Compact Hydraulic Cylinder

Series ***CHQ***

Series CHQ

Nominal pressure: **3.5 MPa**

Bore size (mm): 20, 32, 40, 50, 63, 80, 100

3.5 MPa

Compact Hydraulic Cylinder
Double Acting/Single Rod
Series CH□QB
ø20, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

CHQB 50 – 30 D □ – □

With Auto Switch: CHDQB 50 – 30 D □ – M9BW □ – □

With auto switch (built-in magnet)

Mounting: Basic style

Bore size

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

Cylinder stroke (mm)
Refer to the standard stroke table on page 165.

Action: Double acting

Rod end thread type

Nil	Female thread
M	Male thread

∗ Rod end nut is provided standard for male thread type.

Auto switch type

Nil	Without auto switch

∗ Select applicable auto switch models from the table below.

Number of auto switches

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

Made to order specifications
For details, refer to page 165.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CHDQB50-100D

Applicable Auto Switches: Refer to pages 347 to 406 for further details on each auto switch.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	———	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9NV	M9N	●	●	●	○	—	○	IC circuit	Relay PLC
				3-wire (PNP)			M9PV	M9P	●	●	●	○	—	○		
				2-wire	12 V		M9BV	M9B	●	●	●	○	—	○	—	
		Connector					J79C	—	●	—	●	●	●	—		
	Diagnostic indication (2-color display)	Grommet		3-wire (NPN)	5 V, 12 V		M9NWV	M9NW	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)			M9PWV	M9PW	●	●	●	○	—	○		
				2-wire	12 V		M9BWV	M9BW	●	●	●	○	—	○	—	
	Water resistant (2-color display)			3-wire (NPN)	5 V, 12 V		M9NAV**	M9NA**	○	○	●	○	—	○	IC circuit	
				3-wire (PNP)			M9PAV**	M9PA**	○	○	●	○	—	○		
				2-wire	12 V		M9BAV**	M9BA**	○	○	●	○	—	○	—	
	Diagnostic output (2-color display)			4-wire	5 V, 12 V		—	F79F	●	—	●	○	—	○	IC circuit	
Reed switch	———	Grommet	Yes	3-wire (NPN equiv.)	—	5 V	—	A96V	A96	●	—	●	—	—	—	IC circuit	—
				2-wire		—	200 V	A72	A72H	●	—	●	—	—	—	—	Relay PLC
					24 V	12 V	100 V	A93V	A93	●	—	●	—	—	—	
			No			5 V, 12 V	100 V or less	A90V	A90	●	—	●	—	—	—	IC circuit
		Connector	Yes			12 V	—	A73C	—	●	—	●	●	●	—	—
			No			5 V, 12 V	24 V or less	A80C	—	●	—	●	●	●	—	IC circuit
	Diagnostic indication (2-color display)	Grommet	Yes			—	—	A79W	—	●	—	●	—	—	—	—

∗∗ Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ
None ····· N (Example) J79CN

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

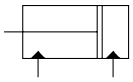
∗ Since there are applicable auto switches other than listed, refer to page 178 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 389 and 390.
∗ For mounting D-A9□(V), M9□(V), M9□W(V), M9□A(V)L with ø32 to ø50 to a surface other than the port surface, order an auto switch mounting bracket separately. Refer to page 179 for details.

SMC

Made to Order **Made to order specifications**
(For details, refer to page 170)

Symbol	Specifications
-XB10	Intermediate stroke (Using exclusive body)

JIS symbol



Hydraulic Fluid Compatibility

Hydraulic fluid	Compatibility
Standard mineral hydraulic fluid	Compatible
W/O hydraulic fluid	Compatible
O/W hydraulic fluid	Compatible
Water/Glycol hydraulic fluid	Not compatible
Phosphate hydraulic fluid	Not compatible

Specifications

Bore size (mm)	20	32	40	50	63	80	100
Action	Double acting/Single rod						
Fluid	Hydraulic fluid						
Nominal pressure	3.5 MPa						
Proof pressure	5.0 MPa						
Maximum allowable pressure	3.5 MPa						
Minimum operating pressure	0.3 MPa						
Ambient and fluid temperature	Without auto switch: –10° to 80°C						
	With auto switch: –10° to 60°C						
Piston speed	8 to 100 mm/s						
Cushion	None						
Rod end thread	Standard: Female thread, Male thread						
Stroke length tolerance	$^{+1.0}_{0}$ mm						
Mounting style	Basic style						
Mounting	Through hole						

Note) Refer to page 134 for definitions of terms related to pressure.

Standard Strokes

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

Note) Consult with SMC regarding the manufacture of strokes other than the above.

Theoretical Output

Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm^2)	Operating pressure (MPa)					
				1	1.5	2	2.5	3	3.5
20	10	OUT	314	314	471	628	785	942	1099
		IN	235	235	352	470	587	705	822
32	16	OUT	804	804	1206	1608	2010	2412	2814
		IN	603	603	904	1206	1507	1809	2110
40	16	OUT	1256	1256	1884	2512	3140	3768	4396
		IN	1055	1055	1582	2110	2637	3165	3692
50	20	OUT	1963	1963	2944	3926	4907	5889	6870
		IN	1649	1649	2473	3298	4122	4947	5771
63	20	OUT	3117	3117	4675	6234	7792	9351	10909
		IN	2803	2803	4204	5606	7007	8409	9810
80	25	OUT	5026	5026	7539	10052	12565	15078	17591
		IN	4535	4535	6802	9070	11337	13605	15872
100	30	OUT	7853	7853	11779	15706	19632	23559	27485
		IN	7147	7147	10720	14294	17867	21441	25014

Theoretical output (N) = Pressure (MPa) x Piston area (mm^2)

Mass

Unit: g

Bore size (mm)	Cylinder stroke (mm)												Male thread additional mass
	5	10	15	20	25	30	35	40	45	50	75	100	
20	180	200	220	240	260	280	300	320	340	360	—	—	10
32	330	350	370	390	410	430	450	470	490	510	610	710	52
40	480	500	520	540	560	580	600	620	640	660	760	860	52
50	—	860	890	920	950	980	1010	1040	1070	1100	1250	1400	100
63	—	1250	1290	1330	1370	1410	1450	1490	1530	1570	1770	1970	100
80	—	2380	2470	2560	2650	2740	2830	2920	3010	3100	3550	4000	172
100	—	3520	3630	3740	3850	3960	4070	4180	4290	4400	4950	5500	283

⚠Specific Product Precautions

Be sure to read before handling. Refer to front matters 30 and 31 for Safety Instructions, and pages 134 to 142 for precautions for hydraulic cylinder and auto switch.

Usage

⚠Caution

1. **Use hexagon socket head cap screws (JISB1176, strength class 10.9 or higher) for cylinder mounting. (ø20: 2 pcs.; ø32 to ø100: 4 pcs.)**
2. **Since a lateral load (eccentric load) cannot be applied to the piston rod, build the mounting jig in such a way that a lateral load will not be applied to the piston rod.**
3. **Make sure that the interlocking length of the rod end thread (male or female thread) and the mounting material is at least 80% of the thread diameter.**
4. **When operating a cylinder for the first time, be sure to release the air inside the cylinder and the piping. When the air release is complete, operate the cylinder at reduced pressure, then gradually increase it to the normal operating pressure.**
5. **Since Series CH□QB does not have an air release plug, release air from other components (e.g. from piping, etc.) as well.**
6. **When mounting the cylinder body with mounting bolts, use the tightening torques in the table at right as a guide.**

Body mounting bolt tightening torques

Bore size (mm)	Mounting bolt		Tightening torque
	Size	Qty.	N·m
20	M5 x 0.8	2	3
32	M5 x 0.8	4	3
40	M5 x 0.8	4	3
50	M6 x 1	4	6
63	M8 x 1.25	4	11.5
80	M10 x 1.5	4	24
100	M10 x 1.5	4	34

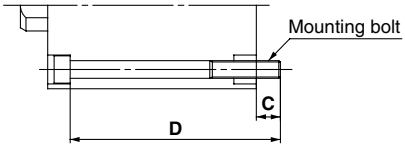
7. **Do not use two cylinders facing one another horizontally or vertically in such a way that their piston rods strike each other.**
8. **When the cylinder head side contains hydraulic fluid or is in a normally pressurized condition, the applied load must not be allowed to strike the piston rod end. Avoid such applications.**

Mounting Bolts for CH□QB

Mounting: Through hole type mounting bolts are available.
Refer to the following for ordering procedures.
Order the actual number of bolts that will be used.

Example) CQ-M5x55L 4 pcs.

Mounting bolt diagram

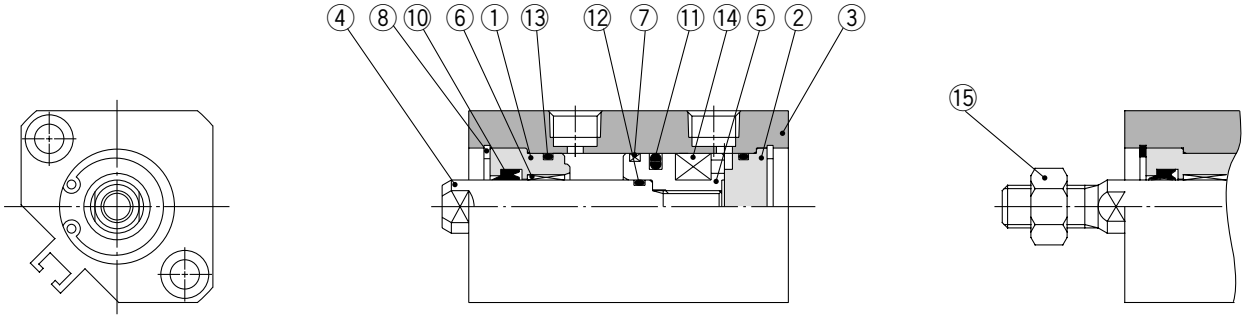


Model	C	D	Mounting bolt part no.
CH□QB20-5D (M)	7	55	CQ-M5 x 55L
-10D (M)		60	x 60L
-15D (M)		65	x 65L
-20D (M)		70	x 70L
-25D (M)		75	x 75L
-30D (M)		80	x 80L
-35D (M)		85	x 85L
-40D (M)		90	x 90L
-45D (M)		95	x 95L
-50D (M)		100	x 100L
CH□QB32-5D (M)	7	70	CQ-M5 x 70L
-10D (M)		75	x 75L
-15D (M)		80	x 80L
-20D (M)		85	x 85L
-25D (M)		90	x 90L
-30D (M)		95	x 95L
-35D (M)		100	x 100L
-40D (M)		105	x 105L
-45D (M)		110	x 110L
-50D (M)		115	x 115L
-75D (M)		140	x 140L
-100D (M)		165	x 165L
CH□QB40-5D (M)	10	75	CQ-M5 x 75L
-10D (M)		80	x 80L
-15D (M)		85	x 85L
-20D (M)		90	x 90L
-25D (M)		95	x 95L
-30D (M)		100	x 100L
-35D (M)		105	x 105L
-40D (M)		110	x 110L
-45D (M)		115	x 115L
-50D (M)		120	x 120L
-75D (M)		145	x 145L
-100D (M)		170	x 170L
CH□QB50-10D (M)	12	90	CQ-M6 x 90L
-15D (M)		95	x 95L
-20D (M)		100	x 100L
-25D (M)		105	x 105L
-30D (M)		110	x 110L
-35D (M)		115	x 115L
-40D (M)		120	x 120L
-45D (M)		125	x 125L
-50D (M)		130	x 130L
-75D (M)		155	x 155L
-100D (M)		180	x 180L

Model	C	D	Mounting bolt part no.
CH□QB63-10D (M)	15.5	95	CQ-M8 x 95L
-15D (M)		100	x 100L
-20D (M)		105	x 105L
-25D (M)		110	x 110L
-30D (M)		115	x 115L
-35D (M)		120	x 120L
-40D (M)		125	x 125L
-45D (M)		130	x 130L
-50D (M)		135	x 135L
-75D (M)		160	x 160L
-100D (M)		185	x 185L
CH□QB80-10D (M)	14.5	100	CQ-M10 x 100L
-15D (M)		105	x 105L
-20D (M)		110	x 110L
-25D (M)		115	x 115L
-30D (M)		120	x 120L
-35D (M)		125	x 125L
-40D (M)		130	x 130L
-45D (M)		135	x 135L
-50D (M)		140	x 140L
-75D (M)		165	x 165L
-100D (M)		190	x 190L
CH□QB100-10D (M)	13.5	105	CQ-M10 x 105L
-15D (M)		110	x 110L
-20D (M)		115	x 115L
-25D (M)		120	x 120L
-30D (M)		125	x 125L
-35D (M)		130	x 130L
-40D (M)		135	x 135L
-45D (M)		140	x 140L
-50D (M)		145	x 145L
-75D (M)		170	x 170L
-100 (M)		195	x 195L

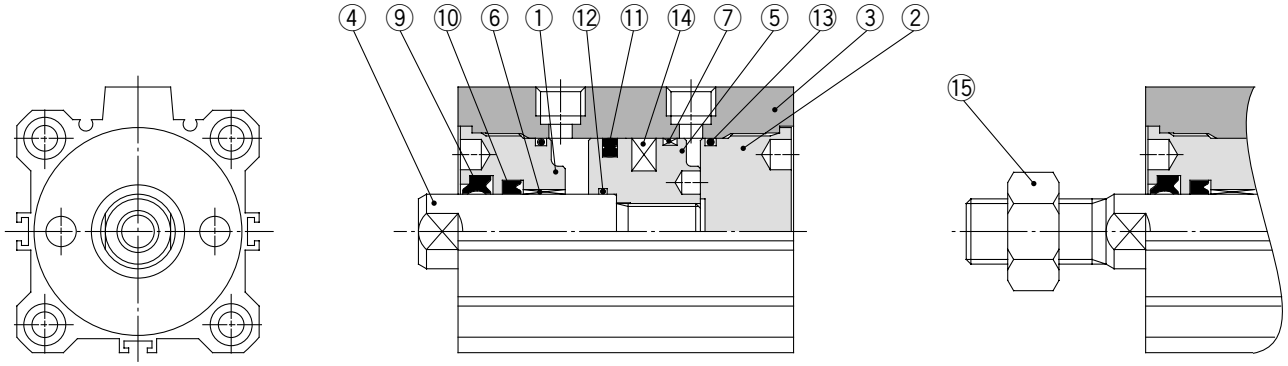
Construction

CH□QB20



Rod end male thread

CH□QB32 to CH□QB100



Rod end male thread

Parts List

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Black anodized
2	**Head cover**	Aluminum alloy	Black anodized
3	**Cylinder tube**	Aluminum alloy	Hard anodized
4	**Piston rod**	ø20: Stainless steel ø32 to ø100: Carbon steel	Hard chromium electroplated
5	**Piston**	Aluminum alloy	Chromated
6	**Bushing**	Copper alloy	
7	**Wear ring**	Resin	
8	**Retaining ring (ø20 only)**	Carbon tool steel	Black zinc chromated
9	**Scraper**	NBR	
10	**Rod seal**	NBR	
11	**Piston seal**	NBR	
12	**Piston gasket**	NBR	
13	**Tube gasket**	NBR	
14	**Magnet**	—	
15	**Rod end nut**	Carbon steel	Nickel plated

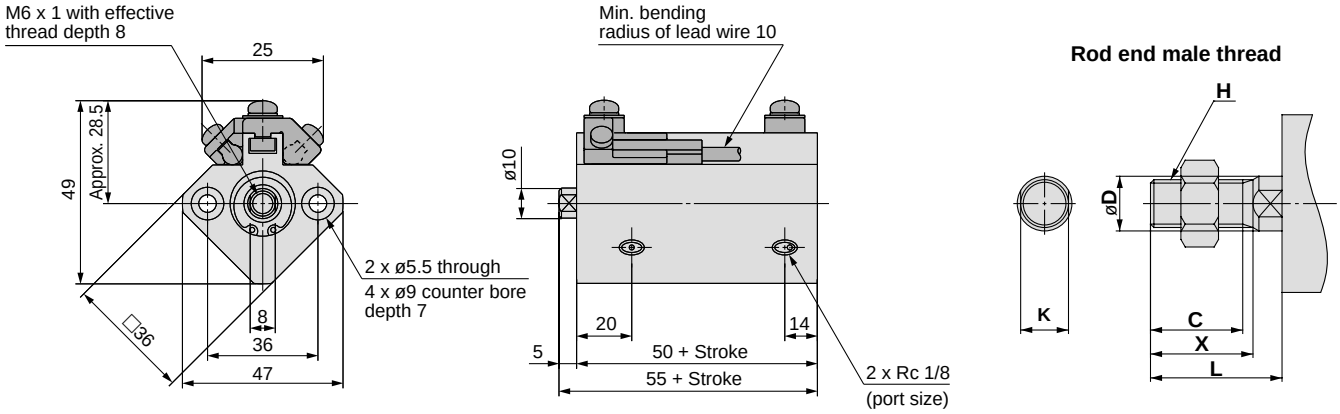
Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.	Content
20	CHQ20-PS	Nos. ⑨, ⑩, ⑪ and ⑬ from the chart at left
32	CHQ32-PS	
40	CHQ40-PS	
50	CHQ50-PS	
63	CHQ63-PS	
80	CHQ80-PS	
100	CHQ100-PS	

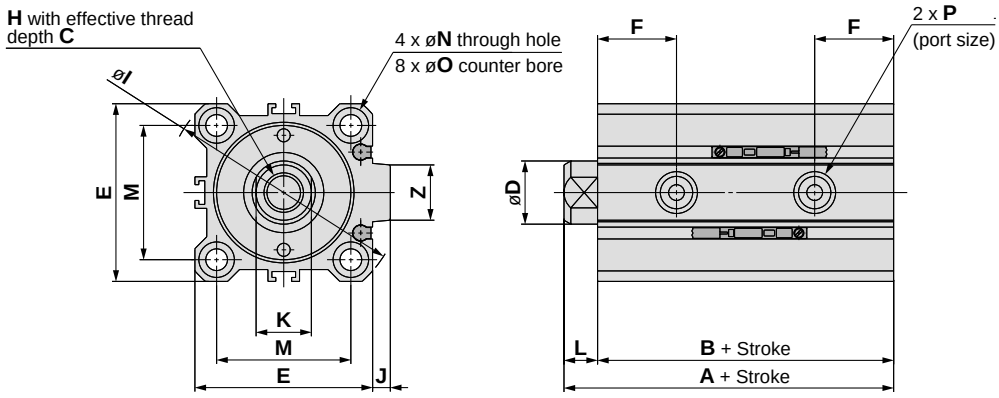
∗ Seal kit consists of items ⑨, ⑩, ⑪ and ⑬ and can be ordered by using the seal kit number for each bore size.
∗ Special tool required for disassembly. Contact SMC for recommended tool designs and dimensions.

Dimensions

ø20



ø32 to ø100



Note) The auto switches above are shown for a D-M9□(W) solid state auto switch.

(mm)

Bore size (mm)	A	B	C	D	E	F	H	I	J	K	L	M	N	O	P	S	U	Z
32	73.5	65	12	16	45	20	M10 x 1.5	60	4.5	14	8.5	34	5.5	9 depth 7	Rc1/8	58.5	31.5	14
40	75.5	67	12	16	52	22	M10 x 1.5	69	5	14	8.5	40	5.5	9 depth 7	Rc1/8	66	35	14
50	87	76	15	20	64	25	M12 x 1.75	86	7	18	11	50	6.6	11 depth 8	Rc1/4	80	41	19
63	91	80	15	20	77	27	M12 x 1.75	103	7	18	11	60	9	14 depth 10.5	Rc1/4	93	47.5	19
80	100	89	20	25	98	28	M16 x 2	132	6	22	11	77	11	17.5 depth 13.5	Rc3/8	112.5	57.5	26
100	107	95	24	30	117	29	M20 x 2.5	156	6.5	26	12	94	11	17.5 depth 13.5	Rc3/8	132.5	67.5	26

Rod end male threads (mm)

Bore size (mm)	C	X	D	H	L	K
20	15.5	18	10	M8 x 1.25	23	8
32	27	30	16	M14 x 1.5	38.5	14
40	27	30	16	M14 x 1.5	38.5	14
50	32	35	20	M18 x 1.5	46	18
63	32	35	20	M18 x 1.5	46	18
80	37	40	25	M22 x 1.5	51	22
100	37	40	30	M26 x 1.5	52	26

Made to Order Specifications:

Please consult with SMC for detailed specifications, delivery and prices.

Symbol

1 Intermediate Strokes (Using Exclusive Body) -XB10

CH □ QB Bore size – Stroke – XB10

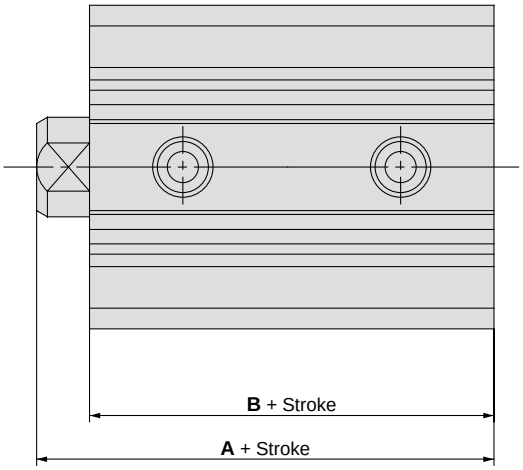
Intermediate stroke (Using exclusive body)

When using an intermediate stroke other than the compact hydraulic cylinder (Series CH□QB) standard strokes, it is possible to shorten the overall length and reduce the mounting space by using an exclusive body that does not have spacers installed.

Specifications

Model	CH□QB
Action	Double acting/Single rod
Bore size (mm)	32, 40, 50, 63, 80, 100
Mounting	Through hole
Auto switch	Mountable
Other specifications	Same as standard double acting single rod

Dimensions



(mm)

Bore size (mm)	A	B
	55 to 100 mm strokes	55 to 100 mm strokes
32	73.5	65
40	75.5	67
50	87	76
63	91	80
80	100	89
100	107	95

∗ Dimensions other than the above are the same as the standard double acting single rod type.

Note) Applicable strokes are available in 5 mm increments.

3.5 MPa

Compact Hydraulic Cylinder
Double Acting/Double Rod
Series CH□QWB
ø20, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

CHQ W B 50 – 30 D □

With Auto Switch: CHDQ W B 50 – 30 D □ – M9BW □

- With auto switch (built-in magnet)
- Model: Double acting/Double rod
- Mounting: Basic style
- Bore size

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

- Cylinder stroke (mm) — Refer to the standard stroke table on page 172.
- Action: Double acting
- Rod end thread type

Nil	Female thread
M	Male thread

* Rod end nut is provided standard for male thread type.

- Auto switch type

Nil	Without auto switch

* Select applicable auto switch models from the table below.

- Number of auto switches

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

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CHDQWB50-100D

Applicable Auto Switches: Refer to pages 347 to 406 for further details on each auto switch.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load: IC circuit	Applicable load: Relay PLC
Solid state switch	———	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9NV	M9N	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)			M9PV	M9P	●	●	●	○	—	○		
				2-wire	12 V		M9BV	M9B	●	●	●	○	—	○	—	
		Connector					J79C	—	●	—	●	●	●	—		
	Diagnostic indication (2-color display)	Grommet		3-wire (NPN)	5 V, 12 V		M9NWV	M9NW	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)			M9PWV	M9PW	●	●	●	○	—	○		
				2-wire	12 V		M9BWV	M9BW	●	●	●	○	—	○	—	
	Water resistant (2-color display)			3-wire (NPN)	5 V, 12 V		M9NAV**	M9NA**	○	○	●	○	—	○	IC circuit	
				3-wire (PNP)			M9PAV**	M9PA**	○	○	●	○	—	○		
				2-wire	12 V		M9BAV**	M9BA**	○	○	●	○	—	○	—	
	Diagnostic output (2-color display)			4-wire	5 V, 12 V		—	F79F	●	—	●	○	—	○	IC circuit	
Reed switch	———	Grommet	Yes	3-wire (NPN equiv.)	—	5 V	—	A96V	A96	●	—	●	—	—	—	IC circuit	—
				2-wire		—	200 V	A72	A72H	●	—	●	—	—	—	—	
					24 V	12 V	100 V	A93V	A93	●	—	●	—	—	—		
			No			5 V, 12 V	100 V or less	A90V	A90	●	—	●	—	—	—	IC circuit	
		Connector	Yes			12 V	—	A73C	—	●	—	●	●	●	—	—	
			No			5 V, 12 V	24 V or less	A80C	—	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color display)	Grommet	Yes			—	—	A79W	—	●	—	●	—	—	—	—	

** Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

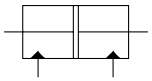
* Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ
None ····· N (Example) J79CN

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

* Since there are applicable auto switches other than listed, refer to page 178 for details.
* For details about auto switches with pre-wired connector, refer to pages 389 and 390.
* For mounting D-A9□(V), M9□(V), M9□W(V), M9□A(V)L with ø32 to ø50 to a surface other than the port surface, order an auto switch mounting bracket separately. Refer to page 179 for details.

JIS symbol

Double acting/Double rod



Specifications

Bore size (mm)	20	32	40	50	63	80	100
Action	Double acting/Double rod						
Fluid	Hydraulic fluid						
Nominal pressure	3.5 MPa						
Proof pressure	5.0 MPa						
Maximum allowable pressure	3.5 MPa						
Minimum operating pressure	0.3 MPa						
Ambient and fluid temperature	Without auto switch: –10° to 80°C						
	With auto switch: –10° to 60°C						
Piston speed	8 to 100 mm/s						
Cushion	None						
Rod end thread	Standard: Female thread, Male thread						
Stroke length tolerance	$^{+1.0}_{0}$ mm						
Mounting style	Basic style						
Mounting	Through hole						

Note) Refer to page 134 for definitions of terms related to pressure.

Hydraulic Fluid Compatibility

Hydraulic fluid	Compatibility
Standard mineral hydraulic fluid	Compatible
W/O hydraulic fluid	Compatible
O/W hydraulic fluid	Compatible
Water/Glycol hydraulic fluid	Not compatible
Phosphate hydraulic fluid	Not compatible

Standard Strokes

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

Note) Consult with SMC regarding the manufacture of strokes other than the above.

Theoretical Output

Unit: N

Bore size (mm)	Rod size (mm)	Piston area (mm^2)	Operating pressure (MPa)					
			1.0	1.5	2.0	2.5	3.0	3.5
20	10	235	235	352	470	587	705	822
32	16	603	603	904	1206	1507	1809	2110
40	16	1055	1055	1582	2110	2637	3165	3692
50	20	1649	1649	2473	3298	4122	4947	5771
63	20	2803	2803	4204	5606	7007	8409	9810
80	25	4535	4535	6802	9070	11337	13605	15872
100	30	7147	7147	10720	14294	17867	21441	25014

Theoretical output (N) = Pressure (MPa) x Piston area (mm^2)

Mass

Unit: g

Bore size (mm)	Cylinder stroke (mm)												Male thread additional mass
	5	10	15	20	25	30	35	40	45	50	75	100	
20	205	230	255	280	305	330	355	380	405	430	—	—	20
32	410	445	480	515	550	585	620	655	690	725	900	1075	104
40	570	605	640	675	710	745	780	815	850	885	1060	1235	104
50	—	1030	1080	1130	1180	1230	1280	1330	1380	1430	1680	1930	200
63	—	1430	1485	1540	1595	1650	1705	1760	1815	1870	2145	2420	200
80	—	2680	2805	2930	3055	3180	3305	3430	3555	3680	4305	4930	344
100	—	4075	4235	4395	4555	4715	4875	5035	5195	5355	6155	6955	566

⚠Specific Product Precautions

Be sure to read before handling. Refer to front matters 30 and 31 for Safety Instructions, and pages 134 to 142 for precautions for hydraulic cylinder and auto switch.

Usage

⚠Caution

1. **Use hexagon socket head cap screws (JISB1176, strength class 10.9 or higher) for cylinder mounting. (ø20: 2pcs, ø32 to ø100: 4pcs.)**
2. **Since a lateral load (eccentric load) cannot be applied to the piston rod, build your mounting jig in such a way that a lateral load will not be applied to the piston rod.**
3. **Make sure that the interlocking length of the rod end threads (male or female thread) and the mounting material is at least 80% of the thread diameter.**
4. **Be sure to release the air inside the cylinder and the piping before operating the cylinder for the first time. When the air release is complete, operate the cylinder at reduced pressure, then gradually increase it to the normal operating pressure.**
5. **Since Series CH□QWB does not have an air release plug, release air from components other than the cylinder (e.g. from piping, etc.) as well.**
6. **When mounting the cylinder body with mounting bolts, use tightening torques in the table below as a guide.**

Body mounting bolt tightening torques

Bore size (mm)	Mounting bolt		Tightening torque
	Size	No.	N·m
20	M5 x 0.8	2	3
32	M5 x 0.8	4	3
40	M5 x 0.8	4	3
50	M6 x 1	4	6
63	M8 x 1.25	4	11.5
80	M10 x 1.5	4	24
100	M10 x 1.5	4	34

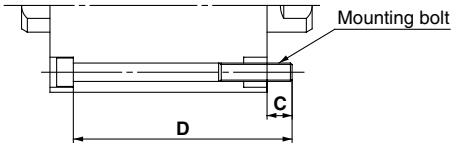
7. **When tightening the piston rod end threads, be sure to use the wrench flats of the rod on the side where the threads are being tightened. Use care, as damage may occur if rotational force is applied to both ends of the piston rod.**
8. **Do not use two cylinders facing one another horizontally or vertically in such a way that their piston rods strike each other.**
9. **When the cylinder head contains fluid or is in a normally pressurized condition, the load should not be allowed to strike the piston rod end. Avoid such applications.**

Mounting Bolts for CH□QWB

Mounting: Through hole type mounting bolts are available.
Refer to the following for ordering procedures.
Order the actual number of bolts that will be used.

Example) CQ-M5x65L 4 pcs.

Mounting bolt diagram



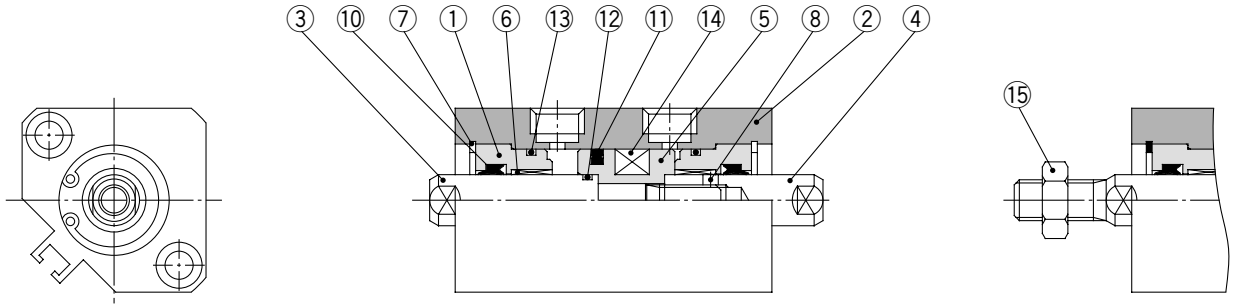
Mounting Bolts

Model	C	D	Mounting bolt part no.
CH□QWB20-5D (M)	10	65	CQ-M5 x 65L
-10D (M)		70	x 70L
-15D (M)		75	x 75L
-20D (M)		80	x 80L
-25D (M)		85	x 85L
-30D (M)		90	x 90L
-35D (M)		95	x 95L
-40D (M)		100	x 100L
-45D (M)		105	x 105L
-50D (M)		110	x 110L
CH□QWB32-5D (M)	7	70	CQ-M5 x 70L
-10D (M)		75	x 75L
-15D (M)		80	x 80L
-20D (M)		85	x 85L
-25D (M)		90	x 90L
-30D (M)		95	x 95L
-35D (M)		100	x 100L
-40D (M)		105	x 105L
-45D (M)		110	x 110L
-50D (M)		115	x 115L
-75D (M)		140	x 140L
-100D (M)		165	x 165L
CH□QWB40-5D (M)	10	75	CQ-M5 x 75L
-10D (M)		80	x 80L
-15D (M)		85	x 85L
-20D (M)		90	x 90L
-25D (M)		95	x 95L
-30D (M)		100	x 100L
-35D (M)		105	x 105L
-40D (M)		110	x 110L
-45D (M)		115	x 115L
-50D (M)		120	x 120L
-75D (M)		145	x 145L
-100D (M)		170	x 170L
CH□QWB50-10D (M)	12	90	CQ-M6 x 90L
-15D (M)		95	x 95L
-20D (M)		100	x 100L
-25D (M)		105	x 105L
-30D (M)		110	x 110L
-35D (M)		115	x 115L
-40D (M)		120	x 120L
-45D (M)		125	x 125L
-50D (M)		130	x 130L
-75D (M)		155	x 155L
-100D (M)		180	x 180L

Model	C	D	Mounting bolt part no.
CH□QWB63-10D (M)	15.5	95	CQ-M8 x 95L
-15D (M)		100	x 100L
-20D (M)		105	x 105L
-25D (M)		110	x 110L
-30D (M)		115	x 115L
-35D (M)		120	x 120L
-40D (M)		125	x 125L
-45D (M)		130	x 130L
-50D (M)		135	x 135L
-75D (M)		160	x 160L
-100D (M)		185	x 185L
CH□QWB80-10D (M)	14.5	100	CQ-M10 x 100L
-15D (M)		105	x 105L
-20D (M)		110	x 110L
-25D (M)		115	x 115L
-30D (M)		120	x 120L
-35D (M)		125	x 125L
-40D (M)		130	x 130L
-45D (M)		135	x 135L
-50D (M)		140	x 140L
-75D (M)		165	x 165L
-100D (M)		190	x 190L
CH□QWB100-10D (M)	13.5	105	CQ-M10 x 105L
-15D (M)		110	x 110L
-20D (M)		115	x 115L
-25D (M)		120	x 120L
-30D (M)		125	x 125L
-35D (M)		130	x 130L
-40D (M)		135	x 135L
-45D (M)		140	x 140L
-50D (M)		145	x 145L
-75D (M)		170	x 170L
-100D (M)		195	x 195L

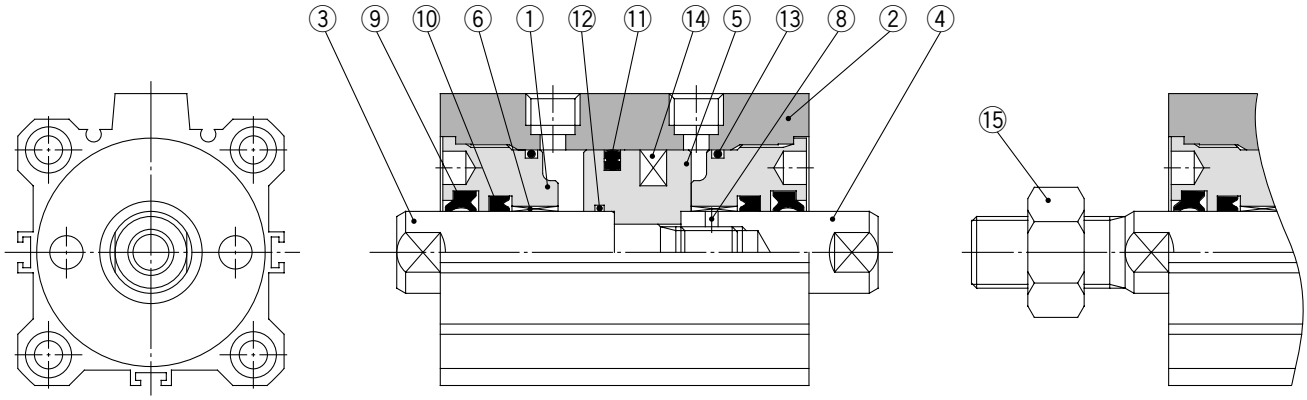
Construction

CH□QWB20



Rod end male thread

CH□QWB32 to CH□QWB100



Rod end male thread

Parts List

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Black anodized
2	**Cylinder tube**	Aluminum alloy	Hard anodized
3	**Piston rod A**	ø20: Stainless steel ø32 to ø100: Carbon steel	Hard chromium electroplated
4	**Piston rod B**	ø20: Stainless steel ø32 to ø100: Carbon steel	Hard chromium electroplated
5	**Piston**	Aluminum alloy	Chromated
6	**Bushing**	Copper alloy	
7	**Retaining ring (ø20 only)**	Carbon tool steel	Black zinc chromated
8	**Spring pin**		
9	**Scraper**	NBR	
10	**Rod seal**	NBR	
11	**Piston seal**	NBR	
12	**Piston gasket**	NBR	
13	**Tube gasket**	NBR	
14	**Magnet**	—	
15	**Rod end nut**	Carbon steel	Nickel plated

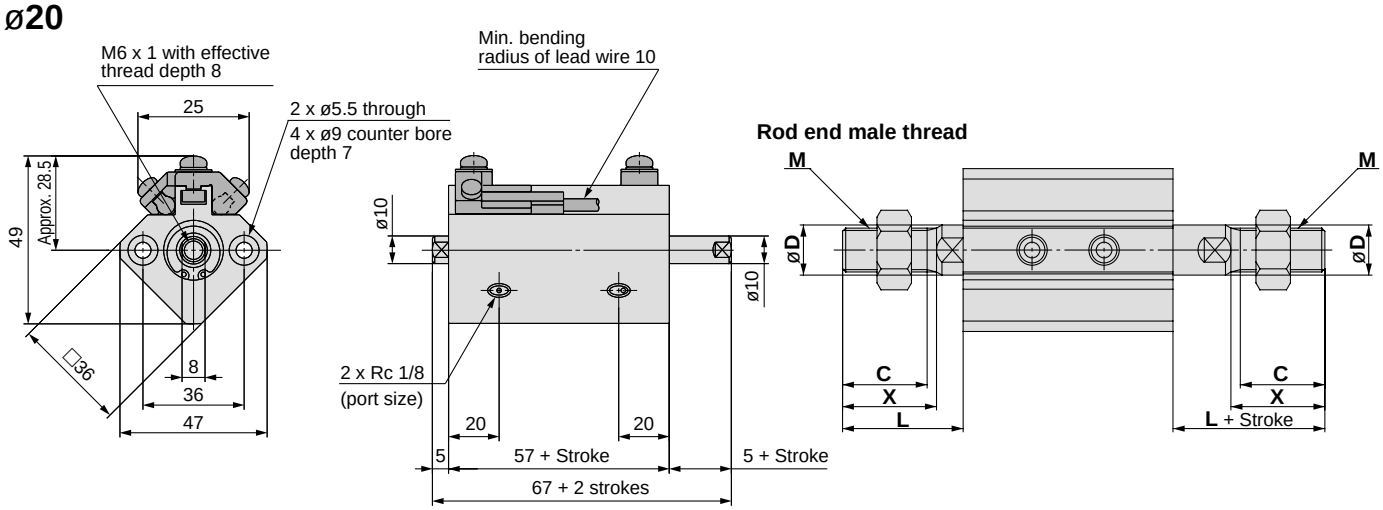
Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.	Content
20	CHQW20-PS	Nos. ⑨, ⑩, ⑪ and ⑬ from the chart at left
32	CHQW32-PS	
40	CHQW40-PS	
50	CHQW50-PS	
63	CHQW63-PS	
80	CHQW80-PS	
100	CHQW100-PS	

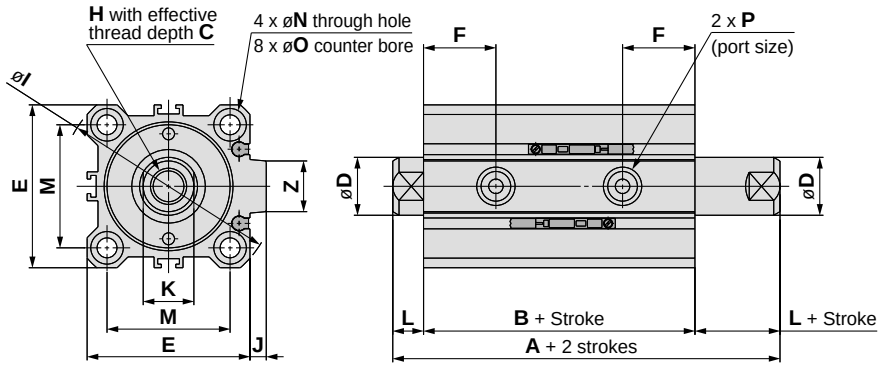
∗ Seal kit consists of items ⑨, ⑩, ⑪ and ⑬ and can be ordered by using the seal kit number for each bore size.
∗ Special tool required for disassembly. Contact SMC for recommended tool designs and dimensions.

Dimensions

ø20



ø32 to ø100



Note) The auto switches above are shown for a D-M9□(W) solid state auto switch.

(mm)

Bore size (mm)	A	B	C	D	E	F	H	I	J	K	L	M	N	O	P	S	U	Z
32	82	65	12	16	45	20	M10 x 1.5	60	4.5	14	8.5	34	5.5	9 depth 7	Rc1/8	58.5	31.5	14
40	84	67	12	16	52	22	M10 x 1.5	69	5	14	8.5	40	5.5	9 depth 7	Rc1/8	66	35	14
50	98	76	15	20	64	25	M12 x 1.75	86	7	18	11	50	6.6	11 depth 8	Rc1/4	80	41	19
63	102	80	15	20	77	27	M12 x 1.75	103	7	18	11	60	9	14 depth 10.5	Rc1/4	93	47.5	19
80	111	89	20	25	98	28	M16 x 2	132	6	22	11	77	11	17.5 depth 13.5	Rc3/8	112.5	57.5	26
100	119	95	24	30	117	29	M20 x 2.5	156	6.5	26	12	94	11	17.5 depth 13.5	Rc3/8	132.5	67.5	26

Rod end male threads (mm)

Bore size (mm)	C	X	D	H	L	K
20	15.5	18	10	M8 x 1.25	23	8
32	27	30	16	M14 x 1.5	38.5	14
40	27	30	16	M14 x 1.5	38.5	14
50	32	35	20	M18 x 1.5	46	18
63	32	35	20	M18 x 1.5	46	18
80	37	40	25	M22 x 1.5	51	22
100	37	40	30	M26 x 1.5	52	26

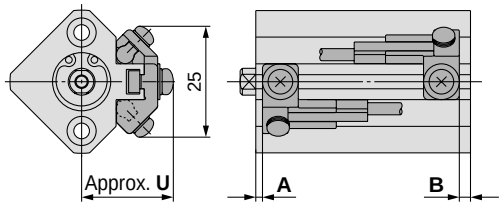
Series CH□QB/CH□QWB
Auto Switch Specifications

Refer to pages 347 to 406 for detailed specifications.

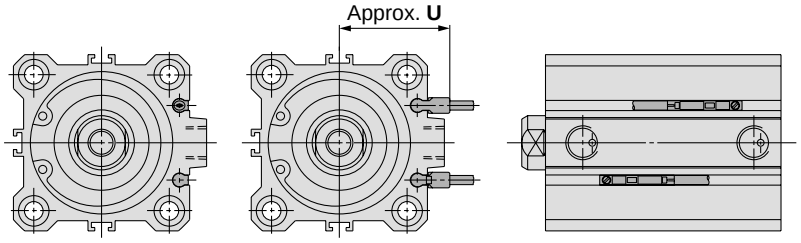
Auto Switches: Proper Mounting Positions and Mounting Heights for Stroke End Detection

D-M9□ **D-M9□V**
D-M9□W **D-M9□WV**
D-M9□AL **D-M9□AVL**
D-A9□ **D-A9□V**

ø20

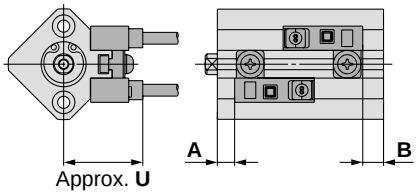


ø32 to ø100

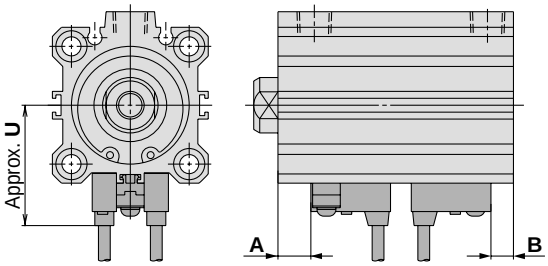


D-F7□ **D-F7NTL**
D-J79 **D-F7BAL**
D-F7□W **D-J79C**
D-J79W **D-A79W**
D-F79F **D-F7□WV**
D-A7□ **D-J7□V**
D-A80 **D-F7BAVL**
D-A7□H **D-A73C**
D-A80H **D-A80C**

ø20



ø32 to ø100



Auto Switch Proper Mounting Positions

(mm)

Bore size (mm)	Solid state auto switch						Reed auto switch							
	D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL		D-F7□/J79 D-F7□V/J79C D-F7□W/F7□WV D-F7BAL/F7BAVL D-F79F/J79W		D-F7NTL		D-A9□/A9□V		D-A73/A80		D-A7□H/A80H D-A73C/A80C D-A72		D-A79W	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
20	24.5	10.5	23.5	9.5	28.5	14.5	20.5	6.5	23	9	23.5	9.5	20.5	6.5
32	30	23	27.5	20.5	32.5	25.5	26	19	27	20	27.5	20.5	24.5	17.5
40	29	26	26.5	23.5	31.5	28.5	25	22	26	23	26.5	23.5	23.5	20.5
50	36.5	27.5	34	25	39	30	32.5	23.5	33.5	24.5	34	25	31	22
63	36.5	31.5	34	29	39	34	32.5	27.5	33.5	28.5	34	29	31	26
80	44	33	41.5	30.5	46.5	35.5	40	29	41	30	41.5	30.5	38.5	27.5
100	47.5	35.5	45	33	50	38	43.5	31.5	44.5	32.5	45	33	42	30

Note) Adjust the auto switch after confirming the operating conditions in the actual setting.

Auto Switch Mounting Heights

(mm)

Bore size (mm)	D-M9□ D-M9□W D-M9□AL D-A9□	D-M9□V D-M9□WV D-M9□AVL	D-A9□V	D-A7□ D-A80	D-F7□ D-F7□W D-J79 D-J79W D-F7BAL D-F7NTL D-F79F D-A7□H D-A80H	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAVL	D-J79C	D-A79W
	U	U	U	U	U	U	U	U	U
20	26.5	26.5	26.5	24.5	25.5	31.5	28	31	27
32	24.5	29	27	31.5	32.5	38.5	35	38	34
40	28	32.5	30.5	35	36	42	38.5	41.5	37.5
50	34	38.5	36.5	41	42	48	44.5	47.5	43.5
63	37.5	42	40	47.5	48.5	54.5	51	54	50
80	47.5	52	50	57.5	58.5	64.5	61	64	60
100	57.5	62	60	67.5	68.5	74.5	71	74	70

Minimum Auto Switch Mounting Stroke

(mm)

Auto switch mounting number	D-M9□ D-M9□V D-F7□V D-J79C	D-A9□ D-A9□V D-A7□ D-A80 D-A7□H D-A80H D-A73C D-A80C	D-F7□ D-J79	D-M9□WV D-M9□AVL D-F7□W D-F7□WV D-J79W D-F7BAVL	D-M9□W D-M9□AL D-F7BAL D-F7NTL D-F79F	D-A79W
1 pc.	5	5	10	10	15	15
2 pcs.	5	10	10	15	15	20

Operating Range

(mm)

Auto switch model	Bore size						
	20	32	40	50	63	80	100
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	5.5	6.5	6	6.5	6	7	7.5
D-F7□/J79 D-F7□V/J79C D-F7□W/F7□WV D-F7BAL/F7BAVL D-F79F/J79W/F7NTL	5.5	6	5.5	6	6.5	6.5	6.5
D-A9□/A9□V	9	9	9	8.5	10.5	10	10.5
D-A7□/A80 D-A7□H/A80H D-A73C/A80C	11.5	11.5	11.5	11.5	13.5	12.5	14
D-A79W	15	15	15	15	17	16	17.5

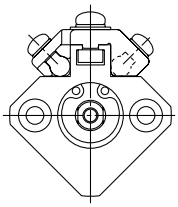
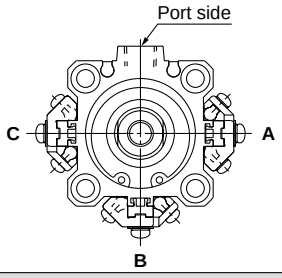
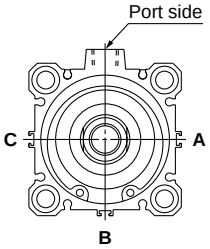
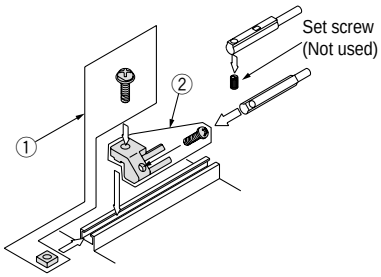
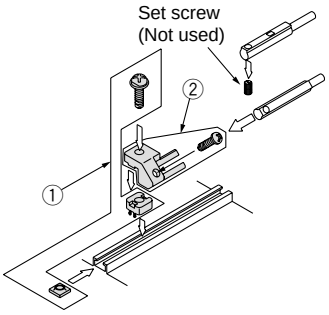
∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion.)
There may be the case it will vary substantially depending on an ambient environment.

Besides the models listed in “How to Order,” the following auto switches are applicable.
Refer to pages 347 to 406 for detailed auto switch specifications.

Auto switch type	Part no.	Electrical entry	Features
Solid state	D-F7NV, F7PV, F7BV	Grommet (perpendicular)	—
	D-F7NWV, F7BWV		Diagnostic indication (2-color display)
	D-F7BAVL		Water resistant (2-color display)
	D-F79, F7P, J79	Grommet (in-line)	—
	D-F79W, F7PW, J79W		Diagnostic indication (2-color display)
	D-F7BAL		Water resistant (2-color display)
	D-F7NTL		With timer
Reed	D-A73	Grommet (perpendicular)	—
	D-A80		Without indicator light
	D-A73H, A76H	Grommet (in-line)	—
	D-A80H		Without indicator light

∗ Solid state switches are also available with pre-wired connector. Refer to pages 389 and 390 for details.
∗ Normally closed (N.C. = b contact), solid state auto switches (D-F9G, F9H) are also available. For details, refer to page 365.

Auto Switch Mounting Brackets: Part Nos.

Auto switch mounting surface / Auto switch models	Bore size (mm) ø20	ø32, ø40, ø50		ø63, ø80, ø100
				
	Auto switch mounting surface	Auto switch mounting surface		Auto switch mounting surface
	Auto switch mounting rail surface only	Port side	A, B, C	Port, A, B, C sides
D-M9□ **D-M9□V** **D-M9□W** **D-M9□WV** **D-M9□AL** **D-M9□AVL** **D-A9□** **D-A9□V**	①BQ-1 ②BQ2-012 Two types of auto switch mounting bracket are used as a set. 	Auto switch mounting bracket not required.	①BQ-2 ②BQ2-012 Two types of auto switch mounting bracket are used as a set. 	Auto switch mounting bracket not required.

Note 1) To mount a compact auto switch on either of the three sides (A, B, and C above) other than the port side, mounting brackets are required separately other than the auto switch mounting brackets in the table above, so please order them separately from the cylinder.
(This is the same for when mounting a compact auto switch using an auto switch mounting rail, instead of using a compact auto switch mounting groove for ø63 to ø100.)
Example
CHDQB32-50-M9NW·····1 unit
BQ-2·····2 pcs.
BQ2-012·····2 pcs.

Note 2) Auto switch mounting brackets and auto switches are packed together at cylinder shipment.

Auto switch models	Bore size (mm) ø20	ø32	ø40 to ø100
D-F7□/J79 **D-F7□V** **D-J79C** **D-F7□W/J79W** **D-F7□WV** **D-F7BAL/F7BAVL** **D-F79F/F7NTL** **D-A7□/A80** **D-A73C/A80C** **D-A7□H/A80H** **D-A79W**	BQ-1	BQ-2	

Note 3) Auto switch mounting brackets and auto switches are packed together at cylinder shipment.

[Stainless steel mounting screw kits]

The following stainless mounting screw kits (including nuts) are available for use depending on the operating environment. (Auto switch spacers (for BQ-2) are not included. Please order BQ-2 separately.)
BBA2: For D-A7/A8/F7/J7 types
When D-F7BAL and F7BAVL auto switches are shipped mounted on a cylinder, the above stainless steel screws are used. Also when switches are shipped separately, BBA2 is included.

Note 4) Refer to the table below for details on BBA2.

Note 5) When an additional D-M9□A(V)L is required, order stainless steel screw kit BBA2 or BQ2-012S as a set separately.

Stainless mounting screw kit details

Part no.	Contents No.	Description	Size	Pcs.	Applicable auto switch mounting bracket part nos.	Applicable auto switches
BBA2	**1**	Auto switch mounting screws	M3 x 0.5 x 6L	1	BMU-1-025	D-A7/A8 D-F7/J7
			M3 x 0.5 x 8L	1	BQ-1	
			M3 x 0.5 x 10L	1	BQ-2	
	2	Auto switch mounting nuts (square nut)	M3 x 0.5	1	BQ-1	
	3	Auto switch mounting nuts (convex)	M3 x 0.5	1	BQ-2	

Note 6) Spacers (black resin) for BQ-2 are not included.

Note 7) Also when using BQ2-012 with D-A9□(V)/M9□(V)/M9□W(V), or M9□A(V)L auto switches, use stainless steel screws equivalent to the auto switch mounting brackets appropriate for each cylinder series.

Mass of auto switch mounting bracket

Mounting bracket part no.	Applicable cylinder I.D.	Mass (g)
BQ-1	ø20	1.5
BQ-2	ø32 to ø100	1.5
BQ2-012	ø20	5

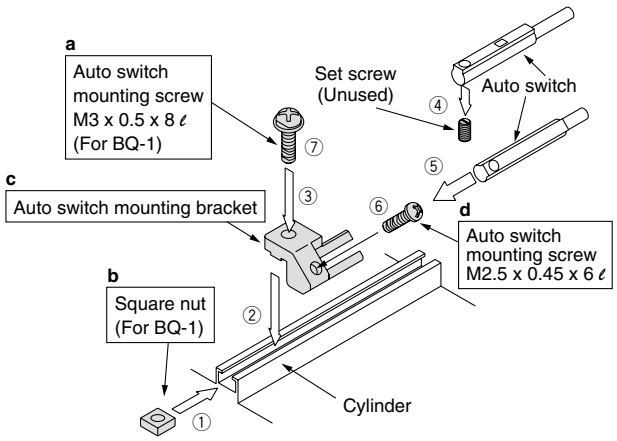
How to Mount and Move the Auto Switch

<Applicable auto switch>

Solid state ····· D-M9N(V), D-M9P(V), D-M9B(V)
D-M9NW(V), D-M9PW(V), D-M9BW(V)
D-M9NA(V), D-M9PA(V), D-M9BA(V)
Reed ····· D-A90(V), A93(V), A96(V)

ø20

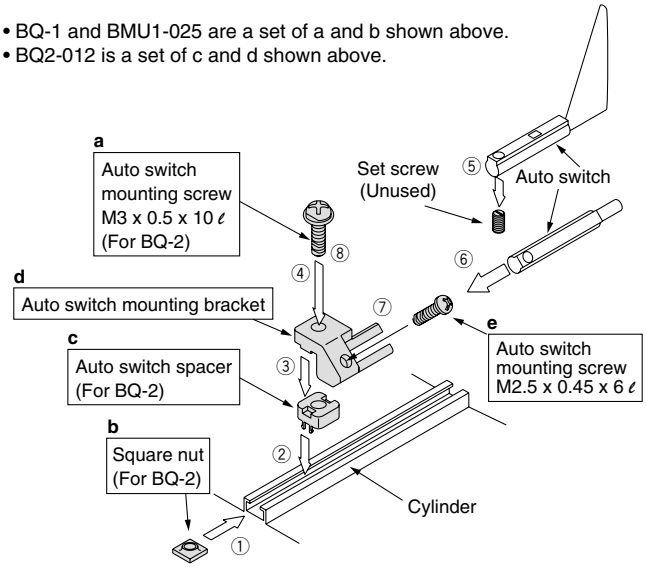
1. Insert the square nut for BQ-1 in the auto switch mounting rail and set it at the approximate auto switch mounting position.
2. Fit the convex part of the auto switch mounting bracket arm over the concave part of the rail, and slide the arm to the nut position.
3. Push the auto switch mounting screw (M3 for BQ-1) lightly into the square nut through the hole of the auto switch mounting arm.
4. Remove the set screw (M2.5) attached to the auto switch.
5. Insert the auto switch in the auto switch attachment part of the auto switch mounting bracket.
6. Secure the auto switch mounting screw (M2.5). (Tightening torque of M2.5 screw: 0.1 to 0.2 N·m)
7. Secure the auto switch mounting screw (3) after confirming the detecting position. (Tightening torque of M3 screw: 0.5 to 0.7 N·m)
8. Modify the detecting position while the auto switch is secured at the position of (3) in the figure.



• BQ-1 and BMU1-025 are a set of a and b shown above.
• BQ2-012 is a set of c and d shown above.

ø32 to ø100

1. Insert the square nut for BQ-2 in the auto switch mounting rail and set it at the approximate auto switch mounting position.
2. Fit the protruding part of the auto switch mounting spacer over the concave part of the rail, and slide the spacer to the nut position.
3. Fit the convex part of the auto switch mounting bracket arm over the concave part of the switch spacer.
4. Turn the auto switch mounting screw (M3 for BQ-2) lightly into the square nut through the mounting holes of the auto switch mounting arm and switch spacer.
5. Remove the set screw (M2.5) attached to the auto switch.
6. Insert the auto switch in the auto switch attachment part of the auto switch mounting bracket.
7. Secure the auto switch mounting screw (M2.5). (Tightening torque of M2.5 screw: 0.1 to 0.2 N·m)
8. Secure the auto switch mounting screw (4) after confirming the detecting position. (Tightening torque of M3 screw: 0.5 to 0.7 N·m)
9. Modify the detecting position while the auto switch is secured at the position of (4) in the figure.

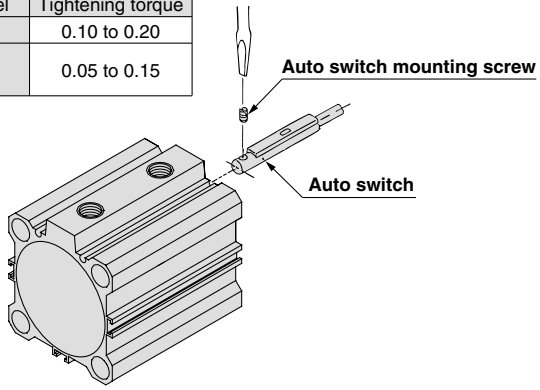


• BQ-2 is a set of a, b and c shown above.
• BQ2-012 is a set of d and e shown above.

ø32 to ø100
• When tightening an auto switch mounting screw, use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm.

Tightening torque for auto switch mounting screw (N·m)

Auto switch model	Tightening torque
D-A9□(V)	0.10 to 0.20
D-M9□(V) **D-M9□W(V)**	0.05 to 0.15

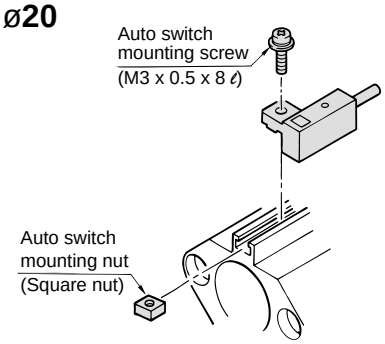


<Applicable auto switch>

Solid state ·····D-F79, D-F7P, D-J79, D-F7NV
D-F7PV, D-F7BV, D-J79C
D-F79W, D-F7PW, D-J79W
D-F7NWV, D-F7BWV
D-F79F, D-F7BAL, D-F7BAVL
D-F7NTL
Reed ·····D-A72, D-A73, D-A80, D-A72H
D-A73H, D-A76H, D-A80H
D-A73C, D-A80C, D-A79W

1. Slide the auto switch mounting nut inserted into the mounting rail and set it at the auto switch mounting position.
2. Fit the convex part of auto switch mounting arm into the concave part of auto switch mounting rail. Then slide the switch over the nut.
   (Series CDQ2: Fit the convex part of auto switch mounting arm through the auto switch spacer into the concave part of auto switch mounting rail.)
3. Push the auto switch mounting screw lightly into the mounting nut through the hole of auto switch mounting arm.
4. After reconfirming the detecting position, tighten the mounting screw to secure the auto switch. (Tightening torque of M3 screw should be 0.5 to 0.7 N·m.)
5. Modification of the detecting position should be made in the condition of 3.

ø20



ø32 to ø100