Round Type Hydraulic Cylinder

Series CHM

Series CHM

Nominal pressure: **3.5 MPa**

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

3.5 MPa

Round Type Hydraulic Cylinder

Series CH□M

ø20, ø25, ø32, ø40

How to Order

CHM L 25 – 100

With Auto Switch **CHDM L 25 – 100 – M9BW □**

With auto switch (built-in magnet)

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

Cylinder stroke (mm)
Refer to the standard stroke table on page 235.

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) CHDMB20-100

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	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	—	**M9N**	●	●	●	○	—	○	IC circuit	Relay PLC
				3-wire (PNP)			**M9P**	●	●	●	○	—	○		
				2-wire	12 V		**M9B**	●	●	●	○	—	○	—	
		Connector					**H7C**	●	—	●	●	●	—		
		Terminal conduit		3-wire (NPN)	5 V, 12 V		∗**G39**	—	—	—	—	●	—	IC circuit	
				2-wire	24 V	12 V	—	∗**K39**	—	—	—	—	●	—	—
	Diagnostic indication (2-color display)	Grommet		3-wire (NPN)	5 V, 12 V		**M9NW**	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)			**M9PW**	●	●	●	○	—	○		
				2-wire	12 V		**M9BW**	●	●	●	○	—	○	—	
	Water resistant (2-color display)						**H7BA**∗∗	○	○	●	○	—	○		
	Diagnostic output (2-color display)			4-wire (NPN)	5 V, 12 V		**H7NF**	●	—	●	○	—	○	IC circuit	
Reed switch	———	Grommet	Yes	3-wire (NPN equiv.)	—	5 V	—	**A96**	●	—	●	—	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	**A93**	●	—	●	—	—	—	—	Relay PLC
			No				100 V or less	**A90**	●	—	●	—	—	—	IC circuit	
			Yes				100 V, 200 V	**B54**	●	—	●	●	—	—	—	
			No				200 V or less	**B64**	●	—	●	—	—	—		
		Connector	Yes					**C73C**	●	—	●	●	●	—		
			No				24 V or less	**C80C**	●	—	●	●	●	—	IC circuit	
		Terminal conduit	Yes					**A33**∗	—	—	—	—	●	—	—	PLC
		DIN terminal					100 V, 200 V	**A34**∗	—	—	—	—	●	—		Relay PLC
								A44∗	—	—	—	—	●	—		
	Diagnostic indication (2-color display)	Grommet				—	—	**B59W**	●	—	●	—	—	—		

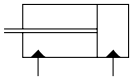
∗∗ Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

∗ 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) H7CN

∗ Solid state auto switches marked "○" are produced upon receipt of order.
∗ Do not indicate lead wire length symbol N (none) for types D-A3□, D-A44, D-G-39 or D-K39.
∗ D-A9□V, M9□V, M9□WV, M9□A(V)L are not mountable.

∗ Since there are applicable auto switches other than listed, refer to page 244 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 389 and 390.
∗ D-A9□, M9□, M9□W, M9□AL are shipped together (but not assembled). (Only auto switch mounting brackets are assembled at the time of shipment.)

JIS symbol



Specifications

Bore size (mm)	20	25	32	40
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 300 mm/s			
Cushion	None			
Stroke length tolerance	to 250 mm $^{+1.0}_{0}$ 250 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 134 for definitions of terms related to pressure.

Accessories

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

Optional

I-type single knuckle joint Y-type double knuckle joint Bracket for clevis style Knuckle pin Bracket pin	Refer to page 241

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: Refer to page 243 regarding minimum strokes for auto switch mounting.

Bore size (mm)	Standard strokes (mm)
20	25 to 800
25	
32	
40	

∗ Orders of the standard strokes above can be supplied with a minimum lead time.
Please consult with SMC regarding the manufacture of strokes other than the above.

Mounting Brackets: Part Nos.

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

∗ When ordering the axial foot type, order 2 pcs. for each cylinder.

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
25	12	OUT	490	490	735	980	1225	1470	1715
		IN	377	377	565	754	942	1131	1319
32	16	OUT	804	804	1206	1608	2010	2412	2814
		IN	603	603	904	1206	1507	1809	2110
40	18	OUT	1256	1256	1884	2512	3140	3768	4396
		IN	1002	1002	1503	2004	2505	3006	3507

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

Mass

Unit: kg

Bore size (mm)		**20**	**25**	**32**	**40**
Basic mass	Basic type	0.20	0.29	0.50	0.82
	Axial foot type	0.44	0.55	0.88	1.36
	Flange type	0.29	0.46	0.69	1.03
	Clevis type	0.18	0.37	0.64	0.77
Additional mass per 50 mm		0.06	0.08	0.12	0.16

- Calculation method
  (Example) **CHML20-100**
  (Foot type ø20/100 mm stroke)
- Basic mass·····0.44 kg
- Additional mass···0.06/50 mm
- Cylinder stroke····100 mm
  0.44 + 0.06 x 100/50 = 0.56 kg

⚠ 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.

Air Release

⚠ Caution

1. Since Series CH□M does not have an air release valve, release air from components other than the cylinder (e.g. from piping, etc.).

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

Mounting

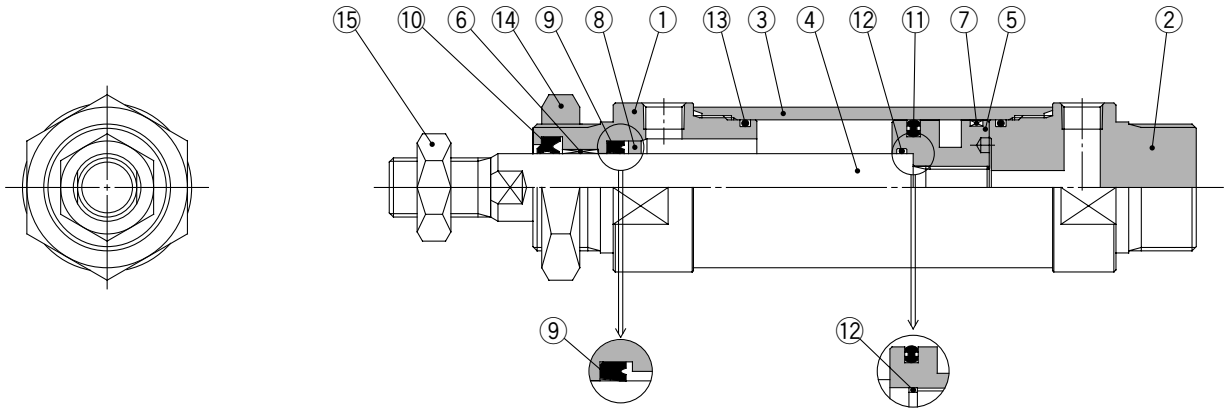
⚠ Caution

1. 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

2. When mounted with one side attached and one side free (basic type, flange type) and operating at high speed, the bending moment acts on the cylinder due to oscillation at the stroke end, which may cause cylinder damage. In this type of situation, 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.

Construction



Bore size ø20 **Bore sizes ø20 & ø25**

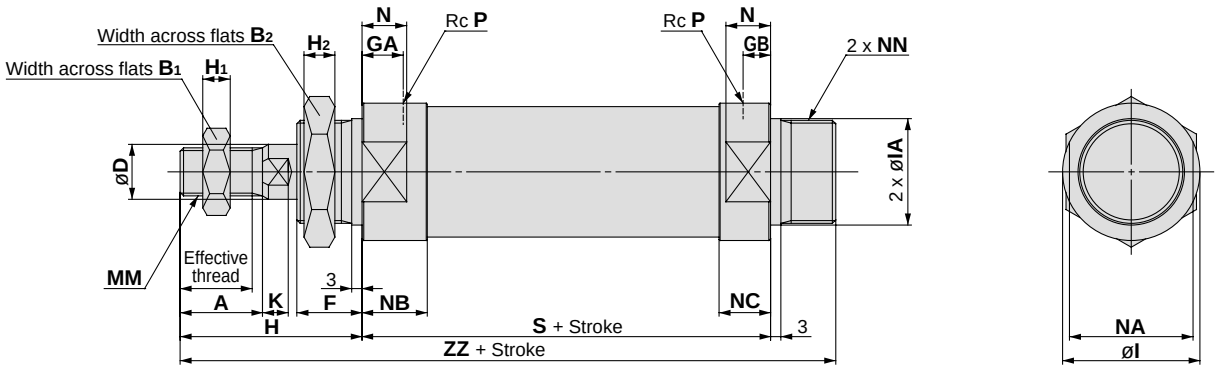
Parts List

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Hard black anodized
2	**Head cover**	Aluminum alloy	Hard black anodized
3	**Cylinder tube**	Aluminum alloy	Hard anodized
4	**Piston rod**	Carbon steel	Hard chromium electroplated*
5	**Piston**	Aluminum alloy	Chromated
6	**Bushing**	Oil impregnated alloy	
7	**Wear ring**	Resin	
8	**Retainer**	Copper alloy	
9	**Rod seal**	NBR	
10	**Wiper ring**	NBR	
11	**Piston seal**	NBR	
12	**Piston gasket**	NBR	
13	**Tube gasket**	NBR	
14	**Mounting nut**	Carbon steel	Black zinc chromated
15	**Rod end nut**	Rolled steel	Nickel plated

∗ In case of cylinder bore sizes ø20 and ø25 for built-in magnet type, the piston rod material is stainless steel when equipped with auto switches.

Dimensions

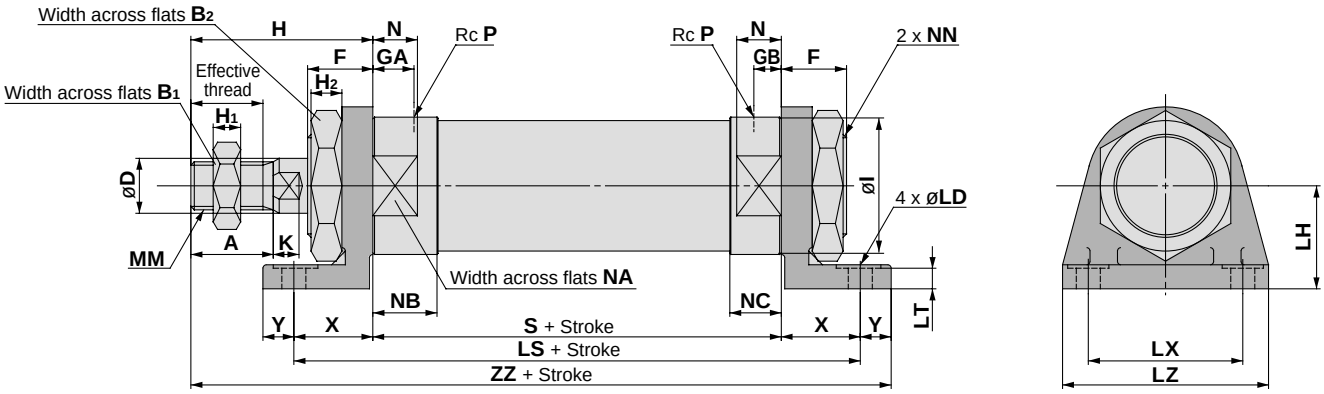
Basic style: CHMB



(mm)

Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B1	B2	D	F	GA	GB	H	H1	H2	I	IA (tolerance)	K	MM	P	S	NN	N	NA	NB	NC	ZZ
20	Up to 800	15.5	18	13	26	10	16	12	8	41	5	8	30	23 f8 $^{-0.020}_{-0.053}$	5	M8 x 1.25	1/8	81	M22 x 1.5	13	26	19	15	138
25	Up to 800	19.5	22	17	32	12	16	12	8	46	6	8	32	25 f8 $^{-0.020}_{-0.053}$	5.5	M10 x 1.25	1/8	81	M24 x 1.5	13	28	19	15	143
32	Up to 800	21	24	22	38	16	19	12	8	53	8	9	40	31 f8 $^{-0.025}_{-0.064}$	7.5	M14 x 1.5	1/8	87	M30 x 1.5	13	36	19	15	159
40	Up to 800	21	24	24	41	18	21	14	11	54	10	11	48	34 f8 $^{-0.025}_{-0.064}$	7.5	M16 x 1.5	1/4	108	M33 x 2	19	44	24	21	183

Axial foot style: CHML



(mm)

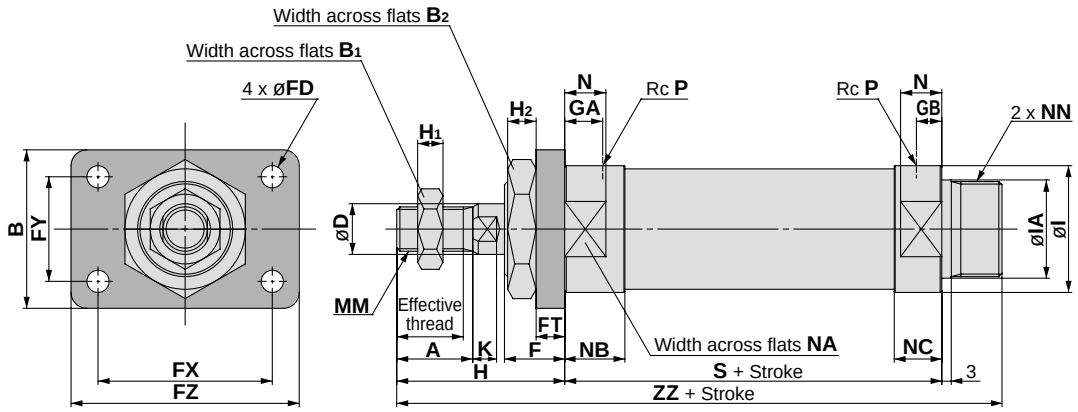
Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B1	B2	D	F	GA	GB	H	H1	H2	I	K	LD	LH	LS	LT	LX	LZ	MM	N	NA	NB	NC
20	Up to 800	15.5	18	13	26	10	16	12	8	41	5	8	30	5	7	25	121	5.5	40	55	M8 x 1.25	13	26	19	15
25	Up to 800	19.5	22	17	32	12	16	12	8	46	6	8	32	5.5	7	28	121	5.5	40	55	M10 x 1.25	13	28	19	15
32	Up to 800	21	24	22	38	16	19	12	8	53	8	9	40	7.5	7	30	133	6	45	60	M14 x 1.5	13	36	19	15
40	Up to 800	21	24	24	41	18	21	14	11	54	10	11	48	7.5	9	35	158	6	55	75	M16 x 1.5	19	44	24	21

(mm)

Bore size (mm)	NN	P	S	X	Y	ZZ
20	M22 x 1.5	1/8	81	20	9	151
25	M24 x 1.5	1/8	81	20	9	156
32	M30 x 1.5	1/8	87	23	9	172
40	M33 x 2	1/4	108	25	11	198

∗ Foot bracket plate thickness is dimension LT + 1 mm.

Rod flange style: CHMF



(mm)

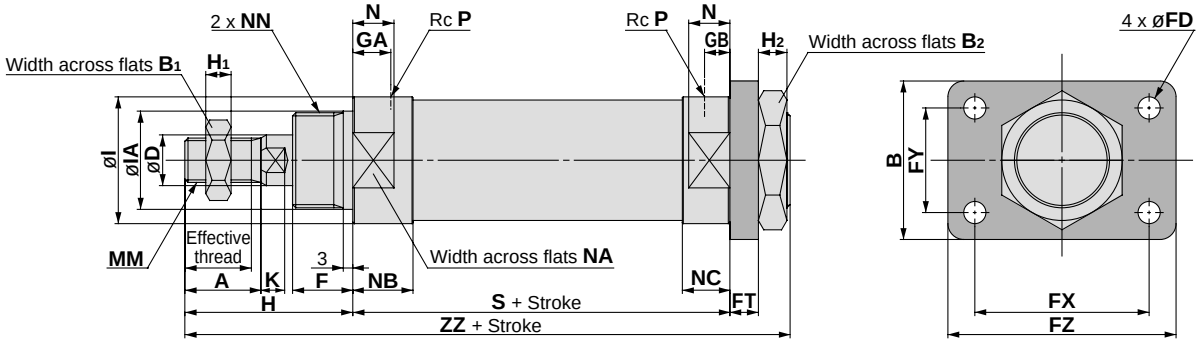
Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B	B1	B2	D	F	FD	FT	FX	FY	FZ	GA	GB	H	H1	H2	I	IA (tolerance)	K	MM	N	NA
20	Up to 800	15.5	18	38	13	26	10	16	7	6	51	21	68	12	8	41	5	8	30	23 f8 $^{-0.020}_{-0.053}$	5	M8 x 1.25	13	26
25	Up to 800	19.5	22	44	17	32	12	16	7	9	53	27	70	12	8	46	6	8	32	25 f8 $^{-0.020}_{-0.053}$	5.5	M10 x 1.25	13	28
32	Up to 800	21	24	50	22	38	16	19	7	9	55	33	72	12	8	53	8	9	40	31 f8 $^{-0.025}_{-0.064}$	7.5	M14 x 1.5	13	36
40	Up to 800	21	24	60	24	41	18	21	9	9	66	36	84	14	11	54	10	11	48	34 f8 $^{-0.025}_{-0.064}$	7.5	M16 x 1.5	19	44

(mm)

Bore size (mm)	NB	NC	NN	P	S	ZZ
20	19	15	M22 x 1.5	1/8	81	138
25	19	15	M24 x 1.5	1/8	81	143
32	19	15	M30 x 1.5	1/8	87	159
40	24	21	M33 x 2	1/4	108	183

Dimensions

Head flange style: CHMG



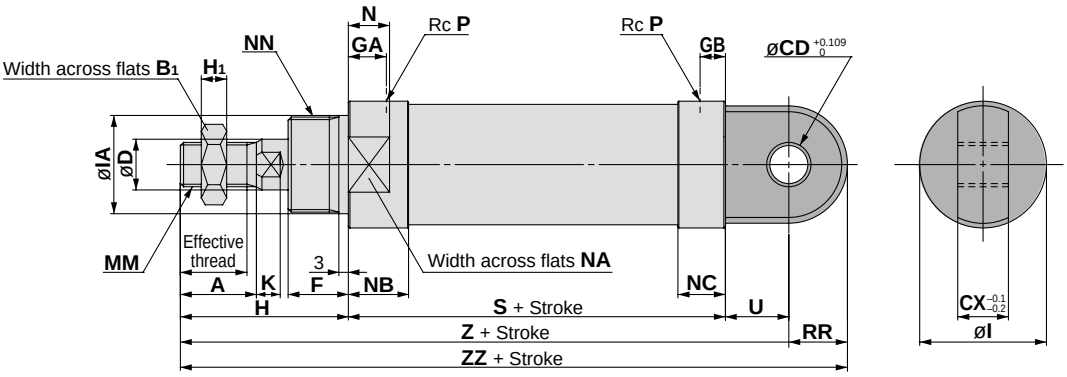
(mm)

Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B	B1	B2	D	F	FD	FT	FX	FY	FZ	GA	GB	H	H1	H2	I	IA (tolerance)	K	MM	N	NA
20	Up to 800	15.5	18	38	13	26	10	16	7	6	51	21	68	12	8	41	5	8	30	23 f8 $^{-0.020}_{-0.053}$	5	M8 x 1.25	13	26
25	Up to 800	19.5	22	44	17	32	12	16	7	9	53	27	70	12	8	46	6	8	32	25 f8 $^{-0.020}_{-0.053}$	5.5	M10 x 1.25	13	28
32	Up to 800	21	24	50	22	38	16	19	7	9	55	33	72	12	8	53	8	9	40	31 f8 $^{-0.025}_{-0.064}$	7.5	M14 x 1.5	13	36
40	Up to 800	21	24	60	24	41	18	21	9	9	66	36	84	14	11	54	10	11	48	34 f8 $^{-0.025}_{-0.064}$	7.5	M16 x 1.5	19	44

(mm)

Bore size (mm)	NB	NC	NN	P	S	ZZ
20	19	15	M22 x 1.5	1/8	81	138
25	19	15	M24 x 1.5	1/8	81	143
32	19	15	M30 x 1.5	1/8	87	159
40	24	21	M33 x 2	1/4	108	183

Single clevis style: CHMC

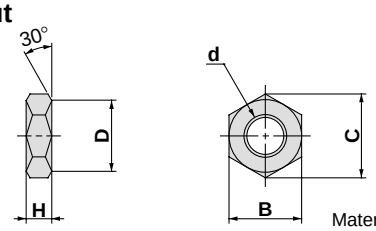


(mm)

Bore size (mm)	Stroke range (mm)	Effective thread length (mm)	A	B1	CD	CX	D	F	GA	GB	H	H1	I	IA (tolerance)	K	MM	N	NA	NB	NC	NN	P	RR	S	U	Z	ZZ
20	Up to 800	15.5	18	13	10	16	10	16	12	8	41	5	30	23 f8 $^{-0.020}_{-0.053}$	5	M8 x 1.25	13	26	19	15	M22 x 1.5	1/8	13.5	81	14	136	149.5
25	Up to 800	19.5	22	17	10	16	12	16	12	8	46	6	32	25 f8 $^{-0.020}_{-0.053}$	5.5	M10 x 1.25	13	28	19	15	M24 x 1.5	1/8	14.5	81	15	142	156.5
32	Up to 800	21	24	22	12	16	16	19	12	8	53	8	40	31 f8 $^{-0.025}_{-0.064}$	7.5	M14 x 1.5	13	36	19	15	M30 x 1.5	1/8	18.5	87	20	160	178.5
40	Up to 800	21	24	24	12	24	18	21	14	11	54	10	48	34 f8 $^{-0.025}_{-0.064}$	7.5	M16 x 1.5	19	44	24	21	M33 x 2	1/4	22.5	108	20	182	204.5

Accessories (Standard)

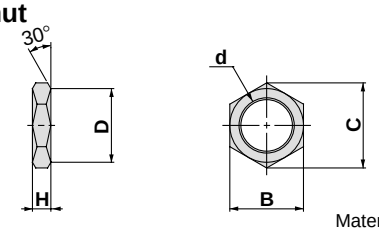
Rod end nut



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



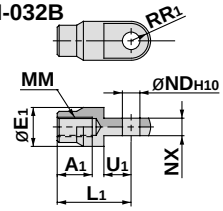
Material: Carbon steel

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

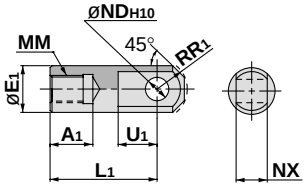
Accessory Brackets (Optional)

I-type single knuckle joint

ø20: I-020B
ø25: I-032B



ø32: I-04A
ø40: IA-04



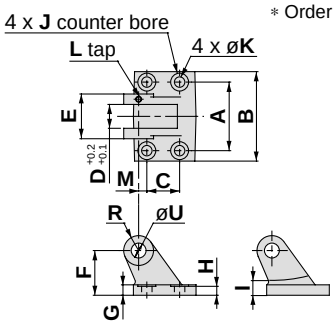
Material: Rolled steel

Material: Cast iron

Part no.	Applicable bore size (mm)	A1	E1	L1	MM	R1	U1	NDH10	NX
I-020B	20	16	20	36	M8 x 1.25	10	14	$9^{+0.058}_{0}$	$9^{-0.1}_{-0.2}$
I-032B	25	18	20	38	M10 x 1.25	10	14	$9^{+0.058}_{0}$	$9^{-0.1}_{-0.2}$
I-04A	32	22	24	55	M14 x 1.5	15.5	20	$12^{+0.070}_{0}$	$16^{-0.1}_{-0.3}$
IA-04	40	22	24	55	M16 x 1.5	15.5	20	$12^{+0.070}_{0}$	$16^{-0.1}_{-0.3}$

Bracket

∗ Order bracket pin separately.

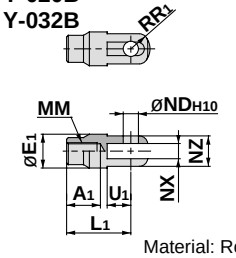


Material: Cast iron

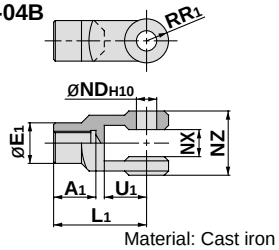
Part no.	Applicable bore size (mm)	A	B	C	D	U (H8) Size	U (H8) Tolerance	E	F	G	H	I	J	K	L	M	R
AD-FI-20	20	46	60	22	16	10	$^{+0.027}_{0}$	30	28	6.5	5.5	10	12	7	M4	5.5	10
AD-FI-25	25	46	60	22	16	10	$^{+0.027}_{0}$	30	30	6.5	5.5	10	12	7	M4	5.5	10
AD-FI-32	32	56	80	30	16	12	$^{+0.027}_{0}$	36	40	10	9	13	12	7	M5	7	12
AD-FI-40	40	64	88	30	24	12	$^{+0.027}_{0}$	44	43	10	9	13	16	9	M5	10	12

Y-type double knuckle joint

ø20: Y-020B
ø25: Y-032B



ø32: Y-04D
ø40: Y-04B

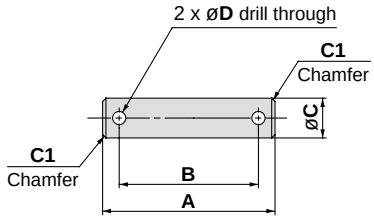


Material: Rolled steel

Material: Cast iron

Part no.	Applicable bore size (mm)	A1	E1	L1	MM	R1	U1	NDH10	NX	NZ	Note
Y-020B	20	16	20	36	M8 x 1.25	5	14	$9^{+0.058}_{0}$	$9^{+0.2}_{+0.1}$	18	With CDP-1
Y-032B	25	18	20	38	M10 x 1.25	5	14	$9^{+0.058}_{0}$	$9^{+0.2}_{+0.1}$	18	
Y-04D	32	22	24	55	M14 x 1.5	13	25	$12^{+0.070}_{0}$	$16^{+0.3}_{+0.1}$	38	With CDP-3
Y-04B	40	22	24	55	M16 x 1.5	13	25	$12^{+0.070}_{0}$	$16^{+0.3}_{+0.1}$	38	

Bracket pin

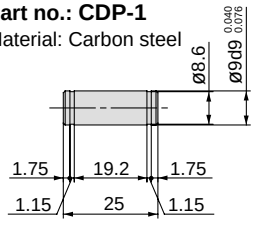


Material: Carbon steel

Part no.	Applicable bore size (mm)	A	B	C (f8) Size	C (f8) Tolerance	D	Note
AD-EI-20	20	45.5	35.5	10	$^{-0.013}_{-0.035}$	3.2	Cotter pin ø3.2 x 15ℓ (2 pcs.)
AD-EI-25	25	45.5	35.5	10	$^{-0.013}_{-0.035}$	3.2	
AD-EI-32	32	52	42	12	$^{-0.016}_{-0.043}$	4	Cotter pin ø4 x 20ℓ (2 pcs.)
AD-EI-40	40	60	50	12	$^{-0.016}_{-0.043}$	4	

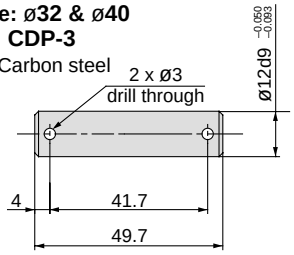
Clevis pin & Knuckle pin

Bore size: ø20 & ø25
Part no.: CDP-1
Material: Carbon steel



Retaining ring: C type, ø9 size for shaft

Bore size: ø32 & ø40
Part no.: CDP-3
Material: Carbon steel



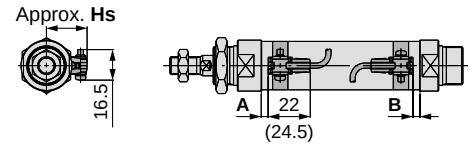
Cotter pin: ø3 x 18ℓ (2 pcs.)

Series CH□M
Auto Switch Specifications

Refer to pages 347 to 406 for detailed specifications.

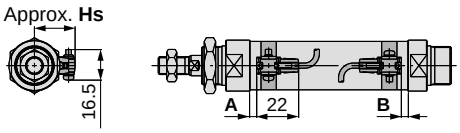
Auto Switches: Proper Mounting Positions and Mounting Heights for Stroke End Detection

D-A9□

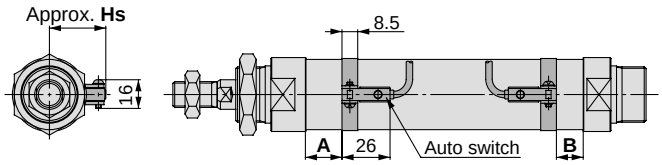


∗ Values inside ( ) are for D-A93.

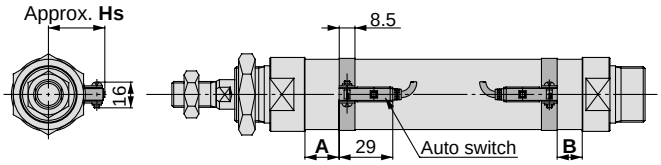
D-M9□/M9□W



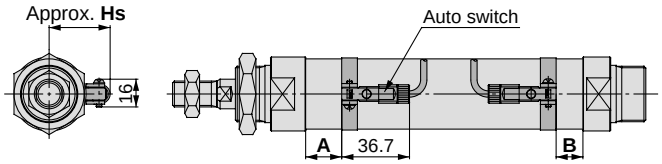
D-C7□/C80



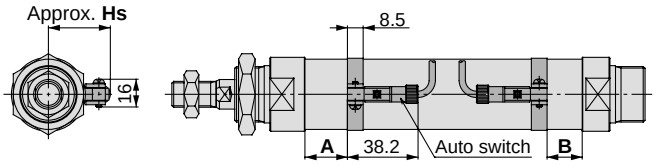
D-H7□/H7□W/H7□F/H7BAL



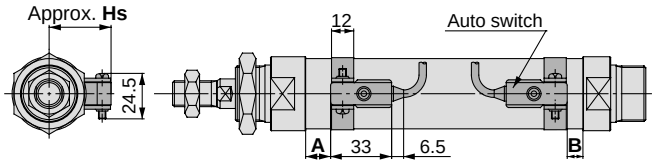
D-C73C/C80C



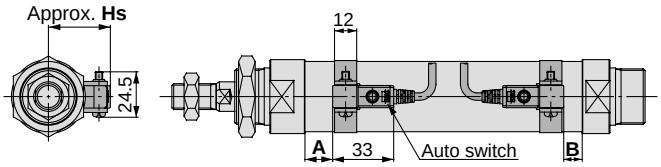
D-H7C



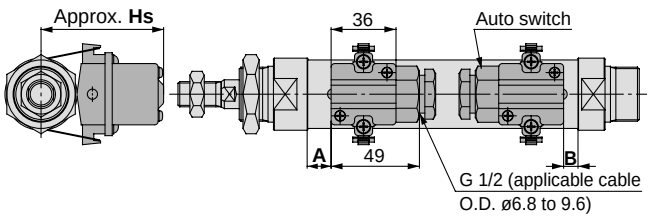
D-B5□/B64/B59W



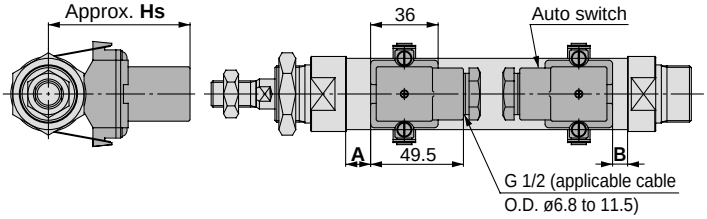
D-G5□/K59/G5□W/K59W/G5BAL/G59F/G5NTL



D-A3□/G39/K39



D-A4



Auto Switch Proper Mounting Positions

(mm)

Bore size (mm)	Solid state auto switch								Reed auto switch									
	D-M9□ D-M9□W		D-H7□ D-H7□W/H7C D-H7NF/H7BAL		D-G5□/K59 D-G5□W/K59W D-G59F/G5BAL D-G5NTL		D-G39/K39		D-A9□		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	18	17	13.5	12.5	10	9	8	7	14	13	14.5	13.5	8.5	7.5	11.5	10.5	8	7
25	16	19	11.5	14.5	8	11	6	9	12	15	12.5	15.5	6.5	9.5	9.5	12.5	6	9
32	23	18	18.5	13.5	15	10	13	8	19	14	19.5	14.5	13.5	8.5	16	11.5	13	8
40	27.5	23.5	23	19	19.5	15.5	17.5	13.5	23.5	19.5	24	20	18	14	21	17	17.5	13.5

Note) When setting an auto switch, be sure to check its operation before adjusting.

Auto Switch Mounting Heights

(mm)

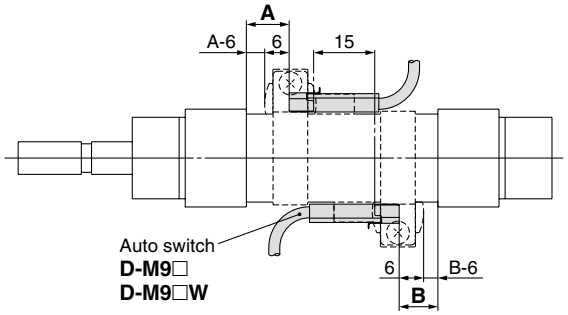
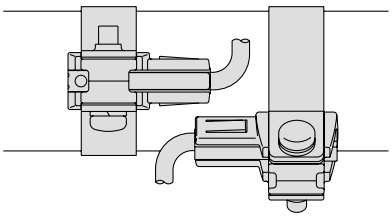
Bore size (mm)	D-M9□/M9□W D-A9□	D-H7□/H7□W D-H7NF/H7BAL D-C7□/C80	D-C73C/C80C	D-G5□/K59 D-G5□W/K59W D-G59F/G5BAL D-G5NTL/H7C D-B5□/B64 D-B59W	D-G39/K39 D-A3□	D-A44
	Hs	Hs	Hs	Hs	Hs	Hs
20	24	25.5	27	27.5	62	72
25	26.5	28	29.5	30	64.5	74.5
32	30	31.5	33	33.5	68	78
40	34.5	36	37.5	38	72.5	82.5

Minimum Auto Switch Mounting Stroke

(mm)

Auto switch model	Number of auto switches mounted				
	1 pc.	2 pcs.		n pcs.	
		Different surfaces	Same surface	Different surfaces	Same surface
D-M9□/M9□W **D-A9□**	10	15 Note 1)	45 Note 1)	$15 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6···)	45 + 45 (n – 2)
D-H7□/H7□W **D-H7NF/H7BAL**	10	15	60	$15 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6···)	60 + 45 (n – 2)
D-C7□ **D-C80**	10	15	50	$15 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6···)	50 + 45 (n – 2)
D-H7C **D-C73C** **D-C80C**	10	15	65	$15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···)	65 + 50 (n – 2)
D-G5□/K59 **D-G5□W/K59W** **D-G59F/G5BAL/G5NTL** **D-B5□/B64**	10	15	75	$15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···)	75 + 55 (n – 2)
D-B59W	15	20	75	$20 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···)	75 + 55 (n – 2)
D-G39/K39 **D-A3□/A44**	10	35	100	35 + 30(n – 2) (n = 2, 3, 4, 5···)	100 + 100 (n – 2)

Note 1) Auto switch mounting (The adjustment as shown in the figures below is required with the following stroke ranges.)

Auto switch model	Auto switches — 2 pcs.	
	Different surfaces Note 1)	Same surface Note 1)
	 The proper mounting position is at 6 mm inward from the end surface of the switch holder.	 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.
D-A93	—	45 to less than 50 stroke
D-M9□ **D-M9□W**	15 to less than 20 stroke	45 to less than 55 stroke

Operating Range

(mm)

Auto switch model	Bore size			
	20	**25**	**32**	**40**
D-M9□ **D-M9□W**	4.5	6.5	4.5	6.5
D-H7□/H7C **D-H7□W** **D-H7NF/H7BAL**	4.5	5.5	5	5.5
D-G5□/K59/G59F **D-G5□W/K59W** **D-G5BAL/G5NTL**	5	5	5	5.5
D-G39/K39	9	8.5	10	10.5
D-A9□	7	6	8	8
D-C7□/C80 **D-C73C/C80C**	8	10	9	10
D-B5□/B64	8	10	9	10
D-B59W	13	13	14	14
D-A3□/A44	9	10	10	11

∗ 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.

Auto Switch Mounting Brackets: Part Nos.

Auto switch model	Bore size (mm)			
	ø20	ø25	ø32	ø40
D-M9□ **D-M9□W** **D-A9□**	Note 1) ①BMA2-020 ②BJ3-1	Note 1) ①BMA2-025 ②BJ3-1	Note 1) ①BMA2-032 ②BJ3-1	Note 1) ①BMA2-040 ②BJ3-1
D-H7□/H7□W/H7NF **D-H7BAL/C7□/C80** **D-C73C/C80C**	BMA2-020	BMA2-025	BMA2-032	BMA2-040
D-G5□/G5□W/G59F **D-G5BAL/G5NTL** **D-B5□/B64/B59W**	BA-01	BA-02	BA-32	BA-04
D-G39/K39 = A3□/A44	BD1-01M	BD1-02M	BD1-02	BD1-04M

Note 1) Two types of auto switch mounting bracket are used as a set.

[Stainless steel mounting screw kits]

The following stainless mounting screw kits are available for use depending on the operating environment. (Auto switch mounting brackets are not included. Order separately.)

BBA3: D-G5, K5, B5, B6

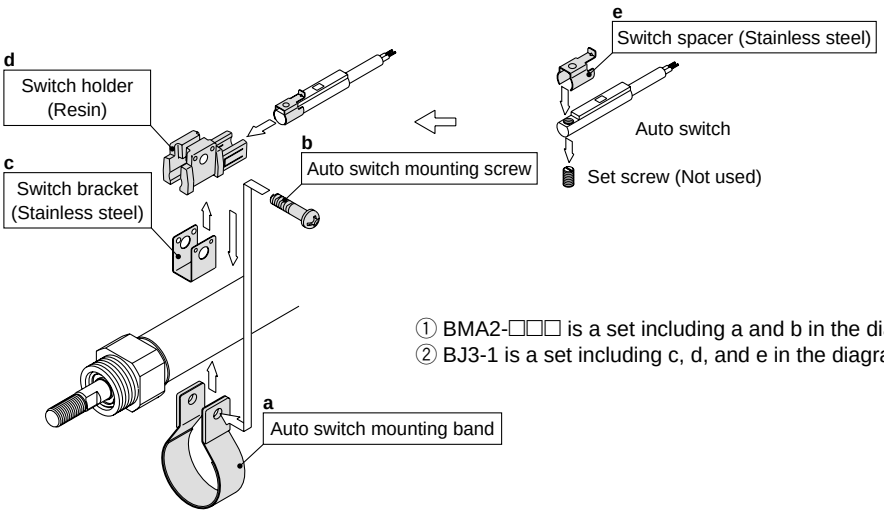
BBA4: D-C7, C8, H7

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

When D-H7BAL and G5BAL auto switches are shipped mounted on a cylinder, the above stainless steel screws are used. Also when switches are shipped separately, BBA3, BBA4 are included.

Stainless mounting screw kit details

Part no.	Contents			Applicable auto switch mounting bracket part nos.	Applicable auto switches
	Description	Size	Pcs.		
BBA3	Auto switch mounting screws	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	
BBA4		M3 x 0.5 x 14L	1	BJ2-006, BJ2-010, BJ2-016	D-C7, C8 D-H7
				BM2-020, BM2-025, BM2-032, BM2-040	
				BMA2-020, BMA2-025, BMA2-032, BMA2-040, BMA2-050, BMA2-063	
				BHN3-025, BHN3-032, BHN3-040	



① BMA2-□□□ is a set including a and b in the diagram.
② BJ3-1 is a set including c, d, and e in the diagram.

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.

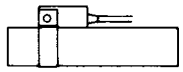
Auto switch type	Part no.	Electrical entry	Features
Solid state	D-H7A1, H7A2, H7B	Grommet (in-line)	—
	D-G59, G5P, K59		
	D-H7NW, H7PW, H7BW		Diagnostic indication (2-color display)
	D-G59W, G5PW, K59W		
	D-G5BAL		Water resistant (2-color display)
	D-G5NTL		With timer
	D-G59F		Diagnostic output (2-color display)
Reed	D-C73, C76, B53	Grommet (in-line)	—
	D-C80		Without indicator light

∗ Solid state auto 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.

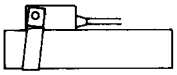
How to Mount and Move the Auto Switch

⚠ 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, D-M9P, D-M9B
D-M9NW, D-M9PW, D-M9BW
Reed ····· D-A90, A93, A96

How to Mount and Move the Auto Switch

Mounting the Auto Switch

1. Attach the switch bracket to the switch holder.
(Fit the convex part of the switch bracket over the concave part of the holder.)
2. Mount the auto switch mounting band to the cylinder tube.
3. Set the switch holder between the reinforcing plates of the auto switch mounting band which is already attached to the cylinder.
4. Insert the auto switch mounting screw in the hole of the reinforcing plate through the switch holder, and thread it into the other plate. Tighten the screw temporarily.
5. Remove the set screw attached to the auto switch.
6. Attach the switch spacer to the auto switch.
7. Insert the auto switch with a switch spacer from the back of the switch holder and set it at the specified position.
(Insert the auto switch with an angle of approximately 10 to 15°. See figure 1.)
8. To secure the auto switch, tighten the switch mounting screw with the specified torque (0.8 N·m to 1.0 N·m).

Adjusting the Switch Position

1. Unloosen the auto switch mounting screw 3 turns to adjust the auto switch set position.
2. Tighten the screw as described above (8) after adjustment.

Dismounting Auto Switch

1. Remove the auto switch mounting screw from the switch holder.
2. Move the auto switch back towards the position where it stops at the lead wire side.
3. Hold up the lead wire side of the auto switch at the angle of around 45°.
4. Maintain the angle, and pull back the auto switch obliquely at the same angle.

Note 1) Be careful not to pull or strain the lead wires.
Be careful not to apply excess tensile force (over 10 N) to the auto switches.
Adjust the auto switch position after sufficiently loosening its screw. For the band mounting type BJ3-1, loosen the screw three rotations or more.
Note 2) Be sure to use the switch spacer and switch bracket for the band mounting type.
Use together with the conventional auto switch mounting bands (brackets) BMA2-□□□.
Confirm that a switch spacer is mounted to the end of the auto switch before fastening the auto switch. If the switch bracket is not mounted, the auto switch may move after installation.

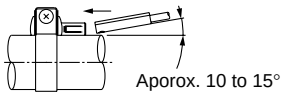
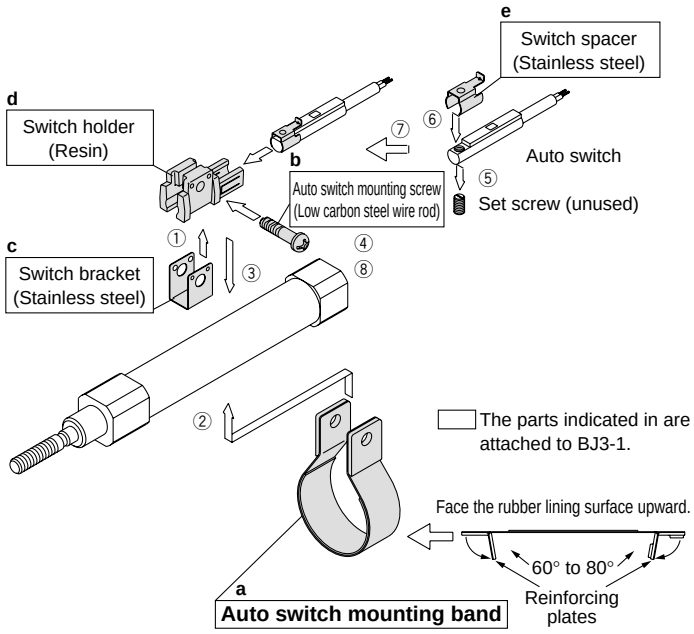


Figure 1. Switch insert angle

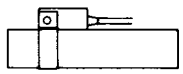


- BMA2-□□□ is a set of a and b shown above.
- BJ3-1 is a set of c, d and e shown above.

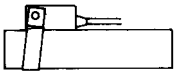
How to Mount and Move the Auto Switch

⚠ Caution

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



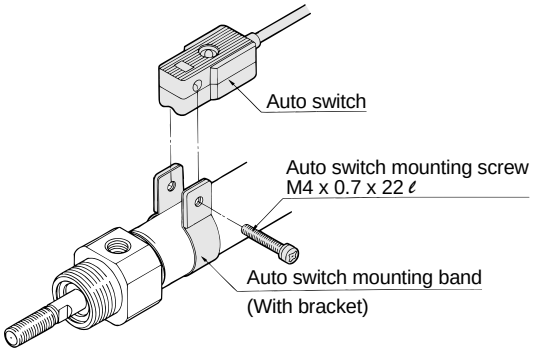
Mounting correctly



Mounting incorrectly

<Applicable auto switch>

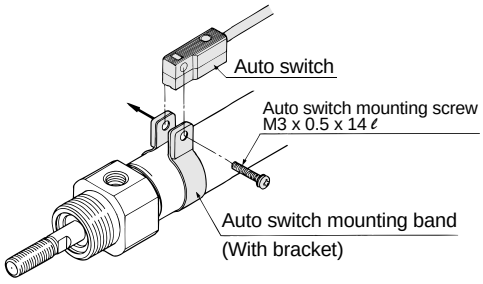
Solid state ····· D-G59, D-G5P, D-K59, D-G5BAL
D-G59W, D-G5PW, D-K59W
D-G59F, D-G5NTL, D-G5NBL
Reed ····· D-B53, D-B54, D-B64, D-B59W



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-H7BAL
D-H7C, D-H7NF, D-H7NW, D-H7PW,
D-H7BW
Reed ····· D-C73, D-C76, D-C80, D-C73C, D-C80C



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 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

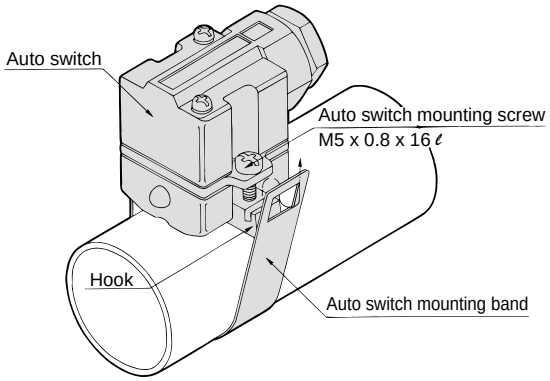
1. Tighten the screw under the specified torque when mounting auto switch.
2. Set the auto switch mounting band perpendicularly to cylinder tube.

Mounting correctly **Mounting incorrectly**

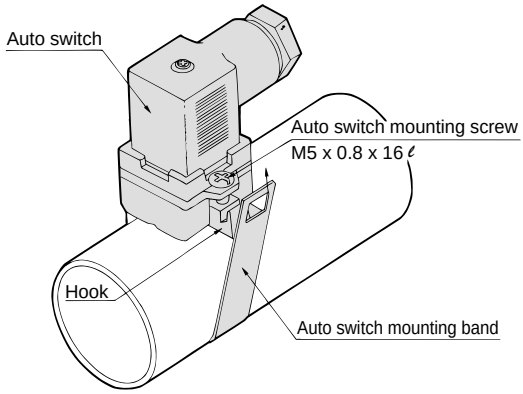
<Applicable auto switch>
Solid state ····· D-G39, D-K39
Reed ····· D-A33, D-A34, D-A44

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 auto switch 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.