

# Pin Cylinder: Double Acting, Single Rod

## Series CJP2

ø4, ø6, ø10, ø16

### How to Order

**Standard** CJP2 **F** **10** - **15** **D** - [ ] - [ ]

**Built-in magnet** CDJP2 **F** **10** - **15** **D** - [ ] - **M9B** **S** - [ ]

**With auto switch** (Built-in magnet)

**Mounting**

Symbol	Mounting	Standard	Built-in magnet
B	Basic	●	●
F	Flange	●	●
L	Foot	●	●
D	Clevis	●	●
T	Trunnion	●	●

\* Bore size of 4 mm is available with basic mounting only.  
\* Mounting bracket is shipped together (but not assembled).

**Bore size**

4	4 mm
6	6 mm
10	10 mm
16	16 mm

**Cylinder standard stroke (mm)**

ø4	5, 10, 15, (20) <sup>Note</sup>
ø6	5, 10, 15, 20, 25
ø10, ø16	5, 10, 15, 20, 25, 30, 35, 40

Note) A stroke of 20 is available with a standard product only.

**Number of auto switches**

Nil	2 pcs.
S	1 pc.

**Auto switch**

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

\* For the applicable auto switch model, refer to the below table.  
\* Auto switches are shipped together, (but not assembled).

**Rod end thread**

Nil	With thread
B	Without thread

**Double acting**

### Applicable Auto Switches / For detailed auto switch specifications, refer to page 17 through to 21.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)*				Pre-wired connector	Applicable load		
					DC	AC	Electrical entry direction		0.5 (Nil)	1 (M)	3 (L)	5 (Z)		IC circuit	Relay, PLC	
							Perpendicular	In-line								
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	—	5 V	—	A96V**	A96**	●	—	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	A93V**	A93**	●	—	●	—	—	—	Relay, PLC
					5 V, 12 V	100 V or less	A90V**	A90**	●	—	●	—	—	—	IC circuit	
Solid state switch	Diagnostic indication (2-color)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	—	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9PV	M9P	●	—	●	○	○	IC circuit	
				2-wire				M9BV	M9B	●	—	●	○	○	—	
				3-wire (NPN)				M9NVV	M9NV	●	●	●	○	○	IC circuit	
				3-wire (PNP)				M9PVV	M9PV	●	●	●	○	○	IC circuit	
				2-wire				M9BVV	M9BV	●	●	●	○	○	—	

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9N  
1 m ..... M M9NWM  
3 m ..... L M9NL  
5 m ..... Z M9NZ

\*\* The D-A9□(V) switch is not attachable to ø4.

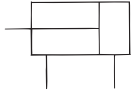
\* Auto switches marked with "○" are made to order specification.  
\* For details about auto switches with pre-wired connector, refer to "Best Pneumatics 2004" Vol. 6 catalog.  
\* Auto switches are shipped together, (but not assembled).

# Series CJP2



## JIS Symbol

Double acting, Single rod



## Made to Order

(For details, refer to page 22, 23.)

Symbol	Specifications
<b>XA</b> □	Change of rod end style
<b>XB6</b>	Heat resistant cylinder (150C)
<b>XB7</b>	Cold resistant cylinder
<b>XC22</b>	Fluoro rubber seals

## Theoretical Output

Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
<b>4</b>	IN	2.8	4.7	6.6
	OUT	3.8	6.3	8.8
<b>6</b>	IN	6.4	10.6	14.8
	OUT	8.5	14.1	19.8
<b>10</b>	IN	19.8	33	46.2
	OUT	23.6	39.3	55
<b>16</b>	IN	51.8	86.4	121
	OUT	60.3	100.5	140.7



## Specifications

<b>Action</b>	Double acting, Single rod	
<b>Maximum operating pressure</b>	0.7 MPa	
<b>Minimum operating pressure</b>	<b>ø4</b>	0.15 MPa
	<b>ø6</b>	0.12 MPa
	<b>ø10, ø16</b>	0.06 MPa
<b>Proof pressure</b>	1.05 MPa	
<b>Ambient and fluid temperature</b>	Without auto switch: -10 to 70°C (No freezing) With auto switch: -10 to 60°C (No freezing)	
<b>Lubrication</b>	Not required (Non-lube)	
<b>Stroke length tolerance</b>	+1.0 0	
<b>Thread tolerance</b>	JIS Class 2	
<b>Rod end style</b>	With thread/Without thread	
<b>Piston speed</b>	50 to 500 mm/s	
<b>Cushion</b>	Rubber bumper	
<b>Mounting</b> <small>(Note)</small>	Basic, Flange, Foot, Clevis, Trunnion	

Note) Bore size of ø4 is available with basic mounting only.

## Standard Equipment Accessory

Accessory	Mounting nut (1 pc.)	Rod end nut (2 pcs.) (with thread)	Trunnion (with pin)
Mounting			
Basic	●	●	—
Flange	●	●	—
Foot	●	●	—
Clevis	—	●	—
Trunnion	—	●	●

## Standard Stroke

Bore size (mm)	Stroke (mm)
<b>4</b>	5, 10, 15, 20 <small>Note)</small>
<b>6</b>	5, 10, 15, 20, 25
<b>10</b>	5, 10, 15, 20, 25, 30, 35, 40
<b>16</b>	5, 10, 15, 20, 25, 30, 35, 40

\* 20 stroke of bore size 4 mm is standard type only.

## Option

Bore size (mm)	6	10	16
Description			
Auto switch	D-A9□(V), D-M9□(V), D-M9□W(V)		
Single knuckle joint	I-P006A	I-P010A	I-P016A
Double knuckle joint (with pin)	Y-P006A	Y-P010A	Y-P016A

## Mounting Bracket Part No.

Bore size (mm)	6	10	16
Bracket			
Flange	CP-F006A	CP-F010A	CP-F016A
Foot	CP-L006A	CP-L010A	CP-L016A
Trunnion (with pin)	CP-T006A	CP-T010A	CP-T016A

## Weight

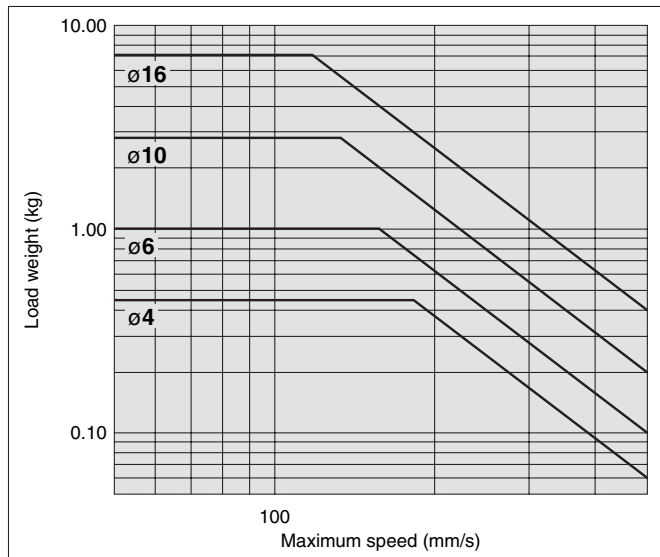
Stroke (mm)	Mounting	Bore size (mm)			
		4	6	10	16
Basic weight	5	11	16	27	42
	10	13	18	29	46
	15	15	21	32	50
	20	17	23	35	54
	25	—	25	37	58
	30	—	—	40	63
	35	—	—	43	67
	40	—	—	45	71
Bracket weight	Flange	—	5	6	16
	Foot	—	7	9	24
	Clevis	—	2	5	8
	Trunnion (with pin)	—	15	25	70
Additional weight for built-in magnet		2	3	5	7

## Allowable Kinetic Energy

### ⚠ Caution

When driving an inertial load, operate a cylinder with kinetic energy within the allowable value. The range in the chart below that is delineated by bold solid lines indicates the relation between load weights and maximum driving speeds.

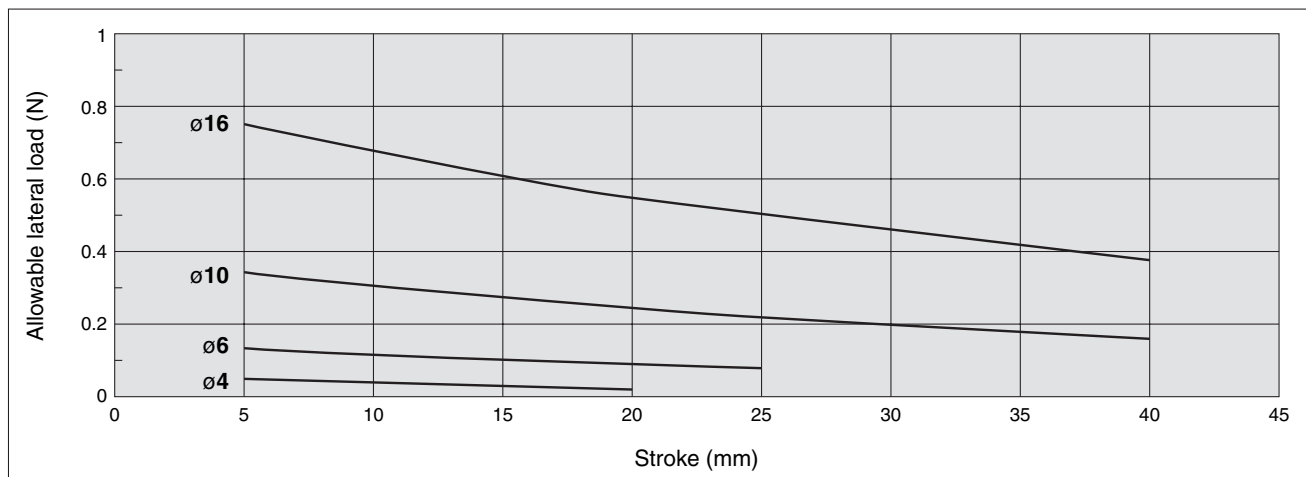
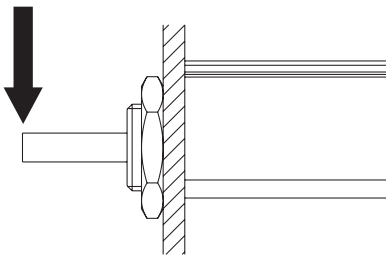
Bore size (mm)	4	6	10	16
Piston speed (m/s)	0.05 to 0.5			
Allowable kinetic energy (J)	$0.75 \times 10^{-2}$	$1.2 \times 10^{-2}$	$2.5 \times 10^{-2}$	$5.0 \times 10^{-2}$



## Allowable Lateral Load

Strictly observe the limiting range of lateral load on a piston rod. (Refer to the below graph.) If this product is used beyond the limits, it may shorten the machine life or cause damage.

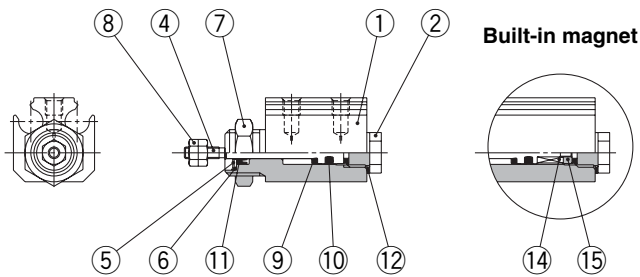
Allowable lateral load



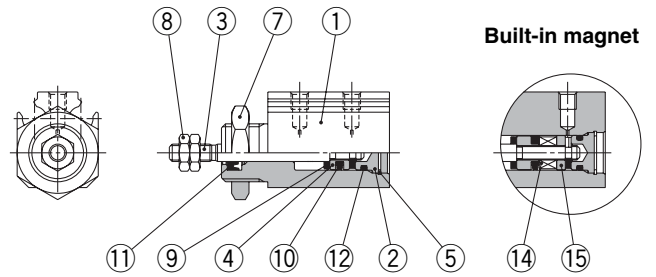
# Series CJP2

## Construction

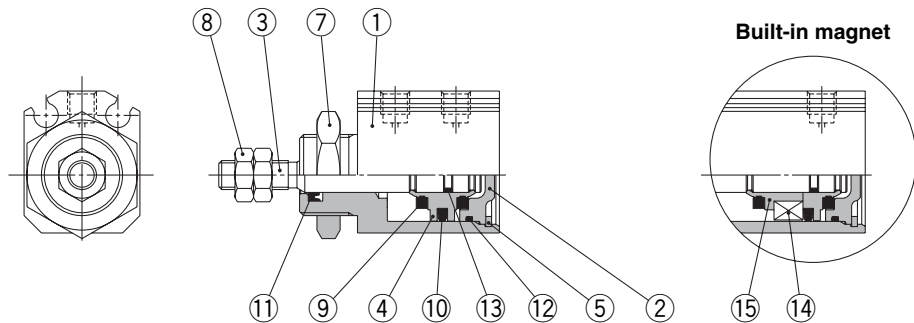
### C□JP2B4



### C□JP2B6



### C□JP2B10, 16



## Component Parts

No.	Description	Material	Note
1	Body	Aluminum alloy	Hard anodized
2	Head cover	ø4, ø6, ø10	Brass Electroless nickel plated
		ø16	Aluminum alloy Chromated
3	Piston rod	Stainless steel	
4	Piston	ø4	Stainless steel
		ø6, ø10	Brass
		ø16	Aluminum alloy Chromated
5	Snap ring	Tool steel	Phosphate coating
6	Seal retainer	Special steel	Nickel plated
7	Mounting nut	Brass	Electroless nickel plated
8	Rod end nut	Steel	Nickel plated
9	Bumper	Urethane rubber	
10	Piston seal	NBR	
11	Rod seal	NBR	
12	Gasket	ø4	Stainless steel + NBR
		ø6, ø10, ø16	NBR
13	Piston gasket	NBR	
14	Magnet	Magnetic material	
15	Magnet retainer	ø4, ø6, ø10	Brass
		ø16	Aluminum alloy Chromated

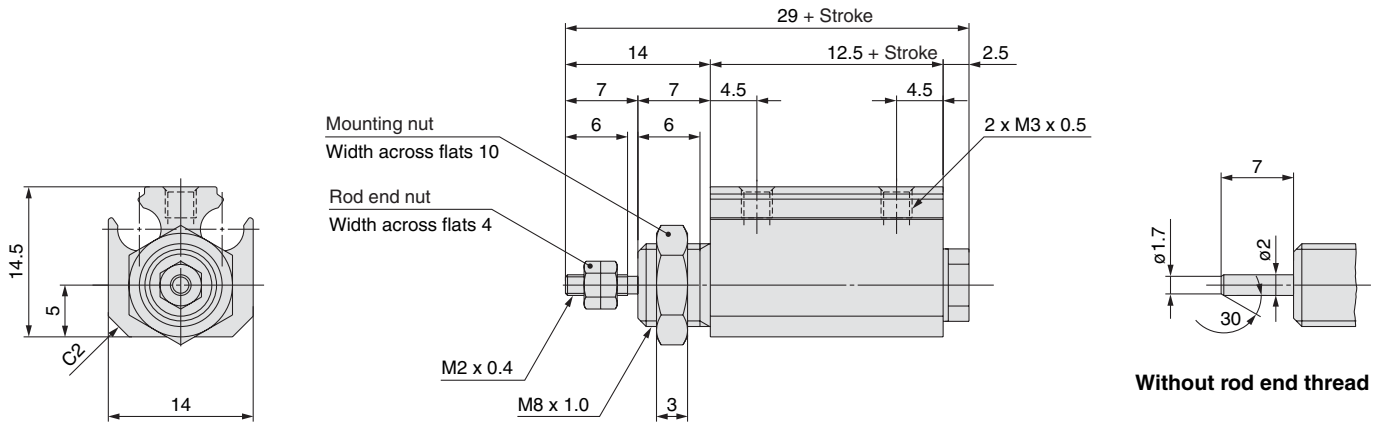
## Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
6	CJP2B6-PS	Piston seal, Rod seal, Gasket, Grease pack (5 g)
10	CJP2B10-PS	
16	CJP2B16-PS	

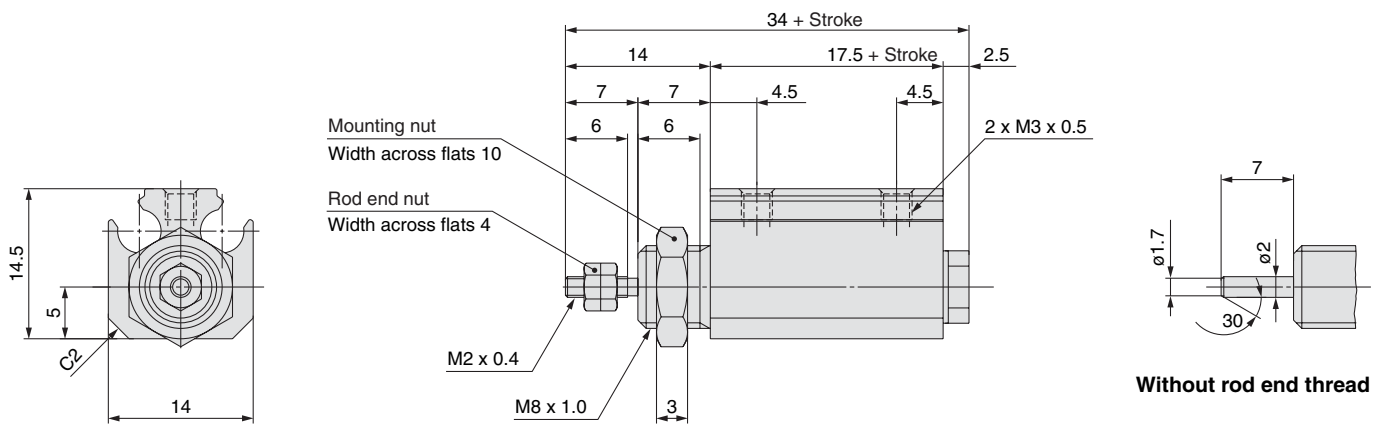
\* Seal kit includes above contents. Order the seal kit, based on each bore size.

**Dimensions: Basic Mounting (ø4)**

**Without magnet: CJP2B4**



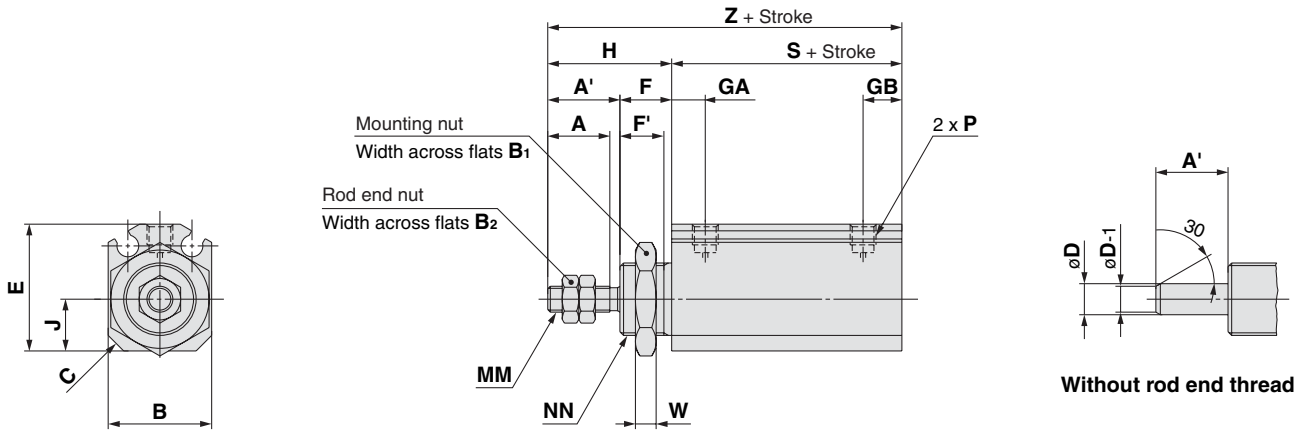
**Built-in magnet: CDJP2B4**



# Series CJP2

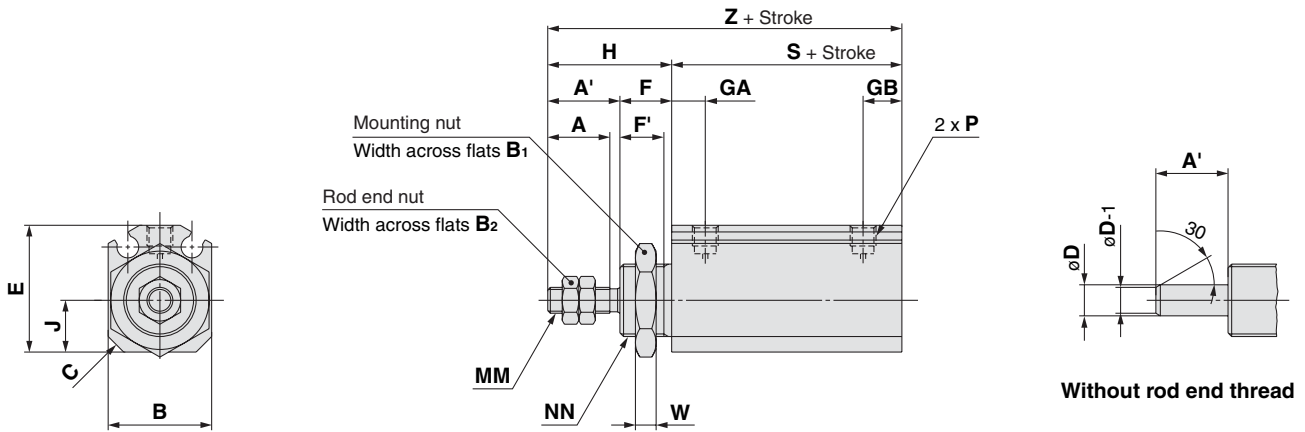
## Dimensions: Basic Mounting (ø6 to ø16)

### Without magnet: CJP2B6 to 16



Symbol	A	A'	B	B <sub>1</sub>	B <sub>2</sub>	C	D	E	F	F'	GA	GB	H	J	MM	NN	P	S	W	Z
Bore size 6	7	9	14	14	5.5	2	3	16.5	8	6.5	5.5	6.5	17	6	M3 x 0.5	M10 x 1.0	M3 x 0.5	16	3	33
Bore size 10	10	12	15	17	7	2.5	4	19	8	6.5	6	7	20	7	M4 x 0.7	M12 x 1.0	M3 x 0.5	19.5	3	39.5
Bore size 16	12	14	20	19	8	3	6	24.5	10	8.5	6.5	7.5	24	10	M5 x 0.8	M14 x 1.0	M5 x 0.8	19.5	4	43.5

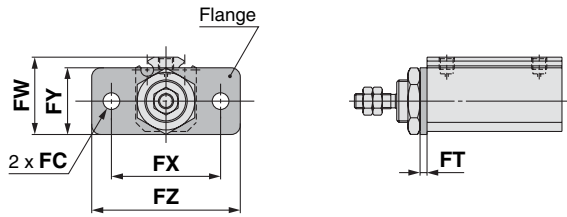
### Built-in magnet: CDJP2B6 to 16



Symbol	A	A'	B	B <sub>1</sub>	B <sub>2</sub>	C	D	E	F	F'	GA	GB	H	J	MM	NN	P	S	W	Z
Bore size 6	7	9	14	14	5.5	2	3	16.5	8	6.5	5.5	6.5	17	6	M3 x 0.5	M10 x 1.0	M3 x 0.5	21	3	38
Bore size 10	10	12	15	17	7	2.5	4	19	8	6.5	6	7	20	7	M4 x 0.7	M12 x 1.0	M3 x 0.5	24.5	3	44.5
Bore size 16	12	14	20	19	8	3	6	24.5	10	8.5	6.5	7.5	24	10	M5 x 0.8	M14 x 1.0	M5 x 0.8	24.5	4	48.5

## Mounting Bracket Dimensions

### Flange: C(D)JP2F6 to 16

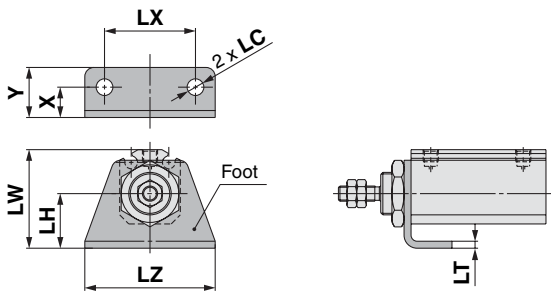


### Flange (mm)

Symbol	FC	FT	FW	FX	FY	FZ
Bore size 6	3.4	1.6	18.5	24	16	32
10	4.5	1.6	21	28	18	37
16	5.5	2.3	25.5	36	22	49

\* Other dimensions are the same as basic mounting.

### Foot: C(D)JP2L6 to 16

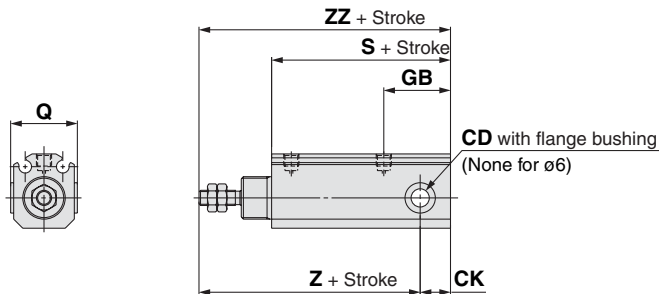


### Foot (mm)

Symbol	X	Y	LC	LH	LT	LW	LX	LZ
Bore size 6	6.5	10.5	3.4	11	1.6	21.5	20	28
10	7	12	4.5	13	1.6	25	24	33
16	10	16.5	5.5	18	2.3	32.5	30	43

\* Other dimensions are the same as basic mounting.

### Clevis: C(D)JP2D6 to 16

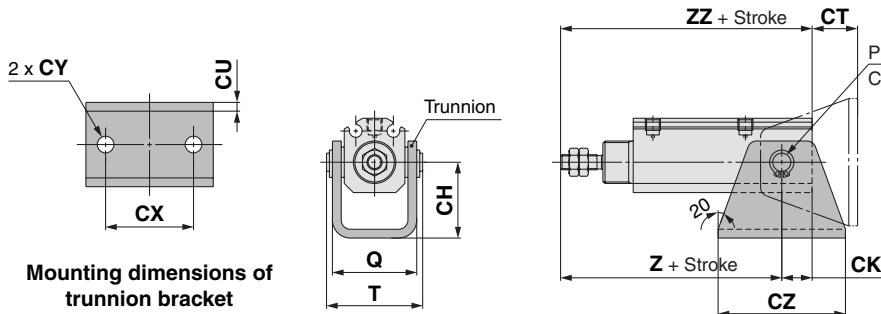


### Clevis (mm)

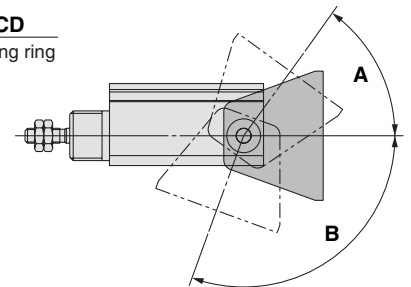
Symbol	CD	CK	GB	Q
Bore size 6	$3^{+0.040}_0$	4	11.5	—
10	$5^{+0.065}_0$	6.5	18	$17^{0}_{-0.5}$
16	$6^{+0.065}_0$	10	22	$22^{0}_{-0.5}$

Symbol	S		Z		ZZ	
	Without magnet	Built-in magnet	Without magnet	Built-in magnet	Without magnet	Built-in magnet
Bore size 6	21	26	34	39	38	43
10	30.5	35.5	44	49	50.5	55.5
16	34	39	48	53	58	63

### Trunnion: C(D)JP2T6 to 16



### Rotation angle



### Trunnion

Symbol	CD	CH	CK	CT	CU	CX	CY	CZ	Q	T	Z		ZZ	
											Without magnet	Built-in magnet	Without magnet	Built-in magnet
											Bore size			
6	3	16	4	12	1.6	18	3.4	26	18.5	20.4	34	39	38	43
10	5	20	6.5	13.5	1.6	24	4.5	33	20.5	23.9	44	49	50.5	55.5
16	6	25	10	15	2.9	29	5.5	42	28	31.7	48	53	58	63

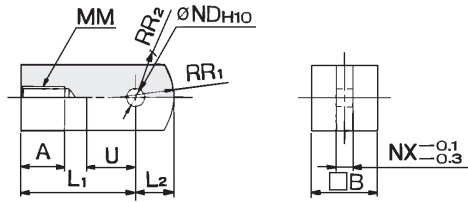
Applicable bore	ø6	ø10	ø16
A	54°	62°	55°
B	110°	110°	102°

\* Provided as guidelines.  
The values are varied depending on the condition.

# Series CJP2

## Accessory Bracket Dimensions

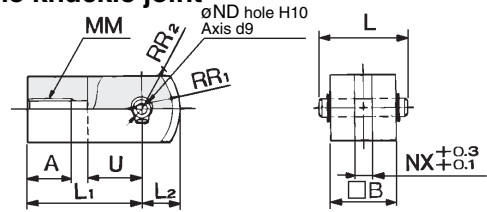
### Single knuckle joint



Material: Rolled steel

Part no.	Applicable bore size (mm)	A	B	L <sub>1</sub>	L <sub>2</sub>	MM	ND <sub>H10</sub>	NX	R <sub>1</sub>	R <sub>2</sub>	U
I-P006A	6	5	6	12	3.5	M3 x 0.5	3 <sup>+0.040</sup> <sub>0</sub>	3	5	4	5
I-P010A	10	6.5	10	16	5.5	M4 x 0.7	5 <sup>+0.048</sup> <sub>0</sub>	5	8	6.3	7
I-P016A	16	7	12	19	7	M5 x 0.8	6 <sup>+0.048</sup> <sub>0</sub>	6	10	7.8	9

### Double knuckle joint

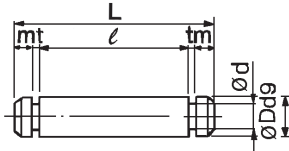


Material: Rolled steel

Part no.	Applicable bore size (mm)	A	B	L	L <sub>1</sub>	L <sub>2</sub>	MM	ND <sub>d9</sub>	ND <sub>H10</sub>	NX	R <sub>1</sub>	R <sub>2</sub>	U
Y-P006A	6	5	6	9	12	3.5	M3 x 0.5	3 <sup>-0.020</sup> <sub>-0.045</sub>	3 <sup>+0.040</sup> <sub>0</sub>	3	5	4	5
Y-P010A	10	6.5	10	13.6	16	5.5	M4 x 0.7	5 <sup>-0.030</sup> <sub>-0.060</sub>	5 <sup>+0.048</sup> <sub>0</sub>	5	8	6.3	7
Y-P016A	16	7	12	15.8	19	7	M5 x 0.8	6 <sup>-0.030</sup> <sub>-0.060</sub>	6 <sup>+0.048</sup> <sub>0</sub>	6	10	7.8	9

\* Knuckle pin and retaining ring are included.

### Knuckle pin

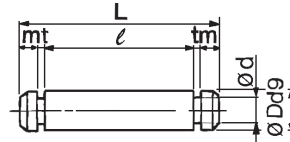


Material: Stainless steel

Part no.	Applicable bore size (mm)	D d9	L	d	ℓ	m	t	Retaining* ring
IY-P006	6	3 <sup>-0.020</sup> <sub>-0.045</sub>	9	2.85	6.2	0.75	0.65	Clip C-type 3
IY-P010	10	5 <sup>-0.030</sup> <sub>-0.060</sub>	13.6	4.8	10.2	1	0.7	C-type 5
IY-P015	16	6 <sup>-0.030</sup> <sub>-0.060</sub>	15.8	5.7	12.2	1	0.8	C-type 6

\* Included

### Trunnion pin

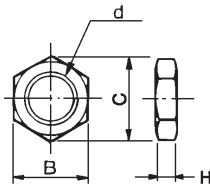


Material: Stainless steel

Part no.	Applicable bore size (mm)	D d9	L	d	ℓ	m	t	Retaining* ring
CT-P006	6	3 <sup>-0.020</sup> <sub>-0.045</sub>	20.4	2.85	17.6	0.75	0.65	Clip C-type 3
CT-P010	10	5 <sup>-0.030</sup> <sub>-0.060</sub>	23.9	4.8	20.5	1	0.7	C-type 5
CT-P015	16	6 <sup>-0.030</sup> <sub>-0.060</sub>	31.7	5.7	28.1	1	0.8	C-type 6

\* Included

### Mounting nut

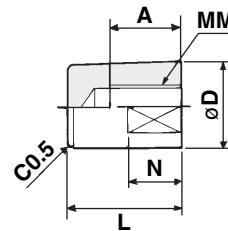


Material: Brass

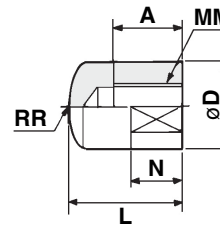
Part no.	Applicable bore size (mm)	d	H	B	C
SNPS-004	4	M8 x 1.0	3	10	11.5
SNP-006	6	M10 x 1.0	3	14	16.2
SNP-010	10	M12 x 1.0	3	17	19.6
SNP-015	16	M14 x 1.0	4	19	21.9

### Rod end cap

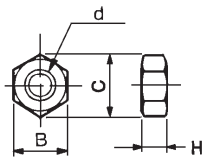
Flat type: CJ-CF□□□



Round type: CJ-CR□□□



### Rod end nut



Material: Iron

Part no.	Applicable bore size (mm)	d	H	B	C
NTJ-004	4	M2 x 0.4	1.6	4	4.6
NTP-006	6	M3 x 0.5	1.8	5.5	6.4
NTP-010	10	M4 x 0.7	2.4	7	8.1
NTP-015	16	M5 x 0.8	3.2	8	9.2

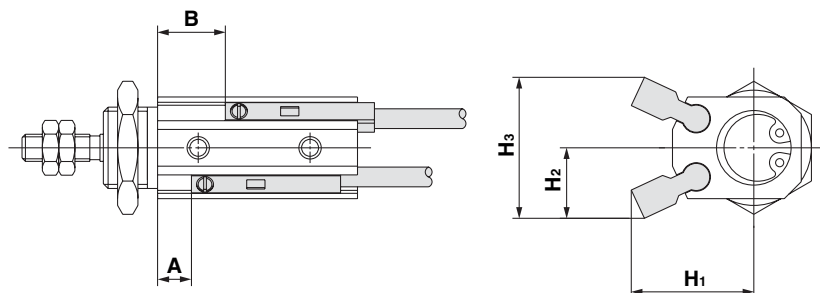
Material: Polyacetal

Part no.		Applicable bore size (mm)	A	D	L	MM	N	RR	W
Flat type	Round type								
CJ-CF004	CJ-CR004	4	5	6	9	M2 x 0.4	3	6	5
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



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

**D-A9□(V), D-M9□(V), D-M9□W(V)**



**Applicable Auto Switches: D-A9□, D-A9□V**

(mm)

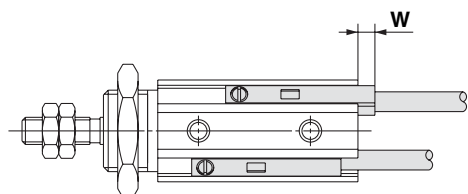
Bore size	A (When detecting at extended stroke end position)	B (When detecting at retracted stroke end position)								H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>
		5 st	10 st	15 st	20 st	25 st	30 st	35 st	40 st			
ø4	—	—	—	—	—	—	—	—	—	—	—	—
ø6	1	6	11	16	21	26	—	—	—	13	10	20
ø10	1	6	11	16	21	26	31	36	41	16	9.5	19
ø16	1	6	11	16	21	26	31	36	41	18	12	24

**Applicable Auto Switches: D-M9□, D-M9□V, D-M9□W, D-M9□WV**

(mm)

Bore size	A (When detecting at extended stroke end position)	B (When detecting at retracted stroke end position)								H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>
		5 st	10 st	15 st	20 st	25 st	30 st	35 st	40 st			
ø4	4	9	14	19	—	—	—	—	—	14.5	11.5	23
ø6	5	10	15	20	25	30	—	—	—	15	11.5	23
ø10	5	10	15	20	25	30	35	40	45	18	10.5	21
ø16	5	10	15	20	25	30	35	40	45	20	13	26

Note) Only adjust the setting position after confirming the auto switch is properly activated.



**Mounting: Basic, Flange, Foot**

(mm)

Auto switch model	D-M9□	D-M9□V	D-A90	D-A93
	D-M9□W	D-M9□WV	D-A96 D-A9□V	
Bore size	W			
ø4	6	4	—	—
ø6	6	4	2	4.5
ø10	2.5	0.5	0	1
ø16	2.5	0.5	0	1

**Mounting: Clevis, Trunnion**

(mm)

Auto switch model	D-M9□	D-M9□V
	D-M9□W	D-M9□WV D-A9□ D-A9□V
Bore size	W	
ø4	—	—
ø6	1	0
ø10	0	0
ø16	0	0

\* 0 (zero) denotes the switch does not protrude from the end surface.

# Series CJP2

## Operating Range

Auto switch model	Bore size (mm)			
	4	6	10	16
<b>D-A9□(V)</b>	—	5	6	7
<b>D-M9□(V)</b>	2	2	2	2
<b>D-M9□W(V)</b>	2.5	2.5	3	3.5

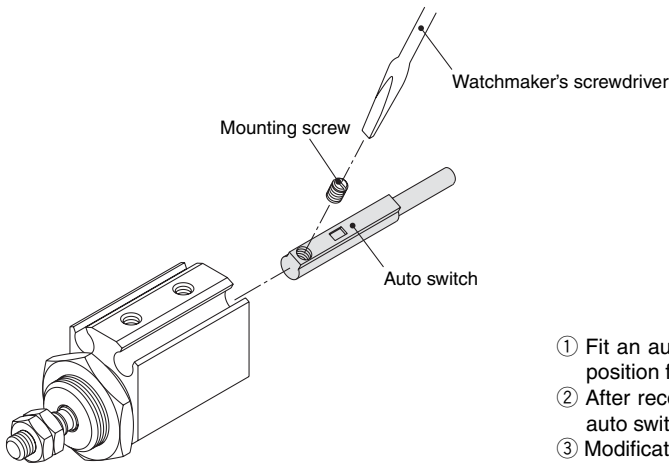
\* Since this is a guideline including hysteresis, not meant to be guaranteed. (assuming approximately ±30% dispersion.)

There may be the case it will vary substantially depending on an ambient environment.

## Minimum Stroke for Auto Switch Mounting

No. of auto switches mounted	Applicable auto switch model (mm)		
	<b>D-A9□, D-A9□V</b>	<b>D-M9□, D-M9□V</b>	<b>D-M9□W, D-M9□WV</b>
1	5	5	5
2	10	5	10

## Mounting and Moving Auto Switches



- ① Fit an auto switch into the switch mounting groove to set it roughly to the mounting position for an auto switch.
- ② After reconfirming the detecting position, tighten the mounting screw\* to secure the auto switch.
- ③ Modification of the detecting position should be made in the condition of ①.

\* When tightening an auto switch mounting screw, use a watchmaker's screwdriver with a handle of approximately 5 to 6 mm in diameter.  
(Use a tightening torque of approximately 0.10 to 0.20 N·m.)

## ⚠ Specific Product Precautions

Before handling auto switches, refer to the back of page 2 through to 5 for Auto Switches Precautions.

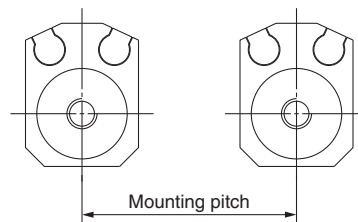
### ⚠ Caution

1. If auto switch cylinders are used in parallel, keep the distance between cylinders in accordance with the below chart.

#### Mounting Pitch (mm)

Auto switch model	Bore size (mm)			
	4	6	10	16
<b>D-A9□(V)</b>	—	20	25	30
<b>D-M9□(V)</b> <b>D-M9□W(V)</b>	25	25	30	35

Use caution not to use them, getting closer than the specified pitch. Otherwise, it may cause auto switch to malfunction.



## ⚠ Specific Product Precautions

Be sure to read this before handling. Consult with SMC for the use other than the specifications.

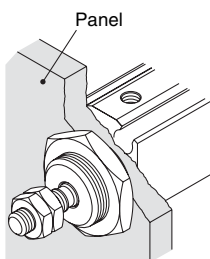
### Mounting

#### ⚠ Caution

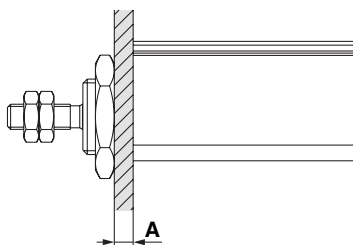
##### Mounting nut maximum tightening torque and panel width

① Do not apply more torque than the maximum torque range when mounting the cylinder or bracket. Also, do not attach a panel with a thickness beyond the specified range.

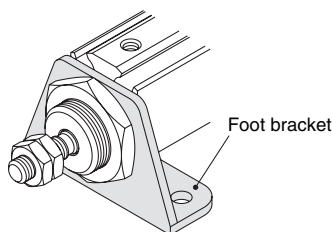
Cylinder bore size	Thread	Maximum tightening torque (N·m)	A dimension maximum value (mm)
ø4	M8 x 1	6.2	3
ø6	M10 x 1	12.5	4
ø10	M12 x 1	21.0	4
ø16	M14 x 1	34.0	5



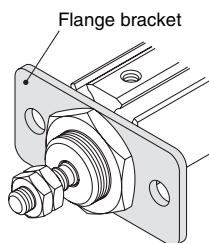
Panel mounting



Panel maximum thickness



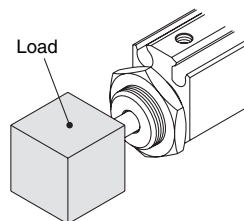
Foot mounting



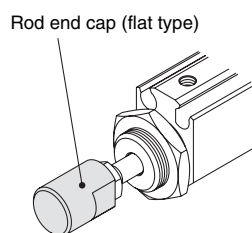
Flange mounting

② Do not apply more tightening torque than the below specified range when attaching a load on the rod end, rod end cap, single or double knuckle joint.

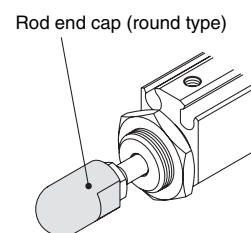
Applicable bore size	Thread size	Maximum tightening torque (N·m)
ø4	M2 x 0.4	0.1
ø6	M3 x 0.5	0.3
ø10	M4 x 0.7	0.8
ø16	M5 x 0.8	1.6



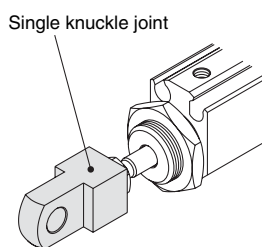
Rod end load mounting



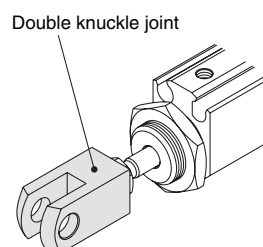
Rod end cap (flat type) mounting



Rod end cap (round type) mounting



Single knuckle joint mounting



Double knuckle joint mounting

### Disassembly and Maintenance

#### ⚠ Caution

##### Snap ring installation / removal

1. To replace seals or grease the cylinder during maintenance, use an appropriate pair of pliers (tool for installing a C-type retaining ring for hole).

After re-installing the cylinder, make sure that the snap ring is placed securely in the groove before supplying air.

2. To remove and install the snap ring for the knuckle pin or the trunnion pin, use an appropriate pair of pliers (tool for installing a C-type retaining ring for hole). In particular, use a pair of ultra-mini pliers, for removing and installing the snap rings on the ø6 cylinder.

Do not disassemble the CJP4 cylinder. Do not loosen or remove the head cover.

# Series CJP2

# Auto Switch Specifications

## Auto Switch Common Specifications

Type	Reed switch	Solid state switch
Leakage current	None	3-wire: 100 A or less 2-wire: 0.8 mA or less
Operating time	1.2 ms	1 ms or less
Impact resistance	300 m/s <sup>2</sup>	1000 m/s <sup>2</sup>
Insulation resistance	50 M or more at 500 Mega VDC (between lead wire and case)	
Withstand voltage	1000 VAC for 1 minute (between lead wire and case)	1000 VAC for 1 minute (between lead wire and case)
Ambient temperature	-10 to 60°C	
Enclosure	IEC529 standard IP67, JIS C 0920 waterproof construction	
Standard	Conforming to CE Standards	

## Lead Wire Length

Lead wire length indication

(Example) D-M9P **L**

Lead wire length

Nil	0.5 m
M	1 m
L	3 m
Z	5 m

Note 1) Applicable auto switch with 5 m lead wire "Z"

Solid state switch: Manufactured upon receipt of order as standard.

Note 2) For 1 m(M), D-M9□W(V) only.

## Contact Protection Boxes: CD-P11, CD-P12

### <Applicable switch model>

D-A9/A9□V

The auto switches below do not have a built-in contact protection circuit. Therefore, please use a contact protection box with the switch for any of the following cases:

- ① Where the operation load is an inductive load.
- ② Where the wiring length to load is greater than 5 m.
- ③ Where the load voltage is 100 VAC.

The contact life may be shortened. (Due to permanent energizing conditions.)

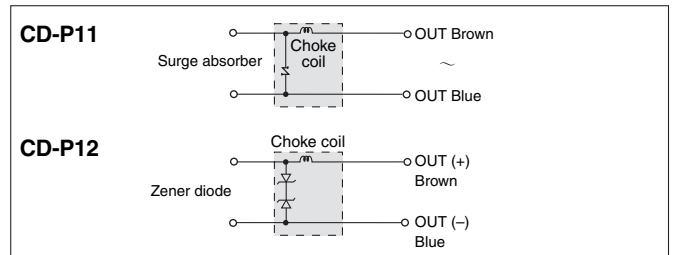
### Specifications

Part no.	CD-P11		CD-P12
Load voltage	100 VAC	200 VAC	24 VDC
Maximum load current	25 mA	12.5 mA	50 mA

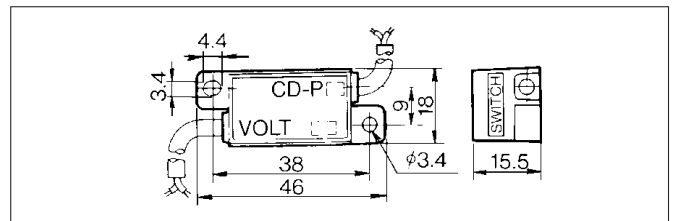
\* Lead wire length — Switch connection side 0.5 m  
Load connection side 0.5 m



### Internal Circuit



### Dimensions



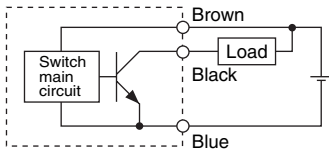
### Connection

To connect a switch unit to a contact protection box, connect the lead wire from the side of the contact protection box marked SWITCH to the lead wire coming out of the switch unit. Keep the switch as close as possible to the contact protection box, with a lead wire length of no more than 1 meter.

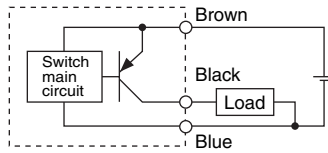
# Auto Switch Connections and Examples

## Basic Wiring

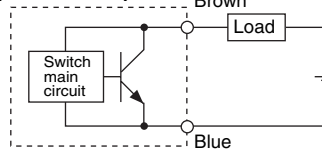
### Solid state 3-wire, NPN



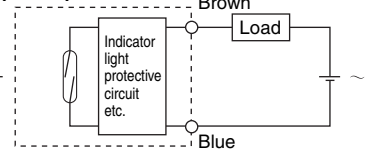
### Solid state 3-wire, PNP



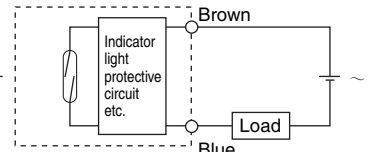
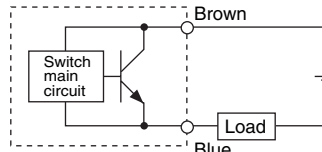
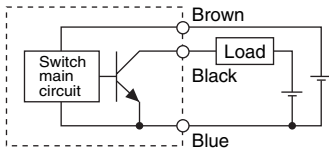
### 2-wire (Solid state)



### 2-wire (Reed)

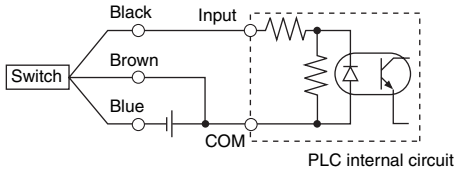


(Power supplies for switch and load are separate.)

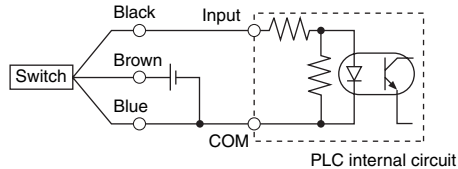


## Example of Connection to PLC (Programmable Logic Controller)

### • Sink input specification 3-wire, NPN

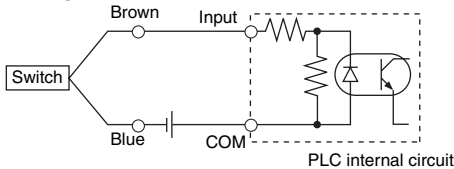


### • Source input specification 3-wire, PNP

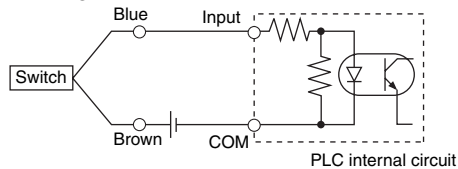


Connect according to the applicable PLC input specifications, since the connection method will vary depending on the PLC input specifications.

### 2-wire



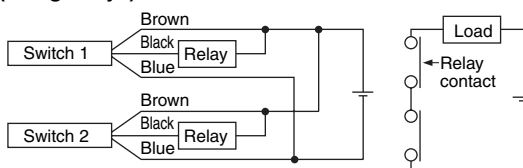
### 2-wire



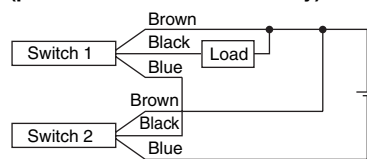
## Example of AND (Serial) and OR (Parallel) Connection

### • 3-wire

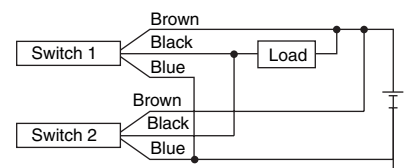
#### AND connection for NPN output (using relays)



#### AND connection for NPN output (performed with switches only)

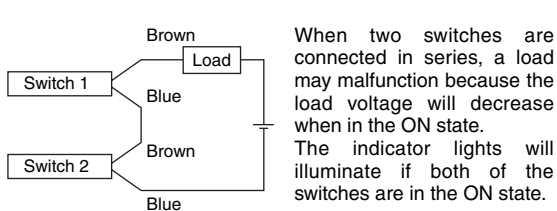


#### OR connection for NPN output



The indicator lights will illuminate when both switches are turned ON.

#### 2-wire with 2-switch AND connection

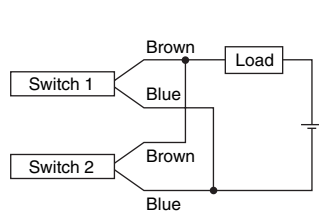


When two switches are connected in series, a load may malfunction because the load voltage will decrease when in the ON state. The indicator lights will illuminate if both of the switches are in the ON state.

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

Example: Power supply is 24 VDC.  
Internal voltage drop in switch is 4 V.

#### 2-wire with 2-switch OR connection



#### (Solid state)

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

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

Example: Load impedance is 3 k.  
Leakage current from switch is 1 mA.

#### (Reed)

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

# Reed Switch: Direct Mounting Style D-A90(V)/D-A93(V)/D-A96(V)

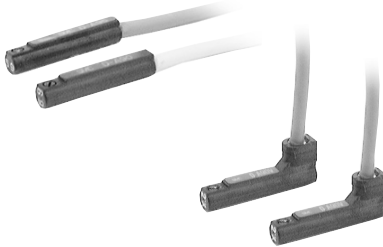


For details about certified products conforming to international standards, visit us at [www.smcworld.com](http://www.smcworld.com).

## Auto Switch Specifications

PLC: Programmable Logic Controller

### Grommet



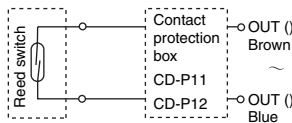
### Caution

#### Operating Precautions

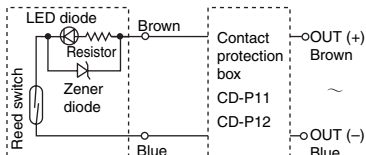
Fix the switch with the existing screw installed on the switch body. The switch may be damaged if a screw other than the one supplied, is used.

### Auto Switch Internal Circuit

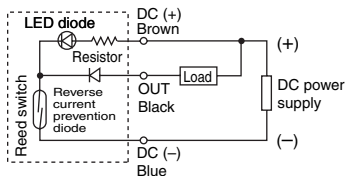
#### D-A90(V)



#### D-A93(V)



#### D-A96(V)



- Note) ① In a case where the operation load is an inductive load.  
② In a case where the wiring load is greater than 5 m.  
③ In a case where the load voltage is 100 VAC.

Use the auto switch with a contact protection box in any of the above mentioned cases. (For details about the contact protection box, refer to page 17.)

D-A90/D-A90V (Without indicator light)						
Auto switch part no.	D-A90	D-A90V	D-A90	D-A90V	D-A90	D-A90V
Electrical entry direction	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Applicable load	IC circuit, Relay, PLC					
Load voltage	24 VAC/DC or less		48 VAC/DC or less		100 VAC/DC or less	
Maximum load current	50 mA		40 mA		20 mA	
Contact protection circuit	None					
Internal resistance	1 or less (including lead wire length of 3 m)					
D-A93/D-A93V/D-A96/D-A96V (With indicator light)						
Auto switch part no.	D-A93	D-A93V	D-A93	D-A93V	D-A96	D-A96V
Electrical entry direction	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Applicable load	Relay, PLC				IC circuit	
Load voltage	24 VDC		100 VAC		4 to 8 VDC	
Load current range and max. load current	5 to 40 mA		5 to 20 mA		20 mA	
Contact protection circuit	None					
Internal voltage drop	D-A93 — 2.4 V or less (to 20 mA)/3 V or less (to 40 mA) D-A93V — 2.7 V or less				0.8 V or less	
Indicator light	Red LED illuminates when ON.					
Standard	Conforming to CE Standards					

#### Lead wires

D-A90(V)/D-A93(V) — Oilproof heavy-duty vinyl cable:  $\phi 2.7$ , 0.18 mm<sup>2</sup> x 2 cores (Brown, Blue), 0.5 m

D-A96(V) — Oilproof heavy-duty vinyl cable:  $\phi 2.7$ , 0.15 mm<sup>2</sup> x 3 cores (Brown, Black, Blue), 0.5 m

Note 1) Refer to page 17 for reed switch common specifications.

Note 2) Refer to page 17 for lead wire lengths.

### Weight

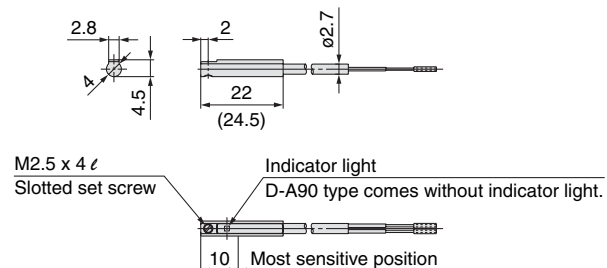
Unit: g

Auto switch part no.	D-A90(V)	D-A93(V)	D-A96(V)
Lead wire length 0.5 m	6	6	8
Lead wire length 3 m	30	30	41

### Dimensions

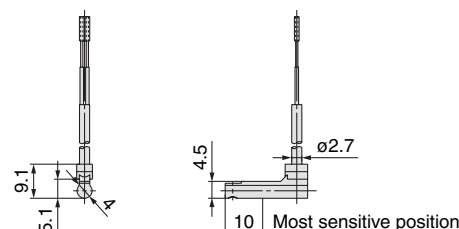
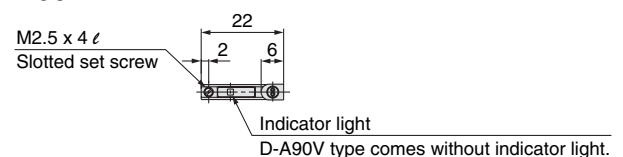
Unit: mm

#### D-A90/D-A93/D-A96



( ): dimensions for D-A93.

#### D-A90V/D-A93V/D-A96V



# Solid State Switch: Direct Mounting Style D-M9N(V)/D-M9P(V)/D-M9B(V) C €



For details about certified products conforming to international standards, visit us at [www.smcworld.com](http://www.smcworld.com).

## Auto Switch Specifications

PLC: Programmable Logic Controller

D-M9□/D-M9□V (With indicator light)						
Auto switch part no.	D-M9N	D-M9NV	D-M9P	D-M9PV	D-M9B	D-M9BV
Electrical entry direction	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less				4 V or less	
Leakage current	100 A or less at 24 VDC				0.8 mA or less	
Indicator light	Red LED illuminates when ON.					
Standard	Conforming to CE Standards					

### Lead wires

Oilproof heavy-duty vinyl cable:  $\phi 2.7 \times 3.2$  ellipse

D-M9B(V) 0.15 mm<sup>2</sup> x 2 cores

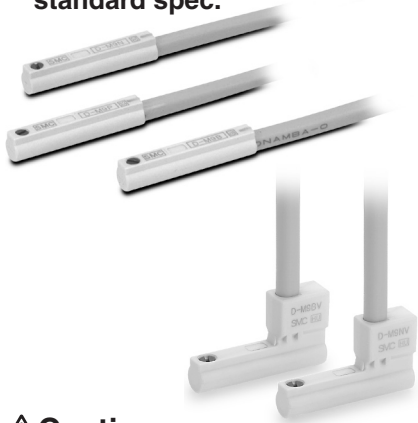
D-M9N(V), D-M9P(V) 0.15 mm<sup>2</sup> x 3 cores

Note 1) Refer to page 17 for solid state switch common specifications.

Note 2) Refer to page 17 for lead wire lengths.

## Grommet

- 2-wire load current is reduced (2.5 to 40 mA).
- Lead free
- UL certified (style 2844) lead cable is used.
- Flexibility is 1.5 times greater than the conventional model (SMC comparison).
- Using flexible cable as standard spec.



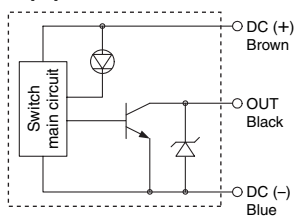
## Caution

### Operating Precautions

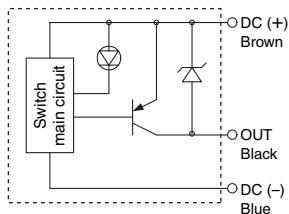
Fix the switch with the existing screw installed on the switch body. The switch may be damaged if a screw other than the one supplied, is used.

## Auto Switch Internal Circuit

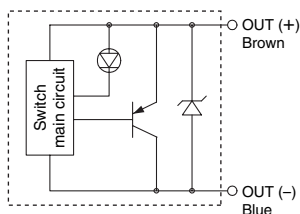
### D-M9N(V)



### D-M9P(V)



### D-M9B(V)



## Weight

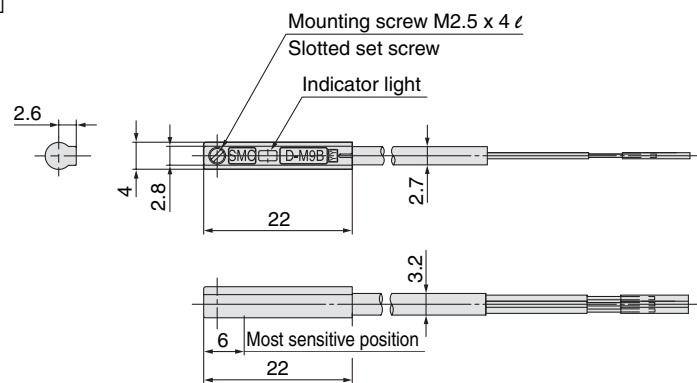
Unit: g

Auto switch part no.	D-M9N(V)	D-M9P(V)	D-M9B(V)
Lead wire length (m)	0.5	8	7
	3	41	38
	5	68	63

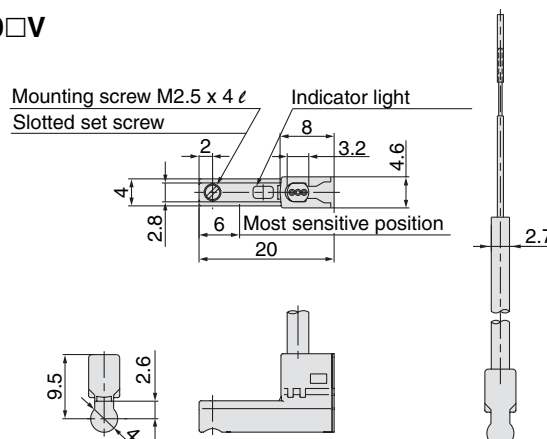
## Dimensions

Unit: mm

### D-M9□



### D-M9□V



# 2-Color Indication Solid State Switch: Direct Mounting Style

## D-M9NW(V)/D-M9PW(V)/D-M9BW(V)



For details about certified products conforming to international standards, visit us at [www.smcworld.com](http://www.smcworld.com).

### Auto Switch Specifications

PLC: Programmable Logic Controller

D-M9□W/D-M9□WV (With indicator light)						
Auto switch part no.	D-M9NW	D-M9NWV	D-M9PW	D-M9PWV	D-M9BW	D-M9BWV
Electrical entry direction	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire			2-wire		
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay IC, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 VDC)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less at 10 mA (2 V or less at 40 mA)				4 V or less	
Leakage current	100 A or less at 24 VDC				0.8 mA or less	
Internal voltage drop	Operating position ..... Red LED illuminates. Optimum operating position ..... Green LED illuminates.					
Standard	Conforming to CE Standards					

### Grommet

- 2-wire load current is reduced (2.5 to 40 mA).
- RoHS compliant
- UL certified (style 2844) lead cable is used.
- Flexibility is 1.5 times greater than the conventional model (SMC comparison).
- Using flexible cable as standard spec.
- The optimum operating position can be determined by the color of the light. (Red → Green → Red)



### Lead wires

Oilproof heavy-duty vinyl cable:  $\phi 2.7 \times 3.2$  ellipse

D-M9BW(V) 0.15 mm<sup>2</sup> x 2 cores

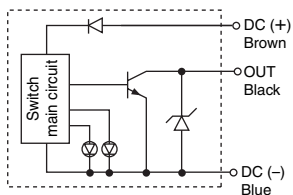
D-M9NW(V), D-M9PW(V) 0.15 mm<sup>2</sup> x 3 cores

Note 1) Refer to page 17 for solid state switch common specifications.

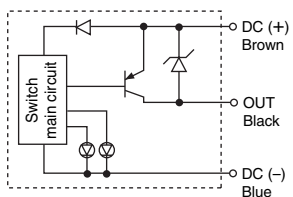
Note 2) Refer to page 17 for lead wire lengths.

### Auto Switch Internal Circuit

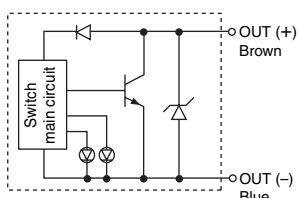
#### D-M9NW(V)



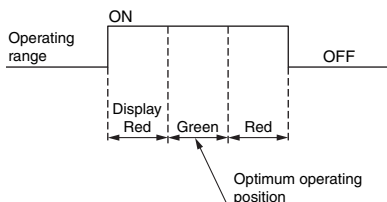
#### D-M9PW(V)



#### D-M9BW(V)



### Indicator light / Display method



### Weight

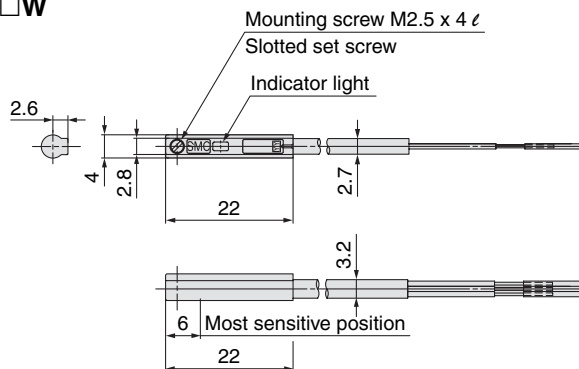
Unit: g

Auto switch part no.	D-M9NW(V)	D-M9PW(V)	D-M9BW(V)
Lead wire length (m)			
0.5	8	8	7
1	14	14	13
3	41	41	38
5	68	68	63

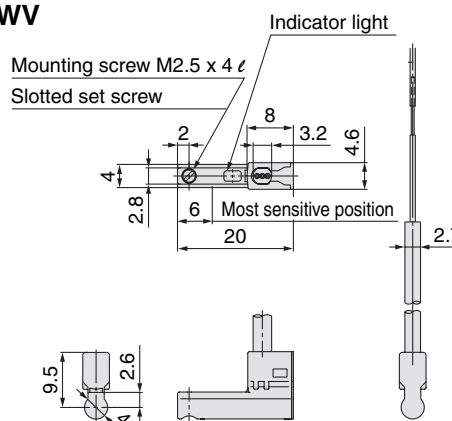
### Dimensions

Unit: mm

#### D-M9□W



#### D-M9□WV





# Series CJP2/CJP

## Simple Specials: Made to Order



For detailed specifications, please contact SMC for detailed specifications, lead times, and prices.

### Simple Specials

We apply the Simple Made to Order system to the below specials. Contact your SMC representative for details.

Symbol	Description	Double acting, Single rod CJP2	Single acting, Single rod CJP	Bore size	
				CJP2	CJP
1 XA0, 1, 10, 11	Change of rod end style	●		ø6 to ø16	ø6 to ø15
<b>Made to Order</b>					
1 XB6	Heat resistant cylinder (150C)	●		ø6 to ø16 <sup>Note)</sup>	—
2 XB7	Cold resistant cylinder	●		ø6 to ø16 <sup>Note)</sup>	—
3 XC17	Pin cylinder with rod quenched		●	—	ø6 to ø15
4 XC22	Fluoro rubber seals	●	●	ø6 to ø16	ø6 to ø15

Note) Except clevis, trunnion type, with switch.

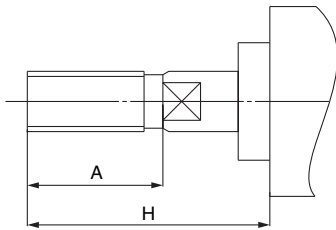
### Simple Specials

#### 1 Change of rod end style XA0, XA1, XA10, XA11

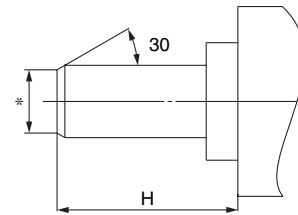
With the exception of standards, we pattern the rod-end configurations.

- SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
- Standard dimensions marked with “\*” will be as follows to the rod diameter (D).  
 $D \leq 6 \rightarrow D-1 \text{ mm}$      $6 < D \leq 25 \rightarrow D-2 \text{ mm}$      $D > 25 \rightarrow D-4 \text{ mm}$
- In the case of double rod and single acting retraction type, fill in the dimension when the rod is retracted.
- Only the single side of a double rod is able to manufacture.

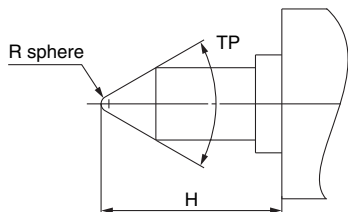
Symbol: **A0**



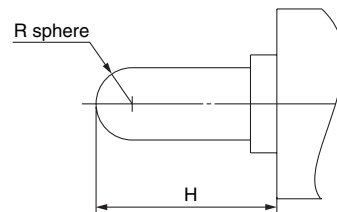
Symbol: **A1**



Symbol: **A10**



Symbol: **A11**



# Series CJP2/CJP Made to Order



For detailed specifications, please contact SMC for detailed specifications, lead times, and prices.

## 1 Heat Resistant Cylinder (-10 to 150C) **Symbol XB6**

Air cylinder which changed the seal material and grease, so that it could be used even at higher temperature up to 150C from -10C.

How to Order

CJP2 <sup>B</sup> <sub>F</sub> Standard model no. - **XB6**  
L  
Heat resistant cylinder

### Specifications

Ambient temperature range	-10 to 150°C
Seals material	Fluoro rubber
Grease	Heat resistant grease

Specifications other than above and external dimensions	Same as standard.
---	-------------------

- Note 1) Operate without lubrication from a pneumatic system lubricator.  
Note 2) Please contact SMC for details on the maintenance intervals for this cylinder, which differ from those of the standard cylinder.  
Note 3) It is impossible to make built-in magnet type and the one with auto switch.  
Note 4) Piston speed is ranged from 50 to 500 mm/s.

### Warning Precautions

Be aware that smoking cigarettes, etc. after your hands have come into contact with the grease used in this cylinder can create a gas that is hazardous to humans.

## 2 Cold Resistant Cylinder **Symbol XB7**

Air cylinder which changed the seal material and grease, so that it could be used even at lower temperature down to -40C.

How to Order

CJP2 <sup>B</sup> <sub>F</sub> Standard model no. - **XB7**  
L  
Cold resistant cylinder

### Specifications

Ambient temperature range	-40 to 70°C
Seals material	Low nitrite rubber
Grease	Cold resistant grease
Auto switch	Not mountable
Dimensions	Same as standard.

Additional specifications	Same as standard.
---------------------------	-------------------

- Note 1) Operate without lubrication from a pneumatic system lubricator.  
Note 2) Use dry air which is suitable for heatless air dryer, etc. not to cause the moisture to be frozen.  
Note 3) Please contact SMC for details on the maintenance intervals for this cylinder, which differ from those of the standard cylinder.  
Note 4) Mounting auto switch is impossible.

## 3 Pin Cylinder with Rod Quenched **Symbol XC17**

The carbon-steel piston rod is induction hardened and chromate surfaced.

How to Order

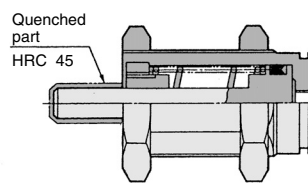
CJP Standard model no. - **XC17**  
Rod quenched

Note) Additional symbol for "-B" (without thread) is unnecessary when indicating the model no.

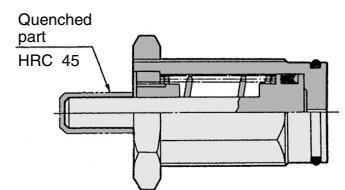
Specifications: Same as standard.

Construction (Dimensions are the same as standard.)

Panel mount type: CJPB



Embedded type: CJPS



## 4 Fluoro Rubber Seals **Symbol XC22**

How to Order

CJP2  
CDJP2 Standard model no. - **XC22**  
CJP  
Fluoro rubber seals

### Specifications

Seal material	Fluoro rubber
Ambient temperature	With auto switch: -10 to 70°C (No freezing) <sup>Note 1)</sup> Without auto switch: -10 to 60°C (No freezing) <sup>Note 1)</sup>

Specifications other than above and external dimensions	Same as standard.
---	-------------------

- Note 1) Please confirm with SMC, as the type of chemical and the operating temperature may not allow the use of this product.  
Note 2) Cylinders with auto switches can also be produced; however, auto switch related parts (auto switch units, mounting bracket, built-in magnets) are the same as standard products. Before using these, please contact SMC regarding their suitability for the operating environment.