

Compact Cylinder with Lock

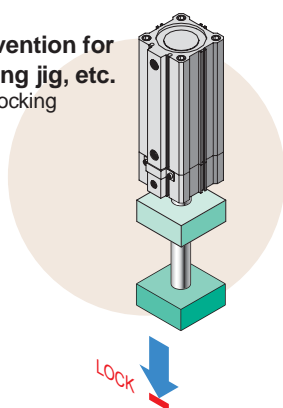
Series *CLQ*

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

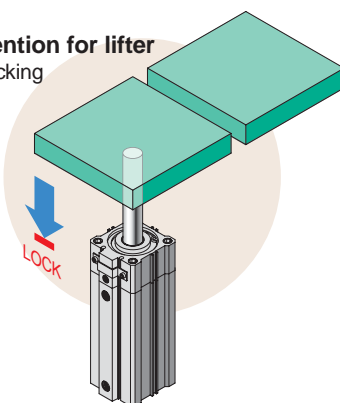


Maintains cylinder position when supply pressure falls or residual pressure is released

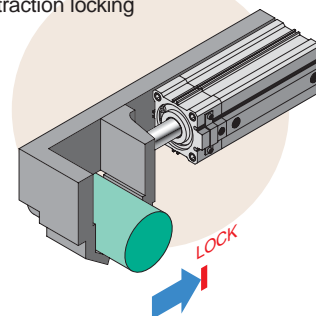
Drop prevention for
press fitting jig, etc.
Extension locking



Drop prevention for lifter
Retraction locking



Holding a clamped condition
Retraction locking



Series CLQ

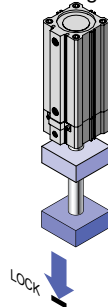
Locking is possible at any position within the entire stroke

Can be locked at any desired position

- Drop prevention for mid-stroke emergency stops
- Locking position can be changed to accommodate external stopper positions and thickness of clamped work pieces

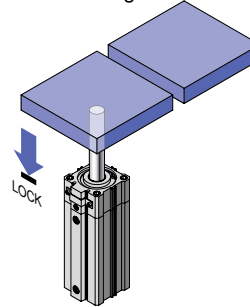
Drop prevention for press fitting jig, etc.

Extension locking



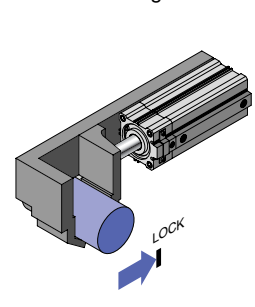
Drop prevention for lifter

Retraction locking

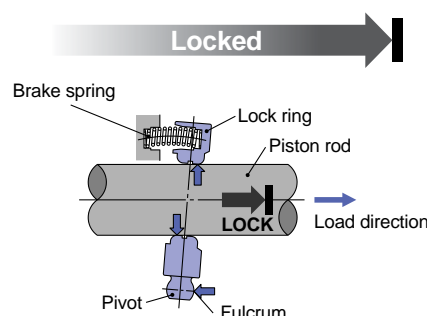
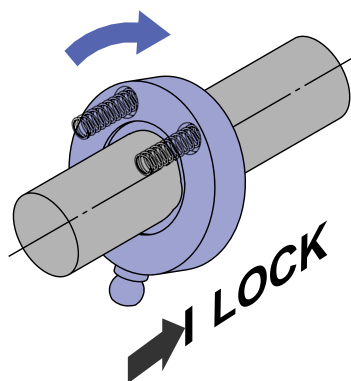


Holding a clamped condition

Retraction locking

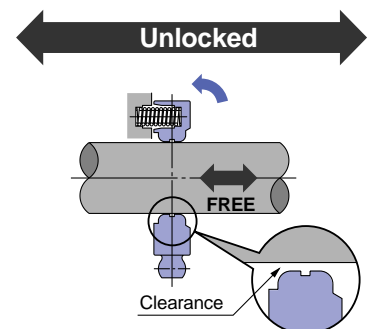


Simple construction/Simple and reliable locking system



Unlocking port: Air exhausted

1. The lock ring is tilted by the brake 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.

Compact Cylinder with Lock

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

Low profile with compact lock unit

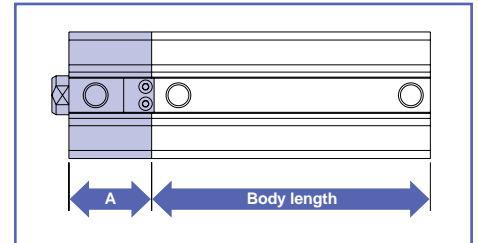
- Lock unit length

27 mm to 50 mm

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

Lock unit thickness (mm)

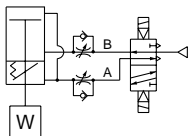
Bore size (mm)	A
20	27
25	31
32	32
40	34
50	35
63	38
80	43
100	50



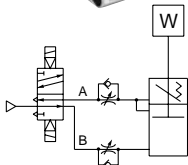
Locking direction is selectable.

(Must be selected at time of order.)

Extension locking

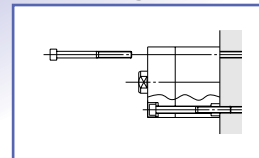


Retraction locking

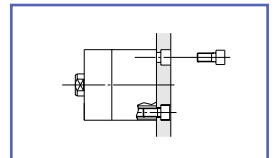


Two types of mounting

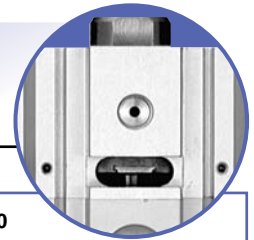
Through holes



Double end taps



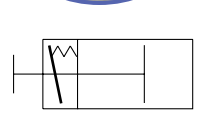
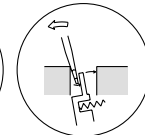
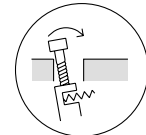
Easy manual unlocking



Locked

ø20 to ø32

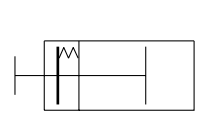
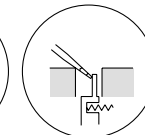
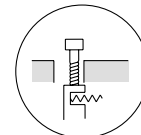
ø40 to ø100

























































































Unlocked

ø20 to ø32

ø40 to ø100



Wide 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 holes, double end taps common	Extension locking	20													
			25													
	Through holes Double end taps		Retraction locking	32												
				40												
		50														
		63														
	80															
	100															

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** **A73** **S**

With auto switch
(built-in magnet)

ø20, ø25

B	Through hole/Double end tapped common (standard)
L	Foot type
F	Front flange type
G	Rear flange type
D	Double clevis type

ø32 to ø100

B	Through hole (standard)
A	Double end tapped
L	Foot type
F	Front flange type
G	Rear flange type
D	Double clevis type

Mounting

* Mounting brackets are packed together when shipped (unassembled).

Bore size

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

Cylinder Stroke (mm)

Refer to page 2 for standard strokes and intermediate strokes.

Number of auto switches

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

Auto switch type

Nil	Without auto switch (built-in magnet cylinder)
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* Select auto switch models from the table below.

Locking direction

F	Extension locking
B	Retraction locking

Body option

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

Action

D	Double acting
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Mounting bracket part nos.

Bore size (mm)	Foot	Flange	Double clevis
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 using foot brackets, order 2 pcs. for each cylinder.

Note 2) The parts included with each bracket are shown below.
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 type

Auto switch specifications

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Rail mount		Direct mount		Lead wire length (m) *				Applicable load				
					DC	AC	ø32 to ø100		ø20 to ø100		0.5 (Nil)	3 (L)	5 (Z)	None (N)					
							Perpendicular	In-line	Perpendicular	In-line									
Reed switch	—	Grommet	Yes	3 wire (NPN equiv.)	—	5V	—	—	A76H	A96V	A96	●	●	—	—	IC circuit	Relay, PLC		
					—	—	200V	A72	A72H	—	—	●	●	—	—	—			
					24V	12V	100V	A73	A73H	—	—	●	●	●	—				
						5V, 12V	100V or less	A80	A80H	A93V	A93	●	●	—	—				
		Connector	No	12V	—	A73C	—	—	—	●	●	●	●	—	IC circuit				
				5V, 12V	24V or less	A80C	—	—	—	●	●	●	●	IC circuit					
		Diagnostic indication (2 colour indicator)	Grommet	Yes	—	—	A79W	—	—	—	●	●	—	—	—				
Solid state switch	—	Grommet	Yes	3 wire (NPN)	5V, 12V	—	F7NV	F79	M9NV	M9N	●	●	○	—	IC circuit	Relay, PLC			
				3 wire (PNP)			F7PV	F7P	M9PV	M9P	●	●	○	—					
				2 wire			F7BV	J79	M9BV	M9B	●	●	○	—	—				
							J79C	—	—	—	●	●	●	●					
	Diagnostic indication (2 colour indicator)	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	F7N WV	F79W	M9N WV	M9N W	●	●	○	—	IC circuit				
				3 wire (PNP)			—	F7P W	M9P W V	M9P W	●	●	○	—					
				2 wire			F7B WV	J79W	M9B WV	M9B W	●	●	○	—	—				
				—			F7B A	—	M9B A	—	●	●	○	—					
				With timer	Grommet	Yes	3 wire (NPN)	5V, 12V	—	F7N T	—	—	—	●	●		○	—	IC circuit
							—		F79F	—	—	—	●	●	○		—		
							4 wire (NPN)		—	F7L F	—	—	—	●	●		○	—	—
	Water resistant (2 colour indicator)	Grommet	Yes	3 wire (NPN)	5V, 12V	—	F7L F	—	—	—	●	●	○	—	—				
With diagnostic output (2 colour indicator)	Grommet	Yes	3 wire (NPN)	5V, 12V	—	F7L F	—	—	—	●	●	○	—	—					
Latch type with diagnostic output (2 colour indicator)	Grommet	Yes	3 wire (NPN)	5V, 12V	—	F7L F	—	—	—	●	●	○	—	—					

* Lead wire length symbols 0.5m Nil (Example) A80C 5m Z (Example) A80CZ
3m L (Example) A80CL None N (Example) A80CN

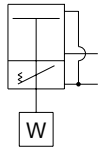
* Solid state switches marked with a "O" symbol are produced upon receipt of order.

Cylinder Specifications

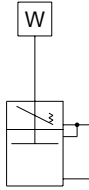


Symbols

Extension locking



Retraction locking



Auto Switch Mounting Bracket Part Nos. (Rail Mount)

Bore size (mm)	Bracket no.	Note
32, 40 50, 63 80, 100	BQ-2	<ul style="list-style-type: none"> Switch mounting screw (M3 x 0.5 x 10ℓ) Switch spacer Switch mounting nut

Applicable 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 D-F7□F D-F7NTL

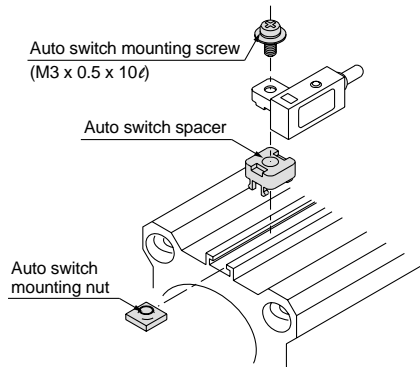
[Stainless steel mounting screw kit]

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 type D-F7BAL when it is shipped mounted on a cylinder.

Also, BBA2 is included when an auto switch alone is shipped.



Bore size (mm)	20	25	32	40	50	63	80	100
Action	Double acting single rod							
Fluid	Air							
Proof pressure	1.5MPa							
Maximum operating pressure	1.0MPa							
Minimum operating pressure	0.2MPa (Note)							
Ambient and fluid temperature	Without auto switch: -10 to 70°C (with no freezing) With auto switch: -10 to 60°C (with no freezing)							
Lubrication	Non-lube							
Piston speed	50 to 500mm/s							
Stroke length tolerance	$^{+1.0}_0$ 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 0.1MPa 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	0.2MPa or more							
Locking pressure	0.05MPa or less							
Locking direction	One direction (extension locking, retraction locking, each type)							
Unlocking port size	M5 x 0.8		Rc 1/8					Rc 1/4
Holding force N (Maximum static load)	157	245	403	629	982	1559	2514	3927
	Equivalent to 0.5MPa							

Standard Strokes

Bore size (mm)	Standard stroke (m)
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 Strokes

Method	Spacers installed in standard stroke body	
Part number	Refer to standard part number and ordering on page 1.	
Method	Strokes are available in 1mm increments by installing spacers in standard stroke cylinders	
Stroke range	Bore size (mm)	Stroke range (mm)
	20, 25	1 to 50
	32, 40, 50, 63, 80, 100	1 to 100
Example	Part number: CLQB40-47D-B A 3 mm spacer is installed in standard cylinder CLQB40-50D-B. The B dimension is 79.5mm.	

(Note) Consult SMC regarding intermediate strokes for sizes ø40 through ø100 with rubber bumpers.

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	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

Weights

Basic weight: Mounting hole through (type B)

Unit: 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

* The through hole and double end tap are common for sizes ø20 and ø25.

Basic weight: Mounting hole double end tapped (type A)

Unit: 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

Unit: g

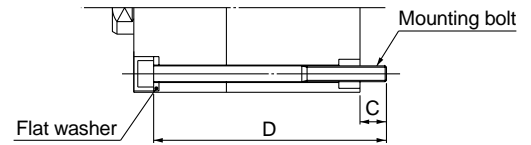
Bore size (mm)		20	25	32	40	50	63	80	100
Magnet		35	45	64	77	118	158	261	380
Rod end male threads	Threads	6	12	26	27	53	53	120	175
	Nut	4	8	17	17	32	32	49	116
With rubber cushion		-2	-3	-3	-7	-9	-18	-31	-56
Foot type (includes mounting bolt)		152	174	137	149	221	288	638	1009
Front flange type (includes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

Calculation (example) **CDLQD32-20DCM-B**

- **Basic weight:** CLQA32-20D-*. 453g
- **Additional weight:** Magnet. 64g
- Rod end male threads. 43g
- With rubber cushion. -3g
- Double clevis type. 145g
- 702g

Mounting Bolts for C□LQB

Mounting: Mounting bolts are available for the through hole type C□LQB.
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		55	M5 x 55ℓ
-10D		60	x 60ℓ
-15D		65	x 65ℓ
-20D		70	x 70ℓ
-25D	10.5	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		60	M5 x 60ℓ
-10D		65	x 65ℓ
-15D		70	x 70ℓ
-20D		75	x 75ℓ
-25D	8.5	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		65	M5 x 65ℓ
-15D		70	x 70ℓ
-20D		75	x 75ℓ
-25D		80	x 80ℓ
-30D		85	x 85ℓ
-35D	7	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		75	M5 x 75ℓ
-15D		80	x 80ℓ
-20D		85	x 85ℓ
-25D		90	x 90ℓ
-30D		95	x 95ℓ
-35D	8.5	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		80	M6 x 80ℓ
-15D		85	x 85ℓ
-20D		90	x 90ℓ
-25D		95	x 95ℓ
-30D		100	x 100ℓ
-35D	12.5	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		90	M8 x 90ℓ
-15D		95	x 95ℓ
-20D		100	x 100ℓ
-25D		105	x 105ℓ
-30D		110	x 110ℓ
-35D	16.5	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		100	M10 x 100ℓ
-15D		105	x 105ℓ
-20D		110	x 110ℓ
-25D		115	x 115ℓ
-30D		120	x 120ℓ
-35D	17	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		115	M10 x 115ℓ
-15D		120	x 120ℓ
-20D		125	x 125ℓ
-25D		130	x 130ℓ
-30D		135	x 135ℓ
-35D	15.5	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		65	M5 x 65ℓ
-10D		70	x 70ℓ
-15D		75	x 75ℓ
-20D		80	x 80ℓ
-25D	10.5	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		70	M5 x 70ℓ
-10D		75	x 75ℓ
-15D		80	x 80ℓ
-20D		85	x 85ℓ
-25D	8.5	90	x 90ℓ
-30D		95	x 95ℓ
-35D		100	x 100ℓ
-40D		105	x 105ℓ
-45D		110	x 110ℓ
-50D		115	x 115ℓ

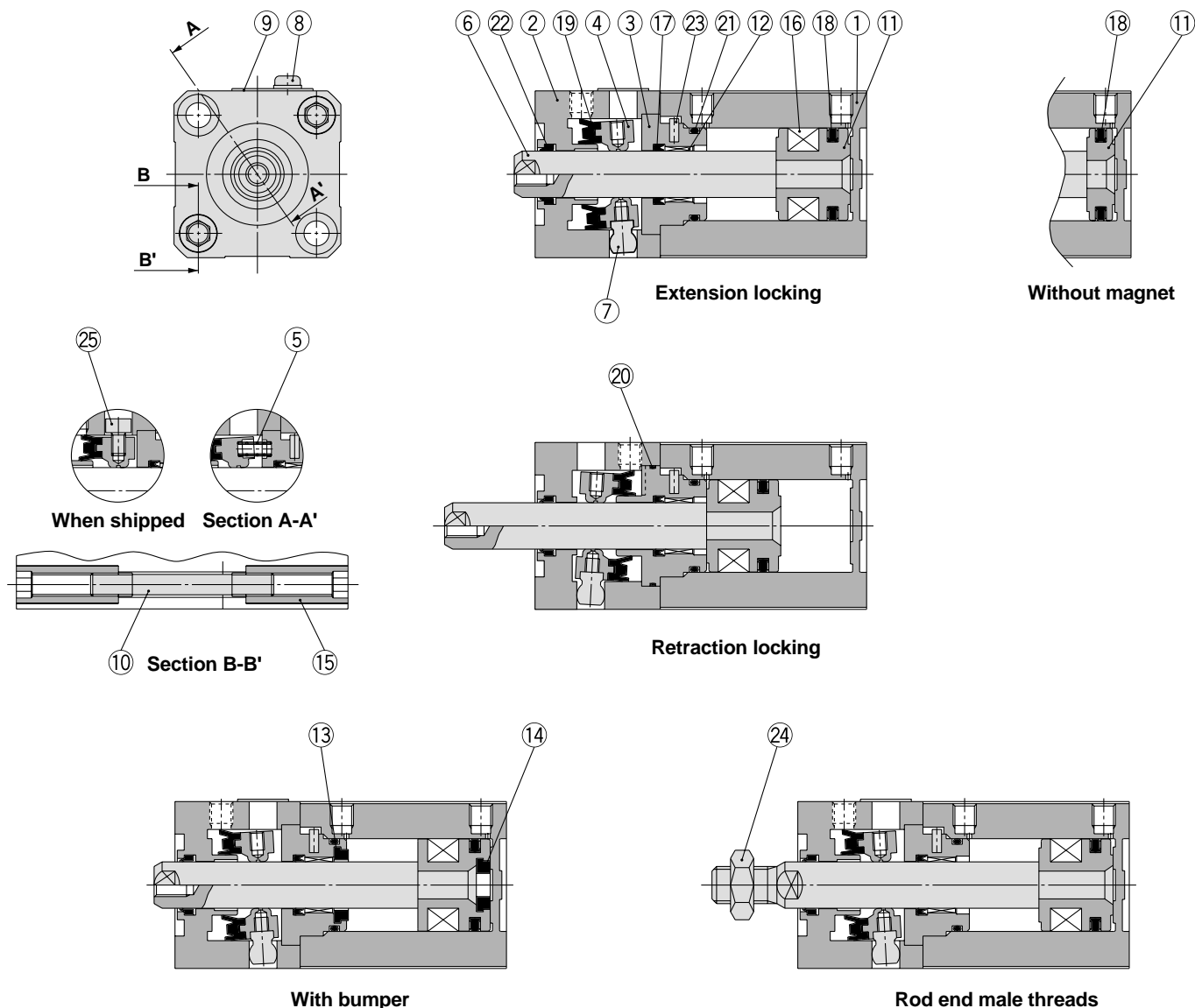
Model	C	D	Mounting bolt
CDLQB32-10D		75	M5 x 75ℓ
-15D		80	x 80ℓ
-20D		85	x 85ℓ
-25D		90	x 90ℓ
-30D		95	x 95ℓ
-35D	7	100	x 100ℓ
-40D		105	x 105ℓ
-45D		110	x 110ℓ
-50D		115	x 115ℓ
-75D		140	x 140ℓ
-100D		165	x 165ℓ
CDLQB40-10D		85	M5 x 85ℓ
-15D		90	x 90ℓ
-20D		95	x 95ℓ
-25D		100	x 100ℓ
-30D		105	x 105ℓ
-35D	8.5	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		90	M6 x 90ℓ
-15D		95	x 95ℓ
-20D		100	x 100ℓ
-25D		105	x 105ℓ
-30D		110	x 110ℓ
-35D	12.5	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		100	M8 x 100ℓ
-15D		105	x 105ℓ
-20D		110	x 110ℓ
-25D		115	x 115ℓ
-30D		120	x 120ℓ
-35D	16.5	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		110	M10 x 110ℓ
-15D		115	x 115ℓ
-20D		120	x 120ℓ
-25D		125	x 125ℓ
-30D		130	x 130ℓ
-35D	17	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		125	M10 x 125ℓ
-15D		130	x 130ℓ
-20D		135	x 135ℓ
-25D		140	x 140ℓ
-30D		145	x 145ℓ
-35D	15.5	150	x 150ℓ
-40D		155	x 155ℓ
-45D		160	x 160ℓ
-50D		165	x 165ℓ
-75D		190	x 190ℓ
-100D		215	x 215ℓ

Series CLQ

Construction/ø20 to ø32



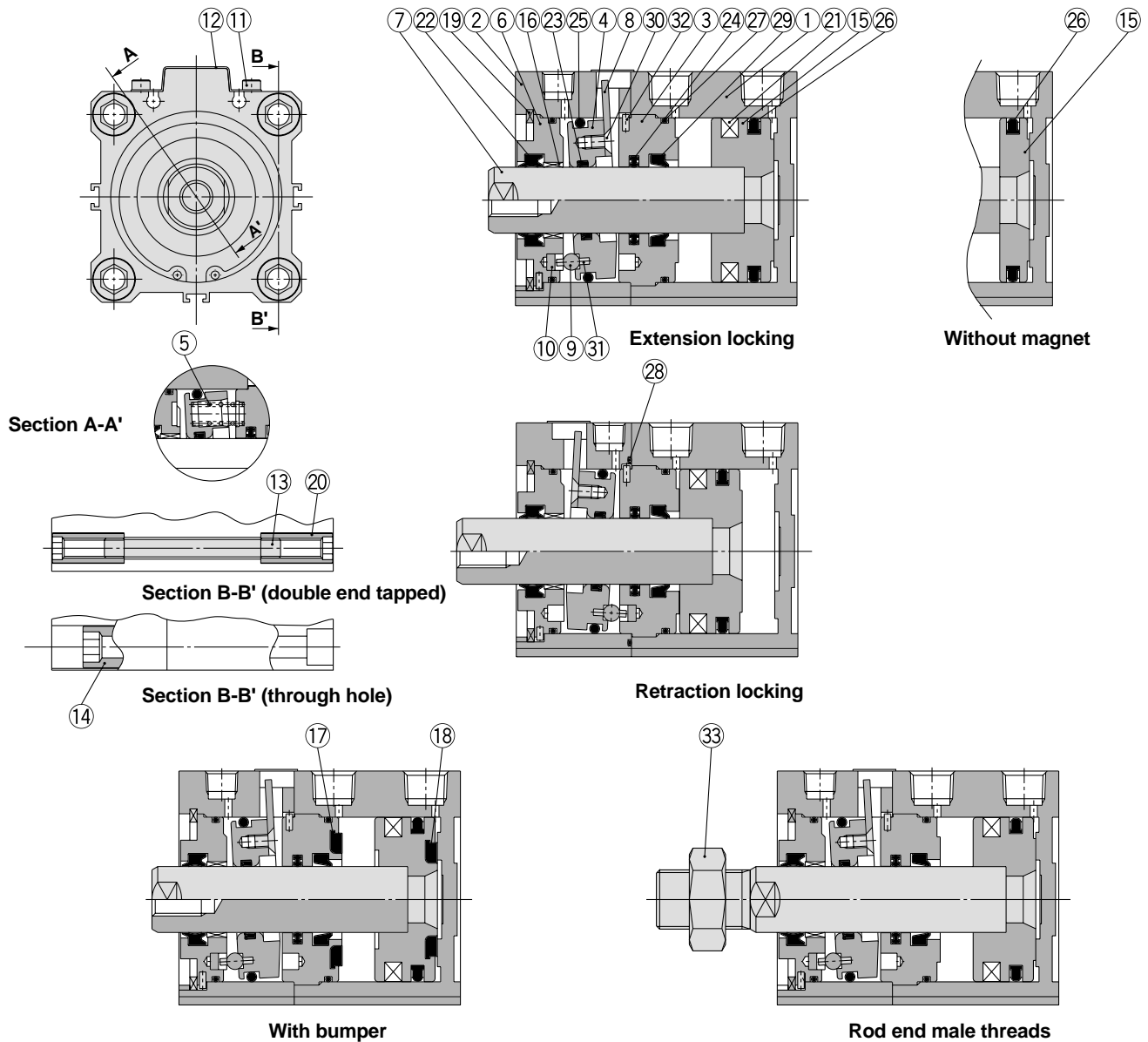
Note) The sectional drawing above shows the locked condition. (A bolt is used to maintain the cylinder in the unlocked condition when shipped.)

Parts list

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	Chrome 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
		Die-cast lead-bronze	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 B1354
24	Rod end nut	Carbon steel	Nickel plated
25	Unlocking bolt	Chrome molybdenum steel	Nickel plated

Construction/ø40 to ø100



Note) The sectional drawing above shows the locked condition.

Parts list

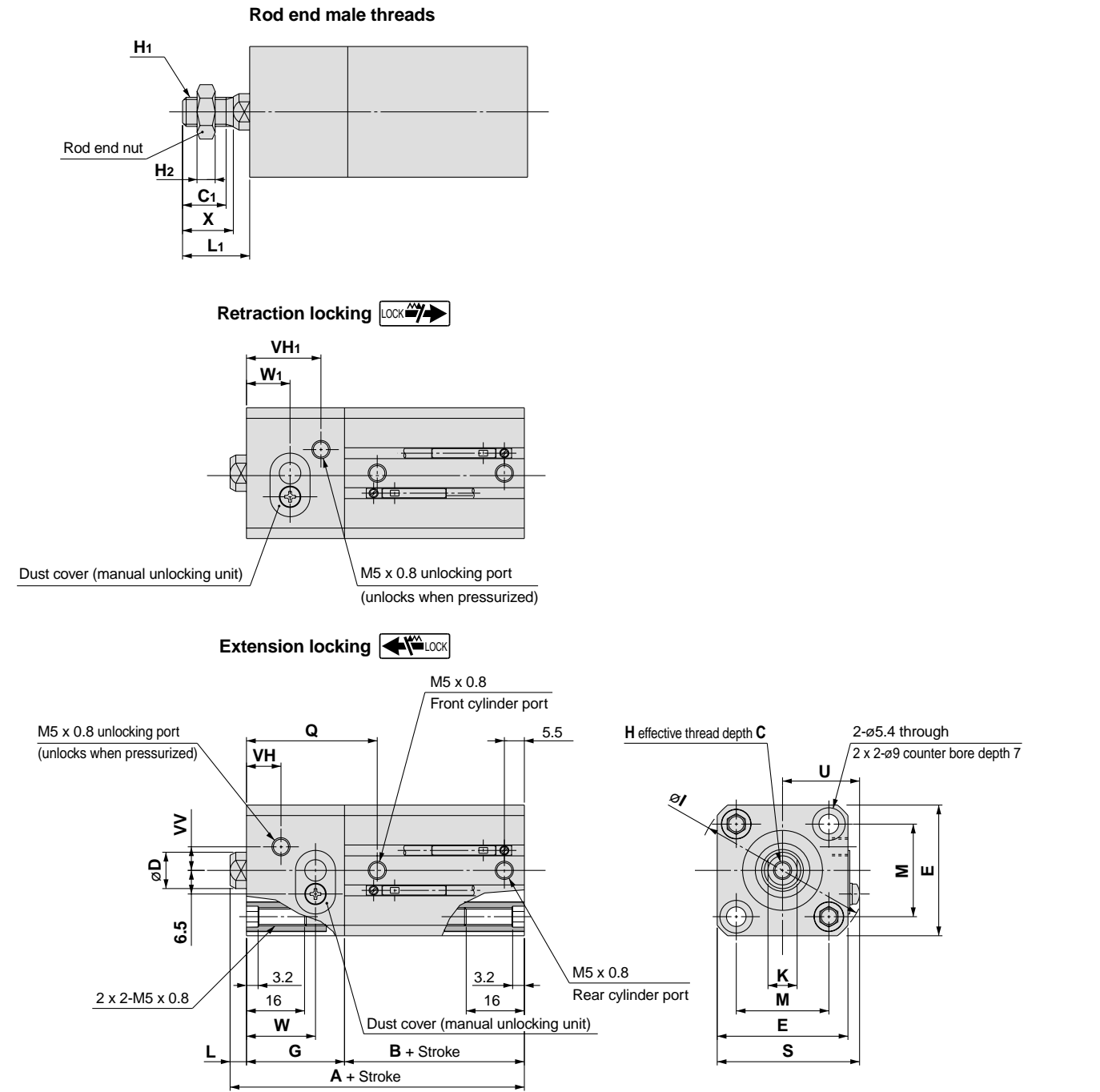
No.	Description	Material	Note
1	Cylinder tube	Aluminum alloy	Hard anodized
2	Lock body	Aluminum alloy	Hard anodized
3	Intermediate collar	Aluminum alloy	Chromated
4	Lock ring	Carbon steel	Heat treated
5	Brake spring	Steel wire	Zinc chromated
6	Collar	Aluminum alloy	ø40: Hard anodized
		Die-cast aluminum alloy	ø50 to ø100: Chromated, coated
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	Chrome 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	Die-cast lead-bronze	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	Chrome molybdenum steel	Nickel plated
31	Spring pin	Carbon steel	JIS B2808
32	Parallel pin	Stainless steel	JIS B1354
33	Rod end nut	Carbon steel	Nickel plated

Series CLQ

Dimensions/ø20, ø25

Standard type (through hole/double end tapped): 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

For retraction locking (mm)

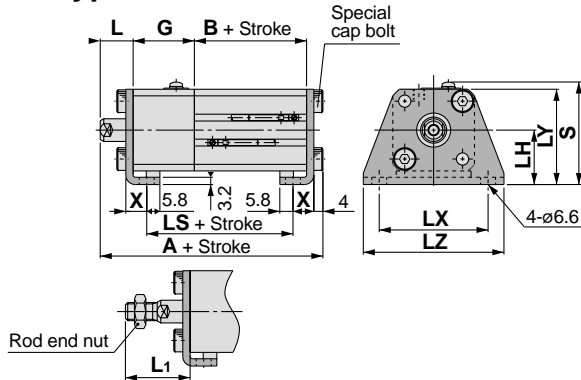
Bore size (mm)	VH1	W1
20	20.5	12
25	23	14.5

For rod end male threads (mm)

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 type: CLQL/CDLQL

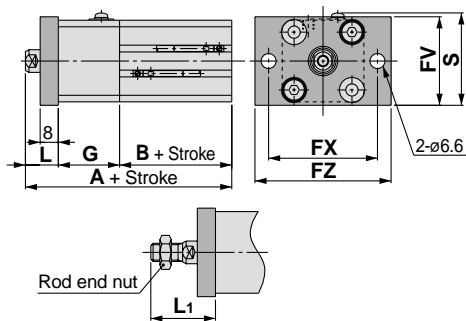


Foot type (mm)

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	L ₁	LH	LX	LY	LZ	X	S
20	27	14.5	28.5	24	48	42	62	9.2	45.2
25	31	15	32.5	26	52	46	66	10.7	49.2

Front flange type: CLQF/CDLQF

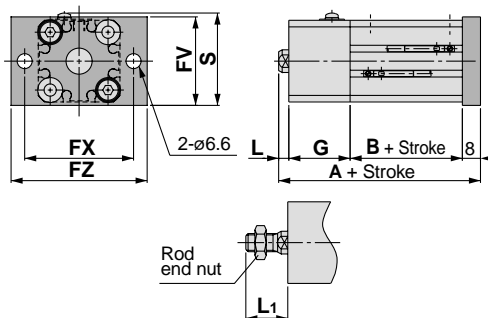


Front flange type (mm)

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	L ₁	S
20	39	48	60	27	14.5	28.5	40.7
25	42	52	64	31	15	32.5	44.2

Rear flange type: CLQG/CDLQG

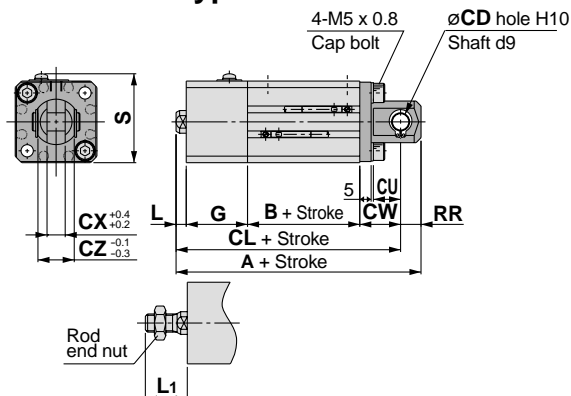


Rear flange type (mm)

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	L ₁	S
20	39	48	60	27	4.5	18.5	40.7
25	42	52	64	31	5	22.5	44.2

Double clevis type: CLQD/CDLQD



Double clevis type (mm)

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	L ₁	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

2 x 4-M5 x 0.8

3.2

16

3.2

16

M14 x 1.5

Rod end nut

8

20.5

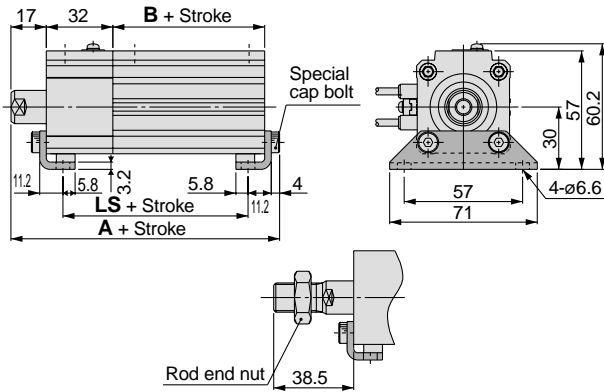
23.5

28.5

(mm)					
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		

Dimensions/ $\phi 32$

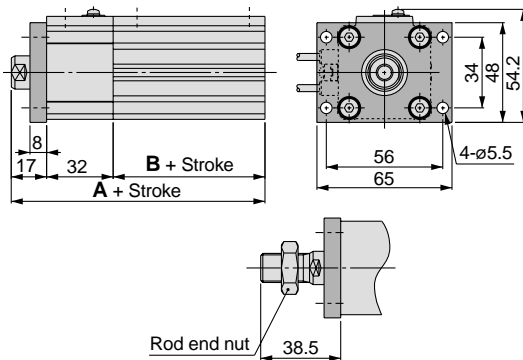
Foot type: C□LQL32



Foot type (mm)

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			

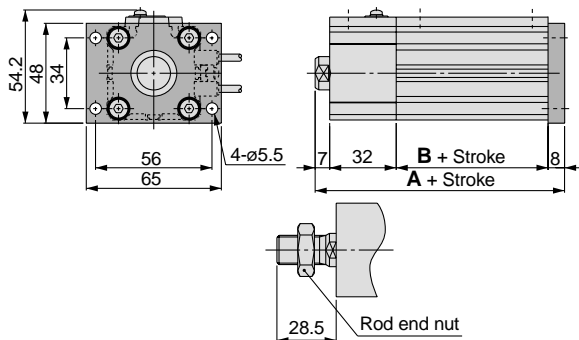
Front flange type: C□LQF32



Front flange type (mm)

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		

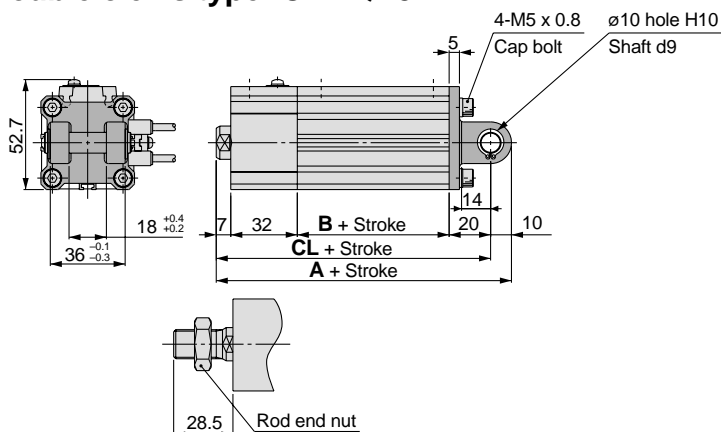
Rear flange type: C□LQG32



Rear flange type (mm)

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 type: C□LQD32



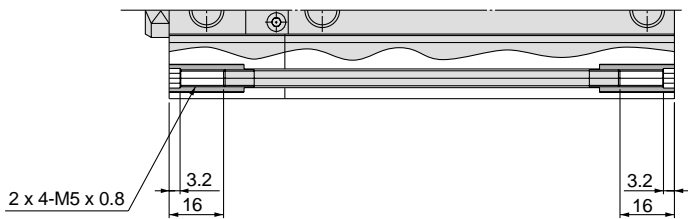
Double clevis type (mm)

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			

Series CLQ

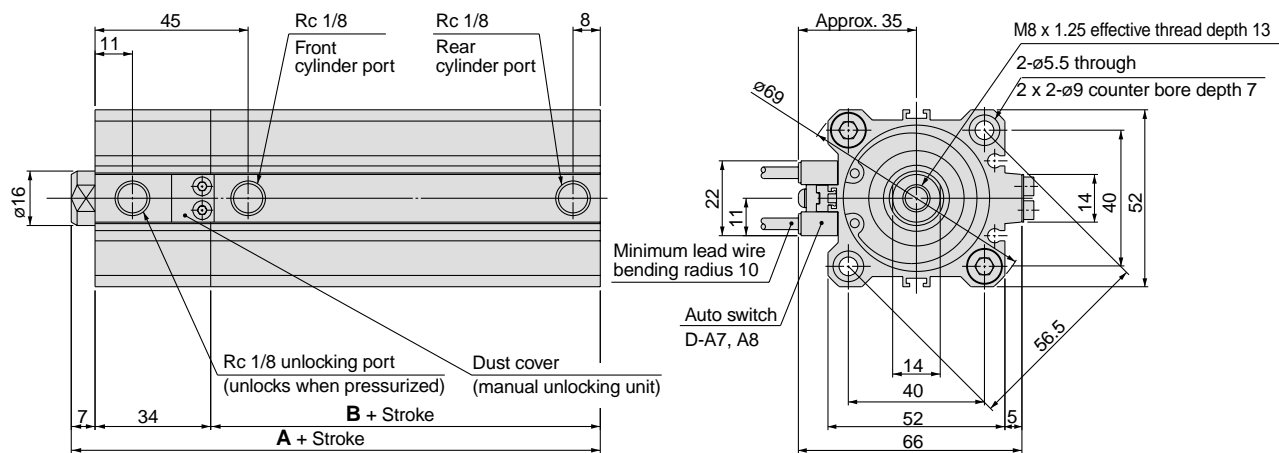
Dimensions/ø40

Double end tapped: C□LQA40

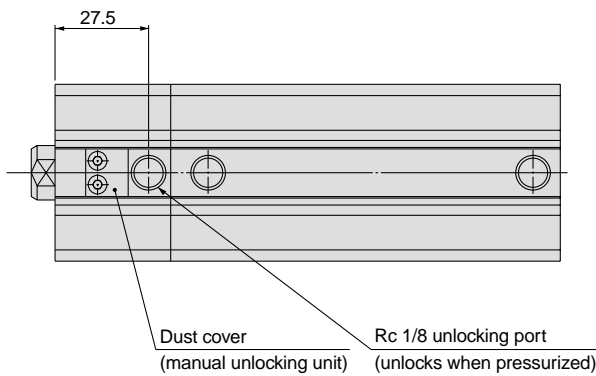


Standard type (through hole): C□LQB40

Extension locking



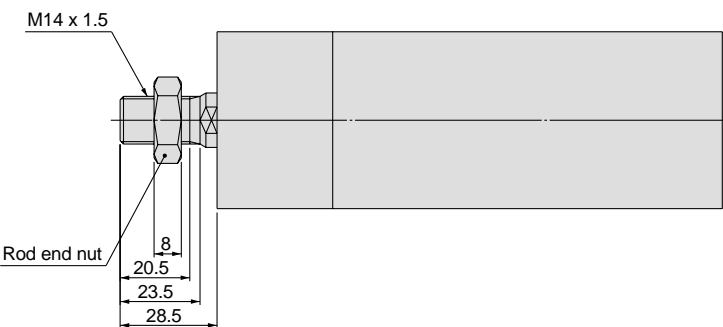
Retraction locking



A, B dimensions (mm)

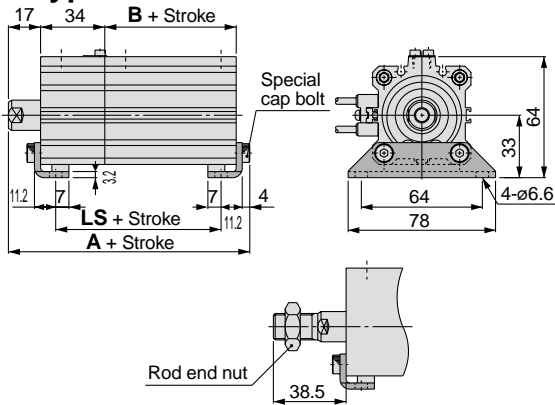
Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch	
		A	B	A	B
40	10 to 50	70.5	29.5	80.5	39.5
	75, 100	80.5	39.5		

Rod end male threads



Dimensions/ø40

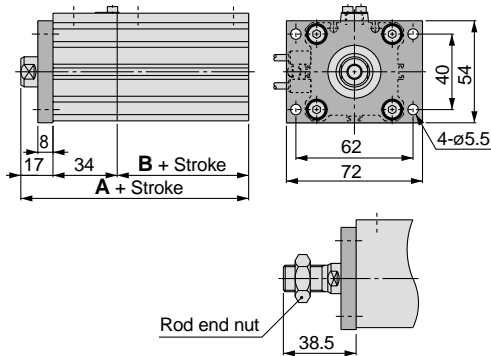
Foot type: C□LQL40



Foot type (mm)

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			

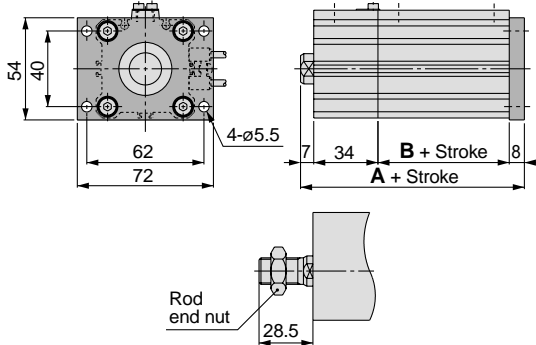
Front flange type: C□LQF40



Front flange type (mm)

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		

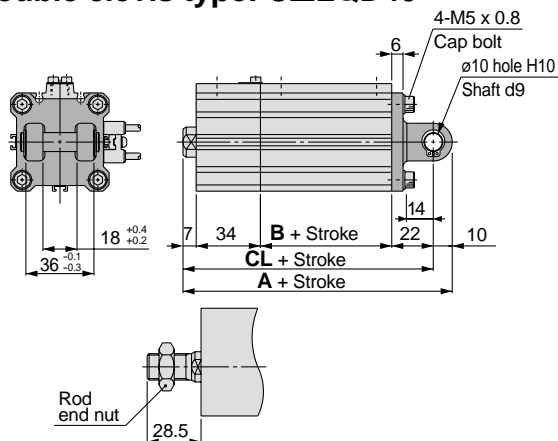
Rear flange type: C□LQG40



Rear flange type (mm)

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 type: C□LQD40



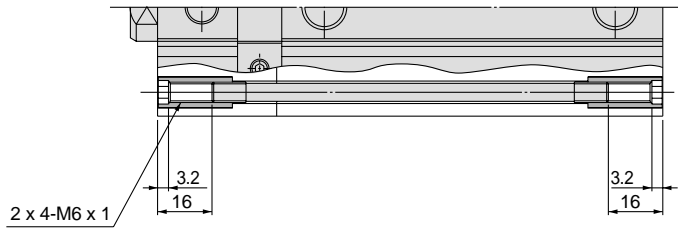
Double clevis type (mm)

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			

Series CLQ

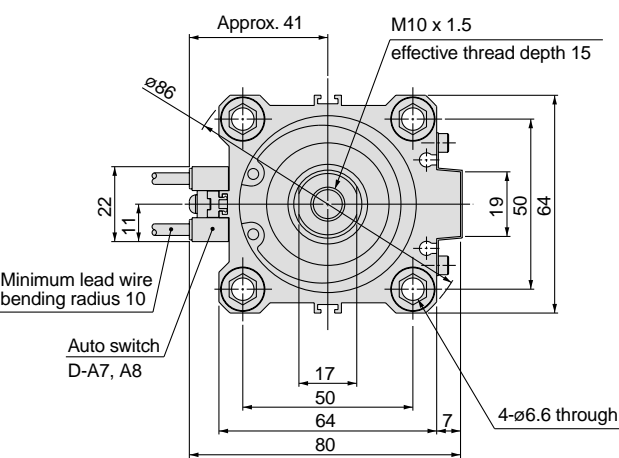
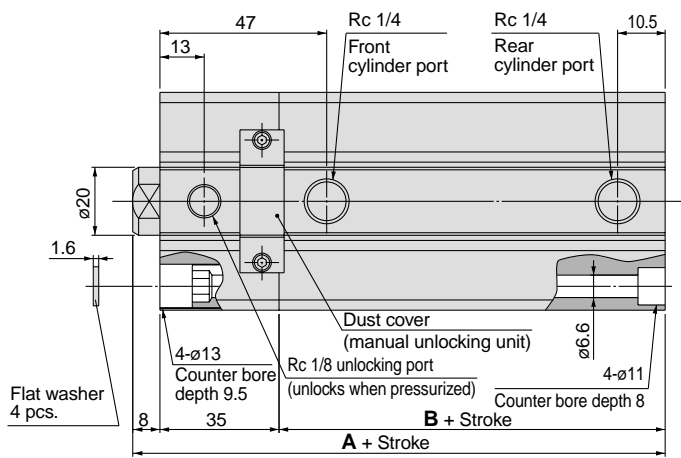
Dimensions/ø50

Double end tapped: C□LQA50

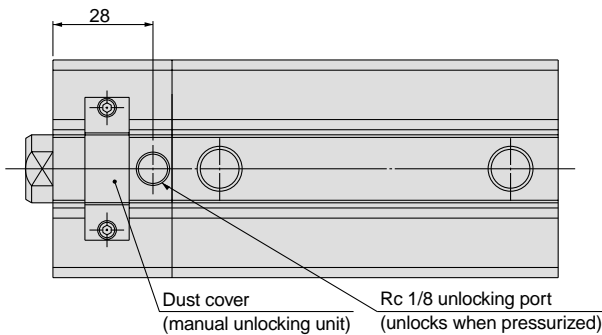


Standard type (through hole): C□LQB50

Extension locking



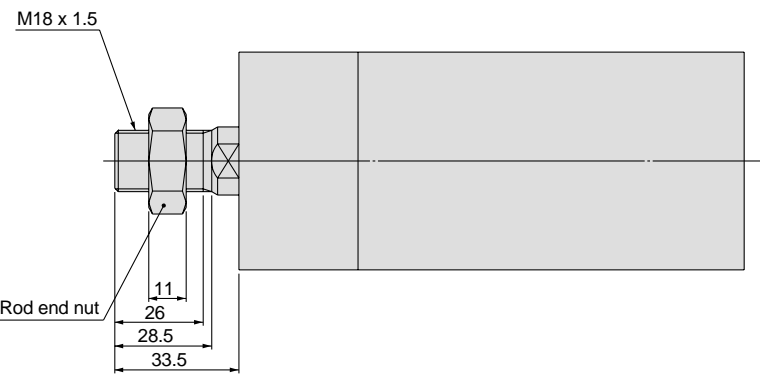
Retraction locking



A, B dimensions (mm)

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		

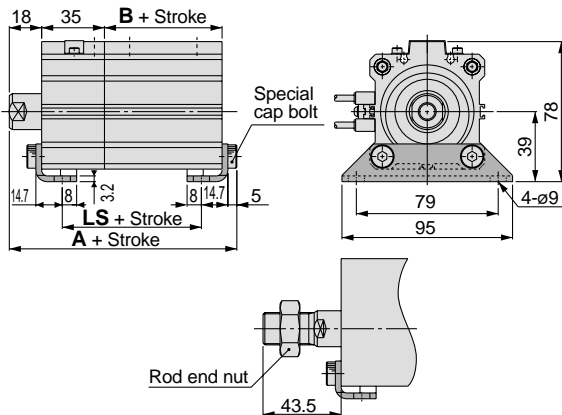
Rod end male threads



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

Dimensions/ø50

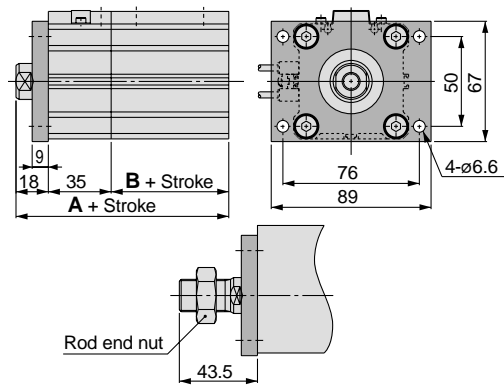
Foot type: C□LQL50



Foot type (mm)

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			

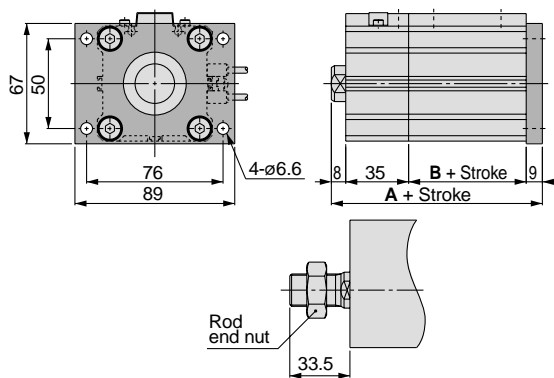
Front flange type: C□LQF50



Front flange type (mm)

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		

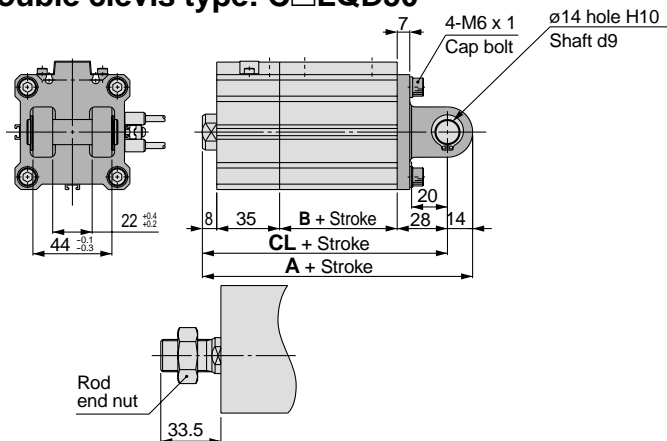
Rear flange type: C□LQG50



Rear flange type (mm)

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 type: C□LQD50



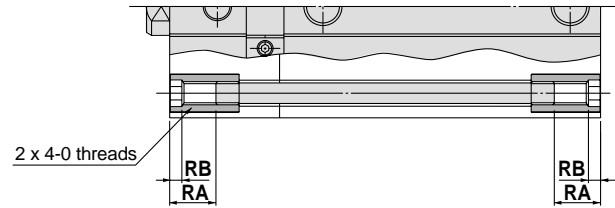
Double clevis type (mm)

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			

Series CLQ

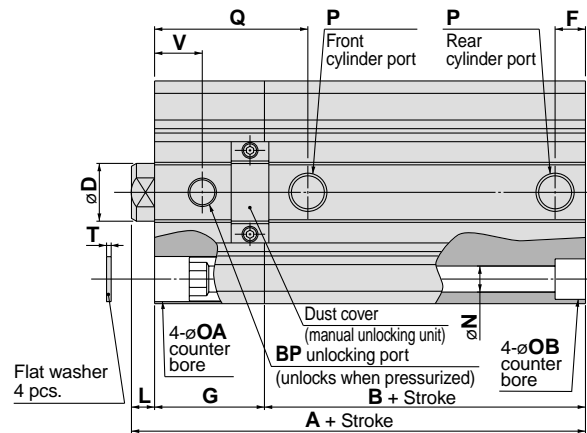
Dimensions/ø63, ø80, ø100

Double end tapped: C□LQA63/80/100

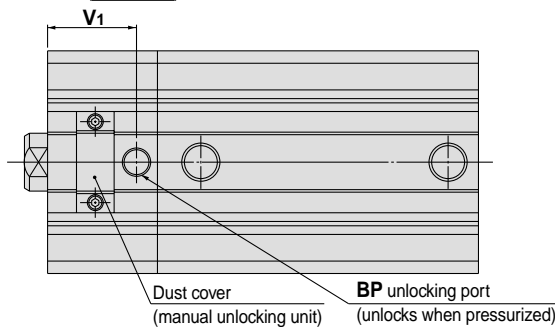


Standard type (through hole): C□LQB63/80/100

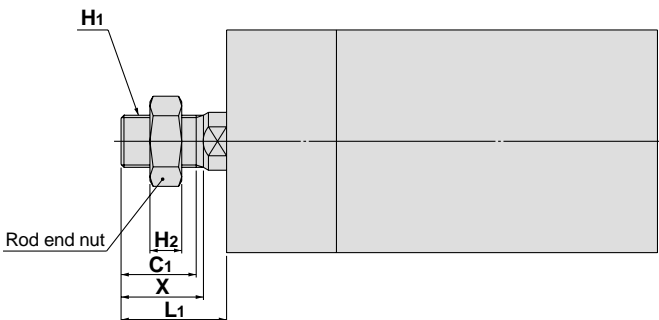
Extension locking



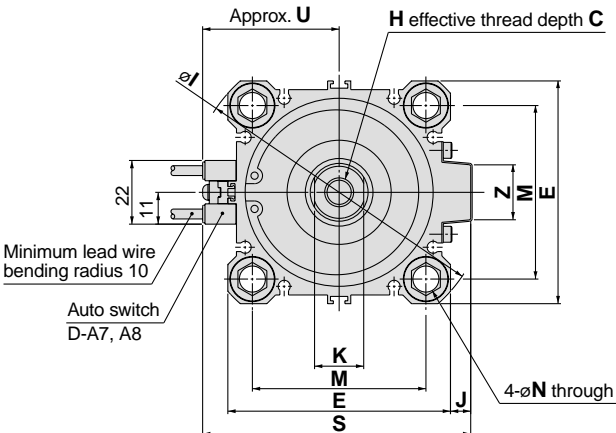
Retraction locking



Rod end male threads



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



For retraction locking (mm)

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

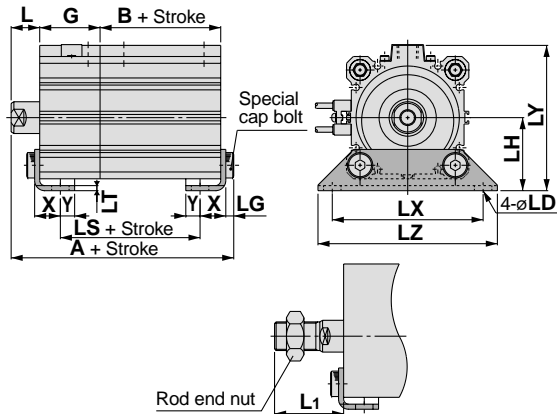
For rod end male threads (mm)

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

(mm)																														
Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch		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
		A	B	A	B																									
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 1/8	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 1/4	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 type: CLQL/CDLQL

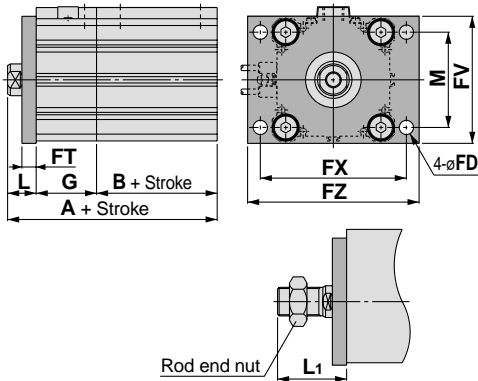


Foot type (mm)

Bore size (mm)	Stroke range	Without auto switch			With auto switch			G	L
		A	B	LS	A	B	LS		
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

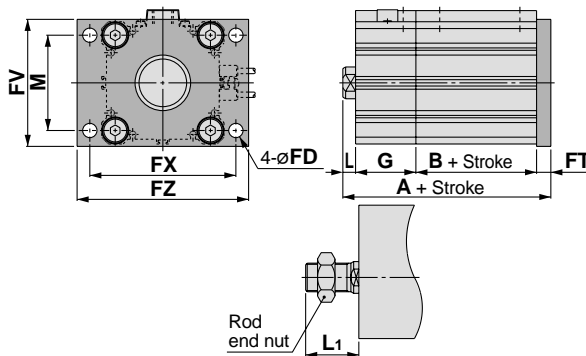
Front flange type: CLQF/CDLQF



Front flange type (mm)

Bore size (mm)	Stroke range	Without auto switch		With auto switch		FD	FT	FV	FX	FZ	G	L	L1	M
		A	B	A	B									
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											

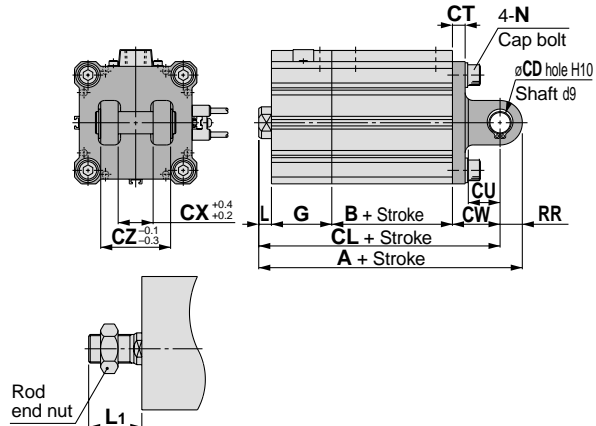
Rear flange type: CLQG/CDLQG



Rear flange type (mm)

Bore size (mm)	Stroke range	Without auto switch		With auto switch		FD	FT	FV	FX	FZ	G	L	L1	M
		A	B	A	B									
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 type: CLQD/CDLQD



Double clevis type (mm)

Bore size (mm)	Stroke range	Without auto switch			With auto switch			CD	CT
		A	B	CL	A	B	CL		
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

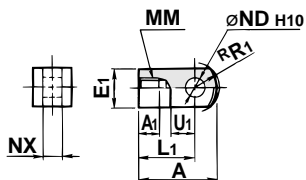
Series CLQ

Accessories

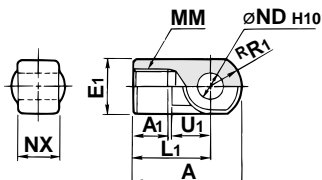
Single knuckle joint

I-G02, I-G03

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



Material: Rolled steel



Material: Cast iron

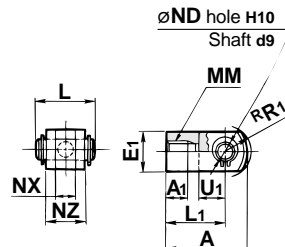
(mm)

Part no.	Applicable bore size (mm)	A	A ₁	E ₁	L ₁	MM	RR 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 ^{-0.3} _{-0.5}
I-G04	32, 40	42	14	∅22	30	M14 x 1.5	12	14	10 ^{+0.058} ₀	18 ^{-0.3} _{-0.5}
I-G05	50, 63	56	18	∅28	40	M18 x 1.5	16	20	14 ^{+0.070} ₀	22 ^{-0.3} _{-0.5}
I-G08	80	71	21	∅38	50	M22 x 1.5	21	27	18 ^{+0.070} ₀	28 ^{-0.3} _{-0.5}
I-G10	100	79	21	∅44	55	M26 x 1.5	24	31	22 ^{+0.084} ₀	32 ^{-0.3} _{-0.5}

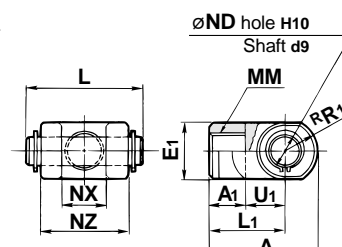
Double knuckle joint

Y-G02, Y-G03

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



Material: Rolled steel



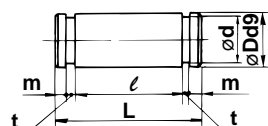
Material: Cast iron

(mm)

Part no.	Applicable bore size (mm)	A	A ₁	E ₁	L ₁	MM	RR 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	∅22	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	∅28	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	∅38	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	∅44	55	M26 x 1.5	24	31	22 ^{+0.084} ₀	32 ^{+0.5} _{+0.3}	64	72	IY-G10

* Knuckle pin and snap rings are included.

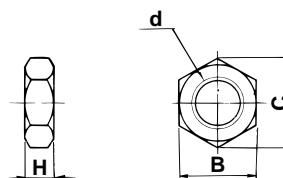
Knuckle pin (common with double clevis pin)



Material: Carbon steel
(mm)

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	C type 8 for shaft
IY-G03	25	10 ^{-0.040} _{-0.076}	25.6	9.6	20.2	1.55	1.15	C type 10 for shaft
IY-G04	32, 40	10 ^{-0.040} _{-0.076}	41.6	9.6	36.2	1.55	1.15	C type 10 for shaft
IY-G05	50, 63	14 ^{-0.050} _{-0.093}	50.6	13.4	44.2	2.05	1.15	C type 14 for shaft
IY-G08	80	18 ^{-0.050} _{-0.093}	64	17	56.2	2.55	1.35	C type 18 for shaft
IY-G10	100	22 ^{-0.065} _{-0.117}	72	21	64.2	2.55	1.35	C type 22 for shaft

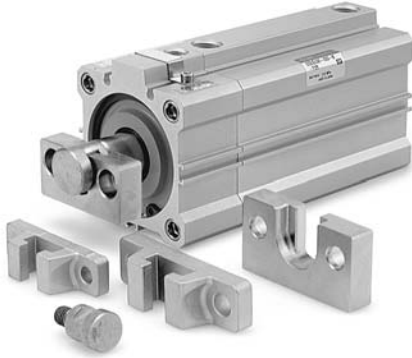
Rod end nut



Material: Rolled steel
(mm)

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 brackets (A, B type) part nos.

YA **03**

Mounting bracket

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

Applicable cylinder bore size

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

Bore size (mm)	Joint	Applicable mounting brackets	
		A type	B type
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 (mm)

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

<Ordering method>

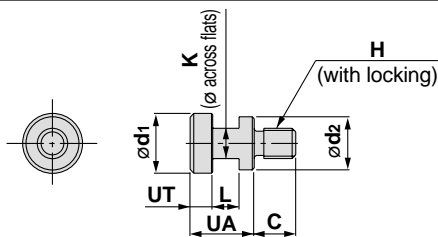
- Joints are not included with A type and B type mounting brackets. Order them separately.

(Example)

For bore size ø40 Part number

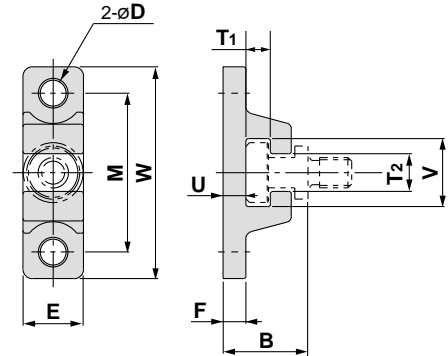
- A type mounting bracket YA-03
- Joint YU-03

Joints



Part no.	Applicable bore size (mm)	UA	C	d1	d2	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

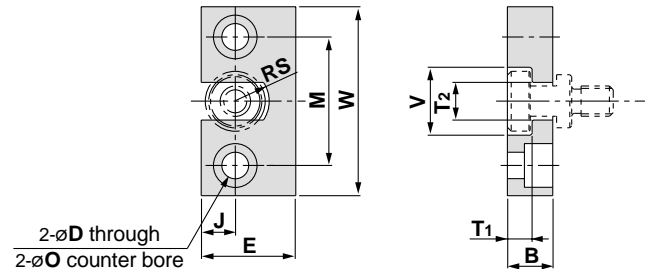
A type mounting brackets



Part no.	Bore size (mm)	B	D	E	F	M	T1	T2
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

B type mounting brackets



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)	T1	T2	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



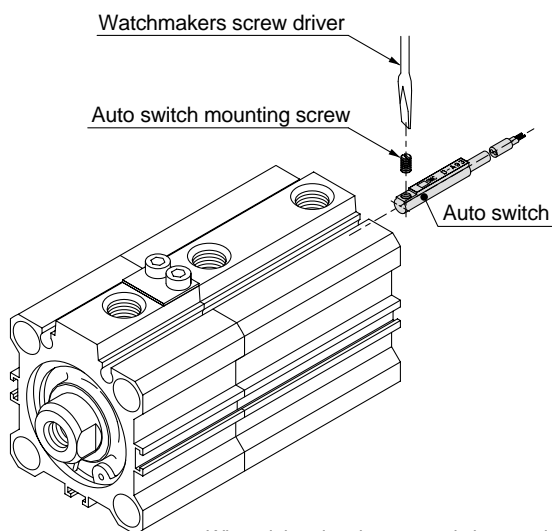
Applicable Auto Switches

Auto switch type	Auto switch model	Electrical entry/Function	Applicable bore size
Reed switch	D-A7□/A80	Grommet (perpendicular)	ø32 to ø100
	D-A7□H/A80H	Grommet (in-line)	
	D-A73C/A80C	Connector	
	D-A79W	Grommet (2 colour indication, perpendicular)	ø20 to ø100
	D-A9□	Grommet (in-line)	
	D-A9□V	Grommet (perpendicular)	
Solid state switch	D-F7□/J79	Grommet (in-line)	ø32 to ø100
	D-F7□V	Grommet (perpendicular)	
	D-J79C	Connector	
	D-F7□W/J79W	Grommet (2 colour indication, in-line)	
	D-F7□WV	Grommet (2 colour indication, perpendicular)	
	D-F7BAL	Grommet (2 colour indication, water resistant, in-line)	
	D-F79F	Grommet (2 colour indication, with diagnostic output, in-line)	
	D-F7LF	Grommet (2 colour indication, latch type with diagnostic output, in-line)	ø20 to ø100
	D-F7NTL	Grommet (with timer, in-line)	
	D-M9□	Grommet (in-line)	
	D-M9□V	Grommet (perpendicular)	
	D-M9□W	Grommet (2 colour indication, in-line)	
	D-M9□WV	Grommet (2 colour indication, perpendicular)	
	D-M9BAL	Grommet (2 colour indication, water resistant, in-line)	

Auto Switch Mounting

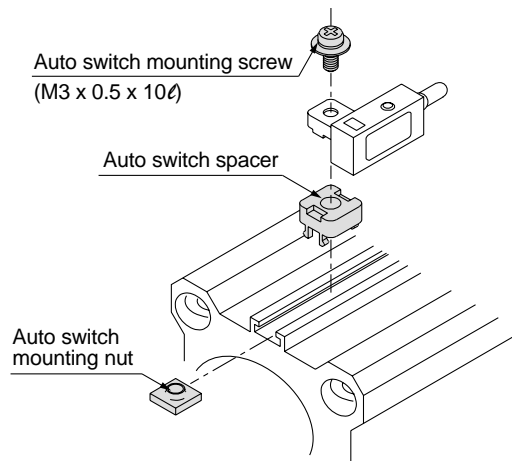
Follow the procedures below to mount auto switches.

ø20 to ø100/Direct mount



- When tightening the auto switch mounting screw, use a watchmakers screw driver with a handle about 5 to 6mm in diameter. Tighten with a torque of 0.10 to 0.20N·m.

ø32 to ø100/Rail mount



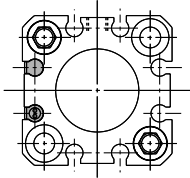
- Use a tightening torque of 0.5 to 0.7N·m for auto switch mounting screws.

* Auto switch mounting brackets are packed together for cylinders with built-in magnets.

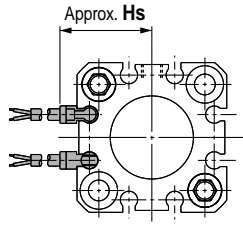
Auto Switches/Proper Mounting Positions and Height for Stroke End Detection

ø20, ø25

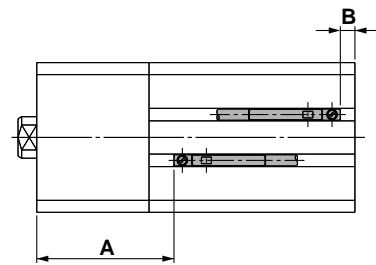
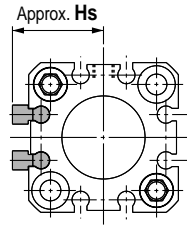
D-A9□
D-M9□
D-M9□W



D-A9□V
D-M9□V
D-M9□WV

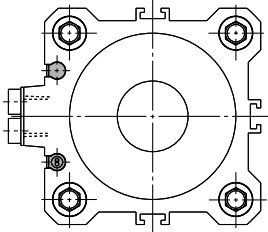


D-M9BAL

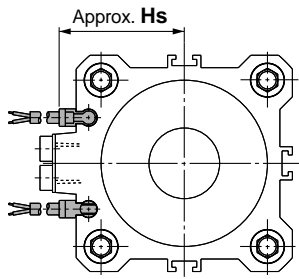


ø32 to ø100

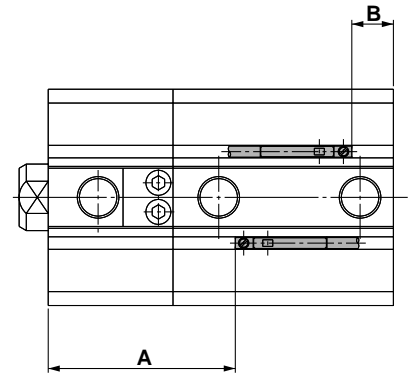
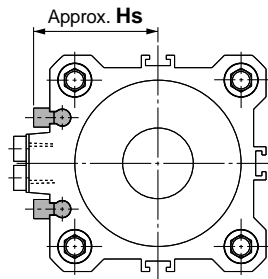
D-A9□
D-M9□
D-M9□W



D-A9□V
D-M9□V
D-M9□WV



D-M9BAL



Proper auto switch mounting positions (mm)

Bore size (mm)	D-A9□ D-A9□V		D-M9□ D-M9□V D-M9□W D-M9□WV		D-M9BAL	
	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 (mm)

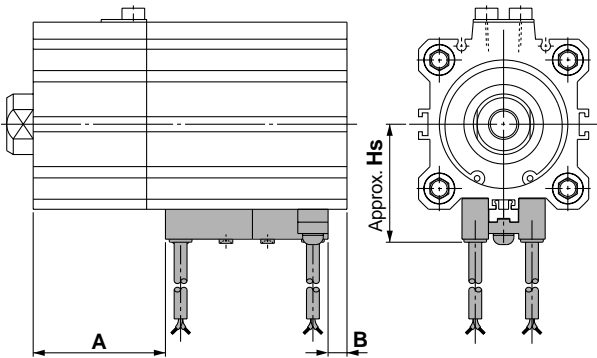
Bore size (mm)	D-A9□V	D-M9□V D-M9□WV	D-M9BAL
	Hs	Hs	Hs
20	22.5	25	22
25	24.5	27	24
32	27	29	26.5
40	30.5	32.5	30
50	36.5	38.5	36
63	40	42	39.5
80	50	52	49.5
100	60	62	59.5

Series CLQ

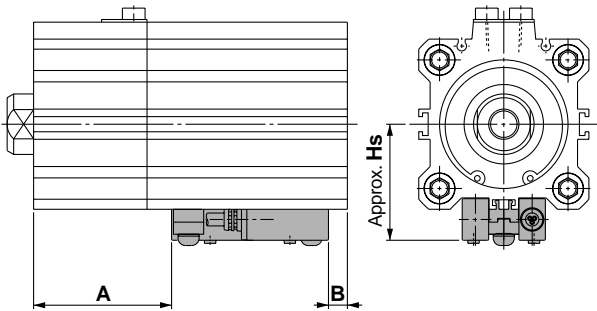
Auto Switches/Proper Mounting Positions and Height for Stroke End Detection

ø32 to ø100

D-A7□
D-A80

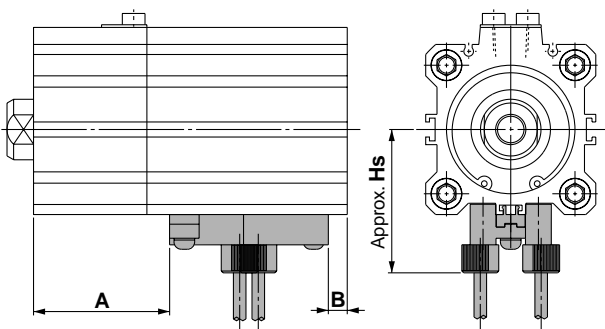


D-A7□H D-J79W
D-A80H D-F7□F
D-F7□ D-F7NT
D-J79 D-F7BAL
D-F7□W

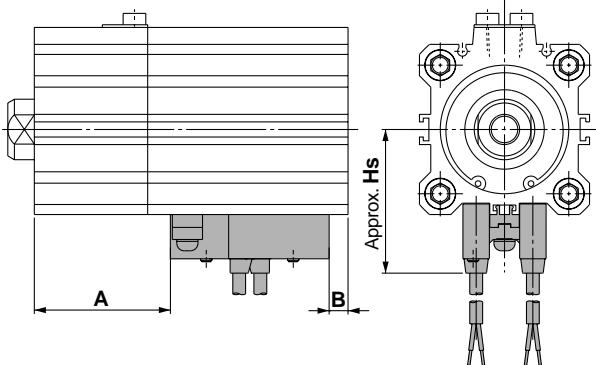


ø32 to ø100

D-A73C
D-A80C
D-J79C



D-A79W
D-F7□WV
D-F7□V



Proper auto switch mounting positions (mm)

Bore size (mm)	D-A7□/A80		D-A7□H/A80H D-A73C/A80C D-F7□/J79 D-F7□V/J79C		D-A79W		D-F79W D-F7BA D-F7□W D-F7□F D-J79W D-F7□WV	
	A	B	A	B	A	B	A	B
20	—	—	—	—	—	—	—	—
25	—	—	—	—	—	—	—	—
32	41	6	41.5	6.5	38.5	3.5	45.5	10.5
40	47	8.5	47.5	9	44.5	6	51.5	13
50	46	11.5	46.5	12	43.5	9	50.5	16
63	51.5	14.5	52	15	49	12	56	19
80	60.5	18	61	18.5	58	15.5	65	22.5
100	71	24	71.5	24.5	68.5	21.5	75.5	28.5

Auto switch mounting height (mm)

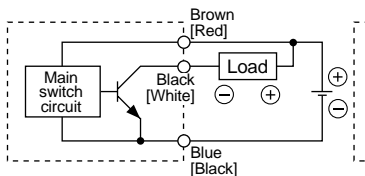
Bore size (mm)	D-A7□ D-A80	D-A7□H D-A80H D-F7□ D-J79 D-F7□W	D-J79W D-F7BAL D-F7□F D-F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV	D-J79C	D-A79W
	Hs	Hs	Hs	Hs	Hs	Hs	Hs
20	—	—	—	—	—	—	—
25	—	—	—	—	—	—	—
32	31.5	32.5	38.5	35	38	34	—
40	35	36	42	38.5	41.5	37.5	—
50	41	42	48	44.5	47.5	43.5	—
63	47.5	48.5	54.5	51	54	50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

Series CLQ Auto Switch Connections and Examples

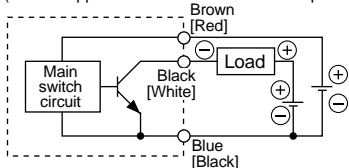
Basic Wiring

Lead wire colours inside [] are those prior to conformity with IEC standards.

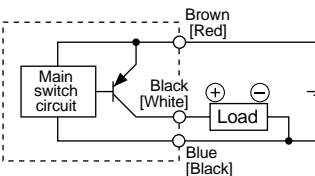
Solid state 3 wire, NPN



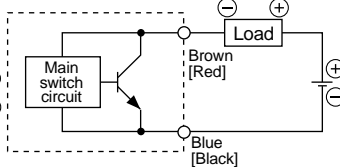
(Power supplies for switch and load are separate.)



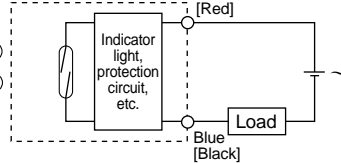
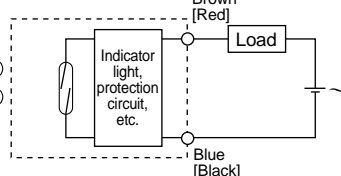
Solid state 3 wire, PNP



2 wire (Solid state)



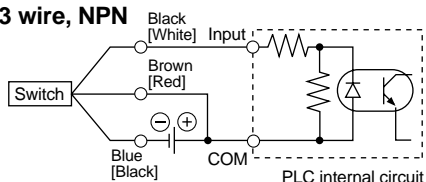
2 wire (Reed switch)



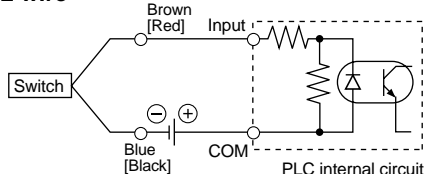
Examples of Connection to PLC

Sink input specifications

3 wire, NPN

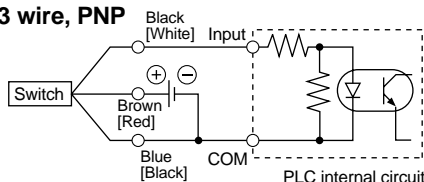


2 wire

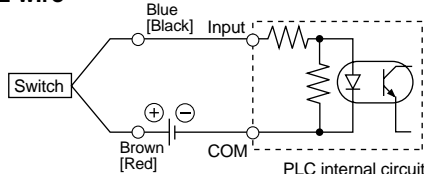


Source input specifications

3 wire, PNP



2 wire

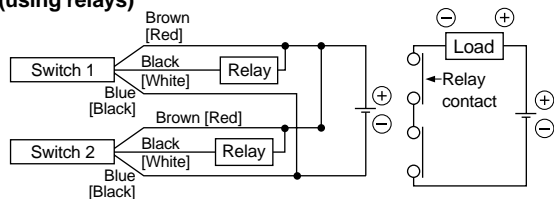


Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

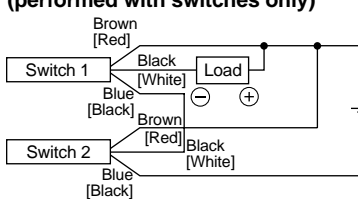
Connection Examples for AND (Series) and OR (Parallel)

3 wire

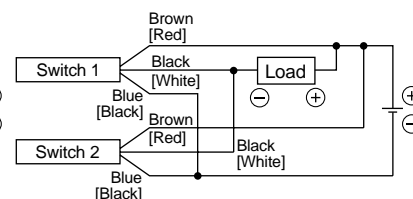
AND connection for NPN output (using relays)



AND connection for NPN output (performed with switches only)

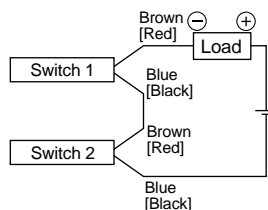


OR connection for NPN output



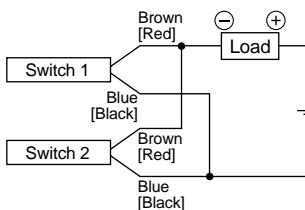
The indicator lights will light up when both switches are turned ON.

2 wire with 2 switch 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.

2 wire with 2 switch 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.

(Reed switch)
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 dim or not light up, because of dispersion and reduction of the current flowing to the switches.

$$\begin{aligned} \text{Load voltage at ON} &= \text{Power supply voltage} - \text{Internal voltage drop} \times 2 \text{ pcs.} \\ &= 24\text{V} - 4\text{V} \times 2 \text{ pcs.} \\ &= 16\text{V} \end{aligned}$$

Example: Power supply is 24VDC
Internal voltage drop in switch is 4V

$$\begin{aligned} \text{Load voltage at OFF} &= \text{Leakage current} \times 2 \text{ pcs.} \times \text{Load impedance} \\ &= 1\text{mA} \times 2 \text{ pcs.} \times 3\text{k}\Omega \\ &= 6\text{V} \end{aligned}$$

Example: Load impedance is 3kΩ
Leakage current from switch is 1mA



Series CLQ

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 – Recommendations for the application of equipment to transmission and control 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.

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 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 CLQ 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. Therefore, the machine should be designed to avoid such dangers.

2. **Attach a protective cover to minimize the risk of human injury.**

If a driven object and moving parts of a cylinder pose a danger of human 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.**

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, etc., 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 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 air pressure, 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 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 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 safe manual control 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 specification, damage and/or malfunction may be caused. Do not use in these conditions. (Refer to specifications.)

Consult SMC if you use a fluid other than compressed air.

⚠ 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 procedures for the maximum usable stroke.

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

Operate within a range such that damage will not occur when the piston having inertial force stops by striking the cover at the stroke end. Refer to the cylinder model selection procedure for the range within which damage will not occur.

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 align the rod axis with the load and direction of movement when connecting.**

When not properly aligned, twisting may occur in the rod and tube, and damage may be caused due to wear on the inner tube surface, bushings, rod surface and seals, etc.

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 piston 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 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 can verify that equipment can operate properly.**

Following mounting, maintenance or conversions, verify correct mounting by suitable function and leakage tests after compressed air and power are connected

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.



Series CLQ Actuator Precautions 2

Be sure to read before handling.

Piping

⚠ Caution

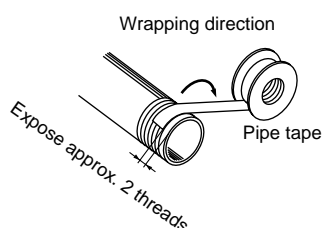
1. Preparation before piping

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 together pipes and fittings, etc., be certain that chips from the pipe threads and sealing material do not get inside the piping.

Also, when pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



Air Supply

⚠ Warning

1. Use clean air.

Do not use compressed air that includes chemicals, synthetic oils containing organic solvents, salt or corrosive gases, etc., as it can cause damage or malfunction.

2. Install an after-cooler, air dryer or water separator, etc.

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

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

Take measures to prevent freezing, since moisture in circuits can be frozen below 5°C, and this may cause damage to seals and lead to malfunction.

Refer to SMC's "Air Cleaning Equipment" catalog for further details on compressed air quality.

⚠ Caution

1. Install air filters.

Install air filters at the upstream side of valves. The filtration degree should be 5µm or finer.

2. Install an after-cooler, air dryer or water separator, etc.

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

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

Take measures to prevent freezing, since moisture in circuits can be frozen below 5°C, and this may cause damage to seals and lead to malfunction.

Refer to SMC's "Air Cleaning Equipment" catalog 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. Perform maintenance 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 check 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.
(Refer to specifications.)

Lubrication

⚠ Caution

1. Lubrication of non-lube type cylinder

The cylinder is lubricated at the factory and can be used without any further lubrication.



Series CLQ 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 for load current, voltage, temperature or impact.

2. Take precautions when multiple cylinders are used close together.

When multiple auto switch cylinders are used in close proximity, magnetic field interference may cause the switches to malfunction. Maintain a minimum cylinder separation of 40mm.

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:

$$V \text{ (mm/s)} = \frac{\text{Auto switch operating range (mm)}}{\text{Load operating time (ms)}} \times 1000$$

In case of high piston speed, the operating time of the load can be extended by using an auto switch (D-F7NT) with built-in OFF delay timer (approx. 200ms).

4. Keep wiring as short as possible.

<Reed switches>

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.)

Use a contact protection box when the wire length is 5m or longer.

<Solid state switches>

Although wire length should not affect switch function, use a wire 100m or shorter.

5. Pay attention to the internal voltage drop of the switch.

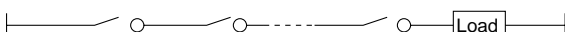
<Reed switches>

- 1) Switches with an indicator light (except D-A76H/A96/A96V)

- 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.



- In the same way, when operating below a specified voltage, although an auto switch may operate normally, the load may not operate. 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 D-A80/A80H/A90/A90V).

<Solid state switches>

- 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).

Also, note that a 12VDC relay is not applicable.

6. Pay attention to leakage current.

<Solid state switches>

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.

$$\text{Operating current of load (OFF condition)} > \text{Leakage current}$$

If the criteria given in the above formula are not met, it will not reset correctly (stays ON). Use a 3 wire switch if this specification will not 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 switches>

If driving a load such as a relay that generates a surge voltage, use a contact protection box.

<Solid state switches>

Although a zener diode for surge protection is connected at the output side of a solid state auto switch, damage may still occur if the surge is applied repeatedly. When a load such as a relay or solenoid which generates surge is directly driven, 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 avoid trouble by providing a mechanical protection function, or by also using another switch (sensor) together with the auto switch.

Also perform periodic maintenance 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.



Series CLQ 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/s² or more for reed switches and 1000m/s² or more 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 a cylinder 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.

If a switch is tightened beyond the range of tightening torque, the mounting screws, mounting brackets or switch may be damaged.

On the other hand, tightening below the range of tightening torque may allow the switch to slip out of position. (Refer to page 19 for switch mounting instructions and tightening torque.)

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 position shown in the catalog indicates the optimum position at stroke end.) If mounted at the end of the operating range (around the borderline of ON and OFF), operation may be unstable.

Wiring

⚠ Warning

1. Avoid repeatedly bending or stretching lead wires.

Broken lead wires can result from wiring patterns which repeatedly apply 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. Confirm proper insulation of wiring.

Be certain that there is no faulty wiring insulation (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 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

Wiring

⚠ Warning

noise from these other lines.

5. Do not allow short circuit of loads.

<Reed switches>

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 switches>

D-M9□(V), D-M9□W(V), and all models of PNP output type switches do not have built-in short circuit protection circuits. Note that if a load is short circuited, the switch will be instantly damaged as in the case of reed switches.

*Take special care to avoid reverse wiring of the brown [red] power supply line and the black [white] output line on 3 wire type switches.

6. Avoid incorrect wiring.

<Reed switches>

A 24VDC switch with indicator light has polarity. The brown [red] lead wire is (+), and the blue [black] lead wire is (–).

- 1) If connections are reversed, a switch will operate, however, the light emitting diode will not light up.

Also note that a current greater than that specified will damage a light emitting diode and it will no longer operate.

Applicable models: D-A73/A73H/A73C

D-A93/A93V

- 2) Note however, that in the case of 2 color indication auto switches (D-A79W), the switch will be in a normally ON condition if the wiring is reversed.

<Solid state switches>

- 1) 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 be in a normally 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.

- *2) If connections are reversed (power supply line + and power supply line –) 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.

* Lead wire colour changes

Lead wire colours 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

Solid state with diagnostic output

	Old	New
Power supply	Red	Brown
GND	Black	Blue
Output	White	Black
Diagnostic output	Yellow	Orange

3 wire

	Old	New
Power supply	Red	Brown
GND	Black	Blue
Output	White	Black

Solid state with latch type diagnostic output

	Old	New
Power supply	Red	Brown
GND	Black	Blue
Output	White	Black
Latch type diagnostic output	Yellow	Orange

Note) Lead wire colors inside [] are those prior to conformity with NECA standards.



Series CLQ Auto Switch Precautions 3

Be sure to read before handling.

Operating Environment

Warning

1. Never use in an atmosphere of explosive gases.

The construction of auto switches 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.

Auto switches can malfunction or magnets inside cylinders can become demagnetized. (Consult SMC regarding the availability of a magnetic field resistant auto switch.)

3. Do not use in an environment where the auto switch will be continually exposed to water.

Although switches satisfy IEC standard IP67 construction (JIS C 0920: watertight construction), avoid using switches in applications where continually exposed to water splash or spray. Poor insulation or swelling of the potting resin inside switches may cause malfunction.

4. Do not use in an environment with oil or chemicals.

Consult SMC if auto switches will be used in an environment with coolant, cleaning solvent, various oils or chemicals. If auto switches are used under these conditions for even a short time, they may be adversely affected by improper insulation, 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 SMC if switches are used where there are temperature cycles other than normal air temperature changes, as there may be adverse effects inside the switches.

6. Do not use in an environment where there is excessive impact shock.

<Reed switches>

When excessive impact (300m/s² or more) is applied to a reed switch during operation, the contact point will malfunction and generate or cut off a signal momentarily (1ms or less). Consult SMC regarding the need to use a solid state switch depending upon the environment.

7. Do not use in an area where surges are generated.

<Solid state switches>

When there are units (solenoid type lifter, high frequency induction furnace, motor, etc.) which generate a large amount of surge in the area around cylinders with solid state auto switches, this may cause deterioration or damage to the switches. Avoid sources of surge generation and crossed lines.

8. Avoid accumulation of iron waste or close contact with magnetic substances.

When a large amount of iron waste such as machining chips or spatter is accumulated, or a magnetic substance (something attracted by a magnet) is brought into close proximity with an auto switch cylinder, it may cause 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 lead wires.

To prevent faulty insulation, replace switches or repair lead wires, etc., if damage is discovered.

3) Confirm the lighting of the green light on the 2 colour indicator type switch.

Confirm that the green LED is on when stopped at the established position. If the red LED is on, the mounting position is not appropriate. Readjust the mounting position until the green LED lights up.

Other

Warning

1. Consult SMC concerning water resistance, elasticity of lead wires, and usage at welding sites, etc.



Series CLQ Specific Product Precautions 1

Be sure to read before handling.

Refer to pages 23 through 28 for safety instructions, actuator precautions and auto switch precautions.

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 lock does not generate holding force in the cylinder's retracting direction, and the retraction lock does not generate holding force in the cylinder's extending direction (free).

3. Even when locked, there may be stroke movement of about 1mm in the locking direction due to external forces such as the weight of the work piece.

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

4. When locked, do not apply impact loads, strong vibration or rotational force, etc.

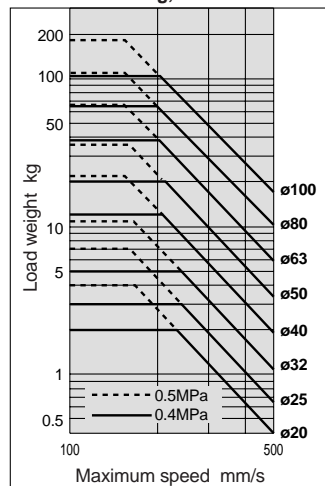
This will lead to lock mechanism damage and reduced service life, etc.

5. Operate so that load weight, maximum speed and eccentric distance are within the limiting ranges in the graphs below.

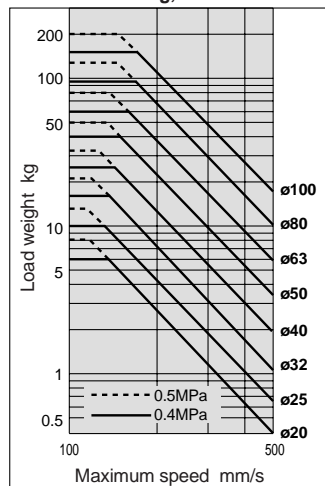
Operation beyond the limiting range will lead to cylinder damage and reduced service life, etc.

Allowable kinetic energy

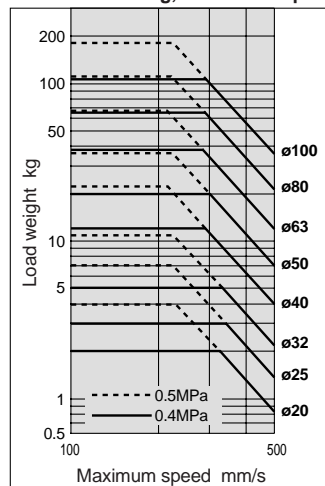
Extension locking, Without cushion



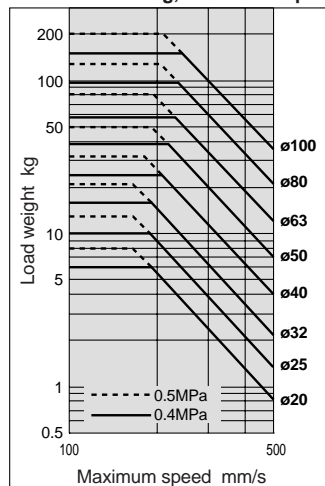
Retraction locking, Without cushion



Extension locking, Rubber bumper



Retraction locking, Rubber bumper

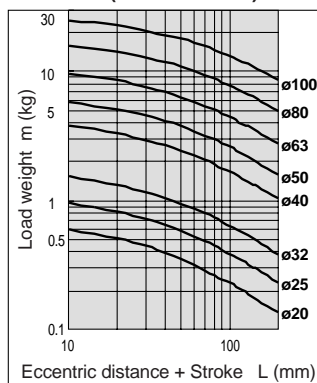


Selection

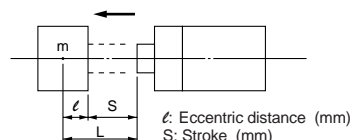
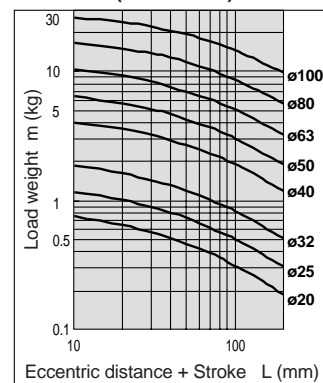
⚠ Warning

Allowable load weight

Horizontal (without switch)



Horizontal (with switch)



Pneumatic Circuits

⚠ 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.

Malfunction may occur if meter-in control is used.

3. Be careful of reverse exhaust pressure flow from a common exhaust type valve manifold.

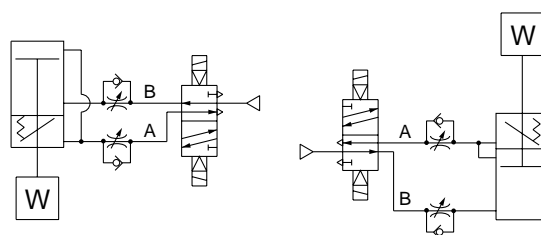
Since the lock may be released due to reverse exhaust pressure flow, use an individual exhaust type manifold or single type valve.

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



Series CLQ Specific Product Precautions 2

Be sure to read before handling.

Refer to pages 23 through 28 for safety instructions, actuator precautions and auto switch precautions.

Mounting

⚠ Caution

1. Be sure to connect the load to the rod end with the cylinder in an unlocked condition.

If this is done when in a locked condition, it may cause damage to the lock mechanism.

Preparing for Operation

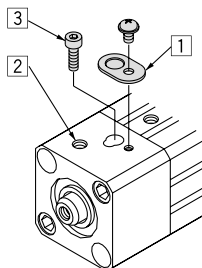
⚠ Warning

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. Sizes $\phi 20$ to $\phi 32$ are shipped in the unlocked condition maintained by the unlocking bolt. Be sure to remove the unlocking bolt following the procedures below before operation.

The locking mechanism will not be effective without the removal of the unlocking bolt.

$\phi 20$ to $\phi 32$ only



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

Since a holding function for the unlocked condition is not available for sizes $\phi 40$ through $\phi 100$, they can be used as shipped.

Manual Unlocking

⚠ Warning

1. Do not perform unlocking when an external force such as a load or spring force is being applied.

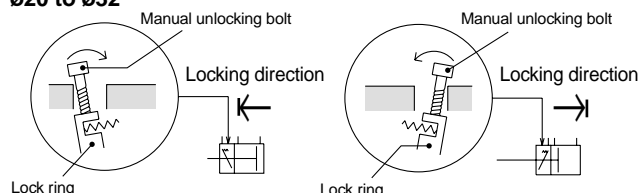
This is very dangerous because the cylinder will move suddenly. Take the following steps.

- 1) the lock after restoring the air pressure in the B line of the pneumatic circuit to operating pressure, and then reduce the pressure gradually.
- 2) In case 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.

Carefully confirm that no one is inside the load movement range, etc., and that there is no danger even if the load moves suddenly.

Manual unlocking $\phi 20$ to $\phi 32$



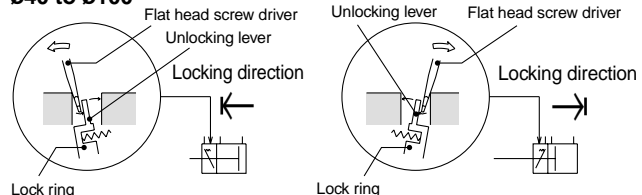
Extension locking

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

$\phi 40$ to $\phi 100$



Extension locking

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

Retraction locking

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



Series CLQ Specific Product Precautions 3

Be sure to read before handling.

Refer to pages 23 through 28 for safety instructions, actuator precautions and auto switch precautions.

Maintenance

⚠ Caution

1. In order to maintain good performance, operate with clean unlubricated air.

If lubricated air, compressor oil or drainage, etc., enter 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. There is also a danger of reducing the locking performance.

4. Never remove the pivot seal and disassemble the internal unit.

Sizes $\phi 20$ to $\phi 32$ have a silver seal (pivot seal) of $\phi 12$ applied on one side of the lock body (opposite side from the unlocking port). The seal is applied for dust prevention, but there is no functional problem even if the seal is removed. However, never disassemble the internal unit.

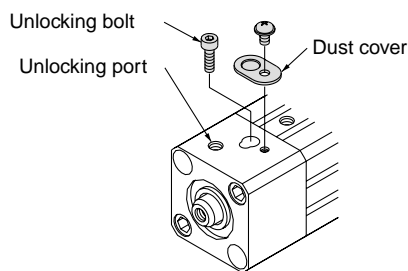
Holding the Unlocked Condition

⚠ Warning

1. Sizes $\phi 20$ to $\phi 32$ can hold the unlocked condition.

<Holding the unlocked condition>

- 1) Remove the dust cover.
- 2) Supply air pressure of 0.2MPa or more to the unlocking port, and set the lock ring to the perpendicular position.
- 3) Screw the unlocking bolt which is included (hexagon socket head cap screw/ $\phi 20$, $\phi 25$: M3 x 5 ϕ , $\phi 32$: M3 x 10 ϕ) into the lock ring to hold the unlocked condition.



2. To use the locking mechanism again, be sure to remove the unlocking bolt.

The locking mechanism will not function with the unlocking bolt screwed-in. Remove the unlocking bolt according to the procedures described in the section "Preparing for Operation".

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