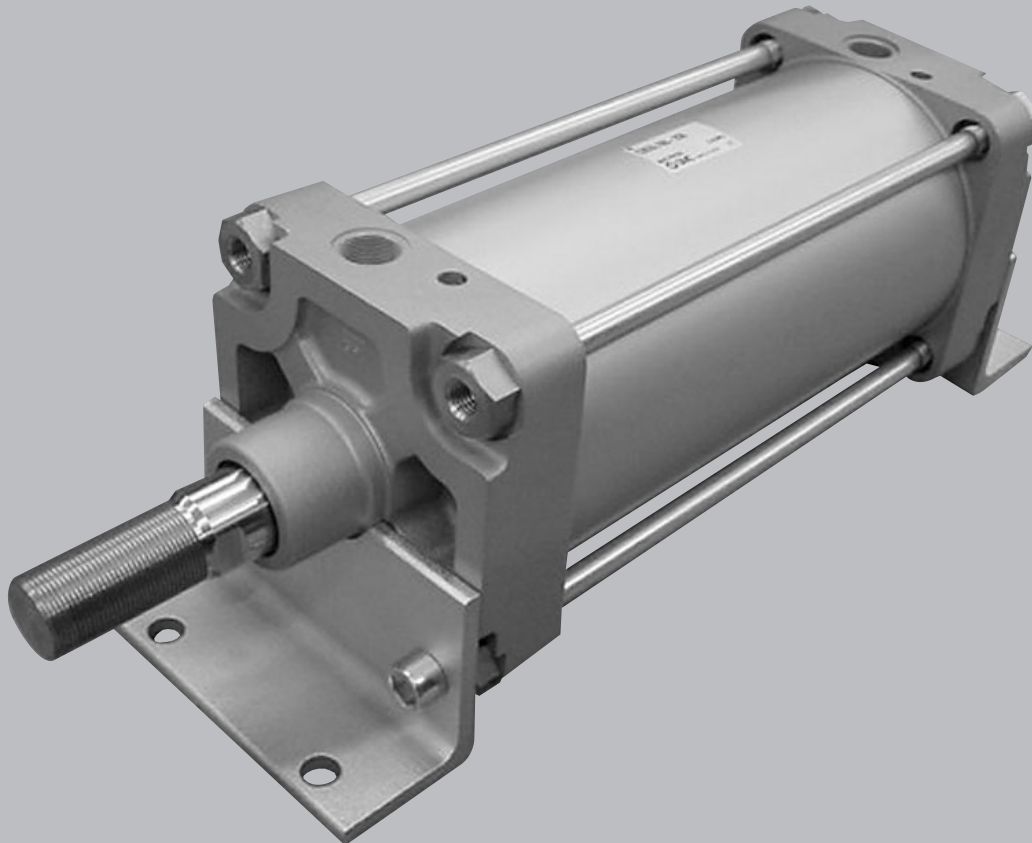


# ISO/VDMA Cylinder: Large Bore Size Type

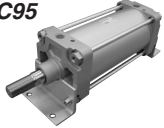
## Series C95

ø160, ø200, ø250

Conforming to ISO 6431/CETOP RP43P/VDMA 24562



### Series Variations

Series	Action	Type	Basic	Standard variations	Option	Bore (mm)	Page
				Built-in magnet Stainless steel rod	Heat resistant		
<b>Large Bore Size</b> <b>Series C95</b> 	Double acting	Single rod	•	•	•	160 200 250	6-38

Quick Reference Guide

C55

C85

C76

CP95

**C95**

-X  
(Made to Order)

D-  
(Auto Switch)

Model Selection Procedures

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

ø160, ø200, ø250

## How to Order

**Without auto switch** C95S **B** **160** **100**

**With auto switch** C95SD **B** **160** **100** **A53** **S**

**Built-in magnet** • **Mounting style** • **Bore size** • **Stroke (mm)** • **Number of auto switches** • **Auto switch**

Mounting style	Description
B	Basic/without bracket 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

Bore size	Stroke (mm)
160	160 mm
200	200 mm
250	250 mm

Number of auto switches	Quantity
Nil	2 pcs.
S	1 pc.
3	3 pcs.
n	"n" pcs.

Auto switch	Description
Nil	Without auto switch

Refer to "Standard Stroke" on page 6-40.

\* For the applicable auto switch model, refer to the

## Applicable Auto Switch/Tie-rod Mounting

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)			Applicable load		
					DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	3 (L)	5 (Z)			
Reed switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	—	5 V	—	A56	—	●	●	—	IC	
				2-wire	24 V	5 V, 12 V	—	A53	—	●	●	●	—	Relay, PLC
					—	12 V	100 V, 200 V	A54	—	●	●	●	—	
				Diagnostic indication (2-color)	—	No	—	—	—	A67	—	●	●	—
	—	—	200 V or less				A64	—	●	●	—	—		
	—	Terminal conduit DIN terminal	Yes	3-wire	—	5 V	—	Z76	—	●	●	—	IC	
				2-wire	24 V	5 V, 12 V	100 V or less	Z80	—	●	●	—	IC	
					—	12 V	100 V, 200 V	A33	—	—	—	—	—	PLC (Note)
				—	—	—	A34	—	—	—	—	—	Relay, PLC (Note)	
				—	—	—	A44	—	—	—	—	—	Relay, PLC (Note)	
—				—	—	—	—	—	—	—	—	—	Relay, PLC (Note)	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F59	—	●	●	○	IC	
				3-wire (PNP)	—	—	100 V, 200 V	F5P	—	●	●	○	—	
	Diagnostic indication (2-color)	—	—	No	2-wire	—	12 V	—	J51	—	●	●	○	—
					—	—	—	J59	—	●	●	○	—	
	Water resistant (2-color)	—	—	No	3-wire (NPN)	24 V	5 V, 12 V	—	F59W	—	●	●	○	IC
					3-wire (PNP)	—	—	—	F5PW	—	●	●	○	—
	With timer	—	—	No	2-wire	—	12 V	—	J59W	—	●	●	○	—
					—	—	—	F5BAL	—	—	●	●	○	—
	Diagnostic output (2-color)	—	—	No	3-wire (NPN)	24 V	5 V, 12 V	—	F5NNTL	—	—	●	○	IC
					4-wire (NPN)	—	—	—	F59F	—	●	●	○	—
	—	—	—	No	3-wire (NPN)	24 V	5 V, 12 V	—	Y59A	—	●	●	○	IC
					2-wire	—	12 V	—	Y59B	—	●	●	○	—
	Diagnostic indication (2-color)	—	—	No	3-wire (PNP)	24 V	5 V, 12 V	—	Y7P	—	●	●	○	—
					3-wire (NPN)	—	—	—	Y7NW	—	●	●	○	IC
	Water resistant (2-color)	—	—	No	3-wire (PNP)	24 V	5 V, 12 V	—	Y7PW	—	●	●	○	—
					2-wire	—	12 V	—	Y7BW	—	●	●	○	—
—	—	Terminal conduit	No	3-wire (NPN)	24 V	5 V, 12 V	—	Y7BAL	—	—	●	○	—	
				2-wire	—	12 V	—	—	—	—	—	—	IC	
—	—	Grommet	Yes	3 wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	○	Relay (Note) PLC	
				3 wire (PNP)	—	—	—	M9PV	M9P	●	●	○		
				2 wire	—	12 V	—	M9BV	M9B	●	●	○		

\* Lead wire length symbols: 0.5 m ..... Nil (Example) A53  
 3 m ..... L (Example) A53L  
 5 m ..... Z (Example) A53Z

○: Manufactured upon receipt of order.  
 Note) Switch can not be mounted on ø250

## Mounting Bracket Part No.

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

Note 1) Two foot brackets and mounting bolts (4 pieces) are included in this no. (ø160 to ø250)

Note 2) Accessories for mounting brackets are as follows

Foot, Flange, Single clevis: Mounting bolts

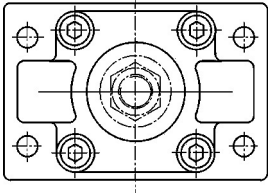
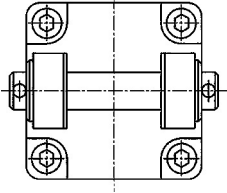
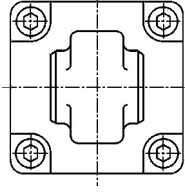
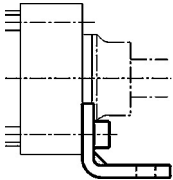
Double clevis : Clevis pin, Retaining rings, Mounting bolts

## Auto Switch Mounting Bracket Part No.

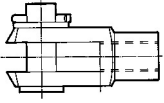
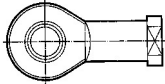
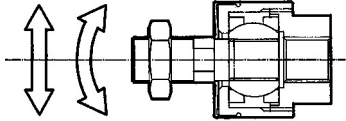
Bore size (mm)	160	200	250
D-A3/A4/K3/G3	BS1-160	BS1-200	—
D-A5/A6/F5/J5	BT-16	BT-16	BT-20
D-Z□/Y□	BS4-160	BS4-160	—
D-M9□	BS5-160	BS5-160	—

**Accessory**

**Mounting Accessory, Cylinder**

	<b>F</b> Rod/Head side flange	<b>D</b> Female head side clevis (Corresponds to E accessories)	<b>C</b> Male head side clevis
Bore size (mm)			
	Supplied with 4 screws	Supplied with bolt, safety device and 4 screws	Supplied with 4 screws
<b>160</b> <b>200</b> <b>250</b>	F5160 F5200 F5250	D5160 D5200 D5250	C5160 C5200 C5250
	See page 6-43 for dimensions.	See page 6-43 for dimensions	See page 6-44 for dimensions.
	<b>L</b> Foot		
Bore size (mm)			
	Supplied with two pieces Supplied with 4 screws		
<b>160</b> <b>200</b> <b>250</b>	L5160 L5200 L5250		
	See page 6-43 for dimensions.		

**Mounting Accessory, Rod**

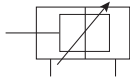
	<b>GKM</b> Rod clevis ISO 8140	<b>KJ</b> Piston rod ball joint ISO 8139	<b>JA</b> Floating joint
Bore size (mm)			
	Supplied with bolts and safety devices		
<b>160</b> <b>200</b> <b>250</b>	GKM35-54 GKM35-54 GKM40-84	KJ36D KJ36D KJ42D	JA160-36-200 JA160-36-200
	See page 6-45 for dimensions.	See page 6-45 for dimensions.	See page 6-45 for dimensions.

# Series C95

## Specifications

Bore size (mm)	160	200	250
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/s		
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		

Double-acting cylinder with cushioning adjustable at both ends, single piston rod



## Minimum Stroke for Auto Switch Mounting

Refer to page 12 for "Minimum Stroke for Auto Switch Mounting".

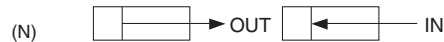
## Standard Stroke

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

Intermediate strokes are available.

\* Please consult with SMC for longer strokes.

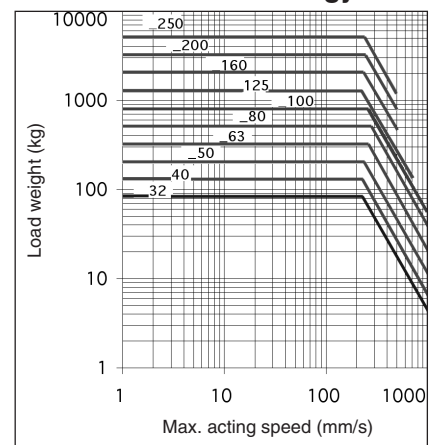
## Theoretical Output



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		

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

## Allowable Kinetic Energy



Example: Load limit at rod end when air cylinder  $\phi 200$  is actuated with max. actuating speed 500 mm/s. See the intersection of lateral axis 500 mm/s and  $\phi 200$  line, and extend the intersection to left. Thus the allowable load is 800 kg.

## Weight/Aluminum Tube

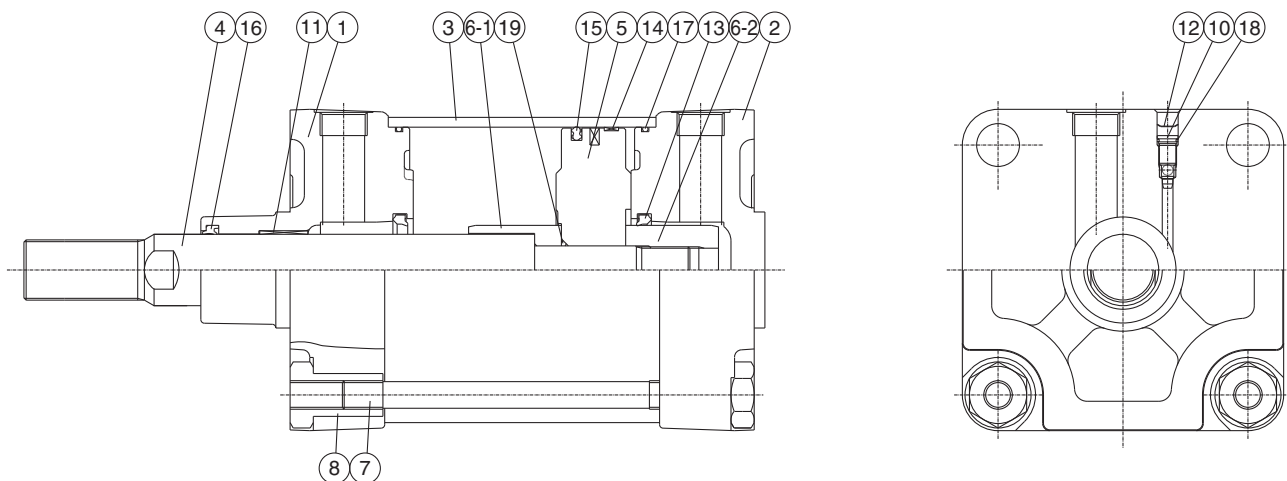
Bore size (mm)		160	200	250	(kg)
Basic weight	Basic style	14.54	20.20	37.17	
	Foot style	4.90	7.76	15.00	
	Flange style	2.45	11.75	20.29	
	Single clevis style	6.90	9.10	18.60	
	Double clevis style	6.30	9.25	18.46	
	Trunnion style	4.50	7.23	14.40	
Additional weight per each 50 mm of stroke	All mounting brackets	0.83	0.90	1.60	
	Accessory				
Accessory	Single rod clevis	1.62	1.62	2.76	
	Double clevis (With pin)	3.92	3.92	6.69	

Calculation: (Example) CP95SD160-100

- Basic weight ..... 14.54 (kg) (Basic,  $\phi 160$ )
  - Mounting ..... 6.30 (kg) (Double clevis)
  - Additional weight ... 0.83 (kg/50 st)
  - Cylinder stroke ..... 100 (st)
- $14.54 + 0.83 \times 100 + 6.30 = 22.50$  kg

**Construction**

[First angle projection]



**Component Parts**

No.	Description	Material	Qty.	Note
①	Rod cover	Aluminum casted	1	
②	Head cover	Aluminum casted	1	
③	Cylinder tube	Aluminum alloy	1	
④	Piston rod	Carbon steel	1	
⑤	Piston	Aluminum alloy	1	
⑥	Cushion ring A	Rolled steel	1	
⑥	Cushion ring B	Rolled steel	1	
⑦	Tie-rod	Carbon steel	4	
⑧	Tie-rod nut	Steel	8	
⑩	Cushion valve	Steel wire	2	
⑪	Bushing	Lead-bronze casted	1	
⑫	Snap ring	Steel for spring	2	
⑬	Cushion seal	Urethane	2	
⑭	Wear ring	Resin	1	
⑮	Piston seal	NBR	1	
⑯	Rod seal	NBR	1	
⑰	Cylinder tube gasket	NBR	2	
⑱	Cushion valve seal	NBR	2	
⑲	Piston gasket	NBR	1	
⑳	Magnet ring		1	

**Replacement Parts: Seal Kit**

Bore size (mm)	Kit no.	Contents
160	CS95-160	Kits include items ⑬ to ⑰ from the table above.
200	CS95-200	
250	CS95-250	

\* Seal kits consist of items ⑬ to ⑰ contained in one kit, and can be ordered using the order number for each respective tube bore size.

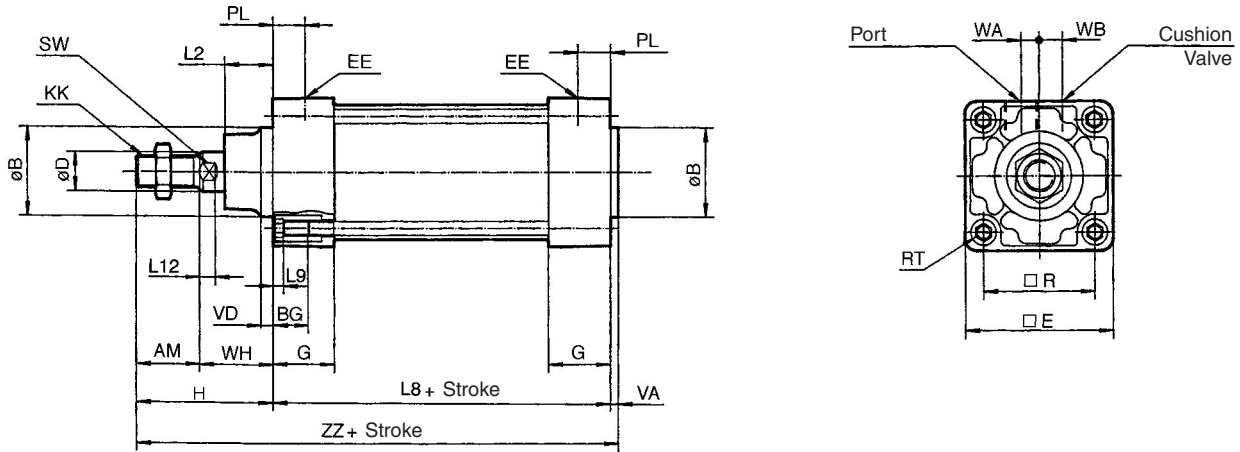
Quick Reference Guide  
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 CP95  
**C95**  
 -X (Made to Order)  
 D- (Auto Switch)  
 Model Selection Procedures

# Series C95

## Dimensions: Without Mounting Bracket

[First angle projection]

C95SB Bore size - Stroke

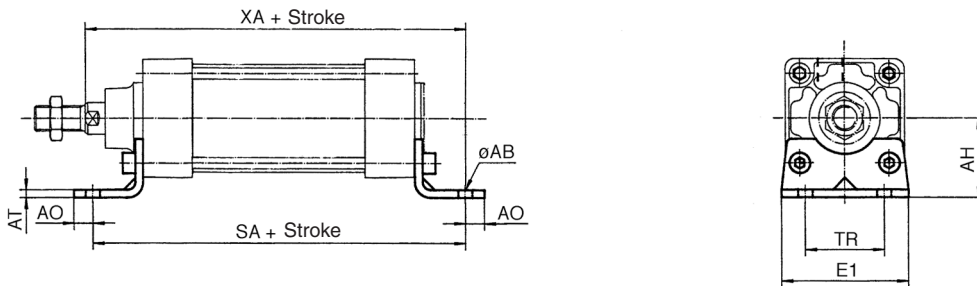


Bore size (mm)	AM	$\phi B$ e11	$\phi D$	EE	PL	RT	L12	KK	SW	G	BG (Min.)	L8	VD	VA	WA	WB	WH	ZZ	$\square E$	$\square R$	L2	L9
160	72	65	40	G 3/4	30	M16 x 2	15	M36 x 2	36	55	27	180	8	6	15	25	80	338	180	140	50	0
200	72	75	40	G 3/4	35	M16 x 2	15	M36 x 2	36	57	27	180	15	6	18	25	95	353	220	175	55	0
250	84	90	50	G 1	31	M20 x 2.5	20	M42 x 2	46	59	29	200	20	10	20	28	105	399	270	220	65	0

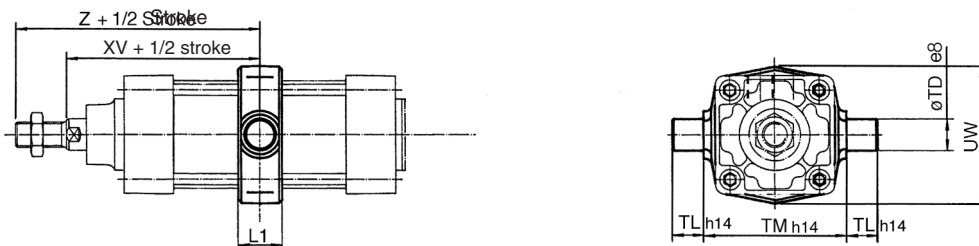
**Dimensions: Cylinder Mounting Accessory**

[First angle projection]

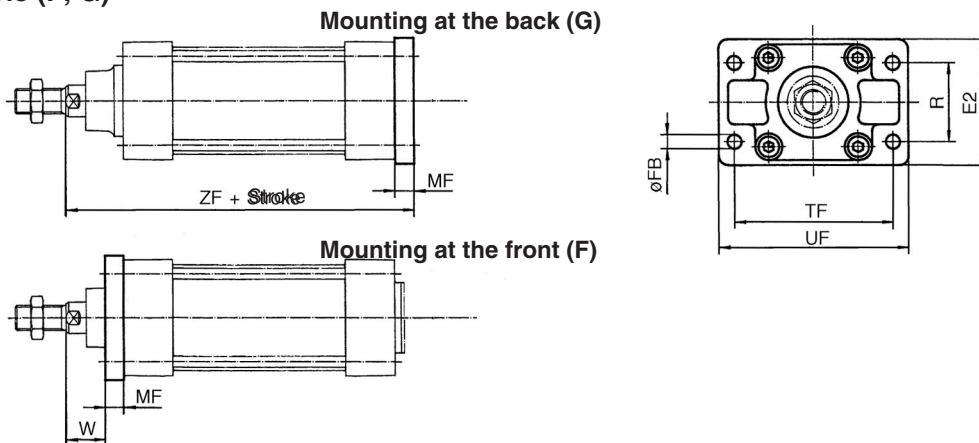
**Foot style (L)**



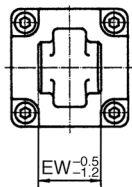
**Center trunnion style (T)**



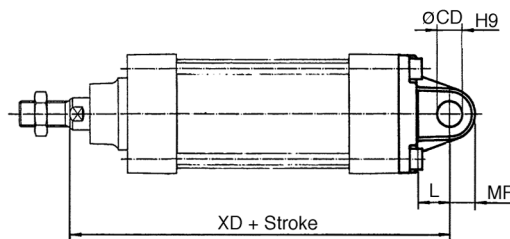
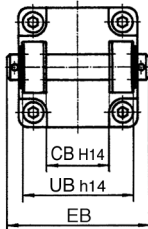
**Flange style (F, G)**



**Head side  
single clevis style (C)**



**Head side  
double clevis style (D)**



Bore (mm)	E1	R	W	MF	ZF	$\phi FB$	$\phi CD$ H9	EB	L	XD	UB h14	CB h14	EW $^{-0.5}_{-1.2}$	MR	TR	AO	AT	XA	SA	AH	$\phi AB$	L1	XV	Z	TL h14	$\phi TD$ e8	TM h14	UW	TF	UF	E2
160	Max. 195	115	60	20	280	18	30	Max. 209	Min. 35	315	170	90	90	Max. 31	115	Max. 25	9	320	300	115	18	Max. 50	170	242	32	32	200	Max. 220	230	Max. 280	Max. 195
200	Max. 238	135	70	25	300	22	30	Max. 209	Min. 35	335	170	90	90	Max. 31	135	Max. 35	12	345	320	135	22	Max. 50	185	257	32	32	250	Max. 260	270	Max. 320	Max. 238
250	Max. 290	165	80	25	330	26	40	Max. 249	Min. 45	375	200	110	110	Max. 41	165	Max. 40	14.5	380	350	165	26	Max. 60	205	289	40	40	320	Max. 320	330	Max. 395	Max. 290

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**C95**  
 -X (Made to Order)  
 D- (Auto Switch)  
 Model Selection Procedures

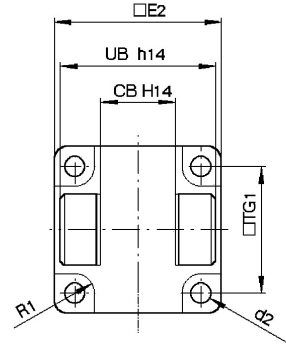
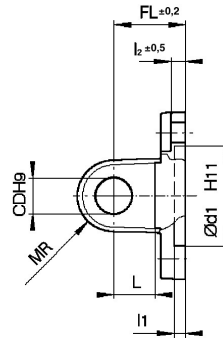
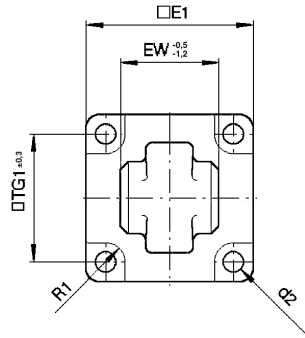
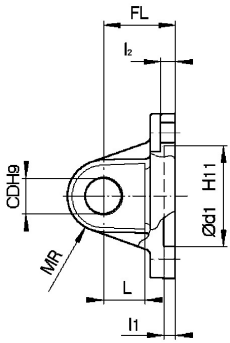
# Series C95

## Dimensions: Cylinder Mounting Accessory C, D, E and CR

[First angle projection]

### Mounting style (C)

### Mounting style (D)



Bore size (mm)	□E1	EW	□TG1	FL	l <sub>1</sub>	l <sub>2</sub>	Ød1	CD	MR	d2	R1	□E2	UB	CB
160	180	90	140	55	7	10	65	30	25	18	13	180	170	90
200	220	90	175	60	7	11	75	30	25	18	13	220	170	90
250	270	110	220	70	11	11	90	40	40	22	16.5	270	200	110



**Dimensions: Piston Rod Mounting Accessory**

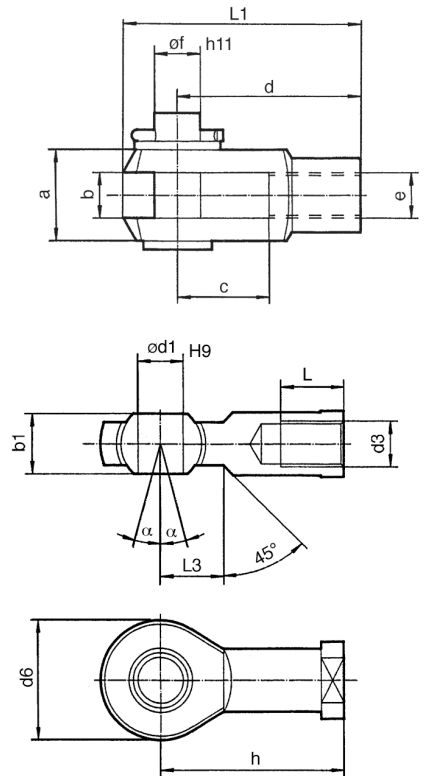
[First angle projection]

**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

**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	16	55
KJ42D	250	M42 x 2	40	142	90	49	60	4	46

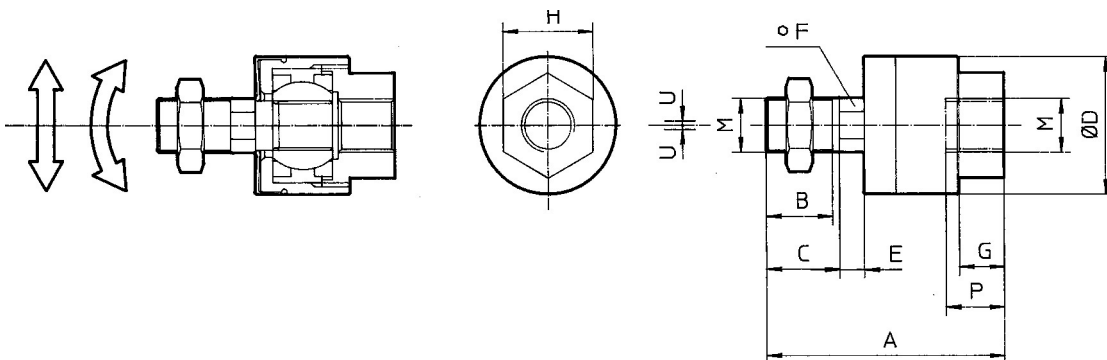


**Dimensions: Piston Rod Mounting Accessory**

[First angle projection]

**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



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-X (Made to Order)

D- (Auto Switch)

Model Selection Procedures

# Auto Switch Specifications

## Applicable Auto Switch



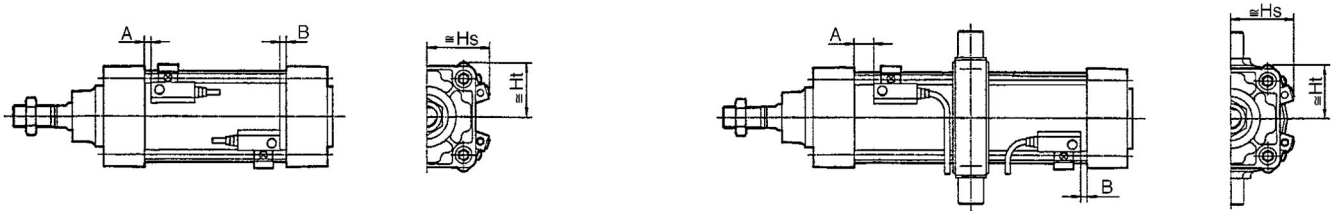
Type	Auto switch model	Electrical entry (Function)
Reed switch	D-A5□/A6□	Grommet
	D-A59W	Grommet (2-color indication)
	D-Z7□/Z80	Grommet
	D-A3□	Terminal conduit
	D-A44	DIN terminal
Solid state switch	D-F5□/J5□	Grommet
	D-F5□W/J59W	Grommet (2-color indication)
	D-F5BAL	Grommet (2-color indication, Water resistant)
	D-F59F	Grommet (2-color indication, Diagnostic output)
	D-F5NTL	Grommet (With timer)
	D-Y59□	Grommet (In-line)
	D-Y69□	Grommet (Perpendicular)
	D-Y7P	Grommet (In-line)
	D-Y7PV	Grommet (Perpendicular)
	D-Y7□W	Grommet (2-color indication, In-line)
	D-Y7□WV	Grommet (2-color indication, Perpendicular)
	D-Y7BAL	Grommet (Water resistant, In-line)
	D-G39/K39	Terminal conduit

## Minimum Stroke for Auto Switch Mounting

Auto switch model	No. of auto switches	Support bracket except center trunnion			Center trunnion		
		ø160	ø200	ø250	ø160	ø200	ø250
A5□ A6□	1, 2	10	10	10	125	125	145
	n	$10 + 55(n-2)/2$ n = 2, 4, 6, 8...	←	←	$125 + 55(n-4)/2$ 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...
A59W	2	←	←	←	135	135	155
	n	←	←	←	$135 + 55(n-4)/2$ 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...
F5□(W)/J5□/J59W F5BAL/F59F	1, 2	10	←	←	135	135	155
	n	$10 + 55(n-2)/2$ 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...
F5NTL	1, 2	15	15	15	150	145	165
	n	$15 + 55(n-2)/2$ n = 2, 4, 6, 8...	←	←	$150 + 55(n-4)/2$ 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...
A3□ K3□ G3□	1	10	100	—	140	140	—
	2 (Same side)	100	100	—	140	140	—
	2 (Different sides)	35	35	—	140	140	—
	n (Same side)	←	←	—	$140 + 100(n-2)$ n = 2, 4, 6, 8...	$140 + 100(n-2)$ n = 2, 4, 6, 8...	—
A44	n (Same side)	←	←	—	$140 + 100(n-2)$ n = 2, 4, 6, 8...	$140 + 100(n-2)$ n = 2, 4, 6, 8...	—
	n (Different sides)	←	←	—	$140 + 100(n-2)$ n = 2, 4, 6, 8...	$140 + 100(n-2)$ n = 2, 4, 6, 8...	—
	1	10	10	—	100	100	—
	2 (Same side)	55	55	—	100	100	—
Z7□/Z80	2 (Different sides)	35	35	—	100	100	—
	n (Same side)	←	←	—	$100 + 100(n-2)$ n = 2, 4, 6, 8...	$100 + 100(n-2)$ n = 2, 4, 6, 8...	—
	n (Different sides)	←	←	—	$100 + 100(n-2)$ n = 2, 4, 6, 8...	$100 + 100(n-2)$ n = 2, 4, 6, 8...	—
	1, 2	10	10	—	120	110	—
Y59□/Y7P Y7□W	n	←	←	—	$120 + 55(n-4)/2$ n = 4, 8, 12, 16...	$110 + 55(n-4)/2$ n = 4, 8, 12, 16...	—
	1, 2	10	10	—	110	110	—
Y69□/Y7PV Y7□WV	n	←	←	—	$110 + 55(n-4)/2$ n = 4, 8, 12, 16...	$110 + 55(n-4)/2$ n = 4, 8, 12, 16...	—
	1, 2	10	10	—	85	80	—
Y7BAL	n	←	←	—	$85 + 55(n-4)/2$ n = 4, 8, 12, 16...	$80 + 55(n-4)/2$ n = 4, 8, 12, 16...	—
	1, 2	10	10	—	120	120	—
Y7BAL	n	←	←	—	$120 + 55(n-4)/2$ n = 4, 8, 12, 16...	$120 + 55(n-4)/2$ n = 4, 8, 12, 16...	—

## Auto Switch Mounting Position and Mounting Height

[First angle projection]



### Auto Switch Mounting Position

Bore size (mm)	D-A5□ D-A6□		D-A59W		D-F5□, D-F5□W D-J5□, D-J59W D-F59F, D-F5BAL		D-F5NTL		D-Z7□, D-Y59□, D-Y7BAL D-Z80, D-Y69□ D-Y7P(V), D-Y7□W(V)		D-A3□, D-G39 D-A44, D-K39	
	A	B	A	B	A	B	A	B	A	B	A	B
160	19.5	18.5	23.5	22.5	26	25	31	30	23	22	19.5	18.5
200	17	17	21	21	23.5	23.5	28.5	28.5	20.5	20.5	17	17
250	20	30	24	34	26.5	36.5	31.5	41.5	—	—	—	—

### Auto Switch Mounting Height

Bore size (mm)	D-A5□ D-A6□ D-A59W		D-F5□, D-F5□W, D-F5NTL D-J5□, D-J59W D-F59F, D-F5BAL		D-A3□, D-G39 D-K39		D-A44		D-Z7□, D-Y59□ D-Z80, D-Y7P D-Y7□W		D-Y69□ D-Y7PV D-Y7□WV		D-Y7BAL	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
160	90	86	89	86	134.5	—	144.5	—	84.5	83	84.5	83	89.5	83
200	102.5	104	102	104	154	—	164	—	100.5	100.5	100.5	100.5	103	100.5
250	127	128	127	128	—	—	—	—	—	—	—	—	—	—

### Switch Hysteresis

Bore size (mm)	ON-OFF switch hysteresis	
	Reed switch	Solid state switch
160 to 200	≤ 2 mm	≤ 1 mm
250	≤ 3 mm	≤ 1 mm

Other than the applicable auto switches listed in “How to Order”, the following auto switches can be mounted. For detailed specifications, refer to page 8-1.

Type	Model	Electrical entry	Features
Solid state switch	D-F5NTL	Grommet (In-line)	With timer
	D-Y69A/Y69B/Y7PV	Grommet (Perpendicular)	—
	D-Y7NWV/Y7PWV/Y7BWV		2-color indication

\* With pre-wire connector is available for solid state auto switches. For details, refer to page 8-1.

\* Normally closed (NC = b contact), solid state switch (D-Y7G/Y7H type) are also available. For details, refer to page 8-1.



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 ( $\phi$ 160 to  $\phi$ 250) 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	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 damper. 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 (Nm)
160, 200	M16 x 2 x 30l	14	99
250	Foot	M20 x 2.5 x 35l	193.5
	Others	M20 x 2.5 x 30l	