Compact Cylinder: Standard Type
Double Acting, Double Rod
Series CQ2W
ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Without auto switch CQ2W | B | | 20 | | 30 | D | |

With auto switch CDQ2W | B | | 20 | | 30 | D | | J79W | S |

Built-in magnet

Mounting style

B	Through-hole (Standard)	L	Foot style
A	Both ends tapped style	F	Flange style

∗ Mounting brackets are shipped together, (but not assembled).

Type

Nil	Pneumatic
H	Air-hydro Note)

Note) Bore sizes available for air-hydro type are ø20 to ø63

Bore size

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

Piping

Nil	Screw-in piping
F	Built-in One-touch fittings Note)

Note) Available bore sizes w/ One-touch fittings are ø32 to ø63. Besides, it is not possible to use for air-hydro type.

Cylinder stroke (mm)

Refer to "Standard Stroke" on page 7-6-26.

Action

D	Double acting

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled). (Except D-P5DWL)

Number of auto switches

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

Body option

Nil	Standard (Rod end female thread)
C	With rubber bumper Note)
M	Rod end male thread

∗ Combination of body options ("CM") is available.
Note) Air-hydro type with rubber bumper is not available.

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

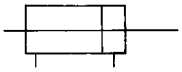
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Rail mounting ø12 to ø100 Perpendicular	Rail mounting ø12 to ø100 In-line	Direct mounting ø32 to ø100 Perpendicular	Direct mounting ø32 to ø100 In-line	Lead wire length (m) ∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	—	A76H	A96V	A96	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200 V	A72	A72H	—	—	●	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	A73	A73H	—	—	●	●	●	—	—		
								—	—	A93V	A93	●	●	—	—	—		
		Connector					—	A73C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	A79W	—	—	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NV	F79	M9NV	M9N	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				F7PV	F7P	M9PV	M9P	●	●	○	—	○		
				2-wire		12 V		F7BV	J79	M9BV	M9B	●	●	○	—	○	—	
		Connector						J79C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		F7NWV	F79W	F9NWV	F9NW	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	F7PW	F9PWV	F9PW	●	●	○	—	○		
				2-wire		12 V		F7BWV	J79W	F9BWV	F9BW	●	●	○	—	○		
	Water resistant (2-color indication)							—	F7BA	—	F9BA	—	●	○	—	○	—	
								F7BAV	—	—	—	—	●	○	—	—		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		—	F79F	—	—	●	●	○	—	○	IC circuit	
	Magnetic field resistant (2-color indication)			2-wire		—		—	P5DW	—	—	—	●	●	—	○	—	

∗ 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.

• D-P5DWL type is available from ø40 up to ø100 only.
• There are other applicable auto switches other than the listed above. For details, refer to page 7-6-23.
• For details about auto switches with pre-wire connector, refer to page 7-9-36.

JIS Symbol
Double acting,
double rod



⚠ Precautions

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

Snap Ring Installation/Removal

⚠ Caution

1. 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 installment.

Mounting

1. When removing a load, be sure to secure the wrench flats of the piston rod on the load side.
2. If this is done without securing the piston rod on the load side, be aware that the coupled (screwed-in) portion of the piston rod could become loosened.

Type

Bore size (mm)			12	16	20	25	32	40	50	63	80	100
Pneumatic	Mounting	Through-hole (Standard)	●	●	●	●	●	●	●	●	●	●
		Both ends tapped style	●	●	●	●	●	●	●	●	●	●
	Built-in magnet		●	●	●	●	●	●	●	●	●	●
	Piping	Screw-in type	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8	(1) M5 x 0.8 Rc 1/8	Rc 1/8	Rc 1/4	Rc 1/4	Rc 3/8	Rc 3/8
		Built-in One-touch fittings	—	—	—	—	ø6/4 (2)	ø6/4	ø8/6	ø8/6	—	—
	Rod end male thread		●	●	●	●	●	●	●	●	●	●
	With rubber bumper		●	●	●	●	●	●	●	●	●	●
Air-hydro	Mounting	Through-hole (Standard)	—	—	●	●	●	●	●	●	●	●
		Both ends tapped style	—	—	●	●	●	●	●	●	●	●
	Built-in magnet		—	—	●	●	●	●	●	●	●	●
	Piping	Screw-in type	—	—	M5 x 0.8	M5 x 0.8	(1) M5 x 0.8 Rc 1/8	Rc 1/8	Rc 1/4	Rc 1/4	Rc 3/8	Rc 3/8
	Rod end male thread		—	—	●	●	●	●	●	●	●	●

Note 1) In the case of without auto switch, M5 x 0.8 is used for 5 stroke only.
Note 2) In the case of built-in fitting, the 5 mm stroke with ø32 bore is the same external dimensions as 10 mm stroke.

Specifications

Type	Pneumatic (Non-lube)	Air-hydro
Fluid	Air	Turbine oil (3)
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)	Air-hydro 5 to 60°C
Rubber bumper	None	—
Rod end thread	Female thread	
Rod end thread tolerance	JIS Class 2	
Stroke length tolerance	$^{+1.0}_{0}$	
Mounting	Through-hole	
Piston speed	50 to 500 mm/s	5 to 50 mm/s

Note 3) For caution on handling, refer to page 7-13-6.

Standard Stroke

Pneumatic (Non-lube)

Bore size (mm)	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, 50, 75, 100
50, 63 80, 100	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100

Air-hydro

Bore size (mm)	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

Manufacture of Intermediate Stroke

Description	Spacer is installed in the standard stroke body.		Exclusive body (-XB10)	
Part no.	"How to Order" for the standard model no. on page 7-6-25.		Suffix "-XB10" to the end of standard model no. on page 7-6-25.	
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	Bore size	Stroke range	Bore size	Stroke range
	—	—	12, 16	6 to 29
			20, 25	6 to 49
	32 to 100	55 to 95	32, 40	6 to 99
			50 to 100	11 to 99
Example	Part no.: CQ2WB50-65D CQ2WB50-75D with 10 mm spacer inside. B dimension is 125.5 mm.		Part no.: CQ2WB50-65D-XB10 Makes 65 stroke tube. B dimension is 115.5 mm.	

• Air-hydro type is excluded.
• In the case of special body type for ø32 to ø100 (-XB10), standard value for longitudinal dimensions will be changed.
Subtract from 75 and 100 stroke dimensions and figure it out.

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

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat resistant cylinder (150°C) w/o auto switch only
-XB7	Cold resistant cylinder w/o auto switch only
-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 and rod end nut made of stainless steel
-XC18	NPT finish piping port
-XC35	With coil scraper, ø32 to 100 only
-XC36	With boss in rod side
-X293	Same full length dimension as Series CQ1W
-X144	Change of port location
-X235	Change of piston rod end of double rod cylinder
-X271	Fluoro rubber for seals

Mounting Bracket Part No.

Bore size (mm)	Foot (4)	Flange
12	CQ-L012	CQ-F012
16	CQ-L016	CQ-F016
20	CQ-L020	CQ-F020
25	CQ-L025	CQ-F025
32	CQ-L032	CQ-F032
40	CQ-L040	CQ-F040
50	CQ-L050	CQ-F050
63	CQ-L063	CQ-F063
80	CQ-L080	CQ-F080
100	CQ-L100	CQ-F100

Note 4) Order two foot brackets per cylinder.
Note 5) Parts belonging to each bracket are as follows.
Foot or Flange style: Body mounting bolt

Minimum Operating Pressure

(MPa)

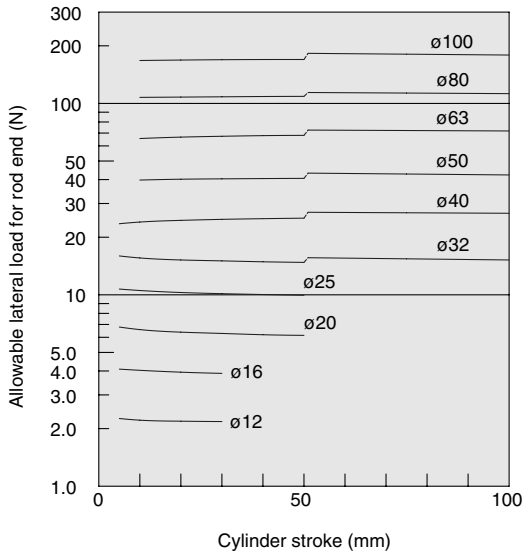
Bore size (mm)	12	16	20	25	32	40	50	63	80	100
Pneumatic (Non-lube)	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Air-hydro	—	—	0.18	0.18	0.18	0.10	0.10	0.10	0.10	0.10

Allowable Kinetic Energy

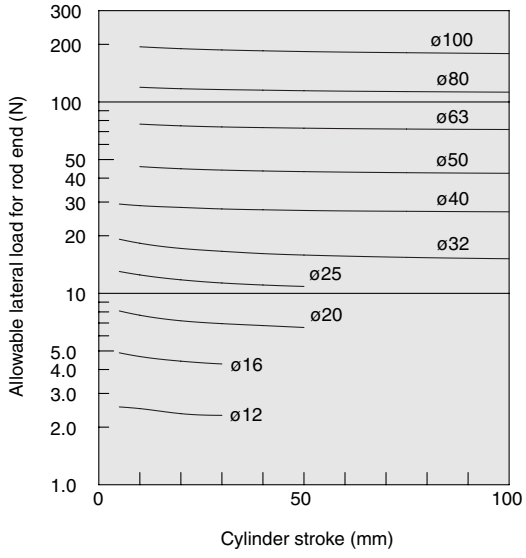
(J)

Bore size (mm)	12	16	20	25	32	40	50	63	80	100
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

Allowable Lateral Load at Rod End



Allowable lateral load for rod end (Double rod, without switch)



Allowable lateral load for rod end (Double rod, with switch)

Theoretical Output

(N)

Bore size (mm)	Operating pressure (MPa)		
	0.3	0.5	0.7
12	25	42	59
16	45	75	106
20	71	118	165
25	113	189	264
32	181	302	422
40	317	528	739
50	495	825	1150
63	841	1400	1960
80	1360	2270	3170
100	2140	3570	5000

Weight

(g)

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	42	49	56	63	70	77	—	—	—	—	—	—
16	59	68	77	86	95	104	—	—	—	—	—	—
20	89	104	119	134	149	164	179	194	209	224	—	—
25	119	136	153	170	187	204	221	238	255	272	—	—
32	192	220	244	268	292	316	340	364	388	412	532	652
40	292	323	354	385	416	447	478	509	540	571	726	881
50	—	528	573	618	663	708	753	798	843	888	1113	1338
63	—	676	714	753	792	831	870	909	948	987	1182	1377
80	—	1241	1325	1409	1493	1577	1661	1745	1829	1913	2333	2753
100	—	2106	2225	2344	2463	2582	2701	2820	2939	3058	3653	4248

Additional Weight

(g)

Bore size (mm)		12	16	20	25	32	40	50	63	80	100
Both ends tapped style		2	2	6	6	6	6	6	19	45	45
Rod end male thread	Male thread	3	6	12	24	52	54	106	106	240	350
	Nut	2	4	8	16	34	34	64	64	98	232
With rubber bumper		0	0	–2	–2	–3	–7	–12	–20	–34	–57
Built-in One-touch fittings		—	—	—	—	12	12	21	21	—	—
Foot style (Including mounting bolt)		57	71	170	195	159	171	267	349	735	1117
Flange style (Including bolt)		57	69	139	161	180	214	373	559	1056	1365

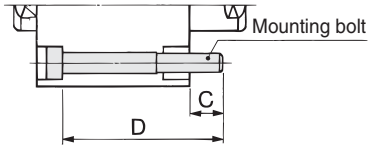
Calculation: (Example) CQ2WF32-20DCM

- Cylinder weight: CQ2WB32-20D ····· 268 g
- Option weight: Both ends tapped style ····· 6 g
  Rod end male thread ····· 86 g
  Rubber bumper ····· –3 g
  Flange style ····· 180 g

537 g

Mounting Bolt for CQ2WB

Mounting method: Mounting bolt for through-hole mounting style of CQ2WB is available as an option.
Ordering: Add the word "Bolt" in front of the bolts to be used.
Example) Bolt M3 x 35ℓ 4 pcs.



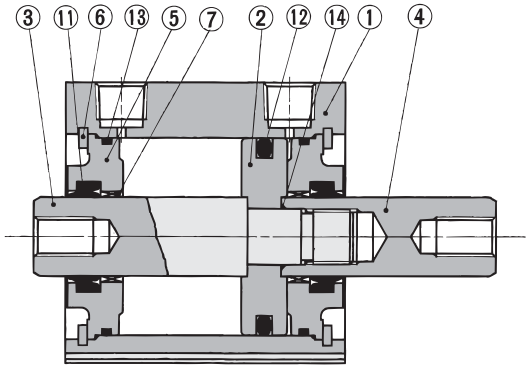
Model	C	D	Bolt
CQ2WB12-5D	8.3	35	M3 x 35ℓ
-10D		40	x 40ℓ
-15D		45	x 45ℓ
-20D		50	x 50ℓ
-25D		55	x 55ℓ
-30D		60	x 60ℓ
CQ2WB16-5D	7.5	35	M3 x 35ℓ
-10D		40	x 40ℓ
-15D		45	x 45ℓ
-20D		50	x 50ℓ
-25D		55	x 55ℓ
-30D		60	x 60ℓ
CQ2WB20-5D	6	30	x 30ℓ
-10D		35	x 35ℓ
-15D		40	x 40ℓ
-20D		45	x 45ℓ
-25D		50	x 50ℓ
-30D		55	x 55ℓ
-35D		60	x 60ℓ
-40D		65	x 65ℓ
-45D		70	x 70ℓ
-50D		75	x 75ℓ
CQ2WB25-5D	8	35	M5 x 35ℓ
-10D		40	x 40ℓ
-15D		45	x 45ℓ
-20D		50	x 50ℓ
-25D		55	x 55ℓ
-30D		60	x 60ℓ
-35D		65	x 65ℓ
-40D		70	x 70ℓ
-45D		75	x 75ℓ
-50D		80	x 80ℓ

Model	C	D	Bolt
CQ2WB32-5D	6.5	35	M5 x 35ℓ
-10D		40	x 40ℓ
-15D		45	x 45ℓ
-20D		50	x 50ℓ
-25D		55	x 55ℓ
-30D		60	x 60ℓ
-35D		65	x 65ℓ
-40D		70	x 70ℓ
-45D		75	x 75ℓ
-50D		80	x 80ℓ
-75D		115	x 115ℓ
-100D		140	x 140ℓ
CQ2WB40-5D	7	45	M5 x 45ℓ
-10D		50	x 50ℓ
-15D		55	x 55ℓ
-20D		60	x 60ℓ
-25D		65	x 65ℓ
-30D		70	x 70ℓ
-35D		75	x 75ℓ
-40D		80	x 80ℓ
-45D		85	x 85ℓ
-50D		90	x 90ℓ
-75D		125	x 125ℓ
-100D		150	x 150ℓ
CQ2WB50-10D	12.5	55	M6 x 55ℓ
-15D		60	x 60ℓ
-20D		65	x 65ℓ
-25D		70	x 70ℓ
-30D		75	x 75ℓ
-35D		80	x 80ℓ
-40D		85	x 85ℓ
-45D		90	x 90ℓ
-50D		95	x 95ℓ
-75D		130	x 130ℓ
-100D		155	x 155ℓ

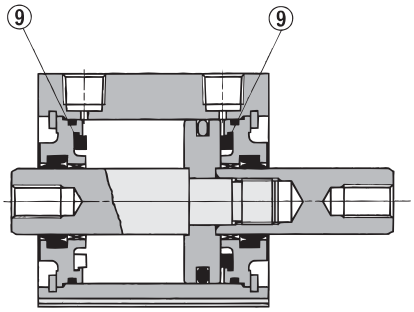
Model	C	D	Bolt
CQ2WB63-10D	13.5	55	M8 x 55ℓ
-15D		60	x 60ℓ
-20D		65	x 65ℓ
-25D		70	x 70ℓ
-30D		75	x 75ℓ
-35D		80	x 80ℓ
-40D		85	x 85ℓ
-45D		90	x 90ℓ
-50D		95	x 95ℓ
-75D		130	x 130ℓ
-100D		155	x 155ℓ
CQ2WB80-10D	12.5	60	M10 x 60ℓ
-15D		65	x 65ℓ
-20D		70	x 70ℓ
-25D		75	x 75ℓ
-30D		80	x 80ℓ
-35D		85	x 85ℓ
-40D		90	x 90ℓ
-45D		95	x 95ℓ
-50D		100	x 100ℓ
-75D		135	x 135ℓ
-100D		160	x 160ℓ
CQ2WB100-10D	13	70	M10 x 70ℓ
-15D		75	x 75ℓ
-20D		80	x 80ℓ
-25D		85	x 85ℓ
-30D		90	x 90ℓ
-35D		95	x 95ℓ
-40D		100	x 100ℓ
-45D		105	x 105ℓ
-50D		110	x 110ℓ
-75D		145	x 145ℓ
-100D		170	x 170ℓ

Construction

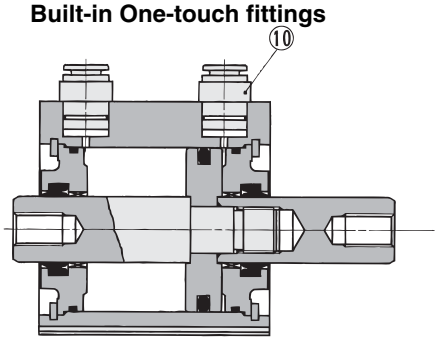
Basic style



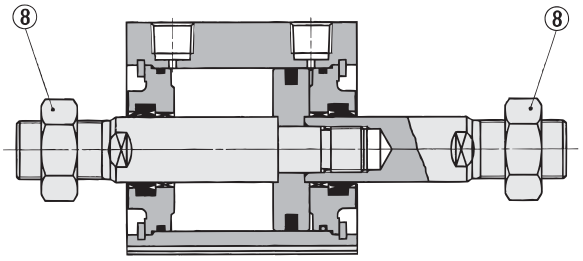
With rubber bumper



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	Chromated
③	Piston rod A	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø100, Hard chrome plated
④	Piston rod B	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø100, Hard chrome plated
⑤	Collar	Aluminum alloy	ø12 to ø40, Anodized
		Aluminum alloy casted	ø50 to ø100, Chromated, painted
⑥	Snap ring	Carbon tool steel	Phosphate coated
⑦	Bushing	Lead bronze casting	For ø50 or larger only
⑧	Rod end nut	Carbon steel	Nickel plated
⑨	Bumper	Urethane	
⑩	One-touch fittings	—	ø32 to ø63
⑪*	Rod seal	NBR	
⑫*	Piston seal	NBR	
⑬*	Tube gasket	NBR	
⑭	Piston gasket	NBR	

Replacement Part: Seal Kit (Pneumatic)

Bore size (mm)	Kit no.	Contents
12	CQ2WB12-PS	Set of nos. above ⑪, ⑫, ⑬
16	CQ2WB16-PS	
20	CQ2WB20-PS	
25	CQ2WB25-PS	
32	CQ2WB32-PS	
40	CQ2WB40-PS	
50	CQ2WB50-PS	
63	CQ2WB63-PS	
80	CQ2WB80-PS	
100	CQ2WB100-PS	

Replacement Part: Seal Kit (Air-hydro)

Bore size (mm)	Kit no.	Contents
20	CQ2WBH20-PS	Set of nos. above ⑪, ⑫, ⑬
25	CQ2WBH25-PS	
32	CQ2WBH32-PS	
40	CQ2WBH40-PS	
50	CQ2WBH50-PS	
63	CQ2WBH63-PS	
80	CQ2WBH80-PS	
100	CQ2WBH100-PS	

∗ Seal kit includes ⑪, ⑫, ⑬. Order the seal kit, based on each bore size.

Copper-free (For CRT manufacturing process)

20 — CQ2WB [Bore size] — [Stroke] D(C)(M)

- **Copper-free**
- **Bore size:** ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

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, Double rod
Bore size (mm)	12, 16, 20, 25, 32, 40, 50, 63, 80, 100
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Rubber bumper	None
Piping	Screw-in piping
Piston speed	50 to 500 mm/s
Mounting	Through-hole
Auto switch	Mountable

Standard: Double Acting, Double Rod
Series CDQ2W
With Auto Switch

∗ Refer to page 7-9-1 for further information on auto switches.

How to Order

For "How to Order" with auto switch, refer to page 7-6-25.

Minimum Stroke for Auto Switch Mounting

(mm)

No. of auto switches mounted	D-F7□V D-J79C D-M9□V	D-A7□ D-A80 D-A73C D-A80C D-A9□V	D-F7□WV D-F9□WV D-F7BAVL	D-A7□H D-A80H D-F7□ D-J79 D-M9□ D-F9□W	D-A79W	D-F7□W D-J79W D-F7BAL D-F79F D-F9BAL	D-P5DWL	D-A9□
1 pc.	5	5	10	15	15	20	30	10
2 pcs.	5	10	15	15	20	20	30	10

Weight

(g)

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	55	63	71	79	87	95	—	—	—	—	—	—
16	88	99	110	121	132	143	—	—	—	—	—	—
20	135	152	169	186	203	220	237	254	271	288	—	—
25	182	199	216	233	250	267	284	301	318	335	—	—
32	247	271	295	319	343	367	391	415	439	463	487	511
40	370	401	432	463	494	525	556	587	618	649	680	711
50	—	647	692	737	782	827	872	917	962	1007	1052	1097
63	—	833	872	911	950	989	1028	1067	1106	1145	1184	1223
80	—	1500	1584	1668	1752	1836	1920	2004	2088	2172	2256	2340
100	—	2501	2620	2739	2858	2977	3096	3215	3334	3453	3572	3691

Additional Weight

(g)

Bore size (mm)		12	16	20	25	32	40	50	63	80	100
Both ends tapped style		1	1	3	3	6	6	6	19	45	45
Rod end male thread	Male thread	3	6	12	24	52	54	106	106	240	350
	Nut	2	4	8	16	34	34	64	64	98	232
With rubber bumper		0	0	–2	–2	–3	–7	–12	–19	–34	–54
Built-in One-touch fittings		—	—	—	—	12	12	21	21	—	—
Foot style (Including mounting bolt)		52	65	153	177	159	171	267	349	735	1117
Flange style (Including mounting bolt)		54	67	131	153	180	214	373	559	1056	1365

Calculation:

(Example) CDQ2WF32-20DCM

- Cylinder weight: CDQ2WB32-20D ···· 319 g
- Option weight: Both ends tapped style·····6 g
  Rod end male thread ·····86 g
  Rubber bumper ·····–3 g
  Rod side flange style·····180 g

588 g

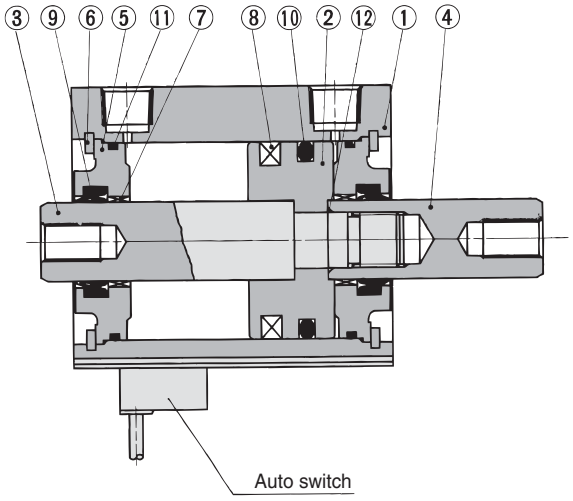
If auto switches are to be installed, the weight that corresponds to the number of auto switches and mounting brackets to be used must be added.

Auto Switch Mounting Bracket Weight

Mounting bracket part no.	Applicable bore (mm)	Weight (g)
BQ-1	12 to 25	1.5
BQ-2	32 to 100	1.5

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

Construction



Component Parts

No.	Description	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②	Piston	Aluminum alloy	Chromated
③	Piston rod A	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø100, Hard chrome plated
④	Piston rod B	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø100, Hard chrome plated
⑤	Collar	Aluminum alloy	ø12 to ø40, Anodized
		Aluminum alloy casted	ø50 to ø100, Chromated, painted
⑥	Snap ring	Carbon tool steel	Phosphate coated
⑦	Bushing	Lead-bronze casted	For ø50 or larger only
⑧	Magnet	—	—
⑨∗	Rod seal	NBR	
⑩∗	Piston seal	NBR	
⑪∗	Tube gasket	NBR	
⑫	Piston gasket	NBR	

Replacement Parts: Seal Kit (Pneumatic)

Bore size (mm)	Kit no.	Contents
12	CQ2WB12-PS	Set of nos. above ⑨, ⑩, ⑪
16	CQ2WB16-PS	
20	CQ2WB20-PS	
25	CQ2WB25-PS	
32	CQ2WB32-PS	
40	CQ2WB40-PS	
50	CQ2WB50-PS	
63	CQ2WB63-PS	
80	CQ2WB80-PS	
100	CQ2WB100-PS	

∗ Seal kits includes ⑨, ⑩, ⑪. Order the seal kit, based on each bore size.

Replacement Parts: Seal Kit (Air-hydro)

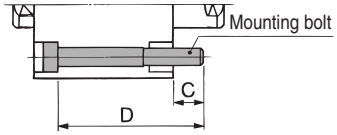
Bore size (mm)	Kit no.	Contents
20	CQ2WBH20-PS	Set of nos. above ⑨, ⑩, ⑪
25	CQ2WBH25-PS	
32	CQ2WBH32-PS	
40	CQ2WBH40-PS	
50	CQ2WBH50-PS	
63	CQ2WBH63-PS	
80	CQ2WBH80-PS	
100	CQ2WBH100-PS	

∗ Seal kits includes ⑨, ⑩, ⑪. Order the seal kit, based on each bore size.

Mounting Bolt for CDQ2 with Auto Switch

Mounting method: Mounting bolt for through-hole mounting style of CDQ2WB is available as an option.

Ordering: Add the word "Bolt" in front of the bolts to be used.
Example) Bolt M3 x 40ℓ 4 pcs.



Model	C	D	Bolt
CDQ2WB12-5DC	6.1	40	M3 x 40ℓ
-10DC		45	x 45ℓ
-15DC		50	x 50ℓ
-20DC		55	x 55ℓ
-25DC		60	x 60ℓ
-30DC		65	x 65ℓ
CDQ2WB16-5D	7.5	45	M3 x 45ℓ
-10D		50	x 50ℓ
-15D		55	x 55ℓ
-20D		60	x 60ℓ
-25D		65	x 65ℓ
-30D		70	x 70ℓ
CDQ2WB20-5D	9	45	M5 x 45ℓ
-10D		50	x 50ℓ
-15D		55	x 55ℓ
-20D		60	x 60ℓ
-25D		65	x 65ℓ
-30D		70	x 70ℓ
-35D		75	x 75ℓ
-40D		80	x 80ℓ
-45D		85	x 85ℓ
-50D		90	x 90ℓ
CDQ2WB25-5D	8	45	M5 x 45ℓ
-10D		50	x 50ℓ
-15D		55	x 55ℓ
-20D		60	x 60ℓ
-25D		65	x 65ℓ
-30D		70	x 70ℓ
-35D		75	x 75ℓ
-40D		80	x 80ℓ
-45D		85	x 85ℓ
-50D		90	x 90ℓ

Model	C	D	Bolt
CDQ2WB32-5D	6.5	45	M5 x 45ℓ
-10D		50	x 50ℓ
-15D		55	x 55ℓ
-20D		60	x 60ℓ
-25D		65	x 65ℓ
-30D		70	x 70ℓ
-35D		75	x 75ℓ
-40D		80	x 80ℓ
-45D		85	x 85ℓ
-50D		90	x 90ℓ
-75D		115	x 115ℓ
-100D		140	x 140ℓ
CDQ2WB40-5D	7	55	M5 x 55ℓ
-10D		60	x 60ℓ
-15D		65	x 65ℓ
-20D		70	x 70ℓ
-25D		75	x 75ℓ
-30D		80	x 80ℓ
-35D		85	x 85ℓ
-40D		90	x 90ℓ
-45D		95	x 95ℓ
-50D		100	x 100ℓ
-75D		125	x 125ℓ
-100D		150	x 150ℓ
CDQ2WB50-10D	12.5	65	M6 x 65ℓ
-15D		70	x 70ℓ
-20D		75	x 75ℓ
-25D		80	x 80ℓ
-30D		85	x 85ℓ
-35D		90	x 90ℓ
-40D		95	x 95ℓ
-45D		100	x 100ℓ
-50D		105	x 105ℓ
-75D		130	x 130ℓ
-100D		155	x 155ℓ

Model	C	D	Bolt
CDQ2WB63-10D	13.5	65	M8 x 65ℓ
-15D		70	x 70ℓ
-20D		75	x 75ℓ
-25D		80	x 80ℓ
-30D		85	x 85ℓ
-35D		90	x 90ℓ
-40D		95	x 95ℓ
-45D		100	x 100ℓ
-50D		105	x 105ℓ
-75D		130	x 130ℓ
-100D		155	x 155ℓ
CDQ2WB80-10D	12.5	70	M10 x 70ℓ
-15D		75	x 75ℓ
-20D		80	x 80ℓ
-25D		85	x 85ℓ
-30D		90	x 90ℓ
-35D		95	x 95ℓ
-40D		100	x 100ℓ
-45D		105	x 105ℓ
-50D		110	x 110ℓ
-75D		135	x 135ℓ
-100D		160	x 160ℓ
CDQ2WB100-10D	13	80	M10 x 80ℓ
-15D		85	x 85ℓ
-20D		90	x 90ℓ
-25D		95	x 95ℓ
-30D		100	x 100ℓ
-35D		105	x 105ℓ
-40D		110	x 110ℓ
-45D		115	x 115ℓ
-50D		120	x 120ℓ
-75D		145	x 145ℓ
-100D		170	x 170ℓ

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

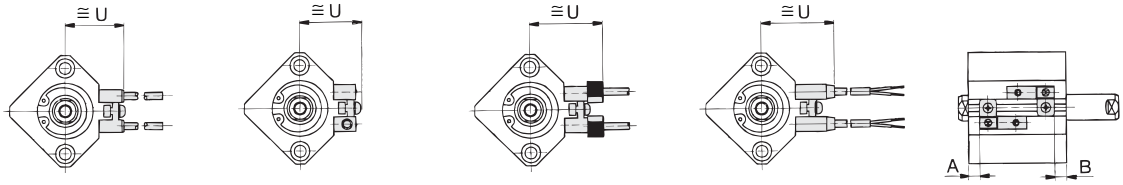
D-A7□
D-A80

D-A7□H, D-A80H
D-F7□, D-J79
D-F7□W, D-J79W
D-F79F, D-F7NTL
D-F7BAL

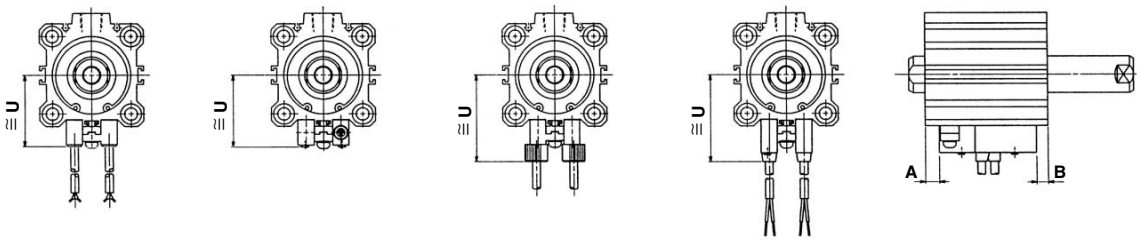
D-A73C
D-A80C
D-J79C

D-A79W
D-F7□WV
D-F7□V
D-F7BAVL

ø12 to ø25



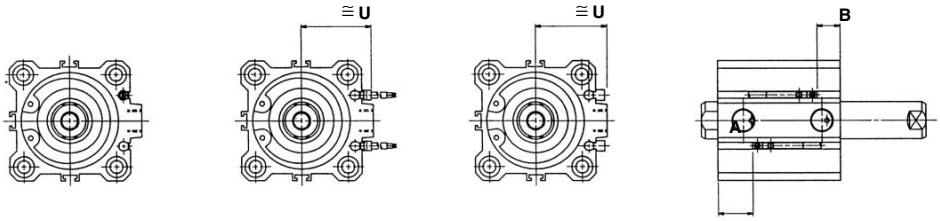
ø32 to ø100



D-A9□
D-M9□, D-F9□W

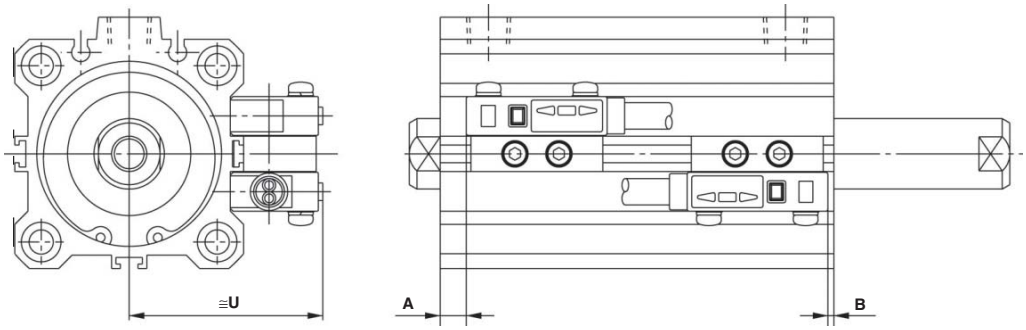
D-A9□V
D-M9□V
D-F9□WV

D-F9BAL



ø40 to ø100

D-P5DWL



Proper Auto Switch Mounting Position

Bore size (mm)	D-A7□/A80		D-F7□H/A80H D-A73C/A80C D-F7□/J79/J79W D-F7□V/J79C D-F7□W/F7□WV D-F7BAL/F7BAVL D-F79F		D-A79W		D-A9□ D-A9□V		D-M9□ D-M9□V D-F9□W D-F9□WV		D-F9BAL		D-P5DWL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
12	4.5	10	5	10.5	2	7.5	—	—	—	—	—	—	—	—
16	7.5	10.5	8	11	5	8	—	—	—	—	—	—	—	—
20	7.5	13	8	13.5	5	10.5	—	—	—	—	—	—	—	—
25	7.5	13	8	13.5	5	10.5	—	—	—	—	—	—	—	—
32	9	13.5	9.5	14	6.5	11	8	12.5	12	16.5	11	15.5	—	—
40	13	19	13.5	19.5	10.5	16.5	12	18	16	22	15	21	9	15
50	11	21.5	11.5	22	8.5	19	10	20.5	14	24.5	13	23.5	7	17.5
63	13.5	20.5	14	21	11	18	12.5	19.5	16.5	23.5	15.5	22.5	9.5	16.5
80	17.5	29	18	29.5	15	26.5	16.5	28	20.5	32	19.5	31	13.5	25
100	21.0	31.5		32	18.5	29	20	30.5	24	34.5	23	33.5	17	27.5

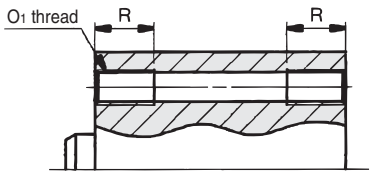
Auto Switch Mounting Height

Bore size (mm)	D-A7□/A80	D-A7□H D-A80H D-F7□ D-J79 D-F7□W D-J79W D-F9BAL D-F79F D-F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAVL	D-J79C	D-A79W	D-A9□V	D-M9□V D-F9□WV	D-F9BAL	D-P5DWL
	U	U	U	U	U	U	U	U	U	U
12	19.5	20.5	26.5	23	26	22	—	—	—	—
16	22.5	23.5	29.5	26	29	25	—	—	—	—
20	24.5	25.5	31.5	28	31	27	—	—	—	—
25	27.5	28.5	34.5	31	34	30	—	—	—	—
32	31.5	32.5	38.5	35	38	34	27	29	26.5	—
40	35	36	42	38.5	41.5	37.5	30.5	32.5	30	44
50	41	42	48	44.5	47.5	43.5	36.5	38.5	36	50
63	47.5	48.5	54.5	51	54	50	40	42	39.5	56.5
80	57.5	58.5	64.5	61	64	60	50	52	49.5	66.5
100	67.5	68.5	74.5	71	74	70	60	62	59.5	76.5

Dimensions: ø12 to ø25/Without Auto Switch

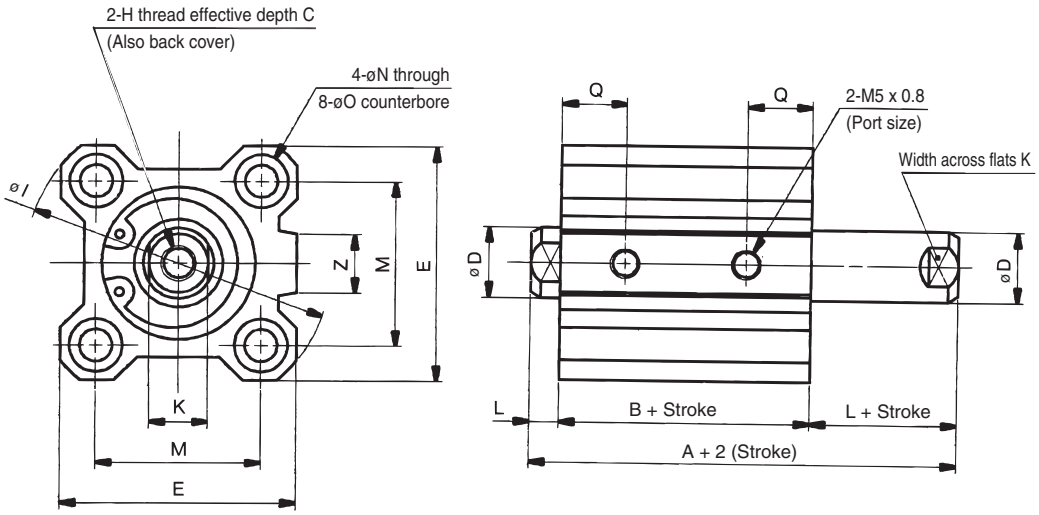
Basic style (Through-hole): CQ2WB

Both ends tapped style: CQ2WA

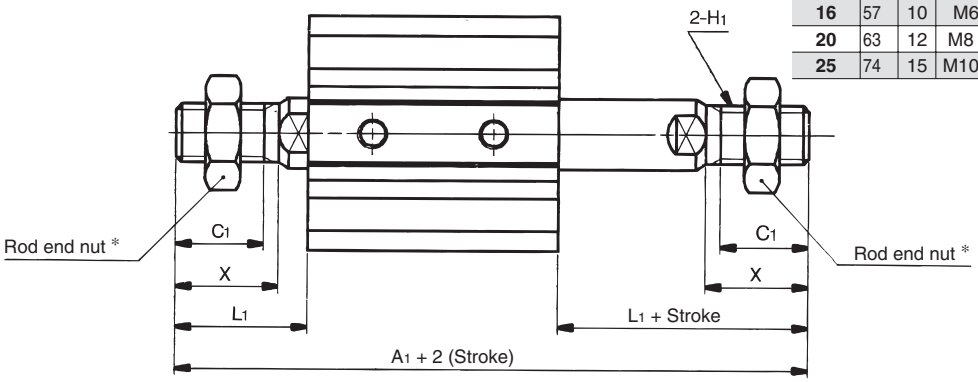


Both Ends Tapped Style

Bore size (mm)	O_1	R
12	M4 x 0.7	7
16	M4 x 0.7	7
20	M6 x 1.0	10
25	M6 x 1.0	10



Rod end male thread



Rod End Male Thread

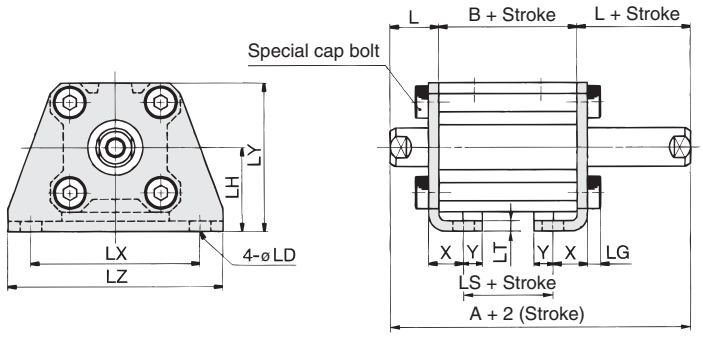
Bore size (mm)	A_1	C_1	H_1	L1	X
12	53.2	9	M5 x 0.8	14	10.5
16	57	10	M6 x 1.0	15.5	12
20	63	12	M8 x 1.25	18.5	14
25	74	15	M10 x 1.25	22.5	17.5

Basic Style

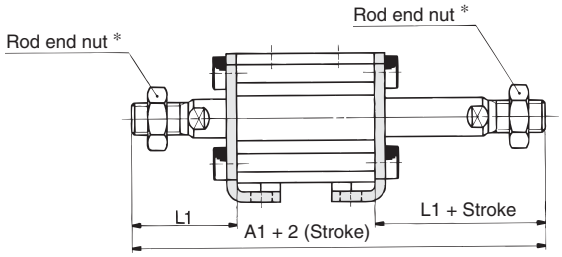
Bore size (mm)	Stroke range (mm)	A	B	C	D	E	H	I	K	L	M	N	O	Q	Z
12	5 to 30	32.2	25.2	6	6	25	M3 x 0.5	32	5	3.5	15.5	3.5	6.5 depth 3.5	10	—
16	5 to 30	33	26	8	8	29	M4 x 0.7	38	6	3.5	20	3.5	6.5 depth 3.5	10	10
20	5 to 50	35	26	7	10	36	M5 x 0.8	47	8	4.5	25.5	5.5	9 depth 7	9.5	10
25	5 to 50	39	29	12	12	40	M6 x 1.0	52	10	5	28	5.5	9 depth 7	11	10

Note) External dimensions with rubber bumper are same as standard type as shown above.
∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Foot style: CQ2WL



Rod end male thread



Rod End Male Thread

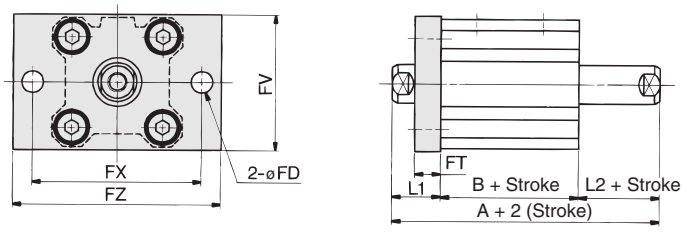
Bore size (mm)	A1	L1
12	73.2	24
16	77	25.5
20	83	28.5
25	94	32.5

Foot Style

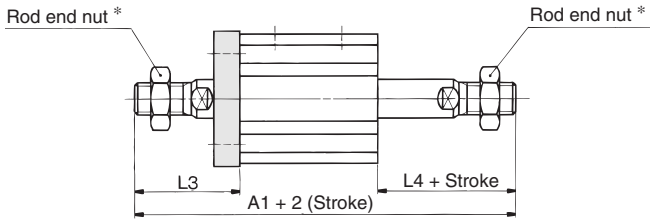
Bore size (mm)	Stroke range (mm)	A	B	L	LD	LG	LH	LS	LT	LX	LY	LZ	X	Y
12	5 to 30	52.2	25.2	13.5	4.5	2.8	17	13.2	2	34	29.5	44	8	4.5
16	5 to 30	53	26	13.5	4.5	2.8	19	14	2	38	33.5	48	8	5
20	5 to 50	55	26	14.5	6.6	4	24	14	3.2	48	42	62	9.2	5.8
25	5 to 50	59	29	15	6.6	4	26	14	3.2	52	46	66	10.7	5.8

Foot bracket material: Carbon steel

Flange style: CQ2WF



Rod end male thread



Rod End Male Thread

Bore size (mm)	A1	L3	L4
12	63.2	24	14
16	67	25.5	15.5
20	73	28.5	18.5
25	84	32.5	22.5

Flange Style

Bore size (mm)	Stroke range (mm)	A	B	FD	FT	FV	FX	FZ	L1	L2
12	5 to 30	42.2	25.2	4.5	5.5	25	45	55	13.5	3.5
16	5 to 30	43	26	4.5	5.5	30	45	55	13.5	3.5
20	5 to 50	45	26	6.6	8	39	48	60	14.5	4.5
25	5 to 50	49	29	6.6	8	42	52	64	15	5

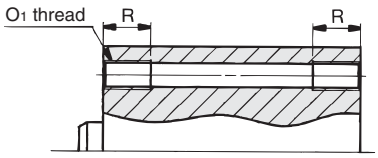
Flange bracket material: Carbon steel

∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Dimensions: ø12 to ø25/With Auto Switch

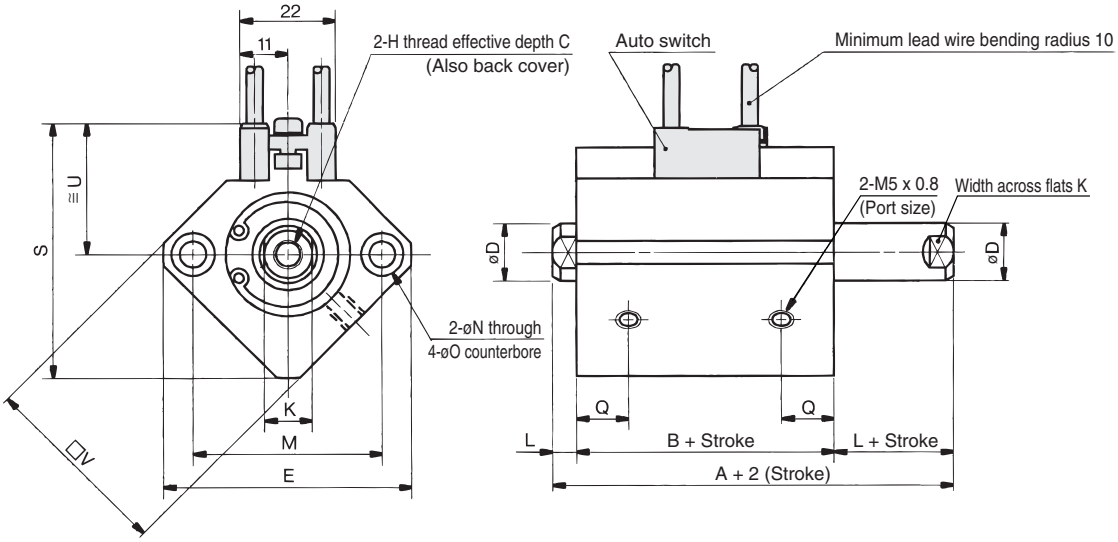
Basic style (Through-hole): CDQ2WB

Both ends tapped style: CDQ2WA

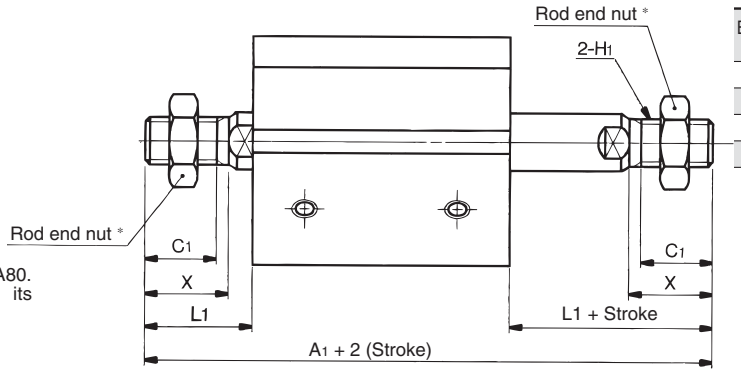


Both Ends Tapped Style

Bore size (mm)	O_1	R
12	M4 x 0.7	7
16	M4 x 0.7	7
20	M6 x 1.0	10
25	M6 x 1.0	10



Rod end male thread



Rod End Male Thread

Bore size (mm)	A_1	C_1	H_1	L_1	X
12	60.4	9	M5 x 0.8	14	10.5
16	67	10	M6 x 1.0	15.5	12
20	75	12	M8 x 1.25	18.5	14
25	84	15	M10 x 1.25	22.5	17.5

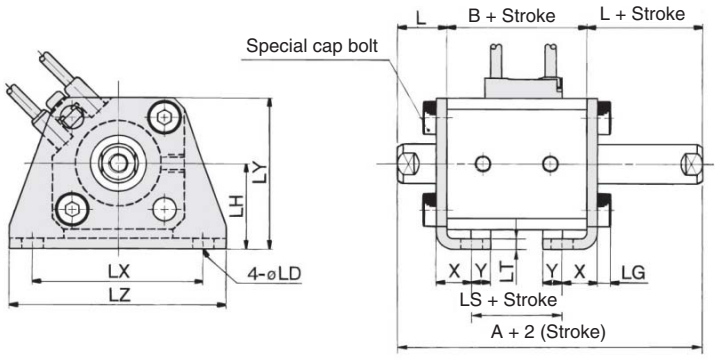
Auto switch shown above is D-A73 and D-A80.
For auto switch mounting position and its mounting height, refer to page 7-6-22.

Basic Style

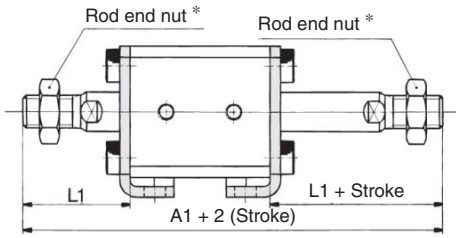
Bore size (mm)	Stroke range (mm)	A	B	C	D	E	H	K	L	M	N	O	Q	S	U	V
12	5 to 30	39.4	32.4	6	6	32	M3 x 0.5	5	3.5	22	3.5	6.5 depth 3.5	10.5	35.5	19.5	25
16	5 to 30	43	36	8	8	38	M4 x 0.7	6	3.5	28	3.5	6.5 depth 3.5	10	41.5	22.5	29
20	5 to 50	47	38	7	10	47	M5 x 0.8	8	4.5	36	5.5	9 depth 7	10.5	48	24.5	36
25	5 to 50	49	39	12	12	52	M6 x 1.0	10	5	40	5.5	9 depth 7	11	53.5	27.5	40

Note) External dimensions with rubber bumper are same as standard type as shown above.
* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Foot style: CDQ2WL



Rod end male thread



Rod End Male Thread

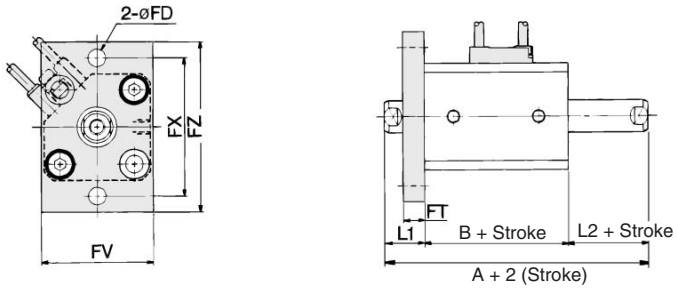
Bore size (mm)	A1	L1
12	80.4	24
16	87	25.5
20	95	28.5
25	104	32.5

Foot Style

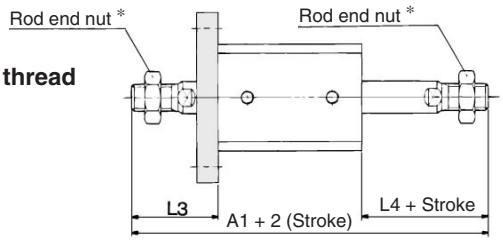
Bore size (mm)	Stroke range (mm)	A	B	L	LD	LG	LH	LS	LT	LX	LY	LZ	X	Y
12	5 to 30	59.4	32.4	13.5	4.5	2.8	17	20.4	2	34	29.5	44	8	4.5
16	5 to 30	63	36	13.5	4.5	2.8	19	24	2	38	33.5	48	8	5
20	5 to 50	67	38	14.5	6.6	4	24	26	3.2	48	42	62	9.2	5.8
25	5 to 50	69	39	15	6.6	4	26	24	3.2	52	46	66	10.7	5.8

Foot bracket material: Carbon steel

Flange style: CDQ2WF



Rod end male thread



Rod End Male Thread

Bore size (mm)	A1	L3	L4
12	70.4	24	14
16	77	25.5	15.5
20	85	28.5	18.5
25	94	32.5	22.5

Flange Style

Bore size (mm)	Stroke range (mm)	A	B	FD	FT	FV	FX	FZ	L1	L2
12	5 to 30	49.4	32.4	4.5	5.5	25	45	55	13.5	3.5
16	5 to 30	53	36	4.5	5.5	30	45	55	13.5	3.5
20	5 to 50	57	38	6.6	8	39	48	60	14.5	4.5
25	5 to 50	59	39	6.6	8	42	52	64	15	5

Flange bracket material: Carbon steel

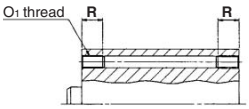
∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

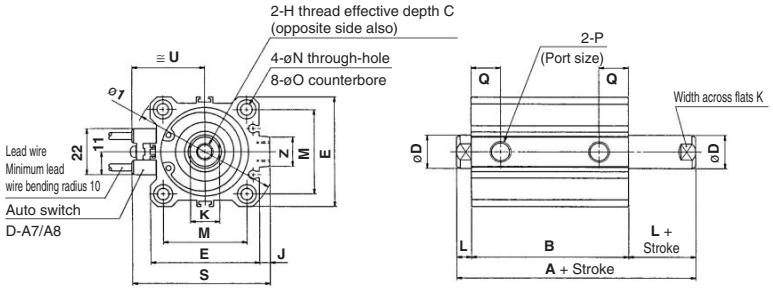
(In the case of without auto switches, A, B and P dimensions will be only changed. Refer to the dimension table.)

Dimensions: ø32 to ø50/With Auto Switch

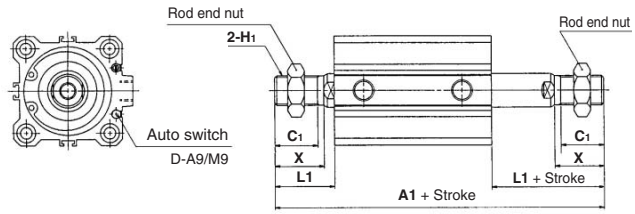
Basic style (Through-hole): CQ2WB/CDQ2WB

Both ends tapped style: CQ2WA

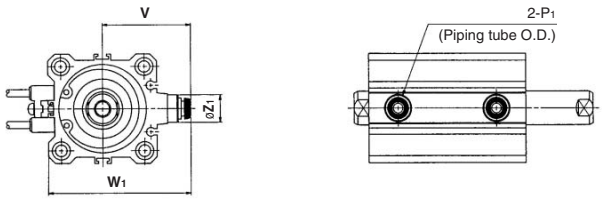




Rod end male thread



Built-in One-touch fittings: ø32 to ø50



Auto switch shown above is D-A73 type and D-A80 type. For the auto switch mounting position and its mounting height, refer to page 7-6-22.

Both Ends Tapped Style

Bore size (mm)	O1	R
32	M6 x 1.0	10
40	M6 x 1.0	10
50	M8 x 1.25	14

Rod End Male Thread

Bore size (mm)	Without auto switch			With auto switch		
	A1			A1		
	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100
32	87.5 + Stroke	172.5	197.5	97.5 + Stroke	172.5	197.5
40	97 + Stroke	182	207	107 + Stroke	182	207
50	107.5 + Stroke	192.5	217.5	117.5 + Stroke	192.5	217.5

Bore size (mm)	C1	H1	L1	X
32	20.5	M14 x 1.5	28.5	23.5
40	20.5	M14 x 1.5	28.5	23.5
50	26	M18 x 1.5	33.5	28.5

Built-in One-touch Fittings

Bore size (mm)	Without auto switch		With auto switch		Z1	P1
	V	W1	V	W1		
32	38	60.5	36.5	59	13	6
40	42	68	40.5	66.5	13	6
50	50	82	50	82	16	8

Basic Style

Bore size (mm)	Without auto switch								With auto switch						
	A			B			P		A			B			P
	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	5 st	10 to 100	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	5 to 100 st
32	44.5 + Stroke	129.5	154.5	30.5 + Stroke	115.5	140.5	M5 x 0.8	Rc 1/8	54.5 + Stroke	129.5	154.5	40.5 + Stroke	115.5	140.5	Rc 1/8
40	54 + Stroke	139	164	40 + Stroke	125	150	Rc 1/8	Rc 1/8	64 + Stroke	139	164	50 + Stroke	125	150	Rc 1/8
50	56.5 + Stroke	141.5	166.5	40.5 + Stroke	125.5	150.5	Rc 1/4	Rc 1/4	66.5 + Stroke	141.5	166.5	50.5 + Stroke	125.5	150.5	Rc 1/4

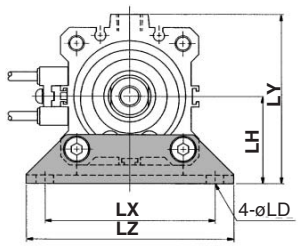
Bore size (mm)	C	D	E	H	I	J	K	L	M	N	O	Q	S	U	Z
32	13	16	45	M8 x 1.25	60	4.5	14	7	34	5.5	9 depth 7	12.5	58.5	31.5	14
40	13	16	52	M8 x 1.25	69	5	14	7	40	5.5	9 depth 7	14	66	35	14
50	15	20	64	M10 x 1.5	86	7	17	8	50	6.6	11 depth 8	14	80	41	19

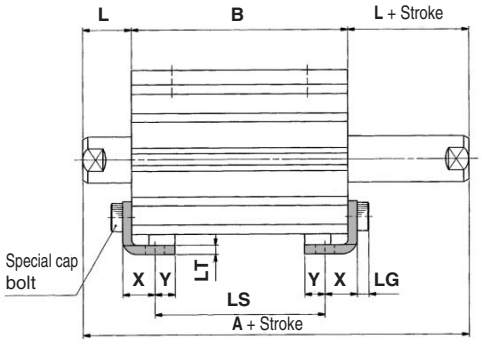
Note) External dimensions with rubber bumper are same as standard type as shown above.
* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

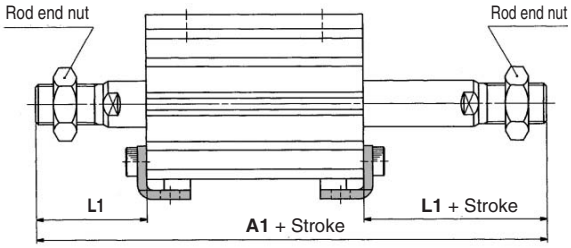
Note) When obtaining the full length dimension of 50 stroke or less, it requires to add the stroke twice.

Example) Full length dimension = A + Stroke
= (◯◯ + Stroke) + Stroke

Foot style: CQ2WL/CDQ2WL







Rod End Male Thread

Bore size (mm)	Without auto switch A1			With auto switch A1			L1
	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	
32	107.5 + Stroke	192.5	217.5	117.5 + Stroke	192.5	217.5	38.5
40	117 + Stroke	202	227	127 + Stroke	202	227	38.5
50	127.5 + Stroke	212.5	237.5	137.5 + Stroke	212.5	237.5	43.5

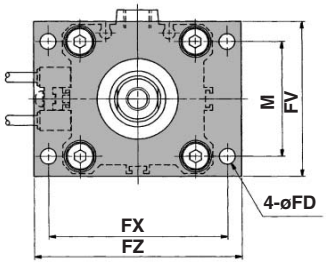
Foot Style

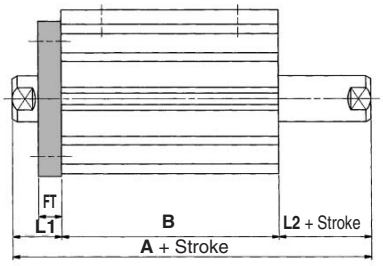
Bore size (mm)	Stroke range (mm)	Without auto switch A			B			LS			With auto switch A			B			LS		
		50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100
32	5 to 50, 75,100	64.5 + Stroke	149.5	174.5	30.5 + Stroke	115.5	140.5	14.5 + Stroke	99.5	124.5	74.5 + Stroke	149.5	174.5	40.5 + Stroke	115.5	140.5	24.5 + Stroke	99.5	124.5
40	5 to 50, 75,100	74 + Stroke	159	184	40 + Stroke	125	150	24 + Stroke	109	134	84 + Stroke	159	184	50 + Stroke	125	150	34 + Stroke	109	134
50	10 to 50, 75,100	76.5 + Stroke	161.5	186.5	40.5 + Stroke	125.5	150.5	17.5 + Stroke	102.5	127.5	86.5 + Stroke	161.5	186.5	50.5 + Stroke	125.5	150.5	27.5 + Stroke	102.5	127.5

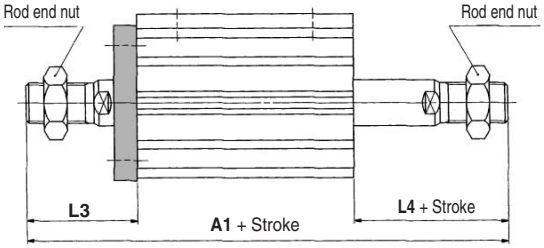
Foot bracket material: Carbon steel

Bore size (mm)	L	LD	LG	LH	LT	LX	LY	LZ	X	Y
32	17	6.6	4	30	3.2	57	57	71	11.2	5.8
40	17	6.6	4	33	3.2	64	64	78	11.2	7
50	18	9	5	39	3.2	79	78	95	14.7	8

Flange style: CQ2WF/CDQ2WF







Rod End Male Thread

Bore size (mm)	Without auto switch A1			With auto switch A1			L3	L4
	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100		
32	97.5 + Stroke	182.5	207.5	107.5 + Stroke	182.5	207.5	38.5	28.5
40	107 + Stroke	202.5	217	117 + Stroke	192	217	38.5	28.5
50	117.5 + Stroke	204	227.5	127.5 + Stroke	202.5	227.5	43.5	33.5

Flange Style

Bore size (mm)	Stroke range (mm)	Without auto switch A			B			With auto switch A			B			FD	FT	FV	FX	FZ	L1	L2	M
		50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100								
32	5 to 50, 75,100	54.5 + Stroke	139.5	164.5	30.5 + Stroke	115.5	140.5	64.5 + Stroke	139.5	164.5	40.5 + Stroke	115.5	140.5	5.5	8	48	56	65	17	7	34
40	5 to 50, 75,100	64 + Stroke	149	174	40 + Stroke	125	150	74 + Stroke	149	174	50 + Stroke	125	150	5.5	8	54	62	72	17	7	40
50	10 to 50, 75,100	66.5 + Stroke	151.5	176.5	40.5 + Stroke	125.5	150.5	76.5 + Stroke	151.5	176.5	50.5 + Stroke	125.5	150.5	6.6	9	67	76	89	18	8	50

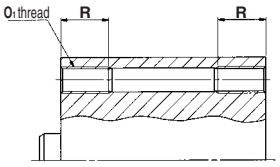
Flange bracket material: Carbon steel

Note) When obtaining the full length dimension of 50 stroke or less, it requires to add the stroke twice.
Example) Full length dimension = A + Stroke = (◯◯ + Stroke) + Stroke

(In the case of without auto switches, A and B dimensions will be only changed. Refer to the dimension table.)

Dimensions: ø63 to ø100/With Auto Switch

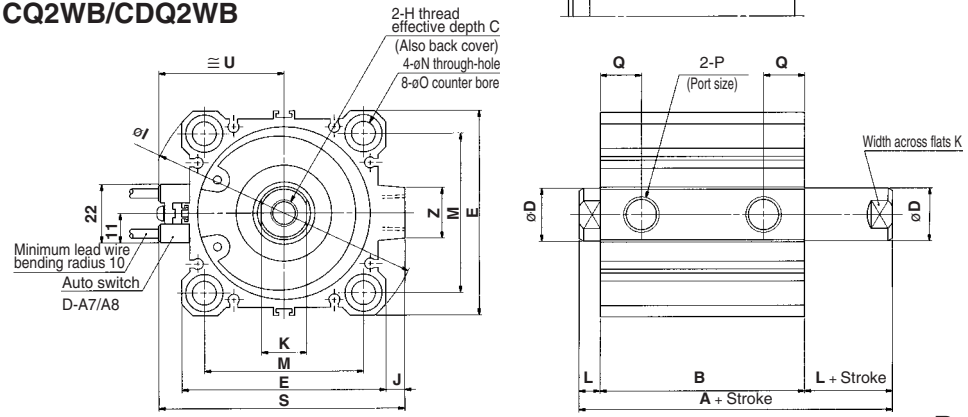
Both ends tapped style: CQ2WA/CDQ2WA



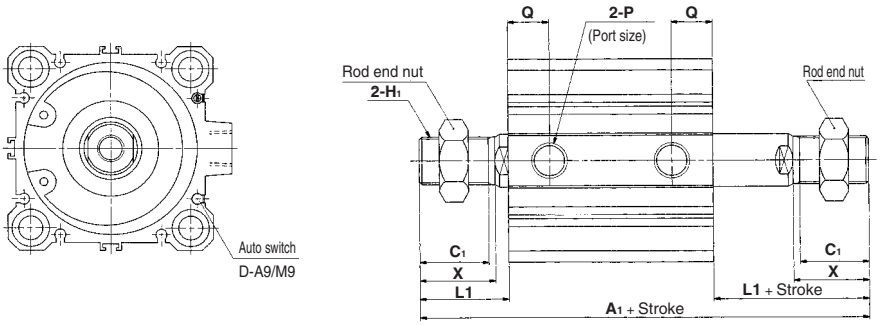
Both Ends Tapped Style

Bore size (mm)	O1	R
63	M10 x 1.5	18
80	M12 x 1.75	22
100	M12 x 1.75	22

Basic style (Through-hole): CQ2WB/CDQ2WB



Rod end male thread

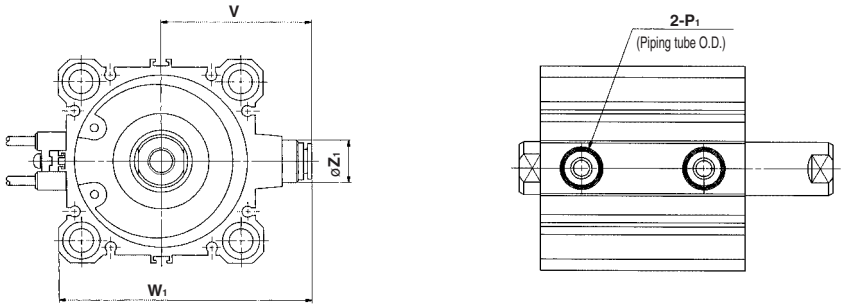


Rod End Male Thread

Bore size (mm)	Without auto switch			With auto switch		
	A1			A1		
	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100
63	109 + Stroke	194	219	119 + Stroke	194	219
80	138 + Stroke	223	248	148 + Stroke	223	248
100	147.5 + Stroke	232.5	257.5	157.5 + Stroke	232.5	257.5

Bore size (mm)	C1	H1	L1	X
63	26	M18 x 1.5	33.5	28.5
80	32.5	M22 x 1.5	43.5	35.5
100	32.5	M26 x 1.5	43.5	35.5

Built-in One-touch fittings



Built-in One-touch Fittings

Bore size (mm)	Z1	P1	V	W1
63	16	8	56.5	95

∗ In the case of built-in One-touch fitting, the 5 mm stroke with ø32 bore is the same external dimensions as 10 mm stroke.

Auto switch shown above is D-A73 type and D-A80 type. For the auto switch mounting position and its mounting height, refer to page 7-6-22.

Basic Style

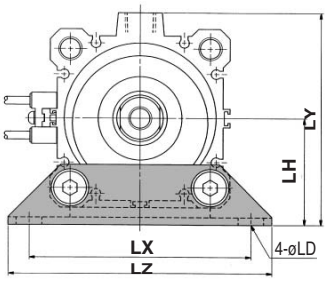
Bore size (mm)	Stroke range (mm)	Without auto switch						With auto switch					
		A			B			A			B		
		50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100
63	10 to 50, 75,100	58 + Stroke	143	168	42 + Stroke	127	152	68 + Stroke	143	168	52 + Stroke	127	152
80	10 to 50, 75,100	71 + Stroke	156	181	51 + Stroke	136	161	81 + Stroke	156	181	61 + Stroke	136	161
100	10 to 50, 75,100	84.5 + Stroke	169.5	194.5	60.5 + Stroke	145.5	170.5	94.5 + Stroke	169.5	194.5	70.5 + Stroke	145.5	170.5

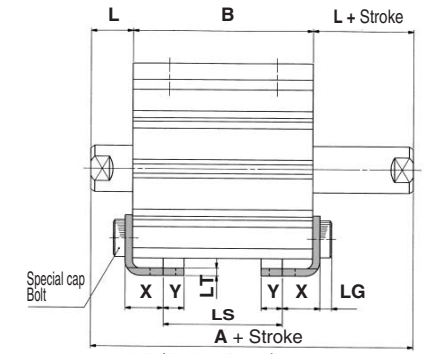
Bore size (mm)	C	D	E	H	I	J	K	L	M	N	O	P	Q	S	U	Z
63	15	20	77	M10 x 1.5	103	7	17	8	60	9	14 depth 10.5	Rc 1/4	15.5	93	47.5	19
80	21	25	98	M16 x 2.0	132	6	22	10	77	11	17.5 depth 13.5	Rc 3/8	18	112.5	57.5	26
100	27	30	117	M20 x 2.5	156	6.5	27	12	94	11	17.5 depth 13.5	Rc 3/8	22	132.5	67.5	26

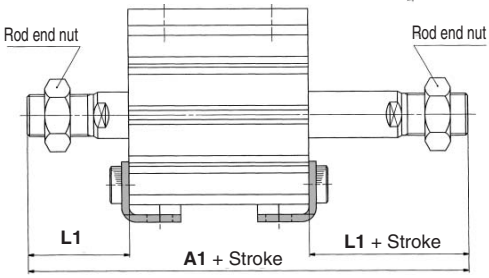
Note 1) External dimensions with rubber bumper are same as standard type as shown above.
∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Note 2) When obtaining the full length dimension of 50 stroke or less, it requires to add the stroke twice.
Example) Full length dimension = A + Stroke = (◯◯+ Stroke) + Stroke

Foot style: CQ2W/CDQ2WL







Rod End Male Thread

Bore size (mm)	Without auto switch A1			With auto switch A1			L1
	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	
63	129 + Stroke	214	239	139 + Stroke	214	239	43.5
80	158 + Stroke	243	268	168 + Stroke	243	268	53.5
100	167.5 + Stroke	252.5	277	177.5 + Stroke	252.5	277.5	53.5

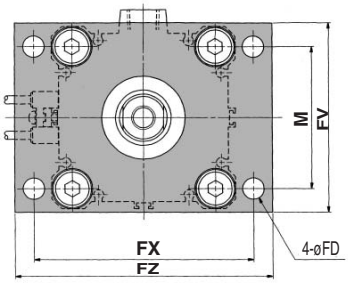
Foot Style

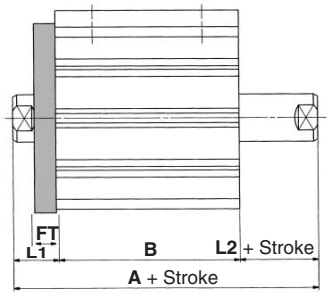
Bore size (mm)	Stroke range (mm)	Without auto switch A			B			LS			With auto switch A			B			LS		
		50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100
63	5 to 50, 75,100	78 + Stroke	163	188	42 + Stroke	127	152	16 + Stroke	101	126	88 + Stroke	163	188	52 + Stroke	127	152	26 + Stroke	101	126
80	5 to 50, 75,100	91 + Stroke	176	201	51 + Stroke	136	161	21 + Stroke	106	131	101 + Stroke	176	201	61 + Stroke	136	161	31 + Stroke	106	131
100	10 to 50, 75,100	104.5 + Stroke	189.5	214.5	60.5 + Stroke	145.5	170.5	26.5 + Stroke	111.5	136.5	114.5 + Stroke	189.5	214.5	70.5 + Stroke	145.5	170.5	36.5 + Stroke	111.5	136.5

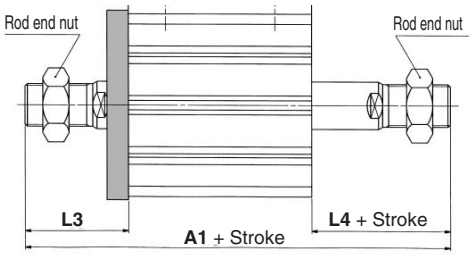
Foot bracket material: Carbon steel

Bore size (mm)	L	LD	LG	LH	LT	LX	LY	LZ	X	Y
63	18	11	5	46	3.2	95	91.5	113	16.2	9
80	20	13	7	59	4.5	118	114	140	19.5	11
100	22	13	7	71	6	137	136	162	23	12.5

Flange style: CQ2WF/CDQ2WF







Rod End Male Thread

Bore size (mm)	Without auto switch A1			With auto switch A1			L3	L4
	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100		
63	119 + Stroke	204	229	129 + Stroke	204	229	43.5	33.5
80	148 + Stroke	233	258	158 + Stroke	233	258	53.5	43.5
100	157.5 + Stroke	242.5	267.5	167.5 + Stroke	242.5	267.5	53.5	43.5

Flange Style

Bore size (mm)	Stroke range (mm)	Without auto switch A			B			With auto switch A			B			FD	FT	FV	FX	FZ	L1	L2	M
		50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100	50 st or less	55 to 75	80 to 100								
32	10 to 50, 75,100	68 + Stroke	153	178	42 + Stroke	127	152	78 + Stroke	153	178	52 + Stroke	127	152	9	9	80	92	108	18	8	60
40	10 to 50, 75,100	81 + Stroke	166	191	51 + Stroke	136	161	91 + Stroke	166	191	61 + Stroke	136	161	11	11	99	116	134	20	10	77
50	10 to 50, 75,100	94.5 + Stroke	179.5	204.5	60.5 + Stroke	145.5	170.5	104.5 + Stroke	179.5	204.5	70.5 + Stroke	145.5	170.5	11	11	117	136	154	22	12	94

Note) When obtaining the full length dimension of 50 stroke or less, it requires to add the stroke twice.
Example) Full length dimension = A + Stroke = (◯◯ + Stroke) + Stroke

Flange bracket material: Carbon steel

Compact Cylinder: Standard Type
Single Acting, Single Rod, Spring Return/Extend
Series CQ2
ø12, ø16, ø20, ø25, ø32, ø40, ø50

How to Order

Without auto switch CQ2 B 20 □ – 10 S □

With auto switch CDQ2 B 20 □ – 10 S □ – J79W S

Built-in magnet

Mounting style

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

∗ Mounting brackets are shipped together, (but not assembled).

Bore size

12	12 mm
16	16 mm
20	20 mm
25	25 mm
32	32 mm
40	40 mm
50	50 mm

Piping

Nil	Screw-in piping
F	Built-in One-touch fittings Note)

Note) Bore sizes available w/ One-touch fittings are ø32 to ø50.

Cylinder stroke (mm)

Refer to "Standard Stroke" on page 7-6-43.

Action

S	Single acting, Spring return
T	Single acting, Spring extend

Body option

Nil	Standard (Rod end female thread)
F	With boss in head side
M	Rod end male thread

∗ Combination of body option ("FM") is available.

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled).

Number of auto switches

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

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 DC		Load voltage AC	Rail mounting ø12 to ø50 Perpendicular	Rail mounting ø12 to ø50 In-line	Direct mounting ø32 to ø50 Perpendicular	Direct mounting ø32 to ø50 In-line	Lead wire length (m) ∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	A76H	A96V	A96	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200 V	A72	A72H	—	—	●	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	A73	A73H	—	—	●	●	●	—	—		
								—	—	A93V	A93	●	●	—	—	—		
		Connector					—	A73C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	A79W	—	—	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NV	F79	M9NV	M9N	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				F7PV	F7P	M9PV	M9P	●	●	○	—	○		
				2-wire		12 V		F7BV	J79	M9BV	M9B	●	●	○	—	○	—	
		Connector						J79C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		F7NWV	F79W	F9NWV	F9NW	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	F7PW	F9PWV	F9PW	●	●	○	—	○		
				2-wire		12 V		F7BWV	J79W	F9BWV	F9BW	●	●	○	—	○	—	
	Water resistant (2-color indication)							—	F7BA	—	F9BA	—	●	○	—	○		
								F7BAV	—	—	—	—	●	○	—	—		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		—	F79F	—	—	●	●	○	—	○	IC circuit	

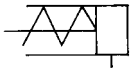
∗ Lead wire length symbols: 0.5 m·····Nil (Example) A73C
3 m·····L (Example) A73CL
5 m·····Z (Example) A73CZ
None·····N (Example) A73CN

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

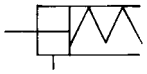
• Since there are other applicable auto switches than listed, refer to page 7-6-23 for details.
• For details about auto switches with pre-wire connector, refer to page 7-9-36.

JIS Symbol

Single acting, Spring return



Single acting, Spring extend



⚠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

1. For installation and removal, use an appropriate pair of pliers (tool for installing a type C snap ring).
2. 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 installment.

Mounting Bracket Part No.

Bore size (mm)	Foot (2)	Flange	Double (3) clevis
12	CQ-L012	CQ-F012	CQ-D012
16	CQ-L016	CQ-F016	CQ-D016
20	CQ-L020	CQ-F020	CQ-D020
25	CQ-L025	CQ-F025	CQ-D025
32	CQ-L032	CQ-F032	CQ-D032
40	CQ-L040	CQ-F040	CQ-D040
50	CQ-L050	CQ-F050	CQ-D050

Note 2) When ordering foot bracket, order 2 pieces per cylinder.
Note 3) Parts belonging to each bracket are as follows. Foot, Flange/Body mounting bolt, Double clevis/Clevis pin, Type C snap ring for axis, Body mounting bolt

Type

Bore size (mm)			12	16	20	25	32	40	50
Pneumatic	Mounting	Through-hole (Standard)	●	●	●	●	●	●	●
		Both ends tapped style	●	●	●	●	●	●	●
	Built-in magnet		●	●	●	●	●	●	●
	Piping	Screw-in type	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8	Note) M5 x 0.8 Rc 1/8	Rc 1/8	Rc 1/4
		Built-in One-touch fittings	—	—	—	—	ø6/4	ø6/4	ø8/6
	Rod end male thread		●	●	●	●	●	●	●
	With boss in head side		●	●	●	●	●	●	●

Note) In the case of without auto switch, M5 x 0.8 is used for 5 stroke only.

Specifications

Type	Pneumatic (Non-lube)
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
Rod end thread	Female thread
Rod end thread tolerance	JIS Class 2
Stroke length tolerance	$^{+1.0}_{0}$
Mounting	Through-hole
Piston speed	50 to 500 mm/s

Standard Stroke

Bore size (mm)	Standard stroke
12, 16, 20 25, 32, 40	5, 10
50	10, 20

Manufacture of Intermediate Stroke (Single acting, Spring retract type is excluded.)

Description	Spacer is installed in the standard stroke body.	
Part no.	Refer to "How to Order" for the standard model no. on page 7-6-42.	
Description	Dealing with the stroke by the 1 mm interval is available by installing spacer with standard stroke cylinder.	
Stroke range	Bore size	Stroke range
	12 to 40	1 to 9
	50	1 to 19
Example	Part no.: CQ2B20-3T CQ2B20-5T with 2 mm width spacer inside. B dimension is 24.5 mm.	

Allowable Kinetic Energy

(J)

Bore size (mm)	12	16	20	25	32	40	50
Allowable kinetic energy	0.022	0.038	0.055	0.09	0.15	0.26	0.46

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

Symbol	Specifications
-XA□	Change of rod end shape, S type only
-XB10	Intermediate stroke (Using exclusive body)
-XC6	Piston rod and rod end nut made of stainless steel
-XC18	NPT finish piping port
-XC36	With boss in rod side, Type T only
-X202	Same full length dimension as Series CQ1 Except ø12, 16, 25
-X203	Same L dimension from rod cover as Series CQ1
-X271	Fluoro rubber for seals

Minimum Operating Pressure (MPa)

Bore size (mm)	Single acting (Spring return/extend)
12	0.25
16	0.25
20	0.18
25	0.18
32	0.17
40	0.15
50	0.13

Theoretical Output (N)

Action	Bore size (mm)	Operating pressure (MPa)		
		0.3	0.5	0.7
Spring return	**12**	21	44	66
	16	45	86	126
	20	79	142	205
	25	126	224	323
	32	211	372	533
	40	338	589	841
	50	535	928	1316
Spring extend	**12**	14	31	48
	16	24	54	85
	20	44	91	138
	25	84	160	235
	32	152	273	393
	40	288	499	710
	50	412	742	1072

For the spring force, refer to page 7-12-3.

Weight

(g)

Action	Bore size (mm)	Cylinder stroke (mm)			
		5	10	15	20
Spring return	**12**	29	35	—	—
	16	42	51	—	—
	20	63	76	—	—
	25	87	101	—	—
	32	131	152	—	—
	40	206	229	—	—
	50	—	369	—	441
Spring extend	**12**	29	35	—	—
	16	43	50	—	—
	20	67	78	—	—
	25	92	104	—	—
	32	141	158	—	—
	40	216	235	—	—
	50	—	399	—	460

Additional Weight

(g)

Bore size (mm)		**12**	**16**	**20**	**25**	**32**	**40**	**50**
Both ends tapped style		2	2	6	6	6	6	6
Rod end male thread	Male thread	1.5	3	6	12	26	27	53
	Nut	1	2	4	8	17	17	32
With boss in head side		0.7	1.3	2	3	5	7	13
Built-in One-touch fittings		—	—	—	—	6	6	10.5
Foot style (Including mounting bolt)		55	67	164	186	143	155	243
Rod side flange style (Including mounting bolt)		57	69	139	161	180	214	373
Rear flange style (Including mounting bolt)		54	65	133	152	165	198	348
Double clevis style (Including pin, snap ring, bolt)		32	39	88	123	151	196	393

Calculation: (Example) CQ2D32-10SM
- Cylinder weight: CQ2B32-10S····· 152 g
- Option weight: Both ends tapped style····· 6 g
  Rod end male thread····· 43 g
  Double clevis style····· 151 g

352 g

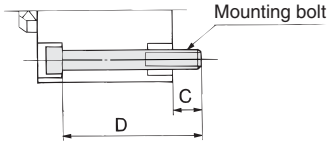
Auto Switch Mounting Bracket Part No.

Bore size (mm)	Mounting bracket part no.	Note	Applicable auto switch	
			Reed switch	Solid state switch
12, **16** **20**, **25**	BQ-1	• Switch mounting screw (M3 x 0.5 x 8ℓ) • Square nut	D-A7/A8 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 D-F7BAVL D-F79F D-F7NTL
32, **40** **50**	BQ-2	• Switch mounting screw (M3 x 0.5 x 10ℓ) • Switch spacer • Switch mounting nut		

[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.
(Since the spacer is not included, order it separately.)
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.

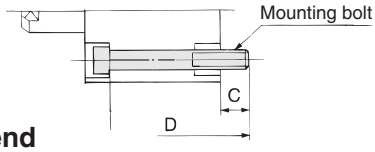
Mounting Bolt for CQ2

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 M3 x 25ℓ 4 pcs.



Spring Return

Model	C	D	Mounting bolt
CQ2B12-5S	6.5	25	M3 x 25ℓ
-10S		30	x 30ℓ
CQ2B16-5S	5	25	M3 x 25ℓ
-10S		30	x 30ℓ
CQ2B20-5S	7.5	25	M5 x 25ℓ
-10S		30	x 30ℓ
CQ2B25-5S	9.5	30	M5 x 30ℓ
-10S		35	x 35ℓ
CQ2B32-5S	9	30	M5 x 30ℓ
-10S		35	x 35ℓ
CQ2B40-5S	7.5	35	M5 x 35ℓ
-10S		40	x 40ℓ
CQ2B50-10S	12.5	45	M6 x 45ℓ
-20S		55	x 55ℓ

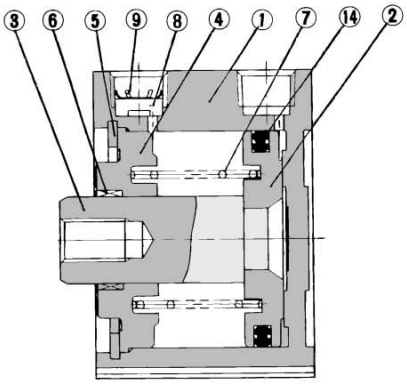


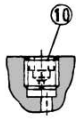
Spring Extend

Model	C	D	Mounting bolt
CQ2B12-5T	6.5	25	M3 x 25ℓ
-10T		30	x 30ℓ
CQ2B16-5T	5	25	M3 x 25ℓ
-10T		30	x 30ℓ
CQ2B20-5T	7.5	25	M5 x 25ℓ
-10T		30	x 30ℓ
CQ2B25-5T	9.5	30	M5 x 30ℓ
-10T		35	x 35ℓ
CQ2B32-5T	9	30	M5 x 30ℓ
-10T		35	x 35ℓ
CQ2B40-5T	7.5	35	M5 x 35ℓ
-10T		40	x 40ℓ
CQ2B50-10T	12.5	45	M6 x 45ℓ
-20T		55	x 55ℓ

Construction

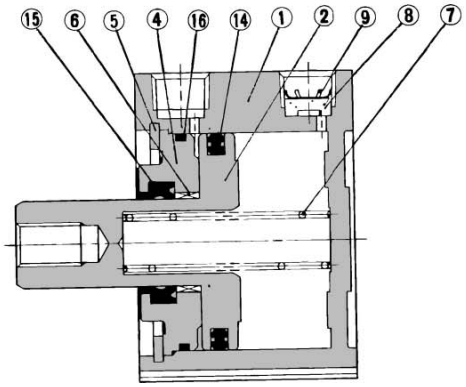
Spring return



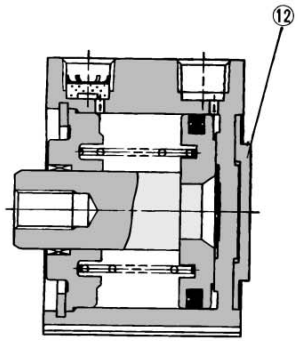


Port size
For M5 x 0.8

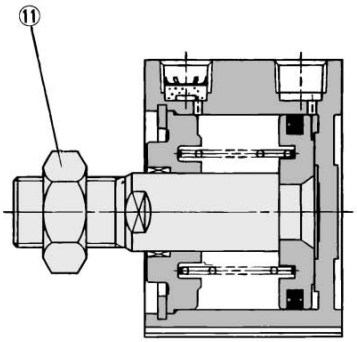
Spring extend



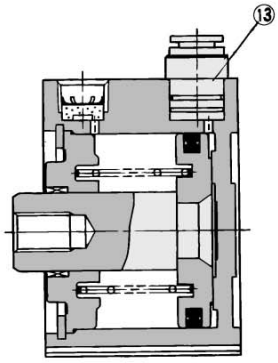
With boss in head side



Rod end male thread



Built-in One-touch fittings



Component Parts

No.	Description	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②*	Piston	Aluminum alloy	Chromated
③	Piston rod	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø50, Hard chrome plated
④	Collar	Aluminum bearing alloy	ø12 to ø40, Anodized
		Aluminum alloy casted	ø50, Chromate, Painted
⑤	Snap ring	Carbon tool steel	Phosphate coated
⑥	Bushing	Lead-bronze casted	ø50, Spring return
		Lead bronze casted	ø50, Spring extend
⑦	Return spring	Piano wire	Zinc chromated
⑧	Bronze element	Sintered metallic BC	Port size Rc 1/8, 1/4
⑨	Snap ring	Carbon tool steel	
⑩	Plug with fixed orifice	Alloy steel	Port size M5 x 0.8
⑪	Rod end nut	Carbon steel	Nickel plated
⑫	Centering location ring	Aluminum alloy	ø20 to ø50, Anodized
⑬	One-touch fitting	—	ø32 to ø50

* On spring extend (type T), piston and piston rod are integrated (stainless steel).

Replacement Parts

No.	Description	Material	Note
⑭	Piston seal	NBR	
⑮	Rod seal	NBR	
⑯	Gasket	NBR	

Replacement Parts: Seal Kit

Bore size (mm)	Single acting/Spring return	Single acting/Spring extend
12	CQ2B12-S-PS	CQ2B12-T-PS
16	CQ2B16-S-PS	CQ2B16-T-PS
20	CQ2B20-S-PS	CQ2B20-T-PS
25	CQ2B25-S-PS	CQ2B25-T-PS
32	CQ2B32-S-PS	CQ2B32-T-PS
40	CQ2B40-S-PS	CQ2B40-T-PS
50	CQ2B50-S-PS	CQ2B50-T-PS
Note	A set includes ⑭.	Kits include items ⑭, ⑮, ⑯ from the table above
How to order	* Seal kit includes ⑭. Order the seal kit, based on each bore size.	* Seal kit includes ⑭, ⑮, ⑯. Order the seal kit, based on each bore size.

Copper-free (For CRT manufacturing process)

20 — CQ2B **Bore size** — **Stroke** S/T (M)

- 20: Copper-free
- Bore size: ø12, ø16, ø20, ø25, ø32, ø40, ø50
- Stroke: S, T

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	Single acting, Single rod
Bore size (mm)	12, 16, 20, 25, 32, 40, 50
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Rubber bumper	None
Piping	Screw-in piping
Piston speed	50 to 500 mm/s
Mounting	Through-hole
Auto switch	Mountable

Minimum Stroke for Auto Switch Mounting

(mm)

No. of auto switches mounted	D-F7□V D-J79C D-M9□V	D-A7□ D-A80 D-A73C D-A80C D-A9□V	D-F7□WV D-F9□WV D-F7BAVL	D-A7□H D-A80H D-F7□ D-J79 D-M9□ D-F9□W	D-A79W	D-F7□W D-J79W D-F7BAL D-F79F D-F9BAL	D-A9□
1 pc.	5	5	10	15	15	20	10
2 pcs.	5	10	15	15	20	20	10

Weight

(g)

Action	Bore size (mm)	Cylinder stroke (mm)			
		5	10	15	20
Spring return	12	48	54	—	—
	16	74	83	—	—
	20	109	123	—	—
	25	146	162	—	—
	32	190	211	—	—
	40	282	305	—	—
	50	—	487	—	559
Spring extend	12	53	70	—	—
	16	73	82	—	—
	20	122	133	—	—
	25	160	175	—	—
	32	200	217	—	—
	40	292	311	—	—
	50	—	517	—	578

Additional Weight

(g)

Bore size (mm)		12	16	20	25	32	40	50
Both ends tapped style		1	1	3	3	6	6	6
Rod end Male thread	Male thread	1.5	3	6	12	26	27	53
	Nut	1	2	4	8	17	17	32
With boss in head side		0.7	1.3	2	3	5	7	13
Built-in One-touch fittings		—	—	—	—	6	6	10.5
Foot style (Including mounting bolt)		49	62	147	169	143	155	243
Rod side flange style (Including mounting bolt)		54	67	131	153	180	214	373
Rear flange style (Including mounting bolt)		52	63	124	144	165	198	348
Double clevis style (Including pin, snap ring, bolt)		29	35	78	114	151	196	393

Calculation: (Example) CDQ2D32-10SM
- Cylinder weight: CDQ2B32-10S ····· 211 g
- Option weight: Both ends tapped style ··· 6 g
  Rod end male thread ··· 43 g
  Double clevis style ····· 151 g
  411 g

If auto switches are to be installed, the weight that corresponds to the number of auto switches and mounting brackets to be used must be added.

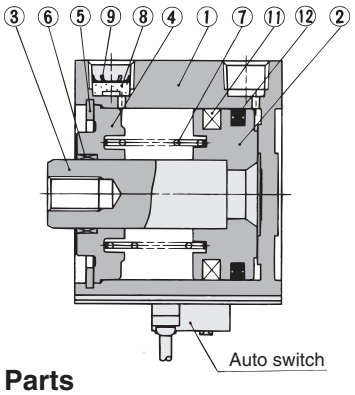
Auto Switch Mounting Bracket Weight

Mounting bracket part no.	Applicable bore (mm)	Weight (g)
BQ-1	12 to 25	1.5
BQ-2	32 to 50	1.5

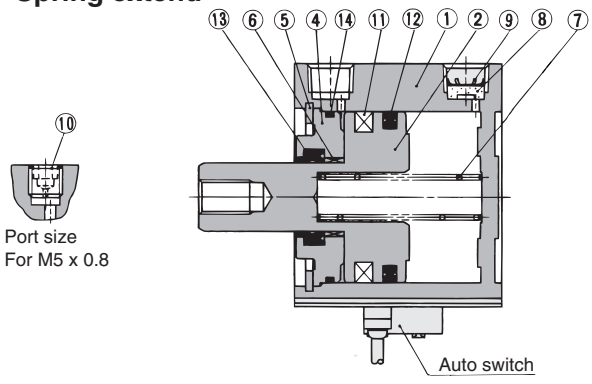
∗ For the auto switch weight, refer to page 7-9-1.

Construction

Spring return



Spring extend



Component Parts

No.	Description	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②	Piston	Aluminum alloy	Chromated
③	Piston rod	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø50, Hard chrome plated
④	Collar	Aluminum alloy	ø12 to ø40, Anodized
		Aluminum alloy casted	ø50, Chromate, Painted
⑤	Snap ring	Carbon tool steel	Phosphate coated
⑥	Bushing	Lead-bronze casted	ø50, Spring return
		Lead bronze casted	ø50, Spring extend
⑦	Return spring	Piano wire	Zinc chromated
⑧	Bronze element	Sintered metallic BC	Port size Rc 1/8, 1/4.
⑨	Snap ring	Carbon tool steel	
⑩	Plug with fixed orifice	Alloy steel	Port size M5 x 0.8
⑪	Magnet	—	

∗ On spring extend (type T), piston with ø20 or more and piston rod are integrated (Stainless steel).

No.	Description	Material	Note
⑫	Piston seal	NBR	
⑬	Rod seal	NBR	
⑭	Gasket	NBR	

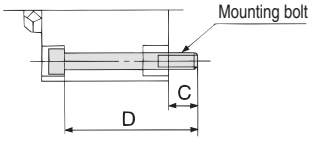
Replacement Parts: Seal Kit

Since the same as standard type, single acting, single rod, refer to page 7-6-46.

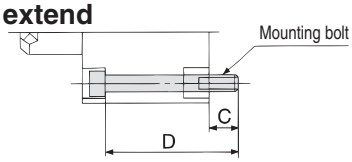
Mounting Bolt for CDQ2 with Auto Switch

Mounting method: Mounting bolt for through-hole mounting style of CDQ2B is available as an option.
Ordering: Add the word "Bolt" in front of the bolts to be used.
Example) Bolt M3 x 35ℓ 2 pcs.

Spring return



Spring extend



Spring Return

Model	C	D	Mounting bolt
CDQ2B12-5S	5.5	35	M3 x 35ℓ
-10S		40	x 40ℓ
CDQ2B16-5S	8	40	M3 x 40ℓ
-10S		45	x 45ℓ
CDQ2B20-5S	10.5	40	M5 x 40ℓ
-10S		45	x 45ℓ
CDQ2B25-5S	9.5	40	M5 x 40ℓ
-10S		45	x 45ℓ
CDQ2B32-5S	9	40	M5 x 40ℓ
-10S		45	x 45ℓ
CDQ2B40-5S	7.5	45	M5 x 45ℓ
-10S		50	x 50ℓ
CDQ2B50-10S	12.5	55	M6 x 55ℓ
-20S		65	x 65ℓ

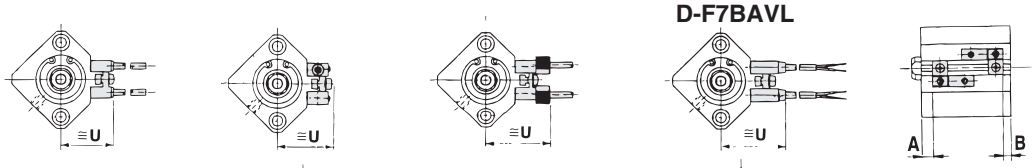
Spring Extend

Model	C	D	Mounting bolt
CDQ2B12-5T	6.1	40	M3 x 40ℓ
-10T		45	x 45ℓ
CDQ2B16-5T	8	40	M3 x 40ℓ
-10T		45	x 45ℓ
CDQ2B20-5T	10.5	40	M5 x 40ℓ
-10T		45	x 45ℓ
CDQ2B25-5T	9.5	40	M5 x 40ℓ
-10T		45	x 45ℓ
CDQ2B32-5T	9	40	M5 x 40ℓ
-10T		45	x 45ℓ
CDQ2B40-5T	7.5	45	M5 x 45ℓ
-10T		50	x 50ℓ
CDQ2B50-10T	12.5	55	M6 x 55ℓ
-20T		65	x 65ℓ

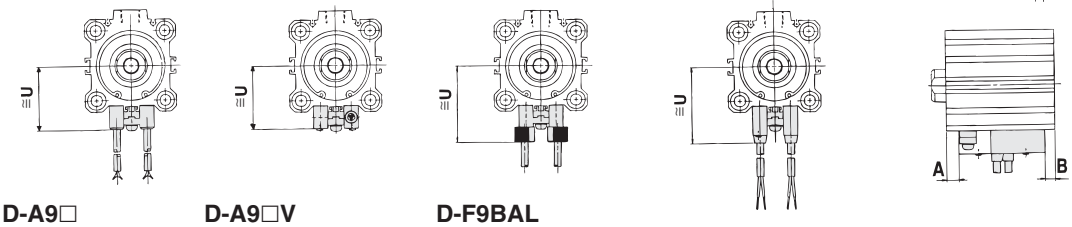
Proper Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height

D-A7□ D-A80 D-A7□H D-A80H D-F7□ D-J79 D-J79W D-F79F D-F7NTL D-BAL D-A73C D-A80C D-J79C D-A79W D-F7□WV D-F7□V D-F7BAVL

ø12 to ø25

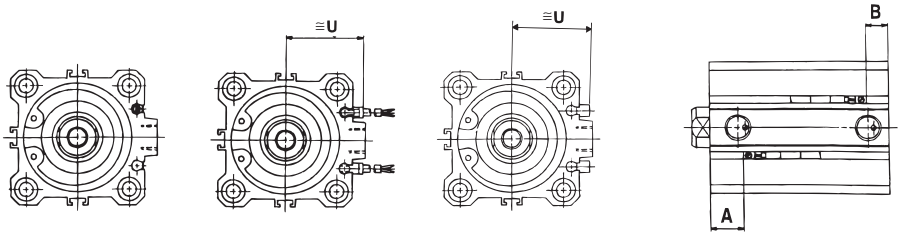


ø32 to ø50



D-A9□ D-M9□ D-F9□W D-A9□V D-M9□V D-F9□WV D-F9BAL

ø32 to ø50



Proper Auto Switch Mounting Position

Bore size (mm)	D-A7□ D-A80		D-A7□H D-A80H D-A73C D-A80C D-F7□ D-F79F D-J79 D-F7□V D-J79C D-F7□W D-J79W D-F7□WV D-F7BAVL D-F7BAL		D-A79W		D-A9□ D-A9□V		D-M9□ D-M9□V D-F9□W D-F9□WV		D-F9BAL	
	A	B	A	B	A	B	A	B	A	B	A	B
12	4.5	5.5 (10)	5	6 (10.5)	2	3 (7.5)	—	—	—	—	—	—
16	7.5 (5.5)	5 (7)	8 (6)	5.5 (7.5)	5 (3)	2.5 (4.5)	—	—	—	—	—	—
20	7.5	6.5	8	7	5	4	—	—	—	—	—	—
25	7.5	7	8	7.5	5	4.5	—	—	—	—	—	—
32	9	6	9.5	6.5	6.5	3.5	8	5	12	9	11	8
40	13	8.5	13.5	9	10.5	6	12	7.5	16	11.5	15	10.5
50	11	11.5	11.5	12	8.5	9	10	10.5	14	14.5	13	13.5

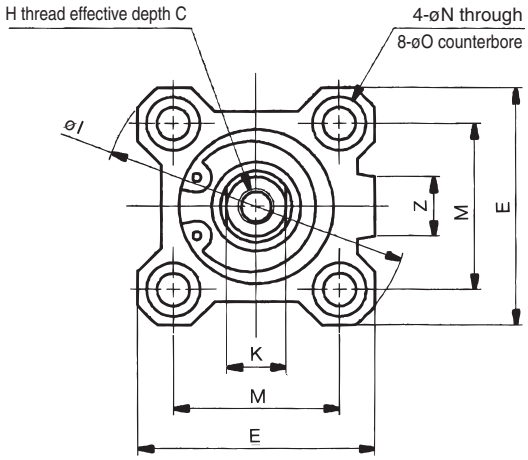
Auto Switch Mounting Height

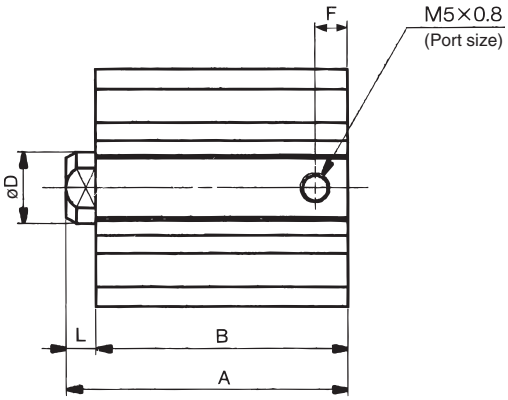
(mm)

D-A7□ D-A80	D-A7□H D-A80H D-F7□ D-J79 D-F7□W D-J79W D-F7BAL D-F79F D-F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAVL	D-J79C	D-A79W	D-A9□V	D-M9□V D-F9□WV	D-F9BAL
U	U	U	U	U	U	U	U	U
19.5	20.5	26.5	23	26	22	—	—	—
22.5	23.5	29.5	26	29	25	—	—	—
24.5	25.5	31.5	28	31	27	—	—	—
27.5	28.5	34.5	31	34	30	—	—	—
31.5	32.5	38.5	35	38	34	27	29	26.5
35	36	42	38.5	41.5	37.5	30.5	32.5	30
41	42	48	44.5	47.5	43.5	36.5	38.5	36

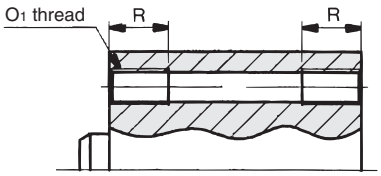
Dimensions: ø12 to ø25/Spring Return without Auto Switch

Basic style (Through-hole): CQ2B





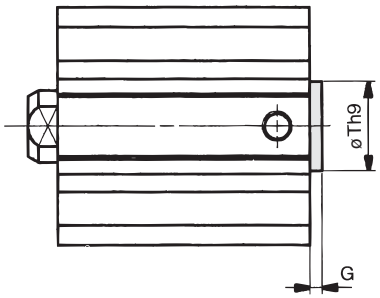
Both ends tapped style: CQ2A



Both Ends Tapped Style

Bore size (mm)	O1	R
12	M4 x 0.7	7
16	M4 x 0.7	7
20	M6 x 1.0	10
25	M6 x 1.0	10

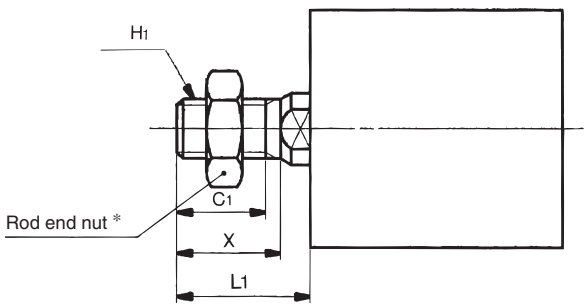
With boss in head side



With Boss in Head Side

Bore size (mm)	G	Th9
12	1.5	$15^{0}_{-0.043}$
16	1.5	$20^{0}_{-0.052}$
20	2	$13^{0}_{-0.043}$
25	2	$15^{0}_{-0.043}$

Rod end male thread



Rod End Male Thread

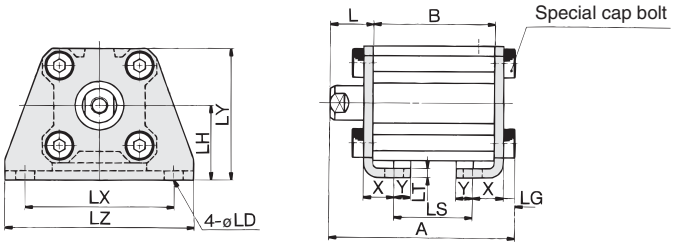
Bore size (mm)	C1	X	H1	L1
12	9	10.5	M5 x 0.8	14
16	10	12	M6 x 1.0	15.5
20	12	14	M8 x 1.25	18.5
25	15	17.5	M10 x 1.25	22.5

Basic Style

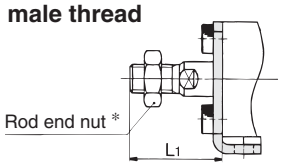
Bore size (mm)	A		B		C	D	E	F	H	I	K	L	M	N	O	Z
	5 st	10 st	5 st	10 st												
12	25.5	30.5	22	27	6	6	25	5	M3 x 0.5	32	5	3.5	15.5	3.5	6.5 depth 3.5	—
16	27	32	23.5	28.5	8	8	29	5.5	M4 x 0.7	38	6	3.5	20	3.5	6.5 depth 3.5	10
20	29	34	24.5	29.5	7	10	36	5.5	M5 x 0.8	47	8	4.5	25.5	5.5	9 depth 7	10
25	32.5	37.5	27.5	32.5	12	12	40	5.5	M6 x 1.0	52	10	5	28	5.5	9 depth 7	10

∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Foot style: CQ2L



Rod end male thread

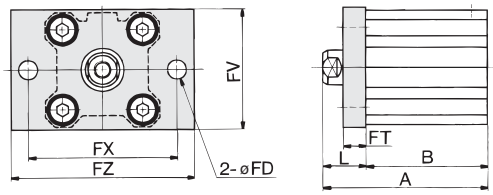


Foot Style

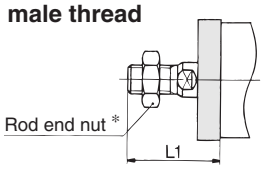
Bore size (mm)	A		B		L	L1	LD	LG	LH	LS		LT	LX	LY	LZ	X	Y
	5 st	10 st	5 st	10 st						5 st	10 st						
12	40.3	45.3	22	27	13.5	24	4.5	2.8	17	10	15	2	34	29.5	44	8	4.5
16	41.8	46.8	23.5	28.5	13.5	25.5	4.5	2.8	19	11.5	16.5	2	38	33.5	48	8	5
20	46.2	51.2	24.5	29.5	14.5	28.5	6.6	4	24	12.5	17.5	3.2	48	42	62	9.2	5.8
25	49.7	54.7	27.5	32.5	15	32.5	6.6	4	26	12.5	17.5	3.2	52	46	66	10.7	5.8

Foot bracket material: Carbon steel

Rod side flange style: CQ2F



Rod end male thread

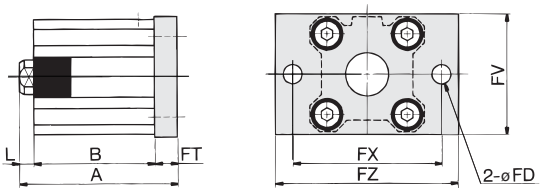


Rod Side Flange Style

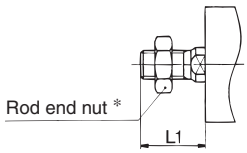
Bore size (mm)	A		B		FD	FT	FV	FX	FZ	L	L1
	5 st	10 st	5 st	10 st							
12	35.5	40.5	22	27	4.5	5.5	25	45	55	13.5	24
16	37	42	23.5	28.5	4.5	5.5	30	45	55	13.5	25.5
20	39	44	24.5	29.5	6.6	8	39	48	60	14.5	28.5
25	42.5	47.5	27.5	32.5	6.6	8	42	52	64	15	32.5

Flange bracket material: Carbon steel

Head side flange style: CQ2G



Rod end male thread



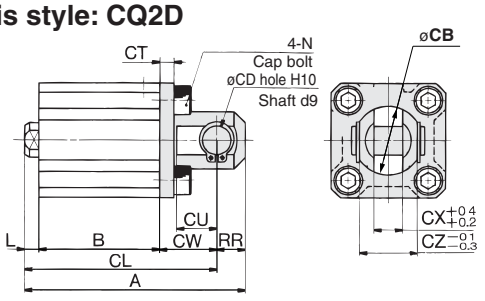
Head Side Flange Style

Bore size (mm)	A		L	L1
	5 st	10 st		
12	31	36	3.5	14
16	32.5	37.5	3.5	15.5
20	37	42	4.5	18.5
25	40.5	45.5	5	22.5

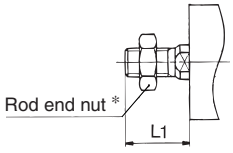
Flange bracket material: Carbon steel

(* Dimensions except A, L and L1 are the same as rod side flange style.)

Double clevis style: CQ2D



Rod end male thread



Double Clevis Style

Bore size (mm)	A		B		CB	CD	CL		CT	CU	CW	CX	CZ	L	L1	N	RR
	5 st	10 st	5 st	10 st			5 st	10 st									
12	45.5	50.5	22	27	12	5	39.5	44.5	4	7	14	5	10	3.5	14	M4 x 0.7	6
16	48	53	23.5	28.5	14	5	42	47	4	10	15	6.5	12	3.5	15.5	M4 x 0.7	6
20	56	61	24.5	29.5	20	8	47	52	5	12	18	8	16	4.5	18.5	M6 x 1.0	9
25	62.5	67.5	27.5	32.5	24	10	52.5	57.5	5	14	20	10	20	5	22.5	M6 x 1.0	10

Double clevis bracket material: Carbon steel

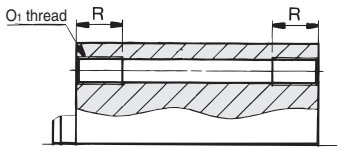
* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

** Clevis pin and snap ring are shipped together.

Dimensions: ø12 to ø25/Spring Return with Auto Switch

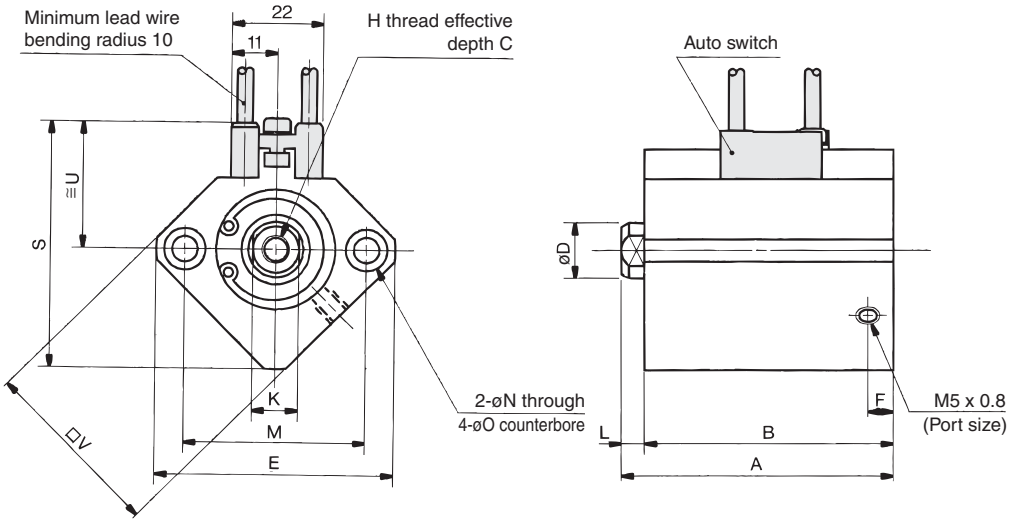
Basic style (Through-hole): CDQ2B

Double clevis style: CDQ2A

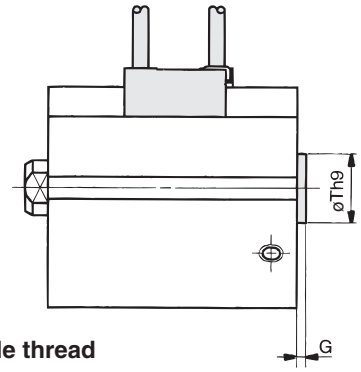


Both Ends Tapped Style

Bore size (mm)	O1	R
12	M4 x 0.7	7
16	M4 x 0.7	7
20	M6 x 1.0	10
25	M6 x 1.0	10



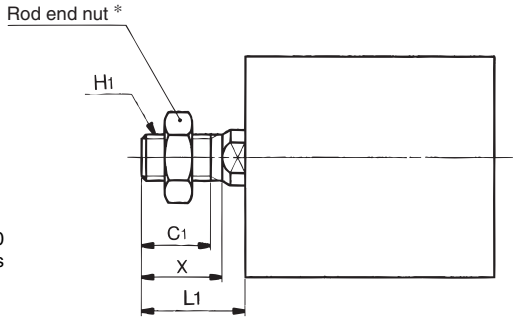
With boss in head side



With Boss in Head Side

Bore size (mm)	G	Th9
12	1.5	$15^{0}_{-0.043}$
16	1.5	$20^{0}_{-0.052}$
20	2	$13^{0}_{-0.043}$
25	2	$15^{0}_{-0.043}$

Rod end male thread



Rod End Male Thread

Bore size (mm)	C1	X	H1	L1
12	9	10.5	M5 x 0.8	14
16	10	12	M6 x 1.0	15.5
20	12	14	M8 x 1.25	18.5
25	15	17.5	M10 x 1.25	22.5

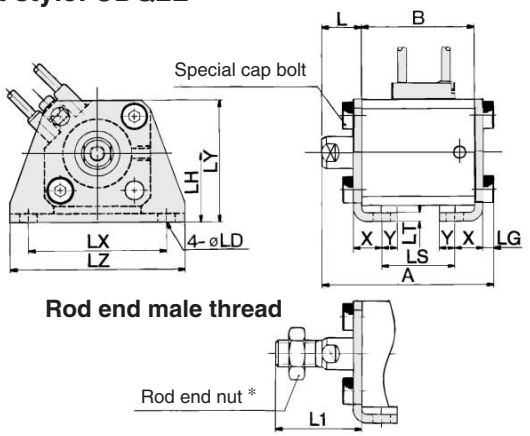
Auto switch shown above is D-A73 type and D-A80 type. For the auto switch mounting position and its mounting height, refer to page 7-6-48.

Basic Style

Bore size (mm)	A		B		C	D	E	F	H	K	L	M	N	O	S	U	V
	5 st	10 st	5 st	10 st													
12	36.5	41.5	33	38	6	6	32	6.5	M3 x 0.5	5	3.5	22	3.5	6.5 depth 3.5	35.5	19.5	25
16	39	44	35.5	40.5	8	8	38	5.5	M4 x 0.7	6	3.5	28	3.5	6.5 depth 3.5	41.5	22.5	29
20	41	46	36.5	41.5	7	10	47	5.5	M5 x 0.8	8	4.5	36	5.5	9 depth 7	48	24.5	36
25	42.5	47.5	37.5	42.5	12	12	52	5.5	M6 x 1.0	10	5	40	5.5	9 depth 7	53.5	27.5	40

* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Foot style: CDQ2L

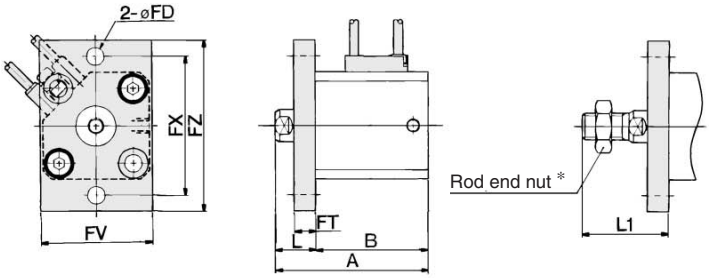


Foot Style

Bore size (mm)	A		B		L	L1	LD	LG	LH	LS		LT	LX	LY	LZ	X	Y
	5 st	10 st	5 st	10 st						5 st	10 st						
12	51.3	56.3	33	38	13.5	24	4.5	2.8	17	21	26	2	34	29.5	44	8	4.5
16	53.8	58.8	35.5	40.5	13.5	25.5	4.5	2.8	19	23.5	28.5	2	38	33.5	48	8	5
20	58.2	63.2	36.5	41.5	14.5	28.5	6.6	4	24	24.5	29.5	3.2	48	42	62	9.2	5.8
25	59.7	64.7	37.5	42.5	15	32.5	6.6	4	26	22.5	27.5	3.2	52	46	66	10.7	5.8

Foot bracket material: Carbon steel

Rod side flange style: CDQ2F

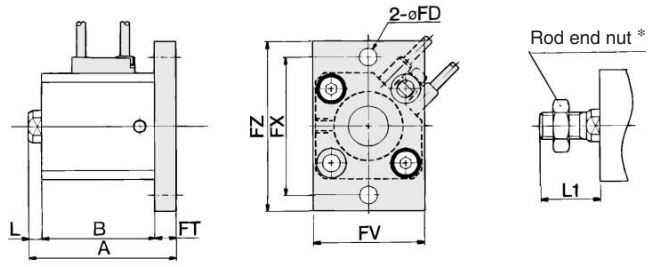


Rod Side Flange Style

Bore size (mm)	A		B		FD	FT	FV	FX	FZ	L	L1
	5 st	10 st	5 st	10 st							
12	46.5	51.5	33	38	4.5	5.5	25	45	55	13.5	24
16	49	54	35.5	40.5	4.5	5.5	30	45	55	13.5	25.5
20	51	56	36.5	41.5	6.6	8	39	48	60	14.5	28.5
25	52.5	57.5	37.5	42.5	6.6	8	42	52	64	15	32.5

Flange bracket material: Carbon steel

Head side flange style: CDQ2G



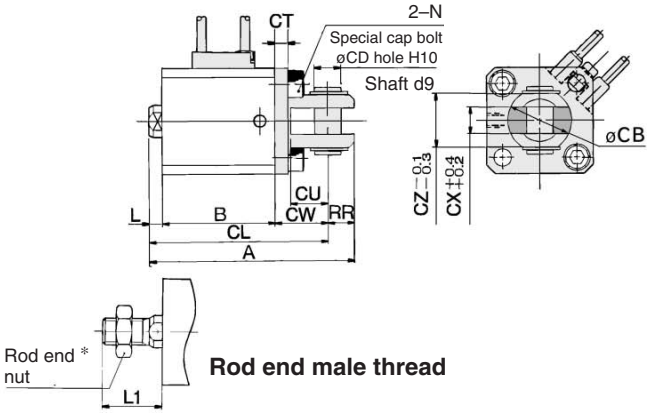
Head Side Flange Style

Bore size (mm)	A		L	L1
	5 st	10 st		
12	46.4	51.4	3.5	14
16	44.5	49.5	3.5	15.5
20	49	54	4.5	18.5
25	50.5	55.5	5	22.5

(* Dimensions except A, L and L1 are the same as rod side flange style.)

Flange bracket material: Carbon steel

Double clevis style: CDQ2A



Double Clevis Style

Bore size (mm)	A		B		CB	CD	CL		CT	CU	CW	CX	CZ	L	L1	N	RR
	5 st	10 st	5 st	10 st			5 st	10 st									
12	56.5	61.5	33	38	12	5	50.5	55.5	4	7	14	5	10	3.5	14	M4 x 0.7	6
16	60	65	35.5	40.5	14	5	54	59	4	10	15	6.5	12	3.5	15.5	M4 x 0.7	6
20	68	73	36.5	41.5	20	8	59	64	5	12	18	8	16	4.5	18.5	M6 x 1.0	9
25	72.5	77.5	37.5	42.5	24	10	62.5	67.5	5	14	20	10	20	5	22.5	M6 x 1.0	10

Double clevis bracket material: Carbon steel

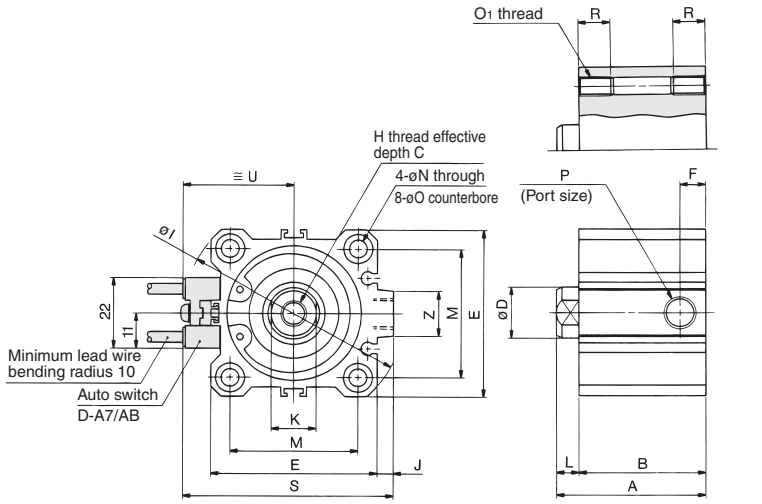
* For details about the rod end nut and accessory brackets, refer to page 7-6-20.
** Clevis pin and snap ring are shipped together.

(In the case of without auto switches, A, B, F and P dimensions will be only changed. Refer to the dimension chart.)

Dimensions: ø32 to ø50/Spring Return With Auto Switch

Basic style (Through-hole): CQ2B/CDQ2B

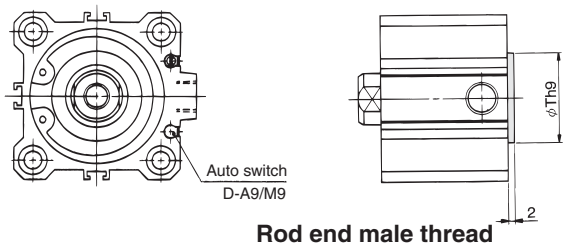
Both ends tapped style: CDQ2A



Both Ends Tapped Style

Bore size (mm)	O1	R
32	M6 x 1.0	10
40	M6 x 1.0	10
50	M8 x 1.25	14

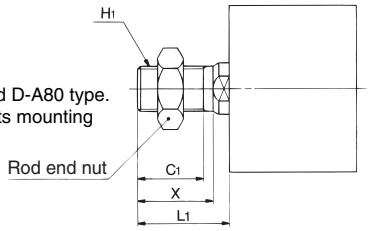
With boss in head side



With Boss in Head Side

Bore size (mm)	Th9
32	$21^{0}_{-0.052}$
40	$28^{0}_{-0.052}$
50	$35^{0}_{-0.062}$

Rod end male thread

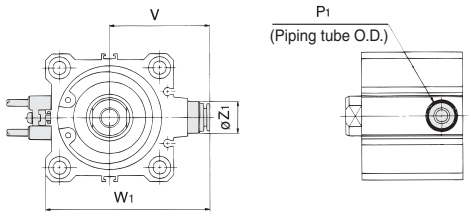


Rod End Male Thread

Bore size (mm)	C1	X	H1	L1
32	20.5	23.5	M14 x 1.5	28.5
40	20.5	23.5	M14 x 1.5	28.5
50	26	28.5	M18 x 1.5	33.5

Auto switch shown above is D-A73 type and D-A80 type.
** For the auto switch mounting position and its mounting height, refer to page 7-6-48.

Built-in One-touch fittings: ø32 to ø50



Built-in One-touch Fittings

Bore size (mm)	Z1	P1	V	W1
32	13	6	36.5	59
40	13	6	40.5	66.5
50	16	8	50	82

Basic Style

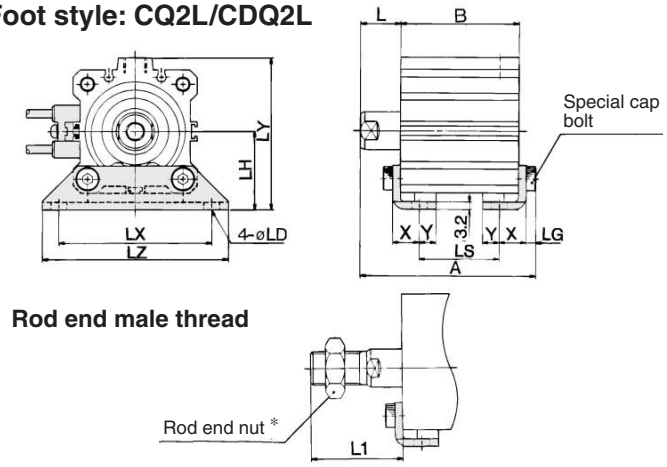
Bore size (mm)	Without auto switch												With auto switch							
	A			B			F			P			A			B			F	P
	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st		
32	35	40	—	28	33	—	5.5	7.5	—	M5 x 0.8	Rc 1/8	—	45	50	—	38	43	—	7.5	Rc 1/8
40	41.5	46.5	—	34.5	39.5	—	8	8	—	Rc 1/8		—	51.5	56.5	—	44.5	49.5	—	8	Rc 1/8
50	—	48.5	58.5	—	40.5	50.5	—	10.5	10.5	—	Rc 1/4		—	58.5	68.5	—	50.5	60.5	10.5	Rc 1/4

Bore size (mm)	C	D	E	H	I	J	K	L	M	N	O	S	U	Z
32	13	16	45	M8 x 1.25	60	4.5	14	7	34	5.5	9 depth 7	58.5	31.5	14
40	13	16	52	M8 x 1.25	69	5	14	7	40	5.5	9 depth 7	66	35	14
50	15	20	64	M10 x 1.5	86	7	17	8	50	6.6	11 depth 8	80	41	19

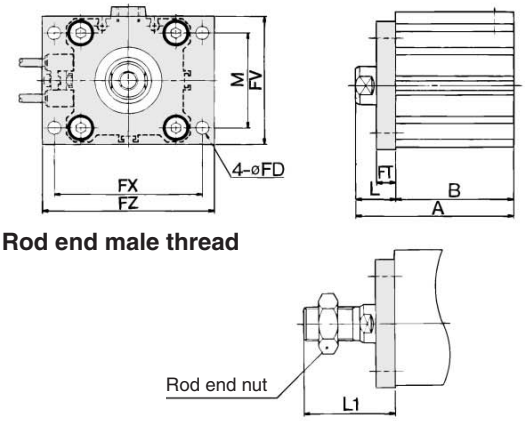
* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Note) A, B dimensions of ø32-5 stroke with One-touch fitting without auto switch are the same dimensions as the stroke ø32-10 without auto switch.

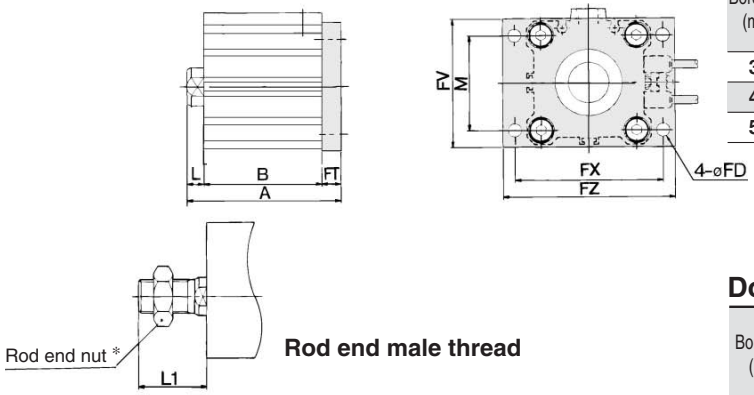
Foot style: CQ2L/CDQ2L



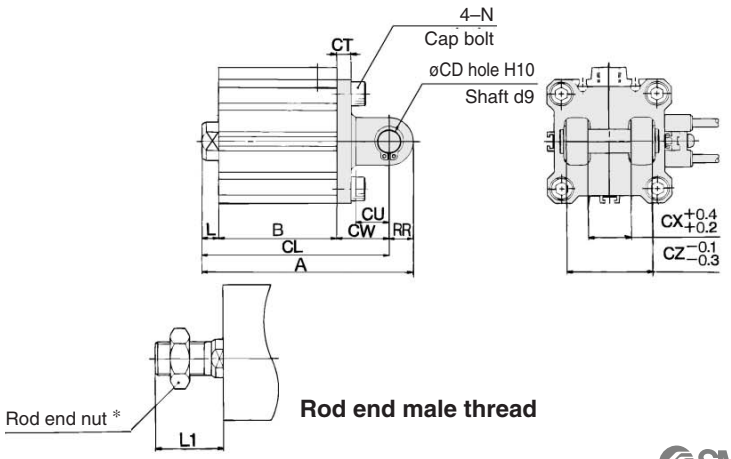
Rod side flange style: CQ2F/CDQ2F



Head side flange style: CQ2G/CDQ2G



Head side flange style: CQ2D/CDQ2D



Foot Style

Bore size (mm)	Without auto switch									With auto switch								
	A			B			LS			A			B			LS		
	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st
32	52.5	57.2	—	28	33	—	12	17	—	62.2	67.2	—	38	43	—	22	27	—
40	58.7	63.7	—	34.5	39.5	—	18.5	23.5	—	68.7	73.7	—	44.5	49.5	—	28.5	33.5	—
50	—	66.7	76.7	—	40.5	50.5	—	17.5	27.5	—	76.7	86.7	—	50.5	60.5	—	27.5	37.5

Bore size (mm)	L	L1	LD	LG	LH	LX	LY	LZ	X	Y
32	17	38.5	6.6	4	30	57	57	71	11.2	5.8
40	17	38.5	6.6	4	33	64	64	78	11.2	7
50	18	43.5	9	5	39	79	78	95	14.7	8

Foot bracket material: Carbon steel

Rod Side Flange Style

Bore size (mm)	Without auto switch						With auto switch					
	A			B			A			B		
	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st
32	45	50	—	28	33	—	55	60	—	38	43	—
40	51.5	56.5	—	34.5	39.5	—	61.5	66.5	—	44.5	49.5	—
50	—	58.5	68.5	—	40.5	50.5	—	68.5	78.5	—	50.5	60.5

Bore size (mm)	FD	FT	FV	FX	FZ	L	L1	M
32	5.5	8	48	56	65	17	38.5	34
40	5.5	8	54	62	72	17	38.5	40
50	6.6	9	67	76	89	18	43.5	50

Flange bracket material: Carbon steel

Head Side Flange Style

Bore size (mm)	Without auto switch			With auto switch			L	L1
	A			B				
	5 st	10 st	20 st	5 st	10 st	20 st		
32	43	48	—	53	58	—	7	28.5
40	49.5	54.5	—	59.5	64.5	—	7	28.5
50	—	57.5	67.5	—	67.5	77.5	8	33.5

Flange bracket material: Carbon steel

* Dimensions except A, L and L1 are the same as rod side flange style.

Double Clevis Style

Bore size (mm)	Without auto switch									With auto switch								
	A			B			CL			A			B			CL		
	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st
32	65	70	—	28	33	—	55	60	—	75	80	—	38	43	—	65	70	—
40	73.5	78.5	—	39.5	39.5	—	63.5	68.5	—	83.5	88.5	—	44.5	49.5	—	73.5	78.5	—
50	—	90.5	100.5	—	40.5	50.5	—	76.5	86.5	—	100.5	110.5	50.5	50.5	60.5	—	86.5	96.5

Bore size (mm)	CD	CT	CU	CW	CX	CZ	L	L1	N	RR
32	10	5	14	20	18	36	7	28.5	M6 x 1.0	10
40	10	6	14	22	18	36	7	28.5	M6 x 1.0	10
50	14	7	20	28	22	44	8	33.5	M8 x 1.25	14

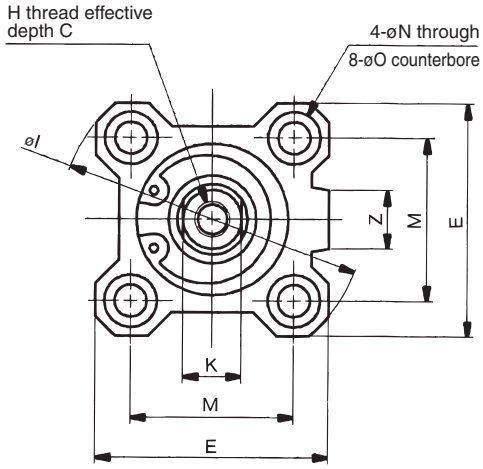
Double clevis bracket material: Cast iron

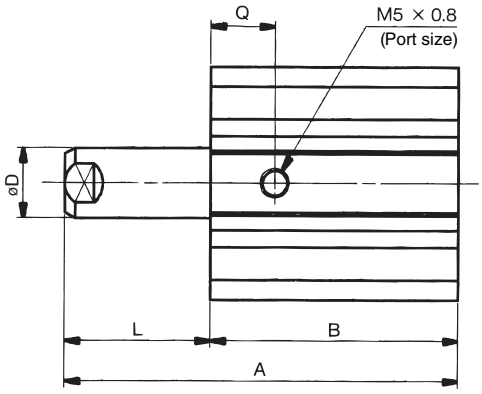
* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

** Clevis pin and snap ring are attached.

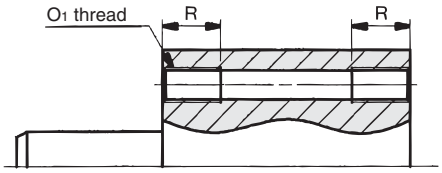
Dimensions: ø12 to ø25/Spring Extend without Auto Switch

Basic style (Through-hole): CQ2B





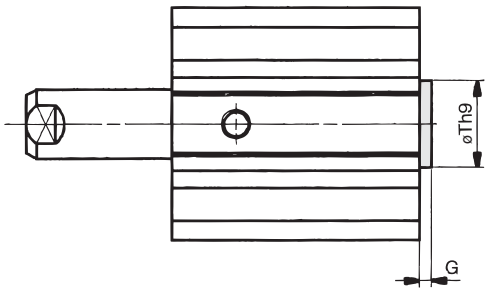
Both end tapped style: CQ2A



Both Ends Tapped Style

Bore size (mm)	O1	R
12	M4 x 0.7	7
16	M4 x 0.7	7
20	M6 x 1.0	10
25	M6 x 1.0	10

With boss in head side

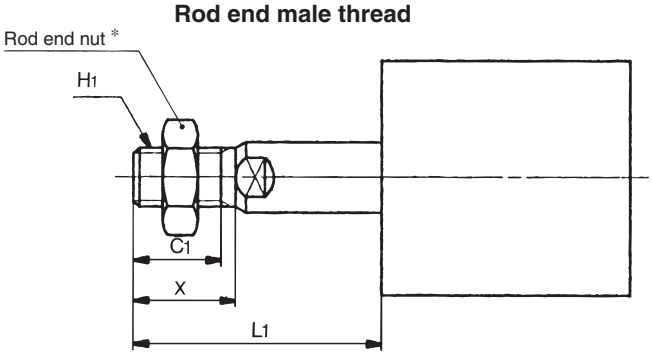


With Boss in Head Side

Bore size (mm)	G	Th9
12	1.5	$15^{\ 0}_{-0.043}$
16	1.5	$20^{\ 0}_{-0.052}$
20	2	$13^{\ 0}_{-0.043}$
25	2	$15^{\ 0}_{-0.043}$

Note) With boss in rod side would be optional. (Suffix "-XC36" to the end of model number.)

Rod end male thread



Rod End Male Thread

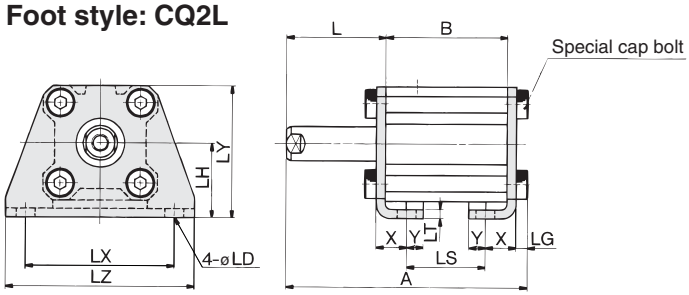
Bore size (mm)	C1	X	H1	L1	
				5 st	10 st
12	9	10.5	M5 x 0.8	19	24
16	10	12	M6 x 1.0	20.5	25.5
20	12	14	M8 x 1.25	23.5	28.5
25	15	17.5	M10 x 1.25	27.5	32.5

Basic Style

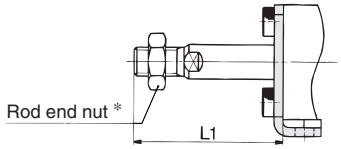
Bore size (mm)	A		B		C	D	E	H	I	K	L		M	N	O	Q	Z
	5 st	10 st	5 st	10 st							5 st	10 st					
12	30.5	40.5	22	27	6	6	25	M3 x 0.5	32	5	8.5	13.5	15.5	3.5	6.5 depth 3.5	7.5	—
16	32	42	23.5	28.5	8	8	29	M4 x 0.7	38	6	8.5	13.5	20	3.5	6.5 depth 3.5	8	10
20	34	44	24.5	29.5	7	10	36	M5 x 0.8	47	8	9.5	14.5	25.5	5.5	9 depth 7	9	10
25	37.5	47.5	27.5	32.5	12	12	40	M6 x 1.0	52	10	10	15	28	5.5	9 depth 7	11	10

∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Foot style: CQ2L



Rod end male thread

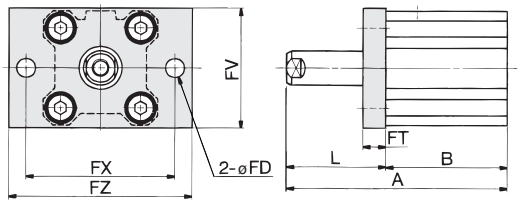


Foot Style

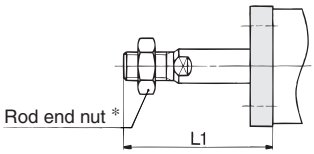
Bore size (mm)	A		B		L		L1		LD	LG	LH	LS		LT	LX	LY	LZ	X	Y
	5 st	10 st	5 st	10 st	5 st	10 st	5 st	10 st				5 st	10 st						
12	45.3	55.3	22	27	18.5	23.5	29	34	4.5	2.8	17	10	15	2	34	29.5	44	8	4.5
16	46.8	56.8	23.5	28.5	18.5	23.5	30.5	35.5	4.5	2.8	19	11.5	16.5	2	38	33.5	48	8	5
20	51.2	61.2	24.5	29.5	19.5	24.5	33.5	38.5	6.6	4	24	12.5	17.5	3.2	48	42	62	9.2	5.8
25	54.7	64.7	27.5	32.5	20	25	37.5	42.5	6.6	4	26	12.5	17.5	3.2	52	46	66	10.7	5.8

Foot bracket material: Carbon steel

Rod side flange style: CQ2F



Rod end male thread

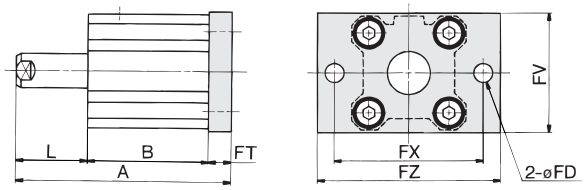


Rod Side Flange Style

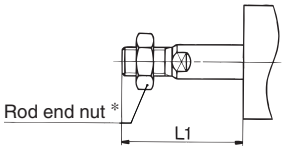
Bore size (mm)	A		B		FD	FT	FV	FX	FZ	L		L1	
	5 st	10 st	5 st	10 st						5 st	10 st	5 st	10 st
12	40.5	50.5	22	27	4.5	5.5	25	45	55	18.5	23.5	29	34
16	42	52	23.5	28.5	4.5	5.5	30	45	55	18.5	23.5	30.5	35.5
20	44	54	24.5	29.5	6.6	8	39	48	60	19.5	24.5	33.5	38.5
25	47.5	57.5	27.5	32.5	6.6	8	42	52	64	20	25	37.5	42.5

Flange bracket material: Carbon steel

Head side flange style: CQ2G



Rod end male thread



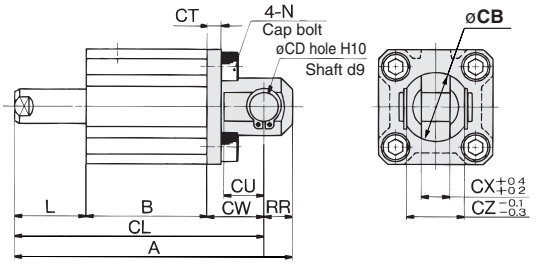
Head Side Flange Style

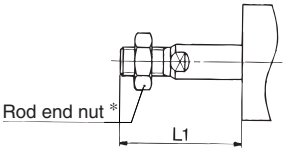
Bore size (mm)	A		L		L1	
	5st	10 st	5 st	10 st	5 st	10 st
12	36	46	8.5	13.5	19	24
16	37.5	47.5	8.5	13.5	20.5	25.5
20	42	52	9.5	14.5	23.5	28.5
25	45.5	55.5	10	15	27.5	32.5

Flange bracket material: Carbon steel

(* Dimensions except A, L and L1 are the same as rod side flange style.)

Double clevis style: CQ2D





Rod end male thread

Double Clevis Style

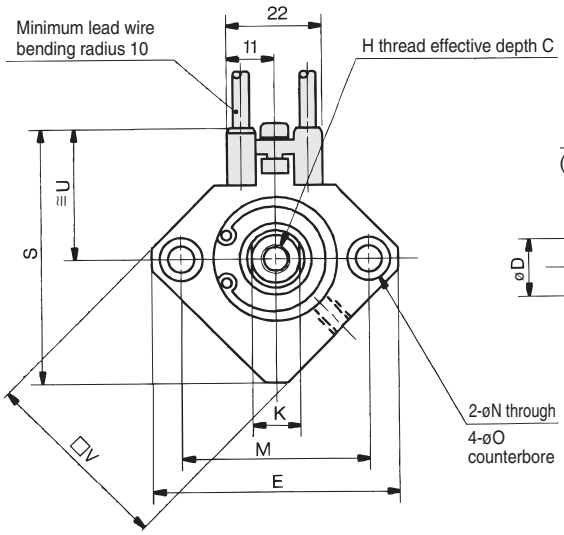
Bore size (mm)	A		B		CB	CD	CL		CT	CU	CW	CX	CZ	L		L1		N	RR
	5 st	10 st	5 st	10 st			5st	10 st						5 st	10 st	5 st	10 st		
12	50.5	60.5	22	27	12	5	44.5	54.5	4	7	14	5	10	8.5	13.5	19	24	M4 x 0.7	6
16	53	63	23.5	28.5	14	5	47	57	4	10	15	6.5	12	8.5	13.5	20.5	25.5	M4 x 0.7	6
20	61	71	24.5	29.5	20	8	52	62	5	12	18	8	16	9.5	14.5	23.5	28.5	M6 x 1.0	9
25	67.5	77.5	27.5	32.5	24	10	57.5	67.5	5	14	20	10	20	10	15	27.5	32.5	M6 x 1.0	10

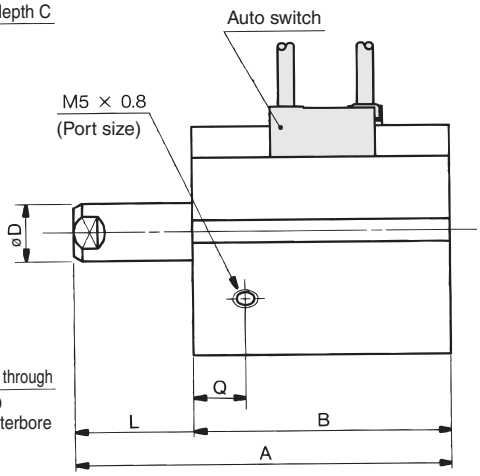
Double clevis bracket material: Carbon steel

* For details about the rod end nut and accessory brackets, refer to page 7-6-20.
** Clevis pin and snap ring are attached.

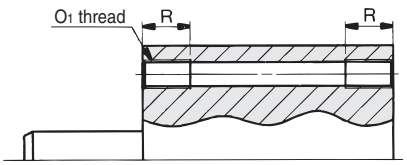
Dimensions: ø12 to ø25/Spring Extend with Auto Switch

Basic style (Through-hole): CDQ2B





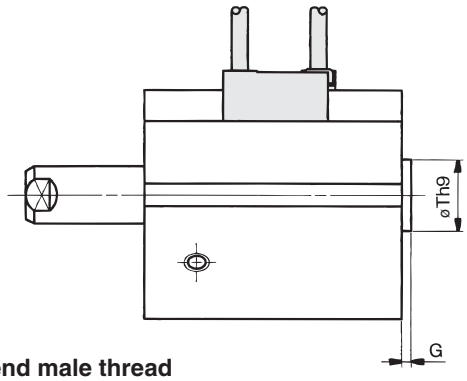
With boss in head side: CDQ2A



Both Ends Tapped Style

Bore size (mm)	O_1	R
12	M4 x 0.7	7
16	M4 x 0.7	7
20	M6 x 1.0	10
25	M6 x 1.0	10

With boss in head side

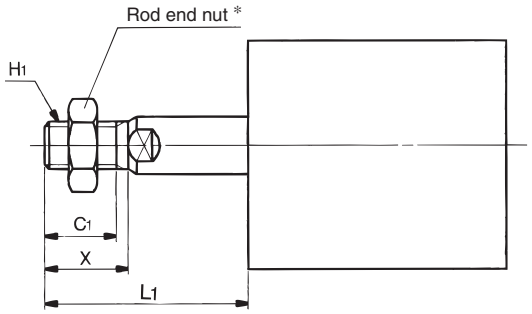


With Boss in Head Side

Bore size (mm)	G	Th9
12	1.5	$15^{0}_{-0.043}$
16	1.5	$20^{0}_{-0.052}$
20	2	$13^{0}_{-0.043}$
25	2	$15^{0}_{-0.043}$

Note) With boss in rod side would be optional. (Suffix "-XC36" to the end of model number.)

Rod end male thread



Rod End Male Thread

Bore size (mm)	C_1	X	H_1	L_1	
				5 st	10 st
12	9	10.5	M5 x 0.8	19	24
16	10	12	M6 x 1.0	20.5	25.5
20	12	14	M8 x 1.25	23.5	28.5
25	15	17.5	M10 x 1.25	27.5	32.5

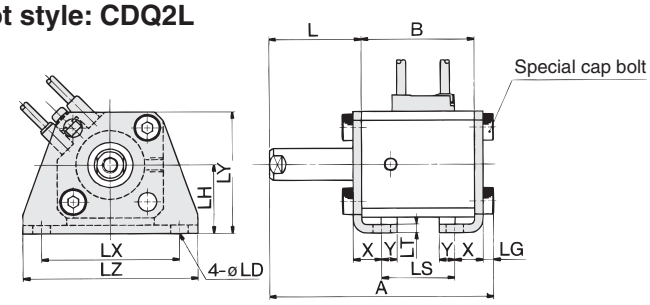
Auto switch shown above is D-A73 type and D-A80 type. For the auto switch mounting position and its mounting height, refer to page 7-6-48.

Basic Style

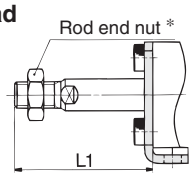
Bore size (mm)	A		B		C	D	E	H	K	L		M	N	O	Q	S	U	V
	5 st	10 st	5 st	10 st						5 st	10 st							
12	45.9	55.9	37.4	42.4	6	6	32	M3 x 0.5	5	8.5	13.5	22	3.5	6.5 depth 3.5	11	35.5	19.5	25
16	44	54	35.5	40.5	8	8	38	M4 x 0.7	6	8.5	13.5	28	3.5	6.5 depth 3.5	10	41.5	22.5	29
20	46	56	36.5	41.5	7	10	47	M5 x 0.8	8	9.5	14.5	36	5.5	9 depth 7	10.5	48	24.5	36
25	47.5	57.5	37.5	42.5	12	12	52	M6 x 1.0	10	10	15	40	5.5	9 depth 7	11	53.5	27.5	40

* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Foot style: CDQ2L



Rod end male thread

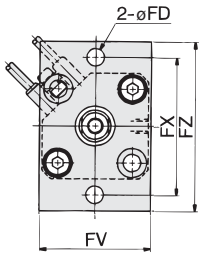


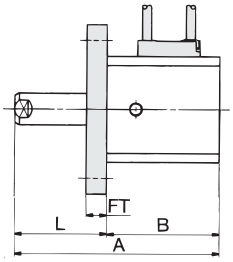
Foot Style

Bore size (mm)	A		B		L		L_1		LD	LG	LH	LS		LT	LX	LY	LZ	X	Y
	5 st	10st	5 st	10st	5 st	10st	5 st	10st				5 st	10st						
12	60.7	70.7	37.4	42.4	18.5	23.5	29	34	4.5	2.8	17	25.4	30.4	2	34	29.5	44	8	4.5
16	58.8	68.8	35.5	40.5	18.5	23.5	30.5	35.5	4.5	2.8	19	23.5	28.5	2	38	33.5	48	8	5
20	63.2	73.2	36.5	41.5	19.5	24.5	33.5	38.5	6.6	4	24	24.5	29.5	3.2	48	42	62	9.2	5.8
25	64.7	74.7	37.5	42.5	20	25	37.5	42.5	6.6	4	26	22.5	27.5	3.2	52	46	66	10.7	5.8

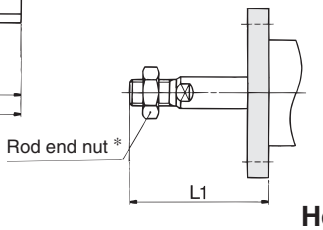
Foot bracket material: Carbon steel

Rod side flange style: CDQ2F





Rod end male thread



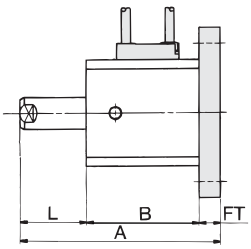
Rod Side Flange Style

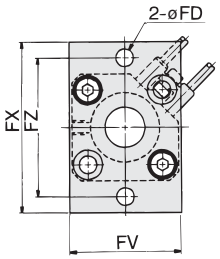
Bore size (mm)	A		B		FD	FT	FV	FX	FZ	L		L_1	
	5 st	10 st	5 st	10 st						5 st	10 st	5 st	10 st
12	55.9	65.9	37.4	42.4	4.5	5.5	25	45	55	18.5	23.5	29	34
16	54	64	35.5	40.5	4.5	5.5	30	45	55	18.5	23.5	30.5	35.5
20	56	66	36.5	41.5	6.6	8	39	48	60	19.5	24.5	33.5	38.5
25	57.5	67.5	37.5	42.5	6.6	8	42	52	64	20	25	37.5	42.5

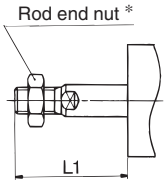
Flange bracket material: Carbon steel

Head side flange style: CDQ2G

Rod end male thread







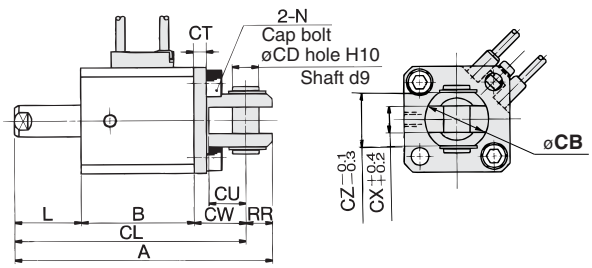
Head Side Flange Style

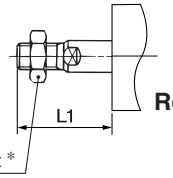
Bore size (mm)	A		L		L_1	
	5 st	10 st	5 st	10 st	5 st	10 st
12	51.4	61.4	8.5	13.5	19	24
16	49.5	59.5	8.5	13.5	20.5	25.5
20	54	64	9.5	14.5	23.5	28.5
25	55.5	65.5	10	15	27.5	32.5

Flange bracket material: Carbon steel

(* Dimensions except A, L and L1 are the same as rod side flange style.)

Double clevis style: CDQ2D





Rod end male thread

Rod end nut *

Double Clevis Style

Bore size (mm)	A		B		CB	CD	CL		CT	CU	CW	CX	CZ	L	
	5 st	10 st	5 st	10 st			5 st	10 st						5 st	10 st
12	65.9	75.9	37.4	42.4	12	5	59.9	69.9	4	7	14	5	10	8.5	13.5
16	65	75	35.5	40.5	14	5	59	69	4	10	15	6.5	12	8.5	13.5
20	73	83	36.5	41.5	20	8	64	74	5	12	18	8	16	9.5	14.5
25	77.5	87.5	37.5	42.5	24	10	67.5	77.5	5	14	20	10	20	10	15

Bore size (mm)	L_1		N	RR
	5 st	10 st		
12	19	24	M4 x 0.7	6
16	20.5	25.5	M4 x 0.7	6
20	23.5	28.5	M6 x 1.0	9
25	27.5	32.5	M6 x 1.0	10

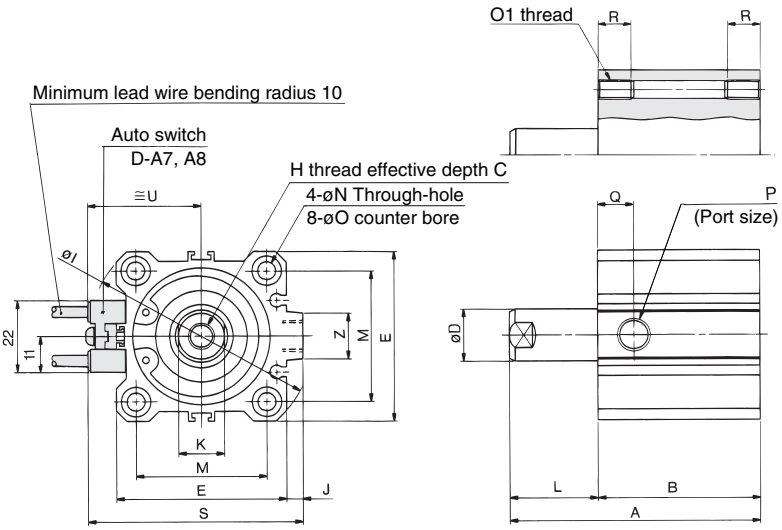
Double clevis bracket material: Carbon steel

* For details about the rod end nut and accessory brackets, refer to page 7-6-20.
** Clevis pin and snap ring are shipped together.

(In the case of without auto switches, A, B, P and Q dimensions will be only changed. Refer to the dimension table.)

Dimensions: ø32 to ø50/Spring Extend with Auto Switch

Basic style (Through-hole): CQ2B, CDQ2B

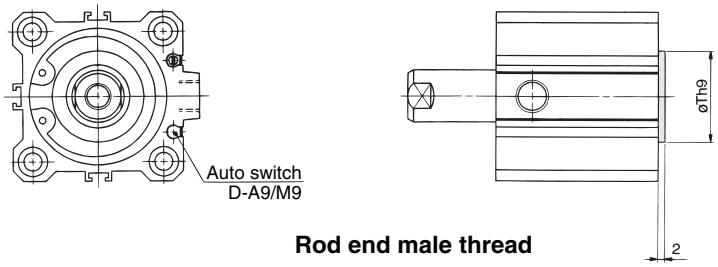


Both ends tapped style: CQ2A/CDQ2A

Both Ends Tapped Style

Bore size (mm)	O1	R
32	M6 x 1.0	10
40	M6 x 1.0	10
50	M8 x 1.25	14

With boss in head side

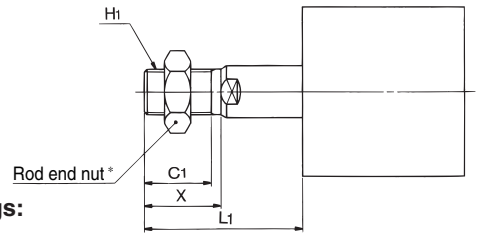


With Boss in Head Side

Bore size (mm)	Th9
32	$21^{\ 0}_{-0.052}$
40	$28^{\ 0}_{-0.052}$
50	$35^{\ 0}_{-0.062}$

Note) With boss in rod side would be optional. (Suffix "-XC36" to the end of model number.)

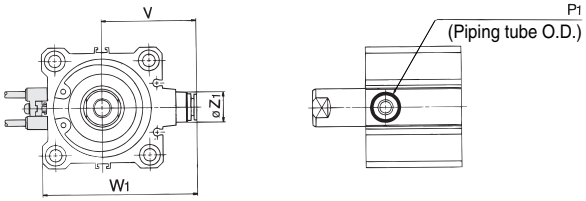
Rod end male thread



Rod End Male Thread

Bore size (mm)	C1	X	H1	L1		
				5 st	10 st	20 st
32	20.5	23.5	M14 x 1.5	33.5	38.5	—
40	20.5	23.5	M14 x 1.5	33.5	38.5	—
50	26	28.5	M18 x 1.5	—	43.5	53.5

Built-in One-touch fittings: ø32 to ø50



Built-in One-touch Fittings

Bore size (mm)	Z1	P1	V	W1
32	13	6	36.5	59
40	13	6	40.5	66.5
50	16	8	50	82

Auto switch shown above is D-A73 and D-A80.
For the auto switch mounting position and its mounting height, refer to page 7-6-48.

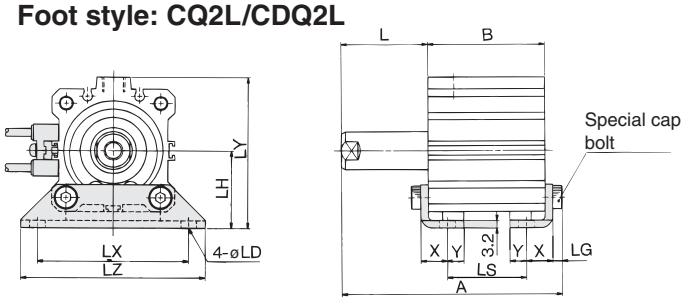
Basic Style

Bore size (mm)	Without auto switch												With auto switch							
	A			B			P			Q			A			B			P	Q
	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st		
32	40	50	—	28	33	—	M5 x 0.8	Rc 1/8	—	11.5	10.5	—	50	60	—	38	43	—	Rc 1/8	10.5
40	46.5	56.5	—	34.5	39.5	—	Rc 1/8		—	11	11	—	56.5	66.5	—	44.5	49.5	—	Rc 1/8	11
50	—	68.5	78.5	—	40.5	50.5	—	Rc 1/4		—	10.5	10.5	—	68.5	88.5	—	50.5	60.5	Rc 1/4	10.5

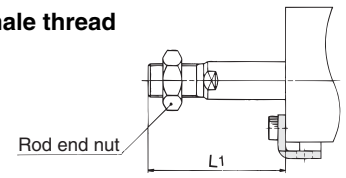
Bore size (mm)	C	D	E	H	I	J	K	L			M	N	O	S	U	Z
								5 st	10 st	20 st						
32	13	16	45	M8 x 1.25	60	4.5	14	12	17	—	34	5.5	9 depth 7	58.5	31.5	14
40	13	16	52	M8 x 1.25	69	5	14	12	17	—	40	5.5	9 depth 7	66	35	14
50	15	20	64	M10 x 1.5	86	7	17	—	18	28	50	6.6	11 depth 8	80	41	19

* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

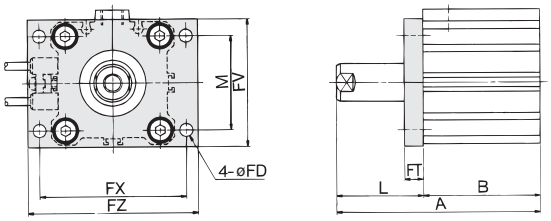
Foot style: CQ2L/CDQ2L



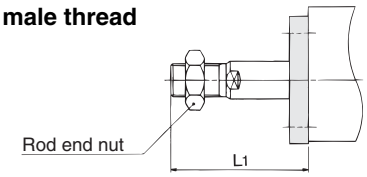
Rod end male thread



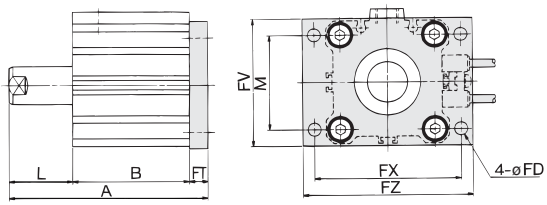
Rod side flange style: CQ2F/CDQ2F

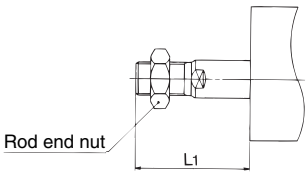


Rod end male thread



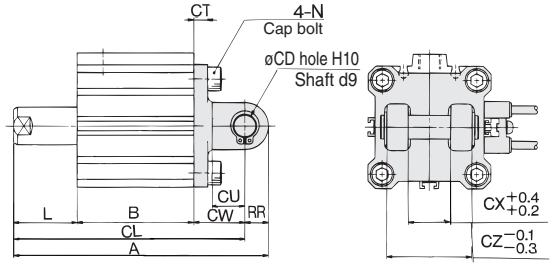
Head side flange style: CQ2G/CDQ2G

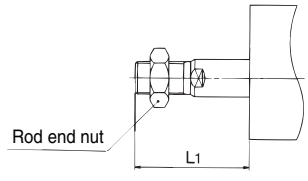




Rod end male thread

Double clevis style: CQ2D/CDQ2D





Rod end male thread

Foot Style

Bore size (mm)	Without auto switch									With auto switch								
	A			B			LS			A			B			LS		
	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st
32	57.2	67.2	—	28	33	—	12	17	—	67.2	77.2	—	38	43	—	22	27	—
40	63.7	73.7	—	34.5	39.5	—	18.5	23.5	—	73.7	83.7	—	44.5	49.5	—	28.5	33.5	—
50	—	76.7	96.7	—	40.5	50.5	—	17.5	27.5	—	86.7	106.7	—	50.5	60.5	—	27.5	37.5

Bore size (mm)	L			L1			LD	LG	LH	LX	LY	LZ	X	Y
	5 st	10 st	20 st	5 st	10 st	20 st								
32	22	27	—	43.5	48.5	—	6.6	4	30	57	57	71	11.2	5.8
40	22	27	—	43.5	48.5	—	6.6	4	33	64	64	78	11.2	7
50	—	28	38	—	53.5	63.5	9	5	39	79	78	95	14.7	8

Foot bracket material: Carbon steel

Rod Side Flange Style

Bore size (mm)	Without auto switch						With auto switch						FD	FT	FV	FX	FZ
	A			B			A			B							
	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st					
32	50	60	—	28	33	—	60	70	—	38	43	—	5.5	8	45	56	65
40	56.5	66.5	—	34.5	39.5	—	66.5	76.5	—	44.5	49.5	—	5.5	8	54	62	72
50	—	68.5	88.5	—	40.5	50.5	—	78.5	98.5	—	50.5	60.5	6.6	9	67	76	89

Bore size (mm)	L			L1			M
	5 st	10 st	20 st	5 st	10 st	20 st	
32	22	27	—	43.5	48.5	—	34
40	22	27	—	43.5	48.5	—	40
50	—	28	38	—	53.5	63.5	50

Flange bracket material: Carbon steel

Head Side Flange Style

Bore size (mm)	Without auto switch	With auto switch					L			L1		
	A			B								
	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st
32	48	58	—	58	68	—	12	17	—	33.5	38.5	—
40	45.5	64.5	—	64.5	74.5	—	12	17	—	33.5	38.5	—
50	—	67.5	87.5	—	77.5	97.5	—	18	28	—	43.5	53.5

* Dimensions except A, L and L1 are the same as rod side flange style.

Flange bracket material: Carbon steel

Double Clevis Style

Bore size (mm)	Without auto switch									With auto switch								
	A			B			CL			A			B			CL		
	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st	5 st	10 st	20 st
32	70	80	—	28	33	—	60	70	—	80	90	—	38	43	—	70	80	—
40	78.5	88.5	—	34.5	39.5	—	68.5	78.5	—	88.5	98.5	—	44.5	49.5	—	78.5	88.5	—
50	—	100.5	120.5	—	40.5	50.5	—	86.5	106.5	—	110.5	130.5	—	50.5	60.5	—	96.5	116.5

Bore size (mm)	CD	CT	CU	CW	CX	CZ	L			L1		
							5 st	10 st	20 st	5 st	10 st	20 st
32	10	5	14	20	18	36	12	17	—	33.5	38.5	—
40	10	6	14	22	18	36	12	17	—	33.5	38.5	—
50	14	7	20	28	22	44	—	18	28	—	43.5	53.5

Double clevis bracket material: Cast iron

* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

** Clevis pin and snap ring are shipped together.

Compact Cylinder: Non-rotating Rod Type
Double Acting, Single Rod
Series CQ2K
ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63

How to Order

Without auto switch CQ2K **B** **20** **□** — **30** **D** **□**

With auto switch CDQ2K **B** **20** **□** — **30** **D** **□** — **J79W** **S**

Built-in magnet

Non-rotating rod type

Mounting style

B	Through-hole (Standard)	ø12 to ø63
A	Both ends tapped style	ø40, ø50 ø63
L	Foot style	
F	Rod side flange style	
G	Head side flange style	
D	Double clevis style	

∗ Mounting brackets are shipped together, (but not assembled).

Bore size

12 Note)	12 mm	**32**	32 mm
16	16 mm	**40**	40 mm
20	20 mm	**50**	50 mm
25	25 mm	**63**	63 mm

Note) When ø12 with switch is required, the body option should be with rubber bumper (C).
Ex.) CDQ2KB12-30DC

Piping

Nil	Screw-in piping
F	Built-in One-touch fittings Note)

Note) Bore sizes available w/ One-touch fittings are ø32 to ø63.

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 7-6-63.

Action

D	Double acting

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled). (Except D-P5DWL)

Number of auto switches

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

Body option

Nil	Standard (Rod end female thread)
F	With boss in head side
C	With rubber bumper (Only ø12 with switch)
M	Rod end male thread

∗ Combination of body option (FM) is available.

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

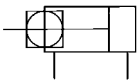
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Rail mounting ø12 to ø63 Perpendicular	Rail mounting ø12 to ø63 In-line	Direct mounting ø32 to ø63 Perpendicular	Direct mounting ø32 to ø63 In-line	Lead wire length (m) ∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	A76H	A96V	A96	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200 V	A72	A72H	—	—	●	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	A73	A73H	—	—	●	●	●	—	—		
								—	—	A93V	A93	●	●	—	—	—		
		Connector					—	A73C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	A79W	—	—	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NV	F79	M9NV	M9N	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				F7PV	F7P	M9PV	M9P	●	●	○	—	○		
				2-wire		12 V		F7BV	J79	M9BV	M9B	●	●	○	—	○	—	
		Connector						J79C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		F7NWV	F79W	F9NWV	F9NW	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	F7PW	F9PWV	F9PW	●	●	○	—	○		
				2-wire		12 V		F7BWV	J79W	F9BWV	F9BW	●	●	○	—	○		
	Water resistant (2-color indication)							—	F7BA	—	F9BA	—	●	○	—	○	—	
								F7BAV	—	—	—	—	●	○	—	—		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		—	F79F	—	—	●	●	○	—	○	IC circuit	
	Magnetic field resistant (2-color indication)			2-wire		—		—	P5DW	—	—	●	●	●	—	○	—	

∗ 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.
• D-P5DWL type is available from ø40 to ø63 only.
• There are other applicable auto switches other than the listed above. For details, refer to page 7-6-23.
• For details about auto switches with pre-wire connector, refer to page 7-9-36.

JIS Symbol

Non-rotating rod



⚠Precautions

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

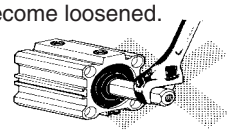
⚠Caution

Snap Ring Installation/Removal

1. For installation and removal, use an appropriate pair of pliers (tool for installing a type C snap ring).
2. 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 installment.

Mounting

1. When removing a load, be sure to secure the wrench flats of the piston rod on the load side.
2. If this is done without securing the piston rod on the load side, be aware that the coupled (screwed-in) portion of the piston rod could become loosened.



3. Using a non-rotating rod cylinder
   - Avoid using the air cylinder in such a way that rotational torque would be applied to the piston rod. If rotational torque is applied, the non-rotating guide will deform, causing a loss of non-rotating accuracy.
     Use the chart below as a guide for the allowable rotational torque ranges.

Allowable rotational torque	12	16	20	25	32	40	50	63
N·m or less	0.04	0.15	0.20	0.25	0.44	0.44	0.44	0.44

   - Operate the cylinder in such a way that the load to the piston rod is always applied in the axial direction.

Type

Bore size (mm)			12	16	20	25	32	40	50	63
Pneumatic	Mounting	Through-hole (Standard)	●	●	●	●	●	●	●	●
		Both ends tapped style	—	—	—	—	—	●	●	●
	Built-in magnet		●	●	●	●	●	●	●	●
	Piping	Screw-in type	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8	Note) M5 x 0.8 Rc 1/8	Rc 1/8	Rc 1/4	Rc 1/4
		Built-in One-touch fittings	—	—	—	—	ø6/4	ø6/4	ø8/6	ø8/6
	Rod end male thread		●	●	●	●	●	●	●	●
	With boss in head side		●	●	●	●	●	●	●	●

Note) In the case of without auto switch, M5 x 0.8 is used for 5 stroke only.

Standard Specifications

Type	Pneumatic (Non-lube)
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
Rod end thread	Female thread
Rod end thread tolerance	JIS Class 2
Stroke length tolerance	$^{+1.0}_{0}$
Mounting	Through-hole
Piston speed	50 to 500 mm/s

Allowable Kinetic Energy (J)

Bore size (mm)	12	16	20	25	32	40	50	63
Allowable kinetic energy	0.022	0.038	0.055	0.09	0.15	0.26	0.46	0.77

Minimum Operating Pressure (MPa)

Bore (mm)	12	16	20	25	32	40	50	63
Minimum operating pressure	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05

Non-rotating Accuracy

Bore (mm)	12	16	20	25	32	40	50	63
Rod non-rotating accuracy	±2°	±1°			±0.8°			

Standard Stroke

Bore (mm)	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	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100

Manufacture of Intermediate Stroke

Description	Spacer is installed in the standard stroke body.	
Part no.	Refer to "How to Order" for the standard model no. on page 7-6-62.	
Description	Dealing with the stroke by the 1 mm interval is available by installing spacer with standard stroke cylinder.	
Stroke range	Bore size	Stroke range
	12, 16	1 to 29
	20, 25	1 to 49
	32 to 63	1 to 99
Example	Part no.: CQ2KB50-57D CQ2KB50-75D with 18 mm width spacer inside. B dimension is 115.5 mm.	

Made to Order

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

Symbol	Specifications
-XA□	Change of rod end shape
-XB10	Intermediate stroke (Using exclusive body)
-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
-XC18	NPT finish piping port

Theoretical Output

(N)

Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
12	IN	25	42	59
	OUT	34	57	79
16	IN	45	75	106
	OUT	60	101	141
20	IN	71	118	165
	OUT	94	157	220
25	IN	113	189	264
	OUT	147	245	344

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	1150
	OUT	589	982	1370
63	IN	841	1400	1960
	OUT	935	1560	2180

Mounting Bracket Part No.

Bore size (mm)	Foot (3)	Flange	Double clevis
40	CQ-L040	CQ-F040	CQ-D040
50	CQ-L050	CQ-F050	CQ-D050
63	CQ-L063	CQ-F063	CQ-D063

Note 3) Order two foot brackets per cylinder.
Note 4) 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.

Weight

(g)

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	60	67	74	81	88	95	—	—	—	—	—	—
16	58	67	76	85	94	103	—	—	—	—	—	—
20	103	117	131	145	159	173	187	201	215	229	—	—
25	137	152	167	182	197	212	227	242	257	272	—	—
32	203	223	243	263	283	303	323	343	363	383	403	423
40	215	238	261	284	307	330	353	376	399	422	445	468
50	—	381	418	455	492	529	566	603	640	677	714	751
63	—	550	592	634	676	718	760	802	844	886	928	970

Additional Weight

(g)

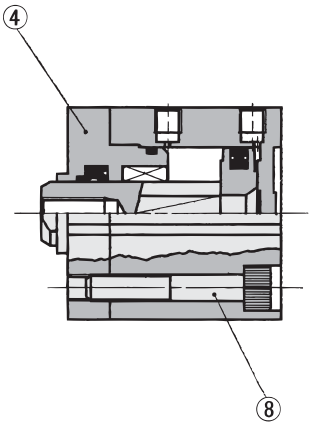
Bore size (mm)		12	16	20	25	32	40	50	63
Both ends tapped style		—	—	—	—	—	6	6	19
Rod end male thread	Male thread	1.5	3	6	12	26	27	53	53
	Nut	1	2	4	8	17	17	32	32
With boss in head side		0.7	1.3	2	3	5	7	13	25
Built-in One-touch fittings		—	—	—	—	12	12	21	21
Foot style (Including mounting bolt)		—	—	—	—	—	154	242	323
Rod side flange style (Including mounting bolt)		—	—	—	—	—	213	372	558
Rear flange style (Including mounting bolt)		—	—	—	—	—	198	348	534
Double clevis style (Including pin, snap ring, bolt)		—	—	—	—	—	196	393	554

Calculation: (Example) CQ2KD40-20DM
- Cylinder weight: CQ2KA40-20D ····· 284 g
- Option weight: Both ends tapped style ····· 6 g
  Rod end male thread ····· 44 g
  Double clevis style ····· 196 g

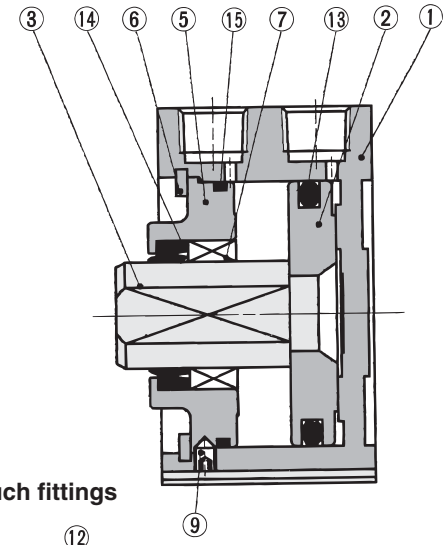
530 g

Construction

Basic style (Bore size ø12 to ø32)

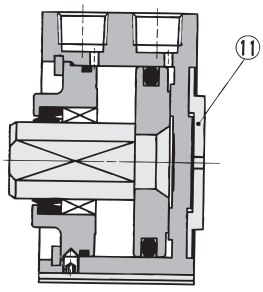


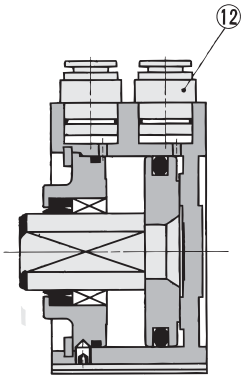
Basic style (Bore size ø40 to ø63)



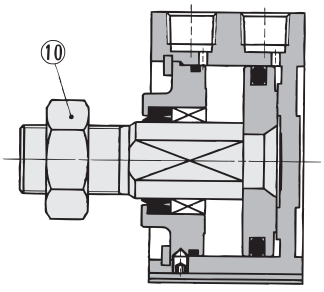
Built-in One-touch fittings

With boss in head side





Rod end male thread



Component Parts

No.	Description	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②	Piston	Aluminum alloy	Chromated
③	Piston rod	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø100, Hard chrome plated
④	Rod cover	Brass	ø12, Nickel plated
		Aluminum alloy	ø16 to ø32, Anodized
⑤	Collar	Aluminum alloy	ø40 to ø63, Anodized
⑥	Snap ring	Carbon tool steel	Phosphate coated
⑦	Bushing	Oil-impregnated sintered alloy	ø16 to ø63
⑧	Hexagon socket head cap screw	Alloy steel	ø12 to ø32, Nickel plated
⑨	Hexagon socket head set screw	Alloy steel	ø40 to ø63, Nickel plated
⑩	Rod end nut	Carbon steel	Nickel plated
⑪	Centering location ring	Aluminum alloy	ø20 to ø63, Hard anodized
⑫	One-touch fitting	—	ø32 to ø63

No.	Description	Material	Note
⑬	Piston seal	NBR	
⑭	Rod seal	NBR	
⑮	Tube gasket	NBR	

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Note	Bore size (mm)	Kit no.	Note
12	CQ2KB12-PS	Nos. above ⑬, ⑭, ⑮	32	CQ2KB32-PS	Nos. above ⑬, ⑭, ⑮
16	CQ2KB16-PS		40	CQ2KB40-PS	
20	CQ2KB20-PS		50	CQ2KB50-PS	
25	CQ2KB25-PS		63	CQ2KB63-PS	

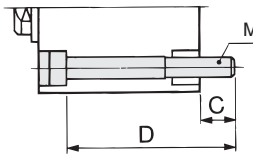
Mounting Bolt for CQ2KB

Mounting method: Mounting bolt for through-hole mounting style of CQ2KB is available as an option.

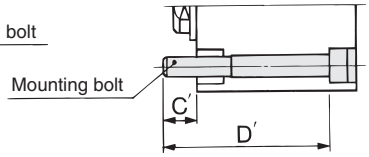
Ordering: Add the word "Bolt" in front of the bolts to be used.

Example) Bolt M3 x 30ℓ 2 pcs.

Head side mounting style



Rod side mounting style



Model	C	D	Mounting bolt	C'	D'	Mounting bolt
CQ2KB12-5D	6.5	30	M3 x 30ℓ	6.5	30	M3 x 30ℓ
-10D		35	x 35ℓ		35	x 35ℓ
-15D		40	x 40ℓ		40	x 40ℓ
-20D		45	x 45ℓ		45	x 45ℓ
-25D		50	x 50ℓ		50	x 50ℓ
-30D		55	x 55ℓ		55	x 55ℓ
CQ2KB16-5D	5	30	M3 x 30ℓ	5	30	M3 x 30ℓ
-10D		35	x 35ℓ		35	x 35ℓ
-15D		40	x 40ℓ		40	x 40ℓ
-20D		45	x 45ℓ		45	x 45ℓ
-25D		50	x 50ℓ		50	x 50ℓ
-30D		55	x 55ℓ		55	x 55ℓ
CQ2KB20-5D	8	35	M5 x 35ℓ	9.5	35	M5 x 35ℓ
-10D		40	x 40ℓ		40	x 40ℓ
-15D		45	x 45ℓ		45	x 45ℓ
-20D		50	x 50ℓ		50	x 50ℓ
-25D		55	x 55ℓ		55	x 55ℓ
-30D		60	x 60ℓ		60	x 60ℓ
-35D		65	x 65ℓ		65	x 65ℓ
-40D		70	x 70ℓ		70	x 70ℓ
-45D		75	x 75ℓ		75	x 75ℓ
-50D		80	x 80ℓ		80	x 80ℓ
CQ2KB25-5D	10	40	M5 x 40ℓ	6.5	35	M5 x 35ℓ
-10D		45	x 45ℓ		40	x 40ℓ
-15D		50	x 50ℓ		45	x 45ℓ
-20D		55	x 55ℓ		50	x 50ℓ
-25D		60	x 60ℓ		55	x 55ℓ
-30D		65	x 65ℓ		60	x 60ℓ
-35D		70	x 70ℓ		65	x 65ℓ
-40D		75	x 75ℓ		70	x 70ℓ
-45D		80	x 80ℓ		75	x 75ℓ
-50D		85	x 85ℓ		80	x 80ℓ
CQ2KB32-5D	8.5	40	M5 x 40ℓ	10	40	M5 x 40ℓ
-10D		45	x 45ℓ		45	x 45ℓ
-15D		50	x 50ℓ		50	x 50ℓ
-20D		55	x 55ℓ		55	x 55ℓ
-25D		60	x 60ℓ		60	x 60ℓ
-30D		65	x 65ℓ		65	x 65ℓ
-35D		70	x 70ℓ		70	x 70ℓ
-40D		75	x 75ℓ		75	x 75ℓ
-45D		80	x 80ℓ		80	x 80ℓ
-50D		85	x 85ℓ		85	x 85ℓ
-75D		120	x 120ℓ		120	x 120ℓ
-100D		145	x 145ℓ		145	x 145ℓ

Model	C	D	Mounting bolt	C'	D'	Mounting bolt
CQ2KB40-5D	7.5	35	M5 x 35ℓ	7.5	35	M5 x 35ℓ
-10D		40	x 40ℓ		40	x 40ℓ
-15D		45	x 45ℓ		45	x 45ℓ
-20D		50	x 50ℓ		50	x 50ℓ
-25D		55	x 55ℓ		55	x 55ℓ
-30D		60	x 60ℓ		60	x 60ℓ
-35D		65	x 65ℓ		65	x 65ℓ
-40D		70	x 70ℓ		70	x 70ℓ
-45D		75	x 75ℓ		75	x 75ℓ
-50D		80	x 80ℓ		80	x 80ℓ
-75D		115	x 115ℓ		115	x 115ℓ
-100D		140	x 140ℓ		140	x 140ℓ
CQ2KB50-10D	12.5	45	M6 x 45ℓ	12.5	45	M6 x 45ℓ
-15D		50	x 50ℓ		50	x 50ℓ
-20D		55	x 55ℓ		55	x 55ℓ
-25D		60	x 60ℓ		60	x 60ℓ
-30D		65	x 65ℓ		65	x 65ℓ
-35D		70	x 70ℓ		70	x 70ℓ
-40D		75	x 75ℓ		75	x 75ℓ
-45D		80	x 80ℓ		80	x 80ℓ
-50D		85	x 85ℓ		85	x 85ℓ
-75D		120	x 120ℓ		120	x 120ℓ
-100D		145	x 145ℓ		145	x 145ℓ
CQ2KB63-10D	14.5	50	M8 x 50ℓ	14.5	50	M8 x 50ℓ
-15D		55	x 55ℓ		55	x 55ℓ
-20D		60	x 60ℓ		60	x 60ℓ
-25D		65	x 65ℓ		65	x 65ℓ
-30D		70	x 70ℓ		70	x 70ℓ
-35D		75	x 75ℓ		75	x 75ℓ
-40D		80	x 80ℓ		80	x 80ℓ
-45D		85	x 85ℓ		85	x 85ℓ
-50D		90	x 90ℓ		90	x 90ℓ
-75D		125	x 125ℓ		125	x 125ℓ
-100D		150	x 150ℓ		150	x 150ℓ

Copper-free (For CRT manufacturing process)

20 — CQ2KB [Bore size] — [Stroke] D(M)

- **Copper-free**
- **ø16, ø20, ø25, ø32, ø40, ø50, ø63**

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)	16, 20, 25, 32, 40, 50, 63
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Rubber bumper	None
Piping	Screw-in piping
Piston speed	50 to 500 mm/s
Mounting	Through-hole
Auto switch	Mountable

∗ Refer to page 7-9-1 for further information on auto switches.

Non-rotating Rod, Double Acting, Single Rod
Series CDQ2K
With Auto Switch

Minimum Stroke for Auto Switch Mounting

(mm)

No. of auto switches mounted	D-F7□V D-J79C D-M9□V	D-A7□ D-A80 D-A73C D-A80C D-A9□V	D-F7□WV D-F9□WV D-F7BAVL	D-A7□H D-A80H D-F7□ D-J79 D-M9□ D-F9□W	D-A79W	D-F7□W D-J79W D-F7BAL D-F79F D-F9BAL	D-A9□	D-P5DWL
1 pc.	5	5	10	15	15	20	10	15
2 pcs.	5	10	15	15	20	20	10	15

Weight

(g)

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	77	83	89	95	101	107	—	—	—	—	—	—
16	86	94	102	110	118	126	—	—	—	—	—	—
20	138	152	166	180	194	208	222	236	250	264	—	—
25	178	194	210	226	242	258	274	290	306	322	—	—
32	236	256	276	296	316	336	356	376	396	416	516	616
40	253	276	299	322	345	368	391	414	437	460	575	690
50	—	464	501	538	575	612	649	686	723	760	945	1130
63	—	654	696	738	780	822	864	906	948	990	1200	1410

Additional Weight

(g)

Bore size (mm)		12	16	20	25	32	40	50	63
Both ends tapped style		—	—	—	—	—	6	6	19
Rod end male thread	Male thread	1.5	3	6	12	26	27	53	53
	Nut	1	2	4	8	17	17	32	32
With boss in head side		0.7	1.3	2	3	5	7	13	25
Built-in One-touch fittings		—	—	—	—	12	12	21	21
Foot style (Including mounting bolt)		—	—	—	—	—	154	242	323
Rod side flange style (Including mounting bolt)		—	—	—	—	—	213	372	558
Head side flange style (Including mounting bolt)		—	—	—	—	—	198	348	534
Double clevis style (Including pin, snap ring and bolt)		—	—	—	—	—	196	393	554

Calculation: (Example) CDQ2KD40-25DM
- Cylinder weight: CDQ2KB40-25D····· 345 g
- Option weight: Both ends tapped style····· 6 g
  Rod end male thread····· 44 g
  Double clevis style····· 196 g

591 g

When auto switch is mounted, add the weight of number of auto switches and mounting brackets.

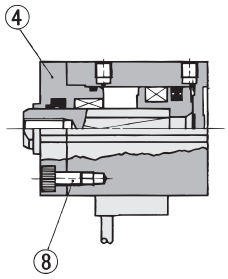
Auto Switch Mounting Bracket Weight

Mounting bracket part no.	Applicable bore size (mm)	Weight (g)
BQ-1	12 to 25	1.5
BQ-2	32 to 63	1.5

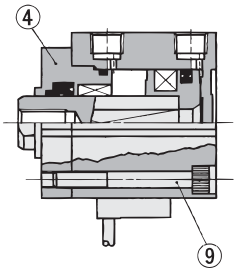
∗ For the auto switch weight, refer to page 7-9-1.

Construction

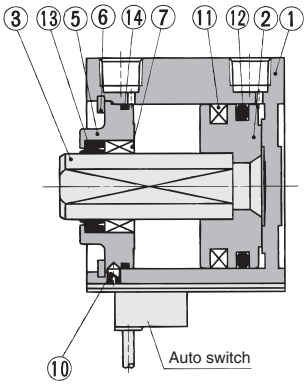
ø12 to ø25



ø32



ø40 to ø63



Component Parts

No.	Description	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②	Piston	Aluminum alloy	Chromated
③	Piston rod	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø63, Hard chrome plated
④	Rod cover	Brass	ø12, Nickel plated
		Aluminum alloy	ø16 to ø32, Anodized
⑤	Collar	Aluminum alloy	ø40 to ø63, Anodized
⑥	Snap ring	Carbon tool steel	Phosphate coated
⑦	Bushing	Oil-impregnated sintered alloy	ø16 to ø63
⑧	Hexagon socket head cap screw	Alloy steel	ø12 to ø25, Nickel plated
⑨	Hexagon socket head cap screw	Alloy steel	ø32, Nickel plated
⑩	Hexagon socket head set screw	Alloy steel	Nickel plated, ø40 to ø63
⑪	Magnet	—	
⑫	Piston seal	NBR	
⑬	Rod seal	NBR	
⑭	Tube gasket	NBR	

Replacement Parts: Pneumatic (Non-lube)

Bore size (mm)	Kit no.	No.
12	CQ2KB12-PS	Set of nos. at left ⑫, ⑬, ⑭
16	CQ2KB16-PS	
20	CQ2KB20-PS	
25	CQ2KB25-PS	
32	CQ2KB32-PS	
40	CQ2KB40-PS	
50	CQ2KB50-PS	
63	CQ2KB63-PS	

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

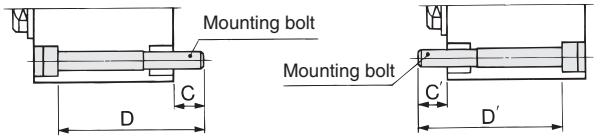
Mounting Bolt for CDQ2KB with Auto Switch

Mounting method: Mounting bolt for through-hole mounting style of CDQ2KB is available as an option.

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

Example) Bolt M3 x 35ℓ 2 pcs.

Head side mounting style **Rod side mounting style**



Model	C	D	Mounting bolt	C'	D'	Mounting bolt
CDQ2KB12-5DC	5.5	35	M3 x 35ℓ	5.5	40	M3 x 40ℓ
-10DC		40	x 40ℓ		45	x 45ℓ
-15DC		45	x 45ℓ		50	x 50ℓ
-20DC		50	x 50ℓ		55	x 55ℓ
-25DC		55	x 55ℓ		60	x 60ℓ
-30DC		60	x 60ℓ		65	x 65ℓ
CDQ2KB16-5D	8	40	M3 x 40ℓ	8	45	M3 x 45ℓ
-10D		45	x 45ℓ		50	x 50ℓ
-15D		50	x 50ℓ		55	x 55ℓ
-20D		55	x 55ℓ		60	x 60ℓ
-25D		60	x 60ℓ		65	x 65ℓ
-30D		65	x 65ℓ		70	x 70ℓ
CDQ2KB20-5D	10.5	40	M5 x 40ℓ	7.5	45	M5 x 45ℓ
-10D		45	x 45ℓ		50	x 50ℓ
-15D		50	x 50ℓ		55	x 55ℓ
-20D		55	x 55ℓ		60	x 60ℓ
-25D		60	x 60ℓ		65	x 65ℓ
-30D		65	x 65ℓ		70	x 70ℓ
-35D		70	x 70ℓ		75	x 75ℓ
-40D		75	x 75ℓ		80	x 80ℓ
-45D		80	x 80ℓ		85	x 85ℓ
-50D		85	x 85ℓ		90	x 90ℓ
CDQ2KB25-5D	9.5	40	M5 x 40ℓ	6.5	45	M5 x 45ℓ
-10D		45	x 45ℓ		50	x 50ℓ
-15D		50	x 50ℓ		55	x 55ℓ
-20D		55	x 55ℓ		60	x 60ℓ
-25D		60	x 60ℓ		65	x 65ℓ
-30D		65	x 65ℓ		70	x 70ℓ
-35D		70	x 70ℓ		75	x 75ℓ
-40D		75	x 75ℓ		80	x 80ℓ
-45D		80	x 80ℓ		85	x 85ℓ
-50D		85	x 85ℓ		90	x 90ℓ
CDQ2KB32-5D	8.5	50	M5 x 50ℓ	10	50	M5 x 50ℓ
-10D		55	x 55ℓ		55	x 55ℓ
-15D		60	x 60ℓ		60	x 60ℓ
-20D		65	x 65ℓ		65	x 65ℓ
-25D		70	x 70ℓ		70	x 70ℓ
-30D		75	x 75ℓ		75	x 75ℓ
-35D		80	x 80ℓ		80	x 80ℓ

Model	C	D	Mounting bolt	C'	D'	Mounting bolt
CDQ2KB32-40D	8.5	85	M5 x 85ℓ	10	85	M5 x 85ℓ
-45D		90	x 90ℓ		90	x 90ℓ
-50D		95	x 95ℓ		95	x 95ℓ
-75D		120	x 120ℓ		120	x 120ℓ
-100D		145	x 145ℓ		145	x 145ℓ
CDQ2KB40-5D	7.5	45	M5 x 45ℓ	7.5	45	M5 x 45ℓ
-10D		50	x 50ℓ		50	x 50ℓ
-15D		55	x 55ℓ		55	x 55ℓ
-20D		60	x 60ℓ		60	x 60ℓ
-25D		65	x 65ℓ		65	x 65ℓ
-30D		70	x 70ℓ		70	x 70ℓ
-35D		75	x 75ℓ		75	x 75ℓ
-40D		80	x 80ℓ		80	x 80ℓ
-45D		85	x 85ℓ		85	x 85ℓ
-50D		90	x 90ℓ		90	x 90ℓ
-75D		115	x 115ℓ		115	x 115ℓ
-100D		140	x 140ℓ		140	x 140ℓ
CDQ2KB50-10D	12.5	55	M6 x 55ℓ	12.5	55	M6 x 55ℓ
-15D		60	x 60ℓ		60	x 60ℓ
-20D		65	x 65ℓ		65	x 65ℓ
-25D		70	x 70ℓ		70	x 70ℓ
-30D		75	x 75ℓ		75	x 75ℓ
-35D		80	x 80ℓ		80	x 80ℓ
-40D		85	x 85ℓ		85	x 85ℓ
-45D		90	x 90ℓ		90	x 90ℓ
-50D		95	x 95ℓ		95	x 95ℓ
-75D		120	x 120ℓ		120	x 120ℓ
-100D		145	x 145ℓ		145	x 145ℓ
CDQ2KB63-10D	14.5	60	M8 x 60ℓ	14.5	60	M8 x 60ℓ
-15D		65	x 65ℓ		65	x 65ℓ
-20D		70	x 70ℓ		70	x 70ℓ
-25D		75	x 75ℓ		75	x 75ℓ
-30D		80	x 80ℓ		80	x 80ℓ
-35D		85	x 85ℓ		85	x 85ℓ
-40D		90	x 90ℓ		90	x 90ℓ
-45D		95	x 95ℓ		95	x 95ℓ
-50D		100	x 100ℓ		100	x 100ℓ
-75D		125	x 125ℓ		125	x 125ℓ
-100D		150	x 150ℓ		150	x 150ℓ

Auto Switch Mounting Bracket Part No.

Bore size (mm)	Mounting bracket part no.	Note	Applicable auto switch	
			Reed switch	Solid state switch
12, 16 20, 25	BQ-1	• Switch mounting screw (M3 x 0.5 x 8ℓ) • Square nut	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
32, 40 50, 63 80, 100	BQ-2	• Switch mounting screw (M3 x 0.5 x 10ℓ) • Switch spacer • Switch mounting nut		
40 to 100	BQP1-050	• Switch mounting bracket • Switch mounting nut • Hexagon hole cap bolt (M3 x 0.5 x 14ℓ spring washer 2 pcs.) • Round head Phillips screw (M3 x 0.5 x 16ℓ spring washer 2 pcs.)	—	D-P5DWL

[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.

(Since the spacer is not included, order it separately.)

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.

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

D-A7□
D-A80

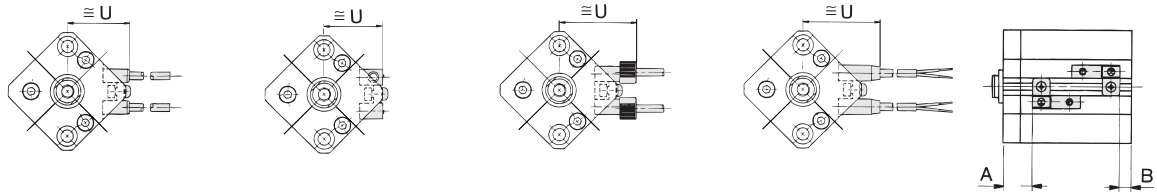
D-A7□H
D-A80H
D-F7□
D-J79
D-F7BAL

D-F7□W
D-J79W
D-F79F
D-F7NTL

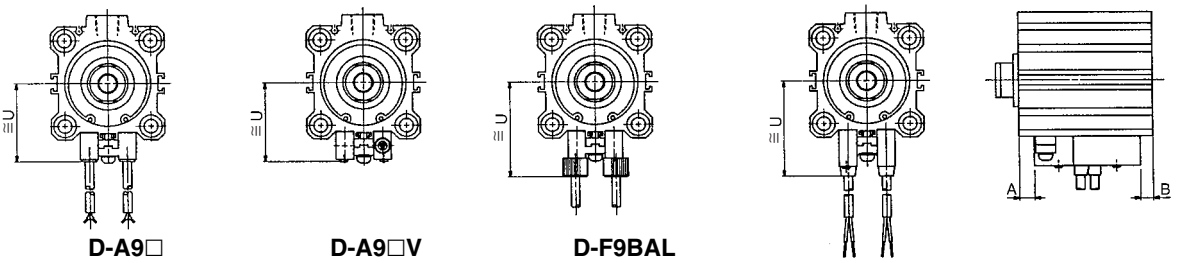
D-A73C
D-A80C
D-J79C

D-A79W
D-F7□WV
D-F7□V
D-F7BAVL

ø12 to ø25



ø32 to ø63

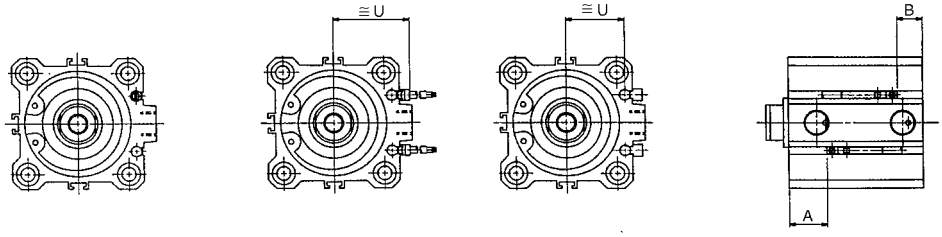


D-A9□
D-M9□
D-F9□W

D-A9□V
D-M9□V
D-F9□WV

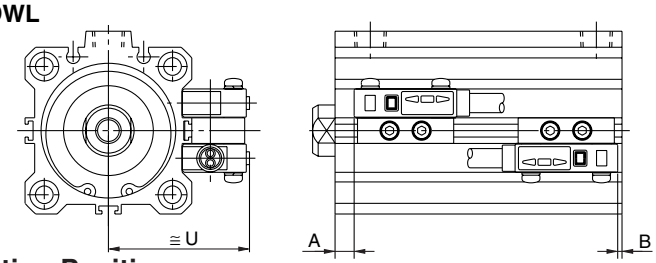
D-F9BAL

ø32 to ø63



ø40 to ø63

D-P5DWL



Proper Auto Switch Mounting Position

Bore size (mm)	D-A7□ D-A80		D-A7□H/A80H D-A73C/A80C D-F7□/J79/J79W/F79F D-F7□V/J79C D-F7□W/F7□WV D-F7BAL/F7BAVL		D-A79W		D-A9□ D-A9□V		D-M9□ D-M9□V D-F9□W D-F9□WV		D-F9BAL		D-P5DWL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
12	9.5	5.5	10	6	7	3	—	—	—	—	—	—	—	—
16	12.5	5	13	5.5	10	2.5	—	—	—	—	—	—	—	—
20	15.5	6.5	16	7	13	4	—	—	—	—	—	—	—	—
25	15.5	7	16	7.5	13	4.5	—	—	—	—	—	—	—	—
32	18	6	18.5	6.5	15.5	3.5	17	5	21	9	20	8	—	—
40	13	8.5	13.5	9	10.5	6	12	7.5	16	11.5	15	10.5	9	4.5
50	11	11.5	11.5	12	8.5	9	10	10.5	14	14.5	13	13.5	7	7.5
63	13.5	14.5	14	15	11	12	12.5	13.5	16.5	17.5	15.5	16.5	9.5	10.5

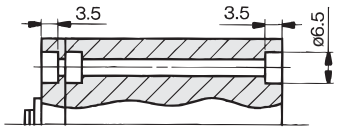
Auto Switch Mounting Height

Bore size (mm)	D-A7□ D-A80	D-A7□H/A80H/F7□ D-J79/F7□W/J79W D-F7BAL/F79F/F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAVL	D-J79C	D-A79W	D-A9□V	D-M9□V D-F9□WV	D-F9BAL	D-P5DWL
	U	U	U	U	U	U	U	U	U	U
12	19.5	20.5	26.5	23	26	22	—	—	—	—
16	22.5	23.5	29.5	26	29	25	—	—	—	—
20	24.5	25.5	31.5	28	31	27	—	—	—	—
25	27.5	28.5	34.5	31	34	30	—	—	—	—
32	31.5	32.5	38.5	35	38	34	27	29	26.5	—
40	35	36	42	38.5	41.5	37.5	30.5	32.5	30	44
50	41	42	48	44.5	47.5	43.5	36.5	38.5	36	50
63	47.5	48.5	54.5	51	54	50	40	42	39.5	56.5

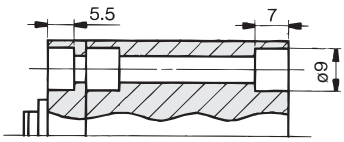
Dimensions: ø12 to ø25/Without Auto Switch

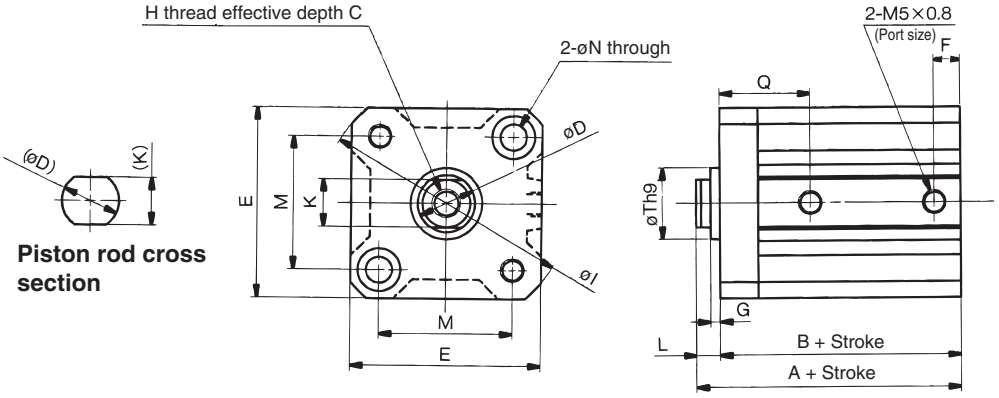
Basic style (Through-hole): CQ2KB

ø12, ø16



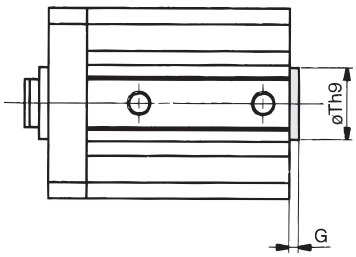
ø20, ø25



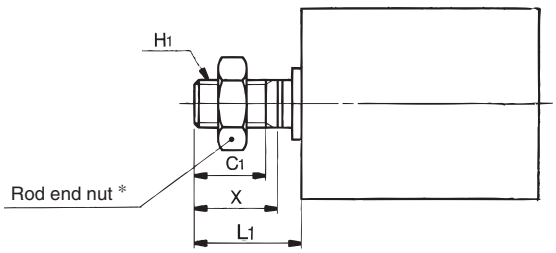


Piston rod cross section

With boss in head side



Rod end male thread



With Boss in Head Side

Bore size (mm)	G	Th9
12	1.5	15 $^{0}_{-0.043}$
16	1.5	20 $^{0}_{-0.052}$
20	2	13 $^{0}_{-0.043}$
25	2	15 $^{0}_{-0.043}$

Rod End Male Thread

Bore size (mm)	C_1	H_1	L_1	X
12	9	M5 x 0.8	14	10.5
16	10	M6 x 1.0	15.5	12
20	12	M8 x 1.25	18.5	14
25	15	M10 x 1.25	22.5	17.5

Basic Style

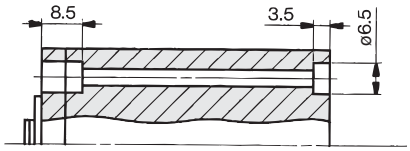
Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	G	H	I	K	L	M	N	Q	Th9
12	5 to 30	25.5	22	6	6	25	5	1.5	M3 x 0.5	32	5.2	3.5	15.5	3.5	12.5	15 $^{0}_{-0.043}$
16	5 to 30	27	23.5	8	8	29	5.5	1.5	M4 x 0.7	38	6	3.5	20	3.5	13	20 $^{0}_{-0.052}$
20	5 to 50	32	27.5	7	10	36	5.5	2	M5 x 0.8	47	8	4.5	25.5	5.5	17	13 $^{0}_{-0.043}$
25	5 to 50	35.5	30.5	12	12	40	5.5	2	M6 x 1.0	52	10	5	28	5.5	19	15 $^{0}_{-0.043}$

* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

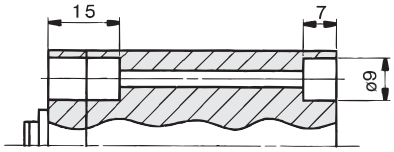
Dimensions: ø12 to ø25/With Auto Switch

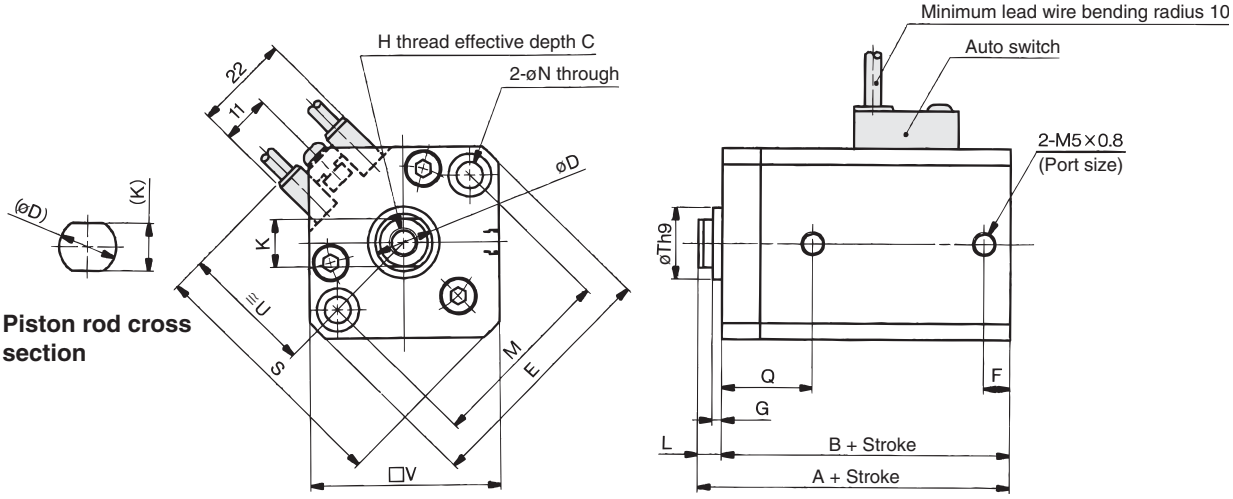
Basic Style (Through-hole): CDQ2KB

ø12, ø16



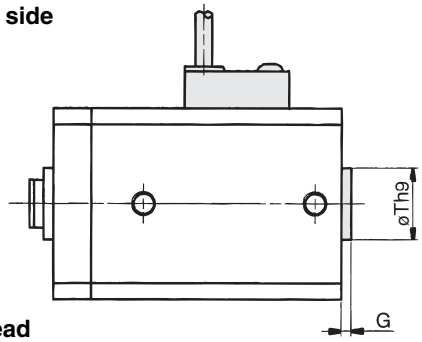
ø20, ø25



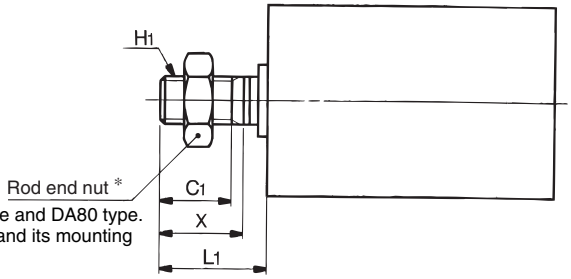


Piston rod cross section

With boss in head side



Rod end male thread



* Auto switch shown above is D-A73 type and DA80 type. For the auto switch mounting position and its mounting height, refer to page 7-6-69.

Rod End Male Thread

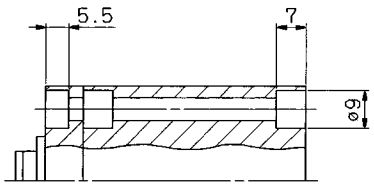
Bore size (mm)	C1	H1	L1	X
12	9	M5 x 0.8	14	10.5
16	10	M6 x 1.0	15.5	12
20	12	M8 x 1.25	18.5	14
25	15	M10 x 1.25	22.5	17.5

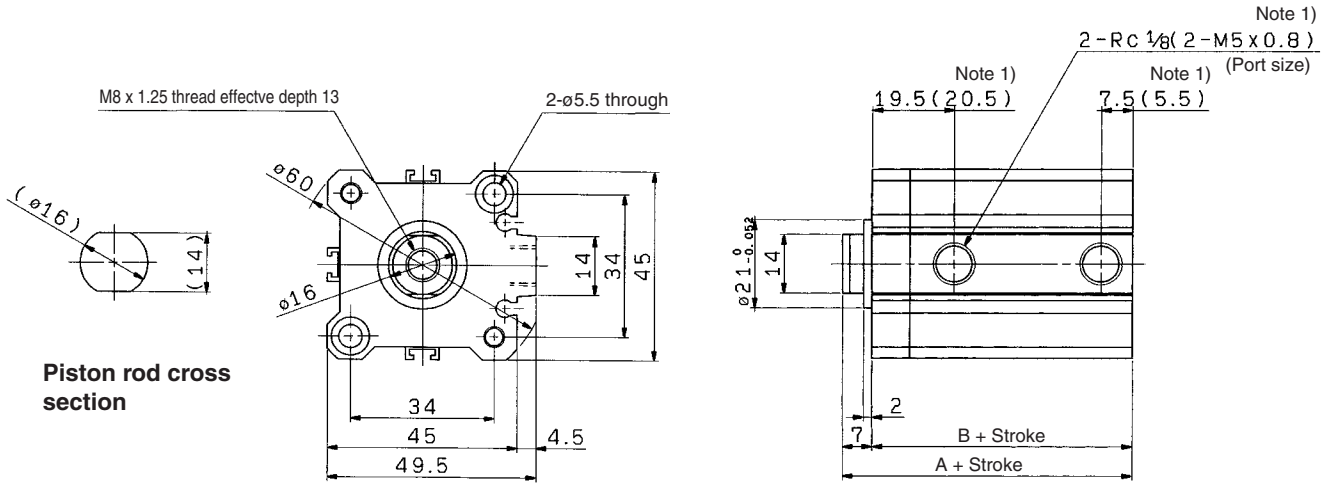
Basic Style

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	G	H	K	L	M	N	Q	S	Th9	U	V
12	5 to 30	36.5	33	6	6	32	6.5	1.5	M3 x 0.5	5.2	3.5	22	3.5	16	35.5	$15^{\ 0}_{-0.043}$	19.5	25
16	5 to 30	39	35.5	8	8	38	5.5	1.5	M4 x 0.7	6	3.5	28	3.5	15	41.5	$20^{\ 0}_{-0.052}$	22.5	29
20	5 to 50	44	39.5	7	10	47	5.5	2	M5 x 0.8	8	4.5	36	5.5	18.5	48	$13^{\ 0}_{-0.043}$	24.5	36
25	5 to 50	45.5	40.5	12	12	52	5.5	2	M6 x 1.0	10	5	40	5.5	19	53.5	$15^{\ 0}_{-0.043}$	27.5	40

* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Dimensions: ø32/Without Auto Switch





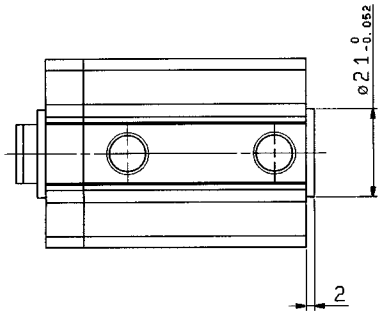
Piston rod cross section

Note 1) ( ): denotes at stroke 5 mm

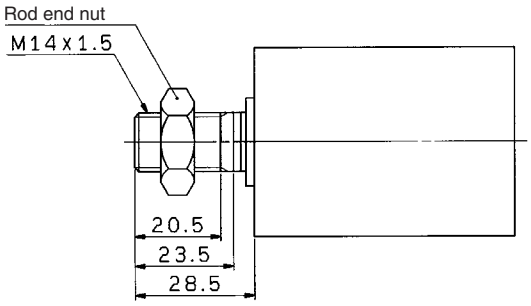
(mm)

Stroke range	A	B
5 to 50	39	32
75, 100	49	42

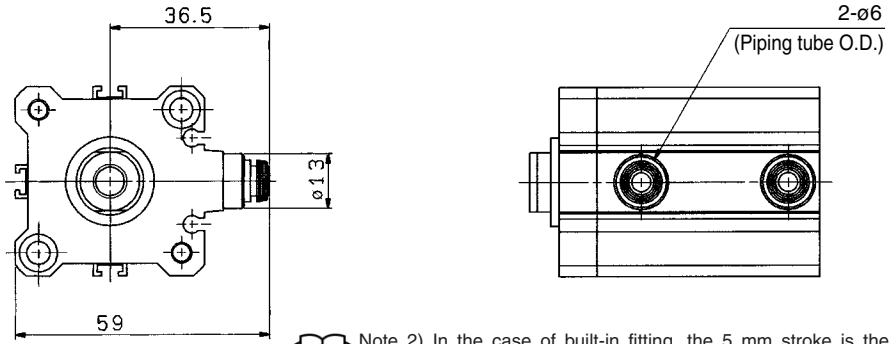
With boss in head side



Rod end male thread



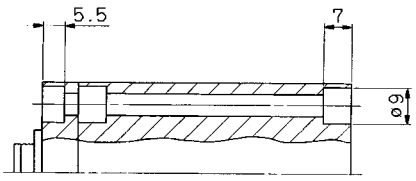
Built-in One-touch fittings: Ø32



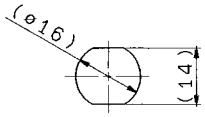
Note 2) In the case of built-in fitting, the 5 mm stroke is the same external dimensions as 10 mm stroke.

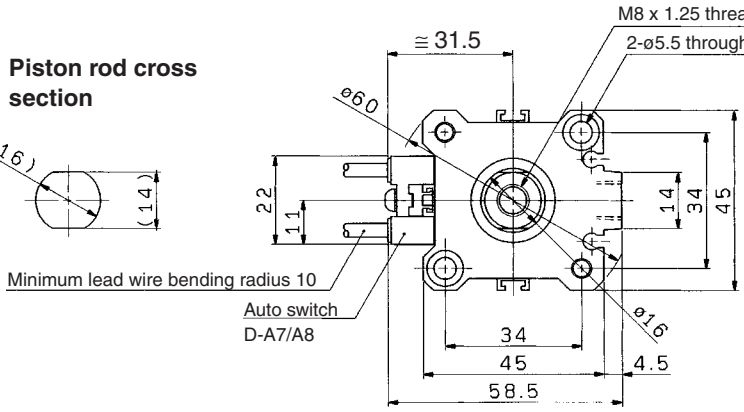
∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

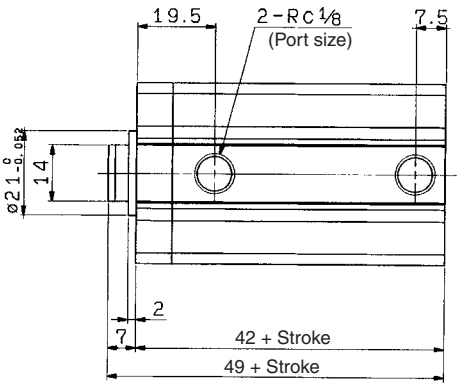
Dimensions: ø32/With Auto Switch



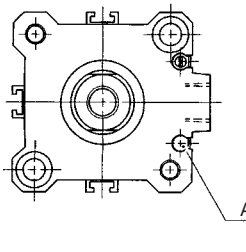
Piston rod cross section

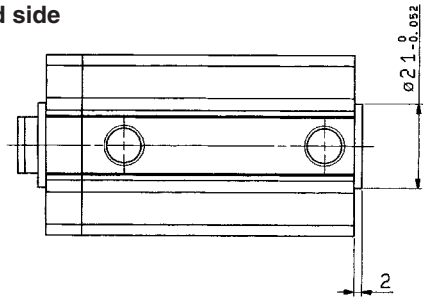




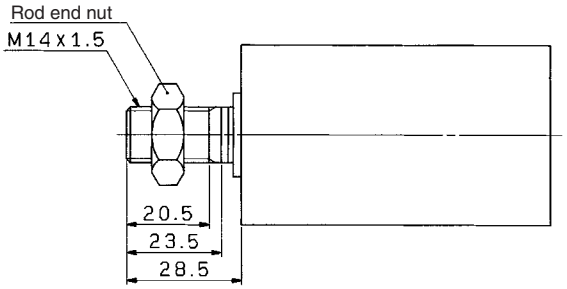


With boss in head side

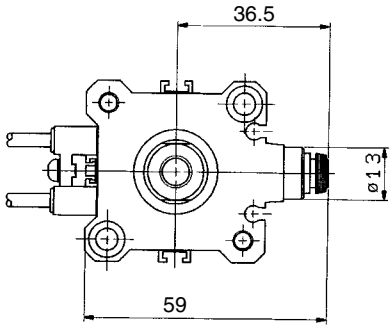


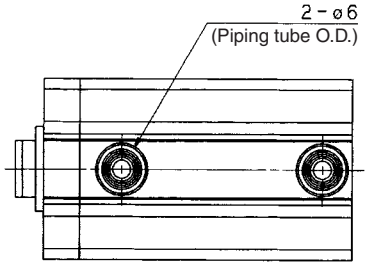


Rod end male thread



Built-in One-touch fittings: ø32





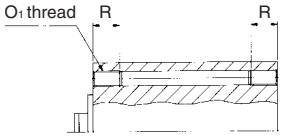
∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

(In the case of without auto switches, A and B dimensions will be only changed. Refer to the dimension chart.)

Dimensions: ø40 to ø63/With Auto Switch

Basic style (Through-hole): CDQ2KB

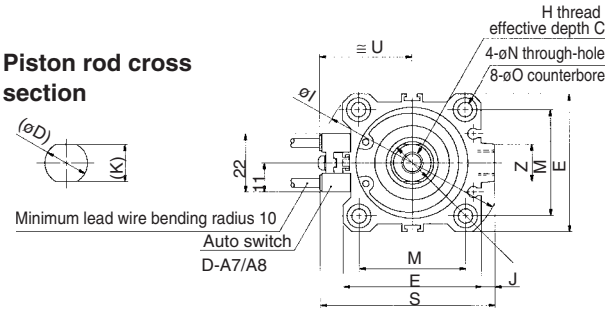
Both ends tapped style: CDQ2KA

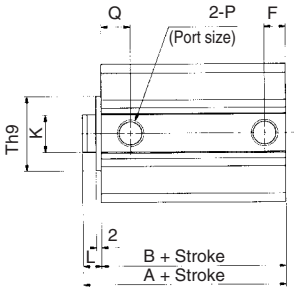


Both Ends Tapped Style

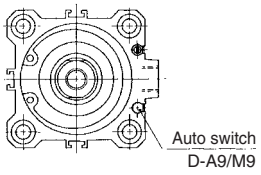
Bore size (mm)	O_1	R
40	M6 x 1.0	10
50	M8 x 1.25	14
63	M10 x 1.5	18

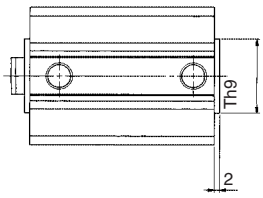
Piston rod cross section





With boss in head side

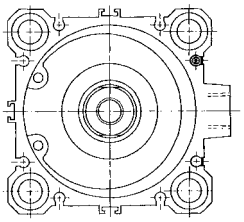




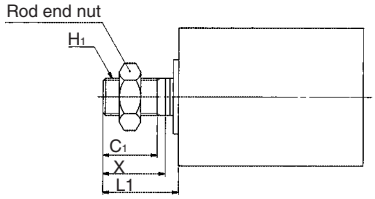
With Boss in Head Side

Bore size (mm)	Th9
40	$28^{\ 0}_{-0.052}$
50	$35^{\ 0}_{-0.062}$
63	$35^{\ 0}_{-0.062}$

Rod end male thread



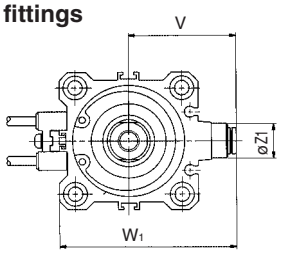
ø63 Cylinder tube form

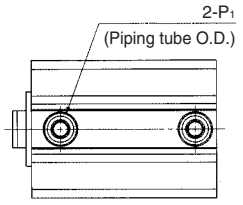


Rod End Male Thread

Bore size (mm)	C_1	H_1	L1	X
40	20.5	M14 x 1.5	28.5	23.5
50	26	M18 x 1.5	33.5	28.5
63	26	M18 x 1.5	33.5	28.5

Built-in One-touch fittings





Built-in One-touch Fittings

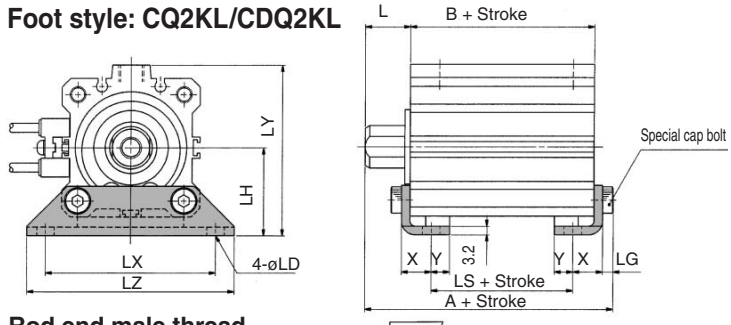
Bore size (mm)	Z_1	P_1	V	W_1
40	13	6	40.5	66.5
50	16	8	50	82
63	16	8	56.5	95

Basic Style

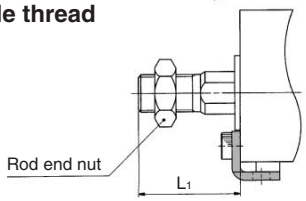
Bore size (mm)	Stroke range (mm)	Without auto switch A	Without auto switch B	With auto switch A	With auto switch B	C	D	E	F	H	I	J	K	L	M	N	O	P	Q	S	Th9	U	Z
40	5 to 50	36.5	29.5	46.5	39.5	13	16	52	8	M8 x 1.25	69	5	14	7	40	5.5	9 depth 7	Rc 1/8	11	66	$28^{\ 0}_{-0.052}$	35	14
	75, 100	46.5	39.5																				
50	10 to 50	38.5	30.5	48.5	40.5	15	20	64	10.5	M10 x 1.5	86	7	18	8	50	6.6	11 depth 8	Rc 1/4	10.5	80	$35^{\ 0}_{-0.062}$	41	19
	75, 100	48.5	40.5																				
63	10 to 50	44	36	54	46	15	20	77	10.5	M10 x 1.5	103	7	18	8	60	9	14 depth 10.5	Rc 1/4	15	93	$35^{\ 0}_{-0.062}$	47.5	19
	75, 100	54	46																				

* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Foot style: CQ2KL/CDQ2KL



Rod end male thread



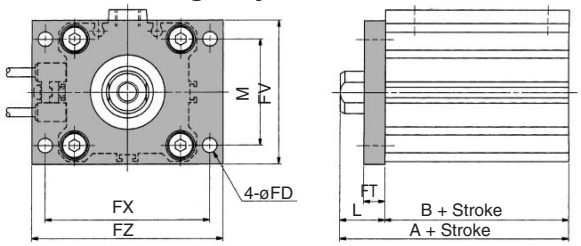
Foot Style

Bore size (mm)	Stroke range (mm)	Without auto switch A	B	LS	With auto switch A	B	LS	L	L1	LD	LG	LH	LX	LY
40	5 to 50	53.7	29.5	13.5	63.7	39.5	23.5	17	38.5	6.6	4	33	64	64
	75, 100	63.7	39.5	23.5										
50	10 to 50	56.7	30.5	7.5	66.7	40.5	17.5	18	43.5	9	5	39	79	78
	75, 100	66.7	40.5	17.5										
63	10 to 50	62.2	36	10	72.2	46	20	18	43.5	11	5	46	95	91.5
	75, 100	72.2	46	20										

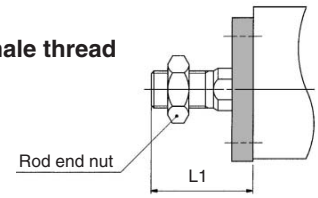
Bore size (mm)	LZ	X	Y
40	78	11.2	7
50	95	14.7	8
63	113	16.2	9

Foot bracket material: Carbon steel

Rod side flange style: CQ2KF/CDQ2KF



Rod end male thread

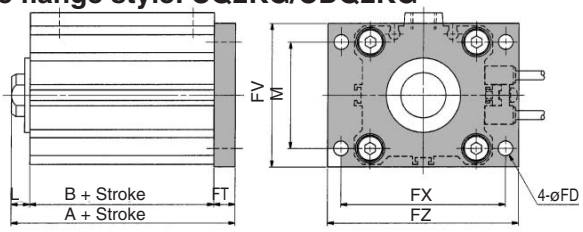


Rod Side Flange Style

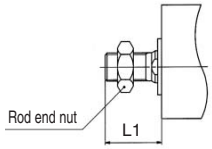
Bore size (mm)	Stroke range (mm)	Without auto switch A	B	With auto switch A	B	FD	FT	FV	FX	FZ	L	L1	M
40	5 to 50	46.5	29.5	56.5	39.5	5.5	8	54	62	72	17	38.5	40
	75, 100	56.5	39.5										
50	10 to 50	48.5	30.5	58.5	40.5	6.6	9	67	76	89	18	43.5	50
	75, 100	58.5	40.5										
63	10 to 50	54	36	64	46	9	9	80	92	108	18	43.5	60
	75, 100	64	46										

Flange bracket material: Carbon steel

Head side flange style: CQ2KG/CDQ2KG



Rod end male thread



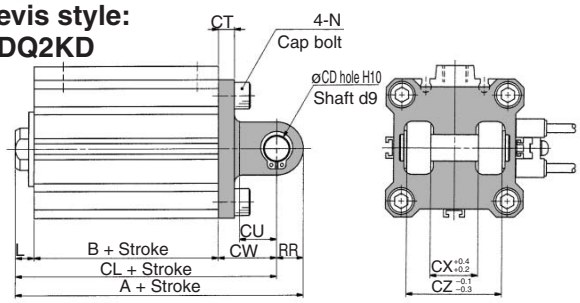
Head Side Flange Style

Bore size (mm)	Stroke range (mm)	Without auto switch A	With auto switch A	L	L1
40	5 to 50	44.5	54.5	7	28.5
	75, 100	54.5			
50	10 to 50	47.5	57.5	8	33.5
	75, 100	57.5			
63	10 to 50	53	63	8	33.5
	75, 100	63			

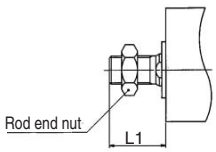
Flange bracket material: Carbon steel

* Dimensions except A, L and L1 are the same as rod side flange style.

Double clevis style: CQ2KD/CDQ2KD



Rod end male thread



Double Clevis Style

Bore size (mm)	Stroke range (mm)	Without auto switch A	B	CL	With auto switch A	B	CL	CD	CT	CU	CW	CX	CZ	L	L1
40	5 to 50	68.5	29.5	58.5	78.5	39.5	68.5	10	6	14	22	18	36	7	28.5
	75, 100	78.5	39.5	68.5											
50	10 to 50	80.5	30.5	66.5	90.5	40.5	76.5	14	7	20	28	22	44	8	33.5
	75, 100	90.5	40.5	76.5											
63	10 to 50	88	36	74	98	46	84	14	8	20	30	22	44	8	33.5
	75, 100	98	46	84											

Bore size (mm)	N	RR
40	M6 x 1.0	10
50	M8 x 1.25	14
63	M10 x 1.5	14

Double clevis bracket material: Carbon steel

* For details about the rod end nut and accessory brackets, refer to page 7-6-20.
** Clevis pin and snap ring are shipped together.

Compact Cylinder: Non-rotating Rod Type
Double Acting, Double Rod
Series CQ2KW
ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63

How to Order

Without auto switch CQ2KW **B** **20** □ — **30** **D** □

With auto switch CDQ2KW **B** **20** □ — **30** **D** □ — **J79W** **S**

Built-in magnet

Mounting style

B	Through-hole (Standard)	ø12 to ø63
A	Both ends tapped style	ø40 to ø63
L	Foot style	
F	Flange style	

∗ Mounting brackets are shipped together, (but not assembled).

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

Piping

Nil	Screw-in piping
F	Built-in One-touch fittings Note)

Note) Bore sizes available w/ One-touch fittings are ø32 to ø63.

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 7-6-77.

Action

D	Double acting

Body option

Nil	Standard (Rod end female thread)
C	With rubber bumper (Only ø12 with switch)
M	Rod end male thread

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled). (Except D-P5DWL)

Number of auto switches

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

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

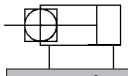
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Rail mounting ø12 to ø63 Perpendicular	Rail mounting ø12 to ø63 In-line	Direct mounting ø32 to ø63 Perpendicular	Direct mounting ø32 to ø63 In-line	Lead wire length (m) ∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	A76H	A96V	A96	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200 V	A72	A72H	—	—	●	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	A73	A73H	—	—	●	●	●	—	—		
								—	—	A93V	A93	●	●	●	—	—		
		Connector					—	A73C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	A79W	—	—	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NV	F79	M9NV	M9N	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				F7PV	F7P	M9PV	M9P	●	●	○	—	○		
				2-wire		12 V		F7BV	J79	M9BV	M9B	●	●	○	—	○	—	
		Connector						J79C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		F7NWV	F79W	F9NWV	F9NW	—	●	○	—	○	IC circuit	
				3-wire (PNP)				—	F7PW	F9PWV	F9PW	●	●	○	—	○		
				2-wire				F7BWV	J79W	F9BWV	F9BW	●	●	○	—	○	—	
	Water resistant (2-color indication)					12 V		F7BAV	F7BA	—	F9BA	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		—	F79F	—	—	●	●	○	—	○	IC circuit	
	Magnetic field resistant (2-color indication)			2-wire		—		—	P5DW	—	—	—	●	●	—	○	—	

∗ 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.

• D-P5DWL type is available from ø40 to ø63 only.
• There are other applicable auto switches other than the listed above. For details, refer to page 7-6-23.
• For details about auto switches with pre-wire connector, refer to page 7-9-36.

JIS Symbol
Non-rotating rod,
Double acting



⚠ Precautions

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

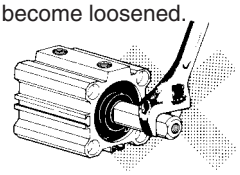
⚠ Caution

Snap Ring Installation/Removal

1. For installation and removal, use an appropriate pair of pliers (tool for installing a type C snap ring).
2. 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 installment.

Mounting

1. When removing a load, be sure to secure the wrench flats of the piston rod on the load side.
2. If this is done without securing the piston rod on the load side, be aware that the coupled (screwed-in) portion of the piston rod could become loosened.



3. Using a non-rotating rod cylinder
   Avoid using the air cylinder in such a way that rotational torque would be applied to the piston rod. If rotational torque is applied, the non-rotating guide will be deformed, causing a loss of non-rotating accuracy.
   Use the chart below as a guide for the allowable rotational torque ranges.

Allowable rotational torque (N·m or less)	ø12	ø16	ø20	ø25	ø32	ø40	ø50	ø63
	0.04	0.15	0.20	0.25	0.44	0.44	0.44	0.44

Operate the cylinder in such a way that the load to the piston rod is always applied in the axial direction.

Type

Bore size (mm)			12	16	20	25	32	40	50	63
Pneumatic	Mounting	Through-hole (Standard)	●	●	●	●	●	●	●	●
		Both ends tapped style	—	—	—	—	—	●	●	●
	Built-in magnet		●	●	●	●	●	●	●	●
	Piping	Screw-in type	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8 (1) Rc 1/8	Rc 1/8	Rc 1/4	Rc 1/4
		Built-in One-touch fittings	—	—	—	—	ø6/4 (2)	ø6/4	ø8/6	ø8/6
	Rod end male thread		●	●	●	●	●	●	●	●

Note 1) In the case of without auto switch, M5 x 0.8 is used for 5 stroke only.
Note 2) In the case of built-in fitting, the 5 mm stroke with ø32 bore is the same external dimensions as 10 mm stroke.

Standard Specifications

Type	Pneumatic (Non-lube)
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 (3)
Rod end thread	Female thread
Rod end thread tolerance	JIS Class 2
Stroke length tolerance	$^{+1.0}_{0}$
Mounting	Through-hole
Piston speed	50 to 500 mm/s

Note 3) ø12, with switch: Rubber bumper is standard.

Minimum Operating Pressure (MPa)

Bore size (mm)	12	16	20	25	32	40	50	63
Minimum operating pressure	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05

Non-rotating Accuracy

Bore size (mm)	12	16	20	25	32	40	50	63
Rod non-rotating accuracy	±2°	±1°			±0.8°			

Allowable Kinetic Energy (J)

Bore size (mm)	12	16	20	25	32	40	50	63	80	100
Standard	0.022	0.038	0.055	0.09	0.15	0.26	0.46	0.77	1.36	2.27

Standard Stroke

Bore size (mm)	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**	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100

Manufacture of Intermediate Stroke

Description	Spacer is installed in the standard stroke body.	
Part no.	Refer to "How to Order" for the standard model no. on page 7-6-76.	
Description	Dealing with the stroke by the 5 mm interval is available by installing spacer with standard stroke cylinder.	
Stroke range	Bore size (mm)	Stroke range
	32 to 63	55 to 95
Example	Part no.: CQ2KWB50-65D CQ2KWB50-75D with 10 mm width spacer inside. B dimension is 125.5 mm.	

Theoretical Output

(N)

Bore size (mm)	Operating pressure (MPa)		
	0.3	0.5	0.7
12	25	42	59
16	45	75	106
20	71	118	165
25	113	189	264

Bore size (mm)	Operating pressure (MPa)		
	0.3	0.5	0.7
32	181	302	422
40	317	528	739
50	495	825	1150
63	841	1400	1960

Mounting Bracket Part No.

Bore size (mm)	Foot (1)	Flange
40	CQ-L040	CQ-F040
50	CQ-L050	CQ-F050
63	CQ-L063	CQ-F063

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

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

Weight

(g)

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	62	69	76	83	90	97	—	—	—	—	—	—
16	62	73	84	95	106	117	—	—	—	—	—	—
20	101	116	131	146	161	176	191	206	221	236	—	—
25	138	155	172	189	206	223	240	257	274	291	—	—
32	242	266	290	314	338	362	386	410	434	458	595	715
40	349	380	411	442	473	504	535	566	597	628	879	1034
50	—	548	593	638	683	728	773	818	863	908	1251	1476
63	—	772	811	850	889	928	967	1006	1045	1084	1391	1586

Additional Weight

(g)

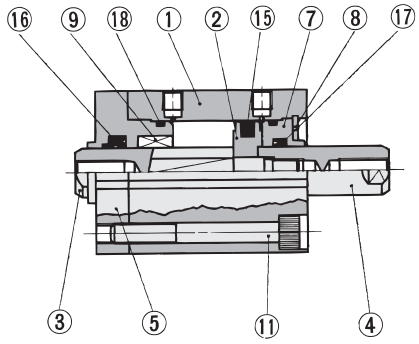
Bore size (mm)		12	16	20	25	32	40	50	63
Both ends tapped style		—	—	—	—	—	6	6	19
Rod end male thread	Male thread	3	6	12	24	52	54	106	106
	Nut	2	4	8	16	34	34	64	64
Built-in One-touch fittings		—	—	—	—	12	12	21	21
Foot style		—	—	—	—	—	155	243	324
Flange style		—	—	—	—	—	214	373	559

Calculation:
(Example) CQ2KWA40-20DM

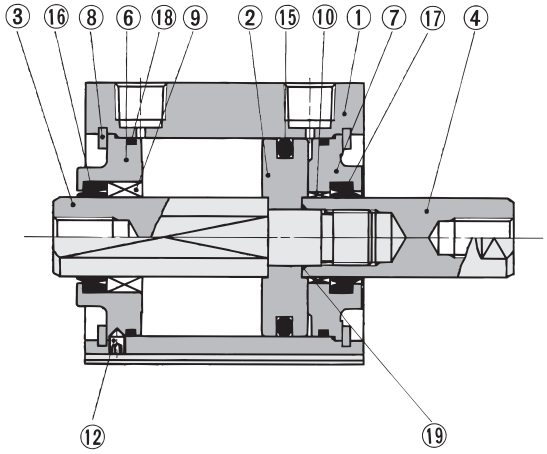
Cylinder weight: CQ2KWB40-20D····· 442 g
Option weight: Both ends tapped style····· 6 g
Rod end male thread····· 88 g
536 g

Construction

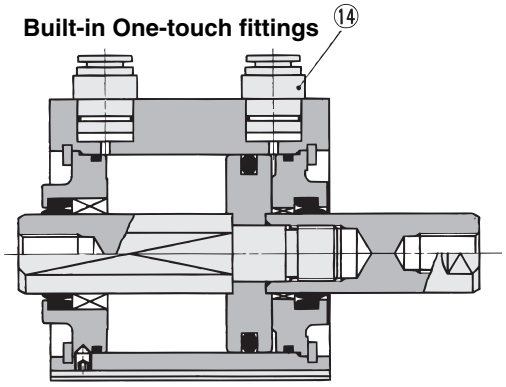
ø12 to ø32



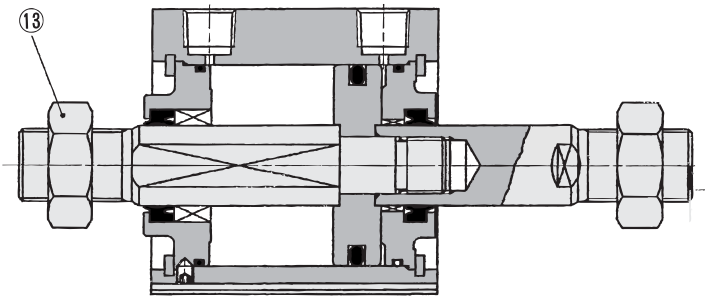
ø40 to ø63



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	Chromated
③	Piston rod A	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø63, Hard chrome plated
④	Piston rod B	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø63, Hard chrome plated
⑤	Rod cover	Brass	ø12, Nickel plated
		Aluminum alloy	ø16 to ø32, Anodized
⑥	Collar for non-rotating	Aluminum alloy	ø40 to ø63, Anodized
⑦	Collar	Aluminum alloy	ø12 to ø40, Anodized
		Aluminum alloy casted	ø50 to ø63, Chromated, Painted
⑧	Snap ring	Carbon tool steel	Phosphate coated
⑨	Bushing for non-rotating	Oil-impregnated sintered alloy	ø16 to ø63
⑩	Bushing	Lead-bronze casted	ø50, ø63
⑪	Hexagon socket head cap screw	Alloy steel	ø12 to ø32, Nickel plated
⑫	Hexagon socket head set screw	Alloy steel	ø40 to ø63, Nickel plated
⑬	Rod end nut	Carbon steel	Nickel plated
⑭	One-touch fitting	—	ø32 to ø63

No.	Description	Material	Note
⑮	Piston seal	NBR	
⑯	Rod seal for nonrotating	NBR	
⑰	Rod seal	NBR	
⑱	Gasket	NBR	
⑲	Piston gasket	NBR	ø32 to ø63

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Note
12	CQ2KWB12-PS	Set of nos. above ⑮, ⑯, ⑰, ⑱
16	CQ2KWB16-PS	
20	CQ2KWB20-PS	
25	CQ2KWB25-PS	
32	CQ2KWB32-PS	
40	CQ2KWB40-PS	
50	CQ2KWB50-PS	
63	CQ2KWB63-PS	

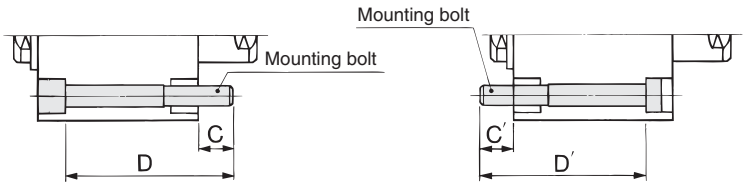
∗ Seal kit includes ⑮, ⑯, ⑰, ⑱. Order the seal kit, based on each bore size.

Mounting Bolt for CQ2KWB

Mounting method: Mounting bolt for through-hole mounting style of CQ2KWB is available as an option.

Ordering: Add the word "Bolt" in front of the bolts to be used.
Example) Bolt M3 x 40ℓ 2 pcs.

Mounting at non-rotating side



Model	C	D	Mounting bolt	C'	D'	Mounting bolt
CQ2KWB12-5D	8.3	40	M3 x 40ℓ	8.3	40	M3 x 40ℓ
-10D		45	x 45ℓ		45	x 45ℓ
-15D		50	x 50ℓ		50	x 50ℓ
-20D		55	x 55ℓ		55	x 55ℓ
-25D		60	x 60ℓ		60	x 60ℓ
-30D		65	x 65ℓ		65	x 65ℓ
CQ2KWB16-5D	7.5	40	M3 x 40ℓ	7.5	40	M3 x 40ℓ
-10D		45	x 45ℓ		45	x 45ℓ
-15D		50	x 50ℓ		50	x 50ℓ
-20D		55	x 55ℓ		55	x 55ℓ
-25D		60	x 60ℓ		60	x 60ℓ
-30D		65	x 65ℓ		65	x 65ℓ
CQ2KWB20-5D	6.5	40	M5 x 40ℓ	8	40	M5 x 40ℓ
-10D		45	x 45ℓ		45	x 45ℓ
-15D		50	x 50ℓ		50	x 50ℓ
-20D		55	x 55ℓ		55	x 55ℓ
-25D		60	x 60ℓ		60	x 60ℓ
-30D		65	x 65ℓ		65	x 65ℓ
-35D		70	x 70ℓ		70	x 70ℓ
-40D		75	x 75ℓ		75	x 75ℓ
-45D		80	x 80ℓ		80	x 80ℓ
-50D		85	x 85ℓ		85	x 85ℓ
CQ2KWB25-5D	8.5	45	M5 x 45ℓ	10	45	M5 x 45ℓ
-10D		50	x 50ℓ		50	x 50ℓ
-15D		55	x 55ℓ		55	x 55ℓ
-20D		60	x 60ℓ		60	x 60ℓ
-25D		65	x 65ℓ		65	x 65ℓ
-30D		70	x 70ℓ		70	x 70ℓ
-35D		75	x 75ℓ		75	x 75ℓ
-40D		80	x 80ℓ		80	x 80ℓ
-45D		85	x 85ℓ		85	x 85ℓ
-50D		90	x 90ℓ		90	x 90ℓ
CQ2KWB32-5D	11	50	M5 x 50ℓ	7.5	45	M5 x 45ℓ
-10D		55	x 55ℓ		50	x 50ℓ
-15D		60	x 60ℓ		55	x 55ℓ
-20D		65	x 65ℓ		60	x 60ℓ
-25D		70	x 70ℓ		65	x 65ℓ
-30D		75	x 75ℓ		70	x 70ℓ
-35D		80	x 80ℓ		75	x 75ℓ
-40D		85	x 85ℓ		80	x 80ℓ
-45D		90	x 90ℓ		85	x 85ℓ
-50D		95	x 95ℓ		90	x 90ℓ
-75D		130	x 130ℓ		125	x 125ℓ
-100D		155	x 155ℓ		150	x 150ℓ

Model	C	D	Mounting bolt
CQ2KWB40-5D	7	45	M5 x 45ℓ
-10D		50	x 50ℓ
-15D		55	x 55ℓ
-20D		60	x 60ℓ
-25D		65	x 65ℓ
-30D		70	x 70ℓ
-35D		75	x 75ℓ
-40D		80	x 80ℓ
-45D		85	x 85ℓ
-50D		90	x 90ℓ
-75D		125	x 125ℓ
-100D		150	x 150ℓ
CQ2KWB50-10D	12.5	55	M6 x 55ℓ
-15D		60	x 60ℓ
-20D		65	x 65ℓ
-25D		70	x 70ℓ
-30D		75	x 75ℓ
-35D		80	x 80ℓ
-40D		85	x 85ℓ
-45D		90	x 90ℓ
-50D		95	x 95ℓ
-75D		130	x 130ℓ
-100D		155	x 155ℓ
CQ2KWB63-10D	13.5	55	M8 x 55ℓ
-15D		60	x 60ℓ
-20D		65	x 65ℓ
-25D		70	x 70ℓ
-30D		75	x 75ℓ
-35D		80	x 80ℓ
-40D		85	x 85ℓ
-45D		90	x 90ℓ
-50D		95	x 95ℓ
-75D		130	x 130ℓ
-100D		155	x 155ℓ

Copper-free (For CRT manufacturing process)

20 — CQ2KWB [Bore size] — [Stroke] D(M)

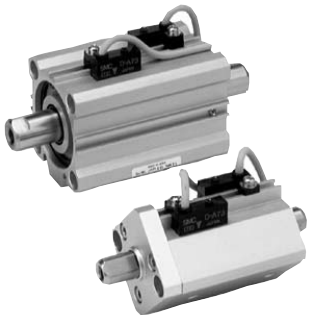
- **Copper-free**
- **ø16, ø20, ø25, ø32, ø40, ø50, ø63**

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, Double rod
Bore size (mm)	16, 20, 25, 32, 40, 50, 63
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Rubber bumper	None
Piping	Screw-in piping
Piston speed	50 to 500 mm/s
Mounting	Through-hole
Auto switch	Mountable

∗ Refer to page 7-9-1 for further information on auto switches.



Minimum Stroke for Auto Switch Mounting

(mm)

Number of auto switches mounted	D-F7□V D-J79C D-M9□V	D-A7□ D-A80 D-A73C D-A80C D-A9□V	D-F7□WV D-F9□WV D-F7BAVL	D-A7□H D-A80H D-F7□ D-J79 D-M9□ D-F9□W	D-A79W	D-F7□W D-J79W D-F7BAL D-F79F D-F9BAL	D-A9□	D-P5DWL
1 pc.	5	5	10	15	15	20	10	30
2 pcs.	5	10	15	15	20	20	10	30

Weight

(g)

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	82	90	98	106	114	122	—	—	—	—	—	—
16	103	114	125	136	147	158	—	—	—	—	—	—
20	169	186	203	220	237	254	271	288	305	322	—	—
25	231	248	265	282	299	316	333	350	367	384	—	—
32	270	294	318	342	366	390	414	438	462	486	606	726
40	458	489	520	551	582	613	644	675	706	737	892	1047
50	—	680	725	770	815	860	905	950	995	1040	1265	1490
63	—	906	945	984	1023	1062	1101	1140	1179	1218	1413	1608

Additional Weight

(g)

Bore size (mm)		12	16	20	25	32	40	50	63
Both ends tapped style		—	—	—	—	—	6	6	19
Rod end male thread	Male thread	3	6	12	24	52	54	106	106
	Nut	2	4	8	16	34	34	64	64
Built-in One-touch fittings		—	—	—	—	12	12	21	21

Calculation: (Example) CDQ2KWA40-20DM

•Cylinder weight: CDQ2KWB40-20D····· 551 g
•Option weight: Both ends tapped style····· 6 g
Rod end male thread····· 88 g
645 g

Add the weight of auto switches and mounting brackets.

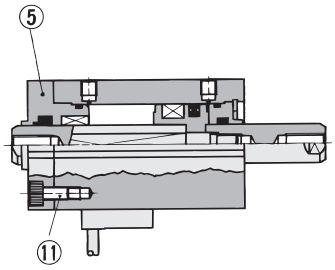
Auto Switch Mounting Bracket Weight

Mounting bracket part no.	Applicable bore size (mm)	Weight (g)
BQ-1	12 to 25	1.5
BQ-2	32 to 63	1.5

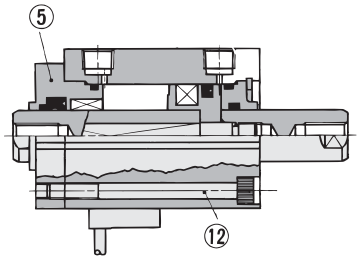
∗ For the auto switch weight, refer to page 7-9-1.

Construction

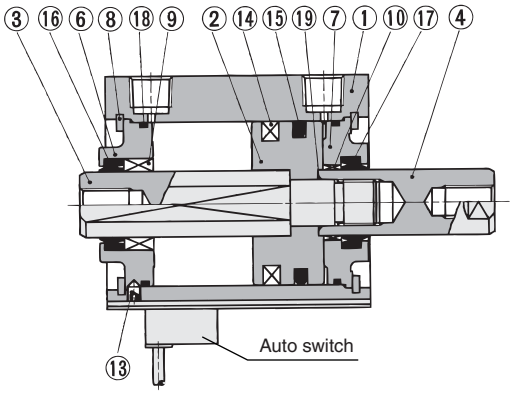
ø12 to ø25



ø32



ø40 to ø63



Component Parts

No.	Description	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②	Piston	Aluminum alloy	Chromated
③	Piston rod A	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø63, Hard chrome plated
④	Piston rod B	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø63, Hard chrome plated
⑤	Rod cover	Brass	ø12, Nickel plated
		Aluminum alloy	ø16 to ø32, Anodized
⑥	Collar for non-rotating	Aluminum alloy	ø40 to ø63, Anodized
⑦	Collar	Aluminum alloy	ø12 to ø40, Anodized
		Aluminum alloy casted	ø50 to ø63, Chromated, painted
⑧	Snap ring	Carbon tool steel	Phosphate coated
⑨	Bushing for non-rotating	Oil-impregnated sintered alloy	ø16 to ø63
⑩	Bushing	Lead-bronze casted	ø50, ø63
⑪	Hexagon socket head cap screw	Alloy steel	ø12 to ø25, Nickel plated
⑫	Hexagon socket head cap screw	Alloy steel	ø32, Nickel plated
⑬	Hexagon socket head set screw	Alloy steel	ø40 to ø63, Nickel plated
⑭	Magnet	—	

No.	Description	Material	Note
⑮	Piston seal	NBR	
⑯	Rod seal for non-rotating	NBR	
⑰	Rod seal	NBR	
⑱	Gasket	NBR	
⑲	Piston gasket	NBR	ø32 to ø63

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Note
12	CQ2KWB12-PS	Set of nos. above ⑮, ⑯, ⑰, ⑱
16	CQ2KWB16-PS	
20	CQ2KWB20-PS	
25	CQ2KWB25-PS	
32	CQ2KWB32-PS	
40	CQ2KWB40-PS	
50	CQ2KWB50-PS	
63	CQ2KWB63-PS	

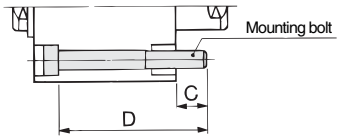
∗ Seal kit includes ⑮, ⑯, ⑰, ⑱. Order the seal kit, based on each bore size.

Mounting Bolt for CDQ2KWB with Auto Switch

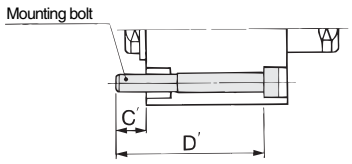
Mounting method: Mounting bolt for through-hole mounting style of CDQ2KWB is available as an option.

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

Example) Bolt M3 x 40ℓ 2 pcs.



Mounting at non-rotating side



Model	C	D	Bolt	C'	D'	Bolt
CDQ2KWB12-5DC	6.1	40	M3 x 40ℓ	6.1	45	M3 x 45ℓ
-10DC		45	x 45ℓ		50	x 50ℓ
-15DC		50	x 50ℓ		55	x 55ℓ
-20DC		55	x 55ℓ		60	x 60ℓ
-25DC		60	x 60ℓ		65	x 65ℓ
-30DC		65	x 65ℓ		70	x 70ℓ
CDQ2KWB16-5D	7.5	45	M3 x 45ℓ	7.5	50	M3 x 50ℓ
-10D		50	x 50ℓ		55	x 55ℓ
-15D		55	x 55ℓ		60	x 60ℓ
-20D		60	x 60ℓ		65	x 65ℓ
-25D		65	x 65ℓ		70	x 70ℓ
-30D		70	x 70ℓ		75	x 75ℓ
CDQ2KWB20-5D	9	45	M5 x 45ℓ	11	55	M5 x 55ℓ
-10D		50	x 50ℓ		60	x 60ℓ
-15D		55	x 55ℓ		65	x 65ℓ
-20D		60	x 60ℓ		70	x 70ℓ
-25D		65	x 65ℓ		75	x 75ℓ
-30D		70	x 70ℓ		80	x 80ℓ
-35D		75	x 75ℓ		85	x 85ℓ
-40D		80	x 80ℓ		90	x 90ℓ
-45D		85	x 85ℓ		95	x 95ℓ
-50D		90	x 90ℓ		100	x 100ℓ
CDQ2KWB25-5D	8	45	M5 x 45ℓ	10	55	M5 x 55ℓ
-10D		50	x 50ℓ		60	x 60ℓ
-15D		55	x 55ℓ		65	x 65ℓ
-20D		60	x 60ℓ		70	x 70ℓ
-25D		65	x 65ℓ		75	x 75ℓ
-30D		70	x 70ℓ		80	x 80ℓ
-35D		75	x 75ℓ		85	x 85ℓ
-40D		80	x 80ℓ		90	x 90ℓ
-45D		85	x 85ℓ		95	x 95ℓ
-50D		90	x 90ℓ		100	x 100ℓ
CDQ2KWB32-5D	11	60	M5 x 60ℓ	7.5	55	M5 x 55ℓ
-10D		65	x 65ℓ		60	x 60ℓ
-15D		70	x 70ℓ		65	x 65ℓ
-20D		75	x 75ℓ		70	x 70ℓ
-25D		80	x 80ℓ		75	x 75ℓ
-30D		85	x 85ℓ		80	x 80ℓ
-35D		90	x 90ℓ		85	x 85ℓ
-40D		95	x 95ℓ		90	x 90ℓ
-45D		100	x 100ℓ		95	x 95ℓ
-50D		105	x 105ℓ		100	x 100ℓ
-75D		130	x 130ℓ		125	x 125ℓ
-100D		155	x 155ℓ		150	x 150ℓ

Model	C	D	Bolt
CDQ2KWB40-5D	7	55	M5 x 55ℓ
-10D		60	x 60ℓ
-15D		65	x 65ℓ
-20D		70	x 70ℓ
-25D		75	x 75ℓ
-30D		80	x 80ℓ
-35D		85	x 85ℓ
-40D		90	x 90ℓ
-45D		95	x 95ℓ
-50D		100	x 100ℓ
-75D		125	x 125ℓ
-100D		150	x 150ℓ
CDQ2KWB50-10D	12.5	65	M6 x 65ℓ
-15D		70	x 70ℓ
-20D		75	x 75ℓ
-25D		80	x 80ℓ
-30D		85	x 85ℓ
-35D		90	x 90ℓ
-40D		95	x 95ℓ
-45D		100	x 100ℓ
-50D		105	x 105ℓ
-75D		130	x 130ℓ
-100D		155	x 155ℓ
CDQ2KWB63-10D	13.5	65	M8 x 65ℓ
-15D		70	x 70ℓ
-20D		75	x 75ℓ
-25D		80	x 80ℓ
-30D		85	x 85ℓ
-35D		90	x 90ℓ
-40D		95	x 95ℓ
-45D		100	x 100ℓ
-50D		105	x 105ℓ
-75D		130	x 130ℓ
-100D		155	x 155ℓ

Auto Switch Mounting Bracket Part No.

Bore size (mm)	Mounting bracket part no.	Note	Applicable auto switch	
			Reed switch	Solid state switch
12, 16 20, 25	BQ-1	• Switch mounting screw (M3 x 0.5 x 8ℓ) • Square nut	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 D-F79F D-F7NTL D-F7BAVL
32, 40 50, 63	BQ-2	• Switch mounting screw (M3 x 0.5 x 10ℓ) • Switch spacer • Switch mounting nut		
40 to 63	BQP1-050	• Switch mounting bracket • Switch mounting nut • Hexagon socket head cap bolt (M3 x 0.5 x 14ℓ spring washer 2 pcs.) • Round head Phillips screw (M3 x 0.5 x 16ℓ spring washer 2 pcs.)	—	D-P5DWL

∗ 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.

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

D-A7□
D-A80

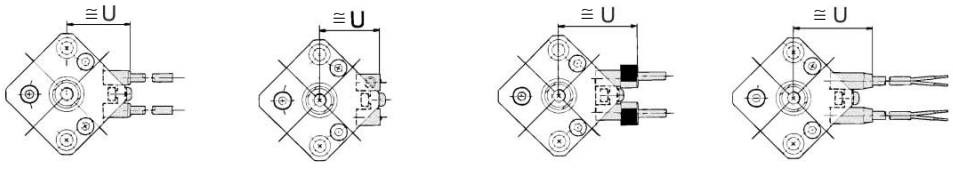
D-A7□H
D-A80H
D-F7□
D-J79

D-F7□W
D-J79W
D-F79F
D-F7NTL
D-F7BAL

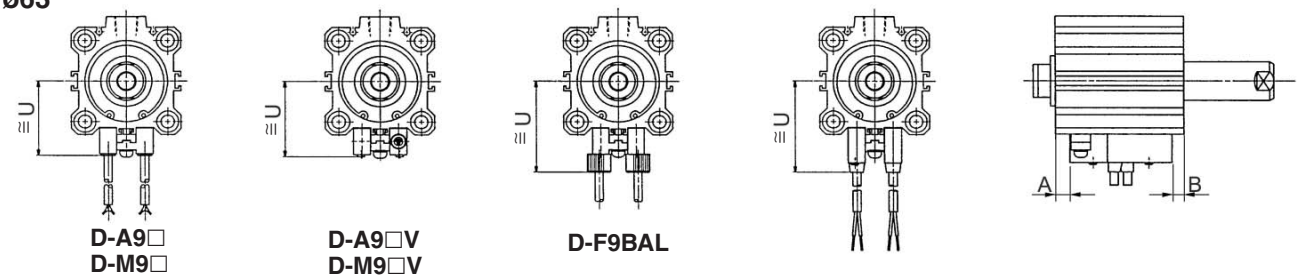
D-A73C
D-A80C
D-J79C

D-F9BAL
D-A79W
D-F7□WV
D-F7□V
D-F7BAVL

ø12 to ø25



ø32 to ø63

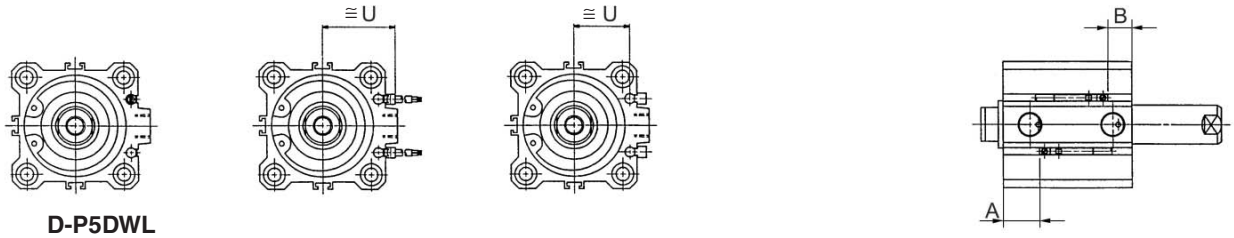


D-A9□
D-M9□
D-F9□W

D-A9□V
D-M9□V
D-F9□WV

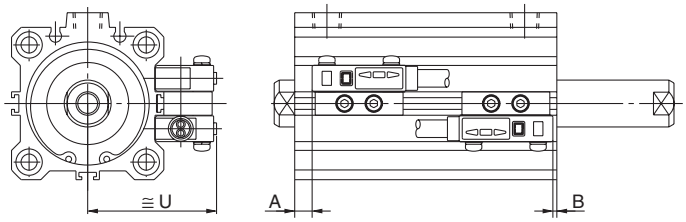
D-F9BAL

ø32 to ø63



ø40 to ø63

D-P5DWL



Proper Auto Switch Mounting Position

Bore size (mm)	D-A7□ D-A80		D-A7□H/A80H D-A73C/A80C D-F7□/J79/F79F D-F7□V/J79C D-F7BAL/F7□W D-J79W/F7□WV D-F7BAVL		D-A79W		D-A9□ D-A9□V		D-M9□ D-M9□V D-F9□W D-F9□WV		D-F9BAL		D-P5DWL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
12	9.5	10	10	10.5	7	7.5	—	—	—	—	—	—	—	—
16	12.5	10.5	13	11	10	8	—	—	—	—	—	—	—	—
20	15.5	13	16	13.5	13	10.5	—	—	—	—	—	—	—	—
25	15.5	13	16	13.5	13	10.5	—	—	—	—	—	—	—	—
32	18	13.5	18.5	14	15.5	11	17	12.5	21	16.5	20	15.5	—	—
40	13	19	13.5	19.5	10.5	16.5	12	18	16	22	15	21	9	15
50	11	21.5	11.5	22	8.5	19	10	20.5	14	24.5	13	23.5	7	17.5
63	13.5	20.5	14	21	11	18	12.5	19.5	16.5	23.5	15.5	22.5	9.5	16.5

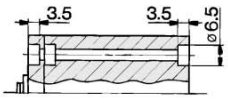
Auto Switch Mounting Height

Bore size (mm)	D-A7□ D-A80	D-A7□H D-A80H D-F7□ D-J79 D-F7□W D-F79W D-F7BAL D-F79F D-F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAVL	D-J79C	D-A79W	D-A9□V	D-M9□V D-F9□WV	D-F9BAL	D-P5DWL
	U	U	U	U	U	U	U	U	U	U
12	19.5	20.5	26.5	23	26	22	—	—	—	—
16	22.5	23.5	29.5	26	29	25	—	—	—	—
20	24.5	25.5	31.5	28	31	27	—	—	—	—
25	27.5	28.5	34.5	31	34	30	—	—	—	—
32	31.5	32.5	38.5	35	38	34	27	29	26.5	—
40	35	36	42	38.5	41.5	37.5	30.5	32.5	30	44
50	41	42	48	44.5	47.5	43.5	36.5	38.5	36	50
63	47.5	48.5	54.5	51	54	50	40	42	39.5	56.5

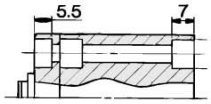
Dimensions: ø12 to ø32/Without Auto Switch

Basic style (Through-hole): CQ2KWB

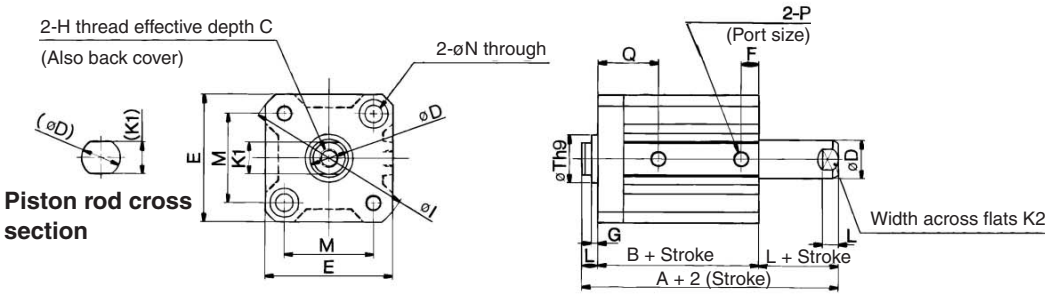
ø12, ø16



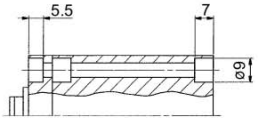
ø20, ø25

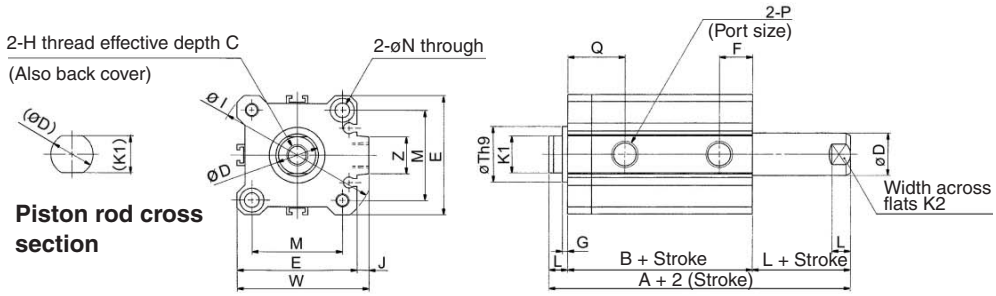


ø12 to ø25

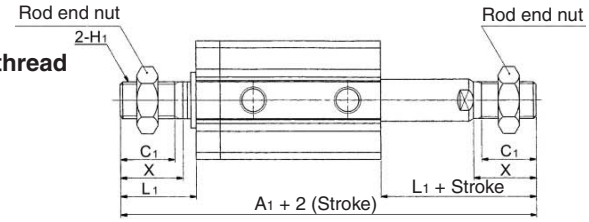


ø32





Rod end male thread

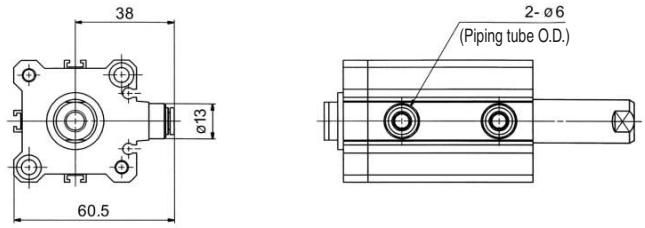


Rod End Male Thread

Bore size (mm)	Stroke range (mm)	A_1	C_1	H_1
12	5 to 30	58.2	9	M5 x 0.8
16	5 to 30	62	10	M6 x 1.0
20	5 to 50	71	12	M8 x 1.25
25	5 to 50	82	15	M10 x 1.25
32	5 to 50	96.5	20.5	M14 x 1.5
	75,100	106.5		

Bore size (mm)	L_1	X
12	14	10.5
16	15.5	12
20	18.5	14
25	22.5	17.5
32	28.5	23.5

Built-in One-touch fittings: ø32



∗ In the case of w/ One-touch fitting, the 5 mm stroke with 32 bore is the same external dimensions as 10 mm stroke.

Basic Style

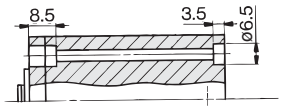
Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	G	H	I	J	K1	K2	L	M	N	P	Q	Th9	W	Z
12	5 to 30	37.2	30.2	6	6	25	10	1.5	M3 x 0.5	32	—	5.2	5	3.5	15.5	3.5	M5 x 0.8	15	$15^{\ 0}_{-0.043}$	—	—
16	5 to 30	38	31	8	8	29	10	1.5	M4 x 0.7	38	—	6	6	3.5	20	3.5	M5 x 0.8	15	$20^{\ 0}_{-0.052}$	—	—
20	5 to 50	43	34	7	10	36	9.5	2	M5 x 0.8	47	—	8	8	4.5	25.5	5.5	M5 x 0.8	17.5	$13^{\ 0}_{-0.043}$	—	—
25	5 to 50	47	37	12	12	40	11	2	M6 x 1.0	52	—	10	10	5	28	5.5	M5 x 0.8	19	$15^{\ 0}_{-0.043}$	—	—
32	5	53.5	39.5	13	16	45	12.5	2	M8 x 1.25	60	4.5	14	14	7	34	5.5	M5 x 0.8	21.5	$21^{\ 0}_{-0.052}$	49.5	14
	10 to 50																RC 1/8				
	75, 100	63.5	49.5																		

∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

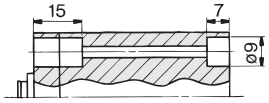
Dimensions: ø12 to ø32/With Auto Switch

Basic style (Through-hole): CDQ2KWB

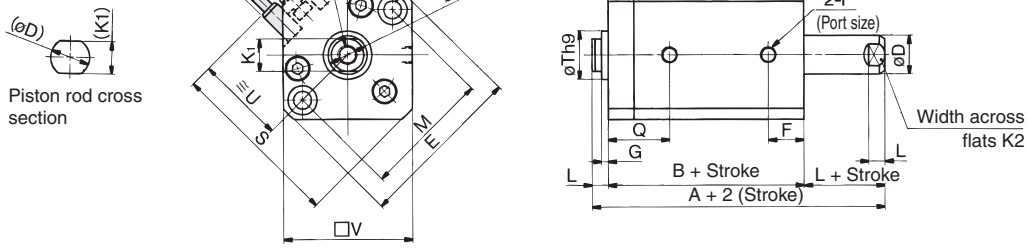
ø12, ø16



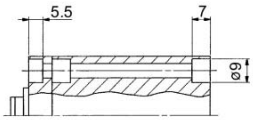
ø20, ø25



ø12 to ø25

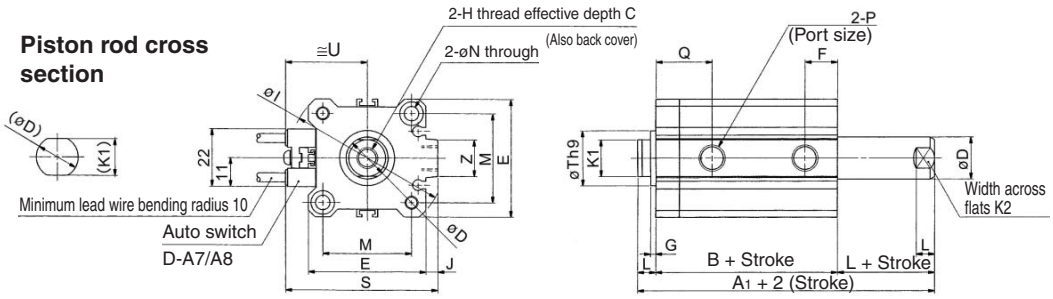


ø32

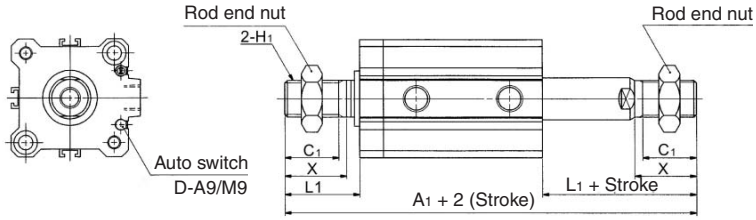


ø32

Piston rod cross section



Rod end male thread



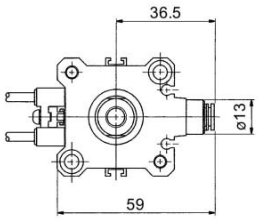
Rod End Male Thread

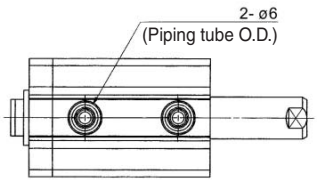
Bore size (mm)	A_1	C_1	H_1
12	65.4	9	M5 x 0.8
16	72	10	M6 x 1.0
20	83	12	M8 x 1.25
25	92	15	M10 x 1.25
32	106.5	20.5	M14 x 1.5

Bore size (mm)	L_1	X
12	14	10.5
16	15.5	12
20	18.5	14
25	22.5	17.5
32	28.5	23.5

Built-in One-touch fittings: ø32

Auto switch shown above is D-A73 type and D-A80 type.
For the auto switch mounting position and its mounting height, refer to page 7-6-83.





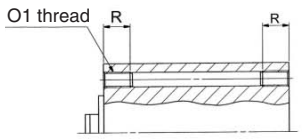
Basic Style

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	G	H	I	J	K1	K2	L	M	N	P	Q	S	Th9	U	V	Z
12	5 to 30	44.4	37.4	6	6	32	10.5	1.5	M3 x 0.5	—	—	5.2	5	3.5	22	3.5	M5 x 0.8	15.5	35.5	$15^{0}_{-0.043}$	19.5	25	—
16	5 to 30	48	41	8	8	38	10	1.5	M4 x 0.7	—	—	6	6	3.5	28	3.5	M5 x 0.8	15	41.5	$20^{0}_{-0.052}$	22.5	29	—
20	5 to 50	55	46	7	10	47	10.5	2	M5 x 0.8	—	—	8	8	4.5	36	5.5	M5 x 0.8	18.5	48	$13^{0}_{-0.043}$	24.5	36	—
25	5 to 50	57	47	12	12	52	11	2	M6 x 1.0	—	—	10	10	5	40	5.5	M5 x 0.8	19	53.5	$15^{0}_{-0.043}$	27.5	40	—
32	5 to 50, 75, 100	63.5	49.5	13	16	45	12.5	2	M8 x 1.25	60	4.5	14	14	7	34	5.5	Rc 1/8	21.5	58.5	$21^{0}_{-0.052}$	31.5	—	14

∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Dimensions: ø40 to ø63

Both ends tapped style: CQ2KWA/CDQ2KWA

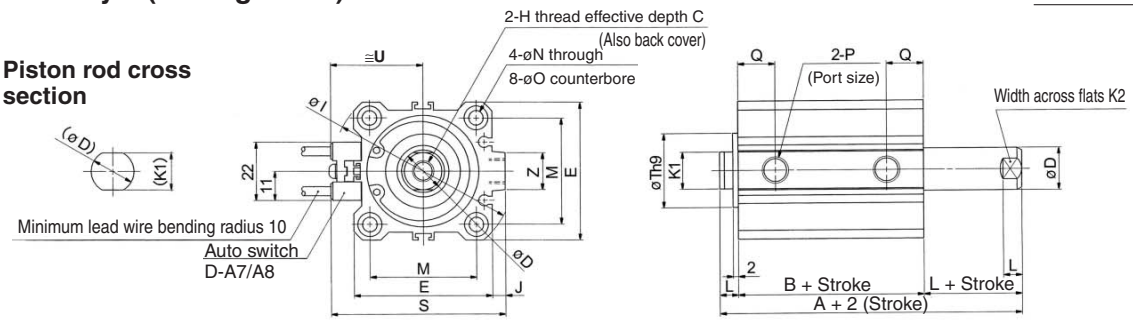


Both Ends Tapped Style

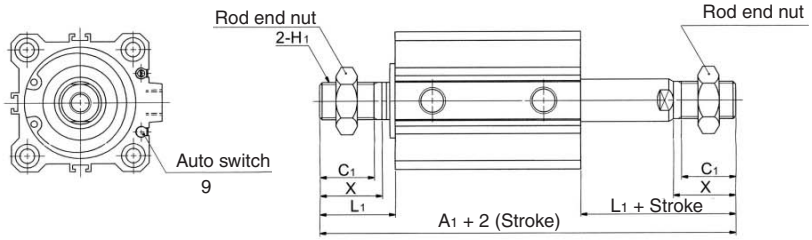
Bore size (mm)	O1	R
40	M6 x 1.0	10
50	M8 x 1.25	14
63	M10 x 1.5	18

Basic style (Through-hole): CQ2KWB/CDQ2KWB

Piston rod cross section

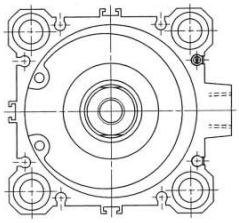


Rod end male thread



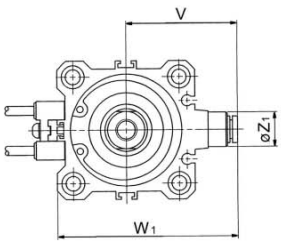
Rod End Male Thread

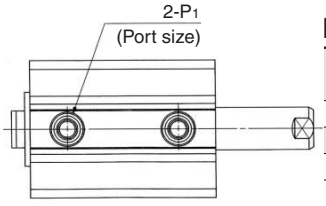
Bore size (mm)	Without auto switch A1	With auto switch A1	C1	H1	L1	X
40	97	107	20.5	M14 x 1.5	28.5	23.5
50	107.5	117.5	26	M18 x 1.5	33.5	28.5
63	109	119	26	M18 x 1.5	33.5	28.5



Cylinder tube form for 63

Built-in One-touch fittings





Built-in One-touch Fittings

Bore size (mm)	Z1	P1	V	W1
40	13	6	40.5	66.5
50	16	8	50	82
63	16	8	56.5	95

Auto switch shown above is D-A73 type and D-A80 type.
For the auto switch mounting position and its mounting height, refer to page 7-6-83.

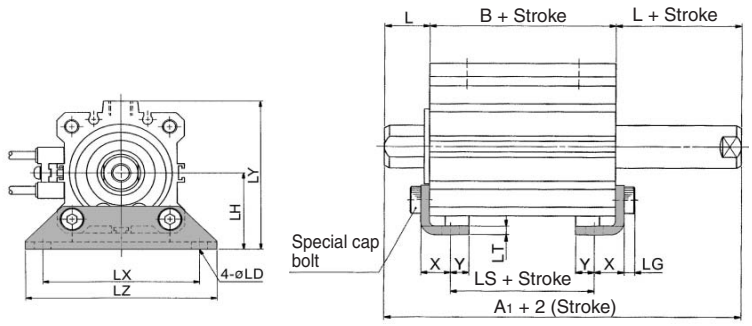
Basic Style

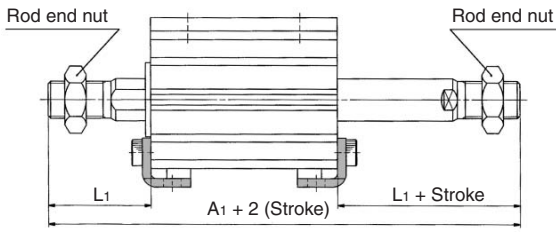
Bore size (mm)	Stroke range (mm)	Without auto switch A	Without auto switch B	With auto switch A	With auto switch B	C	D	E	H	I	J	K1	K2	L	M	N	O	P	Q	S	Th9	U	Z
40	5 to 50	54	40	64	50	13	16	52	M8 x 1.25	69	5	14	14	7	40	5.5	9 depth 7	Rc 1/8	14	66	$28^{0}_{-0.052}$	35	14
	75,100	64	50																				
50	10 to 50	56.5	40.5	66.5	50.5	15	20	64	M10 x 1.5	86	7	18	17	8	50	6.6	11 depth 8	Rc 1/4	14	80	$35^{0}_{-0.062}$	41	19
	75,100	66.5	50.5																				
63	10 to 50	58	42	68	52	15	20	77	M10 x 1.5	103	7	18	17	8	60	9	14 depth 10.5	Rc 1/4	15.5	93	$35^{0}_{-0.062}$	47.5	19
	75,100	68	52																				

* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Dimensions: ø40 to ø63

Foot style: CQ2KWL/CDQ2KWL





Rod End Male Thread

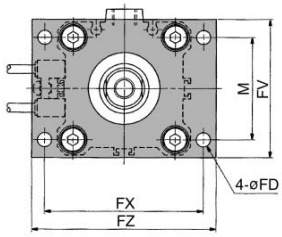
Bore size (mm)	Without auto switch A1	With auto switch A1	L1
40	117	127	38.5
50	127.5	137.5	43.5
63	129	139	43.5

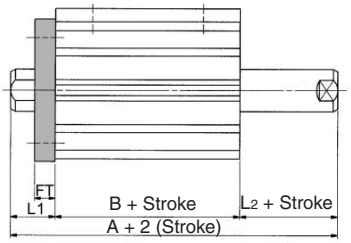
Foot Style

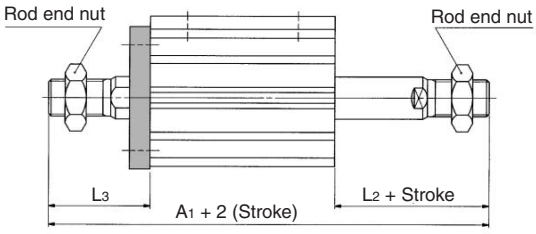
Bore size (mm)	Stroke range (mm)	Without auto switch A	B	LS	With auto switch A	B	LS	L	LD	LG	LH	LT	LX	LY	LZ	X	Y
40	5 to 50	74	40	24	84	50	34	17	6.6	4	33	3.2	64	68	78	11.2	7
	75,100	84	50	34													
50	10 to 50	76.5	40.5	17.5	86.5	50.5	27.5	18	9	5	39	3.2	79	78	95	14.7	8
	75,100	86.5	50.5	27.5													
63	10 to 50	78	42	16	88	52	26	18	11	5	46	3.2	95	91.5	113	16.2	8
	75,100	88	52	26													

Foot bracket material: Carbon steel

Flange style: CQ2KWF/CDQ2KWL







Rod End Male Thread

Bore size (mm)	Without auto switch A1	With auto switch A1	L3	L4
40	107	117	38.5	28.5
50	117.5	127.5	43.5	33.5
63	119	129	43.5	33.5

Auto switch shown above is D-A73 type and D-A80 type.
For the auto switch mounting position and its mounting height, refer to page 7-6-83.

Flange Style

Bore size (mm)	Stroke range (mm)	Without auto switch A	B	With auto switch A	B	FD	FT	FV	FX	FZ	L1	L2	M
40	5 to 50	64	40	74	50	5.5	8	54	62	72	17	7	40
	75,100	74	50										
50	10 to 50	66.5	40.5	76.5	50.5	6.6	9	67	76	89	18	8	50
	75,100	76.5	50.5										
63	10 to 50	68	42	78	52	9	9	80	92	108	18	8	60
	75,100	78	52										

∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Flange bracket material: Carbon steel

Compact Cylinder: Axial Piping Type
Double Acting, Single Rod
Series CQP2
ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Without auto switch CQP2 B ☐ 50 — 30 D ☐

With auto switch CDQP2 B ☐ 50 — 30 D ☐ — J79W S

Built-in magnet

Axial piping type

Mounting style

B	Through-hole

Type

Nil	Pneumatic
H	Air-hydro Note)

Note) Bore sizes available for air-hydro type are ø20 to ø100.

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

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 7-6-89.

Action

D	Double acting

Body option

Nil	Standard (Rod end female thread)
C	With rubber bumper Note)
M	Rod end male thread

∗ Combination of body option ("CM") is available.
Note) Air-hydro type with rubber bumper is not available.

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled). (Except D-P5DWL)

Number of auto switches

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

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

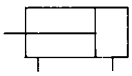
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model Perpendicular	Auto switch model In-line	Lead wire length (m) ∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet		3-wire (NPN equivalent)	—	5 V	—	—	A76H	●	●	—	—	—	IC circuit	—
			Yes	2-wire	—	—	200 V	A72	A72H	●	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	A73	A73H	●	●	●	—	—		
		Connector					—	A73C	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	A79W	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NV	F79	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				F7PV	F7P	●	●	○	—	○		
				2-wire		12 V		F7BV	J79	●	●	○	—	○	—	
		Connector						J79C	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		F7NWV	F79W	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	F7PW	●	●	○	—	○		
	Water resistant (2-color indication)			2-wire		12 V		F7BWV	J79W	●	●	○	—	○	—	
								—	F7BA	—	●	○	—	○		
								F7BAV	—	—	●	○	—	—		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		—	F79F	●	●	○	—	○	IC circuit	
	Magnetic field resistant (2-color indication)			2-wire		—		—	P5DW	—	●	●	—	○	—	

∗ 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.

• D-P5DWL type is available from ø40 up to ø100 only.
• 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.

JIS Symbol
Double acting,
Single rod



Type

Bore size (mm)			12	16	20	25	32	40	50	63	80	100
Pneumatic	Mounting	Through-hole (Standard)	●	●	●	●	●	●	●	●	●	●
	Built-in magnet		●	●	●	●	●	●	●	●	●	●
	Piping	Screw-in type	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8	Rc 1/8	Rc 1/8	Rc 1/4	Rc 1/4	Rc 3/8	Rc 3/8
	Rod end male thread		●	●	●	●	●	●	●	●	●	●
	Rubber bumper		●	●	●	●	●	●	●	●	●	●
Air-hydro	Mounting	Through-hole (Standard)	—	—	●	●	●	●	●	●	●	●
	Built-in magnet		—	—	●	●	●	●	●	●	●	●
	Piping	Screw-in type	—	—	M5 x 0.8	M5 x 0.8	Rc 1/8	Rc 1/8	Rc 1/4	Rc 1/4	Rc 3/8	Rc 3/8
	Rod end male thread		—	—	●	●	●	●	●	●	●	●

Standard Specifications

Type	Pneumatic (Non-lube)	Air-hydro
Fluid	Air	Turbine oil (1)
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)	5 to 60°C
Rubber bumper	None	——
Rod end thread	Female thread	
Rod end thread tolerance	JIS Class 2	
Stroke length tolerance	$^{+1.0}_{0}$	
Mounting	Through-hole	
Piston speed	50 to 500 mm/s	5 to 50 mm/s

Standard Stroke

Pneumatic (Non-lube)

Bore (mm)	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

Air-hydro

Bore (mm)	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

Manufacture of Intermediate Stroke

Description	Spacer is installed in the standard stroke body.	
Part no.	Refer to "How to Order" for the standard model no. on page 7-6-88.	
Description	Dealing with the stroke by the 1 mm interval is available by installing spacer with standard stroke cylinder.	
Stroke range	Bore size	Stroke range
	12, 16	1 to 29
	20, 25	1 to 49
	32 to 100	1 to 99
Example	Part no.: CQP2B50-57D CQP2B50-75D with 18 mm width spacer inside. B dimension is 115.5 mm.	

- Air-hydro type is excluded.
- In the case of spacer type, intermediate stroke with damper for ø40 to ø100, it can be manufactured by 5 mm intervals in 5 mm and 55 to 95 mm.

⚠ 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

1. For installation and removal, use an appropriate pair of pliers (tool for installing a type C snap ring).
2. 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 installment.

Mounting/Removing

1. Do not remove the hexagon socket set screw on the side of the rod.
   - Be aware that if the hexagon socket set screw is removed with compressed air supplied to the cylinder, an internal steel ball could fly out or the compressed air could be discharged, leading to injury to humans or damage to peripheral equipment.

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

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat resistant cylinder (150°C)
-XB7	Cold resistant cylinder
-XB9	Low speed cylinder (10 to 50 mm/s)
-XB13	Low speed cylinder (5 to 50 mm/s)
-XC4	With heavy duty scraper
-XC6	Piston rod and rod end nut made of stainless steel
-XC18	NPT finish piping port
-XC35	With coil scraper
-XC36	With boss in rod side
-X271	Fluoro rubber for seals

Minimum Operating Pressure

(MPa)

Bore size (mm)	**12**	**16**	**20**	**25**	**32**	**40**	**50**	**63**	**80**	**100**
Pneumatic (Non-lube)	0.07	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Air-hydro	—	—	0.18	0.18	0.18	0.10	0.10	0.10	0.10	0.10

Allowable Kinetic Energy

(J)

Bore size (mm)	**12**	**16**	**20**	**25**	**32**	**40**	**50**	**63**	**80**	**100**
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

Auto Switch Mounting Bracket Part No.

Bore size (mm)	Mounting bracket part no.	Note	Applicable auto switch	
			Reed switch	Solid state switch
12, **16** **20**, **25**	BQ-1	• Switch mounting screw (M3 x 0.5 x 8ℓ) • Square nut	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 D-F79F, D-F7NTL D-F7BAVL
32, **40** **50**, **63** **80**, **100**	BQ-2	• Switch mounting screw (M3 x 0.5 x 10ℓ) • Switch spacer • Switch mounting nut		
40 to 100	BQP-050	• Switch mounting bracket • Switch mounting nut • Hexagon socket head cap bolt (M3 x 0.5 x 14ℓ spring washer 2 pcs.) • Round head Phillips screw (M3 x 0.5 x 16ℓ spring washer 2 pcs.)	—	D-P5DWL

∗ 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.
(Since the spacer is not included, order it separately.)
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.

Theoretical Output

(N)

Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
12	IN	25	42	59
	OUT	34	57	79
16	IN	45	75	106
	OUT	60	101	141
20	IN	71	118	165
	OUT	94	157	220
25	IN	113	189	264
	OUT	147	245	344
32	IN	181	302	422
	OUT	241	402	563
40	IN	317	528	739
	OUT	377	628	880
50	IN	495	825	1150
	OUT	589	982	1370
63	IN	841	1400	1960
	OUT	935	1560	2180
80	IN	1360	2270	3170
	OUT	1510	2510	3520
100	IN	2140	3570	5000
	OUT	2360	3930	5500

Weight

(g)

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	32	39	46	53	60	67	—	—	—	—	—	—
16	54	63	72	81	90	98	—	—	—	—	—	—
20	70	84	98	112	126	140	154	168	182	196	—	—
25	102	117	132	147	161	176	191	206	220	235	—	—
32	149	173	199	222	246	270	295	319	343	367	487	607
40	224	258	280	310	336	362	388	414	440	467	602	737
50	—	414	455	496	538	579	620	662	703	744	949	1154
63	—	584	632	679	727	774	822	870	917	965	1205	1445
80	—	1085	1163	1242	1320	1399	1477	1556	1634	1713	2108	2503
100	—	1894	1992	2091	2189	2287	2385	2483	2581	2679	3169	3659

Additional Weight

(g)

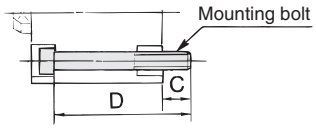
Bore size (mm)		12	16	20	25	32	40	50	63	80	100
Rod end male thread	Male thread	1.5	3	6	12	26	27	53	53	120	175
	Nut	1	2	4	8	17	17	32	32	49	116
With rubber bumper		0	0	–2	–3	–3	–7	–9	–18	–31	–56

Calculation: (Example) CQP2B32-20DCM
- Cylinder weight: CQP2B32-20D····· 222 g
- Option weight: Rod end male thread····· 43 g
  Rubber bumper····· –3 g

262 g

Mounting Bolt for CQP2

Mounting method: Mounting bolt for through-hole mounting style of CQP2B is available as an option.
Ordering: Add the word "Bolt" in front of the bolts to be used.
Example) Bolt M3 x 25ℓ 2 pcs.



Model	C	D	Mounting bolt
CQP2B12-5D	6.5	25	M3 x 25ℓ
-10D		30	x 30ℓ
-15D		35	x 35ℓ
-20D		40	x 40ℓ
-25D		45	x 45ℓ
-30D		50	x 50ℓ
CQP2B16-5D	5	25	M3 x 25ℓ
-10D		30	x 30ℓ
-15D		35	x 35ℓ
-20D		40	x 40ℓ
-25D		45	x 45ℓ
-30D		50	x 50ℓ
CQP2B20-5D	7.5	25	M5 x 25ℓ
-10D		30	x 30ℓ
-15D		35	x 35ℓ
-20D		40	x 40ℓ
-25D		45	x 45ℓ
-30D		50	x 50ℓ
-35D		55	x 55ℓ
-40D		60	x 60ℓ
-45D		65	x 65ℓ
-50D		70	x 70ℓ
CQP2B25-5D	9.5	30	M5 x 30ℓ
-10D		35	x 35ℓ
-15D		40	x 40ℓ
-20D		45	x 45ℓ
-25D		50	x 50ℓ
-30D		55	x 55ℓ
-35D		60	x 60ℓ
-40D		65	x 65ℓ
-45D		70	x 70ℓ
-50D		75	x 75ℓ

Model	C	D	Mounting bolt
CQP2B32-5D	9	30	M5 x 30ℓ
-10D		35	x 35ℓ
-15D		40	x 40ℓ
-20D		45	x 45ℓ
-25D		50	x 50ℓ
-30D		55	x 55ℓ
-35D		60	x 60ℓ
-40D		65	x 65ℓ
-45D		70	x 70ℓ
-50D		75	x 75ℓ
-75D		110	x 110ℓ
-100D		135	x 135ℓ
CQP2B40-5D	7.5	35	M5 x 35ℓ
-10D		40	x 40ℓ
-15D		45	x 45ℓ
-20D		50	x 50ℓ
-25D		55	x 55ℓ
-30D		60	x 60ℓ
-35D		65	x 65ℓ
-40D		70	x 70ℓ
-45D		75	x 75ℓ
-50D		80	x 80ℓ
-75D		115	x 115ℓ
-100D		140	x 140ℓ
CQP2B50-10D	12.5	45	M6 x 45ℓ
-15D		50	x 50ℓ
-20D		55	x 55ℓ
-25D		60	x 60ℓ
-30D		65	x 65ℓ
-35D		70	x 70ℓ
-40D		75	x 75ℓ
-45D		80	x 80ℓ
-50D		85	x 85ℓ
-75D		120	x 120ℓ
-100D		145	x 145ℓ

Model	C	D	Mounting bolt
CQP2B63-10D	14.5	50	M8 x 50ℓ
-15D		55	x 55ℓ
-20D		60	x 60ℓ
-25D		65	x 65ℓ
-30D		70	x 70ℓ
-35D		75	x 75ℓ
-40D		80	x 80ℓ
-45D		85	x 85ℓ
-50D		90	x 90ℓ
-75D		125	x 125ℓ
-100D		150	x 150ℓ
CQP2B80-10D	15	55	M10 x 55ℓ
-15D		60	x 60ℓ
-20D		65	x 65ℓ
-25D		70	x 70ℓ
-30D		75	x 75ℓ
-35D		80	x 80ℓ
-40D		85	x 85ℓ
-45D		90	x 90ℓ
-50D		95	x 95ℓ
-75D		130	x 130ℓ
-100D		155	x 155ℓ
CQP2B100-10D	15.5	65	M10 x 65ℓ
-15D		70	x 70ℓ
-20D		75	x 75ℓ
-25D		80	x 80ℓ
-30D		85	x 85ℓ
-35D		90	x 90ℓ
-40D		95	x 95ℓ
-45D		100	x 100ℓ
-50D		105	x 105ℓ
-75D		140	x 140ℓ
-100D		165	x 165ℓ

∗ Refer to page 7-9-1 for further information on auto switches.

Axial Piping: Double Acting, Single Rod
Series CDQP2
With Auto Switch

Weight

(g)

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	54	62	69	75	82	89	—	—	—	—	—	—
16	91	99	107	115	123	131	—	—	—	—	—	—
20	121	135	147	161	175	188	201	214	228	242	—	—
25	177	190	203	117	230	244	257	270	284	297	—	—
32	217	242	266	290	315	339	363	387	412	436	557	679
40	319	345	371	397	423	449	475	502	528	554	684	814
50	—	546	588	629	670	712	753	794	836	877	1084	1291
63	—	764	812	859	907	955	1002	1050	1098	1145	1384	1622
80	—	1377	1455	1534	1612	1691	1769	1848	1926	2005	2397	2790
100	—	2296	2394	2492	2590	2688	2786	2884	2982	3080	3570	4060

Calculation: (Example) CDQP2B32-20DCM
- Cylinder weight: CDQP2B32-20D·····290 g
- Option weight: Rod end male thread··· 43 g
  Rubber bumper····· –3 g

330 g

Add each weight of auto switches and mounting brackets.

Auto Switch Mounting Bracket Weight

Mounting bracket part no.	Applicable bore size	Weight (g)
BQ-1	12 to 250	1.5
BQ-2	32 to 100	1.5

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

Additional Weight

(g)

Bore size (mm)		12	16	20	25	32
Rod end male thread	Male thread	1.5	3	6	12	26
	Nut	1	2	4	8	17
With rubber bumper		0	–1	–2	–3	–3

Bore size (mm)		40	50	63	80	100
Rod end Male thread	Male thread	27	53	53	120	175
	Nut	17	32	32	49	116
With rubber bumper		–7	–9	–18	–31	–56

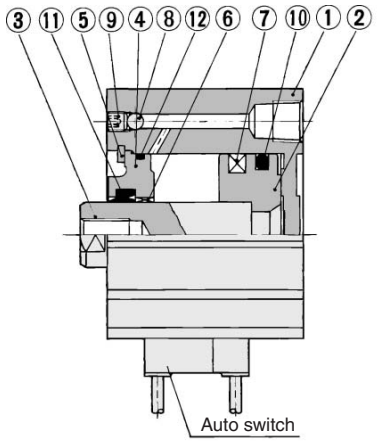
Minimum Stroke for Auto Switch Mounting

(mm)

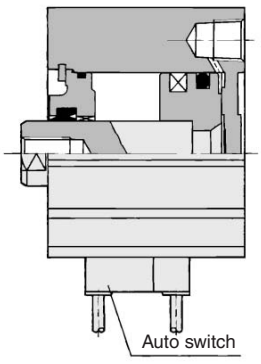
No. of auto switches mounted	D-F7□V D-J79C	D-A7□ D-A80 D-A73C D-A80C	D-F7□WV D-F7BAVL	D-A7□H D-A80H D-F7□ D-J79	D-A79W	D-F7□W D-J79W D-F7BAL D-F79F	D-P5DWL
1 pc.	5	5	10	15	15	20	30
2 pcs.	5	10	15	15	20	20	30

Note) For detailed specifications on auto switch, refer to page 7-9-1.

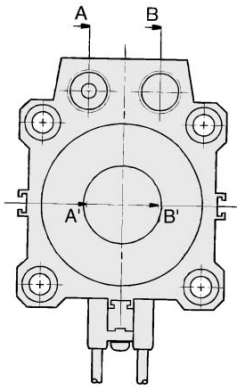
Construction



A-A' section
(Rod side port)



B-B' section
(Head side port)



Component Parts

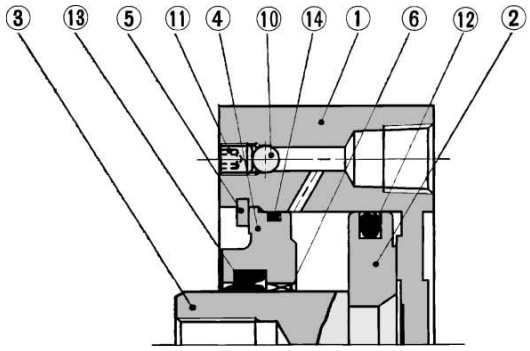
No.	Description	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②	Piston	Aluminum alloy	Chromated
③	Piston rod	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø100, Hard chrome plated
④	Collar	Aluminum alloy	ø12 to ø40, Anodized
		Aluminum alloy casted	ø50 to ø100, Chromated, painted
⑤	Snap ring	Carbon tool steel	Phosphate coated
⑥	Bushing	Lead-bronze casted	ø50 to ø100
⑦	Magnet	—	
⑧	Steel balls	Bearing steel	
⑨	Hexagon socket head set screw	Alloy steel	Zinc chromated
⑩	Piston seal	NBR	
⑪	Rod seal	NBR	
⑫	Gasket	NBR	

Replacement Parts: Seal Kit

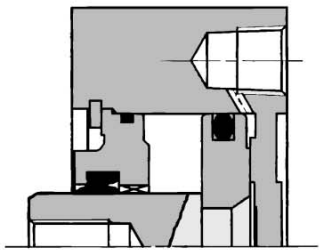
Bore size (mm)	Kit no.		Note
	Pneumatic (Non-lube)	Air-hydro	
12	CQ2B12-PS	—	Set of left nos. ⑩, ⑪, ⑫
16	CQ2B16-PS	—	
20	CQ2B20-PS	CQ2BH20-PS	
25	CQ2B25-PS	CQ2BH25-PS	
32	CQ2B32-PS	CQ2BH32-PS	
40	CQ2B40-PS	CQ2BH40-PS	
50	CQ2B50-PS	CQ2BH50-PS	
63	CQ2B63-PS	CQ2BH63-PS	
80	CQ2B80-PS	CQ2BH80-PS	
100	CQ2B100-PS	CQ2BH100-PS	

∗ Seal kit includes ⑩, ⑪, ⑫. Order the seal kit, based on each bore size.

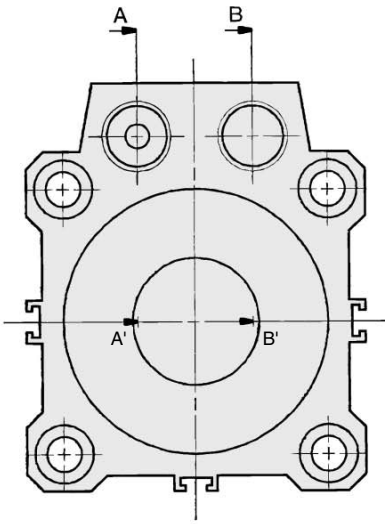
Construction

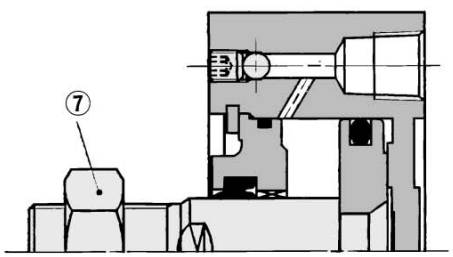


A-A' section (Rod side port)

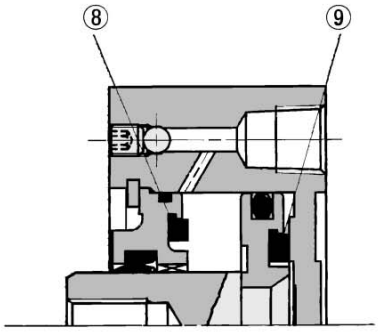


B-B' section (Head side port)





Rod end male thread



With rubber bumper

CUJ
CU
CQS
CQM
CQ2
RQ
MU
D-
-X
20-
Data

Component Parts

No.	Description	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②	Piston *	Aluminum alloy	Chromated
③	Piston rod *	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø100, Hard chrome plated
④	Collar	Aluminum alloy	ø12 to ø40, Anodized
		Aluminum alloy casting	ø50 to ø100, Chromated, Painted
⑤	Snap ring	Carbon tool steel	Phosphate coated
⑥	Bushing	Lead-bronze casting	ø50 to ø100
⑦	Rod end nut	Carbon steel	Nickel plated
⑧	Bumper A	Urethane	
⑨	Bumper B	Urethane	
⑩	Steel balls	Bearing steel	
⑪	Hexagon socket head set screw	Alloy steel	Zinc chromated
⑫	Piston seal	NBR	
⑬	Rod seal	NBR	
⑭	Gasket	NBR	

* On bore size ø12 with rubber bumper style, piston and piston rod are integrated (Stainless steel).

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.		Note
	Pneumatic (Non-lube)	Air-hydro	
12	CQ2B12-PS	—	Set of left nos. ⑫, ⑬, ⑭
16	CQ2B16-PS	—	
20	CQ2B20-PS	CQ2BH20-PS	
25	CQ2B25-PS	CQ2BH25-PS	
32	CQ2B32-PS	CQ2BH32-PS	
40	CQ2B40-PS	CQ2BH40-PS	
50	CQ2B50-PS	CQ2BH50-PS	
63	CQ2B63-PS	CQ2BH63-PS	
80	CQ2B80-PS	CQ2BH80-PS	
100	CQ2B100-PS	CQ2BH100-PS	

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

Copper-free (For CRT manufacturing process)

20 — CQP2B [Bore size] — [Stroke] D

- 20: Copper-free
- Bore size: ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100
- Stroke
- D

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

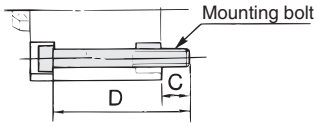
Action	Double acting, Single rod
Bore size (mm)	12, 16, 20, 25, 32, 40, 50, 63, 80, 100
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Rubber bumper	None
Piping	Screw-in piping
Piston speed	50 to 500 mm/s
Mounting	Through-hole
Auto switch	Mountable

Mounting Bolt for CDQP2 with Auto Switch

Mounting method: Mounting bolt for through-hole mounting style of CDQP2B is available as an option.

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

Example) Bolt M3 x 35ℓ 2 pcs.

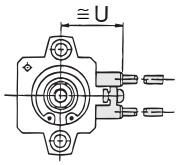
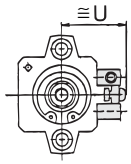
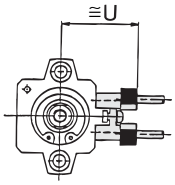
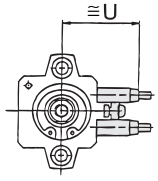
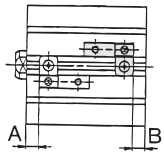
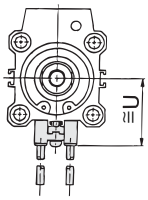
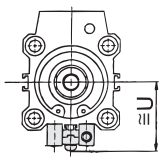
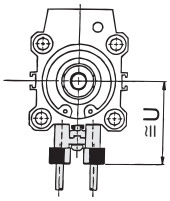
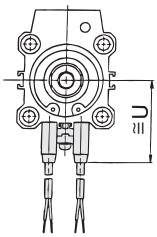
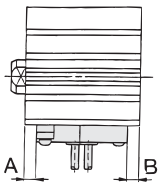
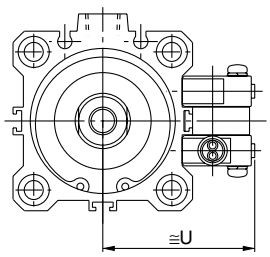
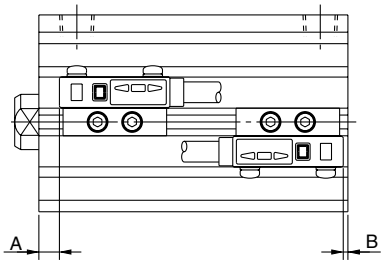


Model	C	D	Mounting bolt
CDQP2B12-5D	5.5	35	M3 x 35ℓ
-10D		40	x 40ℓ
-15D		45	x 45ℓ
-20D		50	x 50ℓ
-25D		55	x 55ℓ
-30D		60	x 60ℓ
CDQP2B16-5D	8	40	M3 x 40ℓ
-10D		45	x 45ℓ
-15D		50	x 50ℓ
-20D		55	x 55ℓ
-25D		60	x 60ℓ
-30D		65	x 65ℓ
CDQP2B20-5D	10.5	40	M5 x 40ℓ
-10D		45	x 45ℓ
-15D		50	x 50ℓ
-20D		55	x 55ℓ
-25D		60	x 60ℓ
-30D		65	x 65ℓ
-35D		70	x 70ℓ
-40D		75	x 75ℓ
-45D		80	x 80ℓ
-50D		85	x 85ℓ
CDQP2B25-5D	9.5	40	M5 x 40ℓ
-10D		45	x 45ℓ
-15D		50	x 50ℓ
-20D		55	x 55ℓ
-25D		60	x 60ℓ
-30D		65	x 65ℓ
-35D		70	x 70ℓ
-40D		75	x 75ℓ
-45D		80	x 80ℓ
-50D		85	x 85ℓ

Model	C	D	Mounting bolt
CDQP2B32-5D	9	40	M5 x 40ℓ
-10D		45	x 45ℓ
-15D		50	x 50ℓ
-20D		55	x 55ℓ
-25D		60	x 60ℓ
-30D		65	x 65ℓ
-35D		70	x 70ℓ
-40D		75	x 75ℓ
-45D		80	x 80ℓ
-50D		85	x 85ℓ
-75D		110	x 110ℓ
-100D		135	x 135ℓ
CDQP2B40-5D	7.5	45	M5 x 45ℓ
-10D		50	x 50ℓ
-15D		55	x 55ℓ
-20D		60	x 60ℓ
-25D		65	x 65ℓ
-30D		70	x 70ℓ
-35D		75	x 75ℓ
-40D		80	x 80ℓ
-45D		85	x 85ℓ
-50D		90	x 90ℓ
-75D		115	x 115ℓ
-100D		140	x 140ℓ
CDQP2B50-10D	12.5	55	M6 x 55ℓ
-15D		60	x 60ℓ
-20D		65	x 65ℓ
-25D		70	x 70ℓ
-30D		75	x 75ℓ
-35D		80	x 80ℓ
-40D		85	x 85ℓ
-45D		90	x 90ℓ
-50D		95	x 95ℓ
-75D		120	x 120ℓ
-100D		145	x 145ℓ

Model	C	D	Mounting bolt
CDQP2B63-10D	14.5	60	M8 x 60ℓ
-15D		65	x 65ℓ
-20D		70	x 70ℓ
-25D		75	x 75ℓ
-30D		80	x 80ℓ
-35D		85	x 85ℓ
-40D		90	x 90ℓ
-45D		95	x 95ℓ
-50D		100	x 100ℓ
-75D		125	x 125ℓ
-100D		150	x 150ℓ
CDQP2B80-10D	15	65	M10 x 65ℓ
-15D		70	x 70ℓ
-20D		75	x 75ℓ
-25D		80	x 80ℓ
-30D		85	x 85ℓ
-35D		90	x 90ℓ
-40D		95	x 95ℓ
-45D		100	x 100ℓ
-50D		105	x 105ℓ
-75D		130	x 130ℓ
-100D		155	x 155ℓ
CDQP2B100-10D	15.5	75	M10 x 75ℓ
-15D		80	x 80ℓ
-20D		85	x 85ℓ
-25D		90	x 90ℓ
-30D		95	x 95ℓ
-35D		100	x 100ℓ
-40D		105	x 105ℓ
-45D		110	x 110ℓ
-50D		115	x 115ℓ
-75D		140	x 140ℓ
-100D		165	x 165ℓ

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

	D-A7□ D-A80	D-A7□H D-A80H D-F7□ D-J79	D-F7□W D-J79W D-F79F D-F7NTL D-F7BAL	D-A73C D-A80C D-J79C	D-A79W D-F7□WV D-F7□V D-F7BAVL
ø12 to ø25					
ø32 to ø100					
ø40 to ø100	**D-P5DWL**				
					

Proper Auto Switch Mounting Position

Bore size (mm)	D-A7□ D-A80		D-A7□H/A80H D-A73C/A80C D-F7□/J79 D-F7□V/J79C D-F7BAL/F7□W D-J79W/F7□WV D-F7BAVL/F79F		D-A79W		D-P5DWL	
	A	B	A	B	A	B	A	B
12	4.5	5.5	5	6	2	3	—	—
16	7.5	5	8	5.5	5	2.5	—	—
20	7.5	6.5	8	7	5	4	—	—
25	7.5	7	8	7.5	5	4.5	—	—
32	9	6	9.5	6.5	6.5	3.5	—	—
40	13	8.5	13.5	9	10.5	6	9	4.5
50	11	11.5	11.5	12	8.5	9	7	7.5
63	13.5	14.5	14	15	11	12	9.5	10.5
80	17.5	18	18	18.5	15	15.5	13.5	14
100	21	24	21.5	24.5	18.5	21.5	17	20

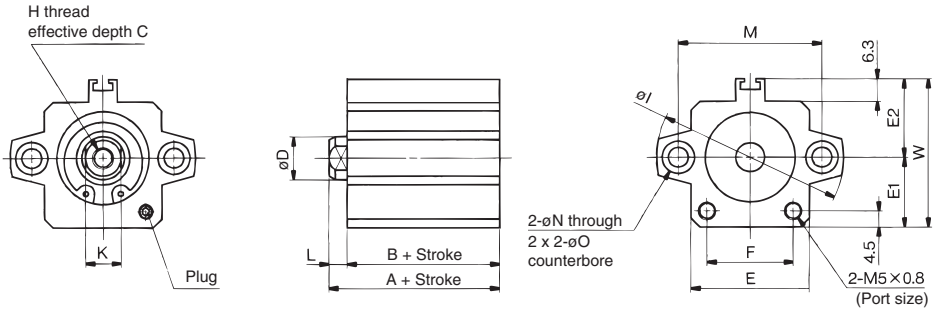
Auto Switch Mounting Height

(mm)

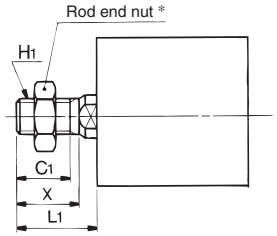
D-A7□ D-A80	D-A7□H, D-A80H D-F7□/J79/F7□W D-J79W, D-F7BAL D-F79F, D-F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAVL	D-J79C	D-A79W	D-P5DWL
U	U	U	U	U	U	U
19.5	20.5	26.5	23	26	22	—
22.5	23.5	29.5	26	29	25	—
24.5	25.5	31.5	28	31	27	—
27.5	28.5	34.5	31	34	30	—
31.5	32.5	38.5	35	38	34	—
35	36	42	38.5	41.5	37.5	44
41	42	48	44.5	47.5	43.5	50
47.5	48.5	54.5	51	54	50	56.5
57.5	58.5	64.5	61	64	60	66.5
67.5	68.5	74.5	71	74	70	76.5

Dimensions: ø12 to ø100/Without Auto Switch

ø12 to ø25



Rod end male thread



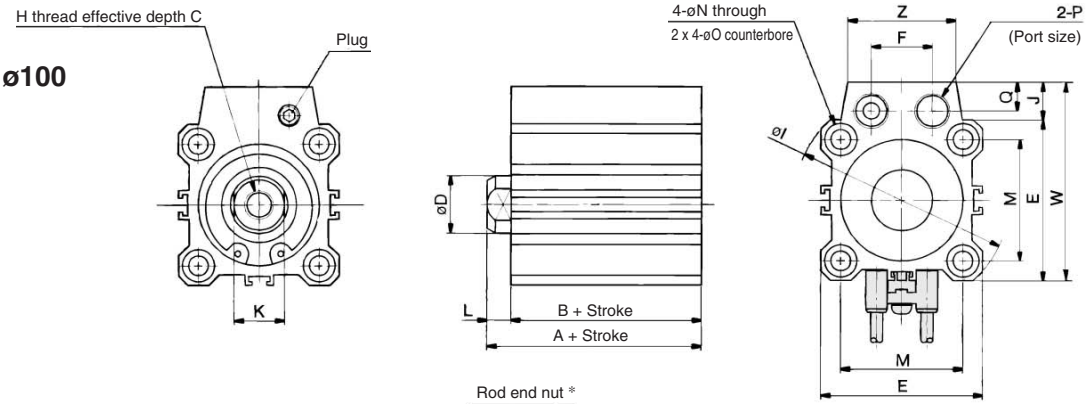
Rod End Male Thread

Bore size (mm)	C1	X	H1	L1
12	9	10.5	M5 x 0.8	14
16	10	12	M6 x 1.0	15.5
20	12	14	M8 x 1.25	18.5
25	15	17.5	M10 x 1.25	22.5

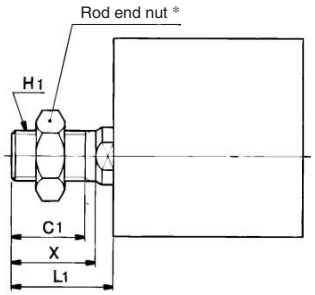
Basic Style

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	E1	E2	F	H	I	K	L	M	N	O	W
12	5 to 30	20.5	17	6	6	23	13	14	14	M3 x 0.5	32	5	3.5	22	3.5	6.5 depth 3.5	27
16	5 to 30	22	18.5	8	8	26	15	17	17	M4 x 0.7	38	6	3.5	28	3.5	6.5 depth 3.5	32
20	5 to 50	24	19.5	7	10	30	17	19	21	M5 x 0.8	47	8	4.5	36	5.5	9 depth 7	36
25	5 to 50	27.5	22.5	12	12	33	19.5	22	24	M6 x 1.0	52	10	5	40	5.5	9 depth 7	41.5

ø32 to ø100



Rod end male thread



Rod End Male Thread

Bore size (mm)	C1	X	H1	L1
32	20.5	23.5	M14 x 1.5	28.5
40	20.5	23.5	M14 x 1.5	28.5
50	26	28.5	M18 x 1.5	33.5
63	26	28.5	M18 x 1.5	33.5
80	32.5	35.5	M22 x 1.5	43.5
100	32.5	35.5	M26 x 1.5	43.5

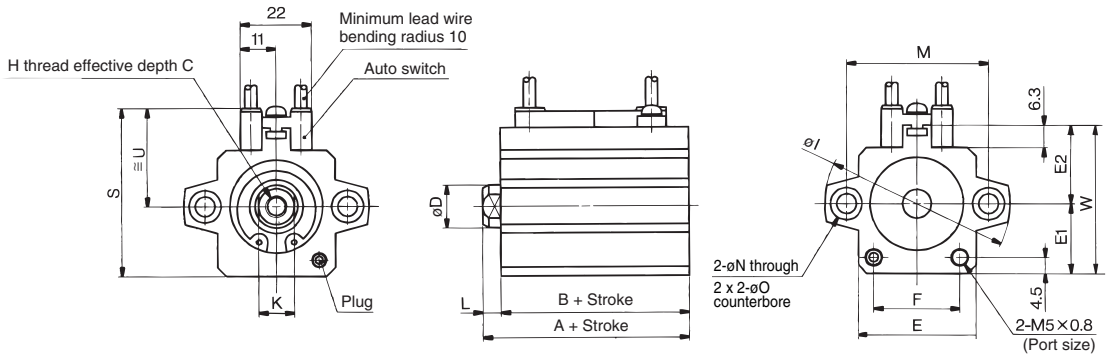
Basic Style

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	H	I	J	K	L	M	N	O	P	Q	W	Z
32	5 to 50	30	23	13	16	45	17	M8 x 1.25	60	10.5	14	7	34	5.5	9 depth 7	Rc 1/8	8	55.5	30
	75,100	40	33																
40	5 to 50	36.5	29.5	13	16	52	17	M8 x 1.25	69	10	14	7	40	5.5	9 depth 7	Rc 1/8	8	62	30
	75,100	46.5	39.5																
50	10 to 50	38.5	30.5	15	20	64	22	M10 x 1.5	86	13	17	8	50	6.6	11 depth 8	Rc 1/4	10	77	39
	75,100	48.5	40.5																
63	10 to 50	44	36	15	20	77	22	M10 x 1.5	103	13	17	8	60	9	14 depth 10.5	Rc 1/4	10	90	39
	75,100	54	46																
80	10 to 50	53.5	43.5	21	25	98	26	M16 x 2.0	132	16	22	10	77	11	17.5 depth 13.5	Rc 3/8	12.5	114	48
	75,100	63.5	53.5																
100	10 to 50	65	53	27	30	117	26	M20 x 2.5	156	17.5	27	12	94	11	17.5 depth 13.5	Rc 3/8	12.5	134.5	48
	75,100	75	63																

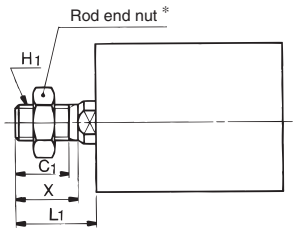
Note) External dimensions with rubber bumper are the same as standard type, as shown above.
∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Dimensions: ø12 to ø100/With Auto Switch

ø12 to ø25



Rod end male thread



Auto switch shown above is D-A73 and D-A80.
For the auto switch mounting position and its mounting height, refer to page 7-6-95.

Rod End Male Thread

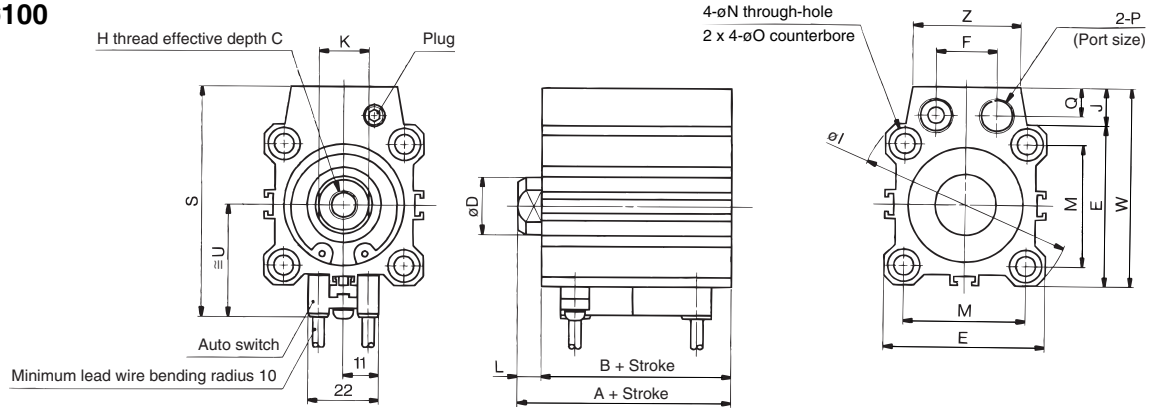
Bore size (mm)	C_1	X	H_1	L_1
12	9	10.5	M5 x 0.8	14
16	10	12	M6 x 1.0	15.5
20	12	14	M8 x 1.25	18.5
25	15	17.5	M10 x 1.25	22.5

Basic Style

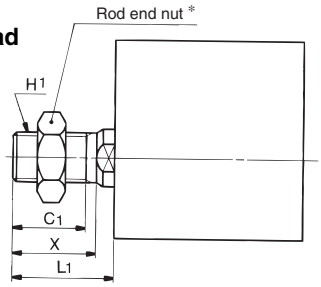
Bore size (mm)	Stroke range (mm)	A	B	C	D	E	E1	E2	F	H	I	K	L	M	N	O	S	U	W
12	5 to 30	31.5	28	6	6	23	13	14	14	M3 x 0.5	32	5	3.5	22	3.5	6.5 depth 3.5	32.5	19.5	27
16	5 to 30	34	30.5	8	8	26	15	17	17	M4 x 0.7	38	6	3.5	28	3.5	6.5 depth 3.5	37.5	22.5	32
20	5 to 50	36	31.5	7	10	30	17	19	21	M5 x 0.8	47	8	4.5	36	5.5	9 depth 7	41.5	24.5	36
25	5 to 50	37.5	32.5	12	12	33	19.5	22	24	M6 x 1.0	52	10	5	40	5.5	9 depth 7	47	27.5	41.5

Note) External dimensions with rubber bumper are the same as standard type, as shown above.

ø32 to ø100



Rod end male thread



Auto switch shown above is D-A73 and D-A80.
For the auto switch mounting position and its mounting height, refer to page 7-6-95.

Rod End Male Thread

Bore size (mm)	C_1	X	H_1	L_1
32	20.5	23.5	M14 x 1.5	28.5
40	20.5	23.5	M14 x 1.5	28.5
50	26	28.5	M18 x 1.5	33.5
63	26	28.5	M18 x 1.5	33.5
80	32.5	35.5	M22 x 1.5	43.5
100	32.5	35.5	M26 x 1.5	43.5

Basic Style

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	H	I	J	K	L	M	N	O	P	Q	S	U	W	Z
32	5 to 100	40	33	13	16	45	17	M8 x 1.25	60	10.5	14	7	34	5.5	9 depth 7	Rc 1/8	8	64.5	31.5	55.5	30
40	5 to 100	46.5	39.5	13	16	52	17	M8 x 1.25	69	10	14	7	40	5.5	9 depth 7	Rc 1/8	8	71	35	62	30
50	10 to 100	48.5	40.5	15	20	64	22	M10 x 1.5	86	13	17	8	50	6.6	11 depth 8	Rc 1/4	10	86	41	77	39
63	10 to 100	54	46	15	20	77	22	M10 x 1.5	103	13	17	8	60	9	14 depth 10.5	Rc 1/4	10	99	47.5	90	39
80	10 to 100	63.5	53.5	21	25	98	26	M16 x 2.0	132	16	22	10	77	11	17.5 depth 13.5	Rc 3/8	12.5	122.5	57.5	114	48
100	10 to 100	75	63	27	30	117	26	M20 x 2.5	156	17.5	27	12	94	11	17.5 depth 13.5	Rc 3/8	12.5	143.5	67.5	134.5	48

Note) External dimensions with rubber bumper are the same as standard type, as shown above.
* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Compact Cylinder: Axial Piping Type
Single Acting, Single Rod, Spring Return/Extend
Series CQP2
ø12, ø16, ø20, ø25, ø32, ø40, ø50

How to Order

Without auto switch CQP2 B 50 – 10 T

With auto switch CDQP2 B 50 – 10 T – J79W S

Built-in magnet

Axial piping type

Mounting style

B	Through-hole

Bore size

12	12 mm
16	16 mm
20	20 mm
25	25 mm
32	32 mm
40	40 mm
50	50 mm

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 7-6-99.

Action

S	Single acting, Spring return
T	Single acting, Spring extend

Body option

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

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled).

Number of auto switches

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

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 DC	Load voltage DC	Load voltage AC	Auto switch model Perpendicular	Auto switch model In-line	Lead wire length (m) ∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	**A76H**	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200 V	**A72**	**A72H**	●	●	—	—	—	—	Relay, PLC
		Connector			24 V	12 V	100 V	**A73**	**A73H**	●	●	●	—	—		
							—	**A73C**	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	**A79W**	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**F7NV**	**F79**	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				**F7PV**	**F7P**	●	●	○	—	○		
				2-wire		12 V		**F7BV**	**J79**	●	●	○	—	○	—	
		Connector						**J79C**	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		**F7NWV**	**F79W**	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	**F7PW**	●	●	○	—	○		
				2-wire		12 V		**F7BWV**	**J79W**	●	●	○	—	○	—	
	Water resistant (2-color indication)							—	**F7BA**	—	●	○	—	○		
								F7BAV	—	—	●	○	—	—		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		—	**F79F**	●	●	○	—	○	IC circuit	

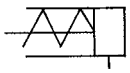
∗ Lead wire length symbols: 0.5 m·····Nil (Example) A73C
3 m·····L (Example) A73CL
5 m·····Z (Example) A73CZ
None·····N (Example) A73CN

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

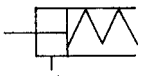
• Since there are other applicable auto switches than listed, refer to page 7-6-23 for details.
• For details about auto switches with pre-wire connector, refer to page 7-9-36.

JIS Symbol

Single acting, Spring return



Single acting, Spring extend



Type

Bore size (mm)			12	16	20	25	32	40	50
Pneumatic	Mounting	Through-hole (Standard)	●	●	●	●	●	●	●
	Built-in magnet		●	●	●	●	●	●	●
	Piping	Screw-in type	M5 x 0.8	M5 x 0.8	M5 x 0.8	M5 x 0.8	Rc 1/8	Rc 1/8	Rc 1/4
	Rod end male thread		●	●	●	●	●	●	●

Standard Specifications

Type	Pneumatic (Non-lube)
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
Rod end thread	Female thread
Rod end thread tolerance	JIS Class 2
Stroke length tolerance	$^{+1.0}_{0}$
Mounting	Through-hole
Piston speed	50 to 500 mm/s

Minimum Operating Pressure

(MPa)

Bore size (mm)	12	16	20	25	32	40	50
Single acting (Spring return/extend)	0.25	0.25	0.18	0.18	0.17	0.15	0.13

Standard Stroke

Bore size (mm)	Standard stroke
12	5, 10
16	
20	
25	
32	
40	
50	10, 20

Manufacture of Intermediate Stroke (Single acting, Spring retract type is excluded.)

Description	Spacer is installed in the standard stroke body.	
Part no.	Refer to “How to Order” for the standard model no. on page 7-6-98.	
Description	Dealing with the stroke by the 1 mm interval is available by installing spacer with standard stroke cylinder.	
Stroke range	Bore size	Stroke range
	12 to 40	1 to 9
	50	1 to 19
Example	Part no.: CQP2B20-3T CQP2B20-5T with 2 mm width spacer inside. B dimension is 24.5 mm.	

Made to Order

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

Symbol	Specifications
-XA□	Change of rod end shape
-XC6	Piston rod and rod end nut made of stainless steel
-XC36	With boss in rod side
-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

1. For installation and removal, use an appropriate pair of pliers (tool for installing a type C snap ring).
2. 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 installment.

Theoretical Output

(N)

Action	Bore size (mm)	Operating pressure (MPa)		
		0.3	0.5	0.7
Spring return	**12**	21	44	66
	16	45	86	126
	20	79	142	205
	25	126	224	323
	32	211	372	533
	40	338	589	841
	50	535	928	1316
Spring extend	**12**	14	31	48
	16	24	54	85
	20	71	118	165
	25	113	189	264
	32	181	302	422
	40	317	528	739
	50	495	825	1150

For spring force, refer to page 7-12-3.

Weight

(g)

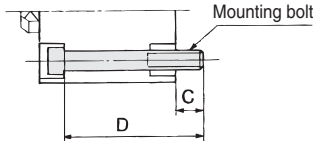
Action	Bore size (mm)	Cylinder stroke (mm)			
		5	10	15	20
Spring return	**12**	33	40	—	—
	16	55	64	—	—
	20	68	83	—	—
	25	103	118	—	—
	32	149	173	—	—
	40	236	262	—	—
	50	—	426	—	691
Spring extend	**12**	33	40	—	—
	16	55	64	—	—
	20	73	87	—	—
	25	109	124	—	—
	32	160	180	—	—
	40	262	284	—	—
	50	—	468	—	540

Mounting Bolt for CQP2

Mounting method: Mounting bolt for through-hole mounting style of CQP2B is available as an option.

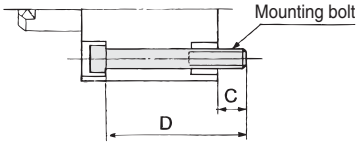
Ordering: Add the word “Bolt” in front of the bolts to be used.

Example) Bolt M3 x 25ℓ 4 pcs.



Spring Return

Model	C	D	Mounting bolt
CQP2B12-5S	6.5	25	M3 x 25ℓ
-10S		30	x 30ℓ
CQP2B16-5S	5	25	M3 x 25ℓ
-10S		30	x 30ℓ
CQP2B20-5S	7.5	25	M5 x 25ℓ
-10S		30	x 30ℓ
CQP2B25-5S	9.5	30	M5 x 30ℓ
-10S		35	x 35ℓ
CQP2B32-5S	9	30	M5 x 30ℓ
-10S		35	x 35ℓ
CQP2B40-5S	7.5	35	M5 x 35ℓ
-10S		40	x 40ℓ
CQP2B50-10S	12.5	45	M6 x 45ℓ
-20S		55	x 55ℓ



Spring Extend

Model	C	D	Mounting bolt
CQP2B12-5T	6.5	25	M3 x 25ℓ
-10T		30	x 30ℓ
CQP2B16-5T	5	25	M3 x 25ℓ
-10T		30	x 30ℓ
CQP2B20-5T	7.5	25	M5 x 25ℓ
-10T		30	x 30ℓ
CQP2B25-5T	9.5	30	M5 x 30ℓ
-10T		35	x 35ℓ
CQP2B32-5T	9	30	M5 x 30ℓ
-10T		35	x 35ℓ
CQP2B40-5T	7.5	35	M5 x 35ℓ
-10T		40	x 40ℓ
CQP2B50-10T	12.5	45	M6 x 45ℓ
-20T		55	x 55ℓ

Additional Weight

(g)

Bore size (mm)		**12**	**16**	**20**	**25**	**32**	**40**	**50**
Rod end male thread	Male thread	1.5	3	6	12	26	27	53
	Nut	1	2	4	8	17	17	32

Calculation: (Example) CQP2B32-10SM

- Cylinder weight: CQP2B32-10S····· 173 g
- Option weight: Rod end male thread·····43 g

216 g

Auto Switch Mounting Bracket Part No.

Bore size (mm)	Mounting bracket part no.	Note	Applicable auto switch	
			Reed switch	Solid state switch
12, **16** **20**, **25**	BQ-1	• Switch mounting screw (M3 x 0.5 x 8 ℓ) • Square nut	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
32, **40** **50**	BQ-2	• Switch mounting screw (M3 x 0.5 x 10 ℓ) • Switch spacer • Switch mounting nut		

∗ 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.)

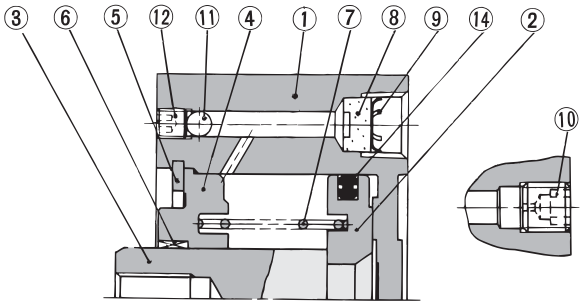
BBA2: For D-A7/A8/F7/J7

“D-F7BAL/F7BAVL” switch is set on the cylinder with the stainless steel screws above when shipped.

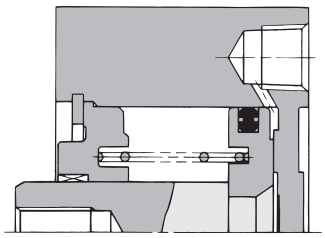
When only a switch is shipped independently, “BBA2” screws are attached.

Construction

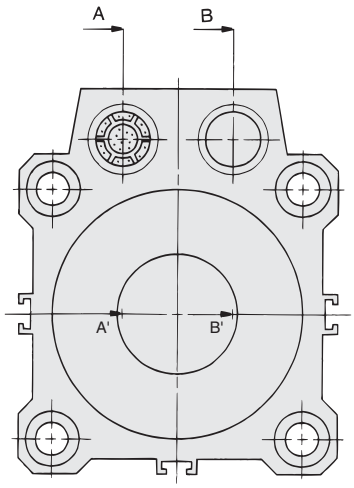
Spring return



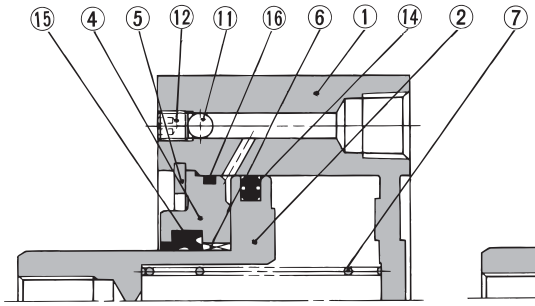
A-A' section (Rod side port)



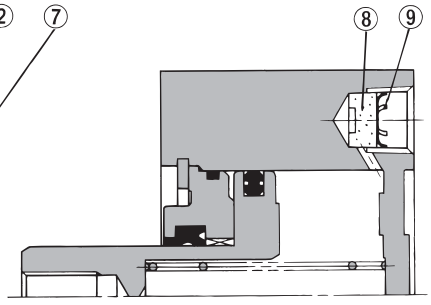
B-B' section (Head side port)



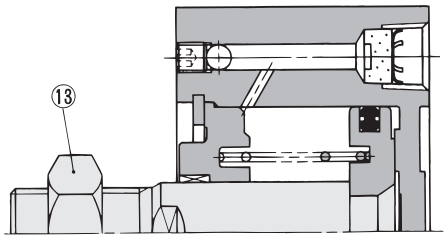
Spring extend



A-A' section (Rod side port)



B-B' section (Head side port)



Rod end male thread

Component Parts

No.	Description	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②*	Piston	Aluminum alloy	Chromated
③	Piston rod	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø50, Hard chrome plated
④	Collar	Aluminum alloy	ø12 to ø40, Anodized
		Aluminum alloy casted	ø50, Chromate, Painted
⑤	Snap ring	Carbon tool steel	Phosphate coated
⑥	Bushing	Lead-bronze casted	ø50, Spring return
		Lead-bronze casted	ø50, Spring extend
⑦	Return spring	Piano wire	Zinc chromated
⑧	Bronze element	Sintered metallic BC	Port size Rc 1/8, 1/4
⑨	Snap ring	Carbon tool steel	
⑩	Plug with fixed orifice	Alloy steel	Port size M5 x 0.8
⑪	Steel balls	Bearing steel	
⑫	Hexagon socket head set screw	Alloy steel	Zinc chromated
⑬	Rod end nut	Carbon steel	Nickel plated

* On spring extend (Type T), piston and piston rod are integrated (stainless steel).

Replacement Parts

No.	Description	Material	Note
⑭	Piston seal	NBR	
⑮	Rod seal	NBR	
⑯	Gasket	NBR	

Replacement Parts: Seal Kit

Bore size (mm)	Single acting/Spring return	Single acting/Spring extend
12	CQ2B12-S-PS	CQ2B12-T-PS
16	CQ2B16-S-PS	CQ2B16-T-PS
20	CQ2B20-S-PS	CQ2B20-T-PS
25	CQ2B25-S-PS	CQ2B25-T-PS
32	CQ2B32-S-PS	CQ2B32-T-PS
40	CQ2B40-S-PS	CQ2B40-T-PS
50	CQ2B50-S-PS	CQ2B50-T-PS
Note	A set includes ⑭.	Kits include items ⑭, ⑮ and ⑯ from the table above
How to order	* Seal kit includes ⑭. Order the seal kit, based on each bore size.	* Seal kit includes ⑭, ⑮, ⑯. Order the seal kit, based on each bore size.

Copper-free (For CRT manufacturing process)

20 — CQP2B [Bore size] — [Stroke] $\frac{S}{T}$(M)

- Copper-free
- ø12, ø16, ø20, ø25, ø32, ø40, ø50

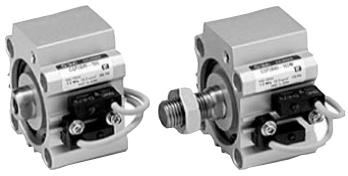
To prevent the influence of copper ions or halogen ions during CRT manufacturing processes, copper and fluorine materials are not used in the component parts.

Specifications

Action	Single acting, Single rod
Bore size (mm)	12, 16, 20, 25, 32, 40, 50
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Rubber bumper	None
Piping	Screw-in piping
Piston speed	50 to 500 mm/s
Mounting	Through-hole
Auto switch	Mountable

∗ Refer to page 7-9-1 for further information on auto switches.

Axial Piping: Single Acting, Single Rod
Series CDQP2
With Auto Switch



Minimum Stroke for Auto Switch Mounting

(mm)

No. of auto switches mounted	D-F7□V D-J79C	D-A7□ D-A80 D-A73C D-A80C	D-F7□WV D-F7BAVL	D-A7□H D-A80H D-F7□ D-J79	D-A79W	D-F7□W D-J79W D-F7BAL D-F79F
1 pc.	5	5	10	15	15	20
2 pcs.	5	10	15	15	20	20

Note) Refer to page 7-6-92 in series CQ2, double acting for detailed specifications on auto switch.

Weight

(g)

Action	Bore size (mm)	Cylinder stroke (mm)			
		5	10	15	20
Spring return	**12**	55	63	—	—
	16	92	100	—	—
	20	121	135	—	—
	25	178	191	—	—
	32	217	242	—	—
	40	323	349	—	—
	50	—	558	—	641
Spring extend	**12**	61	69	—	—
	16	92	100	—	—
	20	126	140	—	—
	25	184	197	—	—
	32	228	253	—	—
	40	349	375	—	—
	50	—	600	—	683

Additional Weight

(g)

Bore size (mm)		12	16	20	25	32	40	50
Rod end male thread	Male thread	1.5	3	6	12	26	27	53
	Nut	1	2	4	8	17	17	32

Calculation: (Example) CDQP2B32-10SM
- Cylinder weight: CDQP2B32-10S····· 242 g
- Option weight: Rod end male thread····· 43 g

285 g

Add each weight of auto switches and mounting brackets when auto switches are mounted.

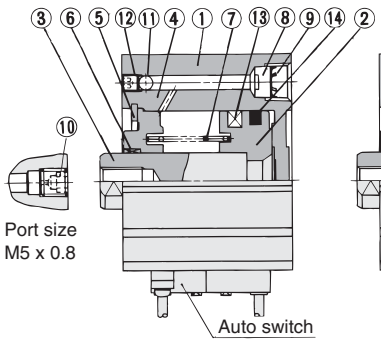
Auto Switch Mounting Bracket Weight

Mounting bracket part no.	Applicable bore size (mm)	Weight (g)
BQ-1	12 to 25	1.5
BQ-2	32 to 50	1.5

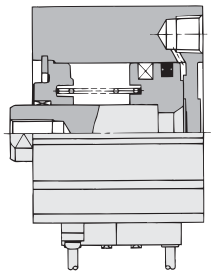
∗ For the auto switch weight, refer to page 7-9-1.

Construction

Spring return

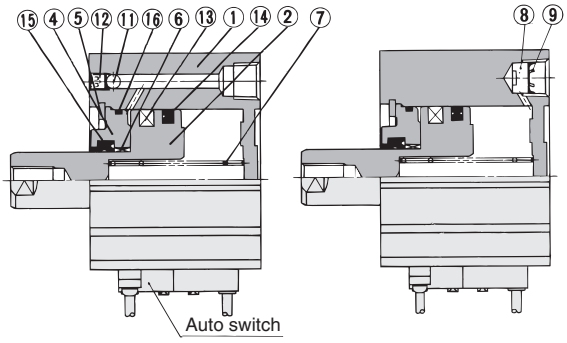


A-A' section (Rod side port)



B-B' section (Head side port)

Spring extend



A-A' section (Rod side port)

B-B' section (Head side port)

Component Parts

No.	Description	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②	Piston ∗	Aluminum alloy	Chromated
③	Piston rod ∗	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø50, Hard chrome plated
④	Collar	Aluminum alloy	ø12 to ø40, Anodized
		Aluminum alloy casted	ø50, Chromate, Painted
⑤	Snap ring	Carbon tool steel	Phosphate coated
⑥	Bushing	Lead-bronze casted	ø50, Spring return
			ø50, Spring extend
⑦	Return spring	Piano wire	Zinc chromated
⑧	Bronze element	Sintered metallic BC	Port size Rc 1/8, 1/4
⑨	Snap ring	Carbon tool steel	
⑩	Plug with fixed orifice	Alloy steel	Port size M5 x 0.8
⑪	Steel balls	Bearing steel	
⑫	Hexagon socket head set screw	Alloy steel	Zinc chromated
⑬	Magnet	—	
⑭	Piston seal	NBR	
⑮	Rod seal	NBR	
⑯	Gasket	NBR	

∗ On spring extend (Type T), piston and piston rod are integrated (stainless steel).

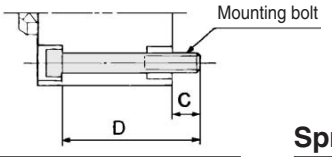
Replacement Parts: Seal Kit

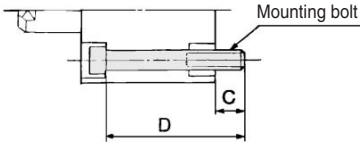
Bore size (mm)	Seal kit no.	Contents
12	CQ2B12-PS	Set of left nos. ⑭, ⑮, ⑯
16	CQ2B16-PS	
20	CQ2B20-PS	
25	CQ2B25-PS	
32	CQ2B32-PS	
40	CQ2B40-PS	
50	CQ2B50-PS	

∗ Seal kit includes ⑭, ⑮, ⑯. Order the seal kit, based on each bore size.

Mounting Bolt for CDQP2 with Auto Switch

Mounting method: Mounting bolt for through-hole mounting style of CDQP2B is available as an option.
Ordering: Add the word "Bolt" in front of the bolts to be used.
Example) Bolt M3 x 35ℓ 2 pcs.





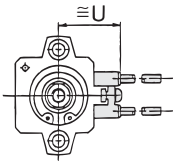
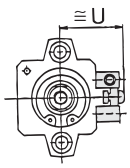
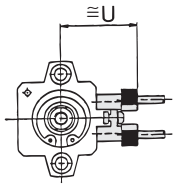
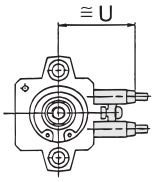
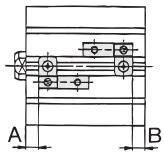
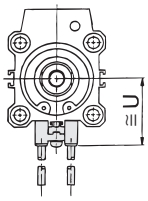
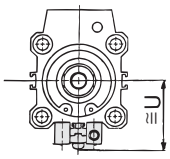
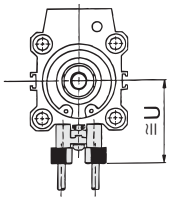
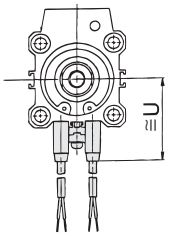
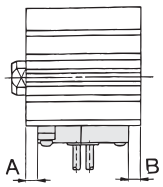
Spring Return

Model	C	D	Mounting bolt
CDQP2B12-5S	5.5	35	M3 x 35ℓ
-10S		40	x 40ℓ
CDQP2B16-5S	8	40	M3 x 40ℓ
-10S		45	x 45ℓ
CDQP2B20-5S	10.5	40	M5 x 40ℓ
-10S		45	x 45ℓ
CDQP2B25-5S	9.5	40	M5 x 40ℓ
-10S		45	x 45ℓ
CDQP2B32-5S	9	40	M5 x 40ℓ
-10S		45	x 45ℓ
CDQP2B40-5S	7.5	45	M5 x 45ℓ
-10S		50	x 50ℓ
CDQP2B50-10S	12.5	55	M6 x 55ℓ
-20S		60	x 60ℓ

Spring Extend

Model	C	D	Mounting bolt
CDQP2B12-5T	6.1	40	M3 x 40ℓ
-10T		45	x 45ℓ
CDQP2B16-5T	8	40	M3 x 40ℓ
-10T		45	x 45ℓ
CDQP2B20-5T	10.5	40	M5 x 40ℓ
-10T		45	x 45ℓ
CDQP2B25-5T	9.5	40	M5 x 40ℓ
-10T		45	x 45ℓ
CDQP2B32-5T	9	40	M5 x 40ℓ
-10T		45	x 45ℓ
CDQP2B40-5T	7.5	45	M5 x 45ℓ
-10T		50	x 50ℓ
CDQP2B50-10T	12.5	55	M6 x 55ℓ
-20T		65	x 65ℓ

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

	D-A7□ **D-A80**	**D-A7□H** **D-A80H** **D-F7□** **D-J79**	**D-F7□W** **D-J79W** **D-F79F** **D-F7NTL** **D-F7BAL**	**D-A73C** **D-A80C** **D-J79C**	**D-A79W** **D-F7□WV** **D-F7□V** **D-F7BAVL**
ø12 to ø25					
ø32 to ø100					

Proper Auto Switch Mounting Position/ Spring Return (Spring extend)

Bore size (mm)	D-A7□ D-A80		D-A7□H/A80H D-A73C/A80C D-F7□/J79 D-F7□V/J79C D-F7BAL/F7□W D-J79W/F7□WV D-F7BAVL/F79F		D-A79W	
	A	B	A	B	A	B
12	4.5	5.5(10)	5	6(10.5)	2	3(7.5)
16	7.5(5.5)	5(7)	8(6)	5.5(7.5)	5(3)	2.5(4.5)
20	7.5	6.5	8	7	5	4
25	7.5	7	8	7.5	5	4.5
32	9	6	9.5	6.5	6.5	3.5
40	13	8.5	13.5	9	10.5	6
50	11	11.5	11.5	12	8.5	9

( ): Denotes spring extend.

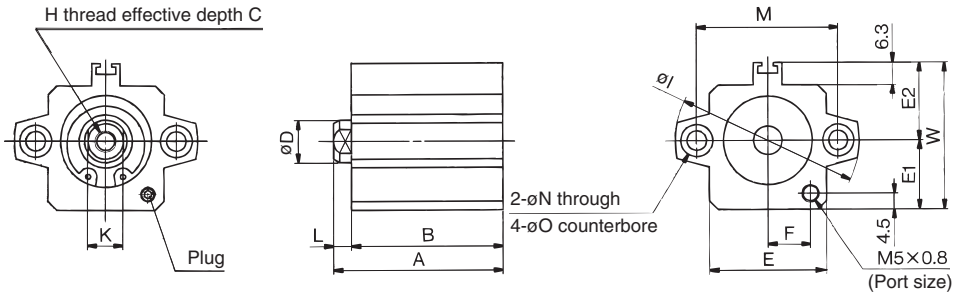
Auto Switch Mounting Height

(mm)

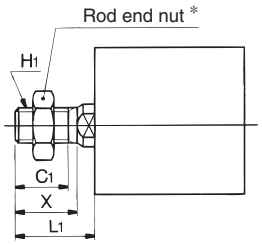
D-A7□ D-A80	D-A7□H/A80H D-F7□/J79/F7□W D-J79W/F7BAL D-F79F/F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAVL	D-J79C	D-A79W
U	U	U	U	U	U
19.5	20.5	26.5	23	26	22
22.5	23.5	29.5	26	29	25
24.5	25.5	31.5	28	31	27
27.5	28.5	34.5	31	34	30
31.5	32.5	38.5	35	38	34
35	36	42	38.5	41.5	37.5
41	42	48	44.5	47.5	43.5

Dimensions: ø12 to ø50/Spring Return without Auto Switch

ø12 to ø25



Rod end male thread



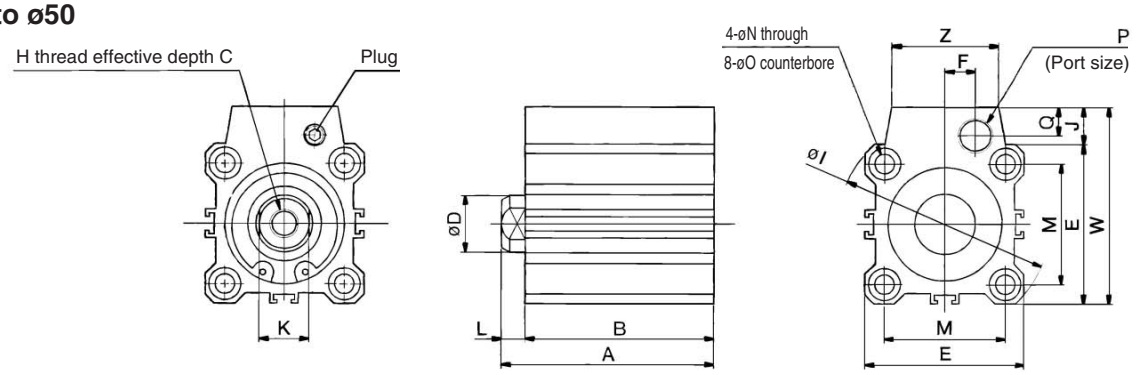
Rod End Male Thread

Bore size (mm)	C1	X	H1	L1
12	9	10.5	M5 x 0.8	14
16	10	12	M6 x 1.0	15.5
20	12	14	M8 x 1.25	18.5
25	15	17.5	M10 x 1.25	22.5

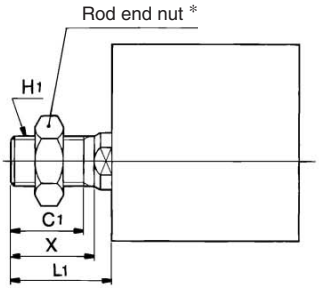
Basic Style

Bore size (mm)	A		B		C	D	E	E1	E2	F	H	I	K	L	M	N	O	W
	5 st	10 st	5 st	10 st														
12	25.5	30.5	22	27	6	6	23	13	14	7	M3 x 0.5	32	5	3.5	22	3.5	6.5 depth 3.5	27
16	27	32	23.5	28.5	8	8	26	15	17	8.5	M4 x 0.7	38	6	3.5	28	3.5	6.5 depth 3.5	32
20	29	34	24.5	29.5	7	10	30	17	19	10.5	M5 x 0.8	47	8	4.5	36	5.5	9 depth 7	36
25	32.5	37.5	27.5	32.5	12	12	33	19.5	22	12	M6 x 1.0	52	10	5	40	5.5	9 depth 7	41.5

ø32 to ø50



Rod end male thread



Rod End Male Thread

Bore size (mm)	C1	X	H1	L1
32	20.5	23.5	M14 x 1.5	28.5
40	20.5	23.5	M14 x 1.5	28.5
50	26	28.5	M18 x 1.5	33.5

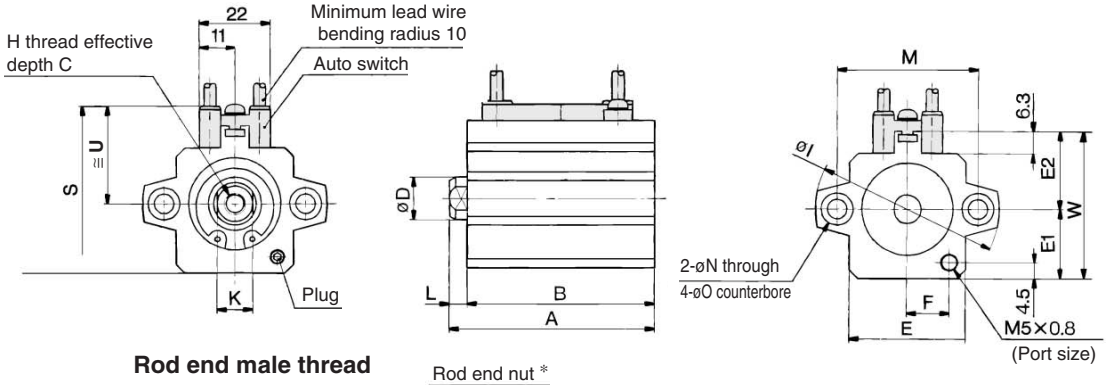
Basic Style

Bore size (mm)	A			B			C	D	E	F	H	I	J	K	L	M	N	O	P	Q	W	Z
	5 st	10 st	20 st	5 st	10 st	20 st																
32	35	40	—	28	33	—	13	16	45	8.5	M8 x 1.25	60	10.5	14	7	34	5.5	9 depth 7	Rc 1/8	8	55.5	30
40	41.5	46.5	—	34.5	39.5	—	13	16	52	8.5	M8 x 1.25	69	10	14	7	40	5.5	9 depth 7	Rc 1/8	8	62	30
50	—	48.5	58.5	—	40.5	50.5	15	20	64	11	M10 x 1.5	86	13	17	8	50	6.6	11 depth 8	Rc 1/4	10	77	39

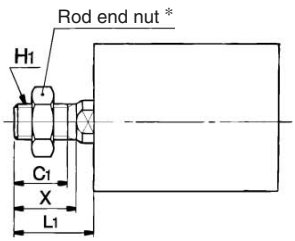
* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Dimensions: ø12 to ø50/Spring Return with Auto Switch

ø12 to ø25



Rod end male thread



Auto switch shown above is D-A73 and D-A80.
For auto switch mounting position and its mounting height, refer to page 7-6-103.

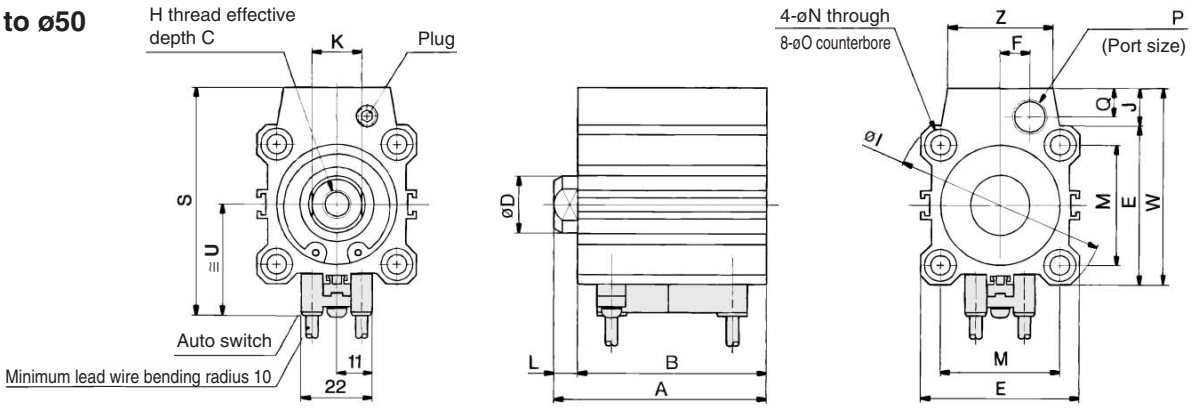
Rod End Male Thread

Bore size (mm)	C1	X	H1	L1
12	9	10.5	M5 x 0.8	14
16	10	12	M6 x 1.0	15.5
20	12	14	M8 x 1.25	18.5
25	15	17.5	M10 x 1.25	22.5

Basic Style

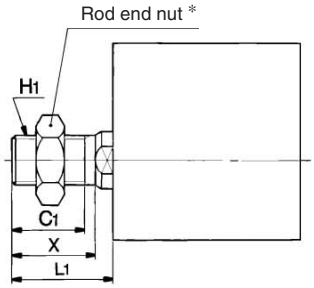
Bore size (mm)	A		B		C	D	E	E1	E2	F	H	I	K	L	M	N	O	S	U	W
	5 st	10 st	5 st	10 st																
12	36.5	41.5	33	38	6	6	23	13	14	7	M3 x 0.5	32	5	3.5	22	3.5	6.5 depth 3.5	32.5	19.5	27
16	39	44	35.5	40.5	8	8	26	15	17	8.5	M4 x 0.7	38	6	3.5	28	3.5	6.5 depth 3.5	37.5	22.5	32
20	41	46	36.5	41.5	7	10	30	17	19	10.5	M5 x 0.8	47	8	4.5	36	5.5	9 depth 7	41.5	24.5	36
25	42.5	47.5	37.5	42.5	12	12	33	19.5	22	12	M6 x 1.0	52	10	5	40	5.5	9 depth 7	47	27.5	41.5

ø32 to ø50



Auto switch shown above is D-A73 and D-A80.
For the auto switch mounting position and its mounting height, refer to page 7-6-103.

Rod end male thread



Rod End Male Thread

Bore size (mm)	C1	X	H1	L1
32	20.5	23.5	M14 x 1.5	28.5
40	20.5	23.5	M14 x 1.5	28.5
50	26	28.5	M18 x 1.5	33.5

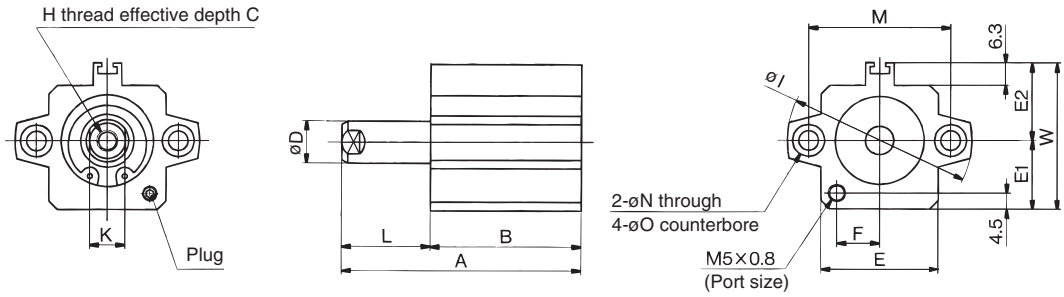
Basic Style

Bore size (mm)	A			B			C	D	E	F	H	I	J	K	L	M	N	O	P	Q	S	U	W	Z
	5 st	10 st	20 st	5 st	10 st	20 st																		
32	45	50	—	38	43	—	13	16	45	8.5	M8 x 1.25	60	10.5	14	7	34	5.5	9 depth 7	Rc 1/8	8	64.5	31.5	55.5	30
40	51.5	56.5	—	44.5	49.5	—	13	16	52	8.5	M8 x 1.25	69	10	14	7	40	5.5	9 depth 7	Rc 1/8	8	71	35	62	30
50	—	58.5	68.5	—	50.5	60.5	15	20	64	11	M10 x 1.5	86	13	17	8	50	6.6	11 depth 8	Rc 1/4	10	86	41	77	39

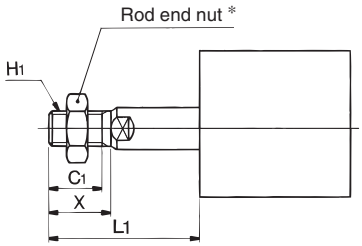
* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Dimensions: ø12 to ø50/Spring Extend without Auto Switch

ø12 to ø25



Rod end male thread



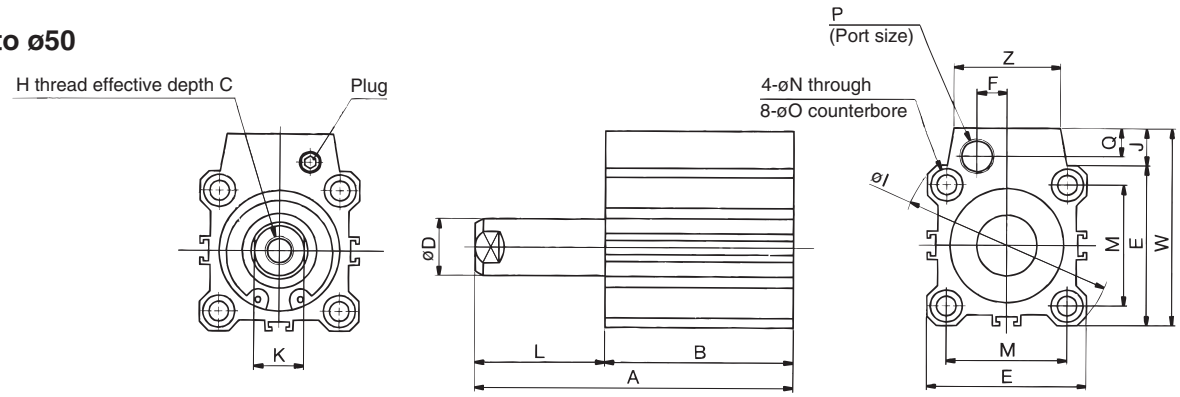
Rod End Male Thread

Bore size (mm)	C1	H1	L1		X
			5 st	10 st	
12	9	M5 x 0.8	19	24	10.5
16	10	M6 x 1.0	20.5	25.5	12
20	12	M8 x 1.25	23.5	28.5	14
25	15	M10 x 1.25	27.5	32.5	17.5

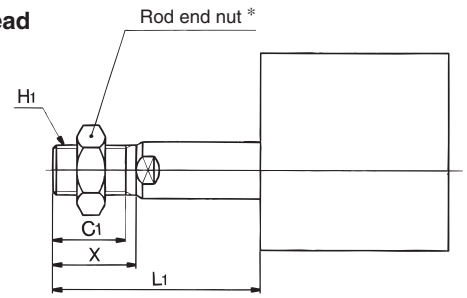
Basic Style

Bore size (mm)	A		B		C	D	E	E1	E2	F	H	I	K	L		M	N	O	W
	5 st	10 st	5 st	10 st										5 st	10 st				
12	30.5	40.5	22	27	6	6	23	13	14	7	M3 x 0.5	32	5	8.5	13.5	22	3.5	6.5 depth 3.5	27
16	32	42	23.5	28.5	8	8	26	15	17	8.5	M4 x 0.7	38	6	8.5	13.5	28	3.5	6.5 depth 3.5	32
20	34	44	24.5	29.5	7	10	30	17	19	10.5	M5 x 0.8	47	8	9.5	14.5	36	5.5	9 depth 7	36
25	37.5	47.5	27.5	32.5	12	12	33	19.5	22	12	M6 x 1.0	52	10	10	15	40	5.5	9 depth 7	41.5

ø32 to ø50



Rod end male thread



Rod End Male Thread

Bore size (mm)	C1	X	H1	L1		
				5 st	10 st	20 st
32	20.5	23.5	M14 x 1.5	33.5	38.5	—
40	20.5	23.5	M14 x 1.5	33.5	38.5	—
50	26	28.5	M18 x 1.5	—	43.5	53.5

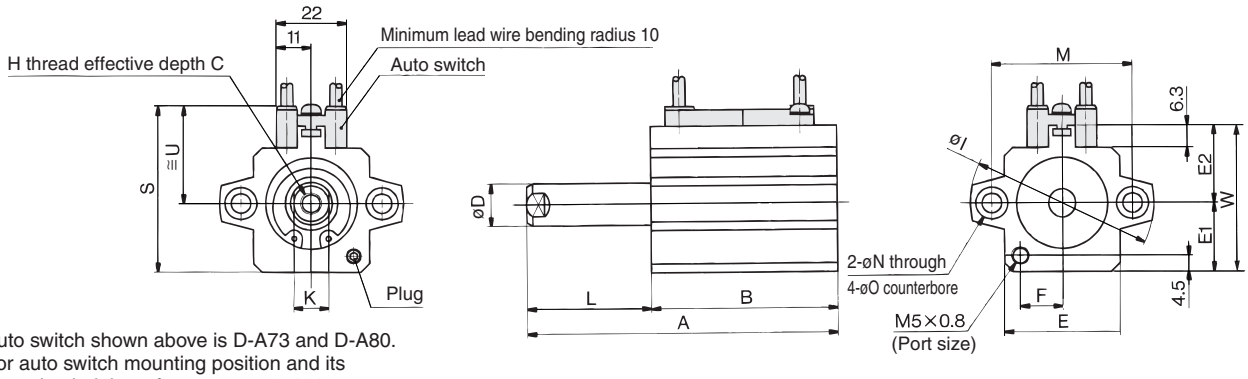
Basic Style

Bore size (mm)	A			B			C	D	E	F	H	I	J	K	L			M	N	O	P	Q	W	Z
	5 st	10 st	20 st	5 st	10 st	20 st									5 st	10 st	20 st							
32	40	50	—	28	33	—	13	16	45	8.5	M8 x 1.25	60	10.5	14	12	17	—	34	5.5	9 depth 7	Rc 1/8	8	55.5	30
40	46.5	56.5	—	34.5	39.5	—	13	16	52	8.5	M8 x 1.25	69	10	14	12	17	—	40	5.5	9 depth 7	Rc 1/8	8	62	30
50	—	58.5	78.5	—	40.5	50.5	15	20	64	11	M10 x 1.5	86	13	17	—	18	28	50	6.6	11 depth 8	Rc 1/4	10	77	39

* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

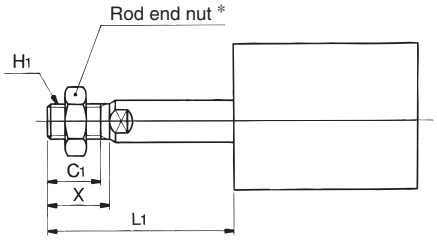
Dimensions: ø12 to ø50/Spring Extend with Auto Switch

ø12 to ø25



Auto switch shown above is D-A73 and D-A80.
For auto switch mounting position and its mounting height, refer to page 7-6-103.

Rod end male thread



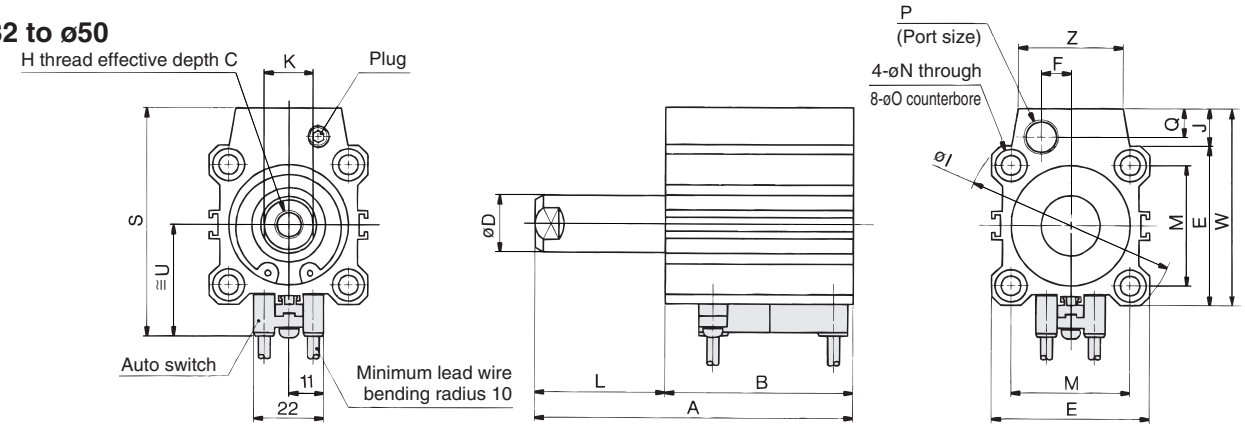
Rod End Male Thread

Bore size (mm)	C1	X	H1	L1	
				5 st	10 st
12	9	10.5	M5 x 0.8	19	24
16	10	12	M6 x 1.0	20.5	25.5
20	12	14	M8 x 1.25	23.5	28.5
25	15	17.5	M10 x 1.25	27.5	32.5

Basic Style

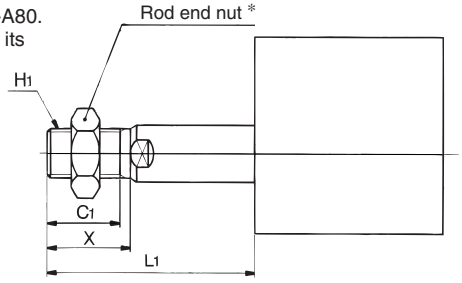
Bore size (mm)	A		B		C	D	E	E1	E2	F	H	I	K	L		M	N	O	S	U	W
	5 st	10 st	5 st	10 st										5 st	10 st						
12	45.9	55.9	37.4	42.4	6	6	23	13	14	7	M3 x 0.5	32	5	8.5	13.5	22	3.5	6.5 depth 3.5	32.5	19.5	27
16	44	54	35.5	40.5	8	8	26	15	17	8.5	M4 x 0.7	38	6	8.5	13.5	28	3.5	6.5 depth 3.5	37.5	22.5	32
20	46	56	36.5	41.5	7	10	30	17	19	10.5	M5 x 0.8	47	8	9.5	14.5	36	5.5	9 depth 7	41.5	24.5	36
25	47.5	57.5	37.5	42.5	12	12	33	19.5	22	12	M6 x 1.0	52	10	10	15	40	5.5	9 depth 7	47	27.5	41.5

ø32 to ø50



Auto switch shown above is D-A73 and D-A80.
For the auto switch mounting position and its mounting height, refer to page 7-6-103.

Rod end male thread



Rod End Male Thread

Bore size (mm)	C1	X	H1	L1		
				5 st	10 st	20 st
32	20.5	23.5	M14 x 1.5	33.5	38.5	—
40	20.5	23.5	M14 x 1.5	33.5	38.5	—
50	26	28.5	M18 x 1.5	—	43.5	53.5

Basic Style

Bore size (mm)	A			B			C	D	E	F	H	I	J	K	L			M	N	O	P	Q	S	U	W	Z
	5 st	10 st	20 st	5 st	10 st	20st									5 st	10 st	20 st									
32	50	60	—	38	43	—	13	16	45	8.5	M8 x 1.25	60	10.5	14	12	17	—	34	5.5	9 depth 7	Rc 1/8	8	64.5	31.5	55.5	30
40	56.5	66.5	—	44.5	49.5	—	13	16	52	8.5	M8 x 1.25	69	10	14	12	17	—	40	5.5	9 depth 7	Rc 1/8	8	71	35	62	30
50	—	68.5	88.5	—	50.5	60.5	15	20	64	11	M10 x 1.5	86	13	17	—	18	28	50	6.6	11 depth 8	Rc 1/4	10	86	41	77	39

* For details about the rod end nut and accessory brackets, refer to page 7-6-20.

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

Series CQ2

ø125, ø140, ø160, ø180, ø200

How to Order

Without auto switch

CQ2B | **125** | **30** | **DC** | |

With auto switch

CDQ2B | **125** | **30** | **DC** | | **Y7BW** | **S**

Built-in magnet

Mounting style

B	Through-hole/Both ends tapped common (Standard)

Bore size

125	125 mm
140	140 mm
160	160 mm
180	180 mm
200	200 mm

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 7-6-109.

Action

D	Double acting

Cushion

C	Rubber bumper

Body option

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

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled).

Number of auto switches

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

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

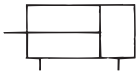
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Rail mounting ø125 to ø160 Perpendicular	Rail mounting ø125 to ø160 In-line	Direct mounting ø125 to ø200 Perpendicular	Direct mounting ø125 to ø200 In-line	Lead wire length (m) ∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	**A76H**	—	**Z76**	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200 V	**A72**	**A72H**	—	—	●	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	**A73**	**A73H**	—	**Z73**	●	●	●	—	—		
		Connector				12 V	—	**A73C**	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	**A79W**	—	—	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**F7NV**	**F79**	**Y69A**	**Y59A**	●	●	○	—	○	IC circuit	PLC
				3-wire (PNP)				**F7PV**	**F7P**	**Y7PV**	**Y7P**	●	●	○	—	○		
				2-wire		12 V		**F7BV**	**J79**	**Y69B**	**Y59B**	●	●	○	—	○	—	
		Connector						**J79C**	—	—	—	●	●	●	—	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		**F7NWV**	**F79W**	**Y7NWV**	**Y7NW**	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	**F7PW**	**Y7PWV**	**Y7PW**	●	●	○	—	○		
				2-wire		12 V		**F7BWV**	**J79W**	**Y7BWV**	**Y7BW**	●	●	○	—	○	—	
	Water resistant (2-color indication)							—	**F7BA**	—	**Y7BA**	—	●	○	—	○		
								F7BAV	—	—	—	—	●	○	—	—		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		—	**F79F**	—	—	●	●	○	—	○	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.

JIS Symbol
Double acting,
Single rod



Made to Order

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

1. For installation and removal, use an appropriate pair of pliers (tool for installing a type C snap ring).

2. 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 installment.

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	$^{+1.4}_{0}$				
Mounting	Through-hole/Both ends tapped (Common)				
Piston speed	50 to 500 mm/s			20 to 400 mm/s	

Minimum Operating Pressure

(MPa)

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

Allowable Kinetic Energy

(J)

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	Bore size	Stroke range	Bore size	Stroke range
	125 to 200	5 to 295	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

(mm)

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

Theoretical Output

(N)

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

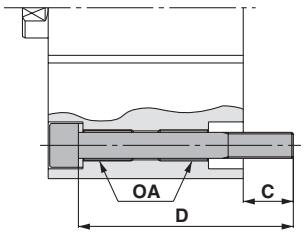
Mounting method: Mounting bolt for through-hole mounting style of CQ2B is available as an option.

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
C□Q2B125/140-10DC	22.9	100	M12 x 100ℓ
-20DC		110	x 110ℓ
-30DC		120	x 120ℓ
-40DC		130	x 130ℓ
-50DC		140	x 140ℓ
-75DC		165	x 165ℓ
-100DC		190	x 190ℓ
C□Q2B160-10DC	27.7	110	M14 x 110ℓ
-20DC		120	x 120ℓ
-30DC		130	x 130ℓ
-40DC		140	x 140ℓ
-50DC		150	x 150ℓ
-75DC		175	x 175ℓ
-100DC		200	x 200ℓ

Model	C	D	Mounting bolt
C□Q2B180-10DC	36	125	M18 x 125ℓ
-20DC		135	x 135ℓ
-30DC		145	x 145ℓ
-40DC		155	x 155ℓ
-50DC		165	x 165ℓ
-75DC		190	x 190ℓ
-100DC		215	x 215ℓ
C□Q2B200-10DC	39	135	M18 x 135ℓ
-20DC		145	x 145ℓ
-30DC		155	x 155ℓ
-40DC		165	x 165ℓ
-50DC		175	x 175ℓ
-75DC		200	x 200ℓ
-100DC		225	x 225ℓ

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
• Cylinder weight: CDQ2B125-30DC····6.06 kg
• Option weight: Rod end male thread·····0.47 kg
6.53 kg

Add the weight of auto switches and mounting brackets.

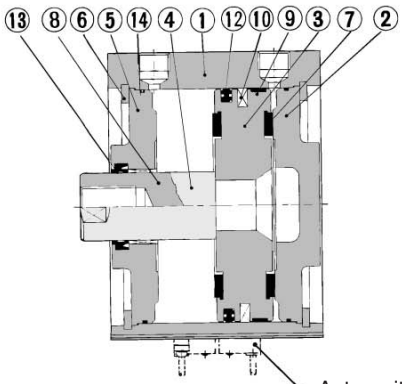
Auto Switch Mounting Bracket Weight

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

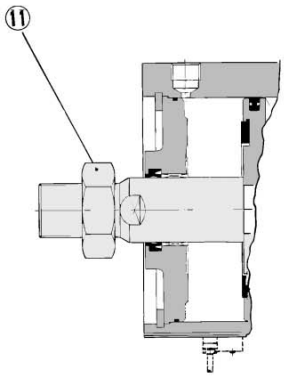
For auto switch weight, refer to page 7-9-1.

Construction

Double acting, Single rod



Rod end male thread



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	

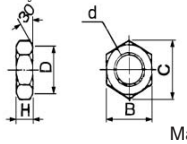
∗ Seal kit includes ⑫, ⑬, ⑭. Order the seal kit, based on each bore size.

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	• Switch mounting screw (M3 x 0.5 x 10ℓ) • Switch spacer • Switch mounting nut	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



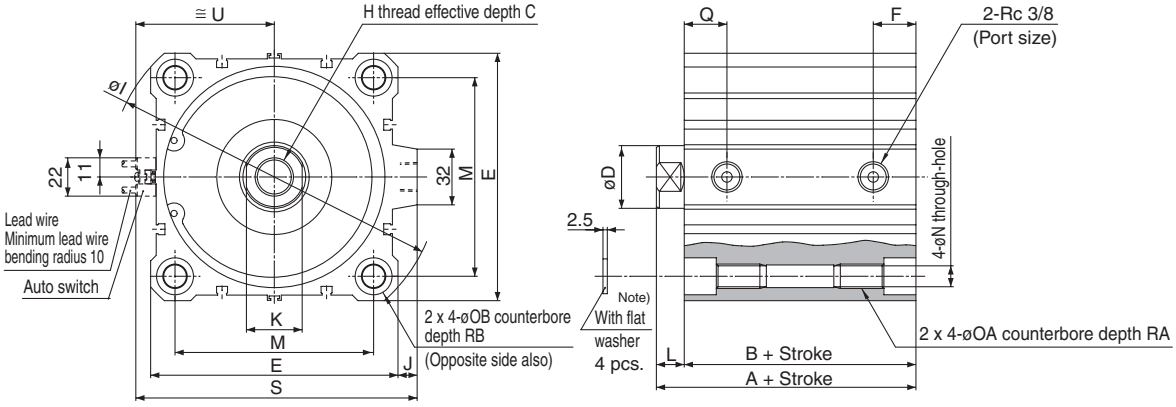
Material: Carbon steel

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

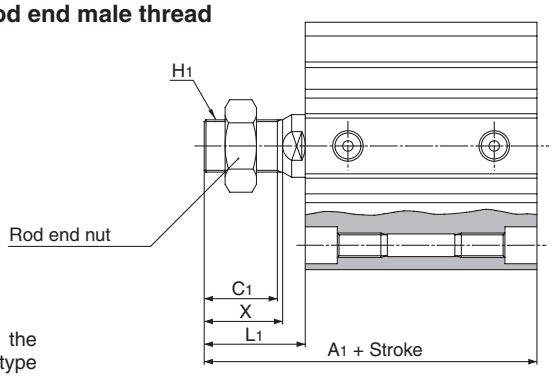
Dimensions: ø125, ø140, ø160

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.

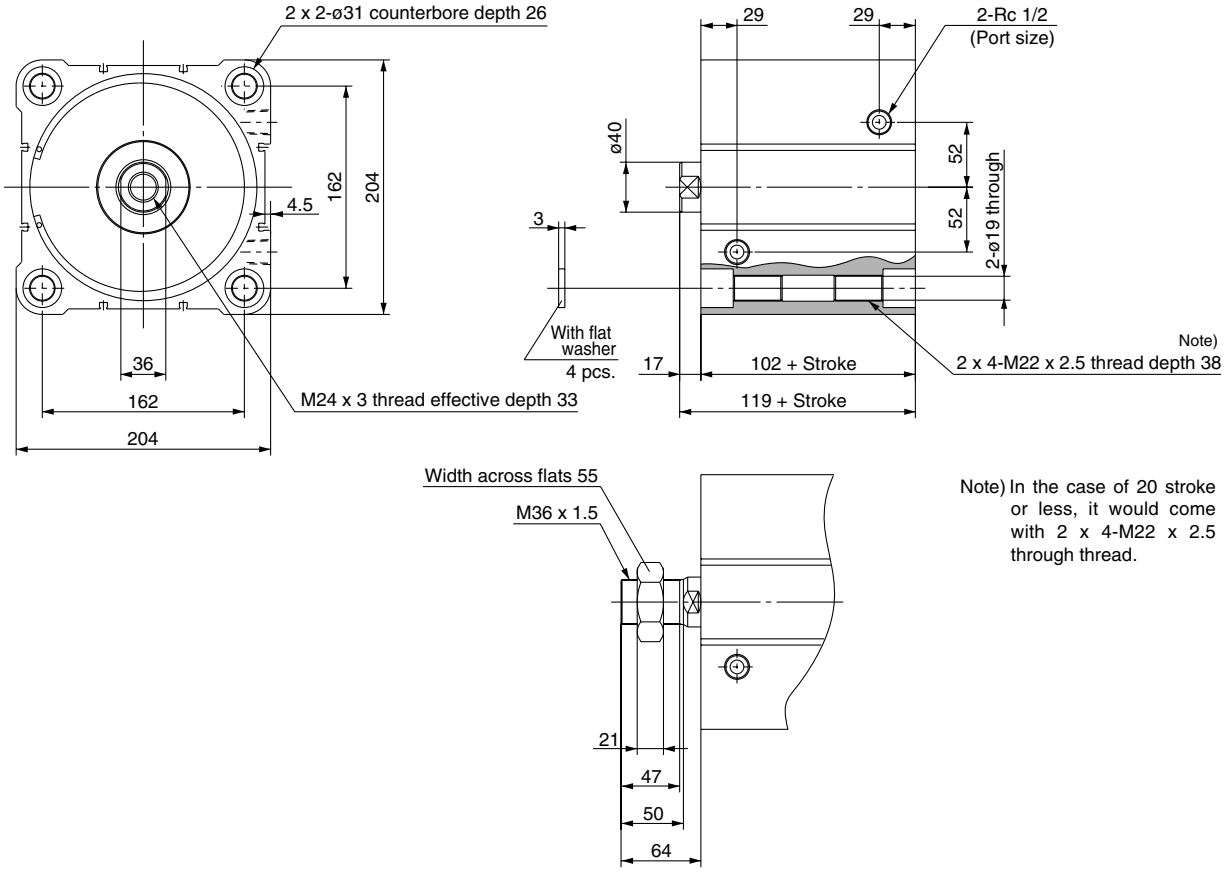
Bore size (mm)	Standard stroke range	A	B	C	D	E	F	H	I	J	K	L	M	N	OA	OB	Q	RA	RB	S	U
125	10, 20, 30, 40, 50	99	83	30	36	142	24.5	M22 x 2.5	190	11	32	16	114	12.5	M14 x 2	21.2	24.5	25	18.4	162	80
140	75, 100, 125, 150	99	83	30	36	158	24.5	M22 x 2.5	210	10	32	16	128	12.5	M14 x 2	21.2	24.5	25	18.4	177	88
160	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.

Dimensions: ø180, ø200

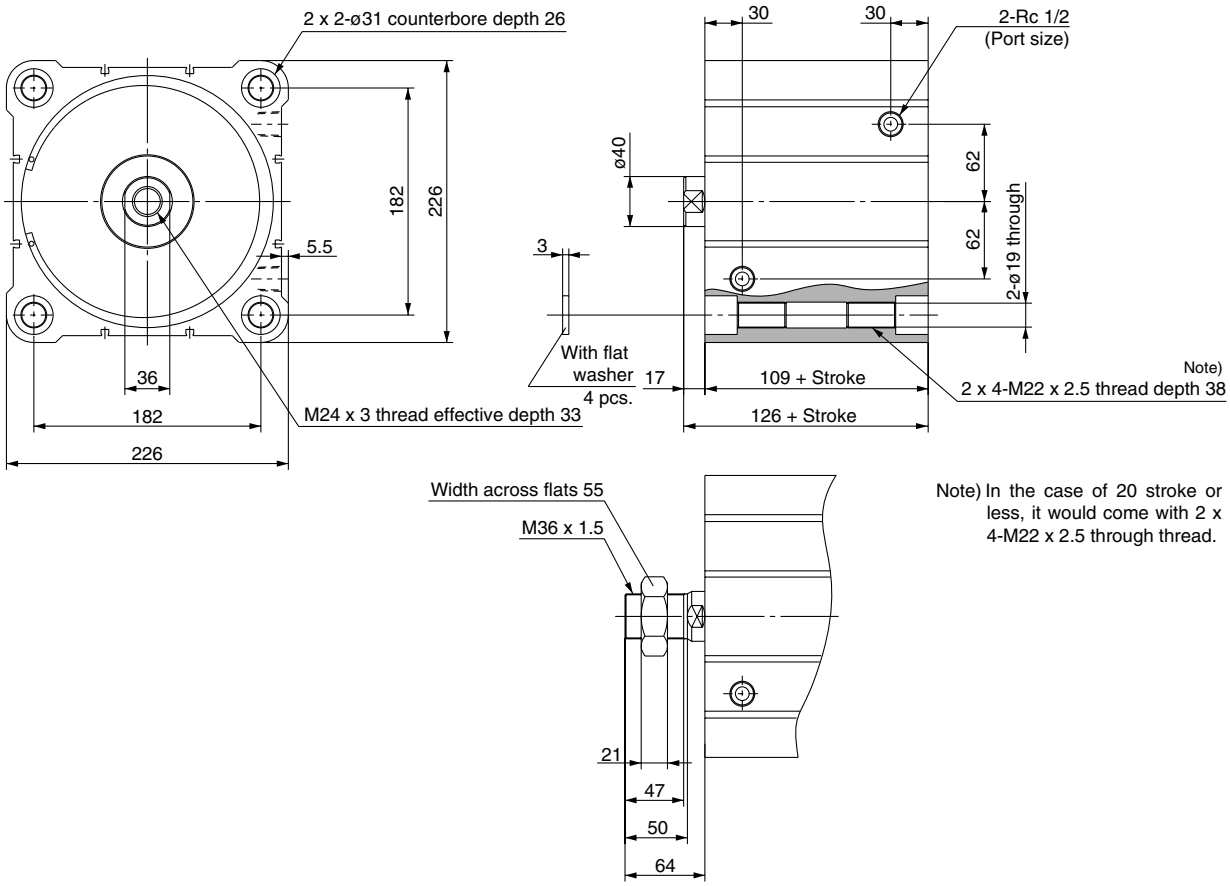
The dimensions are the same with or without an auto switch.

ø180



Note) In the case of 20 stroke or less, it would come with 2 x 4-M22 x 2.5 through thread.

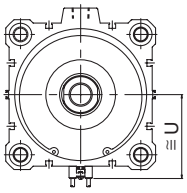
ø200



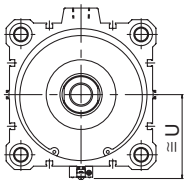
Note) In the case of 20 stroke or less, it would come with 2 x 4-M22 x 2.5 through thread.

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

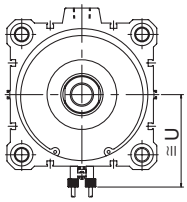
D-A7□
D-A80



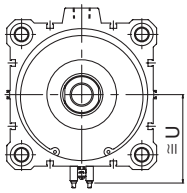
D-A7□H
D-A80H
D-F7□
D-J79
D-F7□W
D-J79W
D-F79F
D-F7NTL
D-F7BAL

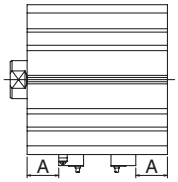


D-A73C
D-A80C
D-J79C

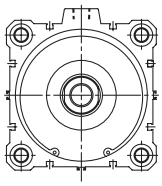


D-A79W
D-F7□WV
D-F7□V
D-F7BAVL

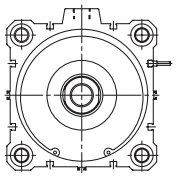




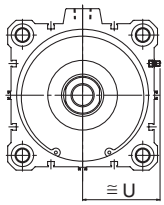
D-Z7□/Z80
D-Y59□/Y7P
D-Y7□W



D-Y69□/Y7PV
D-Y7□WV



D-Y7BAL



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-F7NTL	D-Z7□/Z80 D-Y59□/Y69□ D-F7P/Y7PV D-Y7□W/Y7□WV D-Y7BAL
	A	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-F7NTL	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

Compact Cylinder: Large Bore Size Type
Double Acting, Double Rod
Series CQ2W
ø125, ø140, ø160, ø180, ø200

How to Order

Without auto switch CQ2WB 125 – 30 DC

With auto switch CDQ2WB 125 – 30 DC – Y7BW S

Built-in magnet

Double rod

Mounting style

B	Through-hole/Both ends tapped common (Standard)

Bore size

125	125 mm
140	140 mm
160	160 mm
180	180 mm
200	200 mm

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 7-6-116.

Action

D	Double acting

Cushion

C	Rubber bumper

Body option

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

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled).

Number of auto switches

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

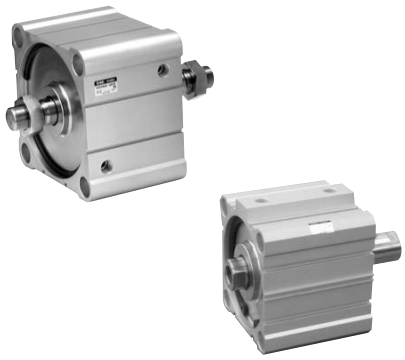
Applicable Auto Switch/Refer to page 7-9-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Rail mounting ø125 to ø160 Perpendicular	Rail mounting ø125 to ø160 In-line	Direct mounting ø125 to ø200 Perpendicular	Direct mounting ø125 to ø200 In-line	Lead wire length (m) ∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	A76H	—	Z76	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200 V	A72	A72H	—	—	●	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	A73	A73H	—	Z73	●	●	●	—	—		
		Connector				12 V	—	A73C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	A79W	—	—	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NV	F79	Y69A	Y59A	●	●	○	—	○	IC circuit	PLC
				3-wire (PNP)				F7PV	F7P	Y7PV	Y7P	●	●	○	—	○		
				2-wire		12 V		F7BV	J79	Y69B	Y59B	●	●	○	—	○	—	
		Connector						J79C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		F7NWV	F79W	Y7NWV	Y7NW	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	F7PW	Y7PWV	Y7PW	●	●	○	—	○		
				2-wire		12 V		F7BWV	J79W	Y7BWV	Y7BW	●	●	○	—	○	—	
	Water resistant (2-color indication)							—	F7BA	—	Y7BA	—	●	○	—	○		
								F7BAV	—	—	—	—	●	○	—	—		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		—	F79F	—	—	●	●	○	—	○	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

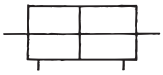
∗ Solid state switches marked with "○" are produced upon receipt of order.

• 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.



JIS Symbol

Double acting,
Double rod



⚠ 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

1. For installation and removal, use an appropriate pair of pliers (tool for installing a type C snap ring).
2. 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 installment.

Mounting

1. When removing a load, be sure to secure the wrench flats of the piston rod on the load side.
2. If this is done without securing the piston rod on the load side, be aware that the coupled (screwed-in) portion of the piston rod could become loosened.

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	$^{+1.4}_{0}$				
Mounting	Through-hole/Both ends tapped (Common)				
Piston speed	50 to 500 mm/s			20 to 400 mm/s	

Minimum Operating Pressure

(MPa)

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

Allowable Kinetic Energy

(J)

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 7-6-115.		Suffix "-XB10" to the end of standard model no. on page 7-6-115.	
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	Bore size	Stroke range	Bore size	Stroke range
	125 to 200	5 to 295	125 to 160	11 to 299
Example	Part no.: CQ2WB160-165DC CQ2WB160-175DC with 10 mm width spacer. B dimension is 266 mm.		Part no.: CQ2WB160-165DC-XB10 Makes 165 stroke tube. B dimension is 256 mm.	

Minimum Stroke for Auto Switch Mounting

(mm)

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

Theoretical Output

(N)

Bore size (mm)	Operating pressure (MPa)		
	0.3	0.5	0.7
125	3376	5627	7878
140	4313	7188	10063
160	5655	9425	13195
180	7257	12095	16933
200	9048	15080	21112

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
-X235	Change of piston rod end for double rod type cylinder
-X271	Fluoro rubber for seals
-X633	Intermediate stroke of double rod type

∗ -X633 intermediate stroke with 5 mm intervals only

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	5.71	6.02	6.34	6.68	7.02	7.87	8.71	9.56	10.41	11.26	12.11	13.81	15.50
140	6.73	7.07	7.43	7.80	8.18	9.13	10.07	11.01	11.96	12.90	13.84	15.73	17.62
160	9.26	9.69	10.12	10.58	11.04	12.18	13.33	14.47	15.62	16.76	17.91	20.20	22.49
180	12.18	12.70	13.23	13.75	14.28	15.59	16.90	18.21	19.52	20.83	22.14	24.76	27.39
200	15.63	16.22	16.80	17.39	17.97	19.44	20.91	22.37	22.84	25.30	26.77	29.70	32.63

Built-in Magnet

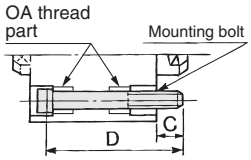
(kg)

Bore size (mm)	Cylinder stroke (mm)												
	10	20	30	40	50	75	100	125	150	175	200	250	300
125	5.77	6.08	6.40	6.74	7.08	7.93	8.77	9.62	10.47	11.32	12.17	13.87	15.56
140	6.80	7.14	7.50	7.87	8.25	9.20	10.14	11.08	12.03	12.97	13.91	15.80	17.69
160	9.34	9.77	10.20	10.66	11.12	12.26	13.41	14.55	15.70	16.84	17.99	20.28	22.57
180	12.26	12.78	13.31	13.83	14.36	15.67	16.98	18.29	19.60	20.91	22.22	24.84	27.47
200	15.71	16.30	16.88	17.47	18.05	19.52	20.99	22.45	22.92	25.38	26.85	29.78	32.71

Mounting Bolt for CQ2

Mounting method: Mounting bolt for through-hole mounting style of CQ2WB 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
C□Q2WB125/140-10DC	22.9	100	M12 x 100ℓ
-20DC		110	x 110ℓ
-30DC		120	x 120ℓ
-40DC		130	x 130ℓ
-50DC		140	x 140ℓ
-75DC		165	x 165ℓ
-100DC		190	x 190ℓ
C□Q2WB160-10DC	27.7	110	M14 x 110ℓ
-20DC		120	x 120ℓ
-30DC		130	x 130ℓ
-40DC		140	x 140ℓ
-50DC		150	x 150ℓ
-75DC		175	x 175ℓ
-100DC		200	x 200ℓ

Model	C	D	Mounting bolt
C□Q2WB180-10DC	36	125	M18 x 125ℓ
-20DC		135	x 135ℓ
-30DC		145	x 145ℓ
-40DC		155	x 155ℓ
-50DC		165	x 165ℓ
-75DC		190	x 190ℓ
-100DC		215	x 215ℓ
C□Q2WB200-10DC	39	135	M18 x 135ℓ
-20DC		145	x 145ℓ
-30DC		155	x 155ℓ
-40DC		165	x 165ℓ
-50DC		175	x 175ℓ
-75DC		200	x 200ℓ
-100DC		225	x 225ℓ

Additional Weight

(kg)

Bore size (mm)		125	140	160, 180, 200
Rod end male thread	Male thread	0.62	0.62	0.96
	Nut	0.32	0.32	0.52

Calculation: (Example) CDQ2WB125-30DCM
• Cylinder weight: CDQ2WB125-30DC····6.40 kg
• Option weight: Rod end male thread·····0.94 kg
7.34 kg

Add the weight of auto switches and mounting brackets.

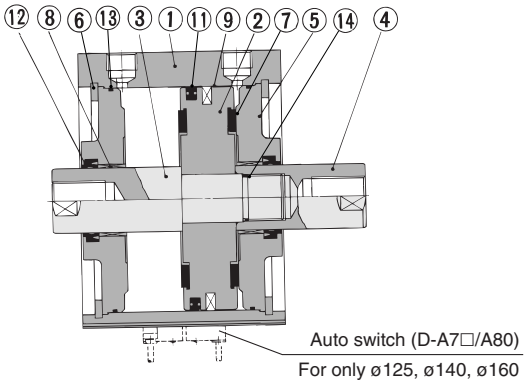
Auto Switch Mounting Bracket Weight

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

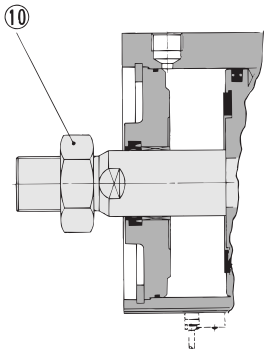
For auto switch weight, refer to page 7-9-1.

Construction

Double acting, Double rod



Rod end male thread



Component Parts

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

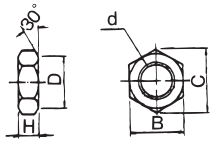
Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
125	CQ2WB125-PS	Set of left nos. ⑪, ⑫, ⑬
140	CQ2WB140-PS	
160	CQ2WB160-PS	
180	CQ2WB180-PS	
200	CQ2WB200-PS	

∗ Seal kit includes ⑪, ⑫, ⑬. Order the seal kit, based on each bore size.

Auto switch mounting bracket: Part number and the proper auto switch mounting position and its mounting height are common as CQ2 series, large bore, double acting, single rod. For details, refer to page 7-6-111 and 114.

Rod End Nut



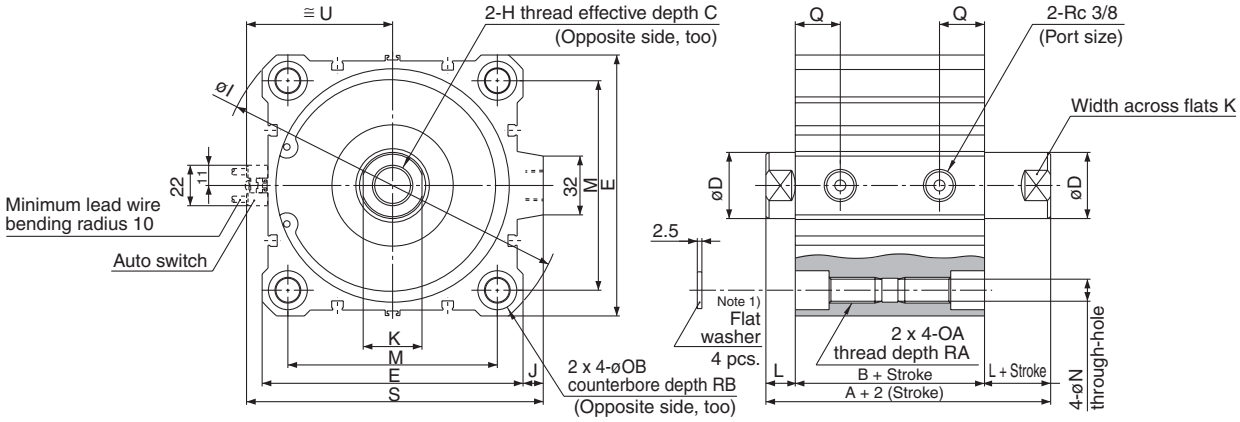
Material: Carbon steel

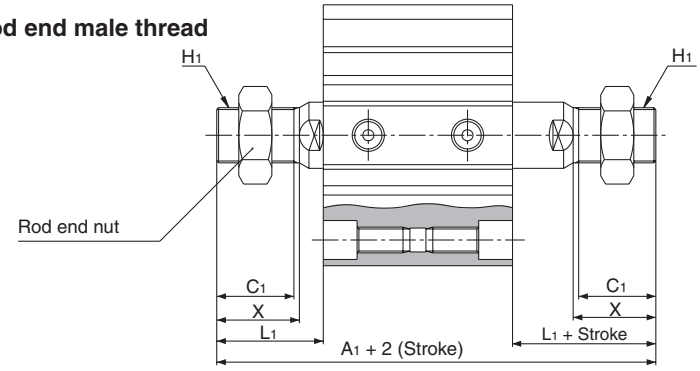
Part no.	Applicable bore size (mm)	d	H	B	C	D
NT-12	125, 140	M30 x 1.5	18	46	53.1	44
NT-16	160, 180, 200	M36 x 1.5	21	55	63.5	53

Dimensions: ø125, ø140, ø160

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

Basic style (Through-hole): C□Q2WB





Rod End Male Thread

Bore size (mm)	A1	C1	H1	L1	X
125	199	42	M30 x 1.5	58	45
140	199	42	M30 x 1.5	58	45
160	219	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.

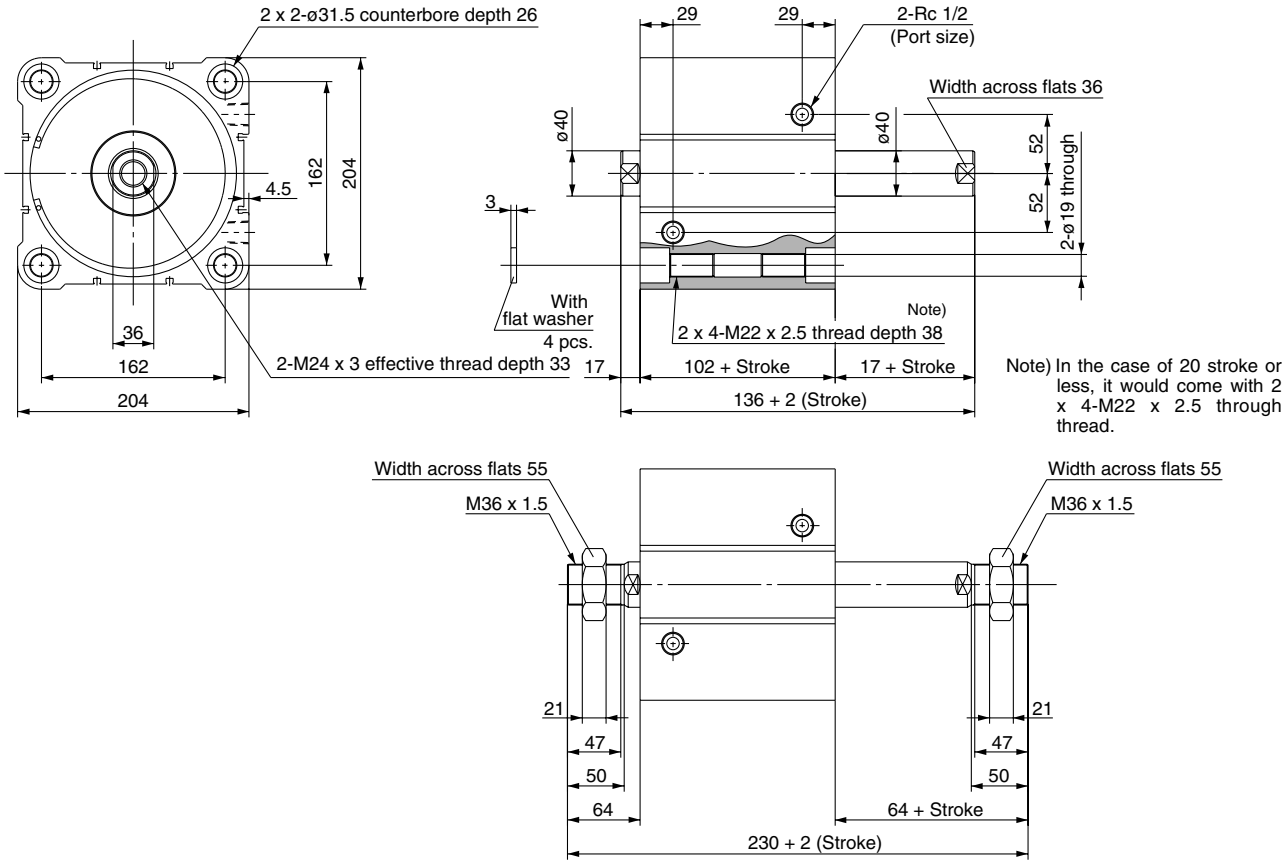
Bore size (mm)	Standard stroke range	A	B	C(2)	D	E	H	I	J	K	L	M	N	OA	OB	Q	RA	RB	S	U
125	10, 20, 30, 40, 50 75, 100, 125, 150 175, 200, 250, 300	115	83	30 (22.5)	36	142	M22 x 2.5	190	11	32	16	114	12.5	M14 x 2	21.2	24.5	25	18.4	162	80
140		115	83	30 (22.5)	36	158	M22 x 2.5	210	10	32	16	128	12.5	M14 x 2	21.2	24.5	25	18.4	177	88
160		125	91	33 (26.5)	40	178	M24 x 3	238	10	36	17	144	14.5	M16 x 2	24.2	27.5	28	21.2	197	98

Note 1) Be sure to use the attached plain washer for mounting, cylinder with through-holes.
Note 2) ( ) denotes the values of effective length in one side, only for the 10 stroke type.

Dimensions: ø180, ø200

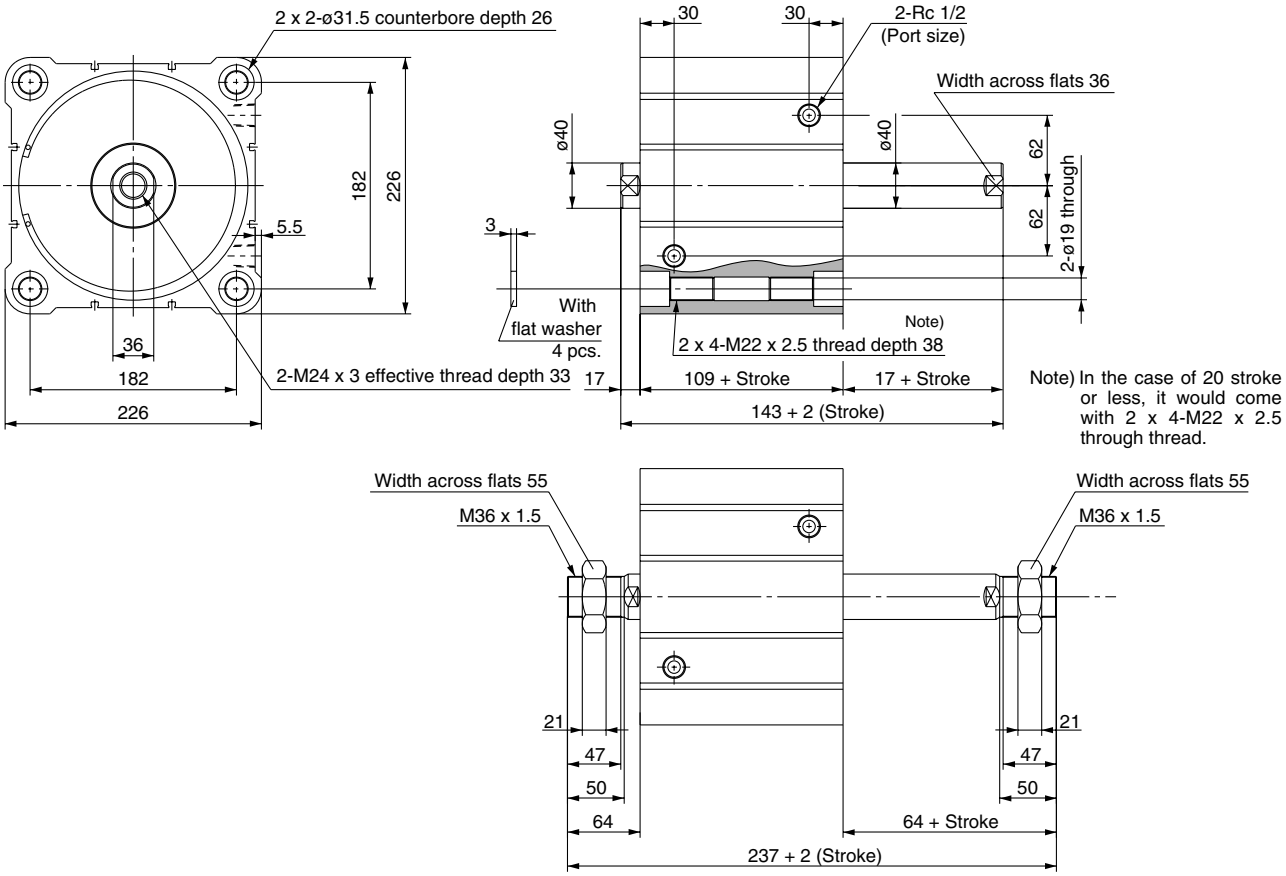
The dimensions are the same with or without an auto switch.

ø180



Note) In the case of 20 stroke or less, it would come with 2 x 4-M22 x 2.5 through thread.

ø200



Note) In the case of 20 stroke or less, it would come with 2 x 4-M22 x 2.5 through thread.

Compact Cylinder: Long Stroke Type
Double Acting, Single Rod
Series CQ2
ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Without auto switch CQ2 [A] [32] — [ ] — [200] [DC] [ ]

With auto switch CDQ2 [A] [32] — [ ] — [200] [DC] [ ] — [F9BW] [S]

Built-in magnet

Mounting style

A	Both ends tapped style
L	Foot style
F	Rod side flange style
G	Head side flange style
D	Double clevis style

∗ Mounting brackets are shipped together, (not assembled).

Bore size

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

Piping

Nil	Screw-in piping
F	Built-in One-touch fittings Note)

Note) Bore sizes available w/ One-touch fittings are ø32 to ø63.

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 7-6-122.

Action

D	Double acting

Cushion

C	Rubber bumper

Body option

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

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled). (Except D-P5DWL)

Number of auto switches

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

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 DC	Load voltage DC	Load voltage AC	Rail mounting Perpendicular	Rail mounting In-line	Direct mounting Perpendicular	Direct mounting In-line	Lead wire length (m) ∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	A76H	A96V	A96	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200 V	A72	A72H	—	—	●	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	A73	A73H	—	—	●	●	●	—	—		
								—	—	A93V	A93	●	●	—	—	—		
		Connector				12 V	—	A73C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	A79W	—	—	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NV	F79	M9NV	M9N	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				F7PV	F7P	M9PV	M9P	●	●	○	—	○		
				2-wire		12 V		F7BV	J79	M9BV	M9B	●	●	○	—	○	—	
		Connector						J79C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		F7NWV	F79W	F9NWV	F9NW	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	F7PW	F9PWV	F9PW	●	●	○	—	○		
				2-wire		12 V		F7BWV	J79W	F9BWV	F9BW	●	●	○	—	○	—	
	Water resistant (2-color indication)							—	F7BA	—	F9BA	—	●	○	—	○		
								F7BAV	—	—	—	—	●	○	—	—		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		—	F79F	—	—	●	●	○	—	○	IC circuit	
	Magnetic field resistant (2-color indication)			2-wire		—		—	P5DW	—	—	—	●	●	—	○	—	

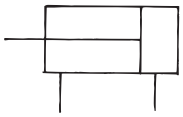
∗ Lead wire length symbols: 0.5 m·····Nil (Example) A73C
3 m·····L (Example) A73CL
5 m·····Z (Example) A73CZ
None·····N (Example) A73CN

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

• D-P5DWL type is available from ø40 up to ø100 only.
• There are other applicable auto switches other than the listed above. For details, refer to page 7-6-23.
• For details about auto switches with pre-wire connector, refer to page 7-9-36.

JIS Symbol

Double acting,
Single rod



Made to Order

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

Symbol	Specifications
-XB10	Intermediate stroke (Using exclusive body)
-XC4	With heavy duty scraper
-XC6	Piston rod and rod end nut made of stainless steel
-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

1. For installation and removal, use an appropriate pair of pliers (tool for installing a type C snap ring).
2. 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 installment.

Type

Bore size (mm)			32	40	50	63	80	100
Pneumatic	Built-in magnet		●	●	●	●	●	●
	Piping	Screw-in type type	Rc 1/8	Rc 1/8	Rc 1/4	Rc 1/4	Rc 3/8	Rc 3/8
		Built-in One-touch fittings	ø6/4	ø6/4	ø8/6	ø8/6	—	—
	Rod end male thread		●	●	●	●	●	●

Specifications

Type	Pneumatic (Non-lube)
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)
Cushion	Rubber bumper (Standard equipment)
Rod end thread	Female thread
Rod end thread tolerance	JIS Class 2
Stroke length tolerance	$^{+1.4}_{0}$
Mounting	Both ends tapped style
Piston speed	50 to 500 mm/s

Minimum Operating Pressure

(MPa)

Bore size (mm)	32	40	50	63	80	100
Minimum operating pressure	0.05					

Allowable Kinetic Energy

(J)

Bore size (mm)	12	16	20	25	32	40	50	63	80	100
Allowable kinetic energy	0.043	0.075	0.11	0.18	0.29	0.52	0.91	1.54	2.71	4.54

Standard Stroke

Bore size (mm)	Standard stroke
32, 40, 50, 63, 80, 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 7-6-121.		Suffix "-XB10" to the end of standard model no. on page 7-6-121.	
Description	Dealing with the stroke by the 1 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	Bore size	Stroke range	Bore size	Stroke range
	32 to 200	101 to 299	32 to 160	101 to 299
Example	Part no.: CQ2A50-166DC CQ2A50-175DC with 9 mm width spacer. B dimension is 230.5 mm.		Part no.: CQ2B50-166DC-XB10 Makes 166 stroke tube. B dimension is 221.5 mm.	

Copper-free (For CRT manufacturing process)

20 — CQ2A | Bore size | — | Stroke | DC(M)

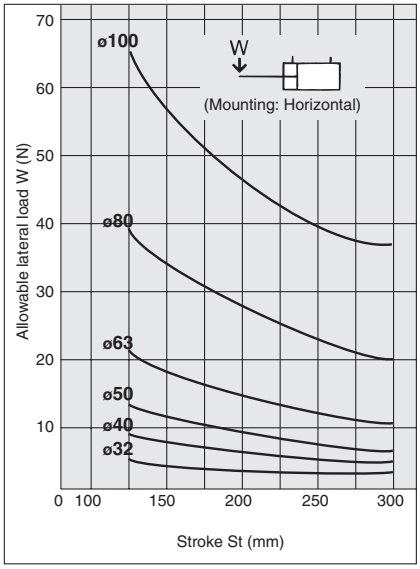
- 20: Copper-free
- Bore size: ø32, ø40, ø50, ø63, ø80, ø100
- Stroke

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)	32, 40, 50, 63, 80, 100
Proof pressure	1.5 MPa
Max. operating pressure	1.0 MPa
Rubber bumper	With (Standard equipment)
Piping	Screw-in piping
Piston speed	50 to 500 mm/S
Mounting	Both ends tapped style
Auto switch	Mountable

Allowable Lateral Load at Rod End



Mounting Bracket Part No.

Bore size (mm)	Foot (2)	Flange	Double clevis
32	CQ-L032	CQ-F032	CQ-D032
40	CQ-L040	CQ-F040	CQ-D040
50	CQ-L050	CQ-F050	CQ-D050
63	CQ-L063	CQ-F063	CQ-D063
80	CQ-L080	CQ-F080	CQ-D080
100	CQ-L100	CQ-F100	CQ-D100

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

Note 3) Parts belonging to each bracket are as follows.
Foot or Flange style: Body mounting bolt, Double clevis/Clevis pin, Body mounting bolt, C shape snap ring for axis.

Theoretical Output

(N)

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

(g)

Bore size (mm)	Cylinder stroke (mm) 125	150	175	200	250	300
32	754	859	965	1070	1279	1490
40	945	1063	1180	1298	1535	1770
50	1469	1650	1832	2007	2376	2739
63	1810	2018	2227	2438	2851	3268
80	3120	3456	3793	4127	4801	5474
100	4956	5374	5790	6020	7042	7875

Built-in Magnet

(g)

Bore size (mm)	Cylinder stroke (mm) 125	150	175	200	250	300
32	763	868	974	1079	1288	1499
40	959	1077	1194	1312	1549	1784
50	1484	1665	1847	2022	2391	2754
63	1834	2042	2251	2462	2875	3292
80	3144	3480	3817	4151	4825	5498
100	4994	5412	5828	6058	7080	7913

Additional Weight

(g)

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 style (Including mounting bolt)		147	159	253	356	685	1123
Rod side flange style (Including mounting bolt)		165	198	348	534	1017	1309
Head side flange style (Including mounting bolt)		165	198	348	534	1017	1309
Double clevis style (Including pin, snap ring, bolt)		151	196	393	554	1109	1887

Calculation: (Example) CQ2D32-200DCM
- Cylinder weight: CQ2A32-200DC····· 1070 g
- Option weight: Rod end male thread····· 43 g
  Double clevis style····· 151 g

1264 g

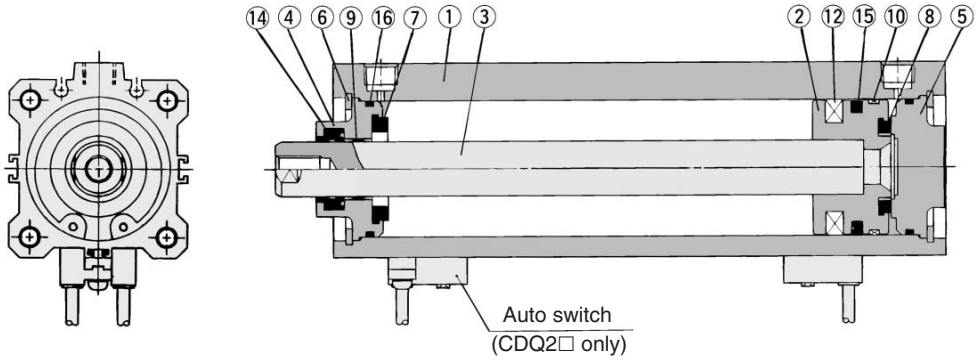
Add the weight of auto switches and mounting brackets when auto switches are mounted.

Auto Switch Mounting Bracket Weight

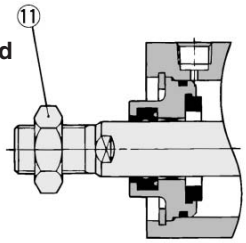
Mounting bracket part no.	Applicable bore size(mm)	Weight (g)
BQ-2	32 to 100	1.5

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

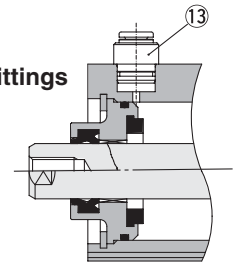
Construction



Rod end male thread



Built-in One-touch fittings



Component Parts

No.	Description	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②	Piston	Aluminum alloy	Chromated
③	Piston rod	Carbon steel	Hard chrome plated
④	Collar	Aluminum alloy	Anodized
⑤	Bottom plate	Aluminum alloy	Anodized
⑥	Snap ring	Carbon tool steel	Phosphate coated
⑦	Bumper A	Urethane	
⑧	Bumper B	Urethane	
⑨	Bushing	Phosphor bronze alloy	
⑩	Wear ring	Resin	
⑪	Rod end nut	Carbon steel	Nickel plated
⑫	Magnet	—	For only CDQ2□A
⑬	One-touch fitting	—	ø32 to ø63
⑭*	Rod seal	NBR	
⑮*	Piston seal	NBR	
⑯*	Tube gasket	NBR	

Replacement Parts: Seal Kit

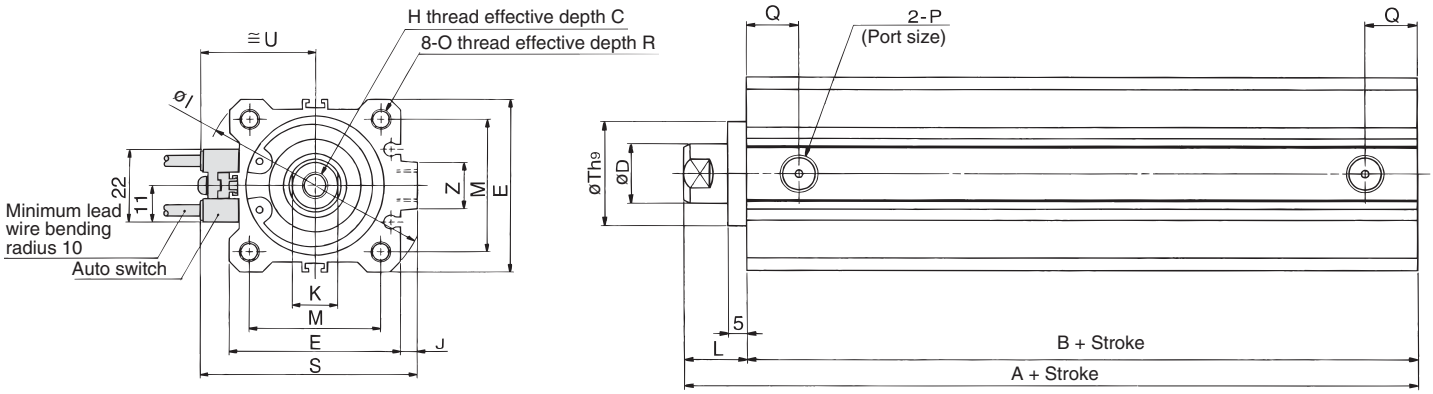
Bore size (mm)	Kit no.	Contents
32	CQ2A32-L-PS	Set of left nos. ⑭, ⑮, ⑯
40	CQ2A40-L-PS	
50	CQ2A50-L-PS	
63	CQ2A63-L-PS	
80	CQ2A80-L-PS	
100	CQ2A100-L-PS	

* Seal kit includes ⑭, ⑮, ⑯. Order the seal kit, based on each bore size.

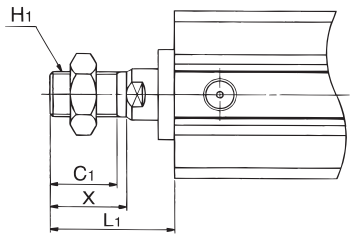
Dimensions: ø32 to ø50

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

Both ends tapped style: C□Q2A



Rod end male thread



Rod End Male Thread

Bore size (mm)	C1	H1	L1	X
32	20.5	M14 x 1.5	38.5	23.5
40	20.5	M14 x 1.5	38.5	23.5
50	26	M18 x 1.5	43.5	28.5

Auto switch shown above is D-A73 and D-A80.
For the auto switch mounting position and its mounting height, refer to page 7-6-130.

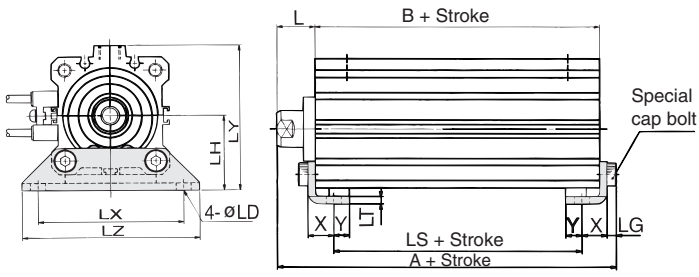
Dimensions of built-in One-touch fitting are equivalent to Series CQ2, double acting, single rod. Refer to page 7-6-16.

Both Ends Tapped Style

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	H	I	J	K	L	M	O	P	Q	R	S	Th9	U	Z
32	(1) 125 to 200 250, 300	62.5	45.5	13	16	45	M8 x 1.25	60	4.5	14	17	34	M6 x 1.0	Rc 1/8	12.5	10	58.5	22 $^{0}_{-0.052}$	31.5	14
40		72	55	13	16	52	M8 x 1.25	69	5	14	17	40	M6 x 1.0	Rc 1/8	14	10	66	28 $^{0}_{-0.052}$	35	14
50		73.5	55.5	15	20	64	M10 x 1.5	86	7	17	18	50	M8 x 1.25	Rc 1/4	14	14	80	35 $^{0}_{-0.062}$	41	19

Note 1) For 125 to 200 stroke, strokes are by the 25 mm interval.
Note 2) For calculation on the longitudinal dimension of the intermediate strokes, refer to page 7-6-122.

Foot style: C□Q2L



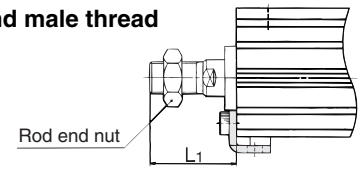
Foot Style

Bore size (mm)	A	B	L	L1	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

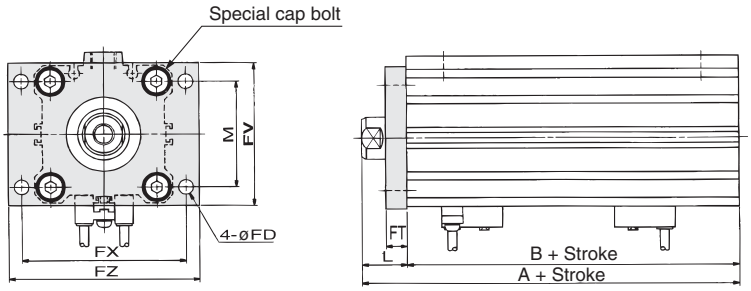
Foot bracket material: Carbon steel

∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Rod end male thread



Rod side flange style: C□Q2F

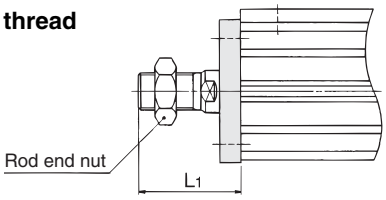


Rod Side Flange Style

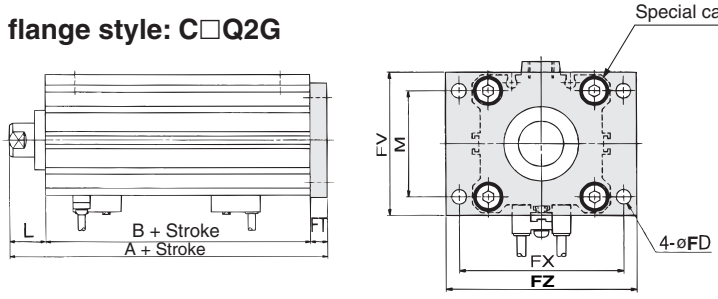
Bore size (mm)	A	B	FD	FT	FV	FX	FZ	L	L1	M
32	62.5	45.5	5.5	8	48	56	65	17	38.5	34
40	72	55	5.5	8	54	62	72	17	38.5	40
50	73.5	55.5	6.6	9	67	76	89	18	43.5	50

Flange bracket material: Carbon steel

Rod end male thread



Head side side flange style: C□Q2G



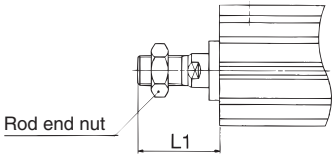
Head Side Flange Style

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

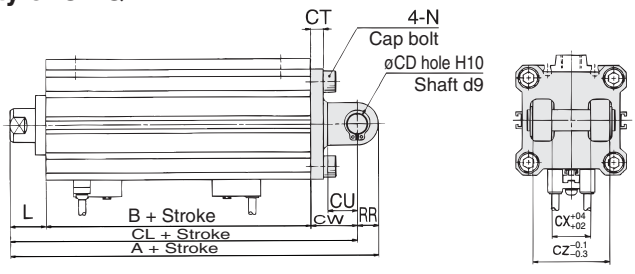
Flange bracket material: Carbon steel

∗ Dimensions except A are the same as rod side flange style.

Rod end male thread



Double clevis style: C□Q2D



Double Clevis Style

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

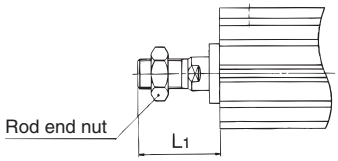
Bore size (mm)	L	L1	N	RR
32	17	38.5	M6 x 1.0	10
40	17	38.5	M6 x 1.0	10
50	18	43.5	M8 x 1.25	14

Double clevis bracket material: Cast iron

∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

∗∗ Clevis pin and snap ring are shipped together.

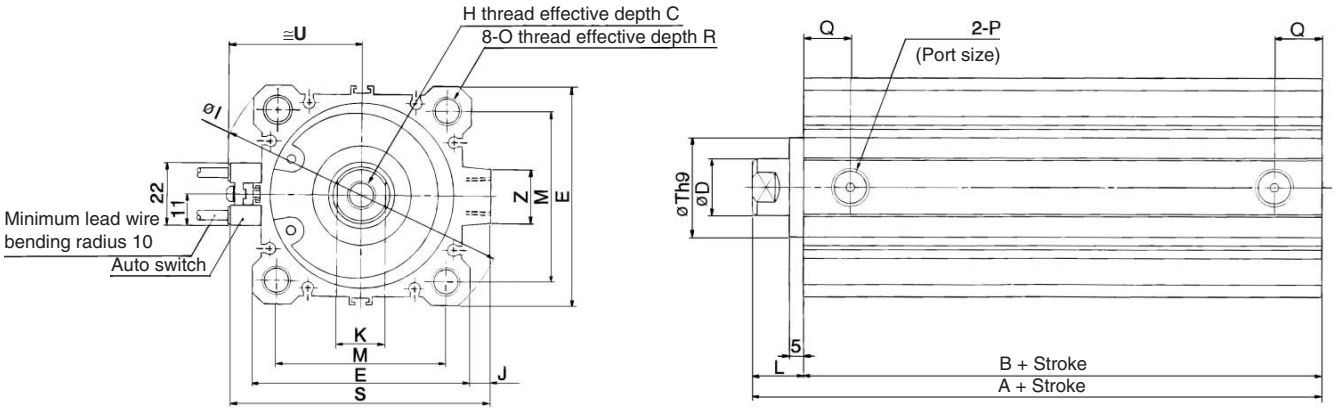
Rod end male thread



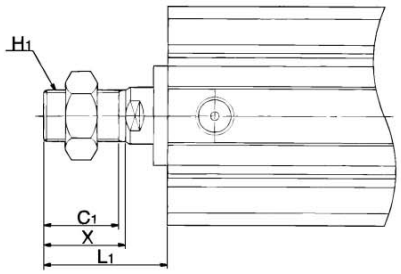
Dimensions: ø63 to ø100

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

Both ends tapped style: Series C□Q2A



Rod end male thread



Rod End Male Thread

Bore size (mm)	C1	H1	L1	X
63	26	M18 x 1.5	43.5	28.5
80	32.5	M22 x 1.5	53.5	35.5
100	32.5	M26 x 1.5	53.5	35.5

Auto switch shown above is D-A73 and D-A80.
For the auto switch mounting position and its mounting height, refer to page 7-6-130.

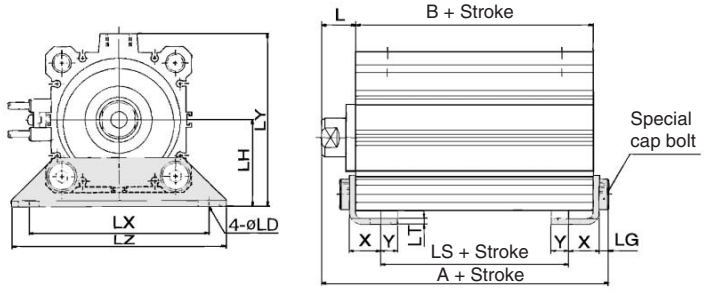
Dimensions of built-in One-touch fitting are equivalent to Series CQ2, double acting, single rod. Refer to page 7-6-18.

Both Ends Tapped Style

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	H	I	J	K	L	M	O	P	Q	R	S	Th9	U	Z
63	125 to 200 (1) 250, 300	75	57	15	20	77	M10 x 1.5	103	7	17	18	60	M10 x 1.5	Rc 1/4	16.5	18	93	$35^{\ 0}_{-0.062}$	47.5	19
80		86	66	21	25	98	M16 x 2.0	132	6	22	20	77	M12 x 1.75	Rc 3/8	19	22	112.5	$43^{\ 0}_{-0.062}$	57.5	26
100		97.5	75.5	27	30	117	M20 x 2.5	156	6.5	27	22	94	M12 x 1.75	Rc 3/8	23	22	132.5	$59^{\ 0}_{-0.074}$	67.5	26

Note 1) For 125 to 200 stroke, strokes are by the 25 mm interval.
Note 2) For calculation on the longitudinal dimension of the intermediate strokes, refer to page 7-6-3.

Foot style: C□Q2L



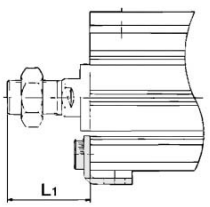
Foot Style

Bore size (mm)	A	B	L	L1	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

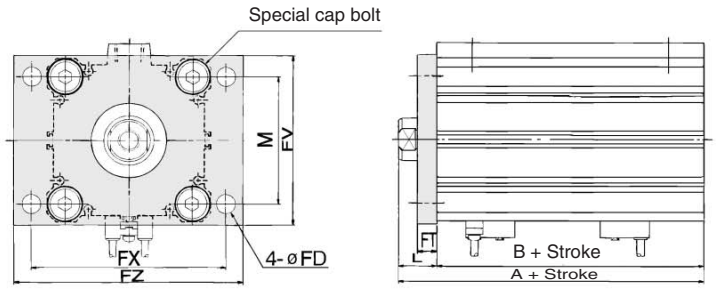
Foot bracket material: Carbon steel

∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

Rod end male thread



Rod side flange style: C□Q2F

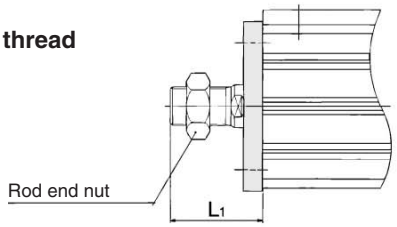


Rod Side Flange Style

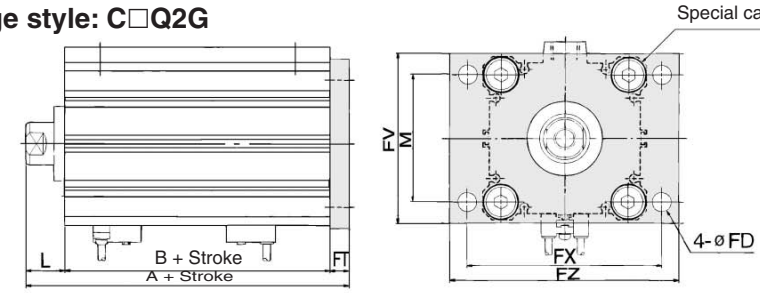
Bore size (mm)	A	B	FD	FT	FV	FX	FZ	L	L1	M
63	75	57	9	9	80	92	108	18	43.5	60
80	86	66	11	11	99	116	134	20	53.5	77
100	97.5	75.5	11	11	117	136	154	22	53.5	94

Flange bracket material: Carbon steel

Rod end male thread



Head side flange style: C□Q2G

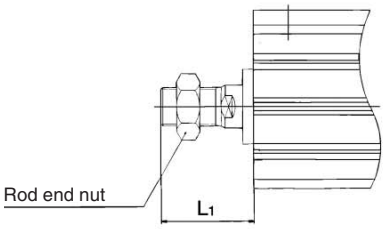


Head Side Flange Style

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

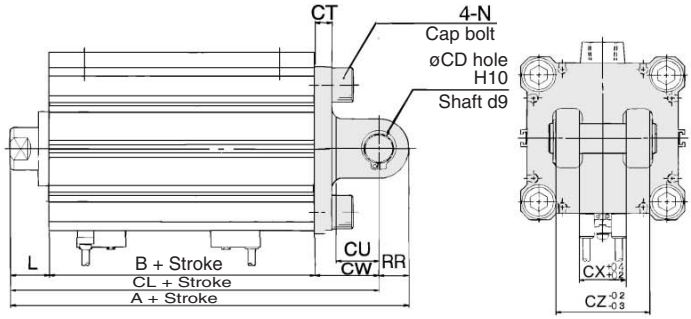
Flange bracket material: Carbon steel

∗ Dimensions except A are the same as rod side flange style.



Rod end male thread

Double clevis style: C□Q2D



Double Clevis Style

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

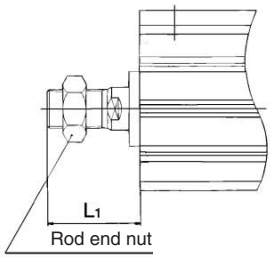
Bore size (mm)	L	L1	N	RR
63	18	43.5	M10 x 1.5	14
80	20	53.5	M12 x 1.75	18
100	22	53.5	M12 x 1.75	22

Double clevis bracket material: Cast iron

∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.

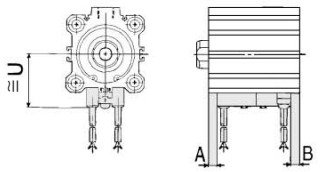
∗∗ Clevis pin and snap ring are attached.

Rod end male thread

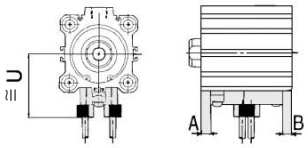


Proper Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height

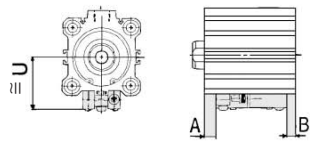
D-A7□
D-A80



D-A73C
D-A80C
D-J79C

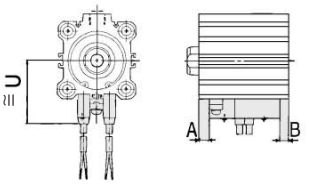


D-A7□H **D-F7□W**
D-A80H **D-J79W**
D-F7□ **D-F79F**
D-J79 **D-F7NTL**
D-F7BAL

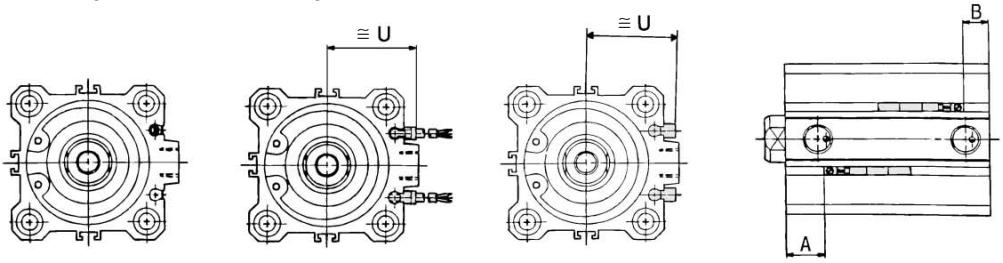


D-A79W
D-F7□WV
D-F7□V
D-F7BAVL

D-F9BAL

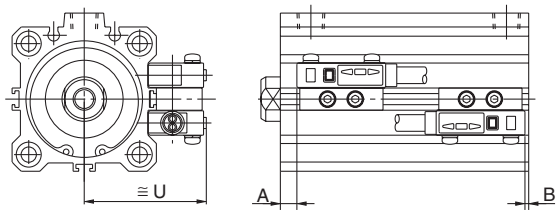


D-A9□ **D-A9□V**
D-M9□ **D-M9□V**
D-F9□W **D-F9□WV**



ø40 to ø100

D-P5DWL



Proper Auto Switch Mounting Position

Bore size (mm)	D-A7□ D-A80		D-A7□H D-A80H D-A73C D-A80C D-F7□ D-F79F D-J79 D-F7□V D-J79C D-F7□W D-J79W D-F7□WV D-F7BAL D-F7BAVL		D-A79W		D-A9□ D-A9□V		D-M9□ D-M9□V D-F9□W D-F9□WV		D-F9BAL		D-P5DWL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
32	9.5	17.5	10	18	7	15	8.5	16.5	12.5	20.5	11.5	19.5	—	—
40	13	23.5	13.5	24	10.5	21	12	22.5	16	26.5	15	25.5	9	19.5
50	11	24	11.5	24.5	8.5	21.5	10	23	14	27	13	26	7	20
63	13.5	25.5	14	26	11	23	12.5	24.5	16.5	28.5	15.5	27.5	9.5	21.5
80	16.5	31.5	17	32	14	29	15.5	30.5	19.5	34.5	18.5	33.5	12.5	29.5
100	19.5	38	20	38.5	17	35.5	18.5	37	22.5	41	21.5	40	15.5	34

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-F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAVL	D-J79C	D-A79W	D-A9□V	D-M9□V D-F9□WV	D-F9BAL	D-P5DWL
U	U	U	U	U	U	U	U	U	U
31.5	32.5	38.5	35	38	34	27	29	26.5	—
35	36	42	38.5	41.5	37.5	30.5	32.5	30	44
41	42	48	44.5	47.5	43.5	36.5	38.5	36	50
47.5	48.5	54.5	51	54	50	40	42	39.5	56.5
57.5	58.5	64.5	61	64	60	50	52	49.5	66.5
67.5	68.5	74.5	71	74	70	60	62	59.5	76.5

Auto Switch Mounting Bracket Part No.

Bore size (mm)	Mounting bracket part no.	Note	Applicable auto switch	
			Reed switch	Solid state switch
32, **40** **50**, **63** **80**, **100**	BQ-2	• Switch mounting screw (M3 x 0.5 x 10ℓ) • Switch spacer • Switch mounting nut	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
40 to 100	BQP1-050	• Switch mounting bracket • Switch mounting nut • Hexagon socket head cap bolt (M3 x 0.5 x 14ℓ spring washer 2 pcs.) • Round head Phillips screw (M3 x 0.5 x 16ℓ spring washer 2 pcs.)	—	D-P5DWL

* 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.
(Since the spacer is not included, order it separately.)
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.

Compact Cylinder: Anti-lateral Load Type
Double Acting, Single Rod
Series CQ2
ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Without auto switch CQ2 B S 32 — 30 D C

With auto switch CDQ2 B S 32 — 30 D C — F9BW S

Built-in magnet

Mounting style

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

∗ Mounting brackets are shipped together, (but not assembled).

Cushion

S	Anti-lateral load type

Bore size

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

Cylinder stroke (mm)

Refer to "Standard Stroke" on page 7-6-133.

Action

D	Double acting

Body option 1

Nil	Standard
F	With boss in head side

Cushion

C	Rubber bumper

Body option 2

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

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled). (Except D-P5DWL)

Number of auto switches

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

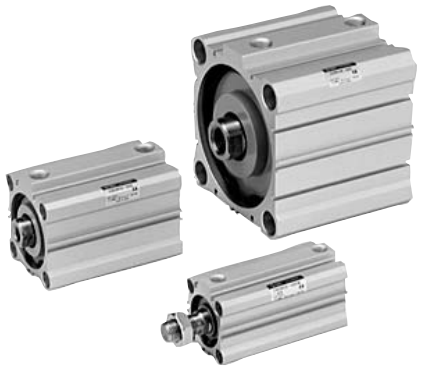
Applicable Auto Switch/Refer to page 7-9-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Rail mounting Perpendicular	Rail mounting In-line	Direct mounting Perpendicular	Direct mounting In-line	Lead wire length (m) ∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	A76H	A96V	A96	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200 V	A72	A72H	—	—	●	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	A73	A73H	—	—	●	●	●	—	—		
								—	—	A93V	A93	●	●	—	—	—		
		Connector				12 V	—	A73C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	A79W	—	—	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NV	F79	M9NV	M9N	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				F7PV	F7P	M9PV	M9P	●	●	○	—	○		
				2-wire		12 V		F7BV	J79	M9BV	M9B	●	●	○	—	○	—	
		Connector						J79C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		F7NWV	F79W	F9NWV	F9NW	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	F7PW	F9PWV	F9PW	●	●	○	—	○		
				2-wire		12 V		F7BWV	J79W	F9BWV	F9BW	●	●	○	—	○	—	
	Water resistant (2-color indication)							—	F7BA	—	F9BA	—	●	○	—	○		
								F7BAV	—	—	—	—	●	○	—	—		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		—	F79F	—	—	●	●	○	—	○	IC circuit	
	Magnetic field resistant (2-color indication)			2-wire		—		—	P5DW	—	—	—	●	●	—	○	—	

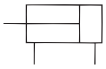
∗ Lead wire length symbols: 0.5 m·····Nil (Example) A73C
3 m·····L (Example) A73CL
5 m·····Z (Example) A73CZ
None·····N (Example) A73CN

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

• D-P5DWL type is available from ø40 up to ø100 only.
• There are other applicable auto switches other than the listed above. For details, refer to page 7-6-23.
• For details about auto switches with pre-wire connector, refer to page 7-9-36.



JIS symbol
Double acting,
Single rod



Type

Bore size (mm)			32	40	50	63	80	100
Pneumatic	Mounting	Through-hole (Standard)	●	●	●	●	●	●
		Both ends tapped style	●	●	●	●	●	●
	Built-in magnet		●	●	●	●	●	●
	Screw-in type		Rc 1/8	Rc 1/8	Rc 1/4	Rc 1/4	Rc 3/8	Rc 3/8
	Rod end male thread		●	●	●	●	●	●
	With rubber bumper (Standard)		●	●	●	●	●	●

Specifications

Type	Pneumatic (Non-lube)
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)
Cushion	Rubber bumper (Standard equipment)
Rod end thread	Female thread
Rod end thread tolerance	JIS Class 2
Stroke length tolerance	$^{+1.0}_{0}$
Mounting	Through-hole
Piston speed	50 to 500 mm/s

Minimum Operating Pressure

(MPa)

Bore size (mm)	32	40	50	63	80	100
Minimum operating pressure	0.05					

Allowable Kinetic Energy

(J)

Bore size (mm)	32	40	50	63	80	100
Allowable kinetic energy	0.29	0.52	0.91	1.54	2.71	4.54

Standard Stroke

Bore size (mm)	Standard stroke
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

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 7-6-132.		Suffix "-XB10" to the end of standard model no. on page 7-6-132.	
Description	Dealing with the stroke by the 1 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	Bore size	Stroke range	Bore size	Stroke range
	32 to 100	1 to 99	32, 40	6 to 99
			50 to 100	11 to 99
Example	Part no.: CQ2BS50-57DC CQ2BS50-75DC with 18 mm width spacer. B dimension is 125.5 mm.		Part no.: CQ2BS50-57DC-XB10 Makes 57 stroke tube. B dimension is 107.5 mm.	

• In the case of an exclusive body with ø32 to 100 (-XB10) with the stroke length exceeding 50 mm, the reference values of the longitudinal dimension will be changed.
Calculate length dimensions by deducting from those of 75 or 100 mm stroke models.

⚠ 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

1. For installation and removal, use an appropriate pair of pliers (tool for installing a type C snap ring).

2. 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 installment.

Made to Order

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

Symbol	Specifications
-XC6	Piston rod and rod end nut made of stainless steel
-XC18	NPT finish piping port
-X271	Fluoro rubber for seals

Copper-free (For CRT manufacturing process)

20-CQ2BS **Bore size** – **Stroke** DC(M)

- **Copper-free**
- **ø32, ø40, ø50, ø63 ø80, ø100**

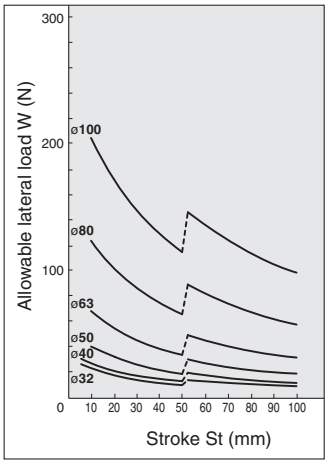
To prevent the influence of copper ions or halogen ions during CRT manufacturing processes, copper and fluorine materials are not used in the component parts.

Specifications

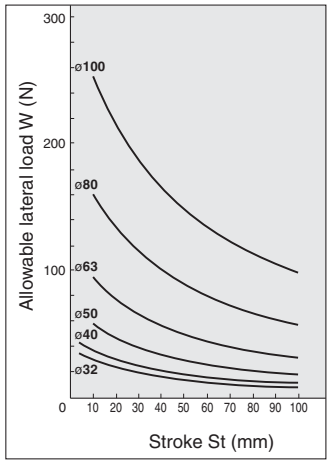
Action	Double acting, Single rod
Bore size (mm)	32, 40, 50, 63, 80, 100
Proof pressure	1.5 MPa
Max. operating pressure	1.0 MPa
Rubber bumper	With (Standard equipment)
Piping	Screw-in piping
Piston speed	50 to 500 mm/s
Mounting	Both ends tapped style
Auto switch	Mountable

Allowable Load at Rod End

Without Auto Switch



With Auto Switch



Theoretical Output

(N)

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
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

(g)

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
32	142	163	184	204	225	246	267	287	308	329	482	587
40	224	247	270	293	316	339	362	386	409	432	616	736
50	—	400	436	472	508	545	581	617	653	690	982	1170
63	—	589	630	671	712	753	794	835	876	916	1264	1475
80	—	1079	1147	1215	1282	1350	1418	1486	1554	1622	2194	2528
100	—	1863	1953	2044	2135	2226	2316	2407	2498	2589	3393	3853

Additional Weight

(g)

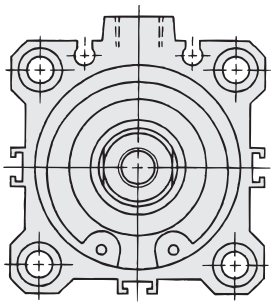
Bore size (mm)		**32**	**40**	**50**	**63**	**80**	**100**
Both ends tapped style		6	6	6	19	45	45
Rod end male thread	Male thread	26	27	53	53	120	175
	Nut	17	17	32	32	49	116
Foot style (Including mounting bolt)		143	155	243	324	696	1062
Rod side flange style (Including mounting bolt)		180	214	373	559	1056	1365
Head side flange style (Including mounting bolt)		165	198	348	534	1017	1309
Double clevis style (Including pin, snap ring, bolt)		151	196	393	554	1109	1887

Calculation: (Example) CQ2DS32-20DCM

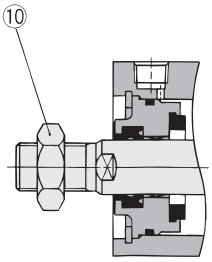
- Cylinder weight: CQ2BS32-20DC····· 204 g
- Option weight: Both ends tapped style····· 6 g
  Rod end male thread·····43 g
  Double clevis style·····151 g

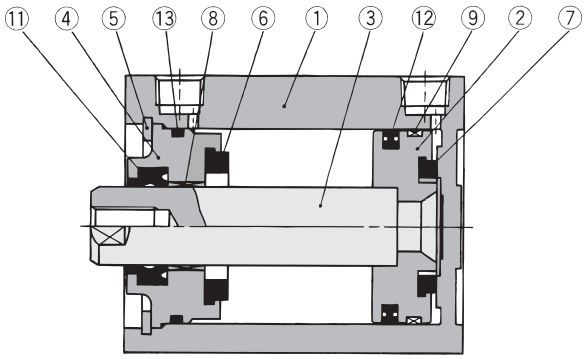
404 g

Construction



Rod end male thread





Component Parts

No.	Description	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②	Piston	Aluminum alloy	Chromated
③	Piston rod	Carbon steel	Hard chrome plated
④	Collar	Aluminum alloy	Anodized
⑤	Snap ring	Carbon tool steel	Phosphate coated
⑥	Bumper A	Urethane	
⑦	Bumper B	Urethane	
⑧	Bushing	Phosphor bronze alloy	
⑨	Wear ring	Resin	
⑩	Rod end nut	Carbon steel	Nickel plated
⑪	Rod seal	NBR	
⑫	Piston seal	NBR	
⑬	Tube gasket	NBR	

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
32	CQ2B32-PS	Set of left nos. ⑪, ⑫, ⑬
40	CQ2B40-PS	
50	CQ2B50-PS	
63	CQ2B63-PS	
80	CQ2B80-PS	
100	CQ2B100-PS	

∗ Seal kit includes ⑪, ⑫, ⑬. Order the seal kit, based on each bore size.

Mounting Bracket Part No.

Bore size (mm)	Foot (1)	Flange	Double clevis
32	CQ-L032	CQ-F032	CQ-D032
40	CQ-L040	CQ-F040	CQ-D040
50	CQ-L050	CQ-F050	CQ-D050
63	CQ-L063	CQ-F063	CQ-D063
80	CQ-L080	CQ-F080	CQ-D080
100	CQ-L100	CQ-F100	CQ-D100

Note 1) Order two foot brackets per cylinder.
Note 2) Parts belonging to each bracket are as follows: Foot, Flange/Body mounting bolt, Double clevis/Clevis pin, C shape snap ring for axis, Body mounting bolt.

Auto Switch Mounting Bracket Part No.

Bore size (mm)	Mounting bracket part no.	Note	Applicable auto switch	
			Reed switch	Solid state switch
32, **40** **50**, **63** **80**, **100**	BQ-2	• Switch mounting screw (M3 x 0.5 x 10 ℓ) • Switch spacer • Switch mounting nut	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
40 to 100	BQP1-050	• Switch mounting bracket • Switch mounting nut • Hexagon socket head cap bolt (M3 x 0.5 x 14ℓ spring washer 2 pcs.) • Round head Phillips screw (M3 x 0.5 x 16ℓ spring washer 2 pcs.)	—	D-P5DWL

∗ Refer to page 7-9-1 for further information on auto switches.

Compact Cylinder: Anti-lateral Load
Series CDQ2
With Auto Switch

Standard Specifications

Type	Pneumatic (Non-lube)
Fluid	Air
Ambient and fluid temperature	–10 to 60°C (No freezing)

Other specifications are the same as standard specifications on page 7-6-133.

How to Order

For "How to Order" with auto switch, refer to page 7-6-132.

Weight

(g)

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
32	201	222	243	263	284	305	326	346	367	388	493	598
40	300	323	347	370	393	416	439	462	485	508	628	748
50	—	518	554	590	626	663	699	735	771	808	996	1184
63	—	748	788	829	870	911	952	993	1034	1075	1286	1497
80	—	1340	1408	1476	1543	1611	1679	1747	1815	1883	2217	2552
100	—	2242	2333	2424	2514	2605	2696	2787	2877	2968	3428	3888

Additional Weight

(g)

Bore size (mm)		32	40	50	63	80	100
Both ends tapped style		6	6	6	19	45	45
Rod end male thread	Male thread	26	27	53	53	120	175
	Nut	17	17	32	32	49	116
Foot style (Including mounting bolt)		143	155	243	324	696	1062
Rod side flange style (Including mounting bolt)		180	214	373	559	1056	1365
Head side flange style (Including mounting bolt)		165	198	348	534	1017	1309
Double clevis style (Included pin, snap ring, bolt)		151	196	393	554	1109	1887

Add the weight of auto switches and mounting brackets when auto switches are mounted.

With auto switch
Calculation: (Example) CDQ2DS32-20DCM
- Cylinder weight: CDQ2BS32-20DC····· 263 g
- Option weight: Both ends tapped style····· 6 g
  Rod end male thread·····43 g
  Double clevis style·····151 g

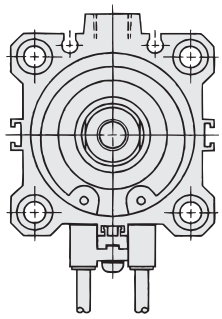
463 g

Auto Switch Mounting Bracket Weight

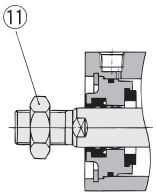
Mounting bracket part no.	Applicable bore size (mm)	Weight (g)
BQ-2	32 to 100	1.5

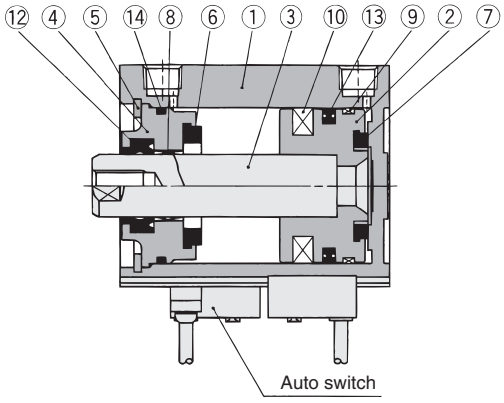
∗ For the auto switch weight, refer to page 7-9-1.

Construction



Rod end male thread





Component Parts

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

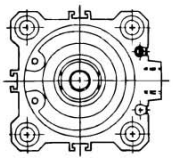
Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
32	CQ2B32-PS	Set of left nos. ⑫, ⑬, ⑭
40	CQ2B40-PS	
50	CQ2B50-PS	
63	CQ2B63-PS	
80	CQ2B80-PS	
100	CQ2B100-PS	

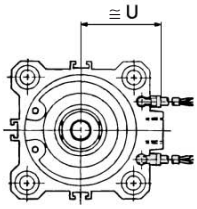
∗ Seal kit includes ⑫, ⑬, ⑭. Order the seal kit, based on each bore size.

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

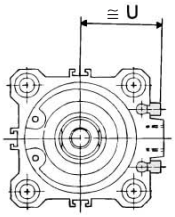
D-A9□
D-M9□
D-F9□W

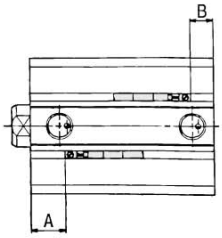


D-A9□V
D-M9□V
D-F9□WV



D-F9BAL





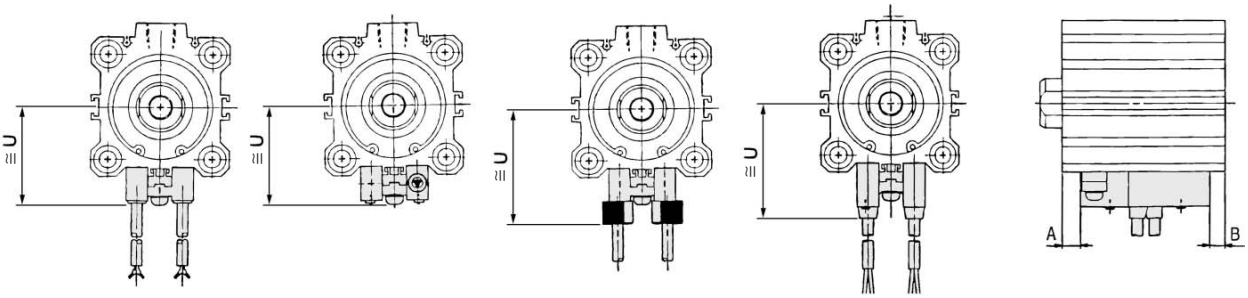
D-A7□
D-A80

D-A7□H
D-A80H
D-F7□
D-J79
D-F7BAL

D-F7□W
D-J79W
D-F79F
D-F7NTL

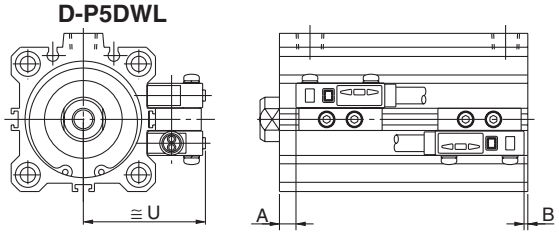
D-A73C
D-A80C
D-J79C

D-A79W
D-F7□WV
D-F7□V
D-F7BAVL



ø40 to ø100

D-P5DWL



Proper Auto Switch Mounting Position

Bore size (mm)	D-A7□/A80		D-A7□H/A80H D-A73C/A80C/F79F D-F7□/J79/J79W D-F7□V/J79C D-F7□W/F7□WV D-F7BAL/F7BAVL		D-A79W		D-A9□ D-A9□V		D-M9□ D-M9□V D-F9□W D-F9□WV		D-F9BAL		D-P5DWL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
32	15	10	15.5	10.5	12.5	7.5	14	9	18	13	17	12	—	—
40	18.5	13	19	13.5	16	10.5	17.5	12	21.5	16	20.5	15	14.5	9
50	16	16.5	16.5	17	13.5	14	15	15.5	19	19.5	18	18.5	12	12.5
63	18.5	19.5	19	20	16	17	17.5	18.5	21.5	22.5	20.5	21.5	14.5	15.5
80	21.5	24	22	24.5	19	21.5	20.5	23	24.5	27	23.5	26	17.5	20
100	24.5	30.5	25	31	22	28	23.5	29.5	27.5	33.5	26.5	32.5	20.5	26.5

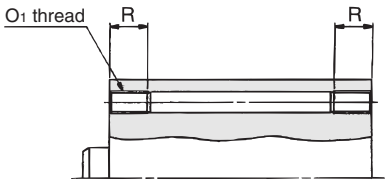
Auto Switch Mounting Height

Bore size (mm)	D-A7□/A80	D-A7□H□/A80H D-F7□, D-J79, D-F7□W D-J79W, D-F7BAL D-F79F, D-F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAVL	D-J79C	D-A79W	D-A9□V	D-M9□V D-F9□WV	D-F9BAL	D-P5DWL
	U	U	U	U	U	U	U	U	U	U
32	31.5	32.5	38.5	35	38	34	27	29	26.5	—
40	35	36	42	38.5	41.5	37.5	30.5	32.5	30	44
50	41	42	48	44.5	47.5	43.5	36.5	38.5	36	50
63	47.5	48.5	54.5	51	54	50	40	42	39.5	56.5
80	57.5	58.5	64.5	61	64	60	50	52	49.5	66.5
100	67.5	68.5	74.5	71	74	70	60	62	59.5	76.5

(In the case of auto switches, A and B dimensions will be only changed. Refer to the dimension chart.)

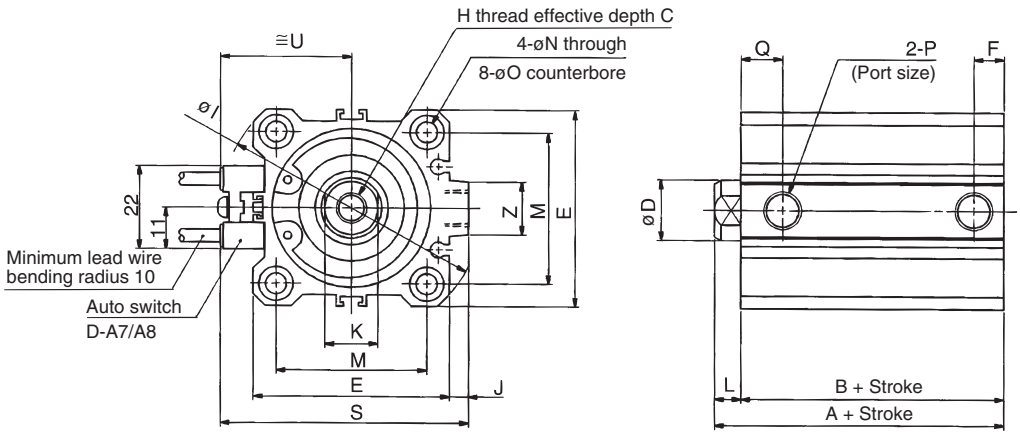
Dimensions: ø32 to ø50

Basic style (Through-hole): CQ2BS/CDQ2BS Both ends tapped style: CQ2AS/CDQ2AS

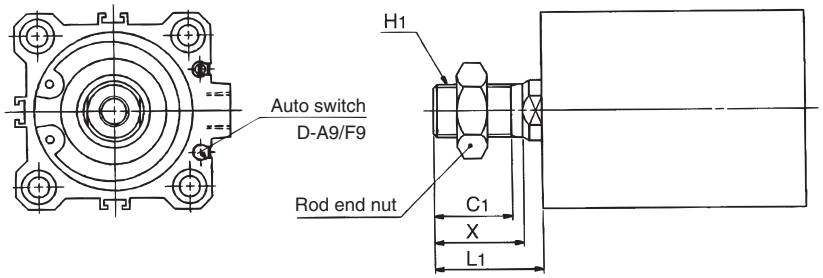


Both Ends Tapped Style

Bore size (mm)	O1	R
32	M6 x 1.0	10
40	M6 x 1.0	10
50	M8 x 1.25	14



Rod end male thread



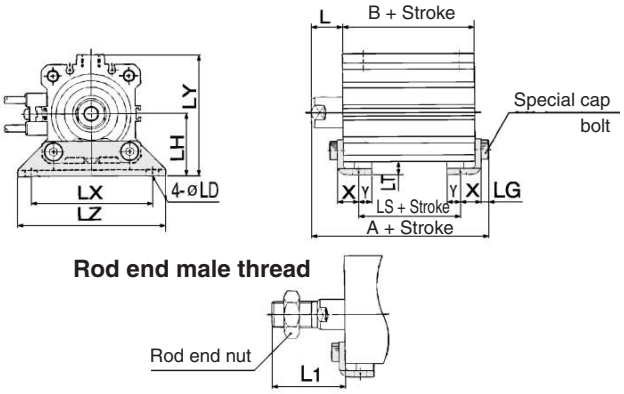
Dimensions of with boss in head side are equivalent to Series CQ2, double acting, single rod. Refer to page 7-6-16.

Rod End Male Thread

Bore size (mm)	C1	X	H1	L1
32	20.5	23.5	M14 x 1.5	28.5
40	20.5	23.5	M14 x 1.5	28.5
50	26	28.5	M18 x 1.5	33.5

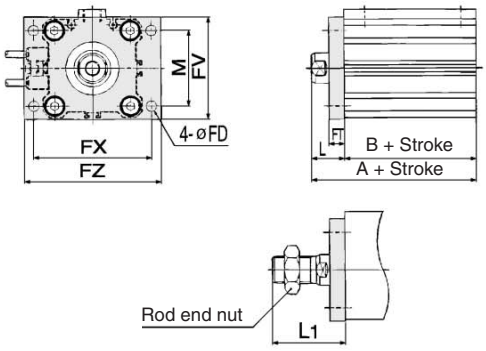
Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch		C	D	E	F	H	I	J	K	L	M	N	O	P	Q	S	U	Z
		A	B	A	B																	
32	5 to 50	40	33	50	43	13	16	45	7.5	M8 x 1.25	60	4.5	14	7	34	5.5	9 depth 7	Rc 1/8	10.5	58.5	31.5	14
	75, 100	50	43																			
40	5 to 50	46.5	39.5	56.5	49.5	13	16	52	8	M8 x 1.25	69	5	14	7	40	5.5	9 depth 7	Rc 1/8	11	66	35	14
	75, 100	56.5	49.5																			
50	10 to 50	48.5	40.5	58.5	50.5	15	20	64	10.5	M10 x 1.5	86	7	17	8	50	6.6	11 depth 8	Rc 1/4	10.5	80	41	19
	75, 100	58.5	50.5																			

Foot style: CQ2LS/CDQ2LS

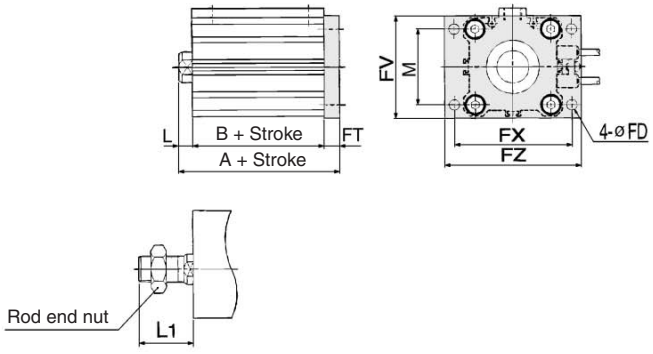


Rod end male thread

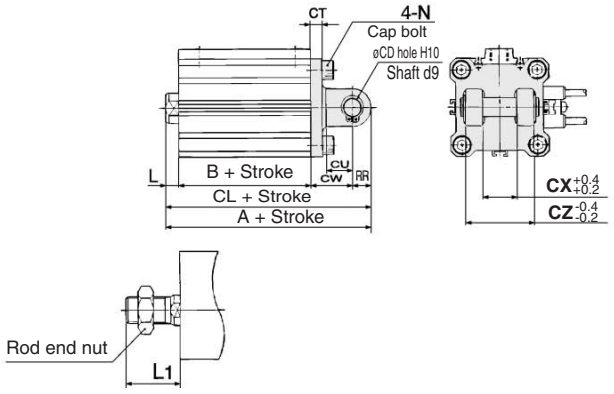
Rod side flange style: CQ2FS/CDQ2FS



Head side flange style: CQ2GS/CDQ2GS



Double clevis style: CQ2DS/CDQ2DS



Foot Style

Bore size (mm)	Stroke range (mm)	Without auto switch			With auto switch			L	L1	LD
		A	B	LS	A	B	LS			
32	5 to 50	57.2	33	17	67.2	43	27	17	38.5	6.6
	75, 100	67.2	43	27						
40	5 to 50	63.7	39.5	23.5	73.7	49.5	33.5	17	38.5	6.6
	75, 100	73.7	49.5	33.5						
50	10 to 50	66.7	40.5	17.5	76.7	50.5	27.5	18	43.5	9
	75, 100	76.7	50.5	27.5						

Bore size (mm)	Stroke range (mm)	LG	LH	LT	LX	LY	LZ	X	Y
32	5 to 50	4	30	3.2	57	57	71	11.2	5.8
	75, 100								
40	5 to 50	4	33	3.2	64	64	78	11.2	7
	75, 100								
50	10 to 50	5	39	3.2	79	78	95	14.7	8
	75, 100								

Foot bracket material: Carbon steel

Rod Side Flange Style

Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch		FD	FT	FV	FX	FZ
		A	B	A	B					
32	5 to 50	50	33	60	43	5.5	8	48	56	65
	75, 100	60	43							
40	5 to 50	56.5	39.5	66.5	49.5	5.5	8	54	62	72
	75, 100	66.5	49.5							
50	10 to 50	58.5	40.5	68.5	50.5	6.6	9	67	76	89
	75, 100	68.5	50.5							

Bore size (mm)	Stroke range (mm)	L	L1	M
32	5 to 50	17	38.5	34
	75, 100			
40	5 to 50	17	38.5	40
	75, 100			
50	10 to 50	18	43.5	50
	75, 100			

Flange bracket material: Carbon steel

Head Side Flange Style

Bore size (mm)	Stroke range (mm)	Without auto switch	With auto switch	L	L1
		A	A		
32	5 to 50	48	58	7	28.5
	75, 100	58			
40	5 to 50	54.5	64.5	7	28.5
	75, 100	64.5			
50	10 to 50	57.5	67.5	8	33.5
	75, 100	67.5			

Flange bracket material: Carbon steel

(∗ Dimensions except A, L and L1 are same as rod side flange style.)

Double Clevis Style

Bore size (mm)	Stroke range (mm)	Without auto switch			With auto switch			CD	CT	CU
		A	B	CL	A	B	CL			
32	5 to 50	70	33	60	80	43	70	10	5	14
	75, 100	80	43	70						
40	5 to 50	78.5	39.5	68.5	88.5	49.5	78.5	10	6	14
	75, 100	88.5	49.5	78.5						
50	10 to 50	90.5	40.5	76.5	100.5	50.5	86.5	14	7	20
	75, 100	100.5	50.5	86.5						

Bore size (mm)	Stroke range (mm)	CW	CX	CZ	L	L1	N	RR
32	5 to 50	20	18	36	7	28.5	M6 x 1.0	10
	75, 100							
40	5 to 50	22	18	36	7	28.5	M6 x 1.0	10
	75, 100							
50	10 to 50	28	22	44	8	33.5	M8 x 1.25	14
	75, 100							

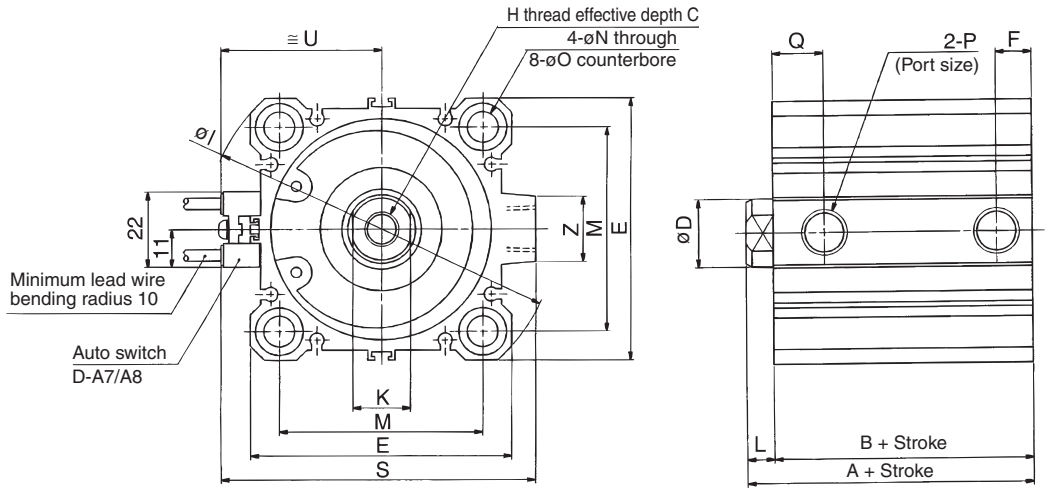
∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.
∗ Clevis pin and set ring are shipped together.

(In the case of auto switches, A and B dimensions will be only changed. Refer to the dimension chart.)

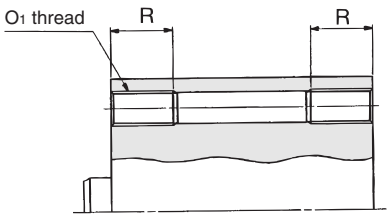
Dimensions: ø63 to ø100

Basic style (Through-hole): CQ2BS/CDQ2BS

Dimensions of with boss in head side are equivalent to Series CQ2, double acting, single rod. Refer to page 7-6-18.

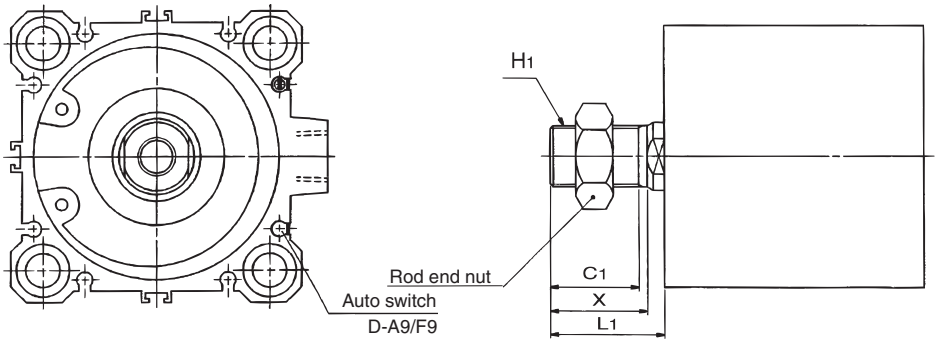


Both ends tapped style: CQ2AS/CDQ2AS



Both Ends Tapped Style

Bore size (mm)	O1	R
63	M10 x 1.5	18
80	M12 x 1.75	22
100	M12 x 1.75	22

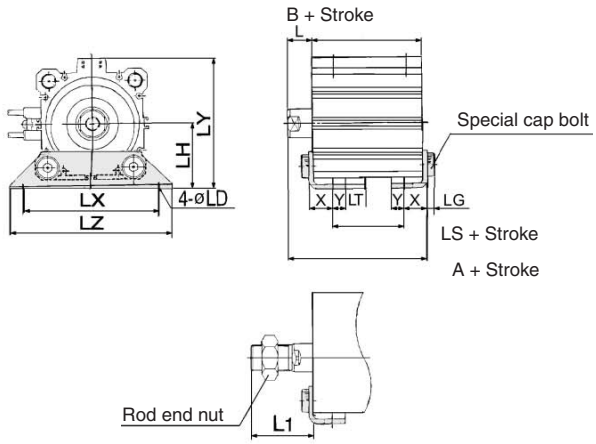


Rod End Male Thread

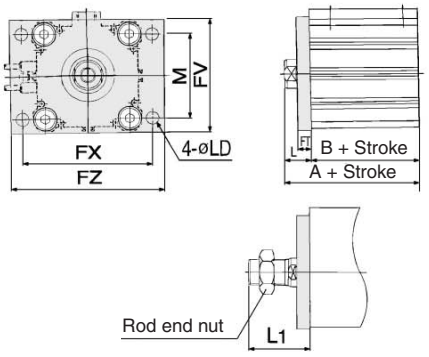
Bore size (mm)	C1	X	H1	L1
63	26	28.5	M18 x 1.5	33.5
80	32.5	35.5	M22 x 1.5	43.5
100	32.5	35.5	M26 x 1.5	43.5

Bore size (mm)	Stroke range (mm)	Without auto switch A	Without auto switch B	With auto switch A	With auto switch B	C	D	E	F	H	I	J	K	L	M	N	O	P	Q	S	U	Z
63	10 to 50	54	46	64	56	15	20	77	10.5	M10 x 1.5	103	7	17	8	60	9	14 depth 10.5	Rc 1/4	15	93	47.5	19
	75, 100	64	56																			
80	10 to 50	63.5	53.5	73.5	63.5	21	25	98	12.5	M16 x 2.0	132	6	22	10	77	11	17.5 depth 13.5	Rc 3/8	16	112.5	57.5	26
	75, 100	73.5	63.5																			
100	10 to 50	75	63	85	73	27	30	117	13	M20 x 2.5	156	6.5	27	12	94	11	17.5 depth 13.5	Rc 3/8	23	132.5	67.5	26
	75, 100	85	73																			

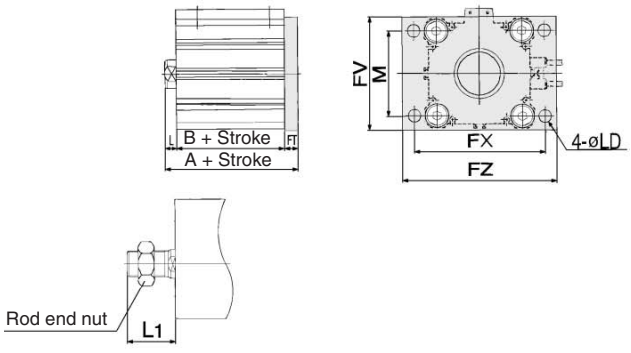
Foot style: CQ2LS/CDQ2LS



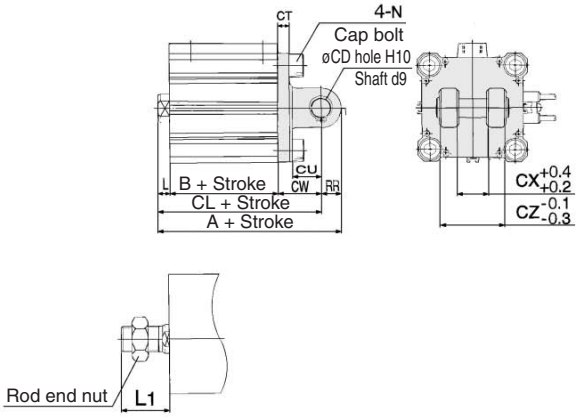
Rod side flange style: CQ2FS/CDQ2FS



Head side style: CQ2GS/CDQ2GS



Double clevis style: CQ2DS/CDQ2DS



Foot Style

Bore size (mm)	Stroke range (mm)	Without auto switch			With auto switch			L	L1	LD
		A	B	LS	A	B	LS			
63	10 to 50	72.2	46	20	82.2	56	30	18	43.5	11
	75, 100	82.2	56	30						
80	10 to 50	85	53.5	23.5	95	63.5	33.5	20	53.5	13
	75, 100	95	63.5	33.5						
100	10 to 50	98	63	29	108	73	39	22	53.5	13
	75, 100	108	73	39						

Bore size (mm)	Stroke range (mm)	LG	LH	LT	LX	LY	LZ	X	Y
63	10 to 50	5	46	3.2	95	91.5	113	16.2	9
	75, 100								
80	10 to 50	7	59	4.5	118	114	140	19.5	11
	75, 100								
100	10 to 50	7	71	6	137	136	162	23	12.5
	75, 100								

Foot bracket material: Carbon steel

Rod Side Flange Style

Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch		FD	FT	FV	FX	FZ
		A	B	A	B					
63	10 to 50	64	46	74	56	9	9	80	92	108
	75, 100	74	56							
80	10 to 50	73.5	53.5	83.5	63.5	11	11	99	116	134
	75, 100	83.5	63.5							
100	10 to 50	85	63	95	73	11	11	117	136	154
	75, 100	95	73							

Bore size (mm)	Stroke range (mm)	L	L1	M
63	10 to 50	18	43.5	60
	75, 100			
80	10 to 50	20	53.5	77
	75, 100			
100	10 to 50	22	53.5	94
	75, 100			

Flange bracket material: Carbon steel

Head Side Flange Style

Bore size (mm)	Stroke range (mm)	Without auto switch	With auto switch	L	L1
		A	A		
63	10 to 50	63	73	8	33.5
	75, 100	73			
80	10 to 50	74.5	84.5	10	43.5
	75, 100	84.5			
100	10 to 50	86	96	12	43.5
	75, 100	96			

Flange bracket material: Carbon steel

∗ Dimensions except A, L and L1 are same as rod side flange style.

Double Clevis Style

Bore size (mm)	Stroke range (mm)	Without auto switch			With auto switch			CD	CT	CU
		A	B	CL	A	B	CL			
63	10 to 50	98	46	84	108	56	94	14	8	20
	75, 100	108	56	94						
80	10 to 50	119.5	53.5	101.5	129.5	63.5	111.5	18	10	27
	75, 100	129.5	63.5	111.5						
100	10 to 50	142	63	120	152	73	130	22	13	31
	75, 100	152	73	130						

Bore size (mm)	Stroke range (mm)	CW	CX	CZ	L	L1	N	RR
63	10 to 50	30	22	44	8	33.5	M10 x 1.5	14
	75, 100							
80	10 to 50	38	28	56	10	43.5	M12 x 1.75	18
	75, 100							
100	10 to 50	45	32	64	12	43.5	M12 x 1.75	22
	75, 100							

∗ For details about the rod end nut and accessory brackets, refer to page 7-6-20.
∗ Clevis pin and set ring are shipped together.

Compact Cylinder: With End Lock

Series CBQ2

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

How to Order

Without auto switch CBQ2 B 40 — 30 D C — H N

With auto switch CDBQ2 B 40 — 30 D C — H N — F9BW

Built-in magnet

Mounting style

ø20, ø25	
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

∗ Mounting brackets are shipped together, (but not assembled).

ø32 to ø100	
B	Through-hole (Standard)(1)
A	Both ends tapped style
L	Foot style
F	Rod side flange style
G	Head side flange style
D	Double clevis style

Note 1) At the 75, and 100 strokes with ø80, ø100, both ends tapped (A) is the standard. Through-hole (B) is not available.
Note 2) Mounting brackets are shipped together, (but not assembled).

Bore size

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

Cylinder stroke (mm)
For "Standard Stroke" and "Manufacture of intermediate of Stroke", refer to page 7-6-143.

Action

D	Double acting

Body option

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

Lock position

H	Head end lock
R	Rod end lock

Manual release type

N	Non-lock type
L	Lock type

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.

Number of auto switches

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

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 DC		Load voltage AC	Rail mounting ø32 to ø100 Perpendicular	Rail mounting ø32 to ø100 In-line	Direct mounting ø20 to ø100 Perpendicular	Direct mounting ø20 to ø100 In-line	Lead wire length (m) ∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	A76H	A96V	A96	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200 V	A72	A72H	—	—	●	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	A73	A73H	—	—	●	●	●	—	—		
								—	—	A93V	A93	●	●	—	—	—		
		Connector					—	A73C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet					—	A79W	—	—	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NV	F79	F9NV	F9N	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				F7PV	F7P	F9PV	F9P	●	●	○	—	○		
				2-wire		12 V		F7BV	J79	F9BV	F9B	●	●	○	—	○	—	
		Connector						J79C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		F7NWV	F79W	F9NWV	F9NW	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	F7PW	F9PWV	F9PW	●	●	○	—	○		
				2-wire		12 V		F7BWV	J79W	F9BWV	F9BW	●	●	○	—	○		
	Water resistant (2-color indication)							—	F7BA	—	F9BA	—	●	○	—	○	—	
								F7BAV	—	—	—	—	●	○	—	—		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		—	F79F	—	—	●	●	○	—	○	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.

Cylinder Specifications

Fluid	Air
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Minimum operating pressure	0.15 MPa *
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)
Lubrication	Non-lube
Cushion	Rubber bumper on both ends (Standard)
Rod end thread tolerance	JIS Class 2
Stroke length tolerance	$^{+1.0}_{0}$
Piston speed	50 to 500 mm/s

* 0.05 MPa except for the lock unit.

Lock Specifications

Lock position	Head end, Rod end							
Holding force (Max.) (N)	ø20	ø25	ø32	ø40	ø50	ø63	ø80	ø100
	215	330	550	860	1340	2140	3450	5390
Pressure for unlocking	0.15 MPa or less							
Backlash	2 mm or less							
Manual release	Non-lock type, Lock type							

Standard Stroke

Bore size (mm)	Standard stroke (mm)
20 to 63	10, 15, 20, 25, 50, 75, 100
80, 100	25, 50, 75, 100

Manufacture of Intermediate Stroke

Description	Spacer is installed in the standard stroke body.	
Part no.	Refer to “How to Order” for the standard model no. on page 7-6-142.	
Description	Dealing with the stroke by the 5 mm interval is available by installing spacer with standard stroke cylinder.	
Stroke range	Bore size (mm)	Stroke range
	20 to 100	5 to 95
Example	Part no.: CBQ2B40-45DC-HL CBQ2B40-50DC-HL with 5 mm width spacer inside.	

Mounting Bracket Part No.

Bore size (mm)	Foot (1)	Flange	Double clevis (2)
20	CQS-L020	CQS-F020	CQS-D020
25	CQS-L025	CQS-F025	CQS-D025
32	CQ-L032	CQ-F032	CQ-D032
40	CQ-L040	CQ-F040	CQ-D040
50	CQ-L050	CQ-F050	CQ-D050
63	CQ-L063	CQ-F063	CQ-D063
80	CQ-L080	CQ-F080	CQ-D080
100	CQ-L100	CQ-F100	CQ-D100

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, Double clevis style: Clevis pin, snap ring retainer, body mounting bolt.
Note 3) Clevis pin and snap ring are included with the double clevis style.

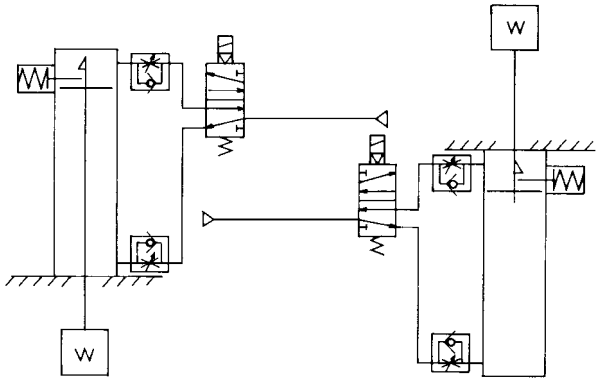
⚠ Precautions

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

Use the Recommended Pneumatic Circuit

⚠ Caution

• This is necessary for the correct locking and unlocking actions.



Head end lock **Rod end lock**

Operating Precautions

⚠ Caution

1. Do not use 3 position solenoid valves.
Avoid use in combination with 3 position solenoid valves (especially closed center metal seal types). If pressure is trapped in the port on the lock mechanism side, the cylinder cannot be locked. Furthermore, even after being locked, the lock may be released after some time, due to air leaking from the solenoid valve and entering the cylinder.

2. Back pressure is required when releasing the lock.
Before starting operation, be sure to control the system so that air is supplied to the side without the lock mechanism as shown in the figure above. There is a possibility that the lock may not be released. (Refer to the section on releasing the lock.)

3. Release the lock when mounting or adjusting the cylinder.
If mounting or other work is performed when the cylinder is locked, the lock unit may be damaged.

4. Operate with a load ratio of 50% or less.
If the load ratio exceeds 50%, this may cause problems such as failure of the lock to release, or damage to the lock unit.

5. Do not operate multiple cylinders in synchronization.
Avoid applications in which two or more end lock cylinders are synchronized to move one workpiece, as one of the cylinder locks may not be able to release when required.

6. Use a speed controller with meter-out control.
Lock cannot be released occasionally by meter-in control.

7. Be sure to operate completely to the cylinder stroke end on the side with the lock.
If the cylinder piston does not reach the end of stroke, locking and unlocking may not be possible.

8. Adjust the position of an auto switch, so that it could work at the both positions where it is distanced from the stroke and a backlash (2 mm) .
When a 2-color indication switch is adjusted for green indication at the stroke end, it may change to red for the backlash return, but this is not abnormal.

Operating Pressure

⚠ Caution

1. Supply air pressure of 0.15 MPa or higher to the port on the side that has the lock mechanism, as it is necessary for disengaging the lock.

Exhaust Speed

⚠ Caution

1. When the pressure on the side with the lock mechanism drops to 0.05 MPa or below, the lock engages automatically. If the piping on the side with the lock mechanism is thin and long, or if the speed controller is away from the cylinder port, the lock engagement may take some due to decline of the exhaust speed. The same result will be caused by clogging of the silencer installed at the EXH port of the solenoid valve.

Releasing the Lock

⚠ Caution

1. Before releasing the lock, be sure to supply air to the side without the lock mechanism, so that there is no load applied to the lock mechanism when it is released. If the lock is released when the port on the other side is in an exhaust state, and with a load applied to the lock unit, the lock unit may be subjected to an excessive force and be damaged. Also, it is very dangerous because the piston rod will be rushed to move.

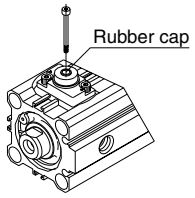
Manual Release

⚠ Caution

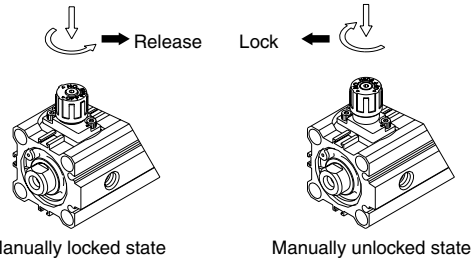
1. Manual release (Non-lock type)
Insert the accessory bolt from the top of the rubber cap (it is not necessary to remove the rubber cap), and after screwing it into the lock piston, pull it to release the lock. If you stop pulling the bolt, the lock will return to an operational state.
Thread sizes, pulling forces and strokes are as shown below.

Bore size (mm)	Thread size	Pulling force (N)	Stroke (mm)
20, 25, 32	M2.5 x 0.45 x 25ℓ or more	4.9	2
40, 50, 63	M3 x 0.5 x 30ℓ or more	10	3
80, 100	M5 x 0.8 x 40ℓ or more	24.5	3

Remove the bolt for normal operation.
It can cause lock malfunction or faulty release.



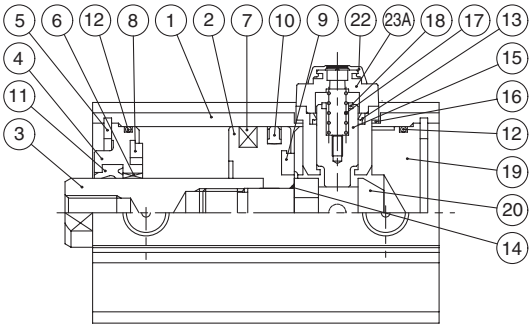
2. Manual release (Lock type)
While pushing the M/O knob, turn it 90° counterclockwise. The lock is released (and remains in a released state) by aligning the ▲ mark on the cap with the ▼ OFF mark on the M/O knob. When locking is desired, turn M/O button clockwise 90° while pushing fully, correspond ▲ on cap and ▼ ON mark on M/O button. The correct position is confirmed by a click sound “click”. If not confirmed, locking is not done.



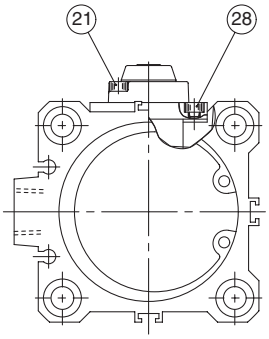
Manually locked state Manually unlocked state

Construction

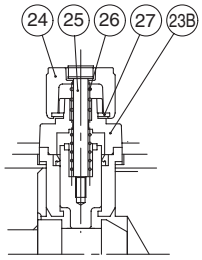
ø32 to ø63



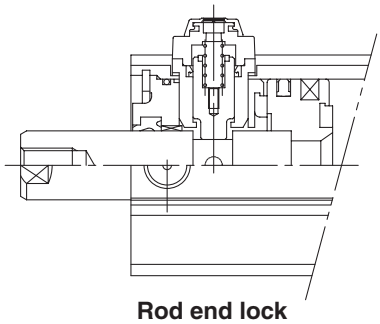
Head end lock



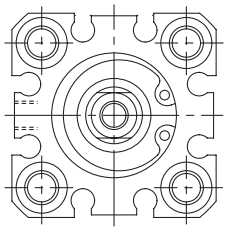
Cylinder tube form for ø32 to ø63



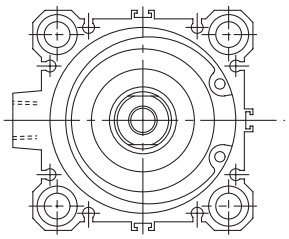
Manual release (Lock type): Suffix L



Rod end lock

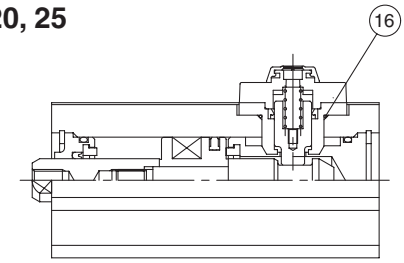


Cylinder tube form for ø25 or less

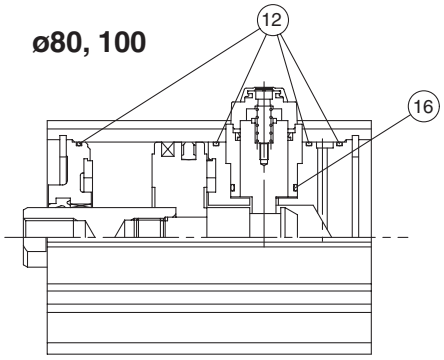


Cylinder tube form for ø63 or more

ø20, 25



ø80, 100



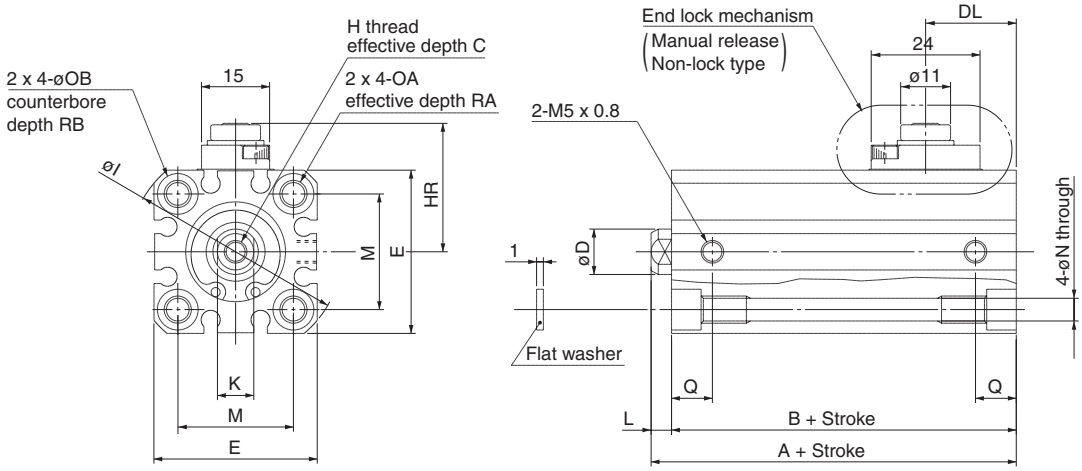
Component Parts

No.	Part	Material	Note
①	Cylinder tube	Aluminum alloy	Hard anodized
②	Piston	Aluminum alloy	Chromated
③	Piston rod	Carbon steel	Hard chrome plated
④	Collar	R□ Aluminum alloy	Anodized
		H□ Aluminum bearing alloy	ø 40 or less, Anodized
		H□ Aluminum alloy casting	ø50 or more, Painted after chromated
⑤	Snap ring	Carbon tool steel	Phosphate coated
⑥	Bushing	Lead-bronze casted	R□ Used for all bore sizes
			H□ Used for ø40 and larger
⑦	Magnet	—	With auto switch
⑧	Bumper A	Urethane	
⑨	Bumper B	Urethane	
⑩	Piston seal	NBR	
⑪	Rod seal	NBR	
⑫	Tube gasket	NBR	Using 4 pcs. for ø80, 100
⑬	Lock piston seal	NBR	
⑭	Piston gasket	NBR	Nothing for ø20, 25
⑮	Lock piston	Carbon steel	Quenched, hard chrome plated
⑯	Gasket	NBR	
⑰	Lock spring	Stainless steel	
⑱	Bumper	Urethane	
⑲	Head cover	Aluminum alloy	Anodized
⑳	Lock bolt	Carbon steel	Quenched, Electroless nickel plated
㉑	Hexagon socket head cap screw	Alloy steel	Black zinc chromated
㉒	Rubber cap	Synthetic rubber	
㉓A	Cap A	Aluminum casted	Black painted
㉓B	Cap B	Carbon steel	Oxide film treated
㉔	M/O knob	Zinc die-casted	Black painted
㉕	M/O bolt	Alloy steel	Red painted
㉖	M/O spring	Steel wire	Zinc chromated
㉗	Stopper ring	Rolled steel	Zinc chromated
㉘	Hexagon socket head cap screw	Alloy steel	Nickel plated

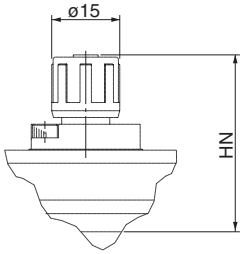
Dimensions: ø20, ø25

Basic style (Through-hole/Both ends tapped common): CBQ2B/CDBQ2B

With head end lock



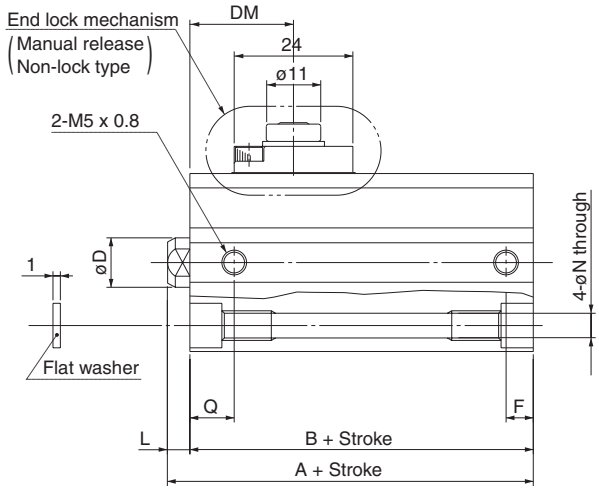
End lock mechanism
(Manual release lock type)



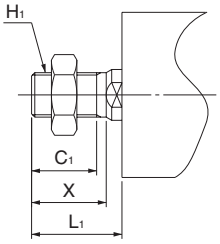
End Lock Mechanism Dimensions

Bore size (mm)	DL	DM	HR	HN (Max.)
20	20	21	28.5	40
25	21	21	29.5	41

With rod end lock



Rod end male thread

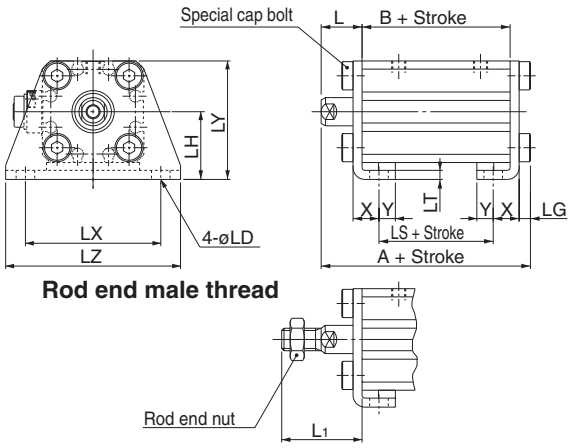


Bore size (mm)	Standard stroke	C_1	X	H_1	L_1
20	10, 15, 20, 25	12	14	M8 x 1.25	18.5
	50, 75, 100				28.5
25	10, 15, 20, 25	15	17.5	M10 x 1.25	22.5
	50, 75, 100				32.5

Bore size (mm)	Standard stroke	With head end lock			With rod end lock				C	D	E	H	I	K	M	N	OA	OB	Q	RA	RB
		A	B	L	A	B	F	L													
20	10, 15, 20, 25	65.5	61	4.5	59	54.5	5.5	4.5	7	10	36	M5 x 0.8	47	8	25.5	5.4	M6 x 1.0	9	9	10	7
	50, 75, 100	80.5	66	14.5	80.5	66	9	14.5													
25	10, 15, 20, 25	69	64	5	62.5	57.5	5.5	5	12	12	40	M6 x 1.0	52	10	28	5.4	M6 x 1.0	9	11	10	7
	50, 75, 100	84	69	15	84	69	11	15													

Dimensions: ø20, ø25

Foot style: CBQ2L/CDBQ2L

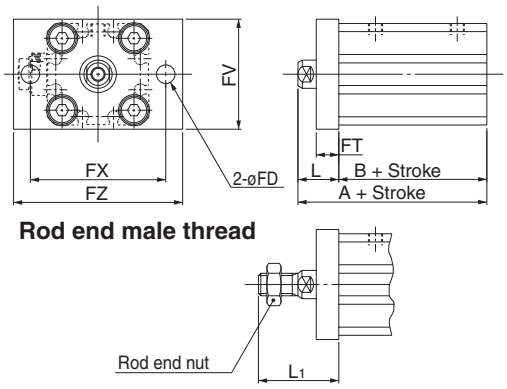


Foot Style

Bore size (mm)	Standard stroke	With head end lock			With rod end lock		
		A	B	LS	A	B	LS
20	10, 15, 20, 25	82.7	61	49	76.2	54.5	42.5
	50, 75, 100	87.7	66	54	87.7	66	54
25	10, 15, 20, 25	86.2	64	49	79.7	57.5	42.5
	50, 75, 100	91.2	69	54	91.2	69	54

Bore size (mm)	Standard stroke	L	L1	LD	LG	LH	LT	LX	LY	LZ	X	Y
20	10, 15, 20, 25, 50, 75, 100	14.5	28.5	6.6	4	24	3.2	48	42	62	9.2	5.8
25		15	32.5	6.6	4	26	3.2	52	46	66	10.7	5.8

Rod side flange style: CBQ2F/CDBQ2F

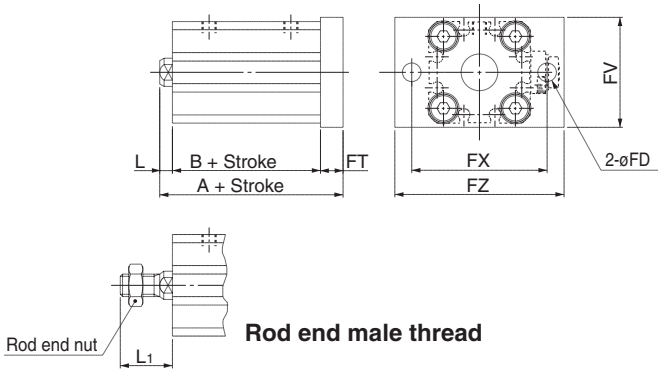


Rod Side Flange Style

Bore size (mm)	Standard stroke	With head end lock		With rod end lock	
		A	B	A	B
20	10, 15, 20, 25	75.5	61	69	54.5
	50, 75, 100	80.5	66	80.5	66
25	10, 15, 20, 25	79	64	72.5	57.5
	50, 75, 100	84	69	84	69

Bore size (mm)	Standard stroke	FD	FT	FV	FX	FZ	L	L1
20	10, 15, 20, 25, 50, 75, 100	6.6	8	39	48	60	14.5	28.5
25		6.6	8	42	52	64	15	32.5

Head side flange style: CBQ2G/CDBQ2G

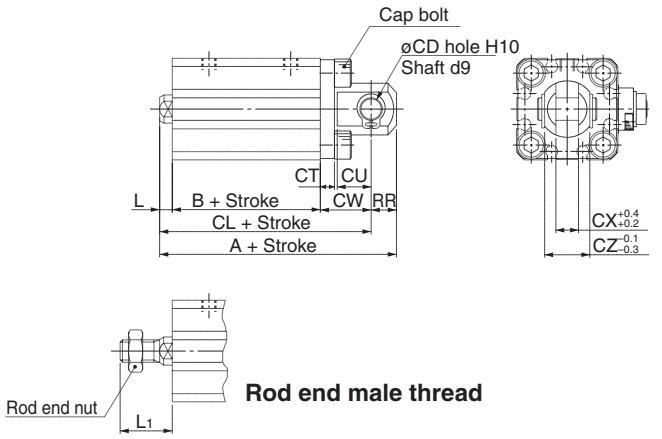


Head Side Flange Style

Bore size (mm)	Standard stroke	With head end lock				With rod end lock			
		A	B	L	L1	A	B	L	L1
20	10, 15, 20, 25	73.5	61	4.5	18.5	67	54.5	4.5	18.5
	50, 75, 100	88.5	66	14.5	28.5	88.5	66	14.5	28.5
25	10, 15, 20, 25	77	64	5	22.5	70.5	57.5	5	22.5
	50, 75, 100	92	69	15	32.5	92	69	15	32.5

Bore size (mm)	Standard stroke	FD	FT	FV	FX	FZ
20	10, 15, 20, 25, 50, 75, 100	6.6	8	39	48	60
25		6.6	8	42	52	64

Double clevis style: CBQ2D/CDBQ2D



Double Clevis Style

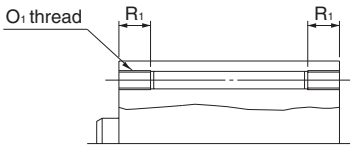
Bore size (mm)	Standard stroke	With head end lock					With rod end lock				
		A	B	CL	L	L1	A	B	CL	L	L1
20	10, 15, 20, 25	92.5	61	83.5	4.5	18.5	86	54.5	77	4.5	18.5
	50, 75, 100	107.5	66	98.5	14.5	28.5	107.5	66	98.5	14.5	28.5
25	10, 15, 20, 25	99	64	89	5	22.5	92.5	57.5	82.5	5	22.5
	50, 75, 100	114	69	104	15	32.5	114	69	104	15	32.5

Bore size (mm)	Standard stroke	CD	CT	CU	CW	CX	CZ	RR
20	10, 15, 20, 25, 50, 75, 100	8	5	12	18	8	16	9
25		10	5	14	20	10	20	10

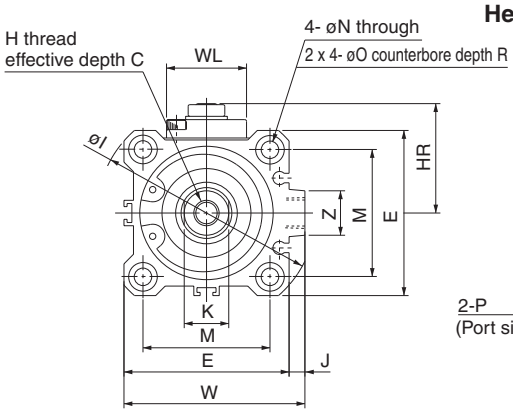
Dimensions: ø32 to ø100

Basic style (Through-hole): CBQ2B/CDBQ2B

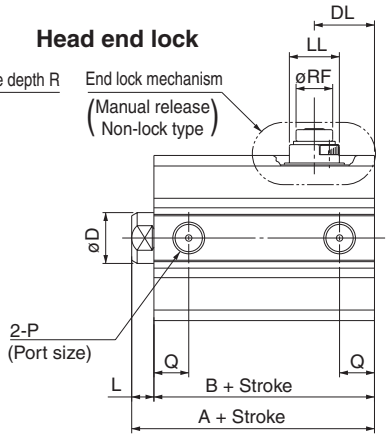
Both ends tapped style: CBQ2A/CDBQ2A



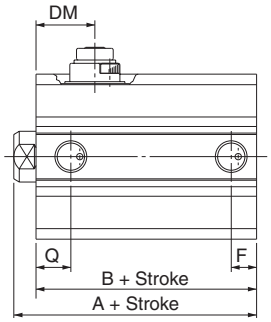
Bore size (mm)	O_1	R_1
32	M6 x 1.0	10
40	M6 x 1.0	10
50	M8 x 1.25	14
63	M10 x 1.5	18
80	M12 x 1.75	22
100	M12 x 1.75	22



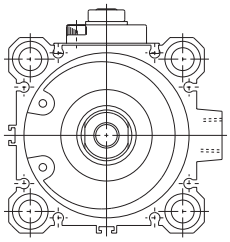
Head end lock



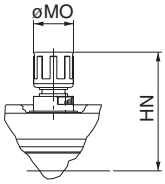
Rod end lock



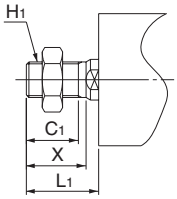
ø63, ø80, ø100
Cylinder tube form



End lock mechanism
(Manual release lock type)



Rod end male thread



End Lock Mechanism Dimensions

Bore size (mm)	DL	DM	HR	HN (Max.)	LL	MO	WL	RF
32	25	22	33.5	45	15	15	24	11
40	29	26	38.5	52.5	21	19	24	11
50	29.5	24	45	59	21	19	24	11
63	28.5	25	50	64	21	19	24	11
80	45	45.5	62	76.5	30	23	40	21
100	48	49	71.5	86	30	23	40	21

Bore size (mm)	Standard stroke	C_1	X	H_1	L_1
32	10, 15, 20, 25 50, 75, 100	20.5	23.5	M14 x 1.5	28.5
40		20.5	23.5	M14 x 1.5	28.5
50		26	28.5	M18 x 1.5	33.5
63		26	28.5	M18 x 1.5	33.5
80	25, 50	32.5	35.5	M22 x 1.5	43.5
	75, 100				53.5
100	25, 50	32.5	35.5	M26 x 1.5	43.5
	75, 100				53.5

Bore size (mm)	Standard stroke	C	D	E	H	I	J	K	M	N	O	P	R	W	Z
32	10, 15, 20, 25 50, 75, 100	13	16	45	M8 x 1.25	60	4.5	14	34	5.5	9	Rc 1/8	7	49.5	14
40		13	16	52	M8 x 1.25	69	5	14	40	5.5	9	Rc 1/8	7	57	14
50		15	20	64	M10 x 1.5	86	7	17	50	6.6	11	Rc 1/4	8	71	19
63		15	20	77	M10 x 1.5	103	7	17	60	9	14	Rc 1/4	10.5	84	19
80	25, 50, 75, 100	21	25	98	M16 x 2.0	132	6	22	77	11	17.5*	Rc 3/8	13.5*	104	26
100		27	30	117	M20 x 2.5	156	6.5	27	94	11	17.5*	Rc 3/8	13.5*	123.5	26

* At the 75, and 100 strokes with ø80, 100, both ends tapped (A) is the standard. Through-hole (B) is not available.

With Head End Lock

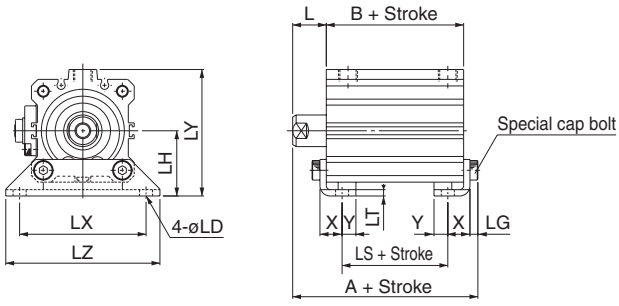
Bore size (mm)	Standard stroke	A	B	L	Q
32	10, 15, 20, 25 50, 75, 100	72.5	65.5	7	12.5
40		82	75	7	14
50		83.5	75.5	8	14
63		85	77	8	15.5
80	25, 50	121	111	10	18
	75, 100	136	116	20	19
100	25, 50	132.5	120.5	12	22
	75, 100	147.5	125.5	22	23

With Rod End Lock

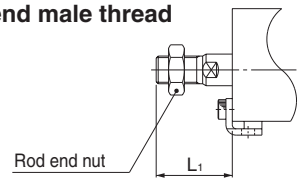
Bore size (mm)	Standard stroke	A	B	F	L	Q
32	10, 15, 20, 25 50, 75, 100	65	58	7.5	7	10.5
40		71.5	64.5	8	7	11
50		73.5	65.5	10.5	8	10.5
63		79	71	10.5	8	15
80	25, 50	113.5	103.5	12.5	10	16
	75, 100	136	116	19	20	19
100	25, 50	125	113	13	12	23
	75, 100	147.5	125.5	23	22	23

Dimensions: ø32 to ø100

Foot style: CBQ2L/CDBQ2L



Rod end male thread

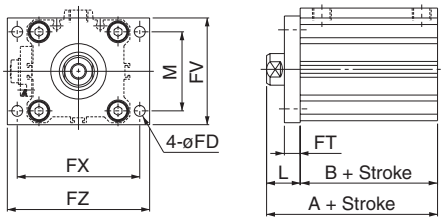


Foot Style

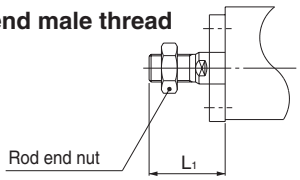
Bore size (mm)	Standard stroke	With head end lock			With rod end lock			L	L1	LD
		A	B	LS	A	B	LS			
32	10, 15, 20, 25 50, 75, 100	89.7	65.5	49.5	82.2	58	42	17	38.5	6.6
40		99.2	75	59	88.7	64.5	48.5	17	38.5	6.6
50		101.7	75.5	52.5	91.7	65.5	42.5	18	43.5	9
63		103.2	77	51	97.2	71	45	18	43.5	11
80	25, 50	142.5	111	81	135	103.5	73.5	20	53.5	13
	75, 100	147.5	116	86	147.5	116	86			
100	25, 50	155.5	120.5	86.5	148	113	79	22	53.5	13
	75, 100	160.5	125.5	91.5	160.5	125.5	91.5			

Bore size (mm)	Standard stroke	LG	LH	LT	LX	LY	LZ	X	Y
32	10, 15, 20, 25 50, 75, 100	4	30	3.2	57	57	71	11.2	5.8
40		4	33	3.2	64	64	78	11.2	7
50		5	39	3.2	79	78	95	14.7	8
63		5	46	3.2	95	91.5	113	16.2	9
80	25, 50, 75, 100	7	59	4.5	118	114	140	19.5	11
100		7	71	6	137	136	162	23	12.5

Rod side flange style: CBQ2F/CDBQ2F



Rod end male thread



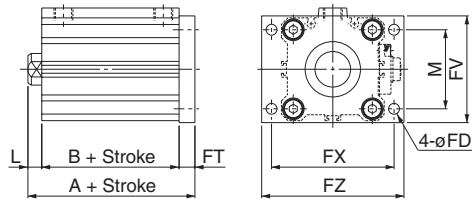
Rod Side Flange Style

Bore size (mm)	Standard stroke	With head end lock		With rod end lock		FD	FT	FV	FX	FZ
		A	B	A	B					
32	10, 15, 20, 25 50, 75, 100	82.5	65.5	75	58	5.5	8	48	56	65
40		92	75	81.5	64.5	5.5	8	54	62	72
50		93.5	75.5	83.5	65.5	6.6	9	67	76	89
63		95	77	89	71	9	9	80	92	108
80	25, 50	131	111	123.5	103.5	11	11	99	116	134
	75, 100	136	116	136	116					
100	25, 50	142.5	120.5	135	113	11	11	117	136	154
	75, 100	147.5	125.5	147.5	125.5					

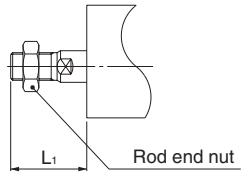
Bore size (mm)	Standard stroke	L	L1	M
32	10, 15, 20, 25 50, 75, 100	17	38.5	34
40		17	38.5	40
50		18	43.5	50
63		18	43.5	60
80	25, 50, 75, 100	20	53.5	77
100		22	53.5	94

Dimensions: ø32 to ø100

Head side flange style: CBQ2G/CDBQ2G



Rod end male thread

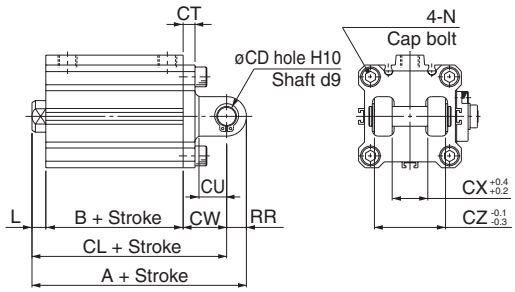


Head Side Flange Style

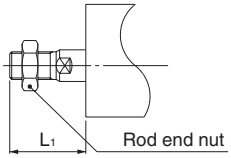
Bore size (mm)	Standard stroke	With head end lock				With rod end lock			
		A	B	L	L1	A	B	L	L1
32	10, 15, 20, 25 50, 75, 100	80.5	65.5	7	28.5	73	58	7	28.5
40		90	75	7	28.5	79.5	64.5	7	28.5
50		92.5	75.5	8	33.5	82.5	65.5	8	33.5
63		94	77	8	33.5	88	71	8	33.5
80	25, 50	132	111	10	43.5	124.5	103.5	10	43.5
	75, 100	147	116	20	53.5	147	116	20	53.5
100	25, 50	143.5	120.5	12	43.5	136	113	12	43.5
	75, 100	158.5	125.5	22	53.5	158.5	125.5	22	53.5

Bore size (mm)	Standard stroke	M	FD	FT	FV	FX	FZ
32	10, 15, 20, 25, 50, 75, 100	34	5.5	8	48	56	65
40		40	5.5	8	54	62	72
50		50	6.6	9	67	76	89
63		60	9	9	80	92	108
80		77	11	11	99	116	134
100		94	11	11	117	136	154

Double clevis style: CBQ2D/CDBQ2D



Rod end male thread



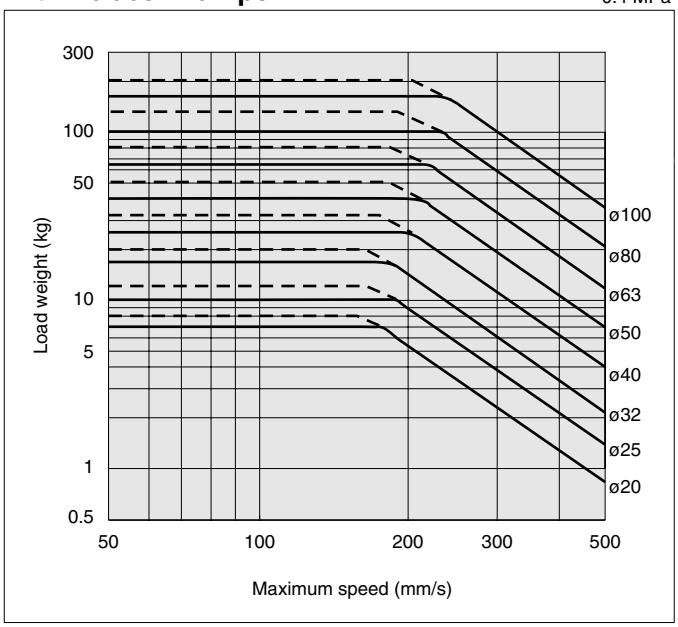
Double Clevis Style

Bore size (mm)	Standard stroke	With head end lock			With rod end lock			CD	CT	CU	L	L1
		A	B	CL	A	B	CL					
32	10, 15, 20, 25 50, 75, 100	102.5	65.5	92.5	95	58	85	10	5	14	7	28.5
40		114	75	104	103.5	64.5	93.5	10	6	14	7	28.5
50		125.5	75.5	111.5	115.5	65.5	101.5	14	7	20	8	33.5
63		129	77	115	123	71	109	14	8	20	8	33.5
80	25, 50	177	111	159	169.5	103.5	151.5	18	10	27	10	43.5
	75, 100	192	116	174	192	116	174				20	53.5
100	25, 50	199.5	120.5	177.5	192	113	170	22	13	31	12	43.5
	75, 100	214.5	125.5	192.5	214.5	125.5	192.5				22	53.5

Bore size (mm)	Standard stroke	CW	CX	CZ	N	RR
32	10, 15, 20, 25 50, 75, 100	20	18	36	M6 x 1.0	10
40		22	18	36	M6 x 1.0	10
50		28	22	44	M8 x 1.25	14
63		30	22	44	M10 x 1.5	14
80	25, 50, 75, 100	38	28	56	M12 x 1.75	18
100		45	32	64	M12 x 1.75	22

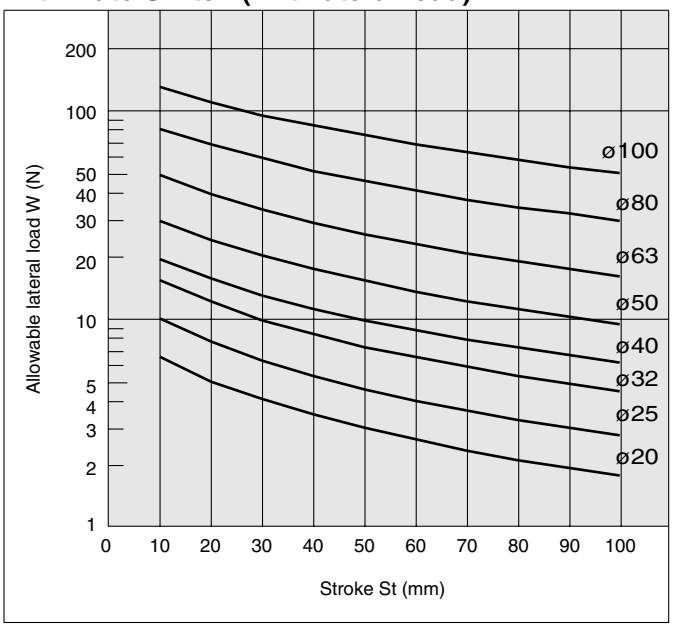
Allowable Kinetic Energy

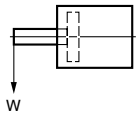
With Rubber Bumper



Allowable Lateral Load at Rod End

With Auto Switch (Anti-lateral load)





(Mounting orientation: Horizontal)

Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of **"Caution", "Warning"** or **"Danger"**. To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.

⚠ Caution : Operator error could result in injury or equipment damage.

⚠ Warning : Operator error could result in serious injury or loss of life.

⚠ Danger : In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414: Pneumatic fluid power--General rules relating to systems.
Note 2) JIS B 8370: General Rules for Pneumatic Equipment

⚠ Warning

1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

2. Only trained personnel should operate pneumatically operated machinery and equipment.

Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.

1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driver objects have been confirmed.
2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc.

4. Contact SMC if the product is to be used in any of the following conditions:

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuits in press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

Actuator Precautions 1

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Caution on Design

⚠ Warning

1. There is a possibility of dangerous sudden action by air cylinders if sliding parts of machinery are twisted due to external forces, etc.

In such cases, human injury may occur; e.g., by catching hands or feet in the machinery, or damage to the machinery itself may occur. Therefore, the machine should be adjusted to operate smoothly and designed to avoid such dangers.

2. A protective cover is recommended to minimize the risk of personal injury.

If a stationary object and moving parts of a cylinder are in close proximity, personal injury may occur. Design the structure to avoid contact with the human body.

3. Securely tighten all stationary parts and connected parts so that they will not become loose.

Especially when a cylinder operates with high frequency or is installed where there is a lot of vibration, ensure that all parts remain secure.

4. A deceleration circuit or shock absorber may be required.

When a driven object is operated at high speed or the load is heavy, a cylinder's cushion will not be sufficient to absorb the impact. Install a deceleration circuit to reduce the speed before cushioning, or install an external shock absorber to relieve the impact.

In this case, the rigidity of the machinery should also be examined.

5. Consider a possible drop in circuit pressure due to a power outage, etc.

When a cylinder is used in a clamping mechanism, there is a danger of workpieces dropping if there is a decrease in clamping force due to a drop in circuit pressure caused by a power outage, etc. Therefore, safety equipment should be installed to prevent damage to machinery and human injury. Suspension mechanisms and lifting devices also require consideration for drop prevention.

6. Consider a possible loss of power source.

Measures should be taken to protect against bodily injury and equipment damage in the event that there is a loss of power to equipment controlled by pneumatics, electricity, or hydraulics.

7. Design circuitry to prevent sudden lurching of driven objects.

When a cylinder is driven by an exhaust center type directional control valve or when starting up after residual pressure is exhausted from the circuit, etc., the piston and its driven object will lurch at high speed if pressure is applied to one side of the cylinder because of the absence of air pressure inside the cylinder. Therefore, equipment should be selected and circuits designed to prevent sudden lurching, because there is a danger of human injury and/or damage to equipment when this occurs.

8. Consider emergency stops.

Design so that human injury and/or damage to machinery and euqipment will not be caused when machinery is stopped by a safety device under abnormal conditions, a power outage or a manual emergency stop.

Caution on Design

9. Consider the action when operation is restarted after an emergency stop or abnormal stop.

Design the machinery so that human injury or equipment damage will not occur upon restart of operation.

When the cylinder has to be reset at the starting position, install manual safely equipment.

Selection

⚠ Warning

1. Confirm the specifications.

The products featured in this catalog are designed for use in industrial compressed air systems. If the products are used in conditions where pressure and/or temperature are outside the range of specifications, damage and/or malfunctions may occur. Do not use in these conditions. (Refer to the specifications.)

Please consult with SMC if you use a fluid other than compressed air.

2. About intermediate stop

In the case of 3 position closed center of a valve, it is difficult to make a piston stop at the required position as acurately and precisely as with hydraulic pressure due to compressibility of air.

Furthermore, since valves and cylinders, etc. are not guaranteed for zero air leakage, it may not be possible to hold a stopped position for an extended period of time. Please contact SMC in the case it is necessary to hold a stopped position for an extended period.

⚠ Caution

1. Operate within the limits of the maximum usable stroke.

Refer to the selection procedures for the air cylinder to be used for the maximum usable stroke.

2. Operate the piston within a range such that collision damage will not occur at the stroke end.

The operation range should prevent damage from occurring when a piston, having inertial force, stops by striking the cover at the stroke end. Refer to the cylinder model selection procedure for the maximum usable stroke.

3. Use a speed controller to adjust the cylinder drive speed, gradually increasing from a low speed to the desired speed setting.

4. Provide intermediate supports for long stroke cylinders.

An intermediate support should be provided in order to prevent damage to a cylinder having a long stroke, due to problems such as sagging of the rod, deflection of the cylinder tube, vibration and external load.

Actuator Precautions 2

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Mounting

⚠ Caution

1. Be certain to match the rod shaft center with the load and direction of movement when connecting.

When not properly matched, problems may arise with the rod and tube, and damage may be caused due to friction on areas such as the inner tube surface, bushings, rod surface, and seals.

2. When an external guide is used, connect the rod end and the load in such a way that there is no interference at any point within the stroke.

3. Do not scratch or gouge the sliding portion of the cylinder tube or the piston rod by striking it with an object, or squeezing it.

The tube bore is manufactured under precise tolerances. Thus, even a slight deformation could lead to a malfunction.
Moreover, scratches or gouges, etc. in the piston rod may lead to damaged seals and cause air leakage.

4. Prevent the seizure of rotating parts.

Prevent the seizure of rotating parts (pins, etc.) by applying grease.

5. Do not use until you verify that the equipment can operate properly.

After mounting, repairs, or modification, etc., connect the air supply and electric power, and then confirm proper mounting by means of appropriate function and leak tests.

6. Instruction manual

Install the products and operate them only after reading the instruction manual carefully and understanding its contents. Also keep the manual where it can be referred to as necessary.

Piping

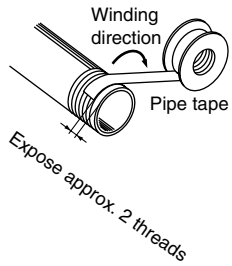
⚠ Caution

1. Before piping

Before piping, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

2. Wrapping of pipe tape

When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not get inside the piping.
Also, when the pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



Cushion

⚠ Caution

1. Readjust with the cushion needle.

Cushions are adjusted at the time of shipment, however, the cushion needle on the cover should be readjusted when the product is put into service, based upon factors such as the size of the load and the operating speed. When the cushion needle is turned clockwise, the restriction becomes smaller and the cushion's effectiveness is increased. Tighten the lock nut securely after adjustment is performed.

2. Do not operate the actuator with the cushion needle fully closed.

This could damage the seals.

Lubrication

⚠ Caution

1. Lubricating the lube style cylinder.

Install a lubricator in the circuit, and use Class 1 turbine oil (with no additive) ISO VG32.
Do not use machine oil or spindle oil.

2. Lubrication of cylinder

The cylinder has been lubricated for life at the factory and can be used without any further lubrication.
However, in the event that it is lubricated additionally, be sure to use Class 1 turbine oil (with no additive) ISO VG32.
Stopping lubrication later may lead to malfunctions because the new lubricant will cancel out the original lubricant. Therefore, lubrication must be continued once it has been started.

Air Supply

⚠ Warning

1. Use clean air.

Do not use compressed air which contains chemicals, synthetic oils containing organic solvents, salts or corrosive gases, etc., as this can cause damage or malfunction.

⚠ Caution

1. Install air filters.

Install air filters close to valves at their upstream side. A filtration degree of 5 m or less should be selected.

2. Install an aftercooler, air dryer, or water separator (Drain Catch).

Air that includes excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an air dryer, aftercooler or water separator, etc.

3. Use the product within the specified range of fluid and ambient temperature.

Take measures to prevent freezing when below 5°C, since moisture in circuits can freeze and cause damage to seals and lead to malfunctions.

For compressed air quality, refer to "Air Preparation Equipment" catalog.

Actuator Precautions 3

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Operating Environment

⚠ Warning

1. Do not use in atmospheres or locations where corrosion hazards exist.
Refer to the construction drawings regarding cylinder materials.

2. In dusty locations or where water or oil, etc., splash on the equipment, take suitable measures to protect the rod.
Use the heavy duty scraper type (-XC4) in situations where there is a lot of dust. Use a water resistant cylinder when there is splash or spray of liquids.

3. When using auto switches, do not operate in an environment with strong magnetic fields.

Maintenance

⚠ Warning

1. Perform maintenance procedures as shown in the instruction manual.
If it is handled improperly, malfunction or damage of machinery or equipment may occur.

2. Removal of equipment, and supply/exhaust of compressed air
Before any machinery or equipment is removed, first ensure that the appropriate measures are in place to prevent the fall or erratic movement of driven objects and equipment, then cut off the electric power and reduce the pressure in the system to zero. Only then should you proceed with the removal of any machinery and equipment.
When machinery is restarted, proceed with caution after confirming that appropriate measures are in place to prevent cylinders from sudden movement.

⚠ Caution

1. Drain flushing
Remove drainage from air filters regularly. (Refer to the specifications.)

Air-hydro

Caution on Design

⚠ Warning

1. Do not use air-hydro cylinder near flames, or in equipment or machinery that exceeds an ambient temperatures of 60°C.
There is a danger of causing a fire because the air-hydro cylinder uses a flammable hydraulic fluid.

⚠ Caution

1. Do not use it in an environment, equipment, or machine that is not compatible with oil mist.
Air-hydro cylinders generate an oil mist during operation which may affect the environment.

2. Be sure to install an exhaust cleaner on the directional control valve for the air-hydro cylinder.
A very small amount of hydraulic fluid is discharged from the exhaust port of the air-hydro cylinder's directional control valve, and this may contaminate the surrounding area.

3. Install an air-hydro cylinder in locations where it can be serviced easily.
Since the air-hydro cylinder requires maintenance, such as refilling of hydraulic fluid and bleeding of air, ensure sufficient space for these activities.

Selection

⚠ Caution

1. Select an air-hydro cylinder in combination with an air-hydro unit.
Since good operation of an air-hydro cylinder depends on combination with an air-hydro unit, be sure to select an appropriate air-hydro unit.

2. Set the load of the air-hydro cylinder to be 50% or less of the theoretical force.
For an air-hydro cylinder to obtain constant speed and stopping accuracy close to that of a hydraulic cylinder, it is necessary to keep the load at 50% or less of the theorectical output.

Piping

⚠ Caution

1. For air-hydro cylinder piping, use self-aligning fittings.
Do not use One-touch fittings in the piping for an air-hydro cylinder, as oil leakage may occur.

2. For air-hydro cylinder piping, use hard nylon tubing or copper piping.
As in the case of hydraulic circuits, surge pressures greater than the operating pressure may occur in an air-hydro cylinder's piping, making it necessary to use safer piping materials.

Lubrication

⚠ Warning

1. Make sure to completely discharge the compressed air in the system before filling the air-hydro unit with hydraulic oil.
When supplying hydraulic fluid to the air-hydro unit, first confirm that safety measures are implemented to prevent dropping of driven objects and release of clamped objects, etc. Then, shut off the air supply and the equipment's electric power, and exhaust the compressed air in the system.
If the air-hydro unit is supply port is opened with compressed air still remaining in the system, there is a danger of hydraulic fluid being blown out.

Maintenance

⚠ Caution

1. Bleed air from the air-hydro cylinder on a regular basis.
Since air may accumulate inside an air-hydro cylinder, bleed air from it at times such as before starting work. Bleed air from a bleeder valve provided on the air-hydro cylinder or the piping.

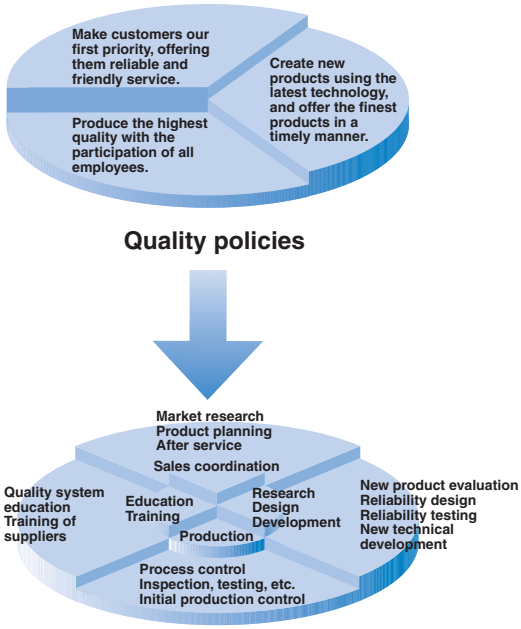
2. Verify the oil level of the air hydro system on a regular basis.
Since a very small amount of hydraulic fluid is discharged from the air-hydro cylinder and air-hydro unit circuit, the fluid will gradually decrease. Therefore, check the fluid regularly and refill as necessary.
The oil level can be checked with a level gauge in the air-hydro converter.

Quality Assurance Information (ISO 9001, ISO 14001)

Reliable quality of products in the global market

To enable our customers throughout the world to use our products with even greater confidence, SMC has obtained certification for international standards “ISO 9001” and “ISO 14001”, and created a complete structure for quality assurance and environmental controls. SMC products pursue to meet its customers’ expectations while also considering company’s contribution in society.

SMC’s quality control system



Quality management system

ISO 9001

This is an international standard for quality control and quality assurance. SMC has obtained a large number of certifications in Japan and overseas, providing assurance to our customers throughout the world.



Environmental management system

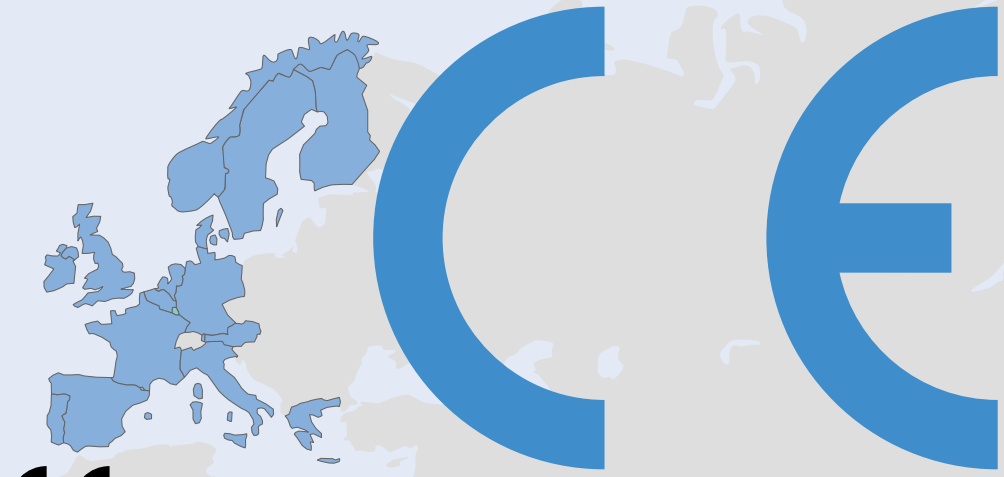
ISO 14001

This is an international standard related to environmental management systems and environmental inspections. While promoting environmentally friendly automation technology, SMC is also making diligent efforts to preserve the environment.



SMC Product Conforming to Inter

SMC products complying with EN/ISO, CSA/UL standards are supporting



CE Mark

The CE mark indicates that machines and components meet essential requirements of all the EC Directives applied.
It has been obligatory to apply CE marks indicating conformity with EC Directives when machines and components are exported to the member Nations of the EU.
Once “A manufacturer himself” declares a product to be safe by means of CE marking (declaration of conformity by manufacturer), free distribution inside the member Nations of the EU is permissible.

■ CE Mark

SMC provides CE marking to products to which EMC and Low Voltage Directives have been applied, in accordance with CETOP (European hydraulics and pneumatics committee) guide lines.

■ As of February 1998, the following 18 countries will be obliged to conform to CE mark legislation

Iceland, Ireland, United Kingdom, Italy, Austria, Netherlands, Greece, Liechtenstein, Sweden, Spain, Denmark, Germany, Norway, Finland, France, Belgium, Portugal, Luxembourg

■ EC Directives and Pneumatic Components

• Machinery Directive

The Machinery Directive contains essential health and safety requirements for machinery, as applied to industrial machines e.g. machine tools, injection molding machines and automatic machines. Pneumatic equipment is not specified in Machinery Directive. However, the use of SMC products that are certified as conforming to EN Standards, allows customers to simplify preparation work of the Technical Construction File required for a Declaration of Conformity.

• Electromagnetic Compatibility (EMC) Directive

The EMC Directive specifies electromagnetic compatibility. Equipment which may generate electromagnetic interference or whose function may be compromised by electromagnetic interference is required to be immune to electromagnetic affects (EMS/immunity) without emitting excessive electromagnetic affects (EMI/emission).

• Low Voltage Directive

This directive is applied to products, which operate above 50 VAC to 1000 VAC and 75 VDC to 1500 VDC operating voltage, and require electrical safety measures to be introduced.

• Simple Pressure Vessels Directive

This directive is applied to welded vessels whose maximum operating pressure (PS) and volume of vessel (V) exceed 50 bar/L. Such vessels require EC type examination and then CE marking.

national Standards

you to comply with EC directives and CSA/UL standards.

■ CSA Standards & UL Standards

UL and CSA standards have been applied in North America (U.S.A. and Canada) symbolizing safety of electric products, and are defined to mainly prevent danger from electric shock or fire, resulting from trouble with electric products. Both UL and CSA standards are acknowledged in North America as the first class certifying body. They have a long experience and ability for issuing product safety certificate. Products approved by CSA or UL standards are accepted in most states and governments beyond question.
Since CSA is a test certifying body as the National Recognized Testing Laboratory (NRTL) within the jurisdiction of Occupational Safety and Health Administration (OSHA), SMC was tested for compliance with CSA Standards and UL Standards at the same time and was approved for compliance with the two Standards. The above CSA NRTL/C logo is described on a product label in order to indicate that the product is approved by CSA and UL Standards.

■ TSSA (MCCR) Registration Products

TSSA is the regulation in Ontario State, Canada. The products that the operating pressure is more than 5 psi (0.03 MPa) and the piping size is bigger than 1 inch. fall into the scope of TSSA regulation.

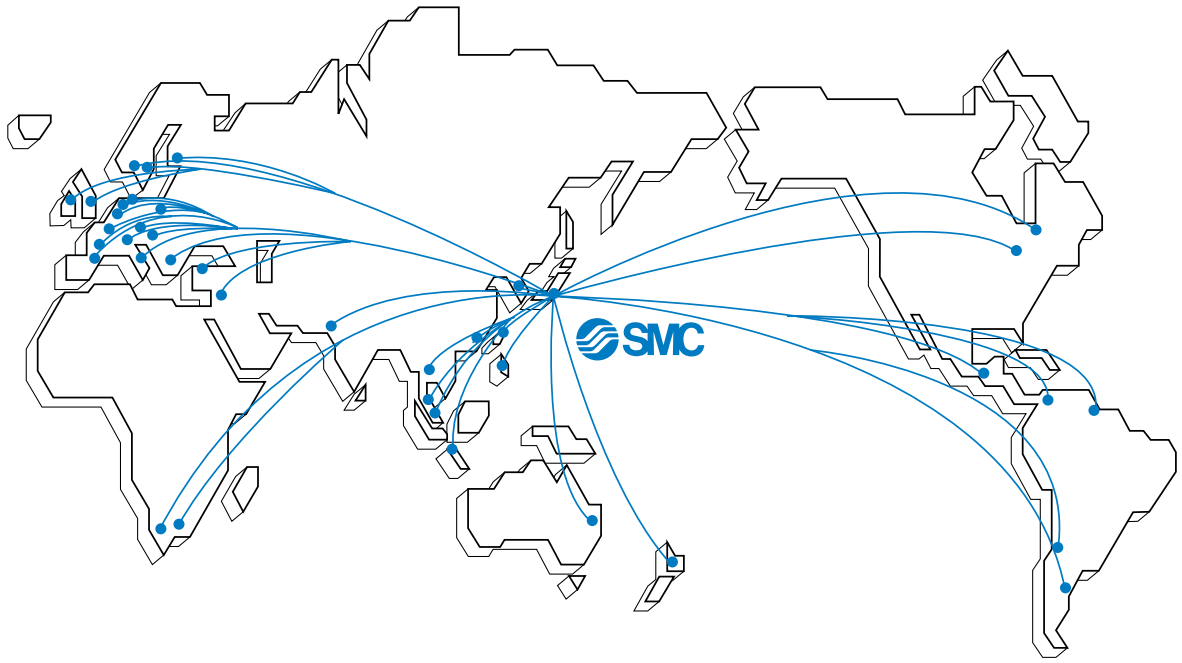
Products conforming to CE Standard

With CE symbol for simple visual recognition

In this catalog each accredited product series is indicated with a CE mark symbol. However, in some cases, every available models may not meet CE compliance. Please visit our web site for the latest selection of available models with CE mark.

http://www.smcworld.com

SMC's Global Service Network



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Low Speed Cylinder
CJ2X/CUX/CQSX/CQ2X/CM2X
ø10 to ø16 ø10 to ø32 ø12 to ø25 ø32 to ø100 ø20 to ø40

Air Cylinder
Series CJ2X

Bore size (mm)	Minimum operating pressure (MPa)	Minimum operating piston speed (mm/s)
10, 16	0.06	1

Page 10-3-6

Free Mount Cylinder
Series CUX

Bore size (mm)	Minimum operating pressure (MPa)	Minimum operating piston speed (mm/s)
10, 16	0.06	1
20, 25, 32	0.05	0.5

10-3-8

Compact Cylinder
Series CQSX

Bore size (mm)	Minimum operating pressure (MPa)	Minimum operating piston speed (mm/s)
12, 16	0.03	1
20, 25	0.025	0.5

10-3-10

Compact Cylinder
Series CQ2X

Bore size (mm)	Minimum operating pressure (MPa)	Minimum operating piston speed (mm/s)
32, 40	0.025	0.5
50, 63, 80, 100	0.01	0.5

10-3-12

Compact Cylinder
Series CM2X

Bore size (mm)	Minimum operating pressure (MPa)	Minimum operating piston speed (mm/s)
20, 25, 32, 40	0.025	0.5

10-3-14

Clean Series

Compact Cylinder
Series 10-/11-CQSX

Air Cylinder
Series 10-/11-CQ2X

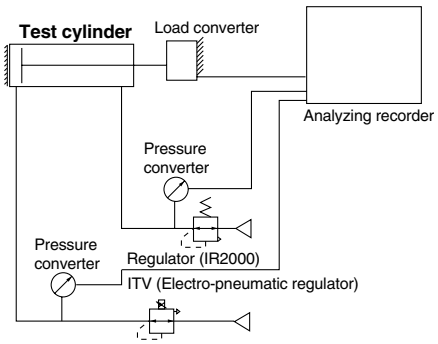
Air Cylinder
Series 10-/11-CM2X

Low Speed Cylinder

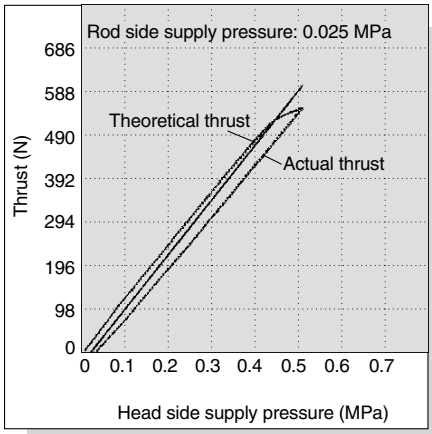
Improved low friction characteristics (CM2X, CQSX, CQ2X)

Minimum operating pressure is reduced in half (compared to previous version).
Stabilization of thrust has been realized.

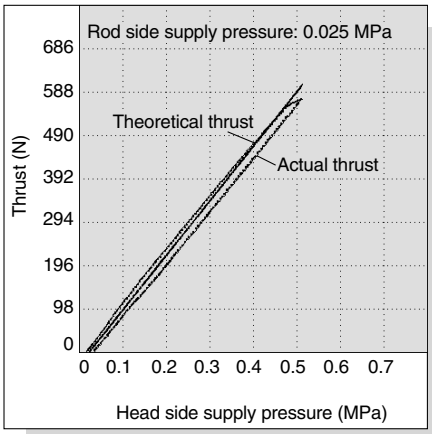
Measurement circuit of cylinder output relative to supply pressure



CQ2B40-75D (Standard)



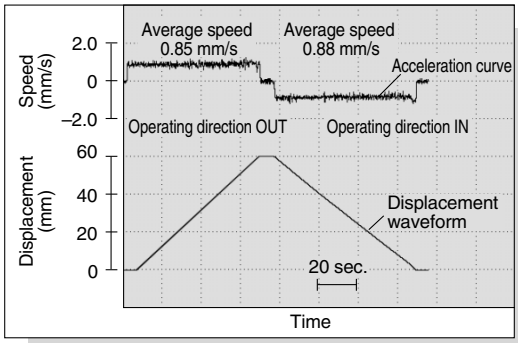
CQ2XB40-75D (Low speed cylinder)



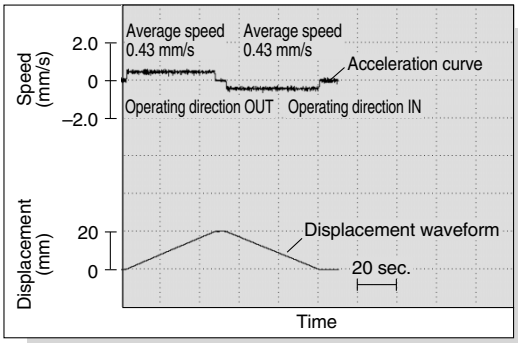
Stable low speed operation even at 0.5 mm/s (1 mm/s for ø16 or smaller) is achieved.

Operates smoothly with minimal stick-slip.

CJ2XB10-60



CQSXB20-20D

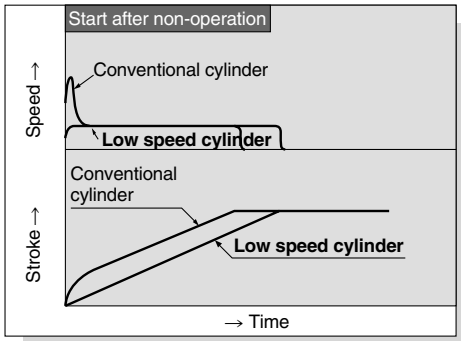


Note 1) Average speed is what the stroke is divided by piston rod's transit time.
Note 2) The OUT operating direction is considered to be positive with regard to speed.

Data conditions • Working fluid····· Air
• Mounting orientation·····Horizontal no-load
• Operating pressure·····0.35 MPa
• Operating circuit····· Meter-in

Possible to transfer a workpiece which hates shocks at lower speeds.

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



The dimensions of all models are the same as those of standard cylinders.

Clean room specification has been added. (10-/11-CQSX, CQ2X, CM2X)

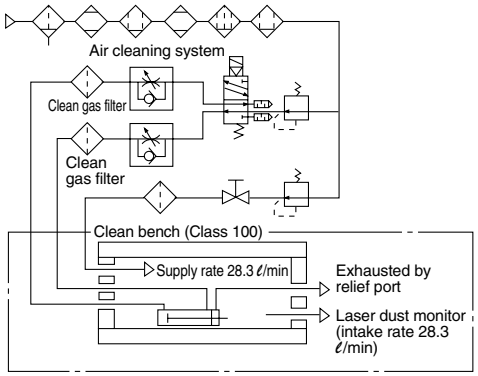
Particulate generation data for microspeed cylinder with clean room specifications are measured using the following test method.

[Example of test method]

The test sample is in place in an acrylic chamber. The chamber is set up on a Class 100 clean bench. The solenoid valve is operated while supplying a volume of clean air equal to the intake volume of a laser dust monitor (28.3 ℓ/min). The amount of particle generation is measured for a specific number of operating cycles.

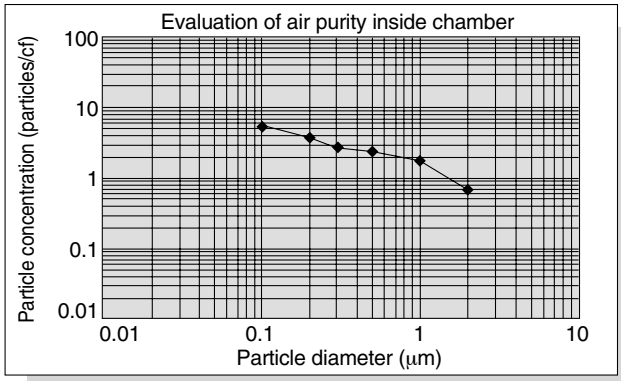
Measuring Conditions

Chamber volume	15 ℓ
Purity of air supplied to chamber	Same quality as supply air
Laser dust monitor	Hitachi Electoronics Engineering Corporation TS-6200 Min. measurable particle dia.: 0.1 μm Intake rate: 28.3 ℓ/min
Laser dust monitor setting conditions	Sampling time: 5 min Interval time: 55 min
Cylinder operating conditions	Operating frequency: 30 cpm Average piston speed: 100 mm/s Mounting: Horizontal no-load Supply pressure: 0.5 MPa

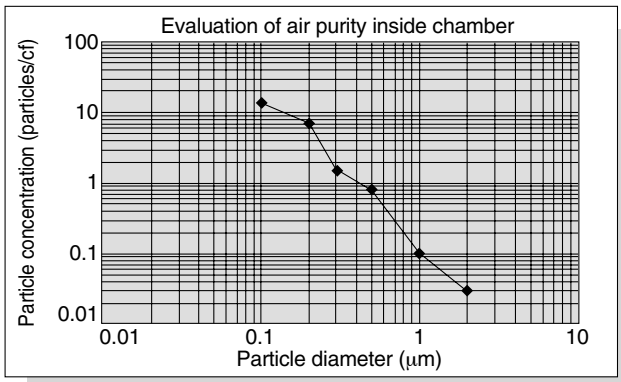


Particle generation measuring circuit

10-CQSXB20-50D



10-CM2XB20-50

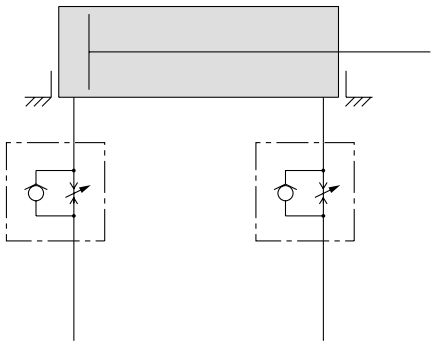


Low Speed Cylinder
Specific Product Precautions
Be sure to read before handling.

Recommended Pneumatic Circuit

⚠ Warning
Horizontal Operation

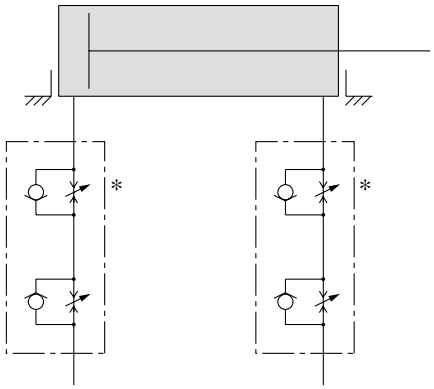
1



Meter-in speed controllers

Meter-in speed controllers can reduce lurching while controlling the speed. The two knobs facilitate adjustment.

2

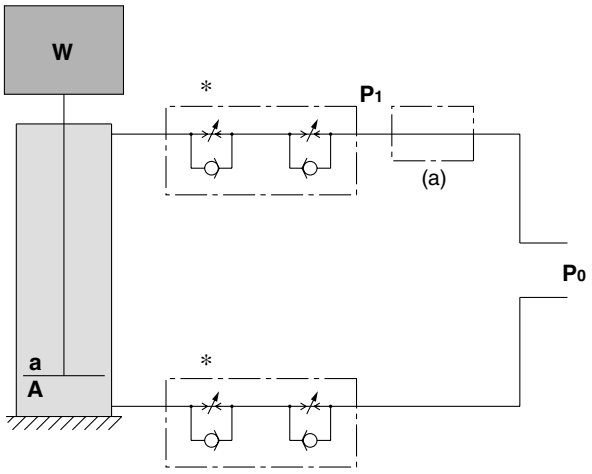


Dual speed controllers

Velocity is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip. More stable low speed operation can be achieved than meter-in circuit alone.

Vertical Operation

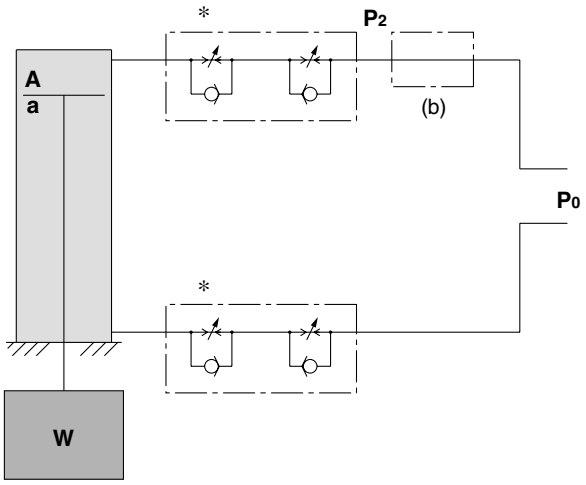
1



(1) The speed is controlled with meter-out control. When the meter-in controller is used in conjunction with the meter-out controller, lurching is reduced. (*)

(2) Depending on the size pf the load, installing a regulator with check valve at position (a) can decrease lurching during descent, and operation delay during ascent.
As a guide, when
W + **P0a** > **P0A**,
adjust **P1**, so that it could be **W** + **P1a** = **P0A**.

2



(1) The speed is controlled with meter-out control. When the meter-in controller is used in conjunction with the meter-out controller, lurching is reduced. (*)

(2) Installing a regulator with check valve at position (b) can decrease lurching during descent, and actuation delay during ascent.
As a guide,
adjust **P2**, so that it could be **W** + **P2A** = **P0a**.

W: Load (N) **P0**: Operating pressure (MPa) **a**: Piston area in the rod side (mm^2) **A**: Piston area in the head side (mm^2)

⚠ Warning

Since **C□J2X**, **C□UX10** are subject to internal leakage due to their construction, the speed may not be fully controlled with the meter-out controller (*) during low speed operation.

CAD The external dimensions and the related things about auto switches are the same as standard type, double acting, single rod. For Series CJ2, refer to Best Pneumatics Vol. 6.

Low Speed Cylinder
Double Acting, Single Rod
Series CJ2X
ø10, ø16

How to Order

Bore size

10	10 mm
16	16 mm

Standard stroke (mm)

10	15, 30, 45, 60, 75, 100, 125, 150
16	15, 30, 45, 60, 75, 100, 125, 150, 175, 200

∗ Intermediate stroke other than above is manufactured upon receipt of order.

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
D	Double clevis style

Without auto switch CJ2X **L** **16** – **60** ☐

With auto switch CDJ2X **L** **16** – **60** ☐ – **H7BW** ☐

- CDJ2X: Built-in magnet
- **L**: Low speed cylinder
- ☐ (after 60): Port location on head cover
- **H7BW**: Auto switch
- ☐ (last): Number of auto switches

Port location on head cover

	ø10, ø16
Nil	Perpendicular to axis
R	Axial direction

∗ For configuration, refer to page 10-3-7.

Auto switch

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches for rail mounting style are shipped together, (but not assembled).

Number of auto switches

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

Built-in Magnet Cylinder Model

Suffix the symbol "-A" (Rail mounting style) or "-B" (Band mounting style) to the end of part number for cylinder with auto switch.

Example	Rail mounting style	CDJ2XB10-45-A
	Band mounting style	CDJ2XB16-60-B

Applicable Auto Switch/Refer to page 10-20-1 for further information on auto switches.

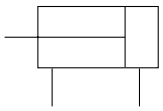
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model: Band mounting	Rail mounting: Perpendicular	Rail mounting: In-line	Lead wire length (m)∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	C76	—	A76H	●	●	—	—	—	IC circuit	—
				2-wire		–	200 V	—	A72	A72H	●	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	C73	A73	A73H	●	●	●	—	—	—	
		Connector				12 V	—	C73C	A73C	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—		—	A79W	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	H7A1	F7NV	F79	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				H7A2	F7PV	F7P	●	●	○	—	○		
				2-wire		12 V		H7B	F7BV	J79	●	●	○	—	○	—	
		Connector						H7C	J79C	—	●	●	●	●	○		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		H7NW	F7NWV	F79W	●	●	○	—	○	IC circuit	
				3-wire (PNP)				H7PW	—	F7PW	●	●	○	—	○		
				2-wire		12 V		H7BW	F7BWV	J79W	●	●	○	—	○	—	
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		H7NF	—	F79F	●	●	○	—	○	IC circuit	

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) C73C
3 m ····· L (Example) C73CL
5 m ····· Z (Example) C73CZ
None ····· N (Example) C73CN

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

• Since there are other applicable auto switches than listed, refer to Best Pneumatics Vol. 6 for details.
• For details about auto switches with pre-wire connector, refer to page 10-20-66.

JIS Symbol
Double acting,
Single rod



Specifications

Action		Double acting, Single rod
Fluid		Air
Proof pressure		1.05 MPa
Maximum operating pressure		0.7 MPa
Minimum operating pressure		0.06 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 equipment)
Lubrication		Not required (Non-lube)
Thread tolerance		JIS Class 2
Stroke length tolerance		$^{+1.0}_{0}$
Piston speed		1 to 300 mm/s
Allowable kinetic energy	ø10	0.035 J
	ø16	0.090 J

Standard Stroke

Bore size (mm)	Standard stroke (mm)
10	15, 30, 45, 60, 75, 100, 125, 150
16	15, 30, 45, 60, 75, 100, 125, 150, 175, 200

Mounting Style and Accessory

Mounting		Basic style	Axial foot style	Rod side flange style	Double* clevis style
Standard equipment	Mounting nut	●	●	●	—
	Rod end nut	●	●	●	●
	Clevis pin	—	—	—	●
Option	Single knuckle joint	●	●	●	●
	Double knuckle joint*	●	●	●	●
	T-bracket	—	—	—	●

∗ Pin and snap ring are shipped together with double clevis and double knuckle joint.

Port Location on Head Cover

For basic style, the port position in a head cover is available either perpendicular to the axis or in-line with the cylinder axis.

Axial direction Perpendicular

Mounting Bracket Part No.

Mounting bracket	Bore size (mm)	
	10	**16**
Foot bracket	CJ-L010B	CJ-L016B
Flange bracket	CJ-F010B	CJ-F016B
T-bracket*	CJ-T010B	CJ-T016B

∗ T-bracket is used with double clevis (D).

Auto Switch Mounting Bracket Part No. (Band mounting style)

Bore size (mm)	Auto switch mounting bracket part no.	Note
10	BJ2-010	Common for the types of D-C7/C8 and D-H7
16	BJ2-016	

⚠Precautions

Be sure to read before handling. For Safety Instructions and Actuator Precautions, refer to pages 10-24-3 to 10-24-6.

Mounting

⚠Caution

1. During installation, secure the rod cover and tighten by applying an appropriate tightening force to the retaining but or to the rod cover body.
   If the head cover is secured or the head cover is tightened, the cover could rotate, leading to the deviation.
2. Proper tightening torque for mounting thread should be within the range specified. Apply a Loctite® (no. 242 Blue) for mounting thread.

Bore size (mm)	Proper tightening torque for mounting thread (N·m) (tightening torque for mounting nut)
10	3.0 to 3.2
16	5.4 to 5.9

3. To remove and install the snap ring for the knuckle pin or the clevis pin, use an appropriate pair of pliers (tool for installing a type C snap ring).
   Especially with ø10, use ultra thin pliers, such as Super Tool Corp., CSM-07A.
4. For the auto switch mounting rail, do not remove the pre-equipped rail. Since the mounting thread is drilled through inside a the cylinder, it will result in air leakage.

Operating Precautions

⚠Warning

1. It might not be able to control by meter-out at a low speed operation.

⚠Caution

1. For Series CJ2X, 0.1 Nℓ/min is the values at maximum in terms of its construction and there is internal leakage (ANR).

The external dimensions and the related things about auto switches are the same as standard type, double acting, single rod. For Series CU, CDU, refer to Best Pneumatics Vol. 7.

Low Speed Cylinder
Double Acting, Single Rod
Series CUX
ø10, ø16, ø20, ø25, ø32

How to Order

Without auto switch CUX 10 — 30 D

With auto switch CDUX 10 — 30 D — F9BW ☐

Built-in magnet

Low speed cylinder

Bore size

10	10 mm
16	16 mm
20	20 mm
25	25 mm
32	32 mm

Standard stroke (mm)

10, 16	5, 10, 15, 20, 25, 30
20, 25, 32	5, 10, 15, 20, 25, 30, 40, 50

Action

D	Double acting

Auto switch

Nil	Without auto switch

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled).

Number of auto switches

Nil	2 pcs.
S	1 pc.

Applicable Auto Switch/Refer to page 10-20-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model Perpendicular	Auto switch model In-line	Lead wire length (m)∗ 0.5 (Nil)	3 (L)	5 (Z)	Pre-wire connector	Applicable load	
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
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**	●	●	○	○	–	
	Diagnostic indication (2-color indication)			3-wire (NPN)		5 V, 12 V		**F9NWV**	**F9NW**	●	●	○	○	IC circuit	
				3-wire (PNP)				**F9PWV**	**F9PW**	●	●	○	○		
				2-wire		12 V		**F9BWV**	**F9BW**	●	●	○	○	—	

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) A93
3 m ····· L (Example) A93L
5 m ····· Z (Example) F9NWZ

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

• Since there are other applicable auto switches than listed, refer to Best Pneumatics Vol. 7 for details.
• For details about auto switches with pre-wire connector, refer to page 10-20-66.

Specifications

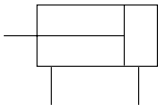
Fluid	Air
Proof pressure	1.05 MPa
Maximum operating pressure	0.7 MPa
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)
Lubrication	Not required (Non-lube)
Piston speed	ø10, ø16: 1 to 300 mm/s ø20 to ø32: 0.5 to 300 mm/s
Cushion	Rubber bumper on both ends
Rod end thread	Male thread
Thread tolerance	JIS Class 2
Stroke length tolerance	$^{+1.0}_{0}$ Note)
Mounting	Basic style

Note) Tolerance $^{+1.0}_{0}$

Minimum Operating Pressure

Bore size (mm)	10	16	20	25	32
Min. operating pressure (MPa)	0.06	0.06	0.05	0.05	0.05

JIS Symbol
Double acting,
Single rod



Standard Stroke

Bore size (mm)	Standard stroke (mm)
10, **16**	5, 10, 15, 20, 25, 30
20, **25**, **32**	5, 10, 15, 20, 25, 30, 40, 50

⚠Precautions

Be sure to read before handling. For Safety Instructions and Actuator Precautions, refer to pages 10-24-3 to 10-24-6.

Mounting

⚠Caution

1. Tightening the cylinder beyond the range of the indicated torque (shown in the table below) may affect operation. Apply Loctite® (no. 242, Blue) to the mounting threads.

Bore size (mm)	Hexagon socket head (mm)	Proper tightening torque (N·m) (Cylinder body)
10	M3	0.54 ±10%
16	M4	1.23 ±10%
20, 25	M5	2.55 ±10%
32	M6	4.02 ±10%

Operating Precautions

⚠Warning

1. It might not be able to control CUX10 by meter-out at a low speed operation.

⚠Caution

1. For Series CUX10, up to 0.1 Nℓ/min (ANR) of internal leakage is anticipated due to cylinder structure.

Maintenance

⚠Caution

1. Replacement parts/Seal kit
Order it in accordance with the bore size.

Bore size (mm)	Kit no.	Contents	
16	CUX16-PS	Piston seal:	1 pc.
20	CUX20-PS	Rod seal:	1 pc.
25	CUX25-PS	Gasket:	1 pc.
32	CUX32-PS	Grease pack (10 g):	1 pc.

∗ It is impossible to replace seals in bore size 10 mm.

2. Grease pack
When maintenance requires only grease, use the following part numbers to order.
Grease pack
GR-L-005 (5 g)
GR-L-010 (10 g)
GR-L-150 (150 g)

The external dimensions and the related things about auto switches are the same as standard type, double acting, single rod. For Series CQS, CDQS, refer to Best Pneumatics Vol. 7.

Low Speed Cylinder
Double Acting, Single Rod
Series CQSX
ø12, ø16, ø20, ø25

How to Order

Without auto switch CQSX | B | 20 | 30 | D | |

With auto switch CDQSX | B | 20 | 30 | D | | F9BW | |

Built-in magnet

Low speed cylinder

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

Standard stroke

Bore size (mm)	Standard stroke (mm)
12, 16	5, 10, 15, 20, 25, 30
20	5, 10, 15, 20, 25, 30, 35, 40, 45, 50
25	

• Manufacturing of intermediate stroke
Intermediate strokes by the 1 mm interval are available by using spacers with standard stroke cylinders. The overall length of cylinder will be the same as the standard stroke with a longer one.
Example) 3 mm width spacer is installed in the standard cylinder CQSXB25-50D to make CQSXB25-47D.

Action

D	Double acting

Cushion/Rod end thread

Nil	Standard (Rod end female thread)
C	With rubber bumper
M	Rod end male thread

∗ Combination above is possible.

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled).

Number of auto switches

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

Applicable Auto Switch/Refer to page 10-20-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m)∗ 0.5 (Nil)	3 (L)	5 (Z)	Pre-wire connector	Applicable load	
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
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**	●	●	○	○	—	
	Diagnostic indication (2-color indication)			3-wire (NPN)		5 V, 12 V		**F9NWV**	**F9NW**	●	●	○	○	IC circuit	
				3-wire (PNP)				**F9PWV**	**F9PW**	●	●	○	○		
				2-wire		12 V		**F9BWV**	**F9BW**	●	●	○	○	—	

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) A93
3 m ····· L (Example) Y93BL
5 m ····· Z (Example) F9NWZ

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

• Since there are other applicable auto switches than listed, refer to Best Pneumatics Vol. 7 for details.
• For details about auto switches with pre-wire connector, refer to page 10-20-66.

Specifications

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
Rod end thread	Female thread
Rod end thread tolerance	JIS Class 2
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

Minimum Stroke for Auto Switch Mounting

(mm)

No. of auto switches mounted	D-A9□, D-F9□WV	D-A9□V	D-M9□, D-F9□W	D-M9□V
2 pcs.	10	10	15 Note)	5
1 pc.	10 Note)	5	15 Note)	5

Note) Please consult with SMC for shorter stroke length than indicated in the table.

Minimum Operating Pressure

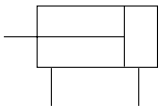
Bore size (mm)	12	16	20	25
Min. operating pressure (MPa)	0.03	0.03	0.025	0.025

Body Option

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

JIS Symbol

Double acting,
Single rod



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

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

Note 2) Parts belonging to each bracket are as follows.
Foot or Flange: Body mounting bolts
Double clevis: Clevis pin, Type C snap ring for shaft, Body mounting bolts

⚠Precautions

Be sure to read before handling. For Safety Instructions and Actuator Precautions, refer to pages 10-24-3 to 10-24-6.

Snap Ring Installation/Removal

⚠Caution

1. For installation and removal, use an appropriate pair of pliers (tool for installing a type C snap ring).
2. 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 installment.

Maintenance

⚠Caution

1. Replacement parts/Seal kit

Order it in accordance with the bore size.

Bore size (mm)	Kit no.	Contents	
12	CQSX12-PS	Piston seal:	1 pc.
16	CQSX16-PS	Rod seal:	1 pc.
20	CQSX20-PS	Tube gasket:	1 pc.
25	CQSX25-PS	Grease pack (10 g):	1 pc.

2. Grease pack

When maintenance requires only grease, use the following part numbers to order.
Grease pack
GR-L-005 (5 g)
GR-L-010 (10 g)
GR-L-150 (150 g)

The external dimensions and the related things about auto switches are the same as standard type, double acting, single rod. For Series CQ2, CDQ2, refer to Best Pneumatics Vol. 7.

Low Speed Cylinder Double Acting, Single Rod

Series CQ2X

ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Without auto switch CQ2X B 40 – 30 D

With auto switch CDQ2X B 40 – 30 D – F9BW

Built-in magnet

Low speed cylinder

Mounting style

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

Bore size

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

Standard stroke
Refer to "Standard Stroke" on page 10-3-13.

Action

D	Double acting

Cushion/Rod end thread

Nil	Standard (Rod end female thread)
C	With rubber bumper
M	Rod end male thread

∗ Combination above is possible.

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled).

Number of auto switches

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

Applicable Auto Switch/Refer to page 10-20-1 for further information on auto switches.

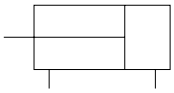
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Rail mounting style ø32 to ø100 Perpendicular	Rail mounting style ø32 to ø100 In-line	Direct mounting style ø32 to ø100 Perpendicular	Direct mounting style ø32 to ø100 In-line	Lead wire length (m)∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	A76H	A96V	A96	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200 V	A72	A72H	—	—	●	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	A73	A73H	—	—	●	●	●	—	—		
								—	—	A93V	A93	●	●	—	—	—		
		Connector					—	A73C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	A79W	—	—	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NV	F79	M9NV	M9N	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				F7PV	F7P	M9PV	M9P	●	●	○	—	○		
				2-wire		12 V		F7BV	J79	M9BV	M9B	●	●	○	—	○	—	
		Connector						J79C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		F7NWV	F79W	F9NWV	F9NW	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	F7PW	F9PWV	F9PW	●	●	○	—	○		
				2-wire		12 V		F7BWV	J79W	F9BWV	F9BW	●	●	○	—	○	—	
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		—	F79F	—	—	●	●	○	—	○	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 Best Pneumatics Vol. 7 for details.
• For details about auto switches with pre-wire connector, refer to page 10-20-66.

JIS Symbol
Double acting,
Single rod



Specifications

Bore size (mm)		32	40	50	63	80	100
Model		Pneumatic (Non-lube)					
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)					
Piping	Screw-in type	Note) M5 x 0.8 Rc 1/8	Rc 1/8	Rc 1/4	Rc 1/4	Rc 3/8	Rc 3/8
Rubber bumper		None					
Rod end thread		Female thread					
Rod end thread tolerance		JIS Class 2					
Stroke length tolerance		$^{+1.0}_{0}$					
Mounting		Through-hole					
Piston speed		0.5 to 300 mm/s					

Note) Only 5 stroke comes with M5 x 0.8 in the case of no auto switch.

Minimum Operating Pressure

Bore size (mm)	32	40	50	63	80	100
Min. operating pressure (MPa)	0.025		0.01			

Standard Stroke

Bore size (mm)	Standard stroke (mm)
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

• Manufacturing of Intermediate stroke
Intermediate strokes by the 1 mm interval are available by using spacers with standard stroke cylinders. But, as for ø40 to ø100 with damper, please consult with SMC separately.
Example) 18 mm width spacer is installed in the standard cylinder CQ2XB40-75D to make CQ2XB40-57D.

Mounting Bracket Part No.

Bore size (mm)	Foot (1)	Flange	Double clevis (3)
32	CQ-L032	CQ-F032	CQ-D032
40	CQ-L040	CQ-F040	CQ-D040
50	CQ-L050	CQ-F050	CQ-D050
63	CQ-L063	CQ-F063	CQ-D063
80	CQ-L080	CQ-F080	CQ-D080
100	CQ-L100	CQ-F100	CQ-D100

Note 1) When ordering foot bracket, order 2 pieces per cylinder.
Note 2) Parts belonging to each bracket are as follows.
Foot or Flange: Body mounting bolts
Double clevis: Clevis pin, Type C snap ring for shaft, Body mounting bolts
Note 3) For double clevis style, clevis pin and snap ring are shipped together.

⚠Precautions

Be sure to read before handling. For Safety Instructions and Actuator Precautions, refer to pages 10-24-3 to 10-24-6.

Snap Ring Installation/Removal

⚠Caution

1. For installation and removal, use an appropriate pair of pliers (tool for installing a type C snap ring).
2. 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 installment.

Pneumatic Circuit

1. Pressure supplied to cylinder should be set affordably. When the operating pressure is low, low speed operation may not be stable depending on a load condition. Besides, the maximum speed may be restricted depending on a pneumatic circuit, or operating pressure.

Maintenance

⚠Caution

1. Replacement parts/Seal kit
Order it in accordance with the bore size.

Bore size (mm)	Kit no.	Contents	
32	CQ2X32-PS	Piston seal:	1 pc.
40	CQ2X40-PS		
50	CQ2X50-PS	Rod seal:	1 pc.
63	CQ2X63-PS	Gasket:	1 pc.
80	CQ2X80-PS		
100	CQ2X100-PS	Grease pack (10 g):	1 pc.

2. Grease pack
When maintenance requires only grease, use the following part numbers to order.
Grease pack
GR-L-005 (5 g)
GR-L-010 (10 g)
GR-L-150 (150 g)

The external dimensions and the related things about auto switches are the same as standard type, double acting, single rod. For Series CM2, refer to Best Pneumatics Vol. 6.

Low Speed Cylinder
Double Acting, Single Rod
Series CM2X
ø20, ø25, ø32, ø40

How to Order

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
C	Single clevis style
D	Double clevis style
U	Rod side trunnion style
T	Head side trunnion style
E	Clevis integrated style
BZ	Boss-cut basic style
FZ	Boss-cut rod side flange style
UZ	Boss-cut rod side trunnion style

Standard stroke
Refer to "Standard Stroke" on page 10-3-15.

Without auto switch CM2X **L** **40** — **150**

With auto switch CDM2X **L** **40** — **150** — **H7BW** □

Built-in magnet

Low speed cylinder

Bore size

20	20 mm
25	25 mm
32	32 mm
40	40 mm

Number of auto switches

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

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.

Applicable Auto Switch/Refer to page 10-20-1 for further information on auto switches.

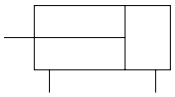
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model	Lead wire length (m)∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**C76**	●	●	—	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	**C73**	●	●	●	—	—		Relay, PLC
							100 V, 200 V	**B54**	●	●	●	—	—		
		Connector					—	**C73C**	●	●	●	●	—		
		Terminal conduit					—	**A33A**	—	—	—	●	—	—	PLC
							100 V, 200 V	**A34A**	—	—	—	●	—		Relay, PLC
		DIN terminal						**A44A**	—	—	—	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	**B59W**	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**H7A1**	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				**H7A2**	●	●	○	—	○		
				2-wire		12 V		**H7B**	●	●	○	—	○	—	
		Connector						**H7C**	●	●	●	●	—		
		Terminal conduit		3-wire (NPN)		5 V, 12 V		**G39A**	—	—	—	●	—	IC circuit	
				2-wire		12 V		**K39A**	—	—	—	●	—	—	
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		**H7NW**	●	●	○	—	○	IC circuit	
				3-wire (PNP)				**H7PW**	●	●	○	—	○		
				2-wire		12 V		**H7BW**	●	●	○	—	○	—	
	Water resistant (2-color indication)							**H7BA**	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		**H7NF**	●	●	○	—	○	IC circuit	

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) C73C
3 m ····· L (Example) C73CL
5 m ····· Z (Example) C73CZ
None ····· N (Example) C73CN

∗ Solid state switches marked with "○" are produced upon receipt of order.
∗ Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.

• Since there are other applicable auto switches than listed, refer to Best Pneumatics Vol. 6 for details.
• For details about auto switches with pre-wire connector, refer to page 10-20-66.

JIS Symbol
Double acting
Single rod



Standard Stroke

Bore size (mm)	Standard stroke (mm) Note)
20	25, 50, 75, 100, 125, 150 200, 250, 300
25	
32	
40	

Note) Other intermediate strokes can be manufactured upon receipt of order.

⚠Precautions

Be sure to read before handling. For Safety Instructions and Actuator Precautions, refer to pages 10-24-3 to 10-24-6.

Operating Precautions

⚠Warning

1. Do not rotate the cover.
- When installing a cylinder or screwing a pipe fitting into the port, the coupling portion of the cover could break if the cover rotated.

⚠Caution

1. Be careful of the snap ring to pop out.
- When replacing the rod seal, take care that the snap ring does not spring out while you are removing it.

Maintenance

⚠Caution

1. Replacement parts/Seal kit
Order it in accordance with the bore size.

Bore size (mm)	Kit no.	Contents
20	CM2X20-PS	Rod seal: 1 pc. Grease pack (10 g): 1 pc.
25	CM2X25-PS	
32	CM2X32-PS	
40	CM2X40-PS	

2. Grease pack
When maintenance requires only grease, use the following part numbers to order.
Grease pack
GR-L-005 (5 g)
GR-L-010 (10 g)
GR-L-150 (150 g)

Specifications

Bore size (mm)		20, 25, 32, 40
Type		Pneumatic
Action		Double acting, Single rod
Fluid		Air
Proof pressure		1.5 MPa
Maximum operating pressure		1.0 MPa
Minimum operating pressure		0.025 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
Piping	Screw-in type	ø20 to ø32: Rc 1/8, ø40: Rc 1/4
Lubrication		Not required (Non-lube)
Thread tolerance		JIS Class 2
Stroke length tolerance		$^{+1.4}_{0}$

Piston Speed

Bore size (mm)	20	25	32	40
Piston speed (mm/s)	0.5 to 300			
Allowable kinetic energy (J)	0.27	0.4	0.65	1.2

Mounting Bracket Part No.

Bore size (mm)	20	25	32	40
Axial foot*	CM-L020B	CM-L032B		CM-L040B
Flange	CM-F020B	CM-F032B		CM-F040B
Single clevis	CM-C020B	CM-C032B		CM-C040B
Double clevis (with pin)**	CM-D020B	CM-D032B		CM-D040B
Trunnion (with nut)	CM-T020B	CM-T032B		CM-T040B

* When ordering foot bracket, order 2 pieces per cylinder.
** Clevis pin and snap ring (cotter pin for ø40) are shipped together.

Auto Switch Mounting Bracket Part No.

Auto switch model	Bore size (mm)			
	20	**25**	**32**	**40**
D-C7/C8, D-H7	BM2-020	BM2-025	BM2-032	BM2-040
D-B5/B6, D-G5	BA2-020	BA2-025	BA2-032	BA2-040
D-A3□A/A44A, D-G39A/K39A	BM3-020	BM3-025	BM3-032	BM3-040

Mounting Style and Accessory

Accessory / Mounting	Standard equipment			Option		
	Mounting nut	Rod end nut	Clevis pin	Single knuckle joint	Double (3) knuckle joint	Clevis bracket
Basic style	● (1 pc.)	●	—	●	●	—
Axial foot style	● (2)	●	—	●	●	—
Rod side flange style	● (1)	●	—	●	●	—
Head side flange style	● (1)	●	—	●	●	—
Clevis integrated style	— (1)	●	—	●	●	●
Single clevis style	— (1)	●	—	●	●	—
Double clevis style (3)	— (1)	●	●	●	●	—
Rod side trunnion style	● (1) (2)	●	—	●	●	—
Head side trunnion style	● (1) (2)	●	—	●	●	—
Boss-cut basic style	● (1)	●	—	●	●	—
Boss-cut flange style	● (1)	●	—	●	●	—
Boss-cut trunnion style	● (1)	●	—	●	●	—
Note					With pin	With pin

Note 1) Mounting nut is not equipped with clevis integrated style, single clevis style and double clevis style.
Note 2) Trunnion nuts are attached for rod side trunnion and head side trunnion styles.
Note 3) Pin and snap ring are shipped together with double clevis and double knuckle joint. (ø40 is cotter pin.)

Clean Series Low Speed Cylinder Series 10-, 11-

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.
Since the external dimensions and applicable auto switches are the same as standard type, refer to the separate catalog of "Pneumatic Clean Series".

Series 10-, 11-CQSX

How to Order

Clean Series

10	Relief type
11	Vacuum type

10 – C(D)QSX B 20 – 30 D – F9BW

Built-in magnet

Low speed cylinder

Mounting style

B	Through-hole/Both ends tapped common (Standard)

Bore size

12	12 mm
16	16 mm
20	20 mm
25	25 mm

Cylinder stroke (mm)

Bore size (mm)	Standard stroke (mm)
12, 16	5, 10, 15, 20, 25, 30
20	5, 10, 15, 20, 25,
25	30, 35, 40, 45, 50

● Manufacturing of Intermediate stroke
Intermediate strokes by the 1 mm interval are available by using spacers with standard stroke cylinders. The overall length of cylinder will be the same as the standard stroke with a longer one.
Example) 3 mm width spacer is installed in the standard cylinder 10-CQSXB25-50D to make 10-CQSXB25-47D.

Number of auto switches

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

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to page 10-3-10.
∗ Auto switches are shipped together, (but not assembled).

Rod end thread

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

Action

D	Double acting

Specifications

Bore size (mm)		10- (Relief type) 12	16	20	25
Fluid		Air			
Proof pressure		1.5 MPa			
Maximum operating pressure		1.0 MPa			
Minimum operating pressure		0.04 MPa		0.035 MPa	
Ambient and fluid temperature		Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)			
Piston speed		1 to 200 mm/s			
Piston rod size		6	8	10	12
Rod end thread	Female thread	M3 x 0.5	M4 x 0.7	M5 x 0.8	M6 x 1.0
	Male thread	M5 x 0.8	M6 x 1.0	M8 x 1.25	M10 x 1.25
Rod end thread tolerance		JIS Class 2			
Stroke tolerance		$^{+1.0}_{0}$ mm			
Port size		M5 x 0.8			
Vacuum port, Relief port		M5 x 0.8			

Bore size (mm)		11- (Vacuum type) 12	16	20	25
Fluid		Air			
Proof pressure		1.5 MPa			
Maximum operating pressure		1.0 MPa			
Minimum operating pressure		0.03 MPa		0.025 MPa	
Ambient and fluid temperature		Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)			
Piston speed		1 to 200 mm/s		0.5 to 200 mm/s	
Piston rod size		6	8	10	12
Rod end thread	Female thread	M3 x 0.5	M4 x 0.7	M5 x 0.8	M6 x 1.0
	Male thread	M5 x 0.8	M6 x 1.0	M8 x 1.25	M10 x 1.25
Rod end thread tolerance		JIS Class 2			
Stroke tolerance		$^{+1.0}_{0}$ mm			
Port size		M5 x 0.8			
Vacuum port, Relief port		M5 x 0.8			

Series 10-, 11-CQ2X

How to Order

Clean Series

10	Relief type
11	Vacuum type

10 – C(D)Q2XB 40 – 30 D – J79W

Built-in magnet

Low speed cylinder

Bore size

32	32 mm
40	40 mm
50	50 mm
63	63 mm

Cylinder stroke (mm)

Standard Stroke

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

● Manufacturing of Intermediate stroke
Intermediate strokes by the 1 mm interval are available by using spacers with standard stroke cylinders. But, as for ø40 with damper, please consult SMC separately.
Example) 18 mm width spacer is installed in the standard cylinder 10-CQ2XB40-75D to make 10-CQ2XB40-57D.

Number of auto switches

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

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to page 10-3-12.
∗ Auto switches are shipped together, (but not assembled).

Rod end thread

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

Action

D	Double acting

Specifications

Bore size (mm)		10- (Relief type) 32	40	50	63	11- (Vacuum type) 32	40	50	63
Fluid		Air							
Proof pressure		1.5 MPa							
Maximum operating pressure		1.0 MPa							
Minimum operating pressure		0.035 MPa		0.03 MPa		0.025 MPa		0.02 MPa	
Ambient and fluid temperature		Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)							
Piston speed		1 to 200 mm/s				0.5 to 200 mm/s			
Piston rod size		16		20		16		20	
Rod end thread	Female thread	M8 x 1.25		M10 x 1.5		M8 x 1.25		M10 x 1.5	
	Male thread	M14 x 1.5		M18 x 1.5		M14 x 1.5		M18 x 1.5	
Rod end thread tolerance		JIS Class 2							
Stroke tolerance		$^{+1.0}_{0}$ mm							
Port size		M5 x 0.8, RC 1/8 Note)		Rc1/4		M5 x 0.8, RC 1/8 Note)		Rc1/4	
Vacuum port, Relief port		M5 x 0.8							

Note) Only 5 stroke comes with M5 x 0.8 in the case of no auto switch on ø32.

Series 10-, 11-CM2X

How to Order

Clean Series

10	Relief type
11	Vacuum type

10 – C(D)M2X L 40 – 150 – F9BW

Built-in magnet

Low speed cylinder

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
BZ	Boss-cut basic style
FZ	Boss-cut rod style Flange style

Bore size

20	20 mm
25	25 mm
32	32 mm
40	40 mm

Number of auto switches

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

Cylinder stroke (mm)

Refer to "Standard Stroke" below.

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to page 10-3-14.

Stroke

Clean series	Bore size (mm)	Standard stroke (mm)
10- (Relief type)	20	25, 50, 75, 100, 125, 150, 175, 200, 250, 300
	25	
	32	
	40	
11- (Vacuum type)	20	
	25	
	32	
	40	

Specifications

Bore size (mm)	10- (Relief type)				11- (Vacuum type)			
	20	25	32	40	20	25	32	40
Fluid	Air							
Proof pressure	1.5 MPa							
Maximum operating pressure	1.0 MPa							
Minimum operating pressure	0.035 MPa				0.025 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							
Piston speed	1 to 200 mm/s				0.5 to 200 mm/s			
Piston rod size	ø8	ø10	ø12	ø14	ø8	ø10	ø12	ø14
Rod end thread	M8 x 1.25	M10 x 1.25		M14 x 1.5	M8 x 1.25	M10 x 1.25		M14 x 1.5
Rod end thread tolerance	JIS Class 2							
Stroke tolerance	$^{+1.4}_{0}$ mm							
Port size	Rc 1/8			Rc 1/4	Rc 1/8			Rc 1/4
Vacuum port, Refief port	M5 x 0.8							

⚠ Precautions

Be sure to read before handling. For Safety Instructions and Actuator Precautions, refer to pages 10-24-3 to 10-24-6.

Operating Precautions

⚠ Warning

1. Do not rotate the cover.

- When installing a cylinder or screwing a pipe fitting into the port, the coupling portion of the cover could break if the cover rotated.

⚠ Caution

1. Be careful of the snap ring to pop out.

- When replacing the rod seal, take care that the snap ring does not spring out while you are removing it.

Maintenance

⚠ Caution

1. Grease pack

When maintenance requires only grease, use the following part numbers to order.

GR-X-005 (5 g)

Made to Order Specifications:
-XB13: Low Speed Cylinder
5 to 50 mm/s (CY1: 7 to 50 mm/s)

Made to Order

Symbol

Low Speed Cylinder **-XB13**

CJ2 Standard model no. — **XB13**

CM2 Mounting style | Bore size | Stroke — **XB13**

CG1 Standard model no. — **XB13**

MB Standard model no. — **XB13**

CU Standard model no. — **XB13**

CQ2 Standard model no. — **XB13**

CQS Standard model no. — **XB13**

Low speed cylinder

CY1 Standard model no. — **XB13**

MGP$^{M}_{L}$ Standard model no. — **XB13**

MGGM Standard model no. — **XB13**

MGCM Standard model no. — **XB13**

CX2 Standard model no. — **XB13**

CXW$^{M}_{L}$ Standard model no. — **XB13**

CXS$^{M}_{L}$ Standard model no. — **XB13**

MXU Standard model no. — **XB13**

CXT$^{M}_{L}$ Standard model no. — **XB13**

Low speed cylinder

Note) Operate without lubrication from a pneumatic system lubricator.

Specifications

Applicable cylinder	Air cylinder/Standard				Free mount cylinder	Compact cylinder	Compact cylinder	Magnetically coupled rodless cylinder	Compact guide cylinder	Guide cylinder		Slide unit		Dual rod cylinder	Compact slide	Platform cylinder
										Slide bearing						
Series	**CJ2**	**CM2**	**CG1**	**MB**	**CU**	**CQ2**	**CQS**	**CY1**	**MGP$^{M}_{L}$**	**MGGM**	**MGCM**	**CX2**	**CXW$^{M}_{L}$**	**CXS$^{M}_{L}$**	**MXU**	**CXT$^{M}_{L}$**
Action	Double acting, Single rod					Double acting										
Bore size (mm)	6, 10 16	20, 25 32, 45	20, 25 32, 40 50, 63	32, 40 50, 63 80, 100	6, 10 16, 20 25, 32	12, 16, 20 25, 32, 40 50, 63, 80 100	12, 16 20, 25	CY1B: 6 10, 15, 20 25, 32 40, 50, 63 CY1S, CY1L: 6 to 40	12, 16, 20 25, 32, 40 50, 63, 80 100	20, 25, 32 40, 50		10, 15 25	10, 16, 20 25, 32	6, 10 15, 20 25, 32	6, 10 16	12, 16 20, 25 32, 40
Piston speed	5 to 50 mm/s							7 to 50 mm/s	5 to 50 mm/s	5 to 50 mm/s						
Cushion	Rubber bumper			Air cushion on both ends	Rubber bumper on both ends	No rubber bumper	No rubber bumper	Rubber bumper on both ends		Rubber bumper (Basic cylinder)		Shock absorber (CX2: Option)		Rubber bumper		
Auto switch	Mountable															
Mounting	Basic Foot Flange Double clevis	Basic Foot Flange Trunnion Clevis		Basic Foot Flange Clevis Trunnion	Basic	Basic Foot Flange Double clevis	Basic Foot Flange Double clevis	Basic Slider	Basic	Basic Front mounting Flange		Basic				
Dimensions	Dimensions and specifications are the same as standard products of double acting. Refer to Best Pneumatics Vol. 6, 7 and 8.															
Additional specifications																

∗ No shock absorber is available for the Series MGGM.

Related Products:
Speed Controller for Low Speed Operation

The effective area of controlled flow is approximately 1/10 of the standard type.
These controllers are suitable for controlling the speed of microspeed cylinders.
The dual type speed controller is especially suitable for cylinders with a small bore size.

Elbow/Universal Type

Air Flow/Effective Area

Model		AS12□1FM-M5 AS13□1FM-M5	AS22□1FM-□01 AS23□1FM-□01		AS22□1FM-□02 AS23□1FM-□02		
Tubing O.D.	Metric size	ø3.2, ø4, ø6	ø3.2, ø4	ø6, ø8	ø4	ø6	ø8, ø10
	Inch size	ø1/8", ø5/32", ø3/16" ø1/4"	ø1/8", ø5/32"	ø3/16", ø1/4" ø5/16"	ø5/32"	ø3/16"	ø1/4", ø5/16" ø3/8"
Controlled flow	Air flow (ℓ/min (ANR))	7	12		38		
	Effective area (mm²)	0.1	0.2		0.6		
Free flow	Flow rate (ℓ/min (ANR))	100	180	230	260	390	460
	Effective area (mm²)	1.5	2.7	3.5	4	6	7

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

In-line Type

Air Flow/Effective Area

Model		AS1001FM	AS2001FM		AS2051FM	
Tubing O.D.	Metric size	ø3.2, ø4, ø6	ø4	ø6	ø6	ø8
	Inch size	ø1/8", ø5/32", ø3/16" ø1/4"	ø5/32"	ø3/16", ø1/4"	ø3/16"	ø1/4", ø5/16"
Controlled flow	Air flow (ℓ/min (ANR))	7	12		38	
	Effective area (mm²)	0.1	0.2		0.6	
Free flow	Flow rate (ℓ/min (ANR))	100	130	230	290	460
	Effective area (mm²)	1.5	2	3.5	4.5	7

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

Elbow Type (Metal body)

Air Flow/Effective Area

Model			AS12□0M		AS22□0M-□01		AS22□0M-□02	
Port size		Cylinder side	M5 x 0.8	10-32 UNF	R 1/8	NPT 1/8	R 1/4	NPT 1/4
		Tube side			Rc 1/8		Rc 1/4	
Controlled flow	Air flow (ℓ/min (ANR))		7		12		38	
	Effective area (mm²)		0.1		0.2		0.6	
Free flow	Flow rate (ℓ/min (ANR))		105		280		420	
	Effective area (mm²)		1.6		4.3		6.5	

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

Dual Type

Air Flow/Effective Area

Model		ASD230FM-M5	ASD330FM-□01	ASD430FM-□02	
Tubing O.D.	Metric size	ø4, ø6	ø6, ø8	ø6	ø8, ø10
	Inch size	ø1/8", ø5/32" ø3/16", ø1/4"	ø3/16", ø1/4"	—	ø1/4", ø5/16" ø3/8"
Controlled flow	Air flow (ℓ/min (ANR))	7	12	38	
	Effective area (mm²)	0.1	0.2	0.6	
Free flow	Air flow (ℓ/min (ANR))	75	175	295	350
	Effective area (mm²)	1.1	2.7	4.5	5.3

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

SMC

Compact Cylinder/Guide Rod Type

Lateral load resisting
2–4 times
* Compared to compact cylinder series CQ

Non-rotating accuracy
0.2 or less
Refer to page 3 for details.

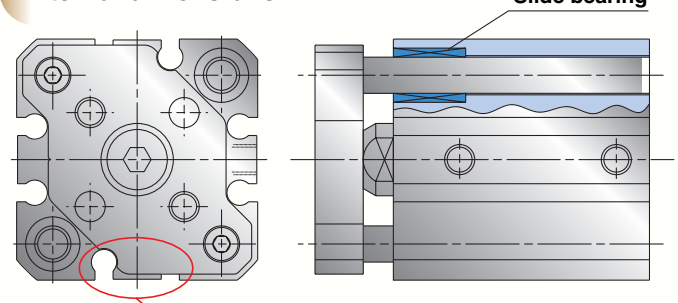
Bore size ø63,ø80,ø100 has been added.

Series CQM

Load can be directly mounted.

Mounting dimensions compatible with the CQS, CQ2 series.

External dimensions



Variations

Series	Bore size (mm)	Standard stroke (mm)											Cushion
		5	10	15	20	25	30	35	40	45	50	75	100	
CQM	12, 16	●	●	●	●	●	●	●	●	●	●	●	●	Rubber bumper
	20, 25	●	●	●	●	●	●	●	●	●	●	●	●	
	32, 40	●	●	●	●	●	●	●	●	●	●	●	●	
	50, 63, 80, 100	●	●	●	●	●	●	●	●	●	●	●	●	

Compact Cylinder/Guide Rod Type

Series CQM

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

How to Order

Without auto switch CQM **B** **20** **□** — **10**

With auto switch CDQM **B** **20** **□** — **10** — **M9B** **S**

With auto switch

Mounting

B	Through-hole (Standard)
A	Both ends tapped (ø32 to ø100)

Note 1) Cylinder bodies of ø12 to ø25 are common for both B (through hole) and A (both ends tapped) types. Symbol to order is unified to "B" for those sizes.

Note 2) Contact SMC for the other mounting types.

Bore size

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

Thread type

Symbol	Port thread	Mounting thread	Bore size
Nil	M thread	M thread	ø12 to ø25
	Rc		ø32 to ø100
TN	NPT		
TF	G		
NN	M thread	Inch thread	ø12 to ø25
	NPT		ø32 to ø100

Note 3) M thread to be used for without auto switch type of ø32, 5 stroke exceptionally.

Number of auto switches

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

Auto switch type

Nil	Without auto switch (Built-in magnet cylinder)

∗ Refer to the table below for auto switch model numbers.
∗ Auto switches are packed together when shipped (unassembled). (Except for D-P5DWL)

Cylinder stroke (mm)

Refer to the next page for standard and intermediate strokes.

Applicable Auto Switches/Refer to page 7-9-1 of Best Pneumatics vol. 7 for detailed auto switch specifications.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage DC	Load voltage AC	Rail mounting ø32 to ø100 Perpendicular	Rail mounting ø32 to ø100 In-line	Direct mounting ø12 to ø100 Perpendicular	Direct mounting ø12 to ø100 In-line	Lead wire length (m)∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	— 5 V	—	—	**A76H**	**A96V**	**A96**	●	●	—	—	IC circuit	—
				2-wire	— —	200 V	**A72**	**A72H**	—	—	●	●	—	—	—	Relay, PLC
					24 V 12 V	100 V	**A73**	**A73H**	—	—	●	●	●	—		
			No		5 V, 12 V		**A80**	**A80H**	**A90V**	**A90**	●	●	—	—	IC circuit	
			Yes		12 V		—	—	**A93V**	**A93**	●	●	—	—	—	
		Connector			12 V	—	**A73C**	—	—	—	●	●	●	●		
			No		5 V, 12 V		**A80C**	—	—	—	●	●	●	●	IC circuit	
	Diagnostic indication (2-color display)	Grommet	Yes		—	—	**A79W**	—	—	—	●	●	—	—	—	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V 5 V, 12 V	—	**F7NV**	**F79**	**M9NV**	**M9N**	●	●	○	—	IC circuit	Relay, PLC
				3-wire (PNP)			**F7PV**	**F7P**	**M9PV**	**M9P**	●	●	○	—		
				2-wire	12 V		**F7BV**	**J79**	**M9BV**	**M9B**	●	●	○	—	—	
		Connector					**J79C**	—	—	—	●	●	●	●		
	Diagnostic indication (2-color display)	Grommet		3-wire (NPN)	5 V, 12 V		**F7NWV**	**F79W**	**F9NWV**	**F9NW**	●	●	○	—	IC circuit	
				3-wire (PNP)			—	**F7PW**	**F9PWV**	**F9PW**	●	●	○	—		
				2-wire	12 V		**F7BWV**	**J79W**	**F9BWV**	**F9BW**	●	●	○	—	—	
	Water resistant (2-color display)						—	**F7BA**	—	**F9BA**	—	●	○	—		
							F7BAV	—	—	—	—	●	○	—		
	Magnetic field resistant (2-color display)				5 V, 12 V		—	**P5DW**	—	—	—	●	●	—		

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

∗ Solid state switches marked with a "○" symbol are produced upon receipt of order.

• In addition to the models in the above table, there are some other auto switches that are applicable. For more information, please refer to page 12.
• D-P5DWL type: ø40 to ø100 only available.

Made to Order Specifications → Refer to page 7-9-36 of Best Pneumatics Vol. 7.

• –50 Without indicator light
• –61 Flexible lead wire
• Pre-wired connector

⚠ Caution

① Do not use the product as a stopper.
② Do not disassemble and modify the product.

Specifications

Model		Pneumatic (non-lube) type
Action		Double acting, Single rod
Fluid		Air
Proof pressure		1.5 MPa
Maximum operating pressure		1.0 MPa
Minimum operating pressure	**ø12, ø16**	0.12 MPa
	ø20 to ø100	0.1 MPa
Ambient and fluid temperature		Without auto switch: –10°C to 70°C (with no freezing) With auto switch: –10°C to 60°C (with no freezing)
Cushion		Rubber bumper on both ends
Stroke length tolerance		+1.0 mm 0
Mounting		Through-holes
Piston speed	**ø12 to ø40**	50 to 500 mm/s
	ø50 to ø100	50 to 300 mm/s

Standard Stroke

Bore size (mm)	Standard stroke (mm)
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

Manufacture of Intermediate Stroke

Description	
Spacers are installed in a cylinder with standard stroke.	
Bore size (mm)	Description
12 to 32	Available in 1 mm stroke increments
40 to 100	Available in 5 mm stroke increments

Intermediate stroke range	
Bore size (mm)	Intermediate stroke range (mm)
12, 16	1 to 29
20, 25	1 to 49
32	1 to 99
40 to 100	5 to 95

Example) Part number: CQMB32–57
Constructed by installing an 18 mm spacer in the standard stroke cylinder CQMB32-75. B dimension: 108 mm.

Weight

Without Auto Switch

Unit: g

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	44	52	60	69	77	86	—	—	—	—	—	—
16	56	67	77	87	97	108	—	—	—	—	—	—
20	92	107	122	137	152	167	183	198	213	227	—	—
25	125	143	162	180	198	216	234	252	270	288	—	—
32	182	205	228	250	274	297	320	343	366	389	553	669
40	269	295	320	345	370	396	421	446	471	497	692	823
50	—	500	540	580	620	661	701	740	780	821	1133	1341
63	—	745	795	845	894	944	993	1043	1093	1143	1535	1791
80	—	1400	1479	1559	1639	1719	1800	1880	1959	2039	2671	3067
100	—	2365	2468	2571	2674	2776	2880	2983	3086	3188	4053	4574

With Auto Switch (Built-in magnet)

Unit: g

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	52	59	68	77	84	93	—	—	—	—	—	—
16	66	77	87	97	107	118	—	—	—	—	—	—
20	122	138	153	168	182	197	213	227	242	257	—	—
25	168	186	205	223	240	258	277	295	313	331	—	—
32	241	264	287	309	333	356	379	401	425	448	564	680
40	345	371	396	421	447	473	498	523	548	574	705	836
50	—	618	658	698	738	779	819	858	898	939	1147	1355
63	—	903	953	1003	1052	1102	1152	1201	1251	1301	1557	1813
80	—	1661	1740	1820	1900	1980	2061	2141	2220	2300	2695	3090
100	—	2745	2848	2950	3053	3156	3260	3362	3465	3568	4088	4609

Add each weight of auto switches and mounting brackets.
Refer to pages 16 to 19 for auto switch weight.

Theoretical Output

Unit: N

Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
12	IN	25	42	59
	OUT	34	57	79
16	IN	45	75	106
	OUT	60	101	141
20	IN	71	118	165
	OUT	94	157	220
25	IN	113	189	264
	OUT	147	245	344
32	IN	181	302	422
	OUT	241	402	563
40	IN	317	528	739
	OUT	377	628	880
50	IN	495	825	1150
	OUT	589	982	1370
63	IN	840	1400	1960
	OUT	936	1560	2184
80	IN	1362	2270	3178
	OUT	1509	2515	3521
100	IN	2145	3575	5005
	OUT	2355	3925	5495

Auto Switch Mounting Bracket Weight

Mounting bracket part no.	Applicable cylinder bore size	Weight (g)
BQ-2	ø32 to ø100	1.5
BQP1-050	ø40 to ø100	16

Plate Non-rotating Accuracy

Non-rotating accuracy without load is designed to be same or less than the figures shown in the table below at the retracted cylinder end (plate).

Bore size (mm)	Non-rotating accuracy
12, 16	±0.2°
20 to 100	±0.1°

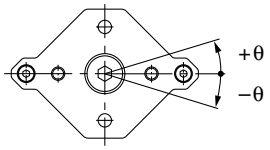
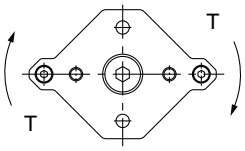


Plate Allowable Rotational Torque

Make sure to operate strictly within the allowable rotation torque range to the plate.

Operation outside of this range may result in shorter service life or damage to the devise.



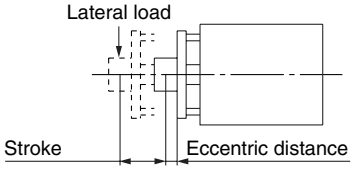
Unit: N·m

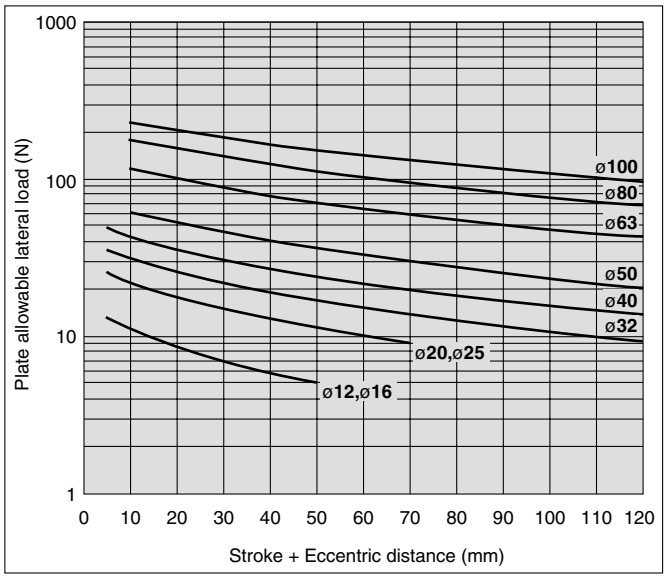
Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	0.11	0.10	0.08	0.07	0.07	0.06	—	—	—	—	—	—
16	0.15	0.12	0.11	0.10	0.09	0.08	—	—	—	—	—	—
20	0.37	0.32	0.28	0.25	0.23	0.21	0.19	0.18	0.17	0.16	—	—
25	0.40	0.35	0.31	0.28	0.25	0.23	0.21	0.20	0.18	0.17	—	—
32	0.66	0.59	0.53	0.49	0.45	0.42	0.39	0.36	0.34	0.32	0.25	0.20
40	1.06	0.96	0.88	0.81	0.75	0.70	0.65	0.61	0.58	0.55	0.43	0.36
50	—	1.70	1.56	1.45	1.35	1.26	1.19	1.12	1.06	1.01	0.80	0.67
63	—	3.90	3.62	3.37	3.15	2.96	2.80	2.65	2.51	2.39	1.92	1.61
80	—	7.44	6.98	6.56	6.20	5.87	5.57	5.31	5.07	4.84	3.98	3.37
100	—	11.85	11.19	10.61	10.08	9.60	9.17	8.77	8.41	8.07	6.73	5.77

Plate Allowable Lateral Load

Make sure to operate strictly within the allowable lateral load range to the plate.

Operation outside of this range may result in shorter service life or damage to the devise.



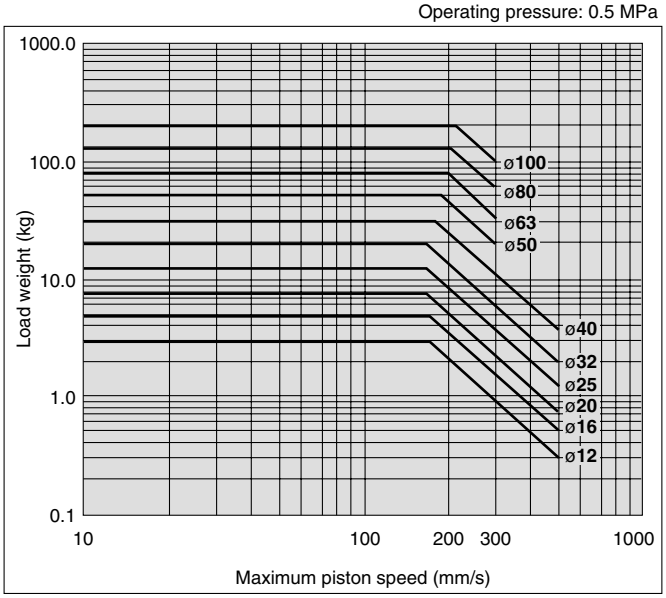


Allowable Kinetic Energy

Make sure to operate strictly within the allowable range of the load weight and maximum speed.

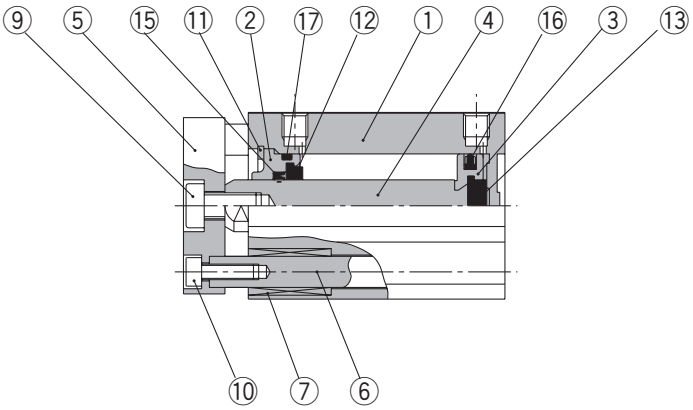
Operation outside of this range may cause excessive impact, which may result in the damage to the devise.

Operating pressure: 0.5 MPa

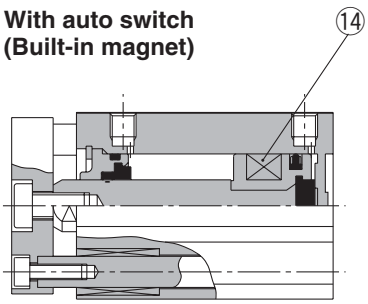


Construction

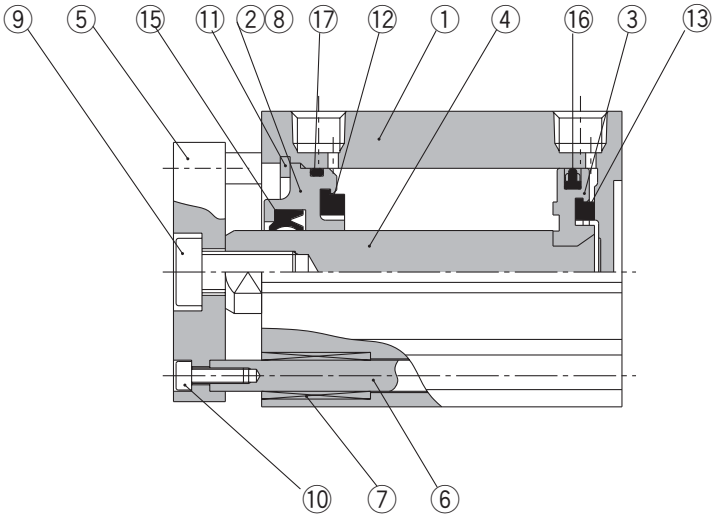
ø12 to ø25



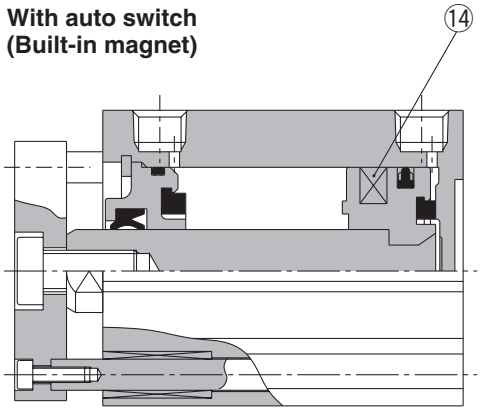
With auto switch (Built-in magnet)



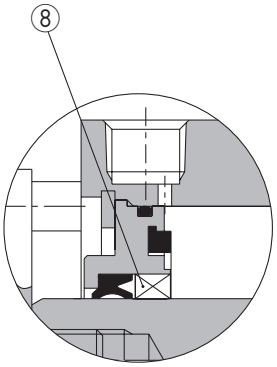
ø32 to ø100



With auto switch (Built-in magnet)



ø50 to ø100



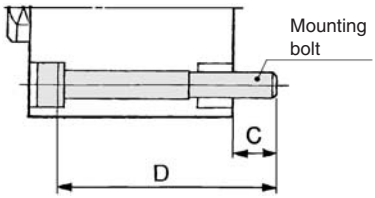
Component Parts

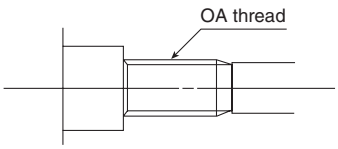
No.	Description	Material	Note
1	**Cylinder tube**	Aluminum alloy	Hard anodized
2	**Collar**	Aluminum alloy	ø12 to ø40 Anodized
		Aluminum alloy casted	ø50 to ø100 Chromated, Coated
3	**Piston**	Aluminum alloy	Chromated
4	**Piston rod**	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø100 Hard chrome plated
5	**Plate**	Aluminum alloy	Anodized
6	**Guide rod**	Stainless steel	Hard chrome plated
7	**Bushing**	Oil-impregnated sintered alloy	
8	**Bushing**	Bronze alloy	ø50 to ø100
9	**Hexagon socket head cap screw**	Carbon steel	Nickel plated
10	**Hexagon socket head cap screw**	Carbon steel	Nickel plated
11	**Snap ring**	Carbon tool steel	Phosphate coated
12	**Bumper A**	Urethan	
13	**Bumper B**	Urethan	
14	**Magnet**	—	
15	**Rod seal**	NBR	
16	**Piston seal**	NBR	
17	**Gasket**	NBR	

Mounting Bolt

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

Ordering: **Add the word "Bolt" in front of the bolts to be used.**
Example) Bolt M3 x 25ℓ 2 pcs.





Note) To install a cylinder with bore size 12 to 25 mm with through-hole, be sure to use the attached flat washer.

Mounting Bolt for CQM/Without Auto Switch

Model	C	D	Mounting bolt
CQMB12- 5	6.5	25	M3 x 25ℓ
-10		30	x 30ℓ
-15		35	x 35ℓ
-20		40	x 40ℓ
-25		45	x 45ℓ
-30		50	x 50ℓ
CQMB16- 5	6.5	25	M3 x 25ℓ
-10		30	x 30ℓ
-15		35	x 35ℓ
-20		40	x 40ℓ
-25		45	x 45ℓ
-30		50	x 50ℓ
CQMB20- 5	6.5	25	M5 x 25ℓ
-10		30	x 30ℓ
-15		35	x 35ℓ
-20		40	x 40ℓ
-25		45	x 45ℓ
-30		50	x 50ℓ
-35		55	x 55ℓ
-40		60	x 60ℓ
-45		65	x 65ℓ
-50		70	x 70ℓ
CQMB25- 5	8.5	30	M5 x 30ℓ
- 10		35	x 35ℓ
- 15		40	x 40ℓ
- 20		45	x 45ℓ
- 25		50	x 50ℓ
- 30		55	x 55ℓ
- 35		60	x 60ℓ
- 40		65	x 65ℓ
- 45		70	x 70ℓ
- 50		75	x 75ℓ

Model	C	D	Mounting bolt
CQMB32- 5	9	30	M5 x 30ℓ
- 10		35	x 35ℓ
- 15		40	x 40ℓ
- 20		45	x 45ℓ
- 25		50	x 50ℓ
- 30		55	x 55ℓ
- 35		60	x 60ℓ
- 40		65	x 65ℓ
- 45		70	x 70ℓ
- 50		75	x 75ℓ
- 75		110	x 110ℓ
-100		135	x 135ℓ
CQMB40- 5	7.5	35	M5 x 35ℓ
- 10		40	x 40ℓ
- 15		45	x 45ℓ
- 20		50	x 50ℓ
- 25		55	x 55ℓ
- 30		60	x 60ℓ
- 35		65	x 65ℓ
- 40		70	x 70ℓ
- 45		75	x 75ℓ
- 50		80	x 80ℓ
- 75		115	x 115ℓ
-100		140	x 140ℓ
CQMB50- 10	12.5	45	M6 x 45ℓ
- 15		50	x 50ℓ
- 20		55	x 55ℓ
- 25		60	x 60ℓ
- 30		65	x 65ℓ
- 35		70	x 70ℓ
- 40		75	x 75ℓ
- 45		80	x 80ℓ
- 50		85	x 85ℓ
- 75		120	x 120ℓ
-100		145	x 145ℓ

Model	C	D	Mounting bolt
CQMB63- 10	14.5	50	M8 x 50ℓ
- 15		55	x 55ℓ
- 20		60	x 60ℓ
- 25		65	x 65ℓ
- 30		70	x 70ℓ
- 35		75	x 75ℓ
- 40		80	x 80ℓ
- 45		85	x 85ℓ
- 50		90	x 90ℓ
- 75		125	x 125ℓ
-100		150	x 150ℓ
CQMB80- 10	15	55	M10 x 55ℓ
- 15		60	x 60ℓ
- 20		65	x 65ℓ
- 25		70	x 70ℓ
- 30		75	x 75ℓ
- 35		80	x 80ℓ
- 40		85	x 85ℓ
- 45		90	x 90ℓ
- 50		95	x 95ℓ
- 75		130	x 130ℓ
-100		155	x 155ℓ
CQMB100- 10	15.5	65	M10 x 65ℓ
- 15		70	x 70ℓ
- 20		75	x 75ℓ
- 25		80	x 80ℓ
- 30		85	x 85ℓ
- 35		90	x 90ℓ
- 40		95	x 95ℓ
- 45		100	x 100ℓ
- 50		105	x 105ℓ
- 75		140	x 140ℓ
-100		165	x 165ℓ

Mounting Bolt for CDQM/With Auto Switch (Built-in magnet)

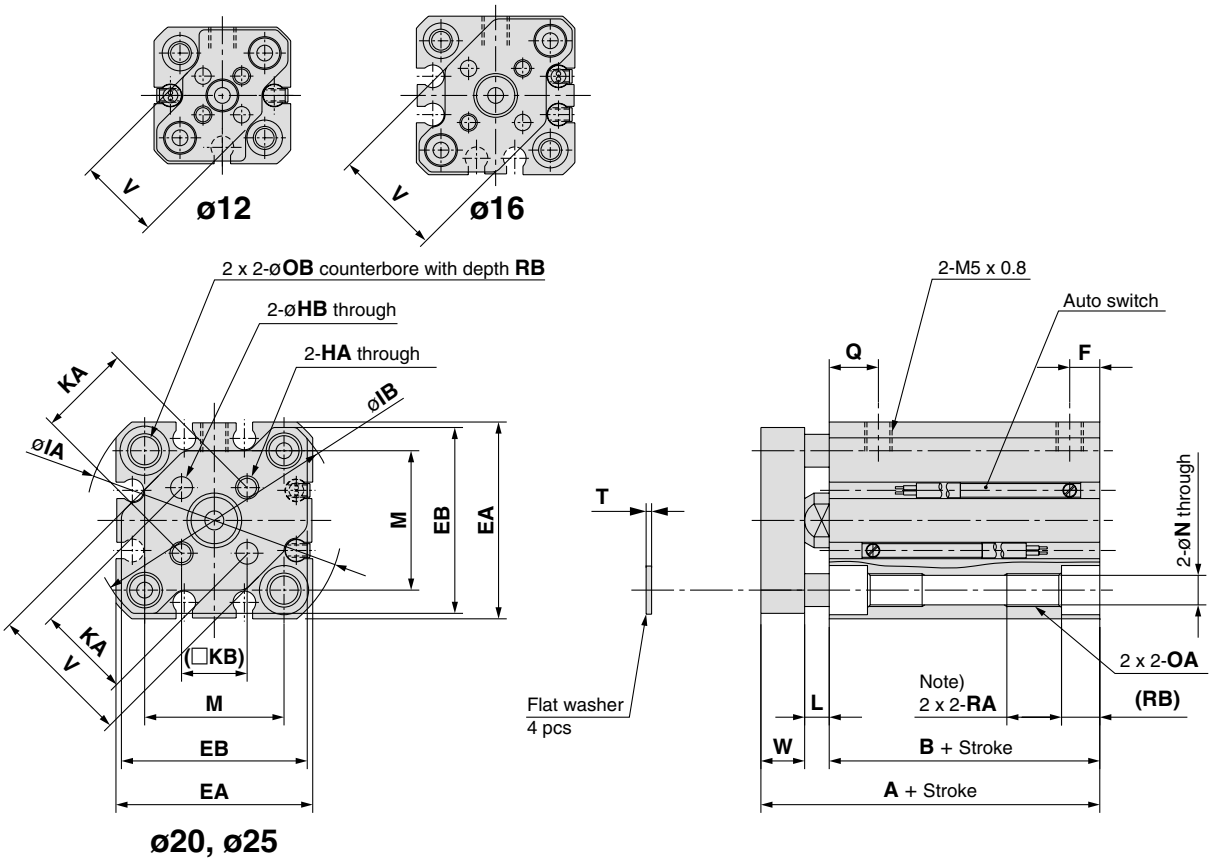
Model	C	D	Mounting bolt
CDQMB12- 5	6.5	30	M3 x 30ℓ
-10		35	x 35ℓ
-15		40	x 40ℓ
-20		45	x 45ℓ
-25		50	x 50ℓ
-30		55	x 55ℓ
CDQMB16- 5	6.5	30	M3 x 30ℓ
-10		35	x 35ℓ
-15		40	x 40ℓ
-20		45	x 45ℓ
-25		50	x 50ℓ
-30		55	x 55ℓ
CDQMB20- 5	6.5	35	M5 x 35ℓ
-10		40	x 40ℓ
-15		45	x 45ℓ
-20		50	x 50ℓ
-25		55	x 55ℓ
-30		60	x 60ℓ
-35		65	x 65ℓ
-40		70	x 70ℓ
-45		75	x 75ℓ
-50		80	x 80ℓ
CDQMB25- 5	8.5	40	M5 x 40ℓ
-10		45	x 45ℓ
-15		50	x 50ℓ
-20		55	x 55ℓ
-25		60	x 60ℓ
-30		65	x 65ℓ
-35		70	x 70ℓ
-40		75	x 75ℓ
-45		80	x 80ℓ
-50		85	x 85ℓ

Model	C	D	Mounting bolt
CDQMB32- 5	9	40	M5 x 40ℓ
- 10		45	x 45ℓ
- 15		50	x 50ℓ
- 20		55	x 55ℓ
- 25		60	x 60ℓ
- 30		65	x 65ℓ
- 35		70	x 70ℓ
- 40		75	x 75ℓ
- 45		80	x 80ℓ
- 50		85	x 85ℓ
- 75		110	x 110ℓ
-100		135	x 135ℓ
CDQMB40- 5	7.5	45	M5 x 45ℓ
- 10		50	x 50ℓ
- 15		55	x 55ℓ
- 20		60	x 60ℓ
- 25		65	x 65ℓ
- 30		70	x 70ℓ
- 35		75	x 75ℓ
- 40		80	x 80ℓ
- 45		85	x 85ℓ
- 50		90	x 90l
- 75		115	x 115ℓ
-100		140	x 140ℓ
CDQMB50- 10	12.5	55	M6 x 55ℓ
- 15		60	x 60ℓ
- 20		65	x 65ℓ
- 25		70	x 70ℓ
- 30		75	x 75ℓ
- 35		80	x 80ℓ
- 40		85	x 85ℓ
- 45		90	x 90ℓ
- 50		95	x 95ℓ
- 75		120	x 120ℓ
-100		145	x 145ℓ

Model	C	D	Mounting bolt
CDQMB63- 10	14.5	60	M8 x 60ℓ
- 15		65	x 65ℓ
- 20		70	x 70ℓ
- 25		75	x 75ℓ
- 30		80	x 80ℓ
- 35		85	x 85ℓ
- 40		90	x 90ℓ
- 45		95	x 95ℓ
- 50		100	x 100ℓ
- 75		125	x 125ℓ
-100		150	x 150ℓ
CDQMB80- 10	15	65	M10 x 65ℓ
- 15		70	x 70ℓ
- 20		75	x 75ℓ
- 25		80	x 80ℓ
- 30		85	x 85ℓ
- 35		90	x 90ℓ
- 40		95	x 95ℓ
- 45		100	x 100ℓ
- 50		105	x 105ℓ
- 75		130	x 130ℓ
-100		155	x 155ℓ
CDQMB100- 10	15.5	75	M10 x 75ℓ
- 15		80	x 80ℓ
- 20		85	x 85ℓ
- 25		90	x 90ℓ
- 30		95	x 95ℓ
- 35		100	x 100ℓ
- 40		105	x 105ℓ
- 45		110	x 110ℓ
- 50		115	x 115ℓ
- 75		140	x 140ℓ
-100		165	x 165ℓ

Dimensions

ø12 to ø25



(mm)

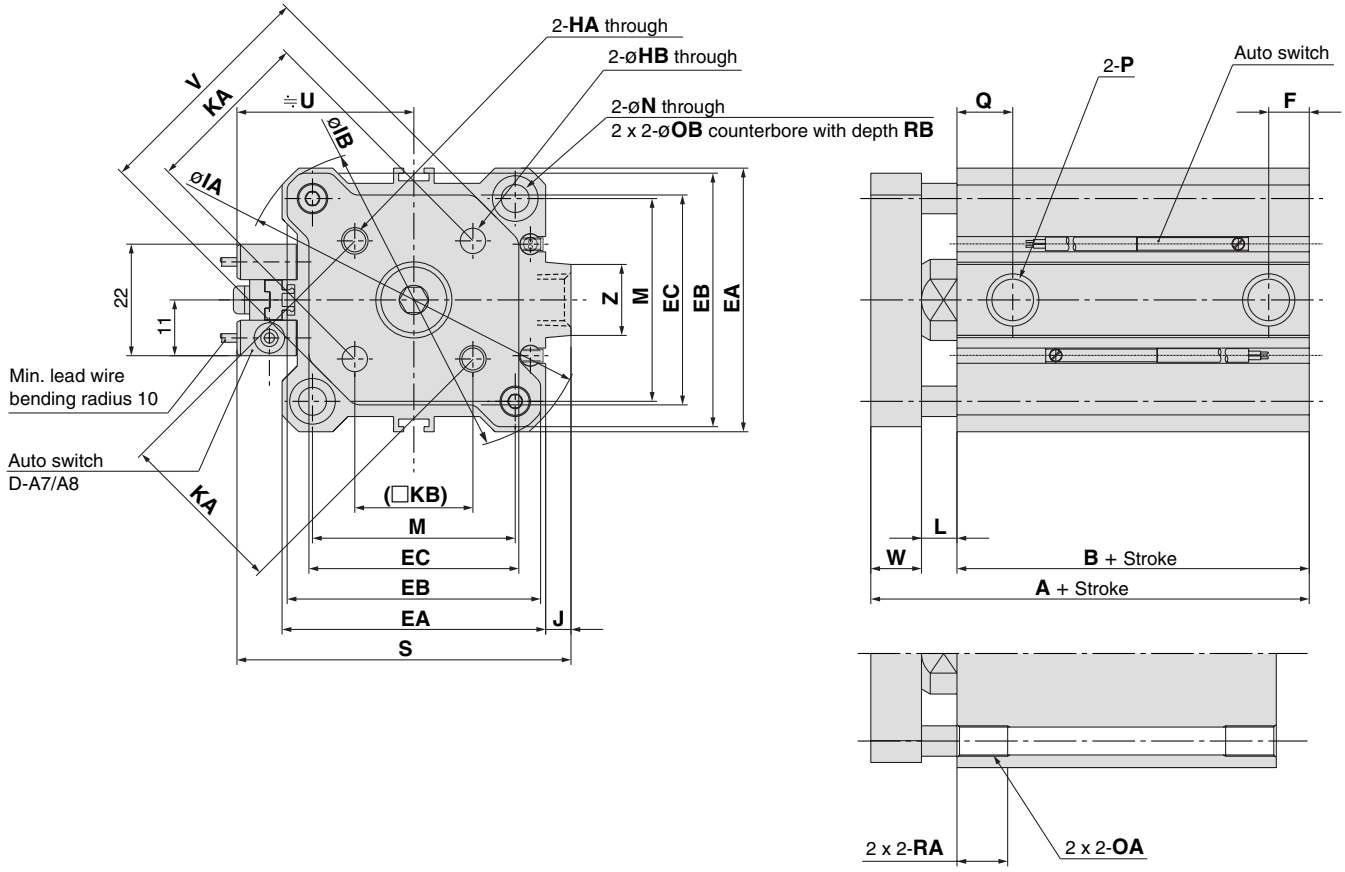
Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch		EA	EB	F	HA		OA		HB	IA	IB
		A	B	A	B				—	NN	—	NN			
12	5 to 30	26.5	17	31.5	22	25	24	5	M3 x 0.5	4-40UNC	M4 x 0.7	8-32UNC	$3^{+0.2}_{0}$	32	31.5
16	5 to 30	26.5	17	31.5	22	29	28	5	M3 x 0.5	4-40UNC	M4 x 0.7	8-32UNC	$3^{+0.2}_{0}$	38	37
20	5 to 50	32	19.5	42	29.5	36	34	5.5	M4 x 0.7	6-32UNC	M6 x 1.0	1/4-20UNC	$4^{+0.2}_{0}$	47	45.5
25	5 to 50	35.5	22.5	45.5	32.5	40	38	5.5	M5 x 0.8	10-32UNF	M6 x 1.0	1/4-20UNC	$5^{+0.2}_{0}$	52	50.5

Bore size (mm)	KA	KB	L	M	N	OB	Q	RA	RB	T	V	W
12	10 ± 0.1	7.1	3.5	15.5	3.5	6.5	7.5	7	4	0.5	14.9	6
16	14 ± 0.1	9.9	3.5	20	3.5	6.5	7.5	7	4	0.5	20	6
20	17 ± 0.1	12	4.5	25.5	5.4	9	9	10	7	1	26	8
25	22 ± 0.1	15.6	5	28	5.4	9	11	10	7	1	30	8

Note) For the following bore/stroke sizes, the through-hole is threaded.
Standard without auto switch: ø12 and ø16; 5 stroke, ø20; 5 to 15 stroke, ø25; 5 and 10 stroke,
Built-in magnet with auto switch: ø20; 5 stroke

Dimensions

ø32 to ø50



Both ends tapped (CQMA)

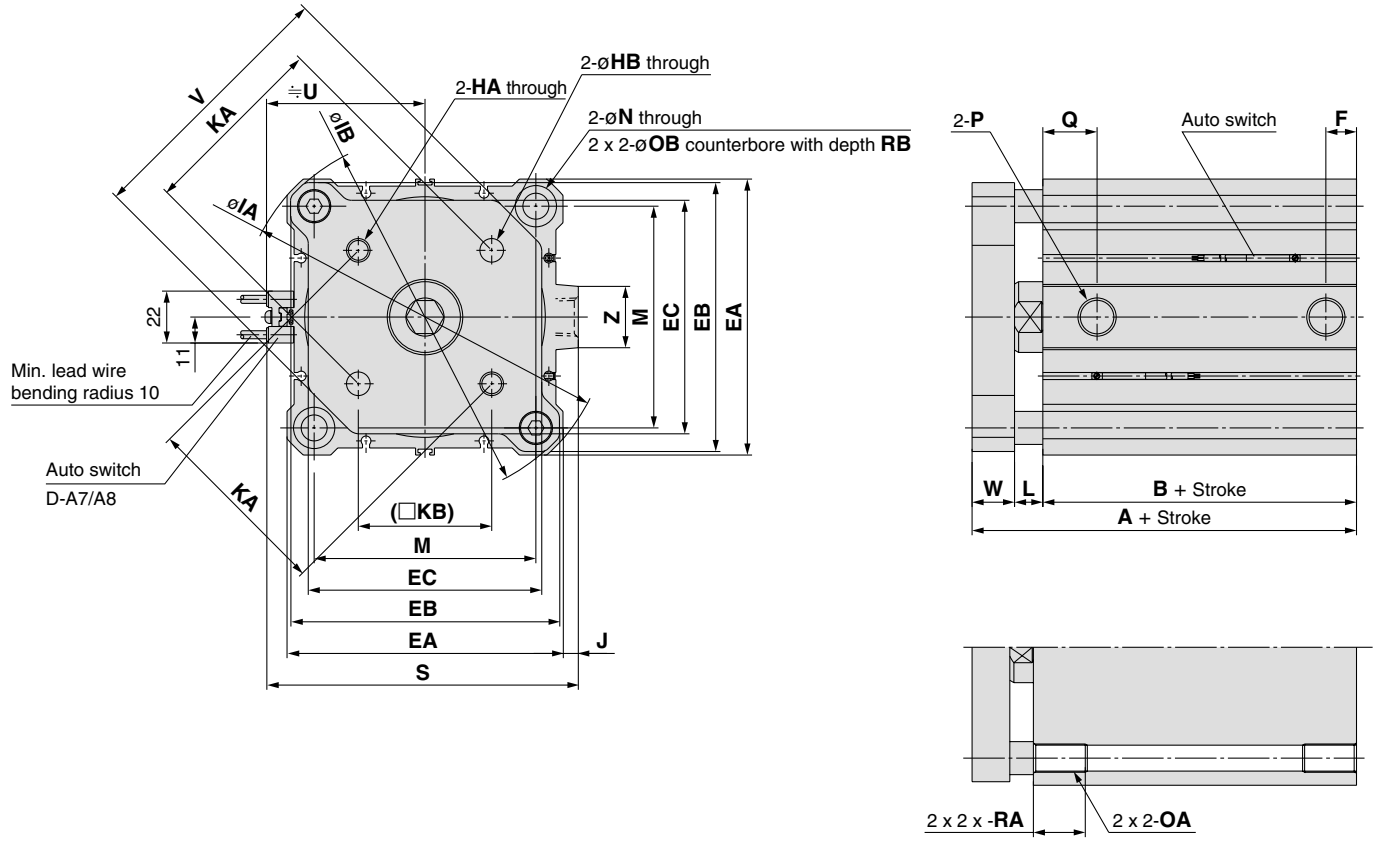
(mm)

Bore size (mm)	Stroke range (mm)	Without auto switch								With auto switch								EA	EB	EC
		A	B	F	Q	P				A	B	F	Q	P						
						—	TN	TF	NN					—	TN	TF	NN			
32	5	40	23	5.5	11.5	M5 x 0.8	—	—	M5 x 0.8	50	33	7.5	10.5	Rc1/8	NPT1/8	G1/8	NPT1/8	45	43	34.4
	10 to 50			7.5	10.5	Rc1/8	NPT1/8	G1/8	NPT1/8											
	75, 100	50	33																	
40	5 to 50	46.5	29.5	8	11	Rc1/8	NPT1/8	G1/8	NPT1/8	56.5	39.5	8	11	Rc1/8	NPT1/8	G1/8	NPT1/8	52	50	41.4
	75, 100	56.5	39.5																	
50	10 to 50	50.5	30.5	10.5	10.5	Rc1/4	NPT1/4	G1/4	NPT1/4	60.5	40.5	10.5	10.5	Rc1/4	NPT1/4	G1/4	NPT1/4	64	62	53.4
	75, 100	60.5	40.5																	

Bore size (mm)	HA		OA		HB	IA	IB	J	KA	KB	L	M	N	OB	RA	RB	S	U	V	W	Z
	—, TN, TF	NN	—, TN, TF	NN																	
32	M5 x 0.8	10-32UNF	M6 x 1.0	1/4-20UNC	$5^{+0.2}_{0}$	60	58.5	4.5	28 ± 0.2	19.8	7	34	5.5	9	10	7	58.5	31.5	38	10	14
40	M5 x 0.8	10-32UNF	M6 x 1.0	1/4-20UNC	$5^{+0.2}_{0}$	69	67.5	5	33 ± 0.2	23.3	7	40	5.5	9	10	7	66	35	46	10	14
50	M6 x 1.0	1/4-20UNC	M8 x 1.25	5/16-18UNC	$6^{+0.2}_{0}$	86	84.5	7	42 ± 0.2	29.7	8	50	6.6	11	14	8	80	41	58	12	19

Dimensions

ø63 to ø100



Both ends tapped (CQMA)

(mm)

Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch		EA	EB	EC	F	HA		HB	IA	IB	J	KA	KB	L
		A	B	A	B					—, TN, TF	NN							
63	10 to 50	56	36	66	46	77	74	59.6	10.5	M6 x 1	1/4-20UNC	$6^{+0.2}_{0}$	103	100	7	50 ± 0.2	35.4	8
	75,100	66	46															
80	10 to 50	67.5	43.5	77.5	53.5	98	95	79.5	12.5	M8 x 1.25	5/16-18UNC	$8^{+0.2}_{0}$	132	129	6	65 ± 0.2	46	10
	75,100	77.5	53.5															
100	10 to 50	79	53	89	63	117	114	99	13	M10x 1.5	7/16-14UNC	$10^{+0.2}_{0}$	156	153	6.5	80 ± 0.2	56.6	10
	75,100	89	63															

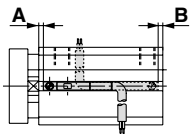
Bore size (mm)	M	N	OA		OB	P				Q	RA	RB	S	U	V	W	Z
			—, TN, TF	NN		—	TN	TF	NN								
63	60	9	M10 x 1.5	7/16-14UNC	14	Rc1/4	NPT1/4	G1/4	NPT1/4	15	18	10.5	93	47.5	69	12	19
80	77	11	M12 x 1.75	1/2-13UNC	17.5	Rc3/8	NPT3/8	G3/8	NPT3/8	16	22	13.5	112.5	57.5	89	14	26
100	94	11	M12 x 1.75	1/2-13UNC	17.5	Rc3/8	NPT3/8	G3/8	NPT3/8	23	22	13.5	132.5	67.5	113	16	26

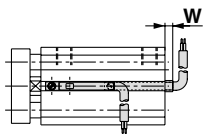
Auto Switches/Proper Mounting Positions and Height for Stroke End Detection

Reed switch
D-A9□

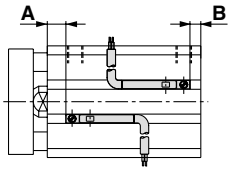
Solid state switch
D-M9□
D-F9BAL
D-F9□W

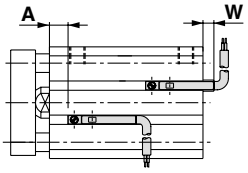
ø12



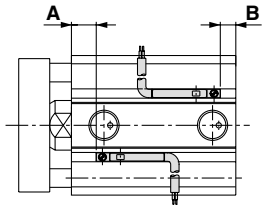


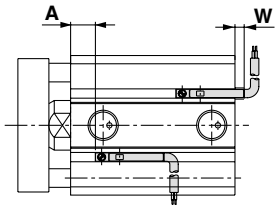
ø16, ø20, ø25

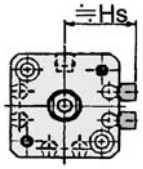




ø32 to ø100







∗ Mounting height "Hs" exists only for the D-F9BAL type.

(mm)

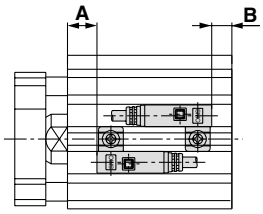
Auto switch model		D-A9□			D-M9□ D-F9□W			D-F9BAL			
Symbol		A	B	W	A	B	W	A	B	W	HS
Bore size (mm)	12	1.5	0.5	1.5 (4)	5.5	4.5	5.5	4.5	3.5	14.5	16.5
	16	2	0	2 (4.5)	6	4	6	5	3	15	18.5
	20	6	3.5	-1.5 (1)	10	7.5	2.5	9	6.5	11.5	22
	25	7	5.5	-3.5 (-1)	11	9.5	0.5	10	8.5	9.5	24
	32	8	5	-3 (-0.5)	12	9	1	11	8	10	26.5
	40	12	7.5	-5.5 (-3)	16	11.5	-1.5	15	10.5	7.5	30
	50	10	10.5	-8.5 (-6)	14	14.5	-4.5	13	13.5	4.5	36
	63	12.5	13.5	-11.5 (-9)	16.5	17.5	-7.5	15.5	16.5	1.5	39.5
	80	15.5	18	-16 (-13.5)	19.5	22	-12	18.5	21	-3	49.5
	100	20	23	-21 (-18.5)	24	27	-17	23	26	-8	59.5

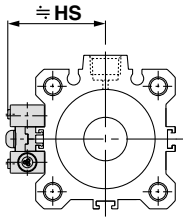
Note 1) The dimension inside ( ) is for D-A93.
Note 2) Minus in "W" column signifies the inner mounting from the edge of a cylinder.

Reed switch
D-A7□H
D-A80H

Solid state switch
D-F7□
D-J79
D-F7□W
D-J79W
D-F7BAL
D-F79F
D-F7NTL

ø32 to ø100



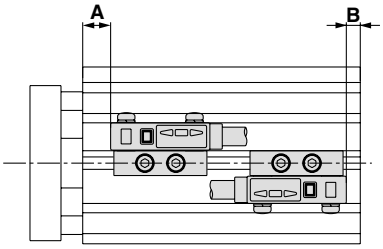


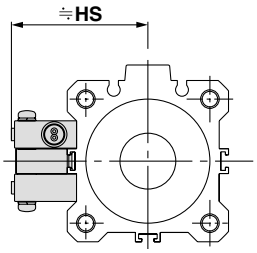
(mm)

Auto switch model		D-A7□H D-A80H			D-F7□ D-J79 D-J79W D-F7BAL D-F7□W D-F79F			D-F7NTL		
Symbol		A	B	Hs	A	B	Hs	A	B	Hs
Bore size (mm)	32	9.5	6.5	32.5	9.5	6.5	32.5	14.5	11.5	32.5
	40	13.5	9	36	13.5	9	36	18.5	14	36
	50	11.5	12	42	11.5	12	42	16.5	17	42
	63	14	15	48.5	14	15	48.5	15	16	48.5
	80	18	18.5	58.5	18	18.5	58.5	19	19.5	58.5
	100	21.5	24.5	68.5	21.5	24.5	68.5	22.5	25.5	68.5

Solid state switch
D-P5DW

ø40 to ø100





(mm)

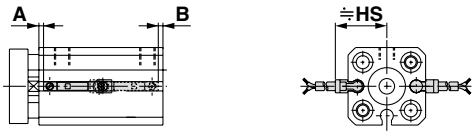
Auto switch model		D-P5DW		
Symbol		A	B	Hs
Bore size (mm)	40	9	4.5	44
	50	7	7.5	50
	63	9.5	10.5	56.5
	80	13.5	14	66.5
	100	17	20	76.5

Auto Switches/Proper Mounting Positions and Height for Stroke End Detection

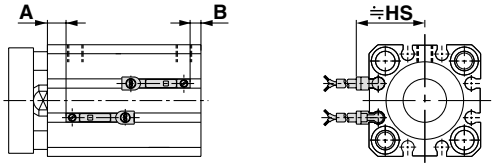
Reed switch
D-A9□V

Solid state switch
D-M9□V
D-F9□WV

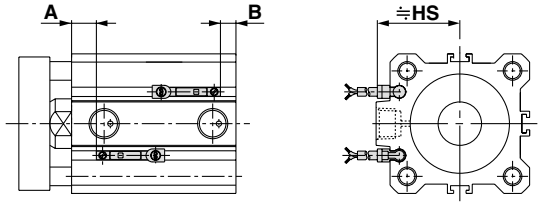
ø12



ø16, ø20, ø25



ø32 to ø100



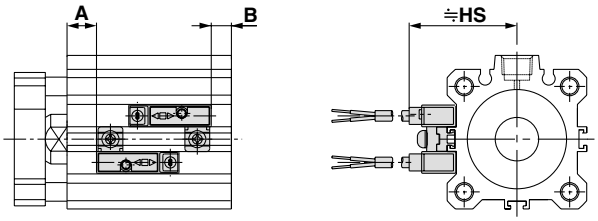
(mm)

Auto switch model		D-A9□V			D-M9□V D-F9□WV		
Symbol		A	B	Hs	A	B	Hs
Bore size (mm)	**12**	1.5	0.5	17	5.5	4.5	19
	16	2	0	19	6	4	21
	20	6	3.5	22.5	10	7.5	24
	25	7	5.5	24.5	11	9.5	26
	32	8	5	27	12	9	29
	40	12	7.5	30.5	16	11.5	32.5
	50	10	10.5	36.5	14	14.5	42
	63	12.5	13.5	40	16.5	17.5	42
	80	16.5	17	50	20.5	21	52
	100	20	23	60	24	27	62

Reed switch
D-A7□
D-A80
D-A73C
D-A80C
D-A79W

Solid state switch
D-F7□V
D-J79C
D-F7□WV
D-F7BAVL

ø32 to ø100



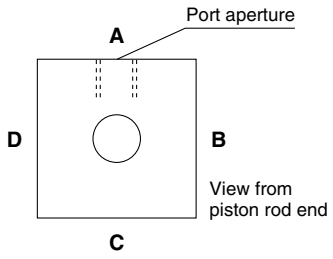
(mm)

Auto switch model		D-A7□ D-A80			D-A73C D-A80C			D-A79W			D-F7□V D-F7BAVL D-F7□WV			D-J79C		
Symbol		A	B	Hs	A	B	Hs	A	B	Hs	A	B	Hs	A	B	Hs
Bore size (mm)	**32**	9(9.5)	6(6.5)	31.5	9.5	6.5	38.5	6.5	3.5	34	9.5	6.5	35	9.5	6.5	38
	40	13(13.5)	8.5(9)	35	13.5	9	42	10.5	6	37.5	13.5	9	38.5	13.5	9	41.5
	50	11(11.5)	11.5(12)	41	11.5	12	48	12	8.5	43.5	11.5	12	44.5	11.5	12	47.5
	63	13.5(14)	14.5(15)	47.5	14	15	54.5	11	12	50	14	15	51	14	15	54
	80	17.5(18)	18(18.5)	57.5	18	18.5	64.5	15	15.5	60	18	18.5	61	18	18.5	64
	100	21(21.5)	24(24.5)	67.5	21.5	24.5	74.5	18.5	21.5	70	21.5	24.5	71	21.5	24.5	74

The dimension inside ( ) is for D-A72.

The number of surfaces and grooves where an auto switch can be mounted (as direct mounting).

The number of the surfaces and grooves where the auto switch can be mounted, by switch type, are shown in the table below.



Switch type	D-A9□(V), M9□(V), F9□W(V)				D-A7□, A8□, F7□, J7□			
Bore size (mm)	A (Mounting groove no.)	B (Mounting groove no.)	C (Mounting groove no.)	D (Mounting groove no.)	A (Mounting groove no.)	B (Mounting groove no.)	C (Mounting groove no.)	D (Mounting groove no.)
12	—	○ (1)	○ (1)	○ (1)	—	—	—	—
16	—	○ (2)	○ (2)	○ (2)	—	—	—	—
20	○ (2)	○ (2)	○ (2)	○ (2)	—	—	—	—
25	○ (2)	○ (2)	○ (2)	○ (2)	—	—	—	—
32	○ (2)	—	—	—	—	○	○	○
40	○ (2)	—	—	—	—	○	○	○
50	○ (2)	—	—	—	—	○	○	○
63	○ (2)	○ (2)	○ (2)	○ (2)	—	○	○	○
80	○ (2)	○ (2)	○ (2)	○ (2)	—	○	○	○
100	○ (2)	○ (2)	○ (2)	○ (2)	—	○	○	○

Operating Range

(mm)

Auto switch model	Bore size									
	12	16	20	25	32	40	50	63	80	100
D-F7□, D-F7□V D-J79, D-J79C D-F7□W, D-F7□WV D-J79W D-F7BAL, D-F7BAVL D-F7NTL, D-F79F	—	—	—	—	6	6	6	6.5	6.5	7
D-F9□W, D-F9□WV D-F9BAL	3	4	5	5.5	5.5	5.5	5.5	6.5	5.5	6.5
D-A7□, D-A80	—	—	—	—	12	11	10	12	12	13
D-A9□(V)	6	7.5	10	10	9.5	9.5	9.5	11.5	9	11.5
D-M9□, D-M9□(V)	2	2.5	3.5	3.5	4	4	4	5	5	5.5

∗ The operating ranges are provided as guidelines including hystereses and are not guaranteed values (assuming approximately ±30% variations). They may vary significantly with ambient environments.

Auto Switch Mounting Bracket/Part No.

Bore size (mm)	Mounting bracket part no.	Note	Applicable switch	
			Reed switch	Solid state switch
32, 40 50, 63 80, 100	BQ-2	• Switch mounting screw (M3 x 0.5 x 10 ℓ) • Switch spacer • Switch mounting nut	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
40, 50 63, 80 100	BQP1-050	• Switch mounting bracket • Switch mounting nut • Hexagon socket head cap bolt (M3 x 0.5 x 14 ℓ, spring washer 2 pcs.) • Round head Phillips screw (M3 x 0.5 x 16 ℓ, spring washer 2 pcs.)	—	D-P5DWL

[Mounting screws set made of stainless steel]
The following set of mounting screws (nut included) made of stainless steel is also available. Use it in accordance with the operating environment. (Please order the auto switch spacer separately, since it is not included.)
For BBA2: D-A7/A8/F7/J7
"D-F7BAL/F7BAVL" switch is set on the cylinder with the stainless steel screws above when shipped. When a switch is shipped independently, "BBA2" screws are attached.

Minimum Auto Switch Mounting Stroke

(mm)

Bore size (mm)	Auto switch model / Number of auto switch	D-A9□	D-A9□V	D-M9□	D-F9□W	D-M9□V	D-F9□WV	D-F9BAL
12 to 25	2 pcs.	10	10	15	15	5	10	25
	1 ps.	10	5	15	15	5	10	25
32, 40, 50, 63, 80, 100	2 pcs.	10	10	10	15	5	15	20
	1 pc.	10	5	10	15	5	10	20

(mm)

Bore size (mm)	Auto switch model / Number of auto switches	D-F7□V D-J79C	D-A7□ D-A8□ D-A73C D-A80C	D-F7□WV D-F7BAVL	D-A7□H D-A80H D-F7□ D-J79	D-A79W	D-F7□W D-J79W D-F7BAL D-F7NT D-F79F	D-P5DW
32, 40, 50, 63, 80, 100	2 pcs.	5	10	15	15	20	20	15
	1 pc.	5	5	10	15	15	20	15

Besides the models listed in "How to Order," the following auto switches are applicable.
Refer to page 7-9-1 of Best Pneumatics vol. 7 for detailed specifications.

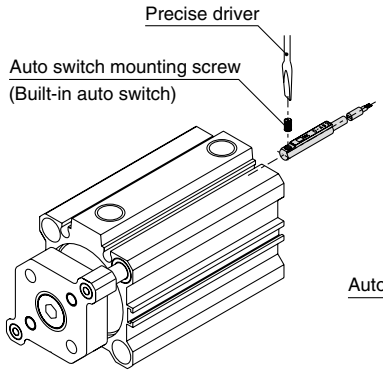
Type	Model	Electrical entry	Features	Applicable bore size
Solid state switch	**D-F7NTL**	Grommet (In-line)	With timer	ø32 to ø100

∗ With pre-wire connector is available for D-F7NTL type, too. Contact SMC for details. For details, refer to page 7-9-36 of Best Pneumatics Vol. 7.
∗ Contact SMC for detailed normally closed solid (N.C. = b contact) state auto switches such as D-F9G and D-F9H. For details, refer to page 7-9-23 of Best Pneumatics Vol. 7.

Auto Switch Mounting

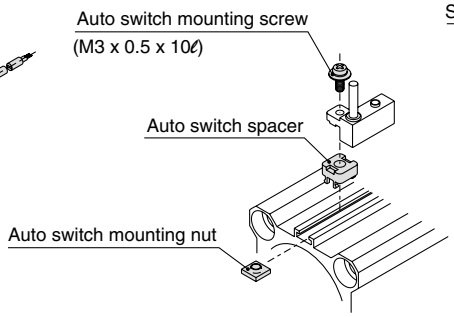
To mount auto switches, follow the instruction illustrated below.

ø12 to ø100/Direct mounting



- Use a watchmakers screwdriver with a handle 5 to 6 mm in diameter when tightening the auto switch mounting screw.
  Tightening torque should be set 0.10 to 0.20 N·m.

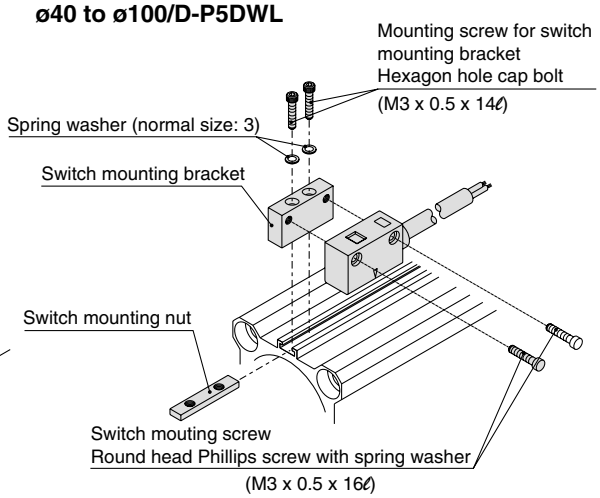
ø32 to ø100/Rail mounting



- Tightening torque of auto switch mounting screw should be set 0.5 to 0.7 N·m.

* In the case of cylinders with built-in magnets, unassembled auto switch mounting brackets are packed together when shipped.

ø40 to ø100/D-P5DWL



1. Mount the switch mounting bracket onto the switch mounting nut by tightening mounting screw for bracket fixing lightly through the mounting hole on the top of bracket.
2. Insert the switch mounting bracket assembly (bracket + nut) into the mounting groove and set it at the auto switch mounting position.
3. Push the auto switch mounting screw lightly into the auto switch through the mounting hole to fix switch mounting bracket tentatively.
4. After reconfirming the detecting position, tighten the mounting screw for switch mounting bracket and switch mounting screw, and fix the auto switch. (Tightening torque should be 0.5 to 0.7 N·m.)

Series CQM
Auto Switch Specifications

Auto Switch Common Specifications

Type	Reed switch	Solid state switch
Leakage current	None	3-wire: 100 μA or less, 2-wire: 0.8 mA or less
Operating time	1.2 ms	1 ms or less Note 2)
Impact resistance	300 m/s^2	1000 m/s^2
Insulation resistance	50 MΩ or more at 500 VDC Mega (between lead wire and case)	
Withstand voltage	1500 VAC for 1 min. Note 1) (between lead wire and case)	1000 VAC for 1 min. (between lead wire and case)
Ambient temperature	−10 to 60°C	
Enclosure	IEC529 standard IP67, watertight (JIS C 0920)	

Note1) Connector style (D-A73C/A80C) and A9/A9 □V style: 1000 V AC/min. (between lead wire and the case)
Note 2) Except for solid state switch with timer (F7NTL) and solid state switch for strong magnetic field resistant 2-color display (D-P5DWL).

Lead Wire Length

Lead wire length indication

(Example) D-M9P L

Lead wire length

Nil	0.5 m
L	3 m
Z	5 m
N ∗	None

∗ Applicable for the connector style (D-□□C) only.

Note 1) Lead wire length Z: 5 m applicable auto switches
Reed switch: D-A73 (C) (H), A80C
Solid state switch: All types are produced upon receipt of order.
Note 2) The standard lead wire length of solid state switch with timer or with water tight 2-color display is 3 meters. (Not available 0.5 m)
Note 3) The standard lead wire length of solid state switch for strong magnetic fields resistant 2-color display is 3 m and 5 m.
Note 4) For solid state switches with flexible wire specification, add "−61" at the end of the lead wire length.

(Example) D-F9PVL- 61

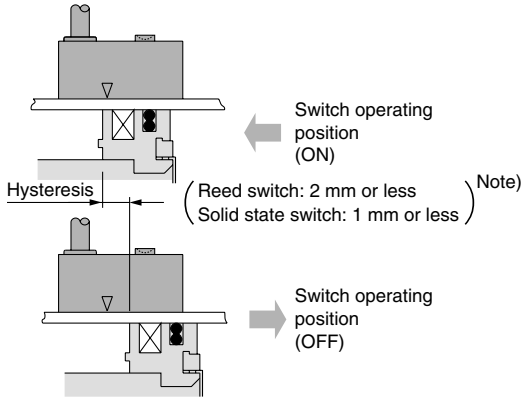
Flexible specification

Part no. of lead wires with connectors
(applicable only for connector type)

Model	Lead wire length
D-LC05	0.5 m
D-LC30	3 m
D-LC50	5 m

Auto Switch Hysteresis

Hysteresis is the distance between the position at which piston movement operates an auto switch to the position at which reverse movement turns the switch off. This hysteresis is included in part of the operating range (one side).



Note) Hysteresis may fluctuate due to the operating environment. Contact SMC if hysteresis causes an operational problem.

Contact Protection Box/CD-P11, CD-P12

<Applicable switch type>

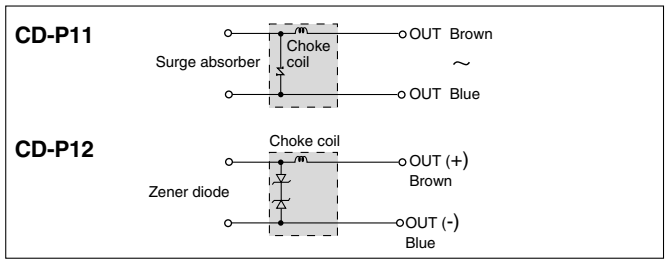
D-A9 and D-A9□V, D-A7□(H), (C) and D-A80□(H), (C) type switches do not have internal contact protection circuits.
① The operated load is an induction load.
② The length of wiring to the load is 5 m or more.
③ The load voltage is 100 VAC and 200 VAC.
A contact protection box should be used in any of the above situations. The lifetime of the contact may be shortened.
D-A72 (H) must be used with the contact protection box regardless of load styles and lead wire length.

Specifications

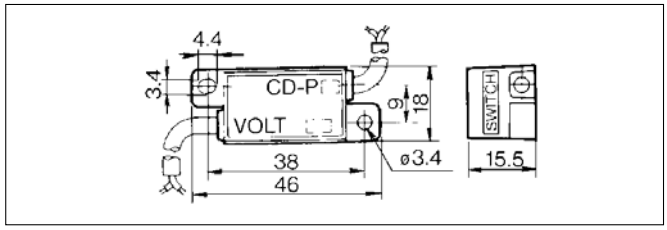
Part No.	CD-P11		CD-P12
Load voltage	100 VAC	200 VAC	24 VDC
Max. load current	25 mA	12.5 mA	50 mA

∗ Lead wire length —— Switch connection side: 0.5 m
Load connection side: 0.5 m

Internal Circuit



Dimensions



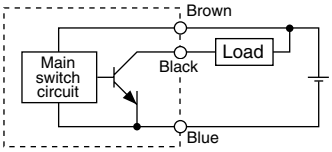
Contact Protection Box/Connection

To connect a switch unit to a contact protection box, connect the lead wire from the side of the contact protection box marked SWITCH to the lead wire coming out of the switch unit. The switch unit should be kept as close as possible to the contact protection box with a lead wire that is no more than 1 meter in length.

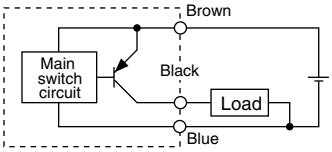
Series CQM
Auto Switch Connections and Examples

Basic Wiring

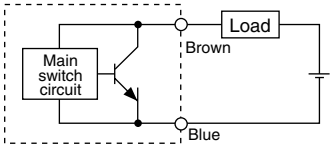
Solid state 3-wire, NPN



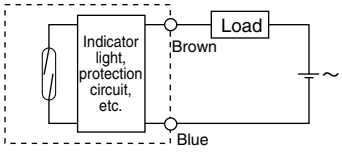
Solid state 3-wire, PNP



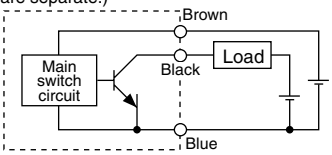
2-wire (Solid state)

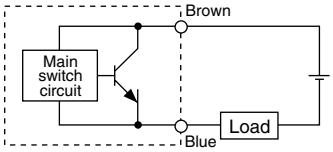


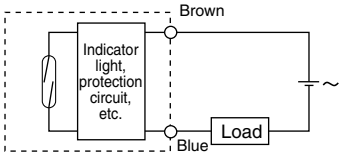
2-wire (Reed)



(When power supply for switch and load are separate.)



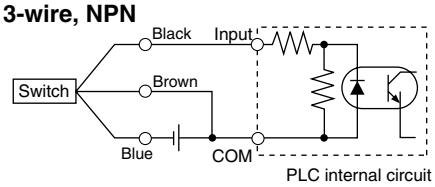




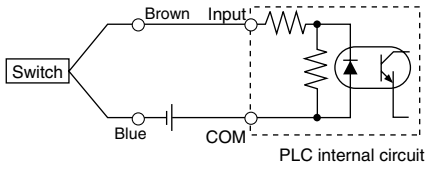
Examples of Connection to PLC

Sink input specifications

3-wire, NPN

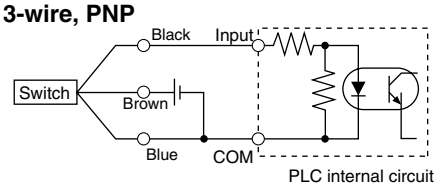


2-wire

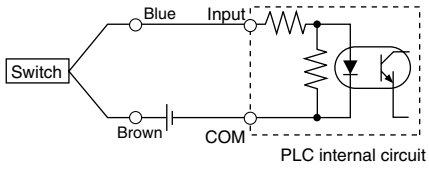


Source input specifications

3-wire, PNP



2-wire

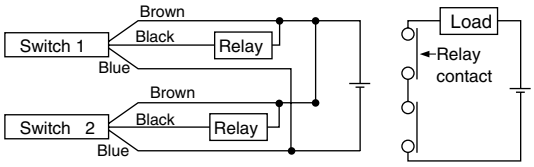


Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

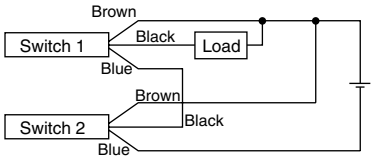
Connection Examples for AND (Series) and OR (Parallel)

3-wire

AND connection for NPN output (using relays)

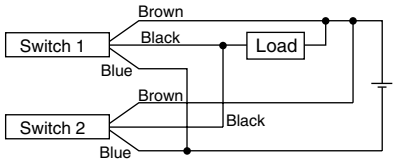


AND connection for NPN output (performed with switches only)

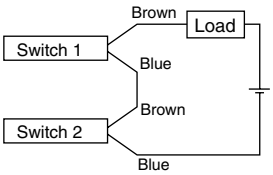


The indicator lights will light up when both switches are turned ON.

OR connection for NPN output



2-wire with 2 switches AND connection



When two switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state.
The indicator lights will light up if both of the switches are in the ON state.

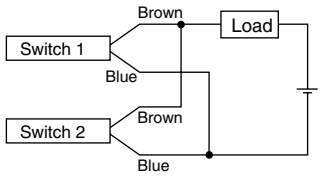
$$\text{Load voltage at ON} = \frac{\text{Power supply voltage}}{} - \frac{\text{Residual voltage}}{} \times 2 \text{ pcs.}$$

$$= 24\text{V} - 4\text{V} \times 2 \text{ pcs.}$$

$$= 16\text{V}$$

Example: Power supply voltage is 24VDC
Voltage decline in switch is 4V

2-wire with 2 switches OR connection



(Solid state)
When two switches are connected in parallel, malfunction may occur because the load voltage will increase when in the OFF state.

$$\text{Load voltage at OFF} = \frac{\text{Leakage current}}{} \times 2 \text{ pcs.} \times \frac{\text{Load impedance}}{}$$

$$= 1\text{mA} \times 2 \text{ pcs.} \times 3\text{k}\Omega$$

$$= 6\text{V}$$

Example: Load impedance is 3kΩ
Leakage current from switch is 1mA

(Reed)
Because there is no current leakage, the load voltage will not increase when turned OFF. However, depending on the number of switches in the ON state, the indicator lights may sometimes get dark or not light up, because of dispersion and reduction of the current flowing to the switches.

Reed Switch: Direct Mounting Style
D-A90(V)/D-A93(V)/D-A96(V)

Grommet
Electrical entry: In-line

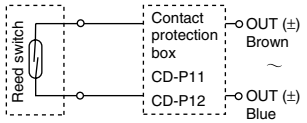
⚠Caution

Operating Precautions

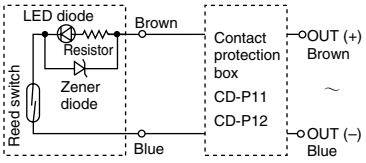
Fix the switch with the existing screw installed on the switch body. The switch may be damaged if a screw other than the one supplied, is used.

Auto Switch Internal Circuit

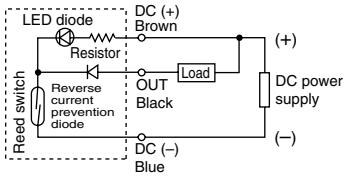
D-A90(V)



D-A93(V)



D-A96(V)



Note) ① In a case where the operation load is an inductive load.
② In a case where the wiring load is greater than 5 m.
③ In a case where the load voltage is 100 VAC.

Please use the auto switch with a contact protection box any of the above mentioned cases. (For details about the contact protection box, refer to page 14.)

Auto Switch Specifications

For details about certified products conforming to international standards, visit us at www.smcworld.com.

PLC: Abbreviation for Programmable Logic Controller

D-A90/D-A90V (Without indicator light)			
Auto switch part no.	**D-A90/D-A90V**		
Applicable load	IC circuit, Relay, PLC		
Load voltage	24 V AC/DC or less	48 V AC/DC or less	100 V AC/DC or less
Maximum load current	50 mA	40 mA	20 mA
Contact protection circuit	None		
Internal resistance	1 Ω or less (including lead wire length of 3 m)		
D-A93/D-A93V/D-A96/D-A96V (With indicator light)			
Auto switch part no.	**D-A93/D-A93V**		**D-A96/D-A96V**
Applicable load	Relay, PLC		IC circuit
Load voltage	24 VDC	100 VAC	4 to 8 VDC
Note 3) Load current range and max. load current	5 to 40 mA	5 to 20 mA	20 mA
Contact protection circuit	None		
Internal voltage drop	D-A93 — 2.4 V or less (to 20 mA)/3 V or less (to 40 mA) D-A93V — 2.7 V or less		0.8 V or less
Indicator light	Red LED lights when ON		

● Lead wires
D-A90(V)/D-A93(V) — Oilproof vinyl heavy-duty cord: ø2.7, 0.18 mm² x 2 cores (Brown, Blue), 0.5 m
D-A96(V) — Oilproof vinyl heavy-duty cord: ø2.7, 0.15 mm² x 3 cores (Brown, Black, Blue), 0.5 m
Note 1) Refer to page 14 for reed switch common specifications.
Note 2) Refer to page 14 for lead wire lengths.

Weight

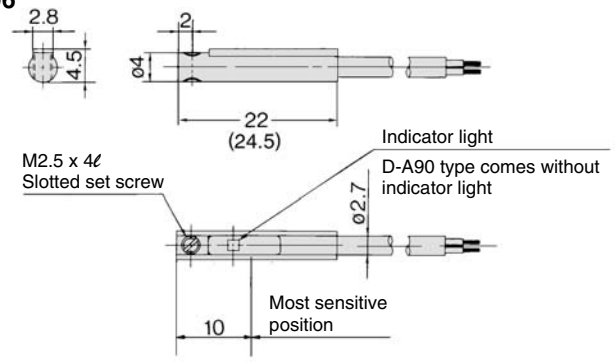
Unit: g

Model	D-A90	D-A90V	D-A93	D-A93V	D-A96	D-A96V
Lead wire length: 0.5 m	6	6	6	6	8	8
Lead wire length: 3 m	30	30	30	30	41	41

Dimensions

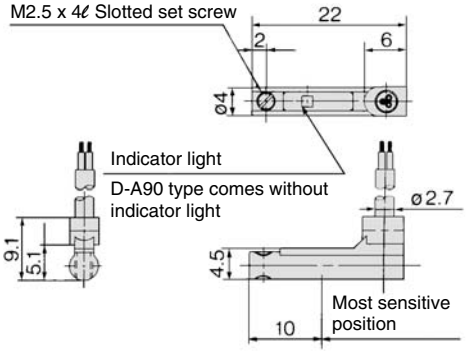
Unit: mm

D-A90/D-A93/D-A96



D-A90V/D-A93V/D-A96V

( ): dimensions for D-A93.



Solid State Switch: Direct Mounting Style
D-M9N(V)/D-M9P(V)/D-M9B(V)

Grommet

- **2-wire load current is reduced (2.5 to 40 mA)**
- **Lead-free**
- **UL certified (style 2844) lead cable is used.**

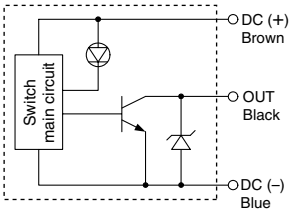
⚠Caution

Operating Precautions

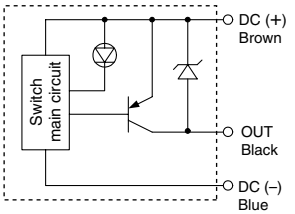
Fix the switch with the existing screw installed on the switch body. The switch may be damaged if a screw other than the one supplied, is used.

Auto Switch Internal Circuit

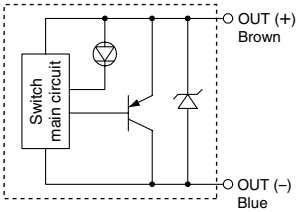
D-M9N(V)



D-M9P(V)



D-M9B(V)



Auto Switch Specifications

For details about certified products conforming to international standards, visit us at www.smcworld.com.

PLC: Abbreviation of Programmable Logic Controller

D-M9□, D-M9□V (With indicator light)						
Auto switch part no.	D-M9N	D-M9NV	D-M9P	D-M9PV	D-M9B	D-M9BV
Electrical entry direction	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less				4 V or less	
Leakage current	100 μA or less at 24 VDC				0.8 mA or less	
Indicator light	Red LED lights when ON.					

- Lead wires
  Oilproof vinyl heavy-duty cord: ø2.7 x 3.2 ellipse, 0.15 mm²,
  D-M9B(V) 0.15 mm² x 2 cores
  D-M9N(V), D-M9P(V) 0.15 mm² x 3 cores

Note 1) Refer to page 14 for auto switch common specifications.
Note 2) Refer to page 14 for lead wire lengths.

Weight

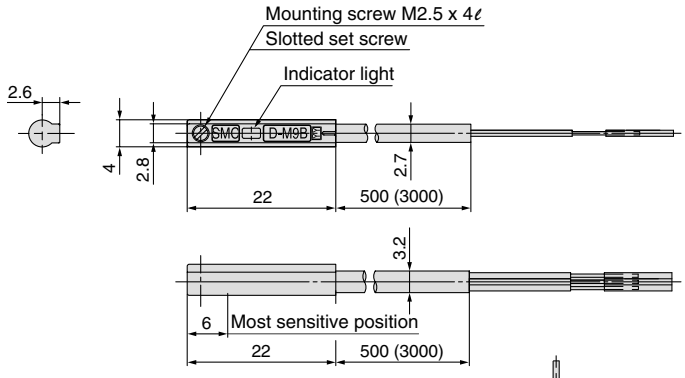
Unit: g

Auto switch part no.		D-M9N(V)	D-M9P(V)	D-M9B(V)
Lead wire length (m)	0.5	8	8	7
	3	41	41	38
	5	68	68	63

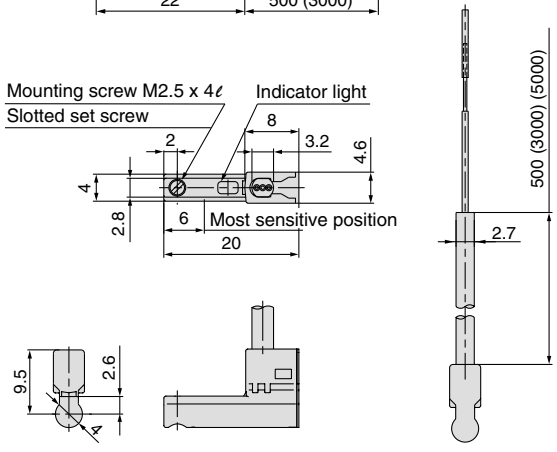
Dimensions

Unit: mm

D-M9□



D-M9□V



SMC

2-color Indication Type, Solid State Switch: Direct Mounting Style
D-F9NW(V)/D-F9PW(V)/D-F9BW(V)

CE

Grommet

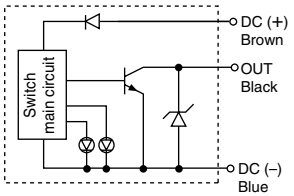
⚠Caution

Operating Precautions

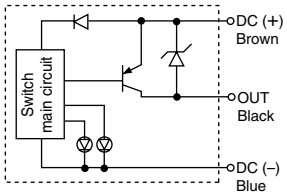
Fix the switch with the existing screw installed on the switch body. The switch may be damaged if a screw other than the one supplied, is used.

Auto Switch Internal Circuit

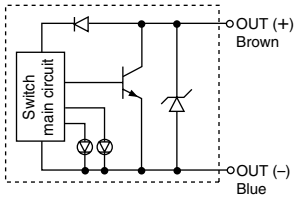
D-F9NW(V)



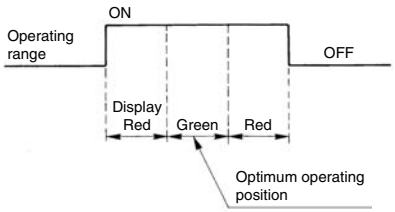
D-F9PW(V)



D-F9BW(V)



Indicator light/Display method



Auto Switch Specifications

For details about certified products conforming to international standards, visit us at www.smcworld.com.

PLC: Abbreviation for Programmable Logic Controller

D-F9□W/D-F9□WV (With indicator light)						
Auto switch part no.	D-F9NW	D-F9NWV	D-F9PW	D-F9PWV	D-F9BW	D-F9BWV
Electrical entry direction	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 VDC)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less		80 mA or less		5 to 40 mA	
Internal voltage drop	1.5 V or less (0.8 V or less at 10 mA load current)		0.8 V or less		4 V or less	
Leakage current	100 μA or less at 24 VDC				0.8 mA or less	
Indicator light	Operating position ····· Red LED lights up Optimum operating position ····· Green LED lights up					

● Lead wires
Oilproof vinyl heavy-duty cord: ø2.7, 0.15 mm² x 3 cores (Brown, Black, Blue), 0.18 mm² x 2 cores (Brown, Blue), 0.5 m

Note 1) Refer to page 14 for auto switch common specifications.
Note 2) Refer to page 14 for lead wire lengths.

Weight

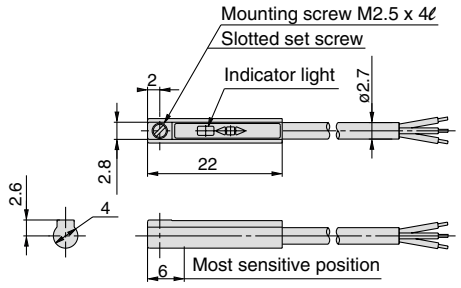
Unit: g

Auto switch part no.		D-F9NW(V)	D-F9PW(V)	D-F9BW(V)
Lead wire length (m)	0.5	7	7	7
	3	34	34	32
	5	56	56	52

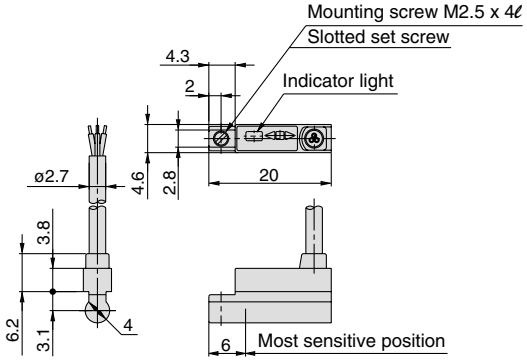
Dimensions

Unit: mm

D-F9□W



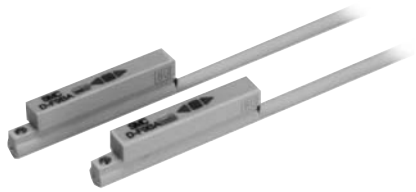
D-F9□WV



Water Resistant 2-color Indication Type Solid State Switch: Direct Mounting Style
D-F9BAL

Grommet

Water (coolant) resistant type

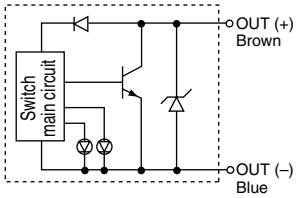


⚠ Caution

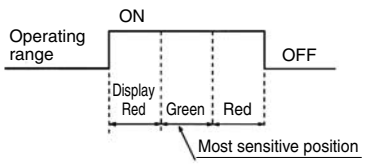
Operating Precautions

① Consult with SMC if using coolant liquid other than water based solution.
② Do not use anything other than the mounting screws attached to the auto switch body to secure the switch. If screws other than those specified are used, it may cause the switch to be damaged.

Auto Switch Internal Circuit



Indicator light



Auto Switch Specifications

Refer to www.smcworld.com for details of products compatible with overseas standards.

PLC: Programable Logic Controller

D-F9BAL (With indicator light)	
Auto switch part no.	**D-F9BAL**
Wiring type	2-wire
Output type	—
Applicable load	24 VDC relay, PLC
Power supply voltage	—
Current consumption	—
Load voltage	24 VDC (10 to 28 VDC)
Load current	5 to 30 mA
Internal voltage drop	5 V or less
Leakage current	1 mA or less at 24 VDC
Indicator light	Operating position ..... Red LED lights up Optimum operating position ..... Green LED lights up

● Lead wires
Oilproof vinyl heavy-duty cord, ø2.7, 0.5 m
0.18 mm² x 2 cores (Brown, Blue)
Note 1) Refer to page 14 for auto switch common specifications.
Note 2) Refer to page 14 for lead wire lengths.

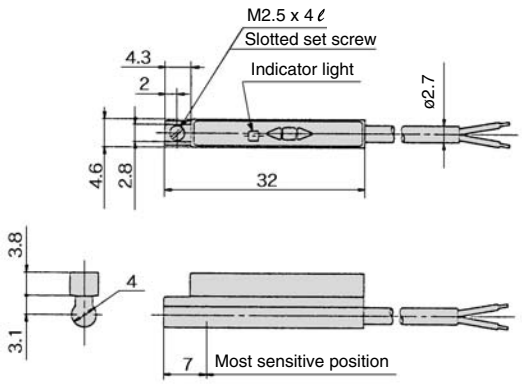
Weight

Unit: g

Model		D-F9BA
Lead wire length (m)	0.5	—
	3	37
	5	57

Dimensions

Unit: mm



SMC

Series CQM
Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by a label of **"Caution"**, **"Warning"** or **"Danger"**. To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.

⚠ Caution : Operator error could result in injury or equipment damage.

⚠ Warning : Operator error could result in serious injury or loss of life.

⚠ Danger : In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414 : Pneumatic fluid power --General rules relating to systems
Note 2) JIS B 8370: Pneumatic system axiom

⚠ Warning

1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified. Referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when constructing a system.

2. Only trained personnel should operate pneumatically operated machinery and equipment.

Compressed air can be dangerous if handled incorrectly. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.

1. Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc. (Bleed air into the system gradually to create back pressure.)

4. Contact SMC if the product is to be used in any of the following conditions:

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

Series CQM
Actuator Precautions 1

Be sure to read before handling.

Design

⚠ Warning

1. There is a danger of sudden action by air cylinders if sliding parts of machinery are twisted, etc. and changes in forces occur.

In such cases, human injury may occur; e.g., by catching hands or feet in the machinery, or damage to the machinery itself may occur. Conduct adjustment to ensure smooth movement of the machine and plan a design to avoid human injury.

2. A protective cover is recommended to minimize the risk of human injury.

If a driven object or moving parts of the cylinder pose a danger of personal injury, design the structure to avoid contact with the human body.

3. Securely tighten all stationary parts and connected parts so that they will not become loose.

When a cylinder operates at a high frequency or is installed where there is a lot of vibration, ensure that all parts remain secure.

4. A deceleration circuit or shock absorber, etc., may be required.

When a driven object is operated at a high speed or the load is heavy, the cylinder's cushion will not be sufficient to absorb the impact. Install a deceleration circuit to reduce the speed before cushioning, or install an external shock absorber to relieve the impact. In this case, the rigidity of the machinery should also be examined.

5. Consider a possible drop in operating pressure due to a power outage, etc.

When a cylinder is used in a clamping mechanism, there is a danger of work pieces dropping if there is a decrease in clamping force due to a drop in circuit pressure caused by a power outage, etc. Therefore, safety equipment should be installed to prevent damage to machinery and/or human injury. Suspension mechanisms and lifting devices also require consideration for drop prevention.

6. Consider a possible loss of power source.

Measures should be taken to protect against human injury and equipment damage in the event that there is a loss of power to equipment controlled by pneumatics, electricity or hydraulics, etc.

7. Design circuitry to prevent sudden lurching of driven objects.

When a cylinder is driven by an exhaust center type directional control valve or when it starts-up after residual pressure is exhausted from the circuit, etc., the piston and its driven object will shoot out at a high speed if pressure is applied to one side of the cylinder because of the absence of air pressure inside the cylinder. Therefore, equipment should be selected and circuits designed to prevent sudden shoot-outs because, there is a danger of human injury and/or damage to equipment when this occurs.

8. Consider emergency stops.

Design so that human injury and/or damage to machinery and equipment will not be caused when machinery is stopped by a safety device under abnormal conditions, a power outage or a manual emergency stop.

9. Consider the action when operation is restarted after an emergency stop or abnormal stop.

Design the machinery so that human injury or equipment damage will not occur upon restart of operation. When the cylinder has to be reset at the starting position, install manual safety equipment.

Selection

⚠ Warning

1. Confirm the specifications.

The products advertised in this catalog are designed according to use in industrial compressed air systems. If the products are used in conditions where pressure, temperature, etc., are out of specifications, damage and/or malfunction may be caused. Do not use in these conditions. (Refer to specifications.)

Consult with SMC if you use a fluid other than compressed air.

2. Intermediate stops

When intermediate stopping of a cylinder piston is performed with a 3-position closed center type directional control valve, it is difficult to achieve stopping positions as accurate and precise as with hydraulic pressure due to the compressibility of air.

In addition, since valves and cylinders are not guaranteed for zero air leakage, it may not be possible to hold a stopped position for an extended period of time. Consult with SMC in cases where you need to hold a stopped position for long periods.

⚠ Caution

1. Operate within the limits of the maximum usable stroke.

The piston rod will be damaged if operated beyond the maximum stroke. Refer to the air cylinder model selection procedure for the maximum useable stroke.

2. Operate the piston within a range such that collision damage will not occur at the stroke end.

3. Use a speed controller to adjust the cylinder drive speed, gradually increasing from a low speed to the desired speed setting.

Mounting

⚠ Caution

1. Be certain to match the rod shaft center with the direction of the load and movement when connecting.

When not properly matched, problems may arise with the rod and tube, and damage may be caused due to friction on areas such as the inner tube surface, bushings, rod surface and seals.

2. When an external guide is used, connect the rod end and the load in such a way that there is no interference at any point within the stroke.

3. Do not scratch or gouge the sliding parts of the cylinder tube or tube rod, etc., by striking or grasping them with other objects.

Cylinder bores are manufactured to precise tolerances, so that even a slight deformation may cause malfunction. Also, scratches or gouges, etc., in the tube rod may lead to damaged seals and cause air leakage.

4. Prevent the seizure of rotating parts.

Prevent the seizure of rotating parts (pins, etc.) by applying grease.

Back page 2

Series CQM
Actuator Precautions 2

Be sure to read before handling.

Mounting

⚠ Caution

5. Do not use until you can verify that equipment can operate properly.

Verify correct mounting by suitable function and leakage inspections after compressed air and power are connected following mounting, maintenance or conversions.

6. Instruction manual

The product should be mounted and operated after thoroughly reading the manual and understanding its contents.

Keep the instruction manual where it can be referred to as needed.

Piping

⚠ Caution

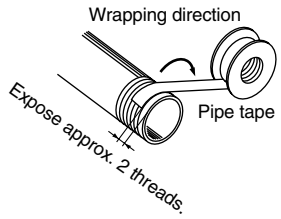
1. Preparation before piping

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

2. Wrapping of pipe tape

When screwing in pipes and fittings, etc., be certain that chips from the pipe threads and sealing material will not ingress inside the piping.

Also, when pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



Lubrication

⚠ Caution

1. Lubrication of non-lube type cylinder

The cylinder is lubricated for life at the factory and can be used without any further lubrication.

However, in the event that it is lubricated additionally, be sure to use class 1 turbine oil (with no additives) ISO VG32.

Stopping lubrication later may lead to malfunctions because the new lubricant will cancel out the original lubricant. Therefore, lubrication must be continued once it has been started.

Air Supply

⚠ Warning

1. Use clean air.

If compressed air includes chemicals, synthetic oils containing organic solvents, salt or corrosive gases, etc., it can cause damage or malfunction.

⚠ Caution

1. Install air filters.

Install air filters at the upstream side of valves. The filtration degree should be 5 μm or finer.

Air Supply

2. Install an after cooler, air dryer or water separator (Drain Catch), etc.

Air that contains excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an after cooler, air dryer or water separator (Drain Catch).

3. Use the product within the specified range of fluid and ambient temperature.

Take measures to prevent freezing, since moisture in the circuit will be frozen below 5°C, and this may cause damage to seals and lead to malfunction.

Refer to SMC's Best Pneumatics Vol.14 for further details on compressed air quality.

Operating Environment

⚠ Warning

1. Do not use in environments where there is a danger of corrosion.

2. In dusty locations or where water, oil, etc. splash on the equipment, take suitable measures to protect rod.

3. When using auto switches, do not operate in an environment with strong magnetic fields.

Maintenance

⚠ Warning

1. Maintenance should be performed according to the procedure indicated in the instruction manual.

If handled improperly, malfunction and damage of machinery or equipment may occur.

2. Removal of equipment, and supply/exhaust of compressed air

When equipment is removed, first take measures to prevent dropping of driven objects and run-away of equipment, etc. Then cut off the supply pressure and electric power, and exhaust all compressed air from the system.

When machinery is restarted, proceed with caution after confirming measures to prevent cylinder lurching.

⚠ Caution

1. Drain flushing

Remove drainage from air filters regularly.

Series CQM
Auto Switch Precautions 1

Be sure to read before handling.

Design and Selection

⚠ Warning

1. Confirm the specifications.

Read the specifications carefully and use this product appropriately. The product may be damaged or malfunction if it is used outside the range of specifications of current load, voltage, temperature or impact.

2. Take precautions when multiple cylinders are used close together.

When two or more auto switch cylinders are lined up in close proximity to each other, magnetic field interference may cause the switches to malfunction. Maintain a minimum cylinder separation of 40 mm. (When the allowable interval is specified for each cylinder series, use the indicated value.)

3. Pay attention to the length of time that a switch is on at an intermediate stroke position.

When an auto switch is placed at an intermediate position of the stroke and a load is driven at the time the piston passes, the auto switch will operate, but if the speed is too great, the operating time will be shortened and the load may not operate properly. The maximum detectable piston speed is:

$$V\ (mm/s) = \frac{\text{Auto switch operating range (mm)}}{\text{Load operating time (ms)}} \times 1000$$

4. Keep wiring as short as possible.

<Reed switch>

As the length of the wiring to a load gets longer, the rush current at switching ON becomes greater, and this may shorten the product's life. (The switch will stay ON all the time.)

1) Use a contact protection box when the wire length is 5 m or longer.

<Solid state switch>

2) Although wire length should not affect switch function, use a wire that is 100 m or shorter.

5. Take precautions for the internal voltage drop of the switch.

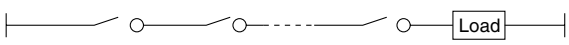
<Reed switch>

1) Switches with an indicator light (Except D-A96, A96V, D-A76H)

- If auto switches are connected in series as shown below, take note that there will be a large voltage drop because of internal resistance in the light emitting diodes. (Refer to internal voltage drop in the auto switch specifications.)

[The voltage drop will be "n" times larger when "n" auto switches are connected.]

Even though an auto switch operates normally, the load may not operate.



- Similarly, when operating below a specified voltage, it is possible that the load may be ineffective even though the auto switch function is normal. Therefore, the formula below should be satisfied after confirming the minimum operating voltage of the load.

$$\text{Supply voltage} - \text{Internal voltage drop of switch} > \text{Minimum operating voltage of load}$$

2) If the internal resistance of a light emitting diode causes a problem, select a switch without an indicator light (Model A90, A90V, A80 (H), (C)).

<Solid state switch>

3) Generally, the internal voltage drop will be greater with a 2-wire solid state auto switch than with a reed switch. Take the same precautions as in 1) above.
Also, note that a 12 VDC relay is not applicable.

6. Pay attention to leakage current.

<Solid state switch>

With a 2-wire solid state auto switch, current (leakage current) flows to the load to operate the internal circuit even when in the OFF state.

$$\text{Current to operate load (OFF condition)} > \text{Leakage current}$$

If the condition given in the above formula is not met, it will not reset correctly (stays ON). Use a 3-wire switch if this specification cannot be satisfied.
Moreover, leakage current flow to the load will be "n" times larger when "n" auto switches are connected in parallel.

7. Do not use a load that generates surge voltage.

<Reed switch>

If driving a load such as a relay that generates a surge voltage, use a contact protection box.

<Solid state switch>

Although a zener diode for surge protection is connected at the output side of a solid state auto switch, damage may still occur if a surge is applied repeatedly. When directly driving a load which generates surge, such as a relay or solenoid valve, use a type of switch with a built-in surge absorbing element.

8. Cautions for use in an interlock circuit

When an auto switch is used for an interlock signal requiring high reliability, devise a double interlock system to safeguard against malfunctions by providing a mechanical protection function, or by also using another switch (sensor) together with the auto switch. Also perform periodic inspection and confirm proper operation.

9. Ensure sufficient clearance for maintenance activities.

When designing an application, be sure to allow sufficient clearance for maintenance and inspections.

Back page 4

Series CQM
Auto Switch Precautions 2

Be sure to read before handling.

Mounting and Adjustment

⚠ Warning

1. Do not drop or bump.

Do not drop, bump or apply excessive impacts (300m/s^2 or greater for reed switches and 1000m/s^2 or greater for solid state switches) while handling.

Although the body of the switch may not be damaged, the inside of the switch could be damaged and cause a malfunction.

2. Do not carry an actuator by the auto switch lead wires.

Never carry a cylinder by its lead wires. This may not only cause broken lead wires, but it may cause internal elements of the switch to be damaged by the stress.

3. Mount switches using the proper tightening torque.

When a switch is tightened above the torque specification, the mounting screws, or switch may be damaged. On the other hand, tightening below the torque specification may allow the switch to slip out of position.

4. Mount a switch at the center of the operating range.

Adjust the mounting position of an auto switch so that the piston stops at the center of the operating range (the range in which a switch is ON). (The mounting positions shown in the catalog indicate the optimum position at the stroke end.) If mounted at the end of the operating range (around the borderline of ON and OFF), operation will be unstable.

<D-M9□>

When the D-M9 auto switch is used to replace old series auto switch, it may not activate depending on operating condition because of its shorter operating range.

Such as

- Application where the stop position of actuator may vary and exceed the operating range of the auto switch, for example, pushing, pressing, clamping operation, etc.
- Application where the auto switch is used for detecting an intermediate stop position of the actuator. (In this case the detecting time will be reduced.)

In these applications, please set the auto switch to the center of the required detecting range.

⚠ Caution

1. Fix the switch with the appropriate screw installed on the switch body. The switch may be damaged if other screws are used.

Wiring

⚠ Warning

1. Avoid repeatedly bending or stretching lead wires.

Broken lead wires will result from repeatedly applying bending stress or stretching force to the lead wires.

2. Be sure to connect the load before power is applied.

<2-wire type>

If the power is turned ON when an auto switch is not connected to a load, the switch will be instantly damaged because of excess current.

Wiring

3. Confirm proper insulation of wiring.

Be certain that there is no faulty wiring insulation (such as contact with other circuits, ground fault, improper insulation between terminals, etc.). Damage may occur due to excess current flow into a switch.

4. Do not wire in conjunction with power lines or high voltage lines.

Wire separately from power lines or high voltage lines, avoiding parallel wiring or wiring in the same conduit with these lines. Control circuits containing auto switches may malfunction due to noise from these lines.

5. Do not allow short circuit of loads.

<Reed switch>

If the power is turned ON with a load in a short circuited condition, the switch will be instantly damaged because of excess current flow into the switch.

<Solid state switch>

D-M9□ and all models of PNP output type switches do not have built-in short circuit protection circuits. If loads are short circuited, the switches will be instantly damaged, as in the case of reed switches.

Take special care to avoid reverse wiring with the brown [red] power supply line and the black [white] output line on 3-wire type switches.

6. Avoid incorrect wiring.

<Reed switch>

A 24 VDC switch with indicator light has polarity. The brown [red] lead wire is (+), and the blue [black] lead wire is (–).

1) If connections are reversed, the switch will still operate, but the light emitting diode will not light up.
   Also note that a current greater than the maximum specified one will damage a light emitting diode and make it inoperable.
   Applicable models: D-A93, A93V, D-A73, D-A73H, D-A73C

<Solid state switch>

1) Even if connections are reversed on a 2-wire type switch, the switch will not be damaged because it is protected by a protection circuit, but it will remain in a normally ON state. But reverse wiring in a short circuit load condition should be avoided to protect the switch from being damaged.
2) Even if (+) and (–) power supply line connections are reversed on a 3-wire type switch, the switch will be protected by a protection circuit. However, if the (+) power supply line is connected to the blue [black] wire and the (–) power supply line is connected to the black [white] wire, the switch will be damaged.

<D-M9□>

D-M9□ does not have built-in short circuit protection circuit. Be aware that if the power supply connection is reversed (e.g. (+) power supply wire and (–) power supply wire connection is reversed), the switch will be damaged.

∗ Lead wire color changes

Lead wire colors of SMC switches have been changed in order to meet NECA Standard 0402 for production beginning September, 1996 and thereafter. Please refer to the tables provided.

Special care should be taken regarding wire polarity during the time that the old colors still coexist with the new colors.

2-wire

	Old	New
Output (+)	Red	Brown
Output (–)	Black	Blue

3-wire

	Old	New
Power supply	Red	Brown
GND	Black	Blue
Output	White	Black

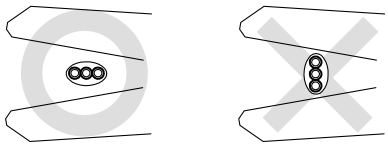
Series CQM
Auto Switch Precautions 3

Be sure to read before handling.

Wiring

⚠Caution

1. When the cable sheath is stripped, confirm the stripping direction. The insulator may be split or damaged depending on the direction. (D-M9□ only)



Recommended tool

Manufacturer	Model name	Model no.
VESSEL	Wire stripper	No 3000G
TOKYO IDEAL CO., LTD	Strip master	45-089

∗ Stripper for a round cable (ø2.0) can be used for a 2-wire type cable.

Operating Environment

⚠Warning

1. Never use in an atmosphere of explosive gases.

The construction of the auto switch is not intended to prevent explosion. Never use in an atmosphere with an explosive gas since this may cause a serious explosion.

2. Do not use in an area where a magnetic field is generated.

The auto switch will malfunction or the magnets inside of an actuator will become demagnetized if used in such an environment.

3. Do not use in an environment where the auto switch will be continually exposed to water.

The switch satisfies the IEC standard IP67 construction (JIS C 0920: watertight construction). Nevertheless, it should not be used in applications where it is continually exposed to water splash or spray. This may cause deterioration of the insulation or swelling of the potting resin inside switch causing a malfunction.

4. Do not use in an environment with oil or chemicals.

Consult with SMC if the auto switch will be used in an environment laden with coolant, cleaning solvent, various oils or chemicals. If the auto switch is used under these conditions for even a short time, it may be adversely effected by a deterioration of the insulation, a malfunction due to swelling of the potting resin, or hardening of the lead wires.

5. Do not use in an environment with temperature cycles.

Consult with SMC if the switch is used where there are temperature cycles other than normal temperature changes, as they may adversely affected the switch internally.

Operating Environment

6. Do not use in an environment where there is excessive impact shock.

<Reed switch>

When excessive impact (300 m/s^2 or more) is applied to a reed switch during operation, the contact point may malfunction and generate a signal momentarily (1 ms or less) or cut off. Consult with SMC regarding the need to use a solid state switch in a specific environment.

7. Do not use in an area where surges are generated.

<Solid state switch>

When there are units (such as solenoid type lifters, high frequency induction furnaces, motors, etc.) that generate a large amount of surge in the area around an actuator with a solid state auto switch, their proximity or pressure may cause deterioration or damage to the internal circuit of the switch. Avoid sources of surge generation and crossed lines.

8. Avoid accumulation of iron debris or close contact with magnetic substances.

When a large accumulated amount of ferrous waste such as machining chips or welding spatter, or a magnetic substance (something attracted by a magnet) is brought into close proximity to an cylinder with auto switches, this may cause the auto switches to malfunction due to a loss of the magnetic force inside the cylinder.

Maintenance

⚠Warning

1. Perform the following maintenance periodically in order to prevent possible danger due to unexpected auto switch malfunction.

1) Securely tighten switch mounting screws.
If screws become loose or the mounting position is dislocated, retighten them after readjusting the mounting position.

2) Confirm that there is no damage to the lead wires.
To prevent faulty insulation, replace switches or repair lead wires, etc., if damage is discovered.

3) Confirm that the green light on the 2-color display type switch lights up.
Confirm that the green LED is ON when stopped at the set position. If the red LED is ON, when stopped at the set position, the mounting position is not appropriate. Readjust the mounting position until the green LED lights up.

Other

⚠Warning

1. Consult with SMC concerning water resistance, elasticity of lead wires, usage at welding sites, etc.

Series CQM
Specific Product Precautions

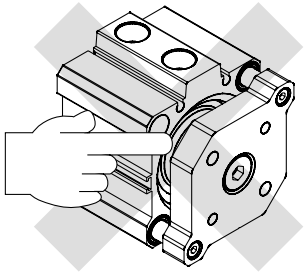
Be sure to read before handling.

Mounting

⚠ Warning

1. Do not put hands or fingers between the plate and cylinder tubing.

Never put hands or fingers in the gap between the plate and cylinder tubing when the piston rods are retracted. Due to the heavy power output of the cylinder, failure to comply with this directive may result in trapping and subsequent injury to the human body.



⚠ Caution

1. Do not scratch or dent the sliding parts of the piston rod and guide rods.

Damage to seals may cause air leakage or faulty operation.

2. Mounting of work piece

When screwing a bolt onto the threaded portion of the plate surface, be certain that the guide rods are fully extended to the end.

Also, be careful that the tightening torque is not applied to the guide rods.

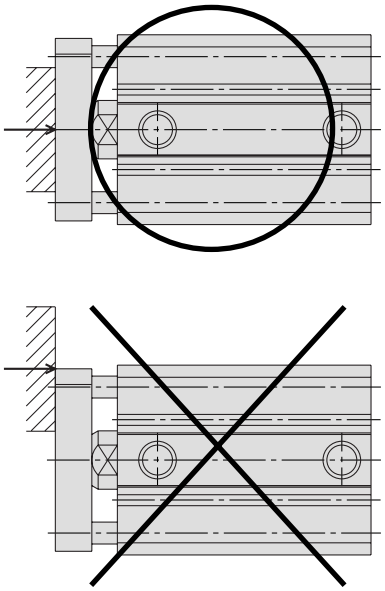
Others

⚠ Caution

1. This product should not be used as a stopper.

2. Do not disassemble and modify the product.

3. For example, in a pressing application, the cylinder thrust is directly applied to the plate, therefore, make sure that the pressing force is applied to the plate directly on the extended axial line of a rod. (Below figures.)



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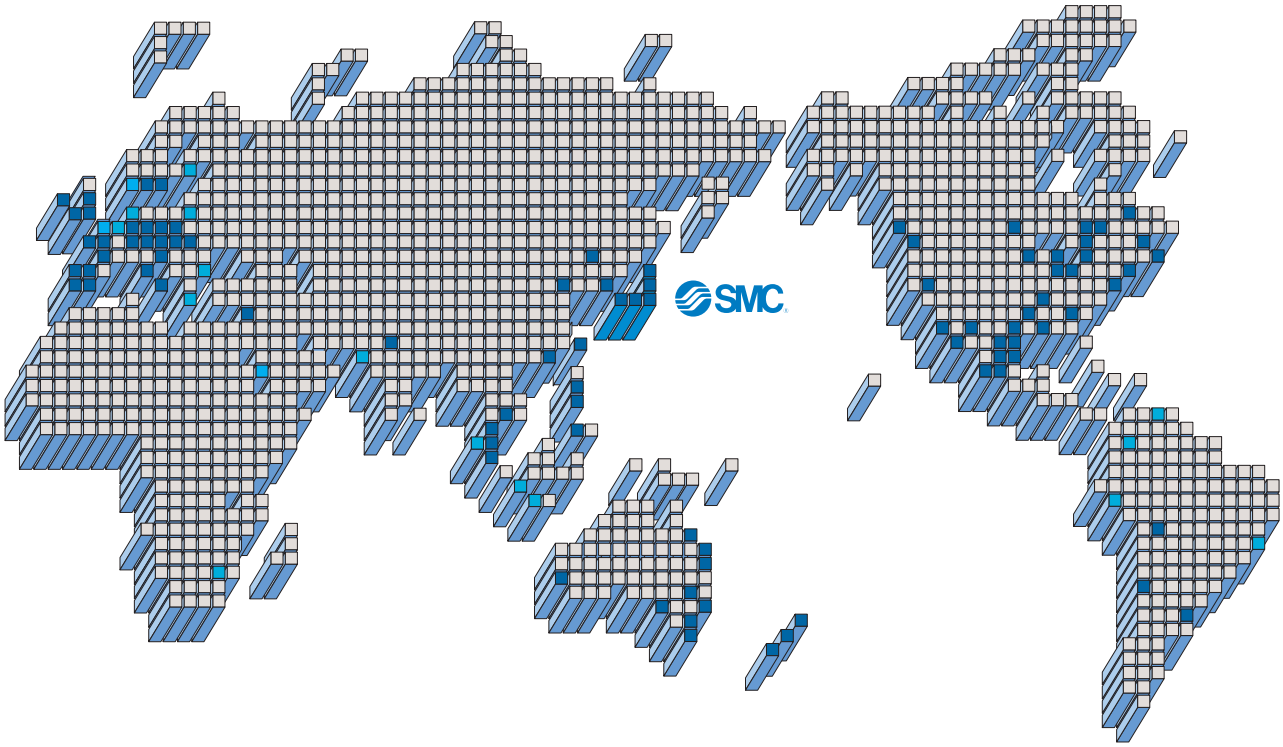

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Low Speed Cylinder
CJ2X/CUX/CQSX/CQ2X/CM2X
ø10 to ø16 ø10 to ø32 ø12 to ø25 ø32 to ø100 ø20 to ø40

Air Cylinder
Series CJ2X

Bore size (mm)	Minimum operating pressure (MPa)	Minimum operating piston speed (mm/s)
10, 16	0.06	1

Page 10-3-6

Free Mount Cylinder
Series CUX

Bore size (mm)	Minimum operating pressure (MPa)	Minimum operating piston speed (mm/s)
10, 16	0.06	1
20, 25, 32	0.05	0.5

10-3-8

Compact Cylinder
Series CQSX

Bore size (mm)	Minimum operating pressure (MPa)	Minimum operating piston speed (mm/s)
12, 16	0.03	1
20, 25	0.025	0.5

10-3-10

Compact Cylinder
Series CQ2X

Bore size (mm)	Minimum operating pressure (MPa)	Minimum operating piston speed (mm/s)
32, 40	0.025	0.5
50, 63, 80, 100	0.01	0.5

10-3-12

Compact Cylinder
Series CM2X

Bore size (mm)	Minimum operating pressure (MPa)	Minimum operating piston speed (mm/s)
20, 25, 32, 40	0.025	0.5

10-3-14

Clean Series

Compact Cylinder
Series 10-/11-CQSX

Air Cylinder
Series 10-/11-CQ2X

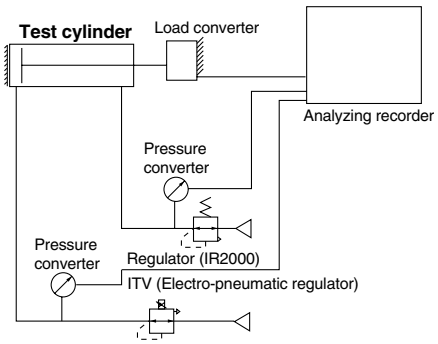
Air Cylinder
Series 10-/11-CM2X

Low Speed Cylinder

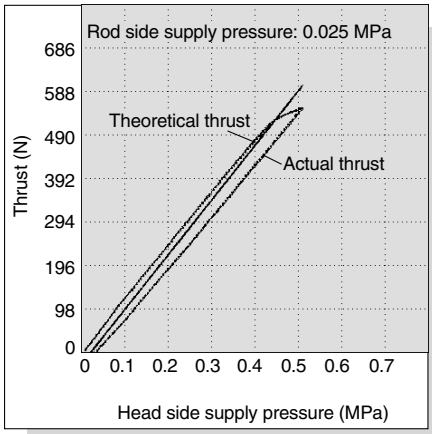
Improved low friction characteristics (CM2X, CQSX, CQ2X)

Minimum operating pressure is reduced in half (compared to previous version).
Stabilization of thrust has been realized.

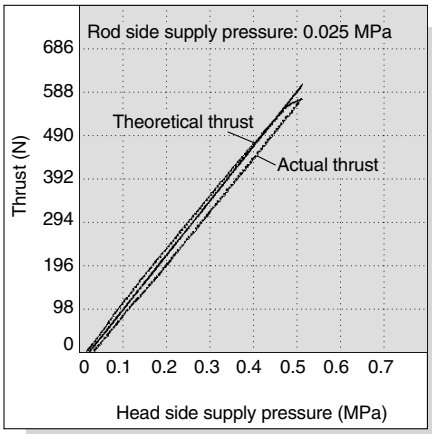
Measurement circuit of cylinder output relative to supply pressure



CQ2B40-75D (Standard)



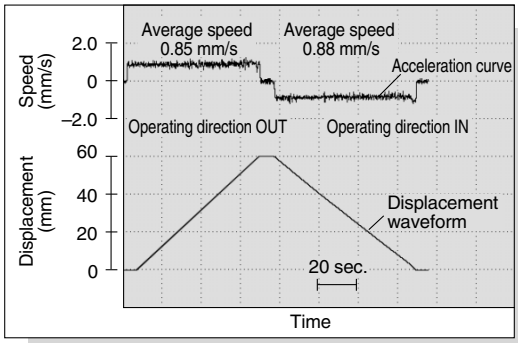
CQ2XB40-75D (Low speed cylinder)



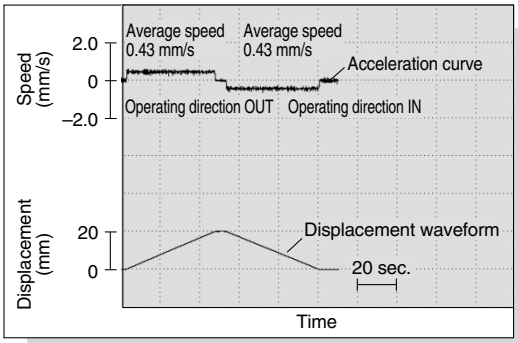
Stable low speed operation even at 0.5 mm/s (1 mm/s for ø16 or smaller) is achieved.

Operates smoothly with minimal stick-slip.

CJ2XB10-60



CQSXB20-20D

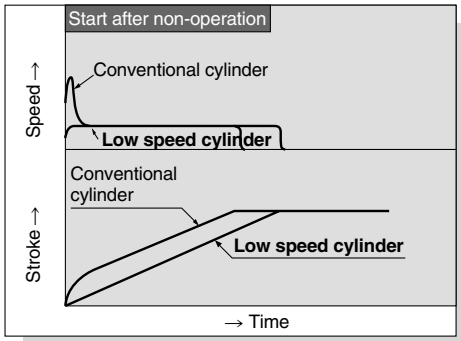


Note 1) Average speed is what the stroke is divided by piston rod's transit time.
Note 2) The OUT operating direction is considered to be positive with regard to speed.

Data conditions • Working fluid····· Air
• Mounting orientation·····Horizontal no-load
• Operating pressure·····0.35 MPa
• Operating circuit····· Meter-in

Possible to transfer a workpiece which hates shocks at lower speeds.

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



The dimensions of all models are the same as those of standard cylinders.

Clean room specification has been added. (10-/11-CQSX, CQ2X, CM2X)

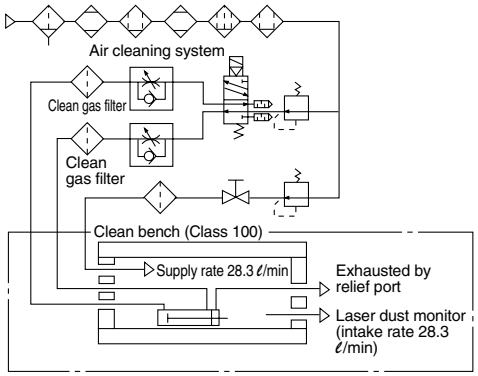
Particulate generation data for microspeed cylinder with clean room specifications are measured using the following test method.

[Example of test method]

The test sample is in place in an acrylic chamber. The chamber is set up on a Class 100 clean bench. The solenoid valve is operated while supplying a volume of clean air equal to the intake volume of a laser dust monitor (28.3 ℓ/min). The amount of particle generation is measured for a specific number of operating cycles.

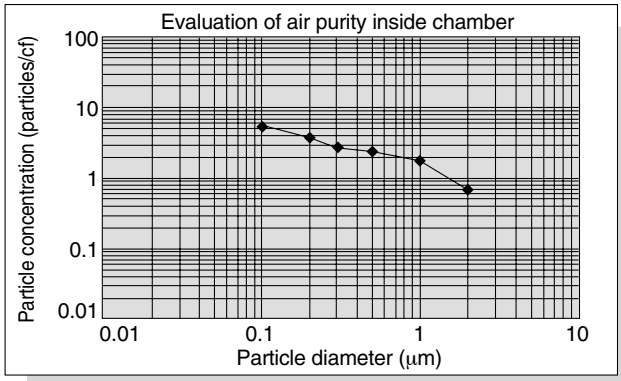
Measuring Conditions

Chamber volume	15 ℓ
Purity of air supplied to chamber	Same quality as supply air
Laser dust monitor	Hitachi Electoronics Engineering Corporation TS-6200 Min. measurable particle dia.: 0.1 μm Intake rate: 28.3 ℓ/min
Laser dust monitor setting conditions	Sampling time: 5 min Interval time: 55 min
Cylinder operating conditions	Operating frequency: 30 cpm Average piston speed: 100 mm/s Mounting: Horizontal no-load Supply pressure: 0.5 MPa

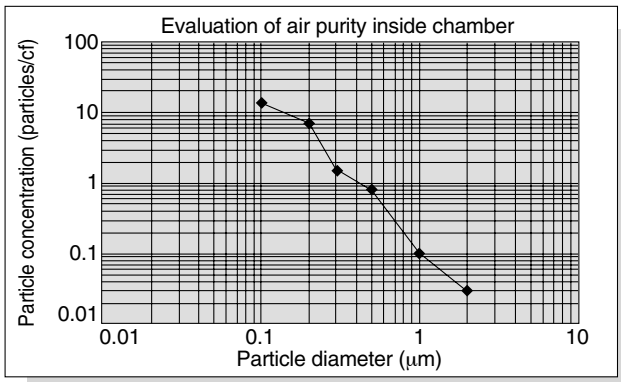


Particle generation measuring circuit

10-CQSXB20-50D



10-CM2XB20-50

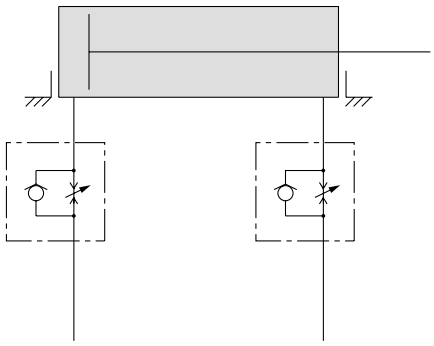


Low Speed Cylinder
Specific Product Precautions
Be sure to read before handling.

Recommended Pneumatic Circuit

⚠ Warning
Horizontal Operation

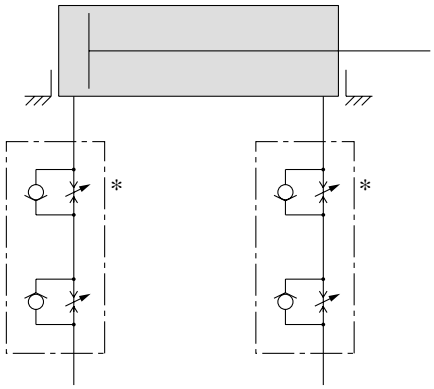
1



Meter-in speed controllers

Meter-in speed controllers can reduce lurching while controlling the speed. The two knobs facilitate adjustment.

2

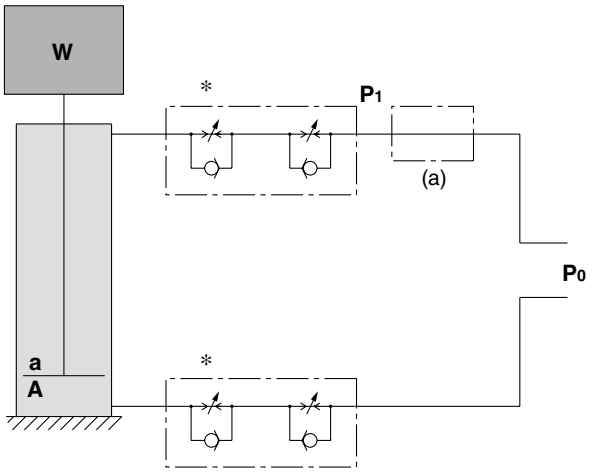


Dual speed controllers

Velocity is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip. More stable low speed operation can be achieved than meter-in circuit alone.

Vertical Operation

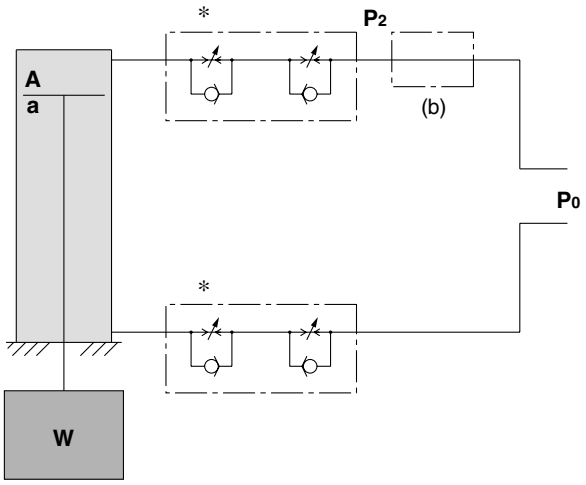
1



(1) The speed is controlled with meter-out control. When the meter-in controller is used in conjunction with the meter-out controller, lurching is reduced. (*)

(2) Depending on the size pf the load, installing a regulator with check valve at position (a) can decrease lurching during descent, and operation delay during ascent.
As a guide, when
W + **P0a** > **P0A**,
adjust **P1**, so that it could be **W** + **P1a** = **P0A**.

2



(1) The speed is controlled with meter-out control. When the meter-in controller is used in conjunction with the meter-out controller, lurching is reduced. (*)

(2) Installing a regulator with check valve at position (b) can decrease lurching during descent, and actuation delay during ascent.
As a guide,
adjust **P2**, so that it could be **W** + **P2A** = **P0a**.

W: Load (N) **P0**: Operating pressure (MPa) **a**: Piston area in the rod side (mm^2) **A**: Piston area in the head side (mm^2)

⚠ Warning

Since **C□J2X**, **C□UX10** are subject to internal leakage due to their construction, the speed may not be fully controlled with the meter-out controller (*) during low speed operation.

The external dimensions and the related things about auto switches are the same as standard type, double acting, single rod. For Series CQS, CDQS, refer to Best Pneumatics Vol. 7.

Low Speed Cylinder
Double Acting, Single Rod
Series CQSX
ø12, ø16, ø20, ø25

How to Order

Without auto switch CQSX | B | 20 | 30 | D | |

With auto switch CDQSX | B | 20 | 30 | D | | F9BW | |

Built-in magnet

Low speed cylinder

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

Standard stroke

Bore size (mm)	Standard stroke (mm)
12, 16	5, 10, 15, 20, 25, 30
20	5, 10, 15, 20, 25, 30, 35, 40, 45, 50
25	

• Manufacturing of intermediate stroke
Intermediate strokes by the 1 mm interval are available by using spacers with standard stroke cylinders. The overall length of cylinder will be the same as the standard stroke with a longer one.
Example) 3 mm width spacer is installed in the standard cylinder CQSXB25-50D to make CQSXB25-47D.

Action

D	Double acting

Cushion/Rod end thread

Nil	Standard (Rod end female thread)
C	With rubber bumper
M	Rod end male thread

∗ Combination above is possible.

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled).

Number of auto switches

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

Applicable Auto Switch/Refer to page 10-20-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m)∗ 0.5 (Nil)	3 (L)	5 (Z)	Pre-wire connector	Applicable load	
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
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**	●	●	○	○	—	
	Diagnostic indication (2-color indication)			3-wire (NPN)		5 V, 12 V		**F9NWV**	**F9NW**	●	●	○	○	IC circuit	
				3-wire (PNP)				**F9PWV**	**F9PW**	●	●	○	○		
				2-wire		12 V		**F9BWV**	**F9BW**	●	●	○	○	—	

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) A93
3 m ····· L (Example) Y93BL
5 m ····· Z (Example) F9NWZ

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

• Since there are other applicable auto switches than listed, refer to Best Pneumatics Vol. 7 for details.
• For details about auto switches with pre-wire connector, refer to page 10-20-66.

Specifications

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
Rod end thread	Female thread
Rod end thread tolerance	JIS Class 2
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

Minimum Stroke for Auto Switch Mounting

(mm)

No. of auto switches mounted	D-A9□, D-F9□WV	D-A9□V	D-M9□, D-F9□W	D-M9□V
2 pcs.	10	10	15 Note)	5
1 pc.	10 Note)	5	15 Note)	5

Note) Please consult with SMC for shorter stroke length than indicated in the table.

Minimum Operating Pressure

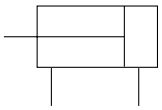
Bore size (mm)	12	16	20	25
Min. operating pressure (MPa)	0.03	0.03	0.025	0.025

Body Option

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

JIS Symbol

Double acting,
Single rod



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

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

Note 2) Parts belonging to each bracket are as follows.
Foot or Flange: Body mounting bolts
Double clevis: Clevis pin, Type C snap ring for shaft, Body mounting bolts

⚠Precautions

Be sure to read before handling. For Safety Instructions and Actuator Precautions, refer to pages 10-24-3 to 10-24-6.

Snap Ring Installation/Removal

⚠Caution

1. For installation and removal, use an appropriate pair of pliers (tool for installing a type C snap ring).
2. 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 installment.

Maintenance

⚠Caution

1. Replacement parts/Seal kit

Order it in accordance with the bore size.

Bore size (mm)	Kit no.	Contents	
12	CQSX12-PS	Piston seal:	1 pc.
16	CQSX16-PS	Rod seal:	1 pc.
20	CQSX20-PS	Tube gasket:	1 pc.
25	CQSX25-PS	Grease pack (10 g):	1 pc.

2. Grease pack

When maintenance requires only grease, use the following part numbers to order.
Grease pack
GR-L-005 (5 g)
GR-L-010 (10 g)
GR-L-150 (150 g)

The external dimensions and the related things about auto switches are the same as standard type, double acting, single rod. For Series CQ2, CDQ2, refer to Best Pneumatics Vol. 7.

Low Speed Cylinder Double Acting, Single Rod

Series CQ2X

ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Without auto switch CQ2X B 40 – 30 D

With auto switch CDQ2X B 40 – 30 D – F9BW

Built-in magnet

Low speed cylinder

Mounting style

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

Bore size

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

Standard stroke
Refer to "Standard Stroke" on page 10-3-13.

Action

D	Double acting

Cushion/Rod end thread

Nil	Standard (Rod end female thread)
C	With rubber bumper
M	Rod end male thread

∗ Combination above is possible.

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the table below.
∗ Auto switches are shipped together, (but not assembled).

Number of auto switches

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

Applicable Auto Switch/Refer to page 10-20-1 for further information on auto switches.

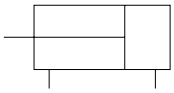
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Rail mounting style ø32 to ø100 Perpendicular	Rail mounting style ø32 to ø100 In-line	Direct mounting style ø32 to ø100 Perpendicular	Direct mounting style ø32 to ø100 In-line	Lead wire length (m)∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wire connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	—	A76H	A96V	A96	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200 V	A72	A72H	—	—	●	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	A73	A73H	—	—	●	●	●	—	—		
								—	—	A93V	A93	●	●	—	—	—		
		Connector					—	A73C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	A79W	—	—	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F7NV	F79	M9NV	M9N	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				F7PV	F7P	M9PV	M9P	●	●	○	—	○		
				2-wire		12 V		F7BV	J79	M9BV	M9B	●	●	○	—	○	—	
		Connector						J79C	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		F7NWV	F79W	F9NWV	F9NW	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	F7PW	F9PWV	F9PW	●	●	○	—	○		
				2-wire		12 V		F7BWV	J79W	F9BWV	F9BW	●	●	○	—	○	—	
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		—	F79F	—	—	●	●	○	—	○	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 Best Pneumatics Vol. 7 for details.
• For details about auto switches with pre-wire connector, refer to page 10-20-66.

JIS Symbol
Double acting,
Single rod



Specifications

Bore size (mm)		32	40	50	63	80	100
Model		Pneumatic (Non-lube)					
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)					
Piping	Screw-in type	Note) M5 x 0.8 Rc 1/8	Rc 1/8	Rc 1/4	Rc 1/4	Rc 3/8	Rc 3/8
Rubber bumper		None					
Rod end thread		Female thread					
Rod end thread tolerance		JIS Class 2					
Stroke length tolerance		$^{+1.0}_{0}$					
Mounting		Through-hole					
Piston speed		0.5 to 300 mm/s					

Note) Only 5 stroke comes with M5 x 0.8 in the case of no auto switch.

Minimum Operating Pressure

Bore size (mm)	32	40	50	63	80	100
Min. operating pressure (MPa)	0.025		0.01			

Standard Stroke

Bore size (mm)	Standard stroke (mm)
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

• Manufacturing of Intermediate stroke
Intermediate strokes by the 1 mm interval are available by using spacers with standard stroke cylinders. But, as for ø40 to ø100 with damper, please consult with SMC separately.
Example) 18 mm width spacer is installed in the standard cylinder CQ2XB40-75D to make CQ2XB40-57D.

Mounting Bracket Part No.

Bore size (mm)	Foot (1)	Flange	Double clevis (3)
32	CQ-L032	CQ-F032	CQ-D032
40	CQ-L040	CQ-F040	CQ-D040
50	CQ-L050	CQ-F050	CQ-D050
63	CQ-L063	CQ-F063	CQ-D063
80	CQ-L080	CQ-F080	CQ-D080
100	CQ-L100	CQ-F100	CQ-D100

Note 1) When ordering foot bracket, order 2 pieces per cylinder.
Note 2) Parts belonging to each bracket are as follows.
Foot or Flange: Body mounting bolts
Double clevis: Clevis pin, Type C snap ring for shaft, Body mounting bolts
Note 3) For double clevis style, clevis pin and snap ring are shipped together.

⚠Precautions

Be sure to read before handling. For Safety Instructions and Actuator Precautions, refer to pages 10-24-3 to 10-24-6.

Snap Ring Installation/Removal

⚠Caution

1. For installation and removal, use an appropriate pair of pliers (tool for installing a type C snap ring).
2. 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 installment.

Pneumatic Circuit

1. Pressure supplied to cylinder should be set affordably. When the operating pressure is low, low speed operation may not be stable depending on a load condition. Besides, the maximum speed may be restricted depending on a pneumatic circuit, or operating pressure.

Maintenance

⚠Caution

1. Replacement parts/Seal kit
Order it in accordance with the bore size.

Bore size (mm)	Kit no.	Contents	
32	CQ2X32-PS	Piston seal:	1 pc.
40	CQ2X40-PS		
50	CQ2X50-PS	Rod seal:	1 pc.
63	CQ2X63-PS	Gasket:	1 pc.
80	CQ2X80-PS		
100	CQ2X100-PS	Grease pack (10 g):	1 pc.

2. Grease pack
When maintenance requires only grease, use the following part numbers to order.
Grease pack
GR-L-005 (5 g)
GR-L-010 (10 g)
GR-L-150 (150 g)

Clean Series Low Speed Cylinder Series 10-, 11-

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.
Since the external dimensions and applicable auto switches are the same as standard type, refer to the separate catalog of "Pneumatic Clean Series".

Series 10-, 11-CQSX

How to Order

Clean Series

10	Relief type
11	Vacuum type

10 – C(D)QSX B 20 – 30 D – F9BW

Built-in magnet

Low speed cylinder

Mounting style

B	Through-hole/Both ends tapped common (Standard)

Bore size

12	12 mm
16	16 mm
20	20 mm
25	25 mm

Cylinder stroke (mm)

Bore size (mm)	Standard stroke (mm)
12, 16	5, 10, 15, 20, 25, 30
20	5, 10, 15, 20, 25,
25	30, 35, 40, 45, 50

● Manufacturing of Intermediate stroke
Intermediate strokes by the 1 mm interval are available by using spacers with standard stroke cylinders. The overall length of cylinder will be the same as the standard stroke with a longer one.
Example) 3 mm width spacer is installed in the standard cylinder 10-CQSXB25-50D to make 10-CQSXB25-47D.

Number of auto switches

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

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to page 10-3-10.
∗ Auto switches are shipped together, (but not assembled).

Rod end thread

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

Action

D	Double acting

Specifications

Bore size (mm)		10- (Relief type) 12	16	20	25
Fluid		Air			
Proof pressure		1.5 MPa			
Maximum operating pressure		1.0 MPa			
Minimum operating pressure		0.04 MPa		0.035 MPa	
Ambient and fluid temperature		Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)			
Piston speed		1 to 200 mm/s			
Piston rod size		6	8	10	12
Rod end thread	Female thread	M3 x 0.5	M4 x 0.7	M5 x 0.8	M6 x 1.0
	Male thread	M5 x 0.8	M6 x 1.0	M8 x 1.25	M10 x 1.25
Rod end thread tolerance		JIS Class 2			
Stroke tolerance		$^{+1.0}_{0}$ mm			
Port size		M5 x 0.8			
Vacuum port, Relief port		M5 x 0.8			

Bore size (mm)		11- (Vacuum type) 12	16	20	25
Fluid		Air			
Proof pressure		1.5 MPa			
Maximum operating pressure		1.0 MPa			
Minimum operating pressure		0.03 MPa		0.025 MPa	
Ambient and fluid temperature		Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)			
Piston speed		1 to 200 mm/s		0.5 to 200 mm/s	
Piston rod size		6	8	10	12
Rod end thread	Female thread	M3 x 0.5	M4 x 0.7	M5 x 0.8	M6 x 1.0
	Male thread	M5 x 0.8	M6 x 1.0	M8 x 1.25	M10 x 1.25
Rod end thread tolerance		JIS Class 2			
Stroke tolerance		$^{+1.0}_{0}$ mm			
Port size		M5 x 0.8			
Vacuum port, Relief port		M5 x 0.8			

Series 10-, 11-CQ2X

How to Order

Clean Series

10	Relief type
11	Vacuum type

10 – C(D)Q2XB 40 – 30 D – J79W

Built-in magnet

Low speed cylinder

Bore size

32	32 mm
40	40 mm
50	50 mm
63	63 mm

Cylinder stroke (mm)

Standard Stroke

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

● Manufacturing of Intermediate stroke
Intermediate strokes by the 1 mm interval are available by using spacers with standard stroke cylinders. But, as for ø40 with damper, please consult SMC separately.
Example) 18 mm width spacer is installed in the standard cylinder 10-CQ2XB40-75D to make 10-CQ2XB40-57D.

Number of auto switches

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

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to page 10-3-12.
∗ Auto switches are shipped together, (but not assembled).

Rod end thread

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

Action

D	Double acting

Specifications

Bore size (mm)		10- (Relief type) 32	40	50	63	11- (Vacuum type) 32	40	50	63
Fluid		Air							
Proof pressure		1.5 MPa							
Maximum operating pressure		1.0 MPa							
Minimum operating pressure		0.035 MPa		0.03 MPa		0.025 MPa		0.02 MPa	
Ambient and fluid temperature		Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)							
Piston speed		1 to 200 mm/s				0.5 to 200 mm/s			
Piston rod size		16		20		16		20	
Rod end thread	Female thread	M8 x 1.25		M10 x 1.5		M8 x 1.25		M10 x 1.5	
	Male thread	M14 x 1.5		M18 x 1.5		M14 x 1.5		M18 x 1.5	
Rod end thread tolerance		JIS Class 2							
Stroke tolerance		$^{+1.0}_{0}$ mm							
Port size		M5 x 0.8, RC 1/8 Note)		Rc1/4		M5 x 0.8, RC 1/8 Note)		Rc1/4	
Vacuum port, Relief port		M5 x 0.8							

Note) Only 5 stroke comes with M5 x 0.8 in the case of no auto switch on ø32.

Made to Order Specifications:
-XB13: Low Speed Cylinder
5 to 50 mm/s (CY1: 7 to 50 mm/s)

Made to Order

Symbol

Low Speed Cylinder **-XB13**

CJ2 Standard model no. — **XB13**

CM2 Mounting style | Bore size | Stroke — **XB13**

CG1 Standard model no. — **XB13**

MB Standard model no. — **XB13**

CU Standard model no. — **XB13**

CQ2 Standard model no. — **XB13**

CQS Standard model no. — **XB13**

Low speed cylinder

CY1 Standard model no. — **XB13**

MGP$^{M}_{L}$ Standard model no. — **XB13**

MGGM Standard model no. — **XB13**

MGCM Standard model no. — **XB13**

CX2 Standard model no. — **XB13**

CXW$^{M}_{L}$ Standard model no. — **XB13**

CXS$^{M}_{L}$ Standard model no. — **XB13**

MXU Standard model no. — **XB13**

CXT$^{M}_{L}$ Standard model no. — **XB13**

Low speed cylinder

Note) Operate without lubrication from a pneumatic system lubricator.

Specifications

Applicable cylinder	Air cylinder/Standard				Free mount cylinder	Compact cylinder	Compact cylinder	Magnetically coupled rodless cylinder	Compact guide cylinder	Guide cylinder		Slide unit		Dual rod cylinder	Compact slide	Platform cylinder
										Slide bearing						
Series	**CJ2**	**CM2**	**CG1**	**MB**	**CU**	**CQ2**	**CQS**	**CY1**	**MGP$^{M}_{L}$**	**MGGM**	**MGCM**	**CX2**	**CXW$^{M}_{L}$**	**CXS$^{M}_{L}$**	**MXU**	**CXT$^{M}_{L}$**
Action	Double acting, Single rod					Double acting										
Bore size (mm)	6, 10 16	20, 25 32, 45	20, 25 32, 40 50, 63	32, 40 50, 63 80, 100	6, 10 16, 20 25, 32	12, 16, 20 25, 32, 40 50, 63, 80 100	12, 16 20, 25	CY1B: 6 10, 15, 20 25, 32 40, 50, 63 CY1S, CY1L: 6 to 40	12, 16, 20 25, 32, 40 50, 63, 80 100	20, 25, 32 40, 50		10, 15 25	10, 16, 20 25, 32	6, 10 15, 20 25, 32	6, 10 16	12, 16 20, 25 32, 40
Piston speed	5 to 50 mm/s							7 to 50 mm/s	5 to 50 mm/s	5 to 50 mm/s						
Cushion	Rubber bumper			Air cushion on both ends	Rubber bumper on both ends	No rubber bumper	No rubber bumper	Rubber bumper on both ends		Rubber bumper (Basic cylinder)		Shock absorber (CX2: Option)		Rubber bumper		
Auto switch	Mountable															
Mounting	Basic Foot Flange Double clevis	Basic Foot Flange Trunnion Clevis		Basic Foot Flange Clevis Trunnion	Basic	Basic Foot Flange Double clevis	Basic Foot Flange Double clevis	Basic Slider	Basic	Basic Front mounting Flange		Basic				
Dimensions	Dimensions and specifications are the same as standard products of double acting. Refer to Best Pneumatics Vol. 6, 7 and 8.															
Additional specifications																

∗ No shock absorber is available for the Series MGGM.

Related Products:
Speed Controller for Low Speed Operation

The effective area of controlled flow is approximately 1/10 of the standard type.
These controllers are suitable for controlling the speed of microspeed cylinders.
The dual type speed controller is especially suitable for cylinders with a small bore size.

Elbow/Universal Type

Air Flow/Effective Area

Model		AS12□1FM-M5 AS13□1FM-M5	AS22□1FM-□01 AS23□1FM-□01		AS22□1FM-□02 AS23□1FM-□02		
Tubing O.D.	Metric size	ø3.2, ø4, ø6	ø3.2, ø4	ø6, ø8	ø4	ø6	ø8, ø10
	Inch size	ø1/8", ø5/32", ø3/16" ø1/4"	ø1/8", ø5/32"	ø3/16", ø1/4" ø5/16"	ø5/32"	ø3/16"	ø1/4", ø5/16" ø3/8"
Controlled flow	Air flow (ℓ/min (ANR))	7	12		38		
	Effective area (mm²)	0.1	0.2		0.6		
Free flow	Flow rate (ℓ/min (ANR))	100	180	230	260	390	460
	Effective area (mm²)	1.5	2.7	3.5	4	6	7

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

In-line Type

Air Flow/Effective Area

Model		AS1001FM	AS2001FM		AS2051FM	
Tubing O.D.	Metric size	ø3.2, ø4, ø6	ø4	ø6	ø6	ø8
	Inch size	ø1/8", ø5/32", ø3/16" ø1/4"	ø5/32"	ø3/16", ø1/4"	ø3/16"	ø1/4", ø5/16"
Controlled flow	Air flow (ℓ/min (ANR))	7	12		38	
	Effective area (mm²)	0.1	0.2		0.6	
Free flow	Flow rate (ℓ/min (ANR))	100	130	230	290	460
	Effective area (mm²)	1.5	2	3.5	4.5	7

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

Elbow Type (Metal body)

Air Flow/Effective Area

Model			AS12□0M		AS22□0M-□01		AS22□0M-□02	
Port size		Cylinder side	M5 x 0.8	10-32 UNF	R 1/8	NPT 1/8	R 1/4	NPT 1/4
		Tube side			Rc 1/8		Rc 1/4	
Controlled flow	Air flow (ℓ/min (ANR))		7		12		38	
	Effective area (mm²)		0.1		0.2		0.6	
Free flow	Flow rate (ℓ/min (ANR))		105		280		420	
	Effective area (mm²)		1.6		4.3		6.5	

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

Dual Type

Air Flow/Effective Area

Model		ASD230FM-M5	ASD330FM-□01	ASD430FM-□02	
Tubing O.D.	Metric size	ø4, ø6	ø6, ø8	ø6	ø8, ø10
	Inch size	ø1/8", ø5/32" ø3/16", ø1/4"	ø3/16", ø1/4"	—	ø1/4", ø5/16" ø3/8"
Controlled flow	Air flow (ℓ/min (ANR))	7	12	38	
	Effective area (mm²)	0.1	0.2	0.6	
Free flow	Air flow (ℓ/min (ANR))	75	175	295	350
	Effective area (mm²)	1.1	2.7	4.5	5.3

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

CAT.ES20-186B

Hygienic Design Cylinder

Series HY□

A water resistant cylinder c

Flat, grooveless configuration

Eliminates the auto switch groove and the holes for cushion needle holes, etc.

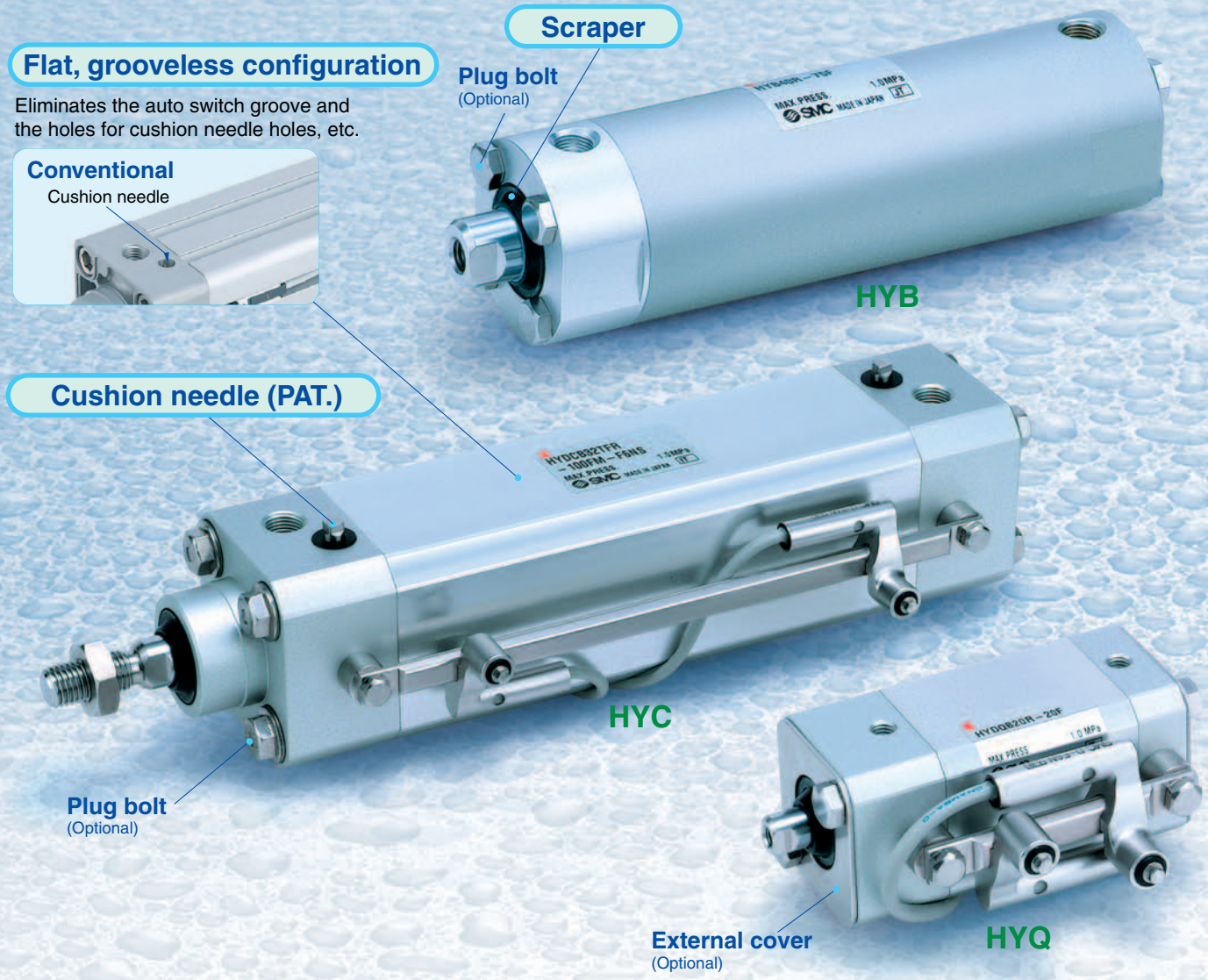
Conventional

Cushion needle

Scraper

Plug bolt (Optional)

Cushion needle (PAT.)

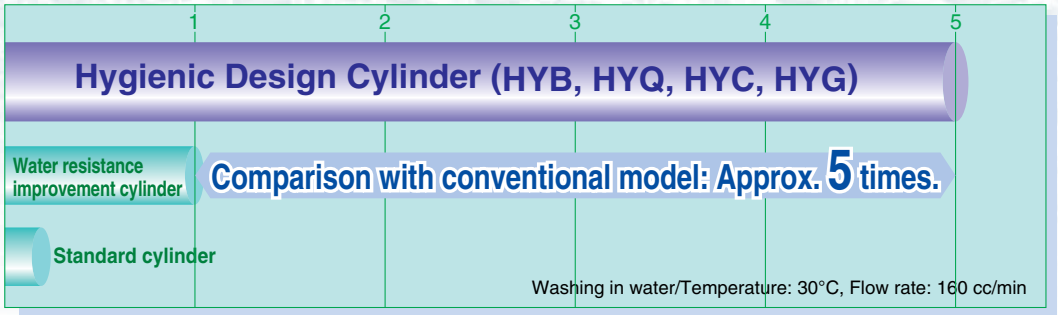


Plug bolt (Optional)

External cover (Optional)

Five times increase in service life compared to conventional model (SMC ratio)

Water-proof examination result (Reference data)



Grease for food (NSF-H1 certified) is available.

External seal material: Choice of NBR or FKM

Mounting section: Conforms to ISO/VDMA standard. (Series HYQ, HYC)

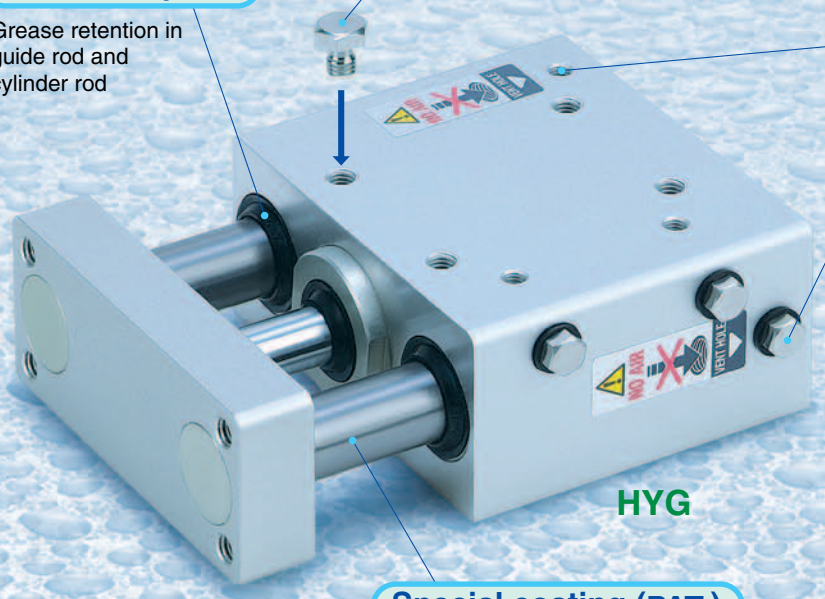
Not applicable for use in a "food zone". For details, refer to Specific Product Precautions (Back page 5).

onfigured for easy cleaning

New scraper

Grease retention in guide rod and cylinder rod

Plug bolt (Optional)



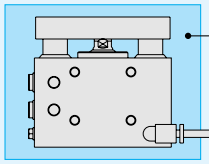
HYG

Special coating (PAT.)

Guide accommodates a special coating.

Breathing port on guide (PAT.)

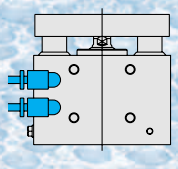
<Use example>



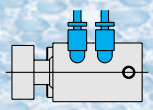
Piping at the breathing port on guide allows breathing outside the water dispersion environment.

Piping

1. Top piping

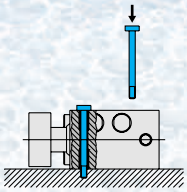


2. Side piping

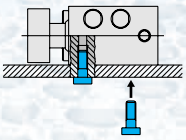


Mounting

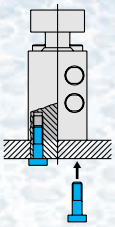
1. Top mounting



2. Lower side mounting

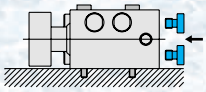


3. Bottom mounting

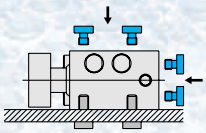


Plug bolt

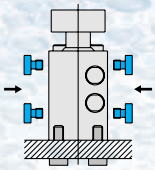
Application: Plug bolts are used to close the mounting hole not used.



1. Top mounting
Mounting hole of the bottom surface is closed.



2. Lower side mounting
Mounting hole of the top and bottom surface is closed.



3. Bottom mounting
Mounting hole of the top and lower surface is closed.

Series	Bore size (20 / 25 / 32 / 40 / 50 / 63 / 80 / 100)	External seal material	Body material	Optional parts*	Mounting brackets*
HYB	● ● ● ● ● ● ● ●	NBR, FKM	Aluminum	Plug bolt	Foot, Flange (ø32 to ø100)
HYQ	● ● ● ● ● ●			External cover (Rod end, Head end)	Foot, Flange, Single clevis, Double clevis (ø32 to ø63)
HYC	● ● ● ● ● ●			Plug bolt	
HYG	● ● ● ● ● ●				

* Optional parts and mounting brackets must be ordered separately. Refer to page 32 to 36.

Hygienic Design Cylinder
Basic Type
Series HYQ
ø20, ø25, ø32, ø40, ø50, ø63

How to Order

Without auto switch HYQB 20 □ R – 50 F M

With auto switch HYDQB 20 □ R – 50 F M – F6B □

With auto switch (Built-in magnet and switch rail)

Bore size

20	20 mm
25	25 mm
32	32 mm
40	40 mm
50	50 mm
63	63 mm

Port thread type

Nil	M thread	ø20, ø25
	Rc	ø32 to ø63
TN	NPT	
TF	G	

Sealant material

R	NBR
H	External FKM Note)

Note) External seal material: Rod scraper, tube gasket, and rod seal are made from FKM.

< Mounting bracket > Foot, flange, single clevis, double clevis, and clevis pin
< Option parts > External cover
Please place an order for above mentioned parts separately, please refer to page 32 to 36 for details.

Cylinder stroke
Refer to the next page for the standard stroke.

Style of rod end

Nil	Female thread
M	Male thread

Grease

Nil	Standard grease (for non-food)
F	Grease for food

Note) Select grease for food for use in a water dispersion environment or when washing a product with water (Water resistance is insufficient with standard grease.)

Auto switch

Nil	Without auto switch (Built-in magnet and switch rail)

Refer to table below for selection of applicable auto switch.
Auto switch is shipped not assembled with the cylinder.

Number of auto switches

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

Applicable Auto Switches/Refer to page 37 for detailed auto switch specifications.

Type	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Auto switch model	Lead wire length (m)* 0.5 (Nil)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state switch	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	**F6N**	●	●	○	○	IC circuit	Relay, PLC
			3-wire (PNP)			**F6P**	●	●	○	○		
			2-wire		12 V	**F6B**	●	●	○	○	—	

* Lead wire length symbols 0.5 m.. Nil (Example) F6N
3 m.. L (Example) F6NL
5 m.. Z (Example) F6NZ

* Auto switches marked with a "○" symbol are produced upon receipt of orders.

• Refer to "SMC Best Pneumatics" catalog vol. 10, page 10-20-66 for detailed specifications about the auto switch with pre-wired connector.

Specifications

Bore size (mm)	20	25	32	40	50	63
Action	Double acting, Single rod					
Fluid	Air					
Minimum operating pressure	0.2 MPa		0.15 MPa			
Maximum operating pressure	1.0 MPa					
Proof pressure	1.5 MPa					
Ambient and operating fluid temperature	Without auto switch 0 to 70°C					
	With auto switch 0 to 60°C					
Lubrication	Not required					
Piston speed	50 to 500 mm/s (With pressure at 1.0 MPa) Note)					
Cushion	Rubber bumper					
Stroke length tolerance	$^{+1.4}_{0}$ mm					
Piston rod material	Stainless steel 304 / Hard chrome plated					

Note) Use a cylinder below the allowable kinetic energy. Refer to page 7 for the allowable kinetic energy.

Standard Stroke

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

∗ Intermediate strokes of 1 mm each can be produced. (The spacer is not used.)

Weight

Without auto switch / Female thread type Unit: kg

Bore size (mm)	Stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
20	0.16	0.17	0.18	0.19	0.20	0.22	0.23	0.24	0.25	0.26	—	—
25	0.24	0.26	0.27	0.29	0.30	0.32	0.34	0.35	0.37	0.39	—	—
32	0.43	0.45	0.48	0.50	0.52	0.55	0.57	0.60	0.62	0.65	0.77	0.89
40	0.63	0.66	0.69	0.72	0.76	0.79	0.82	0.85	0.89	0.92	1.08	1.25
50	—	1.11	1.20	1.30	1.39	1.48	1.57	1.67	1.76	1.85	2.32	2.78
63	—	1.59	1.70	1.82	1.94	2.06	2.18	2.30	2.41	2.53	3.12	3.72

Without auto switch / Male thread type Unit: kg

Bore size (mm)	Stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
20	0.16	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.27	—	—
25	0.25	0.27	0.28	0.30	0.32	0.33	0.35	0.36	0.38	0.40	—	—
32	0.45	0.48	0.50	0.52	0.55	0.57	0.60	0.62	0.65	0.67	0.79	0.91
40	0.66	0.70	0.73	0.76	0.79	0.83	0.86	0.89	0.92	0.96	1.12	1.28
50	—	1.28	1.37	1.46	1.55	1.65	1.74	1.83	1.93	2.02	2.48	2.95
63	—	1.68	1.80	1.92	2.04	2.15	2.27	2.39	2.51	2.63	3.22	3.81

With auto switch (Built-in magnet and switch rail) / Female thread type Unit: kg

Bore size (mm)	Stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
20	0.21	0.22	0.23	0.24	0.26	0.27	0.28	0.29	0.31	0.32	—	—
25	0.30	0.32	0.33	0.35	0.37	0.39	0.40	0.42	0.44	0.46	—	—
32	0.54	0.56	0.89	0.61	0.64	0.66	0.69	0.72	0.74	0.77	0.90	1.02
40	0.77	0.81	0.84	0.87	0.90	0.94	0.97	1.00	1.03	1.07	1.23	1.39
50	—	1.30	1.40	1.49	1.59	1.68	1.78	1.87	1.97	2.06	2.53	3.01
63	—	1.86	1.98	2.10	2.22	2.34	2.46	2.58	2.70	2.82	3.42	4.02

With auto switch (Built-in magnet and switch rail) / Male thread type Unit: kg

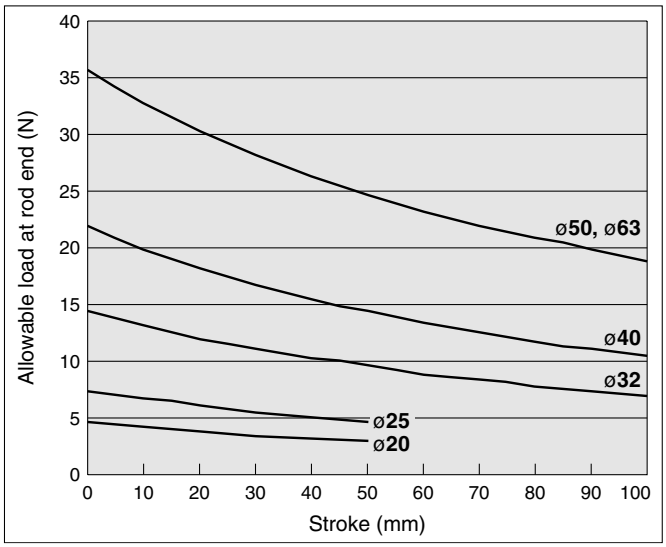
Bore size (mm)	Stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
20	0.21	0.22	0.24	0.25	0.26	0.27	0.29	0.30	0.31	0.32	—	—
25	0.31	0.33	0.35	0.36	0.38	0.40	0.42	0.43	0.45	0.47	—	—
32	0.56	0.59	0.61	0.64	0.66	0.69	0.71	0.74	0.77	0.79	0.92	1.05
40	0.81	0.84	0.88	0.91	0.94	0.97	1.01	1.04	1.07	1.10	1.27	1.43
50	—	1.47	1.57	1.66	1.76	1.85	1.94	2.04	2.13	2.23	2.70	3.17
63	—	1.96	2.08	2.20	2.31	2.43	2.55	2.67	2.79	2.91	3.51	4.11

Theoretical Output

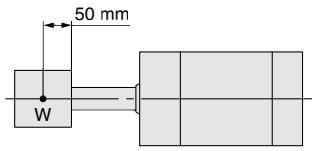
Unit: N

Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
20	IN	79.2	132	185
	OUT	94.2	157	220
25	IN	124	206	288
	OUT	147	246	344
32	IN	207	346	484
	OUT	241	402	563
40	IN	318	530	742
	OUT	378	630	882
50	IN	495	825	1160
	OUT	588	980	1370
63	IN	840	1400	1960
	OUT	936	1560	2180

Allowable Load at Rod End

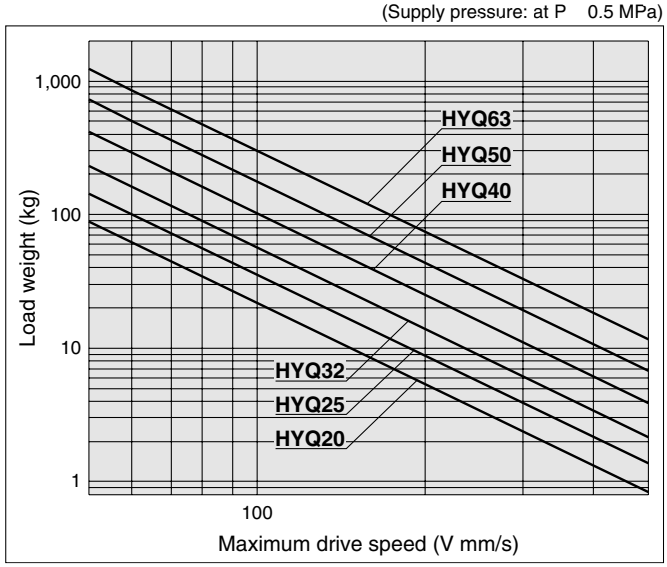


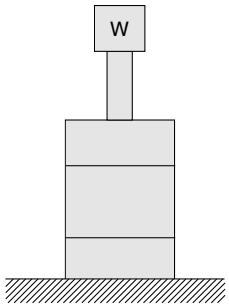
• A case where the center of gravity of the load rests 50 mm from the rod end.



Allowable Kinetic Energy

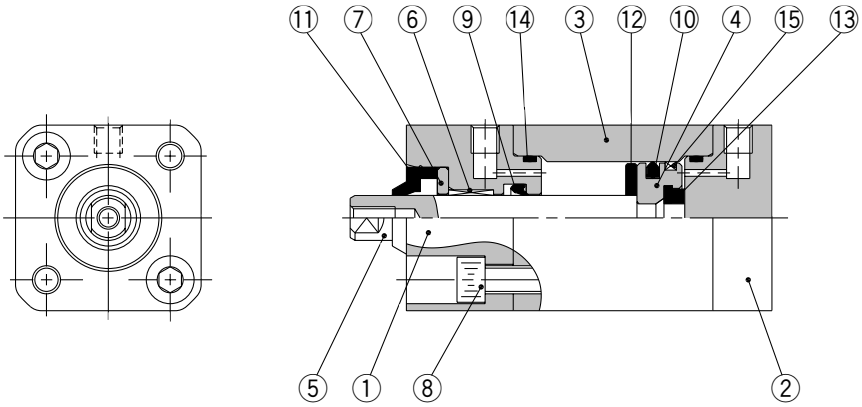
(Supply pressure: at P 0.5 MPa)



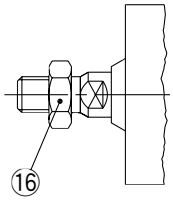


Construction ø20, ø25

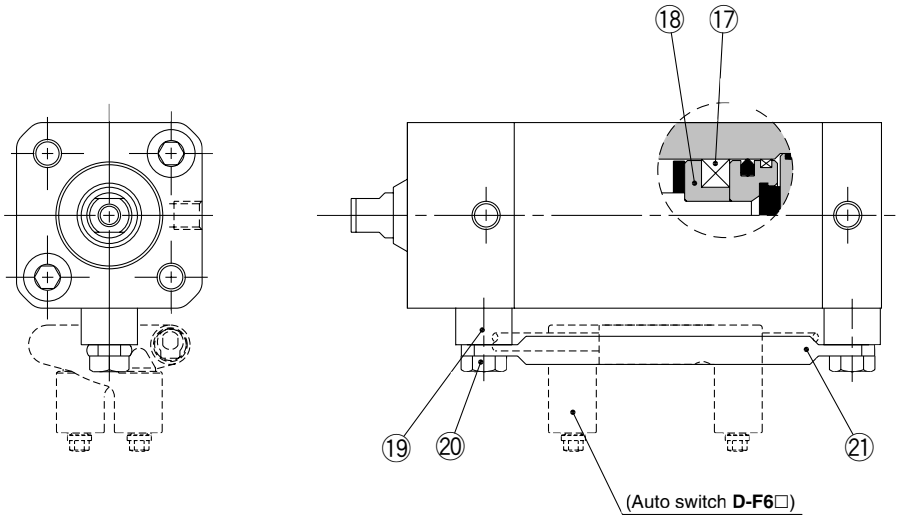
Basic type



Rod end male thread



Built-in magnet



Component Parts

No.	Description	Material	Qty.	Note
1	**Rod cover**	Aluminum alloy	1	Anodic oxide film
2	**Head cover**	Aluminum alloy	1	Anodic oxide film
3	**Cylinder tube**	Aluminum alloy	1	Anodic oxide film
4	**Piston**	Aluminum alloy	1	Chromated
5	**Piston rod**	Stainless steel	1	Hard chromium plated
6	**Bushing**	Resin	1	
7	**Bushing retainer**	Aluminum alloy	1	Chromated
8	**Hexagon socket head cap screw**	Stainless steel	4	
9	**Rod seal**	NBR	1	(FKM can be selected.)
10	**Piston seal**	NBR	1	
11	**Rod scraper**	NBR	1	(FKM can be selected.)
12	**Bumper A**	Resin	1	
13	**Bumper B**	Resin	1	
14	**Tube gasket**	NBR	2	(FKM can be selected.)
15	**Wearing**	Resin	1	
16	**Rod end nut**	Stainless steel	1	(Only rod end male thread)

No.	Description	Material	Qty.	Note
7	**Magnet**	Resin	1	(Only built-in magnet)
18	**Magnet holder**	Aluminum alloy	1	(Only built-in magnet) Chromated
19	**Switch rail base**	Stainless steel	2	(Only built-in magnet)
20	**Hexagon bolt**	Stainless steel	2	(Only built-in magnet)
21	**Switch rail**	Stainless steel	1	(Only built-in magnet)

Replacement Parts: Seal Kit

Bore size	Part no.	Set contents
20	HYQB20□-PS	⑨ Rod seal (1 pc.) ⑩ Piston seal (1 pc.) ⑭ Tube gaskets (2 pcs.)
25	HYQB25□-PS	

Place the seal material symbol in □.

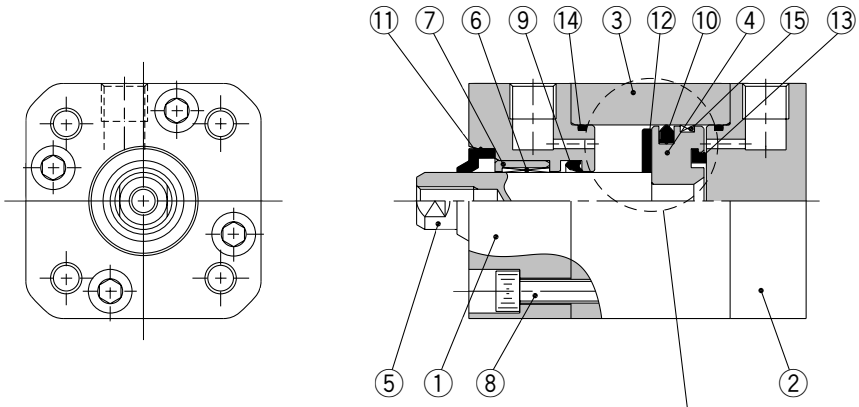
Symbol	Material
R	NBR
H	External FKM*

* External seal Rod seal and the tube gasket are made from FKM.

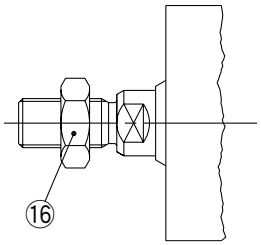
Grease package (Food compatible grease) GR-H-010 (10 g)
(Standard grease) GR-S-010 (10 g)

Construction ø32 to ø63

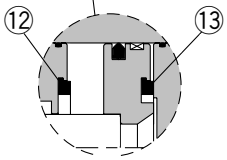
Basic type



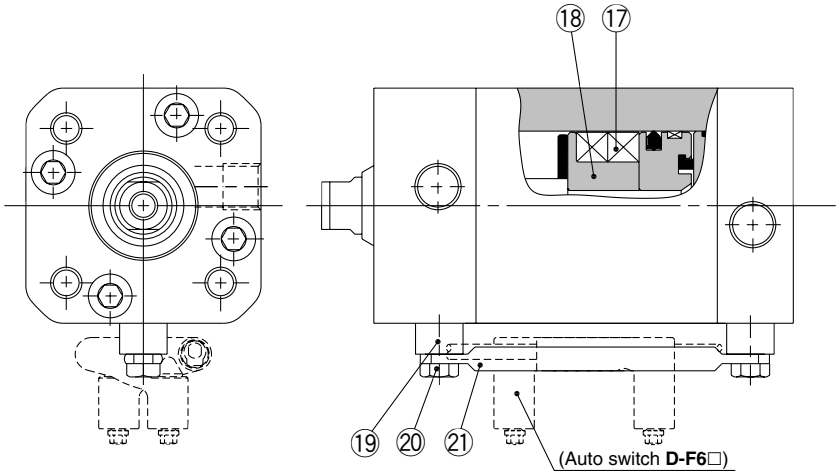
Rod end male thread



ø63



Built-in magnet



Component Parts

No.	Description	Material	Qty.	Note
1	**Rod cover**	Aluminum alloy	1	Anodic oxide film
2	**Head cover**	Aluminum alloy	1	Anodic oxide film
3	**Cylinder tube**	Aluminum alloy	1	Anodic oxide film
4	**Piston**	Aluminum alloy	1	Chromated
5	**Piston rod**	Stainless steel	1	Hard chromium plated
6	**Bushing**	Resin	1	
7	**Bushing retainer**	Aluminum alloy	1	Chromated
8	**Hexagon socket head cap screw**	Stainless steel	8	
9	**Rod seal**	NBR	1	(FKM can be selected.)
10	**Piston seal**	NBR	1	
11	**Rod scraper**	NBR	1	(FKM can be selected.)
12	**Bumper A**	Resin	1	
13	**Bumper B**	Resin	1	(Only ø63 is common to the bumper A.)
14	**Tube gasket**	NBR	2	(FKM can be selected.)
15	**Wearing**	Resin	1	
16	**Rod end nut**	Stainless steel	1	(Only rod end male thread)
17	**Magnet**	Resin	2	(Only built-in magnet)

No.	Description	Material	Qty.	Note
18	**Magnet holder**	Aluminum alloy	1	(Only built-in magnet) Chromated
19	**Switch rail base**	Stainless steel	2	(Only built-in magnet)
20	**Hexagon bolt**	Stainless steel	2	(Only built-in magnet)
21	**Switch rail**	Stainless steel	1	(Only built-in magnet)

Replacement Parts: Seal Kit

Bore size	Part no.	Set contents
32	HYQB32□-PS	⑨ Rod seal (1 pc.) ⑩ Piston seal (1 pc.) ⑭ Tube gaskets (2 pcs.)
40	HYQB40□-PS	
50	HYQB50□-PS	
63	HYQB63□-PS	

Place the seal material symbol in □.

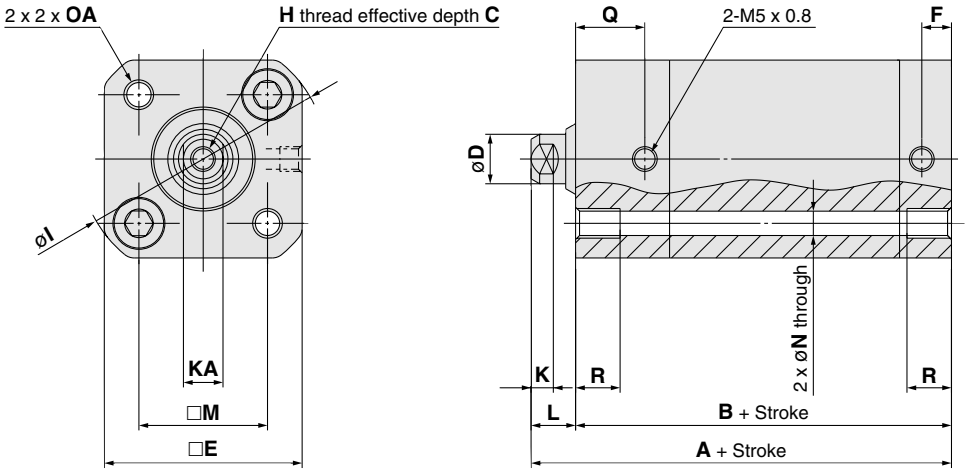
Symbol	Material
R	NBR
H	External FKM*

* External seal Rod seal and the tube gasket are made from FKM.

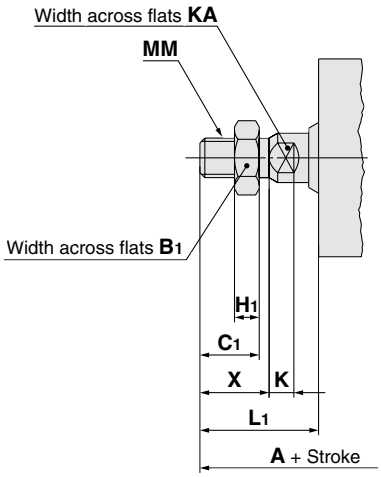
Grease package (Food compatible grease) GR-H-010 (10 g)
(Standard grease) GR-S-010 (10 g)

Dimensions

Without auto switch: HYQB20, 25



Rod end male thread



Rod End Male Thread (mm)

Bore size	A	B_1	C_1	MM	H_1	K	KA	L_1	X
20	72	10	10	M6 x 1.0	3.6	5	6	22	12
25	75	13	12	M8 x 1.25	5	5	8	24	14

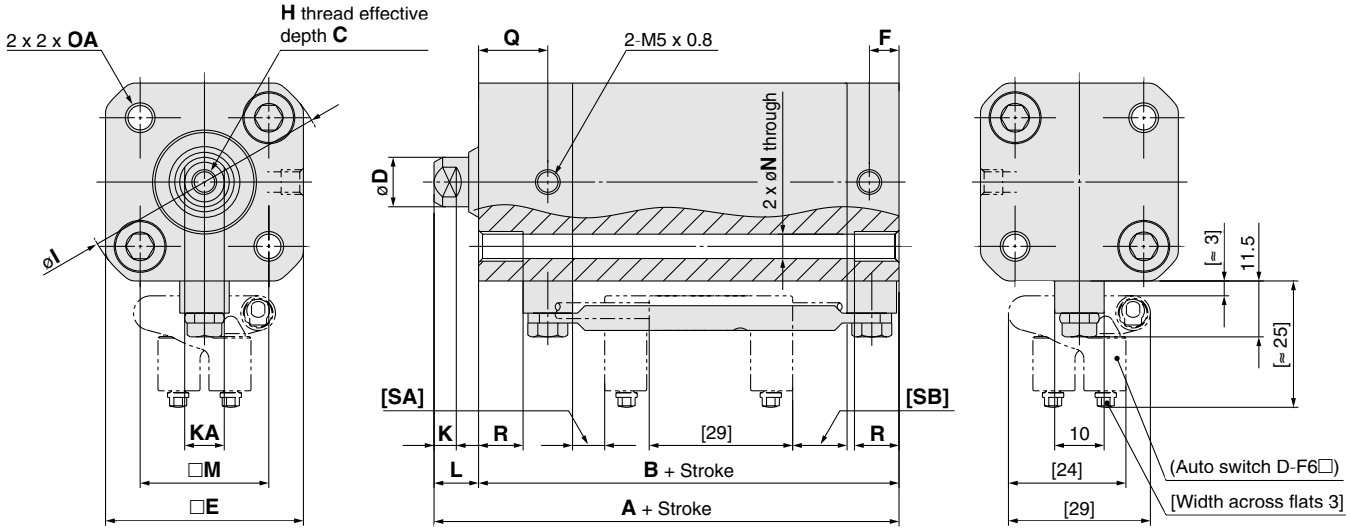
(mm)

Bore size	Stroke range	A	B	C	D	E	F	H	I	K	KA	L	M	N	OA	Q	R
20	50 or less	60	50	8	8	33	6	M4 x 0.7	42	5	6	10	22	4.4	M5 x 0.8	14	10
25	50 or less	61	51	10	10	40	6	M5 x 0.8	50	5	8	10	26	5.4	M6 x 1.0	14	10

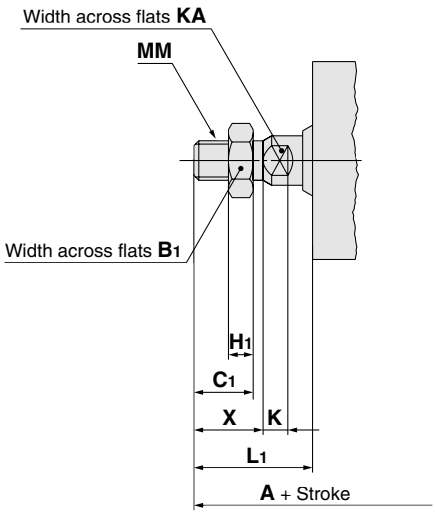
Note 1) Refer to page 32 for details about the rod end nut, mounting bracket and accessory bracket.
Note 2) When the unit is installed, ensure that dirt does not collect in the rod end (threaded portion).

Dimensions

With auto switch HYDQB20, 25



Rod end male thread



Rod End Male Thread (mm)

Bore size	A	B_1	C_1	MM	H_1	K	KA	L_1	X
20	82	10	10	M6 x 1.0	3.6	5	6	22	12
25	85	13	12	M8 x 1.25	5	5	8	24	14

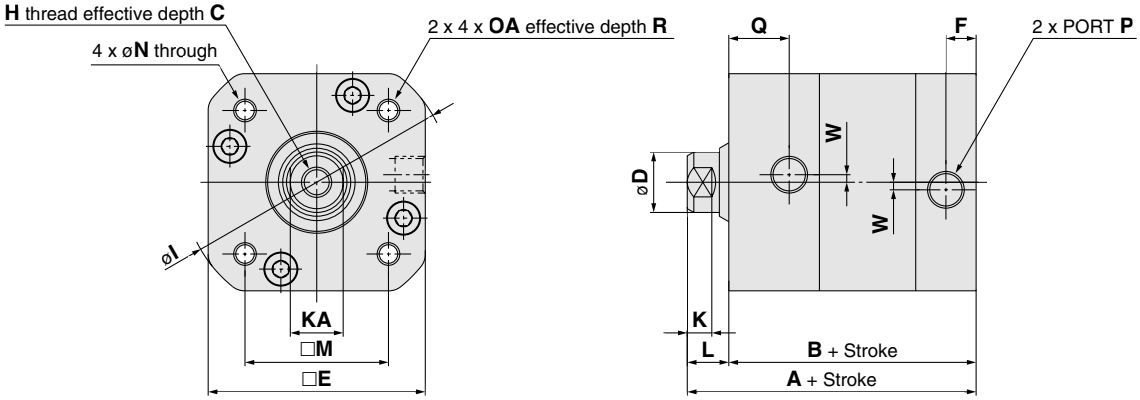
(mm)

Bore size	Stroke range	A	B	C	D	E	F	H	I	K	KA	L	M	N	OA	Q	R	SA	SB
20	50 or less	70	60	8	8	33	6	M4 x 0.7	42	5	6	10	22	4.4	M5 x 0.8	14	10	6.5	10.5
25	50 or less	71	61	10	10	40	6	M5 x 0.8	50	5	8	10	26	5.4	M6 x 1.0	14	10	6.5	11

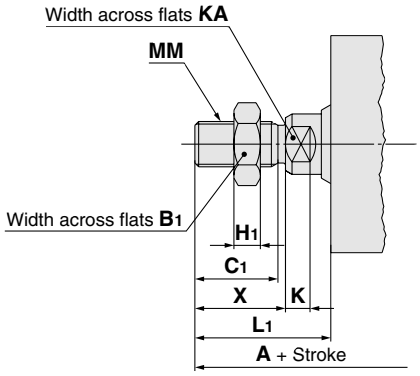
Note 1) The [ ] value denotes dimensions with the auto switch D-F6□ mounted, which is dedicated to the Hygienic Design Cylinder.
Note 2) Refer to page 32 for details about the rod end nut, mounting bracket and accessory bracket.
Note 3) When the unit is installed, ensure that dirt does not collect in the rod end (threaded portion).

Dimensions

Without auto switch: HYQB32 to 63



Rod end male thread



Rod End Male Thread (mm)

Bore size	A	B1	C1	MM	H1	K	KA	L1	X
32	94	17	20	M10 x 1.25	6	6	10	33	22
40	101.5	19	22	M12 x 1.25	7	6.5	13	36	24
50	122.5	24	29.5	M16 x 1.5	10	8	16	46	32
63	123	24	29.5	M16 x 1.5	10	8	16	46	32

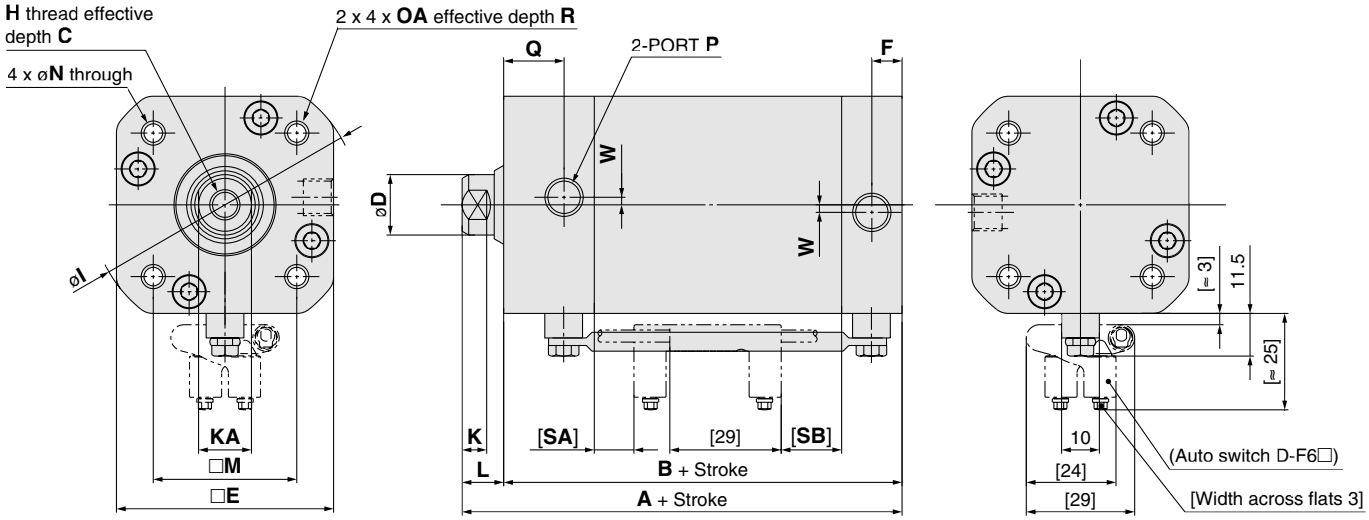
(mm)

Bore size	Stroke range	A	B	C	D	E	F	H	I	K	KA	L	M	N	OA	P	Q	R	W
32	100 or less	72	61	12	12	49.5	8.5	M6 x 1.0	62	6	10	11	32.5	5.4	M6 x 1.0	1/8	13.5	16	4
40	100 or less	77.5	65.5	13	16	57.5	8.5	M8 x 1.25	71	6.5	13	12	38	5.4	M6 x 1.0	1/8	16	16	2
50	100 or less	90.5	76.5	15	20	69	10.5	M10 x 1.5	88	8	16	14	46.5	6.8	M8 x 1.25	1/4	20	16	4
63	100 or less	91	77	18	20	84	10.5	M12 x 1.75	102	8	16	14	56.5	6.8	M8 x 1.25	1/4	21	16	4

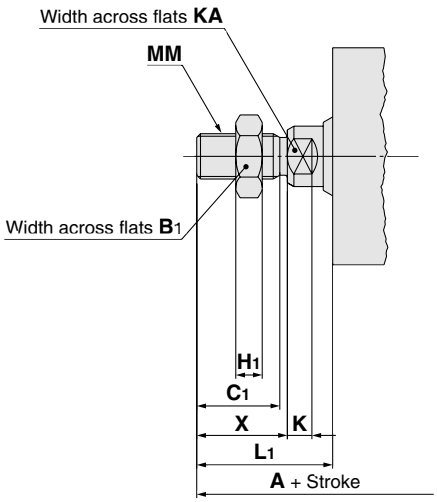
Note 1) Refer to page 32 for details about the rod end nut, mounting bracket and accessory bracket.
Note 2) When the unit is installed, ensure that dirt does not collect in the rod end (threaded portion).

Dimensions

With auto switch HYDQB32 to 63



Rod end male thread



Rod End Male Thread (mm)

Bore size	A	B_1	C_1	MM	H_1	K	KA	L_1	X
32	109	17	20	M10 x 1.25	6	6	10	33	22
40	116.5	19	22	M12 x 1.25	7	6.5	13	36	24
50	137.5	24	29.5	M16 x 1.5	10	8	16	46	32
63	138	24	29.5	M16 x 1.5	10	8	16	46	32

(mm)

Bore size	Stroke range	A	B	C	D	E	F	H	I	K	KA	L	M	N	OA	P	Q	R	SA	SB	W
32	100 or less	87	76	12	12	49.5	8.5	M6 x 1.0	62	6	10	11	32.5	5.4	M6 x 1.0	1/8	13.5	16	8.5	16	4
40	100 or less	92.5	80.5	13	16	57.5	8.5	M8 x 1.25	71	6.5	13	12	38	5.4	M6 x 1.0	1/8	16	16	10.5	16	2
50	100 or less	105.5	91.5	15	20	69	10.5	M10 x 1.5	88	8	16	14	46.5	6.8	M8 x 1.25	1/4	20	16	10.5	17	4
63	100 or less	106	92	18	20	84	10.5	M12 x 1.75	102	8	16	14	56.5	6.8	M8 x 1.25	1/4	21	16	9	18	4

Note 1) The [ ] value denotes dimensions with the auto switch D-F6□ mounted, which is dedicated to the Hygienic Design Cylinder
Note 2) Refer to page 32 for details about the rod end nut, mounting bracket and accessory bracket.
Note 3) When the unit is installed, ensure that dirt does not collect in the rod end (threaded portion).

Hygienic Design Cylinder
ISO Standard Type
Series HYC
ø32, ø40, ø50, ø63

How to Order

Without auto switch HYCB 32 □ R — 500 F

With auto switch HYDCB 32 □ R — 500 F — F6B □

With auto switch (Built-in magnet and switch rail)

Bore size

32	32 mm
40	40 mm
50	50 mm
63	63 mm

Port thread type

Nil	Rc
TN	NPT
TF	G

Sealant material

R	NBR
H	External FKM Note)

Note) External seal material: Rod scraper, tube gasket, rod seal and needle scraper are made from FKM

Grease

Nil	Standard grease (for non-food)
F	Grease for food

Note) Select grease for food for use in a water dispersion environment or when washing a product with water. (Water resistance is insufficient with standard grease.)

Auto switch

Nil	Without auto switch (Built-in magnet and switch rail)

Refer to table below for selection of applicable auto switch.
Auto switch is shipped not assembled with the cylinder.

Number of auto switches

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

Cylinder stroke
Refer to the next page for the standard stroke.

< Mounting bracket > Foot, flange, single clevis, double clevis, and clevis pin
< Option parts > External cover
Please place an order for above mentioned parts separately, please refer to page 32 to 36 for details.

Applicable Auto Switches/Refer to page 37 for detailed auto switch specifications.

Type	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Auto switch model	Lead wire length (m)* 0.5 (Nil)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state switch	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	**F6N**	●	●	○	○	IC circuit	Relay, PLC
			3-wire (PNP)			**F6P**	●	●	○	○		
			2-wire		12 V	**F6B**	●	●	○	○	—	

* Lead wire length symbols 0.5 m.. Nil (Example) F6N
3 m.. L (Example) F6NL
5 m.. Z (Example) F6NZ

* Auto switches marked with a "○" symbol are produced upon receipt of orders.

• Refer to "SMC Best Pneumatics" catalog vol. 10, page 10-20-66 for detailed specifications about the auto switch with pre-wired connector.

Specifications

Bore size (mm)	32	40	50	63
Action	Double acting, Single rod			
Fluid	Air			
Minimum operating pressure	0.15 MPa			
Maxmum operating pressure	1.0 MPa			
Proof pressure	1.5 MPa			
Ambient and operating fluid temperature	Without auto switch 0°C to 70°C			
	With auto switch 0°C to 60°C			
Lubrication	Not required			
Piston speed	50 to 500 mm/s (With pressure at 1.0 MPa) Note)			
Cushion	Air cushion			
Stroke length tolerance	250 mm $^{+1.0}_{0}$ mm or less, 251 to 600 mm $^{+1.4}_{0}$ mm			
Piston rod material	Stainless steel 304 / Hard chrome plated			

Note) Use a cylinder below the allowable kinetic energy. Refer to page 16 for the allowable kinetic energy.

Standard Stroke

Bore size (mm)	Standard stroke (mm)
32	25, 50, 75, 100, 125, 150, 200, 250, 300, 400, 500
40	25, 50, 75, 100, 125, 150, 200, 250, 300, 400, 500
50	25, 50, 75, 100, 125, 150, 200, 250, 300, 400, 500, 600
63	25, 50, 75, 100, 125, 150, 200, 250, 300, 400, 500, 600

∗ Intermediate strokes of 1 mm each can be produced. (The spacer is not used.)

Weight

Without auto switch Unit: kg

Bore size (mm)	Stroke (mm)											
	25	50	75	100	125	150	200	250	300	400	500	600
32	0.89	1.02	1.14	1.26	1.38	1.50	1.75	1.99	2.23	2.72	3.21	—
40	1.30	1.46	1.62	1.79	1.95	2.11	2.44	2.77	3.09	3.75	4.40	—
50	2.03	2.26	2.50	2.73	2.96	3.20	3.66	4.13	4.59	5.52	6.45	7.38
63	2.95	3.25	3.54	3.84	4.13	4.43	5.02	5.61	6.21	7.39	8.57	9.76

With auto switch (Built-in magnet and switch rail) Unit: kg

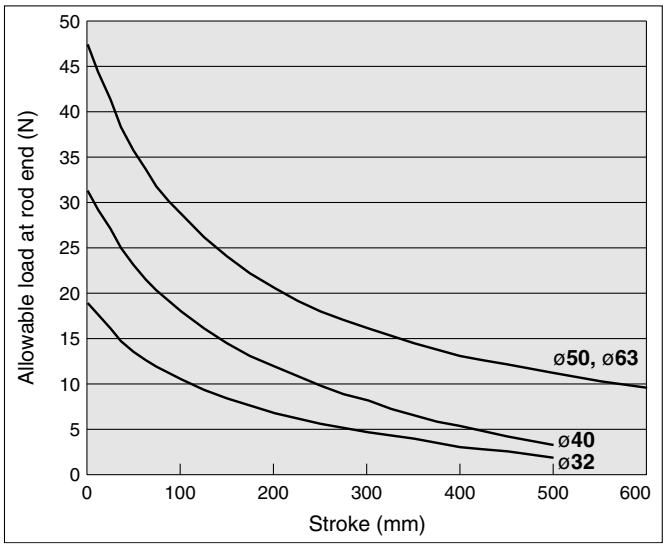
Bore size (mm)	Stroke (mm)											
	25	50	75	100	125	150	200	250	300	400	500	600
32	0.93	1.06	1.19	1.32	1.44	1.57	1.83	2.09	2.34	2.86	3.37	—
40	1.34	1.51	1.68	1.85	2.02	2.19	2.53	2.87	3.21	3.89	4.57	—
50	2.07	2.31	2.55	2.79	3.03	3.27	3.75	4.23	4.71	5.66	6.62	7.58
63	3.00	3.30	3.60	3.91	4.21	4.51	5.12	5.72	6.33	7.54	8.75	9.96

Theoretical Output

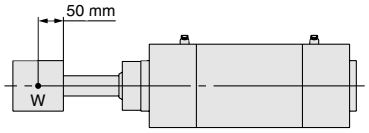
Unit: N

Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
32	IN	207	346	484
	OUT	241	402	563
40	IN	318	530	742
	OUT	378	630	882
50	IN	495	825	1160
	OUT	588	980	1370
63	IN	840	1400	1960
	OUT	936	1560	2180

Allowable Load at Rod End

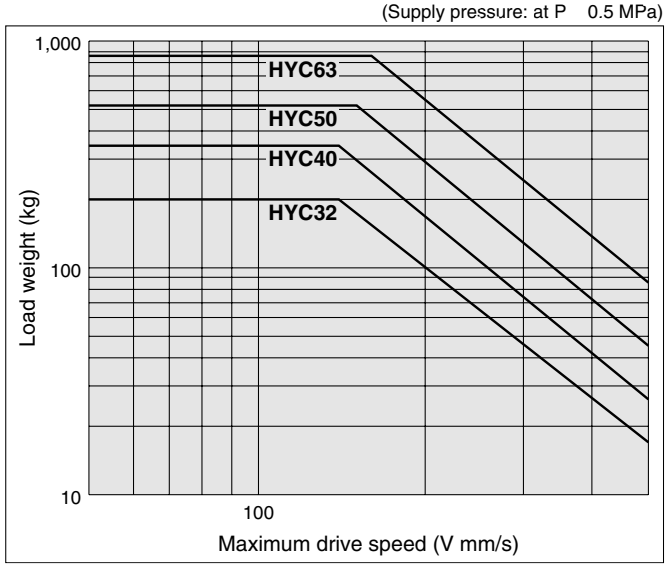


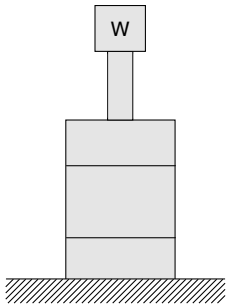
• A case where the center of gravity of the load rests 50 mm from the rod end.



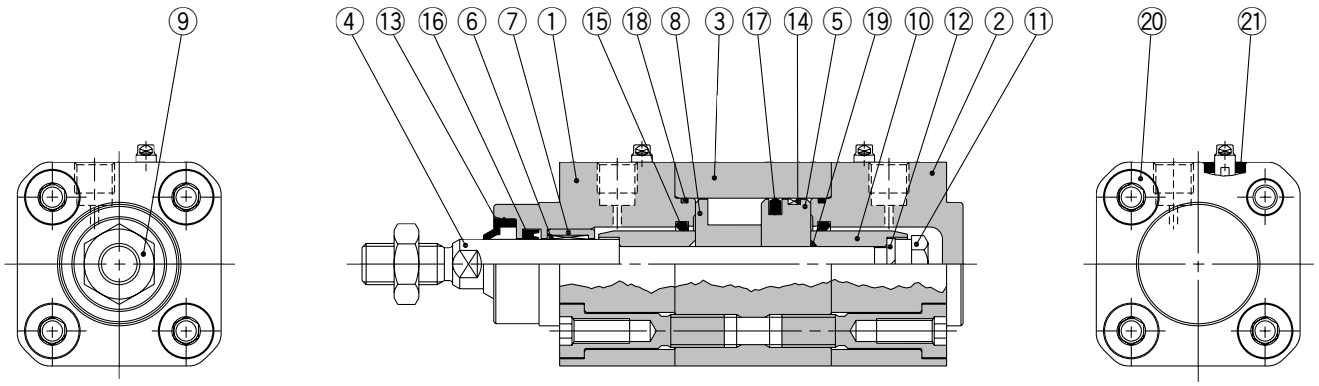
Allowable Kinetic Energy

(Supply pressure: at P 0.5 MPa)

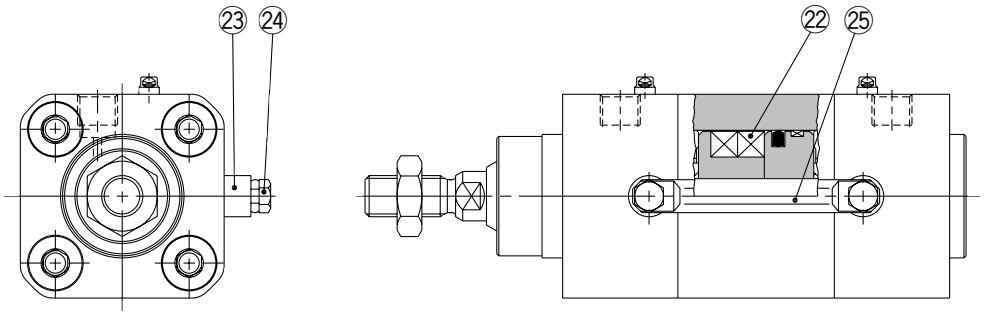




Construction



Built-in magnet



Component Parts

No.	Description	Material	Qty.	Note
1	**Rod cover**	Aluminum alloy	1	Anodic oxide film
2	**Head cover**	Aluminum alloy	1	Anodic oxide film
3	**Cylinder tube**	Aluminum alloy	1	Anodic oxide film
4	**Piston rod**	Stainless steel	1	Hard chromium plated
5	**Piston**	Aiuminum alloy	1	Chromated
6	**Bushing**	Resin	1	
7	**Bushing retainer**	Aluminum alloy	1	Chromated
8	**Magnet holder**	Aluminum alloy	1	Chromated
9	**Rod end nut**	Stainless steel	1	
10	**Cushion ring**	Steel	2	Zinc chromated
11	**Piston nut**	Stainless steel	1	
12	**Spring washer**	Steel	1	
13	**Rod scraper**	NBR	1	(FKM can be selected.)
14	**Wearing**	Resin	1	
15	**Cushion seal**	Resin	2	
16	**Rod seal**	NBR	1	(FKM can be selected.)
17	**Piston seal**	NBR	1	
18	**Cylinder tube gasket**	NBR	2	(FKM can be selected.)
19	**Piston gasket**	NBR	1	
20	**Tie-rod bolt**	Stainless steel	8	
21	**Needle scraper**	NBR	2	(FKM can be selected.)

No.	Description	Material	Qty.	Note
22	**Magnet**	Resin	2	(Only built-in magnet)
23	**Switch rail base**	Stainless steel	2	(Only built-in magnet)
24	**Hexagon bolt**	Stainless steel	2	(Only built-in magnet)
25	**Switch rail**	Stainless steel	1	(Only built-in magnet)

Replacement Parts: Seal Kit

Bore Size	Part no.	Set contents
32	HYCB32□-PS	⑮ Cushion seal (2 pcs.) ⑯ Rod seal (1 pc.) ⑰ Piston seal (1 pc.) ⑱ Tube gaskets (2 pcs.) ㉑ Needle scraper (2 pcs.)
40	HYCB40□-PS	
50	HYCB50□-PS	
63	HYCB63□-PS	

Place the seal material symbol in □.

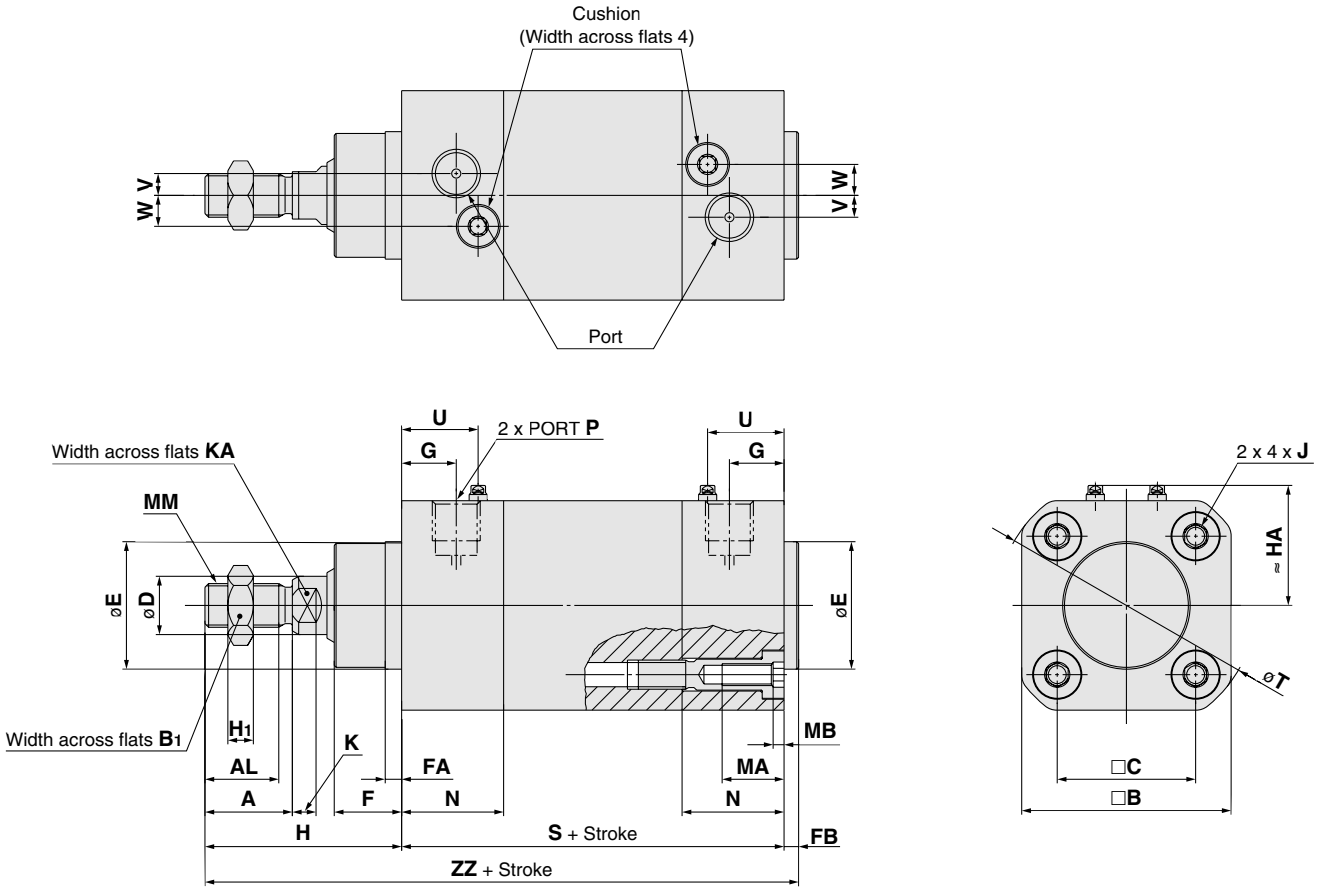
Symbol	Material
R	NBR
H	External FKM*

* Extemal seal: Rod seal, tube gasket and needle scraper are made from FKM.

Grease package (Food compatible grease) GR-H-010 (10 g)
(Standard grease) GR-S-010 (10 g)

Construction

Without auto switch: HYCB32 to 63



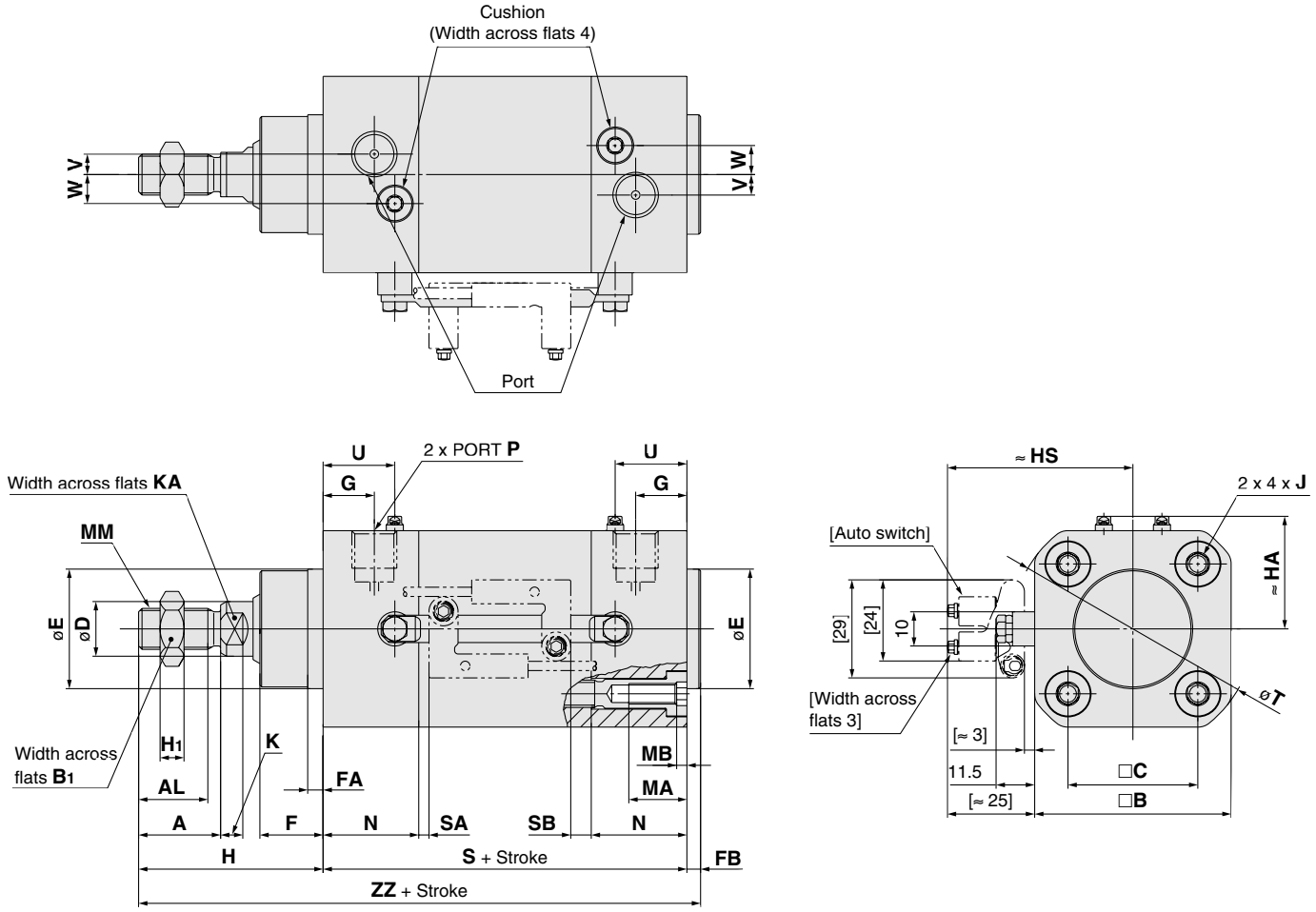
(mm)

Bore size	Stroke range	A	AL	B	B1	C	D	E e11	F	FA	FB	G	H	H1	MA	MB	J	K	KA	MM	N	P	S	T	U	V	W	HA	ZZ
32	500 or less	22	18	50	17	32.5	12	30	16	5	4	14	48	6	16	3.2	M6 x 1.0	6	10	M10 x 1.25	28	1/8	94	62	21	6	6.5	30	146
40	500 or less	24	20	58	19	38	16	35	18.5	4.5	4	15	54	7	16	3.2	M6 x 1.0	6.5	13	M12 x 1.25	28	1/4	105	71	21	6	8.5	34	163
50	600 or less	32	27	70	24	46.5	20	40	23	5	4	17	69	10	16	4.2	M8 x 1.25	8	16	M16 x 1.5	32	1/4	106	88	25	8	11	40	179
63	600 or less	32	27	84	24	56.5	20	45	23	5	4	17	69	10	16	4.2	M8 x 1.25	8	16	M16 x 1.5	32	3/8	121	102	25	10	9	47	194

Note 1) Refer to page 32 for details about the rod end nut, mounting bracket and accessory bracket.
Note 2) When the unit is installed, ensure that dirt does not collect in the rod end (threaded portion).

Construction

With auto switch HYDCB32 to 63



(mm)

Bore size	Stroke range	A	AL	B	B1	C	D	E e11	F	FA	FB	G	H	H1	MA	MB	J	K	KA	MM	N	P	S	T	U	V	W	SA
32	500 or less	22	18	50	17	32.5	12	30	16	5	4	14	48	6	16	3.2	M6 x 1.0	6	10	M10 x 1.25	28	1/8	94	62	21	6	6.5	7.5
40	500 or less	24	20	58	19	38	16	35	18.5	4.5	4	15	54	7	16	3.2	M6 x 1.0	6.5	13	M12 x 1.25	28	1/4	105	71	21	6	8.5	12
50	600 or less	32	27	70	24	46.5	20	40	23	5	4	17	69	10	16	4.2	M8 x 1.25	8	16	M16 x 1.5	32	1/4	106	88	25	8	11	9
63	600 or less	32	27	84	24	56.5	20	45	23	5	4	17	69	10	16	4.2	M8 x 1.25	8	16	M16 x 1.5	32	3/8	121	102	25	10	9	19

Bore size	SB	HS	HA	ZZ
32	16.5	50	30	146
40	23	54	34	163
50	19	60	40	179
63	24	67	47	194

Note 1) The [ ] value denotes dimensions with the auto switch D-F6□ mounted, which is dedicated to the Hygienic Design Cylinder.
Note 2) Refer to page 32 for details about the rod end nut, mounting bracket and accessory bracket.
Note 3) When the unit is installed, ensure that dirt does not collect in the rod end (threaded portion).

Hygienic Design Cylinder

Series HYG

ø20, ø25, ø32, ø40, ø50, ø63

How to Order

Without auto switch HYG 20 ☐ R – 50 F

With auto switch HYDG 20 ☐ R – 50 F – F6B ☐

With auto switch (Built-in magnet and switch rail)

Number of auto switches

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

Bore size

20	20 mm
25	25 mm
32	32 mm
40	40 mm
50	50 mm
63	63 mm

Port thread type

Nil	M thread	ø20, ø25
	Rc	ø32 to ø63
TN	NPT	
TF	G	

Auto switch

Nil	Without auto switch (Built-in magnet and switch rail)

Refer to the table below for selection of applicable auto switch.
Auto switch is shipped not assembled with the cylinder.

Sealant material

R	NBR
H	External FKM Note)

Note) External sealant: Scraper, rod seal, O ring (rod end) and seal washer are made from FKM.

Grease

Nil	Standard grease (for non-food)
F	Grease for food

Note) Select grease for food for use in a water dispersion environment or when washing a product with water.
(Water resistance is insufficient with standard grease.)

Cylinder stroke

Refer to the next page for the standard stroke.

Optional parts (plug bolt) should be ordered separately.
Please refer to page 35 for details.

Applicable Auto Switches/Refer to page 37 for detailed auto switch specifications.

Type	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Auto switch model	Lead wire length (m)* 0.5 (Nil)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state switch	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	F6N	●	●	○	○	IC circuit	Relay, PLC
			3-wire (PNP)			F6P	●	●	○	○		
			2-wire		12 V	F6B	●	●	○	○	—	

* Lead wire length symbols: 0.5 m: Nil (Example) F6N; 3 m: L (Example) F6NL; 5 m: Z (Example) F6NZ

* Auto switches marked with a "○" symbol are produced upon receipt of orders.

• Refer to "SMC Best Pneumatics" catalog vol. 10, page 10-20 66 for detailed specifications about the auto switch with pre wired connector.

Specifications

Bore size (mm)	20	25	32	40	50	63
Action	Double acting					
Fluid	Air					
Minimum operating pressure	0.2 MPa		0.15 MPa			
Maxmum operating pressure	1.0 MPa					
Proof pressure	1.5 MPa					
Ambient and operating fluid temperature	0°C to 60°C					
Lubrication	Not required					
Piston speed	50 to 500 mm/s (With pressure at 1.0 MPa) Note)					
Cushion	Rubber bumper					
Stroke length tolerance	$^{+1.5}_{0}$ mm					

Note) Use a cylinder below the allowable kinetic energy. Refer to page 24 for the allowable kinetic energy.

Standard Stroke

Bore size (mm)	Standard stroke (mm)
20	20, 30, 50, 100, 150, 200
25	20, 30, 50, 100, 150, 200
32	25, 50, 100, 150, 200
40	25, 50, 100, 150, 200
50	25, 50, 100, 150, 200
63	25, 50, 100, 150, 200

* Manufacture of Intermediate Stroke
Intermediate strokes of mm each can be produced by using spacers with standard stroke cylinders. However, intermediate strokes of 5 mm each can be produced about ø40 to 63.
Example) HYG32R-57 mounts a 43mm spacer in standard stroke cylinder HYG32R-100.

Weight

Without auto switch Unit: kg

Bore size (mm)	Stroke (mm)						
	20	25	30	50	100	150	200
20	0.77	—	0.86	1.10	1.68	2.24	2.42
25	1.17	—	1.29	1.61	2.40	3.15	3.43
32	—	2.04	—	2.56	3.61	4.59	5.43
40	—	2.31	—	2.90	4.12	5.23	6.17
50	—	3.79	—	4.64	6.43	8.04	9.41
63	—	4.71	—	5.74	7.95	9.92	11.56

With auto switch (Built-in magnet and switch rail) Unit: kg

Bore size (mm)	Stroke (mm)						
	20	25	30	50	100	150	200
20	0.80	—	0.89	1.12	1.71	2.26	2.45
25	1.19	—	1.32	1.63	2.43	3.18	3.47
32	—	2.07	—	2.60	3.66	4.66	5.51
40	—	2.35	—	2.94	4.96	5.30	6.25
50	—	3.83	—	4.68	6.48	8.11	9.49
63	—	4.75	—	5.79	8.01	9.99	11.65

Theoretical Output

Unit: N

Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
20	IN	71	118	165
	OUT	94	157	220
25	IN	113	189	265
	OUT	147	246	344
32	IN	181	302	422
	OUT	241	402	563
40	IN	317	528	739
	OUT	377	629	880
50	IN	495	825	1154
	OUT	589	982	1374
63	IN	841	1402	1962
	OUT	935	1559	2182

Plate Allowable Rotational Torque

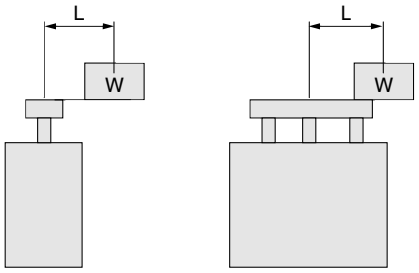
Strictly observe the values in the following table regarding rotational torque (T) pressurized to the plate (rod end).
When operated outside of the acceptable range, it can decrease the machine's service life.

Unit: N•m

Bore size (mm)	Stroke (mm)						
	20	25	30	50	100	150	200
20	0.72	—	0.60	0.57	0.51	0.45	0.37
25	1.29	—	1.18	1.04	0.97	0.83	0.68
32	—	3.23	—	3.07	2.87	2.59	2.24
40	—	3.56	—	3.39	3.16	2.86	2.47
50	—	7.83	—	6.80	5.88	5.25	4.61
63	—	8.83	—	7.67	6.63	5.92	5.20

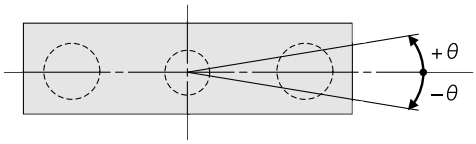
Plate Allowable Moment

Strictly observe the values in the following table regarding allowed moment when eccentric distance is generated from the plate.
When operated outside of the acceptable range, it can decrease the machine's service life.



Allowable moment (N•m)	**ø20**	**ø25**	**ø32, ø40**	**ø50, ø63**
	3.57	5.07	21.5	35.3

Plate Non-rotating Accuracy

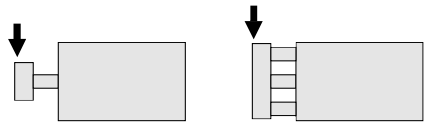


Bore size (mm)	Non-rotating accuracy θ
20	±0.10
25	±0.09
32	±0.08
40	±0.08
50	±0.07
63	±0.06

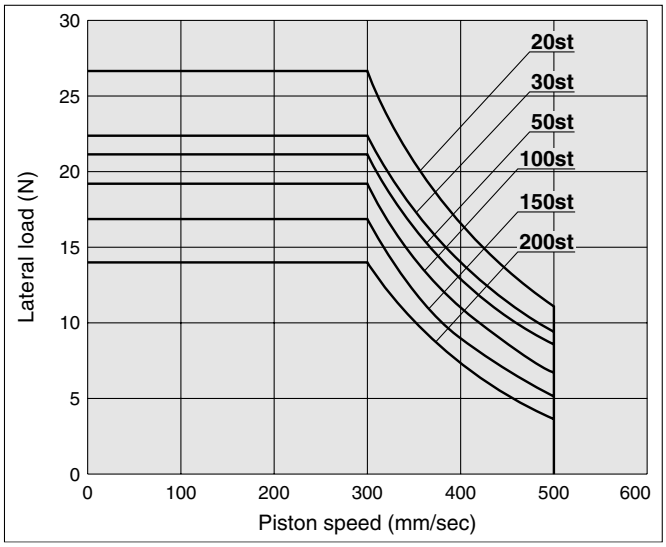
* When the cylinder retracts (initial value), for non-rotating accuracy in load-free states and/or except the guide rod deflection, use a value that does not exceed those listed above.

Plate Allowable Lateral Load

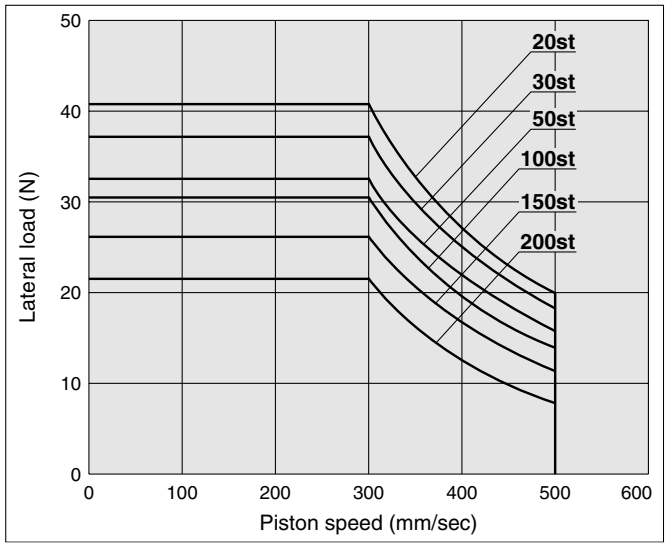
Strictly observe the values in the following graph regarding lateral loads hanging upon the plate end point.
When operated outside of the acceptable range, it can decrease the machine's service life.



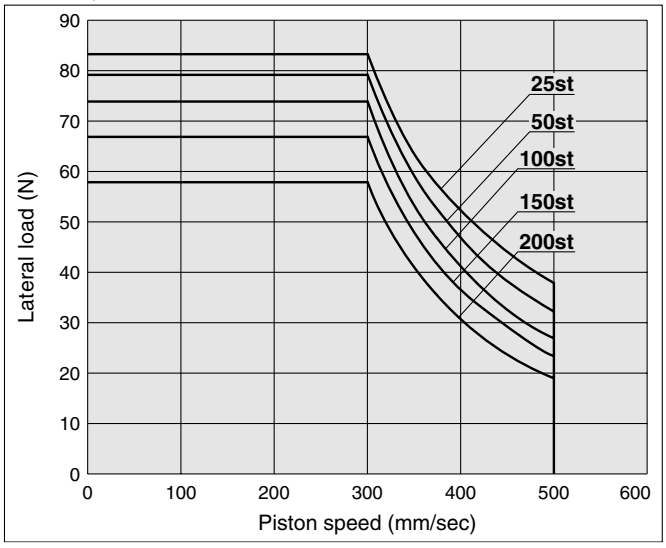
HYG20



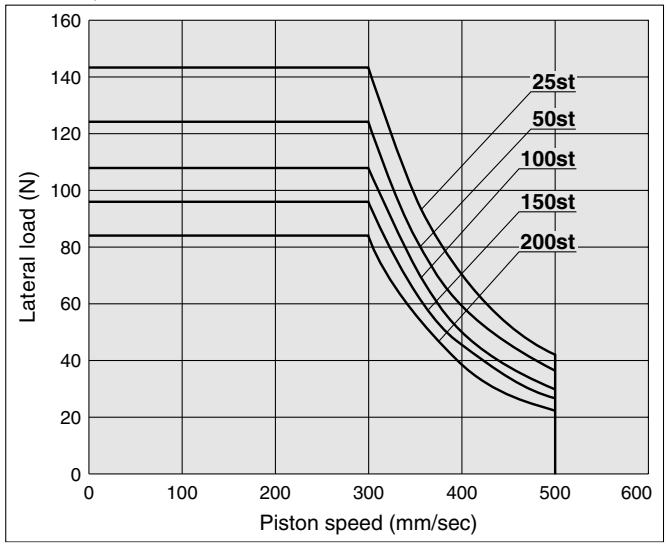
HYG25



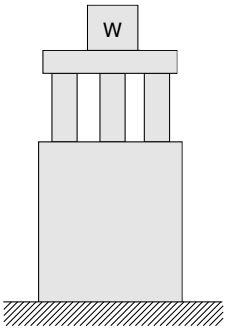
HYG32, 40



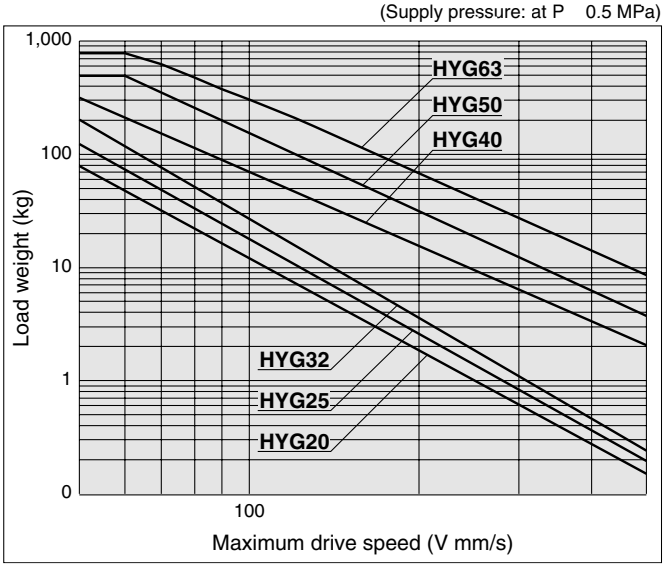
HYG50, 63



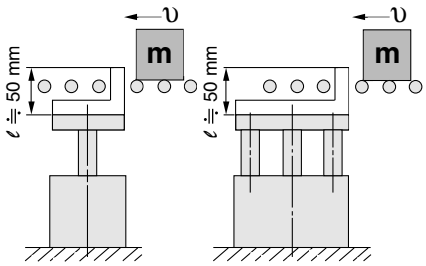
Allowable Kinetic Energy



(Supply pressure: at P 0.5 MPa)



Operating Range When Used as Stopper



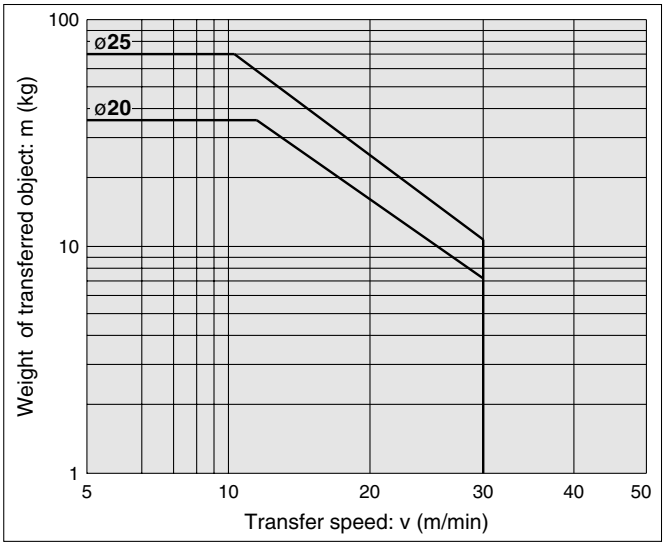
∗ When selecting a model with a longer ℓ dimension, be sure to choose a sufficiently large bore size.

⚠Caution

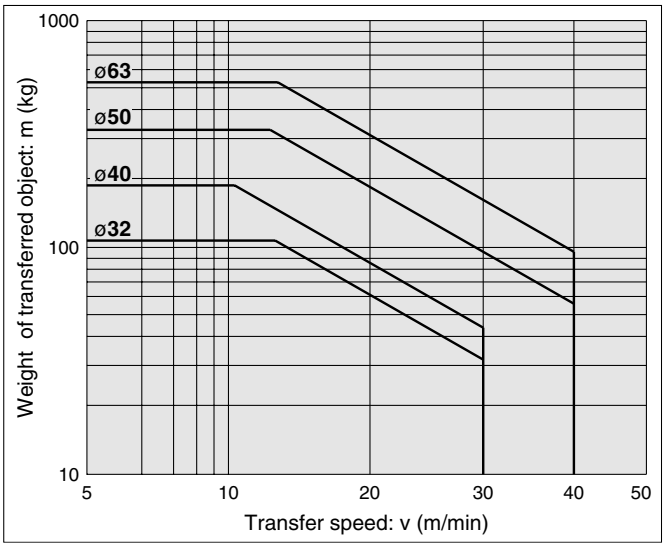
Caution on handling

Note) When using as a stopper
Bore size ø20 and ø25: Select a model with ø30 strokes or less.
Bore size ø32 to ø63 Select a model with ø50 strokes or less.

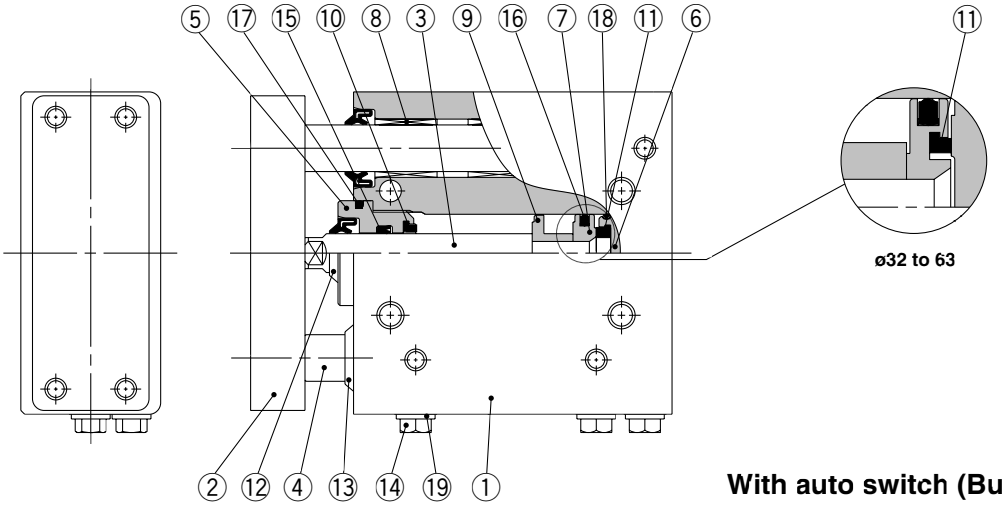
Bore size ø20 and ø25



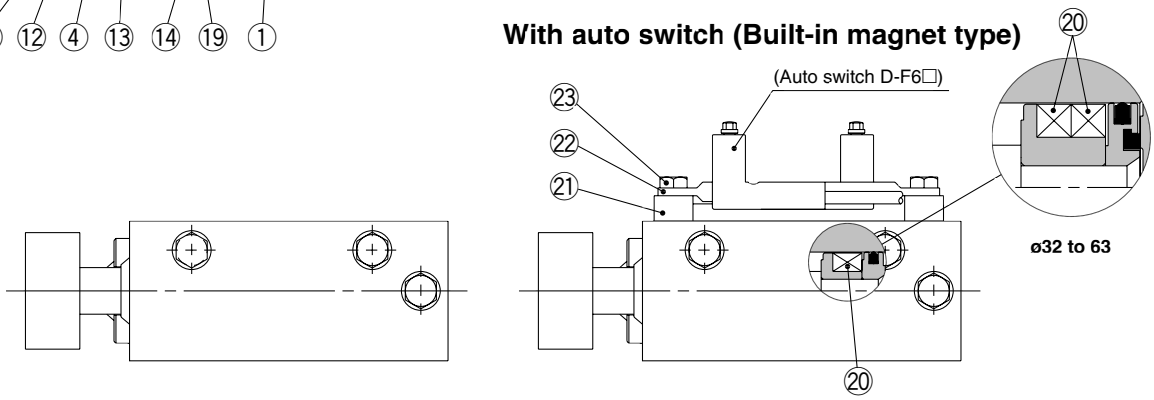
Bore size ø32 to ø63



Construction



With auto switch (Built-in magnet type)



Component Parts

No.	Description	Material	Qty.	Note
1	**Body**	Aluminum alloy	1	Anodic oxide film
2	**Plate**	Aluminum alloy	1	Anodic oxide film
3	**Piston rod**	Stainless steel	1	Hard chromium plated
4	**Guide rod**	Stainless steel	2	Special coated
5	**Rod cover**	Aluminum alloy	1	Anodic oxide film
6	**Head cover**	Aluminum alloy	1	Chromated
7	**Piston**	Aluminum alloy	1	Chromated
8	**Bushing**	Stainless steel	4	Special coated
9	**Magnet holder**	Aluminum alloy	1	Chromated
10	**Bumper A**	Resin	1	
11	**Bumper B**	Resin	1	
12	**Scraper (Piston rod)**	Stainless steel+NBR	1	(FKM can be selected.)
13	**Scraper (Guide rod)**	Stainless steel+NBR	2	(FKM can be selected.)
14	**Hexagon bolt**	Stainless steel	3	(Over ø32: 2 plugs and 1 hexagon bolt)
15	**Rod seal**	NBR	1	(FKM can be selected.)
16	**Piston seal**	NBR	1	
17	**O-ring (Rod end)**	NBR	1	(FKM can be selected.)
18	**O-ring (Head end)**	NBR	1	
19	**Seal washer**	Stainless steel+NBR	3	(FKM can be selected.)
20	**Magnet**	Resin	1	(Only built-in magnet) (Over ø32: 2 magnets)
21	**Switch rail base**	Stainless steel	2	(Only built-in magnet)
22	**Switch rail**	Stainless steel	1	(Only built-in magnet)
23	**Hexagon bolt**	Stainless steel	2	(Only built-in magnet)

Replacement Parts: Seal Kit

Bore size	Part no.	Set contents
20	HYG20□-PS	⑮ Rod seal (1 pc.) ⑯ Piston seal (1 pc.) ⑰ O-ring (Rod end) (1 pc.) ⑲ Seal washer (3 pcs.)
25	HYG25□-PS	
32	HYG32□-PS	⑮ Rod seal (1 pc.) ⑯ Piston seal (1 pc.) ⑰ O-ring (Rod end) (1 pc.) ⑲ Seal washer (Breathing port for guide) (1 pc.) ⑲ Seal washer (cylinder port) (2 pcs.)
40	HYG40□-PS	
50	HYG50□-PS	
63	HYG63□-PS	

Place the seal material symbol in □.

Symbol	Material
R	NBR
H	External FKM*

* External seal: Rod seal, O-ring (Rod side) and seal washer are made from FKM.

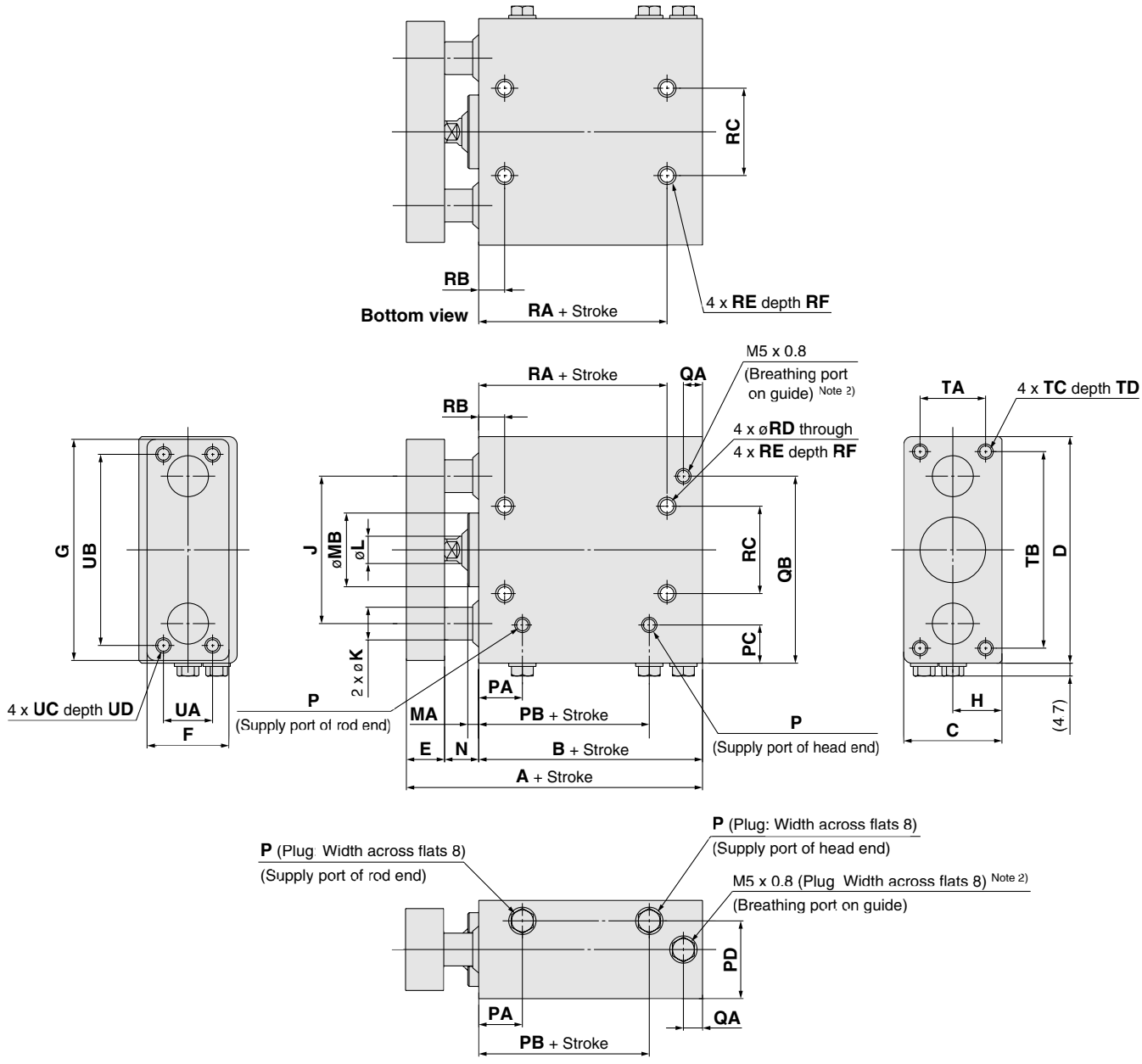
Grease package (Food compatible grease): GR-H-010 (10 g)
(Standard grease): GR-S-010 (10 g)

⚠Caution

Please contact SMC to repair or replace seals of cylinder bore size 40 mm and above.
Please contact SMC when the cylinder has to be disassembled for the purpose of replacing seals, etc.

Dimensions ø20, ø25

Without auto switch: HYG20, 25



(mm)

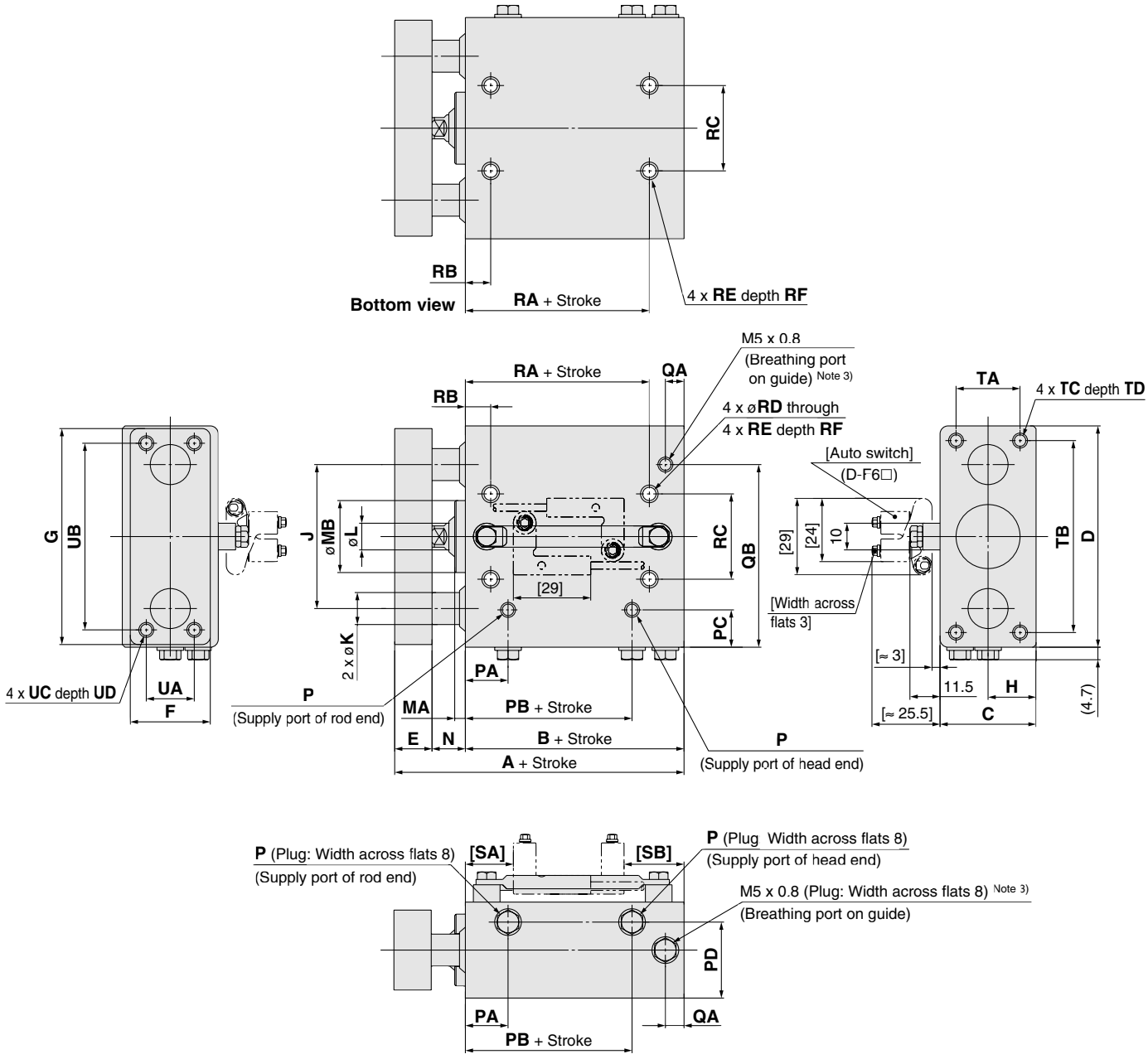
Bore size	Standard stroke	A				B				C	D	E	F	G	H	J	K	L	MA	MB	N	P	PA
		30 st or less	31 to 50 st	51 to 100 st	Over 101 st	30 st or less	31 to 50 st	51 to 100 st	Over 101 st														
20	20, 30, 50, 100, 150, 200	78.5	88.5	108.5	128.5	52	62	82	102	36	83	14	30	81	18	54	12	10	4	27	12.5	M5 x 0.8	16
25		86	96	116	136	56.5	66.5	86.5	106.5	42	93	16	38	91	21	64	16	12	4.5	32	13.5	M5 x 0.8	18

Bore size	PB	PC	PD	QA	QB	RA	RB	RC	RD	RE	RF	TA	TB	TC	TD	UA	UB	UC	UD
20	32.5	14	28.5	7	68.5	39	9.5	32	5.4	M6 x 1	12	24	72	M5 x 0.8	13	18	70	M5 x 0.8	16
25	34.5	15	34	8.5	78.5	41.5	9.5	38	5.4	M6 x 1	12	29	80	M6 x 1	14.5	26	78	M6 x 1	12

Note 1) Refer to page 35 for details about the optional parts (plug bolt).
Note 2) For piping, refer to Specific Product Precautions.

Dimensions ø20, ø25

With auto switch HYDG20, 25



(mm)

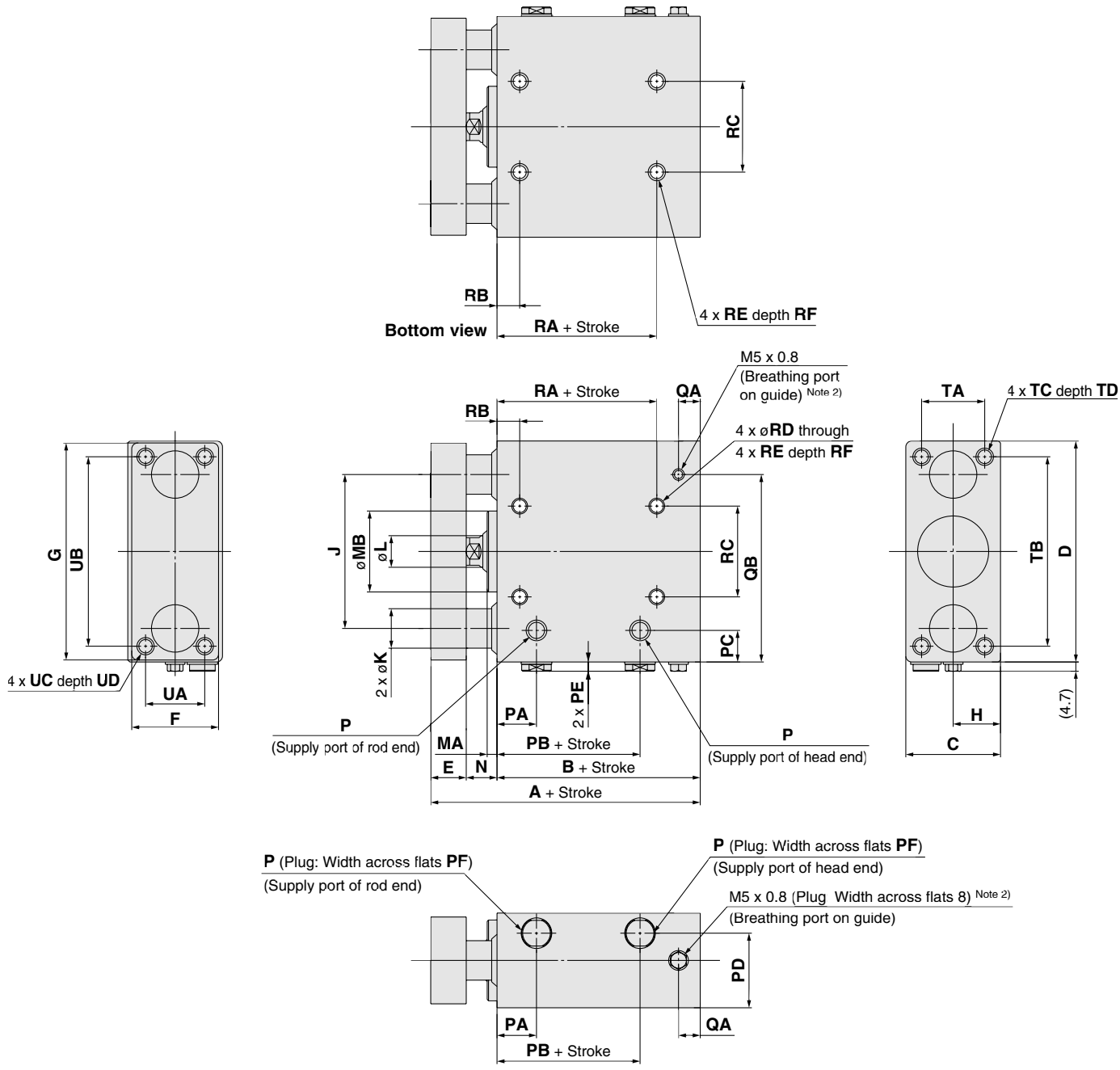
Bore size	Standard stroke	A				B				C	D	E	F	G	H	J	K	L	MA	MB	N	P	PA
		30 st or less	31 to 50 st	51 to 100 st	Over 101 st	30 st or less	31 to 50 st	51 to 100 st	Over 101 st														
20	20, 30, 50, 100, 150, 200	78.5	88.5	108.5	128.5	52	62	82	102	36	83	14	30	81	18	54	12	10	4	27	12.5	M5 x 0.8	16
25		86	96	116	136	56.5	66.5	86.5	106.5	42	93	16	38	91	21	64	16	12	4.5	32	13.5	M5 x 0.8	18

Bore size	PB	PC	PD	QA	QB	RA	RB	RC	RD	RE	RF	SA	SB				TA	TB	TC	TD	UA	UB	UC	UD
													30 st or less	31 to 50 st	51 to 100 st	Over 101 st								
20	32.5	14	28.5	7	68.5	39	9.5	32	5.4	M6 x 1	12	16	22.5	32.5	52.5	72.5	24	72	M5 x 0.8	13	18	70	M5 x 0.8	16
25	34.5	15	34	8.5	78.5	41.5	9.5	38	5.4	M6 x 1	12	17	25.5	35.5	55.5	75.5	29	80	M6 x 1	14.5	26	78	M6 x 1	12

Note 1) The [ ] value denotes dimensions with the auto switch D-F6□ mounted, which is dedicated to the Hygienic Design Cylinder.
Note 2) Refer to page 35 for details about the optional parts (plug bolt).
Note 3) For piping, refer to Specific Product Precautions.

Dimensions ø32 to ø63

Without auto switch: HYG32 to 63



(mm)

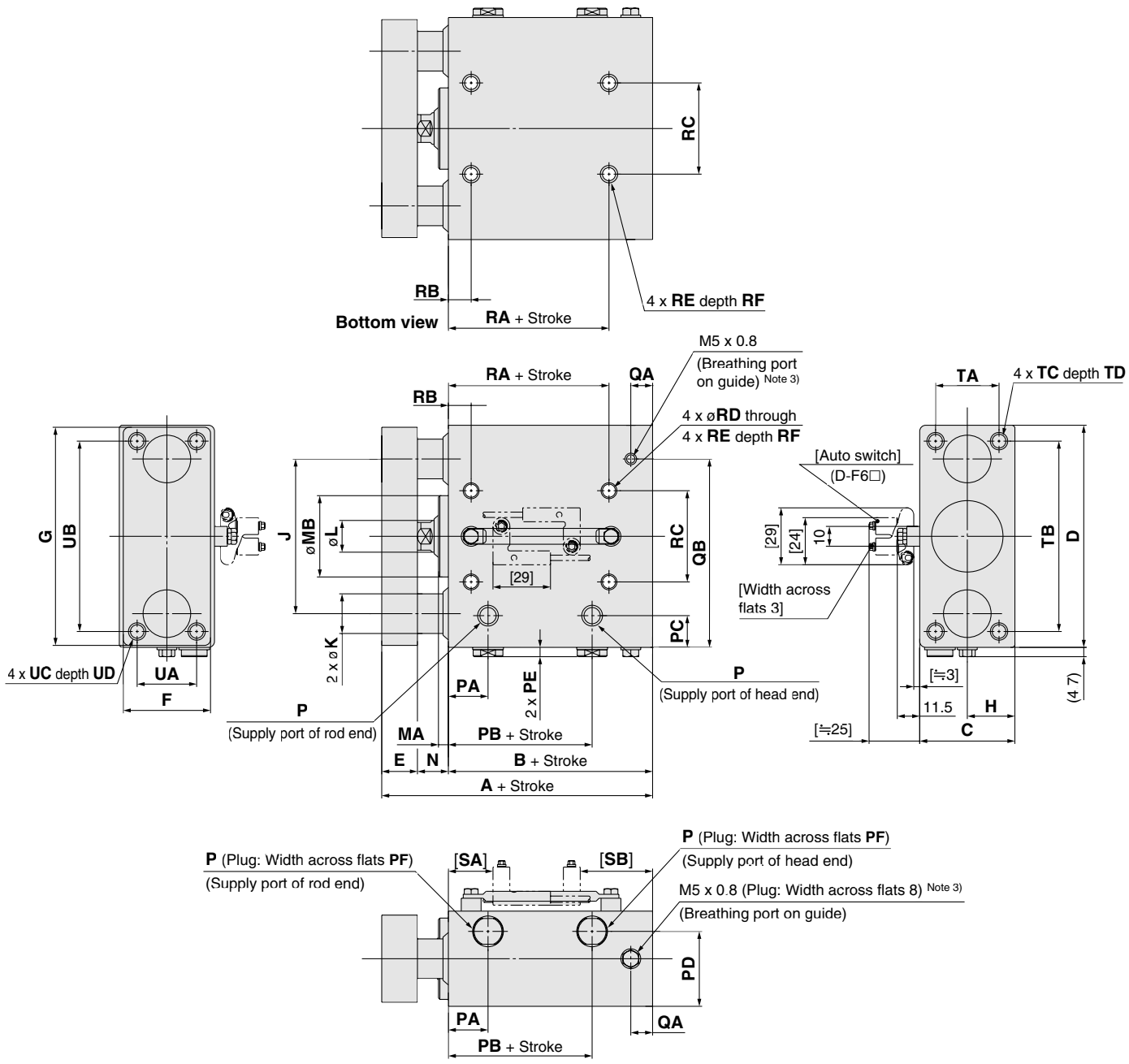
Bore size	Stroke	A				B				C	D	E	F	G	H	J	K	L	MA	MB	N
		30 st or less	31 to 50 st	51 to 100 st	Over 101 st	30 st or less	31 to 50 st	51 to 100 st	Over 101 st												
32	25, 50, 100, 150, 200	106.5	116.5	131.5	146.5	73	83	98	113	48	112	18	44	110	24	78	20	16	5	41	15.5
40		106.5	116.5	131.5	146.5	73	83	98	113	54	120	18	44	118	27	86	20	16	5	48	15.5
50		121.5	131.5	146.5	161.5	80	90	105	120	64	148	23	60	146	32	110	25	20	6	59	18.5
63		121.5	131.5	146.5	161.5	80	90	105	120	78	162	23	70	158	39	124	25	20	6	74	18.5

Bore size	P			PA	PB	PC	PD	PE	PF	QA	QB	RA	RB	RC	RD	RE	RF	TA	TB	TC	TD	UA	UB	UC	UD
	Nil	TF	TN																						
32	Rc1/8	G1/8	NPT1/8	20	42.5	16	37.8	4.7	13	11	95	51	11.5	46	6.6	M8 x 1.25	16	32	96	M8 x 1.25	20	30	96	M8 x 1.25	13.5
40	Rc1/8	G1/8	NPT1/8	20.5	40.5	17	42.5	4.7	13	11	103	31	30	50	6.6	M8 x 1.25	16	38	104	M8 x 1.25	20	30	104	M8 x 1.25	13.5
50	Rc1/4	G1/4	NPT1/4	22	41.5	22	52	6.2	16	12.5	129	31	32	63	8.6	M10 x 1.5	20	43	127	M10 x 1.5	22	40	130	M10 x 1.5	17
63	Rc1/4	G1/4	NPT1/4	24	45	23	61	6.2	16	12	143	35	34	76	8.6	M10 x 1.5	20	57	141	M10 x 1.5	22	50	130	M10 x 1.5	17

Note 1) Refer to page 35 for details about the optional parts (plug bolt).
Note 2) For piping, refer to Specific Product Precautions.

Dimensions ø32 to ø63

With auto switch HYDG32 to 63



(mm)

Bore size	Stroke	A				B				C	D	E	F	G	H	J	K	L	MA	MB	N	P			PA
		30 st or less	31 to 50 st	51 to 100 st	Over 101 st	30 st or less	31 to 50 st	51 to 100 st	Over 101 st													Nil	TF	TN	
32	25, 50, 100, 150, 200	106.5	116.5	131.5	146.5	73	83	98	113	48	112	18	44	110	24	78	20	16	5	41	15.5	Rc1/8	G1/8	NPT1/8	20
40		106.5	116.5	131.5	146.5	73	83	98	113	54	120	18	44	118	27	86	20	16	5	48	15.5	Rc1/8	G1/8	NPT1/8	20.5
50		121.5	131.5	146.5	161.5	80	90	105	120	64	148	23	60	146	32	110	25	20	6	59	18.5	Rc1/4	G1/4	NPT1/4	22
63		121.5	131.5	146.5	161.5	80	90	105	120	78	162	23	70	158	39	124	25	20	6	74	18.5	Rc1/4	G1/4	NPT1/4	24

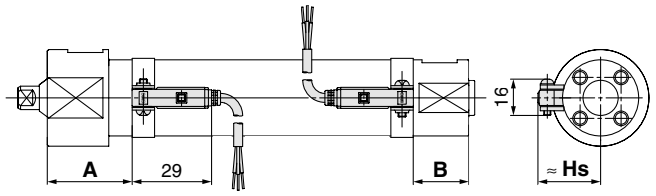
Bore size	PB	PC	PD	PE	PF	QA	QB	RA	RB	RC	RD	RE	RF	SA	SB				TA	TB	TC	TD	UA	UB	UC	UD
															30 st or less	31 to 50 st	51 to 100 st	Over 101 st								
32	42.5	16	37.8	4.7	13	11	95	51	11.5	46	6.6	M8 x 1.25	16	22.5	36.5	46.5	61.5	76.5	32	96	M8 x 1.25	20	30	96	M8 x 1.25	13.5
40	40.5	17	42.5	4.7	13	11	103	31	30	50	6.6	M8 x 1.25	16	21	38	48	63	78	38	104	M8 x 1.25	20	30	104	M8 x 1.25	13.5
50	41.5	22	52	6.2	16	12.5	129	31	32	63	8.6	M10 x 1.5	20	21	45	55	70	85	43	127	M10 x 1.5	22	40	130	M10 x 1.5	17
63	45	23	61	6.2	16	12	143	35	34	76	8.6	M10 x 1.5	20	23.5	42.5	52.5	67.5	82.5	57	141	M10 x 1.5	22	50	130	M10 x 1.5	17

Note 1) The [ ] value denotes dimensions with the auto switch D-F6□ mounted, which is dedicated to the Hygienic Design Cylinder.
Note 2) Refer to page 35 for details about the optional parts (plug bolt).
Note 3) For piping, refer to Specific Product Precautions.

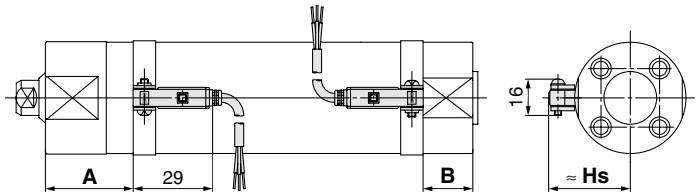
Auto Switch Proper Mounting Position (Detection at stroke end) and Its Mounting Height

HYB

D-H7BA

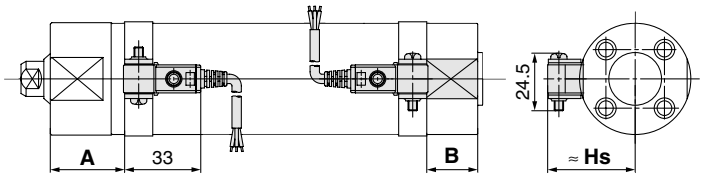


ø20, 25



ø32 to ø63

D-G5BA



ø80, ø100

(mm)

Bore size	D-H7BA			D-G5BA		
	A	B	Hs	A	B	Hs
20	29	19.5	24.5	—	—	
25	29	19.5	27	—	—	—
32	30	20.5	30.5	—	—	
40	34.5	22.5	35	—	—	—
50	42	27.5	40.5	—	—	
63	42	27.5	47.5	—	—	—
80	—	—	—	48	32	59
100	—	—	—	48	32	69.5

Note) The above values are a guide in the stroke end detection of the mounting position of the auto switch. Please adjust in an actual setting after confirming the operating state of the auto switch.

Operating Range

Auto switch model	Bore size							
	20	**25**	**32**	**40**	**50**	**63**	**80**	**100**
D-H7BA	4	4	4.5	5	6	6.5	—	—
D-G5BA	—	—	—	—	—	—	6.5	7

∗ Since this is a guideline including hysteresis, it is not meant to be guaranteed. There may be substantial variation depending on the surrounding environment (assuming approximately ±30% dispersion).

Minimum Stroke of Auto Switch Mounting

Auto switch model	1 pc.	2 pcs.
D-H7BA	10	15
D-G5BA	10	15

Auto Switch Mounting Bracket/Part No.

Auto switch model	Bore size (mm)							
	20	**25**	**32**	**40**	**50**	**63**	**80**	**100**
D-H7BA	BMA2-020	BMA2-025	BMA2-032	BMA2-040	BMA2-050	BMA2-063	—	—
D-G5BA	—	—	—	—	—	—	BA-08	BA-10

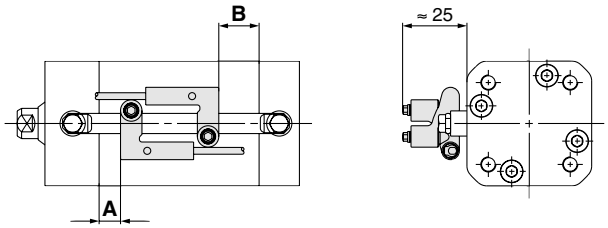
∗ An iron screw is attached when the above mounting bracket is ordered on its own. Please use the provided stainless steel screws, attached below the switch, for final assembly.
Mounting screws set made of stainless steel
BBA3: for D-G5BA
BBA4: for G-H7BA

- D-G5BA and D-H7BA switches are set on the cylinder with the stainless steel screws above when shipped. When the switches are shipped as individual parts, the BBA3 or BBA4 is included.

- Refer to “SMC Best Pneumatics” catalog vol. 10 for auto switch mounting.

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

HYQ
D-F6

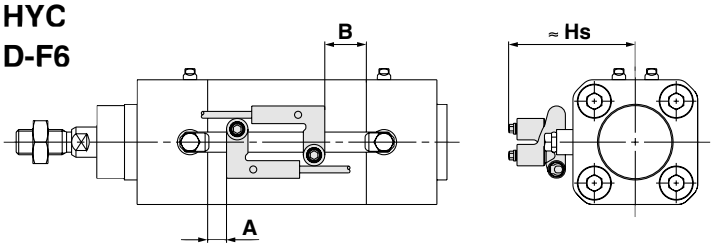


(mm)

Bore size	A	B
20	6.5	10.5
25	6.5	11
32	8.5	16
40	10.5	16
50	10.5	17
63	9	18

Note) The above values are a guide in the stroke end detection of the mounting position of the auto switch. Please adjust in an actual setting after confirming the operating state of the auto switch.

HYC
D-F6

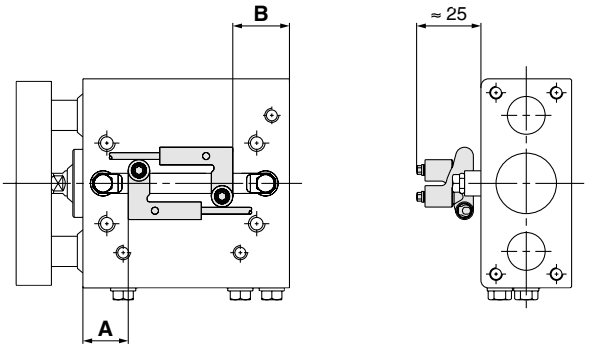


(mm)

Bore size	A	B	Hs
32	7.5	16.5	50
40	12	23	54
50	9	19	60
63	19	24	67

Note) The above values are a guide in the stroke end detection of the mounting position of the auto switch. Please adjust in an actual setting after confirming the operating state of the auto switch.

HYG
D-F6



(mm)

Bore size	A	B			
		30 st or less	31 to 50 st	51 to 100 st	Over 101 st
20	16	22.5	32.5	52.5	72.5
25	17	25.5	35.5	55.5	75.5
32	22.5	36.5	46.5	61.5	76.5
40	21	38	48	63	78
50	21	45	55	70	85
63	23.5	42.5	52.5	67.5	82.5

Note) The above values are a guide in the stroke end detection of the mounting position of the auto switch. Please adjust in an actual setting after confirming the operating state of the auto switch.

Operating Range

Unit: Operating range [mm]

Auto switch model	Series	Bore size					
		20	**25**	**32**	**40**	**50**	**63**
D-F6	**HYQ**	7	6	7.5	7.5	7.5	7.5
	HYC	—	—	7.5	7.5	7.5	7.5
	HYG	7	7	8	7.5	7.5	7.5

Note) Since this is a guideline including hysteresis, it is not meant to be guaranteed. There may be substantial variation depending on the surrounding environment (assuming approximately ±50% dispersion).

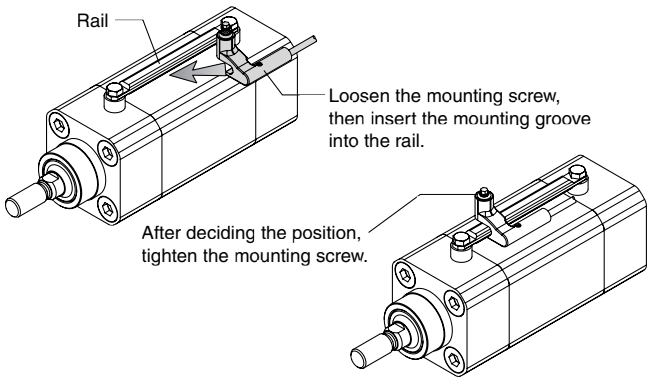
Minimum Stroke of Auto Switch Mounting

Auto switch model	Series	1 pc.	2 pcs.
D-F6	**HYQ, HYC**	5	10
	HYG	10	15

Auto Switch Mounting (HYQ, HYC, HYG common)

Proper tightening torque

When the mounting screw is tightened, use a special tool or torque wrench The tightening torque of the M3 mounting screw should be 0.8 to .4 N•m



Tighten the screw within the following torque range when the auto switch mounting rail is installed during maintenance.

Screw size	Tightening torque (N•m)
M4	1.1 to 1.9

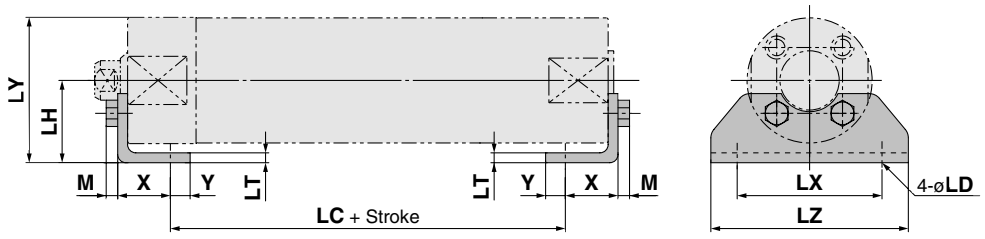
Tighten the screw within the following torque range when the auto switch is installed on the mounting rail.

Tightening torque (N•m)
0.8 to 1.4

Mounting Brackets

Foot Bracket

HYB

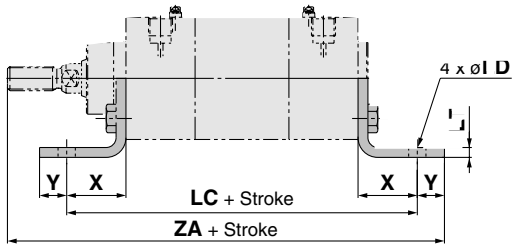


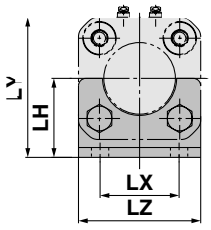
Foot bracket material: Stainless steel

Bore size	Bracket part no.	Weight (g)	X	Y	LD	LH	LC	LT	LX	LY	LZ	M	Mounting bolt
32	**CG-L032SUS**	0.06	16	6	7.2	25	45	3	44	44	60	3.5	M5 x 0.8
40	**CG-L040SUS**	0.08	16.5	6.5	7.2	30	51	3	54	53.5	75	4	M6 x 1.0
50	**CG-L050SUS**	0.17	21.5	11.5	10	40	55	4	66	69	90	5.5	M8 x 1.25
63	**CG-L063SUS**	0.23	21.5	11.5	12	45	55	4	82	81	110	7	M10 x 1.5
80	**CG-L080SUS**	0.36	28	17	12	55	60	4	100	99.5	130	7	M10 x 1.5
100	**CG-L100SUS**	0.69	30	15	14	70	60	6	120	125	160	8	M12 x 1.75

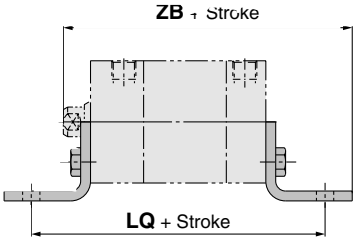
Note 1) One mounting bracket is attached with one foot bracket and two mounting bolts.
Note 2) Order two foot brackets per cylinder.
Note 3) Contact SMC for HYB ø20, ø25.

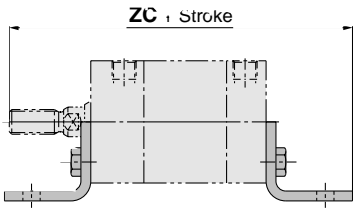
HYC





HYQ





Foot bracket material: Stainless steel
(mm)

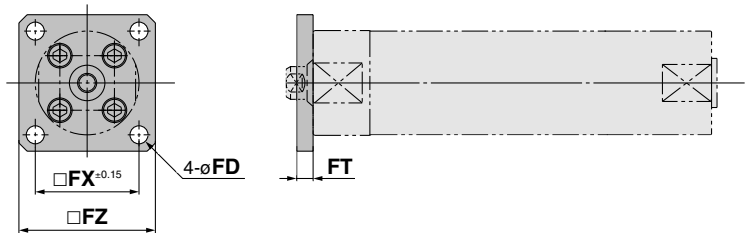
Bore size	Bracket part no.	Weight (g)	X	Y	LD	LH	LC	LQ	LT	LX	LY	LZ	HYC	HYQ Without auto switch		HYDQ With auto switch		Mounting bolt
													ZA	ZB	ZC	ZB	ZC	
32	**HY-L032SUS**	100	24	11	7	32	142	109	4	32	57	49.5	177	107	129	122	144	M6 x 1 x 18L
40	**HY-L040SUS**	120	28	10	9	36	161	121.5	4	36	65	57.5	198	115.5	139.5	130.5	154.5	M6 x 1 x 18L
50	**HY-L050SUS**	210	32	11	9	45	170	140.5	5	45	80	69	218	133.5	165.5	148.5	180.5	M8 x 1.25 x 20L
63	**HY-L063SUS**	260	32	11	9	50	185	141	5	50	92	84	233	134	166	149	181	M8 x 1.25 x 20L

Note 1) One mounting bracket is attached with one foot bracket and two mounting bolts.
Note 2) Two foot brackets per cylinder should be ordered.
Note 3) Contact SMC for HYQ ø20, ø25.

Flange Bracket

HYB (Rod end)

Rod end flange bracket (Material: Stainless steel)



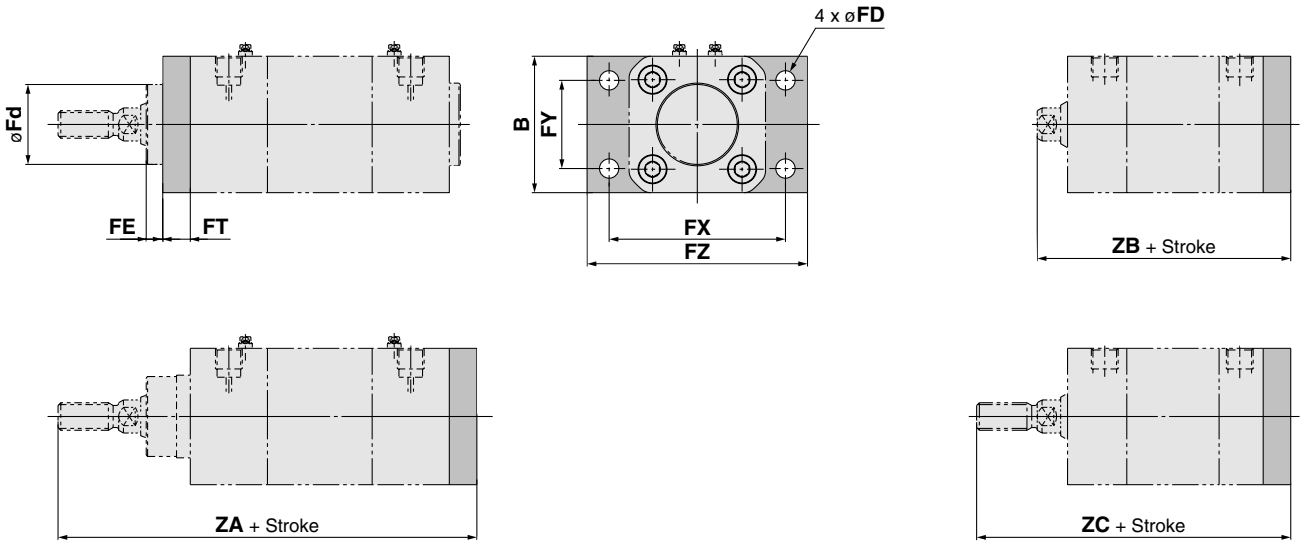
Flange bracket material: Stainless steel

Bore size	Bracket part no.	Weight (g)	FT	FX	FZ	FD
32	**CG-F032SUS**	0.10	6	38	50	6.6
40	**CG-F040SUS**	0.15	6	46	60	6.6
50	**CG-F050SUS**	0.26	9	58	75	9
63	**CG-F063SUS**	0.52	9	70	90	11
80	**CG-F080SUS**	0.66	9	82	100	11
100	**CG-F100SUS**	1.16	10	100	125	14

Note 1) One mounting bracket is attached with one flange bracket and four mounting bolts.
Note 2) Contact SMC for HYB ø20, ø25.

HYC (Rod end and head end are common.)

HYQ



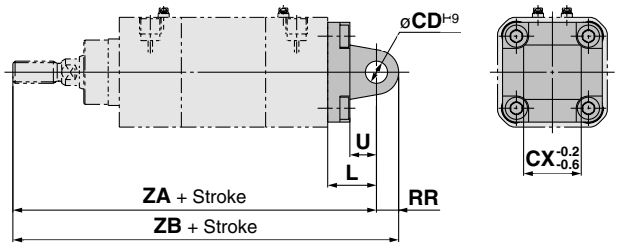
Flange bracket material: Stainless steel
(mm)

Bore size	Bracket part no.	Weight (g)	B	FD	FE	FT	FX	FY	FZ	Fd	HYC	HYQ Without auto switch		HYDQ With auto switch		Mounting bolt
											ZA	ZB	ZC	ZB	ZC	
32	**HY-F032SUS**	260	49.5	7	6	10	64	32	80	29	152	82	104	97	119	M6 x 1 x 18L
40	**HY-F040SUS**	320	57.5	9	8.5	10	72	36	90	34	169	87.5	111.5	102.5	126.5	M6 x 1 x 18L
50	**HY-F050SUS**	580	69	9	11	12	90	45	110	39	187	102.5	134.5	117.5	149.5	M8 x 1.25 x 20L
63	**HY-F063SUS**	770	82	9	11	12	100	50	120	44	202	103	135	118	150	M8 x 1.25 x 20L

Note 1) One mounting bracket is attached with 4 mounting bolts.
Note 2) Contact SMC for HYQ ø20, ø25.

Single Clevis Bracket

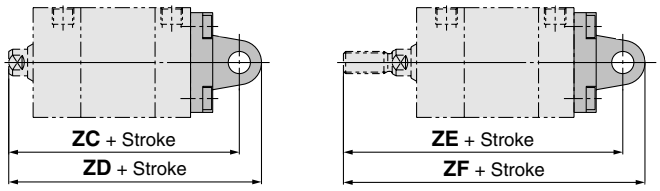
HYC



Single clevis bracket material: Stainless steel
(mm)

Bore size	Bracket part no.	Weight (g)	L	RR	U	CD H9	CX -0.2 -0.6	HYC	
								ZA	ZB
32	HY-C032SUS	200	22	10	12	10	26	164	174
40	HY-C040SUS	310	25	12	15	12	28	184	196
50	HY-C050SUS	440	27	12	17	12	32	202	214
63	HY-C063SUS	760	32	16	20	16	40	222	238

HYQ



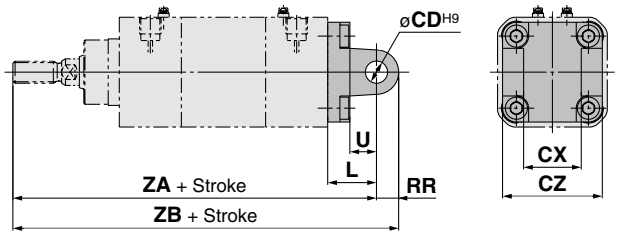
Bore size	Bracket part no.	HYQ / without auto switch			
		ZC	ZD	ZE	ZF
32	HY-C032SUS	94	104	116	126
40	HY-C040SUS	102.5	114.5	126.5	138.5
50	HY-C050SUS	117.5	129.5	149.5	161.5
63	HY-C063SUS	123	139	155	171

Bore size	Bracket part no.	HYDQ / with auto switch				Mounting bolt
		ZC	ZD	ZE	ZF	
32	HY-C032SUS	109	119	131	141	M6 x 1 x 18L
40	HY-C040SUS	117.5	129.5	141.5	153.5	M6 x 1 x 18L
50	HY-C050SUS	132.5	144.5	164.5	176.5	M8 x 1.25 x 20L
63	HY-C063SUS	138	154	170	186	M8 x 1.25 x 20L

Note 1) One mounting bracket is attached with 4 mounting bolts.
Note 2) Contact SMC for HYQ ø20, ø25.

Double Clevis Bracket

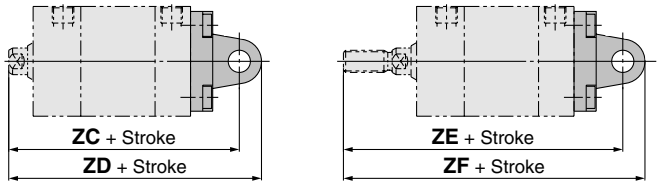
HYC



Double clevis bracket material: Stainless steel
(mm)

Bore size	Bracket part no.	Weight (g)	L	RR	U	CD H9	CX H14	CZ h14
32	HY-D032SUS	220	22	10	12	10	26	45
40	HY-D040SUS	350	25	12	15	12	28	52
50	HY-D050SUS	490	27	12	17	12	32	60
63	HY-D063SUS	810	32	16	20	16	40	70

HYQ

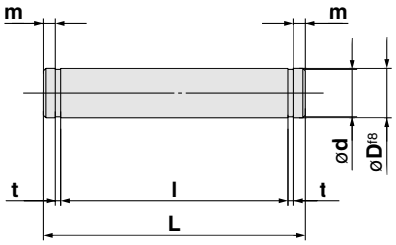


Bore size	Bracket part no.	HYC		HYQ / without auto switch			
		ZA	ZB	ZC	ZD	ZE	ZF
32	HY-D032SUS	164	174	94	104	116	126
40	HY-D040SUS	184	196	102.5	114.5	126.5	138.5
50	HY-D050SUS	202	214	117.5	129.5	149.5	161.5
63	HY-D063SUS	222	238	123	139	155	171

Bore size	Bracket part no.	HYDQ / with auto switch				Mounting bolt
		ZC	ZD	ZE	ZF	
32	HY-D032SUS	109	119	131	141	M6 x x 18L
40	HY-D040SUS	117.5	129.5	141.5	153.5	M6 x 1 x 18L
50	HY-D050SUS	132.5	144.5	164.5	176.5	M8 x .25 x 20L
63	HY-D063SUS	138	154	170	186	M8 x 1.25 x 20L

Note 1) One mounting bracket is attached with 4 mounting bolts and clevis pin (HY-E0□SUS) and snap rings.
Note 2) Contact SMC for HYQ ø20, ø25.

Clevis Pin



Material: Stainless steel
(mm)

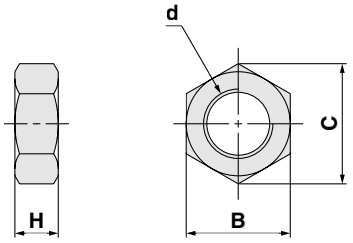
Bore size	Bracket part no.	Weight (g)	D f8	L	d	l	m	t	Applied snap ring
32	HY-E03SUS	40	10	53	9.6	46	2.3	1.2	C type for shaft 10
40	HY-E04SUS	60	12	60	11.5	53	2.3	1.2	C type for shaft 12
50	HY-E05SUS	70	12	68	11.5	61	2.3	1.2	C type for shaft 12
63	HY-E06SUS	130	16	78	15.2	71	2.3	1.2	C type for shaft 16

Note 1) One clevis pin is attached with two snap rings.
Note 2) Contact SMC for HYQ ø20, ø25.

Options

Rod End Nut

HYQ, HYC

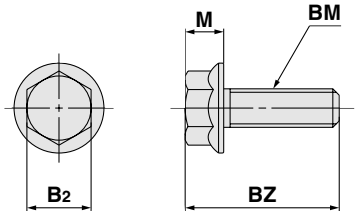


Material: Stainless steel
(mm)

Part no.	Applicable bore size	d	H	B	C
NTH-02SUS	20	M6 x 1.0	3.6	10	11.5
NT-02SUS	25	M8 x 1.25	5	13	15
NT-03SUS	32	M10 x 1.25	6	17	19.6
NTH-04SUS	40	M12 x 1.25	7	19	21.9
NTH-05SUS	50, 63	M16 x 1.5	10	24	27 7

Plug Bolt

HYC

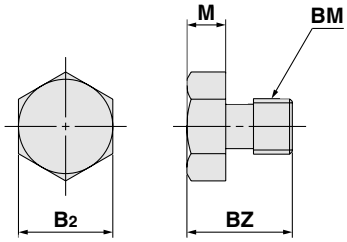


Material: Stainless steel
(mm)

Part no.	Applicable bore size	B2	BM	BZ	M
HYC-H03SUS	32, 40	10	M6 x 1.0	22	6
HYC-H05SUS	50, 63	12	M8 x 1.25	24	8

Note) The above part number is attached with 4 bolts.

HYB, HYG



HYB

Material: Stainless steel
(mm)

Part no.	Applicable bore size	B2	BM	BZ	M
HYB-H020SUS	20	7	M4 x 0.7	9	3
HYB-H025SUS	25	8	M5 x 0.8	9.5	3.5
	32	8	M5 x 0.8	9.5	3.5
HYB-H040SUS	40	10	M6 x 1.0	12	4
HYB-H050SUS	50	13	M8 x 1.25	15.5	5.5
HYB-H063SUS	63	17	M10 x 1.5	19	7
	80	17	M10 x 1.5	19	7
HYB-H100SUS	100	19	M12 x 1.75	24	8

Note) The above part number is attached with 4 bolts.

HYG

(mm)

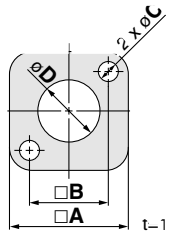
Part no.	B2	BM	BZ	M
HYG-H020SUS	8	M5 x 0.8	9.5	3.5
HYG-H025SUS	10	M6 x 1.0	12	4
HYG-H032SUS	13	M8 x 1.25	15.5	5.5
HYG-H050SUS	17	M10 x 1.5	19	7

Note) The above part number is attached with 4 bolts.

External Cover

HYQ: ø20, ø25

Rod end

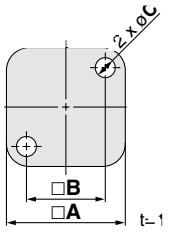


Material: Stainless steel
(mm)

Part no.	A	B	C	D	Installation bolt
HYQ-HA020SUS	32.2	22	5.5	18.5	M5 x 0.8 x 10L
HYQ-HA025SUS	39.2	26	6.6	20.5	M6 x 1.0 x 10L

Note) One mounting bracket is attached with two mounting bolts.

Head end



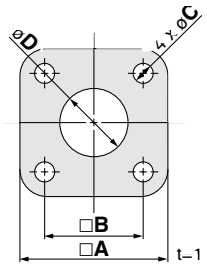
Material: Stainless steel
(mm)

Part no.	A	B	C	Installation bolt
HYQ-HB020SUS	32.2	22	5.5	M5 x 0.8 x 10L
HYQ-HB025SUS	39.2	26	6.6	M6 x 1.0 x 10L

Note) One mounting bracket is attached with two mounting bolts.

HYQ: ø32 to ø63

Rod end

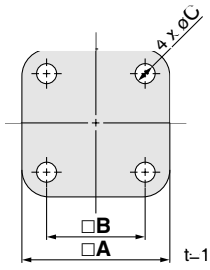


Material: Stainless steel
(mm)

Part no.	A	B	C	D	Installation bolt
HYQ-HA032SUS	48.8	32.5	6.6	22.5	M6 x 1.0 x 10L
HYQ-HA040SUS	56.8	38	6.6	26.5	M6 x 1.0 x 10L
HYQ-HA050SUS	68.2	46.5	8.8	32.5	M8 x 1.25 x 10L
HYQ-HA063SUS	83.2	56.5	8.8	32.5	M8 x 1.25 x 10L

Note) One mounting bracket is attached with four mounting bolts.

Head end



Material: Stainless steel
(mm)

Part no.	A	B	C	Installation bolt
HYQ-HB032SUS	48.8	32.5	6.6	M6 x 1.0 x 10L
HYQ-HB040SUS	56.8	38	6.6	M6 x 1.0 x 10L
HYQ-HB050SUS	68.2	46.5	8.8	M8 x 1.25 x 10L
HYQ-HB063SUS	83.2	56.5	8.8	M8 x 1.25 x 10L

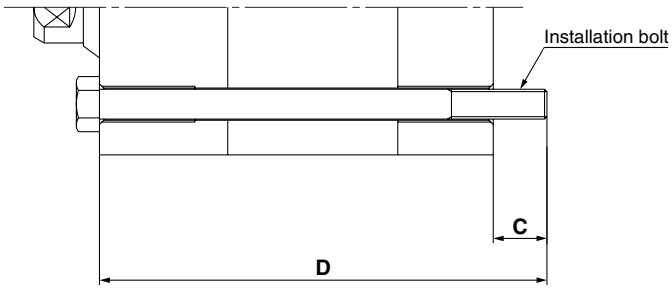
Note) One mounting bracket is attached with four mounting bolts.

Mounting Bolt

Mounting method **Mounting bolt for through-hole type HYQB is available.**

How to Order **Add "HY-" to the head of the bolt.**

Example) **Prepare the mounting bolt of cylinder model "HYQB20-5" The part no. is "HY-M4 x 65L" 2 pcs.**



HYQ/Without built-in magnet

Material: Stainless steel

Model	C	D	Mounting bolt
HYQB20-5	10	65	HY-M4 x 65L
-10		70	x 70L
-15		75	x 75L
-20		80	x 80L
-25		85	x 85L
-30		90	x 90L
-35		95	x 95L
-40		100	x 100L
-45		105	x 105L
-50		110	x 110L
HYQB25-5	9	65	HY-M5 x 65L
-10		70	x 70L
-15		75	x 75L
-20		80	x 80L
-25		85	x 85L
-30		90	x 90L
-35		95	x 95L
-40		100	x 100L
-45		105	x 105L
-50		110	x 110L

Model	C	D	Mounting bolt
HYQB32-5	9	75	HY-M5 x 75L
-10		80	x 80L
-15		85	x 85L
-20		90	x 90L
-25		95	x 95L
-30		100	x 100L
-35		105	x 105L
-40		110	x 110L
-45		115	x 115L
-50		120	x 120L
-75		145	x 145L
-100		170	x 170L
HYQB40-5	9.5	80	HY-M5 x 80L
-10		85	x 85L
-15		90	x 90L
-20		95	x 95L
-25		100	x 100L
-30		105	x 105L
-35		110	x 110L
-40		115	x 105L
-45		120	x 120L
-50		125	x 125L
-75		150	x 150L
-100		175	x 175L

Model	C	D	Mounting bolt
HYQB50-10	13.5	100	HY-M6 x 100L
-15		105	x 105L
-20		110	x 110L
-25		115	x 115L
-30		120	x 120L
-35		125	x 125L
-40		130	x 130L
-45		135	x 135L
-50		140	x 140L
-75		165	x 165L
-100		190	x 190L
HYQB63-10	13	100	HY-M6 x 100L
-15		105	x 105L
-20		110	x 110L
-25		115	x 115L
-30		120	x 120L
-35		125	x 125L
-40		130	x 130L
-45		135	x 135L
-50		140	x 140L
-75		165	x 165L
-100		190	x 190L

HYDQ/With built-in magnet

Model	C	D	Mounting bolt
HYDQB20-5	10	75	HY-M4 x 75L
-10		80	x 80L
-15		85	x 85L
-20		90	x 90L
-25		95	x 95L
-30		100	x 100L
-35		105	x 105L
-40		110	x 110L
-45		115	x 115L
-50		120	x 120L
HYDQB25-5	9	75	HY-M5 x 75L
-10		80	x 80L
-15		85	x 85L
-20		90	x 90L
-25		95	x 95L
-30		100	x 100L
-35		105	x 105L
-40		110	x 110L
-45		115	x 115L
-50		120	x 120L

Model	C	D	Mounting bolt
HYDQB32-5	9	90	HY-M5 x 90L
-10		95	x 95L
-15		100	x 100L
-20		105	x 105L
-25		110	x 110L
-30		115	x 115L
-35		120	x 120L
-40		125	x 125L
-45		130	x 130L
-50		155	x 155L
-75		180	x 180L
-100		185	x 185L
HYDQB40-5	9.5	95	HY-M5 x 95L
-10		100	x 100L
-15		105	x 105L
-20		110	x 110L
-25		115	x 115L
-30		120	x 120L
-35		125	x 125L
-40		130	x 130L
-45		135	x 135L
-50		140	x 140L
-75		165	x 165L
-100		190	x 190L

Model	C	D	Mounting bolt
HYDQB50-10	13.5	115	HY-M6 x 115L
-15		120	x 120L
-20		125	x 125L
-25		130	x 130L
-30		135	x 135L
-35		140	x 140L
-40		145	x 145L
-45		150	x 150L
-50		155	x 155L
-75		180	x 180L
-100		205	x 205L
HYDQB63-10	13	115	HY-M6 x 115L
-15		120	x 120L
-20		125	x 125L
-25		130	x 130L
-30		135	x 135L
-35		140	x 140L
-40		145	x 145L
-45		150	x 150L
-50		155	x 155L
-75		180	x 180L
-100		205	x 205L

Series HY□

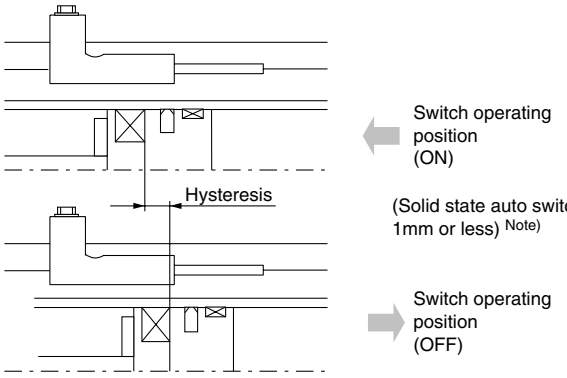
Auto Switch Specifications

Specifications

Type	Solid state switch
Leakage current	3-wire: 100 μA or less 2-wire: 0.8 mA or less
Operating time	1 ms or less
Impact resistance	1000 m/s^2
Insulation resistance	50 MΩ or more at 500 VDC Mega (between lead wire and case)
Withstand voltage	1000 VAC for 1 minute (between lead wire and case)
Ambient temperature	–10 to 60°C
Enclosure	IEC529 standard IP67, JIS C 0920 waterproof construction

Hysteresis

Hysteresis is the distance between the position at which piston movement operates an auto switch and the position at which reverse movement turns the switch off. This hysteresis is included in a part of the operating range (one side).



Note) Hysteresis may fluctuate due to the operating environment, and it does not be guaranteed.
Contact SMC if hysteresis causes an operational problem.

Lead Wire Length

Lead wire length indication

(Example) **D-F6P L**

Lead wire length

Nil	0.5 m
L	3 m
Z	5 m

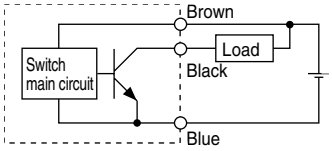
Note 1) Applicable auto switch with 5 m lead wire "Z"
Solid state switch: All types are manufactured upon receipt of order (as standard).

Note 2) The standard lead wire length of solid state switch with water resistant 2-color indication is 3 meters. (0.5 m is not available.)

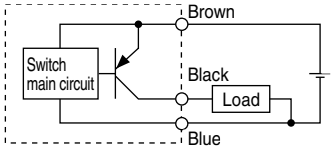
Series HY□
Auto Switch Connections and Examples

Basic Wiring

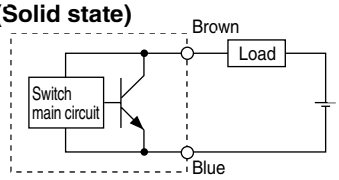
Solid state 3-wire, NPN



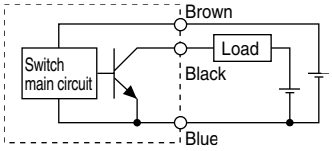
Solid state 3-wire, PNP

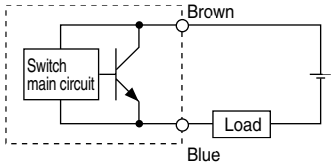


2-wire (Solid state)



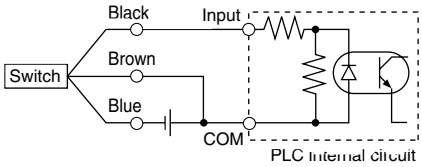
(The switch power supply and the load power supply are another cases.)



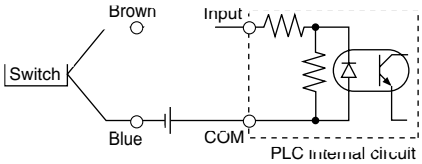


Example of Connection to PLC

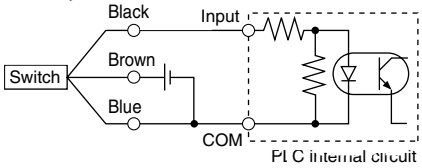
• Sink input specifications
3-wire, NPN



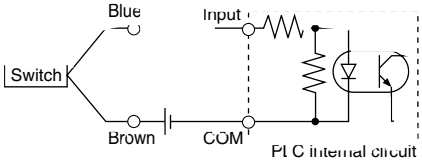
2-wire



• Source input specifications
3-wire, PNP



2-wire

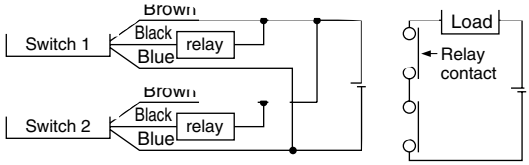


Connect according to the applicable PLC input specifications, since the connection method will vary depending on the PLC input specifications.

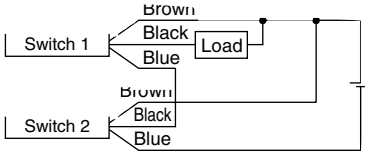
Example of AND (Series) and OR (Parallel) Connection

● 3-wire

AND connection for NPN output (using relays)

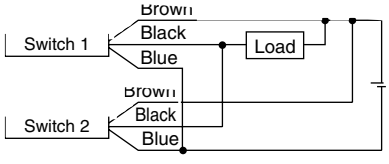


AND connection for NPN output (performed with switches only)

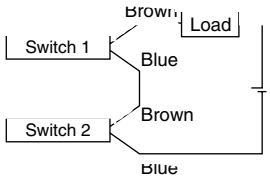


The indicator lights will illuminate when both switches are turned ON.

OR connection for NPN output



2-wire with 2 switches AND connection



When two switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state. The indicator lights will light up if both of the switches are in the ON state.

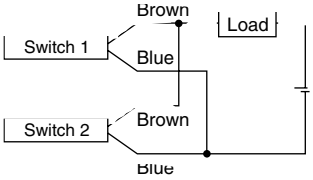
$$\text{Load voltage at ON} = \left(\text{Power supply voltage} - \text{Internal voltage drop}\right) \times \text{2 pcs.}$$

$$= (24\ \text{V} - 4\ \text{V}) \times 2\ \text{pcs.}$$

$$= 16\ \text{V}$$

Example : Power supply voltage is 24 V DC
Internal voltage drop in switch is 4 V.

2-wire with 2 switches OR connection



(Solid state)
When two switches are connected in parallel, malfunction may occur because the load voltage will increase when in the OFF state.

$$\text{Load voltage at OFF} = \text{Leakage current} \times \text{2 pcs.} \times \text{Load impedance}$$

$$= \text{mA} \times 2\ \text{pcs.} \times 3\ \text{k}\Omega$$

$$= 6\ \text{V}$$

Example : Load impedance is 3 kΩ
Leakage current from switch is 1 mA.

Water Resistance 2-color Indication Type Solid State Switch: Band Mounting Style
D-H7BAL

Grommet

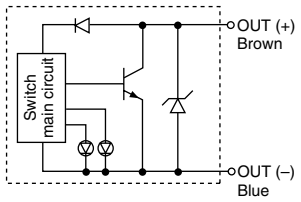
Water (coolant) resistant type

⚠Caution

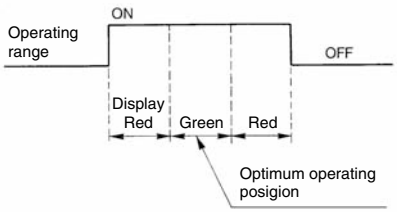
Operating Precautions

Please consult with SMC if using coolant liquid other than water based solutions.

Auto Switch Internal Circuit



Indicator light / Display method



Auto Switch Specifications

PLC: Programmable Logic Controller

D-H7BAL (With indicator light)	
Auto switch part no.	**D-H7BAL**
Wiring type	2-wire
Output type	—
Applicable load	24 VDC relay, PLC
Power supply voltage	—
Current consumption	—
Load voltage	24 VDC (10 to 28 VDC)
Load current	5 to 40 mA
Internal voltage drop	4 V or less
Leakage current	0.8 mA or less at 24 VDC
Indicator light	Operating position ····· Red LED illuminates when ON. Optimum operating position ····· Green LED illuminates when ON.

● Lead wires Oilproof vinyl heavy-duty cord: ø3.4, 0.2 mm², 2 cores (brown, blue), 3 m (standard)

Note 1) Refer to page 37 for solid state switch common specifications.

Note 2) Refer to page 37 for lead wire lengths.

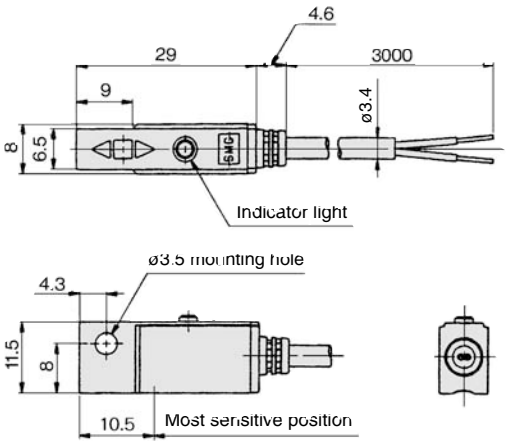
Weight

Unit g

Auto switch part no.		**D-H7BA**
Lead wire length (m)	0.5	—
	3	50
	5	81

Dimensions

Unit : mm



Water Resistance 2-color Indication Type Solid State Switch: Band Mounting Style
D-G5BAL

Grommet

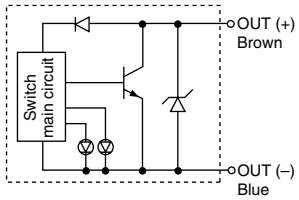
Water (coolant) resistant type

⚠Caution

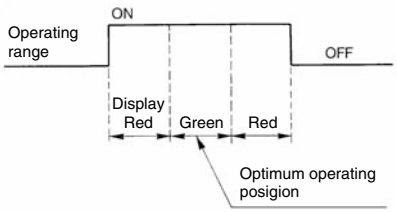
Operating Precautions

Please consult with SMC if using coolant liquid other than water based solutions.

Auto Switch Internal Circuit



Indicator light / Display method



Auto Switch Specifications

PLC: Programmable Logic Controller

D-G5BAL (With indicator light)	
Auto switch part no.	**D-G5BAL**
Wiring type	2-wire
Output type	—
Applicable load	24 VDC relay, PLC
Power supply voltage	—
Current consumption	—
Load voltage	24 VDC (10 to 28 VDC)
Load current	5 to 40 mA
Internal voltage drop	4 V or less
Leakage current	0.8 mA or less at 24 VDC
Indicator light	Operating position ····· Red LED illuminates when ON. Optimum operating position ····· Green LED illuminates when ON.

● Lead wires Oilproof vinyl heavy-duty cord: ø4, 0.3 mm² 2 cores (brown, blue), 3 m (standard)

Note 1) Refer to page 37 for solid state switch common specifications.

Note 2) Refer to page 37 for lead wire lengths.

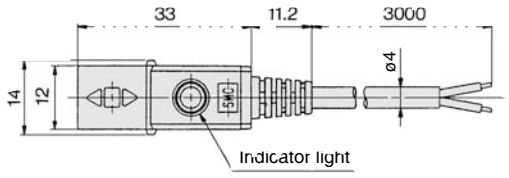
Weight

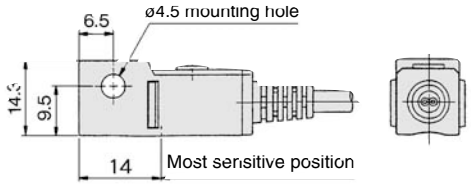
Unit g

Auto switch part no.		**D-G5BA**
Lead wire length (m)	0.5	—
	3	68
	5	108

Dimensions

Unit : mm





Solid State Switch: Direct Mounting Style
D-F6N/D-F6P/D-F6B

Grommet

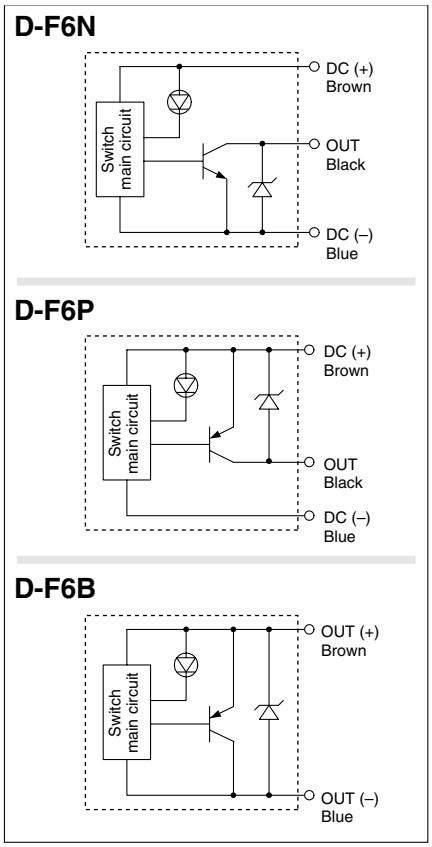
- **2-wire load current is reduced (2.5 to 40 mA)**
- **UL certified (style 2844) lead cable is used**
- **For RoHS**

⚠Caution

Operating Precautions

Fix the switch with the existing screw installed on the switch body. The switch may be damaged if a screw other than the one supplied, is used.

Auto Switch Internal Circuit



Auto Switch Specifications

PLC: Programmable Logic Controller

D-F6□ (With indicator light)			
Auto switch part no.	D-F6N	D-F6P	D-F6B
Electrical entry direction	In-line		
Wiring type	3-wire		2-wire
Output type	NPN	PNP	—
Applicable load	IC circuit, relay, and PLC		24 VDC relay, PLC
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)		—
Current consumption	10 mA or less		—
Load voltage	28 VDC or less	—	24 VDC (10 to 28 VDC)
Load current	40 mA or less		2.5 to 40 mA
Internal voltage drop	0.8 V or less		4 V or less
Leakage current	100 μA or less at 24 V DC		0.8 mA or less
Indicator light	Red LED illuminates when ON.		

● Lead wires Oilproof vinyl heavy-duty cord: 2.7 x 3.2 ellipse
D-F6B 0.15 mm^2 x 2 cores
D-F6N, D-F6P: 0.15 mm^2 x 3 cores

Note 1) Refer to page 37 for solid state switch common specifications.
Note 2) Refer to page 37 for lead wire lengths.

Weight

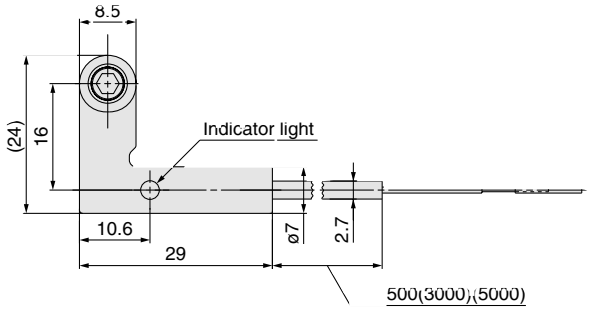
Unit g

Auto switch part no.		D-F6N	D-F6P	D-F6B
Lead wire length (m)	0.5	20	20	19
	3	53	53	50
	5	80	80	75

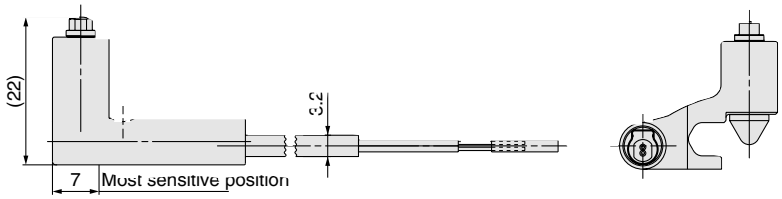
Dimensions

Unit mm

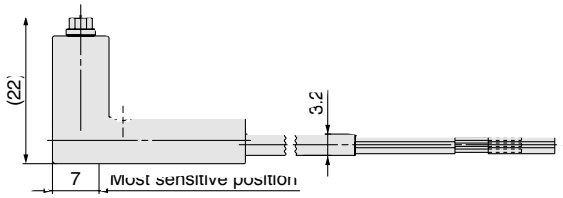
D-F6□



D-F6B



D-F6N/F6P



SMC

Series HY□
Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of **"Caution", "Warning"** or **"Danger"**. To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.

■ Explanation of the Labels

Labels	Explanation of the labels
⚠ **Danger**	In extreme conditions, there is a possible result of serious injury or loss of life.
⚠ **Warning**	Operator error could result in serious injury or loss of life.
⚠ **Caution**	Operator error could result in injury Note 3) or equipment damage. Note 4)

Note 1) ISO 4414: Pneumatic fluid power – General rules relating to systems
Note 2) JIS B 8370: General Rules for Pneumatic Equipment
Note 3) Injury indicates light wounds, burns and electrical shocks that do not require hospitalization or hospital visits for long-term medical treatment.
Note 4) Equipment damage refers to extensive damage to the equipment and surrounding devices.

■ Selection/Handling/Applications

1. The compatibility of the pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.
Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or post analysis and/or tests to meet the specific requirements. The expected performance and safety assurance are the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

2. Only trained personnel should operate pneumatically operated machinery and equipment.
Compressed air can be dangerous if handled incorrectly. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators. (Understanding JIS B 8370 General Rules for Pneumatic Equipment, and other safety rules are included.)

3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.
1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driver objects have been confirmed.
2. When equipment is removed, confirm that safety process as mentioned above. Turn off the supply pressure for this equipment and exhaust all residual compressed air in the system, and release all the energy (liquid pressure, spring, condenser, gravity).
3. Before machinery/equipment is restarted, take measures to prevent quick extension of a cylinder piston rod, etc.

4. Contact SMC if the product will be used in any of the following conditions:
1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuits in press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.
4. If the products are used in an interlock circuit, prepare a double interlock style circuit with a mechanical protection function for the prevention of a breakdown. And, examine the devices periodically if they function normally or not.

■ Exemption from Liability

1. SMC, its officers and employees shall be exempted from liability for any loss or damage arising out of earthquakes or fire, action by a third person, accidents, customer error with or without intention, product misuse, and any other damages caused by abnormal operating conditions.

2. SMC, its officers and employees shall be exempted from liability for any direct or indirect loss or damage, including consequential loss or damage, loss of profits, or loss of chance, claims, demands, proceedings, costs, expenses, awards, judgments and any other liability whatsoever including legal costs and expenses, which may be suffered or incurred, whether in tort (including negligence), contract, breach of statutory duty, equity or otherwise.

3. SMC is exempted from liability for any damages caused by operations not contained in the catalogs and/or instruction manuals, and operations outside of the specification range.

4. SMC is exempted from liability for any loss or damage whatsoever caused by malfunctions of its products when combined with other devices or software.

Series HY□
Auto Switch Precautions 1

Be sure to read this before handling.

Caution on Design / Selection

⚠Warning

1. Confirm the specifications.

Read the specifications carefully and use this product appropriately. The product may be damaged or malfunction if it is used outside the range of specifications of current load, voltage, temperature or impact. We do not guarantee any damage in any case the product is used outside of the specification range.

2. Pay attention to the length of time that a switch is on at an intermediate stroke position.

When an auto switch is placed at an intermediate position of the stroke and a load is driven at the time the piston passes, the auto switch will operate, but if the speed is too great, the operating time will be shortened and the load may not operate properly. The maximum detectable piston speed is:

$$V\ (mm/s) = \frac{\text{Auto switch operating range (mm)}}{\text{Load operating time (ms)}} \times 1000$$

3. Keep wiring as short as possible.

<Solid state switch>

Although wire length should not affect switch function, use a wire that is 100 m or shorter.

4. Do not use a load that generates surge voltage. If a surge voltage is generated, the discharge occurs at the contact, possibly resulting in the shortening of product life.

<Solid state switch>

Although a zener diode for surge protection is connected at the output side of a solid state auto switch, damage may still occur if a surge is applied repeatedly. When directly driving a load which generates surge, such as a relay or solenoid valve, use a type of switch with a built-in surge absorbing element.

5. Cautions for use in an interlock circuit

When an auto switch is used for an interlock signal requiring high reliability, devise a double interlock system to safeguard against malfunctions by providing a mechanical protection function, or by also using another switch (sensor) together with the auto switch. Also perform periodic inspection and confirm proper operation.

6. Do not repair, diassemble, or make any modifications to the product, including changes in the printed circuit board, as this may result in injury or an accident.

⚠Caution

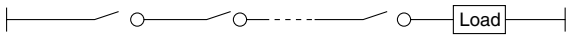
1. Take precautions when multiple cylinders (actuators) are used close together.

When two or more auto switch cylinders (actuators) are lined up in close proximity to each other, magnetic field interference may cause the switches to malfunction. Maintain a minimum cylinder separation of 40 mm. (When the allowable interval is specified for each cylinder series, use the indicated value.)

2. Take precautions for the internal voltage drop of the switch.

- If auto switches are connected in series as shown below, take note that there will be a large voltage drop because of internal resistance in the light emitting diodes. (Refer to internal voltage drop in the auto switch specifications.)
  [The voltage drop will be “n” times larger when “n” auto switches are connected.]

Even though an auto switch operates normally, the load may not operate.



- Similarly, when operating below a specified voltage, it is possible that the load may be ineffective even though the auto switch function is normal. Therefore, the formula below should be satisfied after confirming the minimum operating voltage of the load.

$$\text{Supply voltage} - \text{Internal voltage drop of switch} > \text{Minimum operating voltage of load}$$

<Solid state switch>

Generally, the internal voltage drop will be great with a 2-wire solid state auto switch.
Also, note that a 12 VDC relay is not applicable.

3. Pay attention to leakage current.

<Solid state switch>

With a 2-wire solid state auto switch, current (leakage current) flows to the load to operate the internal circuit even when in the OFF state.

$$\text{Current to operate load (OFF condition)} > \text{Leakage current}$$

If the condition given in the above formula is not met, it will not reset correctly (stays ON). Use a 3-wire switch if this specification cannot be satisfied.
Moreover, leakage current flow to the load will be “n” times larger when “n” auto switches are connected in parallel.

4. Ensure sufficient clearance for maintenance activities.

When designing an application, be sure to allow sufficient clearance for maintenance and inspections.

Back page 2

Series HY□
Auto Switch Precautions 2

Be sure to read this before handling.

Mounting and Adjustment

⚠Warning

1. Instruction manual.

Install the products and operate them only after reading the instruction manual carefully and understanding its contents. Also keep the manual where it can be referred to as necessary.

2. Do not drop or bump.

Do not drop, bump or apply excessive impacts (1000 m/s^2 or greater for solid state switches) while handling.
Although the body of the switch may not be damaged, the inside of the switch could be damaged and cause a malfunction.

3. Mount switches using the proper tightening torque.

When a switch is tightened above the torque specification, the mounting screws, or switch may be damaged. On the other hand, tightening below the torque specification may allow the switch to slip out of position. (Refer to switch mounting for each series regarding switch mounting, moving, and fastening torque, etc.)

4. Mount a switch at the center of the operating range.

Adjust the mounting position of an auto switch so that the piston stops at the center of the operating range (the range in which a switch is ON). (The mounting positions shown in the catalog indicate the optimum position at the stroke end.) If mounted at the end of the operating range (around the borderline of ON and OFF), operation will be unstable.

5. Secure the space for maintenance.

When installing the products, please allow access for maintenance.

⚠Caution

1. Do not carry an actuator by the auto switch lead wires.

Never carry a cylinder by its lead wires. This may not only cause broken lead wires, but it may cause internal elements of the switch to be damaged by the stress.

2. Fix the switch with the appropriate screw installed on the switch body. If using other screws, switch may be damaged.

Wiring

⚠Warning

1. Confirm proper insulation of wiring.

Be certain that there is no faulty wiring insulation (such as contact with other circuits, ground fault, improper insulation between terminals, etc.). Damage may occur due to excess current flow into a switch.

2. Do not wire in conjunction with power lines or high voltage lines.

Wire separately from power lines or high voltage lines, avoiding parallel wiring or wiring in the same conduit with these lines. Control circuits containing auto switches may malfunction due to noise from these lines.

Wiring

⚠Caution

1. Avoid repeatedly bending or stretching lead wires.

Broken lead wires will result from repeatedly applying bending stress or stretching force to the lead wires.

2. Be sure to connect the load before power is applied.

<2-wire type>

If the power is turned ON when an auto switch is not connected to a load, the switch will be instantly damaged because of excess current.

3. Do not allow short circuit of loads.

<Solid state switch>

F6□ does not have built-in short circuit protection circuits. If loads are short circuited, the switches will be instantly damaged, as in the case of reed switches.
Take special care to avoid reverse wiring with the brown power supply line and the black output line on 3-wire type switches.

4. Avoid incorrect wiring.

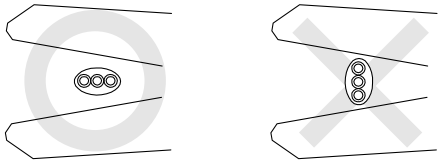
<Solid state switch>

If connections are reversed on a 2-wire type switch, the switch will not be damaged if protected by a protection circuit, but the switch will always stay in an ON state. However, it is still necessary to avoid reversed connections, since the switch could be damaged by a load short circuit in this condition.

<F6□>

D-F6□ does not have built-in short circuit protection circuit. Be aware that if the power supply connection is reversed (e.g. (+) power supply wire and (–) power supply wire connection is reversed), the switch will be damaged.

5. When the cable sheath is stripped, confirm the stripping direction. The insulator may be split or damaged depending on the direction. (D-F6□)



Recommended Tool

Model name	Model no.
Wire stripper	D-M9N-SWY

∗ Stripper for a round cable (ø2.0) can be used for a 2-wire type cable.

Series HY□
Auto Switch Precautions 3

Be sure to read this before handling.

Operating Environment

⚠Warning

1. Never use in an atmosphere of explosive gases.

The construction of the auto switch is not intended to prevent explosion. Never use in an atmosphere with an explosive gas since this may cause a serious explosion.

2. Do not use in an area where a magnetic field is generated.

The auto switch will malfunction or the magnets inside of an actuator will become demagnetized if used in such an environment.

3. Do not use in an environment where the auto switch will be continually exposed to water.

The switch satisfies the IEC standard IP67 construction (JIS C 0920: waterproof construction). Nevertheless, it should not be used in applications where it is continually exposed to water splash or spray. This may cause deterioration of the insulation or swelling of the potting resin inside switch causing a malfunction.

4. Do not use in an environment with oil or chemicals.

Consult with SMC if the auto switch will be used in an environment with coolant, cleaning solvent, various oils or chemicals. If the auto switch is used under these conditions for even a short time, it may be adversely effected by a deterioration of the insulation, a malfunction due to swelling of the potting resin, or hardening of the lead wires.

5. Do not use in an environment with temperature cycles.

Consult with SMC if the switch is used where there are temperature cycles other than normal temperature changes, as they may adversely affected the switch internally.

6. Do not use in an area where surges are generated.

<Solid state switch>

When there are units (such as solenoid type lifters, high frequency induction furnaces, motors, etc.) that generate a large amount of surge in the area around an actuator with a solid state auto switch, their proximity or pressure may cause deterioration or damage to the internal circuit of the switch. Avoid sources of surge generation and crossed lines.

⚠Caution

1. Avoid accumulation of iron debris or close contact with magnetic substances.

When a large accumulated amount of ferrous waste such as machining chips or welding spatter, or a magnetic substance (something attracted by a magnet) is brought into close proximity to an cylinder with auto switches, this may cause the auto switches to malfunction due to a loss of the magnetic force inside the cylinder.

2. Contact SMC for the water resistance ability, the elasticity ability of the lead wire, and the welding site etc.

3. Do not expose the product to direct sunlight for an extended period of time.

4. Do not use the product in locations where it is exposed to radiant heat.

Maintenance

⚠Warning

1. Perform the following maintenance periodically in order to prevent possible danger due to unexpected auto switch malfunction.

1) Securely tighten switch mounting screws.
If screws become loose or the mounting position is dislocated, retighten them after readjusting the mounting position.

2) Confirm that there is no damage to the lead wires.
To prevent faulty insulation, replace switches or repair lead wires, etc., if damage is discovered.

2. Perform the maintenance procedures outlined in the instruction manual.

If the maintenance procedures are performed improperly, malfunction or damage to the machinery or equipment may occur.

3. Removal of equipment, and supply/exhaust of compressed air.

When an equipment is serviced, first confirm that measures are in place to prevent workpieces from dropping run-away equipment, etc. Then cut the supply pressure and power, and exhaust all compressed air from the system using the residual pressure release function.

When the equipment is operated after remounting or replacement, first confirm that measures are in place to prevent lurching of actuators, etc. Then confirm that the equipment is operating normally.

Back page 4

Series HY□
Specific Product Precautions 1

Be sure to read this before handling.
Please refer to the back of page 1 to 4 for Safety Instruction and Auto Switch Precautions.

Caution on Design

⚠ Caution

1. Speed adjustment should be conducted in the environment where the cylinder is used.

In a different environment, the speed adjustment may be incorrect.

2. There are possibilities that dust may accumulate by the usage condition in the thread part and brackets for mounting of this products.

Do measures according to the usage condition when you mount it.

Operating Environment

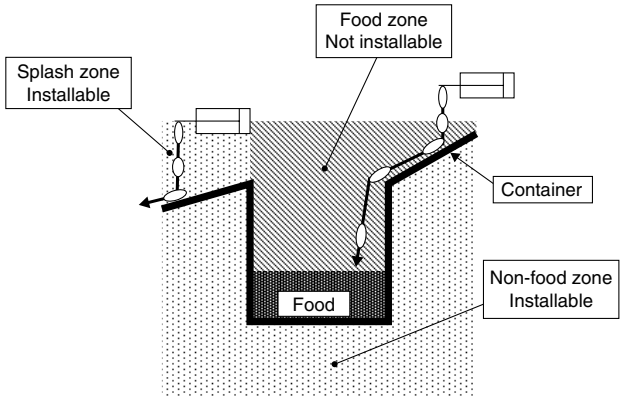
⚠ Caution

1. Avoid installing and using a cylinder inside a food zone.

<Not installable>
Food zone ····· An environment where food which will be sold as merchandize, directly touches the cylinder's components.

<Installable>
Splash zone ····· An environment where food which will not be sold as merchandize, directly touches the cylinder's components.

Non-food zone ····· An environment where there is no contact with food.



2. When a detergent or chemical liquid other than water is splashed on the cylinder, the cylinder's service life may be substantially shortened. Please contact us for details.

3. When washing a cylinder with steam, please observe the allowable temperature range of the cylinder and perform for a short period of time.

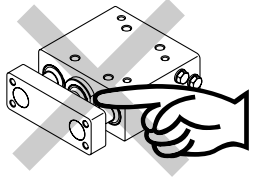
4. When washing a cylinder with a brush, etc., please do not apply excessive force to the auto switch's lead wire, etc.

Mounting

⚠ Warning

1. Do not put hands or fingers, etc. between the plate and body. [Series HYG]

Care should be taken that hands or fingers do not get caught in between the cylinder body and the plate when air pressure is applied.



⚠ Caution

1. Design the aptitude enough by thinking about the rigidity of mount because the cylinder puts out big power.

2. Tighten in following tightening torque when you install the auto switch rail when repairing it.

Thread size	Tightening torque (N•m)
M4	1.1 to 1.9

3. Do not apply any force to lead wires when auto switch is mounted on cylinder.

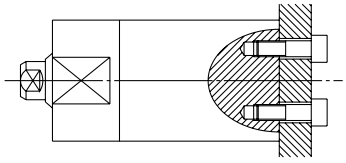
Never apply any force to lead wires. This may not only cause broken lead wires, but it may cause internal elements of the switch to be damaged by the stress. Moreover, the switch might not operate when force applys to the lead wire and the distance between the switch and the cylinder become long.

4. Pay attention to magnetic substance density between the auto switch and the cylinder body and the circumference.

When a magnetic substance is brought into close proximity with an auto switch and cylinder, it may cause the auto switch to malfunction due to a loss of the magnetic force inside the cylinder.

5. When the cylinder, the support bracket and the plug bolt are mounted, tighten them within below tightening torque. [Series HYB]

Bore size	Thread size	Tightening torque (N•m)
ø20	M4 x 0.7	1.1 to 1.9
ø25, ø32	M5 x 0.8	2.1 to 3.9
ø40	M6 x 1	3.7 to 6.7
ø50	M8 x 1.25	8.8 to 16.2
ø63, ø80	M10 x 1.5	17.2 to 31.8
ø100	M12 x 1.75	29.4 to 54.6



Series HY□
Specific Product Precautions 2

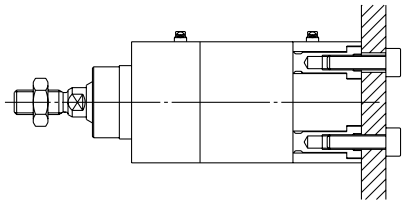
Be sure to read this before handling.
Please refer to the back of page 1 to 4 for Safety Instruction and Auto Switch Precautions.

Mounting

⚠ Caution

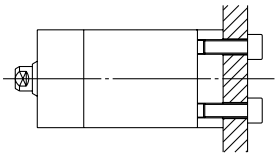
[Series HYC]

Bore size	Thread size	Tightening torque (N•m)
ø32, 40	M6 x 1	3.7 to 6.7
ø50, 63	M8 x 1.25	8.8 to 16.2



6. When the cylinder, the support bracket and the external cover are mounted, tighten them within below tightening torque. [Series HYQ]

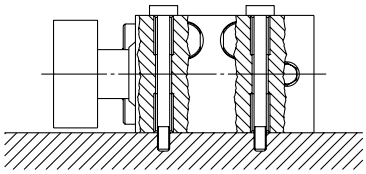
Bore size	Thread size	Tightening torque (N•m)
ø20	M5 x 0.8	2.1 to 3.9
ø25, 32, 40	M6 x 1	3.7 to 6.7
ø50, 63	M8 x 1.25	8.8 to 16.2



7. When the cylinder, the plug bolt and the load are mounted, tighten within below tightening torque. [Series HYG]

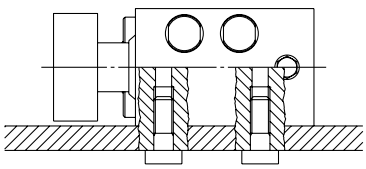
Top Mounting

Bore size	Thread size	Tightening torque (N•m)
ø20, 25	M5 x 0.8	2.1 to 3.9
ø32, 40	M6 x 1	3.7 to 6.7
ø50, 63	M8 x 1.25	8.8 to 16.2



Lower Side Mounting

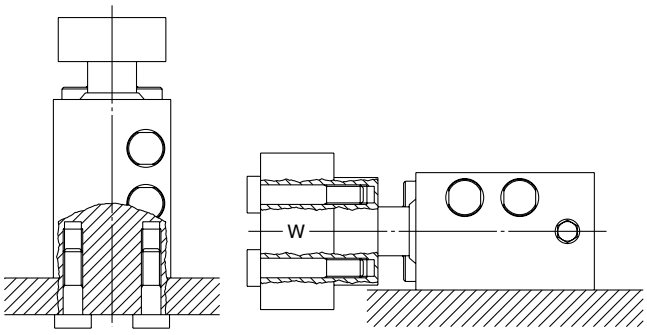
Bore size	Thread size	Tightening torque (N•m)
ø20, 25	M6 x 1	3.7 to 6.7
ø32, 40	M8 x 1.25	8.8 to 16.2
ø50, 63	M10 x 1.5	17.2 to 31.8



⚠ Caution

Bottom Mounting or Load Mounting

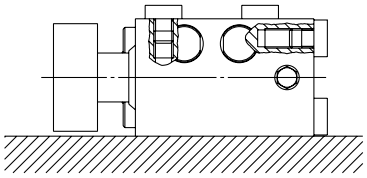
Bore size	Thread size	Tightening torque (N•m)
ø20	M5 x 0.8	2.1 to 3.9
ø25	M6 x 1	3.7 to 6.7
ø32, 40	M8 x 1.25	8.8 to 16.2
ø50, 63	M10 x 1.5	17.2 to 31.8



Bottom mounting **Load mounting**

Plug Bolt Mounting (Optional)

Thread size	Tightening torque (N•m)
M5 x 0.8	2.1 to 3.9
M6 x 1	3.7 to 6.7
M8 x 1.25	8.8 to 16.2
M10 x 1.5	17.2 to 31.8



8. Install the load when the piston rod is retracted. [Series HYG]

The twist occurs in the guide part if the load is installed on the plate when the piston rod is extended, and it causes the malfunction.

Lubrication

⚠ Caution

1. Lubrication of Hygienic Design Cylinder (standard grease use goods).

This unit can be operated without lubrication. If lubrication is performed, build in the lubricator in the circuit, use turbine oil Class 1 (with no additives) ISO VG32.

Moreover, the malfunction will occur if the lubrication is discontinued on the way because the disappearance of the initial lubrication part. Lubricate without fail continuously. Consult with SMC if other lubricant are used.

Back page 6

Series HY□
Specific Product Precautions 3

Be sure to read this before handling.
Please refer to the back of page 1 to 4 for Safety Instruction and Auto Switch Precautions.

Lubrication

⚠Caution

2. Lubrication to Hygienic Design Cylinder (food compatible grease use goods).

If this unit is lubricated, it might cause the malfunction.
Moreover, when a grease out of specification is used, it causes the malfunction.

- Place a purchase order with the following model number when only the grease for maintenance is necessary.
  Standard grease (for non-food) GR-S-010 (10 g)
  Food compatible grease GR-H-010 (10 g)

3. Do not wipe off the grease adhering to the sliding part of the air cylinder.

It might cause the malfunction when compulsorily peeling off the adhering grease to the sliding parts. If the cylinder operates the long distance, the sliding parts might become black. In that case, the actuation becomes possible for a long term when the grease of the sliding parts is wiped off once, and it greases it again.
(Wipe off by water. If alcohol and a special solvent are used, the seal might be damaged.)

Cushion (HYC)

⚠Caution

1. Readjust with the cushion needle.

Readjust the cushion needle installed in the cover according to the load size and the operating speed before use, though it is adjusted to near the fully closed states when it ships. When the cushion adjuster is rotated to clockwise, the throttle strengthens becomes tight and the cushion strengthens will be good.

2. Do not use the cushion needle for a long term in the fully closed states.

It causes the damage of the seal.

3. Torque to the cushion adjuster should be below of the following torque when the cushion needle is adjusted.

Tightening torque (N•m)
0.5

Do not exceed the torque mentioned above. Otherwise it causes the damage.

4. Do not exceed the adjustable range of cushion needle.

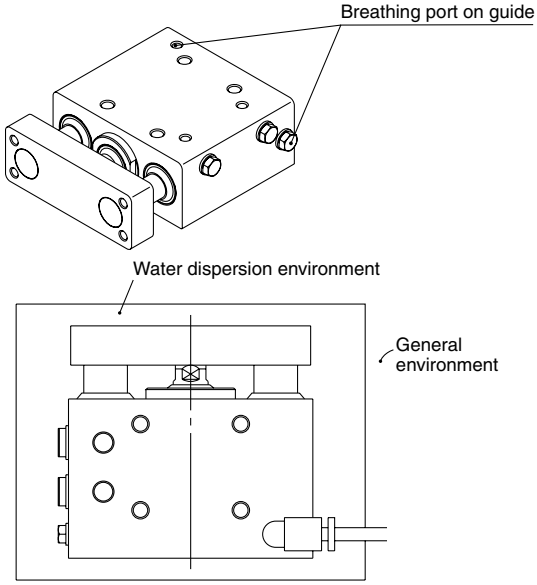
If cushion needle is rotated with the torque over adjustable range, it causes the damage.

Bore size	Rotations
ø32, 40	4 or less
ø50, 63	5 or less

Piping

⚠Caution

1. This product might be damaged if the compressed air is supplied to the breathing port for guide, so do not supply it. [Series HYG]



<Example>

- Piping is connected in the breathing port on guide, breathing at general environment is possible.

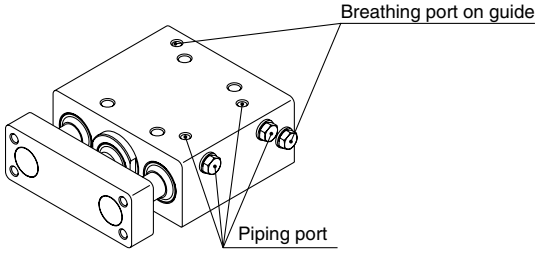
2. Plug piping ports and breathing port on guide according to the operating conditions. [Series HYG]

Piping Port

Bore size	Plug thread size	Plug width across flats	Tightening torque (N•m)
ø20, 25	M5	8	After tightening by hand, tighten1/6 turn.
ø32, 40	1/8	13	7 to 9
ø50, 63	1/4	16	12 to 14

Breathing Port for Guide

Bore size	Plug thread size	Plug width across flats	Tightening torque (N•m)
ø20 to ø63	M5	8	After tightening by hand, tighten1/6 turn.



3. Use the piping tube installed in the breathing port for guide is more than ø4 in bore size and within 3 m in length, otherwize the cylinder piston speed might decrease.

Series HY□
Specific Product Precautions 4

Be sure to read this before handling.
Please refer to the back of page 1 to 4 for Safety Instruction and Auto Switch Precautions.

Caution on Handling

⚠ Caution

1 If the sliding parts is washed, the grease will wash out and the service life will be shorten, keep washing at a minimum.

2. Plug up unnecessary mounting holes with plug bolts or external cover (optional), etc., bacteria might grow if water gets in these holes.

⚠ Safety Instructions | Be sure to read “Precautions for Handling Pneumatic Devices” (M-03-E3A) before using.

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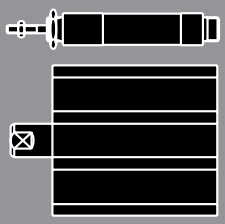
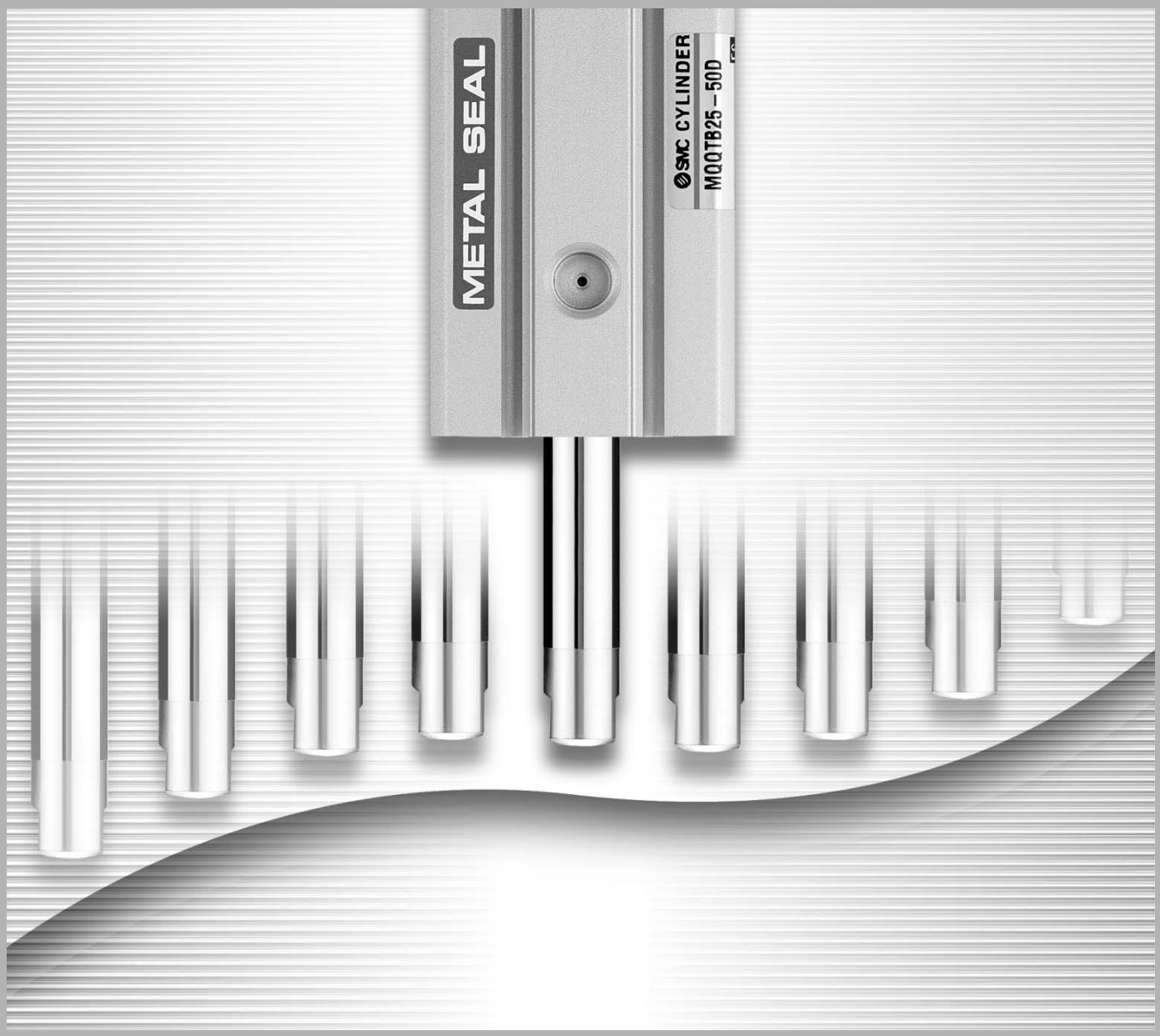


Low Friction Cylinder

Series MQQ (Compact type/Metal seal)
ø10, ø16, ø20, ø25, ø28

Series MQM (Anti-lateral load type/Metal seal)
ø6, ø10, ø16, ø20, ø25



Low Friction Cylinder

Series MQQ
Series MQM

Metal seal construction with low in speed and output control ranges

Low breakaway pressure

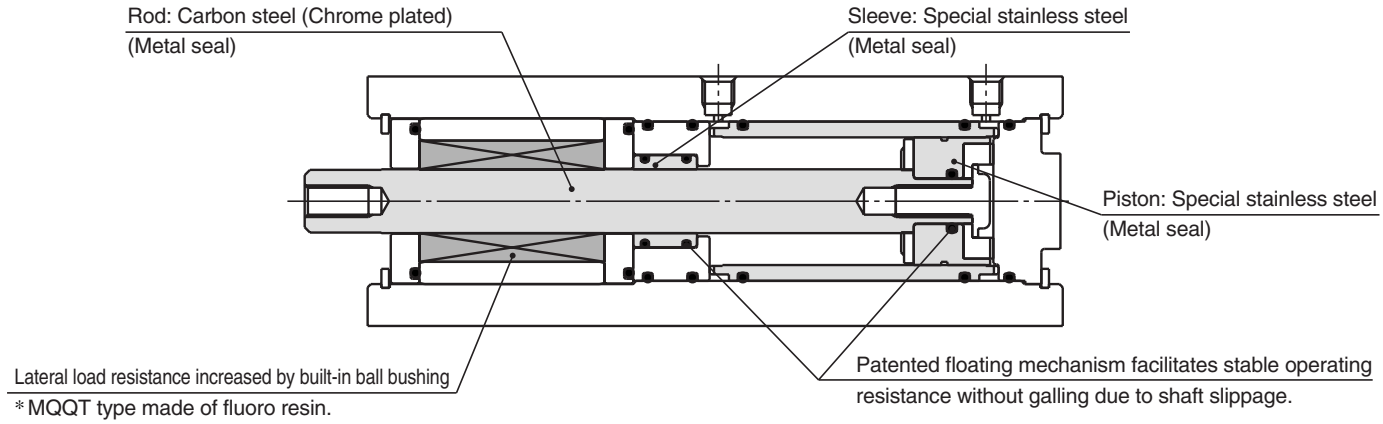
Minimal operating resistance allows low pressure actuation at 0.005 MPa.
Please contact SMC regarding vacuum applications.

Long service life

Long service life of 10,000 km or 100 million full cycles.

Low & uniform speed actuation

Smooth, uniform speed actuation ranges as low as 0.3 mm/s.



*MQQT type made of fluoro resin.

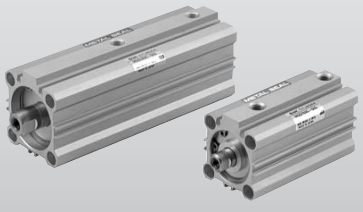
Low friction

Low operating resistance and high stability allow force control as low as 0.05 N. (Based on cylinder Piston area x Pressure accuracy)
No increased operating resistance after periods of non-operation.

Lateral load resistance

Lateral load resistance is increased by a built-in ball bushing.
(MQQL/MQML)

Series Variations



Series MQQ

Compact low friction cylinders designed for low pressure, low speed, uniform speed or low friction applications

Series	Bore size (mm)	Stroke (mm) 10 20 30 40 50 60 75 100	Operating pressure range (MPa)	Actuation speed (mm/s)
MQQT Standard type	10	● ● ● ● ● ● ● ●	0.005 to 0.5	0.3 to 300
	16	● ● ● ● ● ● ● ●		
	20	● ● ● ● ● ● ● ●		
MQQL Anti-lateral load type (Built-in ball bushing)	25	● ● ● ● ● ● ● ●	0.005 to 0.7	0.5 to 500
	28	● ● ● ● ● ● ● ●		

Series MQM

Anti-lateral load low friction cylinders for low pressure, low speed, low friction high pressure, high speed and high speed response (high frequency) actuation

Series	Bore size (mm)	Stroke (mm) 15 30 45 60 75 100	Operating pressure range (MPa)	Actuation speed (mm/s)
MQML Standard type	6 (Standard only)	● ● ● ● ● ●	ø6: 0.02 to 0.7 ø10 to ø25: 0.005 to 0.7	0.5 to 1000
	10	● ● ● ● ● ●		
	16	● ● ● ● ● ●		
MQML□□H High speed/frequency	20	● ● ● ● ● ●	0.01 to 0.7	5 to 3000
	25	● ● ● ● ● ●		

(Metal Seal Type)

/ø10, ø16, ø20, ø25, ø28

/ø6, ø10, ø16, ø20, ø25

operating resistance allows actuation impossible for ordinary cylinders.

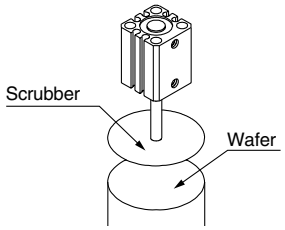
High speed, High frequency actuation

Type H achieves speeds up to 3,000 mm/s (without fixed orifice), and continuous actuation up to 50 cpm. (MQML□□H)

Application Example

Pressure control with fine pressure variations

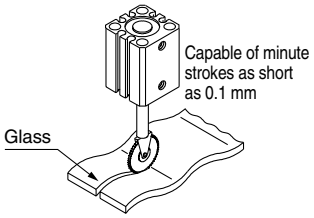
Applicable model: **MQQT/MQML**



Polishing of wafers

Cutting of glass and lenses, requiring constant force

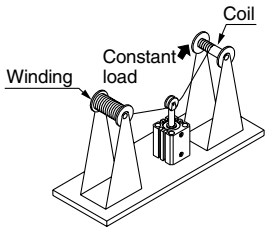
Applicable model: **MQQL/MQML**



Cutting of wavy surfaces

Tension control responding to very low pressure and minute pressure variations

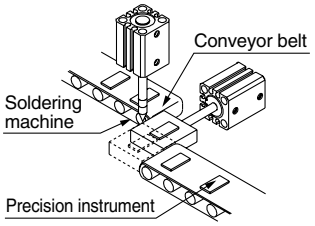
Applicable model: **MQQL/MQML**



Winding of coils

Transferring of precision components, etc., that require low or uniform speed actuation

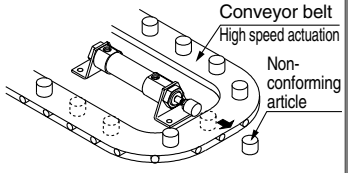
Applicable model: **MQQT/MQML**



Transferring of precision components

Eliminating of non-conforming articles requiring high speed actuation

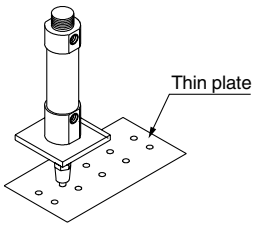
Applicable model: **MQML/MQML□□H**



Eliminating of non-conforming articles

Punching operations requiring high frequency actuation

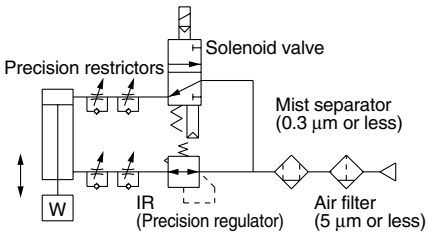
Applicable model: **MQML/MQML□□H**



Punching

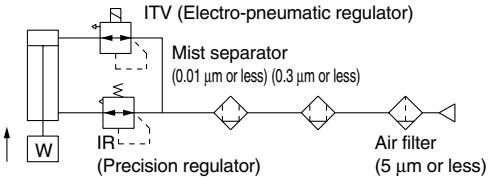
Recommended Circuit Example

Example 1) Uniform & low speed actuation (no control of cylinder output)



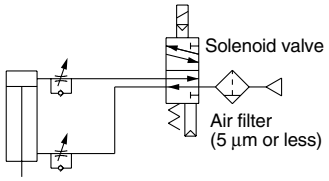
∗ When using a solenoid valve, use a metal seal type (Series VQ/VQZ/SQ, etc.).

Example 2) Low speed with output control



∗ When performing control of cylinder output, do not create a restriction circuit using a speed controller, etc. Pressure inside the cylinder will drop and control will become impossible. Always control actuation by means of pressure control.
Besides, when using as pressing force or tension control (actuated by external force), air contained inside cylinder is discharged from a relief port on the regulator. When the pressure inside a cylinder is increased by displacement (stroke) or driving speed, etc., install an air tank.

Example 3) High speed & high frequency actuation



∗ When using a solenoid valve, use a metal seal type (Series VQ/VQZ/SQ, etc.).

Applications based on low friction specification

1) Operating resistance will vary with an offset load. Be sure to properly align the rod axis with the load and direction of movement when connecting. When an offset load is expected, provide a suitable mechanism such as a floating joint.
2) Use clean air (atmospheric pressure dew point temperature –10°C or less). Use of a series AM mist separator (filtration rating of 0.3 μm or less), or series AM + AMD (filtration rating of 0.01 μm or less) is recommended.

Specific Product Precautions 1

Be sure to read before handling.

Operating Precautions

⚠ Caution

1. **When mounting, thoroughly flush out the connector piping and be sure that dirt and chips, etc., do not get inside the cylinder.**
2. **Install an air filter with a filtration degree of 5 m or less on the air supply. Furthermore, when controlling for low speed or controlled output, use clean air (atmospheric pressure dew point temperature of –10°C). Installation of a mist separator (filtration degree 0.3 μm or less) is also recommended.**
3. **Use a metal seal type when using solenoid valves for cylinder actuation. If a rubber seal type is used, there may be an increase in operating resistance due to grease sprayed from the main valve.**
4. **Operate so that the load applied to the piston rod is normally in the axial direction.**
   In the event that a lateral load is unavoidable, do not exceed the range of the allowable lateral load at the rod end (Refer to pages 10-5-6 and 7.) (Using outside of the operating limit may give an adverse effect on the service life such as looseness in the guide unit and a loss of precision.)
5. **Take care not to scratch or gouge the sliding portion of the rod. This may cause a malfunction or shorten the unit's life.**
6. **When attaching a workpiece to the end of the rod, move the rod to the fully retracted position and use the wrench flats at the end of the rod. Fasten the workpiece without applying a large amount of torque to the rod.**
7. **Be certain to connect a load so that the rod axis is aligned with the load and its direction of movement.**
   Especially, if connecting cylinder rod directly with the functional parts of guide (bearing, etc.) in the equipment side, this could be the eccentric load, or might cause the unstable sliding resistance, or gall in the metal seal. Be sure to use a floating joint or spherical surface joint.
8. **When using in the circuit in which the piston is actuated by the external force, such as pressing force or tension control, stick-slip phenomenon may occur and lead to unstable sliding resistance when displacement rate is 0.05 mm or less.**
9. **Please consult with SMC separately for using in locations where vibration is applied constantly by polishing machine, etc.**

Disassembly

⚠ Caution

1. **The component parts of the metal seal cylinder are manufactured to precision tolerances, and therefore cannot be disassembled.**

Lubrication

⚠ Caution

1. **Lubrication of non-lube type cylinder**
   Do not apply lubrication when controlling for low speed or controlled output. If lubrication is applied, there may be changes in operating resistance due to factors such as the viscosity and surface tension of the oil. Also, use a metal seal type when using solenoid valves for cylinder actuation. If a rubber seal type is used, there may be an increase in operating resistance due to grease sprayed from the main valve.
   Lubrication is also unnecessary for high speed actuation, but in the event that lubrication is applied, use turbine oil class 1 (with no additives) ISO VG32. (Do not use spindle oil or machine oil.)

Specific Product Precautions 2

Be sure to read before handling.

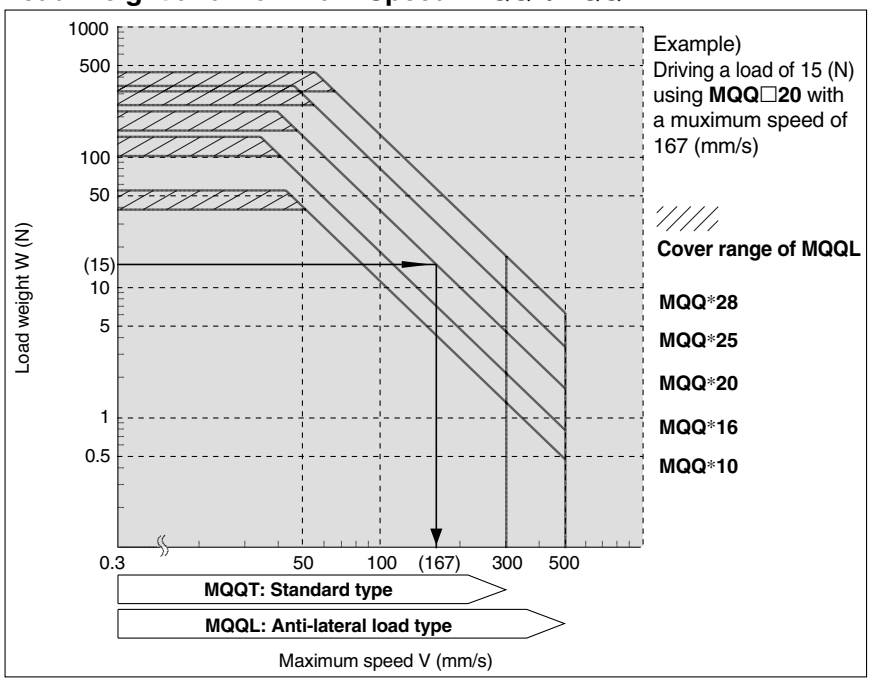
Selection

Series MQQ

⚠ Caution

Operating Speed

Load Weight and Maximum Speed: MQQT/MQQL



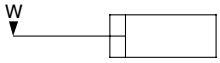
Note) When a load is attached to the rod end, adjust the speed so that the maximum speed is no more than that shown in the graph for the corresponding load weight.

Allowable Kinetic Energy

Anti-lateral Load Type: MQQ□

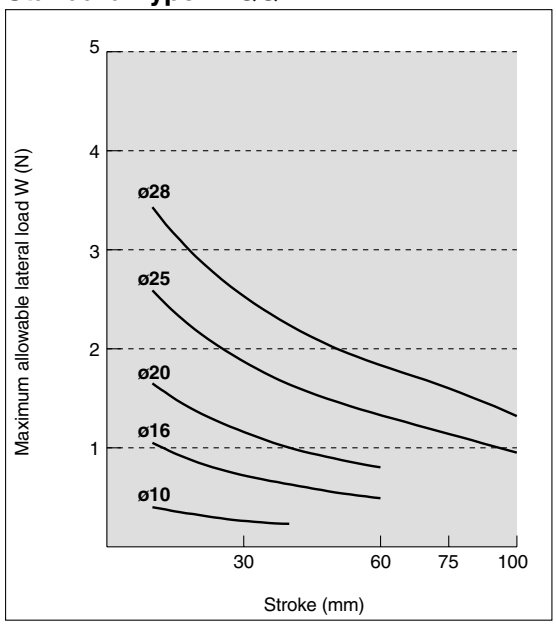
Bore size (mm)	Allowable kinetic energy (J)
10	0.006
16	0.010
20	0.022
25	0.044
28	0.080

Allowable Lateral Load at Rod End

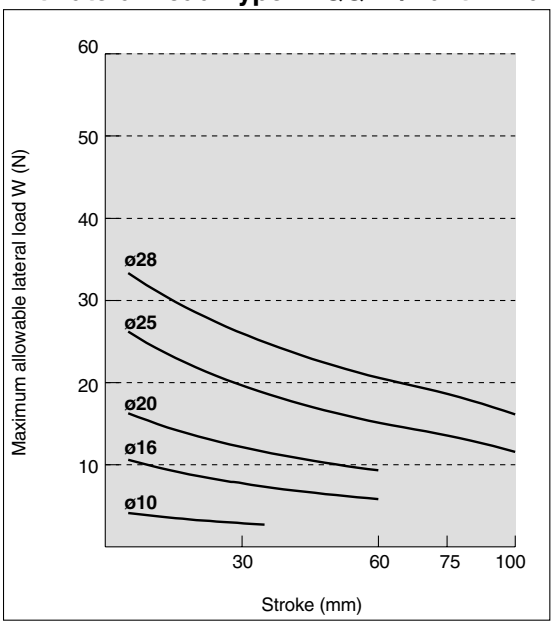


Mounting orientation: Horizontal
Operating pressure: 0.5 MPa

Standard Type: MQQTB



Anti-lateral Load Type: MQQLB/Built-in Ball Bushing Type



Note 1) The allowable lateral load at rod end indicates the value in rod end female thread.
Note 2) The allowable lateral load varies depending on the size of the load (the distance to the load's center of gravity). Please contact SMC for further details.

Specific Product Precautions 3

Be sure to read before handling.

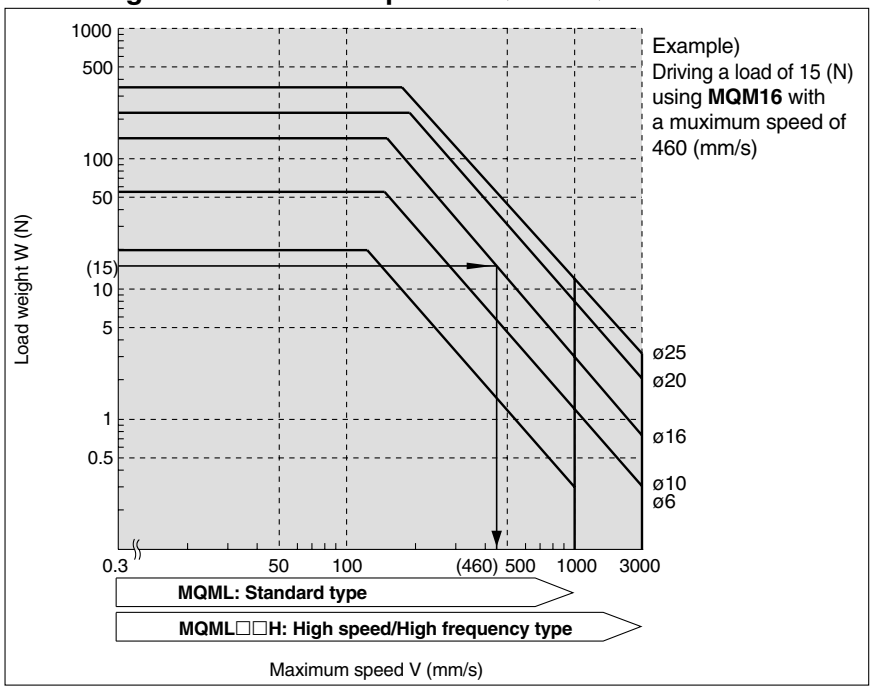
Selection

Series MQM

⚠ Caution

Operating Speed

Load Weight and Maximum Speed: MQML/MQML□□H



Note) When a load is attached to the rod end, adjust the speed so that the maximum speed is no more than that shown in the graph for the corresponding load weight.

Allowable Kinetic Energy

Anti-lateral Load Type: MQML

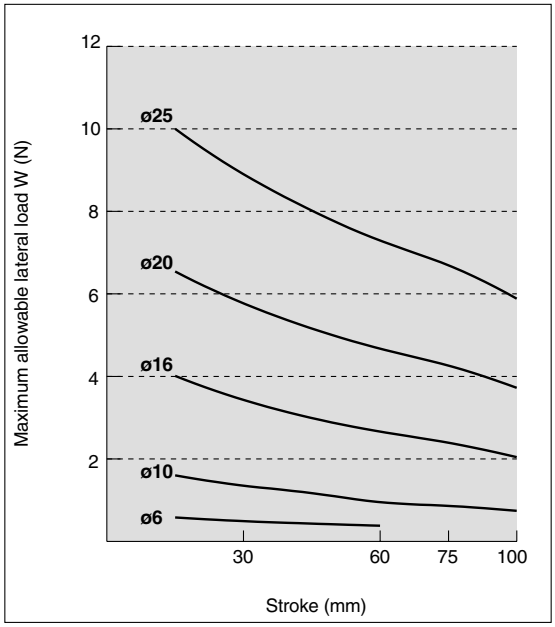
Bore size (mm)	Allowable kinetic energy (J)
6	0.015
10	0.059
16	0.161
20	0.386
25	0.597

Allowable Lateral Load at Rod End

W

Mounting orientation: Horizontal
Operating pressure: 0.5 MPa

Allowable Lateral Load at Rod End



Note) The allowable lateral load varies depending on the size of the load (the distance to the load's center of gravity). Please contact SMC for further details.

Compact Low Friction Cylinder
Metal Seal

Series MQQ

ø10, ø16, ø20, ø25, ø28

How to Order

MQQ | **T** | **B** | **10** — **10** | **D** | ☐

Compact low friction cylinder

Type

T	Standard type
L	Anti-lateral load type (Built-in ball bushing)

Mounting style

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

Note) Available only for MQQL☐.
∗ Mounting brackets are shipped together, (but not assembled).

Bore size

10	10 mm
16	16 mm
20	20 mm
25	25 mm
28	28 mm

Action

D	Double acting

Body option

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

Note) A rod end thread adapter is attached.

Cylinder stroke (mm)

Bore size (mm)	Standard stroke (mm)
10	10, 20, 30, 40
16	10, 20, 30, 40, 50, 60
20	10, 20, 30, 40, 50, 60
25	10, 20, 30, 40, 50, 75, 100
28	10, 20, 30, 40, 50, 75, 100

● Dealing with the stroke by the 1 mm interval is available by installing a spacer with the standard stroke cylinder.

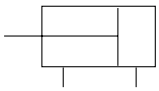
∗ **Series MQQ is not auto switch capable.**

Mounting Bracket Part No.

Bore size (mm)	Foot (1)	Flange	Double clevis	Rod end thread adapter (With nut)
10	CQS-L016	CQS-F016	CQS-D016	MQ10-M
16	CQS-L020	CQS-F020	CQS-D020	MQ16-M
20	CQS-L025	CQS-F025	CQS-D025	MQ20-M
25	CQ-L032	CQ-F032	CQ-D032	MQ25-M
28	CQ-L040	CQ-F040	CQ-D040	MQ28-M

Note 1) When ordering foot bracket, order 2 pieces per cylinder.
Note 2) The following parts are included with the respective brackets.
Foot, Flange·····Body mounting bolts
Double clevis·····Clevis pin, type C snap ring for shaft, Body mounting bolts

JIS Symbol
Double acting,
Single rod



Specifications/Standard Type: MQQT

Bore size (mm)		10	16	20	25	28
Seal construction		Metal seal				
Action		Double acting, Single rod				
Fluid		Air				
Proof pressure		1.05 MPa				
Maximum operating pressure		0.5 MPa				
Minimum operating pressure (1)		0.005 MPa				
Ambient and fluid temperature		–10 to 80°C				
Cushion		Rubber bumper (Standard)				
Lubrication (2)		Not required (Non-lube)				
Rod end thread		Female thread				
Rod end thread tolerance		JIS Class 2				
Stroke length tolerance		$^{+1.0}_{0}$				
Piston speed (3)		0.3 to 300 mm/s (Refer to page 10-5-6.)				
Total allowable leakage	Supply pressure 0.1 MPa	150 cm³/min or less		200 cm³/min or less		300 cm³/min or less
	Supply pressure 0.3 MPa	800 cm³/min or less		1000 cm³/min or less		1200 cm³/min or less
	Supply pressure 0.5 MPa	1500 cm³/min or less		2000 cm³/min or less		3000 cm³/min or less

Note 1) Use clean, dry air with no freezing.
Note 2) For lubrication, refer to precautions on page 10-5-5.
Note 3) Control low speed actuation with differential pressure and a speed controller, etc.
(For further details, refer to recommended circuit examples.)

Specifications/Anti-lateral Load Type: MQQL

Bore size (mm)		10	16	20	25	28
Seal construction		Metal seal				
Action		Double acting, Single rod				
Fluid		Air				
Proof pressure		1.05 MPa				
Maximum operating pressure		0.7 MPa				
Minimum operating pressure (1)		0.005 MPa				
Ambient and fluid temperature		–10 to 80°C				
Cushion		Rubber bumper (Standard)				
Lubrication (2)		Not required (Non-lube)				
Rod end thread		Female thread				
Rod end thread tolerance		JIS Class 2				
Stroke length tolerance		$^{+1.0}_{0}$				
Piston speed (3)		0.5 to 500 mm/s (Refer to page 10-5-6.)				
Total allowable leakage	Supply pressure 0.1 MPa	150 cm³/min or less		200 cm³/min or less		300 cm³/min or less
	Supply pressure 0.3 MPa	800 cm³/min or less		1000 cm³/min or less		1200 cm³/min or less
	Supply pressure 0.5 MPa	1500 cm³/min or less		2000 cm³/min or less		3000 cm³/min or less

Note 1) Use clean, dry air with no freezing.
Note 2) For lubrication, refer to precautions on page 10-5-5.
Note 3) Control low speed actuation with differential pressure and a speed controller, etc.
(For further details, refer to recommended circuit examples.)

Weight/Standard Type: MQQT

(g)

Bore (mm)	Cylinder stroke (mm)							
	10	20	30	40	50	60	75	100
10	94	118	142	166	—	—	—	—
16	166	206	246	286	326	366	—	—
20	228	290	352	414	476	538	—	—
25	395	487	579	671	763	—	993	1223
28	661	799	937	1075	1213	—	1558	1903

Weight/Anti-lateral Load Type: MQQL (Built-in ball bushing)

(g)

Bore (mm)	Cylinder stroke (mm)							
	10	20	30	40	50	60	75	100
10	148	172	196	220	—	—	—	—
16	284	324	364	404	444	484	—	—
20	383	445	507	569	631	693	—	—
25	552	644	736	828	920	—	1150	1380
28	965	1103	1241	1379	1517	—	1862	2207

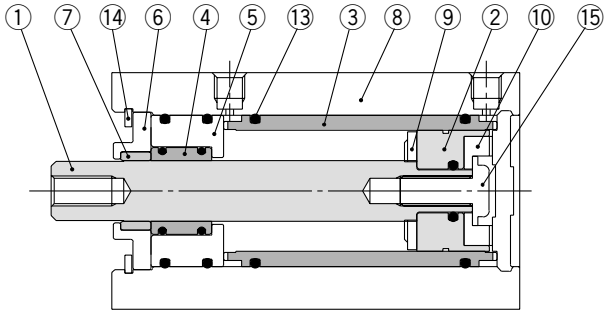
Theoretical Output

OUT IN (N)

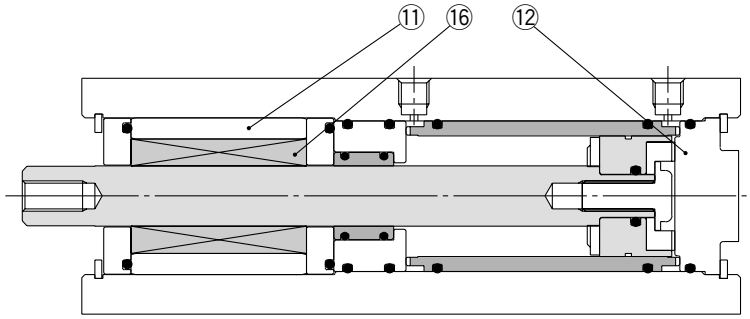
Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm²)	Operating pressure (MPa)						
				0.1	0.2	0.3	0.4	0.5	0.6	0.7
10	6	IN	50.3	5.0	10.1	15.1	20.1	25.2	30.2	35.2
		OUT	78.5	7.9	15.7	23.6	31.4	39.3	47.1	55.0
16	8	IN	145.8	14.9	29.2	43.7	58.3	72.9	87.5	102.1
		OUT	196.1	19.6	39.2	58.9	78.4	98.1	117.7	137.3
20	10	IN	235.6	23.6	47.1	70.7	94.2	117.8	141.4	164.9
		OUT	314.2	31.4	62.8	94.3	125.7	157.1	188.5	219.9
25	12	IN	377.8	37.8	75.6	113.3	151.1	188.9	226.7	262.5
		OUT	490.9	49.1	98.2	147.3	196.4	245.5	294.5	343.6
28	16	IN	423.5	42.4	84.7	127.1	169.4	211.8	254.1	296.5
		OUT	624.6	62.5	124.9	187.4	249.8	312.3	374.8	437.2

Construction

Standard type: MQQT



Anti-lateral load type: MQQL (Built-in ball bushing type)



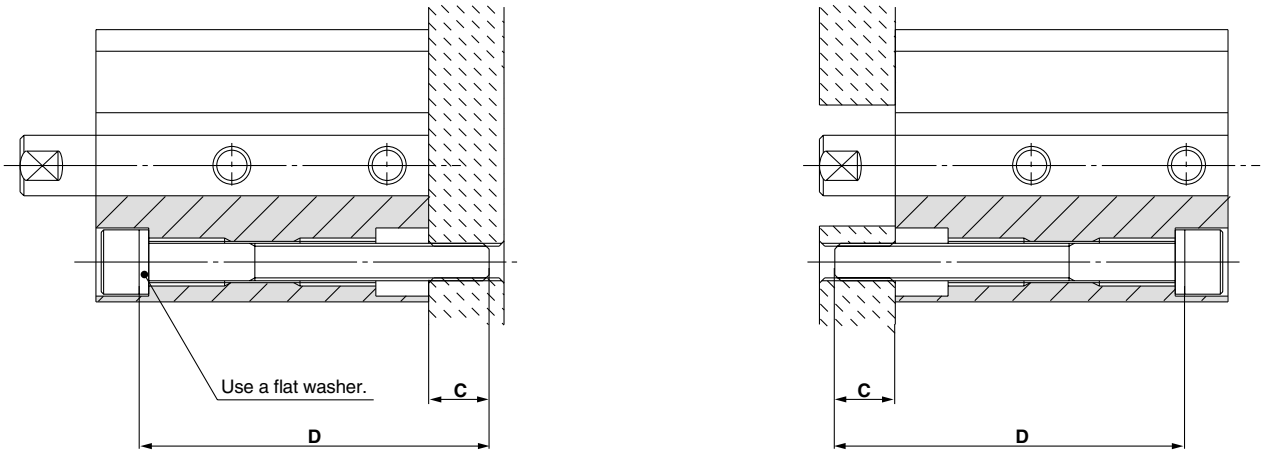
Component Parts

No.	Description	Material	Note
①	Rod	Carbon steel	Hard chrome plated
②	Piston	Special stainless steel	
③	Liner	Special stainless steel	
④	Sleeve	Special stainless steel	
⑤	Sleeve retainer	Aluminum alloy	
⑥	Plate	Aluminum alloy	Hard anodized
⑦	Guide	Fluororesin	
⑧	Cylinder tube	Aluminum alloy	Hard anodized
⑨	Bumper A	Polyurethane	
⑩	Bumper B	Polyurethane	
⑪	Bushing	Aluminum alloy	
⑫	Bottom plate	Aluminum alloy	Hard anodized
⑬	O-ring	NBR	
⑭	Snap ring	Carbon tool steel	Nickel plated
⑮	Bolt	Carbon tool steel	Nickel plated
⑯	Ball bushing		

Mounting

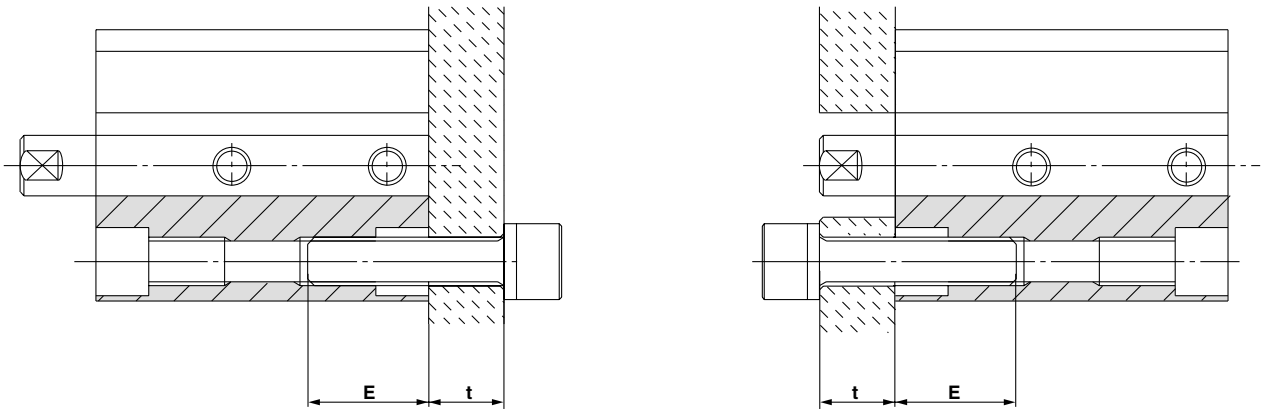
Mounting bolt

a) Type A mounting (When using the mounting plate threads)



Note) Be sure to use a flat washer for the type A mounting.

b) Type B mounting (When using the cylinder tube threads)



Compatible Mounting Bolt Dimensions

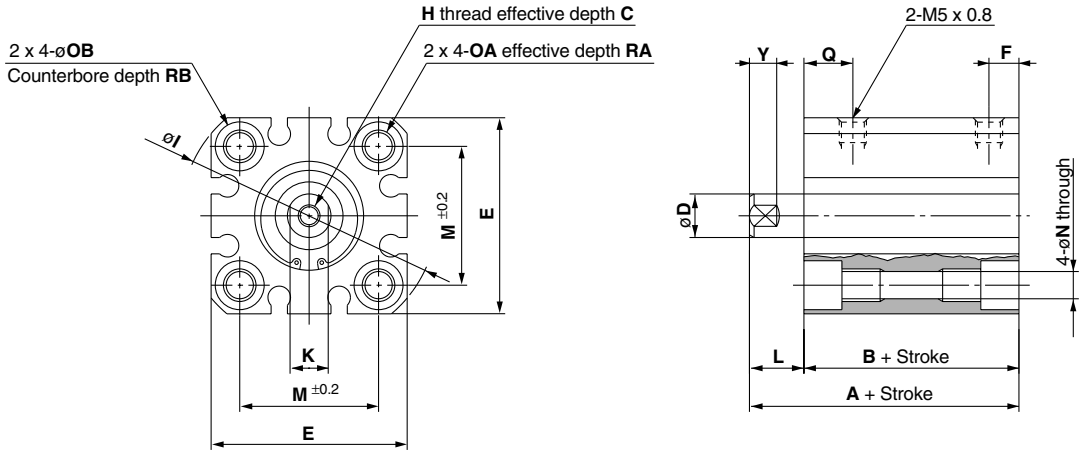
Model		Type A mounting			Type B mounting	
		Mounting bolt size	C (mm)	D: Bolt length (mm)	Mounting bolt size	E (mm)
Standard type: MQQT	MQQTB10-□D	M3 x 0.5	7	35 + Stroke	M4 x 0.7	8 to 11
	MQQTB16-□D	M5 x 0.8	7	35 + Stroke	M6 x 1	13 to 17
	MQQTB20-□D		8.5	40 + Stroke		
	MQQTB25-□D		9	45 + Stroke		
	MQQTB28-□D		7.5	50 + Stroke		
Anti-lateral load type: MQQL (Built-in ball bushing type)	MQQLB10-□D	M3 x 0.5	7	65 + Stroke	M4 x 0.7	8 to 11
	MQQLB16-□D	M5 x 0.8	5.5	70 + Stroke	M6 x 1	13 to 17
	MQQLB20-□D		8	80 + Stroke		
	MQQLB25-□D		6.5	85 + Stroke		
	MQQLB28-□D		7	105 + Stroke		

□: Stroke

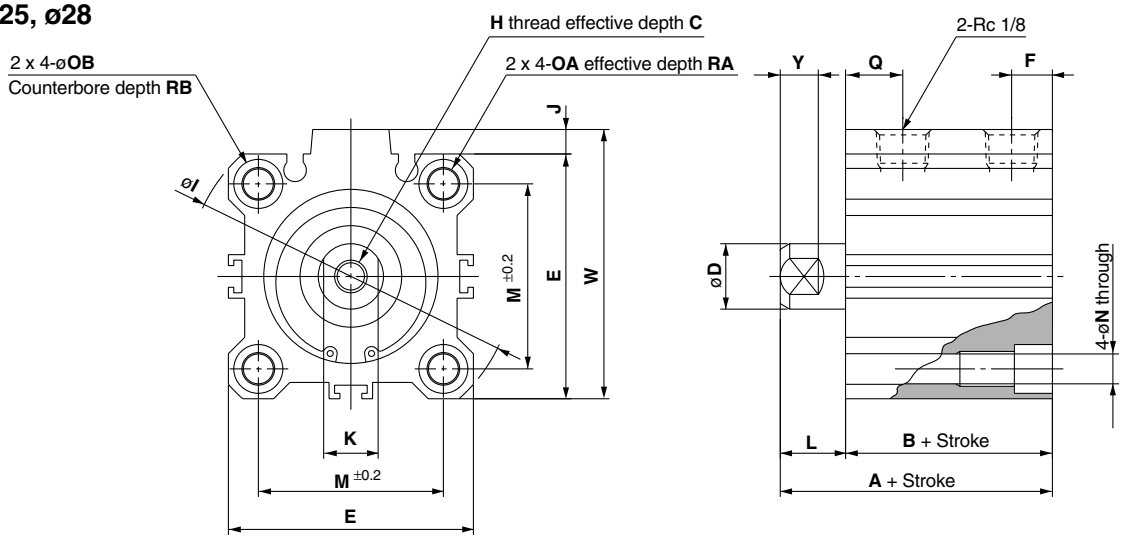
Dimensions

Basic style (Through-hole and Both ends tapped common): MQQTB

ø10, ø16, ø20

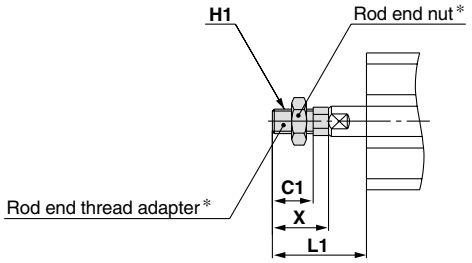


ø25, ø28



Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	H	I	J	K	L	M	N	OA	OB	Q	RA	RB	W	Y
10	10 to 40	39.5	31.5	6	6	29	5.5	M3 x 0.5	38	—	5	8	20	3.5	M4 x 0.7	6.5	14.5	7	4	—	5
16	10 to 60	44	34	8	8	36	5.5	M4 x 0.7	47	—	7	10	25.5	5.4	M6 x 1.0	9	18	10	7	—	5
20	10 to 60	47.5	37.5	10	10	40	5.5	M5 x 0.8	52	—	8	10	28	5.4	M6 x 1.0	9	19.5	10	7	—	6
25	10 to 50, 75, 100	54	42	12	12	45	8.5	M6 x 1.0	60	4.5	10	12	34	5.5	M6 x 1.0	9	23	10	7	49.5	7
28	10 to 50, 75, 100	60.5	48.5	13	16	52	8.5	M8 x 1.25	69	5	14	12	40	5.5	M6 x 1.0	9	26	10	7	57	10

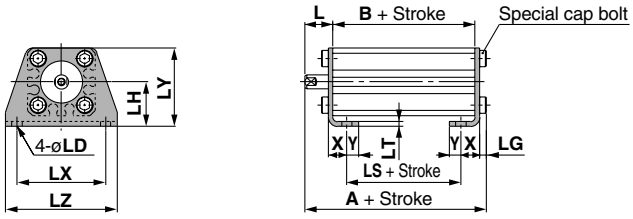
With rod end male thread: MQQ□–□DM



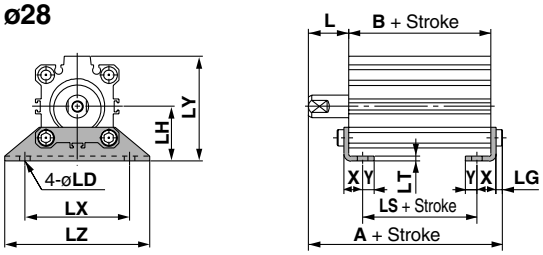
Bore size (mm)	L1	C1	H1	X
10	23.5	10.5	M5 x 0.8	15.5
16	26.5	11.5	M6 x 1.0	16.5
20	28.5	13.5	M8 x 1.25	18.5
25	34.5	16.5	M10 x 1.25	22.5
28	40.5	22.5	M14 x 1.5	28.5

* For details about the rod end thread adapter and rod end nut, refer to page 10-5-16.

Foot style: MQQTL
ø10, ø16, ø20



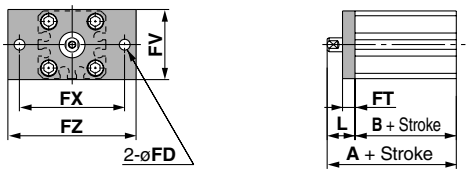
ø25, ø28



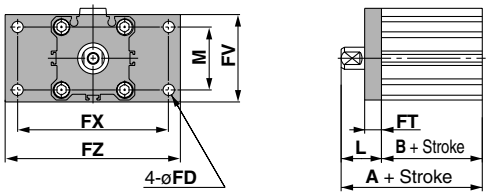
Bore size (mm)	Stroke range (mm)	A	B	L	LD	LG	LH
10	10 to 40	44.3	31.5	8	4.5	2.8	19
16	10 to 60	51.2	34	10	6.6	4	24
20	10 to 60	54.7	37.5	10	6.6	4	26
25	10 to 50, 75, 100	61.2	42	12	6.6	4	30
28	10 to 50, 75, 100	67.7	48.5	12	6.6	4	33

Bore size (mm)	LS	LT	LX	LY	LZ	X	Y
10	19.5	2	38	33.5	48	8	5
16	22	3.2	48	42	62	9.2	5.8
20	22.5	3.2	52	46	66	10.7	5.8
25	26	3.2	57	57	71	11.2	5.8
28	32.5	3.2	64	64	78	11.2	7

Rod side flange style: MQQTF
ø10, ø16, ø20



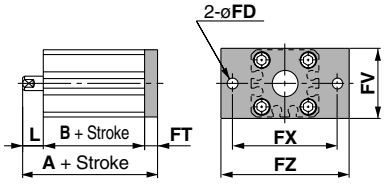
ø25, ø28



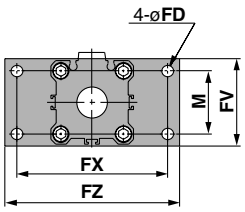
Bore size (mm)	Stroke range (mm)	A	B	FD	FT	FV	FX
10	10 to 40	49.5	31.5	4.5	5.5	30	45
16	10 to 60	54	34	6.6	8	39	48
20	10 to 60	57.5	37.5	6.6	8	42	52
25	10 to 50, 75, 100	64	42	5.5	8	48	56
28	10 to 50, 75, 100	70.5	48.5	5.5	8	54	62

Bore size (mm)	FZ	L	M
10	55	18	—
16	60	20	—
20	64	20	—
25	65	22	34
28	72	22	40

Head side flange style: MQQTG
ø10, ø16, ø20



ø25, ø28

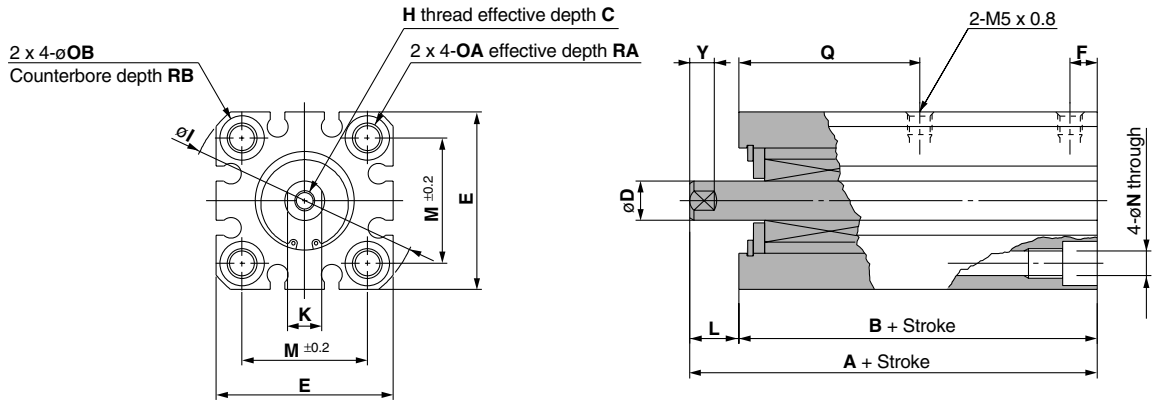


Bore size (mm)	Stroke range (mm)	A	L
10	10 to 40	45	8
16	10 to 60	52	10
20	10 to 60	55.5	10
25	10 to 50, 75, 100	62	12
28	10 to 50, 75, 100	68.5	12

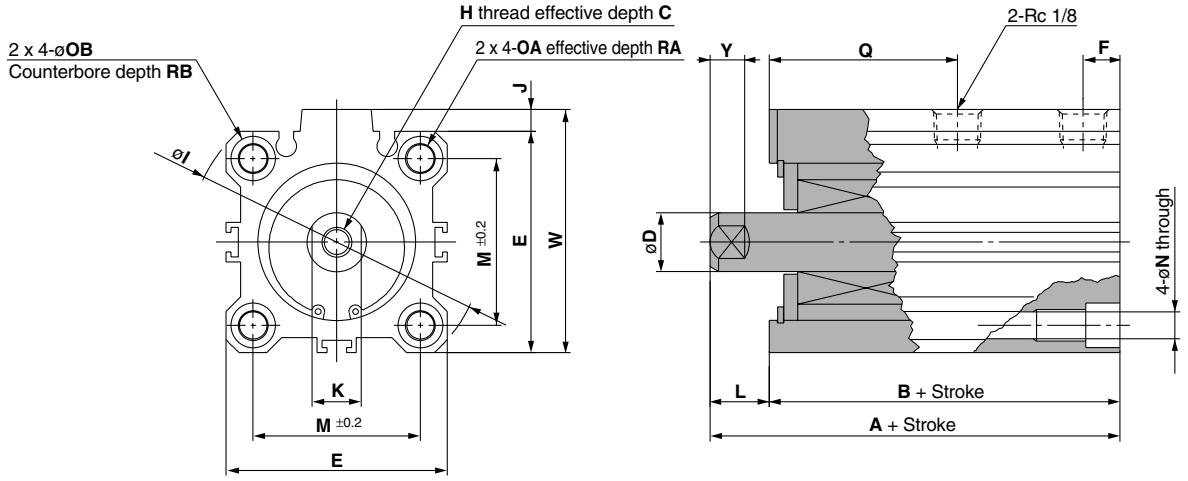
(Dimensions except A and L are same as rod side flange style.)

Dimensions

Anti-lateral load type (Through-hole and Both end tapped common): MQQLB
ø10, ø16, ø20

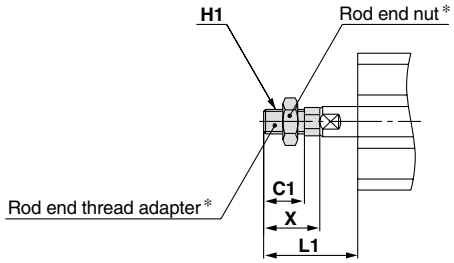


ø25, ø28



Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	H	I	J	K	L	M	N	OA	OB	Q	RA	RB	W	Y
10	10 to 40	69.5	61.5	6	6	29	9	M3 x 0.5	38	—	5	8	20	3.5	M4 x 0.7	6.5	39.5	7	4	—	5
16	10 to 60	80.5	70.5	8	8	36	11.5	M4 x 0.7	47	—	7	10	25.5	5.4	M6 x 1.0	9	48.5	10	7	—	5
20	10 to 60	89	79	10	10	40	12	M5 x 0.8	52	—	8	10	28	5.4	M6 x 1.0	9	55	10	7	—	6
25	10 to 50, 75, 100	96.5	84.5	12	12	45	13.5	M6 x 1.0	60	4.5	10	12	34	5.5	M6 x 1.0	9	58	10	7	49.5	7
28	10 to 50, 75, 100	116	104	13	16	52	17.5	M8 x 1.25	69	5	14	12	40	5.5	M6 x 1.0	9	71	10	7	57	10

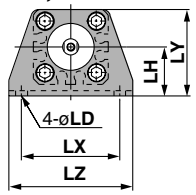
With rod end male thread: MQQ□–□DM

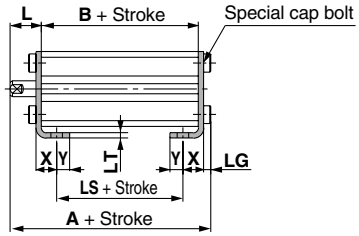


Bore size (mm)	L1	C1	H1	X
10	23.5	10.5	M5 x 0.8	15.5
16	26.5	11.5	M6 x 1.0	16.5
20	28.5	13.5	M8 x 1.25	18.5
25	34.5	16.5	M10 x 1.25	22.5
28	40.5	22.5	M14 x 1.5	28.5

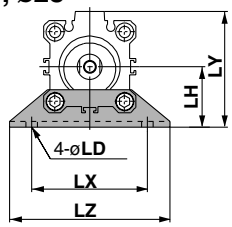
* For details about the rod end thread adapter and rod end nut, refer to page 10-5-16.

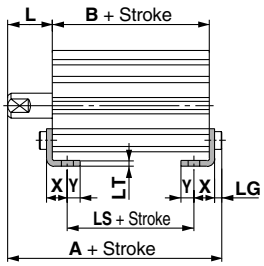
Foot style: MQQLL
ø10, ø16, ø20





ø25, ø28

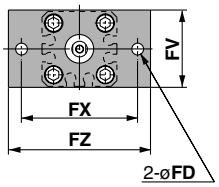


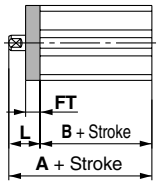


Bore size (mm)	Stroke range (mm)	A	B	L	LD	LG	LH
10	10 to 40	74.3	61.5	8	4.5	2.8	19
16	10 to 60	87.7	70.5	10	6.6	4	24
20	10 to 60	96.2	79	10	6.6	4	26
25	10 to 50, 75, 100	103.7	84.5	12	6.6	4	30
28	10 to 50, 75, 100	123.2	104	12	6.6	4	33

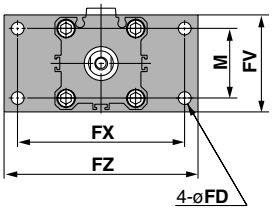
Bore size (mm)	LS	LT	LX	LY	LZ	X	Y
10	49.5	2	38	33.5	48	8	5
16	58.5	3.2	48	42	62	9.2	5.8
20	64	3.2	52	46	66	10.7	5.8
25	68.5	3.2	57	57	71	11.2	5.8
28	88	3.2	64	64	78	11.2	7

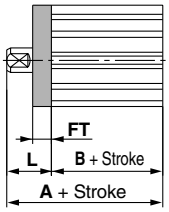
Rod side flange style: MQQLF
ø10, ø16, ø20





ø25, ø28

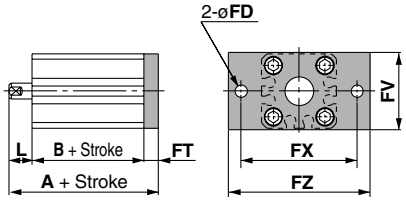




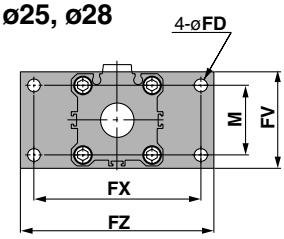
Bore size (mm)	Stroke range (mm)	A	B	FD	FT	FV	FX
10	10 to 40	79.5	61.5	4.5	5.5	30	45
16	10 to 60	90.5	70.5	6.6	8	39	48
20	10 to 60	99	79	6.6	8	42	52
25	10 to 50, 75, 100	106.5	84.5	5.5	8	48	56
28	10 to 50, 75, 100	126	104	5.5	8	54	62

Bore size (mm)	FZ	L	M
10	55	18	—
16	60	20	—
20	64	20	—
25	65	22	34
28	72	22	40

Rear flange style: MQQLG
ø10, ø16, ø20



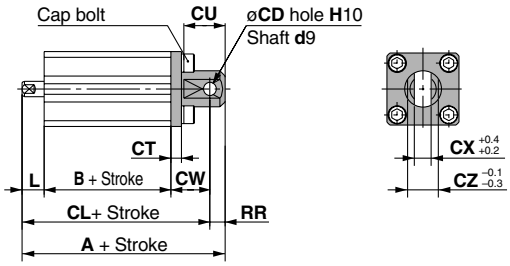
ø25, ø28



Bore size (mm)	Stroke range (mm)	A	L
10	10 to 40	75	8
16	10 to 60	88.5	10
20	10 to 60	97	10
25	10 to 50, 75, 100	104.5	12
28	10 to 50, 75, 100	124	12

(Dimensions except A and L are same as rod side flange style.)

Double clevis style: MQQLD

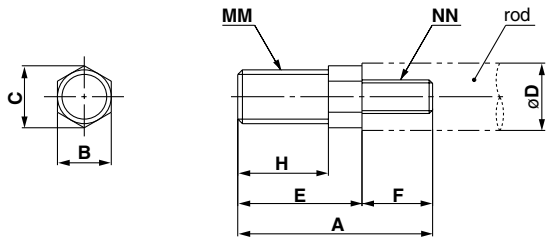


Bore size (mm)	Stroke range (mm)	A	B	CD	CL	CT	CU
10	10 to 40	90.5	61.5	5	84.5	4	10
16	10 to 60	107.5	70.5	8	98.5	5	12
20	10 to 60	119	79	10	109	5	14
25	10 to 50, 75, 100	126.5	84.5	10	116.5	5	14
28	10 to 50, 75, 100	148	104	10	138	6	14

Bore size (mm)	CW	CX	CZ	L	RR
10	15	6.5	12	8	6
16	18	8	16	10	9
20	20	10	20	10	10
25	20	18	36	12	10
28	22	18	36	12	10

Accessory Bracket Dimensions

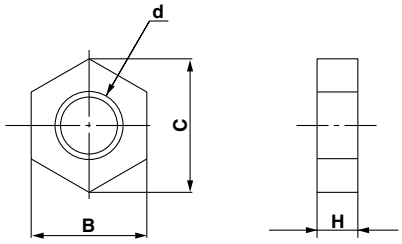
Rod end thread adapter



Part no.	Applicable bore (mm)	A	B	C	D	E	F
MQ10-M	10	20.5	8	9.2	6	15.5	5
MQ16-M	16	22.5	8	9.2	8	16.5	6
MQ20-M	20	24.5	8	9.2	10	18.5	6
MQ25-M	25	33.5	10	11.5	12	22.5	11
MQ28-M	28	40.5	14	16	16	28.5	12

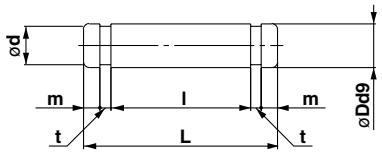
Part no.	Applicable bore (mm)	H	MM	NN
MQ10-M	10	10.5	M5 x 0.8	M3 x 0.5
MQ16-M	16	11.5	M6 x 1.0	M4 x 0.7
MQ20-M	20	13.5	M8 x 1.25	M5 x 0.8
MQ25-M	25	16.5	M10 x 1.25	M6 x 1.0
MQ28-M	28	22.5	M14 x 1.5	M8 x 1.25

Rod end nut



Part no.	Applicable bore (mm)	B	C	d	H
NTJ-015A	10	8	9.2	M5 x 0.8	4
NT-015A	16	10	11.5	M6 x 1.0	5
NT-02	20	13	15	M8 x 1.25	5
NT-03	25	17	19.6	M10 x 1.25	6
NT-04	28	22	25.4	M14 x 1.5	8

Clevis pin



Part no.	Applicable bore (mm)	Dd9	L	d	l	m	t	Applicable snap ring
IY-J015	10	$5^{-0.030}_{-0.040}$	16.6	4.8	12.2	1.5	0.7	Type C 5 for axis
IY-G02	16	$8^{-0.040}_{-0.076}$	21	7.6	16.2	1.5	0.9	Type C 8 for axis
IY-G03	20	$10^{-0.040}_{-0.076}$	25.6	9.6	20.2	1.55	1.15	Type C 10 for axis
IY-G04	25, 28	$10^{-0.040}_{-0.076}$	41.6	9.6	36.2	1.55	1.15	Type C 10 for axis

Low Friction Cylinder: Anti-lateral Load Type Metal Seal

Series MQM

ø6, ø10, ø16, ø20, ø25

How to Order

MQML B 10 — 15 D

Anti-lateral load, low friction cylinder

Type

L	Anti-lateral load type (Built-in ball bushing)

Mounting style

B	Basic style
L	Foot style
F	Rod side flange style
G	Head side flange style (Except ø6)
C (1)	Single clevis style (Non-integrated type)
D (2)	Double clevis style

Note 1) Bore size: 20, 25 mm only
∗ Mounting brackets are shipped together, (but not assembled).
(Except clevis style)

Note 2) ø6, ø10, ø16 ····Integrated style
ø20, ø25 ·····Non-integrated style

∗ **Series MQM is not auto switch capable.**

Bore size

6	6 mm
10	10 mm
16	16 mm
20	20 mm
25	25 mm

Function

Nil	Standard type
H (Note)	High speed/High frequency type (Without fixed orifice)

Note) Except 6 mm bore size.

Cylinder stroke

Bore size (mm)	Standard stroke (mm)
6	15, 30, 45, 60
10	15, 30, 45, 60, 75, 100
16	15, 30, 45, 60, 75, 100
20	15, 30, 45, 60, 75, 100
25	15, 30, 45, 60, 75, 100

● Dealing with the stroke by the 1 mm interval is available by installing a spacer with the standard stroke cylinder.

Action

D	Double acting

Mounting Style and Accessory

Mounting		B: Basic style	L: Foot style	F: Rod side flange style	G: Head side flange style	C: Single clevis style	D: Double clevis style	Note
Standard equipment	Mounting nut	● (1 pc.)	● (2 pcs.)	● (1 pc.)	● (1 pc.)	— (1)	— (2)	
	Rod end nut	●	●	●	●	●	●	
	Clevis pin	—	—	—	—	—	●	With pin
Option	T-bracket	—	—	—	—	—	●	

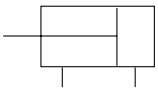
Note 1) Mounting nut is not equipped with clevis integrated style, single clevis style and double clevis style.
Note 2) Pin and snap ring are packaged together with double clevis style.

Mounting Bracket Part No.

Bore size (mm)	Foot (1)	Flange	Single clevis	Double clevis (with pin) (2)	T-bracket
6	CJK-L016B	CJK-F016B	—	—	CJ-T010B
10			—	—	
16	CLJ-L016B	CLJ-F016B	—	—	CJ-T016B
20	CM-L020B	CM-F020B	CM-C020B	CM-D020B	—
25	CM-L032B	CM-F032B	CM-C032B	CM-D032B	—

Note 1) 2 foot brackets and 1 mounting nut are attached.
Note 2) Clevis pin and snap ring are included in package.
Note 3) T-bracket is applicable to the double clevis style (D).

JIS Symbol
Double acting,
Single rod



Specifications

Bore size (mm)		6	10	16	20	25
Seal construction		Metal seal				
Action		Double acting, Single rod				
Fluid		Air				
Proof pressure		1.05 MPa				
Maximum operating pressure		0.7 MPa				
Minimum (1) operating pressure	Standard type	0.02 MPa	0.005 MPa			
	H (High speed/High frequency type)	—	0.01 MPa			
Ambient and fluid temperature		–10 to 80°C				
Cushion		Rubber bumper (Standard)				
Lubrication (2)		Not required (Non-lube)				
Rod end thread tolerance		JIS Class 2				
Stroke length tolerance		$^{+1.0}_{0}$				
Piston (3) speed	Standard type	0.5 mm/s to 1000 mm/s (Refer to page 10-5-7.)				
	H (High speed/High frequency type)	—	5 mm/s to 3000 mm/s (Refer to page 10-5-7.)			
Total allowable leakage	Supply pressure 0.1 MPa	150 cm³/min or less		250 cm³/min or less		300 cm³/min or less
	Supply pressure 0.3 MPa	800 cm³/min or less		1000 cm³/min or less		1200 cm³/min or less
	Supply pressure 0.5 MPa	1500 cm³/min or less		2500 cm³/min or less		3000 cm³/min or less

Note 1) Use clean, dry air with no freezing.
Note 2) For lubrication, refer to precautions on page 10-5-5.
Note 3) Control low speed actuation with differential pressure and a speed controller, etc.
(For further details, refer to recommended circuit examples.)

Weight/Standard Type, High Speed/High Frequency Type

(g)

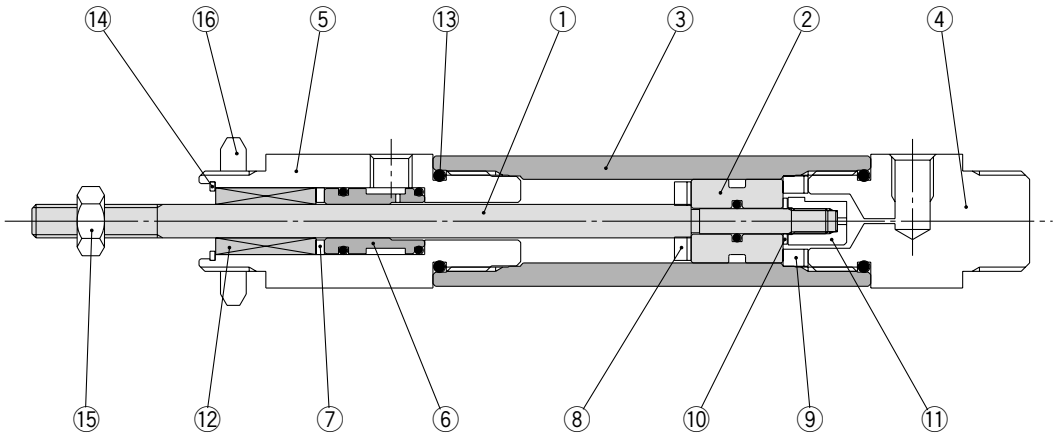
Bore size (mm)	Cylinder stroke (mm)					
	15	30	45	60	75	100
6	52.5	60.7	68.9	77.1	—	—
10	92.4	102.7	113.0	123.3	133.6	143.9
16	152.4	175.2	198.0	220.8	243.6	266.4
20	349.8	392.6	435.4	478.2	521.0	563.8
25	460.8	510.0	559.2	608.4	657.6	706.8

Theoretical Output

OUT IN (N)

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm²)	Operating pressure (MPa)						
				0.1	0.2	0.3	0.4	0.5	0.6	0.7
6	4	IN	15.7	1.6	3.2	4.7	6.3	7.9	9.4	11.0
		OUT	28.3	2.8	5.7	8.5	11.3	14.2	17.0	19.8
10	4	IN	66.0	6.6	13.2	19.8	26.4	33.0	39.6	46.2
		OUT	78.5	7.9	15.7	23.6	31.4	39.3	47.1	55.0
16	5	IN	181.4	18.1	36.3	54.4	72.6	90.7	108.8	127.0
		OUT	201.1	20.1	40.2	60.3	80.4	100.6	120.7	140.8
20	8	IN	263.9	26.4	52.8	79.2	105.6	132.0	158.3	184.7
		OUT	314.2	31.4	62.8	94.3	125.7	157.1	188.5	219.9
25	10	IN	412.3	41.2	82.5	123.7	164.9	206.2	247.4	288.6
		OUT	490.9	49.1	98.2	147.3	196.4	245.5	294.5	343.6

Construction



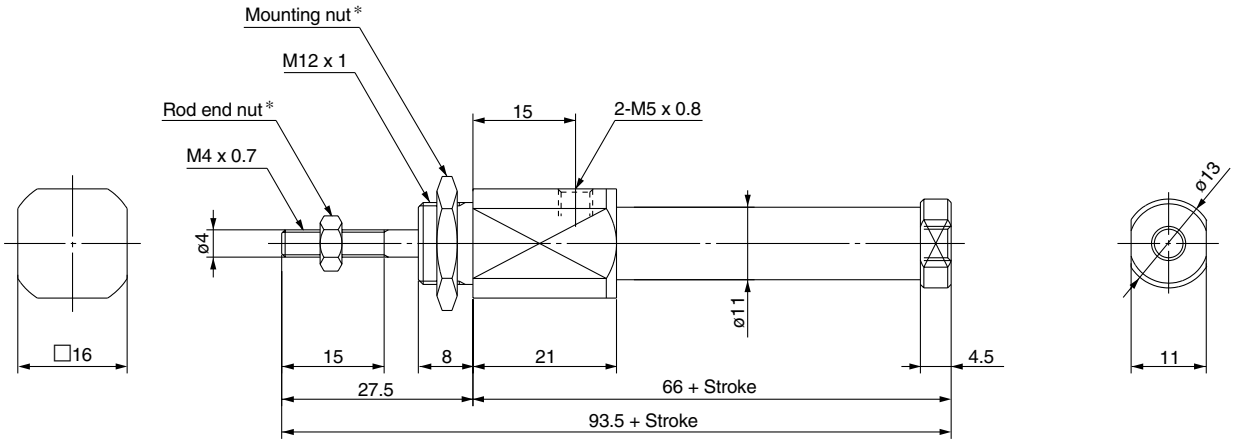
Component Parts

No.	Description	Material	Note
①	Rod	Carbon steel	Hard chrome plated
②	Piston	Special stainless steel	
③	Tube	Special stainless steel	
④	Head cover	Aluminum alloy	Hard anodized
⑤	Rod cover	Aluminum alloy	Hard anodized
⑥	Sleeve	Special stainless steel	
⑦	Seat	NBR	
⑧	Bumper A	Polyurethane	
⑨	Bumper B	Polyurethane	
⑩	Bumper C	Polyurethane	
⑪	Nut	Aluminum alloy	
⑫	Ball bushing		
⑬	O-ring	NBR	
⑭	Snap ring	Carbon tool steel	Nickel plated
⑮	Rod end nut	Steel	Nickel plated
⑯	Mounting nut	Steel	

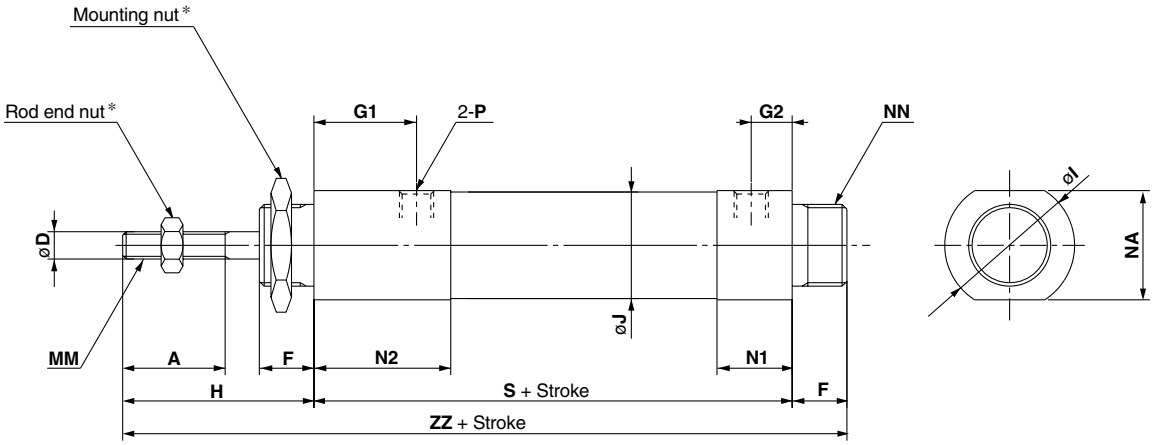
Dimensions

Basic style: MQMLB

ø6



ø10, ø16, ø20, ø25



Bore size (mm)	A	D	F	G1	G2	H	I	J	MM	N1	N2	NA	NN	P	S	ZZ
10	15	4	8	15	6	28	18.5	16	M4 x 0.7	11	20	16	M12 x 1	M5 x 0.8	65	101
16	15	5	10	15	6	30	22	22	M5 x 0.8	12	21	19.5	M14 x 1	M5 x 0.8	74	114
20	18	8	13	25	8.5	40.5	31.5	28.5	M8 x 1.25	20.5	33	29	M20 x 1.5	Rc 1/8	97.5	151
25	18	10	13	30	8.5	44.5	34.5	32	M10 x 1.25	20.5	38	32	M26 x 1.5	Rc 1/8	102.5	160

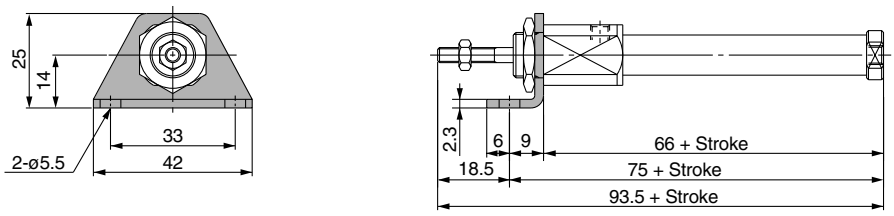
∗ For details on rod end nut and mounting nut, refer to page 10-5-24.

Dimensions

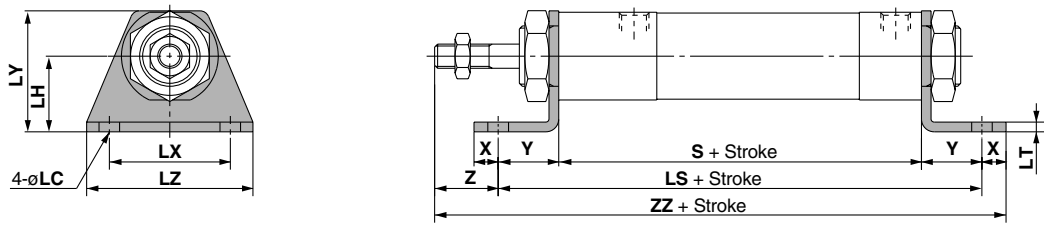
For other dimensions, refer to basic style on page 10-5-20.

Foot style: MQMLL

ø6



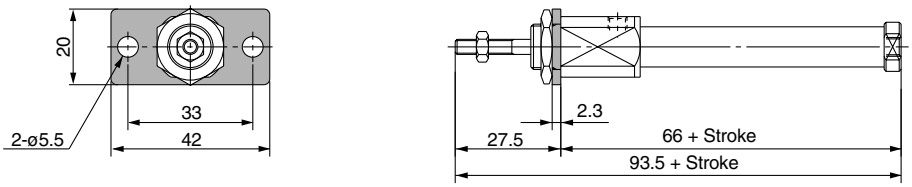
ø10, ø16, ø20, ø25



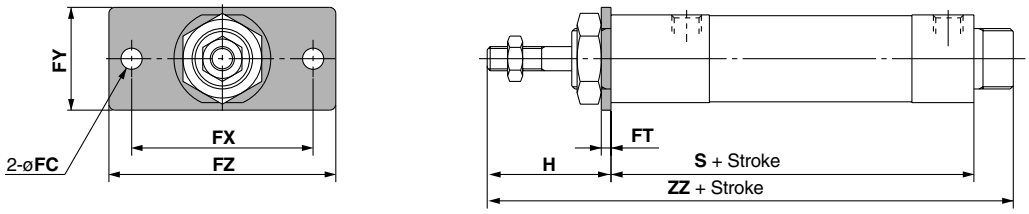
Bore size (mm)	LC	LH	LS	LT	LX	LY	LZ	S	X	Y	Z	ZZ
10	5.5	14	83	2.3	33	25	42	65	6	9	19	108
16	5.5	18	92	2.3	42	30	54	74	6	9	21	119
20	6.8	25	137.5	3.2	40	40	55	97.5	8	20	20.5	166
25	6.8	28	142.5	3.2	40	47	55	102.5	8	20	24.5	175

Rod side flange style: MQMLF

ø6



ø10, ø16, ø20, ø25

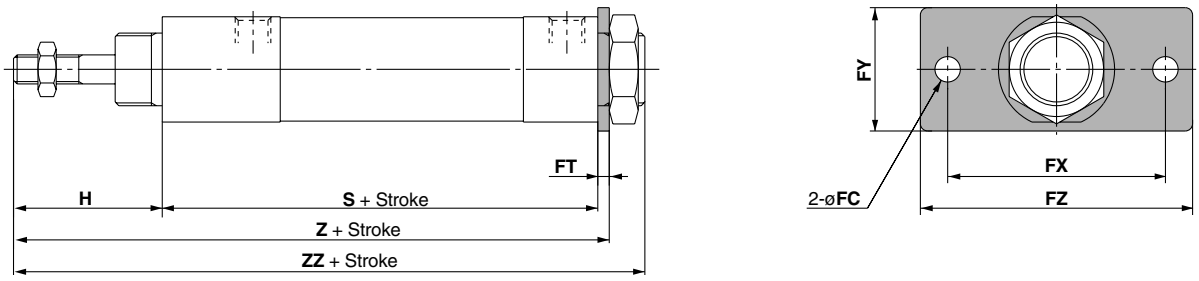


Bore size (mm)	FC	FT	FX	FY	FZ	H	S	ZZ
10	5.5	2.3	33	20	42	28	65	101
16	5.5	2.3	42	24	54	30	74	114
20	7	4	60	34	75	40.5	97.5	151
25	7	4	60	40	75	44.5	102.5	160

Dimensions

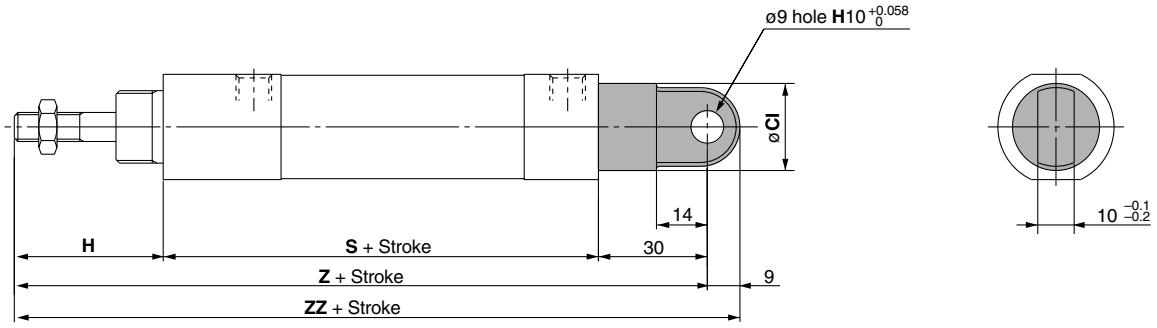
For other dimensions, refer to basic style on page 10-5-20.

Rear flange style: MQMLG (Except ø6)
ø10, ø16, ø20, ø25



Bore size (mm)	FC	FT	FX	FY	FZ	H	S	Z	ZZ
10	5.5	2.3	33	20	42	28	65	95.3	101
16	5.5	2.3	42	24	54	30	74	106.3	114
20	7	4	60	34	75	40.5	97.5	142	151
25	7	4	60	40	75	44.5	102.5	151	160

Single clevis style: MQMLC (ø20 and ø25 only)
ø20, ø25 (Non-integrated type)

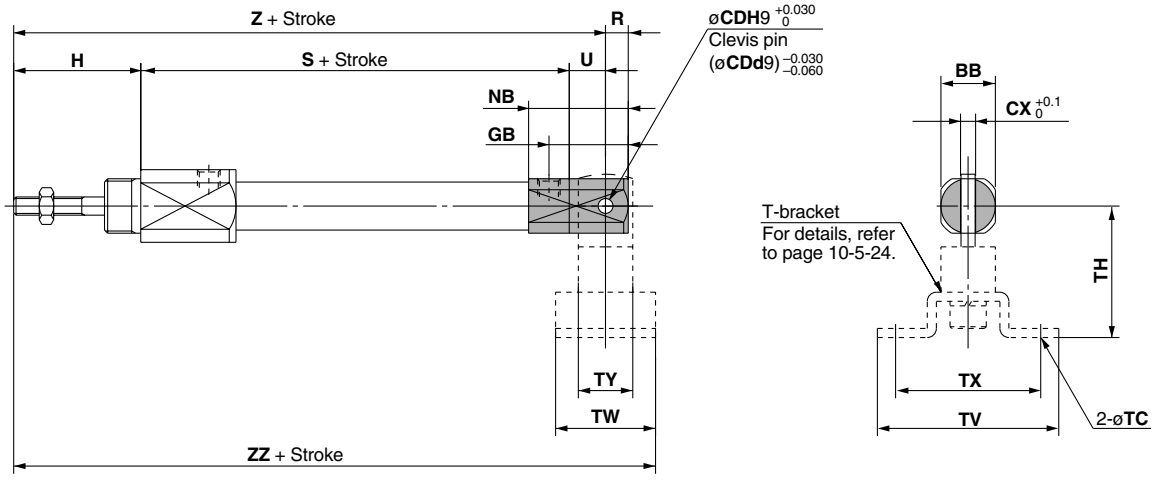


Bore size (mm)	CI	H	S	Z	ZZ
20	24	40.5	97.5	168	177
25	30	44.5	102.5	177	186

Dimensions

For other dimensions, refer to basic style on page 10-5-20.

Double clevis style: MQMLD
ø6, ø10, ø16 (Integrated type)



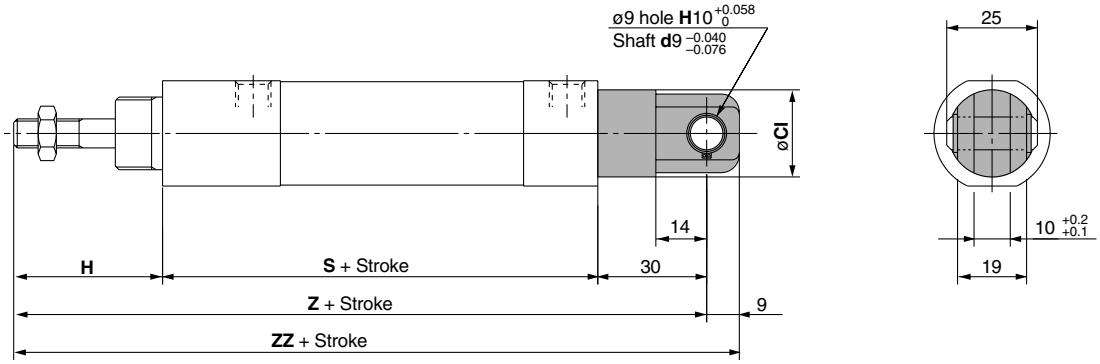
Bore size (mm)	BB	CD	CX	GB	H	NB	R	S	U	Z	ZZ
6	12	3.3	3.3	17.5	27.5	22	5	70.5	8	106	117
10	12	3.3	3.3	19	28	24	5	65	8	101	112
16	18	5	6.6	24	30	30	8	74	10	114	128

T-bracket Dimensions Note)

Part no.	Applicable bore size (mm)	TC	TH	TV	TW	TX	TY
CJ-T010B	6, 10	4.5	29	40	22	32	12
CJ-T016B	16	5.5	35	48	28	38	16

Note) For details, refer to page 10-5-24.

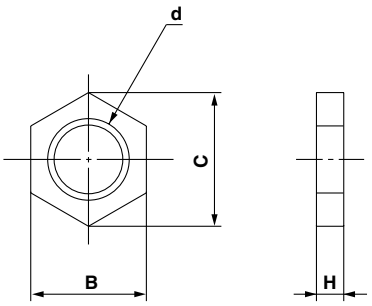
ø20, ø25 (Non-integrated type)



Bore size (mm)	CI	H	S	Z	ZZ
20	24	40.5	97.5	168	177
25	30	44.5	102.5	177	186

Accessory Bracket Dimensions

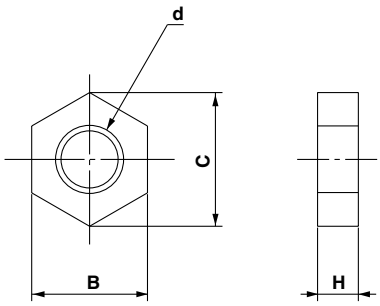
Mounting nut



Material: Carbon steel

Part no.	Applicable bore size (mm)	B	C	d	H
SNKJ-016B	6, 10	17	19.6	M12 x 1	4
SNLJ-016B	16	19	21.9	M14 x 1	5
SN-020B	20	26	30	M20 x 1.5	8
SN-032B	25	32	37	M26 x 1.5	8

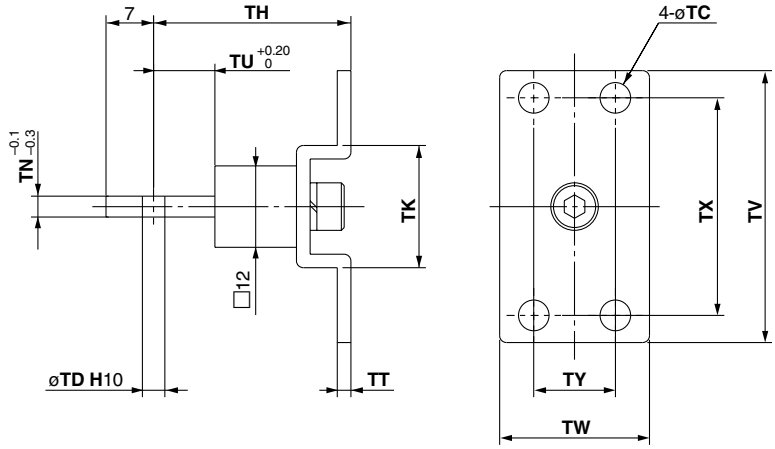
Rod end nut



Material: Carbon steel

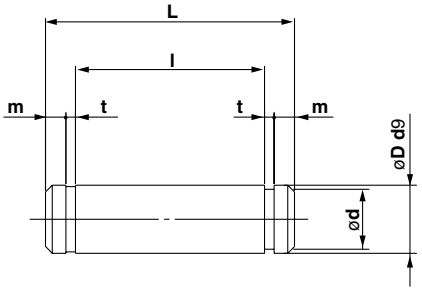
Part no.	Applicable bore size (mm)	B	C	D	H
NTJ-010A	6, 10	7	8.1	M4 x 0.7	3.2
NTJ-015A	16	8	9.2	M5 x 0.8	4
NT-02	20	13	15	M8 x 1.25	5
NT-03	25	17	19.6	M10 x 1.25	6

T-bracket



Part no.	Applicable bore size (mm)	TC	TD	TH	TK	TN	TT	TU	TV	TW	TX	TY
CJ-010B	6, 10	4.5	3.3	29	18	3.1	2	9	40	22	32	12
CJ-016B	16	5.5	5	35	20	6.4	2.3	14	48	28	38	16

Clevis pin



Material: Stainless steel

Part no.	Applicable bore size (mm)	d	D	l	L	m	t
CD-J010	6, 10	3	3.3	12.2	15.2	1.2	0.3
CD-Z015	16	4.8	5	18.3	22.7	1.5	0.7
CDP-1	20, 25	8.6	9	19.2	25	1.75	1.15

Compact Cylinder with Air Cushion

Series RQ

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

The new standard for the future

New AIR CUSHION

NEW Air Cushion Cylinder

Uses a unique air cushion mechanism with no cushion ring.
Size ø63, ø80 and ø100 newly introduced to Series RQ.

Future new standard for shock elimination,

Employs a new construction for the air cushion mechanism.

Compact Cylinder with Air Cushion

Series RQ

ø63, ø80 and ø100 newly introduced!

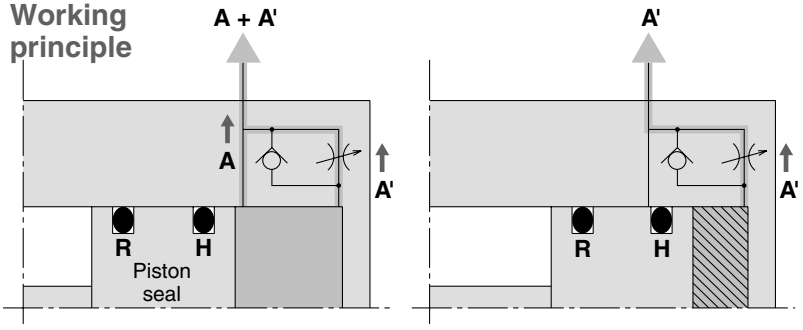
Debut of the air cushion series

New AIR CUSHION

Unique air cushion construction with no cushion ring

Elimination of the cushion ring used in conventional cushion ring type air cushions has made it possible to reduce the overall length of the cylinder. This produces an air cushion cylinder which retains the merits of a compact design.

Working principle



① When the piston is retracting, exhaust is discharged from both A and A' until piston seal H passes the air passage A.
② After piston seal H has passed the air passage A, exhaust is discharged only from A'. The section marked with diagonal lines becomes a cushion chamber, and a cushioning effect is achieved.
③ When air is supplied for piston extension, the check seal opens and the piston starts with no delay.

Wide size variations from ø20 to ø100

Model	Mounting	Rod end configuration	Standard stroke	Auto switch
R(D)Q□20	•Through-hole •Double end tapped •Foot style •Front flange style •Rear flange style •Double clevis style	•Female thread •Male thread	15 20 25 30 40 50 75 100	•ø20 to ø100 Direct mounting auto switch •ø32 to ø100 Rail mounting auto switch
R(D)Q□25				
R(D)Q□32				
R(D)Q□40				
R(D)Q□50				
New R(D)Q□63				
New R(D)Q□80				
New R(D)Q□100				

∗Size ø20 and ø25 have through-holes and double end taps in common.

noise reduction and improvement in repeatability

Minimal extended dimensions from +2.5mm to 13mm

(Compared with series CDQS/CDQ2 of the same bore size with auto switches)

Series **RDQ**

Extention

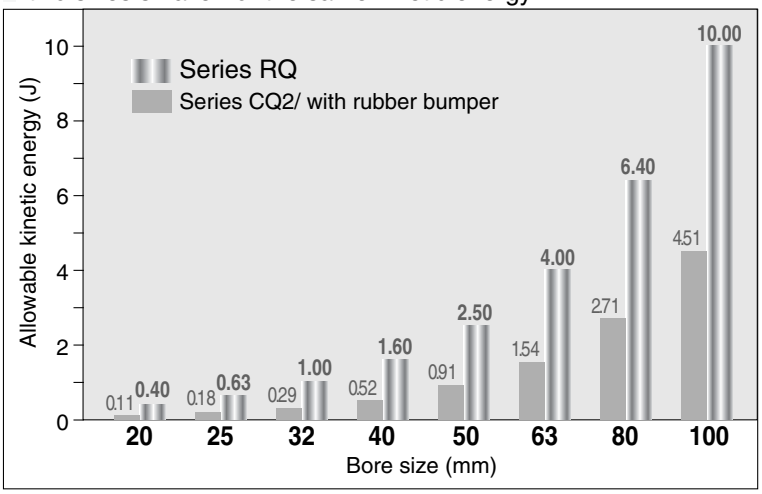
Series CDQS

Series	Bore size	Extended dimension	Comparable cylinder
Series RDQ	20	+2.5mm	Series CDQS
	25	+4mm	
	32	+4mm	Series CDQ2
	40	+4.5mm	
	50	+9mm	
	63	+9mm	
	80	+10mm	
	100	+13mm	

Nearly three times the allowable kinetic energy

(Compared to Series CQS/CQ2 with rubber bumper)

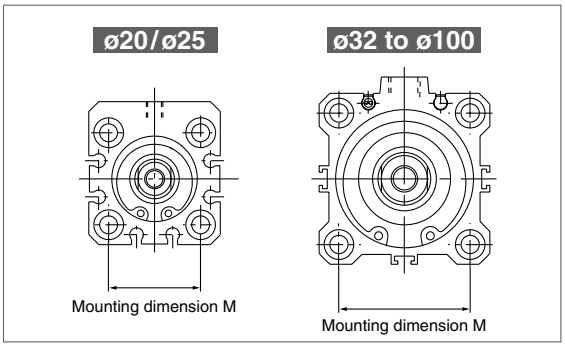
Improved energy absorption allows selection of a cylinder that is two sizes smaller for the same kinetic energy.



Interchangeable mounting

The mounting dimension "M" is the same as the compact cylinder Series CQS/CQ2.

(CQS/CQ2 mounting brackets can be used without any changes.)



Improved repeatability

The piston contact surface at the stroke end is metal, providing improved repeatability for the stopping position as compared with a rubber bumper.

Improved noise reduction (Stroke end impact noise reduced)

- Decrease of 19dB or more (Compared with Series CQ2 without cushion)
- Decrease of 14dB or more (Compared with Series CQ2 with rubber bumper)

Compact Cylinder with Air Cushion
Double Acting, Single Rod
Series RQ
ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Without auto switch

RQ B 32 — 50

With auto switch

RDQ B 32 — 50 — F9BW

Built-in magnet

Mounting style

B	Through-hole (Standard)	**F**	Front flange style
A	Both ends tapped style	**G**	Rear flange style
L	Foot style	**D**	Double clevis style

Note 1) Mounting brackets are packed together when shipped (unassembled).
Note 2) Since sizes ø20 and ø25 have a body with type B (Through-hole) and type A (Both ends tapped style) in common, there is no type A part number.
Example) RQA 20-30 does not exist.

Bore size

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

Thread type

Nil	M thread	ø20, 25
	Rc	ø32 to ø100
TN	NPT	
TF	G	

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 7-7-5.

Body option

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

Auto switch

Nil	Without auto switch (Built-in magnet)

∗ For the applicable auto switch model, refer to the teble below.
∗ Auto switches are shipped together, (but not assembled).

Number of auto switches

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

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 DC		Load voltage AC	Rail mounting ø32 to ø100 Perpendicular	Rail mounting ø32 to ø100 In-line	Direct mounting ø20 to ø100 Perpendicular	Direct mounting ø20 to ø100 In-line	Lead wire length (m)∗ 0.5 (Nil)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	—	5V	—	—	**A76H**	**A96V**	**A96**	●	●	—	—	—	IC circuit	—
				2-wire	—	—	200V	**A72**	**A72H**	—	—	●	●	—	—	—	—	Relay, PLC
					24V	12V	100V	**A73**	**A73H**	—	—	●	●	●	—	—		
								—	—	**A93V**	**A93**	●	●	—	—	—		
		Connector					—	**A73C**	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet				—		**A79W**	—	—	—	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24V	5V, 12V	—	**F7NV**	**F79**	**M9NV**	**M9N**	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				**F7PV**	**F7P**	**M9PV**	**M9P**	●	●	○	—	○		
				2-wire		12V		**F7BV**	**J79**	**M9BV**	**M9B**	●	●	○	—	○	—	
		Connector						**J79C**	—	—	—	●	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5V, 12V		**F7NWV**	**F79W**	**F9NWV**	**F9NW**	●	●	○	—	○	IC circuit	
				3-wire (PNP)				—	**F7PW**	**F9PWV**	**F9PW**	●	●	○	—	○		
				2-wire		12V		**F7BWV**	**J79W**	**F9BWV**	**F9BW**	●	●	○	—	○	—	
	Water resistance (2-color indication)							—	**F7BA**	—	**F9BA**	—	●	○	—	○		
								F7BAV	—	—	—	—	●	○	—	—		
	With diagnostic output (2-color indication)			4-wire (NPN)		5V, 12V		—	**F79F**	—	—	●	●	○	—	○	IC circuit	

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

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

• Besides the models in the above catalog, there are some other auto switches that are applicable. For more information, refer to page 7-7-18.

Specifications

Type	Pneumatic (non-lube)
Fluid	Air
Proof pressure	1.5MPa
Maximum operating pressure	1.0MPa
Minimum operating pressure	0.05MPa
Ambient and fluid temperature	Without auto switch: −10°C to 70°C (with no freezing) With auto switch: −10°C to 60°C (with no freezing)
Rod end thread	Female thread
Rod end thread tolerance	JIS class 2
Stroke length tolerance	$^{+1.0}_{0}$
Mounting	Through-hole
Piston speed	50 to 500mm/s

Standard Stroke

Bore size (mm)	Standard stroke (mm)
20, 25	15, 20, 25, 30, 40, 50
32, 40	20, 25, 30, 40, 50, 75, 100
50, 63	30, 40, 50, 75, 100
80, 100	40, 50, 75, 100

Manufacture of Intermediate Stroke

Description	Exclusive body	
Part no.	Refer to "How to Order" for standard model	
Method	Available in stroke increments of 1mm, using an exclusive body for the specified stroke.	
Stroke range	Bore size	Stroke range
	20, 25	16 to 49
	32, 40	21 to 99
	50, 63	31 to 99
	80, 100	41 to 99
Example	Part no.: RQB32-47 A special tube is manufactured for a 47mm stroke.	

Allowable kinetic energy

Refer to "Selection" on page 7-7-19 regarding the allowable kinetic energy.

Effective Cushion Length

Bore size (mm)	20	25	32	40	50	63	80	100
Effective cushion length (mm)	5.8	6.1	6.6	6.6	7.1	7	7.5	8

Mounting Bracket Part No.

Bore size (mm)	Foot Note 1)	Flange	Double clevis Note 3)
20	CQS-L020	CQS-F020	CQS-D020
25	CQS-L025	CQS-F025	CQS-D025
32	CQ-L032	CQ-F032	CQ-D032
40	CQ-L040	CQ-F040	CQ-D040
50	CQ-L050	CQ-F050	CQ-D050
63	CQ-L060	CQ-F060	CQ-D060
80	CQ-L080	CQ-F080	CQ-D080
100	CQ-L100	CQ-F100	CQ-D100

Note 1) When ordering foot brackets, order 2 pieces per cylinder.
Note 2) The following parts are included with each bracket.
Foot/Flange : Body mounting bolts.
Double clevis: Clevis pins, type C snap ring for axis, and Body mounting bolts.
Note 3) Clevis pins and snap rings are included with the double clevis type.

Theoretical Output

OUT IN

(N)

Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
20	IN	71	118	165
	OUT	94	157	220
25	IN	113	189	264
	OUT	147	245	344
32	IN	181	302	422
	OUT	241	402	563
40	IN	317	528	739
	OUT	377	628	880
50	IN	495	825	1150
	OUT	589	982	1370
63	IN	841	1400	1960
	OUT	935	1560	2180
80	IN	1360	2270	3170
	OUT	1510	2510	3520
100	IN	2140	3570	5000
	OUT	2360	3930	5500

Weight

Basic Weight

(g)

Bore size (mm)	Standard stroke (mm)							
	15	20	25	30	40	50	75	100
20	141	156	171	186	216	245	—	—
25	203	221	239	258	294	331	—	—
32	—	271	291	312	353	394	496	598
40	—	390	413	436	482	528	643	758
50	—	—	—	731	803	875	1055	1235
63	—	—	—	940	1019	1099	1297	1495
80	—	—	—	—	1819	1950	2278	2606
100	—	—	—	—	2859	3038	3483	3928

Additional Weight

(g)

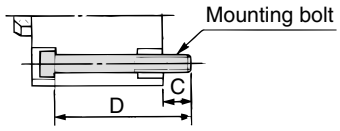
Bore size (mm)		20	25	32	40	50	63	80	100
Magnet		5	6	11	13	14	22	24	35
Both ends tapped style		—	—	6	6	6	19	45	45
Rod end male thread	Male thread	6	12	26	27	53	53	120	175
	Nut	4	8	17	17	32	32	49	116
Foot style (including bolt)		159	181	143	155	243	324	696	1062
Front flange style (including bolt)		143	180	180	214	373	559	1056	1365
Rear flange style (including bolt)		137	171	165	198	348	534	1017	1309
Double clevis style (including pin, snap ring and bolt)		92	127	151	196	393	554	1109	1887

Calculation example) RQD32-20M

- Basic weight : RQB32-20 — 271g
- Additional weight: Double end tapped — 6g
  Rod end male thread — 43g
  Double clevis — 151g
  471g

Mounting

Through-hole type mounting bolts for RQB are available.
How to order: Add "Bolt" in front of the bolts to be used.
Example) Bolt M5 x 50ℓ 4 pcs.



Model	C	D	Mounting bolt
R(D)QB20-15	9	50	M5 x 50ℓ
-20		55	x 55ℓ
-25		60	x 60ℓ
-30		65	x 65ℓ
-40		75	x 75ℓ
-50		85	x 85ℓ
R(D)QB25-15	9.5	55	M5 x 55ℓ
-20		60	x 60ℓ
-25		65	x 65ℓ
-30		70	x 70ℓ
-40		80	x 80ℓ
-50		90	x 90ℓ
R(D)QB32-20	10	60	M5 x 60ℓ
-25		65	x 65ℓ
-30		70	x 70ℓ
-40		80	x 80ℓ
-50		90	x 90ℓ
-75		115	x 115ℓ
-100		140	x 140ℓ

Model	C	D	Mounting bolt
R(D)QB40-20	8	65	M5 x 65ℓ
-25		70	x 70ℓ
-30		75	x 75ℓ
-40		85	x 85ℓ
-50		95	x 95ℓ
-75		120	x 120ℓ
-100		145	x 145ℓ
R(D)QB50-30	13.5	85	M6 x 85ℓ
-40		95	x 95ℓ
-50		105	x 105ℓ
-75		130	x 130ℓ
-100		155	x 155ℓ
R(D)QB63-30	15.5	90	M8 x 90ℓ
-40		100	x 100ℓ
-50		110	x 110ℓ
-75		135	x 135ℓ
-100		160	x 160ℓ
R(D)QB80-40	15	105	M10 x 105ℓ
-50		115	x 115ℓ
-75		140	x 140ℓ
-100		165	x 165ℓ
R(D)QB100-40	17.5	120	M10 x 120ℓ
-50		130	x 130ℓ
-75		155	x 155ℓ
-100		180	x 180ℓ

Replacement Parts: Seal Kit

Series	Bore size	Part no.	Contents
RQ	20	RQB20-PS	Kits consist of piston seal, rod seal and gasket
	25	RQB25-PS	
	32	RQB32-PS	
	40	RQB40-PS	
	50	RQB50-PS	
	63	RQB63-PS	
	80	RQB80-PS	
	100	RQB100-PS	

Auto Switch Mounting Bracket Part No.

Bore size (mm)	Bracket no.	Note	Applicable auto switch	
			Reed switch	Solid state switch
32, 40, 50, 63, 80, 100	BQ-2	•Switch mounting screw (M3 x 0.5 x 10ℓ) •Switch spacer •Switch mounting nut	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 D-F7BAVL D-F79F D-F7NTL

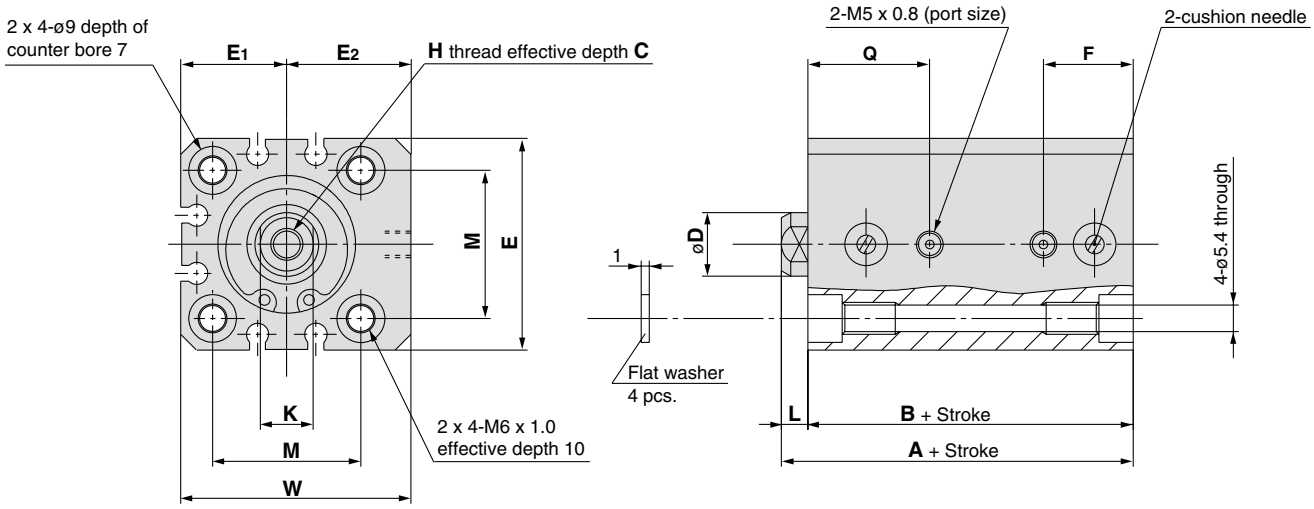
[Stainless steel mounting screw kit]
Use the following stainless steel mounting screw kit (includes nut) depending on the operating environment.
(Auto switch spacer must be ordered separately.
BBA2: For D-A7/A8/F7/J7

The above stainless steel screw kit is used for water resistant auto switch types D-F7BAL and D-F7BAVL when they are shipped mounted on a cylinder.
Also, BBA2 is included when an auto switch alone is shipped.

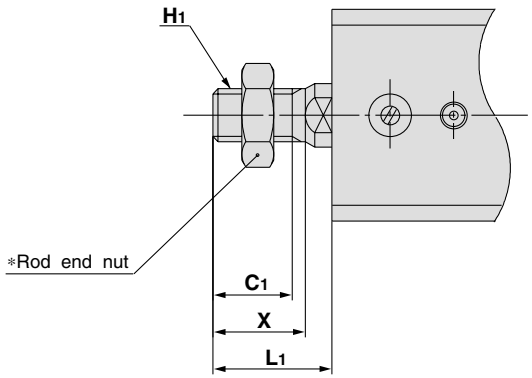
Dimensions: ø20, ø25

∗ For the auto switch mounting position and its mounting height, refer to page 7-7-16.

Basic style (Through-hole/Both ends tapped common): RQB/RDQB



Rod end male thread



Rod End Male Thread

Bore size (mm)	C_1	X	H_1	L_1
20	12	14	M8 x 1.25	18.5
25	15	17.5	M10 x 1.25	22.5

Basic Style

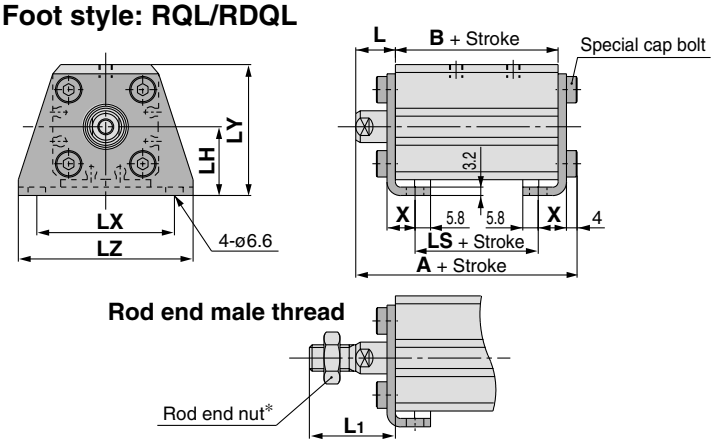
Bore size (mm)	Stroke range (mm)	A	B	C	D	E	E_1	E_2	F	H	K	L	M	Q	W
20	15 to 50	36.5	32	7	10	36	18	21	15.5	M5 x 0.8	8	4.5	25.5	21	39
25	15 to 50	41.5	36.5	12	12	40	20	23.5	17	M6 x 1.0	10	5	28	23	43.5

∗ Refer to page 7-7-14 for details on rod end nut and accessories.

• Add the stroke to calculate the length of intermediate strokes.

Mounting Bracket Dimensions

Foot style: RQL/RDQL



Foot Style

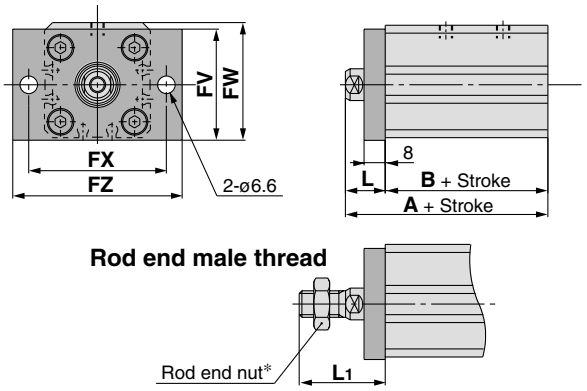
Bore size (mm)	Stroke range (mm)	A	LS	L	L1
20	15 to 50	53.7	20	14.5	28.5
25	15 to 50	58.7	21.5	15	32.5

Bore size (mm)	B	LH	LX	LY	LZ	X
20	32	24	48	45	62	9.2
25	36.5	26	52	49.5	66	10.7

(All dimensions but A, LS, L and L1 are identical to those of the basic style.)

Foot bracket material: Carbon steel

Rod side flange style: RQF/RDQF



Rod Side Flange Style

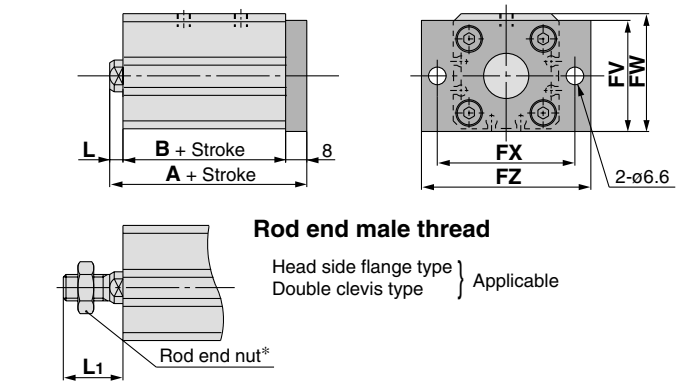
Bore size (mm)	Stroke range (mm)	A	L	L1
20	15 to 50	46.5	14.5	28.5
25	15 to 50	51.5	15	32.5

Bore size (mm)	B	FV	FW	FX	FZ
20	32	39	40.5	48	60
25	36.5	42	44.5	52	64

(All dimensions but A, L and L1 are identical to those of the basic style.)

Flange material: Carbon steel

Head side flange style: RQG/RDQG



Head Side Flange Style

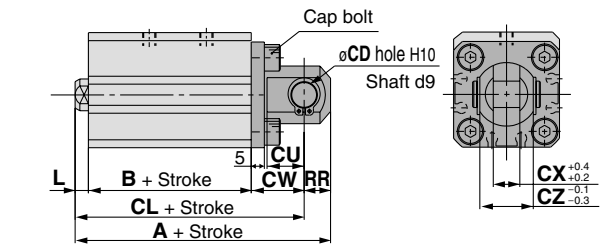
Bore size (mm)	Stroke range (mm)	A
20	15 to 50	44.5
25	15 to 50	49.5

Bore size (mm)	B	L	FV	FW	FX	FZ
20	32	4.5	39	40.5	48	60
25	36.5	5	42	44.5	52	64

(All dimensions but A is identical to those of the basic style.)

Flange material: Carbon steel

Double clevis style: RQD/DQD



Double Clevis Style

Bore size (mm)	Stroke range (mm)	A	CL
20	15 to 50	63.5	54.5
25	15 to 50	71.5	61.5

Bore size (mm)	B	L	L1	CD	CU	CW	CX	CZ	RR
20	32	4.5	18.5	8	12	18	8	16	9
25	36.5	5	22.5	10	14	20	10	20	10

(All dimensions but A and CL are identical to those of the basic style.)

∗ Refer to page 7-7-14 for details on rod end nut and accessories.

Double clevis bracket material: Carbon steel

Dimensions: ø32, ø40, ø50

∗ For the auto switch mounting position and its mounting height, refer to page 7-7-16.

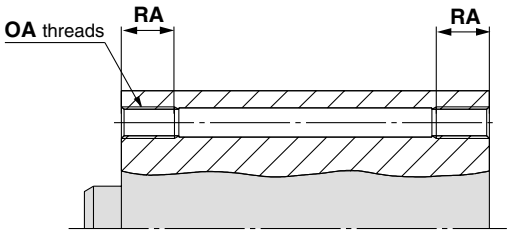
Basic style (Through-hole): RQB/RDQB

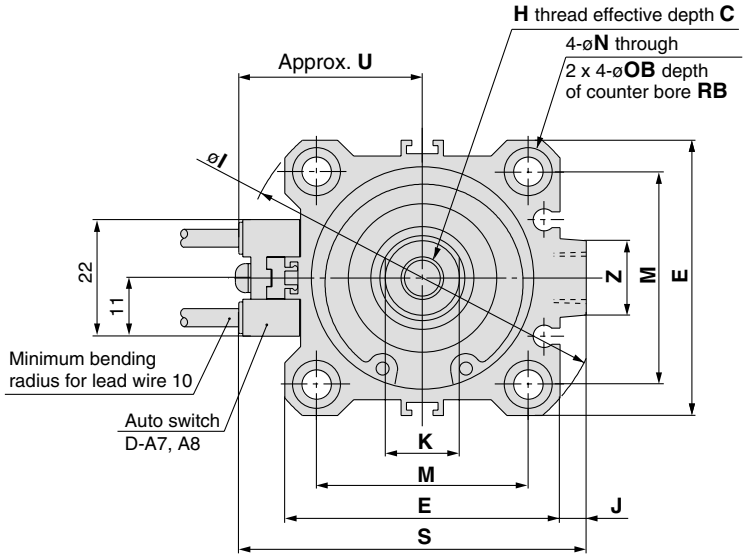
Both ends tapped style: RQA/RDQA

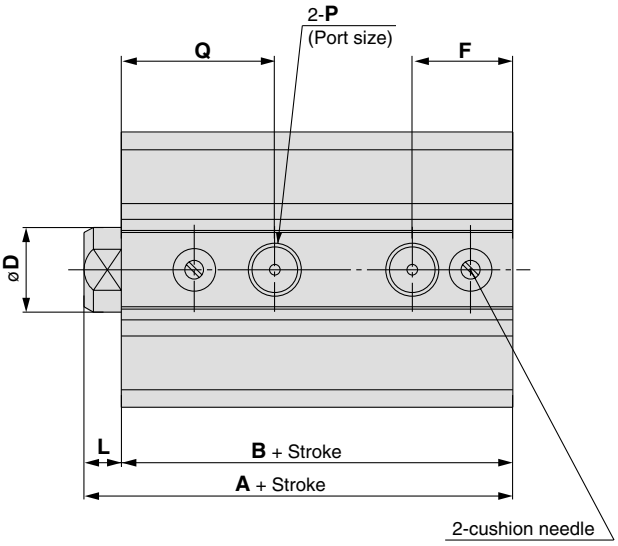
Double end tapped

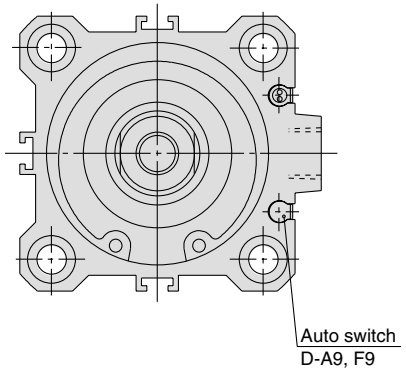
mm

Bore size (mm)	OA	RA
32	M6 x 1.0	10
40	M6 x 1.0	10
50	M8 x 1.25	14

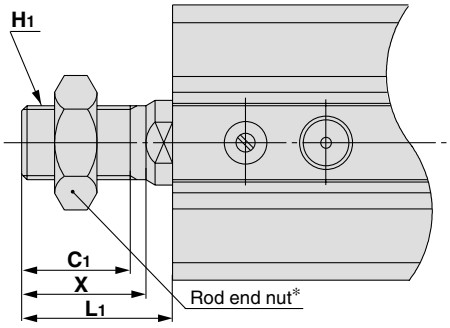








Rod end male thread



Rod End Male Thread

Bore size (mm)	C_1	X	H_1	L_1
32	20.5	23.5	M14 x 1.5	28.5
40	20.5	23.5	M14 x 1.5	28.5
50	26	28.5	M18 x 1.5	33.5

Basic Style

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	H	I	J	K	L	M	N
32	20 to 100	44	37	13	16	45	18.5	M8 x 1.25	60	4.5	14	7	34	5.5
40	20 to 100	51	44	13	16	52	20	M8 x 1.25	69	5	14	7	40	5.5
50	30 to 100	57.5	49.5	15	20	64	28.5	M10 x 1.5	86	7	17	8	50	6.6

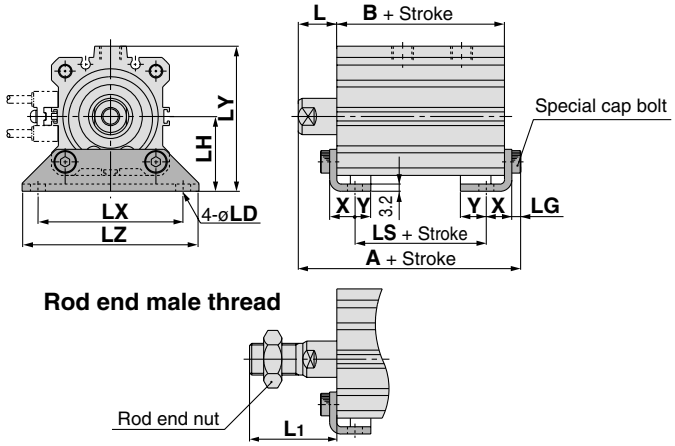
Bore size (mm)	OB	P	Q	RB	S	U	Z
32	9	Rc 1/8	23	7	58.5	31.5	14
40	9	Rc 1/8	28	7	66	35	14
50	11	Rc 1/4	31.5	8	80	41	19

∗ Refer to page 7-7-14 for details on rod end nut and accessories.

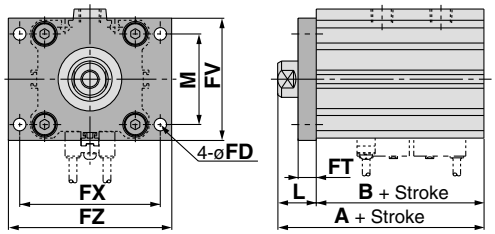
• Add the stroke to calculate the length of intermediate strokes.

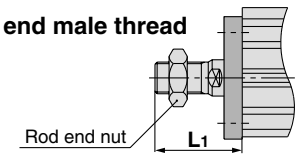
Mounting Bracket Dimensions

Foot style: RQL/RDQL

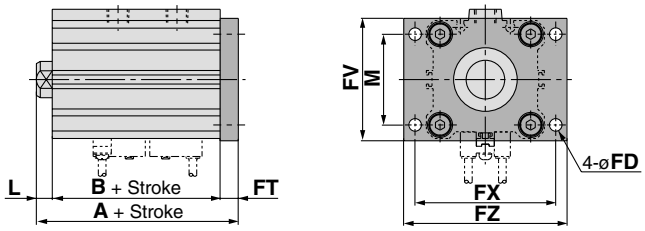


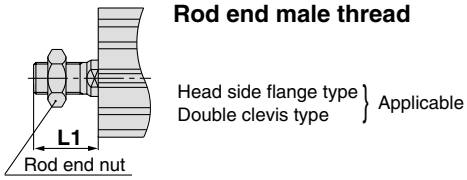
Rod side flange style: RQF/RDQF



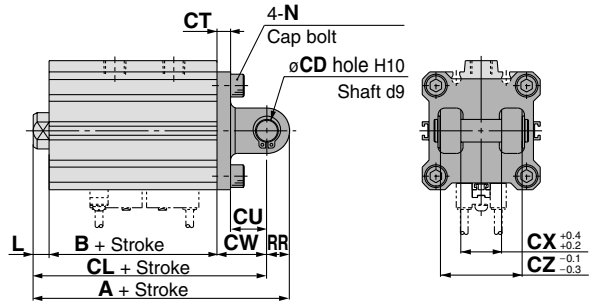


Head side flange style: RQG/RDQG





Double clevis style: RQD/RDQD



Foot Style

Bore size (mm)	Stroke range (mm)	A	B	LS	L	L1	LD
32	20 to 100	61.2	37	21	17	38.5	6.6
40	20 to 100	68.2	44	28	17	38.5	6.6
50	30 to 100	75.7	49.5	26.5	18	43.5	9

Bore size (mm)	LG	LH	LX	LY	LZ	X	Y
32	4	30	57	57	71	11.2	5.8
40	4	33	64	64	78	11.2	7
50	5	39	79	78	95	14.7	8

Foot bracket material: Carbon steel

Rod Side Flange Style

Bore size (mm)	Stroke range (mm)	A	B	FD	FT	FV
32	20 to 100	54	37	5.5	8	48
40	20 to 100	61	44	5.5	8	54
50	30 to 100	67.5	49.5	6.6	9	67

Bore size (mm)	FX	FZ	L	L1	M
32	56	65	17	38.5	34
40	62	72	17	38.5	40
50	76	89	18	43.5	50

Flange material: Carbon steel

Head Side Flange Style

Bore size (mm)	Stroke range (mm)	A	L	L1
32	20 to 100	52	7	28.5
40	20 to 100	59	7	28.5
50	30 to 100	66.5	8	33.5

(∗ All dimensions but A, L and L1 are identical to those of the rod side style.)

Flange material: Carbon steel

Double Clevis Style

Bore size (mm)	Stroke range (mm)	A	B	CL	CD	CT	CU
32	20 to 100	74	37	64	10	5	14
40	20 to 100	83	44	73	10	6	14
50	30 to 100	99.5	49.5	85.5	14	7	20

Bore size (mm)	CW	CX	CZ	L	L1	N	RR
32	20	18	36	7	28.5	M6 x 1.0	10
40	22	18	36	7	28.5	M6 x 1.0	10
50	28	22	44	8	33.5	M8 x 1.25	14

∗ Refer to page 7-7-14 for details on rod end nut and accessories.
∗ Clevis pins and snap rings are included in the package.

Double clevis bracket material: carbon steel

Dimensions: ø63 to ø100

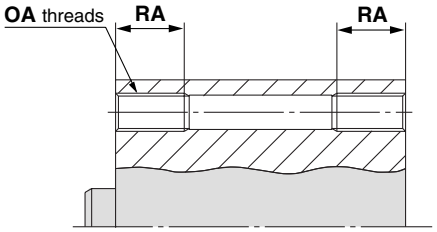
∗ For the auto switch mounting position and its mounting height, refer to page 7-7-16.

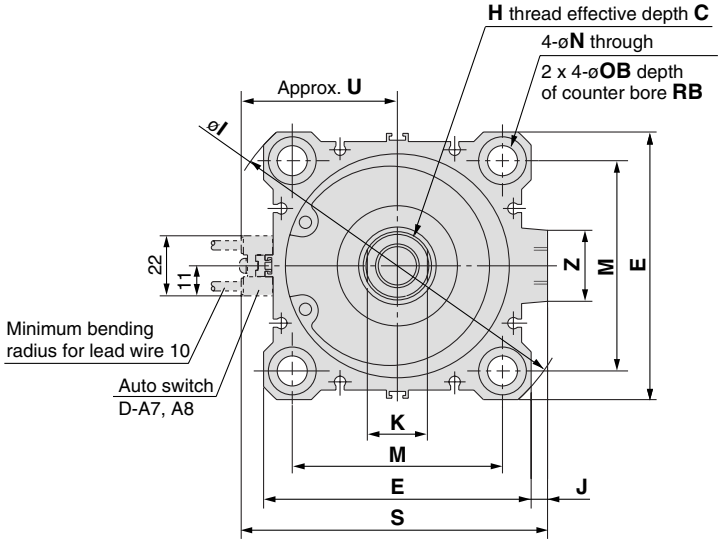
Basic style (Through-hole)

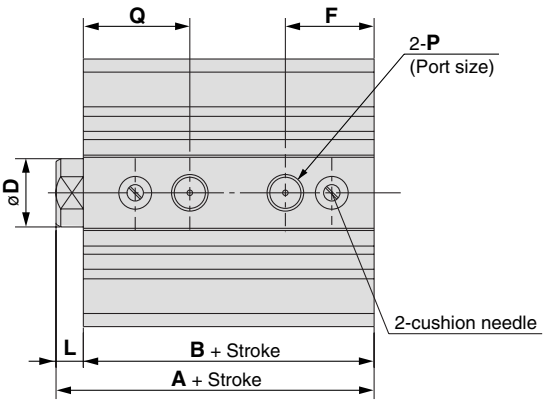
Both ends tapped style: RQA/RDQA

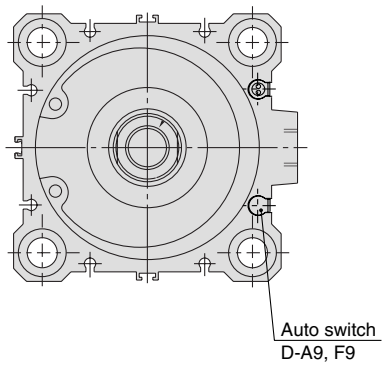
Both Ends Tapped Style

Bore size (mm)	OA	RA
63	M10 x 1.5	18
80	M12 x 1.75	22
100	M12 x 1.75	22

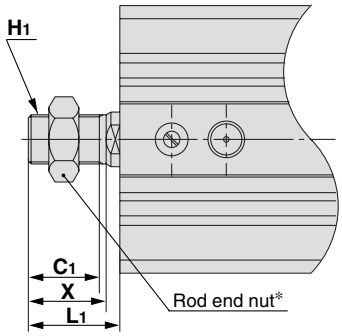








Rod end male thread



Rod End Male Thread

Bore size (mm)	C_1	X	H_1	L_1
63	26	28.5	M18 x 1.5	33.5
80	32.5	35.5	M22 x 1.5	43.5
100	32.5	35.5	M26 x 1.5	43.5

Basic Style

Bore size (mm)	Stroke range (mm)	A	B	C	D	E	F	H	I	J	K	L	M	N	OB	P
63	30 to 100	63	55	15	20	77	31	M10 x 1.5	103	7	17	8	60	9	14	Rc 1/4
80	40 to 100	73.5	63.5	21	25	98	35.5	M16 x 2.0	132	6	22	10	77	11	17.5	Rc 3/8
100	40 to 100	88	76	27	30	117	40	M20 x 2.5	156	6.5	27	12	94	11	17.5	Rc 3/8

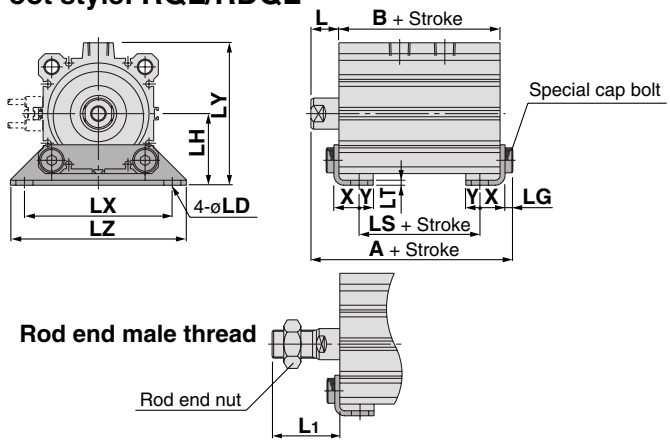
Bore size (mm)	Q	RB	S	U	Z
63	34	10.5	93	47.5	19
80	39	13.5	112.5	57.5	26
100	43	13.5	132.5	67.5	26

∗ Refer to page 7-7-14 for details on rod end nut and accessories.

• Add the stroke to calculate the length of intermediate strokes.

Mounting Bracket Dimensions

Foot style: RQL/RDQL

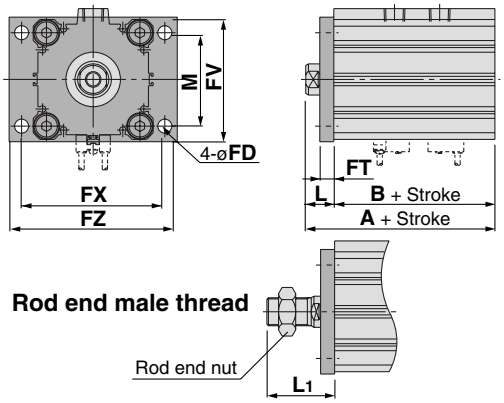


Foot Style

Bore size (mm)	Stroke range (mm)	A	B	LS	L	L1	LD	LG	LH	LT
63	30 to 100	81.2	55	29	18	43.5	11	5	46	3.2
80	40 to 100	95	63.5	33.5	20	53.5	13	7	59	4.5
100	40 to 100	111	76	42	22	53.5	13	7	71	6

Bore size (mm)	Stroke range (mm)	LX	LY	LZ	X	Y
63	10 to 50 / 75, 100	95	91.5	113	16.2	9
80	10 to 50 / 75, 100	118	114	140	19.5	11
100	10 to 50 / 75, 100	137	136	162	23	12.5

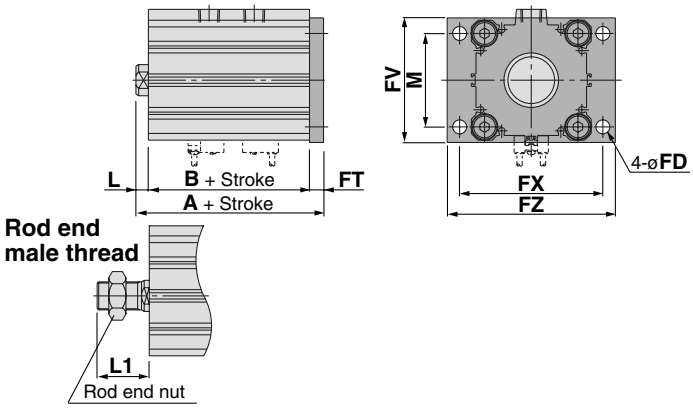
Rod side flange style: RQF/RDQF



Rod Side Flange Style

Bore size (mm)	Stroke range (mm)	A	B	FD	FT	FV	FX	FZ	L	L1	M
63	30 to 100	73	55	9	9	80	92	108	18	43.5	60
80	40 to 100	83.5	63.5	11	11	99	116	134	20	53.5	77
100	40 to 100	98	76	11	11	117	136	154	22	53.5	94

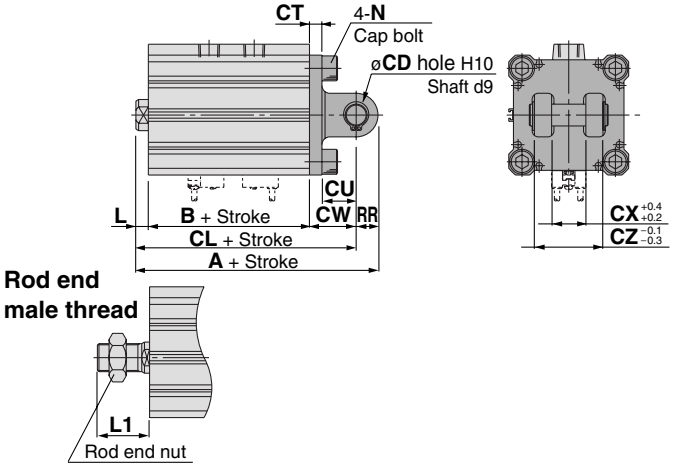
Head side flange style: RQG/RDQG



Head Side Flange Style

Bore size (mm)	Stroke range (mm)	A	L	L1
63	30 to 100	72	8	33.5
80	40 to 100	84.5	10	43.5
100	40 to 100	99	12	43.5

Double clevis style: RQD/RDQD



Double Clevis Style

Bore size (mm)	Stroke range (mm)	A	B	CL	CD	CT	CU	CW	CX	CZ	L
63	30 to 100	107	55	93	14	8	20	30	22	44	8
80	40 to 100	129.5	63.5	111.5	18	10	27	38	28	56	10
100	40 to 100	155	76	133	22	13	31	45	32	64	12

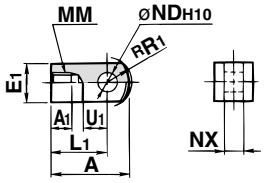
Bore size (mm)	Stroke range (mm)	L1	N	RR
63	10 to 50 / 75, 100	33.5	M10 x 1.5	14
80	10 to 50 / 75, 100	43.5	M12 x 1.75	18
100	10 to 50 / 75, 100	43.5	M12 x 1.75	22

∗ Refer to page 7-7-14 for details on rod end nut and accessories.
∗ Clevis pins and snap rings are included in the package.

Accessory Bracket Dimensions

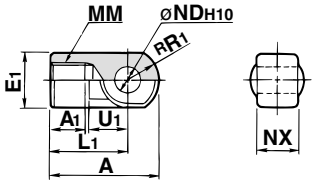
Single Knuckle Joint

For I-G02, I-G03



Material: Carbon steel

For I-G04, I-G05

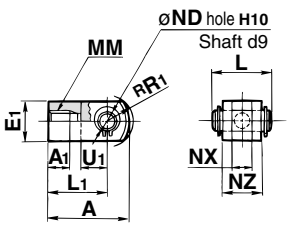


Material: Cast iron

Part no.	Applicable bore size (mm)	A	A_1	E_1	L_1	MM	$^{R}R_1$	U_1	ND	NX
I-G02	**20**	34	8.5	□16	25	M8 x 1.25	10.3	11.5	$8^{+0.058}_{0}$	$8^{-0.2}_{-0.4}$
I-G03	**25**	41	10.5	□20	30	M10 x 1.25	12.8	14	$10^{+0.058}_{0}$	$10^{-0.2}_{-0.4}$
I-G04	**32, 40**	42	14	ø22	30	M14 x 1.5	12	14	$10^{+0.058}_{0}$	$18^{-0.3}_{-0.5}$
I-G05	**50, 63**	56	18	ø28	40	M18 x 1.5	16	20	$14^{+0.070}_{0}$	$22^{-0.3}_{-0.5}$
I-G08	**80**	71	21	ø38	50	M22 x 1.5	21	27	$18^{+0.070}_{0}$	$28^{-0.3}_{-0.5}$
I-G10	**100**	79	21	ø44	55	M26 x 1.5	24	31	$22^{+0.084}_{0}$	$32^{-0.3}_{-0.5}$

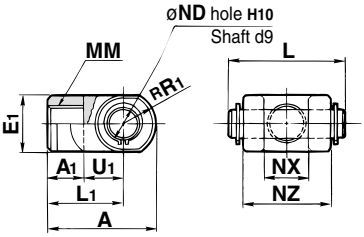
Double Knuckle Joint

For Y-G02, Y-G03



Material: Carbon steel

For Y-G04, Y-G05

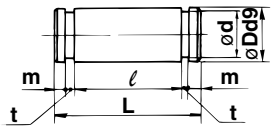


Material: Cast iron

Part no.	Applicable bore size (mm)	A	A_1	E_1	L_1	MM	$^{R}R_1$	U_1	ND	NX	NZ	L	Applicable pin no.
Y-G02	**20**	34	8.5	□16	25	M8 x 1.25	10.3	11.5	$8^{+0.058}_{0}$	$8^{+0.4}_{+0.2}$	16	21	IY-G02
Y-G03	**25**	41	10.5	□20	30	M10 x 1.25	12.8	14	$10^{+0.058}_{0}$	$10^{+0.4}_{+0.2}$	20	25.6	IY-G03
Y-G04	**32, 40**	42	16	ø22	30	M14 x 1.5	12	14	$10^{+0.058}_{0}$	$18^{+0.5}_{+0.3}$	36	41.6	IY-G04
Y-G05	**50, 63**	56	20	ø28	40	M18 x 1.5	16	20	$14^{+0.070}_{0}$	$22^{+0.5}_{+0.3}$	44	50.6	IY-G05
Y-G08	**80**	71	23	ø38	50	M22 x 1.5	21	27	$18^{+0.070}_{0}$	$28^{+0.5}_{+0.3}$	56	64	IY-G08
Y-G10	**100**	79	24	ø44	55	M26 x 1.5	24	31	$22^{+0.084}_{0}$	$32^{+0.5}_{+0.3}$	64	72	IY-G10

∗ Knuckle pin and snap ring are included.

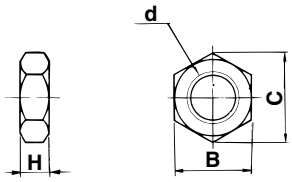
Knuckle Pin (Common with double clevis pin)



Material: Carbon steel

Part no.	Applicable bore size (mm)	D	L	d	ℓ	m	t	Snap ring
IY-G02	**20**	$8^{-0.040}_{-0.076}$	21	7.6	16.2	1.5	0.9	C8 type for pivot
IY-G03	**25**	$10^{-0.040}_{-0.076}$	25.6	9.6	20.2	1.55	1.15	C10 type for pivot
IY-G04	**32,40**	$10^{-0.040}_{-0.076}$	41.6	9.6	36.2	1.55	1.15	C10 type for pivot
IY-G05	**50,63**	$14^{-0.050}_{-0.093}$	50.6	13.4	44.2	2.05	1.15	C14 type for pivot
IY-G08	**80**	$18^{-0.050}_{-0.093}$	64	17	56.2	2.55	1.35	C18 type for pivot
IY-G10	**100**	$22^{-0.065}_{-0.117}$	72	21	64.2	2.55	1.35	C22 type for pivot

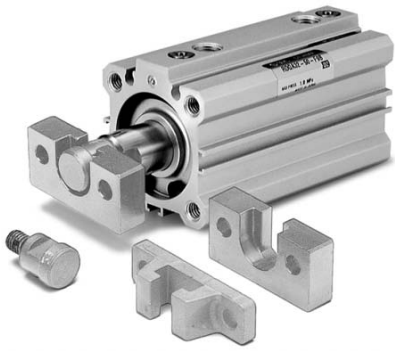
Rod End Nut



Material: Carbon steel

Part no.	Applicable bore size (mm)	d	H	B	C
NT-02	**20**	M8 x 1.25	5	13	15.0
NT-03	**25**	M10 x 1.25	6	17	19.6
NT-04	**32, 40**	M14 x 1.5	8	22	25.4
NT-05	**50, 63**	M18 x 1.5	11	27	31.2
NT-08	**80**	M22 x 1.5	13	32	37.0
NT-10	**100**	M26 x 1.5	16	41	47.3

Simple Joint: ø32 to ø100



Joint And Mounting Bracket (Type A, Type B) Part No.

YA — **03**

Applicable air cylinder bore

03	For ø32, ø40
05	For ø50, ø63
08	ø80
10	ø100

Mounting bracket

YA	Type A mounting bracket
YB	Type B mounting bracket
YU	Joint

Allowable Eccentricity

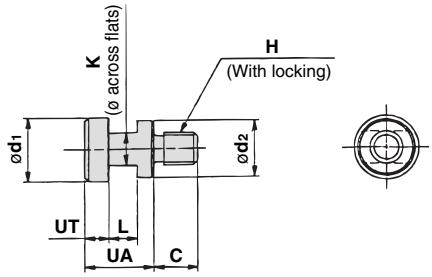
Bore size (mm)	**32**	**40**	**50**	**63**	**80**	**100**
Eccentricity tolerance	±1				±1.5	±2
Backlash	0.5					

<Ordering>
- Joints are not included with the A or B type mounting brackets. Order them separately.

(Example)
Bore size ø40 Part no.
- Type A mounting bracket YA-03
- Joint..... YU-03

Joint Part No.

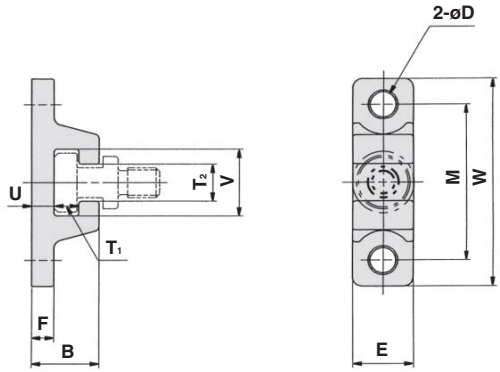
Bore size (mm)	Joint	Applicable mounting bracket		Weight (g)
		Type A mounting bracket	Type B mounting bracket	
32, 40	**YU-03**	**YA-03**	**YB-03**	25
50, 63	**YU-05**	**YA-05**	**YB-05**	40
80	**YU-08**	**YA-08**	**YB-08**	90
100	**YU-10**	**YA-10**	**YB-10**	160



Material: Chrome molybdenum steel (Nickel plated)

Part no.	Applicable bore size (mm)	UA	C	d_1	d_2	H	K	L	UT	Weight (g)
YU-03	**32, 40**	17	11	15.8	14	M8 x 1.25	8	7	6	25
YU-05	**50, 63**	17	13	19.8	18	M10 x 1.5	10	7	6	40
YU-08	**80**	22	20	24.8	23	M16 x 2	13	9	8	90
YU-10	**100**	26	26	29.8	28	M20 x 2.5	14	11	10	160

Type A Mounting Bracket

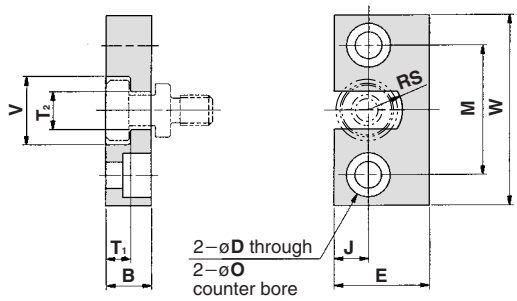


Material: Chrome molybdenum steel (Nickel plated)

Part no.	Bore size (mm)	B	D	E	F	M	T_1	T_2
YA-03	**32, 40**	18	6.8	16	6	42	6.5	10
YA-05	**50, 63**	20	9	20	8	50	6.5	12
YA-08	**80**	26	11	25	10	62	8.5	16
YA-10	**100**	31	14	30	12	76	10.5	18

Part no.	Bore size (mm)	U	V	W	Weight (g)
YA-03	**32, 40**	6	18	56	55
YA-05	**50, 63**	8	22	67	100
YA-08	**80**	10	28	83	195
YA-10	**100**	12	36	100	340

Type B Mounting Bracket



Material: Precision die-casting material equivalent to stainless steel 304

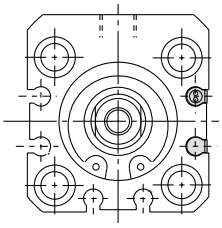
Part no.	Bore size (mm)	B	D	E	J	M	O
YB-03	**32, 40**	12	7	25	9	34	11.5 depth 7.5
YB-05	**50, 63**	12	9	32	11	42	14.5 depth 8.5
YB-08	**80**	16	11	38	13	52	18 depth 12
YB-10	**100**	19	14	50	17	62	21 depth 14

Part no.	Bore size (mm)	T_1	T_2	V	W	RS	Weight (g)
YB-03	**32, 40**	6.5	10	18	50	9	80
YB-05	**50, 63**	6.5	12	22	60	11	120
YB-08	**80**	8.5	16	28	75	14	230
YB-10	**100**	10.5	18	36	90	18	455

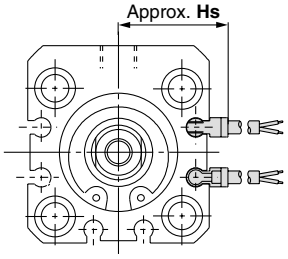
Proper Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height

ø20/ø25

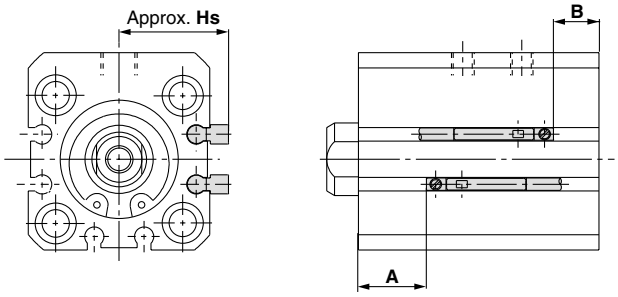
D-A9□
D-M9□
D-F9□W



D-A9□V
D-M9□V
D-F9□WV

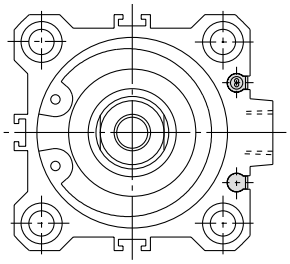


D-F9BAL

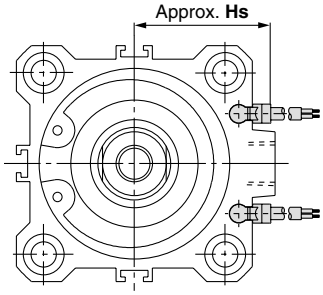


ø32 to ø100

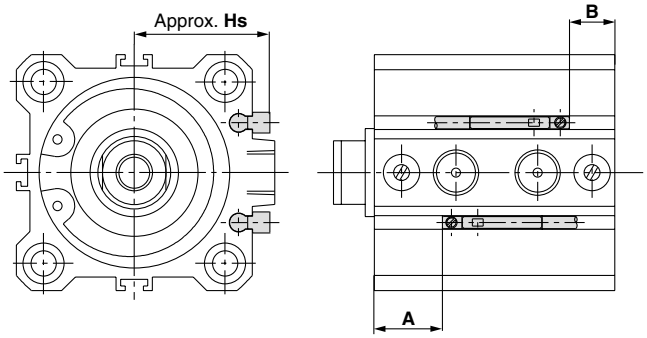
D-A9□
D-M9□
D-F9□W



D-A9□V
D-M9□V
D-F9□WV



D-F9BAL



Proper Auto Switch Mounting Positions

Bore size (mm)	D-A9□ D-A9□V		D-M9□ D-M9□V D-F9□W D-F9□WV		D-F9BAL	
	A	B	A	B	A	B
20	9.5	3	13.5	7	12.5	6
25	11	5.5	15	9.5	14	8.5
32	12.5	4.5	16.5	8.5	15.5	7.5
40	17	7	21	11	20	10
50	17	12.5	21	16.5	20	15.5
63	19.5	15.5	23.5	19.5	22.5	18.5
80	24.5	19	28.5	23	27.5	22
100	31	25	35	29	34	28

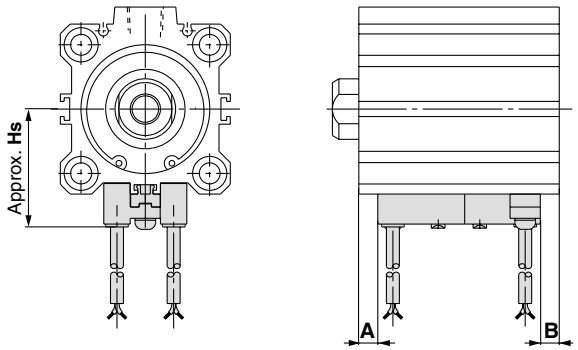
Auto Switch Mounting Height

Bore size (mm)	D-A9□V	D-M9□V D-F9□WV	D-F9BAL
	Hs	Hs	Hs
20	22.5	24.5	22
25	24.5	26.5	24
32	27	29	26.5
40	30.5	32.5	30
50	36.5	38.5	36
63	40	42	39.5
80	50	52	49.5
100	60	62	59.5

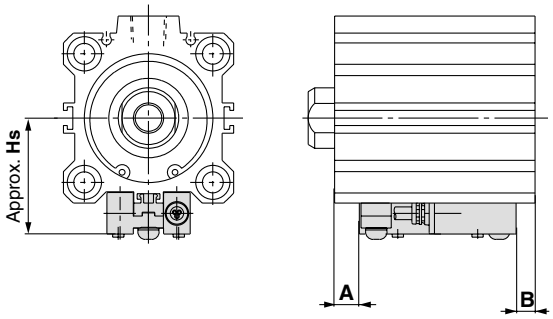
Proper Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height

ø32 to ø100

D-A7□
D-A80

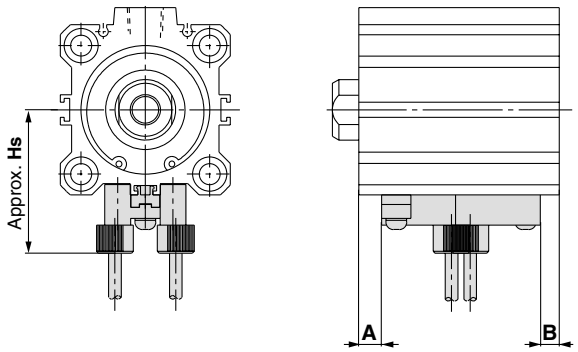


D-A7□H
D-A80H
D-F7□
D-J79
D-F7□W
D-J79W
D-F79F
D-F7NTL
D-F7BAL

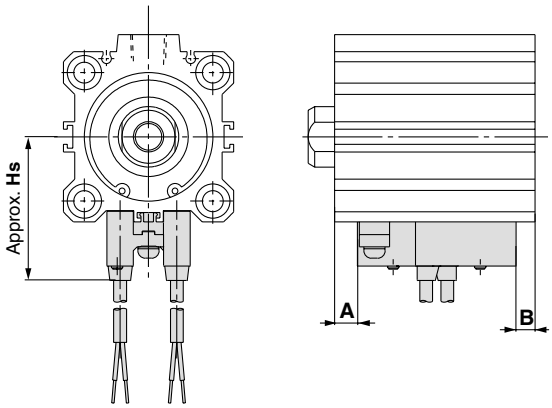


ø32 to ø100

D-A73C
D-A80C
D-J79C



D-A79W
D-F7□V
D-F7□WV
D-F7BAVL



Proper Auto Switch Mounting Position

Bore size (mm)	D-A7□, A80		D-A7□H, A80H D-A73C, A80C D-F7□, F7□V D-F79F, J79 D-J79C, F7□W D-F7□WV, J79W D-F7BAL, F7BAVL		D-A79W		D-F7NTL	
	A	B	A	B	A	B	A	B
20	—	—	—	—	—	—	—	—
25	—	—	—	—	—	—	—	—
32	13.5	5.5	14	6	11	3	19	11
40	18	8	18.5	8.5	15.5	5.5	23.5	13.5
50	18	13.5	18.5	14	15.5	11	23.5	19
63	20.5	16.5	21	17	18	14	26	22
80	25.5	20	26	20.5	23	17.5	31	25.5
100	32	26	32.5	26.5	29.5	23.5	37.5	31.5

Auto Switch Mounting Height

Bore size (mm)	D-A7□ D-A80	D-A7□H D-A80H D-F7□ D-J79 D-F7□W D-J79W D-F7BAL D-F79F D-F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAVL	D-J79C	D-A79W
	Hs	Hs	Hs	Hs	Hs	Hs
20	—	—	—	—	—	—
25	—	—	—	—	—	—
32	31.5	32.5	38.5	35	38	34
40	35	36	42	38.5	41.5	37.5
50	41	42	48	44.5	47.5	43.5
63	47.5	48.5	54.5	51	54	50
80	57.5	58.5	64.5	61	64	60
100	67.5	68.5	74.5	71	74	70

Operation Range

Switch model	Bore size (mm)							
	20	25	32	40	50	63	80	100
D-A7□, A80 D-A7□H, A80H D-A73C, A80C	12	12	12	11	10	12	12	13
D-A79W	13	13	13	14	14	16	15	17
D-A9□, A9□V	—	—	9.5	9.5	9.5	11.5	9	11.5
D-F7□, F7□V D-J79, J79C, J79W D-F7□W, F7□WV D-F79F, F7BAL D-F7BAVL	5.5	5	6	6	6	6.5	6.5	7
D-M9□, M9□V	4	4	4	4	4.5	—	—	—
D-M9□W, M9□WV D-F9BAL	—	—	5.5	5.5	5.5	6.5	5.5	6.5

∗ Hysteresis specifications are given as a guide, it is not a guaranteed range. (Tolerance ±30%)
Hysteresis may fluctuate due to the operating environment.

Other than the applicable auto switches listed in “How to Order”, the following auto switches can be mounted. For detailed specifications, refer to page 7-9-1.

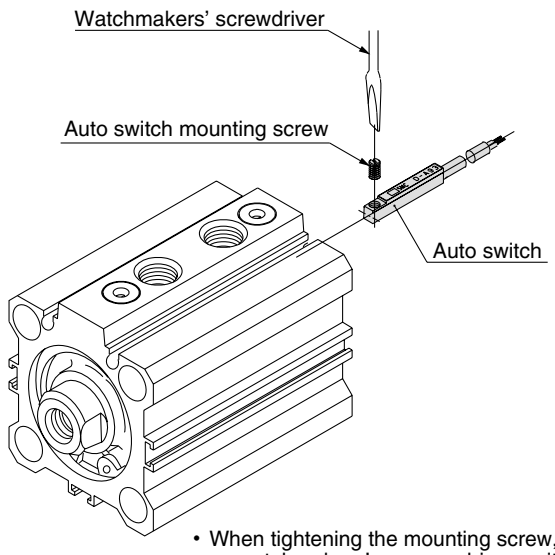
Type	Model	Electrical entry	Features	Applicable bore size (mm)
Reed switch	D-A80	Grommet (perpendicular)	Without indicator light	32 to 100
	D-A80H	Grommet (in-line)		
	D-A80C	Connector (perpendicular)		
	D-A90	Grommet (in-line)		20 to 100
	D-A90V	Grommet (perpendicular)		
Solid state switch	D-F7NTL	Grommet (in-line)	With timer	32 to 100

∗ D-F7NTL is also available with prewire connector.
∗ Normally closed type (NC = b contact) solid state auto switches are also available (D-F9G, F9H).

Mounting of Auto Switch

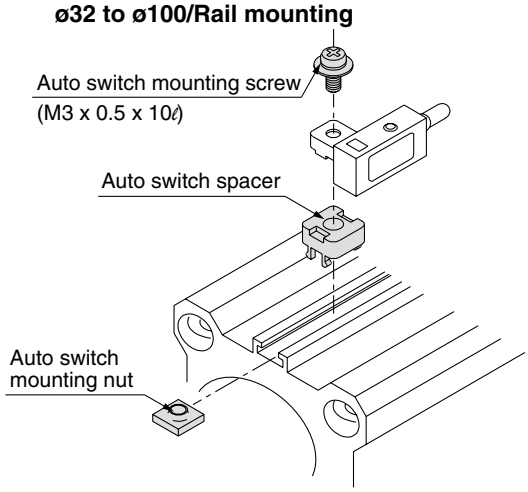
Follow the procedures below to mount auto switches.

ø20 to ø100/Direct mounting



• When tightening the mounting screw, use a watchmakers’ screw driver with a handle 5 to 6 mm in diameter.
Tighten with a torque of 0.10 to 0.20 N·m.

ø32 to ø100/Rail mounting



• Use a tightening torque of 0.5 to 0.7 N·m for auto switch mounting screws.

∗ Auto switch mounting brackets are packed together for cylinders with buit-in magnets.

Specific Product Precautions

Be sure to read before handling.

Installation and Removal of Snap Ring

⚠ Caution

1. Use appropriate pliers (Type C snap ring installing tool) for installation and removal.

2. Even when using appropriate pliers (Type C snap ring installing tool), proceed with caution as there is a danger of the snap ring flying off the end of the pliers (Type C snap ring install-ing tool) and causing human injury or damage to nearby equipment. After installation, confirm that the snap ring is securely seated into the snap ring groove before supplying air.

Selection

⚠ Caution

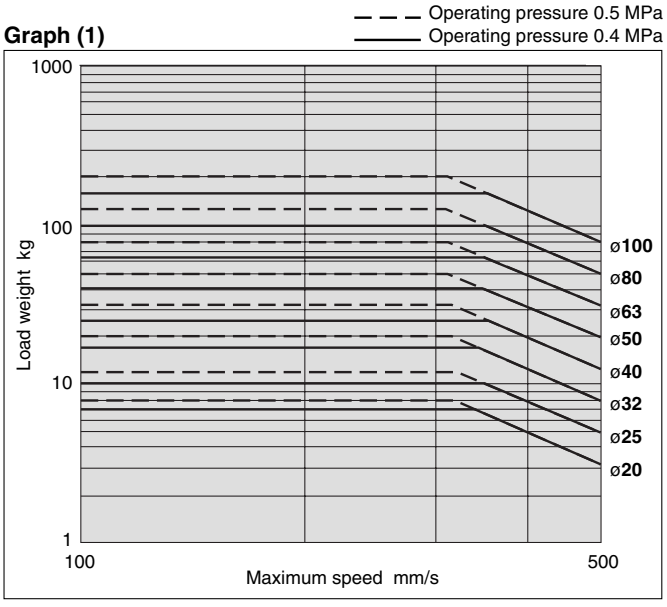
1. Operate the cylinder to the stroke end.

When the stroke is restricted by an external stopper or a clamped work piece, satisfactory cushioning and noise reduction may not be achieved.

2. Strictly observe the limiting ranges for load weight and maximum speed (Graph (1)). Also, the limiting ranges are based on operation of the cylinder to the stroke end and proper adjustment of the cushion needle.

If operated beyond the limiting ranges, excessive impact will occur and this may cause damage to equipment.

Graph (1)



3. Adjust the cushion needle to reduce excessive kinetic energy from the piston impact at the stroke end by absorbing enough kinetic energy during the cushion stroke.

If the piston impacts the stroke end with excessive kinetic energy (values in Table 1 or more), an excessive impact will occur and this may cause damage to equipment.

Table (1) Allowable Kinetic Energy At Piston Impact Unit: [J]

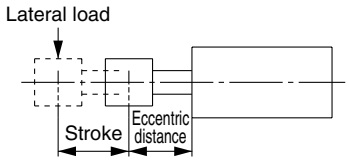
	20	25	32	40	50	63	80	100
Piston speed	50 to 500mm/s							
Allowable kinetic energy	0.055	0.09	0.15	0.26	0.46	0.77	1.30	2.27

Selection

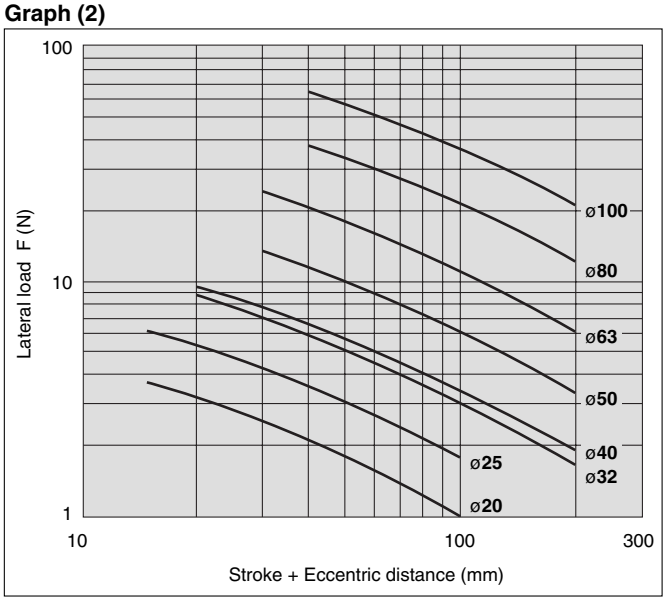
⚠ Caution

4. Strictly observe the limiting ranges for the piston rod lateral load (Graph (2)).

If operated beyond the limiting ranges, this may cause the equipment life to be reduced or damage to equipment may occur.



Graph (2)



Cushion Needle Adjustment

⚠ Caution

1. Keep the adjustment range for the cushion needle between the closed position and the rotations shown below.

	Rotations
ø20 to ø100	2.5 rotations or less

Use a 3mm flat head watchmakers screw driver to adjust the cushion needle. The adjustment range for the cushion needle must be between the closed position and the open position ranges above. A retaining mechanism prevents the cushion needle from coming out, however, it may spring out during operation if it is rotated beyond the ranges shown above.