

# ISO/VDMA Cylinder: Large Bore Size Type

## Series C95

ø160, ø200, ø250, ø320

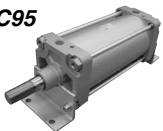
RoHS

Conforming to ISO 15552/ISO 6431/CETOP RP43P/VDMA 24562



- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- C76
- C85
- C95**
- CP95
- NCM
- NCA
- D-
- X
- 20-
- Data

### Series Variations

Series	Action	Type		Basic	Standard variations		Option	Bore (mm)	Page
		Single rod	Non-lube		Built-in magnet	Stainless steel rod			
<b>Large Bore Size</b> <b>Series C95</b> 	Double acting	Single rod	Non-lube	●	●		Heat resistant	160 200 250 320	6-12-34

# ISO/VDMA Cylinder: Large Bore Size Type Double Acting, Single Rod

## Series C95

ø160, ø200, ø250, ø320

### How to Order

Without auto switch

**C95S** **B** **160** **100**

With auto switch

**C95SD** **B** **160** **100** **A53** **S**

Built-in magnet

Mounting style

<b>B</b>	Basic/without bracket style
<b>L</b>	Axial foot style
<b>F</b>	Rod side flange style
<b>G</b>	Head side flange style
<b>C</b>	Single clevis style
<b>D</b>	Double clevis style
<b>T</b>	Center trunnion style

Bore size

<b>160</b>	160 mm
<b>200</b>	200 mm
<b>250</b>	250 mm
<b>320</b>	320 mm

Stroke (mm)

Refer to "Standard Stroke" on page 6-12-35.

Number of auto switches

<b>Nil</b>	2 pcs.
<b>S</b>	1 pc.
<b>3</b>	3 pcs.
<b>n</b>	"n" pcs.

Auto switch

**Nil** Without auto switch

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

**Applicable Auto Switches**/Refer to the **Web Catalog** 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-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	No	3-wire (NPN)	24 V	5 V, 12 V	—	<b>M9N</b>	●	●	●	○	○	IC circuit	Relay, PLC		
				3-wire (PNP)				<b>M9P</b>	●	●	●	○	○				
		2-wire		12 V	<b>M9B</b>	●	●	●	○	○	—						
		Terminal conduit		3-wire (NPN)	24 V	5 V, 12 V	—	<b>G39</b>	—	—	—	—	—	—		—	IC circuit
	2-wire		<b>K39</b>	—				—	—	—	—	—	—				
	Diagnostic indication (2-color indicator)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	<b>M9NW</b>	●	●	●	○	○	IC circuit			
				3-wire (PNP)				<b>M9PW</b>	●	●	●	○	○	—			
	2-wire			12 V	<b>M9BW</b>	●	●	●	○	○	—						
	Water resistant (2-color indicator)			3-wire (NPN)	24 V	5 V, 12 V	—	<b>M9NA</b> *1	○	○	●	○	○	—		IC circuit	
		3-wire (PNP)	<b>M9PA</b> *1	○				○	●	○	○	—					
With diagnostic output (2-color indicator)	Grommet	No	2-wire	24 V	12 V	—	<b>M9BA</b> *1	○	○	●	○	○	—				
			4-wire (NPN)				<b>F59F</b>	●	—	●	○	○	IC circuit				
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	24 V	5 V	—	<b>A96</b>	●	—	●	—	—	IC circuit	Relay, PLC		
				12 V				100 V	<b>A93</b>	●	●	●	—	—			
				5 V, 12 V	100 V or less	<b>A90</b>	●	—	●	—	—	IC circuit					
				100 V, 200 V	200 V or less	<b>A54</b>	●	—	●	●	—	—					
		Terminal conduit	No	2-wire	24 V	12 V	—	—	<b>A64</b>	●	—	●	—	—		—	
									<b>A33</b>	—	—	—	—	—		—	—
									<b>A34</b>	—	—	—	—	—		—	—
									<b>A44</b>	—	—	—	—	—		—	—
DIN terminal	Yes	2-wire	24 V	12 V	—	—	<b>A59W</b>	●	—	●	—	—	—	Relay, PLC			
							100 V, 200 V	—	—	—	—	—	—	—			
Diagnostic indication (2-color indicator)	Grommet	No	—	—	—	—	<b>A59W</b>	●	—	●	—	—	—				

\*1 Water-resistant type auto switches can be mounted on the above models, but SMC cannot guarantee water resistance. Please contact SMC regarding water-resistant types with the above model numbers.

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

\* Solid state auto switches marked with a "O" are produced upon receipt of order.

\* Since there are applicable auto switches other than those listed above, refer to page 6-12-41-2 for details.

\* Auto switches other than the D-G39/K39/A3□/A44 are shipped with the cylinder, but are not mounted to the cylinder. (Only the auto switch mounting brackets are assembled before shipment.)

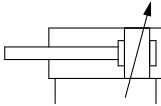
\* D-G39/K39/A3□/A44 auto switches (band mounting type) can only be mounted on ø160 and ø200.

# ISO/VDMA Cylinder: Large Bore Size Type Double Acting, Single Rod Series C95

## Specifications

Bore size (mm)	160	200	250	320
Action	Double acting			
Fluid	Air			
Proof pressure	1.5 MPa			
Max. operating pressure	1.0 MPa			
Min. operating pressure	0.05 MPa			
Ambient and fluid temperature	Without auto switch: -10 to 70°C (No freezing) With auto switch: -10 to 60°C (No freezing)			
Lubrication	Not required (Non-lube)			
Operating piston speed	50 to 500 mm/sec			
Allowable stroke tolerance	Up to 250: ${}^{+1.0}_0$ , 251 to 1000: ${}^{+1.4}_0$ , 1001 to 1500: ${}^{+1.8}_0$			
Cushion	Both ends (Air cushion)			
Thread tolerance	JIS Class 2			
Port size	G 3/4		G 1	
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Center trunnion style			

**Symbol**  
Double acting



## Minimum Stroke for Auto Switch Mounting

Refer to page 6-12-41-1 for "Minimum Stroke for Auto Switch Mounting".

## Standard Stroke

Bore size (mm)	Max.* stroke
160	1600
200	2000
250	2400
320	2400

Intermediate strokes are available.

\* Please consult with SMC for longer strokes.

## Mounting Bracket Part No.

Bore size (mm)	160	200	250	320
Foot (1)	L5160	L5200	L5250	L5320
Flange	F5160	F5200	F5250	F5320
Single clevis	C5160	C5200	C5250	C5320
Double clevis	D5160	D5200	D5250	D5320

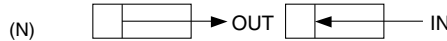
Note 1) Two foot brackets and mounting bolts (4 pieces) are included in this no.

Note 2) Accessories for mounting brackets are as follows

Foot, Flange, Single clevis: Mounting bolts

Double clevis : Clevis pin, Retaining rings, Mounting bolts

## Theoretical Output



Bore size (mm)	Rod diameter (mm)	Operating direction	Piston area (mm <sup>2</sup> )	Operating pressure (MPa)										
				0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0		
160	40	OUT	20106	4021	6032	8042	10053	12064	14074	16085	18095	20106		
		IN	18850	3770	5655	7540	9425	11310	13195	15080	16965	18850		
200	40	OUT	31416	6283	9425	12566	15708	18850	21991	25133	28274	31416		
		IN	30159	6032	9048	12064	15080	18095	21111	24127	27143	30159		
250	50	OUT	49087	9817	14726	19635	24544	29452	34361	39270	44178	49087		
		IN	47124	9425	14137	18850	23562	28274	32987	37699	42412	47124		
320	60	OUT	80425	16085	24127	32170	40212	48255	56297	64340	72382	80425		
		IN	77597	15519	23279	31039	38799	46558	54318	62078	69838	77597		

Note) Theoretical force (N) = Pressure (MPa) x Piston area (mm<sup>2</sup>)

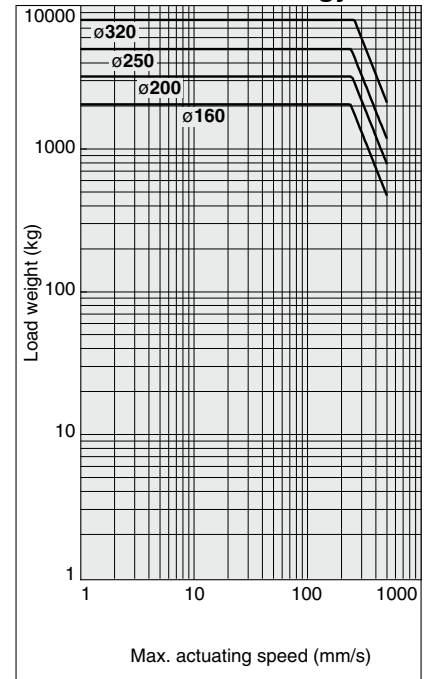
## Weight/Aluminum Tube

Bore size (mm)		160	200	250	320
Basic weight	Basic style	14.54	20.20	37.17	56.20
	Foot style	19.44	27.96	52.17	89.20
	Flange style	16.99	31.95	57.46	90.75
	Single clevis style	21.44	29.30	55.77	87.95
	Double clevis style	20.84	29.45	55.63	88.95
	Trunnion style	19.04	27.43	51.57	78.70
Additional weight per each 50 mm of stroke	All mounting brackets	0.83	0.9	1.6	2.94
Accessory	Single rod clevis	1.62	1.62	2.76	5.00
	Double clevis (With pin)	3.92	3.92	6.69	9.90

Calculation (Example) C95SD160-100

- Double clevis style weight 20.84 (kg)
  - Additional weight ... 0.83 (kg/50 mm stroke)
  - Cylinder stroke ... 100 (mm)
- $$20.84 + 0.83 \times 100 \div 50 = 22.50 \text{ kg}$$

## Allowable Kinetic Energy



Example:

Load limit at rod end when air cylinder ø200 is actuated with max. actuating speed 500 mm/s. See the intersection of lateral axis 500 mm/s and ø200 line, and extend the intersection to left. Thus the allowable load is 800 kg.

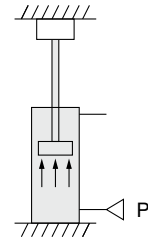
# Series C95

## Relationship between Cylinder Size and Maximum Stroke

The below table shows the applicable maximum stroke (in cm units), found by calculation assuming the case where the force generated by the cylinder itself acts as buckling force on the piston rod, or piston rod and cylinder tube.

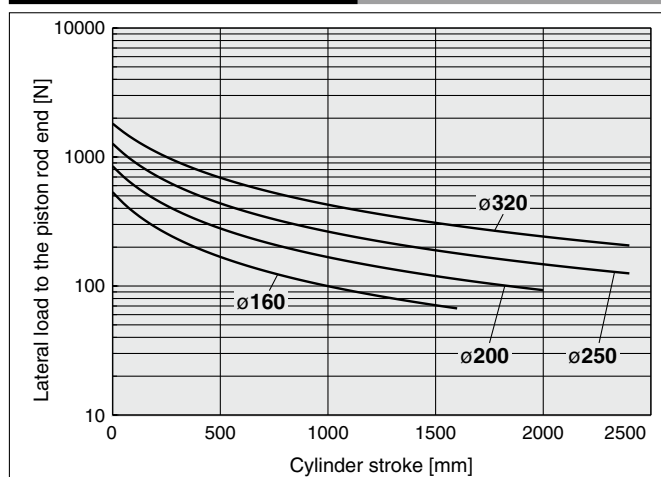
Therefore, it is possible to find the applicable maximum stroke for each cylinder size using the relationship between the size of the operating pressure and the cylinder support type, regardless of the load ratio.

[Reference] If it is stopped with the external stopper on the cylinder extension side, even with a light load, the maximum generated force of the cylinder will act on the cylinder itself.



Mounting			Operating pressure [MPa]	Maximum stroke that can be used according buckling strength				
Mounting bracket diagram		Nominal symbol		ø160	ø200	ø250	ø320	
Foot: L	Rod flange: F	Head flange: G	0.3	120	93	118	134	
				0.5	90	69	88	100
					0.7	74	56	72
			0.3	50	36	47	53	
				0.5	35	24	32	36
					0.7	27	18	24
Clevis: C, D		Center trunnion: T	0.3	114	87	111	124	
				0.5	84	63	81	91
					0.7	68	50	65
			0.3	162	125	159	178	
				0.5	122	93	119	133
					0.7	100	77	97
Foot: L	Rod flange: F	Head flange: G	0.3	363	287	361	407	
				0.5	279	219	277	312
					0.7	233	183	231
			0.3	172	133	169	190	
				0.5	130	99	127	142
					0.7	107	81	104
Foot: L	Rod flange: F	Head flange: G	0.3	519	412	517	582	
				0.5	399	316	397	448
					0.7	335	265	333
			0.3	250	196	247	277	
				0.5	190	148	187	210
					0.7	158	122	155

## Allowable Lateral Load

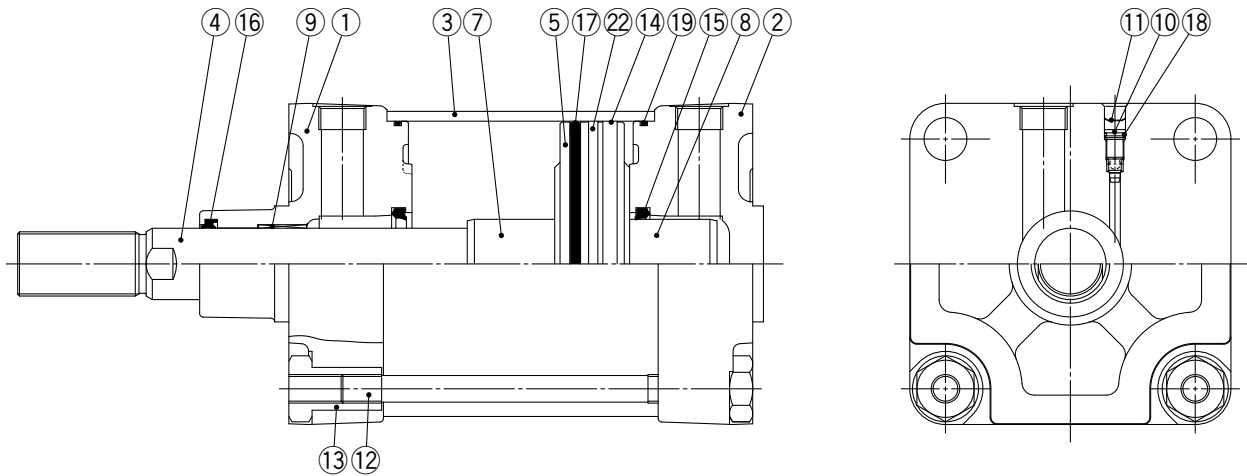




# Series C95

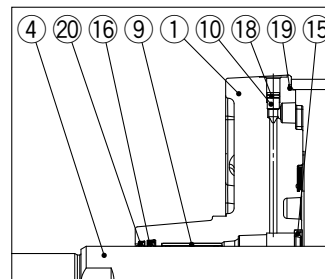
## Construction

[First angle projection]

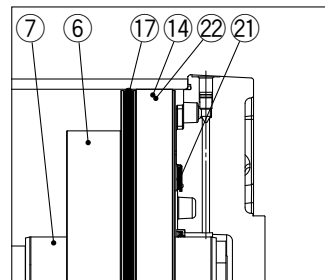


### Component Parts

No.	Description	Material	Qty.	Note
1	Rod cover	Aluminum casting	1	
2	Head cover	Aluminum casting	1	
3	Cylinder tube	Aluminum alloy	1	
4	Piston rod	Carbon steel	1	
5	Piston	Aluminum alloy	1	
6	Piston spacer	Aluminum alloy	1	ø320
7	Cushion ring A	Rolled steel	1	
8	Cushion ring B	Rolled steel	1	
9	Bushing	Bearing alloy	1	
10	Cushion valve	Steel wire	2	
11	Snap ring	Steel for spring	2	ø160 to ø250
12	Tie rod	Carbon steel	4	
13	Tie rod nut	Carbon steel	8	
14	Wear ring	Resin	1	
15	Cushion seal	Urethane	2	ø160 to ø250
		NBR	2	ø320
16	Rod seal	NBR	1	
17	Piston seal	NBR	1	
18	Cushion valve seal	NBR	2	
19	Cylinder tube gasket	NBR	2	
20	Scraper	NBR	1	ø320
21	Bumper	Urethane	2	ø320
22	Magnet		(1)	



In case of ø320



In case of ø320

### Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
160	CS95-160	Set of the nos. 14,
200	CS95-200	15, 16, 17, 19
250	CS95-250	In case of ø320,
320	CS95-320	also add 20

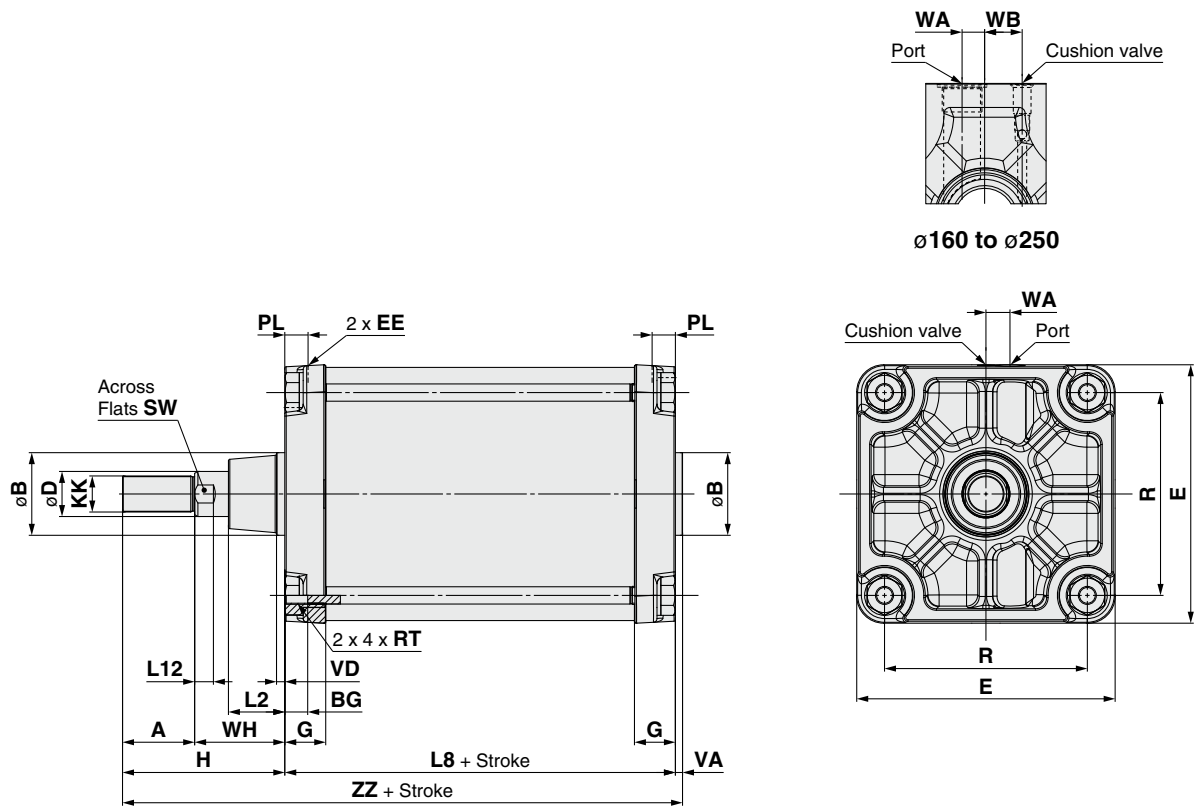
\* Seal kits consist of items 14 to 20 contained in one kit, and can be ordered using the order number for each respective tube bore size.

# ISO/VDMA Cylinder: Large Bore Size Type Double Acting, Single Rod Series C95

## Dimensions: Without Mounting Bracket

[First angle projection]

C95SB | Bore size | Stroke



- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- C76
- C85
- C95**
- CP95
- NCM
- NCA
- D-
- X
- 20-
- Data

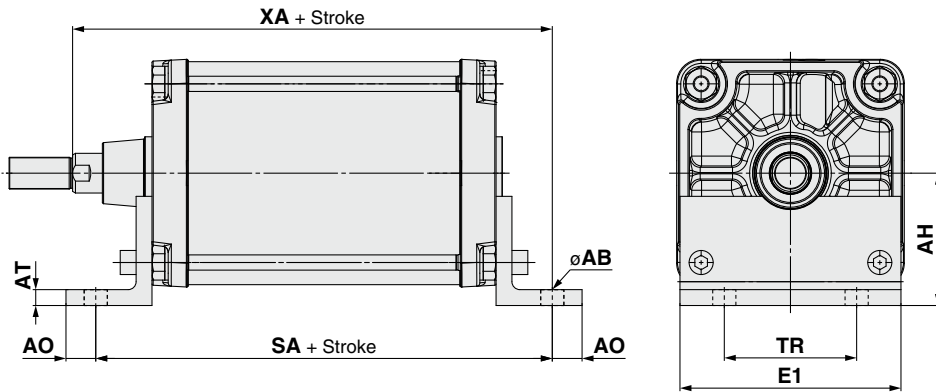
Bore size (mm)	A	øB d11	BG	øD	E	EE	G	H	KK	L2	L8	L12	PL	R	RT	SW	VA	VD	WA	WB	WH	ZZ
160	72	65	25	40	180	G3/4	55	152	M36 x 2	50	180	15	30	140	M16 x 2	36	6	8	15	25	80	338
200	72	75	25	40	220	G3/4	57	167	M36 x 2	55	180	15	35	175	M16 x 2	36	6	15	18	25	95	353
250	84	90	27	50	270	G1	59	189	M42 x 2	65	200	20	31	220	M20 x 2.5	46	10	20	20	28	105	399
320	96	110	30	60	344	G1	54.5	216	M48 x 2	75	220	25	31	270	M24 x 3	55	9.5	11	32	—	120	445.5

# Series C95

## Dimensions: Cylinder Mounting Accessory

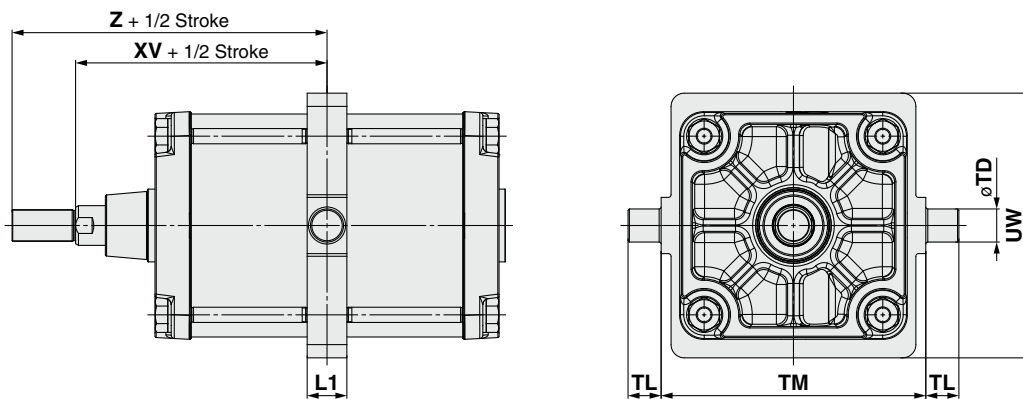
[First angle projection]

### Foot style (L)



Bore size (mm)	E1	TR	AO	AT	XA	SA	AH	øAB
160	Max. 195	115	Max. 25	9	320	300	115	18
200	Max. 238	135	Max. 35	12	345	320	135	22
250	Max. 290	165	Max. 40	14.5	380	350	165	26
320	Max. 334	200	Max. 45	24	425	390	200	35

### Center trunnion style (T)



Bore size (mm)	L1	XV	Z	TL h14	øTD e8	TM h14	UW
160	Max. 50	170	242	32	32	200	Max. 220
200	Max. 50	185	257	32	32	250	Max. 260
250	Max. 60	205	289	40	40	320	Max. 320
320	Max. 70	230	326	50	50	400	Max. 400

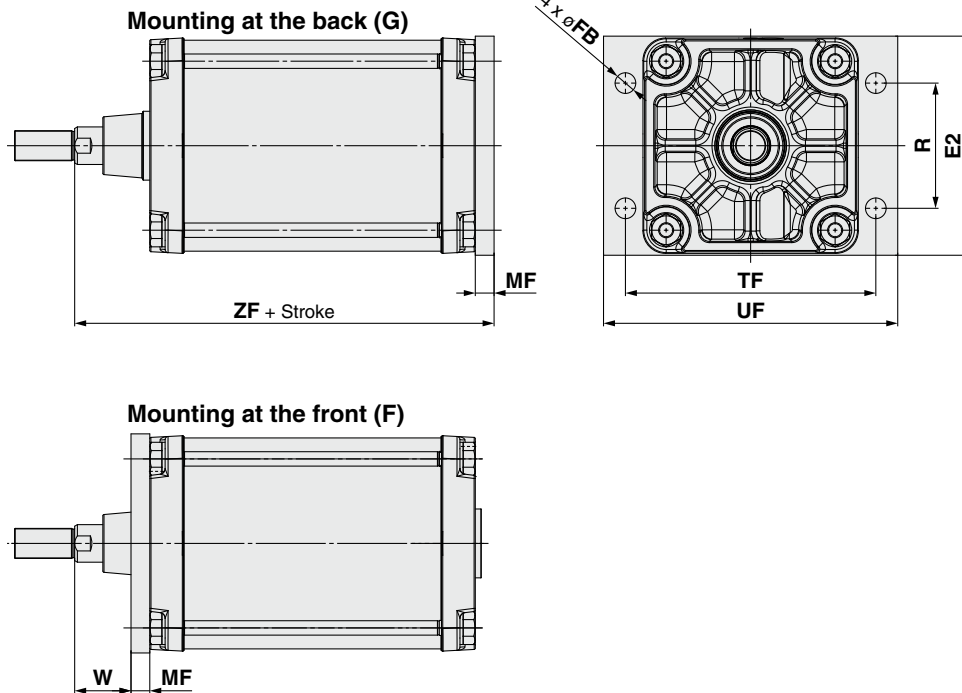


# ISO/VDMA Cylinder: Large Bore Size Type Double Acting, Single Rod Series C95

## Dimensions: Cylinder Mounting Accessory

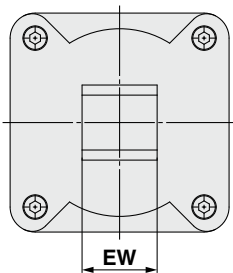
[First angle projection]

### Flange style (F, G)

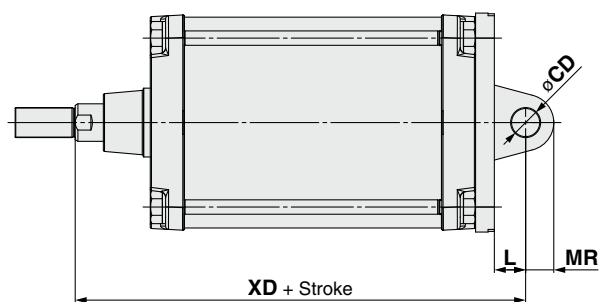
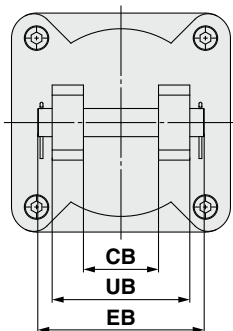


Bore size (mm)	R	W	MF	ZF	øFB	TF	UF	E2
160	115	60	20	280	18	230	Max. 280	Max. 195
200	135	70	25	300	22	270	Max. 320	Max. 238
250	165	80	25	330	26	330	Max. 395	Max. 290
320	200	90	30	370	33	400	Max. 475	Max. 353

### Head side single clevis style (C)



### Head side double clevis style (D)



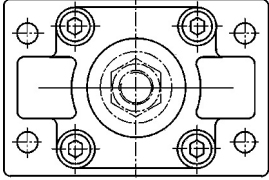
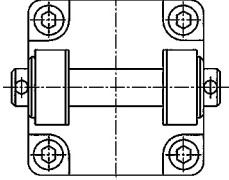
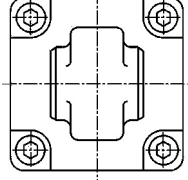
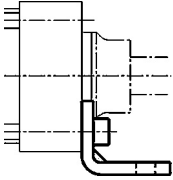
Bore size (mm)	øCD H9	EB	L	XD	UB h14	CB H14	EW -0.5 -1.2	MR
160	30	Max. 209	Min. 35	315	170	90	90	Max. 31
200	30	Max. 209	Min. 35	335	170	90	90	Max. 31
250	40	Max. 249	Min. 45	375	200	110	110	Max. 41
320	45	Max. 269	Min. 50	420	220	120	120	Max. 46

- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- C76
- C85
- C95**
- CP95
- NCM
- NCA
- D-
- X
- 20-
- Data

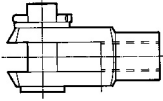
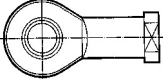
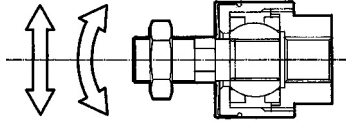
# Series C95

## Accessory

### Mounting Accessory, Cylinder

	<b>F</b> Rod/Head end flange	<b>D</b> Female head end clevis (Corresponds to E accessories)	<b>C</b> Male head end clevis
Bore size (mm)	 <p>Supplied with 4 screws.</p>	 <p>Supplied with bolt, safety device and 4 screws.</p>	 <p>Supplied with 4 screws.</p>
<b>160</b> <b>200</b> <b>250</b> <b>320</b>	F5160 F5200 F5250 F5320	D5160 D5200 D5250 D5320	C5160 C5200 C5250 C5320
	See page 6-12-38-1 for dimensions.	See page 6-12-38-1 for dimensions.	See page 6-12-38-1 for dimensions.
Bore size (mm)	<b>L</b> Foot  <p>Supplied with two pieces Supplied with 4 screws</p>		
<b>160</b> <b>200</b> <b>250</b> <b>320</b>	L5160 L5200 L5250 L5320		
	See page 6-12-38 for dimensions.		

### Mounting Accessory, Rod

	<b>GKM</b> Rod clevis ISO 8140	<b>KJ</b> Piston rod ball joint ISO 8139	<b>JA</b> Floating joint
Bore size (mm)	 <p>Supplied with bolts and safety devices.</p>		
<b>160</b> <b>200</b> <b>250</b> <b>320</b>	GKM35-54 GKM35-54 GKM40-84 GKM50-96	KJ36D KJ36D KJ42D KJ48D	JA160-36-200 JA160-36-200
	See page 6-12-39 for dimensions.	See page 6-12-39 for dimensions.	See page 6-12-39 for dimensions.

# ISO/VDMA Cylinder: Large Bore Size Type Double Acting, Single Rod Series C95

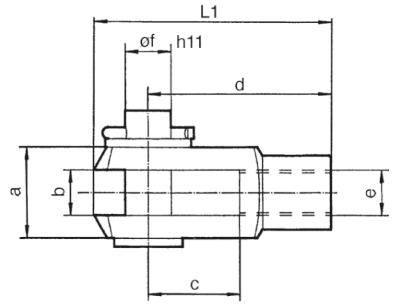
## Dimensions: Piston Rod Mounting Accessory

[First angle projection]

### Piston Rod Clevis (ISO 8140) Steel, Zinc Chromate Plated

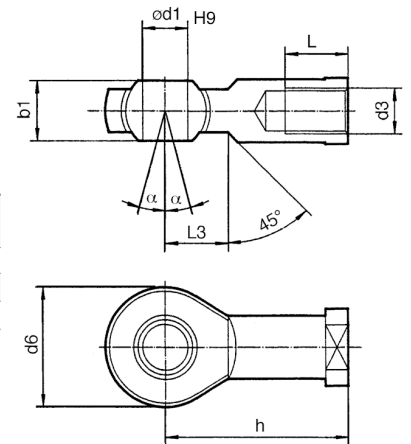
Part no.	Bore size (mm)	e	b	d	øf h11	L1 max.	c min.	a max.	L min.
GKM35-54	160/200	M36 x 2	35 +0.60 +0.15	144	35	201	54*	70	57
GKM40-84	250	M42 x 2	40 +0.60 +0.15	168	40	245	84	85	77
GKM50-96	320	M48 x 2	50 +0.60 +1.15	192	50	265	96	96	73

\* Dimension c for GKM35-54 is substandard of ISO 8140.  
It is min.72 in ISO 8140 standard.



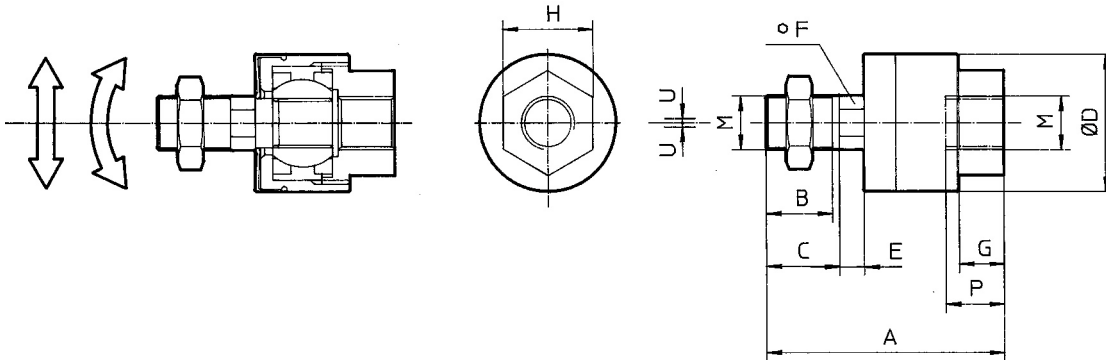
### Piston Rod Ball Joint (ISO 8139) Steel, Zinc Chromate Plated

Part no.	Bore size (mm)	d3	d1 H9	h	d6 max.	b1 h12	L min.	α	L3
KJ36D	160/200	M36 x 2	35	125	80	43	56	19°	41
KJ42D	250	M42 x 2	40	142	91	49	60	16°	45
KJ48D	320	M48 x 2	50	162	117	60	65	14°	58



### Floating Joint JA Steel

Bore size (mm)	M	Part no.	A	B	C	øD	E	F	G	H	P	U	Load (kN)	Weight (g)	Angle
160, 200	M36 x 2	JA160-36-200	178	51	55	96	16	55	24	55	42	3	71	4700	5°



CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

**C95**

CP95

NCM

NCA

D-

-X

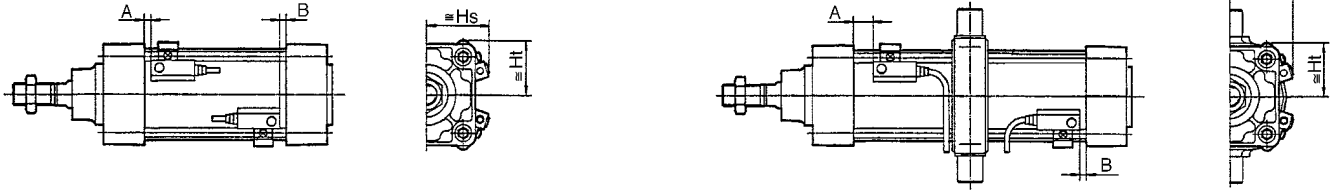
20-

Data

# Series C95

# Auto Switch Mounting

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



### Auto Switch Mounting Position

Bore size (mm)	D-M9□(V) D-M9□W(V) D-M9□A(V)		D-A9□(V)		D-F5□/F5□W D-J59/J59W D-F59F/F5BAL		D-F5NTL		D-A5□/A6□		D-A59W		D-Y59□/Y69□ D-Y7P(V)/Y7□W(V) D-Y7BAL D-Z7□/Z80		D-G39/K39 D-A3□/A44	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
160	29.5	28.5	25.5	24.5	26	25	31	30	19.5	18.5	23.5	22.5	23	22	19.5	18.5
200	27	27	23	23	23.5	23.5	28.5	28.5	17	17	21	21	20.5	20.5	17	17
250	30	40	26	36	26.5	36.5	31.5	41.5	20	30	24	34	—	—	—	—
320	77	22	73	18	—	—	—	—	—	—	—	—	—	—	—	—

### Auto Switch Mounting Height

Bore size (mm)	D-M9□ D-M9□W D-M9□A D-A9□		D-M9□V D-M9□WV D-M9□AV D-A9□V		D-F5□/F5□W D-J59/J59W D-F59F/F5BAL D-F5NTL		D-A5□/A6□ D-A59W		D-Y59□ D-Y7P/Y7□W D-Z7□/Z80		D-Y69□ D-Y7PV/Y7□WV		D-Y7BAL		D-G39/K39 D-A3□		D-A44	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
160	85	83.5	87.5	83.5	89	86	90	86	84.5	83	84.5	83	89.5	83	134.5	—	144.5	—
200	106	106	106	106	102	104	102.5	104	100.5	100.5	100.5	100.5	103	100.5	154	—	164	—
250	130.5	131.5	130.5	131.5	127	128	127	128	—	—	—	—	—	—	—	—	—	—
320	153.5	153.5	153.5	153.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—



# Series C95

## Minimum Stroke for Auto Switch Mounting

Auto switch mode	Number of auto switches	Brackets other than center trunnion				Center trunnion				[mm]
		ø160	ø200	ø250	ø320	ø160	ø200	ø250	ø320	
D-M9□ D-M9□W	2 (Different surfaces, same surface), 1	10	←	←	←	105	105	125	170	
	n	$10 + 40(n-2)/2$ n = 2, 4, 6, 8...	←	←	←	$105 + 40(n-4)/2$ n = 4, 8, 12, 16...	$105 + 40(n-4)/2$ n = 4, 8, 12, 16...	$125 + 40(n-4)/2$ n = 4, 8, 12, 16...	$170 + 40(n-4)/2$ n = 4, 8, 12, 16...	
D-M9□V D-M9□WV	2 (Different surfaces, same surface), 1	10	←	←	←	80	80	100	145	
	n	$10 + 30(n-2)/2$ n = 2, 4, 6, 8...	←	←	←	$80 + 30(n-4)/2$ n = 4, 8, 12, 16...	$80 + 30(n-4)/2$ n = 4, 8, 12, 16...	$100 + 30(n-4)/2$ n = 4, 8, 12, 16...	$145 + 30(n-4)/2$ n = 4, 8, 12, 16...	
D-M9□A	2 (Different surfaces, same surface), 1	15	←	←	←	110	110	130	175	
	n	$15 + 40(n-2)/2$ n = 2, 4, 6, 8...	←	←	←	$110 + 40(n-4)/2$ n = 4, 8, 12, 16...	$110 + 40(n-4)/2$ n = 4, 8, 12, 16...	$130 + 40(n-4)/2$ n = 4, 8, 12, 16...	$175 + 40(n-4)/2$ n = 4, 8, 12, 16...	
D-M9□AV	2 (Different surfaces, same surface), 1	15	←	←	←	85	85	105	150	
	n	$15 + 30(n-2)/2$ n = 2, 4, 6, 8...	←	←	←	$85 + 30(n-4)/2$ n = 4, 8, 12, 16...	$85 + 30(n-4)/2$ n = 4, 8, 12, 16...	$105 + 30(n-4)/2$ n = 4, 8, 12, 16...	$150 + 30(n-4)/2$ n = 4, 8, 12, 16...	
D-A9□	2 (Different surfaces, same surface), 1	10	←	←	←	100	100	120	165	
	n	$10 + 40(n-2)/2$ n = 2, 4, 6, 8...	←	←	←	$100 + 40(n-4)/2$ n = 4, 8, 12, 16...	$100 + 40(n-4)/2$ n = 4, 8, 12, 16...	$120 + 40(n-4)/2$ n = 4, 8, 12, 16...	$165 + 40(n-4)/2$ n = 4, 8, 12, 16...	
D-A9□V	2 (Different surfaces, same surface), 1	10	←	←	←	75	75	95	140	
	n	$10 + 30(n-2)/2$ n = 2, 4, 6, 8...	←	←	←	$75 + 30(n-4)/2$ n = 4, 8, 12, 16...	$75 + 30(n-4)/2$ n = 4, 8, 12, 16...	$95 + 30(n-4)/2$ n = 4, 8, 12, 16...	$140 + 30(n-4)/2$ n = 4, 8, 12, 16...	
D-F5□/F5□W D-J59/J59W D-F5BAL D-F59F	2 (Different surfaces, same surface), 1	10	←	←	—	135	135	155	—	
	n	$10 + 55(n-4)/2$ n = 4, 8, 12, 16...	←	←	—	$135 + 55(n-4)/2$ n = 4, 8, 12, 16...	$135 + 55(n-4)/2$ n = 4, 8, 12, 16...	$155 + 55(n-4)/2$ n = 4, 8, 12, 16...	—	
D-F5NTL	2 (Different surfaces, same surface), 1	15	←	←	—	150	145	165	—	
	n	$15 + 55(n-4)/2$ n = 4, 8, 12, 16...	←	←	—	$150 + 55(n-4)/2$ n = 4, 8, 12, 16...	$145 + 55(n-4)/2$ n = 4, 8, 12, 16...	$165 + 55(n-4)/2$ n = 4, 8, 12, 16...	—	
D-A5□/A6□	2 (Different surfaces, same surface), 1	10	←	←	—	125	125	145	—	
	n	$10 + 55(n-4)/2$ n = 4, 8, 12, 16...	←	←	—	$125 + 55(n-4)/2$ n = 4, 8, 12, 16...	$125 + 55(n-4)/2$ n = 4, 8, 12, 16...	$145 + 55(n-4)/2$ n = 4, 8, 12, 16...	—	
D-A59W	2 (Different surfaces, same surface), 1	20	←	←	—	135	135	155	—	
	n	$20 + 55(n-2)/2$ n = 2, 4, 6, 8...	←	←	—	$135 + 55(n-4)/2$ n = 4, 8, 12, 16...	$135 + 55(n-4)/2$ n = 4, 8, 12, 16...	$155 + 55(n-4)/2$ n = 4, 8, 12, 16...	—	
D-Y59□ D-Y7P/Y7□W	2 (Different surfaces, same surface), 1	10	←	—	—	110	110	—	—	
	n	$10 + 40(n-2)/2$ n = 2, 4, 6, 8...	←	—	—	$110 + 40(n-4)/2$ n = 4, 8, 12, 16...	$110 + 40(n-4)/2$ n = 4, 8, 12, 16...	—	—	
D-Y69□ D-Y7PV/Y7□WV	2 (Different surfaces, same surface), 1	10	←	—	—	85	80	—	—	
	n	$10 + 30(n-2)/2$ n = 2, 4, 6, 8...	←	—	—	$85 + 30(n-4)/2$ n = 4, 8, 12, 16...	$80 + 30(n-4)/2$ n = 4, 8, 12, 16...	—	—	
D-Y7BAL	2 (Different surfaces, same surface), 1	10	←	—	—	120	120	—	—	
	n	$10 + 45(n-2)/2$ n = 2, 4, 6, 8...	←	—	—	$120 + 45(n-4)/2$ n = 4, 8, 12, 16...	$120 + 45(n-4)/2$ n = 4, 8, 12, 16...	—	—	
D-G39/K39 D-A3□	1	10	10	—	—	140	140	—	—	
	2 (Same surface)	100	100	—	—	140	140	—	—	
	2 (Different surfaces)	35	35	—	—	140	140	—	—	
	n (Same surface)	$100 + 100(n-2)$ n = 2, 3, 4, 5...	←	—	—	$140 + 100(n-2)$ n = 2, 4, 6, 8...	$140 + 100(n-2)$ n = 2, 4, 6, 8...	—	—	
D-A44	1	10	10	—	—	100	100	—	—	
	2 (Same surface)	55	55	—	—	100	100	—	—	
	2 (Different surfaces)	35	35	—	—	100	100	—	—	
	n (Same surface)	$55 + 55(n-2)$ n = 2, 3, 4, 5...	←	—	—	$100 + 100(n-2)$ n = 2, 4, 6, 8...	$100 + 100(n-2)$ n = 2, 4, 6, 8...	—	—	
D-A44	n (Different surfaces)	$35 + 30(n-2)$ n = 2, 3, 4, 5...	←	—	—	$100 + 100(n-2)$ n = 2, 4, 6, 8...	$100 + 100(n-2)$ n = 2, 4, 6, 8...	—	—	

# ISO/VDMA Cylinder: Large Bore Size Type Double Acting, Single Rod **Series C95**

## Operating Range

Auto switch model	Bore size [mm]			
	160	200	250	320
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	6.5	7		
D-A9□/A9□V	11.5	12.5	11	13
D-F5□/F5□W D-J59/J59W D-F5BAL *2 D-F59F/F5NTL	5.5	6		—
D-A5□/A6□ D-A59W	10	10	9	—
D-Y59□/Y69□ D-Y7P(V)/Y7□W(V) D-Y7BAL *1	7	8	—	—
D-Z7□/Z80	13	14.5	—	—
D-G39/K39	10	10	—	—
D-A3□/A44	10	10	—	—

## Auto Switch Mounting Brackets/Part Nos.

Auto switch model	Bore size [mm]			
	160	200	250	320
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV*1 D-A9□/A9□V	BS5-160	BS5-160	BS5-200	BS5-250
D-F5□/F5□W D-J59/J59W D-F5BAL *2 D-F59F/F5NTL D-A5□/A6□ D-A59W	BT-16	BT-16	BT-20	—
D-Y59□/Y69□ D-Y7P(V)/Y7□W(V) D-Y7BAL *1 D-Z7□/Z80	BS4-160	BS4-160	—	—
D-G39/K39 D-A3□/A44	BS1-160	BS1-200	—	—

### [Stainless Steel Mounting Screw]

\*1 When using the D-M9□A/M9□AV or Y7BAL, do not use the steel set screws which are included with the auto switch mounting brackets above (BA4-080, BA7-080, BS5-□□□, BS4-□□□).

Order a stainless steel screw kit (BBA1) separately, and use the M4 x 8 L stainless steel set screws included in the BBA1.

When ordered cylinder with D-M9□A/M9□AV or Y7BAL, the screws of the switch mounting bracket have been changed to stainless steel.

\*2 When using the D-F5BAL, do not use the steel set screws which are included with the auto switch mounting brackets above (BT-□□).

Order a stainless steel screw kit (BBA1) separately, and use the M4 x 8 L stainless steel set screws included in the BBA1.

When D-F5BAL is shipped independently, the BBA1 is attached.

When ordered cylinder with D-F5BAL, the screws of the switch mounting bracket have been changed to stainless steel.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

C95

CP95

NCM

NCA

D-

-X

20-

Data

Other than the applicable auto switches listed in "How to Order," the following auto switches are also mountable. Refer to the **Web Catalog** for the detailed specifications.

Type	Model	Electrical entry	Features
Reed	D-A90V	Grommet (Perpendicular)	Without indicator light
	D-A93V, A96V		
	D-Z73, Z76		
	D-A53, A56	Grommet (In-line)	Without indicator light
	D-A67		
	D-Z80		
Solid state	D-F59, F5P, J59	Grommet (In-line)	—
	D-Y59A, Y59B, Y7P		
	D-F59W, F5PW, J59W		
	D-Y7NW, Y7PW, Y7BW		
	D-F5BA, Y7BA		
	D-F5NT	Grommet (Perpendicular)	—
	D-M9NV, M9PV, M9BV		
	D-Y69A, Y69B, Y7PV		
	D-M9NWV, M9PWV, M9BWV		
	D-Y7NWV, Y7PWV, Y7BWV		
D-M9NAV, M9PAV, M9BAV	Grommet (Perpendicular)	2-color indicator	
			Water-resistant (2-color indicator)
			With timer
			—
			2-color indicator
			Water-resistant (2-color indicator)

\* With pre-wired connector is also available for solid state switches. For details, refer to the **Web Catalog**.

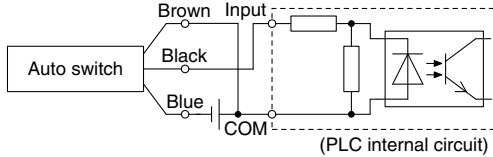
\* Normally closed (NC = b contact) solid state auto switches (D-M9□E (V), D-Y7G/Y7H) are also available. For details, refer to the **Web Catalog**.

# Prior to Use

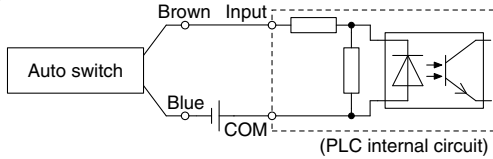
## Auto Switch Connections and Examples

### Sink Input Specifications

#### 3-wire, NPN

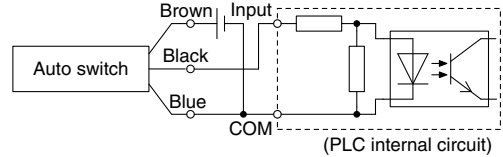


#### 2-wire

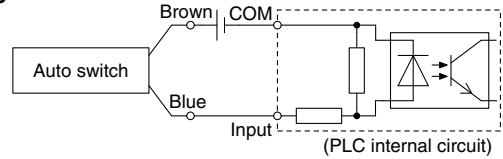


### Source Input Specifications

#### 3-wire, PNP



#### 2-wire

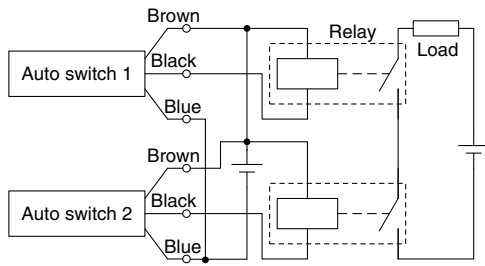


Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

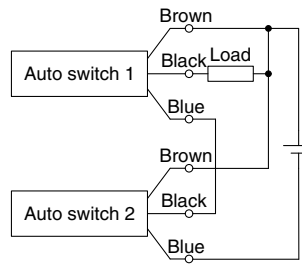
### Examples of AND (Series) and OR (Parallel) Connections

\* When using solid state auto switches, ensure the application is set up so the signals for the first 50 ms are invalid. Depending on the operating environment, the product may not operate properly.

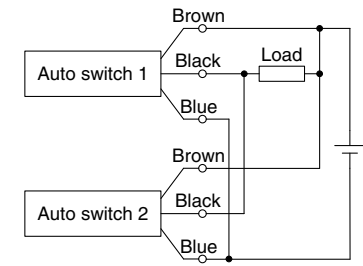
#### 3-wire AND connection for NPN output (Using relays)



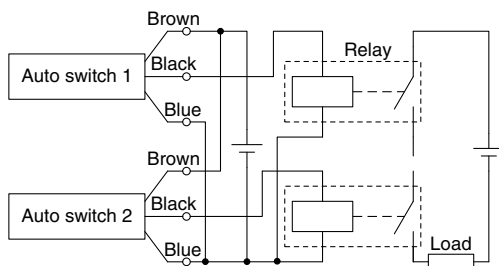
#### (Performed with auto switches only)



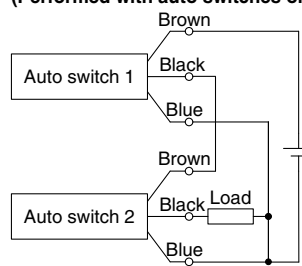
#### 3-wire OR connection for NPN output



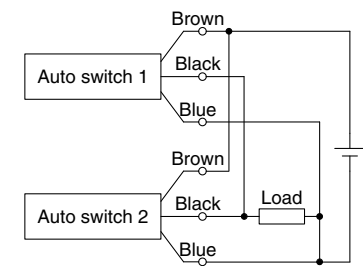
#### 3-wire AND connection for PNP output (Using relays)



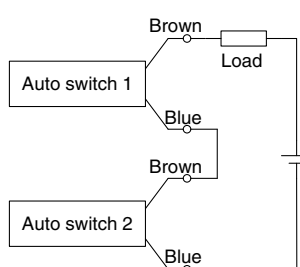
#### (Performed with auto switches only)



#### 3-wire OR connection for PNP output



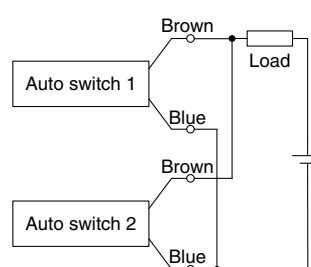
#### 2-wire AND connection



When two auto switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state. The indicator lights will light up when both of the auto switches are in the ON state. Auto switches with a load voltage less than 20 V cannot be used. Please contact SMC if using AND connection for a heat-resistant solid state auto switch or a trimmer switch.

Example) Load voltage at ON  
 Power supply voltage: 24 VDC  
 Internal voltage drop: 4 V  
 Load voltage at ON = Power supply voltage –  
 Internal voltage drop x 2 pcs.  
 = 24 V – 4 V x 2 pcs.  
 = 16 V

#### 2-wire OR connection



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

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

Example) Load voltage at OFF  
 Leakage current: 1 mA  
 Load impedance: 3 kΩ  
 Load voltage at OFF = Leakage current x 2 pcs. x  
 Load impedance  
 = 1 mA x 2 pcs. x 3 kΩ  
 = 6 V





Series C95

# Specific Product Precautions

Be sure to read before handling.

## Adjustment

### Warning

#### 1. Do not open the cushion valve above the stopper.

Cushion valves are provided with a retaining ring (ø160 to ø250) as a stopping mechanism, and the cushion valve should not be opened above that point.

If air is supplied and operation started without confirming the above condition, the cushion valve may be ejected from the cover.

Bore size (mm)	Cushion valve	Width across flats	Socket wrench
160, 200 250, 320	MB-A2-10-EA064	4	JIS 4648 Hex spanner wrench 4

#### 2. Be certain to activate the air cushion at the stroke end.

When it is intended to use the cushion valve in the fully opened position, select a style with a bumper. If this is not done, the tie-rods or piston rod assembly will be damaged.

#### 3. When replacing brackets, use the hexagon wrench shown below.

Bore size (mm)		Bolt	Width across flats	Tightening torque (N·m)
160, 200		M16 x 2 x 30ℓ	14	99
250, 320	Foot	M20 x 2.5 x 35ℓ	17	193.5
	Others	M20 x 2.5 x 30ℓ	17	

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

C76

C85

**C95**

CP95

NCM

NCA

D-

-X

20-

Data