

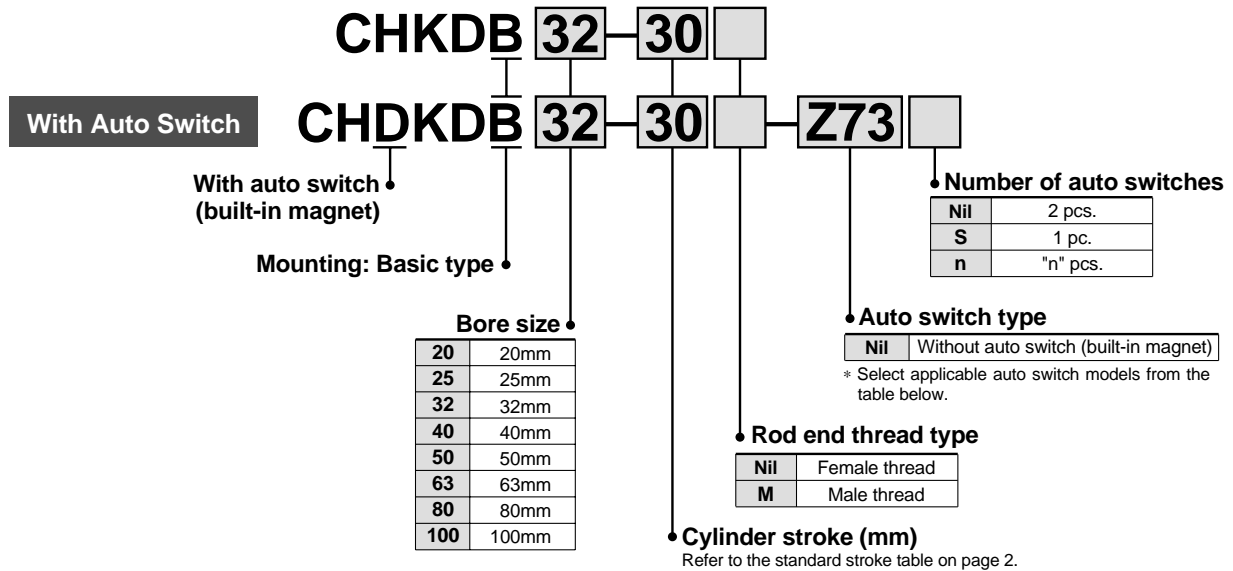
10MPa

JIS Standard Compact Hydraulic Cylinder

Series **CH** **KDB**

∅20, ∅25, ∅32, ∅40, ∅50, ∅63, ∅80, ∅100

How to Order



Applicable Auto Switches: Refer to "Auto Switch Guide" CAT. E274-A for further details on each auto switch. Refer to pages 117 and 118 for auto switch circuit diagrams.

Bore sizes ∅20 and ∅25

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch type		Lead wire length (m)*			Applicable load		
					DC	AC	Electrical entry direction	Perpendicular	In-line	0.5 (Nil)	3 (L)			5 (Z)
Reed switch	—	Grommet	No	2-wire	24V	5V, 12V	100V or less	A90V	A90	●	●	—	IC circuit	Relay PLC
			Yes	3-wire (NPN equiv.)	—	5V	—	A93V	A93	●	●	—	—	—
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24V	5V, 12V	—	F9NV	F9N	●	●	○	IC circuit	Relay PLC
				3-wire (PNP)				F9PV	F9P	●	●	○	—	
				2-wire				F9BV	F9B	●	●	○	—	
	Diagnostic indication (2-color display)		3-wire (NPN)	F9NWV	F9NW	●	●	○	IC circuit					
	Water resistant (2-color display)		3-wire (PNP)	F9PWV	F9PW	●	●	○	—					
			2-wire	F9BWV	F9BW	●	●	○	—					
—	—	—	—	—	—	—	F9BA	—	●	○	—	—		

* Lead wire length symbols: 0.5m Nil (Example) A93
 3m L (Example) A93L
 5m Z (Example) F9NWZ

Note) Solid state switches marked "○" are produced upon receipt of order.

Bore sizes ∅32 to ∅100

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch type		Lead wire length (m)*			Applicable load		
					DC	AC	Electrical entry direction	Perpendicular	In-line	0.5 (Nil)	3 (L)			5 (Z)
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	24V	5V	—	—	Z76	●	●	—	IC circuit	—
				2-wire				12V	100V	—	Z73	●	●	●
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24V	5V, 12V	—	Y69A	Y59A	●	●	○	IC circuit	Relay PLC
				3-wire (PNP)				Y7PV	Y7P	●	●	○	—	
				2-wire				Y69B	Y59B	●	●	○	—	
	Diagnostic indication (2-color display)		3-wire (NPN)	Y7NWV	Y7NW	●	●	○	IC circuit					
	Water resistant (2-color display)		3-wire (PNP)	Y7PWV	Y7PW	●	●	○	—					
			2-wire	Y7BWV	Y7BW	●	●	○	—					
—	—	—	—	—	—	—	Y7BA	—	●	○	—	—		

* Lead wire length symbols: 0.5m Nil (Example) Y59A
 3m L (Example) Y59AL
 5m Z (Example) Y59AZ

Note) • Solid state switches marked "○" are produced upon receipt of order.
 • Auto switches are not mounted on the cylinder at the time of the shipment, but rather packaged together with the cylinder for shipment.

Specifications

- Light and compact aluminum body.
- Auto switches can be mounted.
- Auto switch mounting does not affect overall length.
- A wide range of operating pressures, bore sizes, and standard strokes make more selections possible to suit your individual needs.



Action	Double acting/Single rod type
Fluid	Hydraulic fluid
Nominal pressure	10MPa
Proof pressure	15MPa
Maximum allowable pressure	13MPa
Minimum operating pressure	0.3MPa
Ambient and fluid temperature	Without auto switch: -10° to 80°C
	With auto switch: -10° to 60°C
Piston speed	8 to 100mm/s
Cushion	None
Rod end thread	Female thread, Male thread
Thread tolerance	JIS class 2
Stroke length tolerance	+ ^{0.8} ₀ mm
Mounting type	Basic type
Mounting	Through hole

Note) Refer to page 136 for definitions of terms related to pressure.

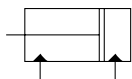
Standard Strokes

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



Pages 10 to 12

JIS symbol



Manufacture of Intermediate Stroke Cylinders

Intermediate strokes in 5mm increments can be manufactured by installing spacers inside standard stroke cylinders.

55, 60, 65 and 70mm stroke cylinders have the same overall length as a 75mm stroke cylinder, and 80, 85, 90 and 95mm stroke cylinders have the same length as a 100mm stroke cylinder.

Refer to the Made to Order Specifications on page 11 for the ordering procedure.

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	*
Phosphate hydraulic fluid	Not compatible

* Contact SMC.

Minimum Strokes for Auto Switch Mounting

∅20 & ∅25

No. of auto switches	Auto switch type		
	D-A9□, D-F9□W D-A9□V, D-F9□WV	D-F9□ D-F9□V	D-F9BAL
1 pc.	5	5	20
2 pcs.	10	5	20

∅32 to ∅100

No. of auto switches	Auto switch type			
	D-Z7 D-Z8	D-Y5, D-Y6 D-Y7 D-Y7□V	D-Y7□W D-Y7□WV	D-Y7BAL
1 pc.	5	5	10	15
2 pcs.	10	5	10	15

Theoretical Output

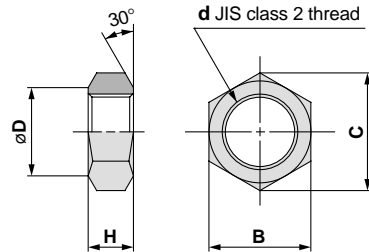
Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm ²)	Operating pressure (MPa)		
				3.5	7	10
20	12	OUT	314	1099	2198	3140
		IN	201	704	1407	2010
25	14	OUT	490	1715	3430	4900
		IN	336	1176	2352	3360
32	18	OUT	804	2814	5628	8040
		IN	549	1922	3843	5490
40	22.4	OUT	1256	4396	8792	12560
		IN	862	3017	6034	8620
50	28	OUT	1963	6871	13741	19630
		IN	1347	4715	9429	13470
63	35.5	OUT	3117	10910	21819	31170
		IN	2127	7445	14889	21270
80	45	OUT	5026	17591	35182	50260
		IN	3436	12026	24052	34360
100	56	OUT	7853	27486	54971	78530
		IN	5390	18865	37730	53900

Theoretical output (N) = Pressure (MPa) x Piston area (mm²)

Optional Parts

Rod end nut



(mm)

Part no.	Bore size (mm)	B	C	d	D	H
NTH-025	20	17	19.6	M10 x 1.25	16.5	6
NTH-032	25	19	21.9	M12 x 1.25	18	7
NTH-040	32	22	25.4	M16 x 1.5	21	10
NTH-050	40	27	31.2	M20 x 1.5	26	12
NTH-060	50	32	37	M24 x 1.5	31	14
NTH-080	63	41	47.3	M30 x 1.5	40	17
NTH-100	80	55	63.5	M39 x 1.5	54	20
NTH-125	100	70	80.8	M48 x 1.5	69	26

Weights

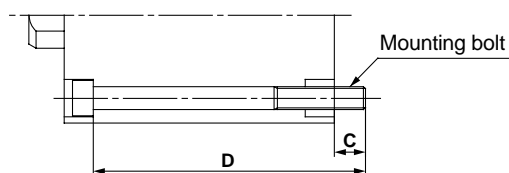
Unit: g

Bore size (mm)	Standard stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
20	218	240	262	282	304	326	348	370	392	414	—	—
25	299	327	355	383	411	439	467	495	523	551	—	—
32	515	558	601	644	687	730	773	816	859	902	1117	—
40	729	784	839	894	949	1004	1059	1114	1169	1224	1499	1774
50	1065	1139	1213	1287	1361	1435	1509	1583	1657	1731	2101	2471
63	1773	1882	1991	2100	2209	2318	2427	2536	2645	2754	3299	3844
80	3216	3379	3542	3868	4031	4194	4357	4520	4683	4846	5661	6476
100	6142	6384	6626	6868	7110	7352	7594	7836	8078	8320	9530	10740

Mounting Bolts for CH□KDB

Through hole type mounting bolts are available.
 How to order: Add "Bolt" in front of the bolts to be used.
 Example: M8 x 80 / 4 pcs.

Mounting bolt diagram



Model	C	D	Mounting bolt
CH□KDB20 -5 (M)	12.4	55	M5 x 55 /
		60	x 60 /
		65	x 65 /
		70	x 70 /
		75	x 75 /
		80	x 80 /
		85	x 85 /
		90	x 90 /
		95	x 95 /
		100	x 100 /
		CH□KDB25 -5 (M)	10.4
60	x 60 /		
65	x 65 /		
70	x 70 /		
75	x 75 /		
80	x 80 /		
85	x 85 /		
90	x 90 /		
95	x 95 /		
100	x 100 /		
CH□KDB32 -5 (M)	10.5		
		65	x 65 /
		70	x 70 /
		75	x 75 /
		80	x 80 /
		85	x 85 /
		90	x 90 /
		95	x 95 /
		100	x 100 /
		105	x 105 /
		130	x 130 /
CH□KDB40 -5 (M)	13.5	65	M8 x 65 /
		70	x 70 /
		75	x 75 /
		80	x 80 /
		85	x 85 /
		90	x 90 /
		95	x 95 /
		100	x 100 /
		105	x 105 /
		110	x 110 /
		135	x 135 /
160	x 160 /		

Model	C	D	Mounting bolt
CH□KDB50 -5 (M)	15.8	70	M10 x 70 /
		75	x 75 /
		80	x 80 /
		85	x 85 /
		90	x 90 /
		95	x 95 /
		100	x 100 /
		105	x 105 /
		110	x 110 /
		115	x 115 /
		140	x 140 /
165	x 165 /		
CH□KDB63 -5 (M)	16	75	M12 x 75 /
		80	x 80 /
		85	x 85 /
		90	x 90 /
		95	x 95 /
		100	x 100 /
		105	x 105 /
		110	x 110 /
		115	x 115 /
		120	x 120 /
		145	x 145 /
170	x 170 /		
CH□KDB80 -5 (M)	22.2	90	M14 x 90 /
		95	x 95 /
		100	x 100 /
		105	x 105 /
		110	x 110 /
		115	x 115 /
		120	x 120 /
		125	x 125 /
		130	x 130 /
		135	x 135 /
		160	x 160 /
185	x 185 /		
CH□KDB100 -5 (M)	26.5	110	M16 x 110 /
		115	x 115 /
		120	x 120 /
		125	x 125 /
		130	x 130 /
		135	x 135 /
		140	x 140 /
		145	x 145 /
		150	x 150 /
		155	x 155 /
		180	x 180 /
205	x 205 /		

Series CH□KDB

Water Resistant Type

A special scraper is installed on the basic cylinder to prevent liquid in the surrounding area from entering the cylinder. It can be used in environments where exposure to machine tool coolants is likely, as well as in environments where water spray and splashing is frequent, such as in food processing machinery and car washing equipment.

CH□KDB Bore size R Stroke Rod end thread type Y7BA S

Water resistant cylinder

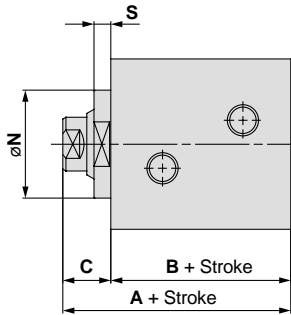
R	NBR Seal (nitrile rubber)
V	FKM Seal (fluoro rubber)

Water resistant solid state switch with 2-color display

ø20 and 25	F9BA
ø32 to ø100	Y7BA

Auto switch symbol

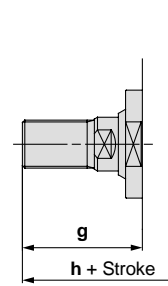
Refer to page 2 for specifications.



(mm)

Bore size (mm)	A	B	C	N	S
20	61	43	18	26.5	6
25	63	45	18	30	6
32	71	51	20	38	7
40	75	55	20	45	7
50	81	60	21	55	7
63	90	67	23	66	7
80	105	78	27	86	7
100	132	96	36	104	7

Note) For all dimensions other than the above, please refer to page 7.



Rod end male thread

(mm)

Bore size (mm)	g	h
20	33	76
25	36	81
32	45	96
40	50	105
50	56	116
63	68	135
80	87	165
100	111	207

Note) For all dimensions other than the above, please refer to page 7.

⚠ Specific Product Precautions

Be sure to read before handling. Refer to pages 135 through 141 for safety instructions, hydraulic cylinder precautions and auto switch precautions.

Usage

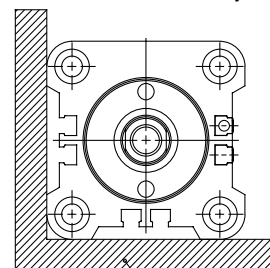
⚠ Caution

- Use hexagon socket head cap screws (JISB1176, strength class 10.9 or higher) for cylinder mounting.
- 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.
- 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.
- 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.
- Since Series CH□KDB does not have an air release plug, release air from other components (e.g. from piping, etc.) as well.
- Do not use two cylinders facing one another horizontally or vertically in such a way that their piston rods strike each other.
- 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.
- When mounting the cylinder body with mounting bolts, use tightening torques in the table at left as a guide.

Body mounting bolt tightening torques

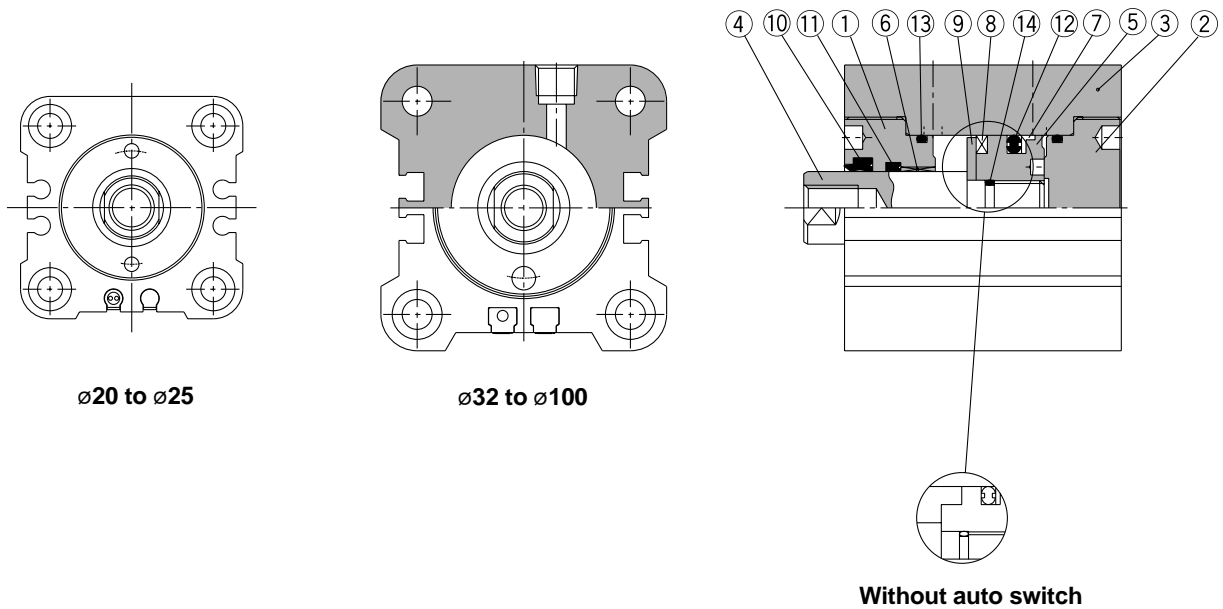
Bore size (mm)	Mounting bolt size	Tightening torque (N·m)
20	M5	2.5
25	M5	4
32	M6	7
40	M8	16
50	M10	30
63	M12	40
80	M14	70
100	M16	100

Consult with SMC when using a cylinder in close proximity to a magnetic body (including proximity on any side) as shown in the figure below, as the operation of auto switches may become unstable.



Magnetic body (steel plate, etc.)

Construction



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 & ø25: Stainless steel ø32 to ø100: Carbon steel	Hard chromium electroplated
5	Piston	Stainless steel	
6	Bushing	Copper alloy	
7	Back-up ring	Resin	
8	Magnet	—	With switch only
9	Magnet plate	Stainless steel	With switch only
10	Scraper	NBR	
11	Rod seal		
12	Piston seal		
13	Tube gasket		
14	Piston gasket		

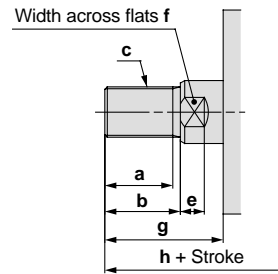
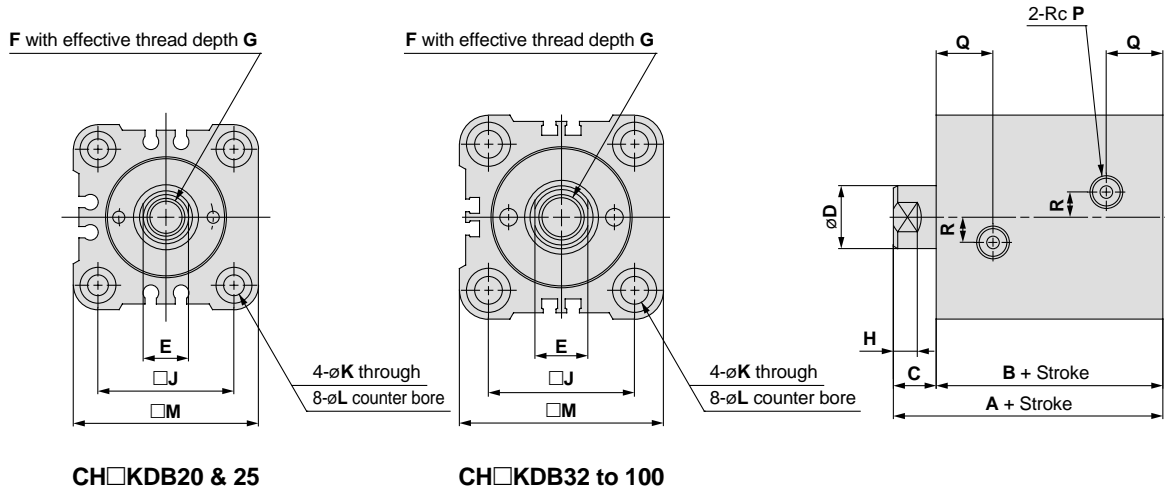
Replacement parts: Seal kits

Bore size (mm)	Seal kit no.	Kit components
20	CHKD20-PS	Nos. 7, 10, 11, 12, and 13 from the chart at left
25	CHKD25-PS	
32	CHKD32-PS	
40	CHKD40-PS	
50	CHKD50-PS	
63	CHKD63-PS	
80	CHKD80-PS	
100	CHKD100-PS	

* Seal kits consist of items 7, 10, 11, 12 and 13, and can be ordered by using the seal kit number for each bore size.

Series CH□KDB

Dimensions



Rod end male thread

Bore size (mm)	A	B	C	D	E	F	G	H	J	K	L	M	P	Q	R
20	51	43	8	12	10	M8 x 1.25	10	6	30	5.5	9.5 depth 5.4	43	1/8	16.5	6
25	53	45	8	14	12	M10 x 1.5	12	6	36	5.5	9.5 depth 5.4	49	1/8	17	8
32	61	51	10	18	14	M12 x 1.75	15	7	47	6.6	11 depth 6.5	63	1/4	19.5	10
40	65	55	10	22.4	19	M16 x 2	20	7	52	9	14 depth 8.6	71	1/4	20.5	10
50	71	60	11	28	24	M20 x 2.5	24	8	58	11	17.5 depth 10.8	81	1/4	22	10
63	80	67	13	35.5	30	M27 x 3	33	9	69	13	20 depth 13	97	1/4	25.5	10
80	95	78	17	45	41	M30 x 3.5	36	14	86	15	23 depth 15.2	117	3/8	30	15
100	122	96	26	56	50	M39 x 4	45	21	106	17	26 depth 17.5	142	3/8	36	15

Note 1) Body dimensions are the same with or without auto switches.

Bore size (mm)	a	b	c	e	f	g	h
20	11	15	M10 x 1.25	6	10	23	66
25	14	18	M12 x 1.25	6	12	26	71
32	21	25	M16 x 1.5	7	14	35	86
40	26	30	M20 x 1.5	7	19	40	95
50	31	35	M24 x 1.5	8	24	46	106
63	41	45	M30 x 1.5	9	30	58	125
80	56	60	M39 x 1.5	14	41	77	155
100	71	75	M48 x 1.5	21	50	101	197

Series CH□KDB Auto Switch Specifications

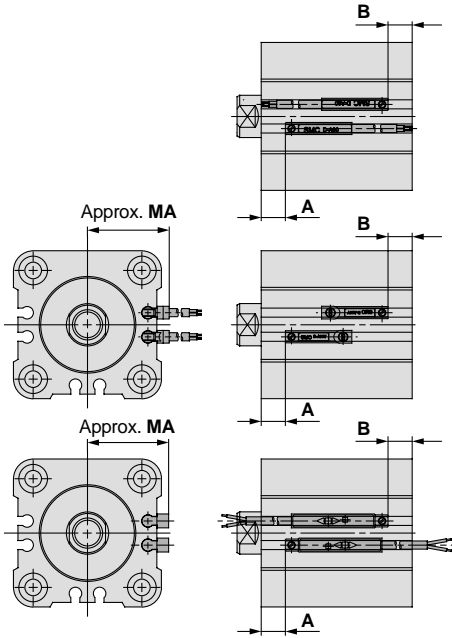
Refer to "Auto Switch Guide" CAT.E274-A for detailed specifications.



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

ø20 & ø25

D-A9□
D-F9□
D-F9□W



Proper auto switch mounting positions (mm)

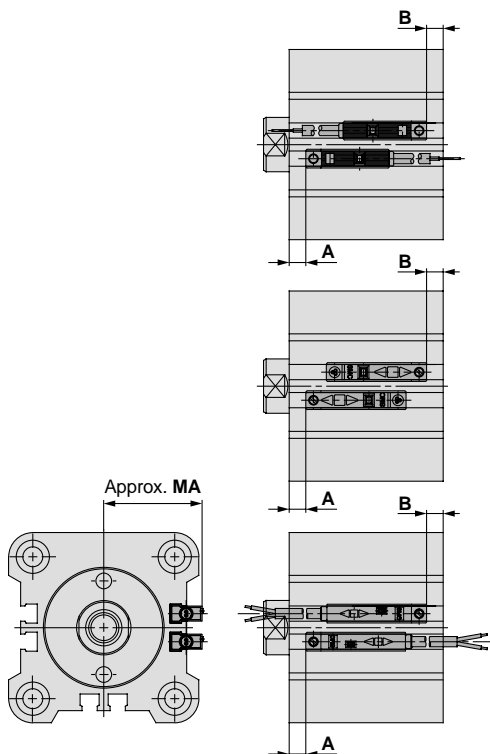
Bore size (mm)	D-A9□ D-A9□V		D-F9□ D-F9□V D-F9□W D-F9□WV		D-F9BAL	
	A	B	A	B	A	B
20	8	15	12	19	11	18
25	9	16	13	20	12	19

Auto switch mounting heights (mm)

Bore size (mm)	D-A9□V	D-F9□V D-F9□WV	D-F9BAL
	MA	MA	MA
20	25	27.5	25
25	27	29.5	27

ø32 to ø100

D-Z7
D-Z8
D-Y5□
D-Y7□
D-Y7□W



Proper auto switch mounting positions (mm)

Bore size (mm)	D-Z7, D-Z8, D-Y5 D-Y, D-Y7 D-Y7□V, D-Y7□WV D-Y7BAL	
	A	B
32	10	16.5
40	12	18.5
50	13	22.5
63	16.5	26
80	18.5	35
100	26.5	44.5

Auto switch mounting heights (mm)

Bore size (mm)	D-Y7BAL
	MA
32	32.5
40	37
50	43
63	51.5
80	62
100	74.5

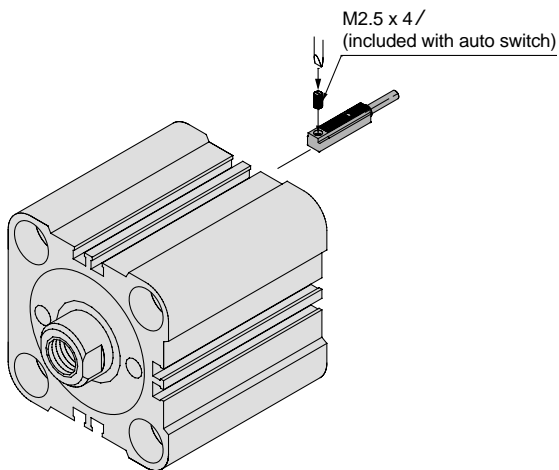
Auto Switch Mounting

When mounting auto switches, they should be inserted into the cylinder's switch mounting groove from the direction shown in the drawing below. After setting in the mounting position, use a flat head watchmakers screw driver to tighten the set screw that is included.

⚠ Caution

When tightening the auto switch mounting screw, use a watchmakers screw driver with a handle about 5 to 6mm in diameter.

Also, tighten with a torque of 0.1 to 0.2N·m for types D-A9 and D-F9, and 0.05 to 0.1N·m for types D-Z7, D-Z8, D-Y5, D-Y6 and D-Y7. As a rule, the mounting screw should be turned about 90° past the point at which tightening can first be felt.



Series CH□KDB

Made to Order Specifications 1

Contact SMC for detailed specifications, lead times, and prices.



1 Series CHQHB (14MPa compatible) Interchangeable Parts

CH□KDB Bore size Stroke Rod end thread type Auto switch Quantity XC61

CH□QHB interchangeable parts

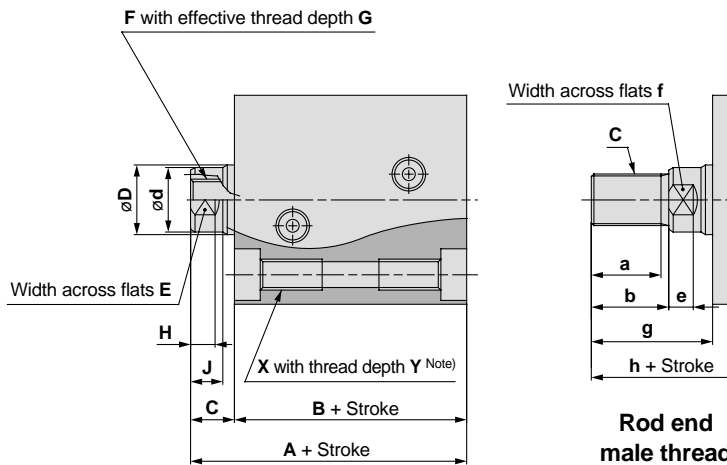
Interchangeable contents Overall length End thread size

Cylinder mounting

Nil	Through hole
R	Front taps
H	Rear taps
W	Double side taps

Dimensions

CH□KDB□-□-XC61□



Bore size (mm)	A	B	C	D	d	E	F	G	H	J	X	Y
20	53	43	10	12	11	10	M6 x 1	8	5.5	6.5	M6 x 1	12
25	56	45	11	14	13	12	M8 x 1.25	10	6.5	7.5	M6 x 1	12
32	63	51	12	18	15	13	M10 x 1.5	12	7	8.5	M8 x 1.25	16
40	69	55	14	22.4	19	16	M12 x 1.75	15	8	10	M10 x 1.5	20
50	75	60	15	28	24	21	M16 x 2	20	9.5	11.5	M12 x 1.75	24
63	85	67	18	35.5	31	27	M20 x 2.5	24	11.5	14	M16 x 2	24
80	99	78	21	45	39	36	M27 x 3	33	15	17	M18 x 2.5	27
100	122	96	26	56	48	41	M30 x 3.5	36	17.5	22	M20 x 2.5	30

Rod end male threads

Bore size (mm)	a	b	c	e	f	g	h
20	12	14	M8 x 1	5.5	10	24	67
25	14.5	17	M10 x 1.25	6.5	12	28	73
32	17.5	20	M12 x 1.25	7	13	32	83
40	22	25	M16 x 1.5	8	16	39	94
50	27	30	M20 x 1.5	9.5	21	45	105
63	32	35	M24 x 1.5	11.5	27	53	120
80	40	43	M30 x 1.5	15	36	64	142
100	47	50	M39 x 1.5	17.5	41	76	172

Part no. suffix	X & Y dimensions
-XC61	None
-XC61R	4 places on front side
-XC61H	4 places on rear side
-XC61W	8 places on both sides

Note) The relationship between the mounting taps (X and Y dimensions) provided on cylinder tubes and their order numbers is as shown above.

Series CH □ KDB

Made to Order Specifications 2

Contact SMC for detailed specifications, lead times, and prices.



2 Intermediate Stroke Type

Intermediate strokes in 5mm increments can be manufactured by installing spacers inside standard stroke cylinders.

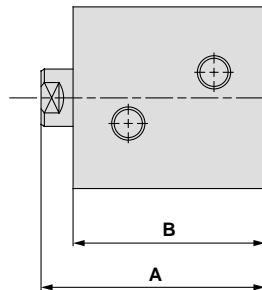
CH□KDB Bore size Stroke Rod end thread type Auto switch Quantity XC63

Intermediate stroke ●

Stroke	Applicable tube
55, 60, 65, 70	For 75mm stroke
80, 85, 90, 95	For 100mm stroke

Dimensions

CH□KDB□-□-XC63



Bore size (mm)	Stroke	55, 60, 65, 70		80, 85, 90, 95	
		A	B	A	B
32		136	126	—	—
40		140	130	165	155
50		146	135	171	160
63		155	142	180	167
80		170	153	195	178
100		197	171	222	196

Note) Dimensions other than those highlighted above are standard.

Series CH□KDB

Made to Order Specifications 3

Contact SMC for detailed specifications, lead times, and prices.



3

With Air Release Valve

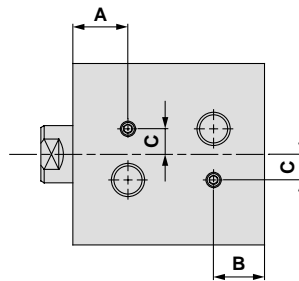
Air release valves are provided on cylinder tube surfaces machined for ports.

CH□KDB Bore size Stroke Rod end thread type Auto switch Quantity XC64

With air release valve

Dimensions

CH□KDB□-□-XC64



Bore size (mm)	A	B	C
20	16.5	14.5	7
25	17	15	8
32	19.5	17	10
40	20.5	17.5	10
50	22	19.5	10
63	25.5	22	10
80	30	26.5	15
100	36	33	15

Note) Dimensions other than those highlighted above are standard.