

# Valve Mounted Cylinder Double Acting, Single Rod Series CVS1

Lube/Non-lube Type: ø40, ø50, ø63, ø80, ø100

## How to Order

**Bore size**

40	40 mm
50	50 mm
63	63 mm
80	80 mm
100	100 mm

**Cushion**

Nil	Lube type
N	Non-lube type
F*	Steel tube

Note) Auto switches are not available with steel tube.

**Cylinder stroke (mm)**

(Refer to "Standard Stroke" on page 10-15-58.)

**Electrical entry**

Nil	Grommet
T	Conduit terminal
D	DIN terminal
DL	DIN terminal with indicator light
TZ	Conduit terminal with surge voltage suppressor

**Solenoid valve**

Nil	2 position single (VS4124-00□□-X46)
W	2 position double (VS4224-00□□)
Y	3 position closed center (VS4324-00□□)
Z	3 position exhaust center (VS4424-00□□)

**Without auto switch**    **CVS1** [L] [N] [40] [100] [JN] [1] [W] [D]

**With auto switch**    **CDVS1** [L] [N] [40] [100] [JN] [Y7BW] [1] [W] [D]

**Built-in magnet**

**Mounting style**

B	Basic style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
C	Single clevis style
D	Double clevis style
T	Center trunnion style

**Suffix for cylinder**

Rod boot	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Cushion	N	Without cushion
	R	With cushion on rod end
	H	With cushion on head end
	Nil	With cushion on both ends

\* When specifying symbol more than one, combine symbols alphabetically.

**Auto switch**

Nil	Without auto switch
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\* For the applicable auto switch model, refer to the table below.  
\* D-Z7□/Z80/Y59□/Y69□/Y7□ types are shipped together, (not assembled). (But, only the mounting bracket for the above models is assembled when shipping.)

**Solenoid valve voltage**

1	100 VAC (50/60 Hz)
2	200 VAC (50/60 Hz)
5	24 VDC
9	Other

**Number of auto switches**

Nil	2 pcs.
3	3 pcs.
S	1 pc.
n	"n" pcs.

### 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	Tie-rod mounting	Band mounting	0.5 (Nil)	3 (L)	5 (Z)		IC circuit	Relay, PLC			
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	Z76	—	●	●	—	—	—			
								100 V	Z73	—	●	●			●		
		Terminal conduit		2-wire	24 V	12 V	100 V, 200 V	A54	B54	●	●	●	—	—	—		
							—	A33C	A33	—	—	—					
							100 V, 200 V	A34C	A34	—	—	—					
DIN terminal	—	—	—	—	A44C	A44	—	—	—	—	Relay, PLC						
Diagnostic indication (2-color indication)	Grommet	—	—	—	A59W	B59W	●	●	—	—							
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	Y59A	G59	●	●	○	○	IC circuit			
				3-wire (PNP)				Y7P	G5P	●	●	○	○				
		Terminal conduit		2-wire	—	12 V	100 V, 200 V	—	—	J51	—	●	●	○	—	—	
										3-wire (NPN)	Y59B	K59	●	●	○		○
		Grommet		2-wire	24 V	12 V	—	—	—	G39C	G39	—	—	—	—	IC circuit	
										K39C	K39	—	—	—	—		
										3-wire (NPN)	Y7NW	G59W **	●	●	○	○	IC circuit
										3-wire (PNP)	Y7PW	G5PW **	●	●	○	○	
										2-wire	Y7BW	K59W **	●	●	○	○	—
										3-wire (NPN)	F5NT	G5NT	—	●	○	○	
4-wire (NPN)	F59F	G59F **	●	●	○	○	IC circuit										

\* Lead wire length symbols: 0.5 m..... Nil (Example) A54  
3 m..... L (Example) A54L  
5 m..... Z (Example) A54Z

\* Solid state switches marked with "○" are produced upon receipt of order.  
\*\* D-G5□W/K59W/G59F types cannot be mounted on bore sizes ø40 and ø50 lubrication type cylinder.

- Since there are other applicable auto switches than listed, refer to page 10-15-76 for details.
- For details about auto switches with pre-wire connector, refer to page 10-20-66.

- RE<sup>A</sup><sub>B</sub>
- REC
- C□X
- C□Y
- MQ<sup>Q</sup><sub>M</sub>
- RHC
- MK(2)
- RS<sup>Q</sup><sub>G</sub>
- RS<sup>H</sup><sub>A</sub>
- RZQ
- MI<sup>W</sup><sub>S</sub>
- CEP1
- CE1
- CE2
- ML2B
- C<sup>1</sup><sub>5-S</sub>
- CV
- MVGQ
- CC
- RB
- J
- D-
- X
- 20-
- Data

# Series CVS1

Speed controller installed

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

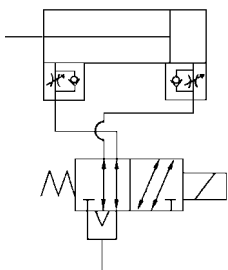
A selection of solenoid valves is possible.

Single, double and 3 position solenoid valves are mountable.

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



## JIS Symbol



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

Symbol	Specifications
-XA□	Change of rod end shape
-XC4	With heavy duty scraper
-XC6	Piston rod and rod end nut made of stainless steel
-XC7	Tie-rod, cushion valve, and tie-rod nut and similar parts made of stainless steel
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC22	Fluoro rubber seals
-XC27	Double clevis pin and double knuckle pin made of stainless steel
-XC28	Compact flange made of SS400
-XC29	Double knuckle joint with spring pin
-XC35	With coil scraper

## Specifications

Applicable bore size (mm)	40, 50, 63, 80, 100	
Type	Lube	Non-lube
Series	CVS1	CVS1□N
Action	Double acting	
Fluid	Air	
Proof pressure	1.5 MPa	
Maximum operating pressure	1.0 MPa	
Minimum operating pressure	0.05 MPa	
Ambient & fluid temperature	-10 to 60°C (No freezing)	
Cushion	Air cushion	
Thread tolerance	JIS Class 2	
Stroke length tolerance	Up to 250 <sup>st.</sup> : +1.0 <sub>0</sub> , 251 to 1,000 <sup>st.</sup> : -1.4 <sub>0</sub>	
Effective area of valve (Cv factor)	Single: 26.5 mm <sup>2</sup> (1.47)	
Port size	Rc 1/4	
Electrical entry	Grommet, Conduit terminal, DIN terminal, DIN terminal with indicator light, Conduit terminal with surge voltage suppressor	
Piston speed	50 to 500 mm/s * Note)	
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Center trunnion style	

\* Operate within the range of absorbed energy.

Note) For operating piston speed for each size, refer to page 10-15-69.

## Allowable Kinetic Energy

Bore size (mm)	40	50	63	80	100
Allowable kinetic energy	2.4	4.4	7.8	11.7	20.5

## Solenoid Valve Specifications

Applicable solenoid valve model	VS4□24			
Coil rated voltage	100/200 VAC (50/60 Hz), 24 VDC			
Allowable voltage	-15 to 10% of the rated voltage			
Coil insulation	Class B or equivalent (130°C)			
Apparent power <sup>Note)</sup>	AC	Inrush	50 Hz: 100 VA 60 Hz: 90 VA	
		Holding	50 Hz: 20 VA 60 Hz: 14 VA	
	Power consumption <sup>Note)</sup>	DC	13.2 W	

Note) At the rated voltage.

## Standard Stroke

Bore size (mm)	Standard stroke (mm)
40	25, 50, 75, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500
50, 63	25, 50, 75, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500, 600
80, 100	25, 50, 75, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700

## Rod Boot Material

Symbol	Rod boot material	Max. ambient temperature
J	Nylon tarpaulin	70°C
K	Heat resistant tarpaulin	110°C*

\* Maximum ambient temperature for the rod boot itself.

## ⚠ Precautions

Be sure to read before handling. For Safety Instructions and Common Precautions, refer to pages 10-24-3 to 6. For Actuator Precautions on Series CVS1, refer to page 10-15-53 because they are the same as those for Series CV3.

## Minimum Stroke for Auto Switch Mounting

### ⚠ Caution

1. Each switch and mounting style of cylinder has different minimum mountable stroke. Be careful especially of the center trunnion style. (For further information, refer to page 10-15-77.)

# Valve Mounted Cylinder Double Acting, Single Rod Series CVS1

## Accessory

Mounting		Basic style	Axial foot style	Rod side flange style	Head side flange style	Single clevis style	Double clevis*	Center trunnion style
Standard equipment	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint* (with pin)	●	●	●	●	●	●	●
	With rod boot	●	●	●	●	●	●	●

\* Pin, plain washer and cotter pin are packaged together with double clevis and double knuckle joint.

## Weight

Bore size (mm)		40	50	63	80	100
Basic weight	Basic style	2.48 (2.53)	3.04 (3.08)	4.12 (4.16)	5.81 (5.96)	7.66 (7.86)
	Axial foot style	2.65 (2.7)	3.24 (3.28)	4.41 (4.45)	6.6 (6.75)	8.59 (8.79)
	Rod side flange style	2.88 (2.93)	3.64 (3.68)	5.08 (5.12)	7.65 (7.8)	9.98 (10.18)
	Head side flange style	2.98 (3.03)	3.78 (3.82)	5.08 (5.12)	7.65 (7.8)	9.98 (10.18)
	Single clevis style	2.74 (2.79)	3.48 (3.52)	4.87 (4.91)	7.19 (7.34)	9.96 (10.16)
	Double clevis style	2.73 (2.78)	3.46 (3.5)	4.89 (4.93)	7.18 (7.33)	9.98 (10.18)
	Trunnion style	3.08 (3.18)	3.78 (3.88)	5.46 (5.66)	8.14 (8.43)	11.18 (11.57)
Additional weight per each 50 mm of stroke	All mounting brackets (Except trunnion style of iron tube)	0.22 (0.28)	0.28 (0.35)	0.37 (0.43)	0.52 (0.70)	0.65 (0.87)
	Steel tube trunnion	(0.36)	(0.46)	(0.65)	(0.86)	(1.07)
Accessory bracket	Single knuckle	0.23	0.26	0.26	0.60	0.83
	Double knuckle (with pin)	0.37	0.43	0.43	0.87	1.27

Calculation: (Example) CVS1L40-100-1 \* ( ): Steel tube type

- Basic weight.....2.65 (kg)
- Additional weight.....0.22 (kg/50 st)
- Cylinder stroke.....100 (st)  $2.65 + 0.22 \times 100 \div 50 = 3.09$  kg
- \* Add 0.34 kg for the double solenoid style.

## Mounting Bracket Part No.

Bore size (mm)	40	50	63	80	100
Axial foot *	CA1-L04	CA1-L05	CA1-L06	CA1-L08	CA1-L10
Flange	CA1-F04	CA1-F05	CA1-F06	CA1-F08	CA1-F10
Single clevis	CA1-C04	CA1-C05	CA1-C06	CA1-C08	CA1-C10
Double clevis **	CA1-D04	CA1-D05	CA1-D06	CA1-D08	CA1-D10

- \* Order two foot brackets per cylinder.  
\*\* For double clevis style, pin for clevis, plain washer and split pin are shipped together.

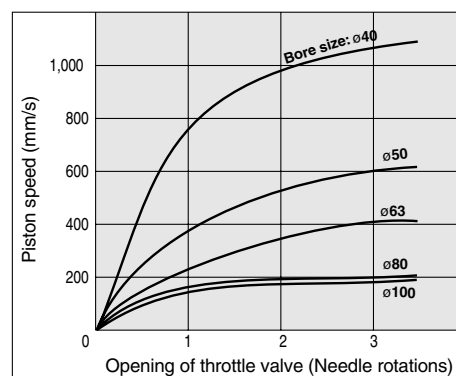
## Auto Switch Mounting Bracket Part No.

Auto switch model	Bore size (mm)				
	40	50	63	80	100
D-A5□/A6□/A59W/F5□/J5□ D-F5□W/J59W/F5NTL/F59F	BT-04	BT-04	BT-06	BT-08	BT-08
D-A3□/A44/G39/K39	BD1-04M	BD1-05M	BD1-06M	BD1-08M	BD1-10M
D-B5□/B64/B59W/G5□/K59 D-G5□W/K59W/G59F/G5NTL	BA-04	BA-05	BA-06	BA-08	BA-10
D-A3□C/A44C/G39C/K39C*	BA3-040	BA3-050	BA3-063	BA3-080	BA3-100
D-Z7□/Z80/Y59□/Y69□/Y7P D-Y7PV/Y7□W/Y7□WV	BA4-040	BA4-040	BA4-063	BA4-080	BA4-080

\* Mounting bracket belongs to D-A3□C/A44C/G39C/K39C. When the mounting bracket is needed separately, order with the above part number. Besides, when ordering an auto switch alone, specify like the below according to the cylinder size.

- Ex.)  $\phi 40$ .....D-A3□C-4       $\phi 80$ .....D-A3□C-8  
 $\phi 50$ .....D-A3□C-5       $\phi 100$ .....D-A3□C-10  
 $\phi 63$ .....D-A3□C-6

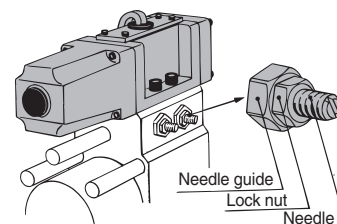
## Opening Range of Throttle Valve and Driving Speed



Conditions: Operating pressure 0.5 MPa, Horizontal mounting, No load, Extending stroke  
 • The speed shown above are for reference.

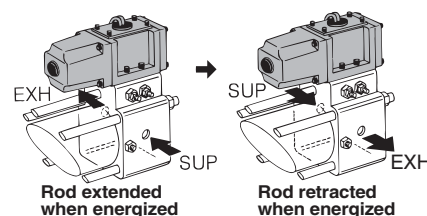
## Piston Speed Adjustment Procedure

- To slow down the piston speed, screw in the speed controller needle clockwise, which reduces the amount of air that is discharged.
- The speed controller needle opens fully when it is loosened 3 1/2 turns from its fully closed position. After the specified speed has been set, secure the needle with the lock nut.

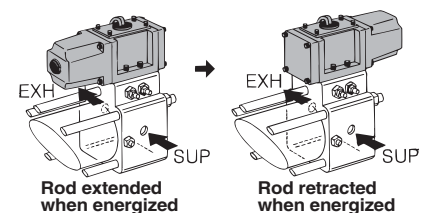


## Changing between Rod Extended when Energized and Rod Retracted when Energized

- This is possible by reversing the SUP port and EXH port piping.

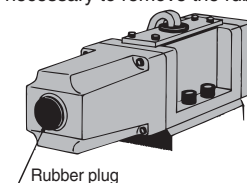


- This is possible by inverting the solenoid valve direction 180°.



## Manual Operation

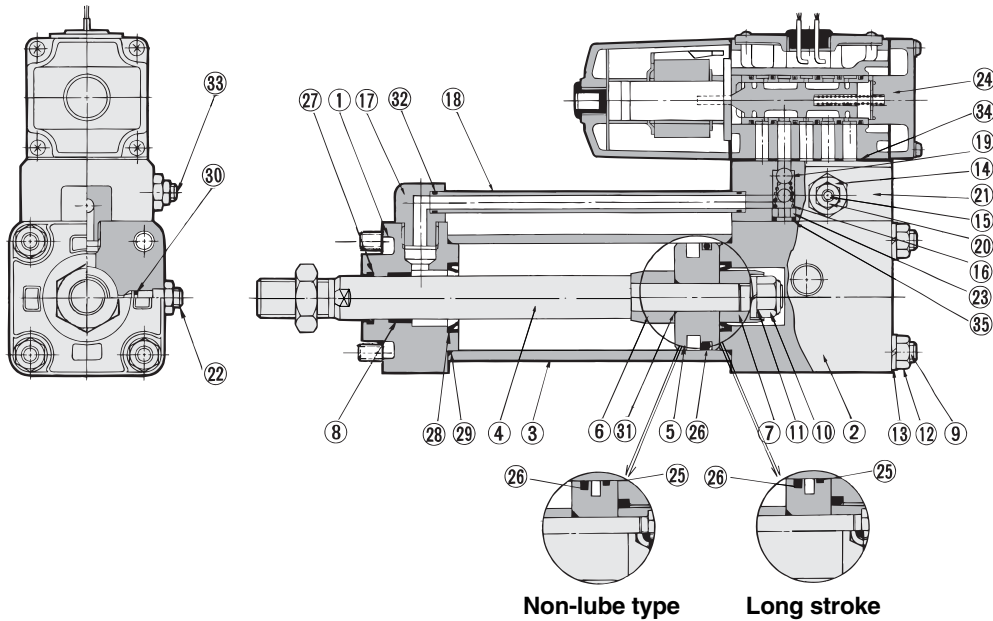
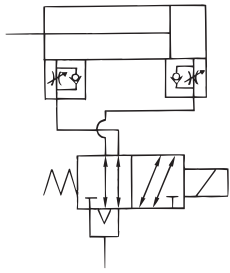
Using a screwdriver or its equivalent, push the center of the rubber plug on the head of the solenoid cap of the solenoid valve.  
 (It is not necessary to remove the rubber plug.)



# Series CVS1

## Construction

### Lube type



### Component Parts

No.	Description	Material	Note
①	Rod cover	Aluminum alloy	Matt black painted
②	Head cover	Aluminum alloy	Matt black painted
③	Cylinder tube	Aluminum alloy	Hard anodized
④	Piston rod	Carbon steel	Hard chrome plated
⑤	Piston	Aluminum alloy	Chromated
⑥	Cushion ring A	Rolled steel	Zinc chromated
⑦	Cushion ring B	Rolled steel	Zinc chromated
⑧*	Bushing	Lead-bronze casted	
⑨	Tie-rod	Carbon steel	Uni Chromated
⑩	Piston nut	Rolled steel	Zinc chromated
⑪	Spring washer	Steel wire	Zinc chromated
⑫	Tie-rod nut	Carbon steel	Black zinc chromated
⑬	Spring washer	Steel wire	Black zinc chromated
⑭	Needle guide	Carbon steel	Electroless nickel plated
⑮	Speed adjustment needle	Carbon steel	Electroless nickel plated
⑯	Check spring	Steel wire	Zinc chromated
⑰	Guide tube fitting	Aluminum alloy	Platinum silver
⑱	Pipe	Carbon steel tube	Uni Chromated
⑲*	Check ball	Polyurethane rubber	<sup>9</sup> / <sub>32</sub>
⑳	lock nut	Carbon steel	Nickel plated
㉑	Sub-plate	Aluminum alloy	Platinum silver
㉒	Cushion valve port	Rolled steel	Electroless nickel plated
㉓*	Valve	Brass	
㉔	Solenoid valve (Note)	—	Refer to the note below.
㉕	Wear ring	Resin	

No.	Description	Material	Note
㉖	Piston seal	NBR	
㉗	Rod seal	NBR	
㉘*	Cushion seal	NBR	
㉙	Cylinder tube gasket	NBR	
㉚	Cushion valve seal	NBR	
㉛*	Piston gasket	NBR	
㉜	Pipe gasket	NBR	
㉝	Speed adjustment valve seal	NBR	
㉞	Gasket	NBR	
㉟	Valve port gasket	NBR	

### Replacement Parts: Seal Kit

#### Lube Type

Bore size (mm)	40	50	63	80	100
Kit no.	CVS1-40-PS	CVS1-50-PS	CVS1-63-PS	CVS1-80-PS	CVS1-100-PS
Contents	Set of nos. above ㉖, ㉗, ㉙, ㉚, ㉛, ㉜, ㉞.				

#### Non-lube Type

Bore size (mm)	40	50	63	80	100
Kit no.	CVS1N40-PS	CVS1N50-PS	CVS1N63-PS	CVS1N80-PS	CVS1N100-PS
Contents	Set of nos. above ㉖, ㉗, ㉙, ㉚, ㉛, ㉜, ㉞.				

\* Seal kit includes ㉖, ㉗, ㉙, ㉚, ㉛, ㉜, ㉞. Order the seal kit, based on each bore size. (The parts indicated with numbers ㉘ and ㉝ are not replaceable.)

Note) Add "-X46" to the end of the part numbers for single solenoid type.

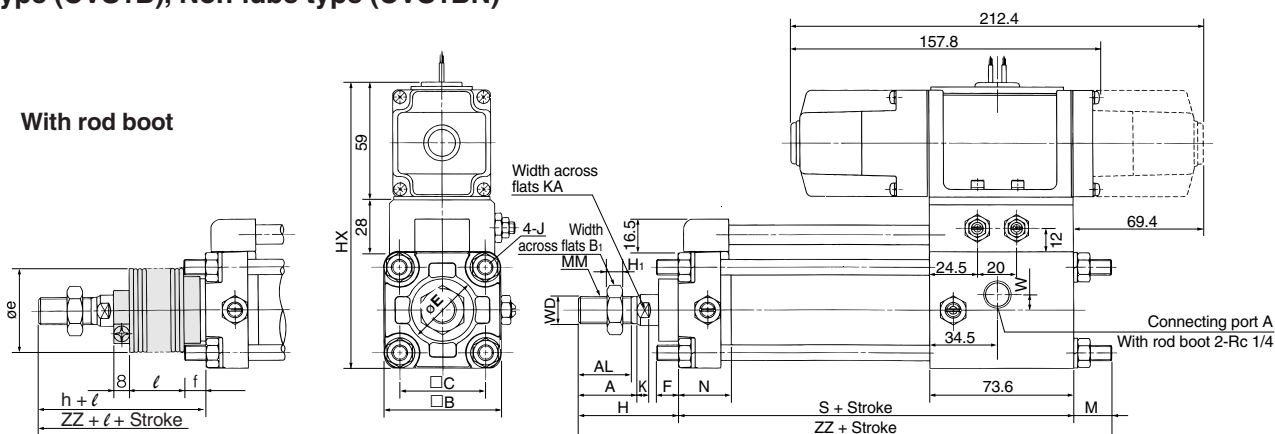
• How to order solenoid valves/VS4□24-00 | Voltage | Electrical entry

\* Not replaceable.

# Valve Mounted Cylinder Double Acting, Single Rod Series CVS1

## Basic Style: CVS1B□

Lube type (CVS1B), Non-lube type (CVS1BN)



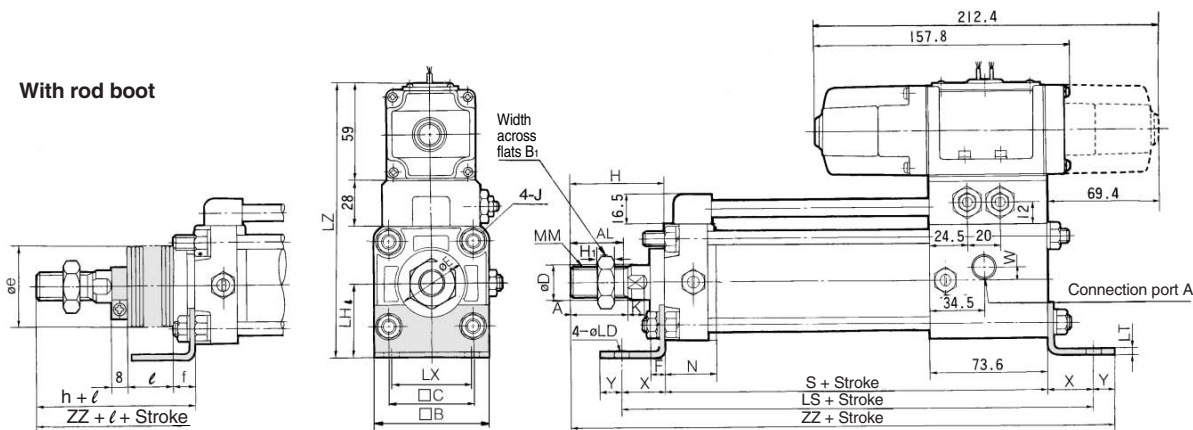
Bore size (mm)	Stroke range* (mm)	A	AL	B	B <sub>1</sub>	C	D	E	F	H <sub>1</sub>	HX	J	K	KA	M	MM	N	S
40	Up to 500	30	27	60	22	44	16	32	10	8	147	M8 x 1.25	6	14	19.4	M14 x 1.5	27	130.6
50	Up to 600	35	32	70	27	52	20	40	10	11	157	M8 x 1.25	7	18	16.4	M18 x 1.5	30	133.6
63	Up to 600	35	32	86	27	64	20	40	10	11	173	M10 x 1.25	7	18	18.4	M18 x 1.5	31	140.6
80	Up to 750	40	37	102	32	78	25	52	14	13	189	M12 x 1.75	11	22	21.4	M22 x 1.5	37	152.6
100	Up to 750	40	37	116	41	92	30	52	14	16	203	M12 x 1.75	11	26	21.4	M26 x 1.5	40	159.6

Bore size (mm)	W	Without rod boot		With rod boot				
		H	ZZ	e	f	h	l	ZZ
40	8	51	201	43	11.2	59	1/4 stroke	209
50	8	58	208	52	11.2	66	1/4 stroke	216
63	8	58	217	52	11.2	66	1/4 stroke	225
80	0	71	245	65	12.5	80	1/4 stroke	254
100	0	72	253	65	14	81	1/4 stroke	262

\* The minimum stroke of the one with rod boot is 20 mm or more.

## Axial Foot Style: CVS1L□

Lube type (CVS1L), Non-lube type (CVS1LN)



Bore size (mm)	Stroke range* (mm)	A	AL	B	B <sub>1</sub>	C	D	E	H <sub>1</sub>	F	J	K	LD	LH	LS	LT	LX	LZ	MM
40	Up to 500, 501 to 800*	30	27	60	22	44	16	32	8	10	M8 x 1.25	6	9	40	184.6	3.2	42	157	M14 x 1.5
50	Up to 600, 601 to 1000*	35	32	70	27	52	20	40	11	10	M8 x 1.25	7	9	45	187.6	3.2	50	167	M18 x 1.5
63	Up to 600, 601 to 1000*	35	32	86	27	64	20	40	11	10	M10 x 1.25	7	11.5	50	208.6	3.2	59	180	M18 x 1.5
80	Up to 750, 751 to 1000*	40	37	102	32	78	25	52	13	14	M12 x 1.75	11	13.5	65	240.6	4.5	76	203	M22 x 1.5
100	Up to 750, 751 to 1000*	40	37	116	41	92	30	52	16	14	M12 x 1.75	11	13.5	75	245.6	6	92	220	M26 x 1.5

Bore size (mm)	N	S	W	X	Y	Without rod boot		With rod boot				
						H	ZZ	e	f	h	l	ZZ
40	27	130.6	8	27	13	51	221.6	43	11.2	59	1/4 stroke	229.6
50	30	133.6	8	27	13	58	231.6	52	11.2	66	1/4 stroke	239.6
63	31	140.6	8	34	16	58	248.6	52	11.2	66	1/4 stroke	256.6
80	37	152.6	0	44	16	71	283.6	65	12.5	80	1/4 stroke	292.6
100	40	159.6	0	43	17	72	291.6	65	14	81	1/4 stroke	300.6



\* Long stroke

\*\* The minimum stroke of the one with rod boot is 20 mm or more.

RE<sup>A</sup><sub>B</sub>

REC

C□X

C□Y

MQ<sup>Q</sup><sub>M</sub>

RHC

MK(2)

RS<sup>Q</sup><sub>G</sub>

RS<sup>H</sup><sub>A</sub>

RZQ

MI<sup>W</sup><sub>S</sub>

CEP1

CE1

CE2

ML2B

C<sup>1</sup>/<sub>5</sub>-S

CV

MVGQ

CC

RB

J

D-

-X

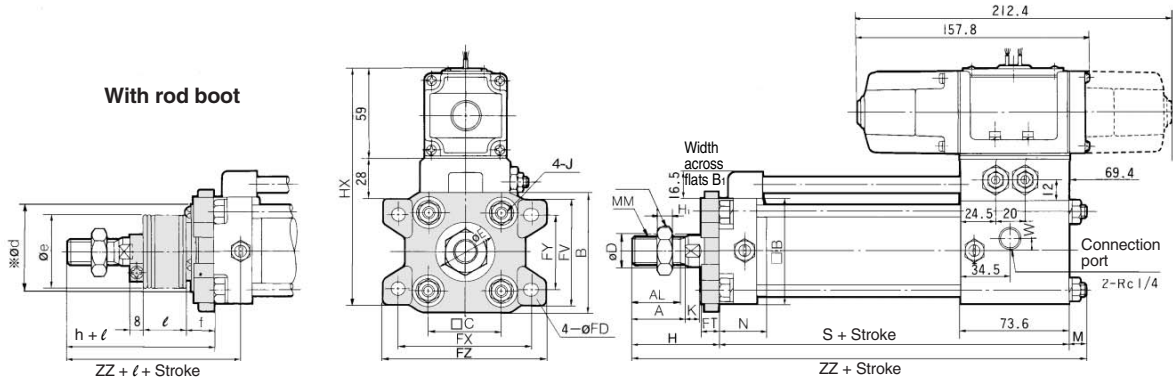
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Data

# Series CVS1

## Rod Side Flange Style: CVS1F□

Lube type (CVS1F), Non-lube type (CVS1FN)



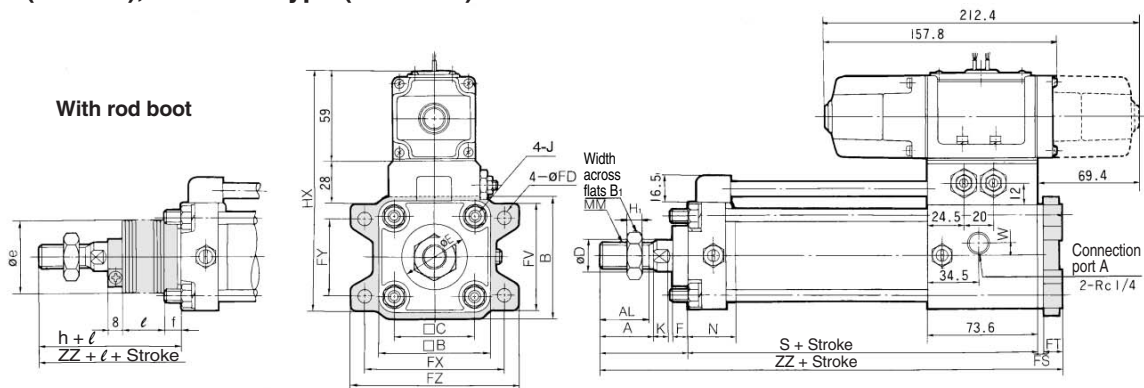
Bore size (mm)	Stroke range* (mm)	A	AL	B	B	B <sub>1</sub>	C	D	E	FD	FT	FV	FX	FY	FZ	H <sub>1</sub>	HX	J	K
40	Up to 500 501 to 800*	30	27	71	60	22	44	16	32	9	12	60	80	42	100	8	147	M8 x 1.25	6
50	Up to 600 601 to 1000*	35	32	81	70	27	52	20	40	9	12	70	90	50	110	11	157	M8 x 1.25	7
63	Up to 600 601 to 1000*	35	32	101	86	27	64	20	40	11.5	15	86	105	59	130	11	173	M10 x 1.25	7
80	Up to 750 751 to 1000*	40	37	119	102	32	78	25	52	13.5	18	102	130	76	160	13	189	M12 x 1.75	11
100	Up to 750 751 to 1000*	40	37	133	116	41	92	30	52	13.5	18	116	150	92	180	16	203	M12 x 1.75	11

Bore size (mm)	M	MM	N	S	W	Without rod boot			With rod boot				
						H	ZZ	d*	e	f	h	ℓ	ZZ
40	19.4	M14 x 1.5	27	130.6	8	51	201	52	43	15	59	1/4 stroke	209
50	16.4	M18 x 1.5	30	133.6	8	58	208	58	52	15	66	1/4 stroke	216
63	18.4	M18 x 1.5	31	140.6	8	58	217	58	52	17.5	66	1/4 stroke	225
80	21.4	M22 x 1.5	37	152.6	0	71	245	80	65	21.5	80	1/4 stroke	254
100	21.4	M26 x 1.5	40	159.6	0	72	253	80	65	21.5	81	1/4 stroke	262

- \* Long stroke
- \* The minimum stroke of the one with rod boot is 20 mm or more.
- \* Machine larger holes than the outside diameter øD of the mounting bracket for rod boot when mounting the rod boot part to the through for mounting.

## Rear Flange Style: CVS1G□

Lube type (CVS1G), Non-lube type (CVS1GN)



Bore size (mm)	Stroke range* (mm)	A	AL	B	B	B <sub>1</sub>	C	D	E	F	FD	FS	FT	FV	FX	FY	FZ	H <sub>1</sub>	HX	J
40	Up to 500	30	27	71	60	22	44	16	32	10	9	4	12	60	80	42	100	8	147	M8 x 1.25
50	Up to 600	35	32	81	70	27	52	20	40	10	9	4	12	70	90	50	110	11	157	M8 x 1.25
63	Up to 600	35	32	101	86	27	64	20	40	10	11.5	0	15	86	105	59	130	11	173	M10 x 1.25
80	Up to 750	40	37	119	102	32	78	25	52	14	13.5	0	18	102	130	76	160	13	189	M12 x 1.75
100	Up to 750	40	37	133	116	41	92	30	52	14	13.5	0	18	116	150	92	180	16	203	M12 x 1.75

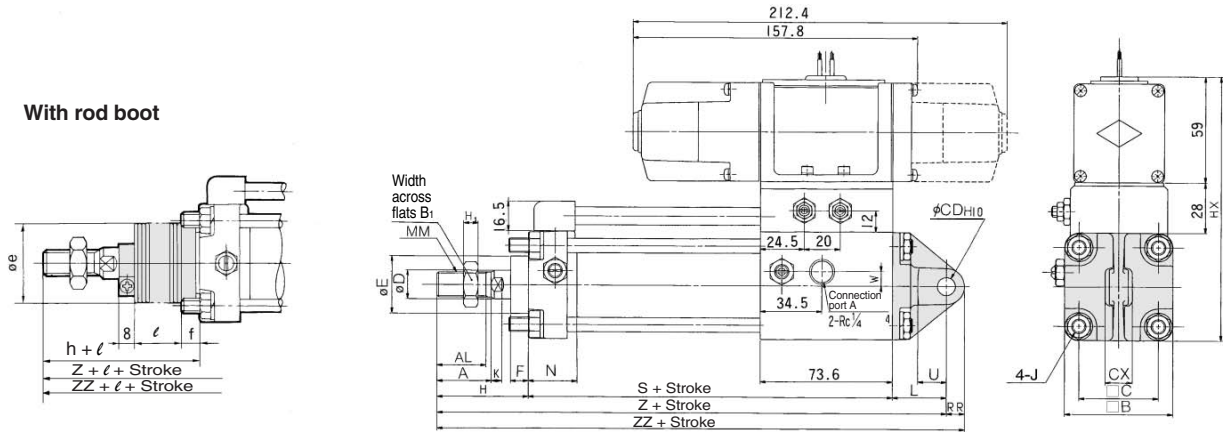
Bore size (mm)	K	MM	N	S	W	Without rod boot			With rod boot				
						H	ZZ	e	f	h	ℓ	ZZ	
40	6	M14 x 1.5	27	130.6	8	51	197.6	43	11.2	59	1/4 stroke	205.6	
50	7	M18 x 1.5	30	133.6	8	58	207.6	52	11.2	66	1/4 stroke	215.6	
63	7	M18 x 1.5	31	140.6	8	58	213.6	52	11.2	66	1/4 stroke	221.6	
80	11	M22 x 1.5	37	152.6	0	71	241.6	65	12.5	80	1/4 stroke	250.6	
100	11	M26 x 1.5	40	159.6	0	72	249.6	65	14	81	1/4 stroke	258.6	

- \* The minimum stroke of the one with rod boot is 20 mm or more.

# Valve Mounted Cylinder Double Acting, Single Rod Series CVS1

## Single Clevis Style: CVS1C□

Lube type (CVS1C), Non-lube type (CVS1CN)



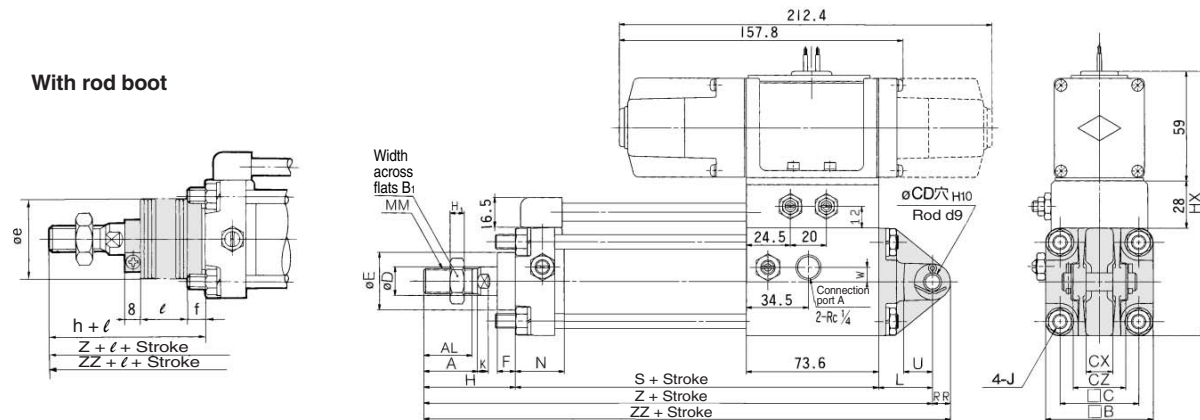
Bore size (mm)	Stroke range* (mm)	A	AL	B	B <sub>1</sub>	C	CD <sub>H10</sub>	CX	D	E	F	H <sub>1</sub>	HX	J	K	L	MM
40	Up to 500	30	27	60	22	44	10 <sub>0</sub> <sup>+0.058</sup>	15 <sub>-0.3</sub> <sup>-0.1</sup>	16	32	10	8	147	M8 x 1.25	6	30	M14 x 1.5
50	Up to 600	35	32	70	27	52	12 <sub>0</sub> <sup>+0.070</sup>	18 <sub>-0.3</sub> <sup>-0.1</sup>	20	40	10	11	157	M8 x 1.25	7	35	M18 x 1.5
63	Up to 600	35	32	86	27	64	16 <sub>0</sub> <sup>+0.070</sup>	25 <sub>-0.3</sub> <sup>-0.1</sup>	20	40	10	11	173	M10 x 1.25	7	40	M18 x 1.5
80	Up to 750	40	37	102	32	78	20 <sub>0</sub> <sup>+0.084</sup>	31.5 <sub>-0.3</sub> <sup>-0.1</sup>	25	52	14	13	189	M12 x 1.75	11	48	M22 x 1.5
100	Up to 750	40	37	116	41	92	25 <sub>0</sub> <sup>+0.084</sup>	35.5 <sub>-0.3</sub> <sup>-0.1</sup>	30	52	14	16	203	M12 x 1.75	11	58	M26 x 1.5

Bore size (mm)	N	RR	S	U	W	Without rod boot			With rod boot					
						H	Z	ZZ	e	f	h	l	Z	ZZ
40	27	10	130.6	16	8	51	211.6	221.6	43	11.2	59	1/4 stroke	219.6	229.6
50	30	12	133.6	19	8	58	226.6	238.6	52	11.2	66	1/4 stroke	234.6	246.6
63	31	16	140.6	23	8	58	238.6	254.6	52	11.2	66	1/4 stroke	246.6	262.6
80	37	20	152.6	28	0	71	271.6	291.6	65	12.5	80	1/4 stroke	280.6	300.6
100	40	25	159.6	36	0	72	289.6	314.6	65	14	81	1/4 stroke	298.6	323.6

\*The minimum stroke of the one with rod boot is 20 mm or more.

## Double Clevis Style: CVS1D□

Lube type (CVS1D), Non-lube type (CVS1DN)



Bore size (mm)	Stroke range* (mm)	A	AL	B	B <sub>1</sub>	C	CD <sub>H10</sub>	CX	CZ	D	E	F	H <sub>1</sub>	HX	J	K	L
40	Up to 500	30	27	60	22	44	10 <sub>0</sub> <sup>+0.059</sup>	15 <sub>-0.1</sub> <sup>+0.3</sup>	29.5	16	32	10	8	147	M8 x 1.25	6	30
50	Up to 600	35	32	70	27	52	12 <sub>0</sub> <sup>+0.070</sup>	18 <sub>-0.1</sub> <sup>+0.3</sup>	38	20	40	10	11	157	M8 x 1.25	7	35
63	Up to 600	35	32	86	27	64	16 <sub>0</sub> <sup>+0.070</sup>	25 <sub>-0.1</sub> <sup>+0.3</sup>	49	20	40	10	11	173	M10 x 1.25	7	40
80	Up to 750	40	37	102	32	78	20 <sub>0</sub> <sup>+0.084</sup>	31.5 <sub>-0.1</sub> <sup>+0.3</sup>	61	25	52	14	13	189	M12 x 1.75	11	48
100	Up to 750	40	37	116	41	92	25 <sub>0</sub> <sup>+0.084</sup>	35.5 <sub>-0.1</sub> <sup>+0.3</sup>	64	30	52	14	16	203	M12 x 1.75	11	58

Bore size (mm)	MM	N	RR	S	U	W	Without rod boot			With rod boot					
							H	Z	ZZ	e	f	h	l	Z	ZZ
40	M14 x 1.5	27	10	130.6	16	8	51	211.6	221.6	43	11.2	59	1/4 stroke	219.6	229.6
50	M18 x 1.5	30	12	133.6	19	8	58	226.6	238.6	52	11.2	66	1/4 stroke	234.6	246.6
63	M18 x 1.5	31	16	140.6	23	8	58	238.6	254.6	52	11.2	66	1/4 stroke	246.6	262.6
80	M22 x 1.5	37	20	152.6	28	0	71	271.6	291.6	65	12.5	80	1/4 stroke	280.6	300.6
100	M26 x 1.5	40	25	159.6	36	0	72	289.6	314.6	65	14	81	1/4 stroke	298.6	323.6

\* The minimum stroke of the one with rod boot is 20 mm or more.

\* Clevis pin, flat washer and cotter pin are shipped together.

RE<sup>A</sup><sub>B</sub>

REC

C□X

C□Y

MQ<sup>Q</sup><sub>M</sub>

RHC

MK(2)

RS<sup>Q</sup><sub>G</sub>

RS<sup>H</sup><sub>A</sub>

RZQ

MI<sup>W</sup><sub>S</sub>

CEP1

CE1

CE2

ML2B

C<sup>1</sup><sub>5-S</sub>

CV

MVGQ

CC

RB

J

D-

-X

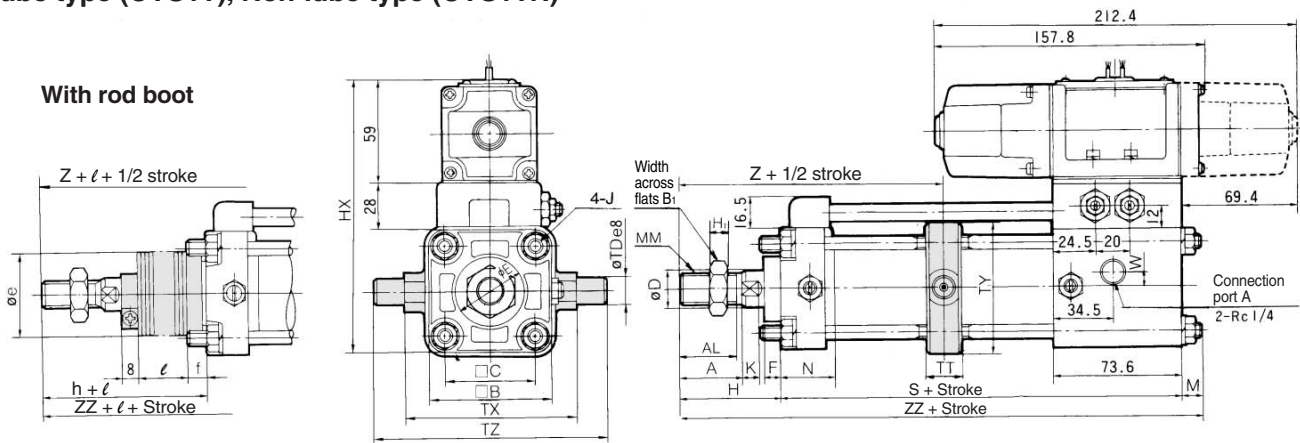
20-

Data

# Series CVS1

## Center Trunnion Style: CVS1T□

Lube type (CVS1T), Non-lube type (CVS1TN)



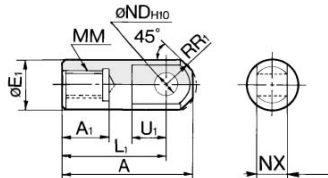
Bore size (mm)	Stroke range* (mm)	A	AL	B	B <sub>1</sub>	C	D	E	F	H	HX	J	K	M	MM	N	S	TDe8
40	Up to 500	30	27	60	22	44	16	32	10	8	147	M8 x 1.25	6	11.4	M14 x 1.5	27	130.6	15 <sup>-0.032</sup> <sub>-0.059</sub>
50	Up to 600	35	32	70	27	52	20	40	10	11	157	M8 x 1.25	7	11.4	M18 x 1.5	30	133.6	15 <sup>-0.032</sup> <sub>-0.059</sub>
63	Up to 600	35	32	86	27	64	20	40	10	11	173	M10 x 1.25	7	13.4	M18 x 1.5	31	140.6	18 <sup>-0.032</sup> <sub>-0.059</sub>
80	Up to 750	40	37	102	32	78	25	52	14	13	189	M12 x 1.75	11	18.4	M22 x 1.5	37	152.6	25 <sup>-0.040</sup> <sub>-0.073</sub>
100	Up to 750	40	37	116	41	92	30	52	14	16	203	M12 x 1.75	11	16.4	M26 x 1.5	40	159.6	25 <sup>-0.040</sup> <sub>-0.073</sub>

Bore size (mm)	TT	TX	TY	TZ	W	Without rod boot			With rod boot					
						H	Z	ZZ	e	f	h	l	Z	ZZ
40	22	85	62	117	8	51	93	193	43	11.2	59	1/4 stroke	101	201
50	22	95	74	127	8	58	103	203	52	11.2	66	1/4 stroke	111	211
63	28	110	90	148	8	58	107	212	52	11.2	66	1/4 stroke	115	220
80	34	140	110	192	0	71	129	242	65	12.5	80	1/4 stroke	138	251
100	40	162	130	214	0	72	135	248	65	14	81	1/4 stroke	144	257

\* The minimum stroke of the one with rod boot is 20 mm or more.

## Accessory Dimensions

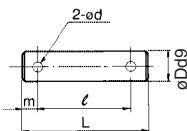
### I Type Single Knuckle Joint



Material: Free cutting sulfur steel

Part no.	Applicable bore size (mm)	A	A <sub>1</sub>	øE <sub>1</sub>	L <sub>1</sub>	MM	R <sub>1</sub>	U <sub>1</sub>	øNDH <sub>10</sub>	NX
I-04	40	69	22	24	55	M14 x 1.5	15.5	20	12 <sup>+0.070</sup> <sub>0</sub>	16 <sup>+0.1</sup> <sub>-0.3</sub>
I-05	50, 63	74	27	28	60	M18 x 1.5	15.5	20	12 <sup>+0.070</sup> <sub>0</sub>	16 <sup>-0.1</sup> <sub>-0.3</sub>
I-08	80	91	37	36	71	M22 x 1.5	22.5	26	18 <sup>+0.070</sup> <sub>0</sub>	28 <sup>-0.1</sup> <sub>-0.3</sub>
I-10	100	105	37	40	83	M26 x 1.5	24.5	28	20 <sup>+0.084</sup> <sub>0</sub>	30 <sup>-0.1</sup> <sub>-0.3</sub>

### Knuckle Pin, Clevis Pin

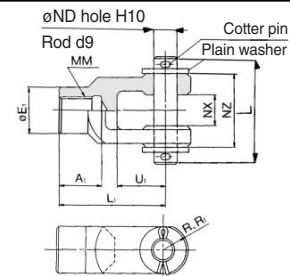


Material: Carbon steel

Part no.	Applicable bore size (mm)		øDd9	L	l	m	ød (Drill through)	Applicable cotter pin
	Clevis	Knuckle						
CDP-2A	40	—	10 <sup>-0.046</sup> <sub>-0.076</sub>	46	38	4	3	ø3 x 18l
CDP-3A	50	40, 50, 63	12 <sup>-0.050</sup> <sub>-0.093</sub>	55.5	47.5	4	3	ø3 x 18l
CDP-4A	63	—	16 <sup>-0.050</sup> <sub>-0.093</sub>	71	61	5	4	ø4 x 25l
CDP-5A	—	80	18 <sup>-0.050</sup> <sub>-0.093</sub>	76.5	66.5	5	4	ø4 x 25l
CDP-6A	80	100	20 <sup>-0.065</sup> <sub>-0.117</sub>	83	73	5	4	ø4 x 30l
CDP-7A	100	—	25 <sup>-0.065</sup> <sub>-0.117</sub>	88	78	6	4	ø4 x 36l

### Y Type Double Knuckle Joint

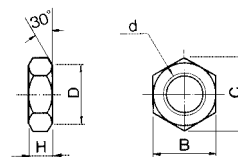
\* Knuckle pin, cotter pin, and plain washer are shipped together.



Material: Cast iron

Part no.	Applicable bore size (mm)	A <sub>1</sub>	E <sub>1</sub>	L <sub>1</sub>	MM	RR <sub>1</sub>	U <sub>1</sub>	ND	NX	NZ	L	Cotter pin size	flat washer size
Y-04C	40	22	24	55	M14 x 1.5	13	25	12	16 <sup>+0.3</sup> <sub>+0.1</sub>	38	55.5	ø3 x 18l	Polished round 12
Y-05C	50, 63	27	28	60	M18 x 1.5	15	27	12	16 <sup>+0.3</sup> <sub>+0.1</sub>	38	55.5	ø3 x 18l	Polished round 12
Y-08C	80	37	36	71	M22 x 1.5	19	28	18	28 <sup>+0.3</sup> <sub>+0.1</sub>	55	76.5	ø4 x 25l	Polished round 18
Y-10C	100	37	40	83	M26 x 1.5	21	38	20	30 <sup>+0.3</sup> <sub>+0.1</sub>	61	83	ø4 x 30l	Polished round 20

### Rod End Nut



Material: Rolled steel

Part no.	Applicable bore size (mm)	d	H	B	C	D
NT-04	40	M14 x 1.5	8	22	25.4	21
NT-05	50, 63	M18 x 1.5	11	27	31.2	26
NT-08	80	M22 x 1.5	13	32	37	31
NT-10	100	M26 x 1.5	16	41	47.3	39

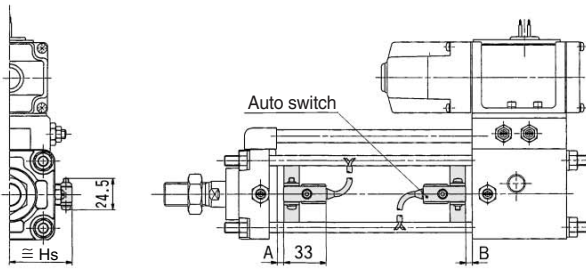


# Valve Mounted Cylinder Double Acting, Single Rod Series CVS1

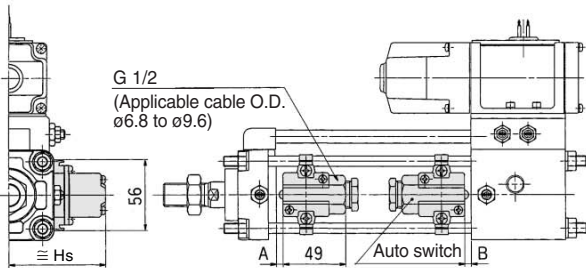
## Proper Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height

### <Band mounting style>

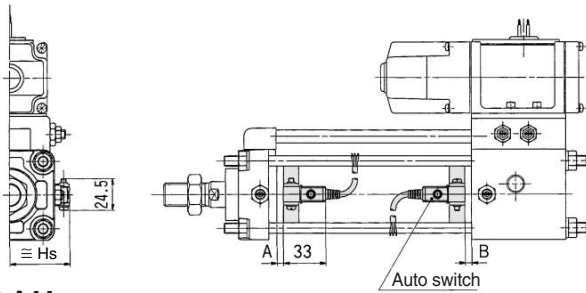
D-B5□/B64/B59W



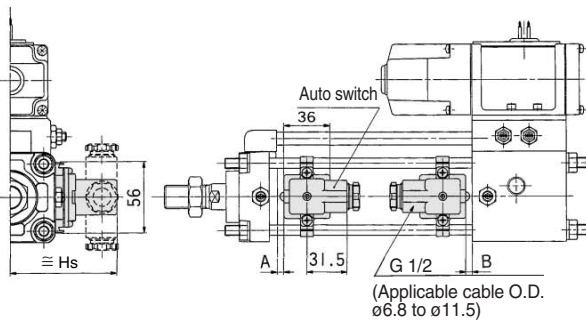
D-A3□/G39/K39



D-G5□/K59/G5□W/K59W  
D-G59F/G5NTL

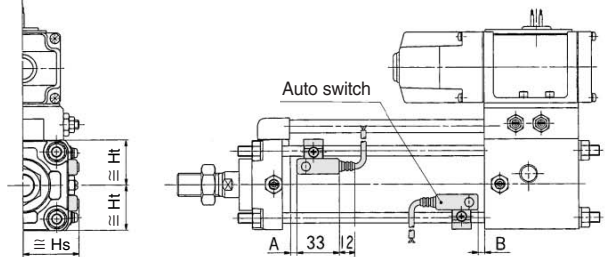


D-A44

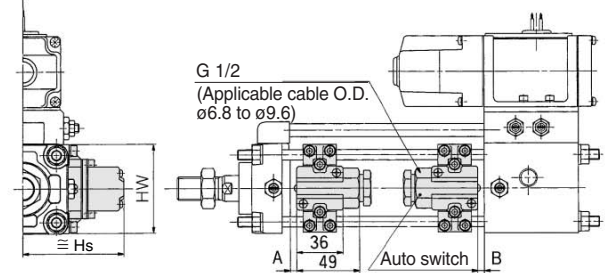


### <Tie-rod mounting style>

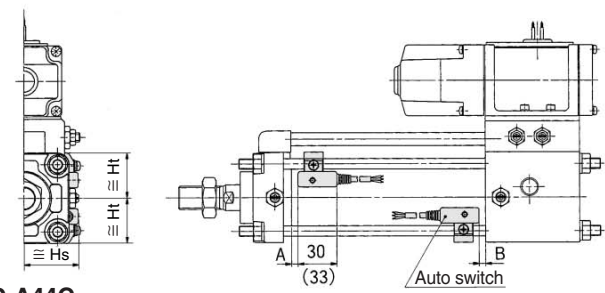
D-A5□/A6□/A59W



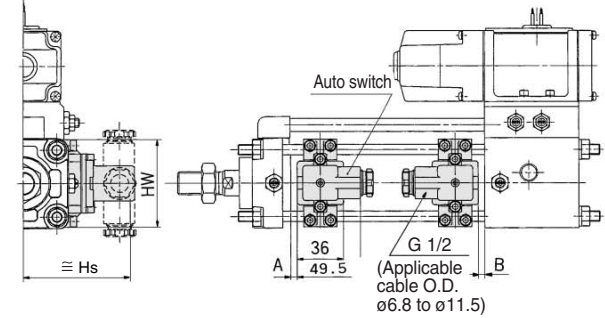
D-A3□C  
D-G39C/K39C



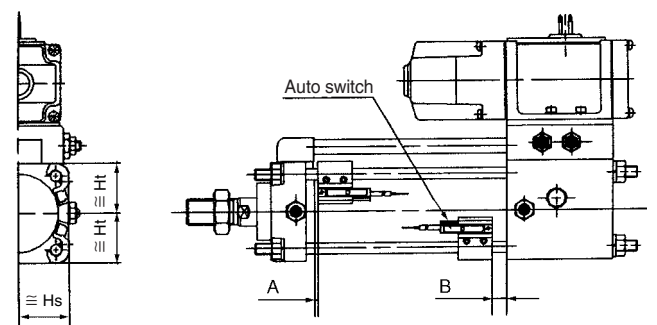
D-F5□/J5□  
D-F5NTL  
D-F5□W/J59W/F5□F



D-A44C



D-Z7/Z8  
D-Y59□/Y69□/Y7P/Y7PV  
D-Y7□W/Y7□WV



RE<sup>A</sup><sub>B</sub>

REC

C□X

C□Y

MQ<sup>Q</sup><sub>M</sub>

RHC

MK(2)

RS<sup>Q</sup><sub>G</sub>

RS<sup>H</sup><sub>A</sub>

RZQ

MI<sup>W</sup><sub>S</sub>

CEP1

CE1

CE2

ML2B

C<sup>1</sup>/<sub>6</sub>5-S

CV

MVGQ

CC

RB

J

D-

-X

20-

Data

# Series CVS1

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

### Proper Auto Switch Mounting Position

Auto switch model	D-A5□, D-A6□ D-A3□/A3□C D-A44/A44C D-G39/G39C D-K39/K39C		D-B5□/B64		D-F5□ D-J5□ D-F5□W D-J59W D-F59F		D-G5□W D-K59W D-G59F D-G5□ D-K59 D-G5NTL		D-A59W		D-F5NTL		D-B59W D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W D-Y7□WV	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
40	0 (0)	1 (0)	0 (0.5)	1.5 (0)	3.5 (6.5)	7.5 (4.5)	0 (2)	3 (0)	1 (4)	5 (2)	8.5 (11.5)	12.5 (9.5)	0.5 (3.5)	4.5 (1.5)
50	0 (0)	1 (0)	0 (0.5)	1.5 (0)	3.5 (6.5)	7.5 (4.5)	0 (2)	3 (0)	1 (4)	5 (2)	8.5 (11.5)	12.5 (9.5)	0.5 (3.5)	4.5 (1.5)
63	0 (2.5)	5.5 (1.5)	0 (3)	6 (2)	5.5 (9)	12 (8)	1 (4.5)	7.5 (3.5)	3 (6.5)	9.5 (5.5)	10.5 (14)	17 (13)	2.5 (6)	9 (5)
80	2 (6)	8.5 (4)	2.5 (6.5)	9 (4.5)	8.5 (12.5)	15 (10.5)	4 (8)	10.5 (6)	6 (10)	12.5 (8)	13.5 (17.5)	20 (15.5)	5.5 (9.5)	12 (7.5)
100	4 (7.5)	10.5 (6.5)	4.5 (8)	11 (7)	10.5 (14)	17 (13)	6 (9.5)	12.5 (8.5)	8 (11.5)	14.5 (10.5)	15.5 (19)	22 (18)	7.5 (11)	14 (10)

- Note 1) ( ): Denotes the values of non-lube type.  
 Note 2) D-G5□W, K59W, G58A and G59F can not be attached on ø40 and ø50 lube type cylinder.  
 Note 3) D-B5□ type, D-G5□type, D-K5□type are mountable only upon a receipt of order. (Not mountable after the time of shipment)

### Auto Switch Mounting Height

Auto switch model	D-B5□/B64 D-B59W D-G5□ D-K59 D-G5NTL D-G5□W D-K59W D-G59F		D-A3□ D-G39 D-K39		D-A44		D-A5□ D-A6□ D-A59W		D-F5□ D-J5□ D-F5□W D-J59W D-F59F D-F5NTL		D-A3□C D-G39C D-K39C		D-A44C		D-Z7□/Z80 D-Y59□ D-Y7P D-Y7□W		D-Y69□ D-Y7PV D-Y7□WV	
	Hs	Hs	Hs	Hs	Ht	Hs	Ht	Hs	Hw	Hs	Hw	Hs	Ht	Hs	Ht			
40	38	72.5	80.5	40	31	38.5	31	73	69	81	69	30	30	30.5	30			
50	43.5	78	86	43.5	35	42.5	35	78.5	77	86.5	77	34	34	35	34			
63	50.5	85	93	49	42	48	42	85.5	91	93.5	91	41	41	42.5	41			
80	59	93.5	101.5	55.5	50	54	50	94	107	102	107	49.5	48.5	51	48.5			
100	69.5	104	112	63	57.5	62	57.5	104	121	112	121	58.5	56	59	56			

### Operating Range

Auto switch model	Bore size (mm)				
	40	50	63	80	100
D-Z7□/Z80	8	7	9	9.5	10.5
D-A3□/A44 D-A3□C, D-A44C	9	10	11	11	11
D-A5□/A6□					
D-B5□/B64					
D-A59W	13	13	14	14	15
D-B59W	14	14	17	16	18
D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV	8	7	5.5	6.5	6.5
D-F5□/J5□ D-F5□W/J59W D-F5NTL/F59F	4	4	4.5	4.5	4.5
D-G5□/K59 D-G5□W/K59W D-G5NTL/G59F	5	6	6.5	6.5	7
D-G39/K39 D-G39C, D-K39C	9	9	10	10	11

\* Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion.)  
 There may be the case it will vary substantially depending on an ambient environment.

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 (Fetching direction)	Features
Reed switch	D-A53/A56	Grommet (In-line)	Without indicator light
	D-A64/A67		
	D-B64		
Solid state switch	D-Z80	Grommet (In-line)	2-color indication
	D-F59/F5P/J59		
	D-F59W/F5PW/J59W		
	D-F5NTL		With timer
	D-G5NTL		
D-Y69A/Y7PV/Y69B D-Y7NWV/Y7PWV/Y7BWV	Grommet (Perpendicular)	2-color indication	

\* With pre-wire connector is also available in solid state auto switches.  
 For details, refer to page 10-20-66.  
 \* Normally closed (NC = b contact), solid state switch (D-Y7G/Y7H type) are also available. For details, refer to page 10-20-41.

# Valve Mounted Cylinder Double Acting, Single Rod Series **CVS1**

## Minimum Stroke for Auto Switch Mounting

n: Number of auto switches

Auto switch model	No. of auto switches mounted	Mounting brackets other than center trunnion	Center trunnion				
			ø40	ø50	ø63	ø80	ø100
D-A5□/A6□ D-F5□/J5□ D-F5□W/J59W D-F59F	2 (Different sides, Same side), 1	15	90		100	110	120
	n (Same side)	$15 + 55 \frac{(n-2)}{2}$ n = 2, 4, 6, 8...	$90 + 55 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...		$100 + 55 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...	$110 + 55 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...	$120 + 55 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...
D-A59W	2 (Different sides, Same side)	20	90		100	110	120
	n (Same side)	$20 + 55 \frac{(n-2)}{2}$ n = 2, 4, 6, 8...	$90 + 55 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...		$100 + 55 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...	$110 + 55 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...	$120 + 55 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...
	1	15	90		100	110	120
D-F5NTL	2 (Different sides, Same side), 1	25	110		120	130	140
	n (Same side)	$25 + 55 \frac{(n-2)}{2}$ n = 2, 4, 6, 8...	$110 + 55 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...		$120 + 55 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...	$130 + 55 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...	$140 + 55 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...
D-B5□/B64 D-G5□/K59 D-G5□W D-K59W D-G59F D-G5NTL	2	Different sides	15	90		100	110
		Same side	75	90		100	110
	n	Different sides	$15 + 50 \frac{(n-2)}{2}$ n = 2, 4, 6, 8...	$90 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...		$100 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...	$110 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...
		Same side	$75 + 50 (n-2)$ n = 2, 3, 4...	$90 + 50 (n-2)$ n = 2, 4, 6, 8, ...		$100 + 50 (n-2)$ n = 2, 4, 6, 8...	$110 + 50 (n-2)$ n = 2, 4, 6, 8, ...
	1	10	90		100	110	
D-B59W	2	Different sides	20	90		100	110
		Same side	75	90		100	110
	n	Different sides	$20 + 50 \frac{(n-2)}{2}$ n = 2, 4, 6, 8...	$90 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...		$100 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...	$110 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...
		Same side	$75 + 50 (n-2)$ n = 2, 3, 4...	$90 + 50 (n-2)$ n = 2, 4, 6, 8...		$100 + 50 (n-2)$ n = 2, 4, 6, 8...	$110 + 50 (n-2)$ n = 2, 4, 6, 8...
	1	15	90		100	110	
D-A3□ D-G39 D-K39	2	Different sides	35	100		100	100
		Same side	100	100		100	100
	n	Different sides	$35 + 30 (n-2)$ n = 2, 3, 4...	$100 + 30 (n-2)$ n = 2, 4, 6, 8...		$100 + 30 (n-2)$ n = 2, 4, 6, 8...	$100 + 30 (n-2)$ n = 2, 4, 6, 8...
		Same side	$100 + 100 (n-2)$ n = 2, 3, 4...	$100 + 100 (n-2)$ n = 2, 4, 6, 8...			
	1	10	75	80	90		
D-A44	2	Different sides	35	100		100	100
		Same side	55	75		80	90
	n	Different sides	$35 + 30 (n-2)$ n = 2, 3, 4...	$75 + 30 (n-2)$ n = 2, 4, 6, 8...		$80 + 30 (n-2)$ n = 2, 4, 6, 8...	$100 + 30 (n-2)$ n = 2, 4, 6, 8...
		Same side	$55 + 50 (n-2)$ n = 2, 3, 4...	$75 + 50 (n-2)$ n = 2, 4, 6, 8...		$80 + 50 (n-2)$ n = 2, 4, 6, 8...	$90 + 50 (n-2)$ n = 2, 4, 6, 8...
	1	10	75	80	90		
D-A3□C D-G39C D-K39C	2	Different sides	20	100		100	100
		Same side	100	100		100	100
	n	Different sides	$20 + 35 (n-2)$ n = 2, 3, 4...	$100 + 35 (n-2)$ n = 2, 4, 6, 8...		$100 + 35 (n-2)$ n = 2, 4, 6, 8...	$100 + 35 (n-2)$ n = 2, 4, 6, 8...
		Same side	$100 + 100 (n-2)$ n = 2, 3, 4, 5...	$100 + 100 (n-2)$ n = 2, 4, 6, 8...			
	1	10	75	80	90		
D-A44C	2	Different sides	20	75		80	90
		Same side	55	75		80	90
	n	Different sides	$20 + 35 (n-2)$ n = 2, 3, 4...	$75 + 35 (n-2)$ n = 2, 4, 6, 8...		$80 + 35 (n-2)$ n = 2, 4, 6, 8...	$90 + 35 (n-2)$ n = 2, 4, 6, 8...
		Same side	$55 + 50 (n-2)$ n = 2, 3, 4...	$75 + 50 (n-2)$ n = 2, 4, 6, 8...		$80 + 50 (n-2)$ n = 2, 4, 6, 8...	$90 + 50 (n-2)$ n = 2, 4, 6, 8...
	1	10	75	80	90		
D-Z7□/Z80 D-Y59□/Y7P D-Y7□W	2 (Different sides, Same side), 1	15	80	85	90	95	105
	n	$15 + 40 \frac{(n-2)}{2}$ n = 2, 4, 6, 8...	$80 + 40 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...	$85 + 40 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...	$90 + 40 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...	$95 + 40 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...	$105 + 40 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...
D-Y69□/Y7PV D-Y7□WV	2 (Different sides, Same side), 1	10	65		75	80	90
	n	$15 + 30 \frac{(n-2)}{2}$ n = 2, 4, 6, 8...	$65 + 30 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...		$75 + 30 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...	$80 + 30 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...	$90 + 30 \frac{(n-4)}{2}$ n = 4, 8, 12, 16...

RE<sup>A</sup><sub>B</sub>

REC

C□X

C□Y

MQ<sup>Q</sup><sub>M</sub>

RHC

MK(2)

RS<sup>Q</sup><sub>G</sub>

RS<sup>H</sup><sub>A</sub>

RZQ

MI<sup>W</sup><sub>S</sub>

CEP1

CE1

CE2

ML2B

C<sub>6</sub><sup>1</sup>/<sub>5</sub>-S

CV

MVGQ

CC

RB

J

D-

-X

20-

Data