










Valve Mounted Cylinder

Series CV/MVGQ

ø10, ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

Series Variations

Series	Action	Standard variations					Bore size (mm)	Page
		Built-in magnet	With air cushion	Built-in One-touch fitting	With auto switch	With strong scraper		
Series CVJ5 	Double acting	●			●		10 16	10-15-4
Series CVJ3 	Single acting (Spring return) (Spring extend)	●			●		10 16	10-15-10
Series CVM5/CVM5K 	Double acting	Standard	●		●	●	20 25 32 40	10-15-16 10-15-26
		Non-rotating rod	●		●	●		
Series CVM3/CVM3K 	Single acting (Spring return) (Spring extend)	Standard	●		●	●	20 25 32 40	10-15-31 10-15-44
		Non-rotating rod	●		●	●		
Series CV3/CV3K 	Double acting	Standard	●	●		●	40, 50 63, 80 100	10-15-50
		Non-rotating rod	●	●		●		40, 50 63
Series CVS1/CVS1K 	Double acting	Standard	●	●		●	40, 50 63, 80 100	10-15-67
		Non-rotating rod	●	●		●		40, 50 63
Series MVGQ 	Double acting	●			●		12, 16 20, 25 32, 40 50, 63 80, 100	10-16-1

RE^A_B

REC

C□X

C□Y

MQ^Q_M

RHC

MK(2)

RS^Q_G

RS^H_A

RZQ

MI^W_S

CEP1

CE1

CE2

ML2B

C_G5-S

CV

MVGQ

CC

RB

J

D-

-X

20-

Data

Series CV Valve Mounted Cylinder Precautions

Be sure to read before handling. Refer to pages 10-24-3 to 10-24-6 for Safety Instructions and Actuator Precautions on the products mentioned in this catalog, and refer to main text for more detailed precautions on every series.

Applicable Series: CVJ5, CVJ3

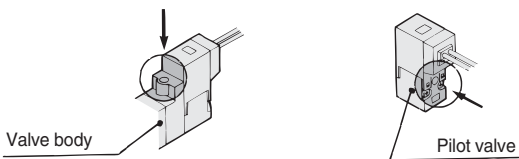
Manual Operation

⚠ Warning

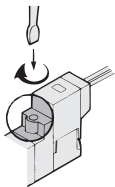
- Manual overrides are provided on two locations, one on the pilot valve, and the other on the valve body. Operate either one to effect manual operation.

■ Non-locking push type

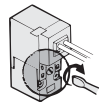
Push in the direction the arrow indicates.



■ Locking slotted type



Press it to enable manual operation and turn it in the direction of the arrow to lock it. If this is not turned, it can be used in the same way as the non-locking type.



Simply turn in the direction of the arrow.

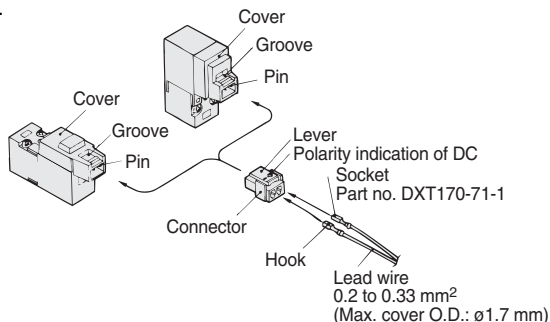
Since the devices in connection are operated by manual override, make sure that there is no danger.

Plug Connector

⚠ Caution

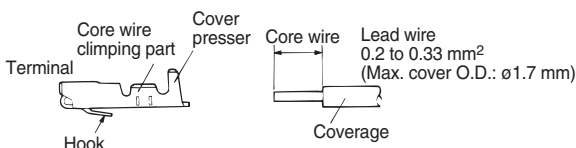
1. Connector installation and removal

- To install the connector, squeeze the lever and the connector body with your fingers, slide the connector straight over the pin, and lock it in place by pushing the tab of the lever into the groove in the cover.
- To remove the connector, press the lever with your thumb to disengage the tab from the groove, and pull the connector straight out.



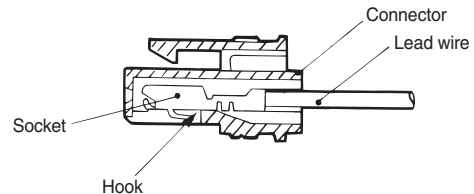
2. Crimping the lead wire into the socket

- Peel approximately 3.2 to 3.7 mm of insulation from the tip of the lead wire, make sure that the ends of the core wire are even, insert the wire into the socket, and crimp it with a crimping tool. At this time, make sure that the insulation of the lead wire does not enter the area in which the core wire is crimped. (Please contact SMC for details on the special crimping tool.)



3. Installation and removal of the sockets containing lead wires

- Installation:**
Insert the sockets into the square holes of the connector (marked + and -, respectively), pinch the lead wires to push them in entirely, allowing the hook on each socket to engage with the seat of the connector, thus locking the socket in place. (Because the hook is open, it locks automatically when the socket is pushed in.) Then, lightly pull on the lead wires to verify that the sockets have been properly locked.
- Removal:**
To pull the sockets out of the connector, use a rod with a small tip (approximately 1 mm) to press the hook of the socket and pull the lead wire out. To reuse the socket, expand the hook outward.



Surge Voltage Suppressor

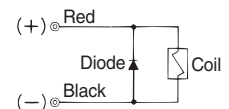
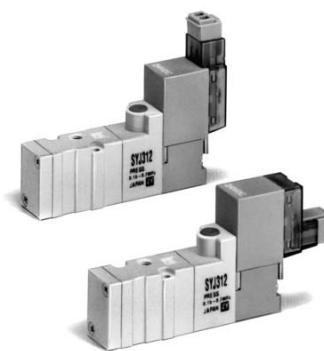
⚠ Caution

For DC:

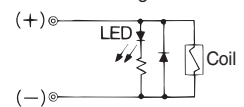
- Connect the wires by matching their polarities to the + and - marks. Be very careful not to interchange the polarities as this could cause the diodes or the switching elements to burn.
- If the lead wires are connected beforehand, the red wire is +, and the black wire is -.

For AC:

- A rectifier assembly is used for preventing the generation of surge voltage.



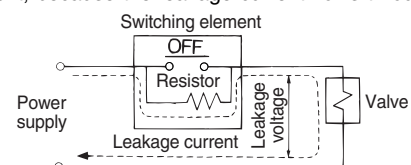
With indicator light



Leakage Voltage

⚠ Caution

- Be aware that there is an increase in the leakage voltage particularly if a C-R element (surge voltage protector) is used for protecting the switching element, because the leakage current flows through the C-R element.



- The residual leakage voltage must be kept as follows:
With a DC coil, 3% of the rated voltage or below
With an AC coil, 8% of the rated voltage or below.



Valve Mounted Cylinder

Double Acting, Single Rod

Series CVJ5

ø10, ø16

How to Order

Stroke (mm)

ø10	15, 30, 45, 60
ø16	15, 30, 45, 60

Bore size

10	10 mm
16	16 mm

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style

Electrical entry

G	Grommet
L	L plug connector
M	M plug connector

Light/Surge voltage suppressor

Nil	Without light/surge voltage suppressor
S	With surge voltage suppressor
Z	With light/surge voltage suppressor
R	With surge voltage suppressor (No polarity)
U	With light/surge voltage suppressor (No polarity)

* Type "R", "U": DC only
* In the case of AC, since the rectifier prevents the production of surge voltage, there is no type "S".

Number of auto switches

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

Without auto switch CVJ5 L 16 60 5 L

With auto switch CDVJ5 L 16 60 5 L J79W

Built-in magnet Built-in magnet

Rod extended/retracted when energized

Nil	Rod extended when energized
B	Rod retracted when energized

Solenoid valve voltage

DC specifications		AC specifications (50/60 Hz)	
5	24 VDC	1	100 VAC
6	12 VDC	2	200 VAC
V	6 VDC	3	110 VAC (115 VAC)
S	5 VDC	4	220 VAC (230 VAC)
R	3 VDC		

Auto switch
Magnet installed even without auto switch

Symbol	Auto switch mounting
A	Rail mounting style
B	Band mounting style

* For the applicable auto switch model, refer to the table below.
* Auto switch for rail mounting style is shipped together (but not assembled).

Built-in Magnet Cylinder Model

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

Example	Rail mounting style	CDVJ5B15-60-A
	Band mounting style	CDVJ5B10-45-B

Applicable Auto Switch/Refer to page 10-20-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model			Lead wire length (m)*				Pre-wire connector	Applicable load			
					DC	AC	Band mounting	Rail mounting Perpendicular	In-line	0.5 (Nil)	3 (L)	5 (Z)	None (N)		IC circuit	Relay, PLC		
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	C76	—	A76H	●	●	—	—	—	IC circuit	—	
						24 V	200 V	—	A72	A72H	●	●	—	—	—	—	Relay, PLC	
		connector		2-wire	12 V	100 V	C73	A73	A73H	●	●	●	—	—	—	—		
					12 V	—	C73C	A73C	—	●	●	●	●	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	H7A1	F7NV	F79	●	●	○	—	○	IC circuit	Relay, PLC	
						12 V	—	H7A2	F7PV	F7P	●	●	○	—	○	—		
		connector		2-wire	5 V, 12 V	—	H7B	F7BV	J79	●	●	○	—	○	—			
					12 V	—	H7C	J79C	—	●	●	●	●	—	○	—		
		Grommet		3-wire (NPN)	5 V, 12 V	—	H7NW	F7NWV	F79W	●	●	○	—	○	—	○		IC circuit
					12 V	—	H7PW	—	F7PW	●	●	○	—	○	—	—		
					2-wire	5 V, 12 V	—	H7BW	F7BWV	J79W	●	●	○	—	○	—		—
								H7NF	—	F79F	●	●	○	—	○	—		○

* Lead wire length symbols: 0.5 m Nil (Example) C73C
3 m L (Example) C73CL
5 m Z (Example) C73CZ
None N (Example) C73CN

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

- Since there are other applicable auto switches than listed, refer to page 10-15-6 for details.
- For details about auto switches with pre-wire connector, refer to page 10-20-66.

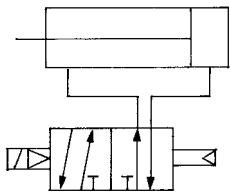
Valve Mounted Cylinder Double Acting, Single Rod Series CVJ5

Operation type can be changed to rod extended when energized or rod retracted when energized.

An auto switch cylinder with the switch installed can also be manufactured.



JIS Symbol
Double acting,
Single rod



Made to Order Specifications
(For details, refer to page 10-21-1.)

Symbol	Specifications
-XA□	Change of rod end shape

Specifications

Action	Double acting, Single rod
Type	Non-lube
Fluid	Air
Proof pressure	1.05 MPa
Maximum operating pressure	0.7 MPa
Minimum operating pressure	0.15 MPa
Ambient and fluid temperature	-10 to 50°C (No freezing)
Cushion	Rubber bumper
Lubrication	Not required (Non-lube)
Thread tolerance	JIS Class 2
Stroke length tolerance	+1.0 0
Applicable bore size (mm)	10, 16
Effective area of valve (Cv factor)	1.8 mm ² (0.1)
Port size	M5 x 0.8
Mounting	Basic style, Axial foot style, Rod side flange style
Piston speed	ø10: 50 to 750 mm/s, ø16: 50 to 150 mm/s

Allowable Kinetic Energy

Bore size (mm)	10	16
Allowable kinetic energy	0.035	0.090

Solenoid Valve Specifications

Applicable solenoid valve model	SYJ3190		
Electrical entry	Grommet (G)/(H), L plug connector (L), M plug connector (M)		
Coil rated voltage (V) ⁽¹⁾	DC	24, 12, 6, 5, 3	
	AC 50/60 Hz	100, 110, 200, 220	
Allowable voltage	±10% of the rated voltage		
Power consumption (W) ⁽²⁾	DC	0.5 (With indicator light: 0.55)	
Apparent power (VA)	AC	100 V	0.9 (With indicator light: 1.0)
		110 V [115 V]	1.0 (With indicator light: 1.1) [1.1 (With indicator light: 1.2)]
		200 V	1.8 (With indicator light: 1.9)
		220 V [230 V]	1.9 (With indicator light: 2.0) [2.2 (With indicator light: 2.3)]

Note 1) 110 VAC and 115 VAC types and 220 VAC and 230 VAC types are common respectively.

Note 2) At the rated voltage.

Standard Stroke

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

* If types for more than the strokes indicated in the table above (61 strokes) are required, please ask SMC.

RE_A
B

REC

C□X

C□Y

MQ_M^Q

RHC

MK(2)

RS_G^Q

RS_A^H

RZQ

MI_S^W

CEP1

CE1

CE2

ML2B

C_G¹5-S

CV

MVGQ

CC

RB

J

D-

-X

20-

Data

Series CVJ5

Minimum Stroke for Auto Switch Mounting (mm)

Auto switch mounting	Auto switch model	No. of auto switches mounted				
		2 (Same side)	2 (Different sides)	1	2	1
Band mounting style	D-C7□/C80	50	15	10	—	—
	D-H7□/H7□W D-H7NF	60	15	10	—	—
	D-C73C/C80C D-H7C	65 ^{Note)}	15	10	—	—
Rail mounting style	D-A7□/A80 D-A7□H/A80H D-A73C/A80C	—	—	—	10	5
	D-F7□/J79 D-F7□V D-J79C	—	—	—	5	5
	D-A79W/F7□W D-J79W D-F7□WV/F79F	—	—	—	15	10

Note) A type for 65 stroke is not available.

Mounting Style and Accessory/For details, refer to page 10-15-9.

Mounting		Basic style	Axial foot style	Rod side style Flange side style
Standard equipment	Mounting nut	●	●	●
	Rod end nut	●	●	●
Option	Single knuckle joint	●	●	●
	Double knuckle joint (With pin)*	●	●	●

* Knuckle pin and set ring are shipped together.

Weight (g)

Bore size (mm)		10	16
Basic weight*		74	107
Additional weight per each 15 mm of stroke		6.5	9.5
Mounting bracket weight	Axial foot style	7	19
	Rod side flange	5	13

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

Calculation: (Example) CVJ5L10-45-1G

- Basic weight.....74 (g) (ø10)
 - Additional weight6.5/15 stroke
 - Cylinder stroke45 stroke
 - Weight of bracket7 (g) (Axial foot style)
- $$74 + 6.5/15 \times 45 + 7 = 100.5 \text{ g}$$

Mounting Bracket Part No.

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

Auto Switch Mounting Bracket Part No. (Band mounting style)

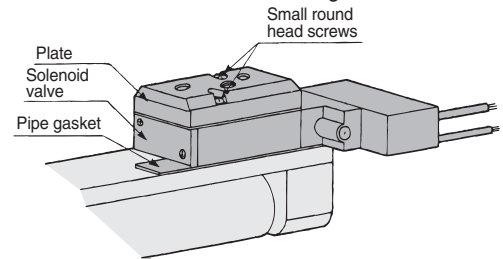
Bore size (mm)	Part no.	Note
10	BJ2-010	Common for the types of D-C7, C8 and D-H7
16	BJ2-016	

Changing between Rod Extended when Energized and Rod Retracted when Energized

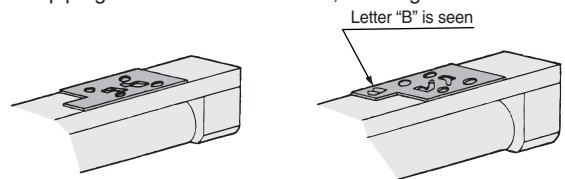
<Step>

This procedure is for changing the rod extended when energized to the rod retracted when energized.

1. Using a screwdriver, loosen the two small round head screws, and remove the plate and the solenoid valve. At this time, instead of removing the plate and the solenoid valve separately, remove them together, with the round head screws remaining inserted.

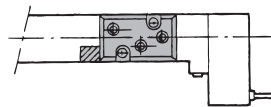


2. Turn the pipe gasket at 180° and mount, showing the letter "B".

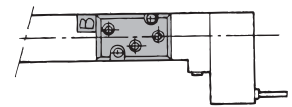


3. Install the solenoid valve and the plate, and tighten the small round head screws, with a screw driver. After tightening, press the manual button on the solenoid valve, check for any air leaks, and verify the operating conditions. When the cylinder is viewed from above, the position of the gasket is as shown in the figure below.

Rod extended when energized

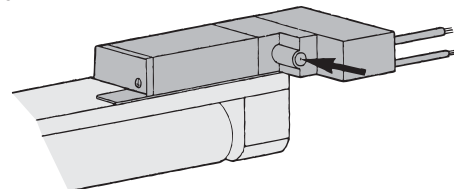


Rod retracted when energized



Manual Operation

Manual operation is possible by pushing the manual button indicated with the arrow.



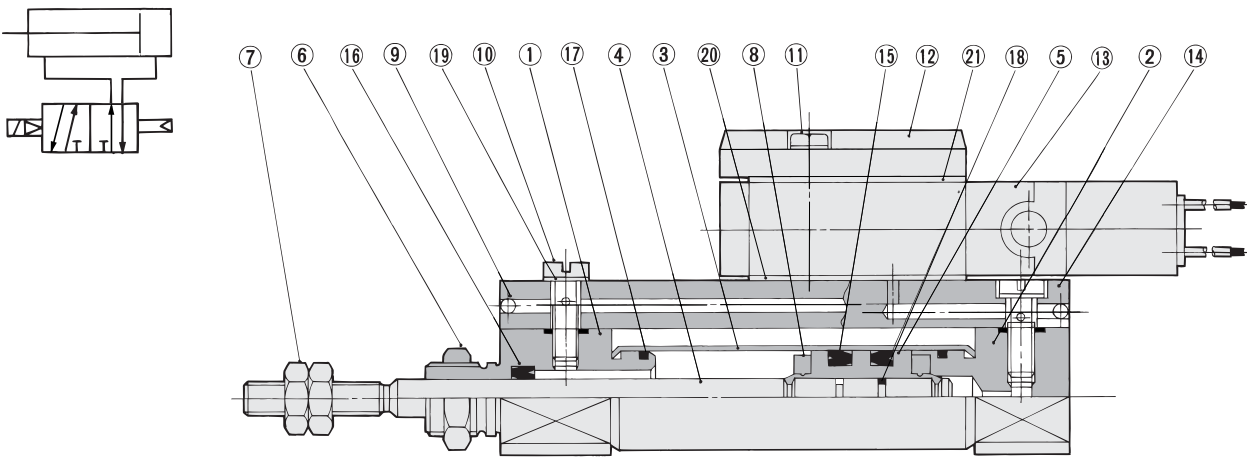
Other than the models listed in "How to Order", the following auto switches are applicable. For detailed specifications, refer to page 10-20-1.

Type	Model	Electrical entry	Features
Reed switch	D-A80	Grommet	Without indicator light
	D-A80H		
	D-A80C	Connector	
	D-C80	Grommet	
	D-C80C	Connector	
Solid state switch	D-F7NNTL	Grommet	With timer

* With pre-wire connector is available for D-F7NNTL type, too. For details, refer to page 10-20-61.

Valve Mounted Cylinder Double Acting, Single Rod Series CVJ5

Construction/(Not able to disassemble.)



Component Parts

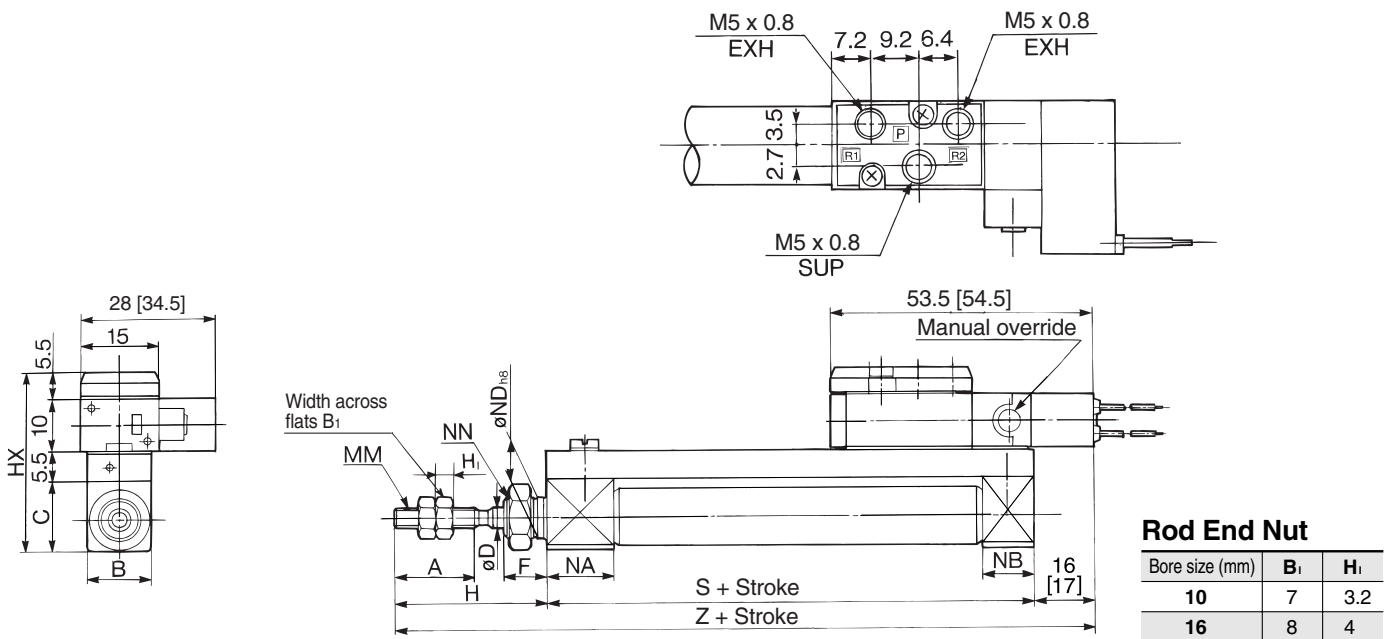
No.	Description	Material	Note
①	Rod cover	Aluminum alloy	Clear anodized
②	Head cover	Aluminum alloy	Clear anodized
③	Cylinder tube	Stainless steel	
④	Piston rod	Stainless steel	
⑤	Piston	Brass	
⑥	Mounting nut	Brass	Nickel plated
⑦	Rod end nut	Rolled steel	Nickel plated
⑧	Bumper	Urethane	
⑨	Steel ball	Carbon steel	
⑩	Stud	Brass	Electroless nickel plated
⑪	Phillips screw	Rolled steel	Black zinc chromated

No.	Description	Material	Note
⑫	Plate	Zinc alloy	
⑬	Solenoid valve	—	* Refer to the note below.
⑭	Pipe	Aluminum alloy	Clear anodized
⑮	Piston seal	NBR	
⑯	Rod seal	NBR	
⑰	Tube gasket	NBR	
⑱	Piston gasket	NBR	
⑲	Gasket	Resin	
⑳	Pipe gasket	NBR	
㉑	Plate gasket	NBR	

* How to order solenoid valves
SYJ3190- [Voltage] [Electrical entry]

Basic Style (B)

CVJ5



* []: Denotes the values of AC.

Bore size (mm)	A	B	C	D	F	H	HX	MM	NA	NB	ND	NN	S	Z
10	15	12	14	4	8	28	35	M4 x 0.7	12.5	9.5	8 ⁰ _{-0.022}	M8 x 1	46	90 [91]
16	15	18	20	5	8	28	41	M5 x 0.8	12.5	9.5	10 ⁰ _{-0.022}	M10 x 1	47	91 [92]

RE^A_B

REC

C□X

C□Y

MQ^Q_M

RHC

MK(2)

RS^Q_G

RS^H_A

RZQ

MI^W_S

CEP1

CE1

CE2

ML2B

C¹₅-S

CV

MVGQ

CC

RB

J

D-

-X

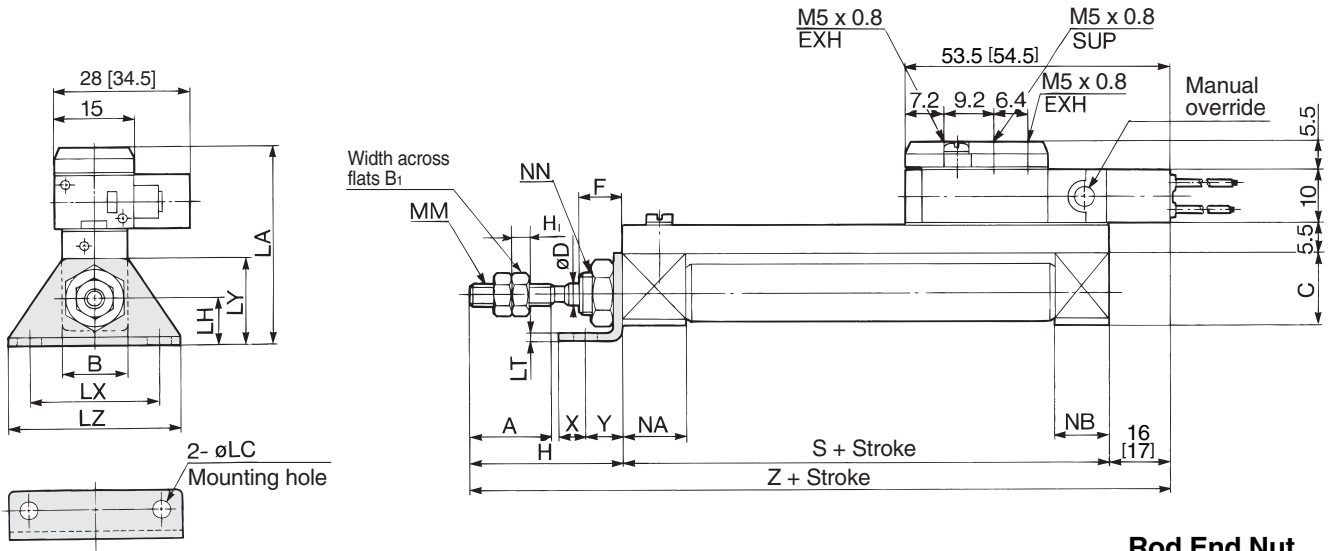
20-

Data

Series CVJ5

Axial Foot Style (L)

CVJ5L



Rod End Nut

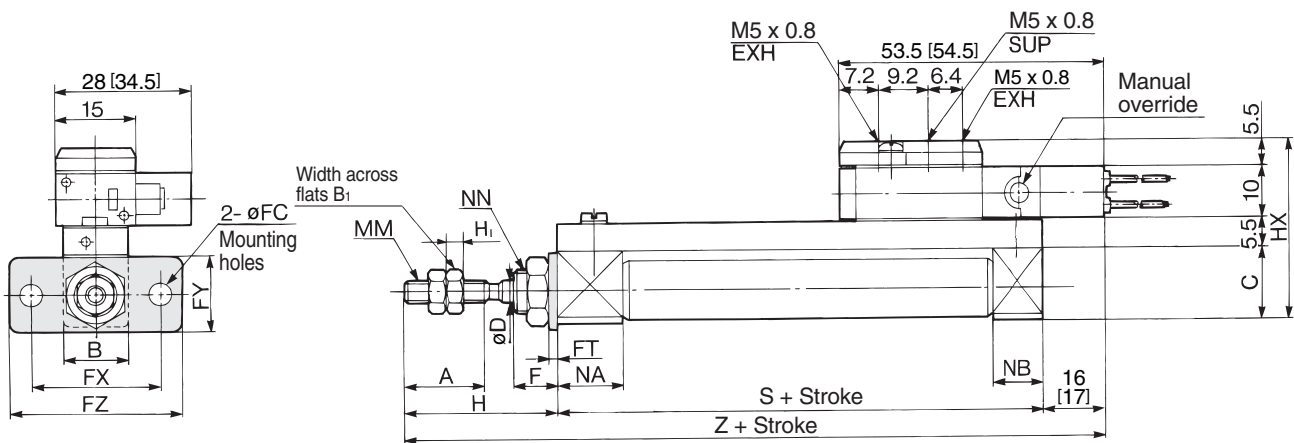
Bore size (mm)	B ₁	H ₁
10	7	3.2
16	8	4

* []: Denotes the values of AC.

Bore size (mm)	A	B	C	D	F	H	LA	LC	LH	LT	LX	LY	LZ	MM	NA	NB	NN	S	X	Y	Z
10	15	12	14	4	8	28	38	4.5	9	1.6	24	16.5	32	M4 x 0.7	12.5	9.5	M8 x 1	46	5	7	90 [91]
16	15	18	20	5	8	28	46	5.5	14	2.3	33	25	42	M5 x 0.8	12.5	9.5	M10 x 1	47	6	9	91 [92]

Rod Side Flange Style (F)

CVJ5F Rod extended/retracted when energized



Rod End Nut

Bore size (mm)	B ₁	H ₁
10	7	3.2
16	8	4

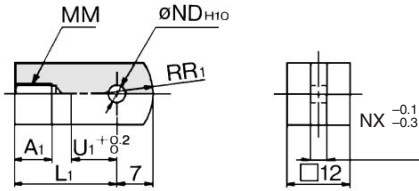
* []: Denotes the values of AC.

Bore size (mm)	A	B	C	D	F	FC	FT	FX	FY	FZ	H	HX	MM	NA	NB	NN	S	Z
10	15	12	14	4	8	4.5	1.6	24	14	32	28	35	M4 x 0.7	12.5	9.5	M8 x 1	46	90 [91]
16	15	18	20	5	8	5.5	2.3	33	20	42	28	41	M5 x 0.8	12.5	9.5	M10 x 1	47	91 [92]

Valve Mounted Cylinder Double Acting, Single Rod Series CVJ5

Accessory Dimensions

Single Knuckle Joint

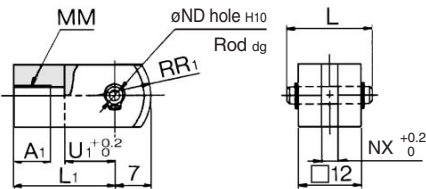


Material: Rolled steel

Part no.	Applicable bore size	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

Double Knuckle Joint

* Knuckle pin and set ring are shipped together.

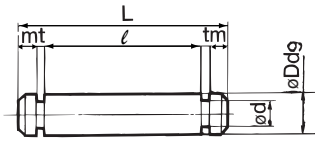


Material: Rolled steel

Part no.	Applicable bore size	A ₁	L	L ₁	MM
Y-J010B	10	8	16.2	21	M4 x 0.7
Y-J016B	16	11	16.6	21	M5 x 0.8

Part no.	ND _{ø9}	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

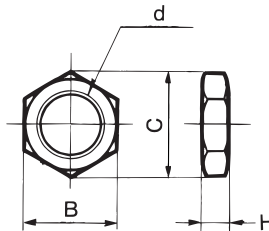
Knuckle Pin



Material: Stainless steel

Part no.	Applicable bore size	Dd ₉	d	L	l	m	t	Applicable snap ring
IY-J010	10	3.3 ^{-0.030} _{-0.060}	3	16.2	12.2	1.7	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

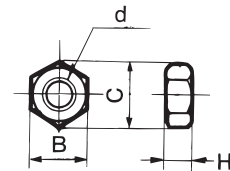
Mounting Nut



Material: Brass

Part no.	Applicable bore size	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 size	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

RE^A_B

REC

C□X

C□Y

MQ^Q_M

RHC

MK(2)

RS^Q_G

RS^H_A

RZQ

MI^W_S

CEP1

CE1

CE2

ML2B

C_G^J5-S

CV

MVGQ

CC

RB

J

D-

-X

20-

Data