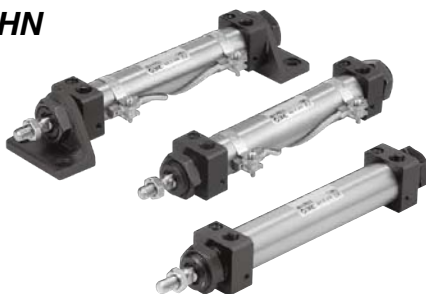


Small Bore Hydraulic Cylinder

Series **CHN**

Series **CHN**



Nominal pressure: **7 MPa**

Bore size (mm): 20, 25, 32, 40

CHQ

CHK ☐

CHN

CHM

CHS ☐

CH2 ☐

CHA

Related
Equipment

D- ☐

Stainless Steel Tube

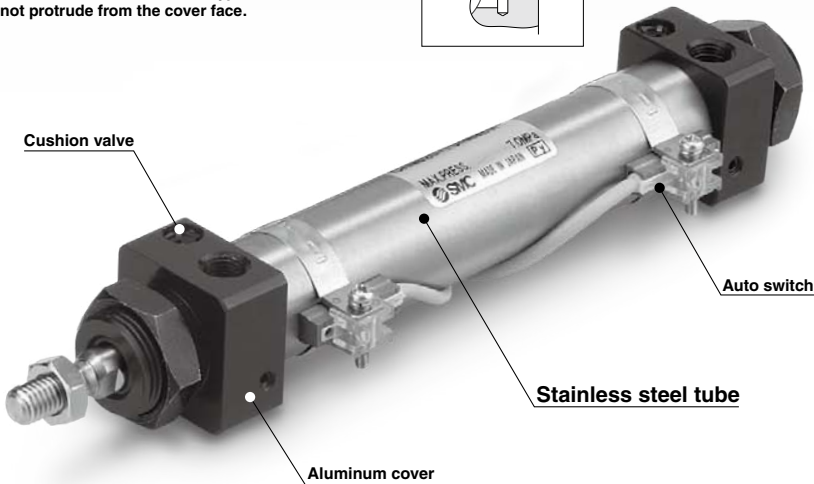
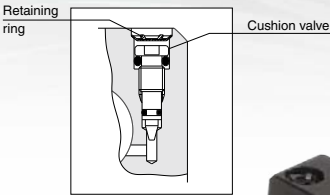
Small Bore Hydraulic Cylinder for 7 MPa

Series **CHN**

ø20, ø25, ø32, ø40

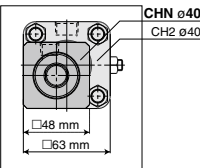
Equipped with cushion mechanism

- A cushion seal system mechanism is now a standard feature.
- Cushion valves are enhanced with a non-slip retaining mechanism.
- The cushion valve is a discreet type valve that does not protrude from the cover face.



Reduced cross sectional area

When compared to the same size tie-rod cylinder, the cross sectional area of our Series CHN cylinder projects less than 45%, thereby attaining better space savings.



Lightweight

Using aluminum alloy for both the rod cover and head cover reduces overall weight.

Model	Weight (kg)
CHNB20-100	0.51
CHNB25-100	0.63
CHNB32-100	0.89
CHNB40-100	1.51

Basic type with a 100 mm stroke

Built-in magnet

All cylinders come with a built-in magnet as a standard feature. This makes possible the mounting of an auto switch for piston position sensing even after the cylinder has been installed.

Series Variations

Series	Nominal pressure	Bore size (mm)	Mounting bracket	Auto Switches
CHN	7.0 MPa	20	Basic style Axial foot style Rod flange style Head flange style Single clevis style	Band mounting type Reed type Solid state type
		25		
		32		
		40		

7 MPa

Hydraulic Cylinder

Series CHN

ø20, ø25, ø32, ø40

How to Order

CHN **L** **25** - **100** - **M9BW** **□** - **C**

Mounting style *

B	Basic style
L	Axial foot style
F	Rod flange style
G	Head flange style
C	Single clevis style

Bore size *

20	20 mm
25	25 mm
32	32 mm
40	40 mm

• Auto switch mounting bracket ^(Note)

Note) This symbol is indicated when the D-A9□ or M9□ type auto switch is specified.
This mounting bracket does not apply to other auto switches (D-C7□ and H7□, etc.)
Applicable to ø20 only.

• Number of auto switches

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

• Auto switch type

Nil	Without auto switch (built-in magnet)
------------	---------------------------------------

* Select applicable auto switches from the table below.

• Cylinder stroke (mm)

Refer to the standard stroke table on page 1318.

Applicable Auto Switches/Refer to pages 1451 to 1510 for further details on each auto switch.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch model		Lead wire length (m)					Pre-wired connector	Applicable load	
					DC	AC	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)			
Solid state auto switch	—	Grommet		3-wire (NPN)	5 V, 12 V	—	M9NV	M9N	●	—	●	○	—	○	IC circuit	
				3-wire (PNP)			M9PV	M9P	●	—	●	○	—	○		
		Connector	Terminal conduit	2-wire			12 V	M9BV	M9B	●	—	●	○	—	○	—
				—			—	—	H7C	●	—	●	●	●	—	
	Diagnostic indication (2-color display)		Yes	3-wire (NPN)	24 V		M9NWV	M9NW	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)			M9PWV	M9PW	●	●	●	○	—	○		
		Grommet	Terminal conduit	2-wire			12 V	M9BWV	M9BW	●	●	●	○	—	○	—
				3-wire (NPN)			M9NAV^{*1}	M9NA^{*1}	○	○	●	○	—	○		
	Water resistant (2-color display)		Grommet	3-wire (PNP)	5 V, 12 V		M9PAV^{*1}	M9PA^{*1}	○	○	●	○	—	○	IC circuit	
				2-wire			M9BAV^{*1}	M9BA^{*1}	○	○	●	○	—	○		
		Terminal conduit	Yes	4-wire (NPN)			5 V, 12 V	—	H7NF	●	—	●	○	—	○	IC circuit
				—			—	—	—	—	—	—	—	—	—	
Reed auto switch	—	Grommet	Yes	3-wire (NPN equiv.)	24 V	12 V	A96V	A96	●	—	●	—	—	IC circuit		
				100 V			A93V^{*2}	A93	●	●	●	●	—		—	
				100 V or less			A90V	A90	●	—	●	—	—	—	IC circuit	
				100 V, 200 V			—	B54	●	—	●	●	—	—		
				200 V or less			—	B64	●	—	●	—	—	—	—	
				—			—	C73C	●	—	●	●	●	—		
				24 V or less			—	C80C	●	—	●	●	●	—	IC circuit	
				—			—	A33	—	—	—	—	●	—		
		Connector	Terminal conduit	Yes	100 V, 200 V	—	A34	—	—	—	—	●	—	—		
					—	—	A44	—	—	—	—	●	—			
					DIN terminal	Grommet	—	—	—	B59W	●	—	●	—	—	Relay PLC
							—	—	—	—	—	—	—	—	—	

*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. --- (Applicable to ø20 only.)

Consult with SMC regarding water resistant types with the above model numbers.

*2 1 m type lead wire is only applicable to D-A93.

* 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) H7CN

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

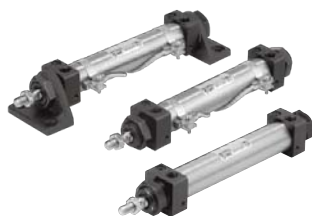
* You do not need to specify "N" (i.e., without lead wire) for D-A3□, D-A44, D-G39, and D-K39. This is the only standard specification automatically available for these models.

* D-A9□V, M9□V, M9□WV, and M9□A(V) models cannot be mounted on ø25 to ø40.

* Since there are applicable auto switches other than listed, refer to page 1330 for details.

* For details about auto switches with pre-wired connector, refer to pages 1494 and 1495.

* D-A9□, M9□, and M9□W type auto switches are shipped with the hydraulic cylinder (but not assembled). (However, they are auto switch mounting brackets are shipped with the mounting brackets mounted already.)



Specifications

Bore size (mm)	20	25	32	40
Action	Double acting/Single rod			
Fluid	Hydraulic fluid			
Nominal pressure	7 MPa			
Proof pressure	10.5 MPa			
Maximum allowable pressure	9 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 300 mm/s			
Cushion	Cushion seal			
Stroke length tolerance	to 250 mm $^{+1.0}_0$			
	251 to 800 mm $^{+1.4}_0$			
Mounting style	Basic style, Axial foot style Head flange style, Rod flange style Single clevis style			

Note) Refer to page 1234 for definitions of terms related to pressure.

Accessories

Mounting style	Basic	Axial foot	Head flange	Rod flange	Single clevis
Standard					
Mounting nut	● (2 pcs.)	● (2 pcs.)	● (1 pc.)	● (1 pc.)	—
Rod end nut	●	●	●	●	●

Option

I-type single knuckle joint Y-type double knuckle joint Bracket for clevis type Knuckle pin Bracket pin	Refer to page 1327
---	--------------------

Hydraulic Fluid Compatibility

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

* Consult with SMC.

Standard Strokes: Refer to page 1329 for minimum strokes for auto switch mounting.

Bore size (mm)	Standard strokes (mm)	Long stroke
20	25 to 300	800
25	25 to 400	
32	25 to 500	
40		

* Standard strokes above have a minimal delivery time.
Consult with SMC for the manufacture of strokes other than the above.

Mounting Brackets: Part Nos.

Bore size (mm)	20	25	32	40
Axial foot *	CHN-L020	CHN-L025	CHN-L032	CHN-L040
Flange	CHN-F020	CHN-F025	CHN-F032	CHN-F040

* When ordering the axial foot type, order 2 pieces for each cylinder.

Theoretical Output

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm ²)	Operating pressure (MPa)			
				1	3	5	7
20	10	OUT	314	314	942	1570	2198
		IN	235	235	705	1175	1645
25	12	OUT	490	490	1470	2450	3430
		IN	377	377	1131	1885	2639
32	16	OUT	804	804	2412	4020	5628
		IN	603	603	1809	3015	4221
40	18	OUT	1256	1256	3768	6280	8792
		IN	1002	1002	3006	5010	7014

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

Weight

Bore size (mm)	Unit: kg			
	20	25	32	40
Basic style	0.27	0.37	0.53	1.05
Axial foot style	0.51	0.63	0.91	1.59
Flange style	0.36	0.54	0.72	1.26
Clevis style	0.25	0.45	0.67	1.00
Additional weight per 50 mm	0.12	0.13	0.18	0.23

- Calculation method (Example) **CHNL20-100** (Foot type, ø20, 100 mm stroke)
- Basic weight 0.51 kg
- Additional weight ... 0.12/50 mm
- Cylinder stroke 100 mm
- 0.51 + 0.12/50 x 100 = 0.75 kg

Specific Product Precautions

Be sure to read before handling. Refer to front matter 38 for Safety Instructions, and pages 1234 to 1241 for precautions for hydraulic cylinder and auto switch.

Caution

When operating a cylinder for the first time, make sure to release the air at low pressure. When the air release is complete, operate the cylinder at reduced pressure, gradually increasing it to the normal operating pressure. However, the piston speed at this time should be adjusted to the minimum speed.

Mounting

Caution

- When mounting with bracket mounting nuts, tighten them using the tightening torques in the table below as a guide.

Bore size (mm)	Mounting nut thread	Mounting nut width across flats (mm)	Tightening torque (N-m)
20	M22 x 1.5	26	45
25	M24 x 1.5	32	60
32	M30 x 1.5	38	85
40	M33 x 1.5	41	110

- When mounted with one side attached and one side unattached (basic type and flange type) and operating at high speed, bending moment acts on the cylinder due to oscillation at the stroke end, which may cause cylinder damage. In this case, install brackets to suppress the oscillation of the cylinder body, or reduce the piston speed enough so that the cylinder body does not oscillate at the stroke end.

CHQ

CHK ☐

CHN

CHM

CHS ☐

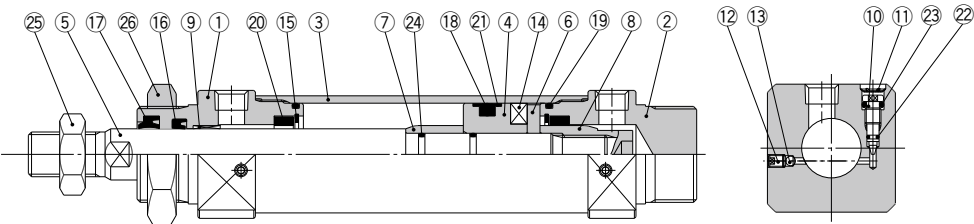
CH2 ☐

CHA

Related Equipment

D- ☐

Construction



Parts List

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Black anodized
2	Head cover	Aluminum alloy	Black anodized
3	Cylinder tube	Stainless steel	
4	Piston	Stainless steel	
5	Piston rod	ø20, 25: Stainless steel ø32, 40: Carbon steel	Hard chromium electro plating
6	Magnet plate	Stainless steel	
7	Cushion ring A	Carbon steel	
8	Cushion ring B	Carbon steel	
9	Bushing	Lead bronze	
10	Cushion valve	Carbon steel	
11	Retaining ring	Spring steel	
12	Air release valve	Alloy steel	
13	Check ball	Bearing steel	

Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.	Content
20	CHN20-PS	Nos. 16 to 21 from the chart
25	CHN25-PS	
32	CHN32-PS	
40	CHN40-PS	

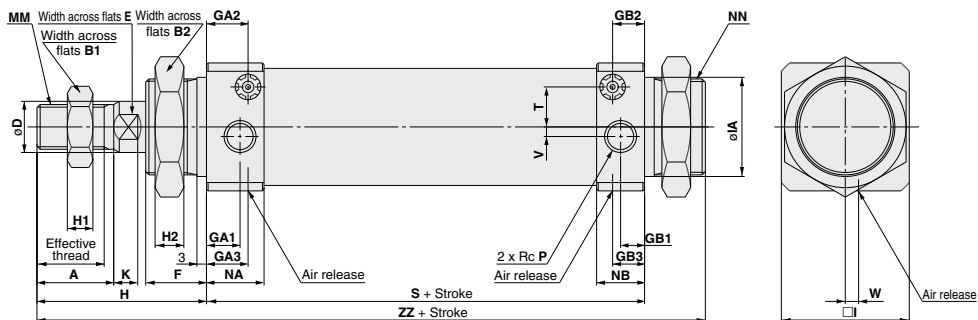
* Seal kit consists of items 16 to 20 and 22 and can be ordered by using the seal kit number for each bore size.

Parts List

No.	Description	Material	Note
14	Magnet	—	
15	Retaining ring	Spring steel	
16	Rod seal	NBR	
17	Scraper	NBR	
18	Piston seal	NBR	
19	Tube gasket	NBR	
20	Cushion seal	—	
21	Back-up ring	Resin	
22	Cushion valve seal A	NBR	
23	Cushion valve seal B	NBR	
24	Piston gasket	NBR	
25	Rod end nut	Carbon steel	
26	Mounting nut	Carbon steel	

Dimensions

Basic style: CHNB

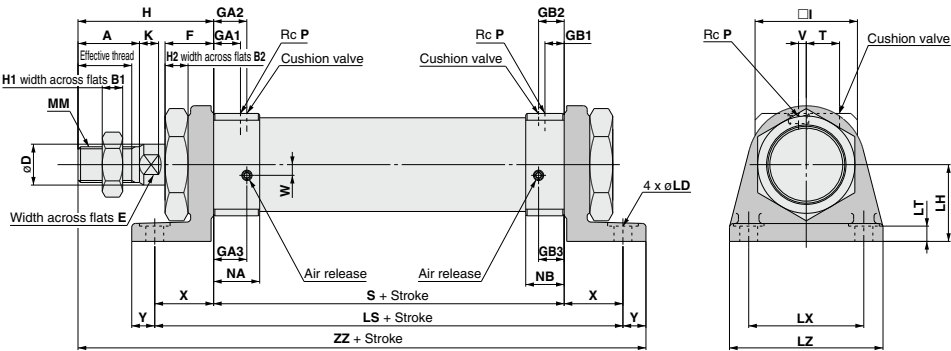
D-☐

(mm)																		
Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B1	B2	D	E	F	GA1	GA2	GA3	GB1	GB2	GB3	H	H1	H2	I
20	25 to 300	15.5	18	13	26	10	8	16	10	12	12	8	10	10	41	5	8	31
25	25 to 400	19.5	22	17	32	12	10	16	10	12	12	8	10	10	46	6	8	34
32	25 to 500	21	24	22	38	16	14	19	11	13	13	8	10	10	53	8	9	40
40	25 to 500	21	24	24	41	18	16	21	12	17	17	11	16	16	54	10	11	48

												(mm)
Bore size (mm)	IA	K	MM	NA	NB	NN	P	S	T	V	W	ZZ
20	23B ^{-0.020 -0.093}	5	M8 x 1.25	17	15	M22 x 1.5	1/8	81	9.5	4.5	6.5	138
25	25B ^{-0.025 -0.093}	5.5	M10 x 1.25	17	15	M24 x 1.5	1/8	81	11	3.5	5.5	143
32	31B ^{-0.025 -0.094}	7.5	M14 x 1.5	18	15	M30 x 1.5	1/8	87	13	3	4	159
40	34B ^{-0.025 -0.094}	7.5	M16 x 1.5	22	21	M33 x 2	1/4	108	16	5	0	183

Dimensions

Axial foot style: **CHNL**



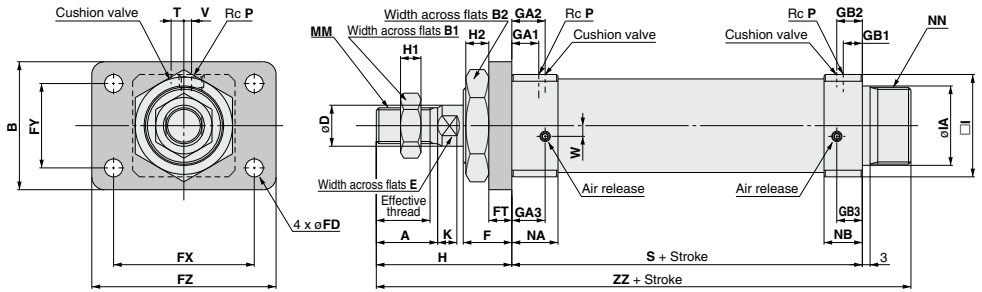
(mm)

Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B1	B2	D	E	F	GA1	GA2	GA3	GB1	GB2	GB3	H	H1	H2	I	K
20	25 to 300	15.5	18	13	26	10	8	16	10	12	12	8	10	10	41	5	8	31	5
25	25 to 400	19.5	22	17	32	12	10	16	10	12	12	8	10	10	46	6	8	34	5.5
32	25 to 500	21	24	22	38	16	14	19	11	13	13	8	10	10	53	8	9	40	7.5
40	25 to 500	21	24	24	41	18	16	21	12	17	17	11	16	16	54	10	11	48	7.5

(mm)

Bore size (mm)	LD	LH	LS	LT	LX	LZ	MM	NA	NB	P	S	T	V	W	X	Y	ZZ
20	7	25	121	5.5	40	55	M8 x 1.25	17	15	1/8	81	9.5	4.5	6.5	20	9	151
25	7	28	121	5.5	40	55	M10 x 1.25	17	15	1/8	81	11	3.5	5.5	20	9	156
32	7	30	133	6	45	60	M14 x 1.5	18	15	1/8	87	13	3	4	23	9	172
40	9	35	158	6	55	75	M16 x 1.5	22	21	1/4	108	16	5	0	25	11	198

Rod flange style: CHNF


CHQ
CHK
CHN
CHM
CHS
CH2
CHA

Related Equipment

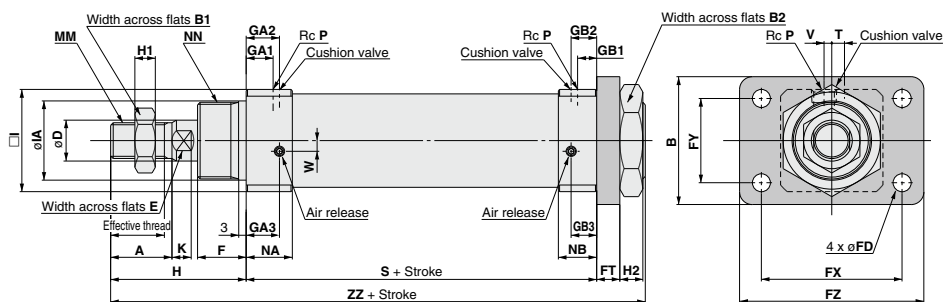
D-

Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B	B1	B2	D	E	F	FD	FT	FX	FY	FZ	GA1	GA2	GA3	GB1	GB2
20	25 to 300	15.5	18	38	13	26	10	8	16	7	6	51	21	68	10	12	12	8	10
25	25 to 400	19.5	22	44	17	32	12	10	16	7	9	53	27	70	10	12	12	8	10
32	25 to 500	21	24	50	22	38	16	14	19	7	9	55	33	72	11	13	13	8	10
40	25 to 500	21	24	60	24	41	18	16	21	9	9	66	36	84	12	17	17	11	16

Bore size (mm)	GB3	H	H1	H2	I	IA	K	MM	NA	NB	NN	P	S	T	V	W	ZZ
20	10	41	5	8	31	23f8 ^{-0.020} _{-0.053}	5	M8 x 1.25	17	15	M22 x 1.5	1/8	81	9.5	4.5	6.5	138
25	10	46	6	8	34	25f8 ^{-0.020} _{-0.053}	5.5	M10 x 1.25	17	15	M24 x 1.5	1/8	81	11	3.5	5.5	143
32	10	53	8	9	40	31f8 ^{-0.025} _{-0.064}	7.5	M14 x 1.5	18	15	M30 x 1.5	1/8	87	13	3	4	159
40	16	54	10	11	48	34f8 ^{-0.025} _{-0.064}	7.5	M16 x 1.5	22	21	M33 x 2	1/4	108	16	5	0	183

Dimensions

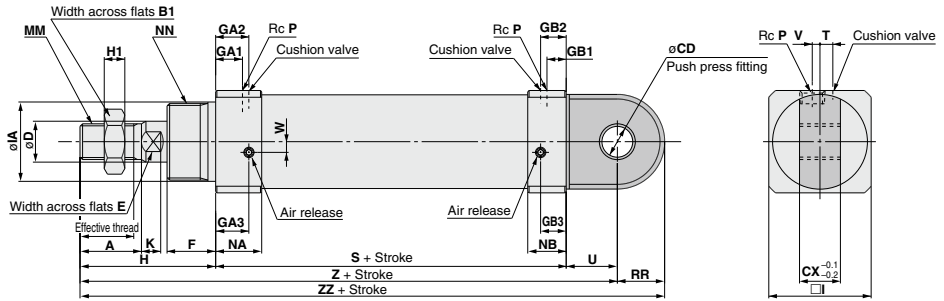
Head flange style: CHNG



(mm)																			
Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B	B1	B2	D	E	F	FD	FT	FX	FY	FZ	GA1	GA2	GA3	GB1	GB2
20	25 to 300	15.5	18	38	13	26	10	8	16	7	6	51	21	68	10	12	12	8	10
25	25 to 400	19.5	22	44	17	32	12	10	16	7	9	53	27	70	10	12	12	8	10
32	25 to 500	21	24	50	22	38	16	14	19	7	9	55	33	72	11	13	13	8	10
40	25 to 500	21	24	60	24	41	18	16	21	9	9	66	36	84	12	17	17	11	16

																	(mm)
Bore size (mm)	GB3	H	H1	H2	I	IA	K	MM	NA	NB	NN	P	S	T	V	W	ZZ
20	10	41	5	8	31	2318 ^{+0.020 -0.053}	5	M8 x 1.25	17	15	M22 x 1.5	1/8	81	9.5	4.5	5.5	138
25	10	46	6	8	34	2518 ^{+0.020 -0.053}	5.5	M10 x 1.25	17	15	M24 x 1.5	1/8	81	11	3.5	6.5	143
32	10	53	8	9	40	3118 ^{+0.025 -0.054}	7.5	M14 x 1.5	18	15	M30 x 1.5	1/4	87	13	3	4	159
40	16	54	10	11	48	3418 ^{+0.025 -0.054}	7.5	M16 x 1.5	22	21	M33 x 2	1/4	108	16	5	0	183

Single clevis style: CHNC


CHQ
CHK
CHN
CHM
CHS
CH2
CHA

Related Equipment

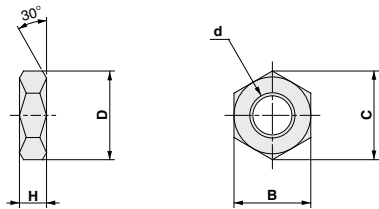
D-

Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B1	CD	CX	D	E	F	GA1	GA2	GA3	GB1	GB2	GB3	H	H1	I
20	25 to 300	15.5	18	13	10 ^{+0.109} ₀	16	10	8	16	10	12	12	8	10	10	41	5	31
25	25 to 400	19.5	22	17	10 ^{+0.109} ₀	16	12	10	16	10	12	12	8	10	10	46	6	34
32	25 to 500	21	24	22	12 ^{+0.109} ₀	16	16	14	19	11	13	13	8	10	10	53	8	40
40	25 to 500	21	24	24	16 ^{+0.034} _{-0.015}	24	18	16	21	12	17	17	11	16	16	54	10	48

Bore size (mm)	IA	K	MM	NA	NB	NN	P	RR	S	T	U	V	W	Z	ZZ
20	2318 ^{-0.020} _{-0.053}	5	M8 x 1.25	17	15	M22 x 1.5	1/8	13.5	81	9.5	14	4.5	6.5	136	149.5
25	2516 ^{-0.020} _{-0.053}	5.5	M10 x 1.25	17	15	M24 x 1.5	1/8	14.5	81	11	15	3.5	5.5	142	156.5
32	3116 ^{-0.025} _{-0.064}	7.5	M14 x 1.5	18	15	M30 x 1.5	1/8	18.5	87	13	20	3	4	160	178.5
40	3418 ^{-0.025} _{-0.064}	7.5	M16 x 1.5	22	21	M33 x 2	1/4	22.5	108	16	20	5	0	182	204.5

Accessories (Standard)

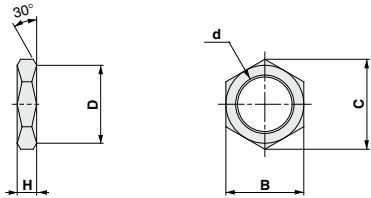
Rod end nut



Material: Carbon steel

Part no.	Applicable bore size (mm)	d	H	B	C	D
NT-02	20	M8 x 1.25	5	13	15.0	12.5
NT-03	25	M10 x 1.25	6	17	19.6	16.5
NT-04	32	M14 x 1.5	8	22	25.4	21.0
AC-NI-50	40	M16 x 1.5	10	24	27.7	23

Mounting nut



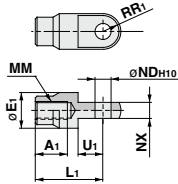
Material: Carbon steel

Part no.	Applicable bore size (mm)	d	H	B	C	D
SO-02	20	M22 x 1.5	8	26	30	26
SO-03	25	M24 x 1.5	8	32	36.9	32
SO-04	32	M30 x 1.5	9	38	43.9	38
SO-05	40	M33 x 2.0	11	41	47.3	41

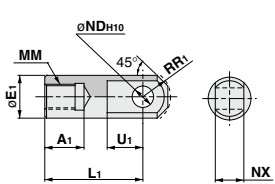
Accessory Brackets (Optional)

I-type single knuckle joint

ø20: I-02
ø25: I-03



ø32: I-04
ø40: IHN-04



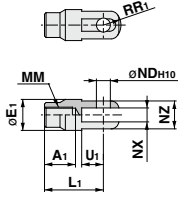
Material: Rolled steel plate

Material: Rolled steel plate

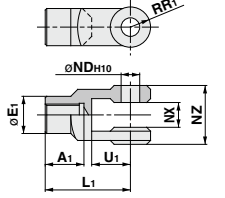
Part no.	Applicable bore size (mm)	A1	E1	L1	MM	R1	U1	NDH10	NX
I-02	20	16	20	36	M8 x 1.25	10	14	9 ^{+0.058} ₀	9 ^{+0.1} _{-0.2}
I-03	25	18	20	38	M10 x 1.25	10	14	9 ^{+0.058} ₀	9 ^{+0.1} _{-0.2}
I-04	32	22	24	55	M14 x 1.5	15.5	20	12 ^{+0.070} ₀	16 ^{+0.1} _{-0.3}
IHN-04	40	22	24	55	M16 x 1.5	15.5	20	15 ^{+0.070} ₀	16 ^{+0.1} _{-0.3}

Y-type double knuckle joint

ø20: Y-02
ø25: Y-03



ø32: Y-04C
ø40: YHN-04



Material: Rolled steel plate

Material: Cast iron

Part no.	Applicable bore size (mm)	A1	E1	L1	MM	R1	U1	NDH10	NX
Y-02	20	16	20	36	M8 x 1.25	12	14	9 ^{+0.058} ₀	9 ^{+0.2} _{-0.1}
Y-03	25	18	20	38	M10 x 1.25	12	14	9 ^{+0.058} ₀	9 ^{+0.2} _{-0.1}
Y-04C	32	22	24	55	M14 x 1.5	13	25	12 ^{+0.070} ₀	16 ^{+0.1} _{-0.3}
YHN-04	40	22	24	55	M16 x 1.5	13	25	15 ^{+0.070} ₀	16 ^{+0.1} _{-0.3}

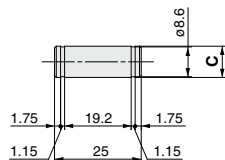
Part no.	NZ	Note
Y-02	18	With CDP-1 (with retaining ring)
Y-03	18	With CDP-1 (with retaining ring)
Y-04C	38	With CDP-3 (with cotter pin)
YHN-04	38	With CDPN-4 (with cotter pin)

Knuckle pin

ø20, ø25

Part no.: CDP-1

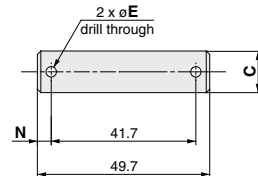
Material: Carbon steel



ø32

Part no.: CDP-3 CDPN-4

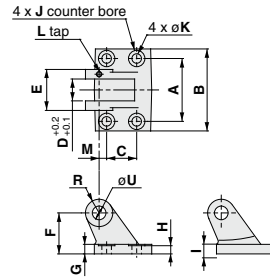
Material: Carbon steel



Retaining ring: C type 9 for shaft

Cotter pin: ø3 x 18 ℓ

Bracket for clevis type

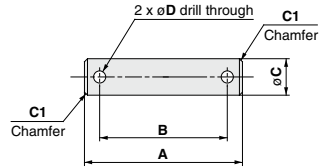


Material: Cast iron

Part no.	Applicable bore size (mm)	A	B	C	D	U (H8) Size Tolerance	E	F	G	H	I
AD-FI-20	20	46	60	22	16	10 ^{+0.027} ₀	30	28	6.5	5.5	10
AD-FI-25	25	46	60	22	16	10 ^{+0.027} ₀	30	30	6.5	5.5	10
AD-FI-32	32	56	80	30	16	12 ^{+0.027} ₀	36	40	10	9	13
AD-CHN-40	40	64	88	30	24	16 ^{+0.027} ₀	44	43	10	9	13

Part no.	J	K	L	M	R	Note
AD-FI-20	12	7	M4	5.5	10	With AD-EI-20 (with cotter pin), and M4 set screws (once)
AD-FI-25	12	7	M4	5.5	10	With AD-EI-25 (with cotter pin), and M4 set screws (once)
AD-FI-32	12	7	M5	7	12	With AD-EI-32 (with cotter pin), and M5 set screws (once)
AD-CHN-40	16	9	M5	10	12	With AD-CHN-40 (with cotter pin), and M5 set screws (once)

Bracket pin



Material: Carbon steel

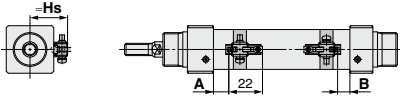
Part no.	Applicable bore size (mm)	A	B	C (H7) Size Tolerance	D	Note
AD-EI-20	20	45.5	35.5	10 ^{+0.016} _{-0.034}	3.2	with (2) cotter pins ø3.2 x 15 ℓ
AD-EI-25	25	45.5	35.5	10 ^{+0.016} _{-0.034}	3.2	with (2) cotter pins ø3.2 x 15 ℓ
AD-EI-32	32	52	42	12 ^{+0.016} _{-0.034}	4	with (2) cotter pins ø4 x 20 ℓ
AE-CHN-40	40	60	50	16 ^{+0.016} _{-0.034}	4	with (2) cotter pins ø4 x 20 ℓ

Auto Switch Mounting

Refer to pages 1451 to 1510 for detailed auto switch specifications.

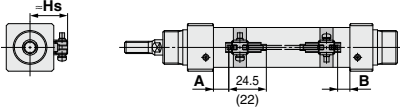
Auto Switches: Proper Mounting Positions and Mounting Heights for Stroke End Detection

D-A9□V



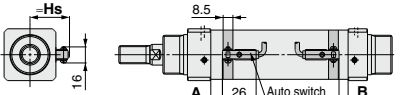
A and B are the dimensions from the end of the head cover/rod cover to the end of the auto switch.

D-A9□

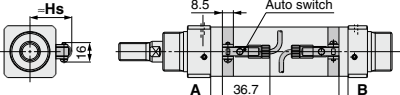


* Dimensions inside () are for D-M9□AV.
A and B are the dimensions from the end of the head cover/rod cover to the end of the auto switch.

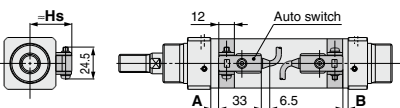
D-C□7/C80



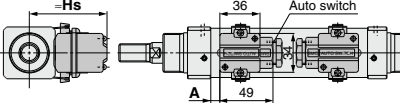
D-C73C/C80C



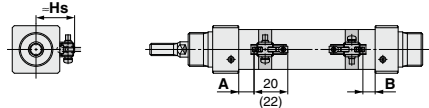
D-B5□/B64/B59W



D-A3□/G39/K39

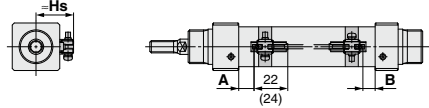


D-M9□V/M9□WV/M9□AV



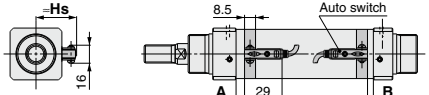
* Dimensions inside () are for D-M9□AV.
A and B are the dimensions from the end of the head cover/rod cover to the end of the auto switch.

D-M9□/M9□W/M9□A

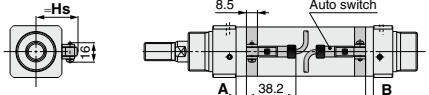


* Dimensions inside () are for D-M9□AV.
A and B are the dimensions from the end of the head cover/rod cover to the end of the auto switch.

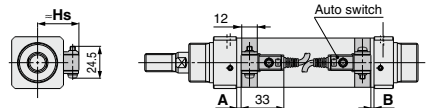
D-H7□/H7□W/H7NF/H7BA



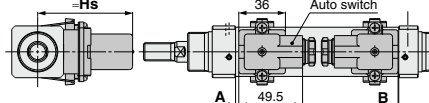
D-H7C



D-G5□/K59/G5□W/K59W/G5BA/G59F/G5NT



D-A44



Auto Switch Proper Mounting Positions

Bore size (mm)	Solid state auto switch										Reed auto switch								
	D-M9□(V) D-M9□W(V) D-M9□A(V)		D-H7□ D-H7□W/H7C D-H7NF/H7BA		D-G5□/K59 D-G5□W/K59W D-G59F/G5BA D-G5NT		D-G39/K39		D-A9□(V)		D-C7□/C80 D-C73C/C80C		D-B5□/B64		D-B59W		D-A3□/A44		
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
	20	23	14	18.5	9.5	15	6	13	4	19	10	19.5	10.5	13.5	4.5	16.5	7.5	13	4
	25	23.5	13.5	19	9	15.5	5.5	13.5	3.5	19.5	9.5	20	10	14	4	17	7	13.5	3.5
32	25.5	16.5	21	12	17.5	8.5	15.5	6.5	21.5	12.5	22	13	16	7	19	10	15.5	6.5	
40	31.5	21.5	27	17	23.5	13.5	21.5	11.5	27.5	17.5	28	18	22	12	25	15	21.5	11.5	

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

Auto Switch Mounting Heights

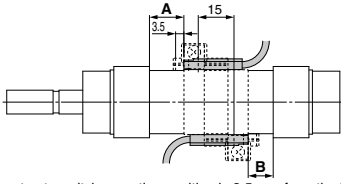
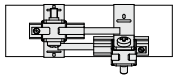
Bore size (mm)	D-M9□(V) D-M9□W(V) D-M9□A(V) D-A9□(V)	D-H7□/H7□W D-H7NF/H7BA D-C7□/C80	D-C73C/C80C	D-G5□/K59 D-G5□W/K59W D-G59F/G5BA D-G5NT/H7C D-B5□/B64 D-B59W	D-G39/K39 D-A3□	D-A44
	Hs	Hs	Hs	Hs	Hs	Hs
20	26	25.5	27	27.5	62	72
25	28	27.5	29	29.5	64	74
32	31.5	31	32.5	33	67.5	77.5
40	35.5	35	36.5	37	71.5	81.5

Minimum Auto Switch Mounting Stroke

Auto switch model	Number of auto switches mounted (mm)			
	1 pc.	2 pcs.		n pcs.
		Different surfaces	Same surface	
D-M9□	5	20	55	$20 + 35 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3)
D-M9□W	10	20	55	$20 + 35 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3)
D-M9□A	10	25	60	$25 + 35 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3)
D-A9□	5	15	50	$15 + 35 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3)
D-M9□V	5	20	35	$20 + 35 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3)
D-A9□V	5	15	25	$15 + 35 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3)
D-M9□WV D-M9□AV	10	20	35	$20 + 35 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3)
D-H7□/H7□W D-H7NF/H7BA	10	15	60	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3)
D-C7□ D-C8□	10	15	50	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3)
D-H7C D-C73C D-C80C	10	15	65	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3)
D-G5□/K59 D-G5□W/K59W D-G59F/G5BA/G5NT D-B5□/B64	10	15	75	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3)
D-B59W	15	20	75	$20 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...) Note 3)
D-G39/K39 D-A3□/A44	10	35	100	$35 + 30 \frac{(n-2)}{2}$ (n = 2, 3, 4, 5...)

Note 3) When "n" is an odd number, an even number that is one larger than this odd number is used for the calculation.

Note 1) Auto switch mounting

Auto switch model	Auto switches — 2 pcs.	
	Different surfaces	Same surface
	 <p>Correct auto switch mounting position is 3.5 mm from the back face of the switch holder.</p>	 <p>Mount auto switches offset (in circumferential direction of cylinder tube) so that auto switch units and lead wires do not run up against each other.</p>
D-M9□ D-M9□W	Less than 20 stroke Note 2)	Less than 55 stroke Note 2)
D-M9□A	Less than 25 stroke Note 2)	Less than 60 stroke Note 2)
D-A9□	—	Less than 50 stroke Note 2)

Note 2) Minimum stroke for auto switch mounting in styles other than those mentioned in Note 1.

Operating Range

Auto switch model	Bore size (mm)			
	20	25	32	40
D-M9□(V) D-M9□W(V) D-M9□A(V)	4.5	4	4	4.5
D-H7□/H7C D-H7□W D-H7NF/H7BA	4.5	5	4.5	5
D-G5□/K59/G59F D-G5□W/K59W D-G5BA/G5NT	5.5	5	4.5	5

Auto switch model	Bore size (mm)			
	20	25	32	40
D-G39/K39	9	8.5	10	10.5
D-A9□(V)	8	7.5	7	8
D-C7□/C8□ D-C73C/C80C	10.5	9.5	8.5	10
D-B5□/B64	13.5	11.5	10	12
D-B59W	13.5	13	11.5	13.5
D-A3□/A44	11.5	10	9	10.5

* 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.

CHQ**CHK□****CHN****CHM****CHS□****CHZ□****CHA**Related
Equipment**D-□**

Auto Switch Mounting Brackets: Part Nos.

Auto switch models	Bore size (mm)			
	ø20	ø25	ø32	ø40
D-A9□(V) D-M9□(V) D-M9□W(V)	Note 1) BMA3-020	BJ3-1 + BHN3-025	BJ3-1 + BHN3-032	BJ3-1 + BHN3-040
D-M9□A(V)	Note 2) BMA3-020S	—	—	—
D-H7□ D-H7□W D-H7NF D-H7BA D-C7□/C80 D-C73C/C80C	BMA2-020A	BHN3-025	BHN3-032	BHN3-040
D-G5□/G5□W D-G59F D-G5BA/G5NT D-B5□/B64 D-B59W	BA-01	BHN2-025	BGS1-032	BH2-040
D-G39/K39 D-A3□/A44	BD1-01M	BD1-02M	BHN1-032	BDS-04M

Note 1) Set part number which includes the auto switch mounting band (BMA2-020A) and the holder kit (BJ5-1/Switch bracket: Transparent).
Since the switch bracket (made from nylon) are affected in an environment where alcohol, chloroform, methylamines, hydrochloric acid or sulfuric acid is splashed over, so it cannot be used. Please consult SMC regarding other chemicals.

Note 2) Set part number which includes the auto switch mounting band, stainless steel screw and the holder kit (BJ4-1/Switch bracket: White).

Note 3) For the D-M9□A(V) type auto switch, do not install the switch bracket on the indicator light.

[Stainless steel mounting screw kits]

The following stainless steel mounting screw kits are available for use depending on the operating environment. (Switch mounting bands are not included and should be ordered separately.)

BBA3: D-G5, K5, B5, B6
BBA4: D-C7, C8, H7

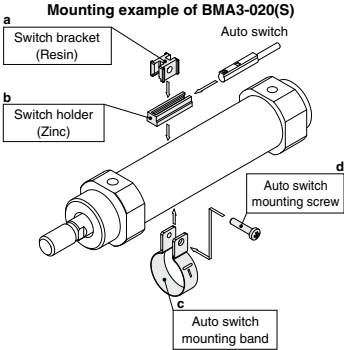
Note) Refer to the table below for details on BBA3, BBA4.

The above stainless steel screws are used when a cylinder is shipped with the D-H7BA or G5BA auto switches.

When only an auto switch is shipped independently, the BBA3 or BBA4 is attached.

Stainless steel mounting screw kit details.

Part no.	Contents			Applicable auto switch mounting bracket part nos.	Applicable auto switches
	Description	size	pcs.		
BBA3	Auto switch mounting screw set	M4 x 0.7 x 22L	1	BA-01, BA-02, BA-32, BA-04, BA-05, BA-06, BA-08, BA-10	D-B5, B6 D-G5, K5
				BA2-020, BA2-025, BA2-032, BA2-040	
				BA5-050, BHN2-025, BSG1-032	
				BH2-040, BH2-050, BH2-080, BH2-100	
				BAF-32, BAF-04, BAF-05, BAF-06, BAF-08, BAF-10	
				BJ2-006, BJ2-010, BJ2-016	
				BM2-020A, BM2-025A, BM2-032A, BM2-040A	
BBA4		M3 x 0.5 x 14L	1	BMA2-020A, BMA2-025A, BMA2-032A, BMA2-040A, BMA2-050A, BMA2-063A	D-C7, C8 D-H7
				BHN3-025, BHN3-032, BHN3-040	



- (1) BJ□-1 is a set of "a" and "b".
(2) BMA2-020A(S) is a set of "c" and "d".
Band (c) is mounted so that the projected part is on the internal side (contact side with the tube).
BJ4-1 (Switch bracket: White)
BJ5-1 (Switch bracket: Transparent)

Besides the models listed in "How to Order," the following auto switches are applicable.
Refer to pages 1451 to 1510 for detailed auto switch specifications.

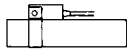
Auto switch type	Part no.	Electrical entry	Features
Solid state	D-H7A1, H7A2, H7B	Grommet (in-line)	—
	D-G59, G5P, K59		Diagnostic indication (2-color display)
	D-H7NW, H7PW, H7BW		Water resistant (2-color display)
	D-G59W, G5PW, K59W		With timer
	D-G5BA, H7BA		With diagnostic output (2-color display)
	D-G5NT		—
Reed	D-G59F	Grommet (in-line)	Without indicator light
	D-C73, C76, B53 D-C80		

* Solid state auto switches are also available with pre-wired connector. Refer to pages 1494 and 1495 for details.
* Normally closed (N.C. = b contact), solid state auto switches (D-F9G, F9H) are also available. For details, refer to page 1463.

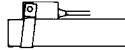
How to Mount and Move the Auto Switch

⚠ Caution

1. Tighten the screw under the specified torque when mounting auto switch.
2. Set the auto switch mounting band perpendicularly to cylinder tube.



Mounting correctly



Mounting incorrectly

<Applicable auto switch>

Solid state D-M9N, M9P, M9B, M9NV, M9PV, M9BV
D-M9NW, M9PW, M9BW, M9NWV, M9PWV, M9BWV
Reed D-M9NA, M9PA, M9BA, M9NAV, M9PAV, M9BAV
D-A90, A93, A96, A90V, A93V, A96V

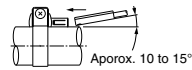


Figure 1. Switch insert angle

How to Mount and Move the Auto Switch

Mounting the Auto Switch

1. Mount the auto switch mounting band around the auto switch setting position on the cylinder tube.
2. Place the switch holder in the opening of the auto switch mounting band (1).
3. Make the concave part of the switch bracket faced downward and set the switch bracket on the switch holder (2).
Set the switch bracket so that both ends of the auto switch mounting band enter the portion between the ribs on both side surfaces of the switch bracket.
For the D-M9□A (V) type auto switch, do not install the switch bracket on the indicator light.
4. Pass the auto switch mounting screw (M3) supplied with the auto switch mounting band from the through-hole side of the auto switch mounting band and engage it with the M3 female thread of the auto switch mounting band through the through-hole in the switch bracket.
5. Tighten the auto switch mounting screw with the specified tightening torque (0.6 to 0.7 N·m).
6. Insert the auto switch into the auto switch mounting groove of the switch holder (2).
7. After checking the detection position, tighten the set screw (M2.5) supplied with the auto switch to secure the auto switch.

Tightening torque for the set screw (M2.5) supplied with the auto switch (N·m)

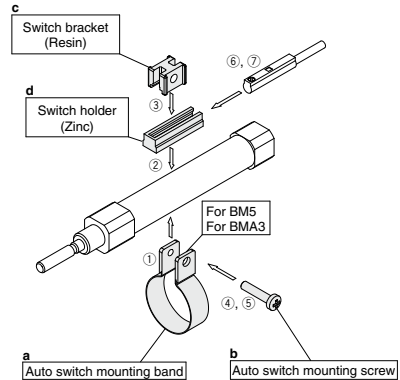
Auto switch model	Tightening torque
D-M9□(V)	0.05 to 0.15
D-M9□W(V)	
D-M9□A(V)	
D-A9□(V)	0.1 to 0.2

When tightening the set screw supplied with the auto switch, use a watchmaker's screw driver with a handle diameter of 5 to 6 mm.

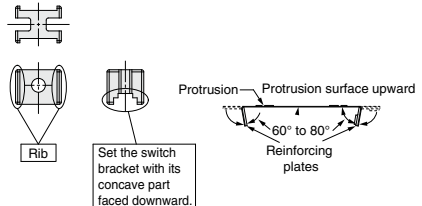
Adjustment the Auto Switch Position

1. To make the fine adjustment, loosen the set screw (M2.5) supplied with the auto switch and slide the auto switch inside the auto switch mounting groove to adjust the position.
2. To move the auto switch setting position largely, loosen the screw (M3) that secures the auto switch mounting band and slide the auto switch together with the switch holder on the cylinder tube to adjust the position.

(Note) When removing the screw connection part with the auto switch mounting screw after the auto switch mounting band has been assembled, be careful not to drop the switch bracket, switch holder, auto switch mounting screw, or auto switch mounting band.



<Switch bracket>



CHQ

CHK

CHN

CHM

CHS

CH2

CHA

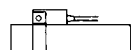
Related Equipment

D-□

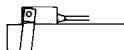
How to Mount and Move the Auto Switch

⚠ Caution

1. Tighten the screw under the specified torque when mounting auto switch.
2. Set the auto switch mounting band perpendicularly to cylinder tube.



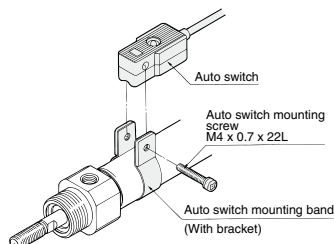
Mounting correctly



Mounting incorrectly

<Applicable auto switch>

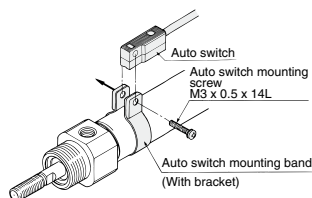
Solid state D-G59, D-G5P, D-K59, D-G5BA
 D-G59W, D-G5PW, D-K59W
 D-G59F, D-G5NT, D-G5NB
 Reed D-B53, D-B54, D-B64, D-B59W



1. Put an auto switch mounting band on the cylinder tube and set it at the auto switch mounting position.
2. Put the mounting section of the auto switch between the auto switch mounting band mounting holes, then adjust the position of mounting holes of switch to those of mounting band.
3. Lightly thread the auto switch mounting screw through the mounting hole into the thread part of band fitting.
4. After reconfirming the detection position, tighten the auto switch mounting screw to secure the auto switch while properly contacting the auto switch bottom part and the cylinder tube.
 (The tightening torque of M4 screw should be about 1 to 1.2 N·m.)
5. Modification of the detection position should be made in the condition of 3.

<Applicable auto switch>

Solid state D-H7A1, D-H7A2, D-H7B, D-H7BA
 D-H7C, D-H7NF, D-H7NW, D-H7PW
 D-H7BW
 Reed D-C73, D-C76, D-C80, D-C73C, D-C80C

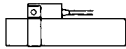


1. Put a mounting band on the cylinder tube and set it at the auto switch mounting position.
2. Put the mounting section of the auto switch between the auto switch mounting band mounting holes, then adjust the position of mounting holes of switch to those of mounting band.
3. Lightly thread the auto switch mounting screw through the mounting hole into the thread part of the auto switch mounting band fitting.
4. After setting the whole body to the detecting position by sliding, tighten the auto switch mounting screw to secure the auto switch while properly contacting the auto switch bottom part and the cylinder tube. (Tightening torque of M3 screw should be 0.8 to 1 N·m.)
5. Modification of the detection position should be made in the condition of 3.

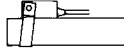
How to Mount and Move the Auto Switch

Caution

1. Tighten the screw under the specified torque when mounting auto switch.
2. Set the auto switch mounting band perpendicularly to cylinder tube.



Mounting correctly



Mounting incorrectly

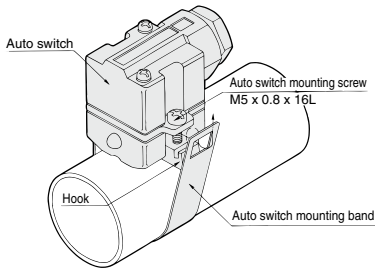
<Applicable auto switch>

Solid state D-G39, D-K39

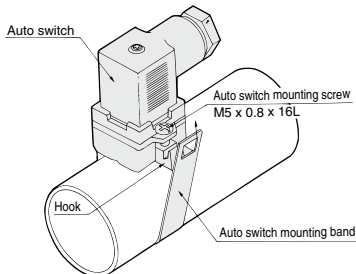
Reed D-A33, D-A34, D-A44

How to Mount and Move the Auto Switch

D-A3, D-G3/K3 type



D-A4



1. Loosen the auto switch mounting screws at both sides to pull down the hook.
2. Put an auto switch mounting band on the cylinder tube and set it at the auto switch mounting position, and then hook the band.
3. Screw lightly the auto switch mounting screw.
4. Set the whole body to the detecting position by sliding, tighten the mounting screw to secure the auto switch. (The tightening torque should be about 2 to 3 N·m.)
5. Modification of the detecting position should be made in the condition of 3.

CHQ

CHK ☐

CHN

CHM

CHS ☐

CH2 ☐

CHA

Related Equipment

D-☐