Air Cylinder

Series CJ2

ø6, ø10, ø16

Improved wear resistance

The bearing portions of the rod cover and the clevis have been improved in wear resistance to ensure the longevity of the cylinder.

Easy installation

The installation is simple because a tool can be placed directly over the cover for installation.

High speed actuation possible

Either the rubber bumper or the air cushion can be selected according to the drive speed conditions. Therefore, it can support high speed drives.

- Rubber bumper·····50 to 750 mm/s (Standard equipment)
- Air cushion·····50 to 1000 mm/s

Reduced piston rod deflection

The clearance between the bushing and the piston rod has been decreased to achieve higher accuracy, thus decreasing the deflection of the piston rod.

Series Variations

Series	Action	Rod	Basic	Standard variations: Built-in magnet	Standard variations: With air cushion	Standard variations: Clean series	Standard variations: Copper and fluorine-free	Bore size (mm)	Page
Standard *Series CJ2*	Double acting	Single rod	●	●	●	●	●	6, 10, 16	42
		Double rod	●	●	●	●	●		52
	Single acting	Single rod, Spring return/ Spring extend	●	●			●		60
Non-rotating Rod *Series CJ2K*	Double acting	Single rod	●	●			●	10, 16	68
	Single acting	Single rod, (Spring return/ Spring extend)	●	●			●		73
Built-in Speed Controller *Series CJ2Z*	Double acting	Single rod	●	●			●		80
		Double rod	●	●			●		85
Low Friction *Series CJ2Q*	Double acting	Single rod	●	●			●		90
Direct Mount *Series CJ2R*	Double acting	Single rod	●	●		●	●		94
	Single acting	Single rod, (Spring return/ Spring extend)	●	●			●		98
Direct Mount, Non-Rotating Rod *Series CJ2RK*	Double acting	Single rod	●	●			●		102
	Single acting	Single rod, (Spring return/ Spring extend)	●	●			●		106
End lock cylinder *Series CBJ2*	Double acting	Single rod	●	●				16	110

Low-speed cylinder *Series CJ2X*	Double acting	Single rod	**Refer to Best Pneumatics No. 3.**

Combinations of Standard Products and Made

Series ***CJ2***

● : Standard
◎ : Made to Order specifications
○ : Special product (Contact SMC for details.)
— : Not available

Symbol	Specification	Applicable bore size	CJ2 (Standard)				CJ2K (Non-rotating)		
			Double acting		Single acting		Double acting	Single acting	
			Single rod	Double rod	Single rod (spring return)	Single rod (spring extend)	Single rod	Single rod (spring return)	Single rod (spring extend)
			ø6 to 16				ø10, ø16		
Standard	**Standard**	ø6 to ø16	●	●	●	●	●	●	●
D	**Built-in magnet**		●	●	●	●	●	●	●
CJ2□-□A	**Air cushion**	ø10, ø16	●	●	—	—	—	—	—
10-, 11-	**Clean series** (4)	ø6 to ø16	●	● (3)	○	○	—	—	—
20-	**Copper and Fluorine-free** (5)		●	●	●	●	●	●	●
XB6	**Heat-resistant cylinder (–10 to 150 °C)** (6)(7)	ø6 to ø16	◎	◎	○	○	○	○	○
XB7	**Cold-resistant cylinder** (6)(7)		◎	◎	○	○	○	○	○
XB9	**Low-speed cylinder (10 to 50 mm/s)** (7)		◎	—	—	—	—	—	—
XB13	**Low-speed cylinder (5 to 50 mm/s)** (7)		◎	—	—	—	—	—	—
XC3	**Special port position** (5)(7)	ø10, ø16	◎	○	—	—	◎	—	—
XC8	**Adjustable stroke cylinder/Adjustable retraction type** (5)(7)		◎	—	○	○	○	○	○
XC9	**Adjustable stroke cylinder/Adjustable extension type** (5)(7)		◎	—	○	—	○	○	—
XC10	**Dual stroke cylinder/Double rod type** (7)		◎	—	○	○	◎	○	○
XC11	**Dual stroke cylinder/Single rod type** (7)		◎	—	—	—	○	—	—
XC22	**Fluororubber seal** (7)	ø6 to ø16	◎	◎	◎	◎	◎	○	○
XC51	**With hose nipple**		◎	◎	◎	◎	◎	◎	◎
X339	**Same as CJ1 mounting dimensions**	ø10, ø16	—	◎ (1)	—	◎ (2)	—	—	◎ (2)
X773	**Short mounting pitch**	ø6	—	—	◎	—	—	—	—

Note 1) ø10 foot style only.
Note 2) ø 10 and ø16 double clevis style.
Note 3) ø 10 and ø16 only.
Note 4) Mounting style: Not compatible with the clevis style. A switch is available in the band mounting style only.
Note 5) A switch is available in the band mounting style only.
Note 6) Not compatible with cylinders with a switch.
Note 7) Not compatible with cylinders with a air cushion.
Note 8) Available only for locking at head end.
Note 9) Refer to Best Pneumatics No. 3 for low-speed cylinders.
Note 10) Available only for locking on rod side.

	CJ2Z (Built-in speed controller)		CJ2Q (Low friction)	CJ2R (Direct mount)			CJ2RK (Direct mount, Non-rotating)			CBJ2 (With end lock)	CJ2X Low-speed cylinder (9)
	Double acting		Double acting	Double acting	Single acting		Double acting	Single acting		Double acting	Double acting
	Single rod	Double rod	Single rod	Single rod	Single rod (spring return)	Single rod (spring extend)	Single rod	Single rod (spring return)	Single rod (spring extend)	Single rod	Single rod
	ø10, ø16									ø16	ø10, ø16
	●	●	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●	●	●
	—	—	—	○	—	—	—	—	—	—	—
	—	—	—	●	○	○	—	—	—	○ (8)	—
	●	●	—	●	●	●	●	●	●	○	—
	○	○	—	○	○	○	○	○	○	○	—
	○	○	—	○	○	○	○	○	○	—	—
	—	—	—	—	—	—	—	—	—	○	—
	—	—	—	—	—	—	—	—	—	—	—
	—	—	○	○	—	—	○	—	—	○	○
	○	—	—	○	○	○	○	○	○	—	—
	—	—	○	○	○	—	○	○	—	○ (10)	—
	○	—	○	○	○	○	○	○	○	○	—
	—	—	—	○	—	—	○	—	—	○ (10)	—
	○	○	—	◎	○	○	○	○	○	○	—
	◎	◎	◎	◎	◎	◎	◎	◎	◎	—	—
	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—

Air Cylinder: Standard Type
Double Acting, Single Rod
Series CJ2
ø6, ø10, ø16

How to Order

Bore size

6	6 mm
10	10 mm
16	16 mm

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
D	Double clevis style (Except ø6)

Cylinder standard stroke (mm)
Refer to the standard stroke table on page 43.

Cushion

Nil	Rubber bumper
A	Air cushion (Except ø6)

Built-in Magnet Cylinder Model

Suffix the symbol "-A" (Rail mounting style) or "-B" (Band mounting style) to the end of part number for cylinder with auto switch.

Example	Rail mounting style	CDJ2B10-45-A
	Band mounting style	CDJ2B16-60-B

∗ For rail mounting style, screws and nuts for 2 pcs switches come with the rail.
∗ Refer to page 123 for switch mounting brackets.

CJ2 L 16 – 60 A □ – □

With auto switch **CDJ2 L 16 – 60 A □ – M9BW □ – □**

With auto switch
(Built-in magnet)

Band mounting style

Head cover port location

Symbol \ Bore size (mm)	ø6	ø10, ø16
Nil	—	Perpendicular to axis
R	Axial	Axial

∗ For configuration, refer to page 43.
∗ Double clevis is only available for being perpendicular to axis.

Auto switch
∗ For the applicable auto switch model, refer to the table below.
∗ If a built-in magnet cylinder without an auto switch is required, refer to the model of built-in magnet cylinder.

Number of auto switches

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

Made to Order
Refer to page 43 for details.

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Band mounting (ø6, ø10, ø16)	Auto switch model: Rail mounting (ø10, ø16) Perpendicular	Auto switch model: Rail mounting (ø10, ø16) In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	**M9N**	—	—	●	●	●	○	—	○	IC circuit	Relay, PLC
							—	**F7NV**	**F79**	●	—	●	○	—	○		
				3-wire (PNP)			**M9P**	—	—	●	●	●	○	—	○		
							—	**F7PV**	**F7P**	●	—	●	○	—	○		
				2-wire	12 V		**M9B**	—	—	●	●	●	○	—	○	—	
							—	**F7BV**	**J79**	●	—	●	○	—	○		
		Connector					**H7C**	**J79C**	—	●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	5 V, 12 V		**M9NW**	—	—	●	●	●	○	—	○	IC circuit	
							—	**F7NWV**	**F79W**	●	—	●	○	—	○		
				3-wire (PNP)			**M9PW**	—	—	●	●	●	○	—	○		
							—	—	**F7PW**	●	—	●	○	—	○		
				2-wire	12 V		**M9BW**	—	—	●	●	●	○	—	○	—	
							—	**F7BWV**	**J79W**	●	—	●	○	—	○		
	Water resistant (2-color indication)						**H7BA**	**F7BAV**	**F7BA**	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5 V, 12 V		**H7NF**	—	**F79F**	●	—	●	○	—	○	IC circuit	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96**	—	**A76H**	●	—	●	—	—	—	IC circuit	—
				2-wire	—	200 V	—	—	**A72**	**A72H**	●	—	●	—	—	—	—	Relay, PLC
					24V	12 V	100 V	—	**A73**	**A73H**	●	—	●	●	—	—		
								—	—	**A93**	●	—	●	—	—	—		
			No				100 V or less	**A90**	**A80**	**A80H**	●	—	●	—	—	—	IC circuit	
		Connector	Yes				—	**C73C**	**A73C**	—	●	—	●	●	●	—	—	
			No				24 V or less	**C80C**	**A80C**	—	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color indication)	Grommet	Yes			—	—	—	**A79W** **	—	●	—	●	—	—	—	—	

∗ 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, refer to page 123 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
∗ Band mounting style is not available for D-A9□V/M9□V/M9□WV and D-M9□A(V)L types.
∗∗ "D-A79W" cannot be mounted on bore size ø10 cylinder with air cushion.

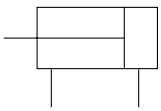
∗ Solid state auto switches marked with "○" are produced upon receipt of order.
∗ D-A9□/M9□/M9□W/A7□□/A80□/F7□□/J7□□ auto switches are shipped together (not assembled). (However, when D-A9□/M9□/M9□W types are selected, only auto switch mounting brackets are assembled before being shipped.)
∗ When D-A9□(V)/M9□(V)/M9□W(V) types are mounted on a ø10 or ø16 rail, order auto switch mounting brackets separately. Refer to page 123 for details.

Specifications

Bore size (mm)		6	10	16
Action		Double acting, Single rod		
Fluid		Air		
Proof pressure		1 MPa		
Maximum operating pressure		0.7 MPa		
Minimum operating pressure	Rubber bumper	0.12 MPa	0.06 MPa	
	Air cushion	—	0.1 MPa	
Ambient and fluid temperature		Without auto switch: −10°C to 70°C, With auto switch: −10°C to 60°C *		
Cushion		Rubber bumper/Air cushion		
Lubrication		Not required (Non-lube)		
Stroke length tolerance		$^{+1.0}_{0}$		
Piston speed	Rubber bumper	50 to 750 mm/s		
	Air cushion	50 to 1000 mm/s		
Allowable kinetic energy	Rubber bumper	0.012J	0.035J	0.090J
	Air cushion (Effective cushion length)	—	0.07J (9.4 mm)	0.18J (9.4 mm)

* No freezing

JIS Symbol
Double acting, Single rod



Standard Stroke

(mm)

Bore size	Standard stroke
6	15, 30, 45, 60
10	15, 30, 45, 60, 75, 100, 125, 150
16	15, 30, 45, 60, 75, 100, 125, 150, 175, 200

* Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Head Cover Port Location

Either perpendicular to the cylinder axis or in-line with the cylinder axis is available for basic style. (ø6 is available only as in-line style.)

Axial

Perpendicular

Refer to pages 117 to 123 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket part no.

Made to Order Specifications

(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
—XA□	Change of rod end shape
—XB6	Heat resistant cylinder (150°C) * Not available with switch & with air cushion
—XB7	Cold resistant cylinder * Not available with switch & with air cushion
—XB9	Low speed cylinder (10 to 50 mm/s) * Not available with air cushion
—XB13	Low speed cylinder (5 to 50 mm/s) * Not available with air cushion
—XC3	Special port location * Not available with air cushion
—XC8	Adjustable stroke cylinder/Adjustable extension type
—XC9	Adjustable stroke cylinder/Adjustable retraction type
—XC10	Dual stroke cylinder/Double rod type
—XC11	Dual stroke cylinder/Single rod type
—XC22	Fluororubber seals * Not available with air cushion
—XC51	With hose nipple

Mounting Style and Accessory/For details, refer to page 51.

Mounting		Basic style	Axial foot style	Rod side flange style	Double * clevis style
Standard equipment	Mounting nut	●	●	●	—
	Rod end nut	●	●	●	●
	Clevis pin	—	—	—	●
Option	Single knuckle joint	●	●	●	●
	Double knuckle joint *	●	●	●	●
	T-bracket	—	—	—	●

* Pin and snap ring are shipped together with double clevis and double knuckle joint.

Mounting Bracket Part No.

Mounting bracket	Bore size (mm)		
	6	10	16
Foot bracket	CJ-L006B	CJ-L010B	CJ-L016B
Flange bracket	CJ-F006B	CJ-F010B	CJ-F016B
T-bracket *	—	CJ-T010B	CJ-T016B

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

Mass

(g)

Bore size (mm)		6	10	16
Basic mass *		15	24	55
Additional mass per each 15 mm of stroke		2	4	6.5
Mounting bracket mass	Axial foot style	8	8	20
	Rod side flange style	5	5	15
	Double clevis style (With pin) *	–	4	10
Accessory bracket	Single knuckle joint	–	16	22
	Double knuckle joint (With pin)	–	24	19.5
	T-bracket	–	32	50

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

** Mounting nut is not attached to the double clevis style, so the mounting nut mass is already subtracted.

Calculation: (Example) **CJ2L10-45**

- Basic mass ····· 24 (ø10)
- Additional mass ····· 4/15 stroke
- Cylinder stroke ····· 45 stroke
- Mounting bracket mass ·· 8 (Axial foot style)

24 + 4/15 x 45 + 8 = 44 g

⚠Precautions

Be sure to read before handling.
Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Mounting

⚠Caution

1. During installation, secure the rod cover and tighten by applying an appropriate tightening force to the retaining but 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.
   ø6: 2.1 to 2.5 N·m, 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 style, 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 style.

Clean Series

10-CJ2 | Mounting style | Bore size – Stroke | Head cover port location

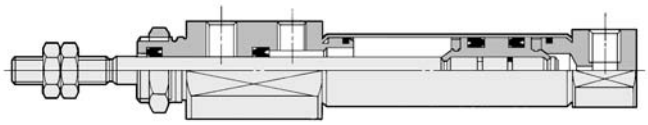
• **Clean Series**

Air cylinder which is applicable for the system which discharges leakage from the rod section directly into the outside of clean room by relief port and making an actuator's rod section having a double seal construction.

Specifications

Action		Double acting, Single rod
Bore size (mm)		6, 10, 16
Maximum operating pressure		0.7 MPa
Minimum operating pressure	**ø6**	0.14 MPa
	ø10, ø16	0.08 MPa
Cushion		Rubber bumper/Air cusion
Standard stroke (mm)		Same as standard type. (Refer to page 43.)
Auto switch		Mountable (Band mounting style)
Mounting		Basic style, Axial foot style, Rod side flange style

Construction



For details, refer to the separate catalog "Pneumatic Clean Series".

Copper and Fluorine-free Cylinder (For CRT manufacturing process)

20-CJ2 | Mounting style | Bore size – Stroke | Head cover port location

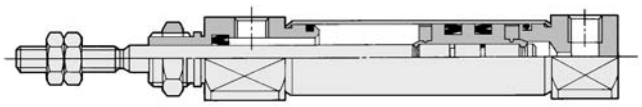
• **Copper and fluorine-free**

Eliminates the effects by copper based ions and fluorine based resins, etc. over the color cathode ray tube.
Making copper based materials into electroless nickel plated treatment or changing them to the non-copper materials in order to prevent copper ions from generating.

Specifications

Action		Double acting, Single rod
Bore size (mm)		6, 10, 16
Maximum operating pressure		0.7 MPa
Minimum operating pressure	**ø6**	0.12 MPa
	ø10, ø16	0.06 MPa
Cushion		Rubber bumper (Standard equipment)
Standard stroke (mm)		Same as standard type. (Refer to page 43.)
Auto switch		Mountable (Band mounting style)
Mounting		Basic style, Axial foot style, Rod side flange style, Double clevis style (Except ø6)

Construction



Low-speed Cylinder

CJ2 X | Mounting style | Bore size – Stroke

• **Low-speed Cylinder**

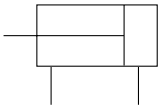
Smooth operation with a little sticking and slipping at low speed.
Can start smoothly with a little ejection even after being rendered for hours.

Specifications

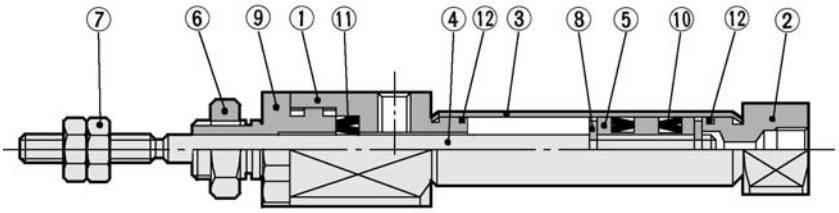
Action		Double acting, Single rod
Bore size (mm)		10, 16
Fluid		Air
Proof pressure		1.05 MPa
Maximum operating pressure		0.7 MPa
Minimum operating pressure		0.06 MPa
Ambient and fluid temperature		Without auto switch: –10 to 70°C With auto switch: –10 to 60°C (No freezing)
Cushion		Rubber bumper (Standard equipment)
Lubrication		Not required (Non-lube)
Stroke length tolerance		$^{+1.0}_{0}$
Piston speed		1 to 300 mm/s
Allowable kinetic energy	**ø10**	0.035 J
	ø16	0.090 J

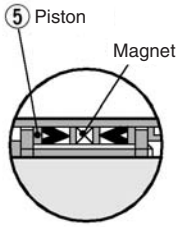
Refer to Best Pneumatics No. 3.

Construction (Not able to disassemble)



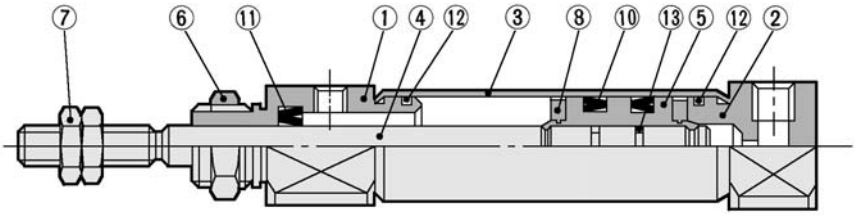
CJ2□6-R

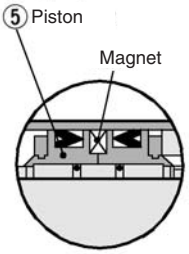




Piston construction when auto switch is mounted.

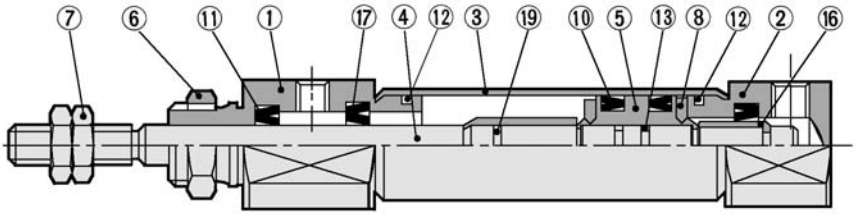
CJ2□10, CJ2□16

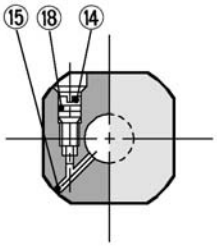




Piston construction when auto switch is mounted.

With air cushion





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**	Brass	
6	**Mounting nut**	Brass	Nickel plated
7	**Rod end nut**	Rolled steel	Nickel plated
8	**Bumper**	Urethane	
9*	**Seal retainer**	Aluminum alloy	Anodized
10	**Piston seal**	NBR	
11	**Rod seal**	NBR	
12	**Tube gasket**	NBR	
13	**Piston gasket**	NBR	

* Only for ø6

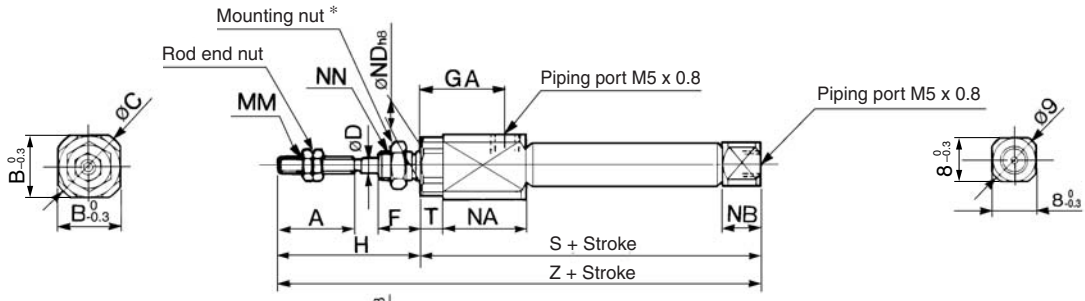
Dedicated for with Air Cushion Type

No.	Description	Material	Note
14	**Cushion needle**	Stainless steel	
15	**Steel balls**	Bearing steel	
16	**Cushion ring**	Brass	
17	**Check seal**	NBR	
18	**Needle seal**	NBR	
19	**Cushion ring gasket**	NBR	

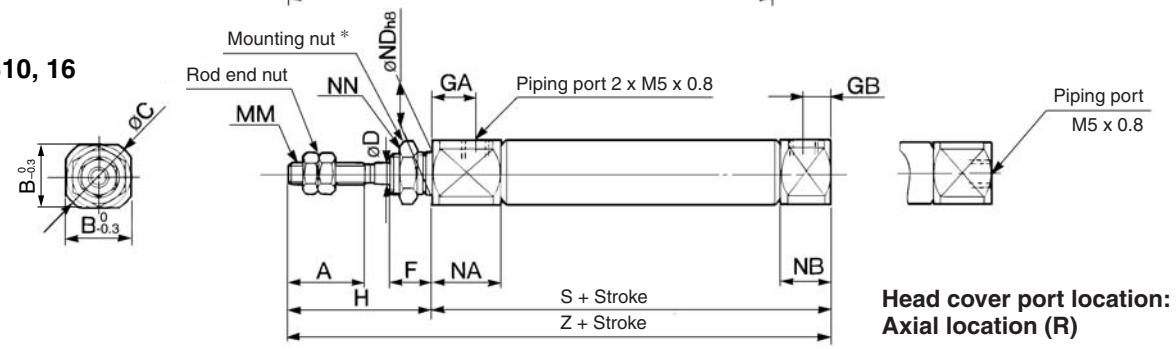
Basic Style (B)

CJ2B Bore size – Stroke Head cover port location

CJ2B6

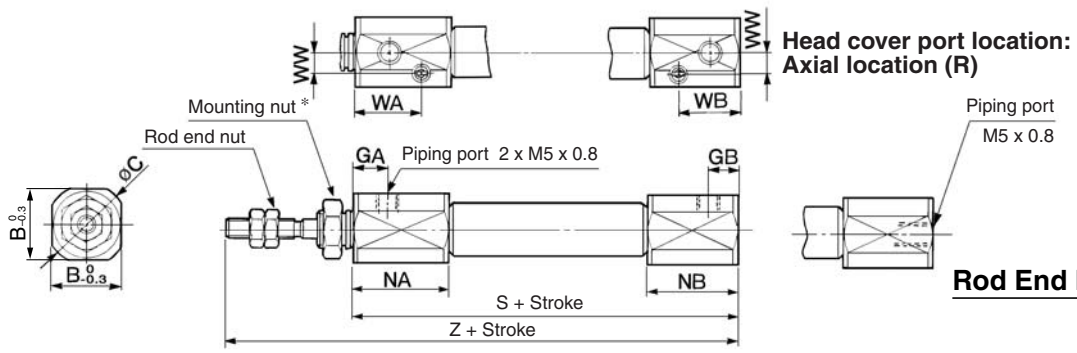


CJ2B10, 16

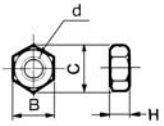


Head cover port location: Axial location (R)

With air cushion: CJ2B Bore size – Stroke A Head cover port location



Rod End Nut



Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-006A	6	5.5	6.4	M3 x 0.5	2.4
NTJ-010A	10	7	8.1	M4 x 0.7	3.2
NTJ-015A	16	8	9.2	M5 x 0.8	4

* For details of the mounting nut, refer to page 51.

(mm)

Bore size (mm)	A	B	C	D	F	GA	GB	H	MM	NA	NB	NDh8	NN	S	T	Z
6	15	12	14	3	8	14.5	–	28	M3 x 0.5	16	7	6 0 -0.018	M6 x 1.0	49	3	77
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

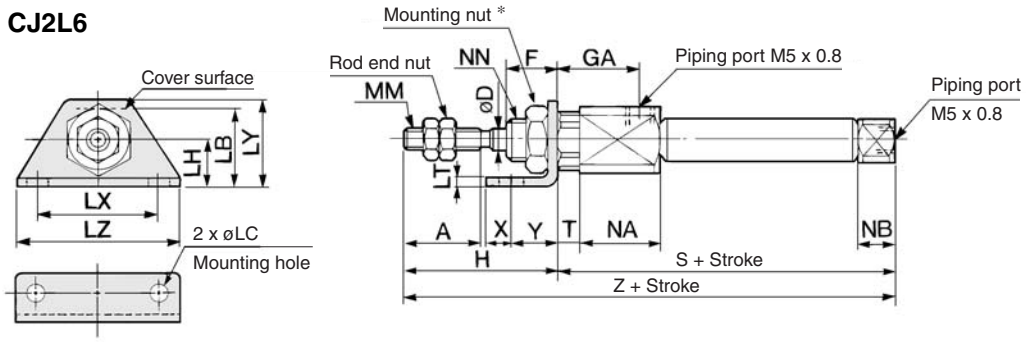
With Air Cushion/Dimensions other than the table below are the same as the table above. (mm)

Bore size (mm)	B	C	GA	GB	NA	NB	WA	WB	WW	S	Z
10	15	17	7.5	6.5	21	20	14.5	13.5	4.5	65	93
16	18.3	20	7.5	6.5	21	20	14.5	13.5	5.5	66	94

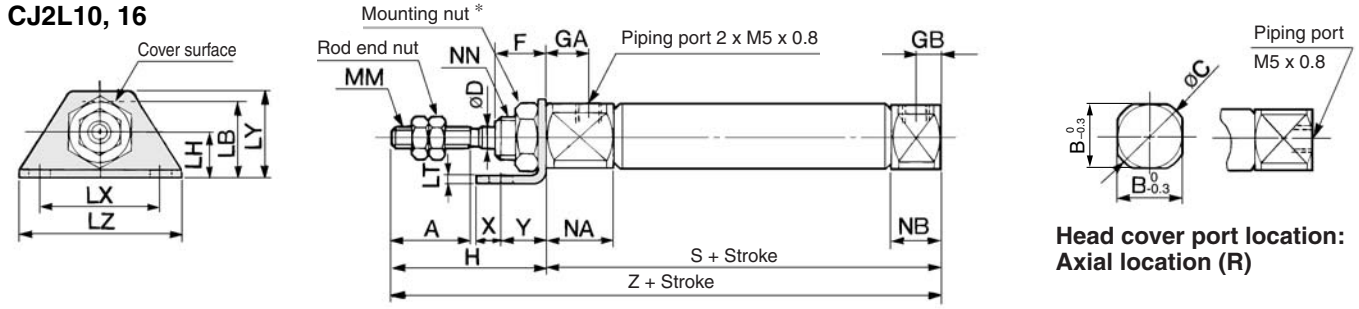
Axial Foot Style (L)

CJ2L Bore size – Stroke Head cover port location

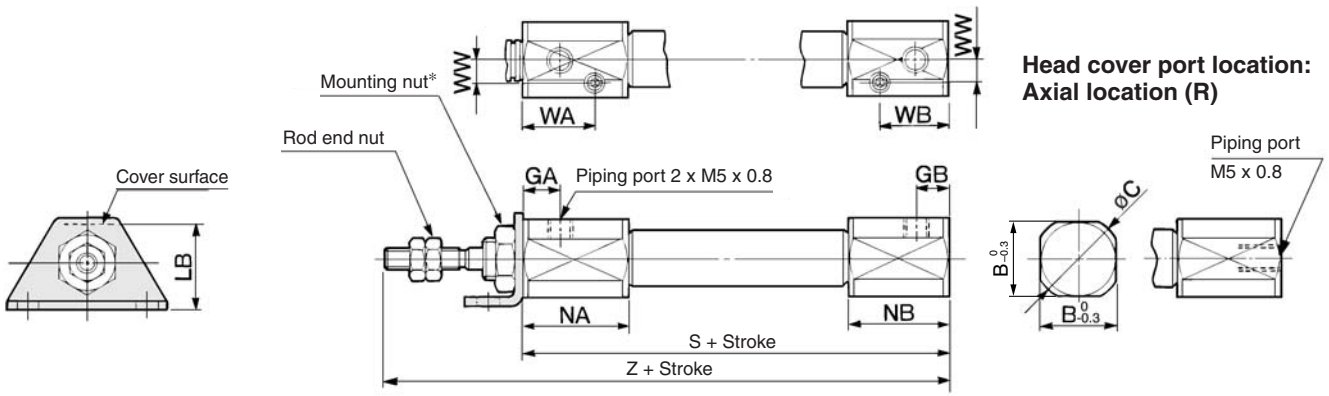
CJ2L6



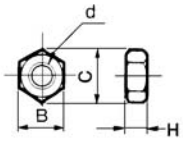
CJ2L10, 16



With air cushion: CJ2L Bore size – Stroke A Head cover port location



Rod End Nut



Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-006A	6	5.5	6.4	M3 x 0.5	2.4
NTJ-010A	10	7	8.1	M4 x 0.7	3.2
NTJ-015A	16	8	9.2	M5 x 0.8	4

∗ For details of the mounting nut, refer to page 51.

Bore size (mm)	A	B	C	D	F	GA	GB	H	LB	LC	LH	LT	LX	LY	LZ	MM	NA	NB	NN	S	T	X	Y	Z
6	15	12	14	3	8	14.5	–	28	15	4.5	9	1.6	24	16.5	32	M3 x 0.5	16	7	M6 x 1.0	49	3	5	7	77
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

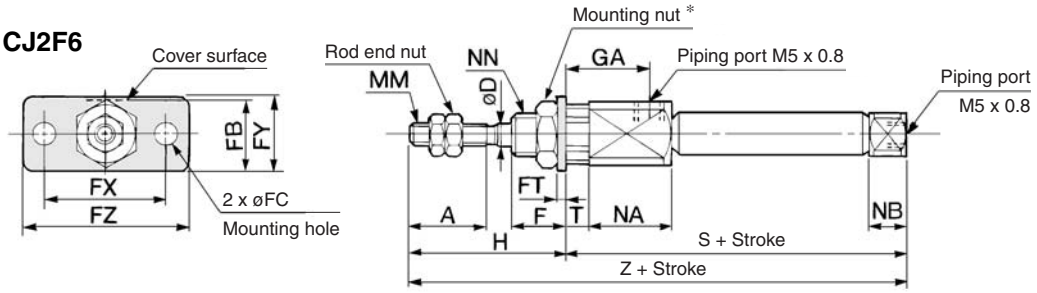
With Air Cushion/Dimensions other than the table below are the same as the table above. (mm)

Bore size (mm)	B	C	GA	GB	LB	NA	NB	WA	WB	WW	S	Z
10	15	17	7.5	6.5	16.5	21	20	14.5	13.5	4.5	65	93
16	18.3	20	7.5	6.5	23	21	20	14.5	13.5	5.5	66	94

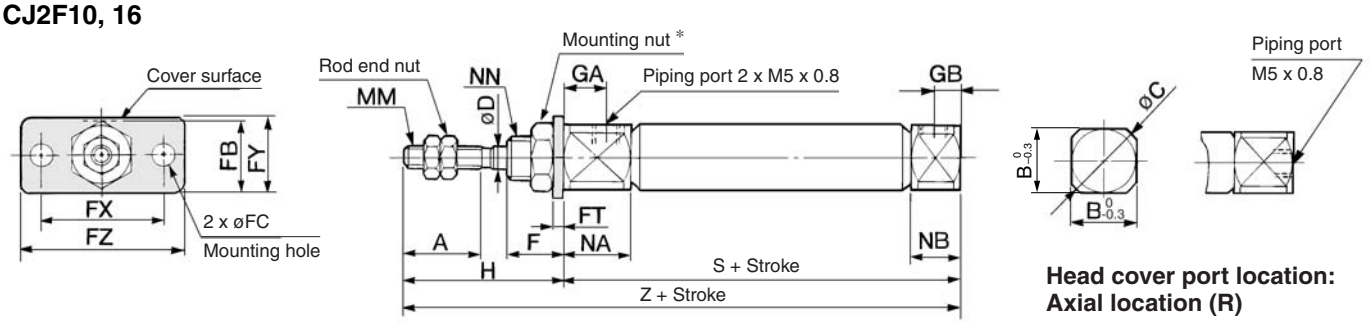
Rod Side Flange Style (F)

CJ2F Bore size – Stroke Head cover port location

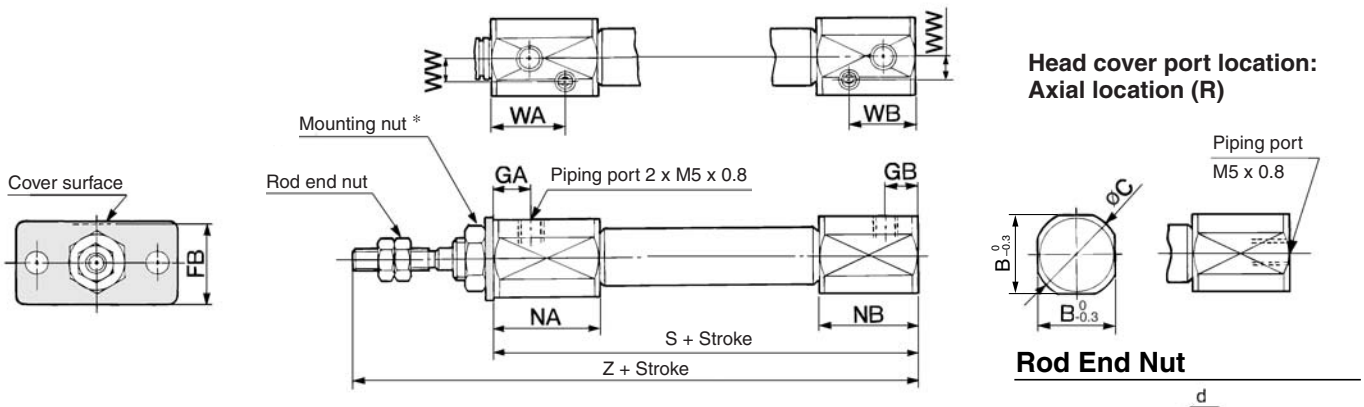
CJ2F6



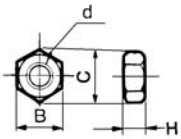
CJ2F10, 16



With air cushion: CJ2F Bore size – Stroke A Head cover port location



Rod End Nut



Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-006A	6	5.5	6.4	M3 x 0.5	2.4
NTJ-010A	10	7	8.1	M4 x 0.7	3.2
NTJ-015A	16	8	9.2	M5 x 0.8	4

∗ For details of the mounting nut, refer to page 51.

(mm)

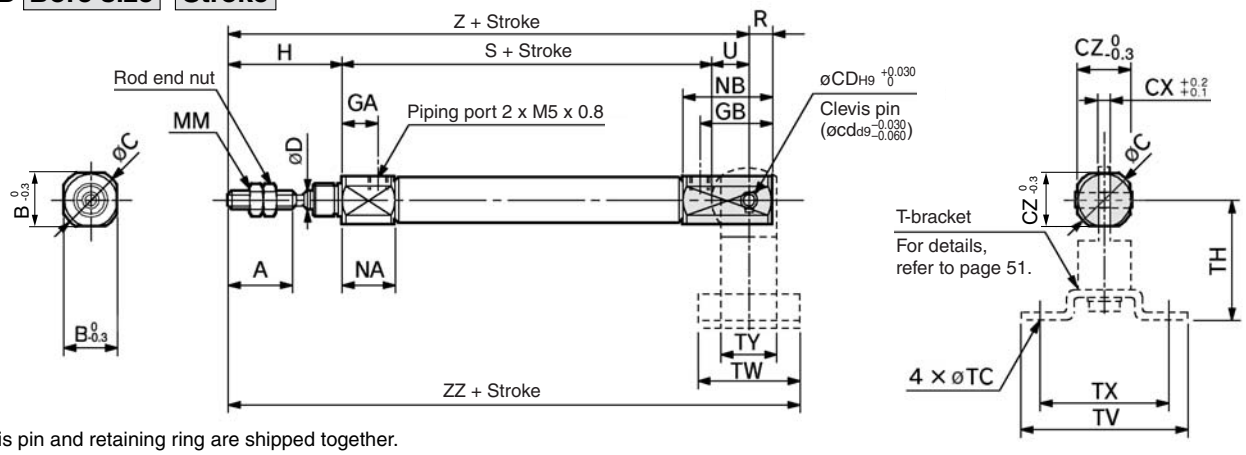
Bore size (mm)	A	B	C	D	F	FB	FC	FT	FX	FY	FZ	GA	GB	H	MM	NA	NB	NN	S	T	Z
6	15	12	14	3	8	13	4.5	1.6	24	14	32	14.5	–	28	M3 x 0.5	16	7	M6 x 1.0	49	3	77
10	15	12	14	4	8	13	4.5	1.6	24	14	32	8	5	28	M4 x 0.7	12.5	9.5	M8 x 1.0	46	—	74
16	15	18.3	20	5	8	19	5.5	2.3	33	20	42	8	5	28	M5 x 0.8	12.5	9.5	M10 x 1.0	47	—	75

With Air Cushion/Dimensions other than the table below are the same as the table above. (mm)

Bore size (mm)	B	C	FB	GA	GB	NA	NB	WA	WB	WW	S	Z
10	15	17	14.5	7.5	6.5	21	20	14.5	13.5	4.5	65	93
16	18.3	20	19	7.5	6.5	21	20	14.5	13.5	5.5	66	94

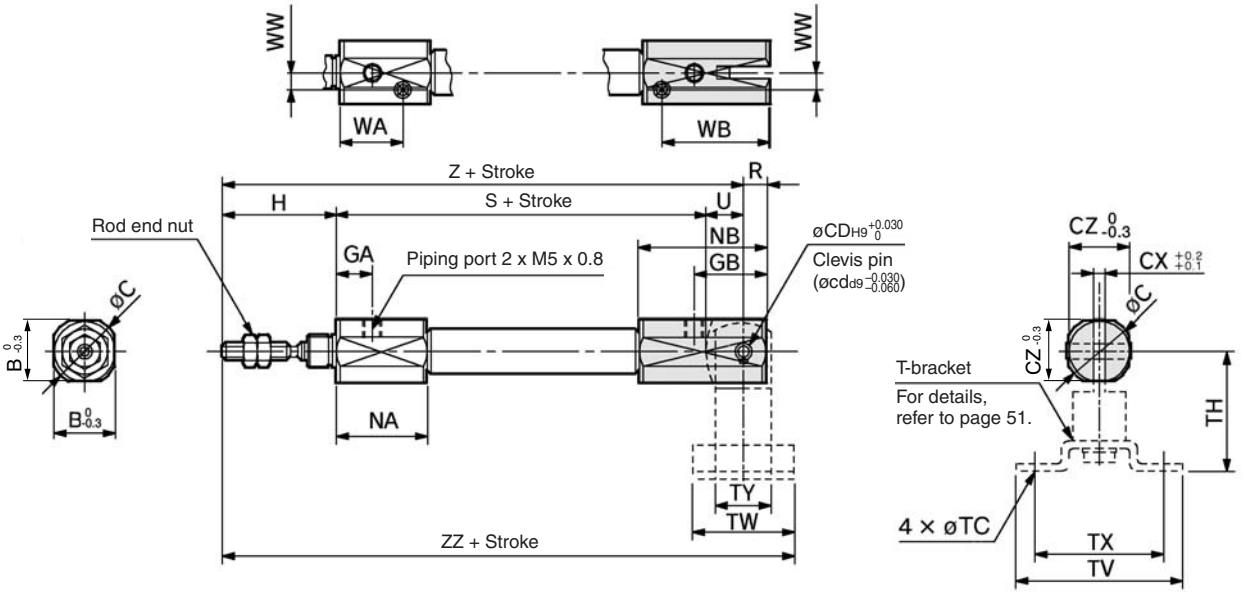
Double Clevis Style (D)

CJ2D Bore size – Stroke



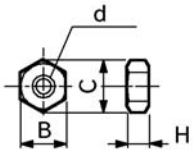
∗ Clevis pin and retaining ring are shipped together.

With air cushion: CJ2D Bore size – Stroke A



∗ Clevis pin and retaining ring are shipped together.

Rod End Nut



Material: Iron

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

(mm)

Bore size (mm)	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	93
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	99

T-bracket Dimensions

(mm)

Bore size (mm)	TC	TH	TV	TW	TX	TY
10	4.5	29	40	22	32	12
16	5.5	35	48	28	38	16

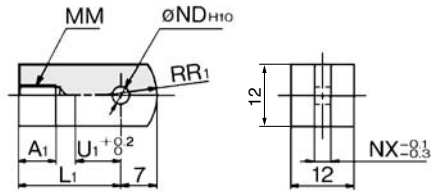
With Air Cushion/Dimensions other than the table below are the same as the table above.

(mm)

Bore size (mm)	B	C	CZ	GA	GB	NA	NB	S	WA	WB	WW	Z	ZZ
10	15	17	15	7.5	19.5	21	33	65	14.5	26.5	4.5	101	112
16	18.3	20	18.3	7.5	24.5	21	38	66	14.5	31.5	5.5	104	118

Accessory Bracket Dimensions (mm)

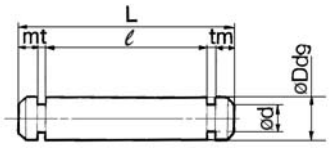
Single Knuckle Joint



Material: Rolled steel

Part no.	Applicable bore (mm)	A_1	L_1	MM	ND^{H10}	NX	R_1	U_1
I-J010B	**10**	8	21	M4 x 0.7	$3.3^{+0.048}_{0}$	3.1	8	9
I-J016B	**16**	8	25	M5 x 0.8	$5^{+0.048}_{0}$	6.4	12	14

Clevis Pin

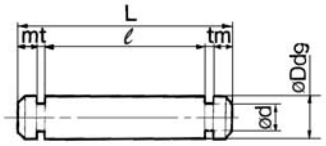


Material: Stainless steel

Part no.	Applicable bore (mm)	Dd9	d	L	ℓ	m	t	Applicable snap ring
CD-J010	**10**	$3.3^{-0.030}_{-0.060}$	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
CD-JA010∗	**10**	$3.3^{-0.030}_{-0.060}$	3	18.2	15.2	1.2	0.3	Type C 3.2

∗ For ø10 double clevis style, with air cushion and built-in speed controller.
∗ Clevis pins are shipped with retaining rings.

Knuckle Pin

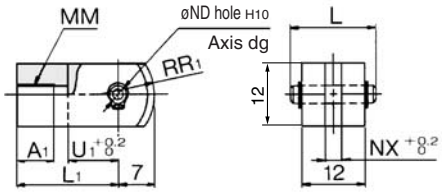


Material: Stainless steel

Part no.	Applicable bore (mm)	Dd9	d	L	ℓ	m	t	Applicable snap ring
CD-J010	**10**	$3.3^{-0.030}_{-0.060}$	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, clevis pin is diverted.
∗ Knuckle pins are shipped with retaining rings.

Double Knuckle Joint



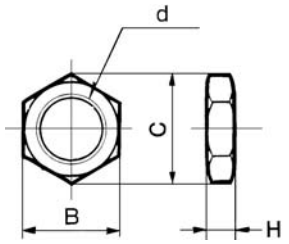
Material: Rolled steel

Part no.	Applicable bore (mm)	A_1	L	L_1	MM
Y-J010B	**10**	8	15.2	21	M4 x 0.7
Y-J016B	**16**	11	16.6	21	M5 x 0.8

Part no.	ND_{d9}	ND_{H10}	NX	R_1	U_1
Y-J010B	$3.3^{-0.030}_{-0.060}$	$3.3^{+0.048}_{0}$	3.2	8	10
Y-J016B	$5^{-0.030}_{-0.060}$	$5^{+0.048}_{0}$	6.5	12	10

∗ Knuckle pin and retaining ring are shipped together.

Mounting Nut

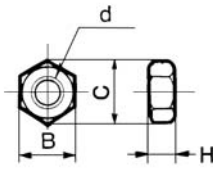


Material: Brass

Part no.	Applicable bore (mm)	B	C	d	H
SNJ-006B	**6**	8	9.2	M6 x 1.0	4
SNJ-010B	**10**	11	12.7	M8 x 1.0	4
SNJ-016B	**16**	14	16.2	M10 x 1.0	4
SNKJ-016B∗	**16**	17	19.6	M12 x 1.0	4

∗ For ø16 non-rotating type. (Use SNJ-016B for ø10 non-rotating type.)

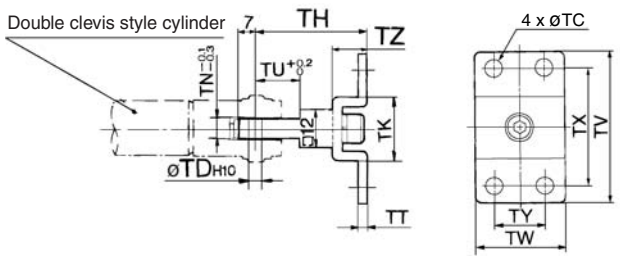
Rod End Nut



Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-006A	**6**	5.5	6.4	M3 x 0.5	2.4
NTJ-010A	**10**	7	8.1	M4 x 0.7	3.2
NTJ-015A	**16**	8	9.2	M5 x 0.8	4

T-bracket

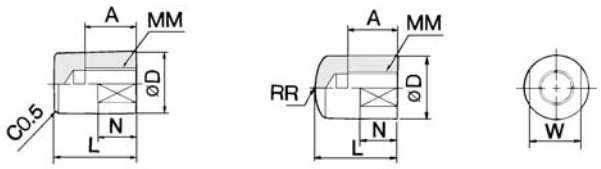


Part no.	Applicable bore (mm)	TC	TD_{H10}	TH	TK	TN	TT	TU	TV	TW	TX	TY	TZ
CJ-T010B	**10**	4.5	$3.3^{+0.048}_{0}$	29	18	3.1	2	9	40	22	32	12	8
CJ-T016B	**16**	5.5	$5^{+0.048}_{0}$	35	20	6.4	2.3	14	48	28	38	16	10

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

Rod End Cap

Flat type/CJ-CF□□□ **Round type/CJ-CR□□□**



Material: Polyacetal

Part no.		Applicable bore (mm)	A	D	L	MM	N	R	W
Flat type	Round type								
CJ-CF006	**CJ-CR006**	6	6	8	11	M3 x 0.5	5	8	6
CJ-CF010	**CJ-CR010**	10	8	10	13	M4 x 0.7	6	10	8
CJ-CF016	**CJ-CR016**	16	10	12	15	M5 x 0.8	7	12	10

Air Cylinder: Standard Type
Double Acting, Double Rod
Series CJ2W
ø6, ø10, ø16

How to Order

Bore size

6	6 mm
10	10 mm
16	16 mm

Mounting style

B	Basic style
L	Foot style
F	Flange style

Cylinder standard stroke (mm)
Refer to the standard stroke table on page 53.

Cushion

Nil	Rubber bumper
A	Air cushion

Built-in Magnet Cylinder Model

Suffix the symbol "-A" (Rail mounting style) or "-B" (Band mounting style) to the end of part number for cylinder with auto switch.

Example	Rail mounting style	CDJ2WB16-60-A
	Band mounting style	CDJ2WB10-45-B

* For rail mounting style, screws and nuts for 2 pcs switches come with the rail.
* Refer to page 123 for switch mounting brackets.

CJ2W L 16 – 45 A – □

With auto switch

CDJ2W L 16 – 45 A – M9BW □ – □

With auto switch
(Built-in magnet)

Auto switch
* For the applicable auto switch model, refer to the table below.
* If a built-in magnet cylinder without an auto switch is required, refer to the model of built-in magnet cylinder.

Number of auto switches

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

Made to Order
Refer to page 53 for details.

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Band mounting (ø6, ø10, ø16)	Auto switch model: Rail mounting (ø10, ø16) Perpendicular	Auto switch model: Rail mounting (ø10, ø16) In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	——	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	**M9N**	—	—	●	●	●	○	—	○	IC circuit	Relay, PLC
							—	**F7NV**	**F79**	●	—	●	○	—	○		
				3-wire (PNP)			**M9P**	—	—	●	●	●	○	—	○		
							—	**F7PV**	**F7P**	●	—	●	○	—	○		
				2-wire	12 V		**M9B**	—	—	●	●	●	○	—	○	—	
							—	**F7BV**	**J79**	●	—	●	○	—	○		
		Connector					**H7C**	**J79C**	—	●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	24 V	—	**M9NW**	—	—	●	●	●	○	—	○	IC circuit	
					5 V, 12 V		—	**F7NWV**	**F79W**	●	—	●	○	—	○		
				3-wire (PNP)			**M9PW**	—	—	●	●	●	○	—	○		
							—	—	**F7PW**	●	—	●	○	—	○	—	
				2-wire	12 V		**M9BW**	—	—	●	●	●	○	—	○		
							—	**F7BWV**	**J79W**	●	—	●	○	—	○		
	Water resistant (2-color indication)						**H7BA**	**F7BAV**	**F7BA**	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V	**H7NF** ***	—	**F79F**	●	—	●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96**	—	**A76H**	●	—	●	—	—	—	IC circuit	—
				2-wire	—	200 V	—	—	**A72**	**A72H**	●	—	●	—	—	—	—	Relay, PLC
					24 V	100 V	—	—	**A73**	**A73H**	●	—	●	●	—	—		
							A93	—	—		●	—	●	—	—	—		
			No			100 V or less	**A90**	**A80**	**A80H**	●	—	●	—	—	—	IC circuit	
		Connector	Yes			—	**C73C**	**A73C**	—	●	—	●	●	●	—	—	
			No			24 V or less	**C80C**	**A80C**	—	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color indication)	Grommet	Yes		—	—	—	**A79W** **	—	●	—	●	—	—	—	—	

* 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, refer to page 123 for details.
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
* Band mounting style is not available for D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L types.
** "D-A79W" cannot be mounted on bore size ø10 cylinder with air cushion.
*** "D-H7NF" cannot be mounted on bore size ø6 cylinder.

* Solid state auto switches marked with "○" are produced upon receipt of order.
* D-A9□/M9□/M9□W/A7□□/A80□/F7□□/J7□□ auto switches are shipped together (not assembled). (However, when D-A9□/M9□/M9□W types are selected, only auto switch mounting brackets are assembled before being shipped.)
* When D-A9□(V)/M9□(V)/M9□W(V) types are mounted on a ø10 or ø16 rail, order auto switch mounting brackets separately. Refer to page 123 for details.

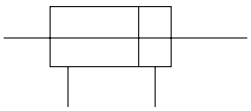
Specifications

Bore size (mm)		6	10	16
Action		Double acting, Double rod		
Fluid		Air		
Proof pressure		1 MPa		
Maximum operating pressure		0.7 MPa		
Minimum operating pressure	Rubber bumper	0.1 MPa		
	Air cushion	—	0.1 MPa	
Ambient and fluid temperature		Without auto switch: −10°C to 70°C, With auto switch: −10°C to 60°C ∗		
Cushion		Rubber bumper/Air cushion		
Lubrication		Not required (Non-lube)		
Stroke length tolerance		$^{+1.0}_{0}$		
Piston speed	Rubber bumper	50 to 750 mm/s		
	Air cushion	50 to 1000 mm/s		
Allowable kinetic energy	Rubber bumper	0.012 J	0.035 J	0.090 J
	Air cushion (Effective cushion length)	—	0.07 J (9.4 mm)	0.18 J (9.4 mm)

∗ No freezing

JIS Symbol

Double acting, Double rod



Standard Stroke

(mm)

Bore size (mm)	Standard stroke
6, 10, 16	15, 30, 45, 60

∗ Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Refer to pages 117 to 123 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket part no.

Made to Order

Made to Order Specifications

(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
–XA□	Change of rod end shape
–XB6	Heat resistant cylinder (150°C) ∗ Not available with switch & with air cushion
–XB7	Cold resistant cylinder ∗ Not available with switch & with air cushion
–XC22	Fluororubber seals ∗ Not available with air cushion
–XC51	With hose nipple

Mounting Style and Accessory/For details, refer to page 51.

Mounting		Basic style	Foot style	Flange style
Standard equipment	Mounting nut	●	●	●
	Rod end nut	●	●	●
Option	Single knuckle joint	●	●	●
	Double knuckle joint *	●	●	●

* Knuckle pin and retaining ring are shipped together with double knuckle joint.

Mounting Bracket Part No.

Mounting bracket	Bore size (mm)		
	6	10	16
Foot bracket	CJ-L006B	CJ-L010B	CJ-L016B
Flange bracket	CJ-F006B	CJ-F010B	CJ-F016B

Mass

(g)

Bore size (mm)		6	10	16
Basic mass *		27	35	70
Additional mass per each 15 mm of stroke		3	6	9
Mounting bracket mass	Foot style	16	16	40
	Flange style	5	5	15

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

Calculation: (Example)

CJ2WL10-45

- Basic mass ····· 35 (ø10)
- Additional mass ····· 6/15 stroke
- Cylinder stroke ····· 45 stroke
- Mounting bracket mass ····· 16 (Foot style)

  35 + 6/15 x 45 + 16 = 69 g
- For accessory bracket mass, refer to page 44.

Theoretical Output

Refer to "Double acting cylinder" in Theoretical Output 1 of Technical data 3 on page 1573.
In the case of the double rod style, the force at IN side will be its theoretical output.

⚠Precautions

Be sure to read before handling.
Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Mounting

⚠Caution

1. During installation, secure the rod cover and tighten by applying an appropriate tightening force to the retaining but 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.
   ø6: 2.1 to 2.5 N·m, 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, use an appropriate pair of pliers (tool for installing a type C retaining ring for hole). In particular, use a pair of ultra-mini pliers for removing and installing the retaining rings on the ø10 cylinder.
4. In the case of auto switch rail mounting style, do not remove the rail that is mounted. Because retaining screws extend into the cylinder, this could lead to an air leak.

Clean Series

10-CJ2W **Mounting style** **Bore size** – **Stroke**

• **Clean Series**

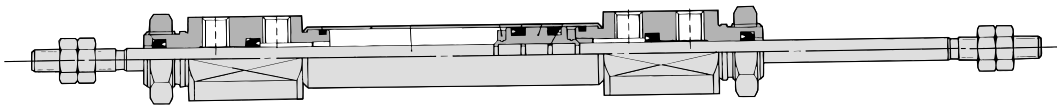
Air cylinder which is applicable for the system which discharges leakage from the rod section directly into the outside of clean room by relief port and making an actuator's rod section having a double seal construction.

Specifications

Action	Double acting, Double rod
Bore size (mm)	10, 16
Maximum operating pressure	0.7 MPa
Minimum operating pressure	0.1 MPa
Cushion	Rubber bumper
Standard stroke (mm)	Same as standard type. (Refer to page 53.)
Auto switch	Mountable (Band mounting style)
Mounting	Basic style, Foot style, Flange style

For details, refer to the separate catalog "Pneumatic Clean Series".

Construction (Not able to disassemble)



Copper and Fluorine-free Air Cylinder (For CRT manufacturing process)

20-CJ2W **Mounting style** **Bore size** – **Stroke**

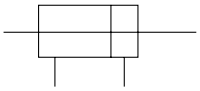
• **Copper and fluorine-free**

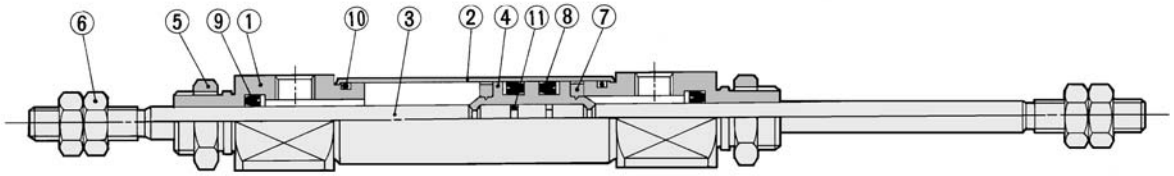
Eliminates the effects by copper based ions and fluorine based resins, etc. over the color cathode ray tube.
Making copper based materials into electroless nickel plated treatment or changing them to the non-copper materials in order to prevent copper ions from generating.

Specifications

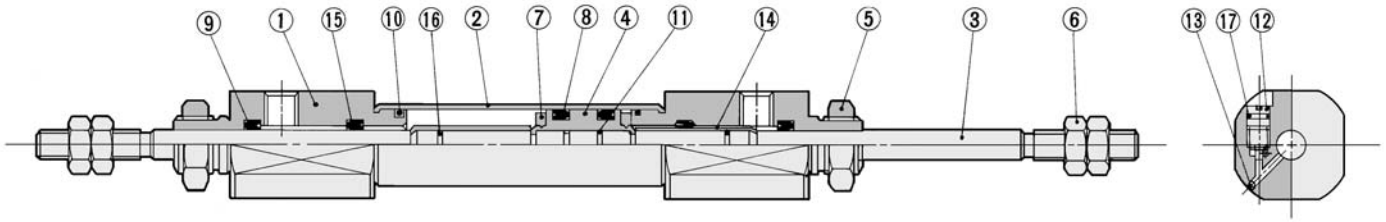
Action		Double acting, Double rod
Bore size (mm)		6, 10, 16
Maximum operating pressure		0.7 MPa
Minimum operating pressure	**ø6**	0.15 MPa
	ø10, ø16	0.1 MPa
Cushion		Rubber bumper
Standard stroke (mm)		15, 30, 45, 60
Auto switch		Mountable (Band mounting style)
Mounting		Basic style, Foot style, Flange style

Construction (Not able to disassemble)





With air cushion



Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Anodized
2	**Cylinder tube**	Stainless steel	
3	**Piston rod**	Stainless steel	
4	**Piston**	Brass	
5	**Mounting nut**	Brass	Nickel plated
6	**Rod end nut**	Rolled steel	Nickel plated
7	**Bumper**	Urethane	
8	**Piston seal**	NBR	
9	**Rod seal**	NBR	
10	**Tube gasket**	NBR	
11	**Piston gasket**	NBR	

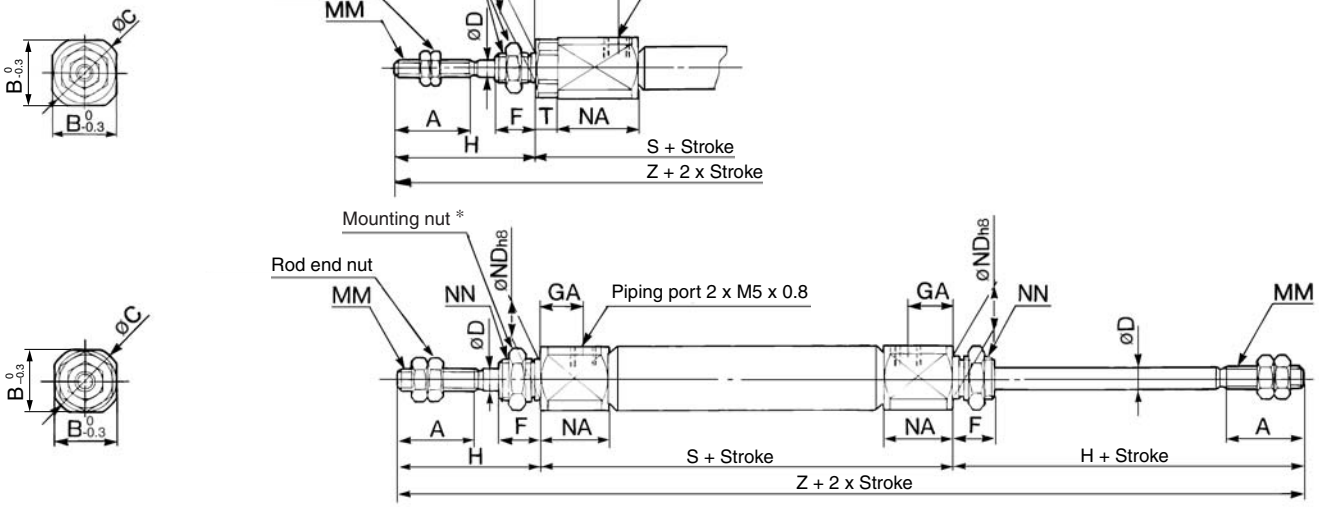
Dedicated for with Air Cushion Type

No.	Description	Material	Note
12	**Cushion needle**	Stainless steel	
13	**Steel balls**	Bearing steel	
14	**Cushion ring**	Brass	
15	**Check seal**	NBR	
16	**Cushion ring gasket**	NBR	
17	**Needle seal**	NBR	

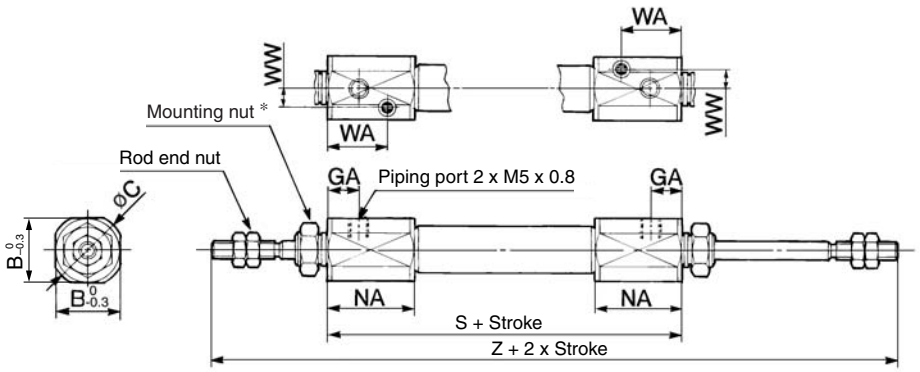
Basic Style (B)

CJ2WB Bore size – Stroke

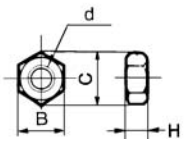
CJ2WB6
Rod cover



With air cushion: CJ2WB Bore size – Stroke A



Rod End Nut



Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-006A	6	5.5	6.4	M3 x 0.5	2.4
NTJ-010A	10	7	8.1	M4 x 0.7	3.2
NTJ-015A	16	8	9.2	M5 x 0.8	4

∗ For details of the mounting nut, refer to page 51.

(mm)

Bore size (mm)	A	B	C	D	F	GA	H	MM	NA	ND h8	NN	S∗	T	Z∗
6	15	12	14	3	8	14.5	28	M3 x 0.5	16	$6^{0}_{-0.018}$	M6 x 1.0	61 (66)	3	117 (122)
10	15	12	14	4	8	8	28	M4 x 0.7	12.5	$8^{0}_{-0.022}$	M8 x 1.0	49	–	105
16	15	18.3	20	5	8	8	28	M5 x 0.8	12.5	$10^{0}_{-0.022}$	M10 x 1.0	50	–	106

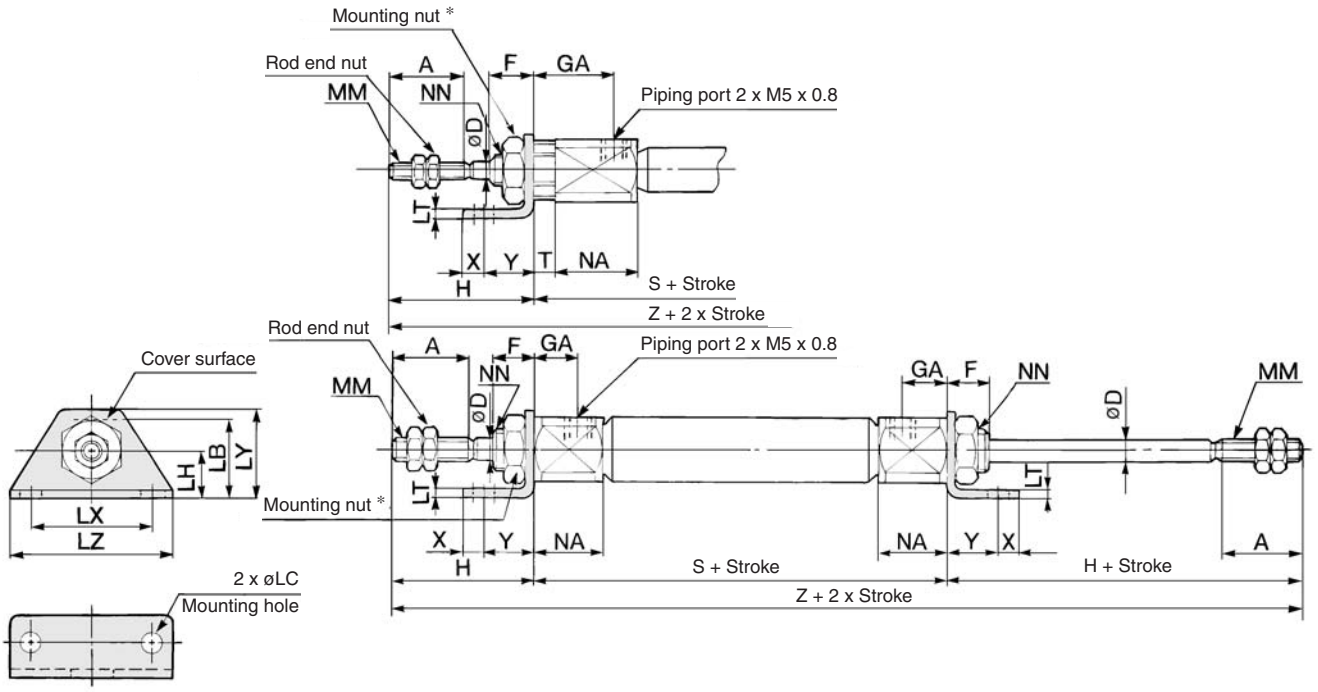
With Air Cushion/Dimensions other than the table below are the same as the table above.

∗ ( ) in S and Z dimensions: With auto switch

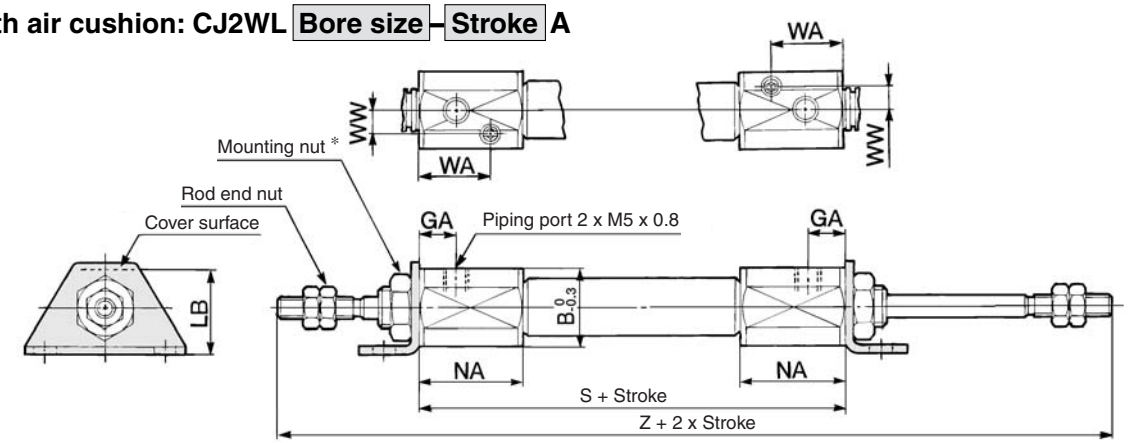
Bore size (mm)	B	C	GA	NA	WA	WW	S	Z
10	15	17	7.5	21	14.5	4.5	66	122
16	18.3	20	7.5	21	14.5	5.5	67	123

Foot Style (L)

CJ2WL Bore size – Stroke

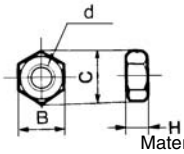


With air cushion: CJ2WL Bore size – Stroke A



* For details of the mounting nut, refer to page 51.

Rod End Nut



Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-006A	6	5.5	6.4	M3 x 0.5	2.4
NTJ-010A	10	7	8.1	M4 x 0.7	3.2
NTJ-015A	16	8	9.2	M5 x 0.8	4

(mm)

Bore size (mm)	A	D	F	GA	H	LB	LC	LH	LT	LX	LY	LZ	MM	NA	NN	S *	T	X	Y	Z *
6	15	3	8	14.5	28	15	4.5	9	1.6	24	16.5	32	M3 x 0.5	16	M6 x 1.0	61 (66)	3	5	7	117 (122)
10	15	4	8	8	28	15	4.5	9	1.6	24	16.5	32	M4 x 0.7	12.5	M8 x 1.0	49	–	5	7	105
16	15	5	8	8	28	23	5.5	14	2.3	33	25	42	M5 x 0.8	12.5	M10 x 1.0	50	–	6	9	106

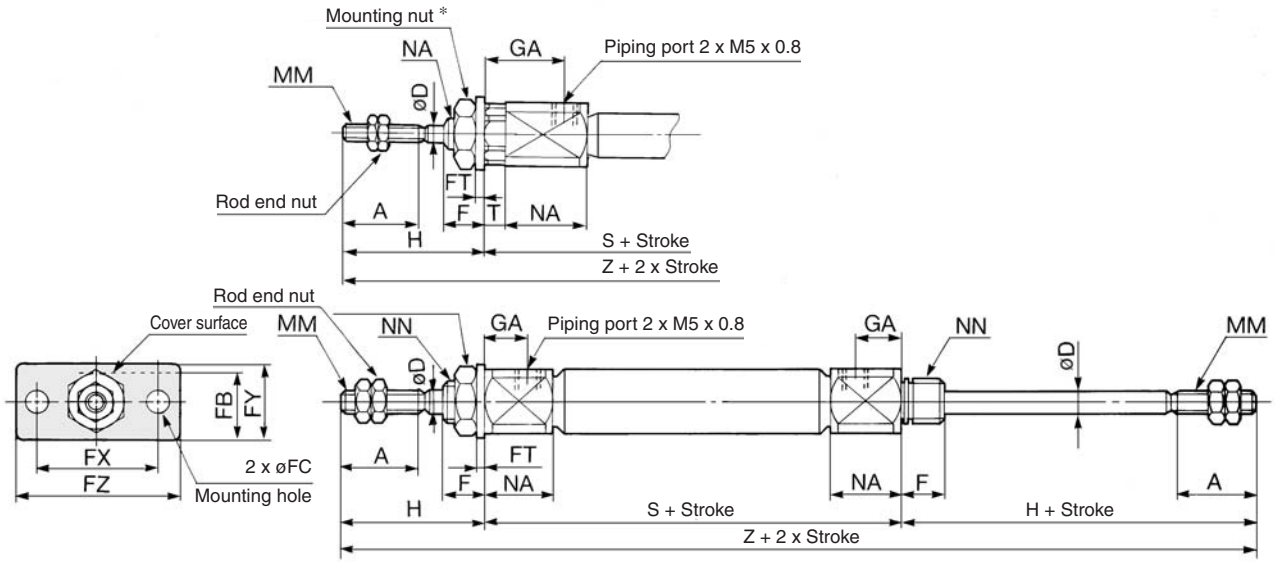
With Air Cushion/Dimensions other than the table below are the same as the table above.

* ( ) in S and Z dimensions: With auto switch

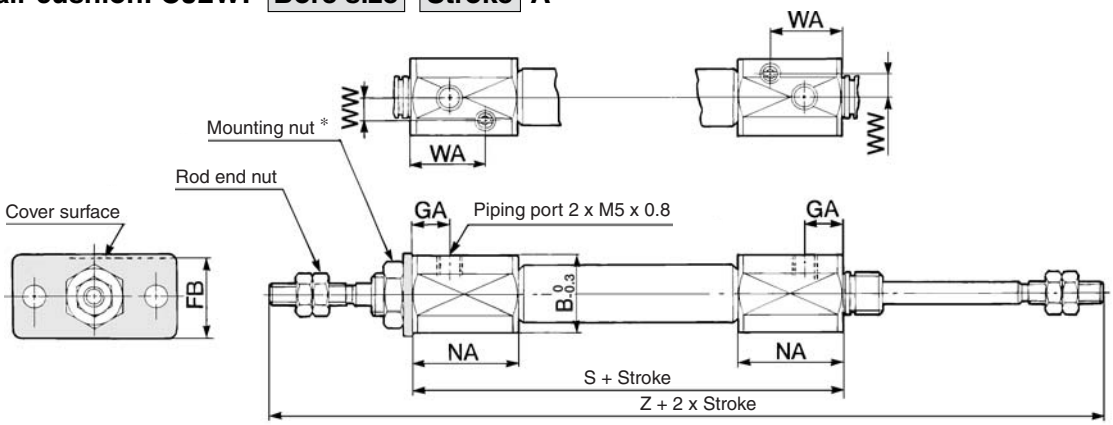
Bore size (mm)	B	GA	LB	NA	WA	WW	S	Z
10	15	7.5	16.5	21	14.5	4.5	66	122
16	18.3	7.5	23	21	14.5	5.5	67	123

Flange Style (F)

CJ2WF Bore size – Stroke

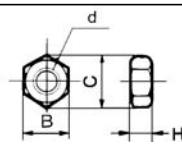


With air cushion: CJ2WF Bore size – Stroke A



* For details of the mounting nut, refer to page 51.

Rod End Nut



Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-006A	6	5.5	6.4	M3 x 0.5	2.4
NTJ-010A	10	7	8.1	M4 x 0.7	3.2
NTJ-015A	16	8	9.2	M5 x 0.8	4

(mm)

Bore size (mm)	A	D	F	FB	FC	FT	FX	FY	FZ	GA	H	MM	NA	NN	S *	T	Z *
6	15	3	8	13	4.5	1.6	24	14	32	14.5	28	M3 x 0.5	16	M6 x 1.0	61 (66)	3	117 (122)
10	15	4	8	13	4.5	1.6	24	14	32	8	28	M4 x 0.7	12.5	M8 x 1.0	49	–	105
16	15	5	8	19	5.5	2.3	33	20	42	8	28	M5 x 0.8	12.5	M10 x 1.0	50	–	106

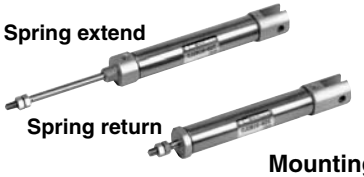
With Air Cushion/Dimensions other than the table below are the same as the table above.

* ( ) in S and Z dimensions: With auto switch

Bore size (mm)	B	FB	GA	NA	WA	WW	S	Z
10	15	14.5	7.5	21	14.5	4.5	66	122
16	18.3	19	7.5	21	14.5	5.5	67	123

Air Cylinder: Standard Type
Single Acting, Spring Return/Extend
Series CJ2
ø6, ø10, ø16

How to Order



Bore size

6	6 mm
10	10 mm
16	16 mm

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
D	Double clevis style (Except ø6)

Cylinder standard stroke (mm)
Refer to the standard stroke table on page 61.

Action

S	Single acting, Spring return
T	Single acting, Spring extend

Built-in Magnet Cylinder Model

Suffix the symbol "-A" (Rail mounting style) or "-B" (Band mounting style) to the end of part number for cylinder with auto switch.

Example	Rail mounting style	CDJ2B16-60S-A
	Band mounting style	CDJ2B10-45S-B

* For rail mounting style, screws and nuts for 2 pcs. switches come with the rail.
* Refer to page 123 for switch mounting brackets.

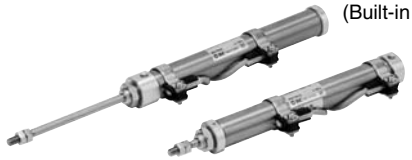
Standard

**CJ2 L 16 – 45 S – **

With auto switch

**CDJ2 L 16 – 45 S – M9BW – **

With auto switch
(Built-in magnet)



Head cover port location

Symbol \ Bore size (mm)	ø6	ø10, ø16
Nil	—	Perpendicular to axis
R	Axial	Axial

* For configuration, refer to page 43.
* Single acting, Spring return (S), Clevis style is available only for 90° to the axis.
* Not applicable to single acting, spring extend (T).

Auto switch
* For the applicable auto switch model, refer to the table below.
* If a built-in magnet cylinder without an auto switch is required, refer to the model of built-in magnet cylinder.

Number of auto switches

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

Made to Order
Refer to page 61 for details.

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Band mounting (ø6, ø10, ø16)	Auto switch model: Rail mounting (ø10, ø16) Perpendicular	Auto switch model: Rail mounting (ø10, ø16) In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	——	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9N	—	—	●	●	●	○	—	○	IC circuit	Relay, PLC
							—	F7NV	F79	●	—	●	○	—	○		
				3-wire (PNP)			M9P	—	—	●	●	●	○	—	○		
							—	F7PV	F7P	●	—	●	○	—	○		
				2-wire	12 V		M9B	—	—	●	●	●	○	—	○	—	
							—	F7BV	J79	●	—	●	○	—	○		
		Connector					H7C	J79C	—	●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	5 V, 12 V		M9NW	—	—	●	●	●	○	—	○	IC circuit	
							—	F7NWV	F79W	●	—	●	○	—	○		
				3-wire (PNP)			M9PW	—	—	●	●	●	○	—	○		
							—	—	F7PW	●	—	●	○	—	○		
				2-wire	12 V		M9BW	—	—	●	●	●	○	—	○	—	
							—	F7BWV	J79W	●	—	●	○	—	○		
	Water resistant (2-color indication)						H7BA	F7BAV	F7BA	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5 V, 12 V		H7NF	—	F79F	●	—	●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96	—	A76H	●	—	●	—	—	—	IC circuit	—
				2-wire	—	200 V	—	A72	A72H	●	—	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	—	A73	A73H	●	—	●	●	—	—	
								A93	—	—	●	—	●	—	—	—	
			No				100 V or less	A90	A80	A80H	●	—	●	—	—	—	IC circuit	
		Connector	Yes				—	C73C	A73C	—	●	—	●	●	●	—	—	
			No				24 V or less	C80C	A80C	—	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color indication)	Grommet	Yes		—	—	—	—	A79W	—	●	—	●	—	—	—	—	

* 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, refer to page 123 for details.
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
* Band mounting style is not available for D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L types.
* Solid state auto switches marked with "○" are produced upon receipt of order.
* D-A9□/M9□/M9□W/A7□□/A80□/F7□□/J7□□ auto switches are shipped together (not assembled). (However, when D-A9□/M9□/M9□W types are selected, only auto switch mounting brackets are assembled before being shipped.)
* When D-A9□(V)/M9□(V)/M9□W(V) types are mounted on a ø10 or ø16 rail, order auto switch mounting brackets separately. Refer to page 123 for details.

Spring extend

Spring return

Specifications

Bore size (mm)		6	10	16
Action		Single acting, Spring return/Single acting, Spring extend		
Fluid		Air		
Proof pressure		1 MPa		
Maximum operating pressure		0.7 MPa		
Minimum operating pressure	Rubber bumper	0.2 MPa	0.15 MPa	
	Air cushion	0.25 MPa	0.15 MPa	
Ambient and fluid temperature		Without auto switch: −10°C to 70°C, With auto switch: −10°C to 60°C *		
Cushion		Rubber bumper/Air cushion		
Lubrication		Not required (Non-lube)		
Stroke length tolerance		$^{+1.0}_{0}$		
Piston speed		50 to 750 mm/s		
Allowable kinetic energy		0.012J	0.035J	0.090J

* No freezing

Standard Stroke (mm)

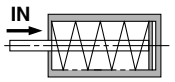
Bore size (mm)	Standard stroke
6	15, 30, 45, 60
10	15, 30, 45, 60
16	15, 30, 45, 60, 75, 100, 125, 150

* Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Spring Reaction Force (N)

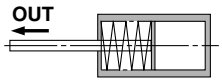
Bore size (mm)	Spring reaction force (N)	
	Primary	Secondary
6	1.77	3.72
10	3.53	6.86
16	6.86	14.2

Spring with primary mounting load



When the spring is set in the cylinder

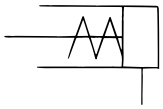
Spring with secondary mounting load



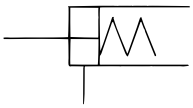
When the spring is contracted by applying air

JIS Symbol

Single acting, Spring return



Single acting, Spring extend



Made to Order Specifications

(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC22	Fluororubber seals
—XC51	With hose nipple

Refer to pages 117 to 123 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket part no.

Mass/Spring Return (S)

(g)

Bore size (mm)		6	10	16
Basic mass *	15 stroke	11	28	63
	30 stroke	16	35	80
	45 stroke	18	44	102
	60 stroke	23	53	124
	75 stroke	—	—	145
	100 stroke	—	—	188
	125 stroke	—	—	224
	150 stroke	—	—	250
Mounting bracket mass	Axial foot style	8	8	20
	Rod side flange style	5	5	15
	Double clevis style (With pin) *	—	4	10

* Mounting nut and rod end nut are included in the basic mass.
** Mounting nut is not attached to the double clevis style, so the mounting nut mass is already subtracted.

Calculation: (Example) **CJ2L10-45S**
- Basic mass ····· 44 (ø10-45 stroke)
- Mounting bracket mass····· 8 (Axial foot style)

44 + 8 = 52 g

Mass/Spring Extend (T)

(g)

Bore size (mm)		6	10	16
Basic mass *	15 stroke	17	28	64
	30 stroke	21	34	80
	45 stroke	23	43	100
	60 stroke	27	51	121
	75 stroke	—	—	140
	100 stroke	—	—	178
	125 stroke	—	—	212
	150 stroke	—	—	236
Mounting bracket mass	Axial foot style	8	8	20
	Rod side flange style	5	5	15
	Double clevis style (With pin)*	—	4	10

* Mounting nut and rod end nut are included in the basic mass.
** Mounting nut is not attached to the double clevis style, so the mounting nut mass is already subtracted.

Calculation: (Example) **CJ2L10-45T**
- Basic mass ····· 43 (ø10-45 stroke)
- Mounting bracket mass····· 8 (Axial foot style)

43 + 8 = 51 g

Mounting Bracket Part No.

Mounting bracket	Bore size (mm)		
	6	10	16
Foot bracket	CJ-L006B	CJ-L010B	CJ-L016B
Flange bracket	CJ-F006B	CJ-F010B	CJ-F016B
T-bracket *	—	CJ-T010B	CJ-T016B

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

Mounting Style and Accessory

/For details, refer to page 51.

Mounting		Basic style	Axial foot style	Rod side flange style	Double * clevis style
Standard equipment	Mounting nut	●	●	●	—
	Rod end nut	●	●	●	●
	Clevis pin	—	—	—	●
Option	Single knuckle joint	●	●	●	●
	Double knuckle joint *	●	●	●	●
	T-bracket	—	—	—	●

* Pin and retaining ring are shipped together with double clevis and double knuckle joint. For the attached bracket mass, refer to page 44.

Theoretical Output

Refer to the "Single acting, Spring return cylinder" in Theoretical Output 1 of Technical data 3 on page 1573. In the case of the spring extend style, the force at OUT side will be the ending force of the spring return, and that at the IN side will be the amount of the IN side force of the double acting style cylinder from which the beginning force of the spring return has been subtracted.

⚠ Specific Product Precautions

Be sure to read before handling.
Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Mounting

⚠ 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.
   ø6: 2.1 to 2.5 N·m, ø10: 5.9 to 6.4 N·m,
   ø16: 10.8 to 11.8 N·m
3. In the case of a single acting cylinder, do not operate it in such a way that a load would be applied during the retraction of the piston rod of the spring return style, or during the extension of the piston rod of the spring extend style. The spring that is built into the cylinder provides only enough force to retract the piton rod. Thus, if a load is applied, the piston rod will not be able to retract to the end of the stroke.
4. In the case of a single acting cylinder, a breather hole is provided in the cover surface. Make sure not to block this hole during installation, as this could lead to a malfunction.
5. 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.
6. In the case of auto switch rail mounting style, do not remove the rail that is mounted. Because retaining screws extend into the cylinder, this could lead to an air leak.

Copper and Fluorine-free Air Cylinder (For CRT manufacturing process)

20-CJ2 | Mounting style | Bore size | — | Stroke | Action | Head cover port location

•Copper and fluorine-free

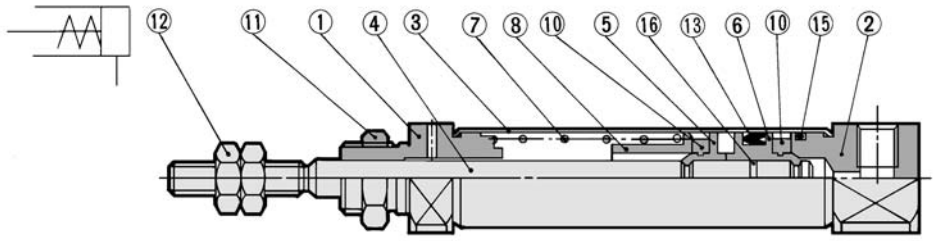
Eliminates the effects by copper based ions and fluorine based resins, etc. over the color cathode ray tube.
Making copper based materials into electroless nickel plated treatment or changing them to the non-copper materials in order to prevent copper ions from generating.

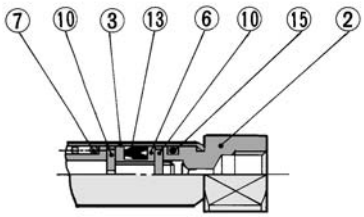
Specifications

Action		Single acting: Spring return	Single acting: Spring extend
Bore size (mm)		6, 10, 16	
Maximum operating pressure		0.7 MPa	
Minimum operating pressure	ø6	0.2 MPa	0.25 MPa
	ø10, ø16	0.15 MPa	
Cushion		Rubber bumper (Standard equipment)	
Standard stroke (mm)		Same as standard type. (Refer to page 61.)	
Auto switch		Mountable (Band mounting style)	
Mounting		Basic style, Axial foot style, Rod side flange style, Double clevis style (Except ø6)	

Construction (Not able to disassemble)

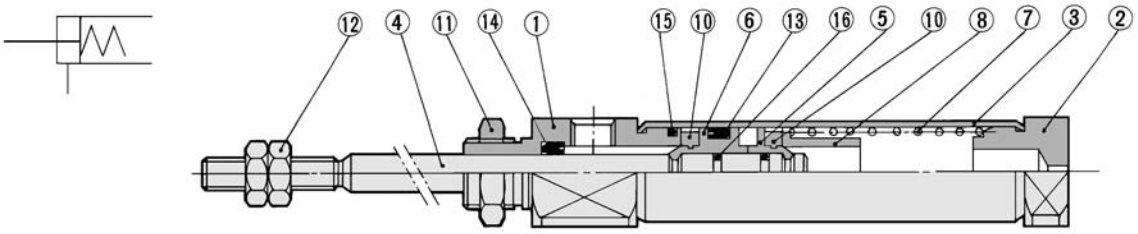
Single acting, Spring return

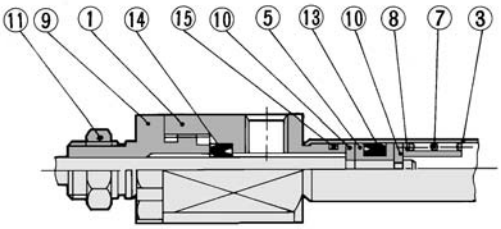




CJ2□6 Piston/Head cover

Single acting, Spring extend





CJ2□6 Piston/Rod cover

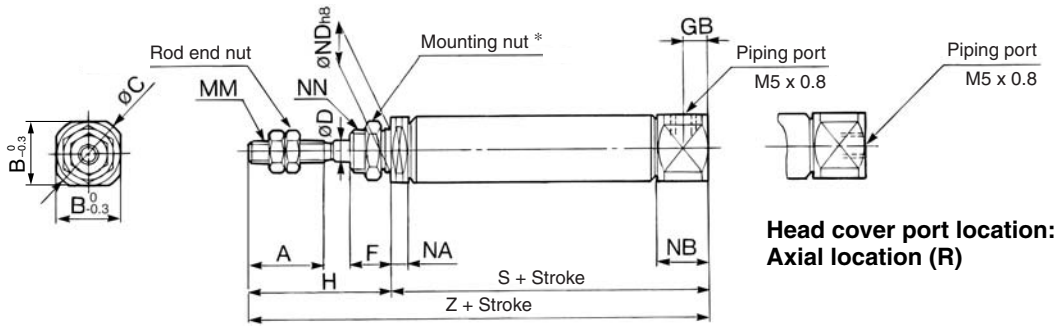
Component Parts

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**	Brass	
6	**Piston B**	Brass	
7	**Return spring**	Piano wire	Zinc chromated
8	**Spring seat**	Brass	

No.	Description	Material	Note
9	**Seal retainer**	Aluminum alloy	Clear anodized (ø6 spring extend)
10	**Bumper**	Urethane	
11	**Mounting nut**	Brass	Nickel plated
12	**Rod end nut**	Rolled steel	Nickel plated
13	**Piston seal**	NBR	
14	**Rod seal**	NBR	
15	**Tube gasket**	NBR	
16	**Piston gasket**	NBR	

Single Acting, Spring Return: Basic Style (B)

CJ2B Bore size – Stroke S Head cover port location



∗ For details of the mounting nut, refer to page 51.

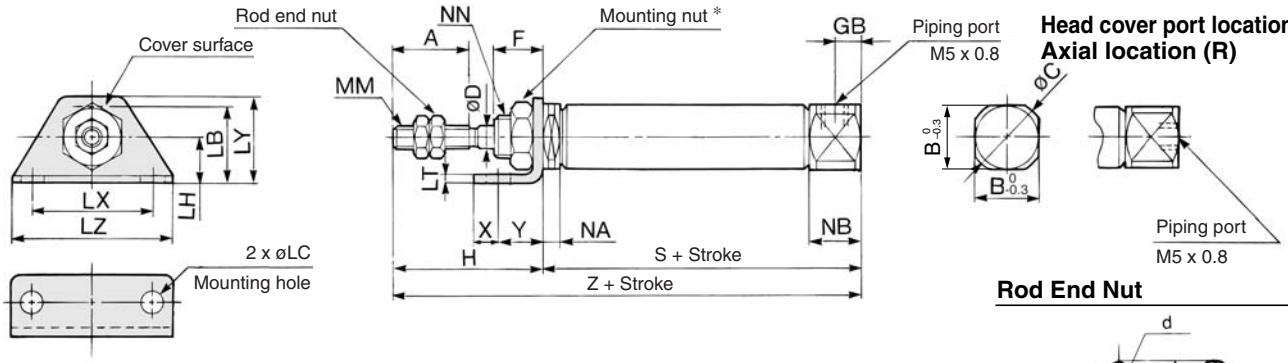
(mm)

Bore size (mm)	A	B	C	D	F	GB	H	MM	NA	NB	ND h8	NN	S ∗								Z ∗							
													5 to 15 st	16 to 30 st	31 to 45 st	46 to 60 st	61 to 75 st	76 to 100 st	101 to 125 st	126 to 150 st	5 to 15 st	16 to 30 st	31 to 45 st	46 to 60 st	61 to 75 st	76 to 100 st	101 to 125 st	126 to 150 st
6	15	8	9	3	8	–	28	M3 x 0.5	3	7	6 0 -0.018	M6 x 1.0	34.5 (39.5)	43.5 (48.5)	47.5 (52.5)	61.5 (66.5)	–	–	–	–	62.5 (67.5)	71.5 (76.5)	75.5 (80.5)	89.5 (94.5)	–	–	–	–
10	15	12	14	4	8	5	28	M4 x 0.7	5.5	9.5	8 0 -0.022	M8 x 1.0	45.5	53	65	77	–	–	–	–	73.5	81	93	105	–	–	–	–
16	15	18.3	20	5	8	5	28	M5 x 0.8	5.5	9.5	10 0 -0.022	M10 x 1.0	45.5	54	66	78	84	108	126	138	73.5	82	94	106	112	136	154	166

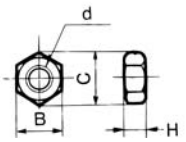
∗ ( ) in S and Z dimensions: With auto switch

Single Acting, Spring Return: Axial Foot Style (L)

CJ2L Bore size – Stroke S Head cover port location



Rod End Nut



Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-006A	**6**	5.5	6.4	M3 x 0.5	2.4
NTJ-010A	**10**	7	8.1	M4 x 0.7	3.2
NTJ-015A	**16**	8	9.2	M5 x 0.8	4

∗ For details of the mounting nut, refer to page 51.

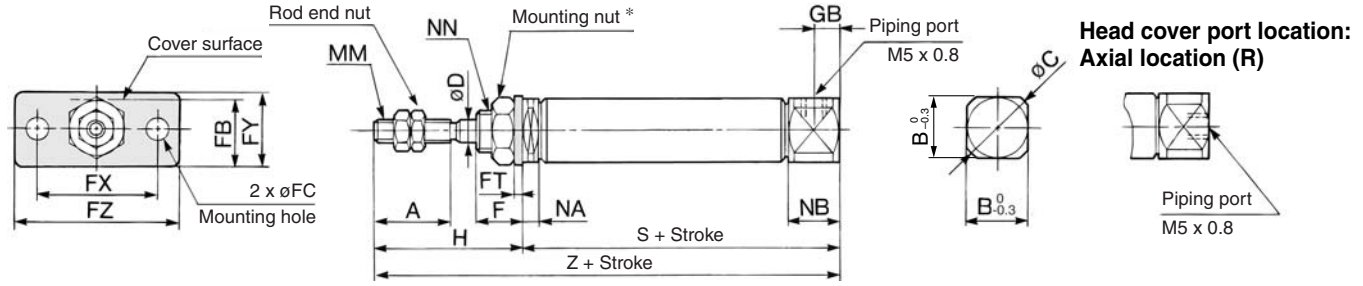
(mm)

Bore size (mm)	A	B	C	D	F	GB	H	LB	LC	LH	LT	LX	LY	LZ	MM	NA	NB	NN	X	Y	S ∗								Z ∗							
																					5 to 15 st	16 to 30 st	31 to 45 st	46 to 60 st	61 to 75 st	76 to 100 st	101 to 125 st	126 to 150 st	5 to 15 st	16 to 30 st	31 to 45 st	46 to 60 st	61 to 75 st	76 to 100 st	101 to 125 st	126 to 150 st
6	15	8	9	3	8	–	28	13	4.5	9	1.6	24	16.5	32	M3 x 0.5	3	7	M6 x 1.0	5	7	34.5 (39.5)	43.5 (48.5)	47.5 (52.5)	61.5 (66.5)	–	–	–	–	62.5 (67.5)	71.5 (76.5)	75.5 (80.5)	89.5 (94.5)	–	–	–	–
10	15	12	14	4	8	5	28	15	4.5	9	1.6	24	16.5	32	M4 x 0.7	5.5	9.5	M8 x 1.0	5	7	45.5	53	65	77	–	–	–	–	73.5	81	93	105	–	–	–	–
16	15	18.3	20	5	8	5	28	23	5.5	14	2.3	33	25	42	M5 x 0.8	5.5	9.5	M10 x 1.0	6	9	45.5	54	66	78	84	108	126	138	73.5	82	94	106	112	136	154	166

∗ ( ) in S and Z dimensions: With auto switch

Single Acting, Spring Return: Rod Side Flange Style (F)

CJ2F Bore size – Stroke S Head cover port location



* For details of the mounting nut, refer to page 51.

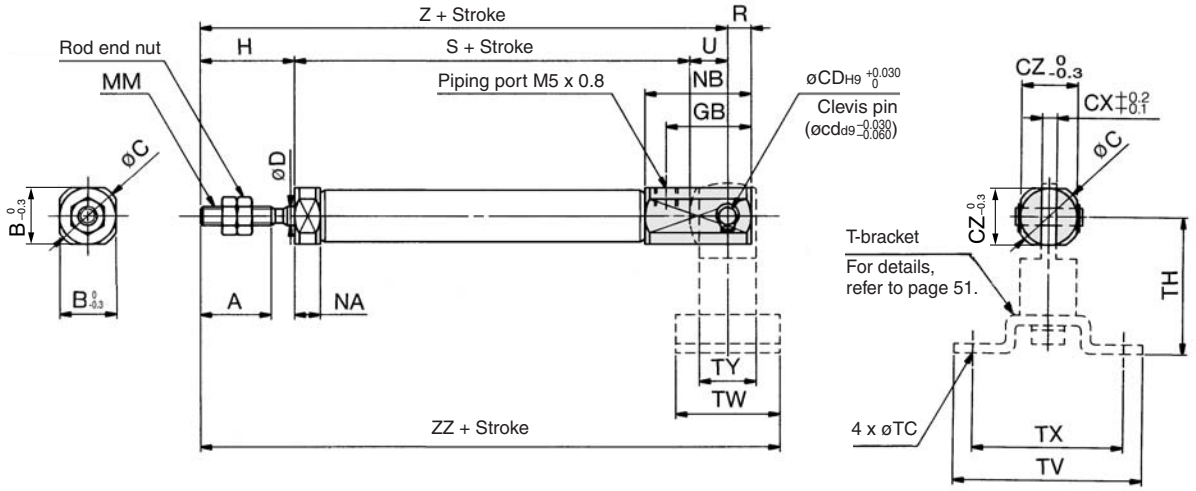
(mm)

Bore size (mm)	A	B	C	D	F	FB	FC	FT	FX	FY	FZ	GB	H	MM	NA	NB	NN	S * 5 to 15 st	S * 16 to 30 st	S * 31 to 45 st	S * 46 to 60 st	S * 61 to 75 st	S * 76 to 100 st	S * 101 to 125 st	S * 126 to 150 st	Z * 5 to 15 st	Z * 16 to 30 st	Z * 31 to 45 st	Z * 46 to 60 st	Z * 61 to 75 st	Z * 76 to 100 st	Z * 101 to 125 st	Z * 126 to 150 st
6	15	8	9	3	8	11	4.5	1.6	24	14	32	–	28	M3 x 0.5	3	7	M6 x 1.0	34.5 (39.5)	43.5 (48.5)	47.5 (52.5)	61.5 (66.5)	–	–	–	–	62.5 (67.5)	71.5 (76.5)	75.5 (80.5)	89.5 (94.5)	–	–	–	–
10	15	12	14	4	8	13	4.5	1.6	24	14	32	5	28	M4 x 0.7	5.5	9.5	M8 x 1.0	45.5	53	65	77	–	–	–	–	73.5	81	93	105	–	–	–	–
16	15	18.3	20	5	8	19	5.5	2.3	33	20	42	5	28	M5 x 0.8	5.5	9.5	M10 x 1.0	45.5	54	66	78	84	108	126	138	73.5	82	94	106	112	136	154	166

* ( ) in S and Z dimensions: With auto switch

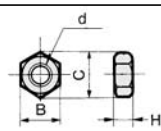
Single Acting, Spring Return: Double Clevis Style (D)

CJ2D Bore size – Stroke S



* Clevis pin and retaining ring are shipped together.

Rod End Nut



Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-006A	6	5.5	6.4	M3 x 0.5	2.4
NTJ-010A	10	7	8.1	M4 x 0.7	3.2
NTJ-015A	16	8	9.2	M5 x 0.8	4

(mm)

Bore size (mm)	A	B	C	CD (cd)	CX	CZ	D	GB	H	MM	NA	NB	R	U	S 5 to 15 st	S 16 to 30 st	S 31 to 45 st	S 46 to 60 st	S 61 to 75 st	S 76 to 100 st	S 101 to 125 st	S 126 to 150 st	Z 5 to 15 st	Z 16 to 30 st	Z 31 to 45 st	Z 46 to 60 st	Z 61 to 75 st	Z 76 to 100 st	Z 101 to 125 st	Z 126 to 150 st
10	15	12	14	3.3	3.2	12	4	18	20	M4 x 0.7	5.5	22.5	5	8	45.5	53	65	77	–	–	–	–	73.5	81	93	105	–	–	–	–
16	15	18.3	20	5	6.5	18.3	5	23	20	M5 x 0.8	5.5	27.5	8	10	45.5	54	66	78	84	108	126	138	75.5	84	96	108	114	138	156	168

Bore size (mm)	ZZ 5 to 15 st	16 to 30 st	31 to 45 st	46 to 60 st	61 to 75 st	76 to 100 st	101 to 125 st	126 to 150 st
10	84.5	92	104	116	–	–	–	–
16	89.5	98	110	122	128	152	170	182

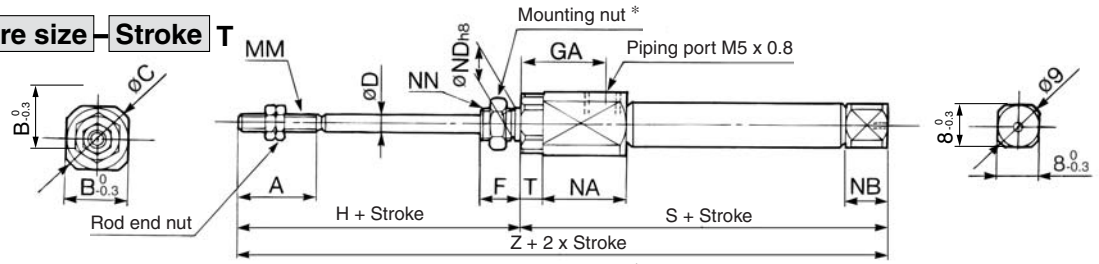
T-bracket Dimensions

Bore size (mm)	TC	TH	TV	TW	TX	TY
10	4.5	29	40	22	32	12
16	5.5	35	48	28	38	16

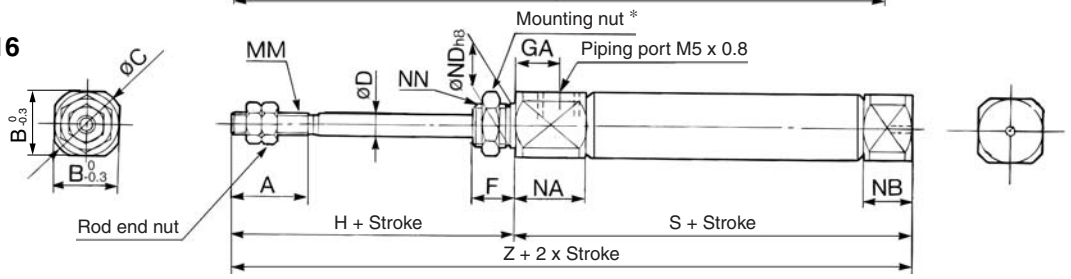
Single Acting, Spring Extend: Basic Style (B)

CJ2B Bore size – Stroke T

CJ2B6



CJ2B10, 16



∗ For details of the mounting nut, refer to page 51.

(mm)

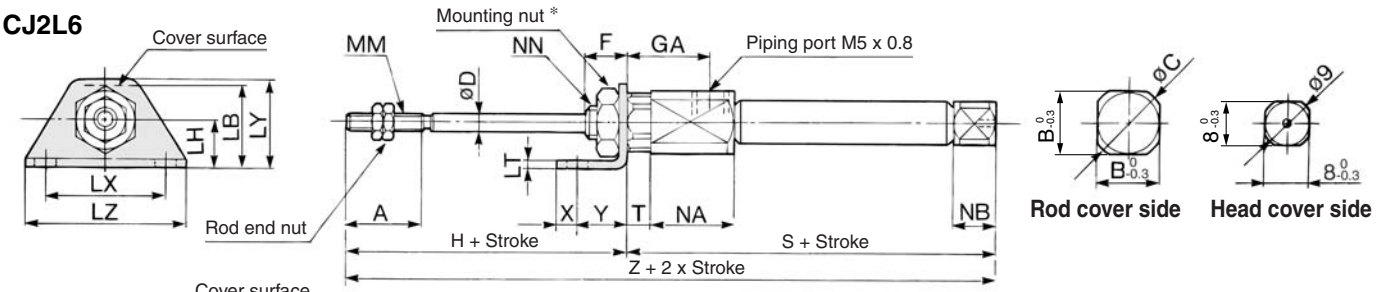
Bore size (mm)	A	B	C	D	F	GA	H	MM	NN	NA	NB	ND h8	T	S ∗ 5 to 15 st	S ∗ 16 to 30 st	S ∗ 31 to 45 st	S ∗ 46 to 60 st	S ∗ 61 to 75 st	S ∗ 76 to 100 st	S ∗ 101 to 125 st	S ∗ 126 to 150 st	Z ∗ 5 to 15 st	Z ∗ 16 to 30 st	Z ∗ 31 to 45 st	Z ∗ 46 to 60 st	Z ∗ 61 to 75 st	Z ∗ 76 to 100 st	Z ∗ 101 to 125 st	Z ∗ 126 to 150 st
6	15	12	14	3	8	14.5	28	M3 x 0.5	M6 x 1.0	16	3	6 0 -0.018	3	46.5 (51.5)	55.5 (60.5)	59.5 (64.5)	73.5 (78.5)	–	–	–	–	74.5 (79.5)	83.5 (88.5)	87.5 (92.5)	101.5 (106.5)	–	–	–	–
10	15	12	14	4	8	8	28	M4 x 0.7	M8 x 1.0	12.5	5.5	8 0 -0.022	–	48.5	56	68	80	–	–	–	–	76.5	84	96	108	–	–	–	–
16	15	18.3	20	5	8	8	28	M5 x 0.8	M10 x 1.0	12.5	5.5	10 0 -0.022	–	48.5	57	69	81	87	111	129	141	76.5	85	97	109	115	139	157	169

∗ ( ) in S and Z dimensions: With auto switch

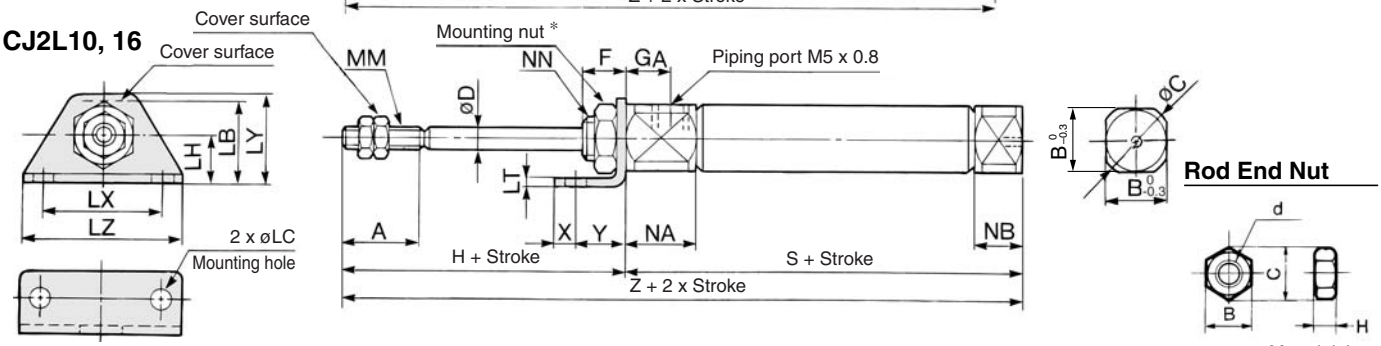
Single Acting, Spring Extend: Axial Foot Style (L)

CJ2L Bore size – Stroke T

CJ2L6



CJ2L10, 16



Rod End Nut

Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-006A	**6**	5.5	6.4	M3 x 0.5	2.4
NTJ-010A	**10**	7	8.1	M4 x 0.7	3.2
NTJ-015A	**16**	8	9.2	M5 x 0.8	4

∗ For details of the mounting nut, refer to page 51.

(mm)

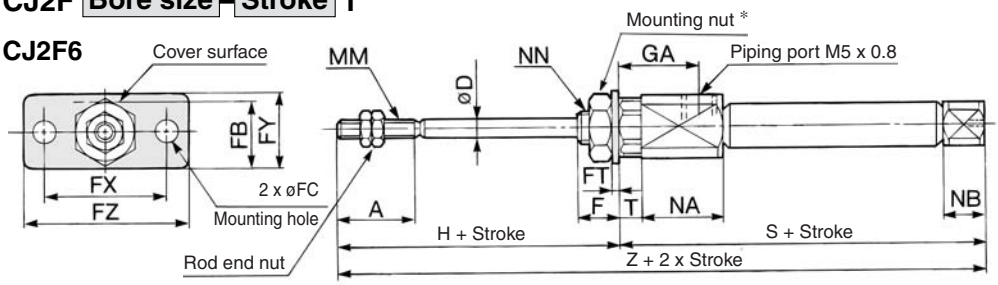
Bore size (mm)	A	B	C	D	F	GA	H	LB	LC	LH	LT	LX	LY	LZ	MM	NA	NB	NN	T	X	Y	S ∗ 5 to 15 st	S ∗ 16 to 30 st	S ∗ 31 to 45 st	S ∗ 46 to 60 st	S ∗ 61 to 75 st	S ∗ 76 to 100 st	S ∗ 101 to 125 st	S ∗ 126 to 150 st	Z ∗ 5 to 15 st	Z ∗ 16 to 30 st	Z ∗ 31 to 45 st	Z ∗ 46 to 60 st	Z ∗ 61 to 75 st	Z ∗ 76 to 100 st	Z ∗ 101 to 125 st	Z ∗ 126 to 150 st
6	15	12	14	3	8	14.5	28	15	4.5	9	1.6	24	16.5	32	M3 x 0.5	16	3	M6 x 1.0	3	5	7	46.5 (51.5)	55.5 (60.5)	59.5 (64.5)	73.5 (78.5)	–	–	–	–	74.5 (79.5)	83.5 (88.5)	87.5 (92.5)	101.5 (106.5)	–	–	–	–
10	15	12	14	4	8	8	28	15	4.5	9	1.6	24	16.5	32	M4 x 0.7	12.5	5.5	M8 x 1.0	–	5	7	48.5	56	68	80	–	–	–	–	76.5	84	96	108	–	–	–	–
16	15	18.3	20	5	8	8	28	23	5.5	14	2.3	33	25	42	M5 x 0.8	12.5	5.5	M10 x 1.0	–	6	9	48.5	57	69	81	87	111	129	141	76.5	85	97	109	115	139	157	169

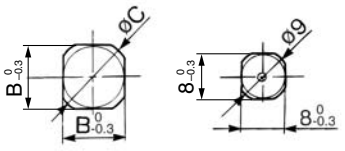
∗ ( ) in S and Z dimensions: With auto switch

Single Acting, Spring Extend: Rod Side Flange Style (F)

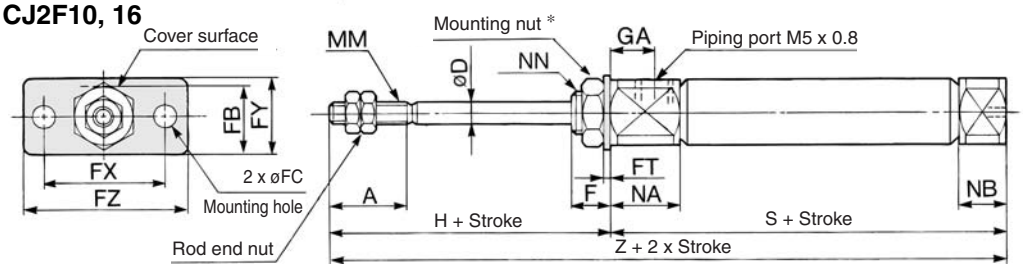
CJ2F Bore size – Stroke T

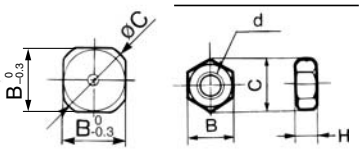
CJ2F6





CJ2F10, 16





Rod End Nut

Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-006A	6	5.5	6.4	M3 x 0.5	2.4
NTJ-010A	10	7	8.1	M4 x 0.7	3.2
NTJ-015A	16	8	9.2	M5 x 0.8	4

∗ For details of the mounting nut, refer to page 51.

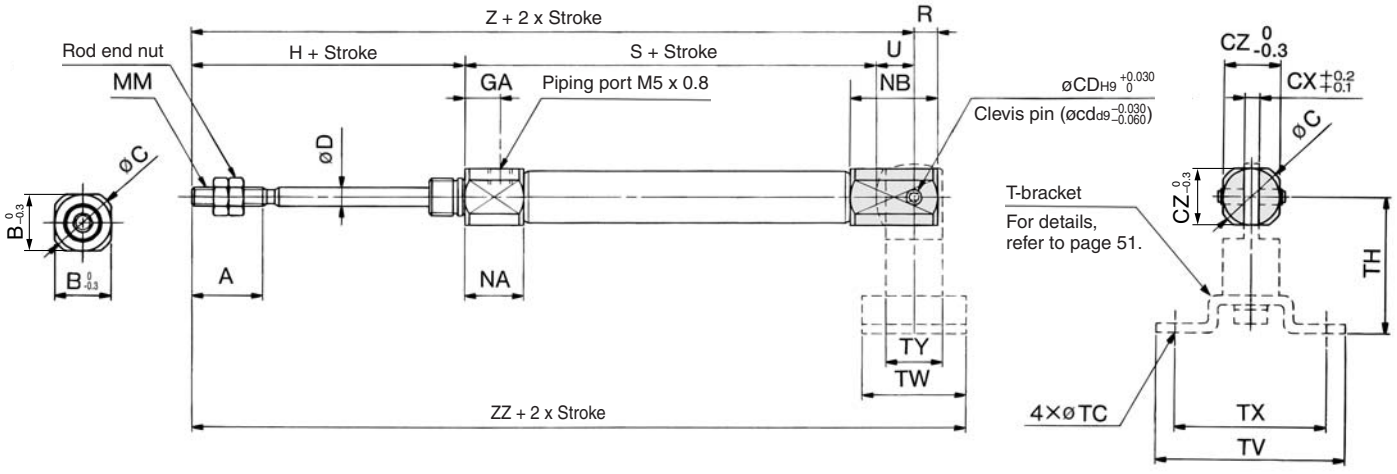
(mm)

Bore size (mm)	A	B	C	D	F	FB	FC	FT	FX	FY	FZ	GA	H	MM	NA	NB	NN	T	S * 5 to 15 st	16 to 30 st	31 to 45 st	46 to 60 st	61 to 75 st	76 to 100 st	101 to 125 st	126 to 150 st	Z * 5 to 15 st	16 to 30 st	31 to 45 st	46 to 60 st	61 to 75 st	76 to 100 st	101 to 125 st	126 to 150 st
6	15	12	14	3	8	13	4.5	1.6	24	14	32	14.5	28	M3 x 0.5	16	3	M6 x 1.0	3	46.5 (51.5)	55.5 (60.5)	59.5 (64.5)	73.5 (78.5)	–	–	–	–	74.5 (79.5)	83.5 (88.5)	87.5 (92.5)	101.5 (106.5)	–	–	–	–
10	15	12	14	4	8	13	4.5	1.6	24	14	32	8	28	M4 x 0.7	12.5	5.5	M8 x 1.0	–	48.5	56	68	80	–	–	–	–	76.5	84	96	108	–	–	–	–
16	15	18.3	20	5	8	19	5.5	2.3	33	20	42	8	28	M5 x 0.8	12.5	5.5	M10 x 1.0	–	48.5	57	69	81	87	111	129	141	76.5	85	97	109	115	139	157	169

∗ ( ) in S and Z dimensions: With auto switch

Single Acting, Spring Extend: Double Clevis Style (D)

CJ2D Bore size – Stroke T



∗ Clevis pin and retaining ring are shipped together.

(mm)

Bore size (mm)	A	B	C	CD (cd)	CX	CZ	D	GA	H	MM	NA	NB	R	U	S 5 to 15 st	16 to 30 st	31 to 45 st	46 to 60 st	61 to 75 st	76 to 100 st	101 to 125 st	126 to 150 st	Z 5 to 15 st	16 to 30 st	31 to 45 st	46 to 60 st	61 to 75 st	76 to 100 st	101 to 125 st	126 to 150 st
10	15	12	14	3.3	3.2	12	4	8	28	M4 x 0.7	12.5	18.5	5	8	48.5	56	68	80	–	–	–	–	84.5	92	104	116	–	–	–	–
16	15	18.3	20	5	6.5	18.3	5	8	28	M5 x 0.8	12.5	23.5	8	10	48.5	57	69	81	87	111	129	141	86.5	95	107	119	125	149	167	179

(mm)

Bore size (mm)	ZZ 5 to 15 st	16 to 30 st	31 to 45 st	46 to 60 st	61 to 75 st	76 to 100 st	101 to 125 st	126 to 150 st
10	95.5	103	115	127	–	–	–	–
16	100.5	109	121	133	139	163	181	193

T-bracket Dimensions

Bore size (mm)	TC	TH	TV	TW	TX	TY
10	4.5	29	40	22	32	12
16	5.5	35	48	28	38	16

Air Cylinder: Non-rotating Rod Type
Double Acting, Single Rod
Series CJ2K
ø10, ø16

How to Order

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
D	Double clevis style

Bore size

10	10 mm
16	16 mm

Cylinder standard stroke (mm)
Refer to the standard stroke table on page 69.

CJ2K **L** **16** – **60** ☐ – ☐

With auto switch

CDJ2K **L** **16** – **60** ☐ – **M9BW** ☐ – ☐

With auto switch
(Built-in magnet)

Made to Order
Refer to page 69 for details.

Head cover port location

Symbol \ Bore size (mm)	ø10, ø16
Nil	Perpendicular to axis
R	Axial

∗For configuration, refer to page 69.
∗ Double clevis is only available for being perpendicular to axis.

Auto switch
∗ For the applicable auto switch model, refer to the table below.
∗ If a built-in magnet cylinder without an auto switch is required, refer to the model of built-in magnet cylinder.

Number of auto switches

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

Built-in Magnet Cylinder Model

Suffix the symbol "-A" (Rail mounting style) or "-B" (Band mounting style) to the end of part number for cylinder with auto switch.

Example	Rail mounting style	CDJ2KB16-60-A
	Band mounting style	CDJ2KB10-45-B

∗ For rail mounting style, screws and nuts for 2 pcs switches come with the rail.
∗ Refer to page 123 for switch mounting brackets.

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model: Band mounting	Auto switch model: Rail mounting Perpendicular	Auto switch model: Rail mounting In-line	Lead wire length (m) 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	——	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**M9N**	—	—	●	●	●	○	—	○	IC circuit	Relay, PLC
								—	**F7NV**	**F79**	●	—	●	○	—	○		
				3-wire (PNP)				**M9P**	—	—	●	●	●	○	—	○		
								—	**F7PV**	**F7P**	●	—	●	○	—	○		
				2-wire		12 V		**M9B**	—	—	●	●	●	○	—	○	—	
								—	**F7BV**	**J79**	●	—	●	○	—	○		
		Connector						**H7C**	**J79C**	—	●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		**M9NW**	—	—	●	●	●	○	—	○	IC circuit	
								—	**F7NWV**	**F79W**	●	—	●	○	—	○		
				3-wire (PNP)				**M9PW**	—	—	●	●	●	○	—	○		
								—	—	**F7PW**	●	—	●	○	—	○		
				2-wire		12 V		**M9BW**	—	—	●	●	●	○	—	○	—	
								—	**F7BWV**	**J79W**	●	—	●	○	—	○		
	Water resistant (2-color indication)							**H7BA**	**F7BAV**	**F7BA**	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		**H7NF**	—	**F79F**	●	—	●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96**	—	**A76H**	●	—	●	—	—	—	IC circuit	—
				2-wire	24 V	—	200 V	—	**A72**	**A72H**	●	—	●	—	—	—	—	Relay, PLC
						12 V	100 V	—	**A73**	**A73H**	●	—	●	●	—	—		
								A93	—	—	●	—	●	—	—	—		
			No				100 V or less	**A90**	**A80**	**A80H**	●	—	●	—	—	—	IC circuit	
		Connector	Yes				—	**C73C**	**A73C**	—	●	—	●	●	●	—	—	
			No				24 V or less	**C80C**	**A80C**	—	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color indication)	Grommet	Yes			—	—	—	**A79W** ∗∗	—	●	—	●	—	—	—	—	

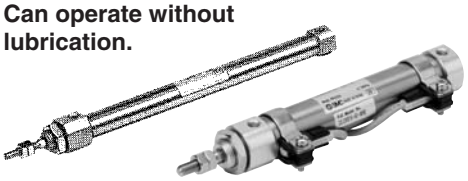
∗ Lead wire length symbols: 0.5 m····· Nil (Example) M9NW
1 m····· M (Example) M9NWM
3 m····· L (Example) M9NWL
5 m····· Z (Example) M9NWZ
None····· N (Example) H7CN

∗ Since there are other applicable auto switches than listed, refer to page 123 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
∗ Band mounting style is not available for D-A9□V/M9□V/M9□WV and D-M9□A(V)L types.
∗∗ "D-A79W" cannot be mounted on bore size ø10 cylinder with air cushion.

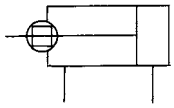
∗ Solid state auto switches marked with "○" are produced upon receipt of order.
∗ D-A9□/M9□/M9□W/A7□□/A80□/F7□□/J7□□ auto switches are shipped together (not assembled). (However, when D-A9□/M9□/M9□W types are selected, only auto switch mounting brackets are assembled before being shipped.)
∗ When D-A9□(V)/M9□(V)/M9□W(V) types are mounted on a ø10 or ø16 rail, order auto switch mounting brackets separately. Refer to page 123 for details.

A cylinder which rod does not rotate because of the hexagonal rod shape.

Non-rotating accuracy
ø10: ±1.5°, ø16: ±1°
Can operate without lubrication.



JIS Symbol
Double acting, Single rod



Head Cover Port Location

Either perpendicular to the cylinder axis or in-line with the cylinder axis is available for basic style.

Axial

Perpendicular

Made to Order Specifications
(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC3	Special port location
—XC10	Dual stroke cylinder/Double rod type
—XC22	Fluororubber seals
—XC51	With hose nipple

Specifications

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	
Cushion	Rubber bumper	
Lubrication	Not required (Non-lube)	
Stroke length tolerance	$^{+1.0}_{0}$	
Rod non-rotating accuracy	±1.5°	±1°
Piston speed	50 to 750 mm/s	
Allowable kinetic energy	0.035 J	0.090 J

∗ No freezing

Standard Stroke

(mm)

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 at 1 mm intervals is possible. (Spacers are not used.)

Mounting Style and Accessory/For details, refer to page 51.

Mounting style		Basic style	Axial foot style	Rod side flange style	Double clevis ∗ style
Standard equipment	Mounting nut	●	●	●	–
	Rod end nut	●	●	●	●
	Clevis pin	–	–	–	●
Option	Single knuckle joint	●	●	●	●
	Double knuckle joint ∗	●	●	●	●
	T-bracket	–	–	–	●

∗ Pin and retaining ring are shipped together with double clevis and double knuckle joint.

Mounting Bracket Part No.

Mounting bracket	Bore size (mm)	
	10	**16**
Foot bracket	CJ-L016B	CJK-L016B
Flange bracket	CJ-F016B	CJK-F016B
T-bracket ∗	CJ-T010B	CJ-T016B

∗ T-bracket is used with double clevis (D).

Refer to pages 117 to 123 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket part no.

⚠ Specific Product Precautions

Be sure to read before handling.
Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

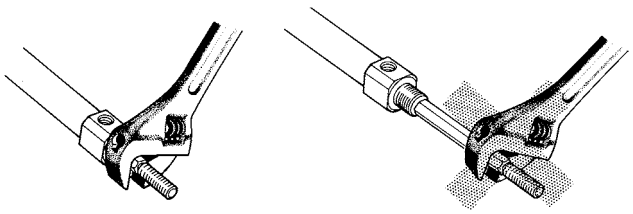
Caution on Handling

⚠Caution

1. During installation, secure the rod cover and tighten by applying an appropriate tightening force to the retaining but 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: 10.8 to 11.8 N·m, ø16: 20 to 21 N·m
3. In the case of a non-rotating cylinder, do not operate it in such a way that rotational torque would be applied to the piston rod. If rotational torque is applied, the non-rotating guide will become deformed, thus affecting the non-rotating accuracy.

Allowable rotational torque (N·m)	ø10	ø16
	0.02	0.04

4. To screw a bracket onto the threaded portion at the tip of the piston rod, make sure to retract the piston rod entirely, and place a wrench over the flat portion of the rod that protrudes. To tighten, take precautions to prevent the tightening torque from being applied to the non-rotating guide.
5. 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.
6. In the case of auto switch rail mounting style, do not remove the rail that is mounted. Because retaining screws extend into the cylinder, this could lead to an air leak.



Mass

(g)

Bore size (mm)		10	16
Basic mass *		24	55
Additional mass per each 15 mm of stroke		4	6.5
Mounting bracket mass	Axial foot style	20	20
	Rod side flange style	15	15
	Double clevis style (With pin) *	4	10

* Mounting nut and rod end nut are included in the basic mass.
** Mounting nut is not attached to the double clevis style, so the mounting nut mass is already subtracted.

Calculation: (Example) **CJ2KL10-45**
- Basic mass ····· 24 (ø10)
- Additional mass ····· 4/15 stroke
- Cylinder stroke ····· 45 stroke
- Mounting bracket mass ····· 20 (Axial foot style)

24 + 4/15 x 45 + 20 = 56 g

Copper and Fluorine-free Air Cylinder (For CRT manufacturing process)

20-CJ2K [Mounting style] [Bore size] – [Stroke] [Head cover port location]

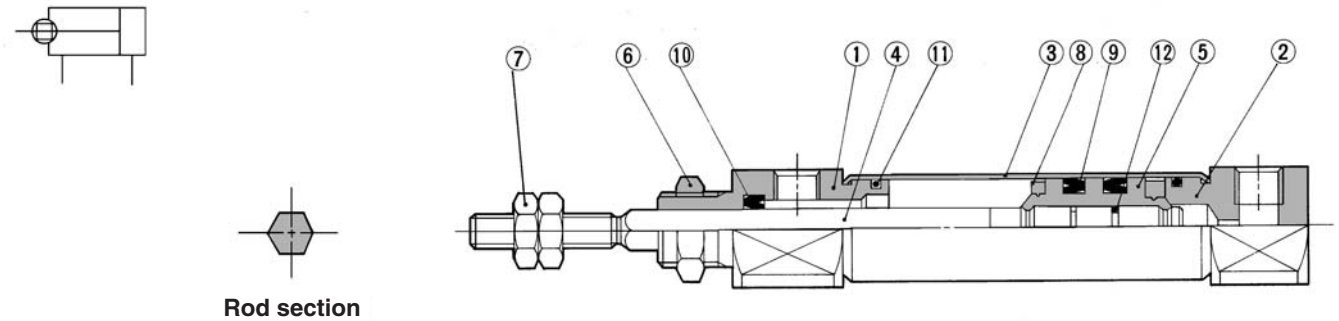
- **Copper and fluorine-free**

Eliminates the effects by copper based ions and fluorine based resins, etc. over the color cathode ray tube.
Making copper based materials into electroless nickel plated treatment or changing them to the non-copper materials in order to prevent copper ions from generating.

Specifications

Action		Double acting, Single rod
Maximum operating pressure		0.7 MPa
Minimum operating pressure		0.06 MPa
Cushion		Rubber bumper (Standard equipment)
Rod non-rotating accuracy	**ø10**	±1.5°
	ø16	±1°
Standard stroke (mm)		Same as standard type. (Refer to page 69.)
Auto switch		Mountable (Band mounting style)
Mounting		Basic style, Axial foot style, Rod side flange style, Double clevis style

Construction (Not able to disassemble)



Rod section

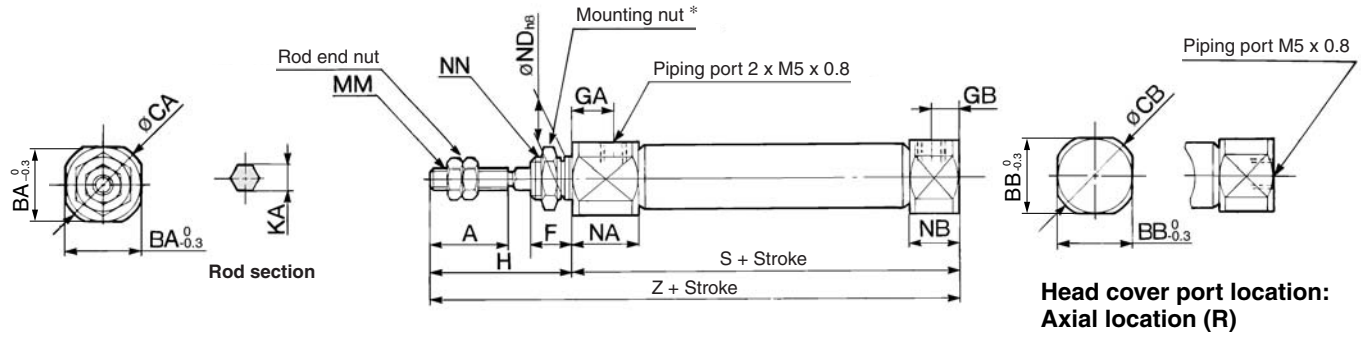
Component Parts

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**	Brass	
6	**Mounting nut**	Brass	Nickel plated

No.	Description	Material	Note
7	**Rod end nut**	Rolled steel	Nickel plated
8	**Bumper**	Urethane	
9	**Piston seal**	NBR	
10	**Rod seal**	NBR	
11	**Tube gasket**	NBR	
12	**Piston gasket**	NBR	

Basic Style (B)

CJ2KB Bore size – Stroke Head cover port location



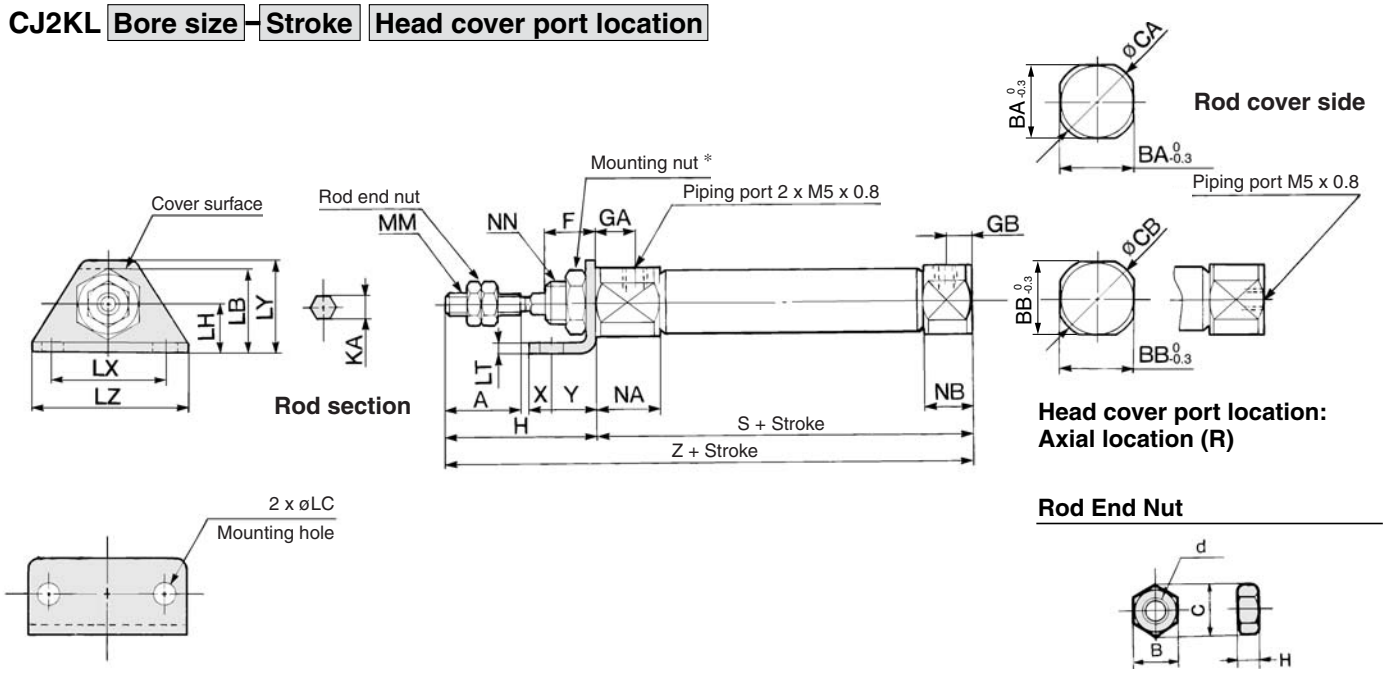
* Refer to page 51 for details of the mounting nut. (SNJ-016B for ø10, SNKJ-016B for ø16)

(mm)

Bore size (mm)	A	BA	BB	CA	CB	F	GA	GB	H	KA	MM	NA	NB	NDh8	NN	S	Z
10	15	15	12	17	14	8	8	5	28	4.2	M4 x 0.7	12.5	9.5	10 $^{0}_{-0.022}$	M10 x 1.0	46	74
16	15	18.3	18.3	20	20	8	8	5	28	5.2	M5 x 0.8	12.5	9.5	12 $^{0}_{-0.027}$	M12 x 1.0	47	75

Axial Foot Style (L)

CJ2KL Bore size – Stroke Head cover port location



Rod End Nut

Material: Iron

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

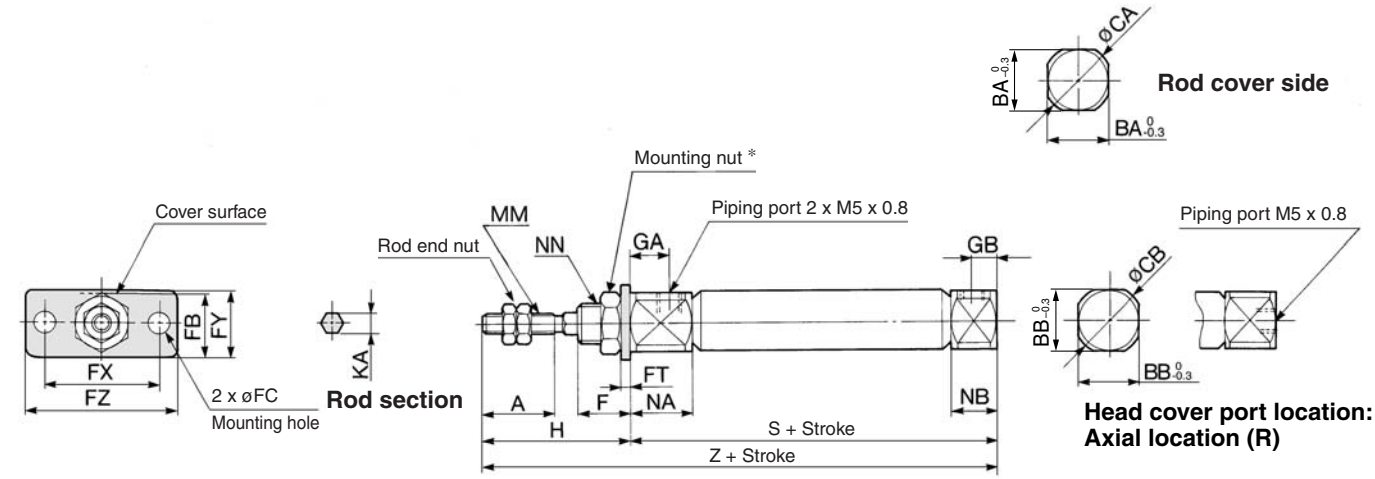
* Refer to page 51 for details of the mounting nut. (SNJ-016B for ø10, SNKJ-016B for ø16)

(mm)

Bore size (mm)	A	BA	BB	CA	CB	F	GA	GB	H	KA	LB	LC	LH	LT	LX	LY	LZ	MM	NA	NB	NN	X	Y	S	Z
10	15	15	12	17	14	8	8	5	28	4.2	21.5	5.5	14	2.3	33	25	42	M4 x 0.7	12.5	9.5	M10 x 1.0	6	9	46	74
16	15	18.3	18.3	20	20	8	8	5	28	5.2	23	5.5	14	2.3	33	25	42	M5 x 0.8	12.5	9.5	M12 x 1.0	6	9	47	75

Rod Side Flange Style (F)

CJ2KF Bore size – Stroke Head cover port location



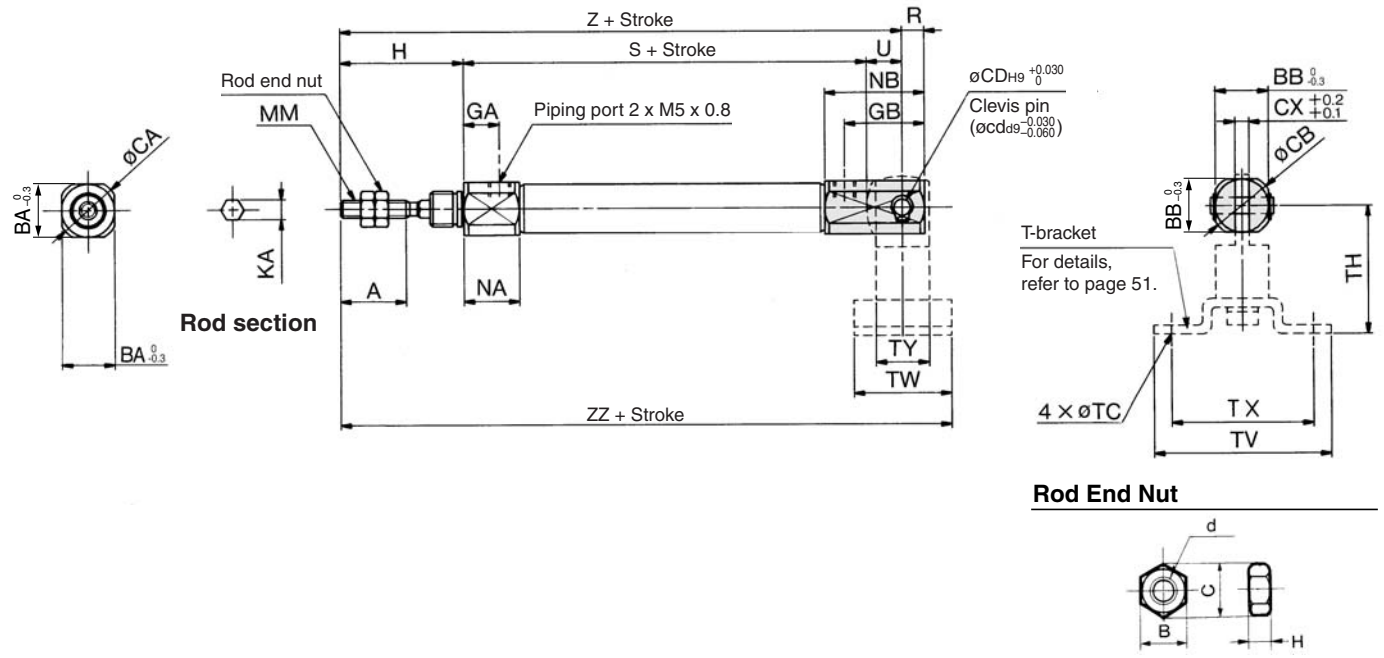
* Refer to page 51 for details of the mounting nut. (SNJ-016B for ø10, SNKJ-016B for ø16)

(mm)

Bore size (mm)	A	BA	BB	CA	CB	F	FB	FC	FT	FX	FY	FZ	GA	GB	H	KA	MM	NA	NB	NN	S	Z
10	15	15	12	17	14	8	17.5	5.5	2.3	33	20	42	8	5	28	4.2	M4 x 0.7	12.5	9.5	M10 x 1.0	46	74
16	15	18.3	18.3	20	20	8	19	5.5	2.3	33	20	42	8	5	28	5.2	M5 x 0.8	12.5	9.5	M12 x 1.0	47	75

Double Clevis Style (D)

CJ2KD Bore size – Stroke



Rod End Nut

Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-010A	**10**	7	8.1	M4 x 0.7	3.2
NTJ-015A	**16**	8	9.2	M5 x 0.8	4

* Clevis pin and retaining ring are shipped together.

Bore size (mm)	A	BA	BB	CA	CB	CD(cd)	CX	GA	GB	H	KA	MM	NA	NB	R	S	U	Z	ZZ
10	15	15	12	17	14	3.3	3.2	8	18	28	4.2	M4 x 0.7	12.5	22.5	5	46	8	82	93
16	15	18.3	18.3	20	20	5	6.5	8	23	28	5.2	M5 x 0.8	12.5	27.5	8	47	10	85	99

T-bracket Dimensions

(mm)

Bore size (mm)	TC	TH	TV	TW	TX	TY
10	4.5	29	40	22	32	12
16	5.5	35	48	28	38	16

Air Cylinder: Non-rotating Rod Type
Single Acting, Spring Return/Extend
Series CJ2K
ø10, ø16

How to Order

Bore size

10	10 mm
16	16 mm

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
D	Double clevis style

Cylinder standard stroke (mm)
Refer to the standard stroke table on page 74.

Action

S	Single acting, Spring return
T	Single acting, Spring extend

Built-in Magnet Cylinder Model

Suffix the symbol "-A" (Rail mounting style) or "-B" (Band mounting style) to the end of part number for cylinder with auto switch.

Example	Rail mounting style	CDJ2KB16-60S-A
	Band mounting style	CDJ2KB10-45S-B

∗ For rail mounting style, screws and nuts for 2 pcs switches come with the rail.
∗ Refer to page 123 for switch mounting brackets.

CJ2K **L** **16** – **45** **S** ☐ – ☐

With auto switch **CDJ2K** **L** **16** – **45** **S** ☐ – **M9BW** ☐ – ☐

With auto switch
(Built-in magnet)

Made to Order
Refer to page 74 for details.

Head cover port location

Symbol \ Bore size (mm)	ø10, ø16
Nil	Perpendicular to axis
R	Axial

∗ For configuration, refer to page 69.
∗ Single acting, Spring return (S), Clevis style is available only for 90° to the axis.
∗ Not applicable to single acting, spring extend (T).

Auto switch
∗ For the applicable auto switch model, refer to the table below.
∗ If a built-in magnet cylinder without an auto switch is required, refer to the model of built-in magnet cylinder.

Number of auto switches

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

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Band mounting	Rail mounting: Perpendicular	Rail mounting: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	——	Grommet	Yes	3-wire (NPN)	24V	5 V, 12 V	—	**M9N**	—	—	●	●	●	○	—	○	IC circuit	Relay, PLC
								—	**F7NV**	**F79**	●	—	●	○	—	○		
				3-wire (PNP)				**M9P**	—	—	●	●	●	○	—	○		
								—	**F7PV**	**F7P**	●	—	●	○	—	○		
				2-wire		12 V		**M9B**	—	—	●	●	●	○	—	○	—	
								—	**F7BV**	**J79**	●	—	●	○	—	○		
		Connector						**H7C**	**J79C**	—	●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		**M9NW**	—	—	●	●	●	○	—	○	IC circuit	
								—	**F7NWV**	**F79W**	●	—	●	○	—	○		
				3-wire (PNP)				**M9PW**	—	—	●	●	●	○	—	○		
								—	—	**F7PW**	●	—	●	○	—	○		
				2-wire		12 V		**M9BW**	—	—	●	●	●	○	—	○	—	
								—	**F7BWV**	**J79W**	●	—	●	○	—	○		
	Water resistant (2-color indication)							**H7BA**	**F7BAV**	**F7BA**	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		**H7NF**	—	**F79F**	●	—	●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96**	—	**A76H**	●	—	●	—	—	—	IC circuit	—
				2-wire		—	200 V	—	**A72**	**A72H**	●	—	●	—	—	—	—	Relay, PLC
					24V	12 V	100 V	—	**A73**	**A73H**	●	—	●	●	—	—		
								A93	—	—	●	—	●	—	—	—		
			No				100 V or less	**A90**	**A80**	**A80H**	●	—	●	—	—	—	IC circuit	
		Connector	Yes				—	**C73C**	**A73C**	—	●	—	●	●	●	—	—	
			No				24 V or less	**C80C**	**A80C**	—	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color indication)	Grommet	Yes			—	—	—	**A79W** ∗∗	—	●	—	●	—	—	—	—	

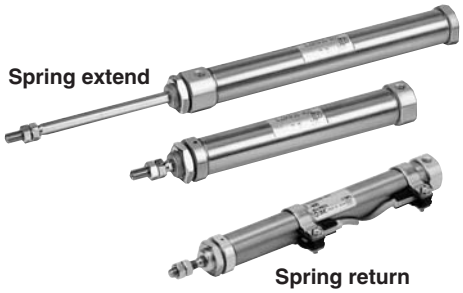
∗ Lead wire length symbols: 0.5 m····· Nil (Example) M9NW
1 m····· M (Example) M9NWM
3 m····· L (Example) M9NWL
5 m····· Z (Example) M9NWZ
None····· N (Example) H7CN

∗ Since there are other applicable auto switches than listed, refer to page 123 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
∗ Band mounting style is not available for D-A9□V/M9□V/M9□WV and D-M9□A(V)L types.
∗∗ "D-A79W" cannot be mounted on bore size ø10 cylinder with air cushion.

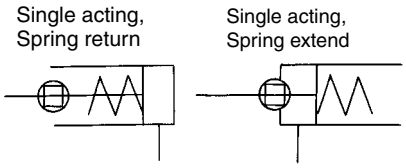
∗ Solid state auto switches marked with "○" are produced upon receipt of order.
∗ D-A9□/M9□/M9□W/A7□□/A80□/F7□□/J7□□ auto switches are shipped together (not assembled). (However, when D-A9□/M9□/M9□W types are selected, only auto switch mounting brackets are assembled before being shipped.)
∗ When D-A9□(V)/M9□(V)/M9□W(V) types are mounted on a ø10 or ø16 rail, order auto switch mounting brackets separately. Refer to page 123 for details.

A cylinder which rod does not rotate because of the hexagonal rod shape.

Non-rotating accuracy
ø10: ±1.5°, ø16: ±1°
Can operate without lubrication.



JIS Symbol



Specifications

Bore size (mm)	10	16
Action	Single acting, Spring return/Single acting, Spring extend	
Fluid	Air	
Proof pressure	1 MPa	
Maximum operating pressure	0.7 MPa	
Minimum operating pressure	0.15 MPa	
Ambient and fluid temperature	Without auto switch: −10°C to 70°C, With auto switch: −10°C to 60°C	
Cushion	Rubber bumper (standard equipment)	
Lubrication	Not required (Non-lube)	
Stroke length tolerance	$^{+1.0}_{0}$	
Rod non-rotating accuracy	±1.5°	±1°
Piston speed	50 to 750 mm/s	
Allowable kinetic energy	0.035 J	0.090 J

∗ No freezing

Standard Stroke (mm)

Bore size	Standard stroke
10	15, 30, 45, 60
16	15, 30, 45, 60, 75, 100, 125, 150

∗ Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Spring Force (N)

Bore size (mm)	Retracted side	Extended side
10	6.86	3.53
16	14.2	6.86

Mounting Style and Accessory /For details, refer to page 44.

Mounting		Basic style	Axial foot style	Rod side flange style	Double clevis* style
Standard equipment	Mounting nut	●	●	●	–
	Rod end nut	●	●	●	●
	Clevis pin	–	–	–	●
Option	Single knuckle joint	●	●	●	●
	Double knuckle joint *	●	●	●	●
	T-bracket	–	–	–	●

∗ Pin and retaining ring are shipped together with double clevis and double knuckle joint.

Mounting Bracket Part No.

Mounting bracket	Bore size (mm)	
	10	**16**
Foot bracket	CJ-L016B	CJK-L016B
Flange bracket	CJ-F016B	CJK-F016B
T-bracket *	CJ-T010B	CJ-T016B

∗ T-bracket is used with double clevis (D).

Made to Order Specifications

(For details, refer to pages 1380 and 1479.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC51	With hose nipple

⚠ Precautions

Be sure to read before handling.
Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Refer to pages 117 to 123 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket part no.

Mass/Spring Return, ( ): Spring Extend

(g)

Bore size (mm)		10	16
Basic mass *	15 stroke	28(28)	63(64)
	30 stroke	35(34)	80(80)
	45 stroke	44(43)	102(100)
	60 stroke	53(51)	124(121)
	75 stroke	—	145(140)
	100 stroke	—	188(178)
	125 stroke	—	224(212)
	150 stroke	—	250(236)
Mounting bracket mass	Axial foot style	20	20
	Rod side flange style	15	15
	Double clevis style * (With pin)	4	10

* Mounting nut and rod end nut are included in the basic mass.
** Mounting nut is not attached to the double clevis style, so the mounting nut mass is already subtracted.

Calculation: (Example) **CJ2KL10-45S**
- Basic mass ····· 44 (ø10-45 stroke)
- Mounting bracket mass ····· 20 (Axial foot style)

44 + 20 = 64 g

Copper and Fluorine-free Air Cylinder (For CRT manufacturing process)

20-CJ2K Mounting style | Bore size | Stroke | Action | Head cover port location

• **Copper and fluorine-free**

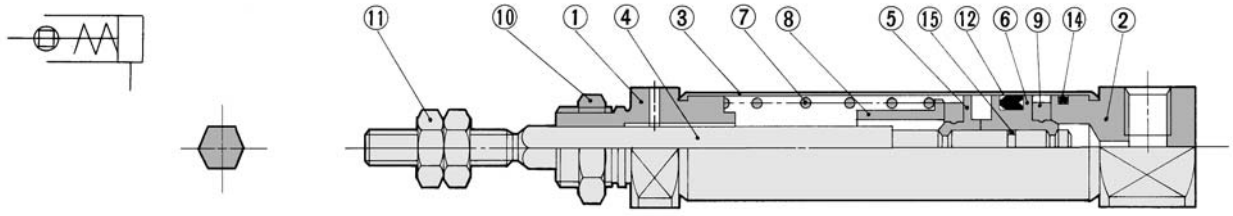
Eliminates the effects by copper based ions and fluorine based resins, etc. over the color cathode ray tube.
Making copper based materials into electroless nickel plated treatment or changing them to the non-copper materials in order to prevent copper ions from generating.

Specifications

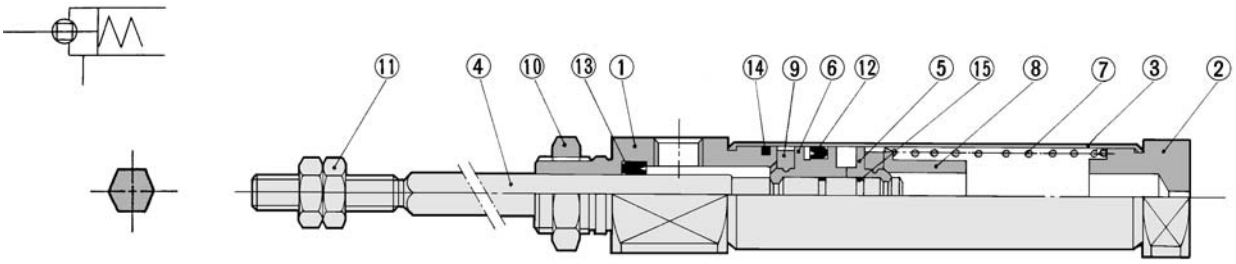
Action	Single acting/Spring return, Spring extend
Fluid	Air
Bore size (mm)	10, 16
Maximum operating pressure	0.7 MPa
Minimum operating pressure	0.15 MPa
Cushion	Rubber bumper (Standard equipment)
Rod non-rotating accuracy	ø10: ±1.5°, ø16: ±1°
Standard stroke (mm)	Same as standard type. (Refer to page 74.)
Auto switch	Mountable (Band mounting style)
Mounting	Basic style, Axial foot style, Rod side flange style, Double clevis style

Construction (Not able to disassemble)

Single acting, Spring return



Single acting, Spring extend



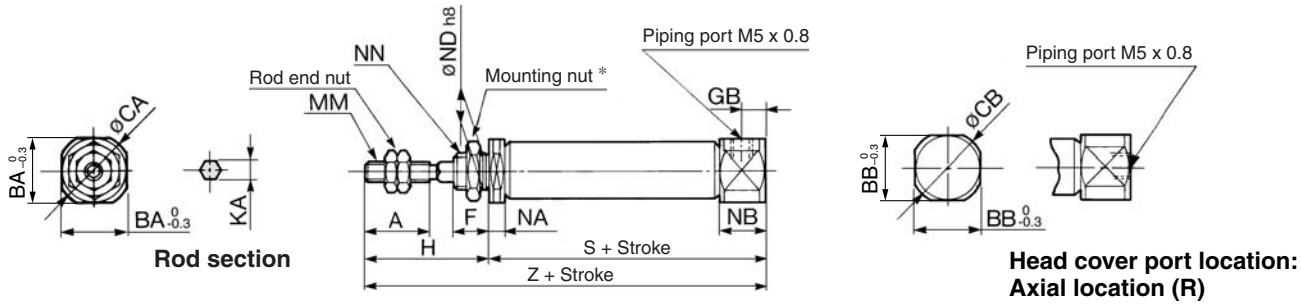
Component Parts

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**	Brass	
6	**Piston B**	Brass	
7	**Return spring**	Piano wire	Zinc chromated
8	**Spring seat**	Brass	

No.	Description	Material	Note
9	**Bumper**	Urethane	
10	**Mounting nut**	Brass	Nickel plated
11	**Rod end nut**	Rolled steel	Nickel plated
12	**Piston seal**	NBR	
13	**Rod seal**	NBR	
14	**Tube gasket**	NBR	
15	**Piston gasket**	NBR	

Single Acting, Spring Return: Basic Style (B)

CJ2KB Bore size – Stroke S Head cover port location



∗ Refer to page 51 for details of the mounting nut. (SNJ-016B for ø10, SNKJ-016B for ø16)

(mm)

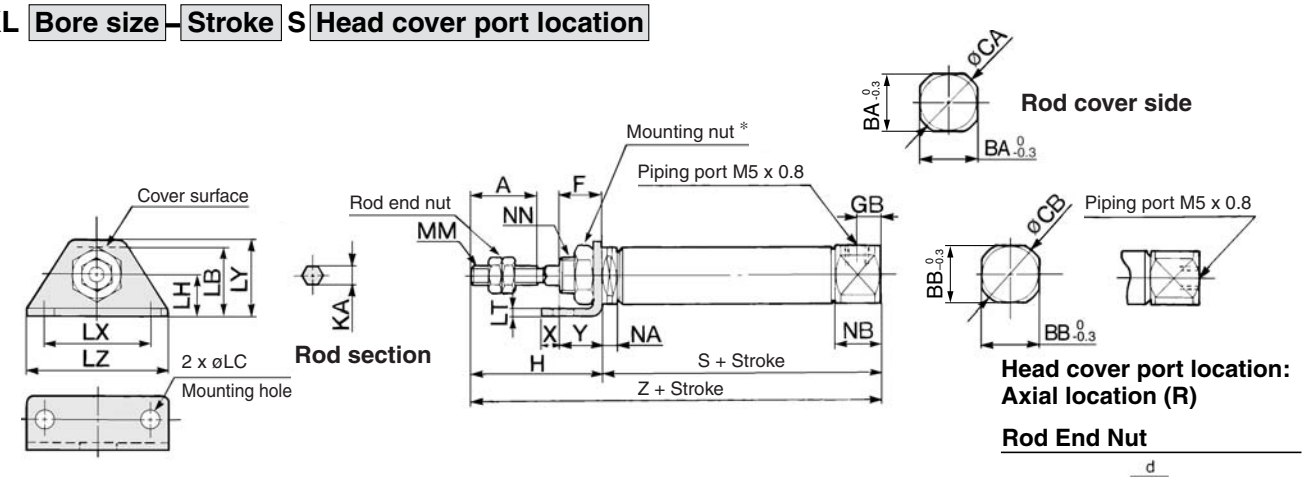
Bore size	A	BA	BB	CA	CB	F	GB	H	KA	MM	NA	NB	NDh8	NN
10	15	15	12	17	14	8	5	28	4.2	M4 x 0.7	5.5	9.5	$10^{\ 0}_{-0.022}$	M10 x 1.0
16	15	18.3	18.3	20	20	8	5	28	5.2	M5 x 0.8	5.5	9.5	$12^{\ 0}_{-0.027}$	M12 x 1.0

Dimensions by Stroke

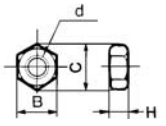
Bore size (mm) \ Symbol / Stroke	S								Z							
	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150
10	45.5	53	65	77	–	–	–	–	73.5	81	93	105	–	–	–	–
16	45.5	54	66	78	84	108	126	138	73.5	82	94	106	112	136	154	166

Single Acting, Spring Return: Axial Foot Style (L)

CJ2KL Bore size – Stroke S Head cover port location



Rod End Nut



Material: Iron

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

∗ Refer to page 51 for details of the mounting nut. (SNJ-016B for ø10, SNKJ-016B for ø16)

(mm)

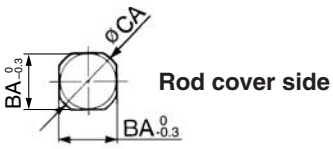
Bore size	A	BA	BB	CA	CB	F	GB	H	KA	LB	LC	LH	LT	LX	LY	LZ	MM	NA	NB	NN	X	Y
10	15	15	12	17	14	8	5	28	4.2	21.5	5.5	14	2.3	33	25	42	M4 x 0.7	5.5	9.5	M10 x 1.0	6	9
16	15	18.3	18.3	20	20	8	5	28	5.2	23	5.5	14	2.3	33	25	42	M5 x 0.8	5.5	9.5	M12 x 1.0	6	9

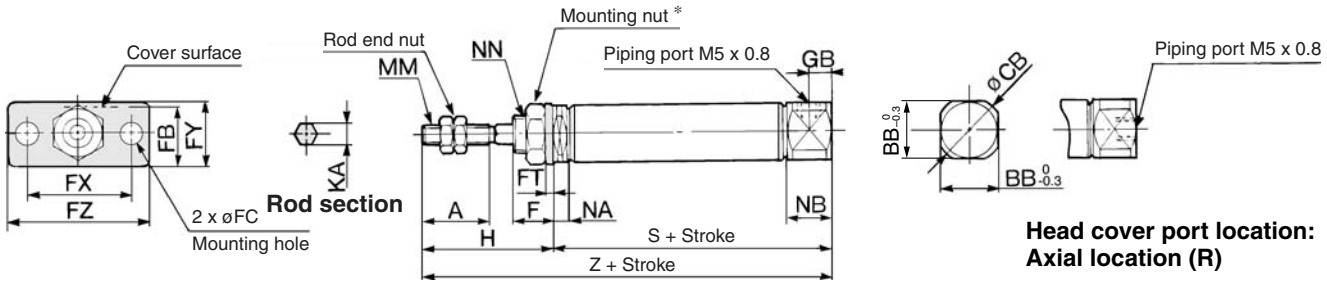
Dimensions by Stroke

Bore size (mm) \ Symbol / Stroke	S								Z							
	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150
10	45.5	53	65	77	–	–	–	–	73.5	81	93	105	–	–	–	–
16	45.5	54	66	78	84	108	126	138	73.5	82	94	106	112	136	154	166

Single Acting, Spring Return: Rod Side Flange Style (F)

CJ2KF Bore size – Stroke S Head cover port location





* Refer to page 51 for details of the mounting nut. (SNJ-016B for ø10, SNKJ-016B for ø16)

(mm)

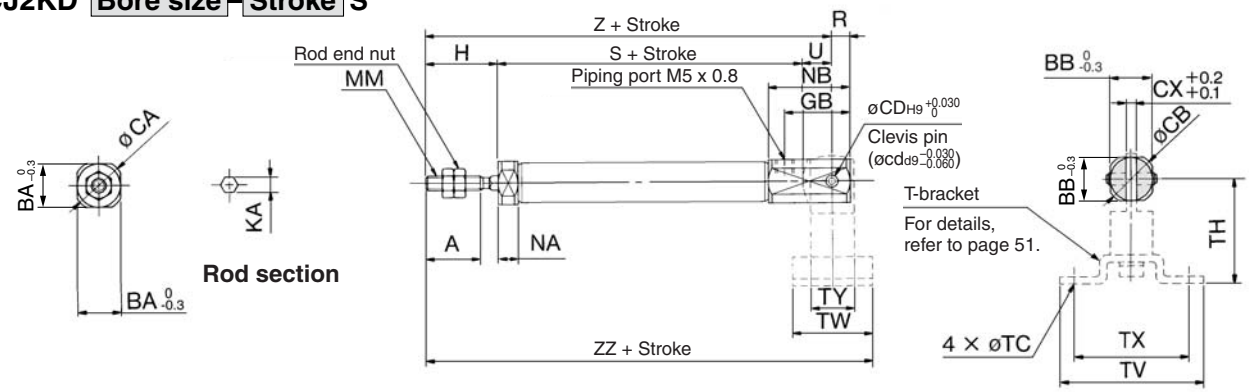
Bore size	A	BA	BB	CA	CB	F	FB	FC	FT	FX	FY	FZ	GB	H	KA	MM	NA	NB	NN
10	15	15	12	17	14	8	17.5	5.5	2.3	33	20	42	5	28	4.2	M4 x 0.7	5.5	9.5	M10 x 1.0
16	15	18.3	18.3	20	20	8	19	5.5	2.3	33	20	42	5	28	5.2	M5 x 0.8	5.5	9.5	M12 x 1.0

Dimensions by Stroke

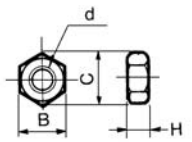
Bore size (mm) \ Stroke	S								Z							
	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150
10	45.5	53	65	77	–	–	–	–	73.5	81	93	105	–	–	–	–
16	45.5	54	66	78	84	108	126	138	73.5	82	94	106	112	136	154	166

Single Acting, Spring Return: Double Clevis Style (D)

CJ2KD Bore size – Stroke S



Rod End Nut



Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-010A	**10**	7	8.1	M4 x 0.7	3.2
NTJ-015A	**16**	8	9.2	M5 x 0.8	4

* Clevis pin and retaining ring are shipped together.

(mm)

Bore size	A	BA	BB	CA	CB	CD (cd)	CX	GB	H	KA	MM	NA	NB	R	U
10	15	12	12	14	14	3.3	3.2	18	20	4.2	M4 x 0.7	5.5	22.5	5	8
16	15	18.3	18.3	20	20	5	6.5	23	20	5.2	M5 x 0.8	5.5	27.5	8	10

Dimensions by Stroke

(mm)

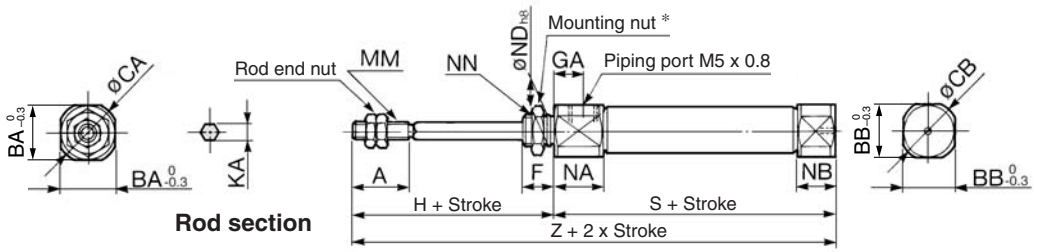
Bore size (mm) \ Stroke	S								Z								ZZ							
	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150
10	45.5	53	65	77	–	–	–	–	73.5	81	93	105	–	–	–	–	84.5	92	104	116	–	–	–	–
16	45.5	54	66	78	84	108	126	138	75.5	84	96	108	114	138	156	168	89.5	98	110	122	128	152	170	182

T-bracket Dimensions

Bore size (mm)	TC	TH	TV	TW	TX	TY
10	4.5	29	40	22	32	12
16	5.5	35	48	28	38	16

Single Acting, Spring Extend: Basic Style (B)

CJ2KB Bore size – Stroke T



* Refer to page 51 for details of the mounting nut. (SNJ-016B for ø10, SNKJ-016B for ø16)

(mm)

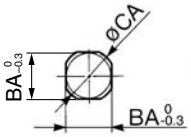
Bore size	A	BA	BB	CA	CB	F	GA	H	KA	MM	NA	NB	NDh8	NN
10	15	15	12	17	14	8	8	28	4.2	M4 x 0.7	12.5	5.5	$10^{0}_{-0.022}$	M10 x 1.0
16	15	18.3	18.3	20	20	8	8	28	5.2	M5 x 0.8	12.5	5.5	$12^{0}_{-0.027}$	M12 x 1.0

Dimensions by Stroke

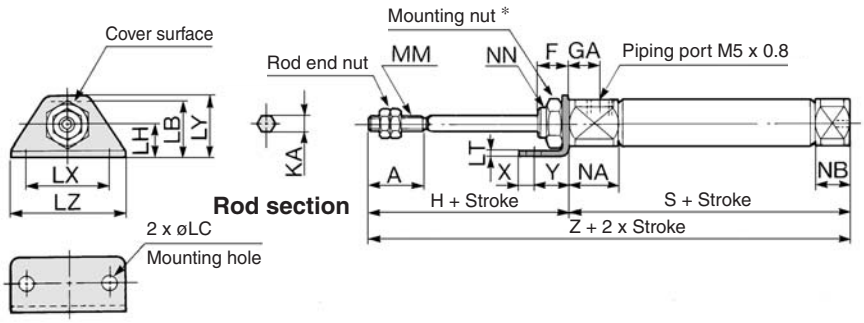
Bore size (mm) \ Symbol / Stroke	S								Z							
	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150
10	48.5	56	68	80	–	–	–	–	76.5	84	96	108	–	–	–	–
16	48.5	57	69	81	87	111	129	141	76.5	85	97	109	115	139	157	169

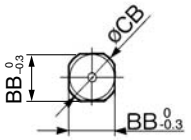
Single Acting, Spring Extend: Axial Foot Style (T)

CJ2KL Bore size – Stroke T

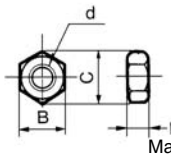


Rod cover side





Rod End Nut



Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-010A	**10**	7	8.1	M4 x 0.7	3.2
NTJ-015A	**16**	8	9.2	M5 x 0.8	4

* Refer to page 51 for details of the mounting nut. (SNJ-016B for ø10, SNKJ-016B for ø16)

(mm)

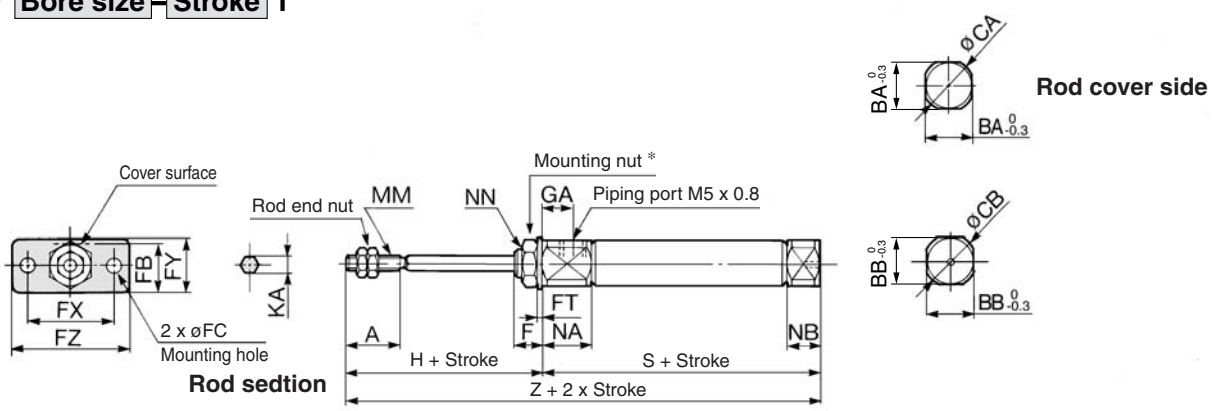
Bore size	A	BA	BB	CA	CB	F	GA	H	KA	LB	LC	LH	LT	LX	LY	LZ	MM	NA	NB	NN	X	Y
10	15	15	12	17	14	8	8	28	4.2	21.5	5.5	14	2.3	33	25	42	M4 x 0.7	12.5	5.5	M10 x 1.0	6	9
16	15	18.3	18.3	20	20	8	8	28	5.2	23	5.5	14	2.3	33	25	42	M5 x 0.8	12.5	5.5	M12 x 1.0	6	9

Dimensions by Stroke

Bore size (mm) \ Symbol / Stroke	S								Z							
	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150
10	48.5	56	68	80	–	–	–	–	76.5	84	96	108	–	–	–	–
16	48.5	57	69	81	87	111	129	141	76.5	85	97	109	115	139	157	169

Single Acting, Spring Extend: Rod Side Flange Style (F)

CJ2KF Bore size – Stroke T



* Refer to page 51 for details of the mounting nut. (SNJ-016B for ø10, SNKJ-016B for ø16)

(mm)

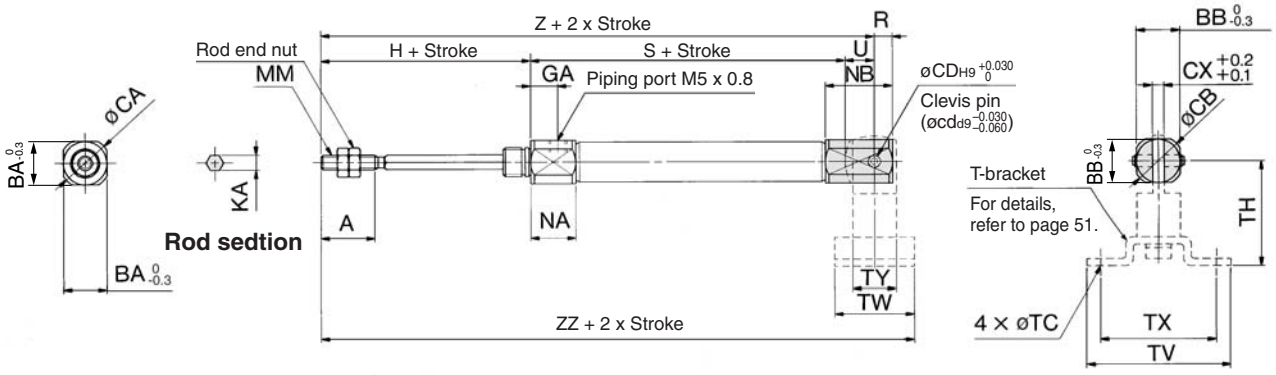
Bore size	A	BA	BB	CA	CB	F	FB	FC	FT	FX	FY	FZ	GA	H	KA	MM	NA	NB	NN
10	15	15	12	17	14	8	17.5	5.5	2.3	33	20	42	8	28	4.2	M4 x 0.7	12.5	5.5	M10 x 1.0
16	15	18.3	18.3	20	20	8	19	5.5	2.3	33	20	42	8	28	5.2	M5 x 0.8	12.5	5.5	M12 x 1.0

Dimensions by Stroke

Bore size (mm) \ Symbol / Stroke	S								Z							
	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150
10	48.5	56	68	80	–	–	–	–	76.5	84	96	108	–	–	–	–
16	48.5	57	69	81	87	111	129	141	76.5	85	97	109	115	139	157	169

Single Acting, Spring Extend/Double Clevis Style (D)

CJ2KD Bore size – Stroke T

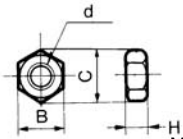


* Clevis pin and retaining ring are shipped together.

(mm)

Bore size	A	BA	BB	CA	CB	CD (cd)	CX	GA	H	KA	MM	NA	NB	R	U
10	15	15	12	17	14	3.3	3.2	8	28	4.2	M4 x 0.7	12.5	18.5	5	8
16	15	18.3	18.3	20	20	5	6.5	8	28	5.2	M5 x 0.8	12.5	23.5	8	10

Rod End Nut



Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-010A	**10**	7	8.1	M4 x 0.7	3.2
NTJ-015A	**16**	8	9.2	M5 x 0.8	4

Dimensions by Stroke

(mm)

Bore size (mm) \ Symbol / Stroke	S								Z								ZZ							
	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150
10	48.5	56	68	80	–	–	–	–	84.5	92	104	116	–	–	–	–	95.5	103	115	127	–	–	–	–
16	48.5	57	69	81	87	111	129	141	86.5	95	107	119	125	149	167	179	100.5	109	121	133	139	163	181	193

T-bracket Dimensions

Bore size (mm)	TC	TH	TV	TW	TX	TY
10	4.5	29	40	22	32	12
16	5.5	35	48	28	38	16

Air Cylinder: Built-in Speed Controller Type
Double Acting, Single Rod
Series CJ2Z
ø10, ø16

How to Order

Bore size

10	10 mm
16	16 mm

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
D	Double clevis style

Cylinder standard stroke (mm)
Refer to the standard stroke table on page 81.

Built-in Magnet Cylinder Model

Suffix the symbol "-A" (Rail mounting style) or "-B" (Band mounting style) to the end of part number for cylinder with auto switch.

Example	Rail mounting style	CDJ2ZB16-60-A
	Band mounting style	CDJ2ZB10-45-B

* For rail mounting style, screws and nuts for 2 pcs switches come with the rail.
* Refer to page 123 for switch mounting brackets.

	CJ2Z	**L**	**16**	–	**60**		–		
With auto switch	CDJ2Z	**L**	**16**	–	**60**		–	**M9BW**		–	

With auto switch
(Built-in magnet)

Made to Order
Refer to page 81 for details.

Head cover port location

Symbol \ Bore size (mm)	ø10, ø16
Nil	Perpendicular to axis
R	Axial

* For configuration, refer to page 81.
* Double clevis is only available for being perpendicular to axis.

Auto switch
* For the applicable auto switch model, refer to the table below.
* If a built-in magnet cylinder without an auto switch is required, refer to the model of built-in magnet cylinder.

Number of auto switches

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

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Band mounting	Auto switch model: Rail mounting Perpendicular	Auto switch model: Rail mounting In-line	Lead wire length (m) 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	——	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	**M9N**	—	—	●	●	●	○	—	○	IC circuit	Relay, PLC
							—	**F7NV**	**F79**	●	—	●	○	—	○		
				3-wire (PNP)			**M9P**	—	—	●	●	●	○	—	○		
							—	**F7PV**	**F7P**	●	—	●	○	—	○		
				2-wire	12 V		**M9B**	—	—	●	●	●	○	—	○	—	
							—	**F7BV**	**J79**	●	—	●	○	—	○		
		Connector					**H7C**	**J79C**	—	●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	5 V, 12 V		**M9NW**	—	—	●	●	●	○	—	○	IC circuit	
							—	**F7NWV**	**F79W**	●	—	●	○	—	○		
				3-wire (PNP)			**M9PW**	—	—	●	●	●	○	—	○		
							—	—	**F7PW**	●	—	●	○	—	○		
				2-wire	12 V		**M9BW**	—	—	●	●	●	○	—	○	—	
							—	**F7BWV**	**J79W**	●	—	●	○	—	○		
	Water resistant (2-color indication)						**H7BA**	**F7BAV**	**F7BA**	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5 V, 12 V		**H7NF**	—	**F79F**	●	—	●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96**	—	**A76H**	●	—	●	—	—	—	IC circuit	—
				2-wire	—	200 V	—	—	**A72**	**A72H**	●	—	●	—	—	—		Relay, PLC
					24V	12 V	100 V	—	**A73**	**A73H**	●	—	●	●	—	—	—	
								A93	—	—	●	—	●	—	—	—		
			No				100 V or less	**A90**	**A80**	**A80H**	●	—	●	—	—	—	IC circuit	
		Connector	Yes				—	**C73C**	**A73C**	—	●	—	●	●	●	—	—	
			No				24 V or less	**C80C**	**A80C**	—	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color indication)	Grommet	Yes			—	—	—	**A79W** **	—	●	—	●	—	—	—	—	

* 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

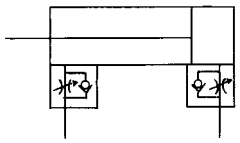
* Since there are other applicable auto switches than listed, refer to page 123 for details.
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
* Band mounting style is not available for D-A9□V/M9□V/M9□WV and D-M9□A(V)L types.
** "D-A79W" cannot be mounted on bore size ø10 cylinder with air cushion.

* Solid state auto switches marked with "○" are produced upon receipt of order.
* D-A9□/M9□/M9□W/A7□□/A80□/F7□□/J7□□ auto switches are shipped together (not assembled). (However, when D-A9□/M9□/M9□W types are selected, only auto switch mounting brackets are assembled before being shipped.)
* When D-A9□(V)/M9□(V)/M9□W(V) types are mounted on a ø10 or ø16 rail, order auto switch mounting brackets separately. Refer to page 123 for details.

Space-saving air cylinder with speed controller built-in cylinder cover

JIS Symbol

Double acting, Single rod



Made to Order Specifications
(For details, refer to pages 1380 and 1479.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC51	With hose nipple

⚠ Precautions

Refer to page 44 before handling.

Specifications

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	
Cushion	Rubber bumper	
Lubrication	Not required (Non-lube)	
Stroke length tolerance	$^{+1.0}_{0}$	
Speed controller	Built-in	
Piston speed	50 to 750 mm/s	
Allowable kinetic energy	0.035 J	0.090 J

∗ No freezing

Standard Stroke

(mm)

Bore size	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 at 1 mm intervals is possible. (Spacers are not used.)

Mounting Style and Accessory/For details, refer to page 51.

Mounting		Basic style	Axial foot style	Rod side flange style	Double clevis∗ style
Standard equipment	Mounting nut	●	●	●	–
	Rod end nut	●	●	●	●
	Clevis pin	–	–	–	●
Option	Single knuckle joint	●	●	●	●
	Double knuckle joint ∗	●	●	●	●
	T-bracket	–	–	–	●

∗ Pin and retaining ring are shipped together with double clevis and double knuckle joint.

Head Cover Port Location

Either perpendicular to the cylinder axis or in-line with the cylinder axis is available for basic style.

Axial

Perpendicular

Refer to pages 117 to 123 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket part no.

Mass

(g)

Bore size (mm)		10	16
Basic mass *		40	73
Additional mass per each 15 mm of stroke		4	6.5
Mounting bracket mass	Axial foot style	8	20
	Rod side flange style	5	15
	Double clevis style * (With pin)	4	10

* Mounting nut and rod end nut are included in the basic mass.
** Mounting nut is not attached to the double clevis style, so the mounting nut mass is already subtracted.

Calculation: (Example) **CJ2ZL10-45**

- Basic mass ····· 40 (ø10)
- Additional mass ····· 4/15 stroke
- Cylinder stroke ····· 45 stroke
- Mounting bracket mass ····· 8 (Axial foot style)

40 + 4/15 x 45 + 8 = 60 g

Copper and Fluorine-free Air Cylinder (For CRT manufacturing process)

20-CJ2Z Mounting style | Bore size – Stroke | Head cover port location

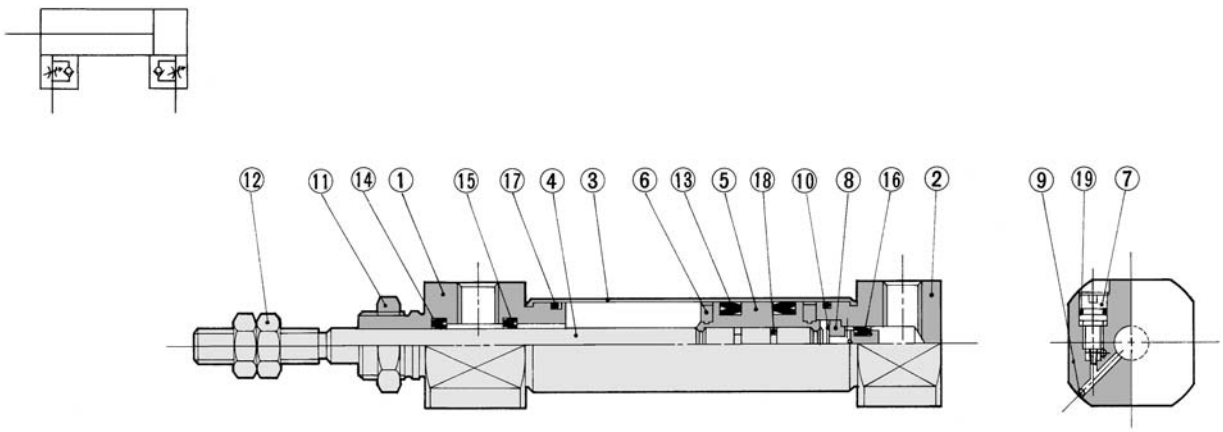
- **Copper and fluorine-free**

Eliminates the effects by copper based ions and fluorine based resins, etc. over the color cathode ray tube.
Making copper based materials into electroless nickel plated treatment or changing them to the non-copper materials in order to prevent copper ions from generating.

Specifications

Action	Double acting, Single rod
Bore size (mm)	10, 16
Maximum operating pressure	0.7 MPa
Minimum operating pressure	0.06 MPa
Cushion	Rubber bumper (Standard equipment)
Standard stroke (mm)	Same as standard type. (Refer to page 81.)
Auto switch	Mountable (Band mounting style)
Mounting	Basic style, Axial foot style, Rod side flange style, Double clevis style

Construction (Not able to disassemble)



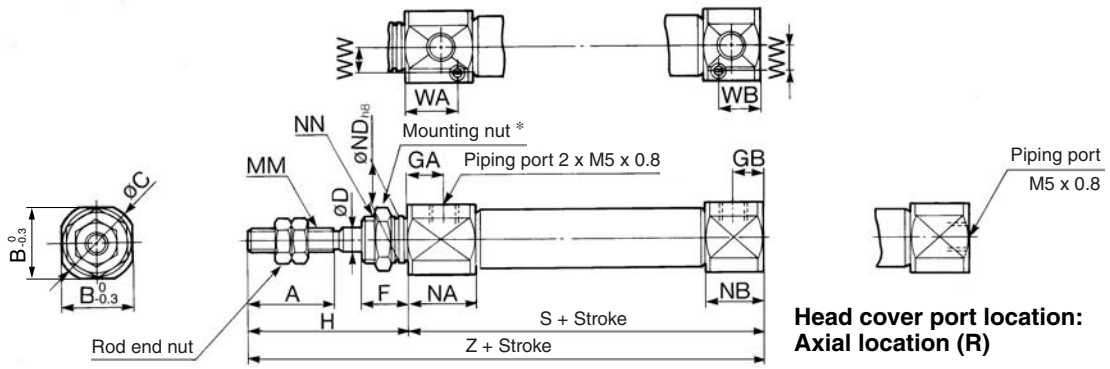
Component Parts

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**	Brass	
6	**Bumper**	Urethane	
7	**Speed controller needle**	Stainless steel	
8	**Check packing sleeve**	Brass	
9	**Steel balls**	Bearing steel	
10	**Retaining ring**	Carbon tool steel	Black zinc chromated

No.	Description	Material	Note
11	**Mounting nut**	Brass	Nickel plated
12	**Rod end nut**	Rolled steel	Nickel plated
13	**Piston seal**	NBR	
14	**Rod seal**	NBR	
15	**Check seal A**	NBR	
16	**Check seal B**	NBR	
17	**Tube gasket**	NBR	
18	**Piston gasket**	NBR	
19	**Needle seal**	NBR	

Basic Style (B)

CJ2ZB Bore size – Stroke Head cover port location



Head cover port location: Axial location (R)

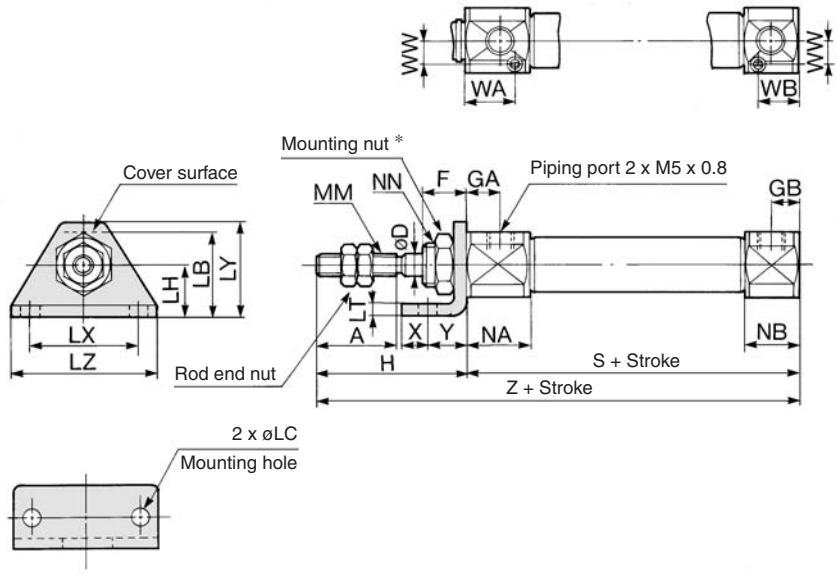
∗ For details of the mounting nut, refer to page 51.

(mm)

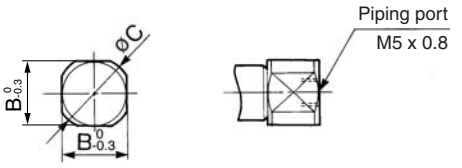
Bore size	A	B	C	D	F	GA	GB	H	MM	NA	NB	NDh8	NN	WA	WB	WW	S	Z
10	15	15	17	4	8	7.5	6.5	28	M4 x 0.7	21	18	8 $^{0}_{-0.022}$	M8 x 1.0	14.5	13.5	4.5	63	91
16	15	18.3	20	5	8	7.5	6.5	28	M5 x 0.8	21	18	10 $^{0}_{-0.022}$	M10 x 1.0	14.5	13.5	5.5	64	92

Axial Foot Style (L)

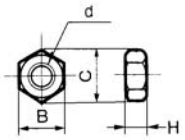
CJ2ZL Bore size – Stroke Head cover port location



Head cover port location: Axial location (R)



Rod End Nut



Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-010A	**10**	7	8.1	M4 x 0.7	3.2
NTJ-015A	**16**	8	9.2	M5 x 0.8	4

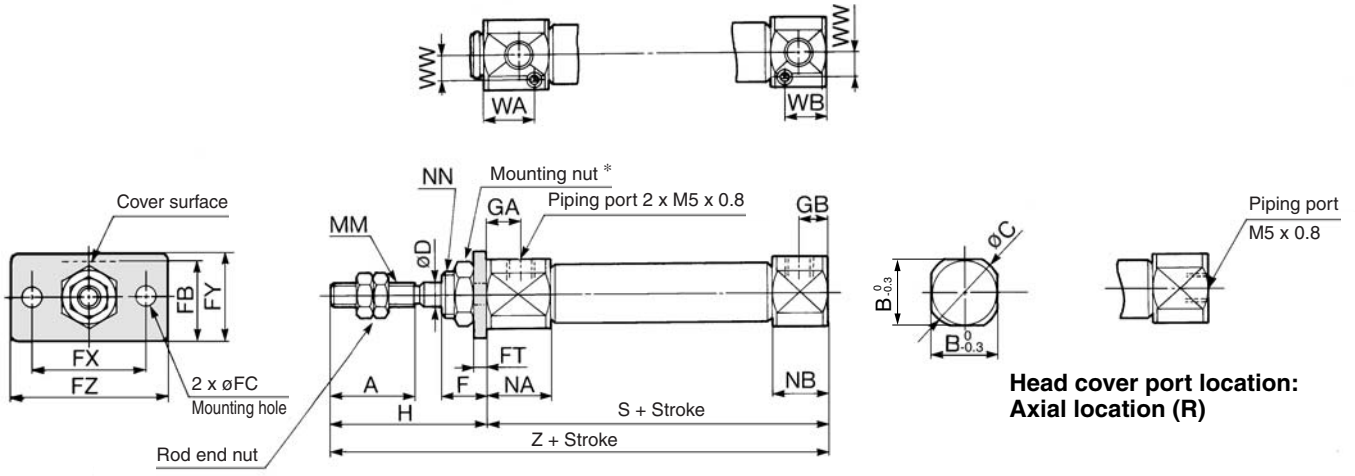
∗ For details of the mounting nut, refer to page 51.

(mm)

Bore size	A	B	C	D	F	GA	GB	H	LB	LC	LH	LT	LX	LY	LZ	MM	NA	NB	NN	S	WA	WB	WW	X	Y	Z
10	15	15	17	4	8	7.5	6.5	28	16.5	4.5	9	1.6	24	16.5	32	M4 x 0.7	21	18	M8 x 1.0	63	14.5	13.5	4.5	5	7	91
16	15	18.3	20	5	8	7.5	6.5	28	23	5.5	14	2.3	33	25	42	M5 x 0.8	21	18	M10 x 1.0	64	14.5	13.5	5.5	6	9	92

Rod Side Flange Style (F)

CJ2ZF Bore size – Stroke Head cover port location



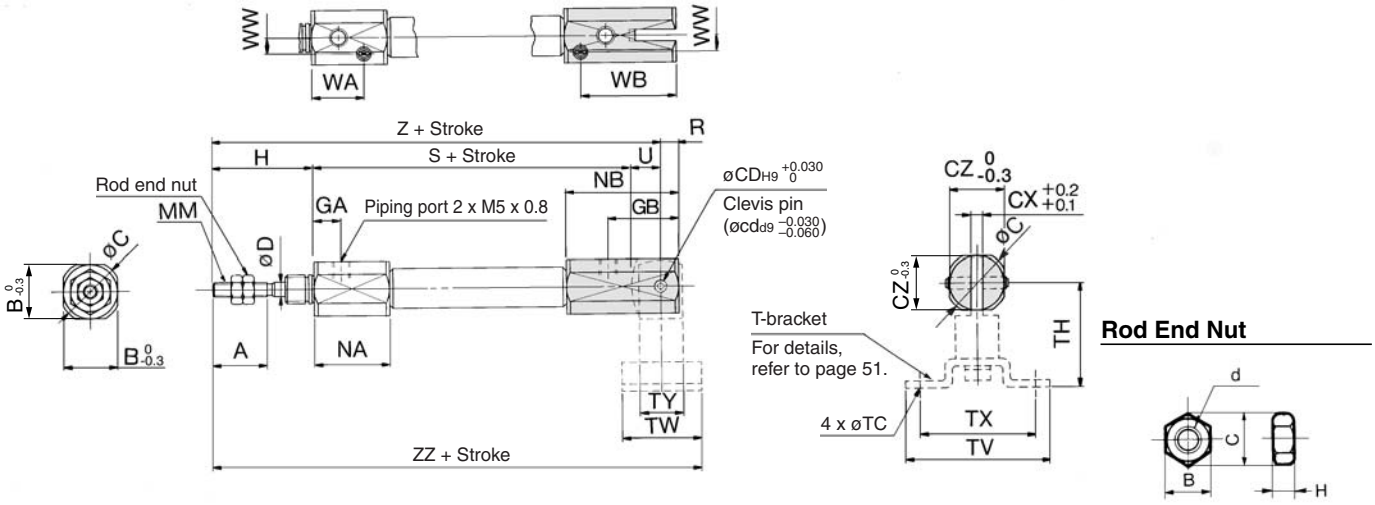
* For details of the mounting nut, refer to page 51.

(mm)

Bore size	A	B	C	D	F	FB	FC	FT	FX	FY	FZ	GA	GB	H	MM	NA	NB	NN	WA	WB	WW	S	Z
10	15	15	17	4	8	14.5	4.5	1.6	24	14	32	7.5	6.5	28	M4 x 0.7	21	18	M8 x 1.0	14.5	13.5	4.5	63	91
16	15	18.3	20	5	8	19	5.5	2.3	33	20	42	7.5	6.5	28	M5 x 0.8	21	18	M10 x 1.0	14.5	13.5	5.5	64	92

Double Clevis Style (D)

CJ2ZD Bore size – Stroke



Rod End Nut

Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-010A	**10**	7	8.1	M4 x 0.7	3.2
NTJ-015A	**16**	8	9.2	M5 x 0.8	4

* Clevis pin and retaining ring are shipped together.

(mm)

Bore size	A	B	C	CD (cd)	CX	CZ	D	GA	GB	H	MM	NA	NB	R	S	U	WA	WB	WW	Z	ZZ
10	15	15	17	3.3	3.2	15	4	7.5	19.5	28	M4 x 0.7	21	31	5	63	8	14.5	26.5	4.5	99	110
16	15	18.3	20	5	6.5	18.3	5	7.5	24.5	28	M5 x 0.8	21	36	8	64	10	14.5	31.5	5.5	102	116

T-bracket Dimensions

(mm)

Bore size	TC	TH	TV	TW	TX	TY
10	4.5	29	40	22	32	12
16	5.5	35	48	28	38	16

Air Cylinder: Built-in Speed Controller Type
Double Acting, Double Rod
Series CJ2ZW
ø10, ø16

How to Order

Bore size

10	10 mm
16	16 mm

Mounting style

B	Basic style
L	Foot style
F	Flange style

Cylinder standard stroke (mm)
Refer to the standard stroke table on page 86.

Built-in Magnet Cylinder Model
Suffix the symbol "-A" (Rail mounting style) or "-B" (Band mounting style) to the end of part number for cylinder with auto switch.

Example	Rail mounting style	CDJ2ZWB16-60-A
	Band mounting style	CDJ2ZWB10-45-B

* For rail mounting style, screws and nuts for 2 pcs switches come with the rail.
* Refer to page 123 for switch mounting brackets.

CJ2ZW L 16 – 45 – ☐

With auto switch

CDJ2ZW L 16 – 45 – M9BW ☐ – ☐

With auto switch
(Built-in magnet)

Auto switch
* For the applicable auto switch model, refer to the table below.
* If a built-in magnet cylinder without an auto switch is required, refer to the model of built-in magnet cylinder.

Number of auto switches

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

Made to Order
Refer to page 86 for details.

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

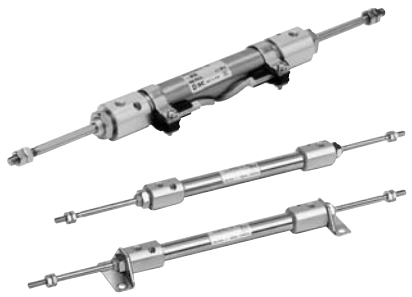
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Band mounting	Auto switch model: Rail mounting, Perpendicular	Auto switch model: Rail mounting, In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9N	—	—	●	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)			—	F7NV	F79	●	—	●	○	—	○		
							M9P	—	—	●	●	●	○	—	○		
							—	F7PV	F7P	●	—	●	○	—	○		
				2-wire	12 V		M9B	—	—	●	●	●	○	—	○	—	
							—	F7BV	J79	●	—	●	○	—	○		
		Connector					H7C	J79C	—	●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	24 V	—	M9NW	—	—	●	●	●	○	—	○	IC circuit	
					5 V, 12 V		—	F7NWV	F79W	●	—	●	○	—	○		
				3-wire (PNP)			M9PW	—	—	●	●	●	○	—	○		
							—	—	F7PW	●	—	●	○	—	○		
				2-wire	12 V		M9BW	—	—	●	●	●	○	—	○	—	
							—	F7BWV	J79W	●	—	●	○	—	○		
	Water resistant (2-color indication)						H7BA	F7BAV	F7BA	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5 V, 12 V		H7NF	—	F79F	●	—	●	○	—	○	IC circuit	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	A96	—	A76H	●	—	●	—	—	—	IC circuit	—
				2-wire	24 V	—	—	A72	A72H	●	—	●	—	—	—	—	Relay, PLC
						100 V	—	A73	A73H	●	—	●	●	—	—		
							A93	—	—	●	—	●	—	—	—		
			No		12 V	100 V or less	A90	A80	A80H	●	—	●	—	—	—	IC circuit	
		Connector	Yes			—	C73C	A73C	—	●	—	●	●	●	—	—	
			No			24 V or less	C80C	A80C	—	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color indication)	Grommet	Yes		—	—	—	A79W **	—	●	—	●	—	—	—	—	

* 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, refer to page 123 for details.
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
* Band mounting style is not available for D-A9□V/M9□V/M9□WV and D-M9□A(V)L types.
** "D-A79W" cannot be mounted on bore size ø10 cylinder with air cushion.

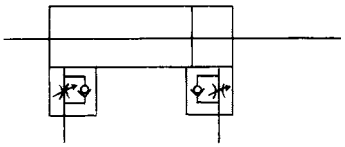
* Solid state auto switches marked with "○" are produced upon receipt of order.
* D-A9□/M9□/M9□W/A7□□/A80□/F7□□/J7□□ auto switches are shipped together (not assembled). (However, when D-A9□/M9□/M9□W types are selected, only auto switch mounting brackets are assembled before being shipped.)
* When D-A9□(V)/M9□(V)/M9□W(V) types are mounted on a ø10 or ø16 rail, order auto switch mounting brackets separately. Refer to page 123 for details.

Space-saving air cylinder with speed controller built-in cylinder cover



JIS Symbol

Double acting, Double rod



Made to Order Specifications

(For details, refer to pages 1380 and 1479.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC51	With hose nipple

⚠ Precautions

Refer to page 44 before handling.

Specifications

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	0.1 MPa	
Ambient and fluid temperature	Without auto switch: −10°C to 70°C, With auto switch: −10°C to 60°C	
Cushion	Rubber bumper	
Lubrication	Not required (Non-lube)	
Stroke length tolerance	$^{+1.0}_{0}$	
Speed controller	Built-in	
Piston speed	50 to 750 mm/s	
Allowable kinetic energy	0.035 J	0.090 J

∗ No freezing

Standard Stroke (mm)

Bore size	Standard stroke
10	15, 30, 45, 60
16	15, 30, 45, 60

∗ Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Mounting Style and Accessory/For details, refer to page 51.

Mounting		Basic style	Foot style	Flange style
Standard equipment	Mounting nut	●	●	●
	Rod end nut	●	●	●
Option	Single knuckle joint	●	●	●
	Double knuckle joint ∗	●	●	●

∗ Knuckle pin and retaining ring are shipped together with double knuckle joint.

Mounting Bracket Part No.

Mounting bracket	Bore size (mm)	
	10	**16**
Foot bracket	CJ-L010B	CJ-L016B
Flange bracket	CJ-F010B	CJ-F016B

Refer to pages 117 to 123 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket part no.

Mass

(g)

Bore size (mm)		10	16
Basic mass *		50	85
Additional mass per each 15 mm of stroke		6	9
Mounting bracket mass	Foot style	16	40
	Flange style	5	15

* Rod end nut are included in the basic mass.

Calculation: (Example)

CJ2ZWL10-45

- Basic mass 50 (ø10)
- Additional mass ..... 6/15 stroke
- Cylinder stroke ..... 45 stroke
- Mounting bracket mass ..... 16 (Axial foot style)

50 + 6/15 x 45 + 16 = 84 g

Copper and Fluorine-free Air Cylinder (For CRT manufacturing process)

20-CJ2ZW Mounting style | Bore size – Stroke | Head cover port location

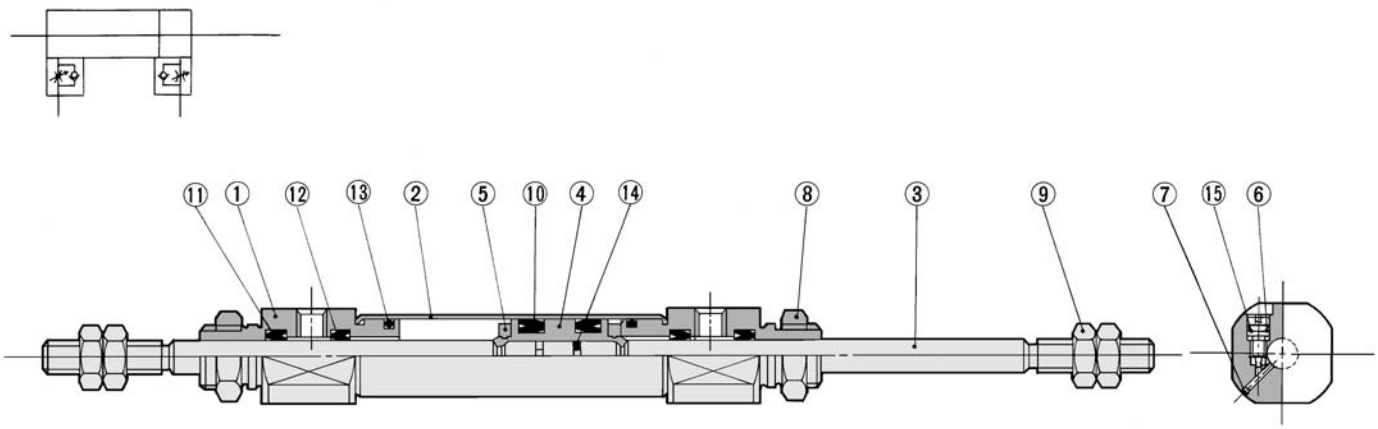
- **Copper and fluorine-free**

Eliminates the effects by copper based ions and fluorine based resins, etc. over the color cathode ray tube.
Making copper based materials into electroless nickel plated treatment or changing them to the non-copper materials in order to prevent copper ions from generating.

Specifications

Action	Double acting, Double rod
Bore size (mm)	10, 16
Maximum operating pressure	0.7 MPa
Minimum operating pressure	0.1 MPa
Cushion	Rubber bumper
Standard stroke (mm)	15, 30, 45, 60
Auto switch	Mountable (Band mounting style)
Mounting	Basic style, Foot style, Flange style

Construction (Not able to disassemble)



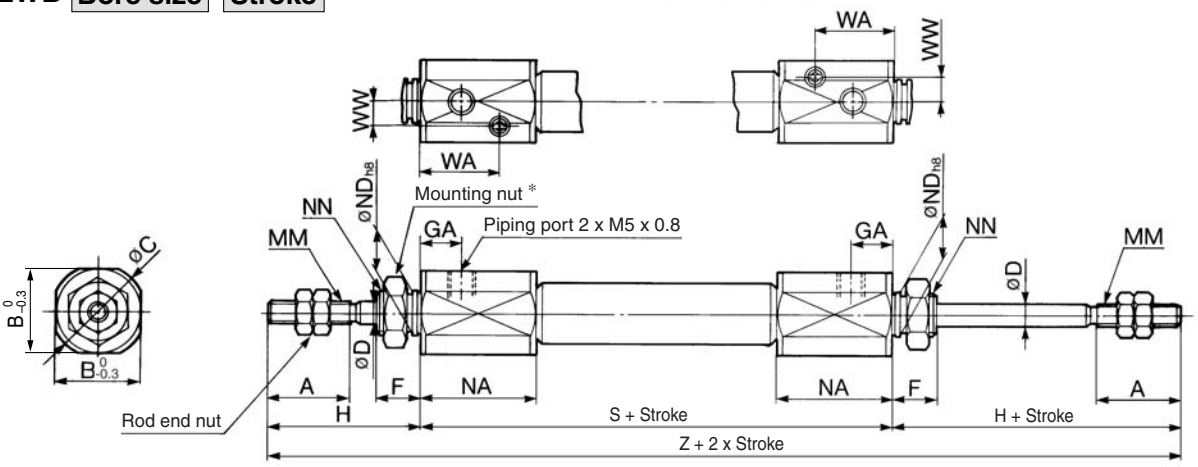
Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Anodized
2	**Cylinder tube**	Stainless steel	
3	**Piston rod**	Stainless steel	
4	**Piston**	Brass	
5	**Bumper**	Urethane	
6	**Speed controller needle**	Stainless steel	
7	**Steel balls**	Bearing steel	
8	**Mounting nut**	Brass	Nickel plated

No.	Description	Material	Note
9	**Rod end nut**	Rolled steel	Nickel plated
10	**Piston seal**	NBR	
11	**Rod seal**	NBR	
12	**Check seal**	NBR	
13	**Tube gasket**	NBR	
14	**Piston gasket**	NBR	
15	**Needle seal**	NBR	

Basic Style (B)

CJ2ZWB Bore size – Stroke



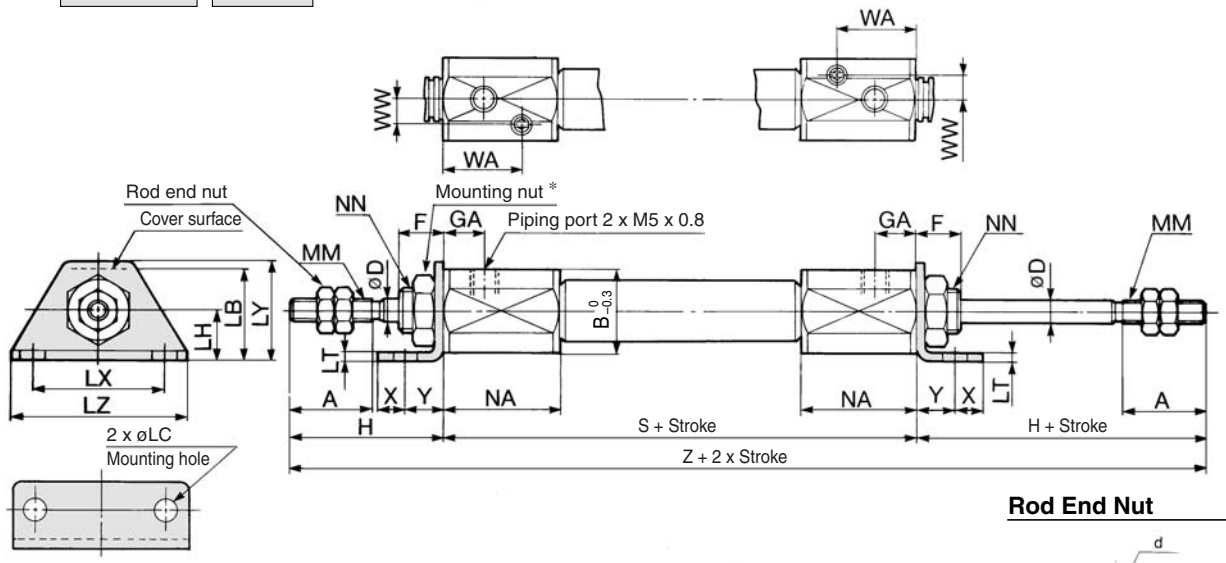
∗ For details of the mounting nut, refer to page 51.

(mm)

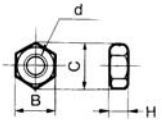
Bore size	A	B	C	D	F	GA	H	MM	NA	NDh8	NN	S	WA	WW	Z
10	15	15	17	4	8	7.5	28	M4 x 0.7	21	8 $^{0}_{-0.022}$	M8 x 1.0	66	14.5	4.5	122
16	15	18.3	20	5	8	7.5	28	M5 x 0.8	21	10 $^{0}_{-0.022}$	M10 x 1.0	67	14.5	5.5	123

Foot Style (L)

CJ2ZWL Bore size – Stroke



Rod End Nut



Material: Iron

Part no.	Applicable bore (mm)	B	C	d	H
NTJ-010A	**10**	7	8.1	M4 x 0.7	3.2
NTJ-015A	**16**	8	9.2	M5 x 0.8	4

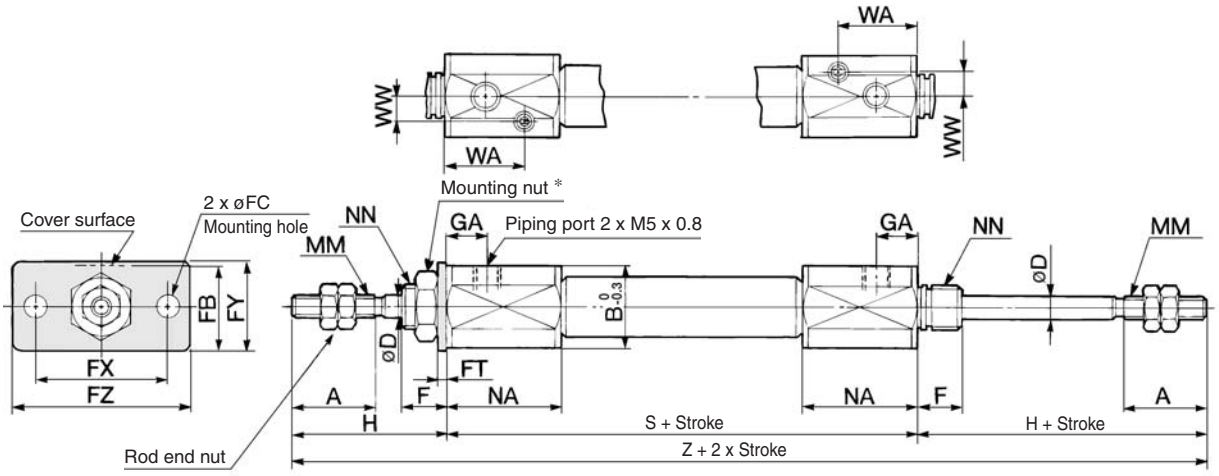
∗ For details of the mounting nut, refer to page 51.

(mm)

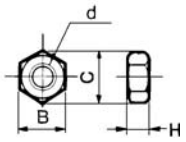
Bore size	A	B	D	F	LB	LC	LH	LT	LX	LY	LZ	GA	H	MM	NA	NN	S	WA	WW	X	Y	Z
10	15	15	4	8	16.5	4.5	9	1.6	24	16.5	32	7.5	28	M4 x 0.7	21	M8 x 1.0	66	14.5	4.5	5	7	122
16	15	18.3	5	8	23	5.5	14	2.3	33	25	42	7.5	28	M5 x 0.8	21	M10 x 1.0	67	14.5	5.5	6	9	123

Flange Style (F)

CJ2ZWF Bore size – Stroke



Rod End Nut



Material: Iron

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

* For details of the mounting nut, refer to page 51.

(mm)

Bore size	A	B	D	F	FB	FC	FT	FX	FY	FZ	GA	H	MM	NA	NN	S	WA	WW	Z
10	15	15	4	8	14.5	4.5	1.6	24	14	32	7.5	28	M4 x 0.7	21	M8 x 1.0	66	14.5	4.5	122
16	15	18.3	5	8	19	5.5	2.3	33	20	42	7.5	28	M5 x 0.8	21	M10 x 1.0	67	14.5	5.5	123

Air Cylinder: Low Friction Type
Double Acting, Single Rod
Series CJ2Q
ø10, ø16

How to Order

Bore size

10	10 mm
16	16 mm

Cylinder standard stroke (mm)
Refer to the standard stroke table on page 91.

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
D	Double clevis style

Built-in Magnet Cylinder Model

Suffix the symbol "-A" (Rail mounting style) or "-B" (Band mounting style) to the end of part number for cylinder with auto switch.

Example	Rail mounting style	CDJ2QB16-60-A
	Band mounting style	CDJ2QB10-45-B

∗ For rail mounting style, screws and nuts for 2 pcs switches come with the rail.
∗ Refer to page 123 for switch mounting brackets.

CJ2Q L 16 – 60 □ – □

With auto switch **CDJ2Q L 16 – 60 □ – M9BW □ – □**

With auto switch
(Built-in magnet)

Head cover port location

Symbol \ Bore size (mm)	ø10, ø16
Nil	Perpendicular to axis
R	Axial

∗ For configuration, refer to page 92.
∗ Double clevis is only available for being perpendicular to axis.

Auto switch
∗ For the applicable auto switch model, refer to the table below.
∗ If a built-in magnet cylinder without an auto switch is required, refer to the model of built-in magnet cylinder.

Made to Order
Refer to page 91 for details.

Number of auto switches

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

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Band mounting	Auto switch model: Rail mounting Perpendicular	Auto switch model: Rail mounting In-line	Lead wire length (m) 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	——	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	**M9N**	—	—	●	●	●	○	—	○	IC circuit	Relay, PLC
							—	**F7NV**	**F79**	●	—	●	○	—	○		
				3-wire (PNP)			**M9P**	—	—	●	●	●	○	—	○		
							—	**F7PV**	**F7P**	●	—	●	○	—	○		
				2-wire	12 V		**M9B**	—	—	●	●	●	○	—	○	—	
							—	**F7BV**	**J79**	●	—	●	○	—	○		
		Connector					**H7C**	**J79C**	—	●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	24 V	—	**M9NW**	—	—	●	●	●	○	—	○	IC circuit	
					5 V, 12 V		—	**F7NWV**	**F79W**	●	—	●	○	—	○		
				3-wire (PNP)			**M9PW**	—	—	●	●	●	○	—	○		
							—	—	**F7PW**	●	—	●	○	—	○		
				2-wire	12 V		**M9BW**	—	—	●	●	●	○	—	○	—	
							—	**F7BWV**	**J79W**	●	—	●	○	—	○		
	Water resistant (2-color indication)						**H7BA**	**F7BAV**	**F7BA**	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5 V, 12 V		**H7NF**	—	**F79F**	●	—	●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96**	—	**A76H**	●	—	●	—	—	—	IC circuit	—
				2-wire	—	200 V	—	**A72**	**A72H**	●	—	●	—	—	—	—	Relay, PLC
					24 V	100 V	—	**A73**	**A73H**	●	—	●	●	—	—	—	
							A93	—	—	●	—	●	—	—	—		
			No			100 V or less	**A90**	**A80**	**A80H**	●	—	●	—	—	—	IC circuit	
		Connector	Yes			—	**C73C**	**A73C**	—	●	—	●	●	●	—	—	
			No			24 V or less	**C80C**	**A80C**	—	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color indication)	Grommet	Yes		—	—	—	**A79W**	—	●	—	●	—	—	—	—	

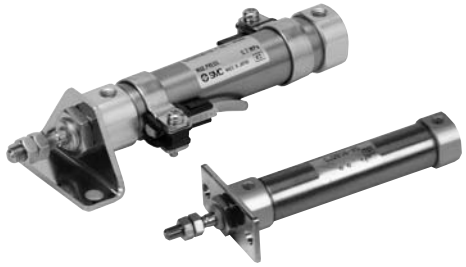
∗ Lead wire length symbols: 0.5 m····· Nil (Example) M9NW
1 m····· M (Example) M9NWM
3 m····· L (Example) M9NWL
5 m····· Z (Example) M9NWZ

∗ Since there are other applicable auto switches than listed, refer to page 123 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
∗ Band mounting style is not available for D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L types.

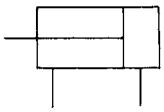
∗ Solid state auto switches marked with "○" are produced upon receipt of order.
∗ D-A9□/M9□/M9□W/A7□□/A80□/F7□□/J7□□ auto switches are shipped together (not assembled). (However, when D-A9□/M9□/M9□W types are selected, only auto switch mounting brackets are assembled before being shipped.)
∗ When D-A9□(V)/M9□(V)/M9□W(V) types are mounted on a ø10 or ø16 rail, order auto switch mounting brackets separately. Refer to page 123 for details.

Specially designed to keep friction of the piston to a minimum. Suitable for contact-pressure control requiring smooth operation at low pressures.

Low sliding resistance
Minimum operating pressure: 0.03 MPa



JIS Symbol
Double acting, Single rod



Made to Order **Made to Order Specifications**
(For details, refer to pages 1380 and 1479.)

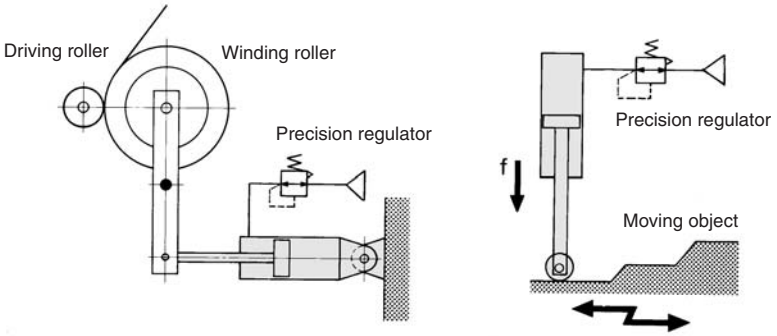
Symbol	Specifications
—XA□	Change of rod end shape
—XC51	With hose nipple

⚠Precautions

Refer to page 44 before handling.

Application Example

Low friction cylinder is used in combination with precision regulator (Series IR).



Specifications

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	0.03 MPa	
Ambient and fluid temperature	Without auto switch: −10°C to 70°C, With auto switch: −10°C to 60°C *	
Cushion	Rubber bumper	
Lubrication	Not applicable	
Stroke length tolerance	$^{+1.0}_{0}$	
Piston speed	50 to 750 mm/s	
Allowable kinetic energy	0.035 J	0.090 J

* No freezing

Standard Stroke

(mm)

Bore size	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 at 1 mm intervals is possible. (Spacers are not used.)

Refer to pages 117 to 123 for cylinders with an auto switch.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket part no.

Mounting Style and Accessory/For details, refer to page 51.

Mounting		Basic style	Axial foot style	Rod side flange style	Double * clevis style
Standard equipment	Mounting nut	●	●	●	–
	Rod end nut	●	●	●	●
	Clevis pin	–	–	–	●
Option	Single knuckle joint	●	●	●	●
	Double knuckle joint *	●	●	●	●
	T-bracket	–	–	–	●

* Pin and retaining ring are shipped together with double clevis and double knuckle joint.

Mounting Bracket Part No.

Mounting bracket	Bore size (mm)	
	10	**16**
Foot bracket	CJ-L010B	CJ-L016B
Flange bracket	CJ-F010B	CJ-F016B
T-bracket *	CJ-T010B	CJ-T016B

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

Mass

(g)

Bore size (mm)		**10**	**16**
Basic mass *		24	55
Additional mass per each 15 mm of stroke		4	6.5
Mounting bracket mass	Axial foot style	8	20
	Rod side flange style	5	15
	Double clevis style (With pin) **	4	10

* Mounting nut and rod end nut are included in the basic mass.
** Mounting nut is not attached to the double clevis style, so the mounting nut mass is already subtracted.

Calculation: (Example) **CJ2QL10-45**
- Basic mass ····· 24 (ø10)
- Additional mass ····· 4/15 stroke
- Cylinder stroke····· 45 stroke
- Mounting bracket mass ····· 8 (Axial foot style)

24 + 4/15 x 45 + 8 = 44 g

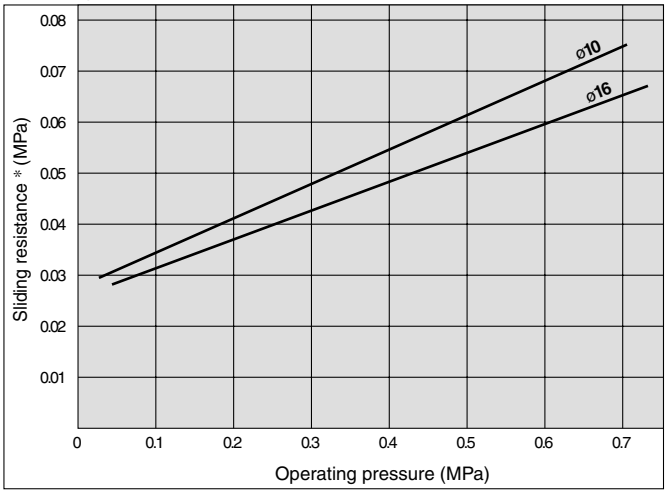
Head Cover Port Location

Either perpendicular to the cylinder axis or in-line with the cylinder axis is available for basic style.

Axial

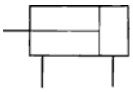
Perpendicular

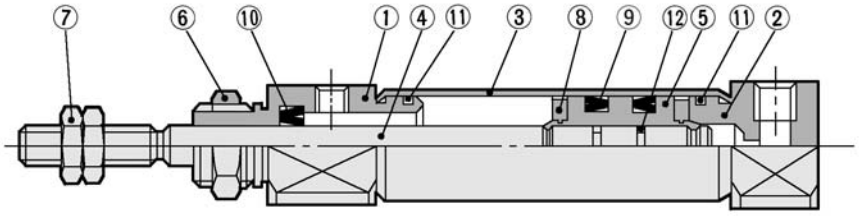
Sliding Resistance of the Low Friction Side



* Conversion into the cylinder operating pressure:

Construction (Not able to disassemble)





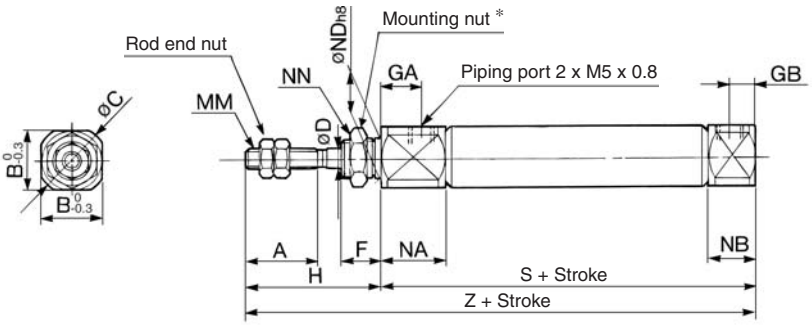
Component Parts

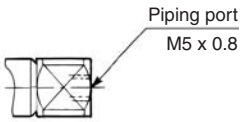
No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Anodized
2	**Head cover**	Aluminum alloy	Anodized
3	**Cylinder tube**	Stainless steel	
4	**Piston rod**	Stainless steel	
5	**Piston**	Brass	
6	**Mounting nut**	Brass	Nickel plated

No.	Description	Material	Note
7	**Rod end nut**	Rolled steel	Nickel plated
8	**Bumper**	Urethane	
9	**Piston seal**	NBR	For low friction
10	**Rod seal**	NBR	For low friction
11	**Tube gasket**	NBR	
12	**Piston gasket**	NBR	

Basic Style (B)

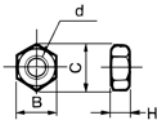
CJ2QB **Bore size** – **Stroke** **Head cover port location**





Head cover port location:
Axial location (R)

Rod End Nut



Material: Iron

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

∗ For details of the mounting nut, refer to page 51.

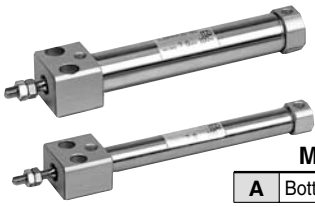
(mm)

Bore size	A	B	C	D	F	GA	GB	H	MM	NA	NB	ND	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

For dimensions of each mounting bracket, refer to pages 48 to 50.

Air Cylinder: Direct Mount Type
Double Acting, Single Rod
Series CJ2R
ø10, ø16

How to Order



Bore size

10	10 mm
16	16 mm

Cylinder standard stroke (mm)
Refer to the standard stroke table on page 95.

Mounting style

A	Bottom mounting style

Built-in Magnet Cylinder Model

Suffix the symbol "-A" (Rail mounting style) or "-B" (Band mounting style) to the end of part number for cylinder with auto switch.

Example	Rail mounting style	CDJ2RA16-60-A
	Band mounting style	CDJ2RA10-45-B

∗ For rail mounting style, screws and nuts for 2 pcs switches come with the rail.
∗ Refer to page 123 for switch mounting brackets.

CJ2RA 16 – 60 □ – □

With auto switch **CDJ2RA 16 – 60 □ – M9BW □ – □**

With auto switch
(Built-in magnet)

Head cover port location

Symbol \ Bore size (mm)	ø10, ø16
Nil	Perpendicular to axis
R	Axial

∗ For configuration, refer to page 95.

Auto switch
∗ For the applicable auto switch model, refer to the table below.
∗ If a built-in magnet cylinder without an auto switch is required, refer to the model of built-in magnet cylinder.

Made to Order
Refer to page 95 for details.

Number of auto switches

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

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

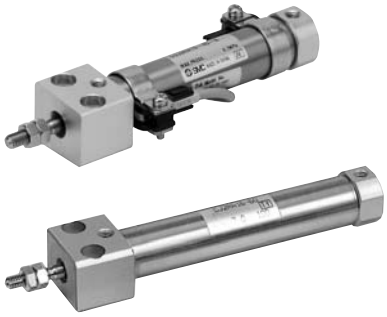
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Band mounting	Auto switch model: Rail mounting: Perpendicular	Auto switch model: Rail mounting: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	——	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	**M9N**	—	—	●	●	●	○	—	○	IC circuit	Relay, PLC
							—	**F7NV**	**F79**	●	—	●	○	—	○		
				3-wire (PNP)			**M9P**	—	—	●	●	●	○	—	○		
							—	**F7PV**	**F7P**	●	—	●	○	—	○		
				2-wire	12 V		**M9B**	—	—	●	●	●	○	—	○	—	
							—	**F7BV**	**J79**	●	—	●	○	—	○		
		Connector					**H7C**	**J79C**	—	●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	5 V, 12 V		**M9NW**	—	—	●	●	●	○	—	○	IC circuit	
							—	**F7NWV**	**F79W**	●	—	●	○	—	○		
				3-wire (PNP)			**M9PW**	—	—	●	●	●	○	—	○		
							—	—	**F7PW**	●	—	●	○	—	○		
				2-wire	12 V		**M9BW**	—	—	●	●	●	○	—	○	—	
							—	**F7BWV**	**J79W**	●	—	●	○	—	○		
	Water resistant (2-color indication)						**H7BA**	**F7BAV**	**F7BA**	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5 V, 12 V		**H7NF**	—	**F79F**	●	—	●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96**	—	**A76H**	●	—	●	—	—	—	IC circuit	—
				2-wire	—	200 V	—	**A72**	**A72H**	●	—	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	—	**A73**	**A73H**	●	—	●	●	—	—	
								A93	—	—	●	—	●	—	—	—	
			No				100 V or less	**A90**	**A80**	**A80H**	●	—	●	—	—	—	IC circuit
		Connector	Yes				—	**C73C**	**A73C**	—	●	—	●	●	●	—	—
			No				24 V or less	**C80C**	**A80C**	—	●	—	●	●	●	—	IC circuit
	Diagnostic indication (2-color indication)	Grommet	Yes		—	—	—	—	**A79W**	—	●	—	●	—	—	—	—

∗ 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

∗ Since there are other applicable auto switches than listed, refer to page 123 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
∗ Band mounting style is not available for D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L types.

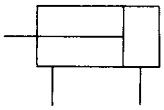
∗ Solid state auto switches marked with "○" are produced upon receipt of order.
∗ D-A9□/M9□/M9□W/A7□□/A80□/F7□□/J7□□ auto switches are shipped together (not assembled). (However, when D-A9□/M9□/M9□W types are selected, only auto switch mounting brackets are assembled before being shipped.)
∗ When D-A9□(V)/M9□(V)/M9□W(V) types are mounted on a ø10 or ø16 rail, order auto switch mounting brackets separately. Refer to page 123 for details.

Series CJ2R direct mount cylinder can be installed directly through the use of a square rod cover.



JIS Symbol

Double acting, Single rod



Made to Order Specifications
(For details, refer to pages 1380, 1462 and 1479.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC22	Fluororubber seals
—XC51	With hose nipple

⚠ Precautions

Refer to page 44 before handling.

Specifications

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 *	
Cushion	Rubber bumper	
Lubrication	Not required (Non-lube)	
Stroke length tolerance	$^{+1.0}_{0}$	
Piston speed	50 to 750 mm/s	
Allowable kinetic energy	0.035 J	0.090 J

* No freezing

Standard Stroke

(mm)

Bore size	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 at 1 mm intervals is possible. (Spacers are not used.)

Head Cover Port Location

Either perpendicular to the cylinder axis or in-line with the cylinder axis is available for basic style.

Axial

Perpendicular

Refer to pages 117 to 123 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket part no.

Mass

(g)

Bore size (mm)	10	16
Basic mass *	36	71.5
Additional mass per each 15 mm of stroke	4	6.5

* Rod end nut is included in the basic mass.

Calculation: (Example) **CJ2RA10-45**

- Basic mass ····· 36 (ø10)
- Additional mass ····· 4/15 stroke
- Cylinder stroke ····· 45 stroke

36 + 4/15 x 45 = 48 g

Clean Series

10-CJ2RA | Bore size | – | Stroke | Head cover port location

• **Clean Series**

Air cylinder which is applicable for the system which discharges leakage from the rod section directly into the outside of clean room by relief port and making an actuator's rod section having a double seal construction.

Specifications

Action	Double acting, Single rod
Bore size (mm)	10, 16
Maximum operating pressure	0.7 MPa
Minimum operating pressure	0.08 MPa
Cushion	Rubber bumper
Standard stroke (mm)	Same as the standard. (Refer to page 95.)
Auto switch	Mountable (Band mounting style)
Mounting	Bottom mounting style

For details, specifications about the Clean Series, refer to the separate catalog "Pneumatic Clean Series".

Copper and Fluorine-free Air Cylinder (For CRT manufacturing process)

20-CJ2RA | Bore size | – | Stroke | Head cover port location

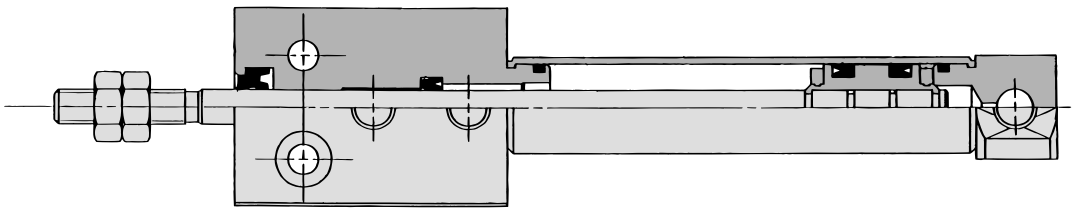
• **Copper and fluorine-free**

Eliminates the effects by copper based ions and fluorine based resins, etc. over the color cathode ray tube.
Making copper based materials into electroless nickel plated treatment or changing them to the non-copper materials in order to prevent copper ions from generating.

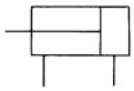
Specifications

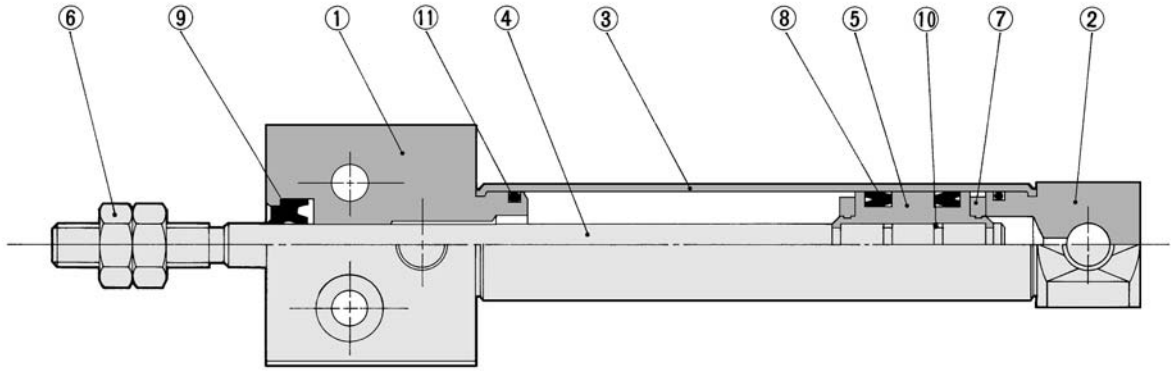
Bore size (mm)	10, 16
Action	Double acting, Single rod
Maximum operating pressure	0.7 MPa
Minimum operating pressure	0.06 MPa
Cushion	Rubber bumper (Standard equipment)
Standard stroke (mm)	Same as standard type. (Refer to page 95.)
Auto switch	Mountable (Band mounting style)
Mounting	Bottom mounting style

10-CJ2RA (Clean series) Construction (Not able to disassemble)



Construction (Not able to disassemble)





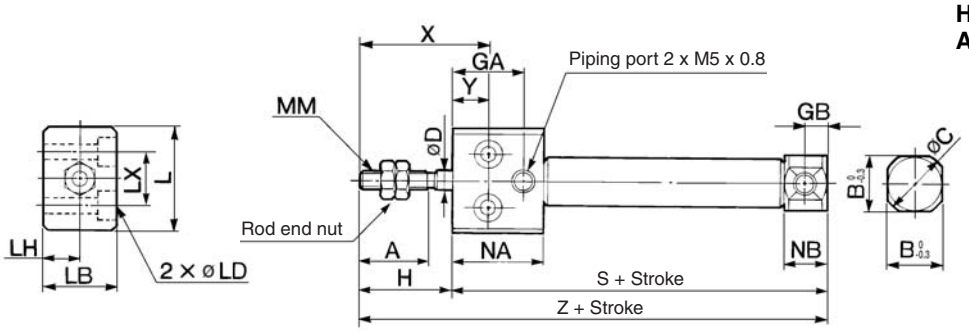
Component Parts

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**	Brass	
6	**Rod end nut**	Rolled steel	Nickel plated

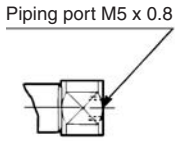
No.	Description	Material	Note
7	**Bumper**	Urethane	
8	**Piston seal**	NBR	
9	**Rod seal**	NBR	
10	**Piston gasket**	NBR	
11	**Tube gasket**	NBR	

Bottom Mounting Style

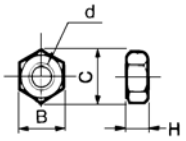
CJ2RA **Bore size** – **Stroke** **Head cover port location**



Head cover port location: Axial location (R)



Rod End Nut



Material: Iron

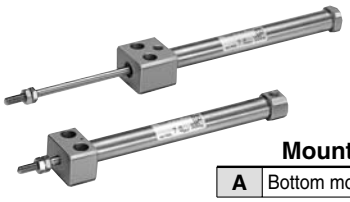
Part no.	Applicable bore (mm)	B	C	d	H
NTJ-010A	10	7	8.1	M4 x 0.7	3.2
NTJ-015A	16	8	9.2	M5 x 0.8	4

(mm)

Bore size	A	B	C	D	GA	GB	H	L	LB	LD	LH	LX	MM	NA	NB	X	Y	S	Z
10	15	12	14	4	16	5	20	23	16	ø3.5, ø6.5 counterbore depth 4	8	12	M4 x 0.7	20.5	9.5	28	8	54	74
16	15	18.3	20	5	16	5	20	26	20	ø4.5, ø8 counterbore depth 5	10	16	M5 x 0.8	20.5	9.5	28	8	55	75

Air Cylinder: Direct Mount Type
Single Acting, Spring Return/Extend
Series CJ2R
ø10, ø16

How to Order



Bore size

10	10 mm
16	16 mm

Cylinder standard stroke (mm)
Refer to the standard stroke table on page 99.

Mounting style

A	Bottom mounting style

Action

S	Single acting, Spring return
T	Single acting, Spring extend

Built-in Magnet Cylinder Model

Suffix the symbol "-A" (Rail mounting style) or "-B" (Band mounting style) to the end of part number for cylinder with auto switch.

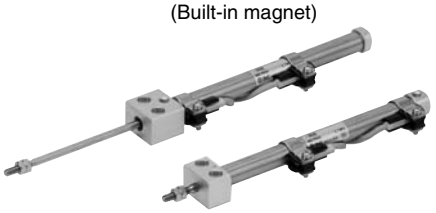
Example	Rail mounting style	CDJ2RA16-60S-A
	Band mounting style	CDJ2RA10-45S-B

* For rail mounting style, screws and nuts for 2 pcs switches come with the rail.
* Refer to page 123 for switch mounting brackets.

CJ2RA 16 – 45 S □ – □

With auto switch **CDJ2RA 16 – 45 S □ – M9BW □ – □**

With auto switch
(Built-in magnet)



Head cover port location

Symbol \ Bore size (mm)	ø10, ø16
Nil	Perpendicular to axis
R	Axial

* For configuration, refer to page 99.
* Not applicable to single acting, spring extend (T).

Auto switch
* For the applicable auto switch model, refer to the table below.
* If a built-in magnet cylinder without an auto switch is required, refer to the model of built-in magnet cylinder.

Number of auto switches

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

Made to Order
Refer to page 99 for details.

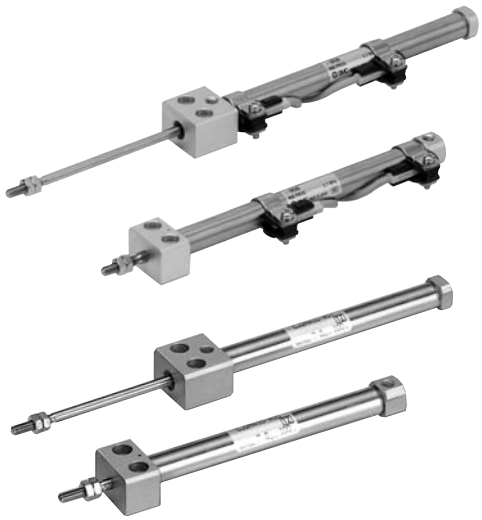
Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Band mounting	Auto switch model: Rail mounting: Perpendicular	Auto switch model: Rail mounting: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	**M9N**	—	—	●	●	●	○	—	○	IC circuit	Relay, PLC
							—	**F7NV**	**F79**	●	—	●	○	—	○		
				3-wire (PNP)			**M9P**	—	—	●	●	●	○	—	○		
							—	**F7PV**	**F7P**	●	—	●	○	—	○		
				2-wire	12 V		**M9B**	—	—	●	●	●	○	—	○	—	
							—	**F7BV**	**J79**	●	—	●	○	—	○		
		Connector					**H7C**	**J79C**	—	●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	24 V, 5 V, 12 V	—	**M9NW**	—	—	●	●	●	○	—	○	IC circuit	
							—	**F7NWV**	**F79W**	●	—	●	○	—	○		
				3-wire (PNP)			**M9PW**	—	—	●	●	●	○	—	○		
							—	—	**F7PW**	●	—	●	○	—	○		
				2-wire	12 V		**M9BW**	—	—	●	●	●	○	—	○	—	
							—	**F7BWV**	**J79W**	●	—	●	○	—	○		
	Water resistant (2-color indication)						**H7BA**	**F7BAV**	**F7BA**	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5 V, 12 V		**H7NF**	—	**F79F**	●	—	●	○	—	○	IC circuit	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	**A96**	—	**A76H**	●	—	●	—	—	—	IC circuit	—
				2-wire		—	200 V	—	**A72**	**A72H**	●	—	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	—	**A73**	**A73H**	●	—	●	●	—	—	
								A93	—	—	●	—	●	—	—	—	
			No				100 V or less	**A90**	**A80**	**A80H**	●	—	●	—	—	—	IC circuit
		Connector	Yes				—	**C73C**	**A73C**	—	●	—	●	●	●	—	—
			No				24 V or less	**C80C**	**A80C**	—	●	—	●	●	●	—	IC circuit
	Diagnostic indication (2-color indication)	Grommet	Yes			—	—	—	**A79W**	—	●	—	●	—	—	—	—

* 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, refer to page 123 for details.
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
* Band mounting style is not available for D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L types.

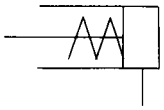
* Solid state auto switches marked with "○" are produced upon receipt of order.
* D-A9□/M9□/M9□W/A7□□/A80□/F7□□/J7□□ auto switches are shipped together (not assembled). (However, when D-A9□/M9□/M9□W types are selected, only auto switch mounting brackets are assembled before being shipped.)
* When D-A9□(V)/M9□(V)/M9□W(V) types are mounted on a ø10 or ø16 rail, order auto switch mounting brackets separately. Refer to page 123 for details.

Series CJ2R direct mount cylinder can be installed directly through the use of a square rod cover.

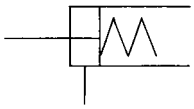


JIS Symbol

Single acting, Spring return



Single acting, Spring extend



Specifications

Bore size (mm)	10	16
Action	Single acting, Spring return/Single acting, Spring extend	
Fluid	Air	
Proof pressure	1 MPa	
Maximum operating pressure	0.7 MPa	
Minimum operating pressure	0.15 MPa	
Ambient and fluid temperature	Without auto switch: −10°C to 70°C, With auto switch: −10°C to 60°C *	
Cushion	Rubber bumper	
Lubrication	Not required (Non-lube)	
Stroke length tolerance	$^{+1.0}_{0}$	
Piston speed	50 to 750 mm/s	
Allowable kinetic energy	0.035 J	0.090 J

* No freezing

Standard Stroke

(mm)

Bore size	Standard stroke
10	15, 30, 45, 60
16	15, 30, 45, 60, 75, 100, 125, 150

* Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Accessory/For details, refer to page 51.

Standard equipment	Rod end nut
Option	Single knuckle joint, Double knuckle joint *

* Knuckle pin and retaining ring are shipped together with double knuckle joint.

Spring Force

(N)

Bore size (mm)	Retracted side	Extended side
10	6.86	3.53
16	14.2	6.86

Made to Order **Made to Order Specifications**
(For details, refer to pages 1380 and 1479.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC51	With hose nipple

⚠Precautions

Refer to page 44 before handling.

Head Cover Port Location

Either perpendicular to the cylinder axis or in-line with the cylinder axis is available for basic style.

Axial

Perpendicular

Refer to pages 117 to 123 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket part no.

Mass

Spring Return

(g)

Bore size (mm)		10	16
Mass *	15 stroke	38	73
	30 stroke	45	90
	45 stroke	54	112
	60 stroke	63	134
	75 stroke	—	155
	100 stroke	—	198
	125 stroke	—	234
	150 stroke	—	260

* Rod end nut is included in the mass.

Spring Extend

(g)

Bore size (mm)		10	16
Mass *	15 stroke	44	78
	30 stroke	50	94
	45 stroke	59	114
	60 stroke	67	135
	75 stroke	—	154
	100 stroke	—	192
	125 stroke	—	226
	150 stroke	—	250

* Rod end nut is included in the mass.

Copper and Fluorine-free Air Cylinder (For CRT manufacturing process)

20-CJ2RA **Bore size** – **Stroke** **Action** **Head cover port location**

Copper and fluorine-free

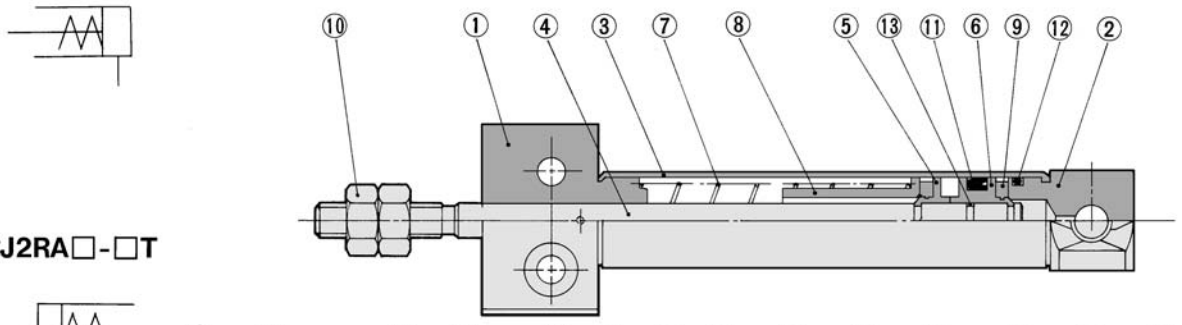
Eliminates the effects by copper based ions and fluorine based resins, etc. over the color cathode ray tube.
Making copper based materials into electroless nickel plated treatment or changing them to the non-copper materials in order to prevent copper ions from generating.

Specifications

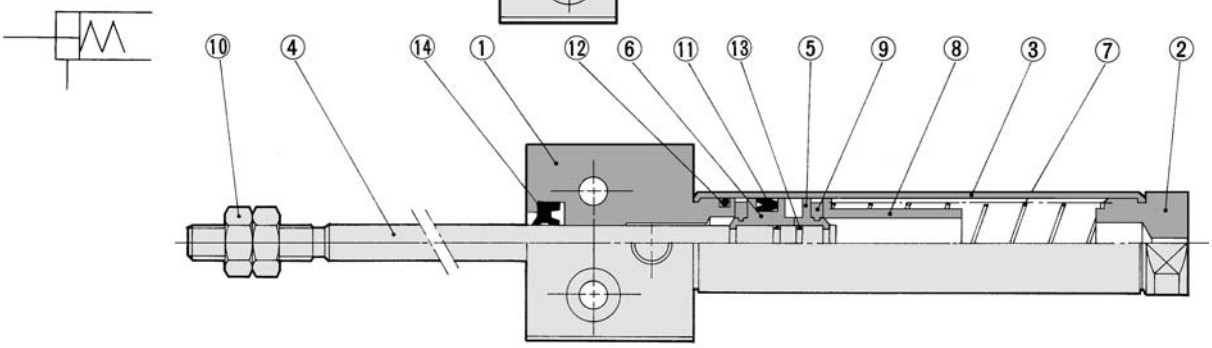
Bore size (mm)	10, 16
Action	Single acting, Spring return; Single acting, Spring extend
Max. operating pressure	0.7 MPa
Min. operating pressure	0.15 MPa
Cushion	Rubber bumper (Standard equipment)
Standard stroke (mm)	Same as standard type. (Refer to page 99.)
Auto switch	Mountable (Band mounting style)
Mounting	Bottom mounting style

Construction (Not able to disassemble)

CJ2RA□-□S



CJ2RA□-□T



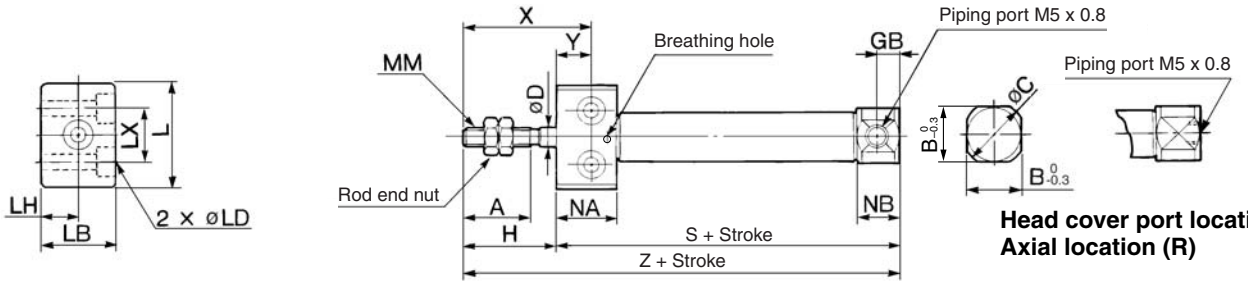
Component Parts

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**	Brass	
6	**Piston B**	Brass	
7	**Return spring**	Piano wire	Zinc chromated

No.	Description	Material	Note
8	**Spring seat**	Brass	
9	**Bumper**	Urethane	
10	**Rod end nut**	Rolled steel	Nickel plated
11	**Piston seal**	NBR	
12	**Tube gasket**	NBR	
13	**Piston gasket**	NBR	
14	**Rod seal**	NBR	

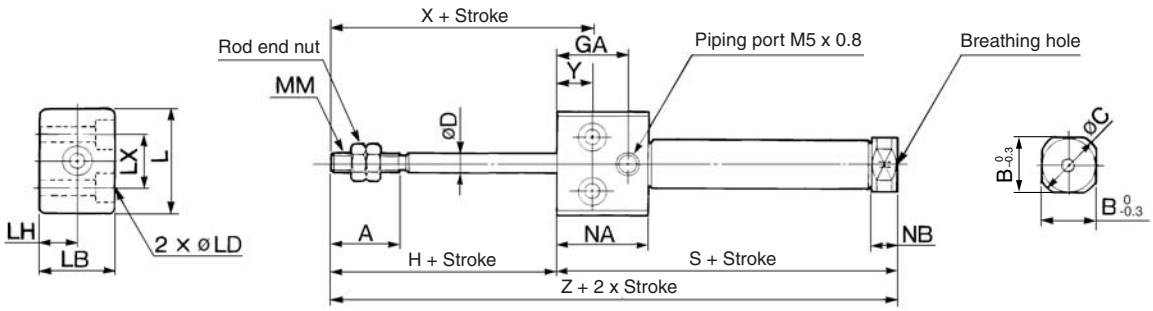
Single Acting: Bottom Mounting Style

Spring return: CJ2RA Bore size – Stroke S Head cover port location

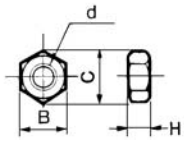


Head cover port location: Axial location (R)

Spring extend: CJ2RA Bore size – Stroke T



Rod End Nut



Material: Iron

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

(mm)

Bore size	A	B	C	D	GB	H	L	LB	LD	LH	LX	MM	NA	NB	X	Y
10	15	12	14	4	5	20	23	16	ø3.5, ø6.5 counterbore depth 4	8	12	M4 x 0.7	13.5	9.5	28	8
16	15	18.3	20	5	5	20	26	20	ø4.5, ø8 counterbore depth 5	10	16	M5 x 0.8	13.5	9.5	28	8

Dimensions by Stroke: Spring Return

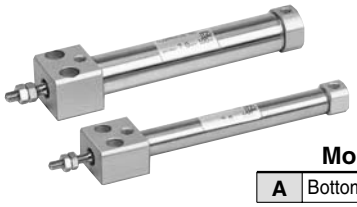
Bore size (mm) \ Symbol / Stroke	S								Z							
	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150
10	53.5	61	73	85	–	–	–	–	73.5	81	93	105	–	–	–	–
16	53.5	62	74	86	92	116	134	146	73.5	82	94	106	112	136	154	166

Dimensions by Stroke: Spring Extend (Dimensions not mentioned in the below table are the same as the above table.)

Bore size	GA	NA	NB	S								Z							
				5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150
10	16	20.5	5.5	56.5	64	76	88	–	–	–	–	76.5	84	96	108	–	–	–	–
16	16	20.5	5.5	56.5	65	77	89	95	119	137	149	76.5	85	97	109	115	139	157	169

Air Cylinder: Direct Mount, Non-rotating Rod Type
Double Acting, Single Rod
Series CJ2RK
ø10, ø16

How to Order



Cylinder standard stroke (mm)
Refer to the standard stroke table on page 103.

Bore size

10	10 mm
16	16 mm

Mounting style

A	Bottom mounting style

Built-in Magnet Cylinder Model

Suffix the symbol "-A" (Rail mounting style) or "-B" (Band mounting style) to the end of part number for cylinder with auto switch.

Example	Rail mounting style	CDJ2RKA16-60-A
	Band mounting style	CDJ2RKA10-45-B

* For rail mounting style, screws and nuts for 2 pcs switches come with the rail.
* Refer to page 123 for switch mounting brackets.

CJ2RKA 16 – 60 □ – □

With auto switch **CDJ2RKA 16 – 60 □ – M9BW □ – □**

With auto switch
(Built-in magnet)

Made to Order
Refer to page 103 for details.

Head cover port location

Symbol \ Bore size (mm)	ø10, ø16
Nil	Perpendicular to axis
R	Axial

* For configuration, refer to page 103.

Auto switch
* For the applicable auto switch model, refer to the table below.
* If a built-in magnet cylinder without an auto switch is required, refer to the model of built-in magnet cylinder.

Number of auto switches

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

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Band mounting	Auto switch model: Rail mounting, Perpendicular	Auto switch model: Rail mounting, In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	——	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	**M9N**	—	—	●	●	●	○	—	○	IC circuit	Relay, PLC
							—	**F7NV**	**F79**	●	—	●	○	—	○		
				3-wire (PNP)			**M9P**	—	—	●	●	●	○	—	○		
							—	**F7PV**	**F7P**	●	—	●	○	—	○		
				2-wire	12 V		**M9B**	—	—	●	●	●	○	—	○	—	
							—	**F7BV**	**J79**	●	—	●	○	—	○		
		Connector					**H7C**	**J79C**	—	●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	24 V, 5 V, 12 V	—	**M9NW**	—	—	●	●	●	○	—	○	IC circuit	
							—	**F7NWV**	**F79W**	●	—	●	○	—	○		
				3-wire (PNP)			**M9PW**	—	—	●	●	●	○	—	○		
							—	—	**F7PW**	●	—	●	○	—	○		
				2-wire	12 V		**M9BW**	—	—	●	●	●	○	—	○	—	
							—	**F7BWV**	**J79W**	●	—	●	○	—	○		
	Water resistant (2-color indication)						**H7BA**	**F7BAV**	**F7BA**	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5 V, 12 V		**H7NF**	—	**F79F**	●	—	●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96**	—	**A76H**	●	—	●	—	—	—	IC circuit	—
				2-wire		—	200 V	—	**A72**	**A72H**	●	—	●	—	—	—		Relay, PLC
					24 V	12 V	100 V	—	**A73**	**A73H**	●	—	●	●	—	—	—	
								A93	—	—	●	—	●	—	—	—		
			No				100 V or less	**A90**	**A80**	**A80H**	●	—	●	—	—	—	IC circuit	
		Connector	Yes				—	**C73C**	**A73C**	—	●	—	●	●	●	—	—	
			No				24 V or less	**C80C**	**A80C**	—	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color indication)	Grommet	Yes			—	—	—	**A79W**	—	●	—	●	—	—	—	—	

* 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, refer to page 123 for details.
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
* Band mounting style is not available for D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L types.

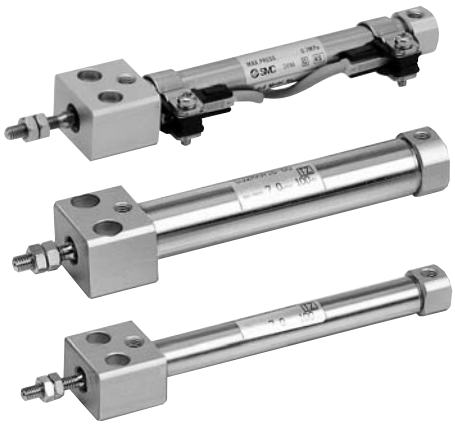
* Solid state auto switches marked with "○" are produced upon receipt of order.
* D-A9□/M9□/M9□W/A7□□/A80□/F7□□/J7□□ auto switches are shipped together (not assembled). (However, when D-A9□/M9□/M9□W types are selected, only auto switch mounting brackets are assembled before being shipped.)
* When D-A9□(V)/M9□(V)/M9□W(V) types are mounted on a ø10 or ø16 rail, order auto switch mounting brackets separately. Refer to page 123 for details.

SMC

A cylinder which rod does not rotate because of the hexagonal rod shape.

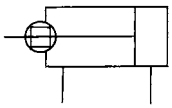
Non-rotating accuracy

ø10: ±1.5°, ø16: ±1°



JIS Symbol

Double acting, Single rod



Made to Order Specifications
(For details, refer to pages 1380 and 1479.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC51	With hose nipple

⚠ Precautions

Refer to page 62 and 70 before handling.

Specifications

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	
Cushion	Rubber bumper	
Lubrication	Not required (Non-lube)	
Stroke length tolerance	$^{+1.0}_{0}$	
Rod non-rotating accuracy	±1.5°	±1°
Piston speed	50 to 750 mm/s	
Allowable kinetic energy	0.035 J	0.090 J

∗ No freezing

Standard Stroke

(mm)

Bore size	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 at 1 mm intervals is possible. (Spacers are not used.)

Accessory/For details, refer to page 51.

Standard equipment	Rod end nut
Option	Single knuckle joint, Double knuckle joint ∗

∗ Knuckle pin and retaining ring are shipped together with double knuckle joint.

Head Cover Port Location

Either perpendicular to the cylinder axis or in-line with the cylinder axis is available for basic style.

Axial

Perpendicular

Refer to pages 117 to 123 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket part no.

Mass

(g)

Bore size (mm)	10	16
Basic mass ∗	36	71.5
Additional mass per each 15 mm of stroke	4	6.5

∗ Rod end nut is included in the basic mass.

Calculation: (Example) **CJ2RKA10-45**

- Basic mass····· 36 (ø10)
- Additional mass····· 4/15 stroke
- Cylinder stroke····· 45 stroke

36 + 4/15 x 45 = 48 g

Copper and Fluorine-free Air Cylinder (For CRT manufacturing process)

20-CJ2RK | Bore size | – | Stroke | Head cover port location |

- **Copper and fluorine-free**

Eliminates the effects by copper based ions and fluorine based resins, etc. over the color cathode ray tube.
Making copper based materials into electroless nickel plated treatment or changing them to the non-copper materials in order to prevent copper ions from generating.

Specifications

Bore size (mm)	10, 16
Action	Double acting, Single rod
Maximum operating pressure	0.7 MPa
Minimum operating pressure	0.06 MPa
Cushion	Rubber bumper (Standard equipment)
Standard stroke (mm)	Same as standard type. (Refer to page 103.)
Auto switch	Mountable (Band mounting style)
Mounting	Bottom mounting style

⚠Caution

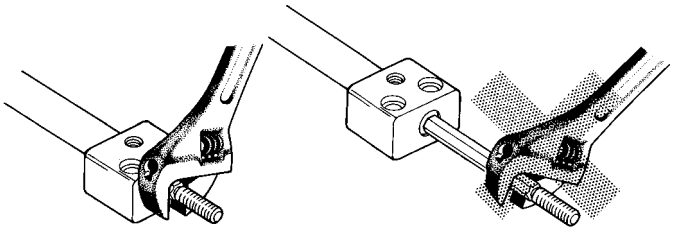
Caution on Handling

<When mounting>

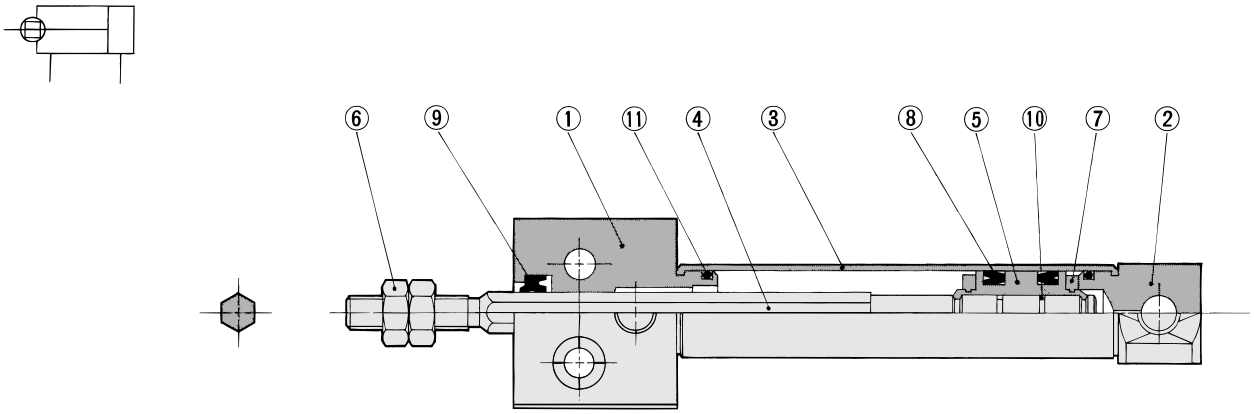
- Avoid using the air cylinder in such a way that rotational torque would be applied to the piston rod because this will deform the non-rotating guide, thus affecting the non-rotating accuracy.

Allowable rotational torque (N·m)	ø10	ø16
	0.02	0.04

- Operate the cylinder in such a way that the load to the piston rod is always applied in the axial direction.
- To screw a bracket onto the threaded portion at the tip of the piston rod, make sure to retract the piston rod entirely, and place a wrench over the flat portion of the rod that protrudes.
  Tighten it by giving consideration to prevent the tightening torque from being applied to the non-rotating guide.



Construction (Not able to disassemble)



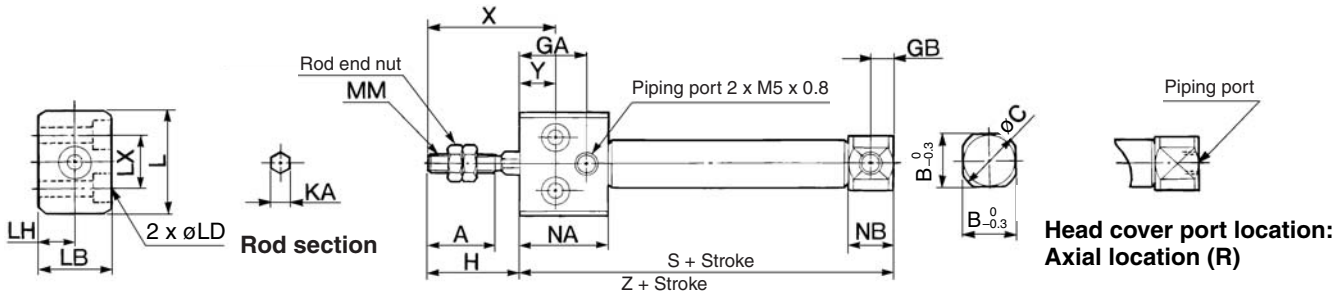
Component Parts

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**	Brass	
6	**Rod end nut**	Rolled steel	Nickel plated

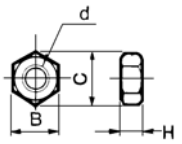
No.	Description	Material	Note
7	**Bumper**	Urethane	
8	**Piston seal**	NBR	
9	**Rod seal**	NBR	
10	**Piston gasket**	NBR	
11	**Tube gasket**	NBR	

Bottom Mounting Style

CJ2RKA **Bore size** – **Stroke** **Head cover port location**



Rod End Nut



Material: Iron

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

(mm)

Bore size	A	B	C	GA	GB	H	KA	L	LB	LD	LH	LX	MM	NA	NB	X	Y	S	Z
10	15	12	14	16	5	20	4.2	23	16	ø3.5, ø6.5 counterbore depth 4	8	12	M4 x 0.7	20.5	9.5	28	8	54	74
16	15	18.3	20	16	5	20	5.2	26	20	ø4.5, ø8 counterbore depth 5	10	16	M5 x 0.8	20.5	9.5	28	8	55	75

Air Cylinder: Direct Mount, Non-rotating Rod Type
Single Acting, Spring Return/Extend
Series CJ2RK
ø10, ø16

How to Order

Bore size

10	10 mm
16	16 mm

Cylinder standard stroke (mm)
Refer to the standard stroke table on page 107.

Action

S	Single acting, Spring return
T	Single acting, Spring extend

Mounting style

A	Bottom mounting style

Built-in Magnet Cylinder Model

Suffix the symbol "-A" (Rail mounting style) or "-B" (Band mounting style) to the end of part number for cylinder with auto switch.

Example	Rail mounting style	CDJ2RKA16-60S-A
	Band mounting style	CDJ2RKA10-45S-B

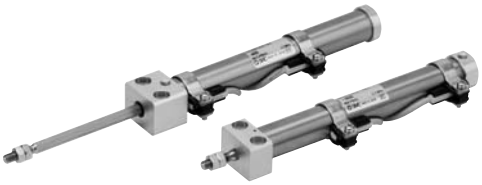
* For rail mounting style, screws and nuts for 2 pcs switches come with the rail.
* Refer to page 123 for switch mounting brackets.

CJ2RKA 16 – 45 S □ – □

With auto switch **CDJ2RKA 16 – 45 S □ – M9BW □ – □**

With auto switch
(Built-in magnet)

Made to Order
Refer to page 107 for details.



Head cover port location

Symbol \ Bore size (mm)	ø10, ø16
Nil	Perpendicular to axis
R	Axial

* For configuration, refer to page 103.
* Not applicable to single acting, spring extend (T).

Auto switch
* For the applicable auto switch model, refer to the table below.
* If a built-in magnet cylinder without an auto switch is required, refer to the model of built-in magnet cylinder.

Number of auto switches

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

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Band mounting	Rail mounting: Perpendicular	Rail mounting: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	**M9N**	—	—	●	●	●	○	—	○	IC circuit	Relay, PLC
							—	**F7NV**	**F79**	●	—	●	○	—	○		
				3-wire (PNP)			**M9P**	—	—	●	●	●	○	—	○		
							—	**F7PV**	**F7P**	●	—	●	○	—	○		
				2-wire	12 V		**M9B**	—	—	●	●	●	○	—	○	—	
							—	**F7BV**	**J79**	●	—	●	○	—	○		
		Connector					**H7C**	**J79C**	—	●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	24 V		**M9NW**	—	—	●	●	●	○	—	○	IC circuit	
					5 V, 12 V		—	**F7NWV**	**F79W**	●	—	●	○	—	○		
				3-wire (PNP)			**M9PW**	—	—	●	●	●	○	—	○		
							—	—	**F7PW**	●	—	●	○	—	○		
				2-wire	12 V		**M9BW**	—	—	●	●	●	○	—	○	—	
							—	**F7BWV**	**J79W**	●	—	●	○	—	○		
	Water resistant (2-color indication)						**H7BA**	**F7BAV**	**F7BA**	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5 V, 12 V		**H7NF**	—	**F79F**	●	—	●	○	—	○	IC circuit	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96**	—	**A76H**	●	—	●	—	—	—	IC circuit	—
				2-wire		—	200 V	—	**A72**	**A72H**	●	—	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	—	**A73**	**A73H**	●	—	●	●	—	—		
								A93	—	—	●	—	●	—	—	—		
			No				100 V or less	**A90**	**A80**	**A80H**	●	—	●	—	—	—	IC circuit	
		Connector	Yes				—	**C73C**	**A73C**	—	●	—	●	●	●	—	—	
			No				24 V or less	**C80C**	**A80C**	—	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color indication)	Grommet	Yes			—	—	—	**A79W**	—	●	—	●	—	—	—	—	

* 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, refer to page 123 for details.
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
* Band mounting style is not available for D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L types.

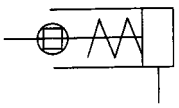
* Solid state auto switches marked with "○" are produced upon receipt of order.
* D-A9□/M9□/M9□W/A7□□/A80□/F7□□/J7□□ auto switches are shipped together (not assembled). (However, when D-A9□/M9□/M9□W types are selected, only auto switch mounting brackets are assembled before being shipped.)
* When D-A9□(V)/M9□(V)/M9□W(V) types are mounted on a ø10 or ø16 rail, order auto switch mounting brackets separately. Refer to page 123 for details.

A cylinder which rod does not rotate because of the hexagonal rod shape.

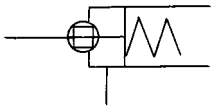
Non-rotating accuracy
ø10: ±1.5°, ø16: ±1°
Can operate without lubrication.

JIS Symbol

Single acting, Spring return



Single acting, Spring extend



Made to Order Specifications
(For details, refer to pages 1380 and 1479.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC51	With hose nipple

⚠ Precautions

Refer to page 62 and 70 before handling.

Specifications

Bore size (mm)	10	16
Action	Single acting, Spring return/Single acting, Spring extend	
Fluid	Air	
Proof pressure	1 MPa	
Maximum operating pressure	0.7 MPa	
Minimum operating pressure	0.15 MPa	
Ambient and fluid temperature	Without auto switch: −10°C to 70°C, With auto switch: −10°C to 60°C *	
Cushion	Rubber bumper	
Lubrication	Not required (Non-lube)	
Stroke length tolerance	$^{+1.0}_{0}$	
Rod non-rotating accuracy	±1.5°	±1°
Piston speed	50 to 750 mm/s	
Allowable kinetic energy	0.035 J	0.090 J

* No freezing

Standard Stroke

(mm)

Bore size	Standard stroke
10	15, 30, 45, 60
16	15, 30, 45, 60, 75, 100, 125, 150

* Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Accessory/For details, refer to page 51.

Standard equipment	Rod end nut
Option	Single knuckle joint, Double knuckle joint *

* Knuckle pin and retaining ring are shipped together with double knuckle joint.

Spring Force

(N)

Bore size (mm)	Retracted side	Extended side
10	6.86	3.53
16	14.2	6.86

Refer to pages 117 to 123 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket part no.

Mass

Spring Return

(g)

Bore size (mm)		10	16
Mass *	15 stroke	38	73
	30 stroke	45	90
	45 stroke	54	112
	60 stroke	63	134
	75 stroke	—	155
	100 stroke	—	198
	125 stroke	—	234
	150 stroke	—	260

* Rod end nut is included in the mass.

Spring Extend

(g)

Bore size (mm)		10	16
Mass *	15 stroke	44	78
	30 stroke	50	94
	45 stroke	59	114
	60 stroke	67	135
	75 stroke	—	154
	100 stroke	—	192
	125 stroke	—	226
	150 stroke	—	250

* Rod end nut is included in the mass.

Copper and Fluorine-free Air Cylinder (For CRT manufacturing process)

20-CJ2RKA | **Bore size** | **–** | **Stroke** | **Action** | **Head cover port location**

• Copper and fluorine-free

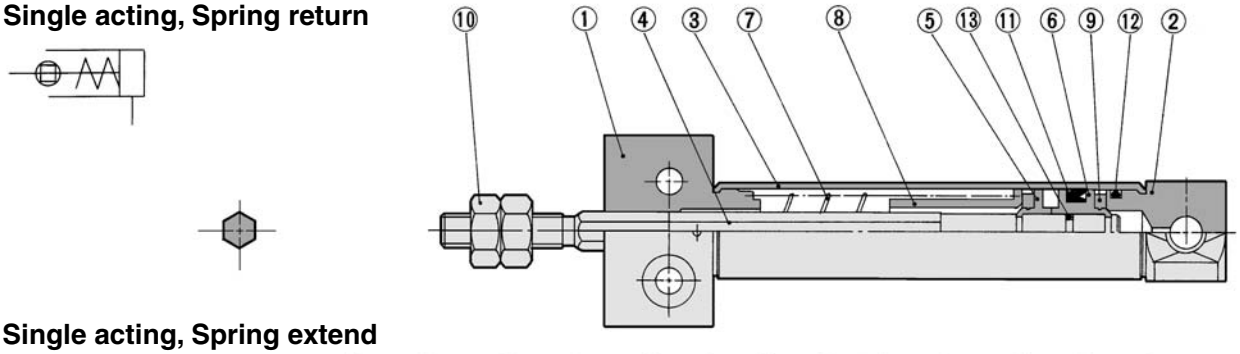
Eliminates the effects by copper based ions and fluorine based resins, etc. over the color cathode ray tube.
Making copper based materials into electroless nickel plated treatment or changing them to the non-copper materials in order to prevent copper ions from generating.

Specifications

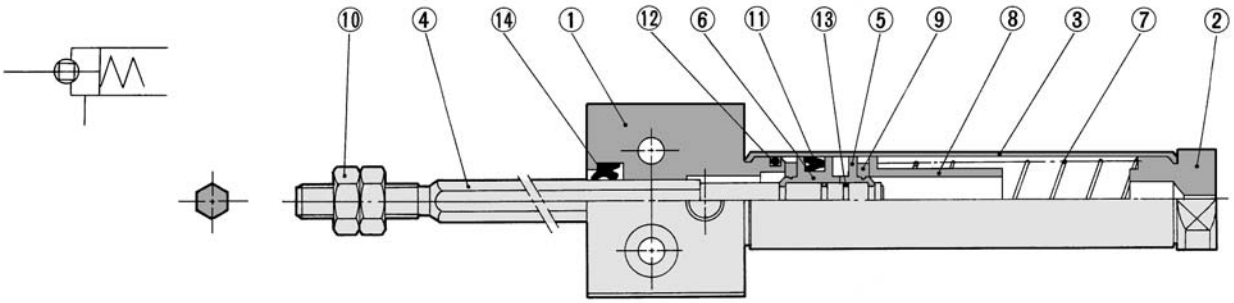
Bore size (mm)	10, 16
Action	Single acting, Spring return/Single acting, Spring extend
Max. operating pressure	0.7 MPa
Min. operating pressure	0.15 MPa
Cushion	Rubber bumper (Standard equipment)
Standard stroke (mm)	Same as standard type. (Refer to page 107.)
Auto switch	Mountable (Band mounting style)
Mounting	Bottom mounting style

Construction (Not able to disassemble)

Single acting, Spring return



Single acting, Spring extend



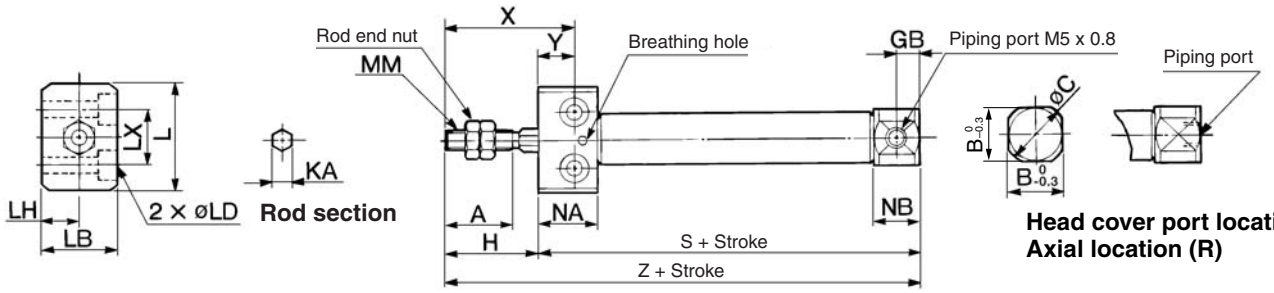
Component Parts

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**	Brass	
6	**Piston B**	Brass	
7	**Return spring**	Piano wire	Zinc chromated
8	**Spring seat**	Brass	

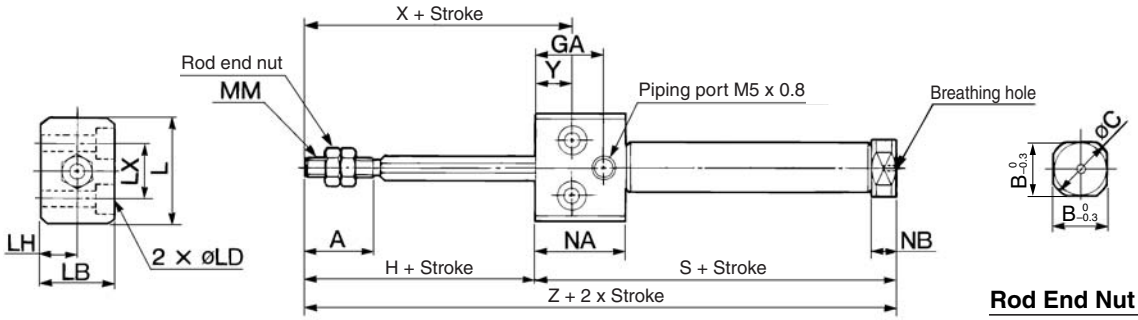
No.	Description	Material	Note
9	**Bumper**	Urethane	
10	**Rod end nut**	Rolled steel	Nickel plated
11	**Piston seal**	NBR	
12	**Tube gasket**	NBR	
13	**Piston gasket**	NBR	
14	**Rod seal**	NBR	

Single Acting: Bottom Mounting Style

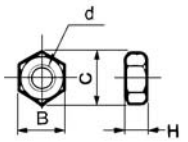
Spring return: CJ2RK Bore size – Stroke S Head cover port location



Spring extend: CJ2RK Bore size – Stroke T



Rod End Nut



Material: Iron

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

(mm)

Bore size	A	B	C	GB	H	KA	L	LB	LD	LH	LX	MM	NA	NB	X	Y
10	15	12	14	5	20	4.2	23	16	ø3.5, ø6.5 counterbore depth 4	8	12	M4 x 0.7	13.5	9.5	28	8
16	15	18.3	20	5	20	5.2	26	20	ø4.5, ø8 counterbore depth 5	10	16	M5 x 0.8	13.5	9.5	28	8

Dimensions by Stroke: Spring Return

Bore size (mm) \ Symbol / Stroke	S								Z							
	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150
10	53.5	61	73	85	–	–	–	–	73.5	81	93	105	–	–	–	–
16	53.5	62	74	86	92	116	134	146	73.5	82	94	106	112	136	154	166

Dimensions by Stroke: Spring Extend (Dimensions not mentioned in the below table are the same as the above table.)

(mm)

Bore size	GA	NA	NB	S								Z							
				5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150	5 to 15	16 to 30	31 to 45	46 to 60	61 to 75	76 to 100	101 to 125	126 to 150
10	16	20.5	5.5	56.5	64	76	88	–	–	–	–	76.5	84	96	108	–	–	–	–
16	16	20.5	5.5	56.5	65	77	89	95	119	137	149	76.5	85	97	109	115	139	157	169

Air Cylinder: With End Lock

Series CBJ2

ø16

How to Order

Mounting Style

B	Basic style
L	Axial foot style
F	Rod side flange style
D	Double clevis style Note)

Note) Rod end lock only.

Cylinder standard stroke (mm)
Refer to the standard stroke table on page 111.

Lock position

H	Head end lock
R	Rod end lock

Built-in Magnet Cylinder Model

Suffix the symbol "-A" (Rail mounting style) or "-B" (Band mounting style) to the end of part number for cylinder with auto switch.

Example	Rail mounting style	CDBJ2B16-45-A
	Band mounting style	CDBJ2B16-60-B

* For rail mounting style, screws and nuts for 2 pcs switches come with the rail.
* Refer to page 123 for switch mounting brackets.

CBJ2 L 16 – 60 – H N

With auto switch **CDBJ2 L 16 – 60 – H N – M9BW**

With auto switch
(Built-in magnet)

Manual release

N	Non-locking type

Auto switch
* For the applicable auto switch model, refer to the table below.
* If a built-in magnet cylinder without an auto switch is required, refer to the model of built-in magnet cylinder.

Number of auto switches

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

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Band mounting	Auto switch model: Rail mounting Perpendicular	Auto switch model: Rail mounting In-line	Lead wire length (m) 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9N	—	—	●	●	●	○	—	○	IC circuit	Relay, PLC
							—	F7NV	F79	●	—	●	○	—	○		
				3-wire (PNP)			M9P	—	—	●	●	●	○	—	○		
							—	F7PV	F7P	●	—	●	○	—	○		
				2-wire	12 V		M9B	—	—	●	●	●	○	—	○	—	
							—	F7BV	J79	●	—	●	○	—	○		
		Connector					H7C	J79C	—	●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	24 V	—	M9NW	—	—	●	●	●	○	—	○	IC circuit	
					5 V, 12 V		—	F7NWV	F79W	●	—	●	○	—	○		
				3-wire (PNP)			M9PW	—	—	●	●	●	○	—	○		
							—	—	F7PW	●	—	●	○	—	○		
				2-wire	12 V		M9BW	—	—	●	●	●	○	—	○	—	
							—	F7BWV	J79W	●	—	●	○	—	○		
	Water resistant (2-color indication)						H7BA	F7BAV	F7BA	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5 V, 12 V		H7NF	—	F79F	●	—	●	○	—	○	IC circuit	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	A96	—	A76H	●	—	●	—	—	—	IC circuit	—
				2-wire	—	200 V	—	A72	A72H	●	—	●	—	—	—	—	Relay, PLC
					24 V	100 V	—	A73	A73H	●	—	●	●	—	—		
							A93	—	—	●	—	●	—	—	—		
			No			100 V or less	A90	A80	A80H	●	—	●	—	—	—	IC circuit	
		Connector	Yes			—	C73C	A73C	—	●	—	●	●	●	—	—	
			No			24 V or less	C80C	A80C	—	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color indication)	Grommet	Yes		—	—	—	A79W	—	●	—	●	—	—	—	—	

* 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, refer to page 123 for details.
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
* Band mounting style is not available for D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L types.

* Solid state auto switches marked with "○" are produced upon receipt of order.
* D-A9□/M9□/M9□W/A7□□/A80□/F7□□/J7□□ auto switches are shipped together (not assembled). (However, when D-A9□/M9□/M9□W types are selected, only auto switch mounting brackets are assembled before being shipped.)
* When D-A9□(V)/M9□(V)/M9□W(V) types are mounted on a ø10 or ø16 rail, order auto switch mounting brackets separately. Refer to page 123 for details.

Series CJ2 air cylinder is equipped with end lock function.

Specifications

Bore size (mm)	16
Action	Double acting, Single rod
Fluid	Air
Proof pressure	1 MPa
Maximum operating pressure	0.7 MPa
Minimum operating pressure	0.15 MPa **
Ambient and fluid temperature	Without auto switch: −10°C to 70°C, With auto switch: −10°C to 60°C *
Cushion	Rubber bumper
Lubrication	Not required (Non-lube)
Stroke length tolerance	$^{+1.0}_{0}$
Piston speed	50 to 750 mm/s
Allowable kinetic energy	0.090 J

* No freezing
** 0.06 MPa for parts other than the lock unit.

Lock Specifications

Lock position	Head end, Rod end
Holding force (Max.)	98 N
Lock release pressure	0.15 MPa or less
Backlash	1 mm or less
Manual release	Non-locking type

Standard Stroke

(mm)

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

* Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Refer to pages 117 to 123 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket part no.

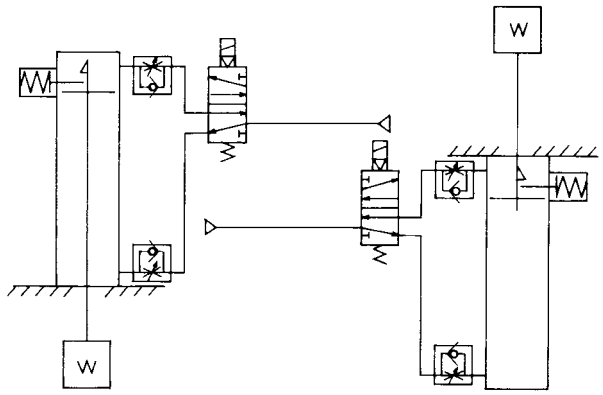
Series CBJ2
Specific Product Precautions

Be sure to read before handling. Please consult with SMC for products outside these specifications.

Use Recommended Air Pressure Circuit.

⚠Caution

• It is necessary for proper locking and unlocking.



With head end lock **With rod end lock**

Selection

⚠Caution

1. Do not use a 3 position solenoid valve.
Avoid using this cylinder in combination with a 3 position solenoid valve (particularly the closed center metal seal type). If air pressure becomes sealed inside the port on the side that contains the lock mechanism, the lock will not engage. Even if the lock is engaged at first, the air that leaks from the solenoid valve could enter the cylinder and cause the lock to disengage as time elapses.

2. Back pressure is necessary for unlocking.
Before starting, make sure that air is supplied to the side that is not equipped with a lock mechanism as shown in the diagram above. Otherwise, the lock may not disengage.
(Refer to "Rock Disengagement".)

3. Disengage the lock before installing or adjusting the cyliner.
The lock could become damaged if the cylinder is installed with its lock engaged.

4. Operate the cylinder at a load ratio of 50% or less.
The lock might not disengage or might become damaged if a load ratio of 50% is exceeded.

5. Do not synchronize multiple cylinders.
Do not operate two or more end lock cylinders synchronized to move a single workpiece because one of the cylinder locks may not be able to disengage when required.

6. Operate the speed controller under meter-out control.
If operated under meter-in control, the lock might not disengage.

7. On the side that has a lock, make sure to operate at the stroke end of the cylinder.
The lock might not engage or disengage if the piston of the cylinder has not reached the stroke end.

8. The position adjustment of the auto switch should be performed at two positions; a position determined by the stroke and a position after the backlash movement (by 1 mm).
When a 2-color indication switch is adjusted to show green at the stroke end, the indication may turn red when the cylinder returns by the backlash. This, however, is not an error.

Operating Pressure

⚠Caution

Supply air pressure of 0.15 MPa or higher to the port on the side that has the lock mechanism, as it is necessary for disengaging the lock.

Exhaust Air Speed

⚠Caution

The lock will engage automatically if the air pressure at the port on the side that has the lock mechanism becomes 0.05 MPa or less. Be aware that if the piping on the side that has the lock mechanism is narrow and long, or if the speed controller is located far from the cylinder port, the exhaust air speed could become slower, involving a longer time for the lock to engage. A similar result will ensure if the silencer that is installed on the exhaust port of the solenoid valve becomes clogged.

Lock Disengagement

⚠Caution

To disengage the lock, make sure to supply air pressure to the port on the side without a lock mechanism, thus preventing the load from being applied to the lock mechanism. (Refer to the recommended air pressure circuit.) If the lock is disengaged when the port on the side that does not contain a lock mechanism is in the exhausted state and the load is being applied to the lock mechanism, undue force will be applied to the lock mechanism, and it may damage the lock mechanism. Also, it could be extremely dangerous, because the piston rod could move suddenly.

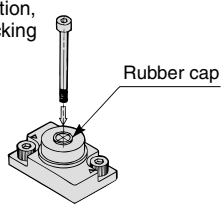
Manual Disengagement

⚠Caution

Non-locking style manual release
Insert the bolt, which is provided as an accessory part, through the rubber cap (it is not necessary to remove the rubber cap). Screw the bolt into the lock piston and pull the bolt to disengage the lock. Releasing the bolt will re-engage the lock. The bolt size, pulling force, and the stroke are listed below.

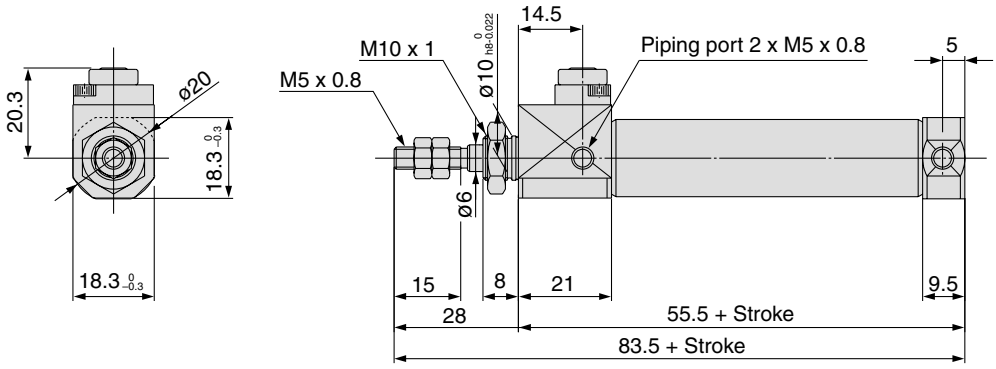
Bore size (mm)	Thread size	Pulling force N	Stroke (mm)
16	M2.5 x 0.45 x 25ℓ or more	4.9	2

Bolt should be detached under normal operation, otherwise it may cause malfunction of the locking feature.

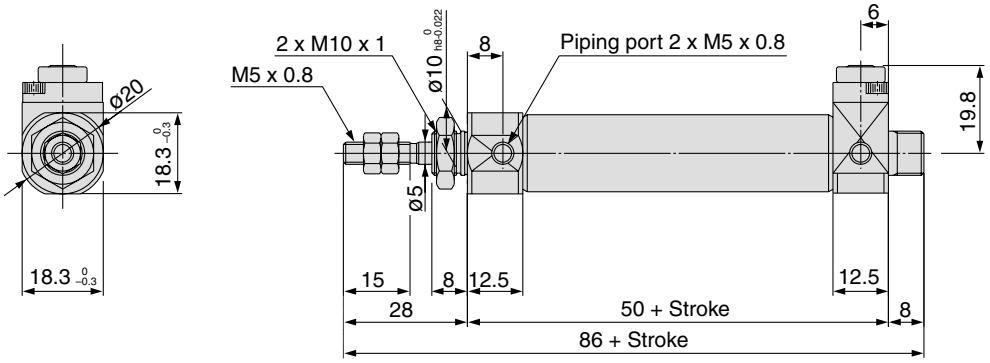


Dimensions

Basic style
With rod end lock: C□BJ2B16-□□-RN

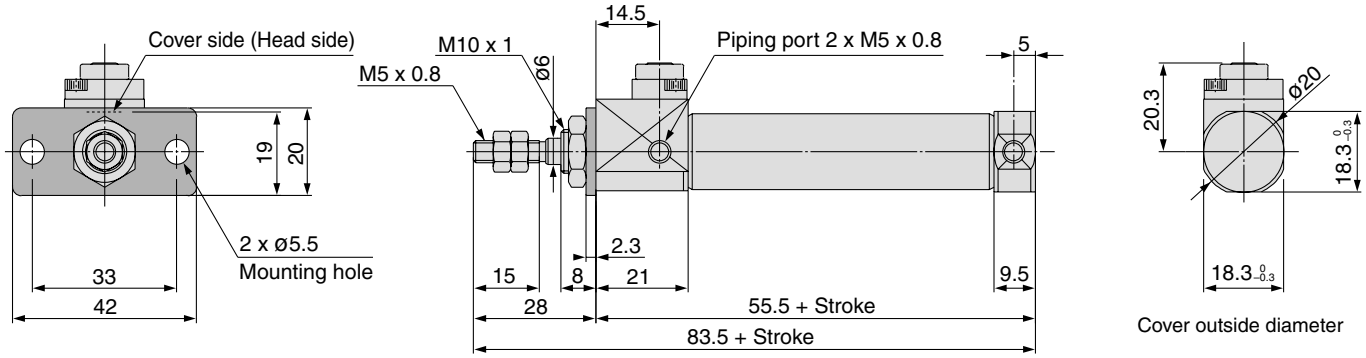


With head end lock: C□BJ2B16-□□-HN

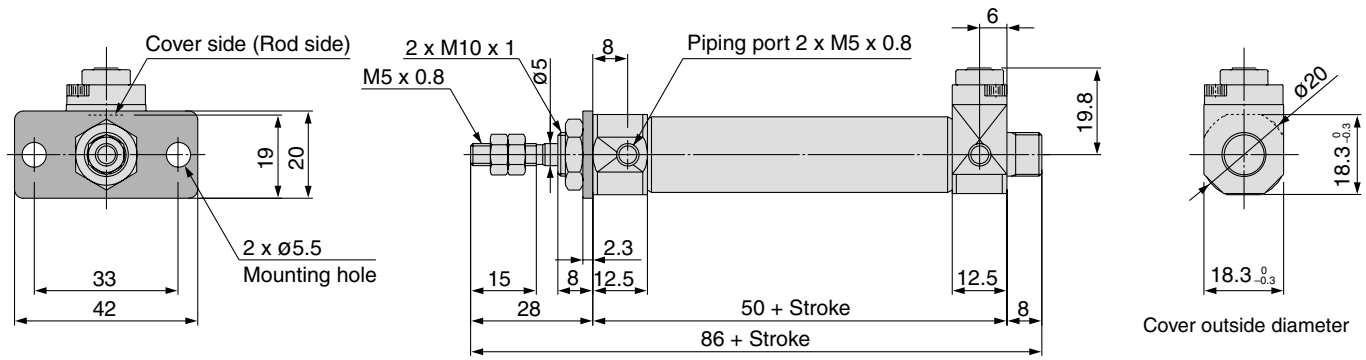


Dimensions

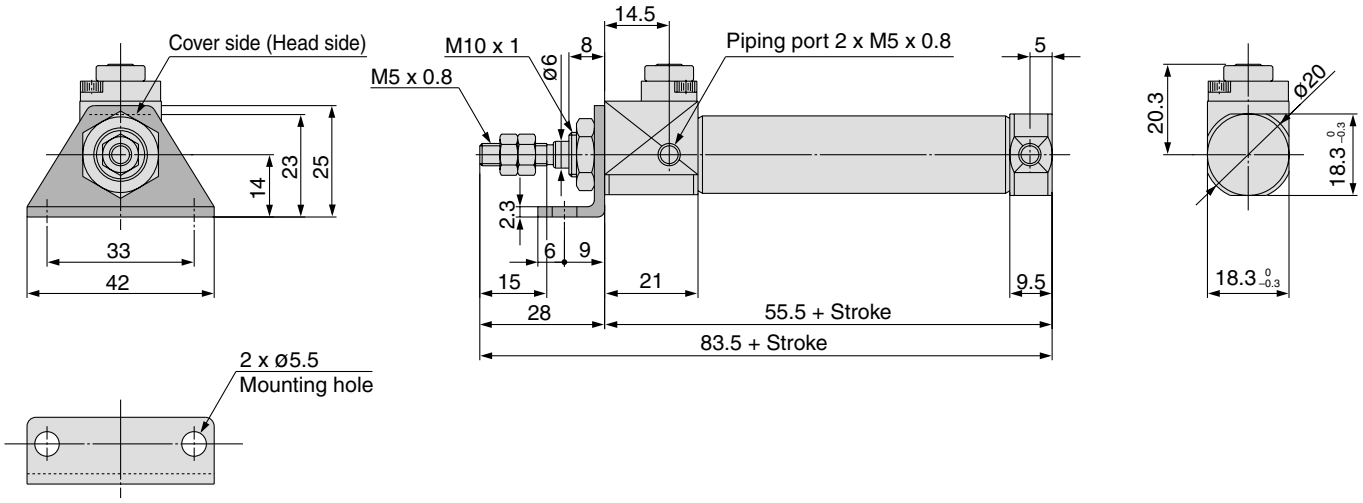
Flange style
With rod end lock: C□BJ2F16-□□-RN



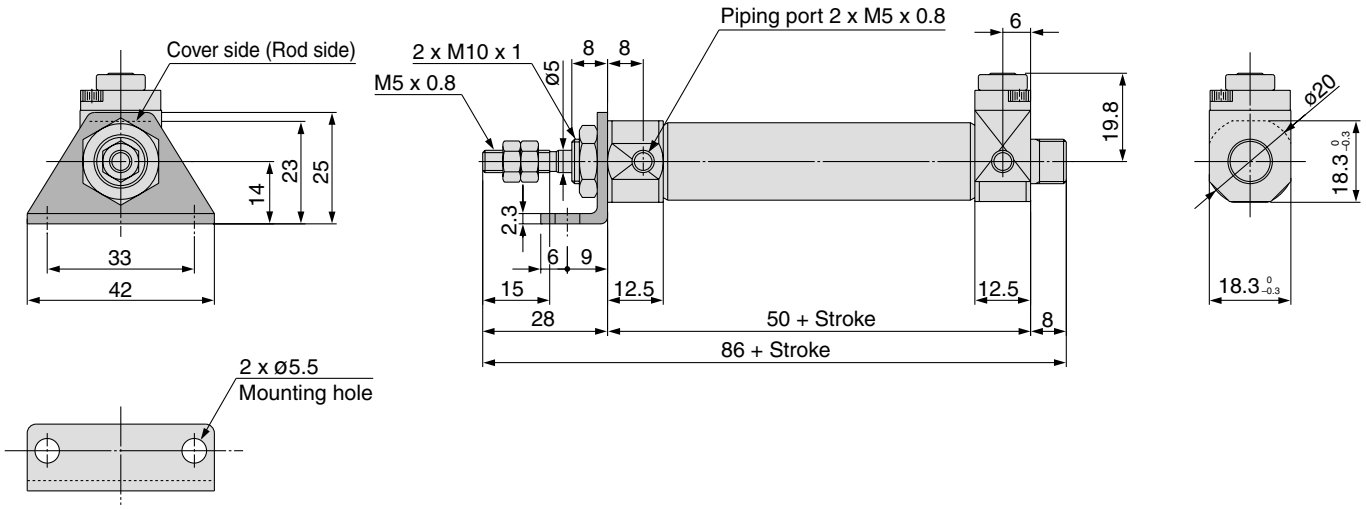
With head end lock: C□BJ2F16-□□-HN



Axial foot style
With rod end lock: C□BJ2L16-□□-RN

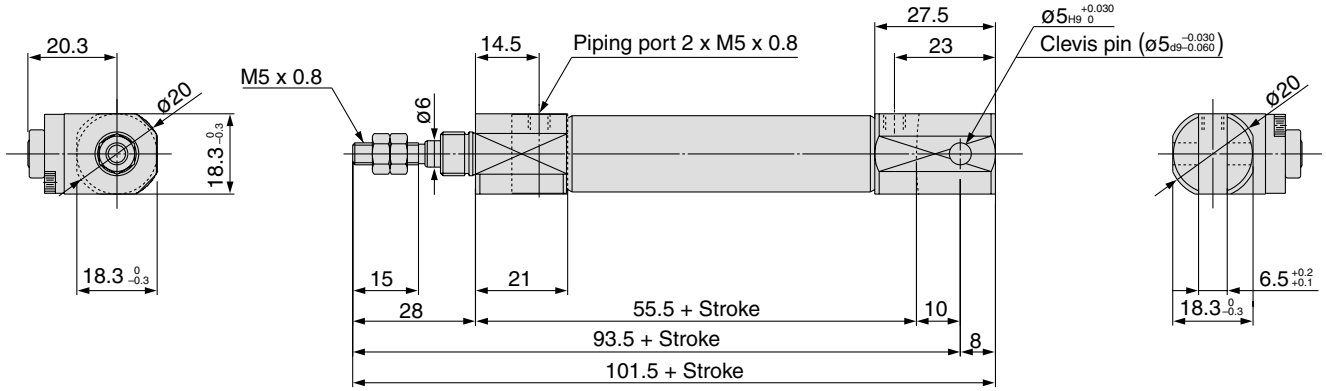


With head end lock: C□BJ2L16-□□-HN



Dimensions

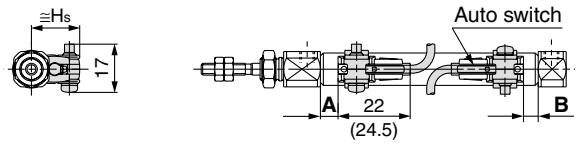
Double clevis style
With rod end lock: C□BJ2D16-□□-RN



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

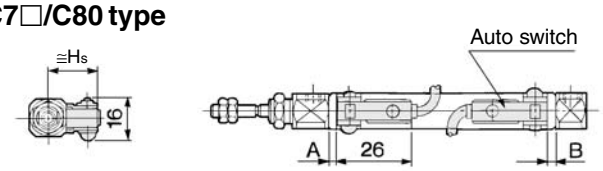
Reed Auto Switch
<Band mounting type>

D-A9□ type

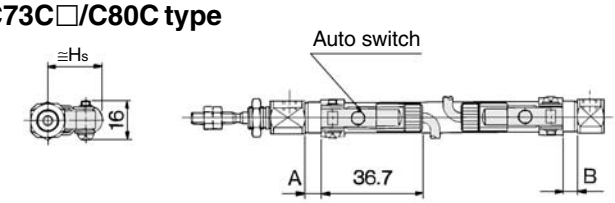


( ): Values for D-A93

D-C7□/C80 type

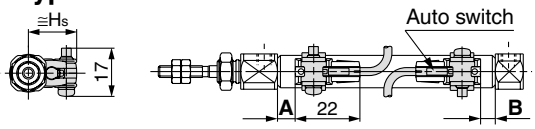


D-C73C□/C80C type

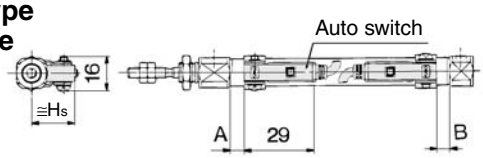


Solid State Auto Switch
<Band mounting type>

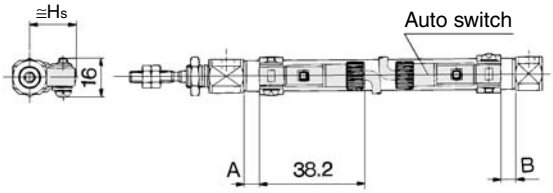
D-M9□ type
D-M9□W type



D-H7□ type
D-H7□W type
D-H7BAL type
D-H7NF type



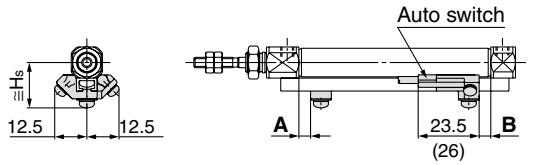
D-H7C type



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

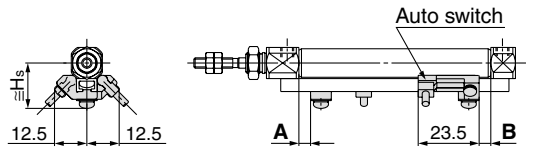
<Rail mounting type>

D-A9□ type

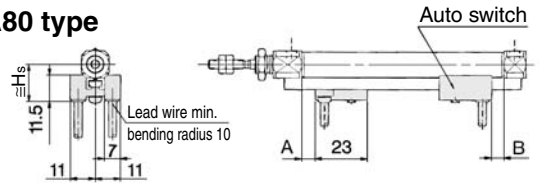


( ): Values for D-A93

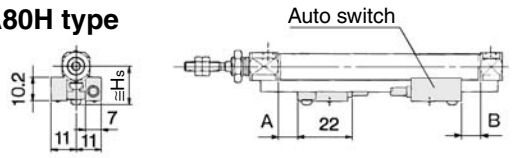
D-A9□V type



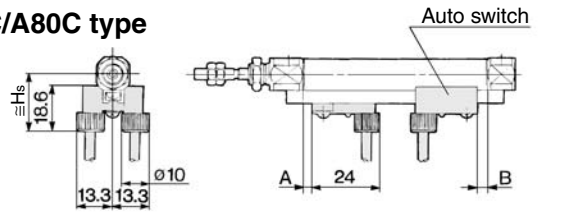
D-A7□/A80 type



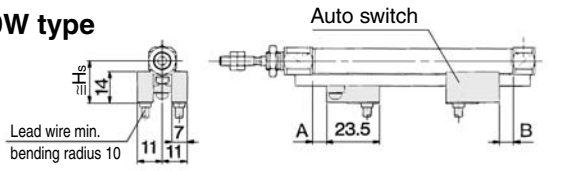
D-A7□H/A80H type



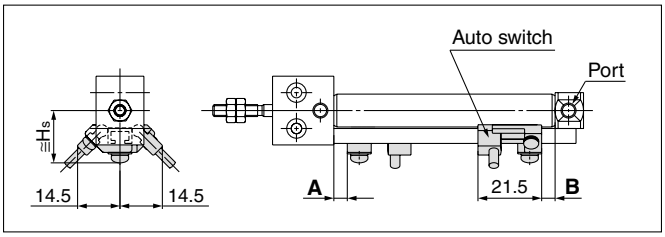
D-A73C/A80C type



D-A79W type

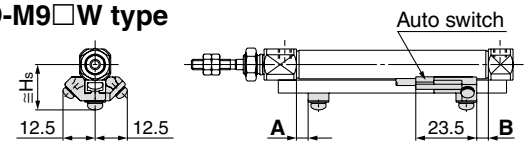


For the direct mount type, the relation between the auto switch mounting position and the port position is as shown below.

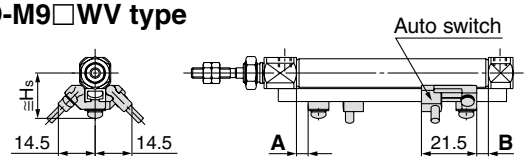


<Rail mounting type>

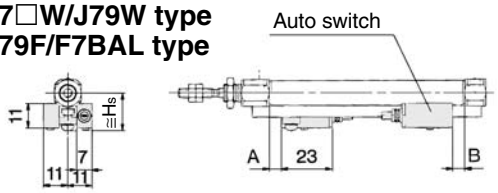
D-M9□ type
D-M9□W type



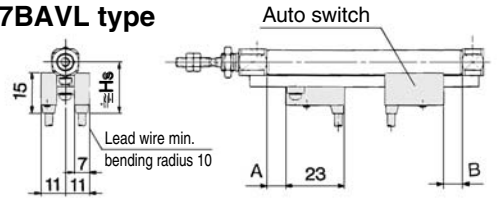
D-M9□V type
D-M9□WV type



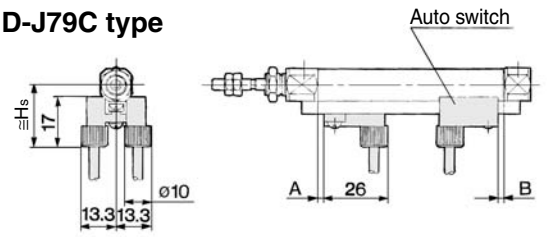
D-F7□/J79 type
D-F7□W/J79W type
D-F79F/F7BAL type



D-F7□V/F7□WV type
D-F7BAVL type



D-J79C type



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

Proper Auto Switch Mounting Position (Single acting type excluded)

(mm)

Auto switch model / Bore size	Band mounting							
	D-A9□		D-M9□ D-M9□W		D-C7□ D-C80 D-C73C D-C80C		D-H7□ D-H7C D-H7NF D-H7□W D-H7BAL	
	A	B	A	B	A	B	A	B
6	1.5 (8)	1.5 (0)	5.5 (12)	5.5 (4)	2 (8.5)	2 (0.5)	1 (7.5)	1 (0)
10	2	2	6	6	2.5	2.5	1.5	1.5
16	2.5	2.5	6.5	6.5	3	3	2	2

(mm)

Auto switch model / Bore size	Rail mounting											
	D-A9□ D-A9□V		D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□AL D-M9□AVL		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-F7BAL D-F7BAVL		D-F7NTL		D-A79W	
	A	B	A	B	A	B	A	B	A	B	A	B
6	—	—	—	—	—	—	—	—	—	—	—	—
10	0.5	0.5	4.5	4.5	3	3	3.5	3.5	8.5	8.5	0.5	0.5
16	1	1	5	5	3.5	3.5	4	4	9	9	1	1

∗ Figures in parentheses for bore ø6 are for the double rod type (Series CJ2W).
∗∗ In the actual setting, adjust them after confirming the auto switch performance.

Auto Switch Mounting Height

(mm)

Auto switch model / Bore size	Band mounting				
	D-A9□ D-M9□ D-M9□W	D-C7□/C80 D-H7□/H7□W D-H7NF D-H7BAL	D-C73C D-C80C	D-H7C	D-A7□ D-A80
	Hs	Hs	Hs	Hs	Hs
6	14.5	15	17.5	18	—
10	16.5	17	19.5	20	16.5
16	20	20.5	23	23.5	19.5

(mm)

Auto switch model / Bore size	Rail mounting					
	D-A9□ D-A9□V D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□AL D-M9□AVL	D-A7□H/A80H D-F7□/J79 D-F7□W/J79W D-F7BAL/F79F D-F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV D-F7BAVL	D-J79C	D-A79W
	Hs	Hs	Hs	Hs	Hs	Hs
6	—	—	—	—	—	—
10	17.5	17.5	23.5	20	23	19
16	21	20.5	26.5	23	26	22

Proper Auto Switch Mounting Position (Detection at stroke end) and Mounting Height Single Acting, Spring Return Type (S)

Proper auto switch mounting position: Spring return type (S)
- **Standard type (CDJ2□□□-□S)**
- **Non-rotating rod type (CDJ2K□□□-□S)**
- **Direct mount type (CDJ2R□□□-□S)**
- **Non-rotating rod/Direct mount type (CDJ2RK□□□-□S)**

(mm)

	Auto switch model	Bore size	**A** Dimensions								**B**
			10 to 15st	16 to 30st	31 to 45st	46 to 60st	61 to 75st	76 to 100st	101 to 125st	126 to 150st	
Band mounting	**D-A9□**	6	8	17	21	35	—	—	—	—	1.5
		10	8.5	16	28	40	—	—	—	—	2
		16	8	16.5	28.5	40.5	46.5	70.5	88.5	100.5	2.5
	D-M9□ **D-M9□W**	6	12	21	25	39	—	—	—	—	5.5
		10	12.5	20	32	44	—	—	—	—	6
		16	12	20.5	32.5	44.5	50.5	74.5	92.5	104.5	6.5
	D-C7□/C80 **D-C73C** **D-C80C**	6	8.5	17.5	21.5	35.5	—	—	—	—	2
		10	9	16.5	28.5	40.5	—	—	—	—	2.5
		16	8.5	17	29	41	47	71	89	101	3
	D-H7□/H7C **D-H7□W/H7BAL** **D-H7NF**	6	7.5	16.5	20.5	34.5	—	—	—	—	1
		10	8	15.5	27.5	39.5	—	—	—	—	1.5
		16	7.5	16	28	40	46	70	88	100	2
Rail mounting	**D-A9□** **D-A9□V**	10	7	14.5	26.5	38.5	—	—	—	—	0.5
		16	6.5	15	27	39	45	69	87	99	1
	D-M9□/M9□V **D-M9□W/M9□WV** **D-M9□AL/M9□AVL**	10	11	18.5	30.5	42.5	—	—	—	—	4.5
		16	10.5	19	31	43	49	73	91	103	5
	D-A7□/A80	10	9.5	17	29	41	—	—	—	—	3
		16	9	17.5	29.5	41.5	47.5	71.5	89.5	101.5	3.5
	D-A7□H/A80H **D-A73C/A80C** **D-F7□/J79** **D-F7□W/J79W** **D-F7□V/F7□WV** **D-F79F/J79C** **D-F7BAL** **D-F7BAVL**	10	10	17.5	29.5	41.5	—	—	—	—	3.5
		16	9.5	18	30	42	48	72	90	102	4
	D-F7NTL	10	15	22.5	34.5	46.5	—	—	—	—	8.5
		16	14.5	23	35	47	53	77	95	107	9
	D-A79W	10	7	14.5	26.5	38.5	—	—	—	—	0.5
		16	6.5	15	27	39	45	69	87	99	1

∗ In the actual setting, adjust them after confirming the auto switch performance.

Proper Auto Switch Mounting Position (Detection at stroke end) and Mounting Height
Single Acting, Spring Extend Type (T)

Proper auto switch mounting position: Spring extend type (T)
- **Standard type (CDJ2□□□-□T)**
- **Non-rotating rod type (CDJ2K□□□-□T)**
- **Direct mount type (CDJ2R□□□-□T)**
- **Non-rotating rod/Direct mount type (CDJ2RK□□□-□T)**

(mm)

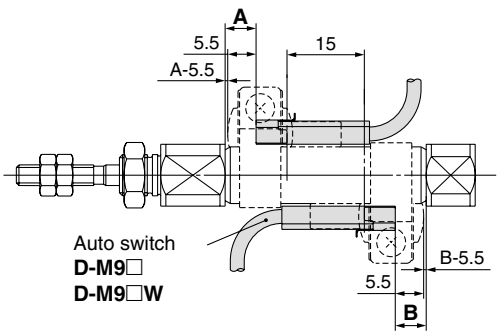
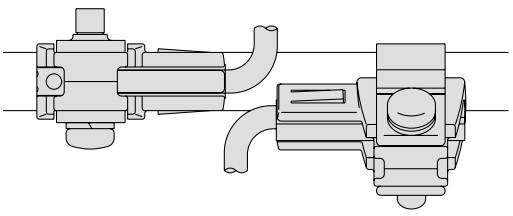
	Auto switch model	Bore size	A	B Dimensions							
				10 to 15st	16 to 30st	31 to 45st	46 to 60st	61 to 75st	76 to 100st	101 to 125st	126 to 150st
Band mounting	D-A9□	6	1.5	8	17	21	35	—	—	—	—
		10	2	8.5	16	28	40	—	—	—	—
		16	2.5	8	16.5	28.5	40.5	46.5	69.5	88.5	100.5
	D-M9□ D-M9□W	6	5.5	12	21	25	39	—	—	—	—
		10	6	12.5	20	32	44	—	—	—	—
		16	6.5	12	20.5	32.5	44.5	50.5	73.5	92.5	104.5
	D-C7□/C80 D-C73C D-C80C	6	2	8.5	17.5	21.5	35.5	—	—	—	—
		10	2.5	9	16.5	28.5	40.5	—	—	—	—
		16	3	8.5	17	29	41	47	71	89	101
	D-H7□/H7C D-H7□W/H7BAL D-H7NF	6	1	7.5	16.5	20.5	34.5	—	—	—	—
		10	1.5	8	15.5	27.5	39.5	—	—	—	—
		16	2	7.5	16	28	40	46	70	88	100
Rail mounting	D-A9□ D-A9□V	10	0.5	7	14.5	16.5	38.5	—	—	—	—
		16	1	6.5	15	27	39	45	68	87	99
	D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	10	4.5	11	18.5	30.5	42.5	—	—	—	—
		16	5	10.5	19	31	43	49	72	91	103
	D-A7□/A80	10	3	9.5	17	29	41	—	—	—	—
		16	3.5	9	17.5	29.5	41.5	47.5	71.5	87.5	101.5
	D-A7□H/A80H D-A73C/A80C D-F7□/J79 D-F7□W/J79W D-F7□V/F7□WV D-F79F/J79C D-F7BAL D-F7BAVL	10	3.5	10	17.5	29.5	41.5	—	—	—	—
		16	4	9.5	18	30	42	48	72	90	102
	D-F7NTL	10	8.5	15	22.5	34.5	46.5	—	—	—	—
		16	9	14.5	23	35	47	53	77	95	107
	D-A79W	10	0.5	7	14.5	26.5	38.5	—	—	—	—
		16	1	6.5	15	27	39	45	69	87	99

∗ In the actual setting, adjust them after confirming the auto switch performance.

Minimum Auto Switch Mounting Stroke

(mm)

Auto switch mounting	Auto switch model	No. of auto switch mounted				
		1 pc.	2 pcs.		n pcs. (n: No. of auto switch)	
			Different surfaces	Same surface	Different surfaces	Same surface
Band mounting	**D-A9□ D-M9□ D-M9□W**	10	15 Note)	45 Note)	$15 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6···)	45 + 15 (n-2)
	D-C7□ D-C80	10	15	50	$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6···)	50 + 20 (n-2)
	D-H7□/H7□W D-H7BAL D-H7NF	10	15	60	$15 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6···)	60 + 22.5 (n-2)
	D-C73C D-C80C D-H7C	10	15	65	$15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···)	50 + 27.5 (n-2)
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□AVL	10	—	15	—	15 + 15 (n-2) (n = 4, 6···)
	D-M9□W	15	—	15	—	20 + 15 (n-2) (n = 4, 6···)
	D-M9□AL	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-F7BAL/F79F D-F7NTL	10	—	15	—	15 + 20 (n-2) (n = 4, 6···)
	D-F7□WV D-F7BAVL	10	—	15	—	10 + 15 (n-2) (n = 4, 6···)

Auto switch model	With 2 auto switches	
	Different surfaces	Same surface
	 The proper auto switch mounting position is 5.5 mm inward from the switch holder edge.	 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-A93	—	Less than 50 strokes
D-M9□ D-M9□W	Less than 20 strokes	Less than 55 strokes

Note) When 2 D-A93/M9□/M9□W auto switches are included.

Operating range

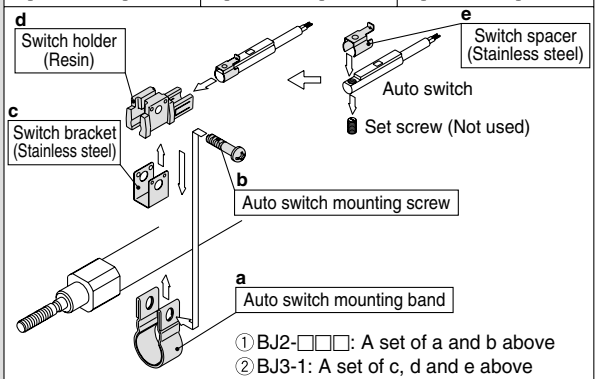
(mm)

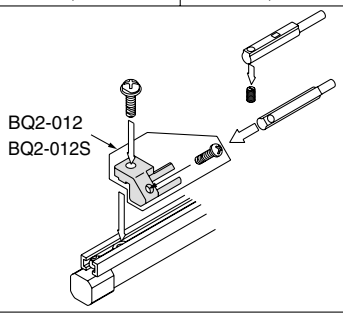
	Auto switch model	Bore size		
		6	10	16
Band mounting	**D-A9□**	4.5	6	7
	D-M9□ **D-M9□W**	2	2.5	3
	D-C7□/C80/C73C/C80C	6	7	7
	D-H7□/H7□W **D-H7BAL/H7NF**	3	4	4
	D-H7C	5	8	9
Rail mounting	**D-A9□/A9□V**	—	6	6.5
	D-M9□/M9□V **D-M9□W/M9□WV** **D-M9□AL/M9□ALV**	—	3	3.5
	D-A7□/A80/A7H/A80H **D-A73C/A80C**	—	8	9
	D-A79W	—	11	13
	D-F7□/J79/F7□W/J79W **D-F7□V/F7□WV/F79F** **D-J79C/F7BAL/F7BAVL** **D-F7NTL**	—	5	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.

Auto Switch Mounting Bracket: Part No.

Auto switch mounting	Auto switch model	Bore size (mm)		
		ø6	**ø10**	**ø16**
Band mounting	**D-A9□** **D-M9□** **D-M9□W**	Note 1), Note 2) ①BJ2-006 ②BJ3-1	Note 1), Note 2) ①BJ2-010 ②BJ3-1	Note 1), Note 2) ①BJ2-016 ②BJ3-1
	D-C7□/C80 **D-C73C/C80C** **D-H7□/H7□W** **D-H7BAL/H7NF**	BJ2-006	BJ2-010	BJ2-016
Rail mounting	**D-A9□** **D-A9□V** **D-M9□** **D-M9□V** **D-M9□W** **D-M9□WV** **D-M9□AL** (4) **D-M9□AVL** (4)	—	Note 3), Note 4) BQ2-012, BQ2-012S	Note 3), Note 4) BQ2-012, BQ2-012S





Note 1) Two kinds of auto switch bracket are used as a set.
Note 2) When cylinders are shipped, only auto switch mounting brackets are assembled.
Note 3) When a compact auto switch is mounted on a ø10 or ø16 rail, an auto switch bracket is needed, to be ordered separately.
CDJ2B10-60-A·····1
D-M9BWV·····2 pcs.
BQ2-012·····2 pcs.
Note 4) For D-M9□A(V)L, order BQ2-012S, which uses stainless steel mounting screws.

[Stainless Steel Mounting Screw Kit]
The following set of stainless steel mounting screws is available. Use them in accordance with the operating environment. (Since auto switch brackets are not included, order them separately.)
BBA4: For D-C7/C8/H7 types

Note 5) Refer to page 1358 for the details of BBA4 screws.
The above stainless steel screws are used when a cylinder is shipped with D-H7BAL-type auto switches. When only a switch is shipped independently, BBA4 screws are 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	

In addition to the auto switches listed above, the following auto switches are also available. Refer to pages 1263 to 1371 for the detailed specifications.

Auto switch type	Part no.	Electrical entry (Entry direction)	Features
Reed	D-C73, C76	Grommet (In-line)	—
	D-C80		Without light
Sold state	D-H7A1, H7A2, H7B		—
	D-H7NW, H7PW, H7BW		Diagnosis indication (2 colors)

∗ Solid state auto switches are also available with a pre-wired connector. Refer to pages 1328 and 1329 for details.
∗ Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H types) are also available. Refer to page 1290 for details.

Low Speed Cylinder
Double Acting, Single Rod
Series CJ2X
ø10, ø16

How to Order

Bore size

10	10 mm
16	16 mm

Standard stroke (mm)

ø10	15, 30, 45, 60, 75, 100, 125, 150
ø16	15, 30, 45, 60, 75, 100, 125, 150, 175, 200

∗ Intermediate stroke other than above is manufactured upon receipt of order.

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
D	Double clevis style

Built-in Magnet Cylinder Model

Suffix the symbol "-A" (Rail mounting style) or "-B" (Band mounting style) to the end of part number for cylinder with auto switch.

Example	Rail mounting style	CDJ2XB10-45-A
	Band mounting style	CDJ2XB16-60-B

∗ For the rail mounting type, screws and nuts for two auto switches are included in the rail.

CJ2X L 16 – 60 □

With auto switch CDJ2X L 16 – 60 □ – M9BW □

With auto switch (Built-in magnet)

Low speed cylinder

Port location on head cover

Symbol \ Bore size (mm)	ø10, ø16
Nil	Perpendicular to axis
R	Axial direction

∗ For configuration, refer to page 1115.

Auto switch

Nil	Without auto switch

∗ For the applicable auto switch model, refer to the table below.

Number of auto switches

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

Applicable Auto Switch/Refer to pages 1719 to 1827 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Band mounting	Auto switch model: Rail mounting Perpendicular	Auto switch model: Rail mounting In-line	Lead wire length (m) 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	**M9N**	—	—	●	●	●	○	—	○	IC circuit	Relay, PLC
							—	**F7NV**	**F79**	●	—	●	○	—	○		
				3-wire (PNP)			**M9P**	—	—	●	●	●	○	—	○		
							—	**F7PV**	**F7P**	●	—	●	○	—	○		
				2-wire	12 V		**M9B**	—	—	●	●	●	○	—	○	—	
							—	**F7BV**	**J79**	●	—	●	○	—	○		
		Connector					**H7C**	**J79C**	—	●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	5 V, 12 V		**M9NW**	—	—	●	●	●	○	—	○	IC circuit	
							—	**F7NWV**	**F79W**	●	—	●	○	—	○		
				3-wire (PNP)			**M9PW**	—	—	●	●	●	○	—	○		
							—	—	**F7PW**	●	—	●	○	—	○		
				2-wire	12V		**M9BW**	—	—	●	●	●	○	—	○	—	
							—	**F7BWV**	**J79W**	●	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5 V, 12 V		**H7NF**	—	**F79F**	●	—	●	○	—	○	IC circuit	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96**	—	**A76H**	●	—	●	—	—	—	IC circuit	—
				2-wire	—	200 V	—	**A72**	**A72H**	●	—	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	—	**A73**	**A73H**	●	—	●	●	—	—	—	
								A93	—	—	●	—	●	—	—	—		
			No				100 V or less	**A90**	**A80**	**A80H**	●	—	●	—	—	—	IC circuit	
		Connector	Yes				—	**C73C**	**A73C**	—	●	—	●	●	●	—	—	
			No				24 V or less	**C80C**	**A80C**	—	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color indication)	Grommet	Yes			—	—	—	**A79W**	—	●	—	●	—	—	—	—	

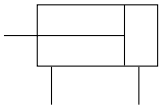
∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

∗ Since there are other applicable auto switches than listed, refer to page 1123 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1784 and 1785.
∗ For the band mounting type, D-A9□V□/M9□V□/M9□WV□/M9□A(V)L types cannot be mounted.

∗ Solid state auto switches marked with "○" are produced upon receipt of order.
∗ D-A9□/M9□/M9□W/A7□□/A80□/F7□□/J7□□ auto switches are shipped together (not assembled). (When D-A9□/M9□/M9□W are specified, only auto switch mounting brackets are assembled before shipped.)
∗ D-C7□□/C80□/H7□□ auto switches are assembled at the time of shipment.
∗ Order auto switch mounting brackets separately when D-A9□(V)/M9□(V)/M9□W(V) types are mounted with a rail. Refer to page 1123 for details.

JIS Symbol

Double acting, Single rod



⚠Precautions

Be sure to read before handling. Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Mounting

⚠Caution

1. During installation, secure the rod cover and tighten by applying an appropriate tightening force to the retaining but 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. Proper tightening torque for mounting thread should be within the range specified. Apply a Loctite® (no. 242 Blue) for mounting thread.

Bore size (mm)	Proper tightening torque for mounting thread (N·m) (tightening torque for mounting nut)
10	3.0 to 3.2
16	5.4 to 5.9

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).
   Especially with ø10, use ultra thin pliers, such as Super Tool Corp., CSM-07A.
4. For the auto switch mounting rail, do not remove the pre-equipped rail. Since the mounting thread is drilled through inside a the cylinder, it will result in air leakage.

Operating Precautions

⚠Warning

1. It might not be able to control by meter-out at a low speed operation.

⚠Caution

1. For Series CJ2X, 0.1 Nℓ/min is the values at maximum in terms of its construction and there is internal leakage (ANR).

Specifications

Bore size (mm)		10	16
Action		Double acting, Single rod	
Fluid		Air	
Proof pressure		1.05 MPa	
Maximum operating pressure		0.7 MPa	
Minimum operating pressure		0.06 MPa	
Ambient and fluid temperature		Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)	
Cushion		Rubber bumper (Standard equipment)	
Lubrication		Not required (Non-lube)	
Stroke length tolerance		$^{+1.0}_{0}$	
Piston speed		1 to 300 mm/s	
Allowable kinetic energy	**ø10**	0.035 J	
	ø16	0.090 J	

Standard Stroke

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

∗ Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Mounting Style and Accessory

Mounting		Basic style	Axial foot style	Rod side flange style	Double∗ clevis style
Standard equipment	Mounting nut	●	●	●	—
	Rod end nut	●	●	●	●
	Clevis pin	—	—	—	●
Option	Single knuckle joint	●	●	●	●
	Double knuckle joint∗	●	●	●	●
	T-bracket	—	—	—	●

∗ Pin and retaining ring are shipped together with double clevis and double knuckle joint.

Port Location on Head Cover

For basic style, the port position in a head cover is available either perpendicular to the axis or in-line with the cylinder axis.

Axial direction **Perpendicular**

Mounting Bracket Part No.

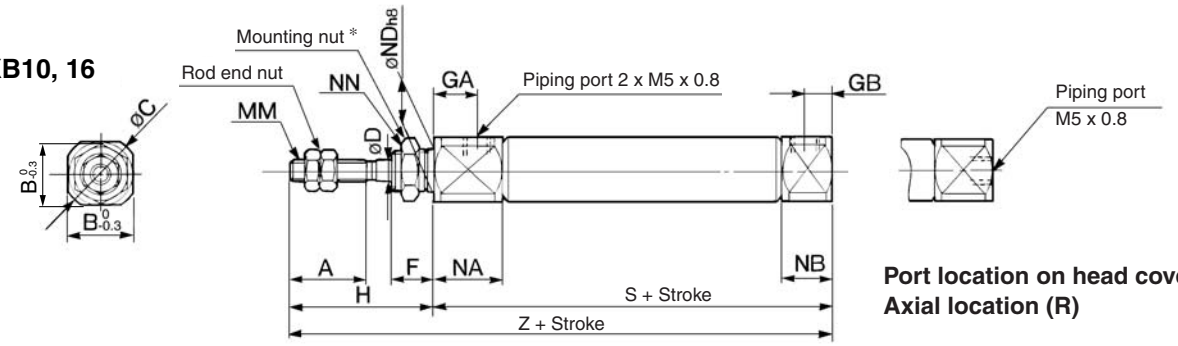
Mounting bracket	Bore size (mm)	
	10	**16**
Foot bracket	CJ-L010B	CJ-L016B
Flange bracket	CJ-F010B	CJ-F016B
T-bracket∗	CJ-T010B	CJ-T016B

∗ T-bracket is used with double clevis (D).

Basic Style (B)

CJ2XB **Bore size** – **Stroke** **Port location on head cover**

CJ2XB10, 16



Port location on head cover: Axial location (R)

∗ For details of the mounting nut, refer to page 1118.

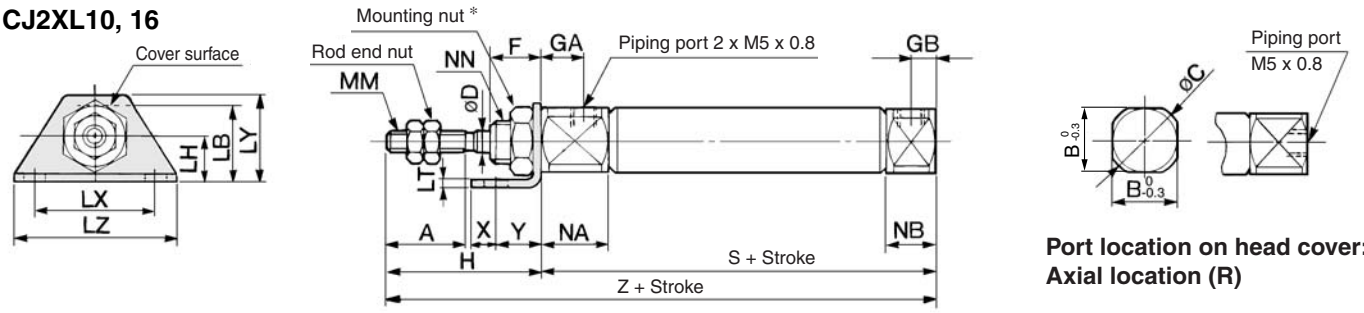
(mm)

Bore size (mm)	A	B	C	D	F	GA	GB	H	MM	NA	NB	NDh8	NN	S	T	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

Axial Foot Style (L)

CJ2XL **Bore size** – **Stroke** **Port location on head cover**

CJ2XL10, 16



Port location on head cover: Axial location (R)

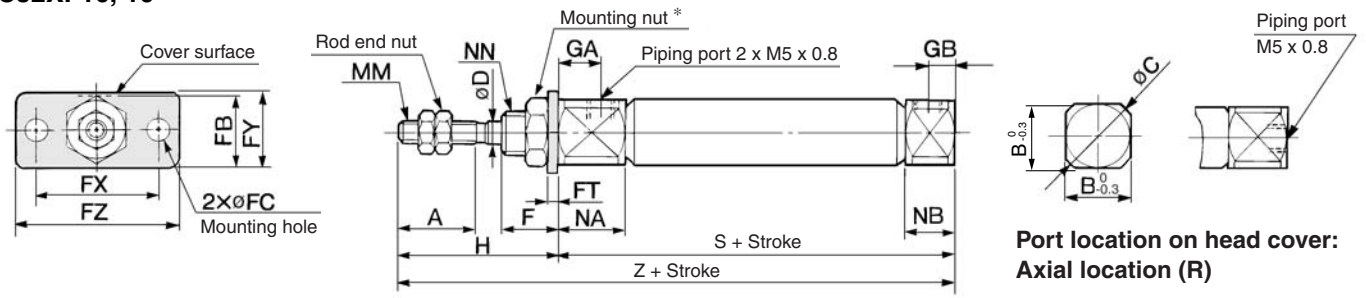
∗ For details of the mounting nut, refer to page 1118.

Bore size (mm)	A	B	C	D	F	GA	GB	H	LB	LC	LH	LT	LX	LY	LZ	MM	NA	NB	NN	S	T	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

Rod Side Flange Style (F)

CJ2XF **Bore size** – **Stroke** **Port location on head cover**

CJ2XF10, 16



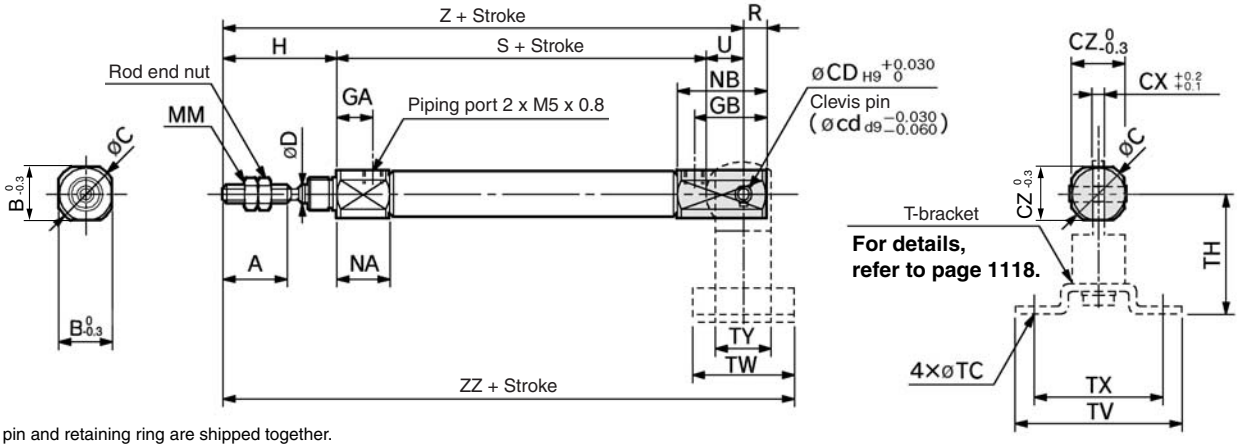
* For details of the mounting nut, refer to page 1118.

(mm)

Bore size (mm)	A	B	C	D	F	FB	FC	FT	FX	FY	FZ	GA	GB	H	MM	NA	NB	NN	S	T	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

Double Clevis Style (D)

CJ2XD **Bore size** – **Stroke**



* Clevis pin and retaining ring are shipped together.

(mm)

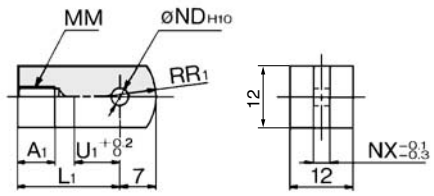
Bore size (mm)	A	B	C	CD (cd)	CX	CZ	D	GA	GB	H	MM	NA	NB	R	S	U	Z	ZZ
10	15	12	14	3.3	3.2	12	4	8	18	28	M4 x 0.7	12.5	22.5	5	46	8	82	93
16	15	18.3	20	5	6.5	18.3	5	8	23	28	M5 x 0.8	12.5	27.5	8	47	10	85	99

T-bracket Dimensions (mm)

Bore size (mm)	TC	TH	TV	TW	TX	TY
10	4.5	29	40	22	32	12
16	5.5	35	48	28	38	16

Accessory Bracket Dimensions (mm)

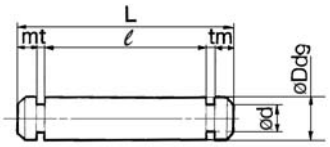
Single Knuckle Joint



Material: Rolled steel

Part no.	Applicable bore	A_1	L_1	MM	ND^{H10}	NX	R_1	U_1
I-J010B	**10**	8	21	M4 x 0.7	$3.3^{+0.048}_{0}$	3.1	8	9
I-J016B	**16**	8	25	M5 x 0.8	$5^{+0.048}_{0}$	6.4	12	14

Clevis Pin

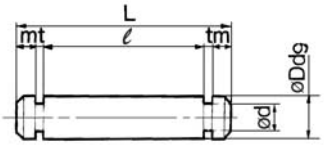


Material: Stainless steel

Part no.	Applicable bore	Dd9	d	L	ℓ	m	t	Applicable retaining ring
CD-J010	**10**	$3.3^{-0.030}_{-0.060}$	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 packaged with clevis pins.

Knuckle Pin

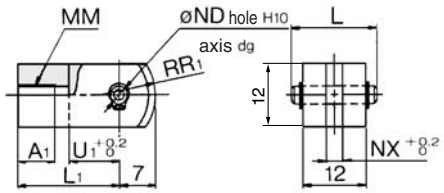


Material: Stainless steel

Part no.	Applicable bore	Dd9	d	L	ℓ	m	t	Applicable retaining ring
CD-J010	**10**	$3.3^{-0.030}_{-0.060}$	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, clevis pin is diverted.
∗ Retaining rings are packaged with knuckle pins.

Double Knuckle Joint



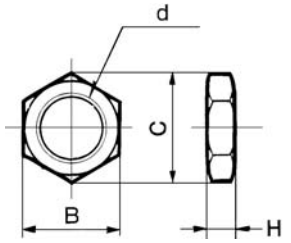
Material: Rolled steel

Part no.	Applicable bore	A_1	L	L_1	MM
Y-J010B	**10**	8	15.2	21	M4 x 0.7
Y-J016B	**16**	11	16.6	21	M5 x 0.8

Part no.	ND_{d9}	ND_{H10}	NX	R_1	U_1
Y-J010B	$3.3^{-0.030}_{-0.060}$	$3.3^{+0.048}_{0}$	3.2	8	10
Y-J016B	$5^{-0.030}_{-0.060}$	$5^{+0.048}_{0}$	6.5	12	10

∗ Knuckle pin and retaining ring are shipped together.

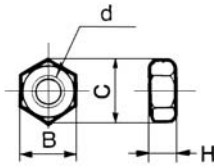
Mounting Nut



Material: Brass

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

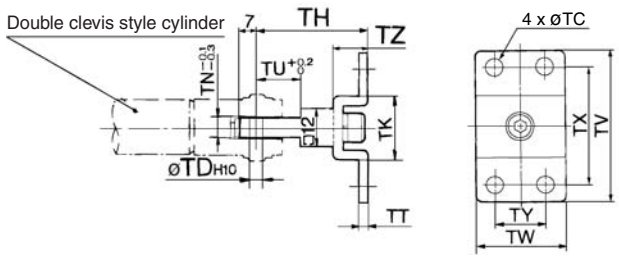
Rod End Nut



Material: Iron

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

T-bracket

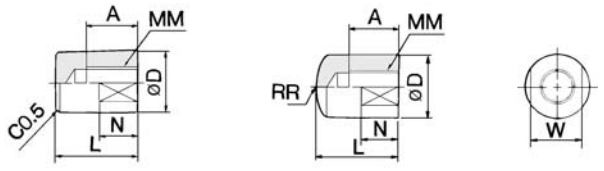


Part no.	Applicable bore	TC	TD_{H10}	TH	TK	TN	TT	TU	TV	TW	TX	TY	TZ
CJ-T010B	**10**	4.5	$3.3^{+0.048}_{0}$	29	18	3.1	2	9	40	22	32	12	8
CJ-T016B	**16**	5.5	$5^{+0.048}_{0}$	35	20	6.4	2.3	14	48	28	38	16	10

∗ T-bracket includes a T-bracket base, single knuckle joint, hexagon socket head cap screw and spring washer.

Rod End Cap

Flat type/CJ-CF□□□ **Round type/CJ-CR□□□**



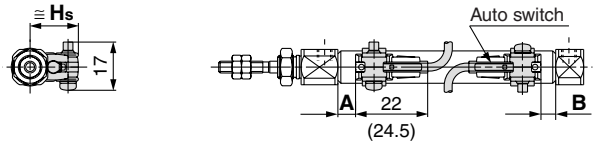
Material: Polyacetal

Part no.		Applicable bore	A	D	L	MM	N	R	W
Flat type	Round type								
CJ-CF010	**CJ-CR010**	10	8	10	13	M4 x 0.7	6	10	8
CJ-CF016	**CJ-CR016**	16	10	12	15	M5 x 0.8	7	12	10

Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

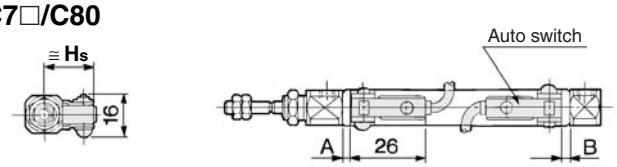
Reed auto switch
<Band mounting style>

D-A9□

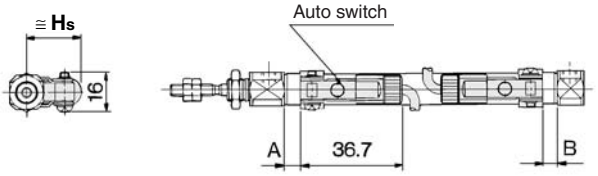


( ): For D-A93 type

D-C7□/C80

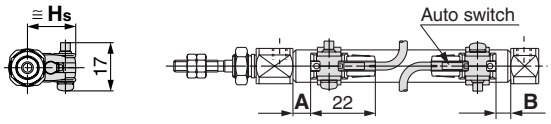


D-C73C□/C80C

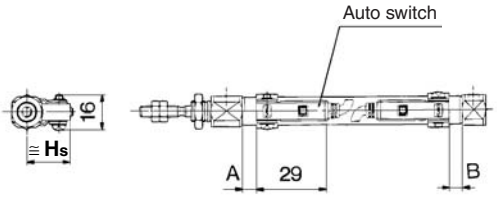


Solid state auto switch
<Band mounting style>

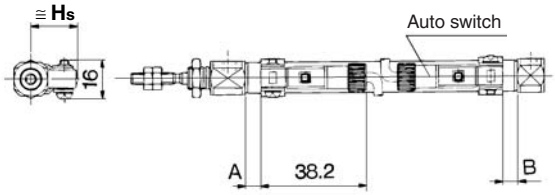
D-M9□
D-M9□W



D-H7□
D-H7□W
D-H7NF



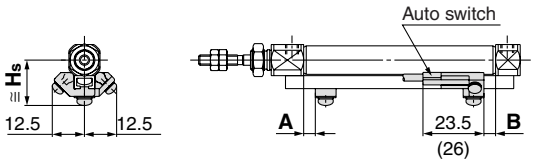
D-H7C



Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

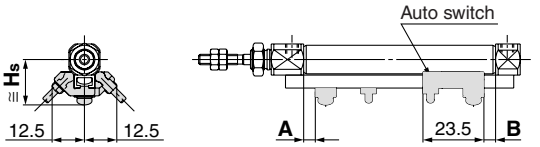
Reed auto switch <Band mounting style>

D-A9□

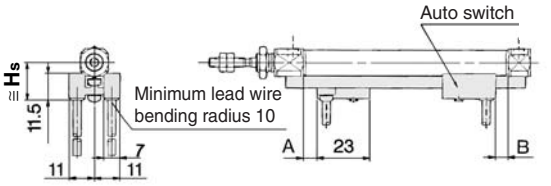


( ): For D-A93 type

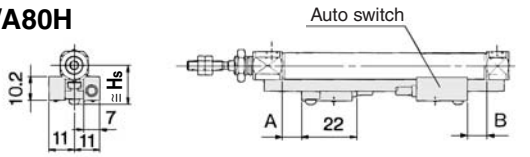
D-A9□V



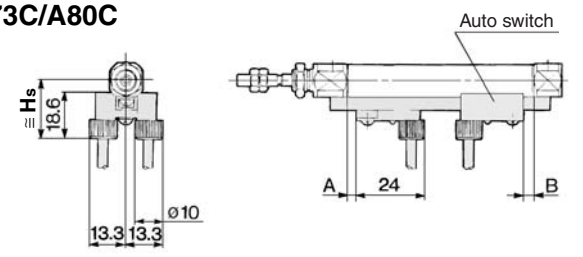
D-A7□/A80



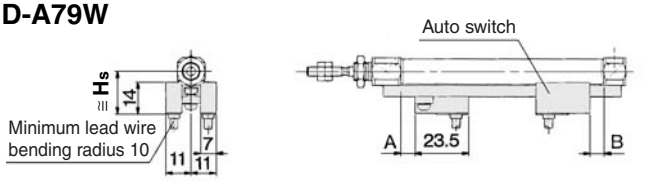
D-A7□H/A80H



D-A73C/A80C

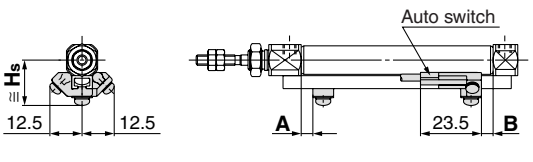


D-A79W

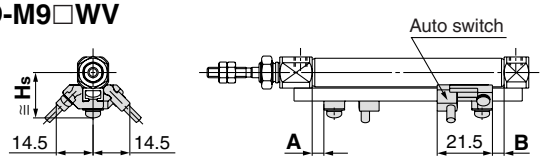


Solid state auto switch <Band mounting style>

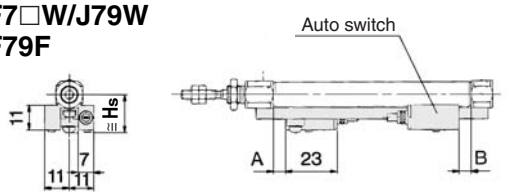
D-M9□
D-M9□W



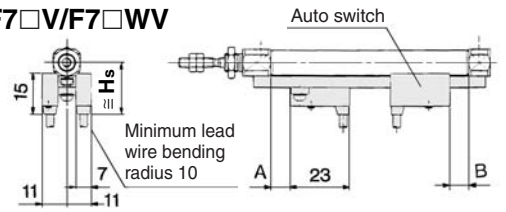
D-M9□V
D-M9□WV



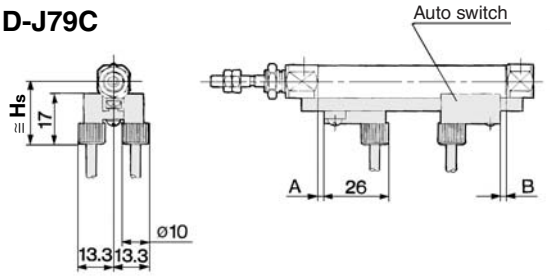
D-F7□/J79
D-F7□W/J79W
D-F79F



D-F7□V/F7□WV



D-J79C



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								Rail mounting											
	D-A9□		D-M9□ D-M9□W		D-C7□ D-C80 D-C73C D-C80C		D-H7□ D-H7C D-H7NF D-H7□W		D-A9□ D-A9□V		D-M9□ D-M9□V D-M9□W D-M9□WV		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-F7NTL		D-A79W	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
10	2	2	6	6	2.5	2.5	1.5	1.5	0.5	0.5	4.5	4.5	3	3	3.5	3.5	8.5	8.5	0.5	0.5
16	2.5	2.5	6.5	6.5	3	3	2	2	1	1	5	5	3.5	3.5	4	4	9	9	1	1

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

Auto Switch Mounting Height

(mm)

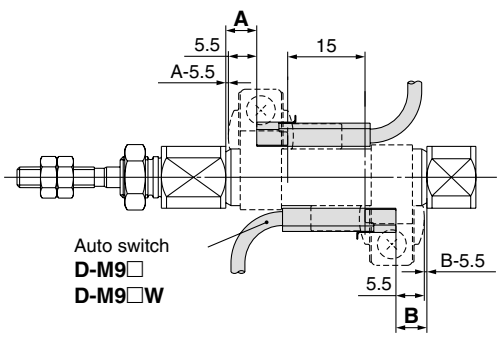
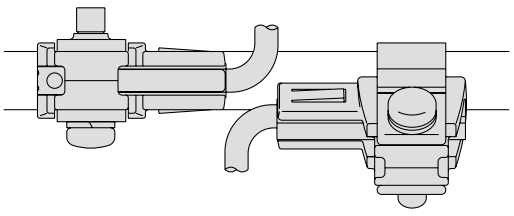
Auto switch model / Bore size (mm)	Band mounting				Rail mounting						
	D-A9□ D-M9□ D-M9□W	D-C7□ D-C80 D-H7□ D-H7□W D-H7NF	D-C73C D-C80C	D-H7C	D-A7□ D-A80	D-A9□ D-A9□V D-M9□ D-M9□V D-M9□W D-M9□WV	D-A7□H/A80H D-F7□/J79 D-F7□W/J79W D-F79F D-F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV	D-J79C	D-A79W
	Hs	Hs	Hs	Hs	Hs	Hs	Hs	Hs	Hs	Hs	Hs
10	16.5	17	19.5	20	16.5	17.5	17.5	23.5	20	23	19
16	20	20.5	23	23.5	19.5	21	20.5	26.5	23	26	22

Minimum Auto Switch Mounting Stroke

(mm)

Auto switch mounting	Auto switch model	No. of auto switch mounted				
		1 pc.	2 pcs.		n pcs. (n: No. of auto switch)	
			Different surfaces	Same surface	Different surfaces	Same surface
Band mounting	**D-A9□ D-M9□ D-M9□W**	10	15 Note)	45 Note)	$15 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6···)	45 + 15 (n-2)
	D-C7□ D-C80	10	15	50	$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6···)	50 + 20 (n-2)
	D-H7□/H7□W D-H7NF	10	15	60	$15 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6···)	60 + 22.5 (n-2)
	D-C73C D-C80C D-H7C	10	15	65	$15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···)	50 + 27.5 (n-2)
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	10	—	15	—	15 + 15 (n-2) (n = 4, 6···)
	D-M9□W	15	—	15	—	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-F79F D-F7NTL	10	—	15	—	15 + 20 (n-2) (n = 4, 6···)
	D-F7□WV	10	—	15	—	10 + 15 (n-2) (n = 4, 6···)

Note) When 2 D-A93/M9□/M9□W auto switches are included.

Auto switch model	With 2 auto switches	
	Different surfaces	Same surface
	 The proper auto switch mounting position is 5.5 mm inward from the switch holder edge.	 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-A93	—	Less than 50 strokes
D-M9□ D-M9□W	Less than 20 strokes	Less than 55 strokes

Operating Range

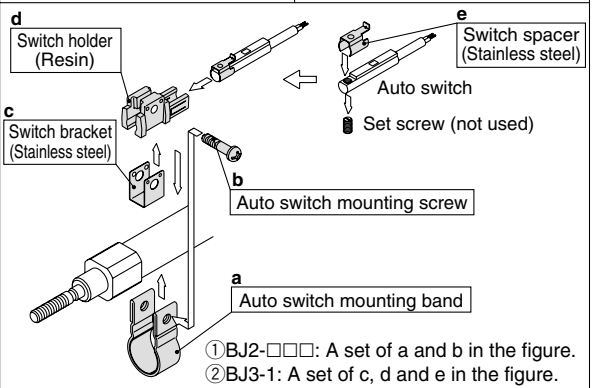
(mm)

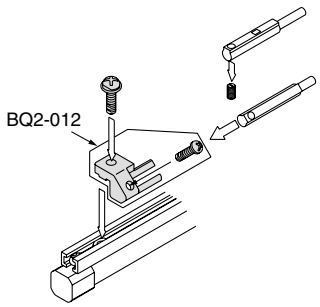
	Auto switch model	Bore size (mm)	
		10	16
Band mounting	D-A9□	6	7
	D-M9□ D-M9□W	2.5	3
	D-C7□/C80/C73C/C80C	7	7
	D-H7□/H7□W D-H7NF	4	4
	D-H7C	8	9
Rail mounting	D-A9□/A9□V	6	6.5
	D-M9□/M9□V D-M9□W/M9□WV	3	3.5
	D-A7□/A80/A7H/A80H D-A73C/A80C	8	9
	D-A79W	11	13
	D-F7□/J79/F7□W/J79W D-F7□V/F7□WV/F79F D-J79C D-F7NTL	5	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.

Auto Switch Mounting Bracket/Part No.

Auto switch mounting	Auto switch model	Bore size ø10	Bore size ø16
Band mounting	D-A9□ D-M9□ D-M9□W	Note 1), Note 2) ①BJ2-010 ②BJ3-1	Note 1), Note 2) ①BJ2-016 ②BJ3-1
	D-C7□/C80 D-C73C/C80C D-H7□/H7□W D-H7NF	BJ2-010	BJ2-016
Rail mounting	D-A9□ D-A9□V D-M9□ D-M9□V D-M9□W D-M9□WV	Note 3) BQ2-012	Note 3) BQ2-012





Note 1) Two kinds of auto switch mounting brackets are used as a set.
Note 2) Auto switch mounting brackets are shipped together with cylinders.
Note 3) When mounting a compact auto switch on the ø10 or ø16 rail mounting type, order auto switch mounting bracket shown in the table above. Order it separately from the cylinder.
Example
CDJ2BX10-60-A ····· 1 unit
D-M9BWV ····· 2 pcs.
BQ2-012 ····· 2 pcs.

Other than the applicable auto switches listed in "How to Order", the following auto switches can be mounted. For detailed specifications, refer to pages 1719 to 1827.

Auto switch type	Model	Electrical entry (Direction)	Features
Reed	D-C73, C76	Grommet (in-line)	—
	D-C80		Without indicator light
Solid state	D-H7A1, H7A2, H7B		—
	D-H7NW, H7PW, H7BW		Diagnostic indication (2-color indication)

∗ With pre-wired connector is available for solid state auto switches. For details, refer to pages 1784 to 1785.
∗ Normally closed (NC = b contact), solid state auto switches (D-F9G, F9H type) are also available. For details, refer to page

Related Products:
Speed Controller for Low Speed Operation

The effective area of controlled flow is approximately 1/10 of the standard type.
These controllers are suitable for controlling the speed of microspeed cylinders.
The dual type speed controller is especially suitable for cylinders with a small bore size.

Elbow/Universal Type

Air Flow/Effective Area

Model		AS12□1FM-M5 AS13□1FM-M5	AS22□1FM-□01 AS23□1FM-□01		AS22□1FM-□02 AS23□1FM-□02		
Tubing O.D.	Metric size	ø3.2, ø4, ø6	ø3.2, ø4	ø6, ø8	ø4	ø6	ø8, ø10
	Inch size	ø1/8", ø5/32", ø3/16" ø1/4"	ø1/8", ø5/32"	ø3/16", ø1/4" ø5/16"	ø5/32"	ø3/16"	ø1/4", ø5/16" ø3/8"
Controlled flow	Air flow (ℓ/min (ANR))	7	12		38		
	Effective area (mm²)	0.1	0.2		0.6		
Free flow	Flow rate (ℓ/min (ANR))	100	180	230	260	390	460
	Effective area (mm²)	1.5	2.7	3.5	4	6	7

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

In-line Type

Air Flow/Effective Area

Model		AS1001FM	AS2001FM		AS2051FM	
Tubing O.D.	Metric size	ø3.2, ø4, ø6	ø4	ø6	ø6	ø8
	Inch size	ø1/8", ø5/32", ø3/16" ø1/4"	ø5/32"	ø3/16", ø1/4"	ø3/16"	ø1/4", ø5/16"
Controlled flow	Air flow (ℓ/min (ANR))	7	12		38	
	Effective area (mm²)	0.1	0.2		0.6	
Free flow	Flow rate (ℓ/min (ANR))	100	130	230	290	460
	Effective area (mm²)	1.5	2	3.5	4.5	7

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

Elbow Type (Metal body)

Air Flow/Effective Area

Model			AS12□0M		AS22□0M-□01		AS22□0M-□02	
Port size		Cylinder side	M5 x 0.8	10-32 UNF	R 1/8	NPT 1/8	R 1/4	NPT 1/4
		Tube side			Rc 1/8		Rc 1/4	
Controlled flow	Air flow (ℓ/min (ANR))		7		12		38	
	Effective area (mm²)		0.1		0.2		0.6	
Free flow	Flow rate (ℓ/min (ANR))		105		280		420	
	Effective area (mm²)		1.6		4.3		6.5	

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

Dual Type

Air Flow/Effective Area

Model		ASD230FM-M5	ASD330FM-□01	ASD430FM-□02	
Tubing O.D.	Metric size	ø4, ø6	ø6, ø8	ø6	ø8, ø10
	Inch size	ø1/8", ø5/32" ø3/16", ø1/4"	ø3/16", ø1/4"	—	ø1/4", ø5/16" ø3/8"
Controlled flow (Free flow)	Air flow (ℓ/min (ANR))	7	12	38	
	Effective area (mm²)	0.1	0.2	0.6	

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

Low Speed Cylinder Specific Product Precautions

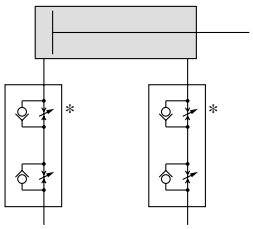
Be sure to read before handling.
Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Recommended Pneumatic Circuit

⚠Warning

Horizontal Operation

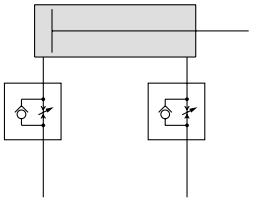
I



Dual speed controller

Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip. More stable low speed operation can be achieved than meter-in circuit alone.

II

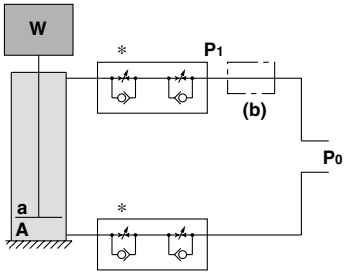


Meter-in speed controller

Meter-in speed controllers can reduce lurching while controlling the speed. The two adjustment needles facilitate adjustment.

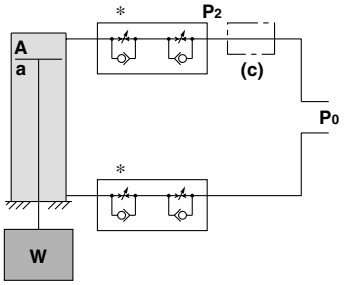
Vertical Operation

I



(1) Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.*
(2) Depending on the size of the load, installing a regulator with check valve at position **(b)** can deduce lurching during descent and operation delay during ascent.
As a guide,
when **W + P0a>P0A**,
adjust **P1** to make **W + P1a = P0A**.

II



(1) Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.*
(2) Installing a regulator with check valve at position **(c)** can reduce lurching during descent and operation delay during ascent.
As a guide,
adjust **P2** to make **W + P2A = P0a**.

W: Load (N) **P0**: Operating pressure (MPa) **P1, P2**: Reduced pressure (MPa) **a**: Rod side piston area (mm^2) **A**: Head side piston area (mm^2)

⚠Warning

Since **C□J2X**, **C□UX10** are subject to internal leakage due to their construction, the speed may not be fully controlled with the meter-out controller (*) during low speed operation.

Selection

⚠Caution

1. **Operate within the standard strokes.**
   Operating with the stroke exceeding the standard stroke may cause malfunction.
2. **Provide a construction that does not apply a lateral load to the cylinder.**
   Applying a lateral load to the cylinder may cause malfunction.
3. **Do not use the product at a high frequency.**
   Use it at 30 cpm or less as a guideline.
4. **Do not wipe out the grease in the sliding part of the air cylinder.**
   Doing so forcefully may cause malfunction.

Pneumatic Circuit

⚠Caution

1. **The piping length between the speed controller and the cylinder port must be kept as short as possible.**
   If the speed controller and the cylinder port are far apart, speed adjustment may be unstable.
2. **Use a low speed controller to easily adjust for low speed operation or a dual speed controller (Series ASD) to prevent cylinders from popping out.**
   (When the low speed controller is used, the maximum speed may be limited.)

Fine Lock Cylinders/Lock-up Cylinder

Series CL

ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100, ø125, ø140, ø160

Locking method	Spring locking	Pneumatic locking	Spring and pneumatic locking
Features	• Unlocking Discharging the air causes the lock to operate.	• Pressure locking The holding power can be varied according to the air pressure that is applied to the port.	• Pressure locking The holding power can be varied according to the air pressure that is applied to the port. • Unlocking Discharging the air causes the lock to operate.

(Lock-up cylinders are spring locking only.)

Locking in both directions is possible.
Locking in either side of cylinder stroke is possible, too.
(The lock-up cylinder can be locked only in one direction.)

Series Variations

Series	Action	Rod	Standard variations: Auto switch built-in magnet	Standard variations: With rod boot	Locking direction	Locking method: Spring locking	Locking method: Pneumatic locking	Locking method: Spring and Pneumatic locking	Bore size (mm)	Standard stroke (mm)	Page
Fine lock cylinders											
Series CLJ2 	Double acting	Single rod	●	●	Both directions	●	●	●	16	15 to 200	601
Series CLM2 	Double acting	Single rod	●	●	Both directions	●	●	●	20, 25, 32, 40	25 to 300	611
Series CLG1 	Double acting	Single rod	●	●	Both directions	●	●	●	20	25 to 200	625
									25, 32, 40	25 to 300	
Lock-up cylinder											
Series CL1 	Double acting	Single rod	●	●	One direction	●	●	●	40	25 to 500	636
									50, 63	25 to 600	
									80, 100	25 to 700	
									125, 140	Up to 1000	
									160	Up to 1200	

Series CL
Specific Product Precautions 1

Be sure to read before handling.
The precautions on these pages are for the fine lock cylinders and the lock-up cylinders.
For general actuator precautions, refer to Actuator Precautions on pages 3 to 7.

Design of Equipment and Machinery

⚠ Warning

1. Construct so that the human body will not come into direct contact with driven objects or the moving parts of locking cylinders.
   If there is a risk of contact, provide safety measures such as a cover or a system that uses sensors that will activate an emergency stop before contact is made.
2. Use a balance circuit in which lurching of the piston is taken into consideration. If the lock is applied at a desired position of a stroke and compressed air is applied to only one side of the cylinder, the piston will lurch at a high speed the moment the lock is disengaged. In such a situation, there is a risk of injury to humans, or equipment damage. To prevent the piston from lurching, use a balance circuit such as the recommended pneumatic circuit (P. 598). If an air-hydro fine lock cylinder is used, make sure to operate the lock portion through air pressure. Never use oil on the lock-up cylinder because the lock-up cylinder is a non-lube style. Failure to observe this could cause the lock to malfunction.

Selection

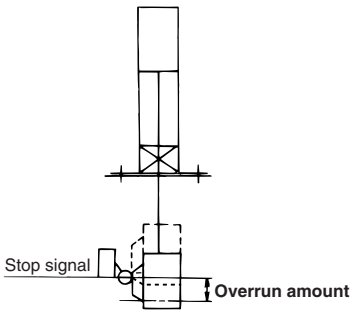
⚠ Warning

Refer to the following criteria for the maximum load in the locked state, and set.

When a cylinder is in a no-load and locked state, the holding force (maximum static load) is the lock's ability to hold a static load that does not involve vibrations or shocks. To ensure braking force, the maximum load must be set as described below.

1. For constant static loads, such as for drop prevention:
   - Fine lock series (Series CLJ2/CLM2/CLG1)
     35% or less of the holding force (maximum static load)
     Note) For applications such as drop prevention, consider situations in which the air source is shut off, and make selections based on the holding force of the spring locked state. Do not use the pneumatic lock for drop prevention purposes.
   - Lock-up series (Series CL1)
     50% or less of the holding force (maximum static load)
2. When kinetic energy acts upon the cylinder, such as when effecting an intermediate stop, there are constraints in terms of the allowable kinetic energy that can be applied to the cylinder in a locked state. Therefore, refer to the allowable kinetic energy of the respective series. Furthermore, during locking, the mechanism must sustain the thrust of the cylinder itself, in addition to absorbing the kinetic energy. Therefore, even within a given allowable kinetic energy level, there is an upper limit to the amount of the load that can be sustained.
   - Fine lock series (Series CLJ2/CLM2/CLG1)
     Maximum load at horizontal mounting: 70% or less of the holding force (Maximum static load) for spring lock
     Maximum load at vertical mounting: 35% or less of the holding force (Maximum static load) for spring lock
   - Lock-up series (Series CL1)
     Maximum load at horizontal mounting: 50% or less of the holding force (Maximum static load)
     Maximum load at vertical mounting: 25% or less of the holding force (Maximum static load)
3. In a locked state, do not apply impacts, strong vibrations or rotational forces.
   Do not apply a impacts, strong vibrations or rotational forces from external sources, because this could damage or shorten the life of the lock unit.
4. The locking of the fine lock cylinder is directional.
   Although the fine lock cylinder can be locked in both directions, be aware that its holding force is smaller in one of the directions.
   CLJ2/CLM2/CLG1···· Holding force at piston rod extended side decreases approx. 15%.
5. The locking of the lock-up cylinder is unidirectional.
   Because the locking direction of the lock-up cylinder is unidirectional, select the locking direction in accordance with the particular operating conditions. It is also possible to manufacture a bidirectional lock-up cylinder. For details, refer to "Made to Order" on page 1989. Due to the nature of its construction, a lock-up cylinder has a play of approximately 0.5 mm to 1 mm in the axial direction. Therefore, if an external stopper is used to stop the piston rod and the lock is engaged, the piston rod will shift in the amount of its axial play.
6. To effect an intermediate stop, take the cylinder's stopping precision and overrun amount into consideration.
   Because the lock is applied by mechanical means, the piston will not stop immediately in response to a stopping signal, but only after a time lag. This lag determines the amount of the overrun of the piston stroke. Thus, the range of the maximum and minimum amounts of the overrun is the stopping precision.
   - Place the limit switch before the desired stopping position, only in the amount of the overrun.
   - The limit switch must have a detection length (dog length) of the overrun amount + α.
   - For SMC's auto switches, the operating range are between 8 and 14 mm. (It varies depending on a switch model.) When the overrun amount exceeds this range, self-holding of the contact should be performed at the switch load side.

   * For stopping accuracy, refer to Series CLJ (P. 603), Series CLM2 (P. 614), Series CLG1 (P. 627), and Series CL1 (P. 637) respectively.



7. In order to further improve stopping accuracy, the time from the stop signal to the operation of the lock should be shortened as much as possible.
   To accomplish this, use a device such as a highly responsive electric control circuit or solenoid valve driven by direct current, and place the solenoid valve as close as possible to the cylinder.
8. Be aware that the stopping accuracy is influenced by changes in the piston speed.
   The variance in the stopping position increases if the piston speed changes, such as due to load fluctuations during the reciprocal movement of the piston. Therefore, take measures to ensure a constant piston speed immediately preceding the stopping position. Furthermore, the variances in the stopping position increases when the piston is effecting a cushioning stroke or during acceleration after starting its movement.
9. When unlocking is performed, if the thrust is applied to the piston, unlocking will not be easily done. To avoid that, ensure that unlocking should be performed before the thrust is applied to the piston.

Series CL
Specific Product Precautions 2

Be sure to read before handling.
The precautions on these pages are for the fine lock cylinders and the lock-up cylinders.
For general actuator precautions, refer to Actuator Precautions on pages 3 to 7.

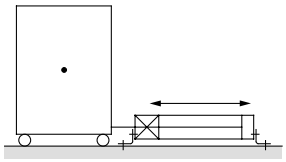
Mounting

⚠Warning

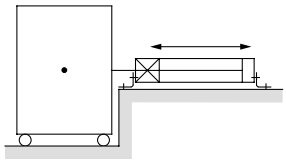
1. Be certain to connect the rod end to the load with the lock released.
- If this is performed with the lock engaged, a load that exceeds the allowable rotational force or holding force would be applied to the piston rod, which could damage the locking mechanism. The fine lock and Series CL1 with ø40 to ø100 cylinders have a built-in manual unlocking mechanism. Therefore, they can be maintained in the unlocked state without supplying air. For Series CL1 with ø125 to ø160 cylinders, simply connect piping to the lock-up port, and supply air pressure of 0.2 MPa or more to disengage the lock in order to attach a load.

⚠Caution

1. Do not apply offset loads on the piston rod.
- Pay particular attention to aligning the center of gravity of the load with the axial center of the cylinder. If there is a large amount of deviation, the piston rod could become unevenly worn or damaged due to the inertial moment that is created when the piston rod is stopped by the lock.



X Load center of gravity and cylinder shaft center are not matched.



○ Load center of gravity and cylinder shaft center are matched.

Note) Can be used if all of the generated moment is absorbed by an effective guide.

Adjustment

⚠Caution

1. Place it in the locked position. (Excluding the series CL1 ø125 to ø160.)
- The locks are manually disengaged at the time the cylinders are shipped from the factory. Therefore, make sure to change them to the locked state before using the cylinders. For procedures to effect the change, refer to page 599 for the fine lock series. Be aware that the lock will not operate properly if the change is not performed correctly.
- Adjust the cylinder's air balance. In the state in which a load is attached to the cylinder, disengage the lock and adjust the air pressure at the rod side and the head side of the cylinder to obtain a load balance. By maintaining a proper air balance, the piston rod can be prevented from lurching when the lock is disengaged.

2. Adjust the mounting position of detections such as those of the auto switches. To effect an intermediate stop, adjust the mounting position of the auto switch detection by taking the amount of overrun into consideration in relation to the desired stopping position.

Series CL
Specific Product Precautions 3

Be sure to read before handling.
The precautions on these pages are for the fine lock cylinders and the lock-up cylinders.
For general actuator precautions, refer to Actuator Precautions on pages 3 to 7.

Pneumatic Circuit

⚠ Warning

1. Be certain to use an pneumatic circuit which will apply balancing pressure to both sides of the piston when in a locked stop.
In order to prevent cylinder lurching after a lock stop, when restarting or when manually unlocking, a circuit should be used to which will apply balancing pressure to both sides of the piston, thereby canceling the force generated by the load in the direction of piston movement.

2. Use a solenoid valve for unlocking which has a large effective area, as a rule 50% or more of the effective area of the cylinder drive solenoid valve.
The larger the effective area is, the shorter the locking time will be (the overrun amount will be shorter), and stopping accuracy will be improved.

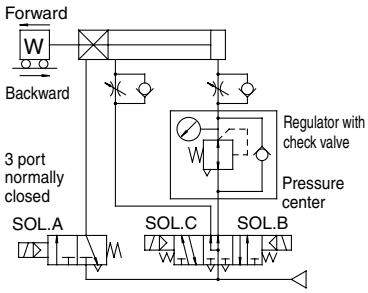
3. Place the solenoid valve for unlocking close to the cylinder, and no farther than the cylinder drive solenoid valve.
The shorter the distance from the cylinder (the shorter the piping), the shorter the overrun amount will be, and stopping accuracy will be improved.

4. Allow at least 0.5 seconds from a locked stop (intermediate stop of the cylinder) until release of the lock.
When the locked stop time is too short, the piston rod (and load) may lurch at a speed greater than the control speed of the speed controller.

5. When restarting, control the switching signal for the unlocking solenoid valve so that it acts before or at the same time as the cylinder drive solenoid valve.
If the signal is delayed, the piston rod (and load) may lurch at a speed greater than the control speed of the speed controller.

6. Basic circuit

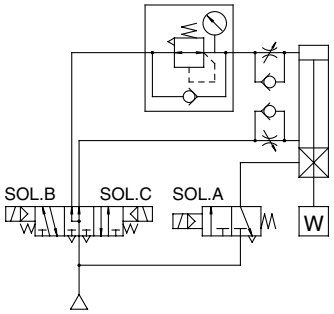
1) [Horizontal]



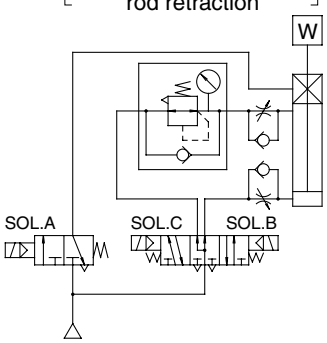
SOL.A	SOL.B	SOL.C	Action	
ON	ON	OFF	Forward	
OFF	OFF	OFF	Locked stop	0.5 s or more
ON	OFF	OFF	Unlocked	
ON	ON	OFF	Forward	0 to 0.5 s
ON	OFF	ON	Backward	
OFF	OFF	OFF	Locked stop	0.5 s or more
ON	OFF	OFF	Unlocked	
ON	OFF	ON	Backward	0 to 0.5 s

2) [Vertical]

[Load in the direction of rod extension]

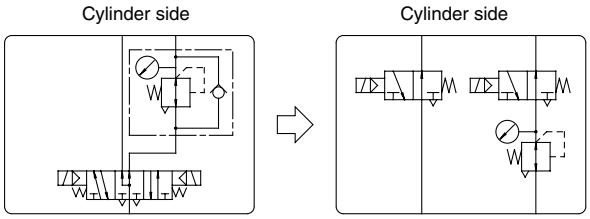


[Load in the direction of rod retraction]



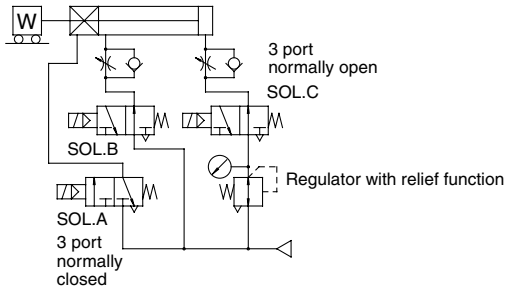
⚠ Caution

1. A 3 position pressure center solenoid valve and regulator with check valve can be replaced with two 3 port normally open valves and a regulator with relief function.



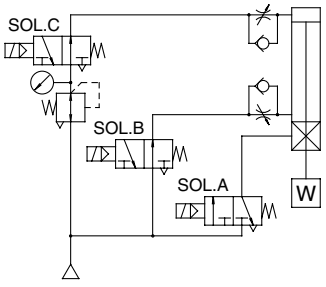
[Example]

1) [Horizontal]

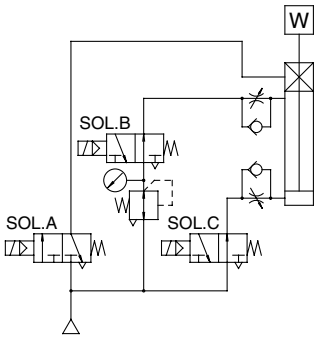


2) [Vertical]

[Load in the direction of rod extension]



[Load in the direction of rod retraction]



Series CL
Specific Product Precautions 4

Be sure to read before handling.
The precautions on these pages are for the fine lock cylinders and the lock-up cylinders.
For general actuator precautions, refer to Actuator Precautions on pages 3 to 7.

How to Manually Disengage the Lock and Change from the Unlocked to the Locked State

The lock is manually disengaged at the time the cylinder is shipped from the factory. Because the lock will not operate in this state, make sure to change it to the locked state before operation, after having adjusted the axial center for installation.

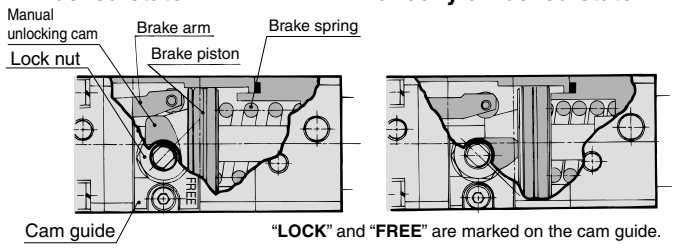
How to Change from Unlocked to Locked State

1. Series CLJ2, CLM2, CLG1

1) Loose locking nut.
2) Turn the wrench flats section of the manual unlocking cam to the LOCK position that is marked on the cam guide.
3) While keeping the wrench flats section in place, tighten the lock nut.

Note) The manual unlocking cam will rotate approximately 180°. Do not rotate the wrench flats section excessively.

Locked state **Manually unlocked state**



"**LOCK**" and "**FREE**" are marked on the cam guide.

Manually Unlocking

The lock of a fine lock series cylinder can be disengaged manually through the procedure described below. However, make sure to disengage the lock pneumatically before operating the cylinder.

Note) Manual disengagement of the lock could create a greater cylinder sliding resistance than pneumatic disengagement of the lock.

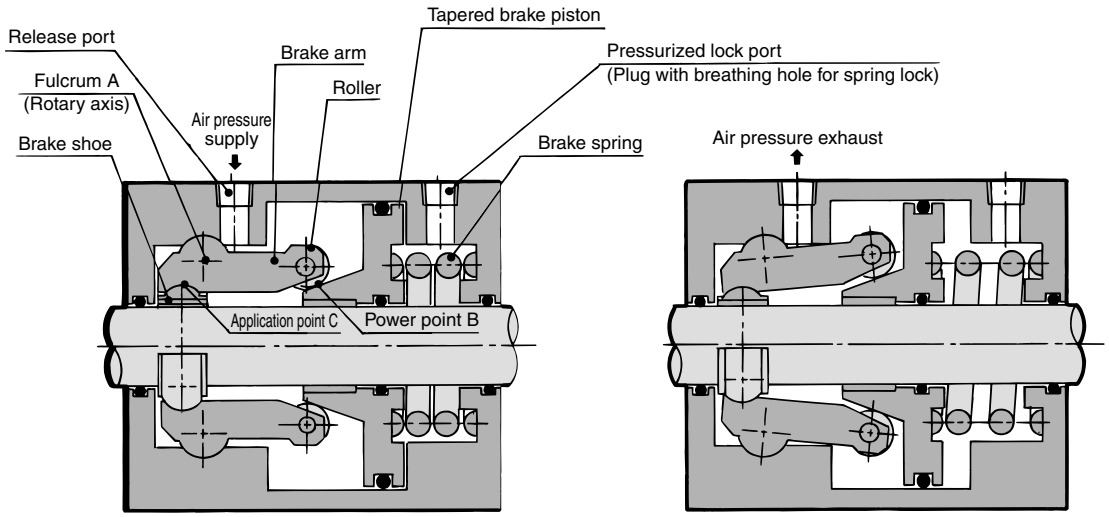
1. Series CLJ2, CLM2, CLG1

1) Loose locking nut.
2) Supply air pressure of 0.3 MPa or more to the lock release port.
3) Turn the wrench flats section of the manual unlocking cam until it stops at the FREE position that is marked on the cam guide.
4) While keeping the wrench flats section in place, tighten the lock nut.

Prior to Use

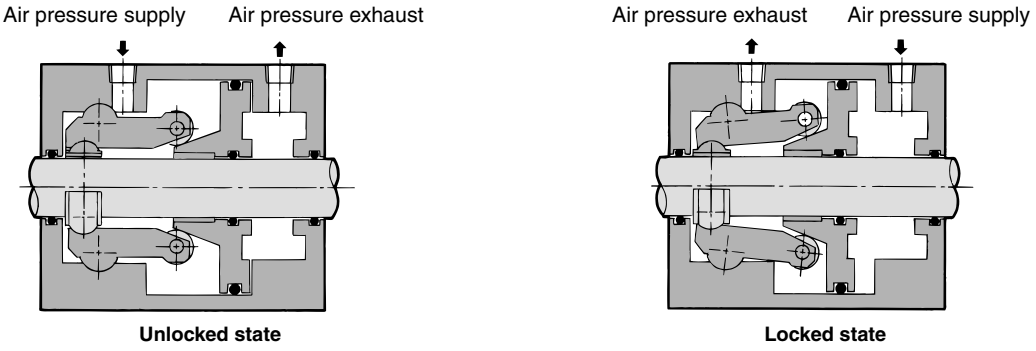
Construction Principle/Applicable Series: CLJ2, CLM2, CLG1, MLGC

Spring locking type



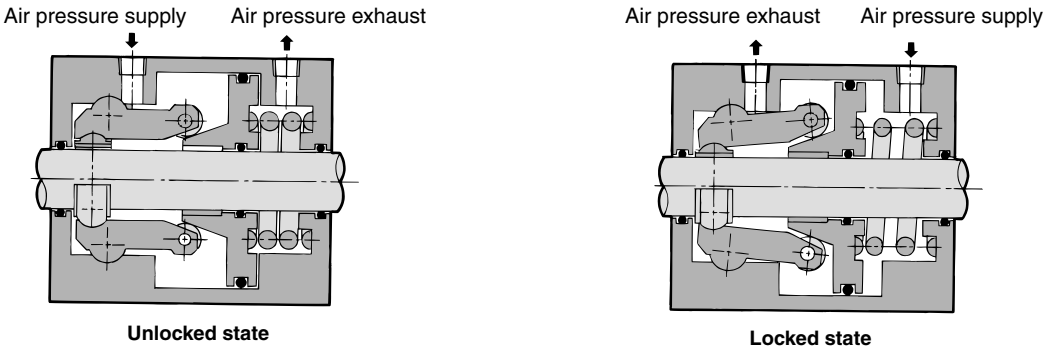
Spring locking (Exhaust locking)
The spring force that is applied to the tapered brake piston becomes amplified through the wedge effect. This force becomes further amplified to the power of AB/AC through the mechanical advantage of a lever and acts on the brake shoe, which in turn, applies a large force to tighten and lock the piston rod. To disengage the lock, air pressure is supplied through the unlocking port, thus disengaging the brake spring force.

Pneumatic locking type



Brake piston is operated by air pressure.

Spring and pneumatic locking type



Brake piston is operated by air pressure and spring force.

Fine Lock Cylinder
Double Acting, Single Rod
Series CLJ2
ø16

How to Order

CLJ2 **L** **16** – **60** **R** – **E** – ☐

With auto switch **CDLJ2** **L** **16** – **60** **R** – **E** – **M9BW** ☐ – ☐

With auto switch
(Built-in magnet)

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
D	Double clevis style

Bore size

16	16 mm

Standard stroke (mm)

ø16	15, 30, 45, 60, 75, 100, 125, 150, 175, 200

Port location on head cover

Nil	Perpendicular to axis
R	Axial direction

Lock operation

E	Spring locking (Exhaust locking)
P	Pneumatic locking (Pressure locking)
D	Spring and pneumatic locking

Auto switch

Nil	Without auto switch

∗ For the applicable auto switch model, refer to the table below.

Number of auto switches

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

Made to Order
Refer to page 602 for details.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CDLJ2B16-45-P

Applicable Auto Switch/Refer to pages 1719 to 1827 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	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)	24 V	5 V, 12 V	—	**M9N**	●	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				**M9P**	●	●	●	○	—	○		
				2-wire		12 V		**M9B**	●	●	●	○	—	○	—	
		Connector						**H7C**	●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		**M9NW**	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)				**M9PW**	●	●	●	○	—	○		
				2-wire		12 V		**M9BW**	●	●	●	○	—	○	—	
	Water resistant (2-color indication)							**H7BA**	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)		5 V, 12 V		**H7NF**	●	—	●	○	—	○	IC circuit	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96**	●	—	●	—	—	—	IC circuit	—
			Yes	2-wire	24 V	12 V		**A93**	●	—	●	—	—	—	—	Relay, PLC
			No				100 V or less	**A90**	●	—	●	—	—	—	IC circuit	
		Connector	Yes				—	**C73C**	●	—	●	●	●	—	—	
			No				24V or less	**C80C**	●	—	●	●	●	—	IC circuit	

∗ 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, refer to page 610 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1784 and 1785.
∗ D-A9□V□/M9□V□/M9□WV□/D-M9□A(V)L types cannot be mounted.

∗ Solid state auto switches marked with "○" are produced upon receipt of order.
∗ D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled at the time of shipment.)
∗ D-C7□□/C80□/H7□□ auto switches are assembled at the time of shipment.

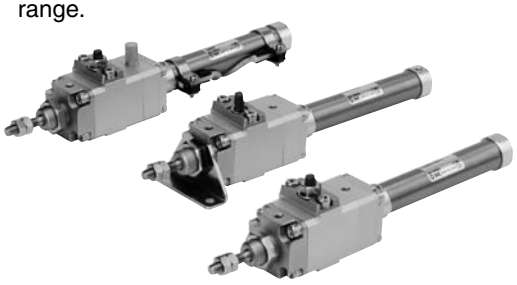
Provided with a compact lock mechanism, it is suitable for intermediate stop, emergency stop, and drop prevention.

Locking in both directions

The piston rod can be locked in either direction of its cylinder stroke.

Maximum piston speed: 500 mm/s

It can be used at 50 to 500 mm/s provided that it is within the allowable kinetic energy range.



Head Cover Port Location

Either perpendicular to the cylinder axis or in-line with the cylinder axis is available for basic style.

Axial Perpendicular

Made to Order Specifications
(For details, refer to page 1836.)

Symbol	Specifications
-XA□	Change of rod end shape

Refer to pages 608 to 610 for cylinders with auto switches.

- Minimum auto switch mounting stroke
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Specifications

Bore size (mm)	16
Action	Double acting, Single rod
Lubricant	Not required (Non-lube)
Lock operation	Spring locking (Exhaust locking) Pneumatic locking (Pressure locking) Spring and pneumatic locking
Fluid	Air
Proof pressure	1.05 MPa
Maximum operating pressure	0.7 MPa
Minimum operating pressure	0.08 MPa
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)
Piston speed	50 to 500 mm/s *
Cushion	Rubber bumper
Stroke length tolerance	$^{+1.0}_{0}$
Mounting	Basic style, Axial foot style, Rod side flange style, Double clevis style

* Constraints associated with the allowable kinetic energy are imposed on the speeds at which the piston can be locked.
The maximum speed of 750 mm/s can be accommodated if the piston is to be locked in the stationary state for the purpose of drop prevention.

Fine Lock Specifications

Lock operation	Spring locking (Exhaust locking)	Spring and pneumatic locking	Pneumatic locking (Pressure locking)
Fluid	Air		
Maximum operating pressure	0.5 MPa		
Unlocking pressure	0.3 MPa or more		0.1 MPa or more
Lock starting pressure	0.25 MPa or less		0.05 MPa or more
Locking direction	Both directions		

Standard Stroke/

Refer to the minimum auto switch mounting stroke (page 609) for those with an auto switch. (mm)

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

* Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Mounting Bracket and Accessory/For details, refer to page 607.

Mounting		Basic style	Axial foot style	Rod side flange style	Double clevis style
Standard equipment	Mounting nut	●	●	●	—
	Rod end nut	●	●	●	●
	Clevis pin	—	—	—	●
Option	Single knuckle joint	●	●	●	●
	Double knuckle joint (With pin) *	●	●	●	●
	T-bracket	—	—	—	●

* Pins and retaining rings are packaged together with double clevis and double knuckle joint.

Mounting Bracket Part No.

Mounting bracket	Part no.
Foot	CLJ-L016B
Flange	CLJ-F016B
T-bracket *	CJ-T016B

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

Mass

(g)

Bore size (mm)		16
Standard mass *		320
Additional mass per each 15 mm of stroke		6.5
Mounting bracket mass	Axial foot style	27
	Rod side flange style	21
	Double clevis style (With pin) **	10

* Mounting nut and rod end nut are included in the basic mass.
** Mounting nut is not included in double clevis style.

Calculation: (Example) **CLJ2L16-60**
- Basic mass·····320 (ø16)
- Additional mass·····6.5/15 stroke
- Cylinder stroke·····60 stroke

320 + 6.5/15 x 60 + 27 = 373 g

Stopping Accuracy (Not including tolerance of control system.) (mm)

Lock type	Piston speed (mm/s)			
	50	100	300	500
Spring locking (Exhaust locking)	±0.4	±0.5	±1.0	±2.0
Pneumatic locking (Pressure locking) Spring and pneumatic locking	±0.2	±0.3	±0.5	±1.5

Condition: Load: 2 kg
Solenoid valve: Lock port mounting

⚠Caution

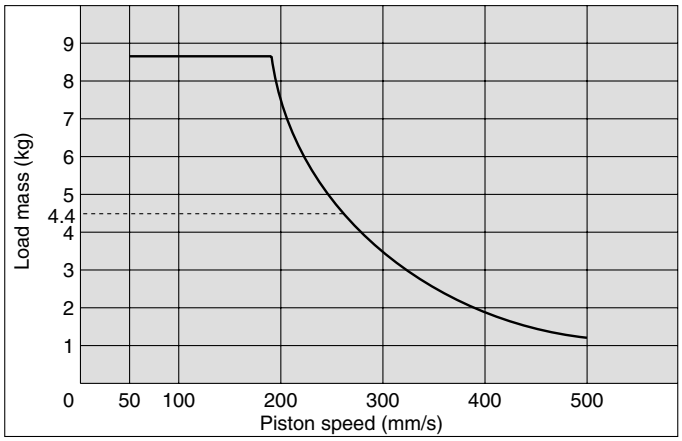
Recommended Pneumatic Circuit/Caution on Handling

For detailed specifications of the fine lock cylinder, Series CLJ2 mentioned above, refer to pages 596 to 599.

⚠ Caution/Allowable Kinetic Energy when Locking

Bore size (mm)	16
Allowable kinetic energy (J)	0.17

1. In terms of specific load conditions, this allowable kinetic energy is equivalent to a load of 3.7 kg in mass, and a piston speed of 300 mm/sec. Therefore, if the operating conditions are below these values, there is no need to calculate.
2. Apply the following formula to obtain the kinetic energy of the load.
   Ek: Kinetic energy of load (J)
   $Ek = \frac{1}{2} m v^2$ m: Load mass (kg)
   v: Piston speed (m/s)
3. The piston speed will exceed the average speed immediately before locking. To determine the piston speed for the purpose of obtaining the kinetic energy of load, use 1.2 times the average speed as a guide.
4. The relationship between the speed and the load is indicated in the graph below. The area below the line is the allowable kinetic energy range.
5. During locking, the lock mechanism must sustain the thrust of the cylinder, in addition to absorbing the energy of the load. Therefore, there is an upper limit to the size of the load that can be sustained. Thus, a horizontally mounted cylinder must be operated below the solid line, and a vertically mounted cylinder must be operated below the dotted line.

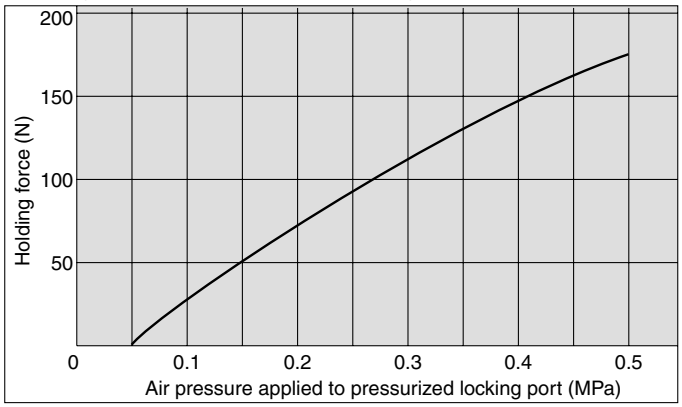


Holding Force of Spring Locking (Maximum static load)

Bore size (mm)	16
Holding force (N)	122

Note) Holding force at piston rod extended side decreases approximately 15%.

Holding Force of Pneumatic Locking (Maximum static load)



* When selecting cylinders, refer to the Precautions and allowable kinetic energy when locking on page 596, and then select a cylinder.

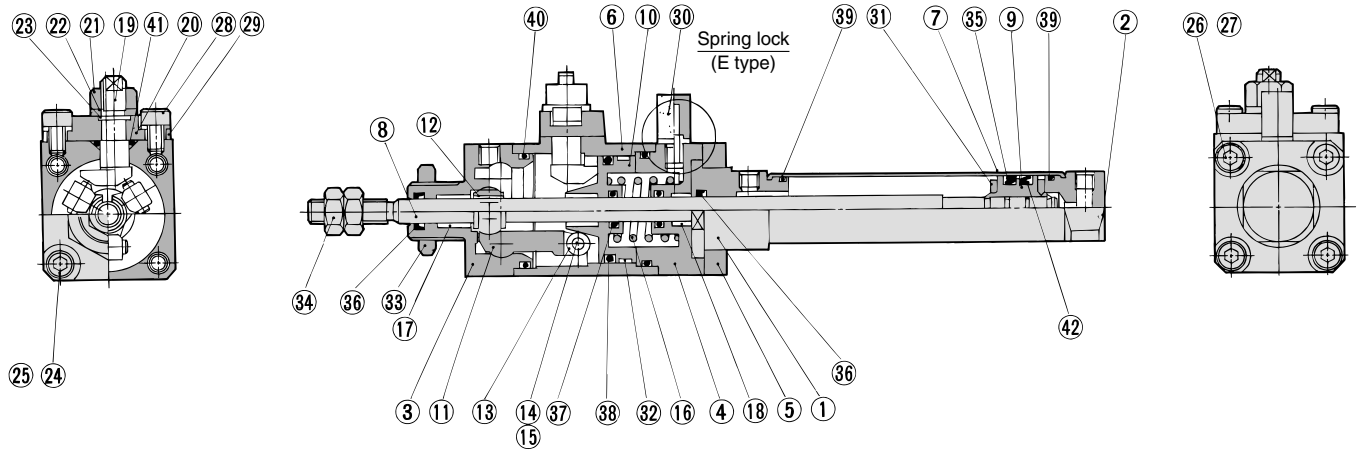
⚠Caution

Caution when Locking

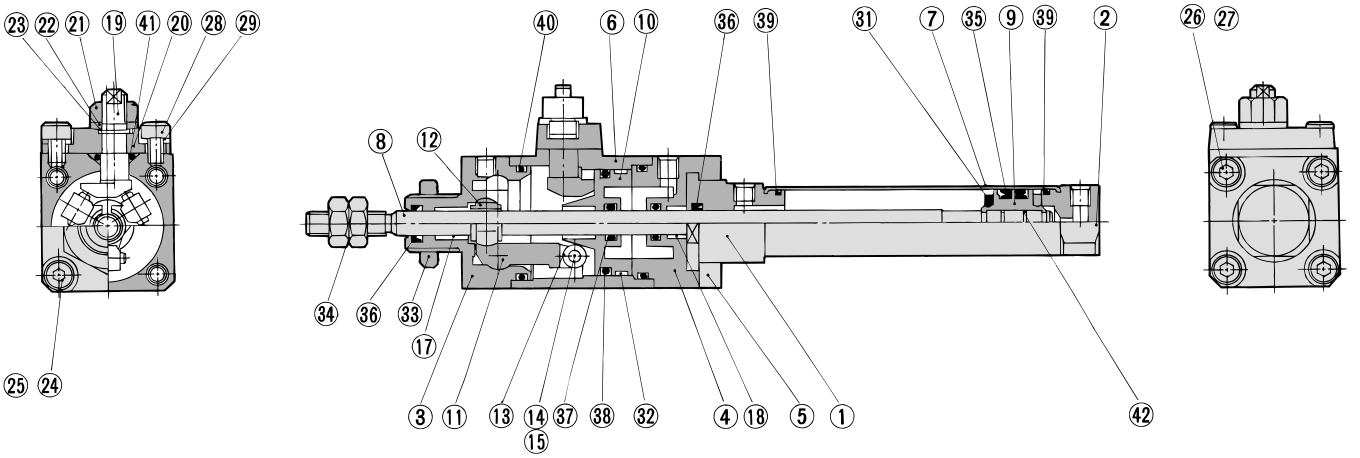
Holding force is the force which can hold a static load, given no vibration or impact, in a locked state. Therefore, do not use cylinders around the maximum holding force. Note the following points.
- If the piston rod slips because the lock's holding force has been exceeded, the brake shoe could be damaged, resulting in a reduced holding force or shortened life.
- To use the lock for drop prevention purposes, the load to be attached to the cylinder must be within 35% of the cylinder's holding force.
- Do not use the cylinder in the locked state to sustain a load that involves impact.

Construction (Not able to disassemble)

Spring locking (Exhaust locking)
Spring and pneumatic locking



Pneumatic locking (Pressure locking)



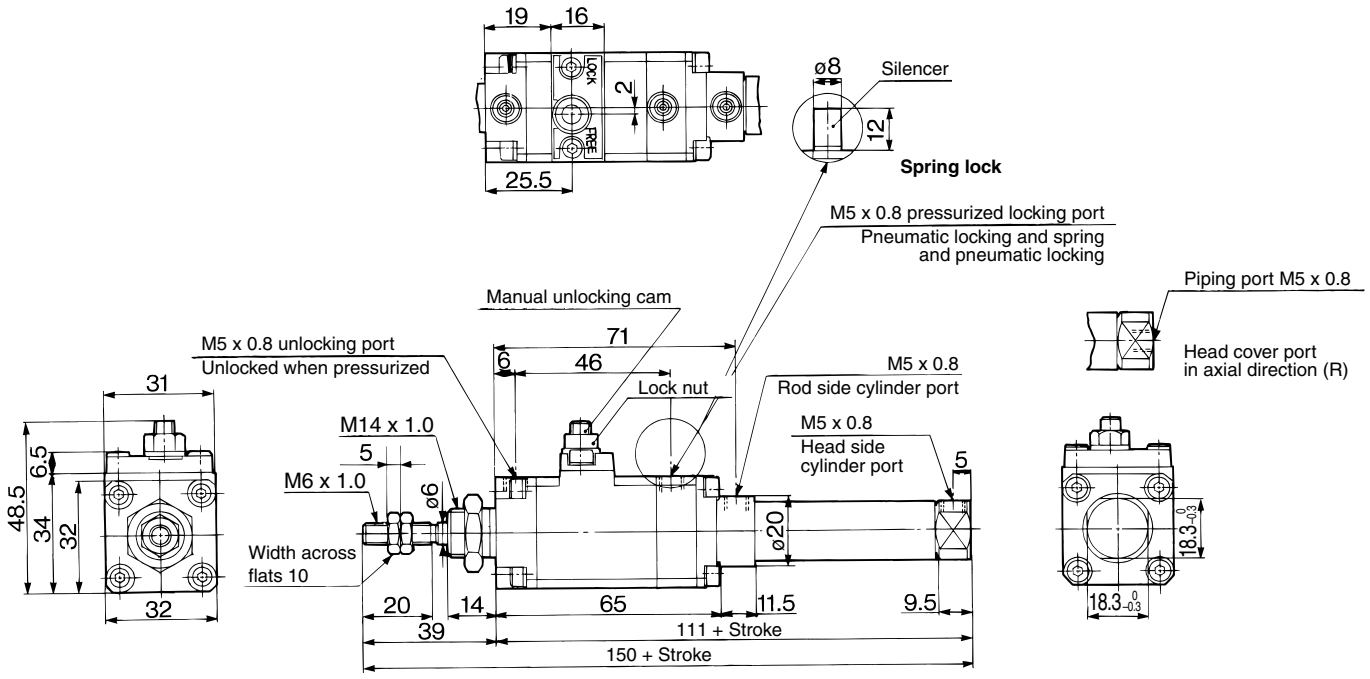
Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Clear anodized
2	**Head cover**	Aluminum alloy	Clear anodized
3	**Cover A**	Carbon steel	Nitrided, nickel chrome plated
4	**Cover B**	Aluminum alloy	Hard anodized
5	**Cover C**	Aluminum alloy	Hard anodized
6	**Intermediate cover**	Aluminum alloy	Hard anodized
7	**Cylinder tube**	Stainless steel	
8	**Piston rod**	Stainless steel	Hard chrome plated
9	**Piston**	Brass	
10	**Brake piston**	Carbon steel	Nitrided
11	**Brake arm**	Carbon steel	Nitrided
12	**Brake shoe**	Special friction material	
13	**Roller**	Carbon steel	Nitrided
14	**Pin**	Carbon steel	Heat treated
15	**Retaining ring**	Carbon tool steel	Nickel plated
16	**Brake spring**	Steel wire	Zinc chromated
17	**Bushing A**	Oil-impregnated sintered alloy	
18	**Bushing B**	Oil-impregnated sintered alloy	
19	**Manual lock release cam**	Chromium molybdenum steel	Nitrided
20	**Cam guide**	Carbon steel	Nitrided, platinum silver painted
21	**Lock nut**	Rolled steel	Nickel plated

No.	Description	Material	Note
22	**Plain washer**	Rolled steel	Nickel plated
23	**Retaining ring**	Carbon tool steel	Nickel plated
24	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated
25	**Spring washer**	Steel wire	Nickel plated
26	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated
27	**Spring washer**	Steel wire	Nickel plated
28	**Hexagon socket head cap screw**	Chromium molybdenum steel	Nickel plated
29	**Spring washer**	Steel wire	Nickel plated
30	**Silencer**	Bronze	Type E only
31	**Bumper**	Urethane	
32	**Wear ring**	Resin	
33	**Mounting nut**	Brass	Nickel plated
34	**Rod end nut**	Rolled steel	Nickel plated
35	**Piston seal**	NBR	
36	**Rod seal A**	NBR	
37	**Rod seal B**	NBR	
38	**Brake piston seal**	NBR	
39	**Cylinder tube gasket**	NBR	
40	**Intermediate cover gasket**	NBR	
41	**Cam gasket**	NBR	
42	**Piston gasket**	NBR	

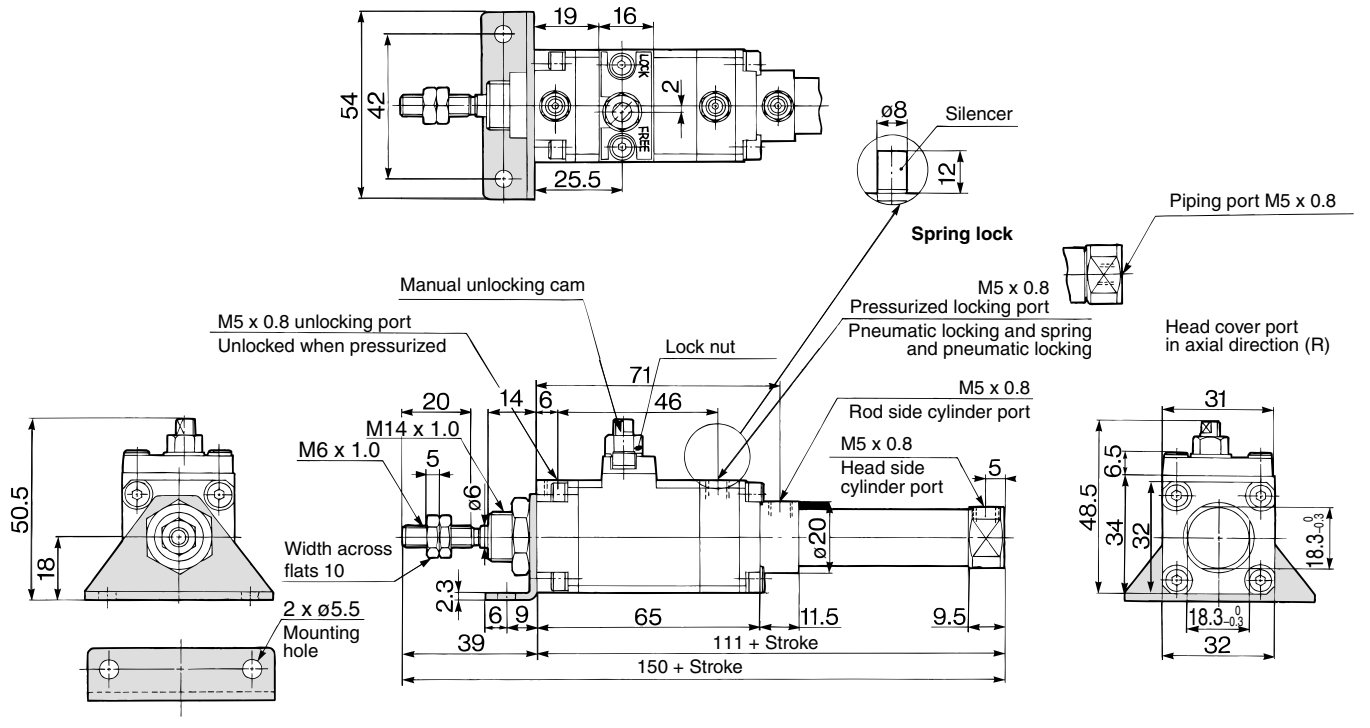
Basic Style (B)

CLJ2B16-□□-$\frac{E}{D}$ / P



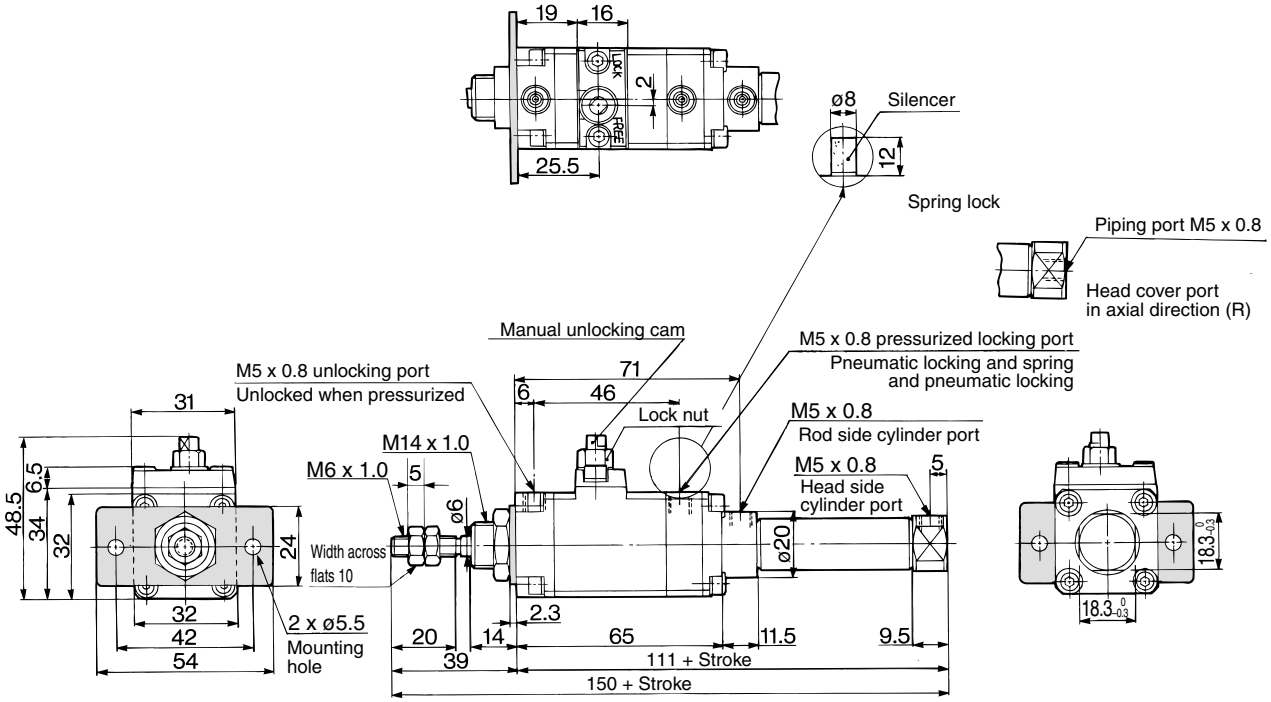
Axial Foot Style (L)

CLJ2L16-□□-$\frac{E}{D}$ / P



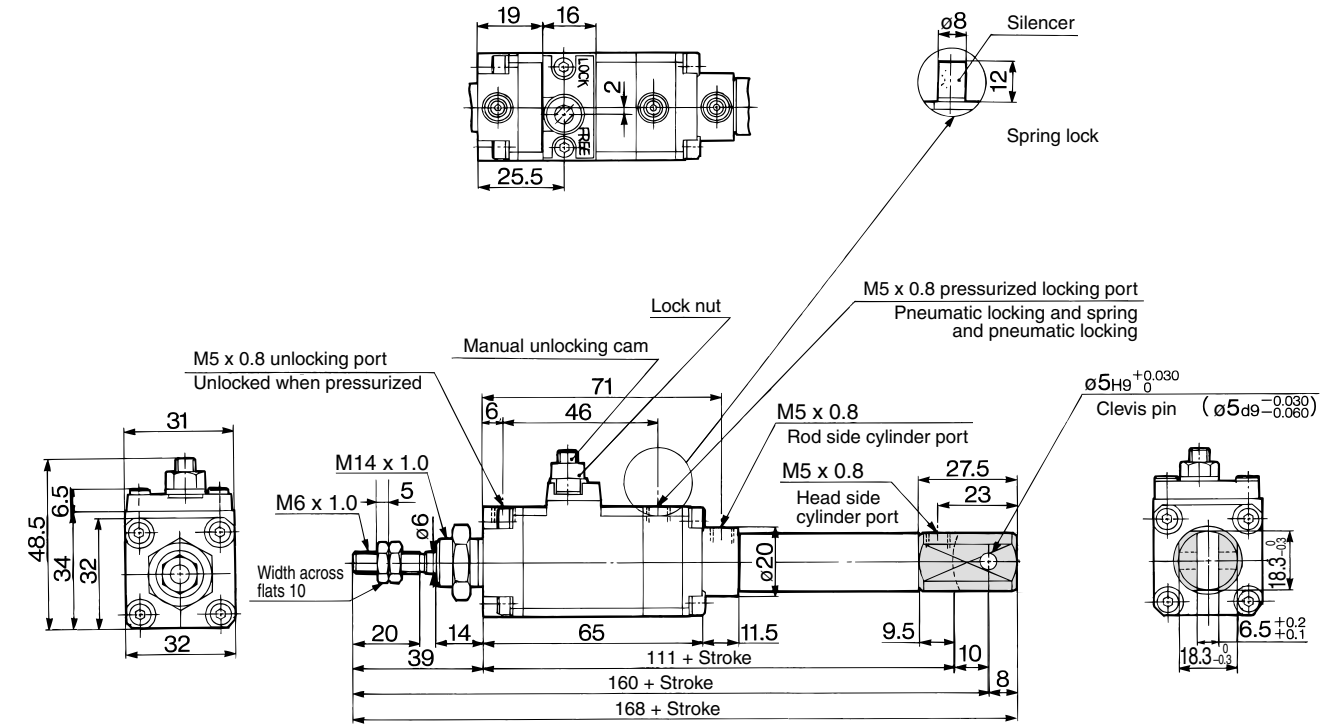
Rod Side Flange Style (F)

CLJ2F16-□□-$\frac{E}{P}$



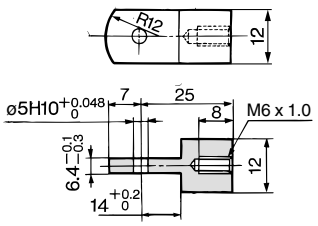
Double Clevis Style (D) * Clevis pin and retaining ring are shipped together.

CLJ2D16-□□-$\frac{E}{P}$



Accessory Bracket Dimensions

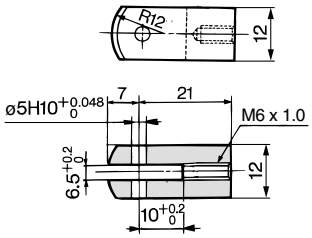
Single Knuckle Joint: I-LJ016B



Material: Rolled steel

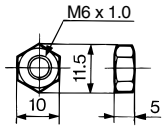
Double Knuckle Joint: Y-LJ016B

∗ Knuckle pin and retaining ring are shipped together.



Material: Rolled steel

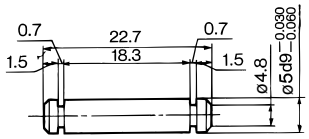
Rod End Nut: NT-015A



Material: Rolled steel

Clevis Pin: CD-Z015

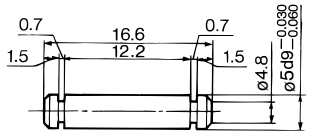
∗ Retaining rings are shipped together.



Material: Stainless steel

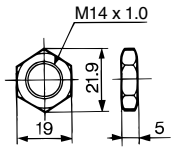
Knuckle Pin: IY-J015A

∗ Retaining rings are shipped together.



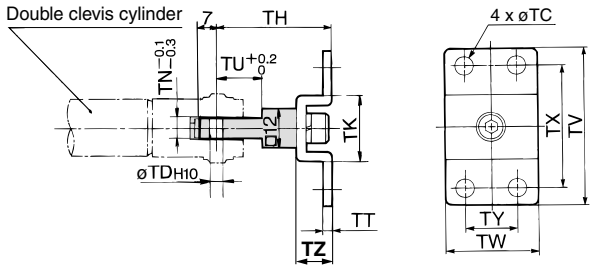
Material: Stainless steel

Mounting Nut: SNLJ-016B



Material: Brass

T-bracket: CJ-T016B



Material: Rolled steel

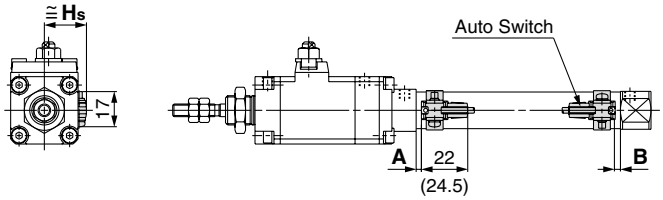
Part no.	Bore size (mm)	TC	TDH10	TH	TK	TN	TT	TU	TV	TW	TX	TY	TZ
CJ-T016B	**16**	5.5	5 +0.048 0	35	20	6.4	2.3	14	48	28	38	16	10

∗ T-bracket includes a T-bracket base, single knuckle joint, hexagon socket head cap screw and spring washer.

Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

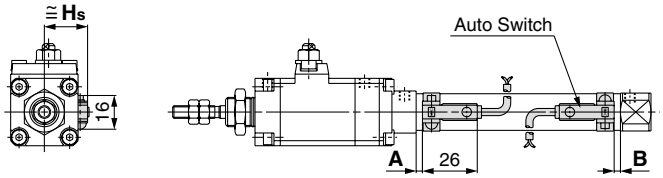
Reed auto switch
<Band Mounting>

D-A9□

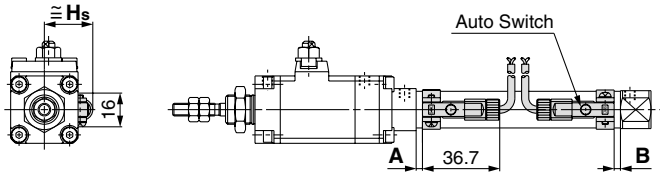


( ): For D-A93

D-C7□/C80

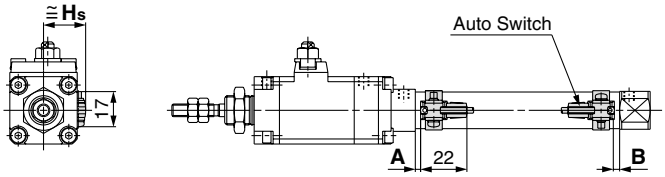


D-C73C□/C80C

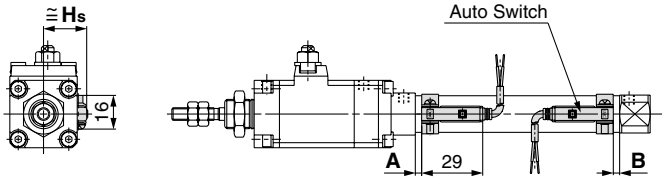


Solid state auto switch
<Band Mounting>

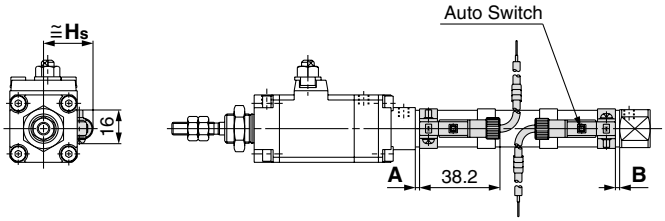
D-M9□
D-M9□W



D-H7□
D-H7□W
D-H7BAL
D-H7NF



D-H7C



Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

Auto Switch Proper Mounting Position

(mm)

Autto switch model / Bore size (mm)	D-A9□		D-M9□ D-M9□W		D-C7□ D-C80 D-C73C D-C80C	
	A	B	A	B	A	B
16	2.5	2.5	6.5	6.5	3	3

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

Auto Switch Mounting Height

(mm)

Autto switch model / Bore size (mm)	D-A9□ D-M9□ D-M9□W	D-C7□/C80 D-H7□/H7□W D-H7NF D-H7BAL	D-C73C D-C80C	D-H7C
	Hs	Hs	Hs	Hs
16	20	20.5	23	23.5

Minimum Auto Switch Mounting Stroke

(mm)

Auto switch mounting	Auto switch model	No. of auto switches mounted				
		1	2		n (n: No. of auto switches)	
			Different surfaces	Same surface	Different surfaces	Same surface
Band mounting	**D-A9□** **D-M9□** **D-M9□W**	10	15 (1)	45 (1)	$15 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6···)	45 + 15(n - 2)
	D-C7□ **D-C80**	10	15	50	$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6···)	50 + 20 (n - 2)
	D-H7□ **D-H7□W** **D-H7BAL** **D-H7NF**	10	15	60	$15 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6···)	60 + 22.5 (n - 2)
	D-C73C **D-C80C** **D-H7C**	10	15	65 (2)	$15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···)	50 + 27.5 (n - 2)

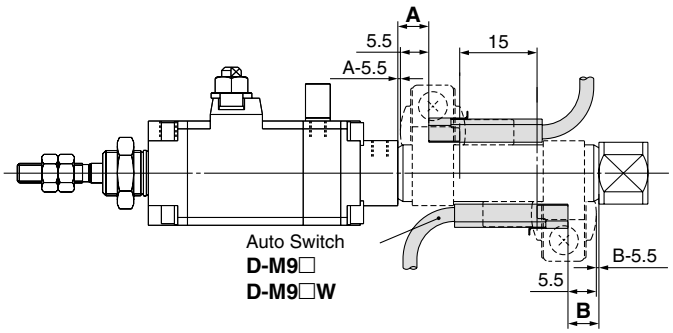
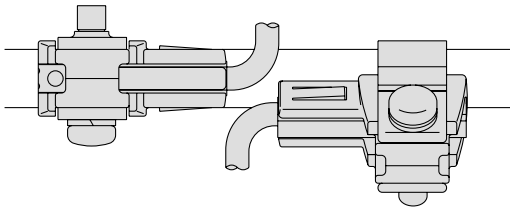
Note 1) The following table is applicable for cylinders with two D-A93/M9□/M9□W auto switches.
Note 2) For Series CDLJ2, 65 strokes cannot be manufactured, as a reference.

Operating Range

(mm)

Auto switch model	Bore size (mm)
	16
D-A9□	7
D-M9□ **D-M9□W**	3
D-C7□/C80 **D-C73C/C80C**	7
D-H7□/H7□W/H7BAL/H7NF	4
D-H7C	9

∗ Since the operating range is provided as a guideline including hysteresis, it cannot be guaranteed (assuming approximately ±30% dispersion). It may vary substantially depending on an ambient environment.

Auto switch model	With 2 auto switches	
	Different surfaces	Same surface
	 The proper auto switch mounting position is 5.5 mm inward from the switch holder edge.	 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-A93	—	Less than 50 strokes
D-M9□ **D-M9□W**	Less than 20 strokes	Less than 55 strokes

Auto Switch Mounting Bracket: Part No.

Auto switch model	Bore size (mm)
	ø16
D-A9□ **D-M9□** **D-M9□W**	(1) ① BJ2-016 ② BJ3-1
D-C7□/C80 **D-C73C/C80C** **D-H7□** **D-H7□W** **D-H7BAL** **D-H7NF**	BJ2-016

Note 1) Two kinds of auto switch mounting brackets are used as a set.

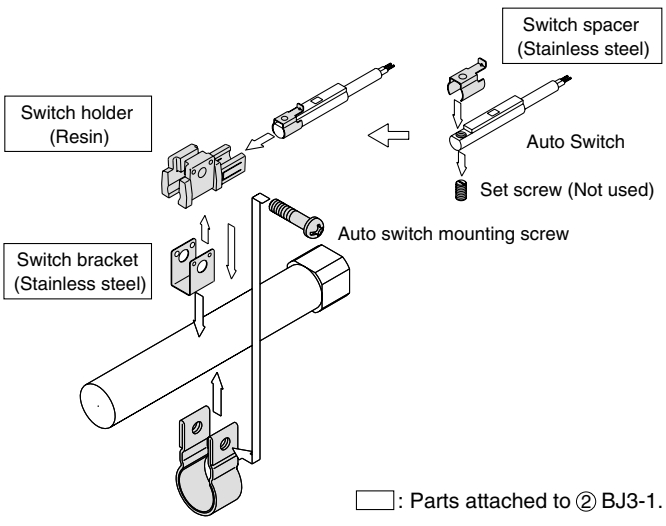
[Mounting screw set made of stainless steel]

The following set of mounting screws made of stainless steel is available. Use it in accordance with the operating environment. (Please order the auto switch mounting bracket separately, since it is not included.)

BBA4: For D-C7/C8/H7 types

Note 2) Refer to page 1814 for the details of BBA4.

D-H7BAL auto switch is set on the cylinder with the stainless steel screws above when shipped. When an auto switch is shipped independently, BBA4 is attached.



1. Auto Switch Mounting Bracket

Besides the models listed in How to Order, the following auto switches are applicable.
Refer to pages 1719 to 1827 for the detailed specifications.

Auto switch type	Part no.	Electrical entry (Fetching direction)	Features
Reed	D-C73, C76	Grommet (In-line)	—
	D-C80		Without indicator light
Solid state	D-H7A1, H7A2, H7B		—
	D-H7NW, H7PW, H7BW		Diagnostic indication (2-color indication)

∗ For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 1784 and 1785 for details.
∗ Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H types) are also available. Refer to page 1746 for details.