

Air Cylinder

ø10, ø16

New

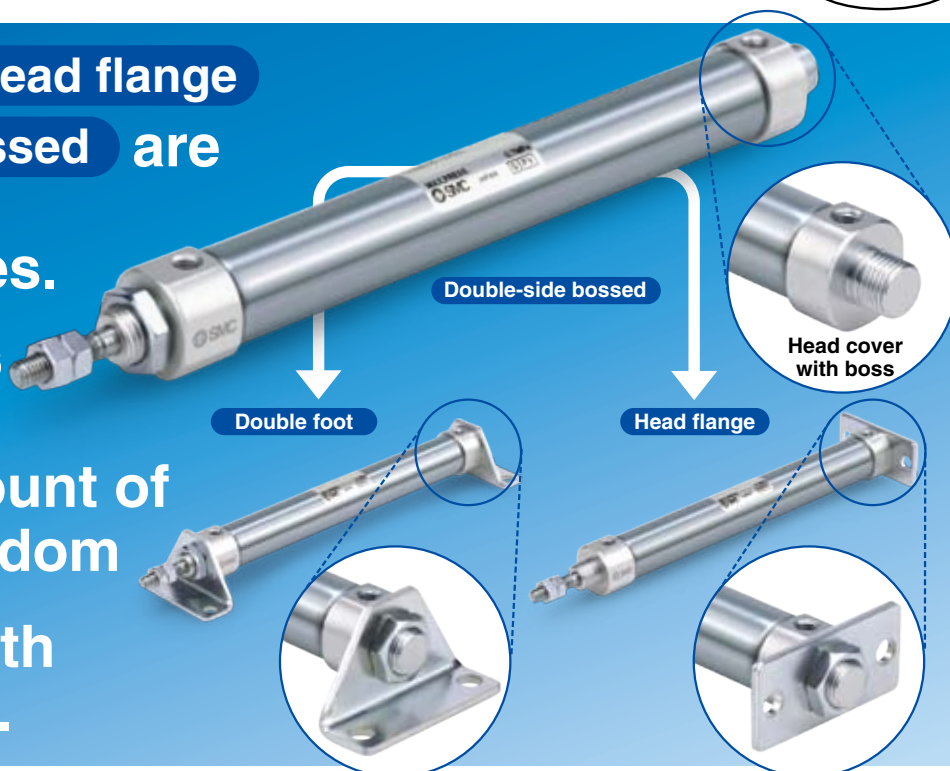
RoHS

Double foot Head flange
Double-side bossed are
added to the
mounting types.

4 types → 7 types

Improved amount of
mounting freedom

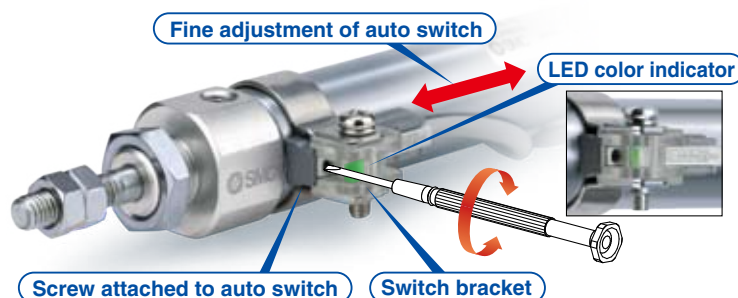
Head cover with
boss is added.



Easy fine adjustment of auto switch position

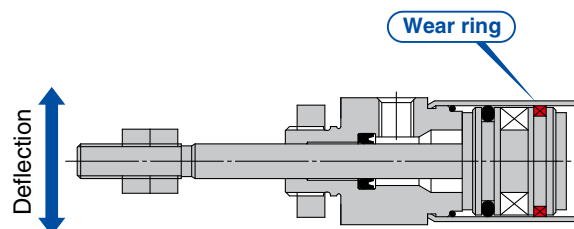
Fine adjustment of the auto switch position is possible by simply loosening the screw attached to the auto switch.

Transparent switch bracket improves
visibility of indicator LED.



Rod end deflection accuracy improved

Rod end deflection is reduced by mounting a wear ring to the piston as standard.



Series CJ2

SMC

CAT.ES20-226A

Air Cylinder

New Part numbers with rod end bracket and/or pivot bracket available

Not necessary to order a bracket for the applicable cylinder separately

Note) Mounting bracket is shipped together with the product, but not assembled.

Example) CDJ2D16-50RZ- **N** **W** -M9BW-B

Pivot bracket

Nil	None
N	Pivot bracket is shipped together with the product, but not assembled.

* Only for CJ2D (double clevis) type

N: Kit of pivot bracket and double clevis



Rod end bracket

Nil	None
V	Single knuckle joint
W	Double knuckle joint
T	Rod end cap (Flat type)
U	Rod end cap (Round type)

With rod end bracket

V: Single knuckle joint

W: Double knuckle joint

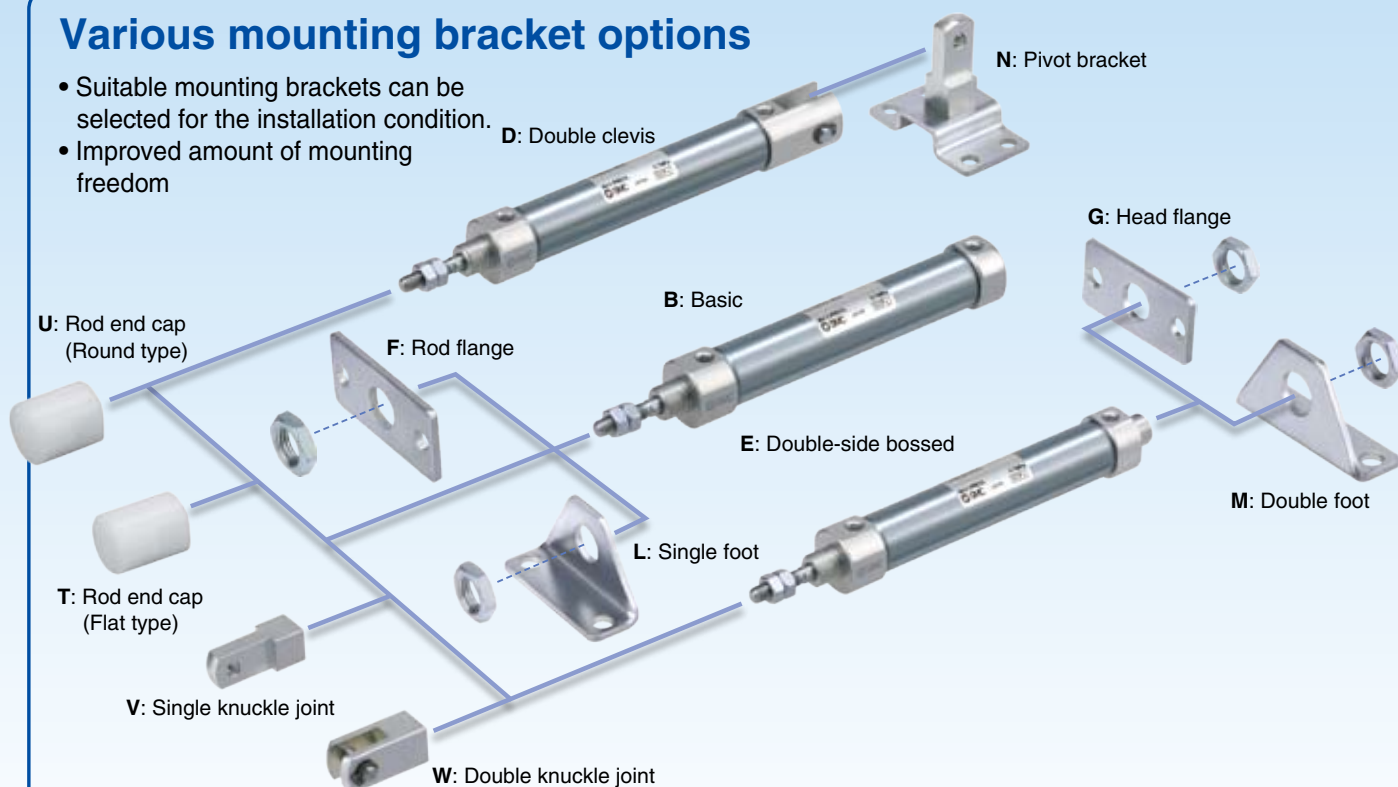
Rod end cap

T: Flat type

U: Round type

Various mounting bracket options

- Suitable mounting brackets can be selected for the installation condition.
- Improved amount of mounting freedom



2 mounting types of compact auto switches

- Band mounting**
- Rail mounting**

The auto switch mounting type, band or rail can be selected with the model number.

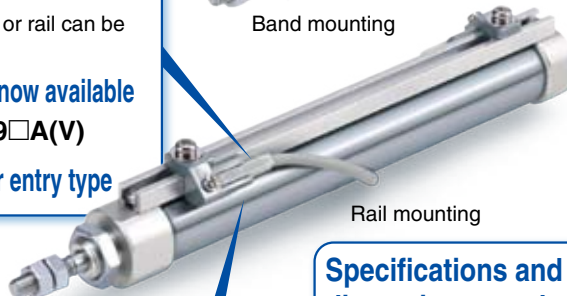
Water resistant compact auto switch now available

- Solid state auto switch D-M9□A(V)**

Applicable to lead wire perpendicular entry type



Band mounting



Rail mounting

Head cover

4 types of head cover shape are available.

Basic	Double clevis
Axial piping	With boss

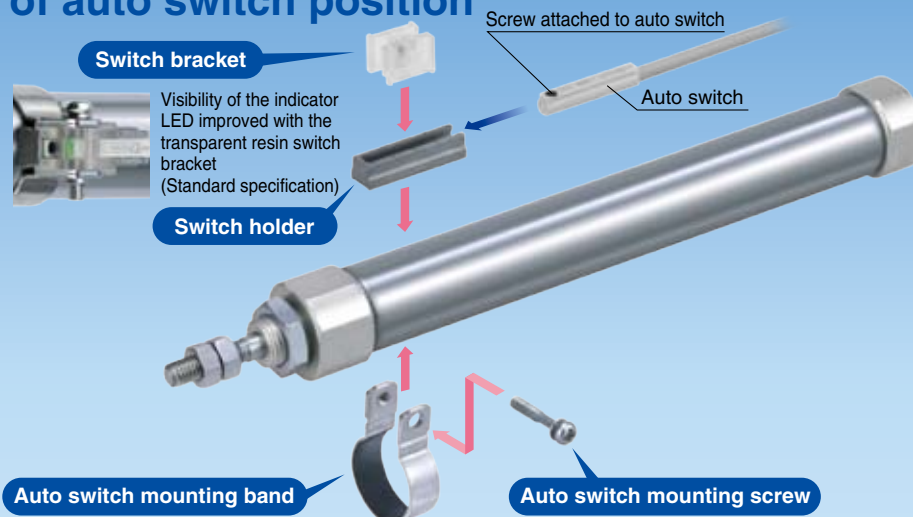
New

Specifications and dimensions are the same as the existing product.

No environmental hazardous substances used

Easy fine adjustment of auto switch position

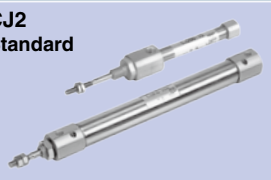
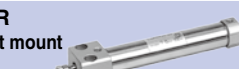
Fine adjustment of the auto switch set position can be performed by loosening the auto switch attached screw without loosening the auto switch mounting band. Operability improved compared with the conventional auto switch set position adjustment, where the complete switch mounting band requires loosening.



Stroke Variations

Bore size (mm)	Standard stroke (mm)									
	15	30	45	60	75	100	125	150	175	200
10	●	●	●	●	●	●	●	●		
16	●	●	●	●	●	●	●	●	●	●

Series Variations

Series	Action	Type	Bore size (mm)			Variations		Catalogs
			6	10	16	Built-in magnet	Air cushion	
CJ2 Standard 	Double acting	Single rod		●	●	●		Page of this catalog Page 1
CJ2 Standard 	Double acting	Single/Double rod	●	●	●	●	*	 Best Pneumatics Page 42
	Single acting	Spring return/extend	●	●	●	●		 Best Pneumatics Page 60
CJ2K Non-rotating rod 	Double acting Single acting	Single rod Spring return/extend		●	●	●		 Best Pneumatics Page 68
CJ2Z Built-in speed controller 	Double acting	Single/Double rod		●	●	●		 Best Pneumatics Page 80
CJ2Q Low friction 	Double acting	Single rod		●	●	●		 Best Pneumatics Page 90
CJ2R Direct mount 	Double acting	Single rod		●	●	●		 Best Pneumatics Page 94
	Single acting	Spring return/extend		●	●	●		
CJ2RK Direct mount, Non-rotating rod 	Double acting	Single rod		●	●	●		 Best Pneumatics Page 102
	Single acting	Spring return/extend		●	●	●		
CBJ2 With end lock 	Double acting	Single rod			●	●		 Best Pneumatics Page 110
CJ2X Low Speed Cylinder 	Double acting	Single rod		●	●	●		 Best Pneumatics Page 1114

* Except ø6

Air Cylinder

Standard: Double Acting, Single Rod

Series CJ2

ø10, ø16

RoHS



How to Order

With auto switch

C J2 B 16 - 60 [] Z - [] V

CDJ2 D 16 - 60 [] Z - N W - M9BW [] - B

Built-in magnet

Mounting

B	Basic
E	Double-side bossed
D	Double clevis
L	Single foot
M	Double foot
F	Rod flange
G	Head flange

* Mounting bracket is shipped together with the product, but not assembled.

Bore size

10	10 mm
16	16 mm

Standard stroke

Bore size (mm)	Standard stroke
10	15, 30, 45, 60, 75, 100, 125, 150
16	15, 30, 45, 60, 75, 100, 125, 150, 175, 200

* Manufacture of intermediate strokes in 1 mm intervals is possible. (Spacers are not used.)
Produced upon receipt of order.

Head cover port location

Nil	Perpendicular to axis	
R	Axial	

Pivot bracket

Nil	None
N	Pivot bracket is shipped together with the product, but not assembled.

* Only for CJ2D (double clevis type)
* Pivot bracket is shipped together with the product, but not assembled.

Auto switch mounting type

A	Rail mounting
B	Band mounting

Number of auto switches

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

Auto switch

Nil	Without auto switch
-----	---------------------

* For applicable auto switches, refer to the table below.

Rod end bracket

Nil	None
V	Single knuckle joint
W	Double knuckle joint
T	Rod end cap (Flat type)
U	Rod end cap (Round type)

* Rod end bracket is shipped together with the product, but not assembled.
* A knuckle joint pin is not provided with the single knuckle joint.

Applicable Auto Switches/Refer to pages 1263 to 1371 in Best Pneumatics No. 2 for further information on auto switches.

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	Band mounting		Rail mounting		0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)				
							Perpendicular	In-line	Perpendicular	In-line									
Solid state auto switch	—	Grommet	No	3-wire (NPN)	5 V, 12 V	—	M9NV	M9N	M9NV	M9N	●	●	●	○	—	○	IC circuit	Relay, PLC	
		3-wire (PNP)		M9PV			M9P	M9PV	M9P	●	●	●	○	—	○				
	Connector	2-wire		12 V	M9BV		M9B	M9BV	M9B	●	●	●	○	—	○	—			
	—	H7C		J79C	—		●	—	●	●	●	—	—						
	Diagnostic indication (2-color indication)	Grommet	Yes	3-wire (NPN)	5 V, 12 V	M9NVV	M9NW	M9NVV	M9NW	●	●	●	○	—	○	IC circuit			
				3-wire (PNP)		M9PWV	M9PW	M9PWV	M9PW	●	●	●	○	—	○				
	2-wire			12 V	M9BVV	M9BW	M9BVV	M9BW	●	●	●	○	—	○	—				
	3-wire (NPN)			M9NAV**	M9NA**	M9NAV**	M9NA**	○	○	●	○	—	○						
	Water resistant (2-color indication)	Grommet	No	3-wire (PNP)	5 V, 12 V	M9PAV**	M9PA**	M9PAV**	M9PA**	○	○	●	○	—	○	IC circuit			
				2-wire		12 V	M9BAV**	M9BA**	M9BAV**	M9BA**	○	○	●	○	—		○		
With diagnostic output (2-color indication)	4-wire (NPN)			5 V, 12 V	—	H7NF	—	F79F	●	—	●	○	—	○	IC circuit				
Reed auto switch	—			Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96V	A96	A96V	A96	●	—	●	—	—	—
		—	200 V					—	—	A72	A72H	●	—	●	—	—	—		
		2-wire	24 V			12 V	100 V	A93V	A93	A93V	A93	●	—	●	●	—	—	—	
							100 V or less	A90V	A90	A90V	A90	●	—	●	●	—	—		
	Diagnostic indication (2-color indication)	Grommet	Yes	No	2-wire	24 V	—	—	C73C	A73C	—	●	—	●	●	—	—	IC circuit	
							—	—	C80C	A80C	—	●	—	●	●	—	—		
							24 V or less	—	—	—	—	●	—	●	●	—	—		
							—	—	—	A79W	—	●	—	●	—	—	—		

** Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Please contact 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

* Since there are other applicable auto switches than listed above, refer to page 13 for details.

* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329 in Best Pneumatics No. 2.

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

* The D-A9□/M9□/M9□W/A7□□/A80□/F7□□/J7□□ auto switches are shipped together, (but not assembled). (For band mounting, only the auto switch mounting brackets are assembled before shipment.)

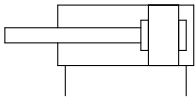
Air Cylinder Standard: Double Acting, Single Rod **Series CJ2**

Specifications



JIS Symbol

Rubber bumper



Refer to pages 8 to 12 for cylinders with auto switches.	
•	Minimum stroke for auto switch mounting
•	Auto switch proper mounting position (detection at stroke end) and its mounting height
•	Operating range
•	Auto switch mounting brackets/Part no.

Bore size (mm)		10	16
Action		Double acting, Single rod	
Fluid		Air	
Proof pressure		1 MPa	
Maximum operating pressure		0.7 MPa	
Minimum operating pressure		0.06 MPa	
Ambient and fluid temperature		Without auto switch: -10°C to 70°C With auto switch: -10°C to 60°C (No freezing)	
Cushion		Rubber bumper	
Lubrication		Not required (Non-lube)	
Piston speed	Rubber bumper	50 to 750 mm/s	
Allowable kinetic energy	Rubber bumper	0.035 J	0.090 J
Stroke length tolerance		+1.0 0	

Mounting and Accessories

For details, refer to page 7.

● Mounted on the product ○ Please order these separately.

Mounting		Basic	Foot	Flange	Double* clevis	Double clevis (including T-bracket)
Standard	Mounting nut	●	●	●	—	—
	Rod end nut	●	●	●	●	●
	Clevis pin	—	—	—	●	●
Option	Single knuckle joint	○	○	○	○	○
	Double knuckle joint*	○	○	○	○	○
	Rod end cap (Flat/Round type)	○	○	○	○	○
	T-bracket	—	—	—	○	●

* A pin and retaining rings are included with double clevis and/or double knuckle joint.

Mounting Brackets/Part No.

Mounting bracket	Bore size (mm)	
	10	16
Foot bracket	CJ-L010C	CJ-L016C
Flange bracket	CJ-F010C	CJ-F016C
T-bracket*	CJ-T010C	CJ-T016C

* A T-bracket is used with double clevis (D) type.

Ordering Example of Cylinder Assembly

Cylinder model:
CDJ2D16-60Z-NW-M9BW-B

Mounting D: Double clevis
Pivot bracket N: Yes
Rod end bracket W: Double knuckle joint
Auto switch D-M9BW: 2 pcs.
Auto switch mounting B: Band mounting

* Pivot bracket, double knuckle joint and auto switch are shipped together with the product, but not assembled.

Weights

Bore size (mm)		10	16
Basic weight (When the stroke is zero)	Basic	22	46
	Axial piping	22	46
	Double clevis (including clevis pin)	24	54
	Head-side bossed	23	48
Additional weight per 15 mm of stroke		4	7
Mounting bracket weight	Single foot	8	25
	Double foot	16	50
	Rod flange	5	13
	Head flange	5	13
Accessories	Single knuckle joint	17	23
	Double knuckle joint (including knuckle pin)	25	21
	Rod end cap (Flat type)	1	2
	Rod end cap (Round type)	1	2
	T-bracket	32	50

* Mounting nut and rod end nut are included in the basic weight.

Note) Mounting nut is not included in the basic weight for double clevis type.

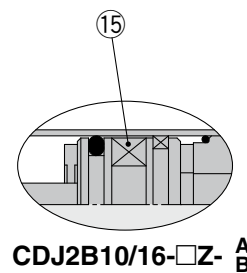
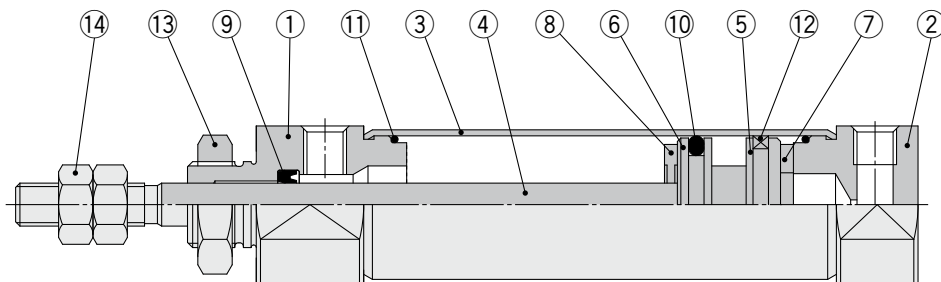
Calculation:

Example) **CJ2L10-45Z**

- Basic weight 22 (ø10)
 - Additional weight 4/15 stroke
 - Cylinder stroke 45 stroke
 - Mounting bracket weight ... 8 (Axial foot type)
- 22 + 4/15 x 45 + 8 = 42 g

Series CJ2

Construction (Not able to disassemble)



Component Parts

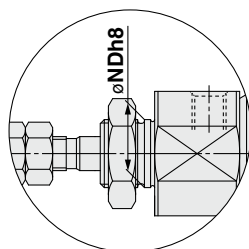
No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Anodized
2	Head cover	Aluminum alloy	Anodized
3	Cylinder tube	Stainless steel	
4	Piston rod	Stainless steel	
5	Piston A	Aluminum alloy	
6	Piston B	Aluminum alloy	
7	Bumper A	Urethane	
8	Bumper B	Urethane	

No.	Description	Material	Note
9	Rod seal	NBR	
10	Piston seal	NBR	
11	Tube gasket	NBR	
12	Wear ring	Resin	
13	Mounting nut	Carbon steel	Zinc chromate
14	Rod end nut	Carbon steel	Zinc chromate
15	Magnet	—	

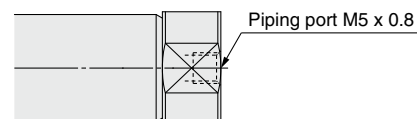
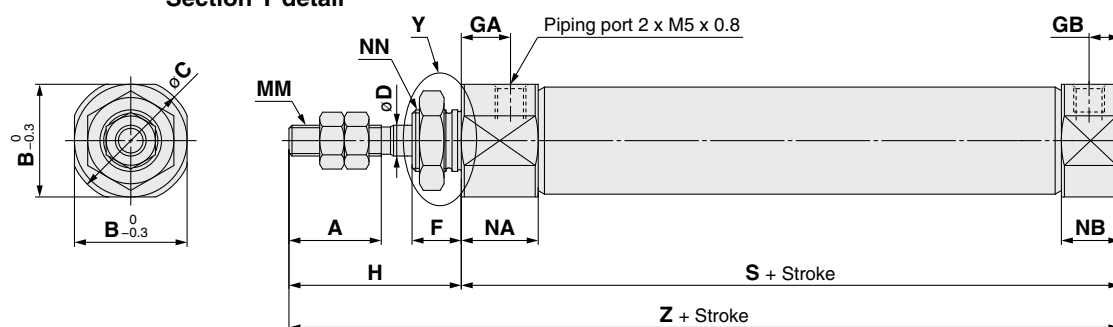
Dimensions

Basic (B)

CJ2B Bore size — Stroke Head cover port location Z



Section Y detail



Axial location (R)

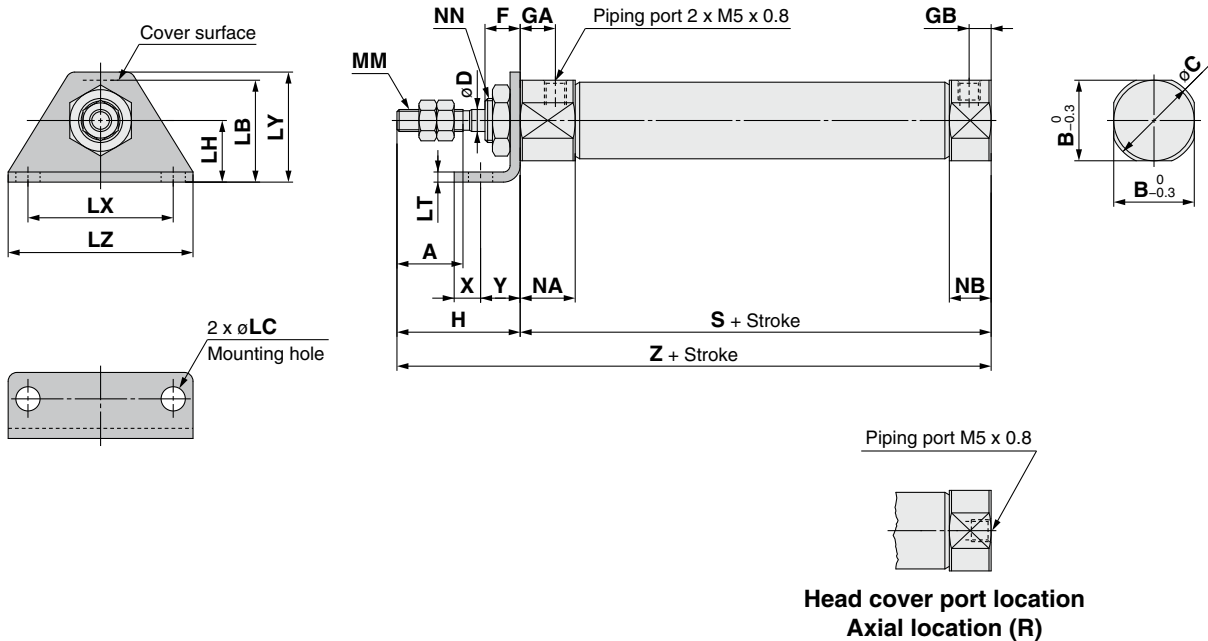
* The overall cylinder length does not change.

Bore size	A	B	C	D	F	GA	GB	H	MM	NA	NB	NDh8	NN	S	Z
10	15	12	14	4	8	8	5	28	M4 x 0.7	12.5	9.5	8 ⁰ _{-0.022}	M8 x 1.0	46	74
16	15	18.3	20	5	8	8	5	28	M5 x 0.8	12.5	9.5	10 ⁰ _{-0.022}	M10 x 1.0	47	75

Dimensions

Single foot (L)

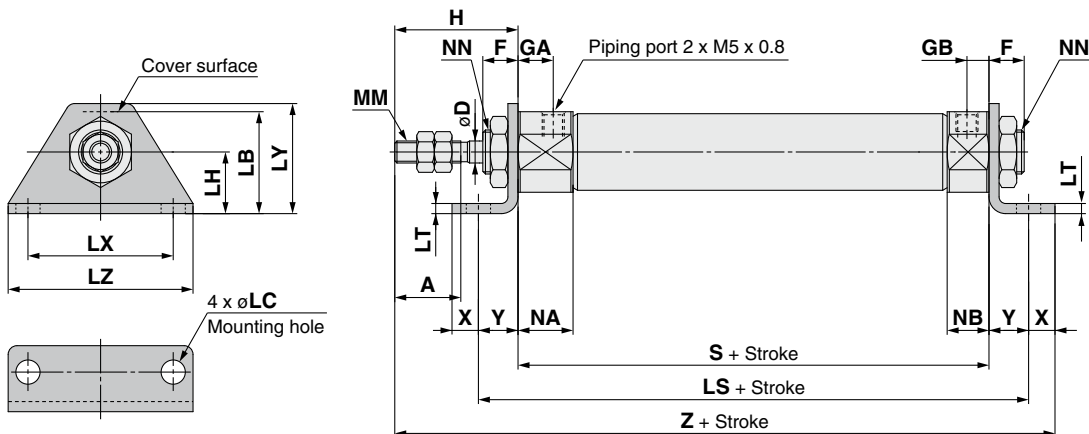
CJ2L Bore size — Stroke Head cover port location **Z**



Bore size	A	B	C	D	F	GA	GB	H	LB	LC	LH	LT	LX	LY	LZ	MM	NA	NB	NN	S	X	Y	Z
10	15	12	14	4	8	8	5	28	15	4.5	9	1.6	24	16.5	32	M4 x 0.7	12.5	9.5	M8 x 1.0	46	5	7	74
16	15	18.3	20	5	8	8	5	28	23	5.5	14	2.3	33	25	42	M5 x 0.8	12.5	9.5	M10 x 1.0	47	6	9	75

Double foot (M)

CJ2M Bore size — Stroke **Z**



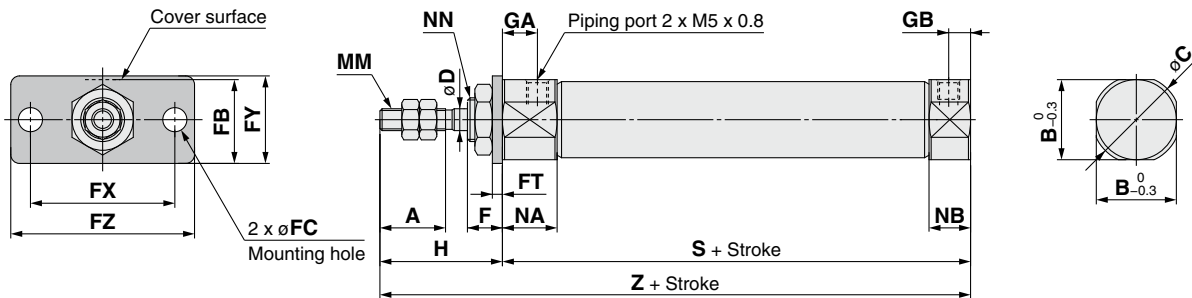
Bore size	A	D	F	GA	GB	H	LB	LC	LH	LS	LT	LX	LY	LZ	MM	NA	NB	NN	S	X	Y	Z
10	15	4	8	8	5	28	15	4.5	9	60	1.6	24	16.5	32	M4 x 0.7	12.5	9.5	M8 x 1.0	46	5	7	86
16	15	5	8	8	5	28	23	5.5	14	65	2.3	33	25	42	M5 x 0.8	12.5	9.5	M10 x 1.0	47	6	9	90

Series CJ2

Dimensions

Rod flange (F)

CJ2F Bore size – Stroke Head cover port location Z

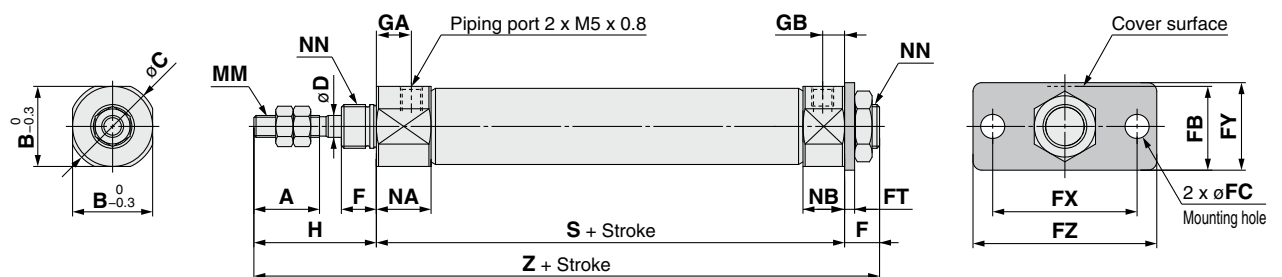


Head cover port location
Axial location (R)

Bore size	A	B	C	D	F	FB	FC	FT	FX	FY	FZ	GA	GB	H	MM	NA	NB	NN	S	Z
10	15	12	14	4	8	13	4.5	1.6	24	14	32	8	5	28	M4 x 0.7	12.5	9.5	M8 x 1.0	46	74
16	15	18.3	20	5	8	19	5.5	2.3	33	20	42	8	5	28	M5 x 0.8	12.5	9.5	M10 x 1.0	47	75

Head flange (G)

CJ2G Bore size – Stroke Z

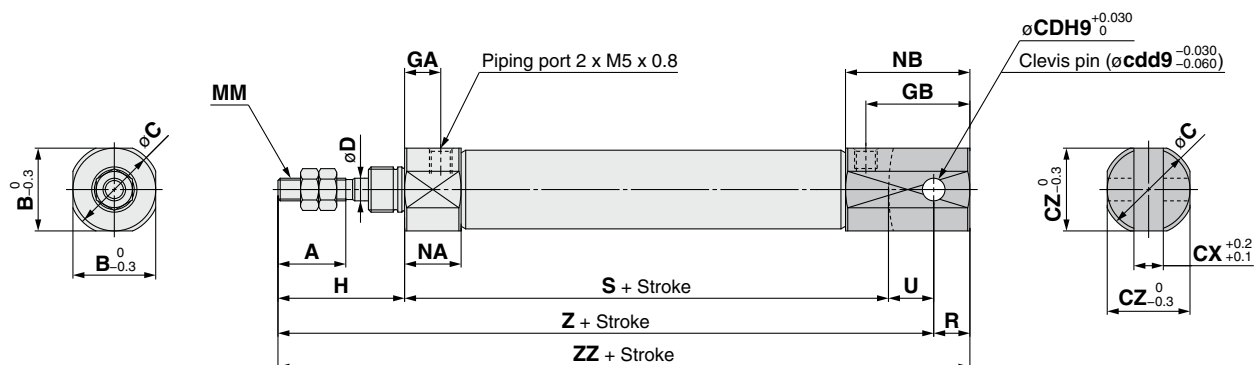


Bore size	A	B	C	D	F	FB	FC	FT	FX	FY	FZ	GA	GB	H	MM	NA	NB	NN	S	Z
10	15	12	14	4	8	13	4.5	1.6	24	14	32	8	5	28	M4 x 0.7	12.5	9.5	M8 x 1.0	46	82
16	15	18.3	20	5	8	19	5.5	2.3	33	20	42	8	5	28	M5 x 0.8	12.5	9.5	M10 x 1.0	47	83

Dimensions

Double clevis (D)

CJ2D Bore size — Stroke Z

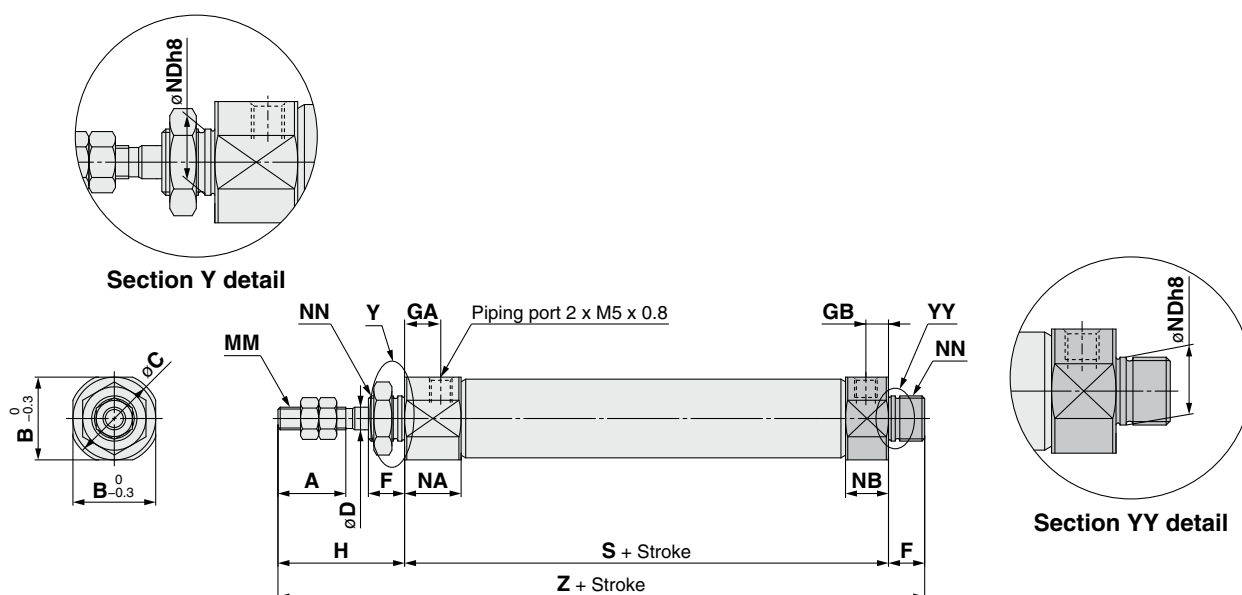


* A clevis pin and retaining rings are included.

Bore size	A	B	C	CD(cd)	CX	CZ	D	GA	GB	H	MM	NA	NB	R	S	U	Z	ZZ
10	15	12	14	3.3	3.2	12	4	8	18	28	M4 x 0.7	12.5	22.5	5	46	8	82	87
16	15	18.3	20	5	6.5	18.3	5	8	23	28	M5 x 0.8	12.5	27.5	8	47	10	85	93

Double-side bossed (E)

CJ2E Bore size — Stroke Z

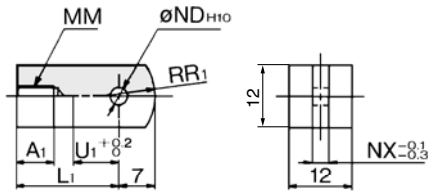


Bore size	A	B	C	D	F	GA	GB	H	MM	NA	NB	NDh8	NN	S	Z
10	15	12	14	4	8	8	5	28	M4 x 0.7	12.5	9.5	$8^{+0}_{-0.022}$	M8 x 1.0	46	82
16	15	18.3	20	5	8	8	5	28	M5 x 0.8	12.5	9.5	$10^{+0}_{-0.022}$	M10 x 1.0	47	83

Series CJ2

Dimensions of Accessories (Option)

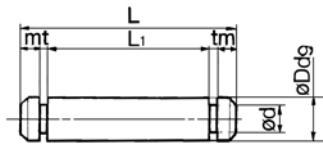
Single Knuckle Joint



Material: Rolled steel

Part no.	Applicable bore size	A ₁	L ₁	MM	ND _{H10}	NX	R ₁	U ₁
I-J010C	10	8	21	M4 x 0.7	33 ^{+0.048} _{-0.060}	3.1	8	9
I-J016C	16	8	25	M5 x 0.8	5 ^{+0.048} _{-0.060}	6.4	12	14

Clevis Pin

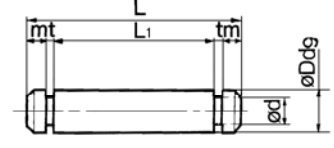


Material: Stainless steel

Part no.	Applicable bore size	Dd9	d	L	L ₁	m	t	Included retaining ring
CD-J010	10	33 ^{+0.030} _{-0.060}	3	15.2	12.2	1.2	0.3	Type C 3.2
CD-Z015	16	5 ^{+0.030} _{-0.060}	4.8	22.7	18.3	1.5	0.7	Type C 5

* Retaining rings are included with a clevis pin.

Knuckle Pin



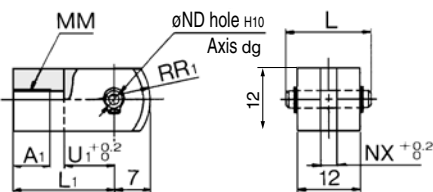
Material: Stainless steel

Part no.	Applicable bore size	Dd9	d	L	L ₁	m	t	Included retaining ring
CD-J010	10	33 ^{+0.030} _{-0.060}	3	15.2	12.2	1.2	0.3	Type C 3.2
IY-J015	16	5 ^{+0.030} _{-0.060}	4.8	16.6	12.2	1.5	0.7	Type C 5

* For size Ø10, a clevis pin is diverted.

* Retaining rings are included with a knuckle pin.

Double Knuckle Joint



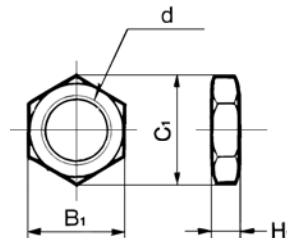
Material: Rolled steel

Part no.	Applicable bore size	A ₁	L	L ₁	MM
Y-J010C	10	8	15.2	21	M4 x 0.7
Y-J016C	16	11	16.6	21	M5 x 0.8

Part no.	ND _{d9}	ND _{H10}	NX	R ₁	U ₁
Y-J010C	33 ^{+0.030} _{-0.060}	33 ^{+0.048} _{-0.060}	3.2	8	10
Y-J016C	5 ^{+0.030} _{-0.060}	5 ^{+0.048} _{-0.060}	6.5	12	10

* A knuckle pin and retaining rings are included.

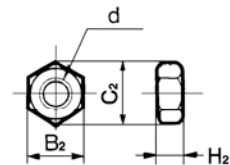
Mounting Nut



Material: Carbon steel

Part no.	Applicable bore size	B ₁	C ₁	d	H ₁
SNJ-010C	10	11	12.7	M8 x 1.0	4
SNJ-016C	16	14	16.2	M10 x 1.0	4

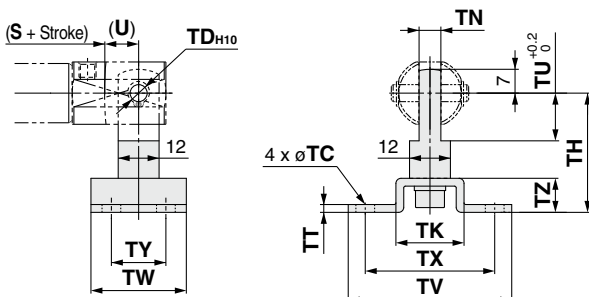
Rod End Nut



Material: Carbon steel

Part no.	Applicable bore size	B ₂	C ₂	d	H ₂
NTJ-010C	10	7	8.1	M4 x 0.7	3.2
NTJ-015C	16	8	9.2	M5 x 0.8	4

T-bracket



Part no.	Applicable bore size	TC	TD _{H10}	TH	TK	TN	TT	TU	TV	TW	TX	TY	TZ
CJ-T010C	10	4.5	3.3 ^{+0.048} _{-0.060}	29	18	3.1	2	9	40	22	32	12	8
CJ-T016C	16	5.5	5 ^{+0.048} _{-0.060}	35	20	6.4	2.3	14	48	28	38	16	10

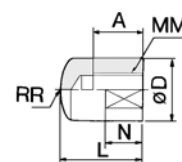
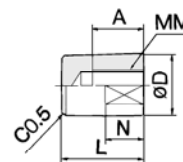
* A T-bracket includes a T-bracket base, single knuckle joint, hexagon socket head bolt and spring washer.

* For dimensions of (U) and (S + Stroke), refer to the double clevis drawing on page 6.

Rod End Cap

Flat type/CJ-CF□□□

Round type/CJ-CR□□□



Material: Polyacetal

Part no.	Applicable bore size	A	D	L	MM	N	R	W
CJ-CF010	10	8	10	13	M4 x 0.7	6	10	8
CJ-CF016	16	10	12	15	M5 x 0.8	7	12	10

Auto Switch Proper Mounting Position (Detection at stroke end) and Its Mounting Height

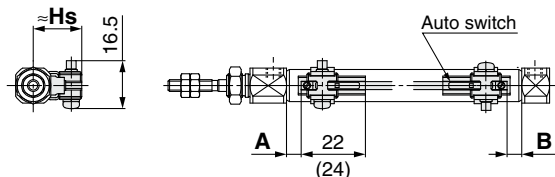
Solid state auto switch

<Band mounting>

D-M9□

D-M9□W

D-M9□A



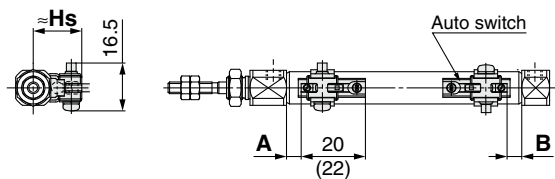
(): Dimension of the D-M9□A.

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

D-M9□V

D-M9□MV

D-M9□AV



(): Dimension of the 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.

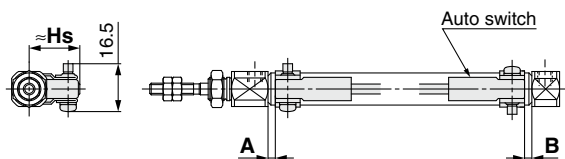
D-H7□

D-H7□W

D-H7BA

D-H7NF

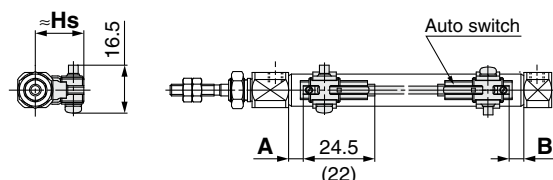
D-H7C



Reed auto switch

<Band mounting>

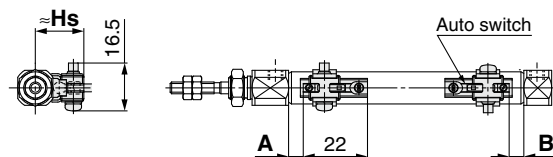
D-A9□



(): Dimension of the D-A96.

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

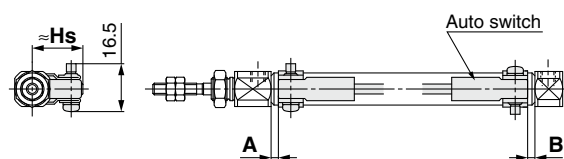
D-A9□V



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

D-C7□/C80

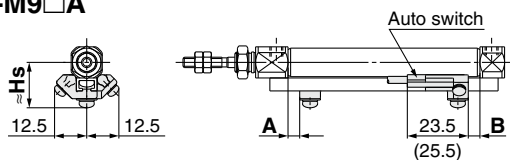
D-C73C□/C80C



Auto Switch Proper Mounting Position (Detection at stroke end) and Its Mounting Height

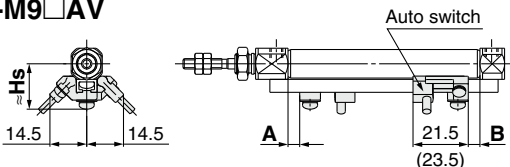
<Rail mounting>

D-M9□
D-M9□W
D-M9□A



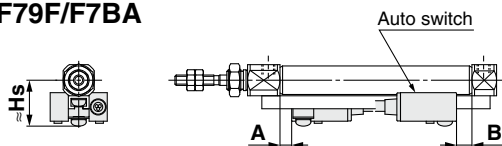
() : Dimension of the D-M9□A.

D-M9□V
D-M9□WV
D-M9□AV

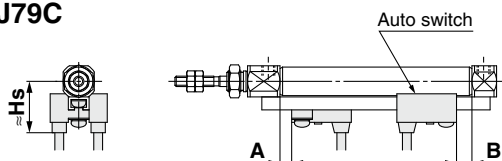


() : Dimension of the D-M9□AV.

D-F7□/J79
D-F7□W/J79W
D-F79F/F7BA

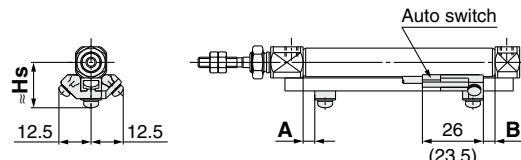


D-F7□V/F7□WV
D-F7BAV
D-J79C



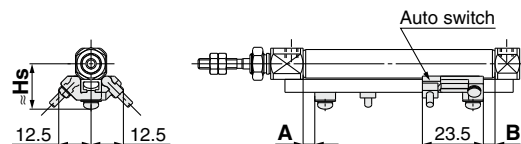
<Rail mounting>

D-A9□

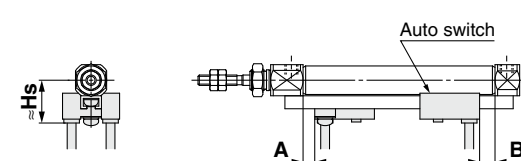


() : Dimension of the D-A96.

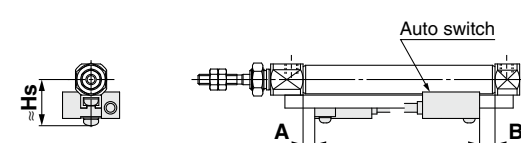
D-A9□V



D-A7□/A80
D-A73C/A80C
D-A79W



D-A7□H/A80H



Auto Switch Proper Mounting Position (Detection at stroke end) and Its Mounting Height

Auto Switch Proper Mounting Position

(mm)

Auto switch model Bore size (mm)	Band mounting							
	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-M9□AV		D-A9□ D-A9□V		D-C7□ D-C80 D-C73C D-C80C		D-H7□ D-H7C D-H7NF D-H7□W D-H7BA	
	A	B	A	B	A	B	A	B
10	(5) 6	(5) 6	(1) 2	(1) 2	2.5	2.5	1.5	1.5
16	(5.5) 6.5	(5.5) 6.5	(1.5) 2.5	(1.5) 2.5	3	3	2	2

* The values in () are measured from the end of the auto switch mounting bracket.

(mm)

Auto switch model Bore size (mm)	Rail mounting											
	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-M9□AV		D-A9□ D-A9□V		D-A7□ D-A80		D-A7□H/A80H D-A73C/A80C D-F7□/J79 D-F7□W/J79W D-F7□V/F7□WV D-F79F D-J79C D-F7BA D-F7BAV		D-F7NT		D-A79W	
	A	B	A	B	A	B	A	B	A	B	A	B
10	4.5	4.5	0.5	0.5	3	3	3.5	3.5	8.5	8.5	0.5	0.5
16	5	5	1	1	3.5	3.5	4	4	9	9	1	1

* Adjust the auto switch after confirming the operating condition in the actual setting.

Auto Switch Mounting Height

(mm)

Auto switch model Bore size (mm)	Band mounting					
	D-M9□ D-M9□W D-M9□A D-A9□	D-M9□V D-M9□WV D-M9□AV D-A9□V	D-C7□/C80 D-H7□/H7□W D-H7NF D-H7BA	D-C73C D-C80C	D-H7C	D-A7□ D-A80
	Hs	Hs	Hs	Hs	Hs	Hs
10	17	18	17	19.5	20	16.5
16	20.5	21	20.5	23	23.5	19.5

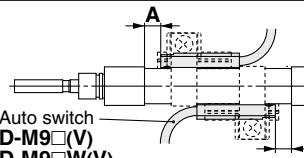
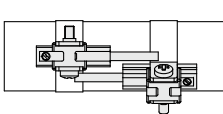
(mm)

Auto switch model Bore size (mm)	Rail mounting					
	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-M9□AV D-A9□ D-A9□V	D-A7□H/A80H D-F7□/J79 D-F7□W/J79W D-F7BA/F79F D-F7NT	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAV	D-J79C	D-A79W
	Hs	Hs	Hs	Hs	Hs	Hs
10	17.5	17.5	23.5	20	23	19
16	21	20.5	26.5	23	26	22

Minimum Stroke for Auto Switch Mounting

							(mm)
Auto switch mounting	Auto switch model	Number of auto switches					
		With 1 pc.	With 2 pcs.		With n pcs. (n: Number of auto switches)		
			Different surfaces	Same surface	Different surfaces	Same surface	
Band mounting	D-M9□ D-M9□W D-M9□A D-A9□	10	15 Note 1)	45 Note 1)	15 + 35 $\frac{(n-2)}{2}$ (n = 2, 4, 6...)	45 + 15 (n-2) (n = 2, 3, 4, 5...)	
	D-M9□V	5	15 Note 1)	35	15 + 35 $\frac{(n-2)}{2}$ (n = 2, 4, 6...)	35 + 25 (n-2) (n = 2, 3, 4, 5...)	
	D-M9□WV D-M9□AV	10	15 Note 1)	35	15 + 35 $\frac{(n-2)}{2}$ (n = 2, 4, 6...)	35 + 25 (n-2) (n = 2, 3, 4, 5...)	
	D-A9□V	5	10	35	10 + 35 $\frac{(n-2)}{2}$ (n = 2, 4, 6...)	35 + 25 (n-2) (n = 2, 3, 4, 5...)	
	D-C7□ D-C80	10	15	50	15 + 40 $\frac{(n-2)}{2}$ (n = 2, 4, 6...)	50 + 20 (n-2) (n = 2, 3, 4, 5...)	
	D-H7□/H7□W D-H7BA D-H7NF	10	15	60	15 + 45 $\frac{(n-2)}{2}$ (n = 2, 4, 6...)	60 + 22.5 (n-2) (n = 2, 3, 4, 5...)	
	D-C73C D-C80C D-H7C	10	15	65	15 + 50 $\frac{(n-2)}{2}$ (n = 2, 4, 6...)	50 + 27.5 (n-2) (n = 2, 3, 4, 5...)	
Rail mounting	D-M9□V	5	—	5	—	10 + 10 (n-2) (n = 4, 6...)	
	D-A9□V	5	—	10	—	10 + 15 (n-2) (n = 4, 6...)	
	D-M9□ D-A9□	10	—	10	—	15 + 15 (n-2) (n = 4, 6...)	
	D-M9□WV D-M9□AV	10	—	15	—	15 + 15 (n-2) (n = 4, 6...)	
	D-M9□W	15	—	15	—	20 + 15 (n-2) (n = 4, 6...)	
	D-M9□A	15	—	20	—	20 + 15 (n-2) (n = 4, 6...)	
	D-A7□/A80 D-A7□H/A80H D-A73C/A80C	5	—	10	—	15 + 10 (n-2) (n = 4, 6...)	
	D-A7□H D-A80H	5	—	10	—	15 + 15 (n-2) (n = 4, 6...)	
	D-A79W	10	—	15	—	10 + 15 (n-2) (n = 4, 6...)	
	D-F7□ D-J79	5	—	5	—	15 + 15 (n-2) (n = 4, 6...)	
	D-F7□V D-J79C	5	—	5	—	10 + 10 (n-2) (n = 4, 6...)	
	D-F7□W/J79W D-F7BA/F79F/F7NT	10	—	15	—	15 + 20 (n-2) (n = 4, 6...)	
	D-F7□WV D-F7BAV	10	—	15	—	10 + 15 (n-2) (n = 4, 6...)	

Note 1) Auto switch mounting

Auto switch model	With 2 auto switches	
	Different surfaces Note 1)	Same surface Note 1)
	 Auto switch D-M9□(V) D-M9□W(V) D-M9□A(V) The proper auto switch mounting position is 5.5 mm inward from the switch holder edge. The above A and B indicate values for band mounting in the table of P.10.	 The auto switch is mounted by slightly displacing it in a direction (cylinder tube circumferential exterior) so that the auto switch and lead wire do not interfere with each other.
D-M9□/M9□W/M9□A	Less than 20 stroke Note 2)	Less than 55 stroke Note 2)
D-A90/A93	—	Less than 50 stroke Note 2)

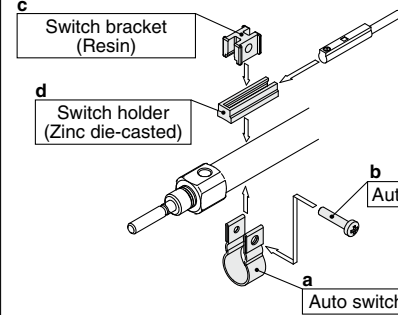
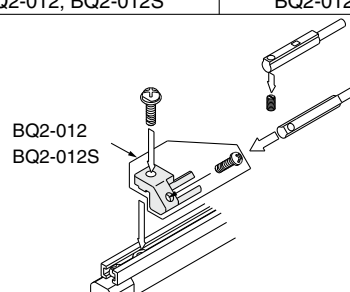
Note 2) Minimum stroke for auto switch mounting in styles other than those mentioned in Note 1.

Operating Range

Auto switch model		Bore size (mm)	
		10	16
Band mounting	D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	2.5	3
	D-A9□	6	7
	D-C7□/C80/C73C/C80C	7	7
	D-H7□/H7□W D-H7BA/H7NF	4	4
	D-H7C	8	9
Rail mounting	D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	3	3.5
	D-A9□/A9□V	6	6.5
	D-A7□/A80/A7H/A80H D-A73C/A80C	8	9
	D-A79W	11	13
	D-F7□/J79/F7□W/J79W D-F7□V/F7□WV/F79F D-J79C/F7BA/F7BAV D-F7NT	5	5

* Values which include hysteresis are for guideline purposes only, they are not a guarantee (assuming approximately ±30% dispersion) and may change substantially depending on the ambient environment.

Auto Switch Mounting Brackets/Part No.

Auto switch mounting	Auto switch model	Bore size (mm)	
		10	16
Band mounting	D-M9□ D-M9□V D-M9□W D-M9□WV D-A9□ D-A9□V	Note 1) BJ6-010	Note 1) BJ6-016
	D-M9□A D-M9□AV	Note 2) BJ6-010S	Note 2) BJ6-016S
	 ① BJ2-□□□: A set of "a" and "b" ② BJ□-1: A set of "c" and "d" BJ4-1 (Switch bracket: White) BJ5-1 (Switch bracket: Transparent)		
Rail mounting	D-C7□/C80 D-C73C/C80C D-H7□/H7□W D-H7BA/H7NF	BJ2-010	BJ2-016
	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A Note 4) D-M9□AV Note 4) D-A9□ D-A9□V	Note 3), Note 4) BQ2-012, BQ2-012S	Note 3), Note 4) BQ2-012, BQ2-012S
			

Note 1) Set part number which includes the auto switch mounting band (BJ2-□□□) 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 auto switch mounting band (BJ2-□□□S) and the holder kit (BJ4-1/Switch bracket: White).

Avoid the indicator LED for mounting the switch bracket. As the indicator LED is projected from the switch unit, indicator LED may be damaged if the switch bracket is fixed on the indicator LED.

Note 3) When the cylinder is shipped, the auto switch mounting bracket and the auto switch will be included.

Note 4) For D-M9□A(V), order the BQ2-012S, which uses stainless steel mounting screws.

[Stainless Steel Mounting Screw]

The following stainless steel mounting screw kit is available. Use it in accordance with the operating environment. (Since the auto switch mounting bracket is not included, order it separately.)

BBA4: For D-C7/C8/H7 types

Note 5) Refer to page 1358 in Best Pneumatics No. 2 for details on the BBA4.

The above stainless steel screws are used when a cylinder is shipped with the D-H7BA auto switch. When only an auto switch is shipped independently, the BBA4 is attached.

[Reference] Auto switch mounting brackets using stainless steel screws are available for stainless steel cylinder CJ5.

Auto Switch Mounting Brackets for CJ5/Part No.

Bore size (mm)	Auto switch mounting bracket part no.	Note
10	BJ2-010S	Stainless steel mounting screw
16	BJ2-016S	

Auto Switch Mounting 4

Other than the applicable auto switches listed in “How to Order”, the following auto switches are mountable.

Refer to pages 1263 to 1371 in Best Pneumatics No. 2 for detailed specifications.

Type	Mounting	Model	Electrical entry	Features
Solid state	Band mounting	D-H7A1/H7A2/H7B	Grommet (In-line)	—
		D-H7NW/H7PW/H7BW		Diagnostic indication (2-color indication)
	Rail mounting	D-F79/F7P/J79		—
		D-F79W/F7PW/J79W		Diagnostic indication (2-color indication)
		D-F7NV/F7PV/F7BV	Grommet (Perpendicular)	—
		D-F7NWV/F7BWV		Diagnostic indication (2-color indication)
Reed	Band mounting	D-C73/C76	Grommet (In-line)	—
		D-C80		Without light
	Rail mounting	D-A73H/A76H		—
		D-A80H		Without light
		D-A73	Grommet (Perpendicular)	—
		D-A80		Without light

* With pre-wired connector is also available for solid state auto switches. For details, refer to pages 1328 and 1329 in Best Pneumatics No. 2.

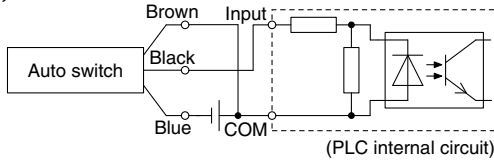
* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H) are also available. For details, refer to page 1290 in Best Pneumatics No. 2.

Prior to Use

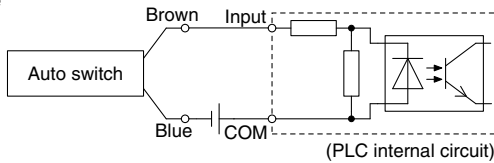
Auto Switch Connection and Example

Sink Input Specifications

3-wire, NPN

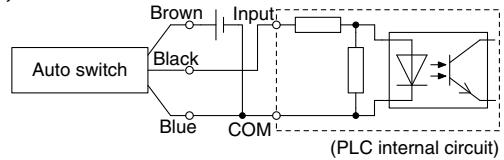


2-wire

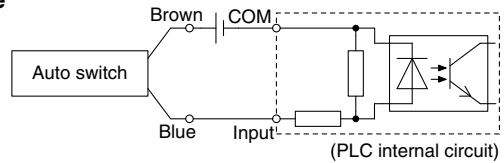


Source Input Specifications

3-wire, PNP



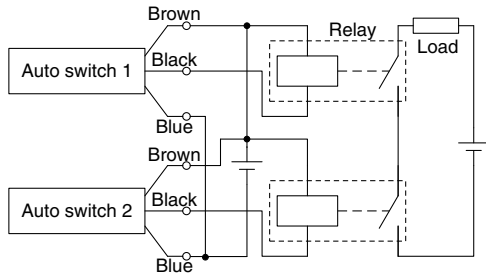
2-wire



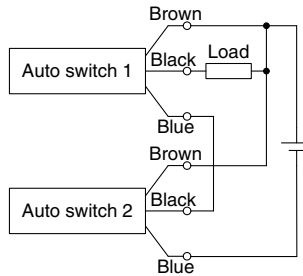
Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

Example of AND (Series) and OR (Parallel) Connection

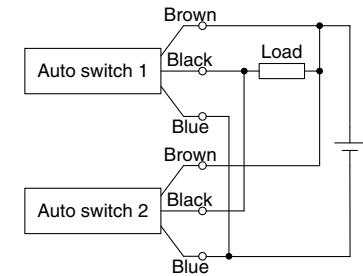
3-wire, AND connection for NPN output (Using relays)



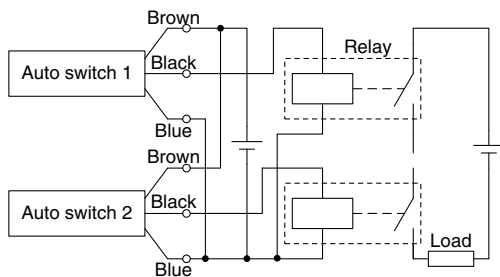
(Performed with auto switches only)



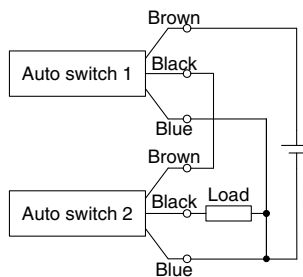
3-wire, OR connection for NPN output



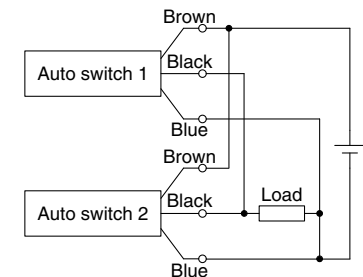
3-wire, AND connection for PNP output (Using relays)



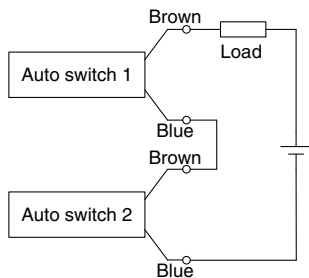
(Performed with auto switches only)



3-wire, OR connection for PNP output



2-wire, AND connection

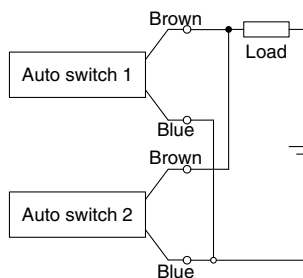


When two auto switches are connected in series, malfunction may occur because the load voltage will decrease in the ON state. The indicator lights will light up when both of the auto switches are in the ON state.

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

Example: Power supply voltage 24 VDC
Auto switch internal voltage drop 4 V

2-wire, OR connection



(Solid state)

When two auto switches are connected in parallel, malfunction may occur because the load voltage will increase in the OFF state.

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

Example: Load impedance 3 kΩ
Auto switch leakage current 1 mA

(Reed)

Because there is no leakage current, the load voltage will not increase in the OFF state. However, depending on the number of auto switches in the ON state, the indicator lights may sometimes grow dim or not light up, due to the dispersion and reduction of the current flowing to the auto switches.



Series CJ2

Specific Product Precautions

Be sure to read before handling. Refer to back cover for Safety Instructions, “Handling Precautions for SMC Products” (M-E03-3) and the Operation Manual for Actuator Precautions and Auto Switch Precautions. Please download it via our website, <http://www.smcworld.com>

Mounting

Warning

1. Use within the specified cylinder speed and kinetic energy ranges.

Otherwise, cylinder and seal damage may occur.

2. Do not apply excessive lateral load to the piston rod.

Easy checking method

Minimum operating pressure after the cylinder is mounted to the equipment (MPa) = Minimum operating pressure of cylinder (MPa) + {Load weight (kg) x Friction coefficient of guide/Sectional area of cylinder (mm²)}

If smooth operation is confirmed within the above value, the load on the cylinder is the resistance of the thrust only and it can be judged as having no lateral load.

Caution

1. During installation, secure the rod cover and tighten by applying an appropriate tightening force to the retaining nut or to the rod cover body.

If the head cover is secured or the head cover is tightened, the cover could rotate, leading to the deviation.

2. Tighten the retaining screws to an appropriate tightening torque within the range given below.

ø10: 5.9 to 6.4 N·m, ø16: 10.8 to 11.8 N·m

3. To remove and install the retaining ring for the knuckle pin or the clevis pin, use an appropriate pair of pliers (tool for installing a type C retaining ring). In particular, use a pair of ultra-mini pliers for removing and installing the retaining ring on the ø10 cylinder.

4. In the case of auto switch rail mounting type, do not remove the rail that is mounted. Because retaining screws extend into the cylinder, this could lead to an air leak.

5. Please contact SMC when the stroke exceeds 100 mm for the axial foot mounting type.

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.



Caution:

Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.



Warning:

Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.



Danger :

Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

- *1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots – Safety.
etc.



Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.



Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) Vacuum pads are excluded from this 1 year warranty.

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.



Safety Instructions

Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.

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D-DN

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