

Valve Mounted Cylinder Double Acting

Series CVS1

Lube/Non-lube Type: $\varnothing 40, \varnothing 50, \varnothing 63, \varnothing 80, \varnothing 100$

How to Order

Mounting style <table border="1"> <tr><td>B</td><td>Basic style</td></tr> <tr><td>L</td><td>Axial foot style</td></tr> <tr><td>F</td><td>Rod side flange style</td></tr> <tr><td>C</td><td>Head side flange style</td></tr> <tr><td>G</td><td>Single clevis style</td></tr> <tr><td>D</td><td>Double clevis style</td></tr> <tr><td>T</td><td>Center trunnion style</td></tr> </table>	B	Basic style	L	Axial foot style	F	Rod side flange style	C	Head side flange style	G	Single clevis style	D	Double clevis style	T	Center trunnion style	Port thread type <table border="1"> <tr><td>Nil</td><td>Rc</td></tr> <tr><td>TN</td><td>NPT</td></tr> <tr><td>TF</td><td>G</td></tr> </table>	Nil	Rc	TN	NPT	TF	G	Cylinder stroke (mm) Refer to page 1785 for standard strokes.	Electrical entry <table border="1"> <tr><td>Nil</td><td>Grommet</td></tr> <tr><td>T</td><td>Conduit terminal</td></tr> <tr><td>D</td><td>DIN terminal</td></tr> <tr><td>DL</td><td>DIN terminal with indicator light</td></tr> <tr><td>TZ</td><td>Conduit terminal with surge voltage suppressor</td></tr> </table>	Nil	Grommet	T	Conduit terminal	D	DIN terminal	DL	DIN terminal with indicator light	TZ	Conduit terminal with surge voltage suppressor
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Ordering Example: CVS1 L N 40 - 100 - 1 W D

With auto switch: CDVS1 L N 40 - 100 - M9BW - 1 W D

With Auto Switch (Built-in magnet): Built-in Magnet Cylinder Model

Cushion:

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

* Auto switches are not available with steel tube.

Suffix for cylinder:

Rod boot	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
	N	Without cushion
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.

Number of auto switches:

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

Auto switch:

Nil	Without auto switch
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* For the applicable auto switch model, refer to the table below.

Solenoid valve voltage:

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

For other rated voltages, please consult with SMC.

Applicable Auto Switches

Refer to pages 1893 to 2007 for further information on auto switches.

Type	Special function	Electrical entry	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)					Pre-wired connector	Applicable load			
				DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	1 (M)	3 (L)	5 (Z)						
Solid state auto switch	—	Grommet	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	—	●	○	○	IC circuit	Relay, PLC		
			3-wire (PNP)				G59***	—	●	—	●	○	○				
		Terminal conduit	2-wire	M9B	—	●	—	●	○	○	○						
			3-wire (NPN)	G39C	G39	—	—	—	—	—	—						
	Diagnostic indication (2-color indication)	Grommet	3-wire (NPN)	24 V	5 V, 12 V	—	M9NW	—	●	●	●	○	○	IC circuit			
			3-wire (PNP)				G59W***	—	●	—	●	○	○				
		Water resistant (2-color indication)	Grommet	2-wire	24 V	12 V	—	M9BW	—	●	—	●	○	○		—	
				3-wire (NPN)				M9NA*1	—	○	○	●	○	○			
			With diagnostic output (2-color indication)	Terminal conduit	3-wire (PNP)	24 V	12 V	—	M9PA*1	—	○	○	●	○		○	IC circuit
					2-wire				M9BA*1	—	○	○	●	○		○	
Reed auto switch	—	Grommet	2-wire	24 V	12 V	—	F59F	G59F***	—	●	—	●	○	IC circuit			
							Terminal conduit	100 V, 200 V	A54	B54***	—	●	—		●	○	IC circuit
		DIN terminal	100 V, 200 V	A64	B64***	—			●	—	●	○	—				
				Grommet	100 V, 200 V	A33C	A33	—	—	—	—	—		PLC			
	Diagnostic indication (2-color indication)	Grommet	—			—	—	—	A34C	A34	—	—	—		—		
				—	—				—	—	—	—	A44C	A44		—	—
	—	—	—			—	—	—					A59W	B59W***	—	●	—

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

Consult with SMC regarding water resistant types with the above model numbers.

*2 1 m type lead wire is only applicable to D-A93.

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

* Since there are other applicable auto switches than listed, refer to page 1801 for details.

* For details about auto switches with pre-wired connector, refer to pages 1960 and 1961.

* D-A91~/M9□/M9□/W/M9□_A auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled before shipped.)

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

** D-G5□W/K59W/G59F cannot be mounted on $\varnothing 40$ and $\varnothing 50$ lube style cylinder.

*** D-B5□/G5□/K5□ types are mountable only upon a receipt of order. (Not mountable after the time of shipment)

**** D-A9□ cannot be mounted on $\varnothing 50$. Select auto switches in brackets.

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.

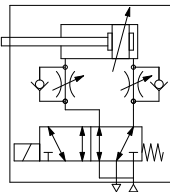
Single, double and 3 position solenoid valves are mountable.

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



Symbol

Air cushion



Made to Order Specifications
(For details, refer to pages 2009 to 2152.)

Symbol	Specifications
-XA□	Change of rod end shape
-XC4	With heavy duty scraper
-XC6	Made of stainless steel
-XC7	Tie-rod, cushion valve, and tie-rod nut made of stainless steel
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC22	Fluororubber seals
-XC27	Double clevis and double knuckle joint pins made of stainless steel
-XC28	Compact flange made of SS400
-XC29	Double knuckle joint with spring pin
-XC35	With coil scraper
-XC65	-XC6 + -XC7

Refer to pages 1893 to 2007 for cylinders with auto switches.

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

Specifications

Bore size (mm)	40	50	63	80	100
Lubrication	Lube/Non-lube				
Action	Double acting				
Fluid	Air				
Proof pressure	1.5 MPa				
Maximum operating pressure	1.0 MPa				
Minimum operating pressure	0.05 MPa				
Ambient and fluid temperature	-10 to 60°C (No freezing)				
Cushion	Air cushion				
Stroke length tolerance	Up to 250 ^{st: -1.0} , 251 to 1000 ^{st: -1.4}				
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)				
Allowable kinetic energy	2.4 J	4.4 J	7.8 J	11.7 J	20.5 J
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 1786.

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			
Effective area of valve (Cv factor)	Single 26.5 mm ² (1.47)			
Coil insulation	Class B or equivalent (130°C)			
Apparent power (Note)	AC	Inrush	50 Hz 100 VA 60 Hz 90 VA	
		Holding	50 Hz 20 VA 60 Hz 14 VA	
	DC	Power consumption (Note)		13.2 W

(Note) At the rated voltage.

Standard Stroke (mm)

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.

CVQ

CVQM

CVJ□

CVM□

CV3

CVS1

MVGQ

D-□

X□

Series CVS1

Accessory

Mounting		Basic style	Axial foot style	Rod side flange style	Head side flange style	Single clevis style	Double clevis* style	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.

* Refer to page 1791 for dimensions and part numbers of the option.
Refer to page 1788 for dimensions of the rod boot.

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 steel 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.

** Accessories for each mounting bracket are as follows.

Foot, Flange, Single clevis: Body mounting bolts, Spring washer
Double clevis: Body mounting bolts, Spring washer, Clevis pin, Flat washer, Cotter pin.

⚠ Precautions

Be sure to read before handling. For Safety Instructions and Actuator Precautions, refer to front matter 39. For Series CVS1, refer to page 1767 since precaution are the same as series CV3.

Selection

⚠ Warning

1. Confirm the specifications.

Products in this catalog are designed to be used for compressed air systems. If not operated within the designated pressure or temperature, it may damage the products or cause malfunction. (Refer to specifications.)

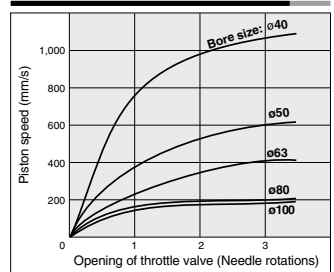
2. Energizing continuously for a long period of time

• When the valve is continuously energized for a long period of time, the performance may deteriorate or effect peripheral equipment adversely since temperature rises when coils generate heat.

3. Mounting orientation

Metal seal: For single solenoids, mounting orientation is flexible. For double solenoids and 3 position valves, mount a spool valve horizontally.

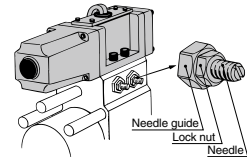
Opening Range of Throttle Valve and Piston Speed



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

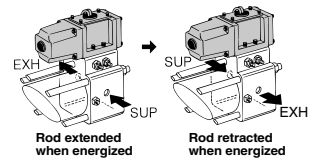
Piston Speed Adjustment Procedure

- 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.

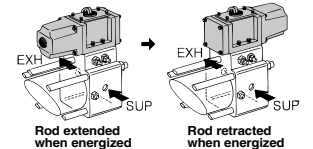


Changing between Rod Extended when Energized and Rod Retracted when Energized

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



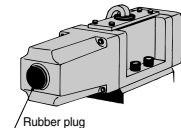
- This is possible by inverting the solenoid valve direction 180°.



Manual Operation

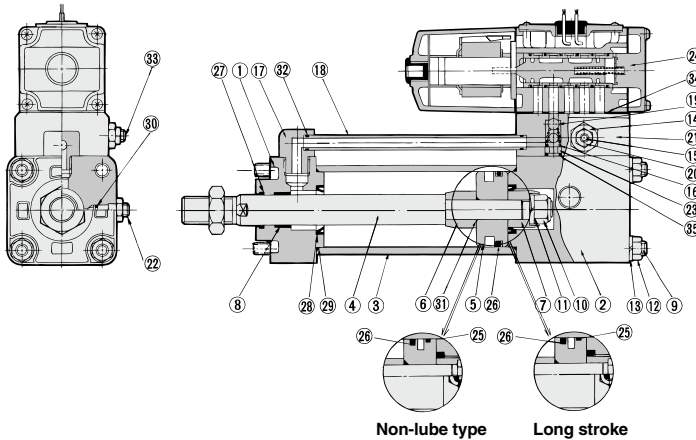
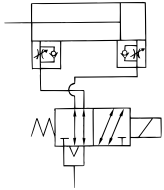
Using a screwdriver or its equivalent, push the center of the rubber plug on the head of the solenoid cap of the solenoid valve.

(It is not necessary to remove the rubber plug.)



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	Zinc 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	9/32
20	Lock nut	Carbon steel	Nickel plated
21	Sub-plate	Aluminum alloy	Platinum silver
22	Cushion valve	Rolled steel	Electroless nickel plated
23*	Valve port	Brass	
24	Solenoid valve ^{Note)}	—	Refer to the note below.
25	Wear ring	Resin	

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.

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			Non-lube Type		
Bore size (mm)	Kit no.	Contents	Bore size (mm)	Kit no.	Contents
40	CVS1-40-PS	Set of nos. above 26, 27, 28, 30, 32, 35.	40	CVS1N40-PS	Set of nos. above 26, 27, 29, 30, 32, 35.
50	CVS1-50-PS		50	CVS1N50-PS	
63	CVS1-63-PS		63	CVS1N63-PS	
80	CVS1-80-PS		80	CVS1N80-PS	
100	CVS1-100-PS		100	CVS1N100-PS	

* Seal kit includes 26, 27, 29, 30, 32, 35. Order the seal kit, based on each bore size. (The parts indicated with numbers 28 and 31 are not replaceable.)

* Seal kit includes a grease pack (ø40, ø50: 10 g, ø63, ø80: 20 g, ø100: 30 g).

Order with the following part number when only the grease pack is needed.

Grease pack part no.: GR-S-010 (10 g), GR-S-020 (20 g)

CVQ

CVQM

CVJ□

CVM□

CV3

CVS1

MVGQ

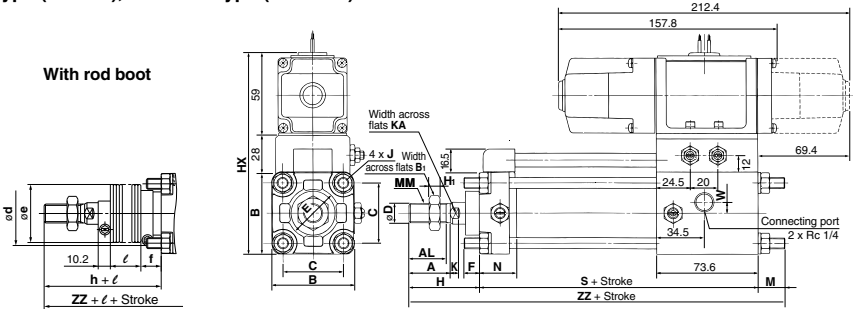
D-□

-X□

Series CVS1

Basic Style: CVS1B□

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



(mm)

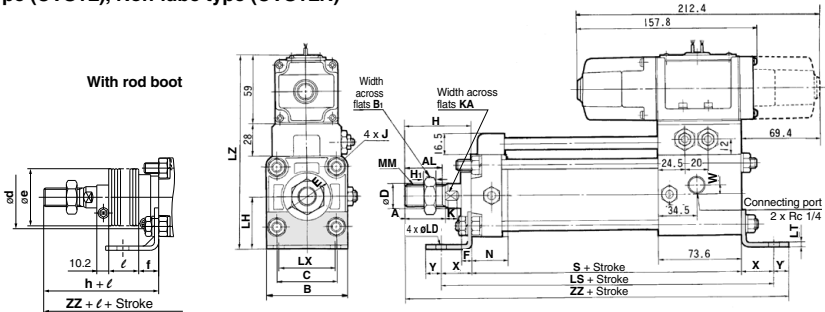
Bore size (mm)	Stroke range* (mm)	A	AL	B	B ₁	C	D	E	F	H ₁	HX	J	K	KA	M	MM	N	S
40	Up to 500	30	27	60	22	44	16	32	10	8	147	M8 x 1.25	6	14	19.4	M14 x 1.5	27	130.6
50	Up to 600	35	32	70	27	52	20	40	10	11	157	M8 x 1.25	7	18	16.4	M18 x 1.5	30	133.6
63	Up to 600	35	32	86	27	64	20	40	10	11	173	M10 x 1.25	7	18	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	10	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	10	26	21.4	M26 x 1.5	40	159.6

Bore size (mm)	W	Without rod boot				With rod boot				
		H	ZZ	d	e	f	h	ℓ	ZZ	
40	8	51	201	56	43	11.2	59	1/4 stroke	209	
50	8	58	208	64	52	11.2	66	1/4 stroke	216	
63	8	58	217	64	52	11.2	66	1/4 stroke	225	
80	0	71	245	76	65	12.5	80	1/4 stroke	254	
100	0	72	253	76	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)



(mm)

Bore size (mm)	Stroke range* (mm)	A	AL	B	B ₁	C	D	E	H ₁	F	J	K	KA	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	14	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	18	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	18	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	10	22	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	10	26	13.5	75	245.6	6	92	220	M26 x 1.5

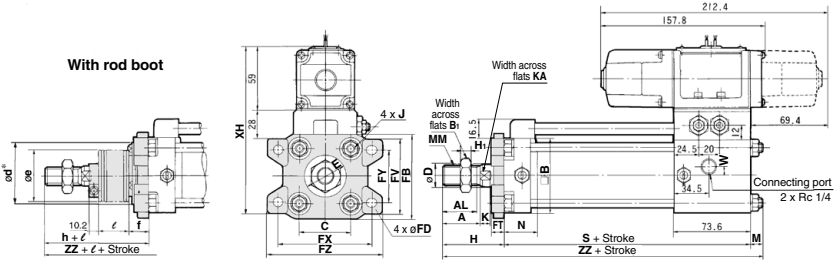
* The minimum stroke of the one with rod boot is 20 mm or more.
** Long stroke

Bore size (mm)	N	S	W	X	Y	Without rod boot				With rod boot			
						H	ZZ	d	e	f	h	ℓ	ZZ
40	27	130.6	8	27	13	51	221.6	56	43	11.2	59	1/4 stroke	229.6
50	30	133.6	8	27	13	58	231.6	64	52	11.2	66	1/4 stroke	239.6
63	31	140.6	8	34	16	58	248.6	64	52	11.2	66	1/4 stroke	256.6
80	37	152.6	0	44	16	71	283.6	76	65	12.5	80	1/4 stroke	292.6
100	40	159.6	0	43	17	72	291.6	76	65	14	81	1/4 stroke	300.6

Valve Mounted Cylinder Double Acting **Series CVS1**

Rod Side Flange Style: CVS1F□

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



(mm)

Bore size (mm)	Stroke range* (mm)	A	AL	B	B ₁	C	D	E	FB	FD	FT	FV	FX	FY	FZ	H ₁	HX	J	K	KA
40	Up to 500 601 to 900**	30	27	60	22	44	16	32	71	9	12	60	80	42	100	8	147	M8 x 1.25	6	14
50	Up to 600 601 to 1000**	35	32	70	27	52	20	40	81	9	12	70	90	50	110	11	157	M8 x 1.25	7	18
63	Up to 600 601 to 1000**	35	32	86	27	64	20	40	101	11.5	15	86	105	59	130	11	173	M10 x 1.25	7	18
80	Up to 750 751 to 1000**	40	37	102	32	78	25	52	119	13.5	18	102	130	76	160	13	189	M12 x 1.75	10	22
100	Up to 750 751 to 1000**	40	37	116	41	92	30	52	133	13.5	18	116	150	92	180	16	203	M12 x 1.75	10	26

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	

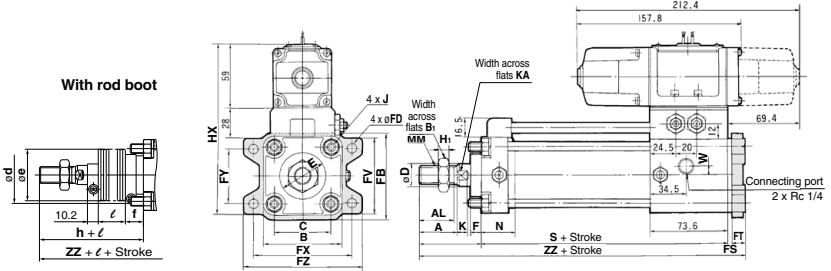
* The minimum stroke of the one with rod boot is 20 mm or more.

** Long stroke

*** Machine larger holes than the outside diameter od of the mounting bracket for rod boot when mounting the rod boot part to the through for mounting.

Head Side Flange Style: CVS1G□

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



(mm)

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

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

Bore size (mm)	K	KA	MM	N	S	W	Without rod boot		With rod boot						
							H	ZZ	d	e	f	h	ℓ	ZZ	
40	6	14	M14 x 1.5	27	130.6	8	51	197.6	56	43	11.2	59	1/4 stroke	205.6	
50	7	18	M18 x 1.5	30	133.6	8	58	207.6	64	52	11.2	66	1/4 stroke	215.6	
63	7	18	M18 x 1.5	31	140.6	8	58	213.6	64	52	11.2	66	1/4 stroke	221.6	
80	10	22	M22 x 1.5	37	152.6	0	71	241.6	76	65	12.5	80	1/4 stroke	250.6	
100	10	26	M26 x 1.5	40	159.6	0	72	249.6	76	65	14	81	1/4 stroke	258.6	

CVQ

CVQM

CVJ□

CVM□

CV3

CVS1

MVGQ

D-□

-X□

Valve Mounted Cylinder: Non-rotating Rod Type Double Acting **Series CVS1K**

Speed controller installed

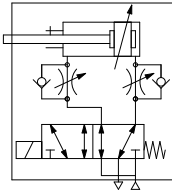
Operation type can be changed to rod extended when energized or rod retracted when energized.

A selection of solenoid valves is possible.

Single, double and 3 position solenoid valves are mountable.



Symbol
Air cushion



Made to Order Specifications

(For details, refer to pages 2009 to 2152.)

Symbol	Specifications
-XA□	Change of rod end shape
-XC7	Tie-rod, cushion valve, and tie-rod nut made of stainless steel
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC27	Double clevis and double knuckle joint pins made of stainless steel
-XC28	Compact flange made of SS400

Refer to pages 1893 to 2007 for cylinders with auto switches.

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

Specifications

Bore size (mm)	40	50	63
Type	Non-lube		
Action	Double acting		
Fluid	Air		
Proof pressure	1.5 MPa		
Maximum operating pressure	1.0 MPa		
Minimum operating pressure	0.05 MPa		
Ambient and fluid temperature	-10 to 60°C (No freezing)		
Cushion	Air cushion		
Stroke length tolerance	Up to 250 st ⁺¹⁰ ₀ , 251 to 600 st ⁺¹⁴ ₀		
Port size	Rc 1/4		
Lubrication	Not required (Non-lube)		
Electrical entry	Grommet, Conduit terminal, DIN terminal, DIN terminal with indicator light, Conduit terminal with surge voltage suppressor		
Rod non-rotating accuracy	±0.8°		
Allowable rotational torque	0.44 N·m or less		
Piston speed	50 to 500 mm/s* (Note)		
Allowable kinetic energy	2.4 J	4.4 J	7.8 J
Mounting style	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) Refer to page 1794 for operating piston speed for each size.

Solenoid Valve Specifications

Applicable solenoid valve model	VS4□24			
Coil rated voltage	100/200 VAC (50/60 Hz), 24 VDC			
Effective area of valve (Cv factor)	Single 26.5 mm ² (1.47)			
Allowable voltage	-15 to 10% of the rated voltage			
Coil insulation	Class B or equivalent (130°C)			
Apparent power (Note)	AC	Inrush	50 Hz	100 VA
			60 Hz	90 VA
		Holding	50 Hz	20 VA
			60 Hz	14 VA
Power consumption (Note)	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*

Please consult with SMC for longer strokes than the strokes marked with *.

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.

CVQ

CVQM

CVJ□

CVM□

CV3

CVS1

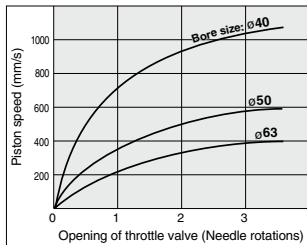
MVGQ

D-□

-X□

Series CVS1K

Opening Range of Throttle Valve and Piston Speed



Conditions: Operating pressure 0.5 MPa, Horizontal mounting, No load, Spring return side

• The actuating speeds above are for reference.

Handling

1. Adjusting of the piston speed
2. Interchange between the spring return style and the spring extend style

3. Manual override

Since the operations above 1. to 3. are the same as Series CVS1, refer to page 1786.

Accessory

Mounting		Basic style	Foot style	Rod side flange style	Head side flange style	Single clevis style	Double clevis style	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 shipped together with double clevis and double knuckle joint.

* Refer to page 1791 for dimensions and part numbers of the option. Refer to page 1795 for dimensions of the rod boot.

Weight

Bore size (mm)		40	50	63
Basic weight	Basic style	2.48	3.04	4.12
	Foot style	2.65	3.24	4.41
	Rod side flange style	2.88	3.64	5.08
	Head side flange style	2.98	3.78	5.08
	Single clevis style	2.74	3.48	4.87
	Double clevis style	2.73	3.46	4.89
	Trunnion style	3.08	3.78	5.46
Additional weight per each 50 mm of stroke		0.22	0.28	0.37
Accessory bracket		0.23	0.26	0.26
Double knuckle (With pin)		0.37	0.43	0.43

Calculation: (Example) CVS1KL40-100-1

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

⚠ Precautions

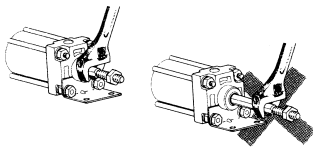
Be sure to read before handling. For Safety Instructions and Actuator Precautions, refer to front matter 39. For Series CVS1K, refer to page 1767.

Operating Precautions

⚠ Caution

1. Avoid using the air cylinder in such a way that rotational torque would be applied to the piston rod.

- If rotational torque is applied, the non-rotating guide will become deformed, causing a loss of non-rotating accuracy. Also, to screw a bracket or a nut onto the threaded portion at the end of the piston rod, make sure the retract the piston rod entirely, and place a wrench on the parallel sections of the rod that protrudes. To tighten, take precautions to prevent the tightening torque from being applied to the non-rotating guide.



Disassembly/Replacement

⚠ Caution

1. When replacing rod seals, please contact SMC.

Air leakage may be happened, depending on the position in which a rod seal is fitted. Thus, please contact SMC when replacing them.

Selection

⚠ Warning

1. Confirm the specifications.

Products in this catalog are designed to be used for compressed air systems. If not operated within the designated pressure or temperature, it may damage the products or cause malfunction. (Refer to specifications.)

2. Energizing continuously for a long period of time

- When the valve is continuously energized for a long period of time, the performance may deteriorate or effect peripheral equipment adversely since temperature rises when coils generate heat.

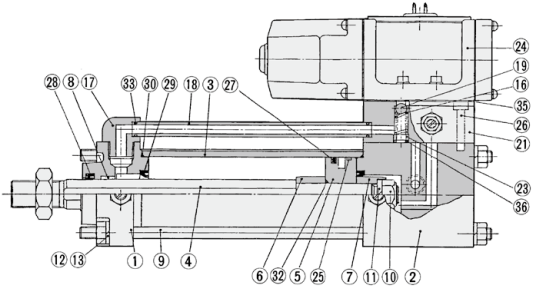
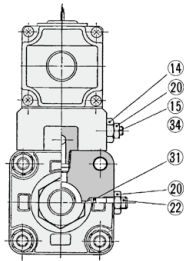
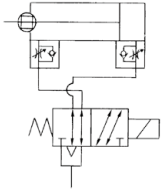
3. Mounting orientation

Metal seal: For single solenoids, mounting orientation is flexible. For double solenoids and 3 position valves, mount a spool valve horizontally.

Valve Mounted Cylinder: Non-rotating Rod Type Double Acting **Series CVS1K**

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*	Non-rotating guide	Oil impregnated sintered alloy	
9	Tie-rod	Carbon steel	Zinc 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	Chromated

* Not replaceable

No.	Description	Material	Note
19	Check ball	Polyurethane rubber	9/32
20	Lock nut	Carbon steel	Nickel plated
21	Sub-plate	Aluminum alloy	Platinum silver
22	Cushion valve	Rolled steel	Electroless nickel plated
23*	Valve port	Brass	
24	Solenoid valve	—	Refer to the note below.*
25	Wear ring	Resin	
26	Hexagon socket head cap screw	Chromium molybdenum steel	Black zinc chromated

(Note) Add "X46" at the end of the part number for single solenoid type.

* How to order solenoid valves

VS4□24-[Voltage] [Electrical entry]

No.	Description	Material	Note
27	Piston seal	NBR	
28	Rod seal	NBR	
29*	Cushion seal	NBR	
30	Cylinder tube gasket	NBR	

No.	Description	Material	Note
31	Cushion valve seal	NBR	
32*	Piston gasket	NBR	
33	Pipe gasket	NBR	
34	Speed adjustment valve seal	NBR	
35	Gasket	NBR	
36	Valve port gasket	NBR	

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
40	CVS1K40-PS	Set of nos. above
50	CVS1K50-PS	②⑦, ②⑧, ③①, ③②, ③③, ③④, ③⑤
63	CVS1K63-PS	③③, ③⑤

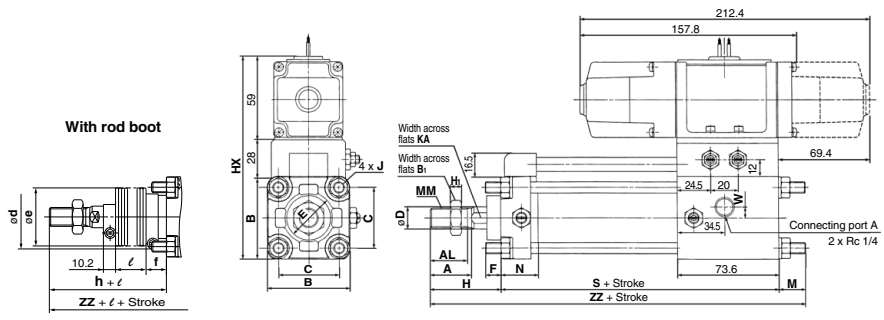
* Seal kit includes ②⑦, ②⑧, ③①, ③②, ③③, ③④, ③⑤. Order the seal kit, based on each bore size.

* Seal kit includes a grease pack (ø40, ø50: 10 g, ø63 or more: 20 g).

Order with the following part number when only the grease pack is needed.

Grease pack part no.: GR-S-010 (10 g), GR-S-020 (20 g)

Basic Style: CVS1K



Bore size (mm)	Stroke range (mm)*	A	AL	B	B ₁	C	D	E	F	H ₁	HX	J	KA	M	MM	N	S	W
40	to 500	30	27	60	22	44	16	32	10	8	147	M8 x 1.25	14	19.4	M14 x 1.5	27	130.6	8
50	to 600	35	32	70	27	52	20	40	10	11	157	M8 x 1.25	18	16.4	M18 x 1.5	30	133.6	8
63	to 600	35	32	86	27	64	20	40	10	11	173	M10 x 1.25	18	18.4	M18 x 1.5	31	140.6	8

Bore size (mm)	Without rod boot		With rod boot					
	H	ZZ	d	e	f	h	ℓ	ZZ
40	51	201	56	43	11.2	59	1/4 stroke	209
50	58	208	64	52	11.2	66	1/4 stroke	216
63	58	217	64	52	11.2	66	1/4 stroke	225

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

• External dimensions of each mounting bracket other than basic style are the same, except KA dimension. Refer to pages 1788 to 1791.

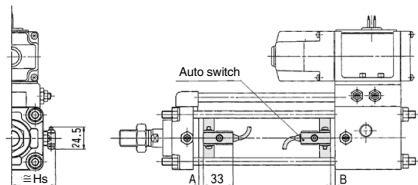
• For accessory, refer to page 1791.

Auto Switch Mounting 1

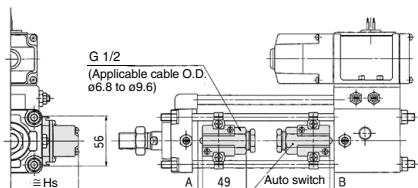
Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

<Band mounting style>

D-B5□/B64/B59W

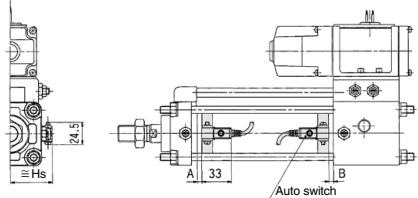


D-A3□/G39/K39

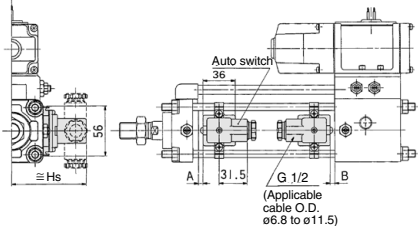


D-G5□/K59/G5□W/K59W

D-G59F/G5NT



D-A44



<Tie-rod mounting style>

D-A9□/A9□V

D-M9□/M9□V

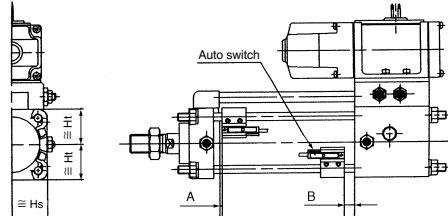
D-M9□W/M9□WV

D-M9□A/M9□AV

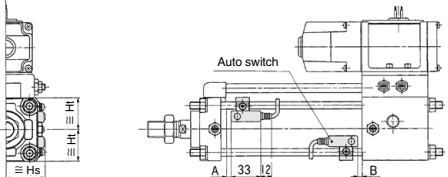
D-Z7□/Z80

D-Y59□/Y69□/Y7P/Y7PV

D-Y7□W/Y7□WV

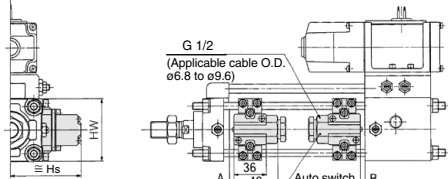


D-A5□/A6□/A59W



D-A3□C

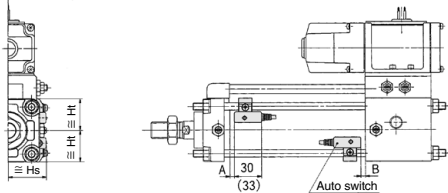
D-G39C/K39C



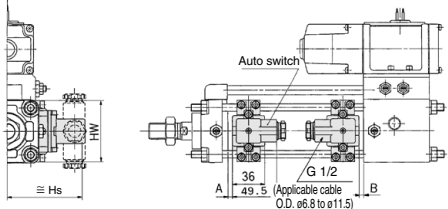
D-F5□/J59

D-F5NT

D-F5□W/J59W/F59F



D-A44C



(): Denotes the values of D-F5LF.

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

Auto Switch Proper Mounting Position

(mm)

Auto switch model Bore size (mm)	D-A9□ D-A9□V		D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-M9□AV		D-A5□ D-A6□ D-A3□ D-A3□C D-A44/A44C D-G39/G39C D-K39/K39C		D-B5□ D-B64		D-F5□ D-J59 D-F5□W D-J59W D-F59F		D-G5□W D-K59W D-G59F D-G5□ D-K59 D-G5NT		D-A59W		D-F5NT		D-B59W D-Z7□ D-Z80 D-Y59□ D-Y69□ D-Y7P D-Y7PW D-Y7□W D-Y7□WV			
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
40	3 (6)	7 (4)	7 (10)	11 (8)	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	—	—	7 (10)	11 (8)	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	5 (8.5)	11 (7.5)	9 (12.5)	15 (11.5)	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	8 (12)	14 (10)	12 (16)	18 (14)	2 (6)	8.5 (4)	2.5 (4.5)	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	10 (13.5)	16 (12.5)	14 (17.5)	20 (16.5)	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 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)

Note 4) D-A9□ and D-A9□V types cannot be mounted on ø50

Note 5) Adjust the auto switch after confirming the operating conditions in the actual setting.

Auto Switch Mounting Height

(mm)

Auto switch model Bore size (mm)	D-A9□ D-M9□ D-M9□W D-M9□A		D-A9□V		D-M9□V D-M9□WV D-M9□AV		D-B5□ D-B64 D-B59W D-G5□ D-K59 D-G5NT D-G5□W D-K59W D-G59F		D-A3□ D-G39 D-K39		D-A44		D-A5□ D-A6□ D-A59W		D-F5□ D-J59 D-F5□W D-J59W D-F59F D-F5NT		D-A3□C D-G39C D-K39C		D-A44C		D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W		D-Y69□ D-Y7PW D-Y7□WV		
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs
40	30	30	32	30	35	30	38	72.5	80.5	40	31	38.5	31	73	69	81	69	30	30	30.5	30				
50	34	34	—	—	39	34	43.5	78	86	43.5	35	42.5	35	78.5	77	86.5	77	34	34	35	34				
63	41	41	43.5	41	46	41	50.5	85	93	49	42	48	42	85.5	91	93.5	91	41	41	42.5	41				
80	49.5	49	51.5	49	54	49	59	93.5	101.5	55.5	50	54	50	94	107	102	107	49.5	48.5	51	48.5				
100	57	56	59.5	56	62.5	56	69.5	104	112	63	57.5	62	57.5	104	121	112	121	58.5	56	59	56				

* D-A9□ and D-A9□V types cannot be mounted on ø50

- CVQ
- CVQM
- CVJ□
- CVM□
- CV3
- CVS1
- MVGQ

- D-□
- X□

Auto Switch Mounting 2

Minimum Stroke For Auto Switch Mounting

n: Number of auto switches (mm)

Auto switch model	No. of auto switches mounted	Mounting brackets other than center trunnion	Center trunnion				
			ø40	ø50	ø63	ø80	ø100
D-A9□	2 (Different surfaces, Same surface), 1	15	75	—	80	85	90
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	$75 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	—	$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-A9□V	2 (Different surfaces, Same surface), 1	10	50	—	55	60	65
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	$50 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	—	$55 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-M9□ D-M9□W	2 (Different surfaces, Same surface), 1	15	—	80	85	90	95
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	—	$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-M9□A	2 (Different surfaces, Same surface), 1	15	—	85	90	95	105
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	—	$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-M9□V D-M9□WV	2 (Different surfaces, Same surface), 1	10	—	55	60	65	70
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	—	$55 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$70 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-M9□AV	2 (Different surfaces, Same surface), 1	10	—	60	65	75	80
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	—	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$80 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-A5□/A6□ D-F5□/J59 D-F5□W/J59W D-F59F	2 (Different surfaces, Same surface), 1	15	—	90	100	110	120
	n (Same surface)	$15 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	—	$90 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$100 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-A59W	2 (Different surfaces, Same surface)	20	—	90	100	110	120
	n (Same surface)	$20 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	—	$90 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$100 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
	1	15	—	90	100	110	120
D-F5NT	2 (Different surfaces, Same surface), 1	25	—	110	120	130	140
	n (Same surface)	$25 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	—	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$130 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$140 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-B5□/B64 D-G5□/K59 D-G5□W D-K59W D-G59F D-G5NT	2 Different surfaces	15	—	—	100	—	110
	Same surface	75	—	—	—	—	—
D-B59W	n	Different surfaces	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) ^{Note 1}	$90 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) ^{Note 2}	$100 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) ^{Note 2}	$110 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) ^{Note 2}	$120 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) ^{Note 2}
		Same surface	$75 + 50(n-2)$ (n = 2, 3, 4, ...)	$90 + 50(n-2)$ (n = 2, 4, 6, 8, ...) ^{Note 1}	$100 + 50(n-2)$ (n = 2, 4, 6, 8, ...) ^{Note 1}	$110 + 50(n-2)$ (n = 2, 4, 6, 8, ...) ^{Note 1}	$120 + 50(n-2)$ (n = 2, 4, 6, 8, ...) ^{Note 1}
	1	10	—	90	100	110	120
D-B59W	2	Different surfaces	20	—	90	100	110
		Same surface	75	—	—	—	—
	n	Different surfaces	$20 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) ^{Note 1}	$90 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) ^{Note 2}	$100 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) ^{Note 2}	$110 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) ^{Note 2}	$120 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) ^{Note 2}
		Same surface	$75 + 50(n-2)$ (n = 2, 3, 4, ...)	$90 + 50(n-2)$ (n = 2, 4, 6, 8, ...) ^{Note 1}	$100 + 50(n-2)$ (n = 2, 4, 6, 8, ...) ^{Note 1}	$110 + 50(n-2)$ (n = 2, 4, 6, 8, ...) ^{Note 1}	$120 + 50(n-2)$ (n = 2, 4, 6, 8, ...) ^{Note 1}
1	15	—	90	100	110	120	

Note 1) When "n" is an odd number, an even number that is one larger than this odd number is used for the calculation.

Note 2) When "n" is an odd number, a multiple of 4 that is larger than this odd number is used for the calculation.

Minimum Stroke For Auto Switch Mounting

n: Number of auto switches (mm)

Auto switch model	No. of auto switches mounted	Mounting brackets other than center trunnion	Center trunnion				
			ø40	ø50	ø63	ø80	ø100
D-A3□ D-G39 D-K39	2	Different surfaces	35	100	100	100	110
		Same surface	100				
	n	Different surfaces	$35 + 30(n-2)$ (n = 2, 3, 4, ...)	$100 + 30(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$100 + 30(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$100 + 30(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	
		Same surface	$100 + 100(n-2)$ (n = 2, 3, 4, ...)	$100 + 100(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)			
		1	10	75	80	90	
D-A44	2	Different surfaces	35	100	100	100	
		Same surface	55	75	80	90	
	n	Different surfaces	$35 + 30(n-2)$ (n = 2, 3, 4, ...)	$75 + 30(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$80 + 30(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$100 + 30(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	
		Same surface	$55 + 50(n-2)$ (n = 2, 3, 4, ...)	$75 + 50(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$80 + 50(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$90 + 50(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	
		1	10	75	80	90	
D-A3□C D-G39C D-K39C	2	Different surfaces	20	100	100	100	
		Same surface	100				
	n	Different surfaces	$20 + 35(n-2)$ (n = 2, 3, 4, ...)	$100 + 35(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)			
		Same surface	$100 + 100(n-2)$ (n = 2, 3, 4, 5-...)	$100 + 100(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)			
		1	10	75	80	90	
D-A44C	2	Different surfaces	20	75	80	90	
		Same surface	55				
	n	Different surfaces	$20 + 35(n-2)$ (n = 2, 3, 4, ...)	$75 + 35(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$80 + 35(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$90 + 35(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	
		Same surface	$55 + 50(n-2)$ (n = 2, 3, 4, ...)	$75 + 50(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$80 + 50(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$90 + 50(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	
		1	10	75	80	90	
D-Z7□/Z80 D-Y59□/Y7P D-Y7□W	2 (Different surfaces, Same surface), 1	15	80	85	90	95	105
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8-...) Note 1)	$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16-...) Note 2)	$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16-...) Note 2)	$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16-...) Note 2)	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16-...) Note 2)	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16-...) Note 2)
D-Y69□/Y7PV D-Y7□WV	2 (Different surfaces, Same surface), 1	10	65		75	80	90
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8-...) Note 1)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16-...) Note 2)		$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16-...) Note 2)	$80 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16-...) Note 2)	$90 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16-...) Note 2)

Note 1) When "n" is an odd number, an even number that is one larger than this odd number is used for the calculation.
 Note 2) When "n" is an odd number, a multiple of 4 that is larger than this odd number is used for the calculation.

- CVQ
- CVQM
- CVJ□
- CVM□
- CV3
- CVS1
- MVGQ

- D-□
- X□

Auto Switch Mounting 3

Operating Range

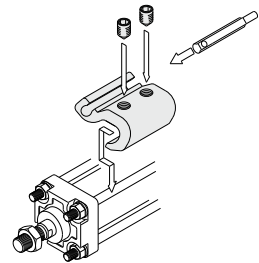
Auto switch model	Bore size (mm)				
	40	50	63	80	100
D-A9□/A9□V	7	—	9	9	9
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	4.5	5	5.5	5	6
D-Z7□/Z80	8	7	9	9.5	10.5
D-A3□/A44 D-A3□C/A44C	9	10	11	11	11
D-A5□/A6□					
D-B5□/B64	13	13	14	14	15
D-A59W	14	14	17	16	18
D-B59W	14	14	17	16	18
D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV	8	7	5.5	6.5	6.5
D-F5□/J59 D-F5□W/J59W D-F5NT/F59F	4	4	4.5	4.5	4.5
D-G5□/K59 D-G5□W/K59W D-G5NT/G59F	5	6	6.5	6.5	7
D-G39/K39 D-G39C/K39C	9	9	10	10	11

* D-A9□ and D-A9□V types cannot be mounted on ø50
 * Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion.)
 There may be the case it will vary substantially depending on an ambient environment.

Auto Switch Mounting Bracket Part No.

<Tie-rod mounting style>

Auto switch model	Bore size (mm)				
	ø40	ø50	ø63	ø80	ø100
D-A9□/A9□V D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	BA7-040	BA7-040	BA7-063	BA7-080	BA7-080
D-A5□/A6□/A59W D-F5□/J59/F5□W/J59W D-F5NT/F59F	BT-04	BT-04	BT-06	BT-08	BT-08
D-A3□C/A44C/G39C/K39C	BA3-040	BA3-050	BA3-063	BA3-080	BA3-100
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV	BA4-040	BA4-040	BA4-063	BA4-080	BA4-080



* Mounting example of D-A9□(V)/M9□(V)/M9□W(V)/M9□A(V)

<Band mounting style>

Auto switch model	Bore size (mm)				
	ø40	ø50	ø63	ø80	ø100
D-A3□/A44/G39/K39	BD1-04M	BD1-05M	BD1-06M	BD1-08M	BD1-10M
D-B5□/B64/B59W D-G5□/K59/G5□W/K59W D-G59F/G5NT	BA-04	BA-05	BA-06	BA-08	BA-10

* D-A9□ and D-A9□V types cannot be mounted on ø50.
 * Auto switch mounting brackets are included in D-A3□C/A44C/G39C/K39C. When the auto switch mounting bracket is needed separately, order it with the above part number. When ordering an auto switch alone, specify it as shown below according to the cylinder size.
 Ex.) ø40: D-A3□C-4, ø50: D-A3□C-5
 ø63: D-A3□C-6, ø80: D-A3□C-8, ø100: D-A3□C-10

Other than the models listed in "How to Order", the following auto switches are applicable.
For detailed specifications, refer to pages 1893 to 2007.

Auto switch type	Model	Electrical entry (Fetching direction)	Features	
Reed	D-A93V, A96V	Grommet (Perpendicular)	—	
	D-A90V		Without indicator light	
	D-A53, A56, B53, Z73, Z76	Grommet (In-line)	—	
	D-A67, Z80		Without indicator light	
Solid state	D-M9NV, M9PV, M9BV	Grommet (Perpendicular)	—	
	D-Y69A, Y69B, Y7PV		—	
	D-M9NWV, M9PWV, M9BWW		Diagnostic indication (2-color indication)	
	D-Y7NWW, Y7PWW, Y7BWW		—	
	D-M9NAV, M9PAV, M9BAV		Water resistant (2-color indication)	
	D-Y59A, Y59B, Y7P		—	
	D-F59, F5P, J59	Grommet (In-line)	—	
	D-Y7NW, Y7PW, Y7BW		Diagnostic indication (2-color indication)	
	D-F59W, F5PW, J59W		—	
	D-F5NT, G5NT		With timer	

* With pre-wired connector is also available in solid state auto switches. For details, refer to pages 1960 and 1961.

* Normally closed (NC = b contact), solid state auto switch (D-F9G/F9H/Y7G/Y7H type) are also available. For details, refer to pages 1911 and 1913.

* Wide range detection type, solid state auto switches (D-G5NB type) are also available. Refer to page 1953 for details.

- CVQ**
- CVQM**
- CVJ**
- CVM**
- CV3**
- CVS1**
- MVGQ**

- D-**
- X**