

ISO Standards

Air Cylinder: Standard Double Acting with End of Stroke Cushioning **Series CP96** ø32, ø40, ø50, ø63, ø80, ø100, ø125

How to order

CP96S **B** **32** - **100** **J** **W** -

With auto switch **CP96SD** **B** **32** - **100** **J** **W** - **M9BW** **S** -

With auto switch
(Built-in magnet)

Mounting

B	Basic
L	Axial foot
F	Rod flange
G	Head flange
C	Single clevis
D	Double clevis

* Mounting brackets are shipped together, (but not assembled).

Bore size

32	32 mm
40	40 mm
50	50 mm
63	63 mm
80	80 mm
100	100 mm
125	125 mm

Cylinder stroke (mm)
Refer to "Standard Strokes" on page 44.

Rod boot

Nil	Without rod boot
J	Nylon tarpaulin (one side)
JJ	Nylon tarpaulin (both sides)
K	Heat resistant tarpaulin (one side)
KK	Heat resistant tarpaulin (both sides)

Auto switch

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

Number of auto switches

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

Made to Order
Refer to page 44 for details.

Rod

Nil	Single rod
W	Double rod

Applicable Auto Switches/Refer to the Best Pneumatics No. 2 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		0.5 (Nil)	1 (M)	3 (L)	5 (Z)				
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	●	●	●	○	○	IC	Relay, PLC
				3-wire (PNP)		12 V		M9P	●	●	●	○	○		
				2-wire		5 V, 12 V		M9B	●	●	●	○	○		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		M9NW	●	●	●	○	○	IC	
				3-wire (PNP)		12 V		M9PW	●	●	●	○	○		
				2-wire		5 V, 12 V		M9BW	●	●	●	○	○		
	Water resistant (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		M9NA*1	○	○	●	○	○	IC	
				3-wire (PNP)		12 V		M9PA*1	○	○	●	○	○		
				2-wire		12 V		M9BA*1	○	○	●	○	○		
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96	●	—	●	—	—	IC	—
				No	2-wire	24 V	12 V	100 V	A93	●	●	●	●	—	—
			100 V or less					A90	●	—	●	—	—	—	—

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

* 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

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

* Since there are other applicable auto switches than listed above, refer to the Best Pneumatics No. 2 for details.

* For details about auto switches with pre-wired connector, refer to the Best Pneumatics No. 2.

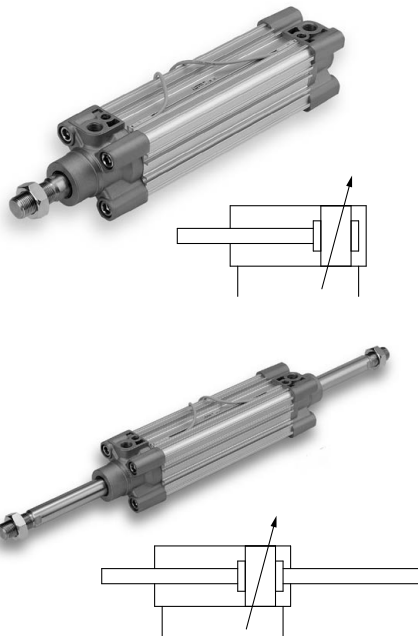
* The D-A9□/M9□/M9□W/M9□A auto switches are shipped together, (but not assembled).

(However, only the auto switch mounting brackets are assembled before shipment.)

Note) D-Y59A, Y69A, Y7P, Y7□W, Z7□, Z80 type cannot be mounted on the CP96 series.

Moreover, the D-M9□□ and A9□ auto switches cannot be mounted on square groove of the CP96 series.

Series CP96



Minimum Stroke for Auto Switch Mounting

Refer to "Minimum Stroke for Auto Switch Mounting" on page 54.



Made to Order
(For details, refer to pages 84 to 91.)

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat resistant cylinder (150°C)
-XC4	With heavy duty scraper
-XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel
-XC10	Dual stroke cylinder/Double rod type
-XC11	Dual stroke cylinder/Single rod type
-XC22	Fluororubber seal
-XC35	With coil scraper
-XC68	Made of stainless steel (with hard chrome plated piston rod)

⚠ Caution

Be sure to read before handling.

Refer to page 105 for Safety Instructions and "Handling Precautions for SMC Products" (M-E03-3) for Actuator and Auto Switch Precautions.

Specifications

Bore size (mm)	32	40	50	63	80	100	125
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: -20 to 70°C (No freezing) With auto switch : -10 to 60°C (No freezing)						
Lubrication	Not required (Non-lube)						
Operating piston speed	50 to 1000 mm/s					50 to 700 mm/s	
Allowable stroke tolerance	Up to 250 st: $\begin{smallmatrix} +1.0 \\ 0 \end{smallmatrix}$, 251 to 1000 st: $\begin{smallmatrix} +1.4 \\ 0 \end{smallmatrix}$, 1001 to 1500 st: $\begin{smallmatrix} +1.8 \\ 0 \end{smallmatrix}$, 1501 to 2000 st: $\begin{smallmatrix} +2.2 \\ 0 \end{smallmatrix}$						
Cushion	Air cushion						
Port size	G 1/8	G 1/4	G 1/4	G 3/8	G 3/8	G 1/2	G 1/2
Mounting	Basic, Axial foot, Rod flange, Head flange, Single clevis, Double clevis, Center trunnion						

Standard Strokes

Bore size (mm)	Standard stroke (mm)	Max. stroke ^{Note)}
32	25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500	2000
40	25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500	2000
50	25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600	2000
63	25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600	2000
80	25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600, 700, 800	2000
100	25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600, 700, 800	2000
125	—	2000

Intermediate strokes are available.

Note) Please consult with SMC for longer strokes.

Accessories

Mounting		Basic	Foot	Rod flange	Head flange	Single clevis	Double clevis	Center trunnion
Standard	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
Option	Piston rod ball joint	●	●	●	●	●	●	●
	Rod clevis	●	●	●	●	●	●	●
	Rod boot	●	●	●	●	●	●	●

* Do not use a piston rod ball joint (or floating joint) together with a single clevis with a ball joint (or clevis pivot bracket with a ball joint).

Theoretical Output



Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm ²)	Operating pressure (MPa)								
				0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
32	12	OUT	804	161	241	322	402	482	563	643	724	804
		IN	691	138	207	276	346	415	484	553	622	691
40	16	OUT	1257	251	377	503	629	754	880	1006	1131	1257
		IN	1056	211	317	422	528	634	739	845	950	1056
50	20	OUT	1963	393	589	785	982	1178	1374	1570	1767	1963
		IN	1649	330	495	660	825	989	1154	1319	1484	1649
63	20	OUT	3117	623	935	1247	1559	1870	2182	2494	2805	3117
		IN	2803	561	841	1121	1402	1682	1962	2242	2523	2803
80	25	OUT	5027	1005	1508	2011	2514	3016	3519	4022	4524	5027
		IN	4536	907	1361	1814	2268	2722	3175	3629	4082	4536
100	25	OUT	7854	1571	2356	3142	3927	4712	5498	6283	7068	7854
		IN	7363	1473	2209	2945	3682	4418	5154	5890	6627	7363
125	32	OUT	12272	2454	3682	4909	6136	7363	8590	9817	11045	12272
		IN	11468	2294	3440	4587	5734	6881	8027	9174	10321	11468

(Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm²)

Weights (Single rod)

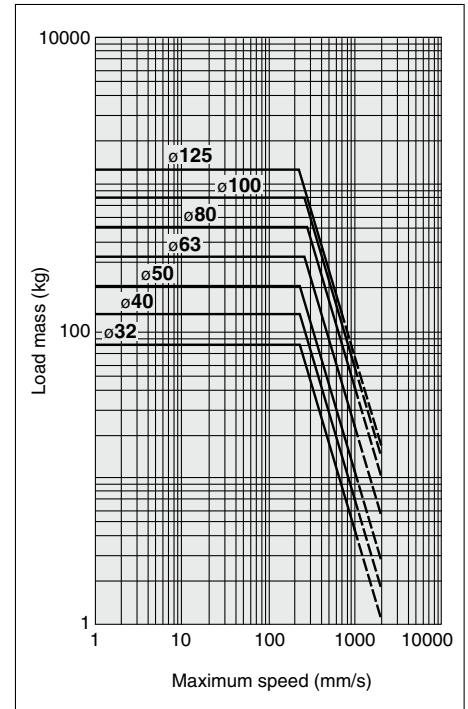
Bore size (mm)		32	40	50	63	80	100	125
Basic weight	Basic	0.55	0.84	1.36	1.77	2.84	3.77	6.82
	Foot	0.16	0.20	0.38	0.46	0.89	1.09	2.60
	Flange	0.20	0.23	0.47	0.58	1.30	1.81	4.10
	Single clevis	0.16	0.23	0.37	0.60	1.07	1.73	4.15
	Double clevis	0.20	0.32	0.45	0.71	1.28	2.11	4.25
	Trunnion	0.71	1.10	1.73	2.48	4.25	5.95	2.98
Additional weight per 50 mm of stroke		0.14	0.18	0.30	0.32	0.49	0.54	0.84
Accessories	Single clevis	0.07	0.11	0.22		0.40		1.20
	Double clevis	0.09	0.15	0.34		0.69		1.84

Calculation: Example) **CP96SD40-100**

- Basic weight 0.84 (kg) (Basic, ø40)
- Additional weight 0.18 (kg/50 st)
- Cylinder stroke 100 (st)
- Mounting bracket weight 0.32 (kg) (Double clevis)

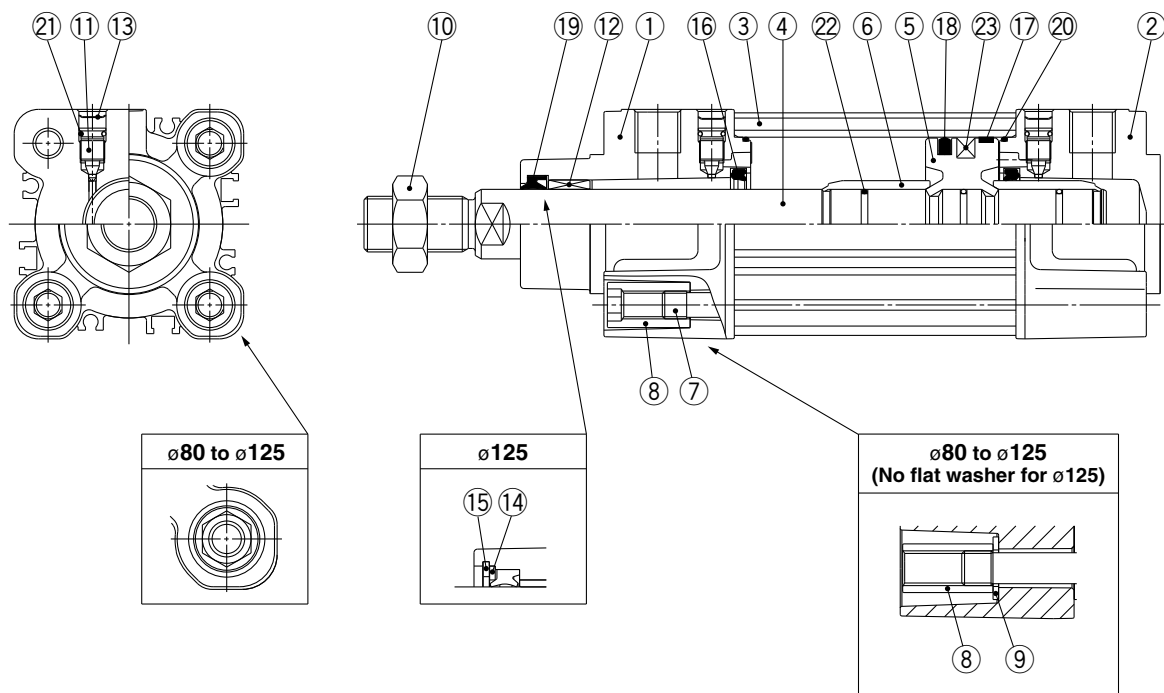
$$0.84 + 0.18 \times 100 \div 50 + 0.32 = 1.52 \text{ kg}$$

Allowable Kinetic Energy



(Example) Find the upper limit of rod end load when an air cylinder of ø63 is operated at 500 mm/s. From a point indicating 500 mm/s on the axis of abscissas, extend a line upward and find a point where it intersects with a line for the 63 mm bore size. Extend a line from the intersection to the left and find a load mass 80 kg.

Construction



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum die-cast	
2	Head cover	Aluminum die-cast	
3	Cylinder tube	Aluminum alloy	
4	Piston rod	Carbon steel	
5	Piston	Aluminum alloy	
6	Cushion ring	Aluminum alloy	
7	Tie-rod	Carbon steel	
8	Tie-rod nut	Steel	
9	Flat washer	Steel	ø80, ø100
10	Rod end nut	Steel	
11	Cushion valve	Steel wire	
12	Bushing	Bearing alloy	
13	Retaining ring	Steel for spring	ø40 to ø125
14	Rod seal holder	Stainless steel	ø125
15	Retaining ring	Steel for spring	ø125
16	Cushion seal	Urethane rubber	
17	Wear ring	Resin	
18	Piston seal	NBR	
19	Rod seal	NBR	
20	Cylinder tube gasket	NBR	
21	Cushion valve seal	NBR	
22	Piston gasket	NBR	
23	Magnet		

Replacement Parts/Seal Kit (Single rod)

Bore size (mm)	Kit no.	Contents
32	CS95-32	Kits include items 16 to 20.
40	CS95-40	
50	CS95-50	
63	CS95-63	
80	CS95-80	
100	CS96-100	
125	CS96-125	

* Seal kits consist of items 16 to 20, and can be ordered by using the seal kit number corresponding to each bore size.

* The seal kit includes a grease pack (10 g for ø32 to ø50, 20 g for ø63 and ø80, 30 g for ø100 and ø125).

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

Grease pack part number: GR-S010 (10 g), GR-S-020 (20 g)

Seal Kit (Double rod)

Bore size (mm)	Kit no.	Contents
32	CS95W-32	Kits include items 16 and 18 to 20.
40	CS95W-40	
50	CS95W-50	
63	CS95W-63	
80	CS95W-80	
100	CS96W-100	
125	CS96W-125	

* Seal kits consist of items 16 and 18 to 20, and can be ordered by using the seal kit number corresponding to each bore size.

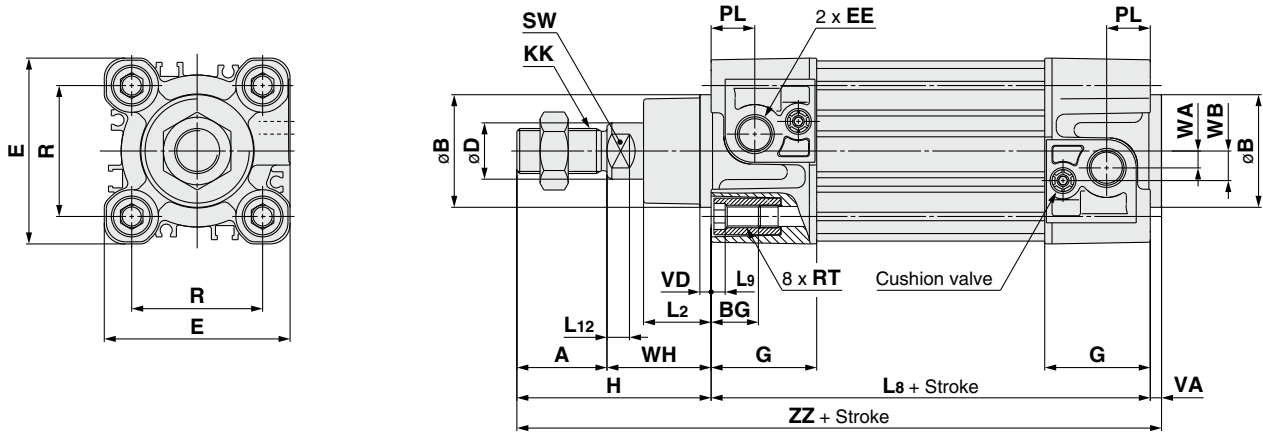
* The seal kit includes a grease pack (10 g for ø32 to ø50, 20 g for ø63 and ø80, 30 g for ø100 and ø125).

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

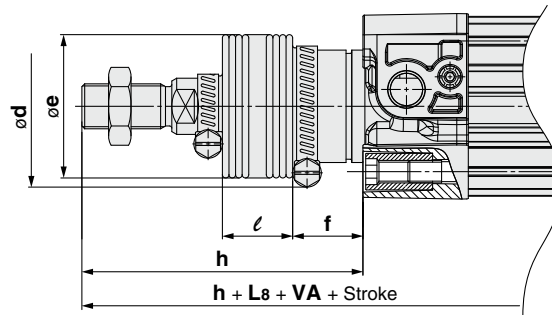
Grease pack part number: GR-S010 (10 g), GR-S-020 (20 g)

Dimensions

Basic: CP96S(D)B Bore size – Stroke



With rod boot



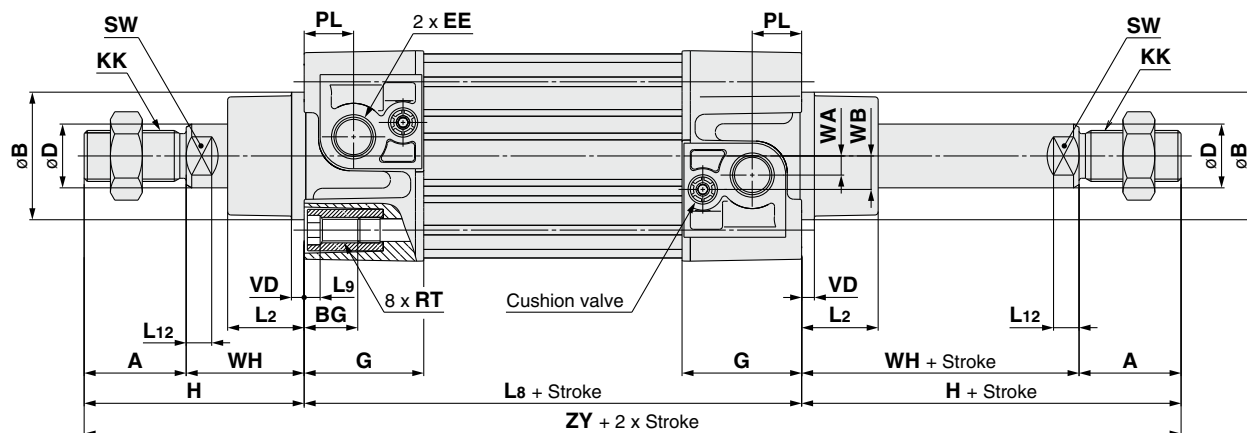
Bore size (mm)	Stroke range (mm)		A	ϕB d11	ϕD	EE	PL	RT	L ₁₂	KK	SW	G	BG	L ₈	VD	VA	WA	WB	WH	ZZ	E	R
	Without rod boot	With rod boot																				
32	Up to 2000	Up to 1000	22	30	12	G 1/8	13	M6 x 1	6	M10 x 1.25	10	32	16	94	4	4	4	7	26	146	47	32.5
40	Up to 2000	Up to 1000	24	35	16	G 1/4	14	M6 x 1	6.5	M12 x 1.25	13	37.5	16	105	4	4	5	9	30	163	54	38
50	Up to 2000	Up to 1000	32	40	20	G 1/4	15.5	M8 x 1.25	8	M16 x 1.5	17	37.5	16	106	4	4	6	10.5	37	179	66	46.5
63	Up to 2000	Up to 1000	32	45	20	G 3/8	16.5	M8 x 1.25	8	M16 x 1.5	17	45	16	121	4	4	9	12	37	194	77	56.5
80	Up to 2000	Up to 1000	40	45	25	G 3/8	19	M10 x 1.5	10	M20 x 1.5	22	45	17	128	4	4	11.5	14	46	218	99	72
100	Up to 2000	Up to 1000	40	55	25	G 1/2	19	M10 x 1.5	10	M20 x 1.5	22	50	17	138	4	4	17	15	51	233	118	89
125	Up to 2000	Up to 1000	54	60	32	G 1/2	19	M12 x 1.75	13	M27 x 2	27	58	20	160	6	6	17	15	65	285	144	110

Bore size (mm)	L ₂	L ₉	H	ød	øe	f	ℓ												h											
							1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000
32	15	4	48	54	36	23	12.5	25	37.5	50	75	100	125	150	175	200	225	250	75	88	100	113	138	163	188	213	238	263	288	313
40	17	4	54	54	36	23	12.5	25	37.5	50	75	100	125	150	175	200	225	250	75	88	100	113	138	163	188	213	238	263	288	313
50	24	5	69	64	51	25	12.5	25	37.5	50	75	100	125	150	175	200	225	250	87	100	112	125	150	175	200	225	250	275	300	325
63	24	5	69	64	51	25	12.5	25	37.5	50	75	100	125	150	175	200	225	250	87	100	112	125	150	175	200	225	250	275	300	325
80	30	—	86	68	56	30	12.5	25	37.5	50	75	100	125	150	175	200	225	250	103	116	128	141	166	191	216	241	266	291	316	341
100	32	—	91	76	56	32	12.5	25	37.5	50	75	100	125	150	175	200	225	250	103	116	128	141	166	191	216	241	266	291	316	341
125	40	—	119	82	75	40	10	20	30	40	60	80	100	120	140	160	180	200	130	140	150	160	180	200	220	240	260	280	300	320

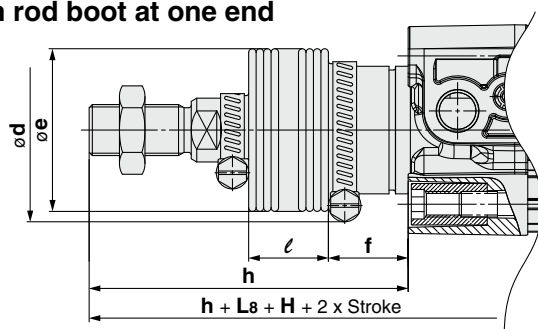
Series CP96

Dimensions

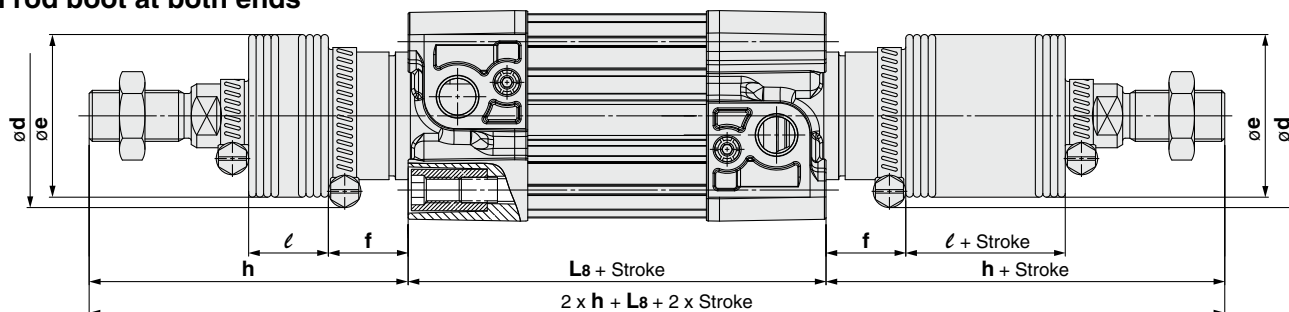
Basic: CP96S(D)B Bore size – StrokeW



With rod boot at one end



With rod boot at both ends

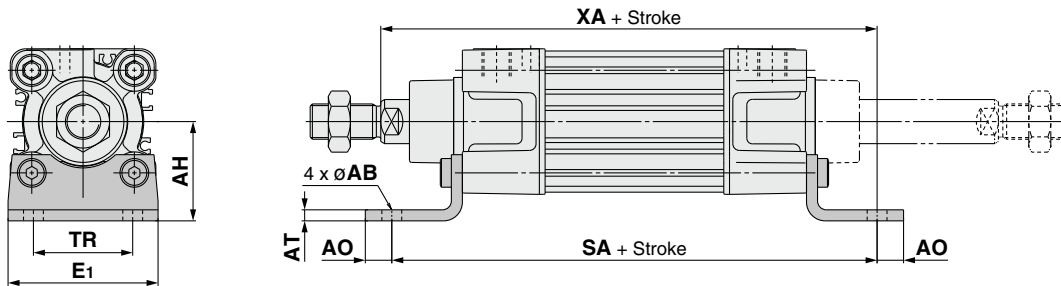


Bore size (mm)	Stroke range (mm)	A	øB d11	øD	EE	PL	RT	L ₁₂	KK	SW	G	BG	L ₈	VD	WA	WB	WH	ZY	L ₂	L ₉
32	Up to 1000	22	30	12	G 1/8	13	M6 x 1	6	M10 x 1.25	10	32	16	94	4	4	7	26	190	15	4
40	Up to 1000	24	35	16	G 1/4	14	M6 x 1	6.5	M12 x 1.25	13	37.5	16	105	4	5	9	30	213	17	4
50	Up to 1000	32	40	20	G 1/4	15.5	M8 x 1.25	8	M16 x 1.5	17	37.5	16	106	4	6	10.5	37	244	24	5
63	Up to 1000	32	45	20	G 3/8	16.5	M8 x 1.25	8	M16 x 1.5	17	45	16	121	4	9	12	37	259	24	5
80	Up to 1000	40	45	25	G 3/8	19	M10 x 1.5	10	M20 x 1.5	22	45	17	128	4	11.5	14	46	300	30	—
100	Up to 1000	40	55	25	G 1/2	19	M10 x 1.5	10	M20 x 1.5	22	50	17	138	4	17	15	51	320	32	—
125	Up to 1000	54	60	32	G 1/2	19	M12 x 1.75	13	M27 x 2	27	58	20	160	6	17	15	65	398	40	—

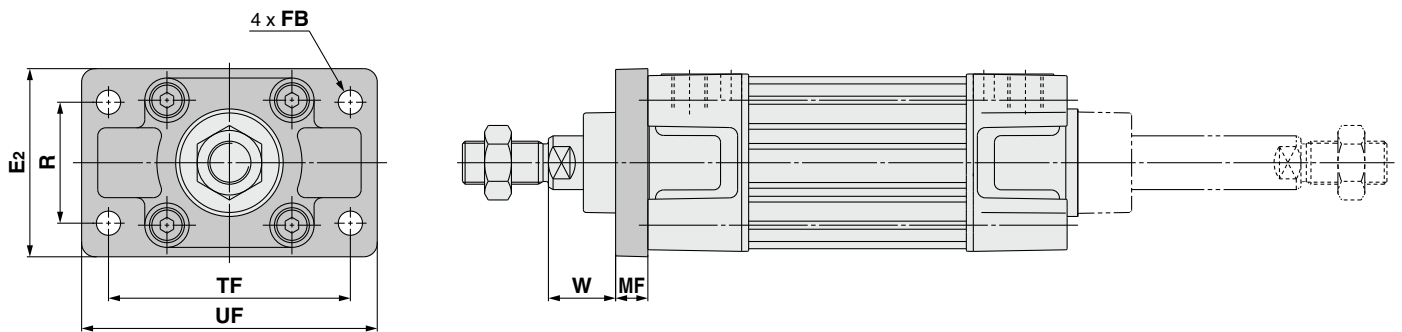
Bore size (mm)	H	ød	øe	f	ℓ												h											
					1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000
32	48	54	36	23	12.5	25	37.5	50	75	100	125	150	175	200	225	250	75	88	100	113	138	163	188	213	238	263	288	313
40	54	54	36	23	12.5	25	37.5	50	75	100	125	150	175	200	225	250	75	88	100	113	138	163	188	213	238	263	288	313
50	69	64	51	25	12.5	25	37.5	50	75	100	125	150	175	200	225	250	87	100	112	125	150	175	200	225	250	275	300	325
63	69	64	51	25	12.5	25	37.5	50	75	100	125	150	175	200	225	250	87	100	112	125	150	175	200	225	250	275	300	325
80	86	68	56	30	12.5	25	37.5	50	75	100	125	150	175	200	225	250	103	116	128	141	166	191	216	241	266	291	316	341
100	91	76	56	32	12.5	25	37.5	50	75	100	125	150	175	200	225	250	103	116	128	141	166	191	216	241	266	291	316	341
125	119	82	75	40	10	20	30	40	60	80	100	120	140	160	180	200	130	140	150	160	180	200	220	240	260	280	300	320

Dimensions

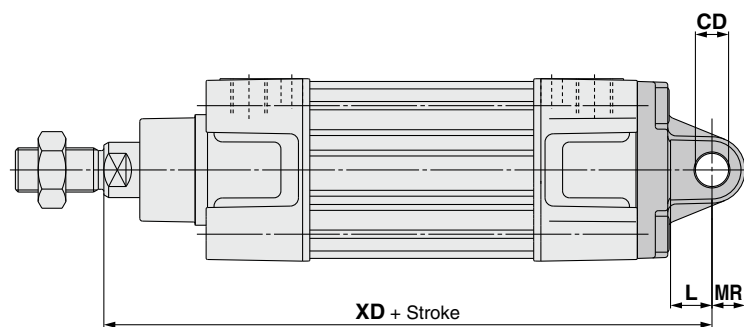
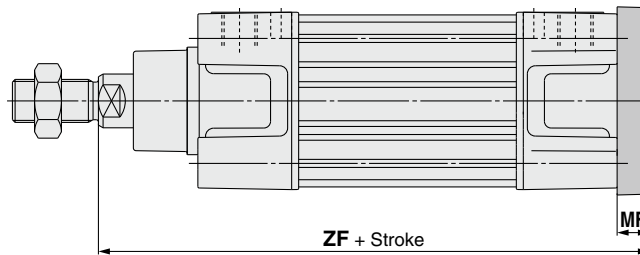
Axial foot (L)



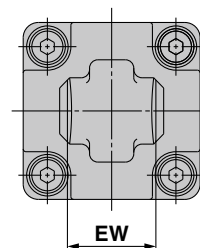
Rod flange (F)



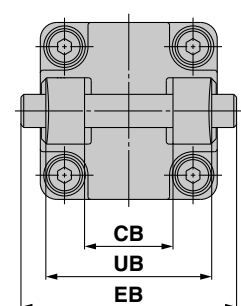
Head flange (G)



Single clevis (C)



Double clevis (D)



Bore size (mm)	E ₁	TR	AH	AO	AT	AB	SA	XA	R	TF	FB	E ₂	UF	W	MF	ZF	UB h14	CB H14	EW	CD H9	L	MR	XD	EB
32	48	32	32	10	4.5	7	142	144	32	64	7	50	79	16	10	130	45	26	26 ^{-0.2} _{-0.6}	10	12	9.5	142	65
40	55	36	36	11	4.5	10	161	163	36	72	9	55	90	20	10	145	52	28	28 ^{-0.2} _{-0.6}	12	15	12	160	75
50	68	45	45	12	5.5	10	170	175	45	90	9	70	110	25	12	155	60	32	32 ^{-0.2} _{-0.6}	12	15	12	170	80
63	80	50	50	12	5.5	10	185	190	50	100	9	80	120	25	12	170	70	40	40 ^{-0.2} _{-0.6}	16	20	16	190	90
80	100	63	63	14	6.5	12	210	215	63	126	12	100	153	30	16	190	90	50	50 ^{-0.2} _{-0.6}	16	20	16	210	110
100	120	75	71	16	6.5	14.5	220	230	75	150	14	120	178	35	16	205	110	60	60 ^{-0.2} _{-0.6}	20	25	20	230	140
125	Max. 157	90	90	Max. 25	8	16	250	270	90	180	16	Max. 157	Max. 224	45	20	245	130	70	70 ^{-0.5} _{-1.2}	25	Min. 30	Max. 26	275	Max. 157

ISO Standards

Air Cylinder: Standard Type Double Acting, Single/Double Rod **Series C96** ø32, ø40, ø50, ø63, ø80, ø100, ø125

How to Order

C96S **B** **32** - **100** **J** **W** - **□**

With auto switch **C96SD** **B** **32** - **100** **J** **W** - **M9BW** **S** - **□**

Mounting

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

* Mounting brackets except center trunnion type are shipped together, (but not assembled).

Bore size

32	32 mm
40	40 mm
50	50 mm
63	63 mm
80	80 mm
100	100 mm
125	125 mm

With auto switch
(Built-in magnet)

Number of auto switches

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

Rod

Nil	Single rod
W	Double rod

Rod boot

Nil	Without rod boot
J	Nylon tarpaulin (one side)
JJ	Nylon tarpaulin (both sides)
K	Heat resistant tarpaulin (one side)
KK	Heat resistant tarpaulin (both sides)

Cylinder stroke (mm)
Refer to "Standard Strokes" on page 57.

Made to Order
Refer to page 57 for details.

Auto switch

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

Applicable Auto Switches/Refer to the Best Pneumatics No. 2 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	—	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC	Relay, PLC		
				3-wire (PNP)				M9P	—	●	●	●	○	○				
		Terminal conduit		2-wire	—	—		100 V, 200 V	M9B	—	●	●	●	○			○	—
				3-wire (NPN)	24 V	5 V, 12 V		—	J51	—	●	—	●	○			—	—
	2-wire	—	G39	—			—		—	—	—	—	IC					
	3-wire (PNP)	—	K39	—			—		—	—	—	—	—					
	2-wire	M9NW	—	●			●		●	○	○	○	IC					
	3-wire (NPN)	M9PW	—	●			●		●	○	○	○	—					
	3-wire (PNP)	M9BW	—	●			●		●	○	○	○	—					
	2-wire	M9NA*1	—	○			○		●	○	○	○	IC					
	3-wire (NPN)	M9PA*1	—	○			○		●	○	○	○	—					
	3-wire (PNP)	M9BA*1	—	○			○		●	○	○	○	—					
	2-wire	F59F	—	●			—		●	○	○	○	IC					
	4-wire (NPN)	P4DW	—	—	—	●	●	○	—	—								
2-wire (Non-polar)																		
Reed auto switch	—	Grommet	Yes	3-wire (NPN Equivalent)	—	5 V	—	A96	—	●	—	●	—	—	IC	Relay, PLC		
				2-wire	24 V	12 V	100 V	A93	—	●	●	●	●	—	—			
							100 V or less	A90	—	●	—	●	—	—	—			
							100 V, 200 V	A54	—	●	—	●	●	—	—			
		200 V or less	A64				—	●	—	●	—	—	—					
		Terminal conduit	Yes	—	A33	—	—	—	—	—	—	—	—					
				100 V, 200 V	A34	—	—	—	—	—	—	—	—					
				—	A44	—	—	—	—	—	—	—	—					
	—			A59W	—	●	—	●	—	—	—	—						
	Diagnostic indication (2-color indication)	Grommet	Yes	—	—	—	—	—	—	—	—	—	—	—	Relay, PLC			

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

* 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

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

* Since there are other applicable auto switches than listed above, refer to the Best Pneumatics No. 2 for details.

* For details about auto switches with pre-wired connector, refer to the Best Pneumatics No. 2.

* The D-A9□/M9□/M9□W/M9□A auto switches are shipped together, (but not assembled).
(However, only the auto switch mounting brackets are assembled before shipment.)

Specifications

Bore size (mm)	32	40	50	63	80	100	125
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: -20 to 70°C (No freezing) With auto switch: -10 to 60°C (No freezing)						
Lubrication	Not required (Non-lube)						
Operating piston speed	50 to 1000 mm/s					50 to 700 mm/s	
Allowable stroke tolerance	Up to 250 st: $^{+1.0}_0$, 251 to 1000 st: $^{+1.4}_0$, 1001 to 1500 st: $^{+1.8}_0$, 1501 to 2000 st: $^{+2.2}_0$						
Cushion	Air cushion						
Port size	G 1/8	G 1/4	G 1/4	G 3/8	G 3/8	G 1/2	G 1/2
Mounting	Basic, Axial foot, Rod flange, Head flange, Single clevis, Double clevis, Center trunnion						

Standard Strokes

Bore size (mm)	Standard stroke (mm)	Max. stroke Note)
32	25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500	1000
40	25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500	1900
50	25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600	1900
63	25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600	1900
80	25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600, 700, 800	1900
100	25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 600, 700, 800	1900
125	—	2000

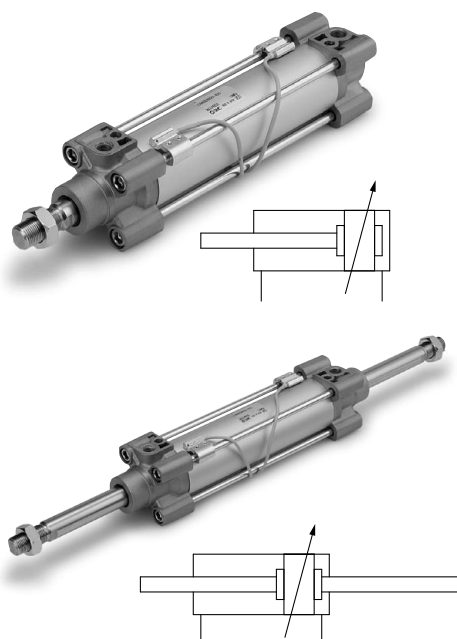
Intermediate strokes are available.

Note) Please consult with SMC for longer strokes.

Accessories

Mounting		Basic	Foot	Rod flange	Head flange	Single clevis	Double clevis	Center trunnion
Standard	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
Option	Piston rod ball joint	●	●	●	●	●	●	●
	Rod clevis	●	●	●	●	●	●	●
	Rod boot	●	●	●	●	●	●	●

* Do not use a piston rod ball joint (or floating joint) together with a single clevis with a ball joint (or clevis pivot bracket with a ball joint).



Minimum Stroke for Auto Switch Mounting

Refer to "Minimum Stroke for Auto Switch Mounting" on page 72.



Made to Order
(For details, refer to pages 84 to 91.)

Symbol	Specifications
-XA□	Change of rod end shape
-XC14	Change of trunnion bracket mounting position
-XB6	Heat resistant cylinder (150°C)
-XB7	Cold resistant cylinder
-XC4	With heavy duty scraper
-XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel
-XC10	Dual stroke cylinder/Double rod type
-XC11	Dual stroke cylinder/Single rod type
-XC22	Fluororubber seal
-XC35	With coil scraper
-XC68	Made of stainless steel (with hard chrome plated piston rod)

Caution

Be sure to read before handling.

Refer to page 105 for Safety Instructions and "Handling Precautions for SMC Products" (M-E03-3) for Actuator and Auto Switch Precautions.

Theoretical Output



Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm ²)	Operating pressure (MPa)								
				0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
32	12	OUT	804	161	241	322	402	482	563	643	724	804
		IN	691	138	207	276	346	415	484	553	622	691
40	16	OUT	1257	251	377	503	629	754	880	1006	1131	1257
		IN	1056	211	317	422	528	634	739	845	950	1056
50	20	OUT	1963	393	589	785	982	1178	1374	1570	1767	1963
		IN	1649	330	495	660	825	989	1154	1319	1484	1649
63	20	OUT	3117	623	935	1247	1559	1870	2182	2494	2805	3117
		IN	2803	561	841	1121	1402	1682	1962	2242	2523	2803
80	25	OUT	5027	1005	1508	2011	2514	3016	3519	4022	4524	5027
		IN	4536	907	1361	1814	2268	2722	3175	3629	4082	4536
100	25	OUT	7854	1571	2356	3142	3927	4712	5498	6283	7068	7854
		IN	7363	1473	2209	2945	3682	4418	5154	5890	6627	7363
125	32	OUT	12272	2454	3682	4909	6136	7363	8590	9817	11045	12272
		IN	11468	2294	3440	4587	5734	6881	8027	9174	10321	11468

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm²)

Weights (Single rod)

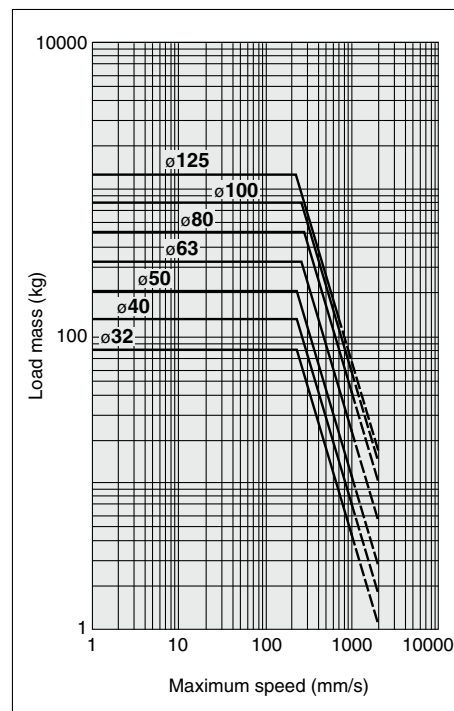
Bore size (mm)		32	40	50	63	80	100	125
Basic weight	Basic	0.53	0.83	1.33	1.74	2.77	3.69	6.70
	Foot	0.16	0.20	0.38	0.46	0.89	1.09	2.60
	Flange	0.20	0.23	0.47	0.58	1.30	1.81	4.10
	Single clevis	0.16	0.23	0.37	0.60	1.07	1.73	4.15
	Double clevis	0.20	0.32	0.45	0.71	1.28	2.11	4.25
	Trunnion	0.71	1.10	1.73	2.48	4.25	5.95	2.98
Additional weight per 50 mm of stroke	All mounting brackets	0.11	0.16	0.24	0.26	0.40	0.44	0.71
Accessories	Single clevis	0.07	0.11	0.22		0.40		1.20
	Double clevis	0.09	0.15	0.34		0.69		1.84

Calculation: Example) **C96SD40-100**

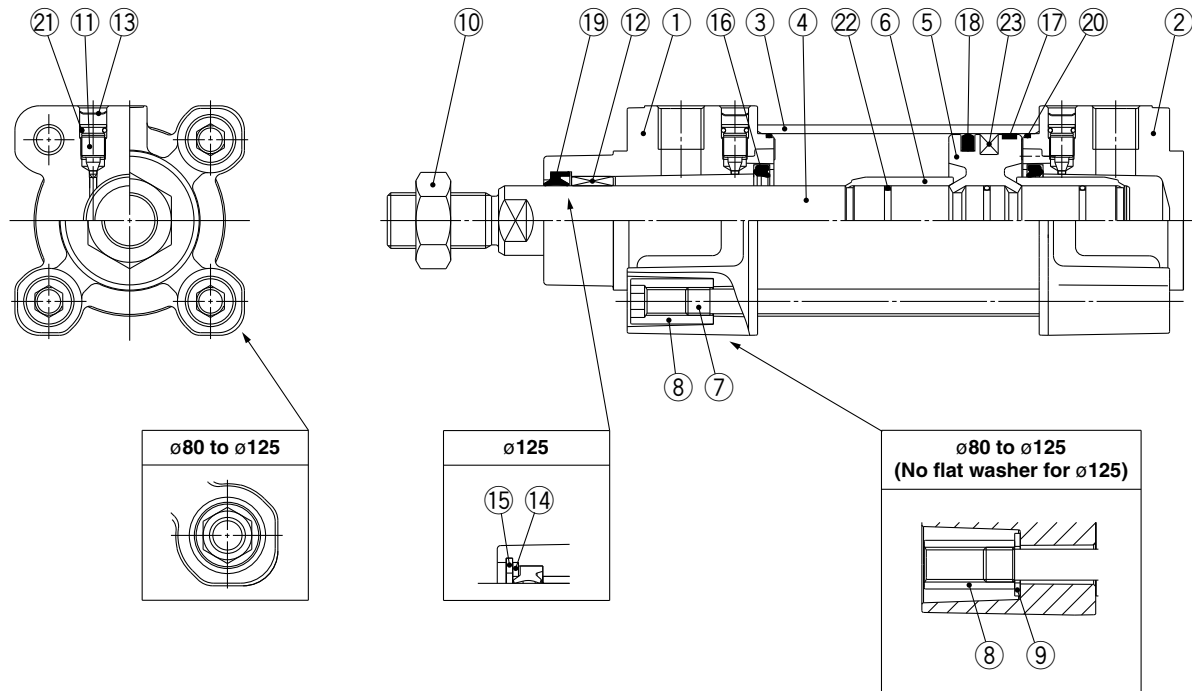
- Basic weight 0.83 (kg) (Basic, ø40)
- Additional weight 0.16 (kg/50 st)
- Cylinder stroke 100 (st)
- Mounting bracket weight 0.32 (kg) (Double clevis)

$$0.83 + 0.16 \times 100 \div 50 + 0.32 = 1.47 \text{ kg}$$

Allowable Kinetic Energy



(Example) Find the upper limit of rod end load when an air cylinder of ø63 is operated at 500 mm/s. From a point indicating 500 mm/s on the axis of abscissas, extend a line upward and find a point where it intersects with a line for the 63 mm bore size. Extend a line from the intersection to the left and find a load mass 80 kg.

Construction**Component Parts**

No.	Description	Material	Note
1	Rod cover	Aluminum die-cast	
2	Head cover	Aluminum die-cast	
3	Cylinder tube	Aluminum alloy	
4	Piston rod	Carbon steel	
5	Piston	Aluminum alloy	
6	Cushion ring	Aluminum alloy	
7	Tie-rod	Carbon steel	
8	Tie-rod nut	Steel	
9	Flat washer	Steel	ø80, ø100
10	Rod end nut	Steel	
11	Cushion valve	Steel wire	
12	Bushing	Bearing alloy	
13	Retaining ring	Steel for spring	ø40 to ø125
14	Rod seal holder	Stainless steel	ø125
15	Retaining ring	Steel for spring	ø125
16	Cushion seal	Urethane rubber	
17	Wear ring	Resin	
18	Piston seal	NBR	
19	Rod seal	NBR	
20	Cylinder tube gasket	NBR	
21	Cushion valve seal	NBR	
22	Piston gasket	NBR	
23	Magnet		

Replacement Parts/Seal Kit (Single rod)

Bore size (mm)	Kit no.	Contents
32	CS95-32	Kits include items 16 to 20.
40	CS95-40	
50	CS95-50	
63	CS95-63	
80	CS95-80	
100	CS96-100	
125	CS96-125	

* Seal kits consist of items 16 to 20, and can be ordered by using the seal kit number corresponding to each bore size.

* The seal kit includes a grease pack (10 g for ø32 to ø50, 20 g for ø63 and ø80, 30 g for ø100 and ø125).

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

Grease pack part number: GR-S010 (10 g), GR-S-020 (20 g)

Seal Kit (Double rod)

Bore size (mm)	Kit no.	Contents
32	CS95W-32	Kits include items 16 and 18 to 20.
40	CS95W-40	
50	CS95W-50	
63	CS95W-63	
80	CS95W-80	
100	CS96W-100	
125	CS96W-125	

* Seal kits consist of items 16 and 18 to 20, and can be ordered by using the seal kit number corresponding to each bore size.

* The seal kit includes a grease pack (10 g for ø32 to ø50, 20 g for ø63 and ø80, 30 g for ø100 and ø125).

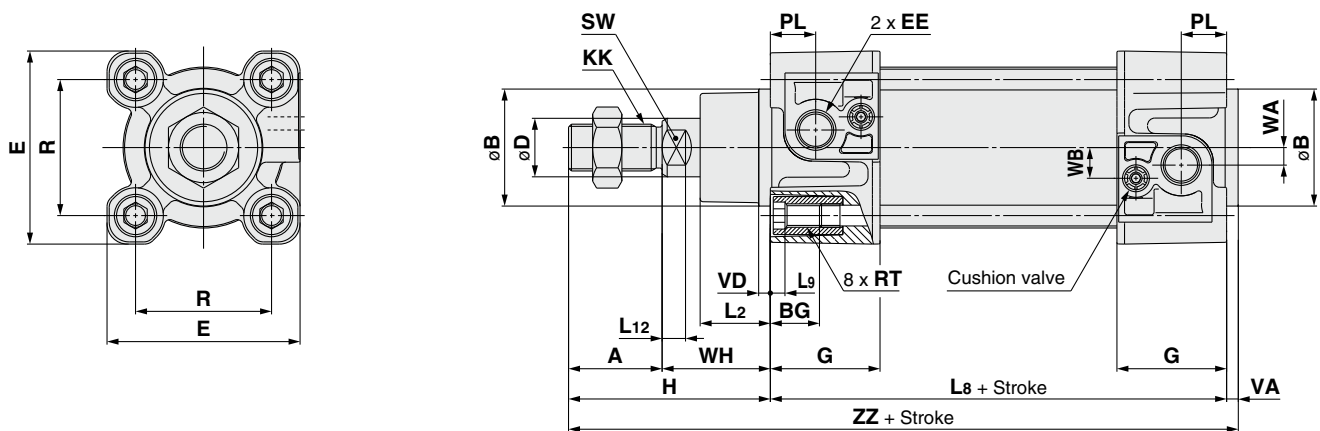
Order with the following part number when only the grease pack is needed.

Grease pack part number: GR-S010 (10 g), GR-S-020 (20 g)

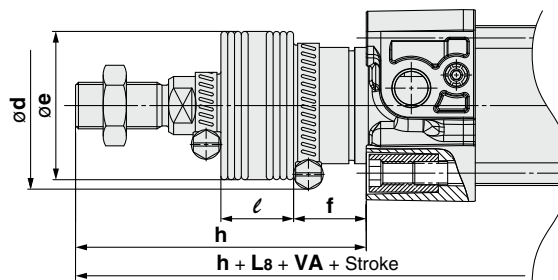
Series C96

Dimensions

Basic: C96S(D)B **Bore size** – **Stroke**



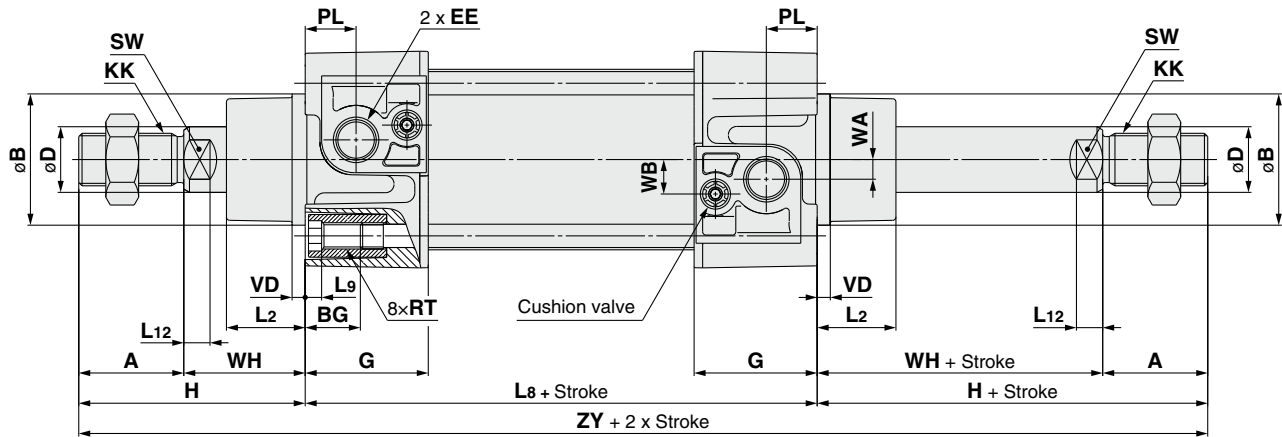
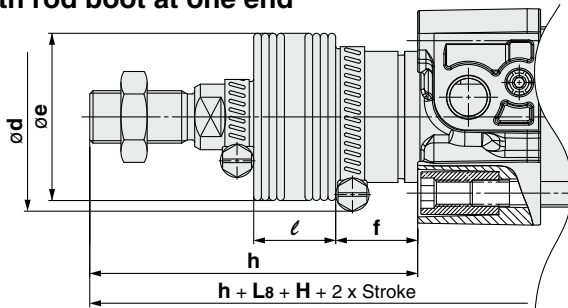
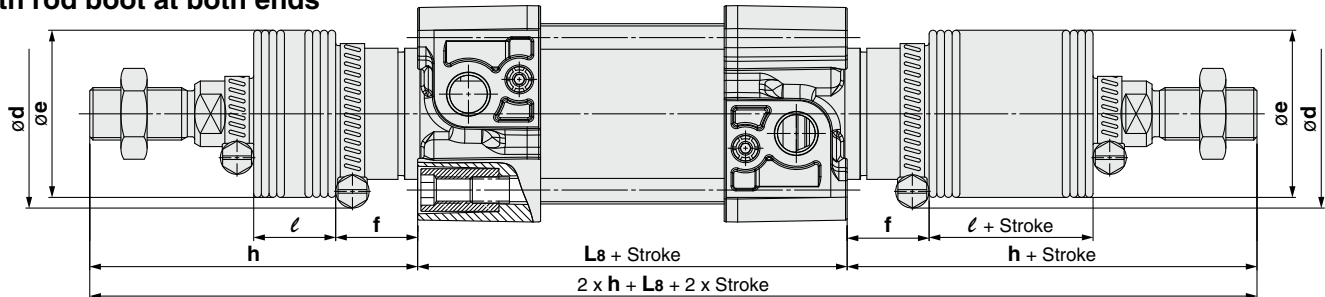
With rod boot



Bore size (mm)	Stroke range (mm)		A	øB d11	øD	EE	PL	RT	L ₁₂	KK	SW	G	BG	L ₈	VD	VA	WA	WB	WH	ZZ	E	R
	Without rod boot	With rod boot																				
32	Up to 1000	Up to 1000	22	30	12	G 1/8	13	M6 x 1	6	M10 x 1.25	10	32	16	94	4	4	4	7	26	146	47	32.5
40	Up to 1900	Up to 1000	24	35	16	G 1/4	14	M6 x 1	6.5	M12 x 1.25	13	37.5	16	105	4	4	5	9	30	163	54	38
50	Up to 1900	Up to 1000	32	40	20	G 1/4	15.5	M8 x 1.25	8	M16 x 1.5	17	37.5	16	106	4	4	6	10.5	37	179	66	46.5
63	Up to 1900	Up to 1000	32	45	20	G 3/8	16.5	M8 x 1.25	8	M16 x 1.5	17	45	16	121	4	4	9	12	37	194	77	56.5
80	Up to 1900	Up to 1000	40	45	25	G 3/8	19	M10 x 1.5	10	M20 x 1.5	22	45	17	128	4	4	11.5	14	46	218	99	72
100	Up to 1900*	Up to 1000*	40	55	25	G 1/2	19	M10 x 1.5	10	M20 x 1.5	22	50	17	138	4	4	17	15	51	233	118	89
125	Up to 2000*	Up to 1000*	54	60	32	G 1/2	19	M12 x 1.75	13	M27 x 2	27	58	20	160	6	6	17	15	65	285	144	110

* Minimum stroke for trunnion mounting are below. Tube I.D. 32 to 80: 0 mm, Tube I.D. 100: 5 mm, Tube I.D. 125: 10 mm

Bore size (mm)	L ₂	L ₉	H	ød	øe	f	ℓ														h											
							1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000		
32	15	4	48	54	36	23	12.5	25	37.5	50	75	100	125	150	175	200	225	250	75	88	100	113	138	163	188	213	238	263	288	313		
40	17	4	54	54	36	23	12.5	25	37.5	50	75	100	125	150	175	200	225	250	75	88	100	113	138	163	188	213	238	263	288	313		
50	24	5	69	64	51	25	12.5	25	37.5	50	75	100	125	150	175	200	225	250	87	100	112	125	150	175	200	225	250	275	300	325		
63	24	5	69	64	51	25	12.5	25	37.5	50	75	100	125	150	175	200	225	250	87	100	112	125	150	175	200	225	250	275	300	325		
80	30	—	86	68	56	30	12.5	25	37.5	50	75	100	125	150	175	200	225	250	103	116	128	141	166	191	216	241	266	291	316	341		
100	32	—	91	76	56	32	12.5	25	37.5	50	75	100	125	150	175	200	225	250	103	116	128	141	166	191	216	241	266	291	316	341		
125	40	—	119	82	75	40	10	20	30	40	60	80	100	120	140	160	180	200	130	140	150	160	180	200	220	240	260	280	300	320		

Dimensions**Basic: C96S(D)B Bore size – Stroke****With rod boot at one end****With rod boot at both ends**

Bore size (mm)	Stroke range (mm)	A	øB d11	øD	EE	PL	RT	L12	KK	SW	G	BG	L8	VD	WA	WB	WH	ZY	L2	L9
32	Up to 1000	22	30	12	G 1/8	13	M6 x 1	6	M10 x 1.25	10	32	16	94	4	4	7	26	190	15	4
40	Up to 1000	24	35	16	G 1/4	14	M6 x 1	6.5	M12 x 1.25	13	37.5	16	105	4	5	9	30	213	17	4
50	Up to 1000	32	40	20	G 1/4	15.5	M8 x 1.25	8	M16 x 1.5	17	37.5	16	106	4	6	10.5	37	244	24	5
63	Up to 1000	32	45	20	G 3/8	16.5	M8 x 1.25	8	M16 x 1.5	17	45	16	121	4	9	12	37	259	24	5
80	Up to 1000	40	45	25	G 3/8	19	M10 x 1.5	10	M20 x 1.5	22	45	17	128	4	11.5	14	46	300	30	—
100	Up to 1000*	40	55	25	G 1/2	19	M10 x 1.5	10	M20 x 1.5	22	50	17	138	4	17	15	51	320	32	—
125	Up to 1000*	54	60	32	G 1/2	19	M12 x 1.75	13	M27 x 2	27	58	20	160	6	17	15	65	398	40	—

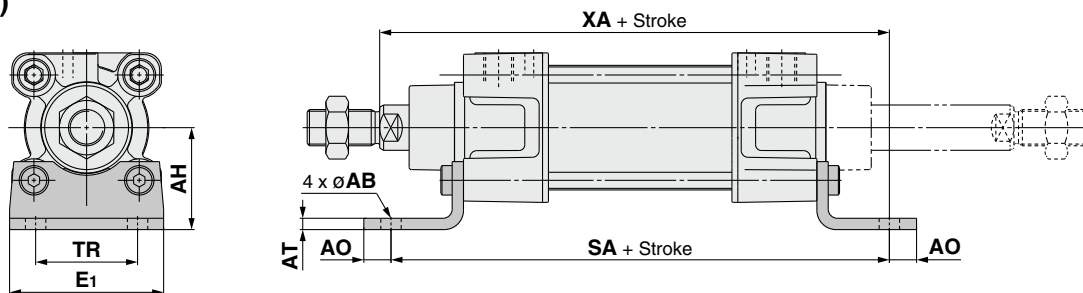
* Minimum stroke for trunnion mounting are below. Tube I.D. 32 to 80: 0 mm, Tube I.D. 100: 5 mm, Tube I.D. 125: 10 mm

Bore size (mm)	H	ød	øe	f	ℓ												h											
					1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	501 to 600	601 to 700	701 to 800	801 to 900	901 to 1000
32	48	54	36	23	12.5	25	37.5	50	75	100	125	150	175	200	225	250	75	88	100	113	138	163	188	213	238	263	288	313
40	54	54	36	23	12.5	25	37.5	50	75	100	125	150	175	200	225	250	75	88	100	113	138	163	188	213	238	263	288	313
50	69	64	51	25	12.5	25	37.5	50	75	100	125	150	175	200	225	250	87	100	112	125	150	175	200	225	250	275	300	325
63	69	64	51	25	12.5	25	37.5	50	75	100	125	150	175	200	225	250	87	100	112	125	150	175	200	225	250	275	300	325
80	86	68	56	30	12.5	25	37.5	50	75	100	125	150	175	200	225	250	103	116	128	141	166	191	216	241	266	291	316	341
100	91	76	56	32	12.5	25	37.5	50	75	100	125	150	175	200	225	250	103	116	128	141	166	191	216	241	266	291	316	341
125	119	82	75	40	10	20	30	40	60	80	100	120	140	160	180	200	130	140	150	160	180	200	220	240	260	280	300	320

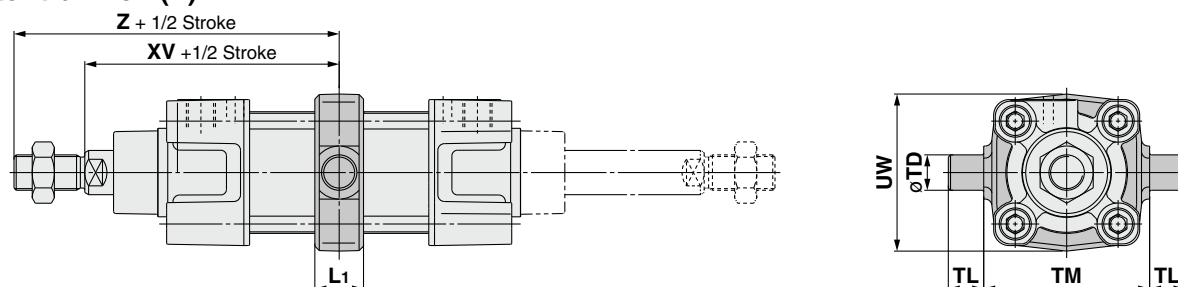
Series C96

Dimensions

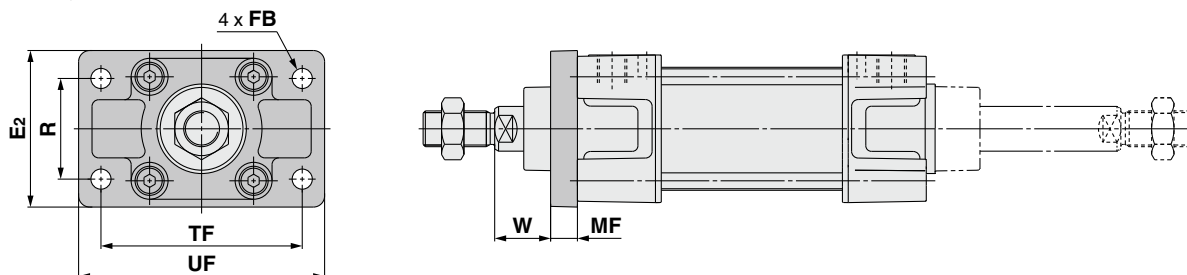
Axial foot (L)



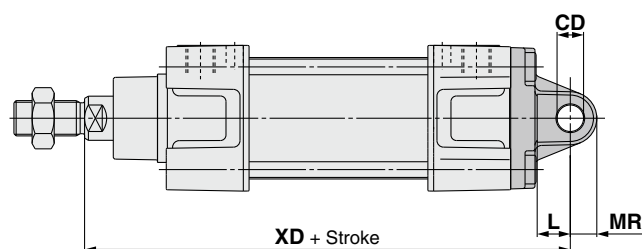
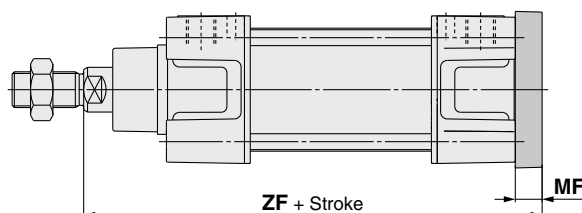
Center trunnion (T)



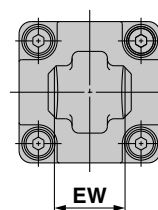
Rod flange (F)



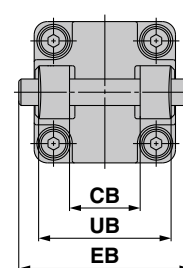
Head flange (G)



Single clevis (C)



Double clevis (D)



Bore size (mm)	E1	TR	AH	AO	AT	AB	SA	XA	TM	TL	TD _{e8}	UW	L1	XV	Z	R	TF	FB	E2	UF	W	MF	ZF	UB _{h14}	CB _{H14}	EW	CD _{H9}	L	MR	XD	EB
32	48	32	32	10	4.5	7	142	144	50	12	12	49	17	73	95	32	64	7	50	79	16	10	130	45	26	26 ^{-0.2/-0.6}	10	12	9.5	142	65
40	55	36	36	11	4.5	10	161	163	63	16	16	58	22	82.5	106.5	36	72	9	55	90	20	10	145	52	28	28 ^{-0.2/-0.6}	12	15	12	160	75
50	68	45	45	12	5.5	10	170	175	75	16	16	71	22	90	122	45	90	9	70	110	25	12	155	60	32	32 ^{-0.2/-0.6}	12	15	12	170	80
63	80	50	50	12	5.5	10	185	190	90	20	20	87	28	97.5	129.5	50	100	9	80	120	25	12	170	70	40	40 ^{-0.2/-0.6}	16	20	16	190	90
80	100	63	63	14	6.5	12	210	215	110	20	20	110	34	110	150	63	126	12	100	153	30	16	190	90	50	50 ^{-0.2/-0.6}	16	20	16	210	110
100	120	75	71	16	6.5	14.5	220	230	132	25	25	136	40	120	160	75	150	14	120	178	35	16	205	110	60	60 ^{-0.2/-0.6}	20	25	20	230	140
125	Max. 157	90	90	Max. 25	8	16	250	270	160	25	25	Max. 160	50	145	199	90	180	16	Max. 157	Max. 224	45	20	245	130	70	70 ^{-0.5/-1.2}	25	Min. 30	Max. 26	275	Max. 157

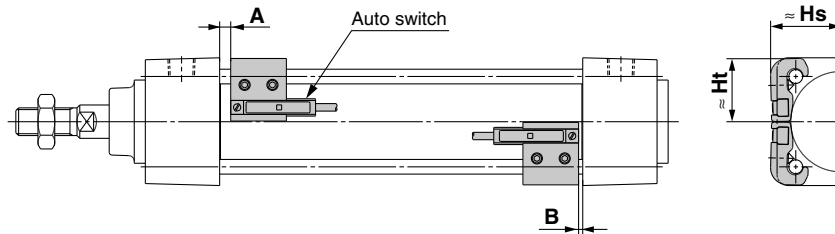
(mm)



Minimum Stroke for Auto Switch Mounting

Auto switch model	Number of auto switches	Center trunnion							Support bracket other than center trunnion		
		ø32	ø40	ø50	ø63	ø80	ø100	ø125	ø32, ø40, ø50, ø63	ø80, ø100	ø125
D-A9□	With 2 pcs. (Different surfaces, Same surface) With 1 pc.	70	75		80	85	95	100		15	
	With n pcs.	70 + 40 (n - 4)/2 n = 4, 8, 12, 16...	75 + 40 (n - 4)/2 n = 4, 8, 12, 16...		80 + 40 (n - 4)/2 n = 4, 8, 12, 16...	85 + 40 (n - 4)/2 n = 4, 8, 12, 16...	95 + 40 (n - 4)/2 n = 4, 8, 12, 16...	100 + 40 (n - 4)/2 n = 4, 8, 12, 16...		15 + 40 (n - 2)/2 n = 2, 4, 6, 8...	
D-A9□V	With 2 pcs. (Different surfaces, Same surface) With 1 pc.	45	50		55	60	70	75		10	
	With n pcs.	45 + 30 (n - 4)/2 n = 4, 8, 12, 16...	50 + 30 (n - 4)/2 n = 4, 8, 12, 16...		55 + 30 (n - 4)/2 n = 4, 8, 12, 16...	60 + 30 (n - 4)/2 n = 4, 8, 12, 16...	70 + 30 (n - 4)/2 n = 4, 8, 12, 16...	75 + 30 (n - 4)/2 n = 4, 8, 12, 16...		10 + 30 (n - 2)/2 n = 2, 4, 6, 8...	
D-M9□ D-M9□W	With 2 pcs. (Different surfaces, Same surface) With 1 pc.	75	80		85	90	95	105		15	
	With n pcs.	75 + 40 (n - 4)/2 n = 4, 8, 12, 16...	80 + 40 (n - 4)/2 n = 4, 8, 12, 16...		85 + 40 (n - 4)/2 n = 4, 8, 12, 16...	90 + 40 (n - 4)/2 n = 4, 8, 12, 16...	95 + 40 (n - 4)/2 n = 4, 8, 12, 16...	105 + 40 (n - 4)/2 n = 4, 8, 12, 16...		15 + 40 (n - 2)/2 n = 2, 4, 6, 8...	
D-M9□V D-M9□WV	With 2 pcs. (Different surfaces, Same surface) With 1 pc.	50	55		60	65	70	80		10	
	With n pcs.	50 + 30 (n - 4)/2 n = 4, 8, 12, 16...	55 + 30 (n - 4)/2 n = 4, 8, 12, 16...		60 + 30 (n - 4)/2 n = 4, 8, 12, 16...	65 + 30 (n - 4)/2 n = 4, 8, 12, 16...	70 + 30 (n - 4)/2 n = 4, 8, 12, 16...	80 + 30 (n - 4)/2 n = 4, 8, 12, 16...		10 + 30 (n - 2)/2 n = 2, 4, 6, 8...	
D-M9□A	With 2 pcs. (Different surfaces, Same surface) With 1 pc.	80	85		90	95	100	110		15	
	With n pcs.	80 + 40 (n - 2)/2 n = 4, 8, 12, 16...	85 + 40 (n - 2)/2 n = 4, 8, 12, 16...		90 + 40 (n - 2)/2 n = 4, 8, 12, 16...	95 + 40 (n - 2)/2 n = 4, 8, 12, 16...	100 + 40 (n - 2)/2 n = 4, 8, 12, 16...	110 + 40 (n - 2)/2 n = 4, 8, 12, 16...		15 + 40 (n - 2)/2 n = 2, 4, 6, 8...	
D-M9□AV	With 2 pcs. (Different surfaces, Same surface) With 1 pc.	55	60		65	70	75	85		15	
	With n pcs.	55 + 30 (n - 2)/2 n = 4, 8, 12, 16...	60 + 30 (n - 2)/2 n = 4, 8, 12, 16...		65 + 30 (n - 2)/2 n = 4, 8, 12, 16...	70 + 30 (n - 2)/2 n = 4, 8, 12, 16...	75 + 30 (n - 2)/2 n = 4, 8, 12, 16...	85 + 30 (n - 2)/2 n = 4, 8, 12, 16...		15 + 30 (n - 2)/2 n = 2, 4, 6, 8...	
D-A3□ D-G39 D-K39	With 2 pcs. (Different surfaces)	60	65		75	80	85	90		35	
	With 2 pcs. (Same surface)	90	95		100	105	110	125		100	
	With n pcs. (Different surfaces)	60 + 30 (n - 2) n = 2, 4, 6, 8...	65 + 30 (n - 2) n = 2, 4, 6, 8...		75 + 30 (n - 2) n = 2, 4, 6, 8...	80 + 30 (n - 2) n = 2, 4, 6, 8...	85 + 30 (n - 2) n = 2, 4, 6, 8...	90 + 30 (n - 2) n = 2, 4, 6, 8...		35 + 30 (n - 2) n = 2, 3, 4...	
	With n pcs. (Same surface)	90 + 100 (n - 2) n = 2, 4, 6, 8...	95 + 100 (n - 2) n = 2, 4, 6, 8...		100 + 100 (n - 2) n = 2, 4, 6, 8...	105 + 100 (n - 2) n = 2, 4, 6, 8...	110 + 100 (n - 2) n = 2, 4, 6, 8...	125 + 100 (n - 2) n = 2, 4, 6, 8...		100 + 100 (n - 2) n = 2, 3, 4...	
	With 1 pc.	60	65		75	80	85	90		10	
D-A44	With 2 pcs. (Different surfaces)	70	75		80		85	90		35	
	With 2 pcs. (Same surface)	70	75		80		85	90		55	
	With n pcs. (Different surfaces)	70 + 30 (n - 2) n = 2, 4, 6, 8...	75 + 30 (n - 2) n = 2, 4, 6, 8...		80 + 30 (n - 2) n = 2, 4, 6, 8...		85 + 30 (n - 2) n = 2, 4, 6, 8...	90 + 30 (n - 2) n = 2, 4, 6, 8...		35 + 30 (n - 2) n = 2, 3, 4...	
	With n pcs. (Same surface)	70 + 50 (n - 2) n = 2, 4, 6, 8...	75 + 50 (n - 2) n = 2, 4, 6, 8...		80 + 50 (n - 2) n = 2, 4, 6, 8...		85 + 50 (n - 2) n = 2, 4, 6, 8...	90 + 50 (n - 2) n = 2, 4, 6, 8...		55 + 50 (n - 2) n = 2, 3, 4...	
	With 1 pc.	70	75		80		85	90		10	
D-A5□ D-A6□	With 2 pcs. (Different surfaces, Same surface) With 1 pc.	60	80		105	110	115		15	20	
	With n pcs. (Same surface)	60 + 55 (n - 4)/2 n = 4, 8, 12, 16...	80 + 55 (n - 4)/2 n = 4, 8, 12, 16...		105 + 55 (n - 4)/2 n = 4, 8, 12, 16...	110 + 55 (n - 4)/2 n = 4, 8, 12, 16...	115 + 55 (n - 4)/2 n = 4, 8, 12, 16...		15 + 55 (n - 2)/2 n = 2, 4, 6, 8...	20 + 55 (n - 2)/2 n = 2, 4, 6, 8...	
D-A59W	With 2 pcs. (Different surfaces, Same surface)	60	70	85	110	115	120		20	25	
	With n pcs. (Same surface)	60 + 55 (n - 4)/2 n = 4, 8, 12, 16...	70 + 55 (n - 4)/2 n = 4, 8, 12, 16...	85 + 55 (n - 4)/2 n = 4, 8, 12, 16...	110 + 55 (n - 4)/2 n = 4, 8, 12, 16...	115 + 55 (n - 4)/2 n = 4, 8, 12, 16...	120 + 55 (n - 4)/2 n = 4, 8, 12, 16...		20 + 55 (n - 2)/2 n = 2, 4, 6, 8...	25 + 55 (n - 2)/2 n = 2, 4, 6, 8...	
	With 1 pc.	60	70	85	110	115	120		15	25	
D-F5□ D-J5□ D-F5□W D-J59W D-F5BA D-F59F	With 2 pcs. (Different surfaces, Same surface)	90	95		110	115	120	130	15	25	
	With n pcs. (Same surface)	90 + 55 (n - 4)/2 n = 4, 8, 12, 16...	95 + 55 (n - 4)/2 n = 4, 8, 12, 16...		110 + 55 (n - 4)/2 n = 4, 8, 12, 16...	115 + 55 (n - 4)/2 n = 4, 8, 12, 16...	120 + 55 (n - 4)/2 n = 4, 8, 12, 16...	130 + 55 (n - 4)/2 n = 4, 8, 12, 16...	15 + 55 (n - 2)/2 n = 2, 4, 6, 8...	25 + 55 (n - 2)/2 n = 2, 4, 6, 8...	
	With 1 pc.	90	95		110	115	120	130	10	25	
	With 2 pcs. (Different surfaces, Same surface)	100	105		120	125	130	140	15	25	30
D-F5NT	With n pcs. (Same surface)	100 + 55 (n - 4)/2 n = 4, 8, 12, 16...	105 + 55 (n - 4)/2 n = 4, 8, 12, 16...		120 + 55 (n - 4)/2 n = 4, 8, 12, 16...	125 + 55 (n - 4)/2 n = 4, 8, 12, 16...	130 + 55 (n - 4)/2 n = 4, 8, 12, 16...	140 + 55 (n - 4)/2 n = 4, 8, 12, 16...	15 + 55 (n - 2)/2 n = 2, 4, 6, 8...	25 + 55 (n - 2)/2 n = 2, 4, 6, 8...	30 + 55 (n - 2)/2 n = 2, 4, 6, 8...
	With 1 pc.	100	105		120	125	130	140	10	25	30
	With 2 pcs. (Different surfaces, Same surface) With 1 pc.	80	85	90		95	100	105		15	
D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W	With n pcs.	80 + 40 (n - 4)/2 n = 4, 8, 12, 16...	85 + 40 (n - 4)/2 n = 4, 8, 12, 16...	90 + 40 (n - 4)/2 n = 4, 8, 12, 16...		95 + 40 (n - 4)/2 n = 4, 8, 12, 16...	100 + 40 (n - 4)/2 n = 4, 8, 12, 16...	105 + 40 (n - 4)/2 n = 4, 8, 12, 16...		15 + 40 (n - 2)/2 n = 2, 4, 6, 8...	
	With 2 pcs. (Different surfaces, Same surface) With 1 pc.	60	65	70	75	85			10		
D-Y69□ D-Y7PV D-Y7□WV	With n pcs.	60 + 30 (n - 4)/2 n = 4, 8, 12, 16...	65 + 30 (n - 4)/2 n = 4, 8, 12, 16...	70 + 30 (n - 4)/2 n = 4, 8, 12, 16...	75 + 30 (n - 4)/2 n = 4, 8, 12, 16...	85 + 30 (n - 4)/2 n = 4, 8, 12, 16...			10 + 30 (n - 2)/2 n = 2, 4, 6, 8...		
	With 2 pcs. (Different surfaces, Same surface) With 1 pc.	85	90	100	105	110	115		20 + 45 (n - 2)/2 n = 2, 4, 6, 8...		
D-Y7BA	With n pcs.	85 + 45 (n - 4)/2 n = 4, 8, 12, 16...	90 + 45 (n - 4)/2 n = 4, 8, 12, 16...	100 + 45 (n - 4)/2 n = 4, 8, 12, 16...	105 + 45 (n - 4)/2 n = 4, 8, 12, 16...	110 + 45 (n - 4)/2 n = 4, 8, 12, 16...	115 + 45 (n - 4)/2 n = 4, 8, 12, 16...		20 + 45 (n - 2)/2 n = 2, 4, 6, 8...		
	With 2 pcs. (Different surfaces, Same surface) With 1 pc.	120	130	140	150				15	20	
D-P4DW	With n pcs.	120 + 65 (n - 4)/2 n = 4, 8, 12, 16...	130 + 65 (n - 4)/2 n = 4, 8, 12, 16...	140 + 65 (n - 4)/2 n = 4, 8, 12, 16...	150 + 65 (n - 4)/2 n = 4, 8, 12, 16...				15 + 65 (n - 2)/2 n = 2, 4, 6, 8...	20 + 65 (n - 2)/2 n = 2, 4, 6, 8...	

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



Auto Switch Proper Mounting Position

(mm)

Auto switch model	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-A59W		D-F5□W D-J59W D-F5□ D-J5□ D-F5BA D-F59F		D-F5NT		D-A3□ D-A44 D-G39 D-K39		D-Z7□ D-Z80 D-Y59□ D-Y69□ D-Y7P D-Y7PV D-Y7□W D-Y7□WV D-Y7BA		D-P4DW	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
32	6.5	4	10.5	8	0.5	0	4.5	2	7	4.5	12	9.5	0.5	0	4	1.5	3.5	1
40	6.5	4	10.5	8	0.5	0	4.5	2	7	4.5	12	9.5	0.5	0	4	1.5	3.5	1
50	7	4.5	11	8.5	1	0	5	2.5	7.5	5	12.5	10	1	0	4.5	2	4	1.5
63	7	4.5	11	8.5	1	0	5	2.5	7.5	5	12.5	10	1	0	4.5	2	4	1.5
80	10	8.5	14	12.5	4	2.5	8	6.5	10.5	9	15.5	14	4	2.5	7.5	6	7	5.5
100	10	8.5	14	12.5	4	2.5	8	6.5	10.5	9	15.5	14	4	2.5	7.5	6	7	5.5
125	12	12	16	16	6	6	10	10	12.5	12.5	17.5	17.5	6	6	9.5	9.5	9	9

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

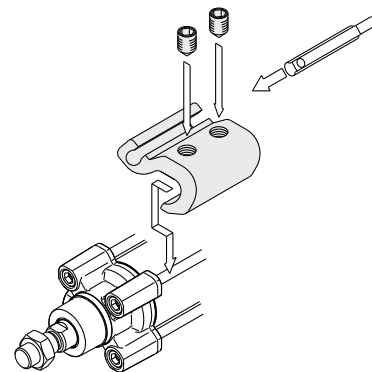
Auto Switch Mounting Height

(mm)

Auto switch model	D-A9□ D-M9□ D-M9□W D-M9□A		D-A9□V		D-M9□V D-M9□WV D-M9□AV		D-A5□ D-A6□ D-A59W		D-F5□ D-J5□ D-F59F D-F5□W D-J59W D-F5BA D-F5NT		D-A3□ D-G39 D-K39		D-A44		D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W D-Y7BA		D-Y69□ D-Y7PV D-Y7□WV		D-P4DW	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
32	24.5	23	27.5	23	30.5	23	35	24.5	32.5	25	67	27.5	77	27.5	25.5	23	26.5	23	38	31
40	28.5	25.5	31.5	25.5	34	25.5	38.5	27.5	36.5	27.5	71.5	27.5	81.5	27.5	29.5	26	30	26	42	33
50	33.5	31	36	31	38.5	31	43.5	34.5	41	34	77	—	87	—	33.5	31	34.5	31	46.5	39
63	38.5	36	40.5	36	43	36	48.5	39.5	46	39	83.5	—	93.5	—	39	36	40	36	51.5	44
80	46.5	45	49	45	52	45	55	46.5	52.5	46.5	92.5	—	103	—	47.5	45	48.5	45	58	51.5
100	54	53.5	57	53.5	59.5	53.5	62	55	59.5	55	103	—	113.5	—	55.5	53.5	56.5	53.5	65.5	60.5
125	65.5	64.5	68.5	64.5	71	64.5	71.5	66.5	70.5	66.5	115	—	125	—	67.5	65	68.5	65	76.5	72

Auto Switch Mounting Brackets/Part No.

Auto switch model	Bore size (mm)						
	ø32	ø40	ø50	ø63	ø80	ø100	ø125
D-A9□/A9□V D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	BMB5-032	BMB5-032	BA7-040	BA7-040	BA7-063	BA7-063	BA7-080
D-A3□/A44 D-G39/K39	BMB2-032	BMB2-040	BMB1-050	BMB1-063	BMB1-080	BMB1-100	BS1-125
D-A5□/A6□ D-A59W D-F5□/J5□ D-F5□W/J59W D-F59F D-F5BA D-F5NT	BT-03	BT-03	BT-05	BT-05	BT-06	BT-06	BT-08
D-P4DW	BMB3T-040	BMB3T-040	BMB3T-050	BMB3T-050	BMB3T-080	BMB3T-080	BAP2T-080
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W D-Y7□WV D-Y7BA	BMB4-032	BMB4-032	BMB4-050	BMB4-050	BA4-063	BA4-063	BA4-080



● Mounting example for D-A9□(V), M9□(V), M9□W(V), M9□A(V)

[Stainless Steel Mounting Screw]

The following stainless steel mounting screw kit (including set screws) is available. Use it in accordance with the operating environment. (Since the auto switch mounting bracket is not included, order it separately.)

BBA1: For D-A5/A6/F5/J5

Note 1) For details on BBA1, refer to page 78.

"D-F5BA" switch is set on the cylinder with the stainless steel screws above when shipped from factory. When only an auto switch is shipped independently, the BBA1 is attached.

Note 2) When using type D-M9□A(V) or Y7BA, please do not use the iron set screws included with the auto switch mounting bracket (BMB5-032, BA7-□□□, BMB4-□□□, BA4-□□□) shown above, instead order the set of stainless steel set screws (BBA1), and please use the stainless steel set screws (M4 x 6 L) included in BBA1.

Operating Range

Auto switch model	Bore size (mm)						
	32	40	50	63	80	100	125
D-A9□/A9□V	7	7.5	8.5	9.5	9.5	10.5	12
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	4	4.5	5	6	6	6	7
D-Z7□/Z80	7.5	8.5	7.5	9.5	9.5	10.5	13
D-A5□/A6□	9	9	10	11	11	11	10
D-A59W	13	13	13	14	14	15	17
D-A3□/A44	9	9	10	11	11	11	10
D-Y59□/Y69□ D-Y7P/Y7□V D-Y7□W/Y7□WV D-Y7BA	5.5	5.5	7	7.5	6.5	5.5	7
D-F5□/J5□ D-F5□W/J59W D-F5BA/F5NT D-F59F	3.5	4	4	4.5	4.5	4.5	5
D-G39/K39	9	9	9	10	10	11	11
D-P4DW	4	4	4	4.5	4	4.5	4.5

* Values which include hysteresis are for guideline purposes only, they are not a guarantee (assuming approximately ±30% dispersion) and may change substantially depending on the ambient environment.

Other than the applicable auto switches listed in “How to Order”, the following auto switches are mountable.

Refer to the Best Pneumatics No. 2 for the detailed specifications.

Type	Part no.	Electrical entry	Features
Sold state	D-M9NV, M9PV, M9BV	Grommet (Perpendicular)	—
	D-Y69A, Y69B, Y7PV		—
	D-M9NWV, M9PWV, M9BWV		Diagnostic indication (2-color indication)
	D-Y7NWV, Y7PWV, Y7BWV		Water resistant (2-color indication)
	D-M9NAV, M9PAV, M9BAV		—
	D-Y59A, Y59B, Y7P	Grommet (In-line)	—
	D-F59, F5P, J59		Diagnostic indication (2-color indication)
	D-Y7NW, Y7PW, Y7BW		Water resistant (2-color indication)
	D-F59W, F5PW, J59W		With timer
	D-F5BA, Y7BA		Magnetic field resistant (2-color indication)
	D-F5NT		—
	D-P5DW		—
	D-A93V, A96V	Grommet (Perpendicular)	Without indicator light
Reed	D-A90V	Grommet (In-line)	—
	D-A67, Z80		—
	D-A53, A56, Z73, Z76		—
			—

* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H/Y7G/Y7H) are also available.

For details, refer to the Best Pneumatics No. 2.

* With pre-wired connector is also available for solid state auto switches. For details, refer to the Best Pneumatics No. 2.

⚠ Specific Product Precautions

Adjustment

⚠ Warning

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

Cushion valves are provided with a crimp (ø32) or a retaining ring (ø40 to ø100) 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.

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 wrenches shown below.

Bore size (mm)	Width across flats	Tightening torque (N·m)
32, 40	4	5.1
50, 63	5	11
80, 100	6	19.2
125	10	30.1

Series C96

How to Mount and Move the Auto Switch 1

Mounting Bracket Tie-rod Mounting Type

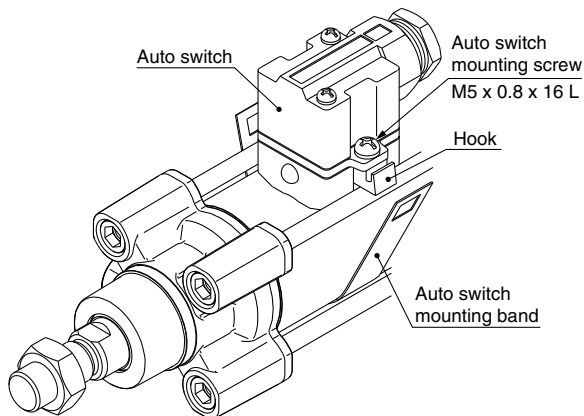
<Applicable Auto Switch>

Solid state switch ... D-G39, D-K39

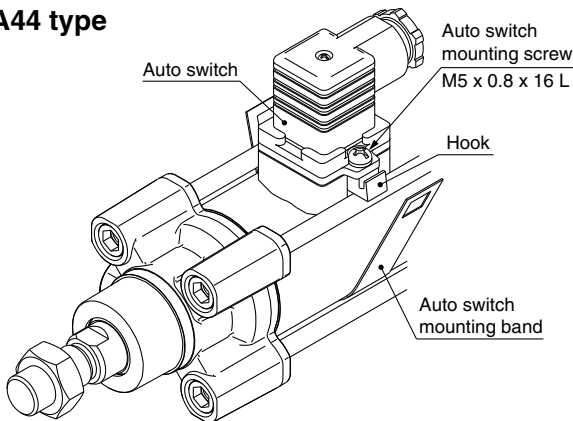
Reed switch D-A33, D-A34, D-A44

How to Mount and Move the Auto Switch

D-A3□, D-G3/K3 type



D-A44 type



1. Loosen the auto switch mounting screws at both sides to pull down the hook.
2. Put an auto switch mounting band on the cylinder tube and set it at the auto switch mounting position, and then hook the band.
3. Screw lightly the auto switch mounting screw (M5 x 0.8 x 16 L).
4. Set the whole body to the detecting position by sliding, tighten the mounting screw (M5 x 0.8 x 16 L) to secure the auto switch. (The tightening torque should be about 2 to 3 N·m.)
5. Modification of the detecting position should be made in the state of 3.

Auto Switch Mounting Bracket Part No. (Band)

Cylinder series	Applicable bore size (mm)						
	32	40	50	63	80	100	125
C96	BMB2-032	BMB2-040	BMB1-050	BMB1-063	BMB1-080	BMB1-100	BS1-125

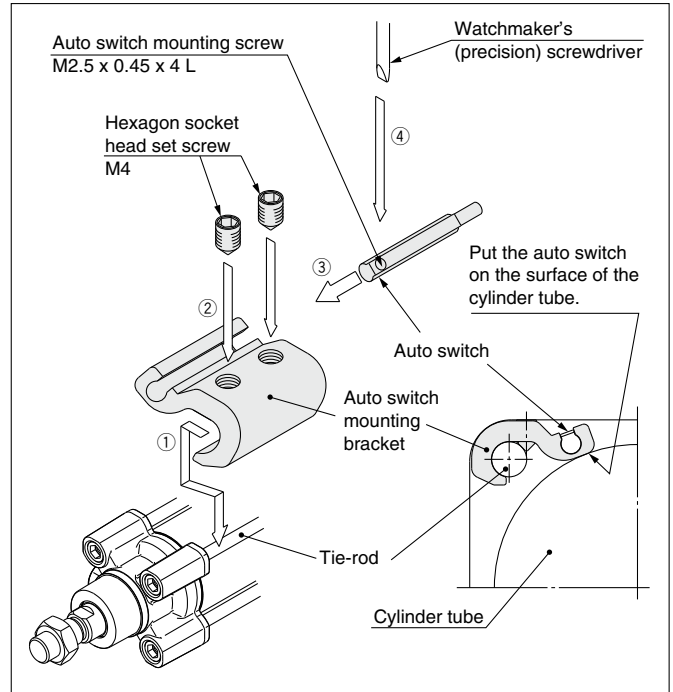
<Applicable Auto Switch>

Solid state switch ... D-M9N(V), D-M9P(V), D-M9B(V)
D-M9NW(V), D-M9PW(V), D-M9BW(V)

D-M9NA(V), D-M9PA(V), D-M9BA(V)

Reed switch D-A90(V), A93(V), A96(V)

How to Mount and Move the Auto Switch



1. Fix it to the detecting position with a set screw by installing an auto switch mounting bracket in cylinder tie-rod and letting the bottom surface of an auto switch mounting bracket contact the cylinder tube firmly.
2. Fix it to the detecting position with a set screw (M4). (Use a hexagon wrench.)
3. Fit an auto switch into the auto switch mounting groove to set it roughly to the mounting position for an auto switch.
4. After confirming the detecting position, tighten up the mounting screw (M2.5 x 0.45 x 4 L) attached to an auto switch, and secure the auto switch.
5. When changing the detecting position, carry out in the state of 3.

Note 1) To protect auto switches, ensure that main body of an auto switch should be embedded into auto switch mounting groove with a depth of 15 mm or more.

Note 2) Set the tightening torque of a hexagon socket head set screw (M4) to be 1.0 to 1.2 N·m.

Note 3) When tightening an auto switch mounting screw (M2.5 x 0.45 x 4 L), use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm.

Also, set the tightening torque to be 0.05 to 0.15 N·m. As a guide, turn 90° from the position where it comes to feel tight.

Auto Switch Mounting Bracket Part No. (Including Bracket, Set Screw)

Cylinder series	Applicable bore size (mm)						
	32	40	50	63	80	100	125
C96	BMB5-032	BMB5-032	BA7-040	BA7-040	BA7-063	BA7-063	BA7-080

Note 1) When using D-M9□A(V) type, please order stainless steel screw set BBA1 separately (page 78), and use the stainless steel set screws, after selecting set screws of the appropriate length for the cylinder series—as shown in the table above.

Note 2) Color or gloss differences in the metal surfaces have no effect on metal performance.

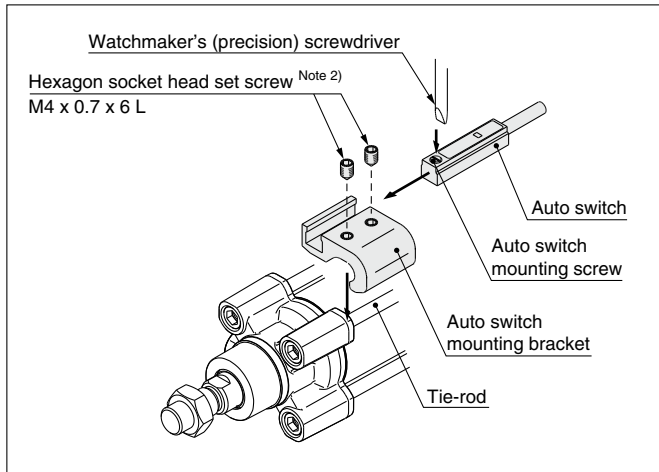
The special properties of the chromate (trivalent) applied to the main body of the auto switch mounting bracket for BA7-□ and BMB5-□ result in differences in coloration depending on the production lot, but these have no adverse impact on corrosion resistance.

Mounting Bracket Tie-rod Mounting Type

<Applicable Auto Switch>

Solid state switch ... D-Y59^A_B, Y69^A_B, D-Y7P(V)
D-Y7NW(V), Y7PW(V), Y7BW(V)
D-Y7BA
Reed switch D-Z73, Z76, Z80

How to Mount and Move the Auto Switch



Note 1) When tightening an auto switch mounting screw, use a watchmaker's screwdriver with a handle diameter of 5 to 6 mm. Also, set the tightening torque to be 0.05 to 0.1 N·m. As a guide, turn 90° from the position where it comes to feel tight. Set the tightening torque of a hexagon socket head set screw (M4 x 0.7 x 6 L) to be 1.0 to 1.2 N·m.

1. Fix it to the detecting position with a set screw by installing an auto switch mounting bracket in cylinder tie-rod and letting the bottom surface of an auto switch mounting bracket contact the cylinder tube firmly. (Use a hexagon wrench.)
2. Fit an auto switch into the auto switch mounting groove to set it roughly to the mounting position for an auto switch.
3. After confirming the detecting position, tighten up the mounting screw attached to an auto switch, and secure the auto switch.
4. When changing the detecting position, carry out in the state of 2.

* To protect auto switches, ensure that main body of an auto switch should be embedded into auto switch mounting groove with a depth of 15 mm or more.

Auto Switch Mounting Bracket Part No. (Including Bracket, Set Screw)

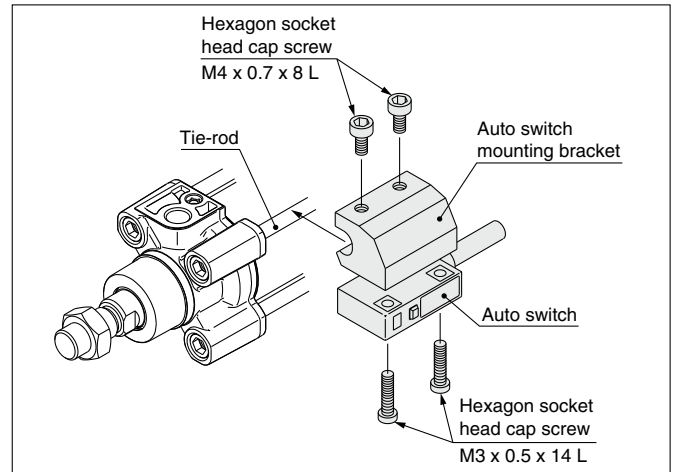
Cylinder series	Applicable bore size (mm)						
	32	40	50	63	80	100	125
C96	BMB4-032	BMB4-032	BMB4-050	BMB4-050	BA4-063	BA4-063	BA4-080

Note 2) When using D-Y7BA type, please order stainless steel screw set BBA1 separately (page 78), and use the stainless steel set screws, after selecting set screws of the appropriate length for the cylinder series — as shown in the table above.

<Applicable Auto Switch>

Solid state switch ... D-P4DW

How to Mount and Move the Auto Switch



1. Slightly screw the hexagon socket head cap screw (M4 x 0.7 x 8 L) into the M4 tapped portion of auto switch mounting bracket. (2 locations) Use caution that the tip of the hexagon socket head cap screw should not stick out to the concave portion of auto switch mounting bracket.
2. Put a hexagon socket head cap screw (M3 x 0.5 x 14 L) through the auto switch's through-hole (2 locations), and then push it down into the M3 tapped part on the auto switch mounting bracket while turning it lightly.
3. Place the concave part of the auto switch mounting bracket into the cylinder tie-rod, and slide the auto switch mounting bracket in order to set roughly to the detecting position.
4. After reconfirming the detecting position, tighten the M3 mounting screw to secure the auto switch by making the bottom face of auto switch attached to the cylinder tube. (Tightening torque of M3 screw should be 0.5 to 0.7 N·m.)
5. Tighten up M4 screw of auto switch mounting bracket to secure the auto switch mounting bracket. (Ensure that tightening torque of M4 screw should be set 1.0 to 1.2 N·m.)

Auto Switch Mounting Bracket Part No. (Including Bracket, Screw)

Cylinder series	Applicable bore size (mm)						
	32	40	50	63	80	100	125
C96	BMB3T-040	BMB3T-040	BMB3T-050	BMB3T-050	BMB3T-080	BMB3T-080	BAP2T-080

Mounting Bracket Tie-rod Mounting Type

<Applicable Auto Switch>

Solid state switch ... D-F59, D-F5P

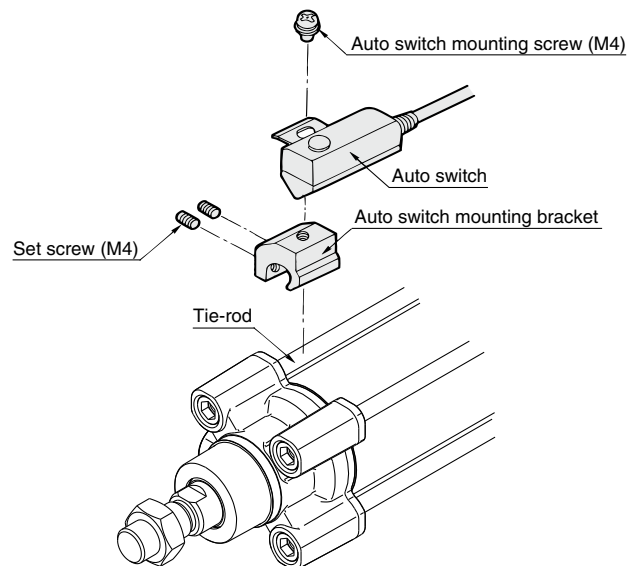
D-J59, D-J51, D-F5BA

D-F59W, D-F5PW, D-J59W

D-F59F, D-F5NT

**Reed switch D-A53, D-A54, D-A56, D-A64, D-A67
D-A59W**

1. Fix the auto switch on the auto switch mounting bracket with the auto switch mounting screw (M4) and install the set screw (M4).
2. Fit the auto switch mounting bracket into the cylinder tie-rod and then fix the auto switch at the detecting position with a set screw (M4).
(Be sure to put the auto switch on the surface of cylinder tube.) (Use a hexagon wrench.)
3. When changing the detecting position, loosen the set screw to move the auto switch and then re-fix the auto switch on the cylinder tube.
(Tightening torque of M4 screw should be 1.0 to 1.2 N·m.)



Auto Switch Mounting Bracket Part No. (Including Bracket, Screw, Set Screw)

Cylinder series	Applicable bore size (mm)						
	32	40	50	63	80	100	125
C96	BT-03	BT-03	BT-05	BT-05	BT-06	BT-06	BT-08

The following stainless steel mounting screw kit (including set screws) is available. Use it in accordance with the operating environment. (Since the auto switch mounting bracket is not included, order it separately.)

BBA1: For D-A5/A6/F5/J5

"D-F5BA" switch is set on the cylinder with the stainless steel screws above when shipped from factory.

When only an auto switch is shipped independently, the BBA1 is attached.

Stainless Steel Mounting Screw Set

Part no.	Contents				Applicable auto switch mounting bracket part no.	Applicable auto switch
	No.	Description	Size	Q'ty		
BBA1	1	Auto switch mounting screw	M4 x 0.7 x 8 L	1	BT-□□	D-A5, A6 D-F5, J5
	2	Set screw	M4 x 0.7 x 6 L	2	BT-03, BT-04, BT-05 BT-06, BT-08, BT-12	D-Z7, Z8 D-Y5, Y6, Y7
					BMA4-040, BMA4-063, BMA4-080 BMB4-032, BMB4-050	D-A9 D-M9
					BT-16, BT-18A, BT-20	D-A5, A6 D-F5, J5
	3	Set screw	M4 x 0.7 x 8 L	2	BS4-125, BS4-160 BS4-180, BS4-200	D-Z7, Z8 D-Y5, Y6, Y7
					BS5-125, BS5-160 BS5-180, BS5-200	D-A9 D-M9

Note) Use the set screw after selecting the appropriate length for the auto switch mounting bracket.

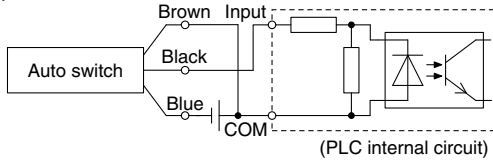
(Example) When using the BA7-040, select the 6 L type. 8 L type is not required.

Prior to Use

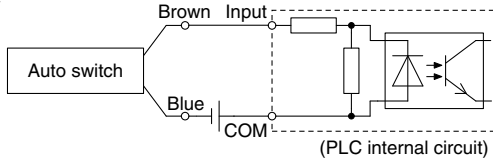
Auto Switch Connection and Example

Sink Input Specifications

3-wire, NPN

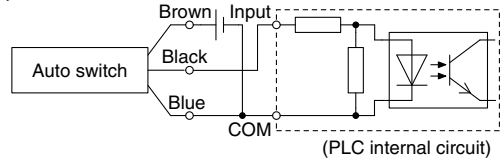


2-wire

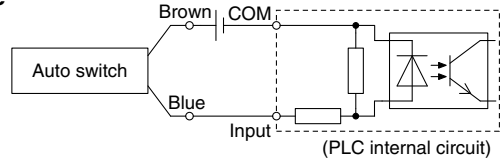


Source Input Specifications

3-wire, PNP



2-wire



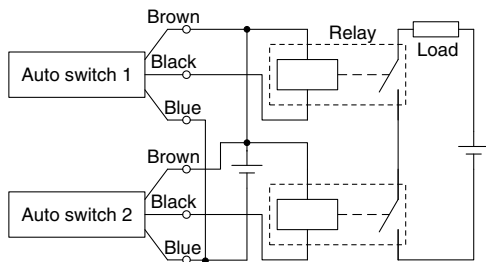
Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

Example of AND (Series) and OR (Parallel) Connection

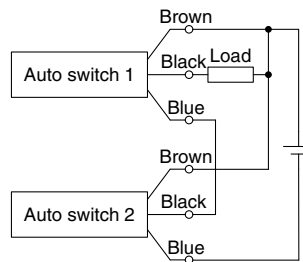
* When using solid state auto switches, ensure the application is set up so the signals for the first 50 ms are invalid.

3-wire AND connection for NPN output

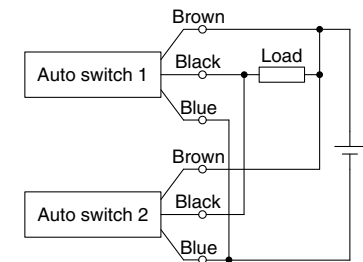
(Using relays)



(Performed with auto switches only)

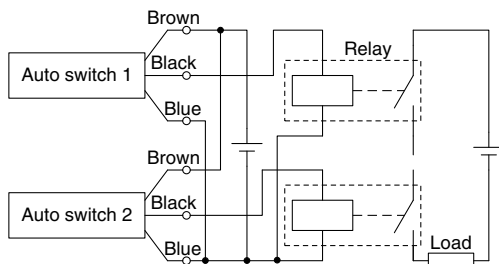


3-wire OR connection for NPN output

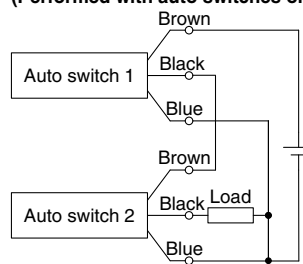


3-wire AND connection for PNP output

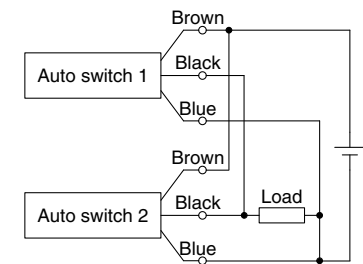
(Using relays)



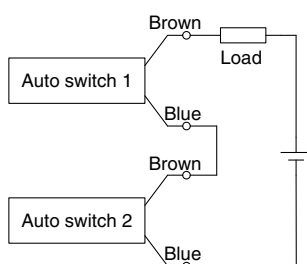
(Performed with auto switches only)



3-wire OR connection for PNP output



2-wire AND connection

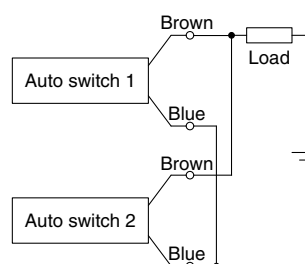


When two auto switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state. The indicator lights will light up when both of the auto switches are in the ON state. Auto switches with load voltage less than 20 V cannot be used.

$$\begin{aligned} \text{Load voltage at ON} &= \text{Power supply voltage} - \\ &\quad \text{Residual voltage} \times 2 \text{ pcs.} \\ &= 24 \text{ V} - 4 \text{ V} \times 2 \text{ pcs.} \\ &= 16 \text{ V} \end{aligned}$$

Example: Power supply is 24 VDC
Internal voltage drop in auto switch is 4 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.

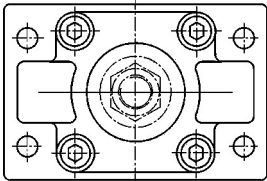
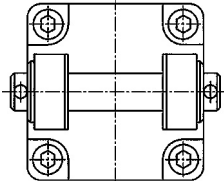
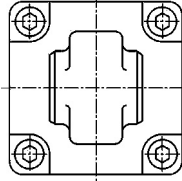
$$\begin{aligned} \text{Load voltage at OFF} &= \text{Leakage current} \times 2 \text{ pcs.} \times \\ &\quad \text{Load impedance} \\ &= 1 \text{ mA} \times 2 \text{ pcs.} \times 3 \text{ k}\Omega \\ &= 6 \text{ V} \end{aligned}$$

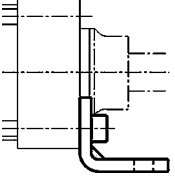
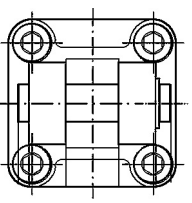
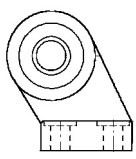
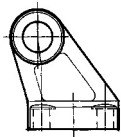
Example: Load impedance is 3 k Ω .
Leakage current from auto switch is 1 mA.

Series CP96/C96

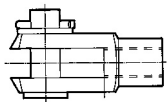
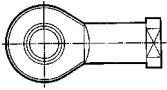
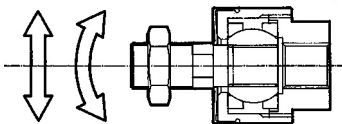
Accessories

Cylinder Mounting Accessories/Part No.

Bore size (mm)	F	Rod/Head flange	D	Double clevis (Corresponds to E accessory)	C	Single clevis
						
		* Supplied with 4 screws.	* Supplied with 4 screws, clevis pin, and safety device.		* Supplied with 4 screws.	
					Plain	With ball joint
	32	F5032	D5032		C5032	CS5032
	40	F5040	D5040		C5040	CS5040
	50	F5050	D5050		C5050	CS5050
	63	F5063	D5063		C5063	C95063
	80	F5080	D5080		C5080	CS5080
	100	F5100	D5100		C5100	CS5100
125	F5125	D5125		C5125	CS5125	
	Refer to page 62 for dimensions.		Refer to page 81 for dimensions.		Refer to page 81 for dimensions.	

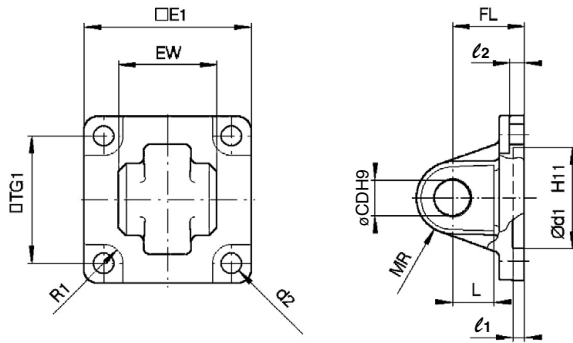
Bore size (mm)	L Foot	DS Double clevis (for ES accessory)	ES Clevis pivot bracket with ball joint	E Clevis pivot bracket
	 * Supplied with 2 pieces and 4 screws.			
32	L5032	DS5032	ES5032	E5032
40	L5040	DS5040	ES5040	E5040
50	L5050	DS5050	ES5050	E5050
63	L5063	DS5063	ES5063	E5063
80	L5080	DS5080	ES5080	E5080
100	L5100	DS5100	ES5100	E5100
125	L5125	DS5125	ES5125	E5125
	Refer to page 62 for dimensions.	Refer to page 82 for dimensions.	Refer to page 82 for dimensions.	Refer to page 81 for dimensions.

Piston Rod Mounting Accessories/Part No.

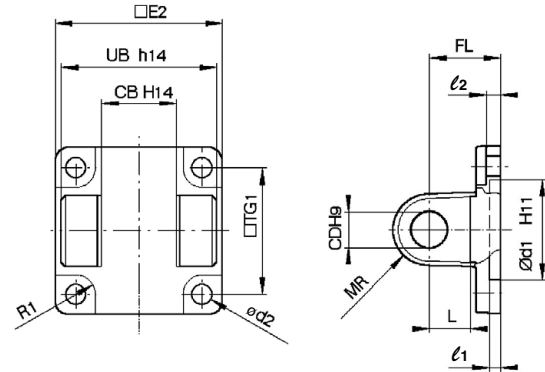
Bore size (mm)	GKM Rod clevis (ISO 8140)	KJ Piston rod ball joint (ISO 8139)	JA Floating joint
	 * Supplied with clevis pin and safety device.		
32	GKM10-20	KJ10D	JA30-10-125
40	GKM12-24	KJ12D	JA40-12-125
50	GKM16-32	KJ16D	JA50-16-150
63	GKM16-32	KJ16D	JA50-16-150
80	GKM20-40	KJ20D	JA50-20-150
100	GKM20-40	KJ20D	JA50-20-150
125	GKM30-54	KJ27D	JA125-27-200
	Refer to page 83 for dimensions.	Refer to page 83 for dimensions.	Refer to page 83 for dimensions.

Dimensions: Cylinder Mounting Accessories

Single clevis (C)

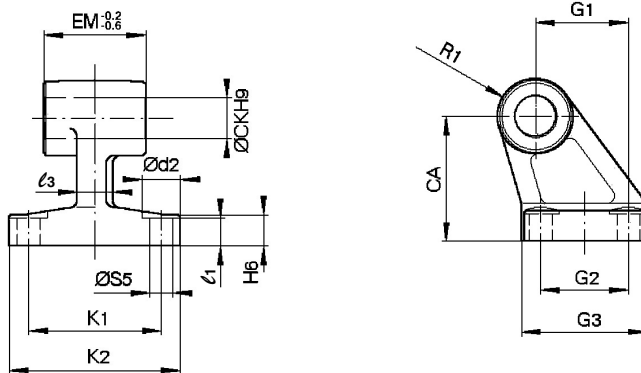


Double clevis (D)



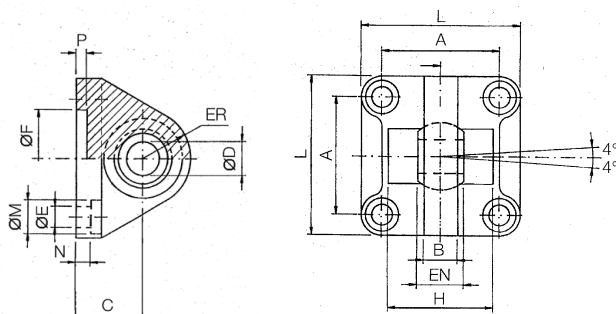
Bore size (mm)	E ₁	EW	TG ₁	FL	l ₁	L	l ₂	Ød ₁	ØCD	MR	Ød ₂	R ₁	E ₂	UB	CB
32	45	26 ^{-0.2} _{-0.6}	32.5	22	5	12	5.5	30	10	9.5	6.6	6.5	48	45	26
40	51	28 ^{-0.2} _{-0.6}	38	25	5	15	5.5	35	12	12	6.6	6.5	56	52	28
50	64	32 ^{-0.2} _{-0.6}	46.5	27	5	15	6.5	40	12	12	9	8.5	64	60	32
63	74	40 ^{-0.2} _{-0.6}	56.5	32	5	20	6.5	45	16	16	9	8.5	75	70	40
80	94	50 ^{-0.2} _{-0.6}	72	36	5	20	10	45	16	16	11	11	95	90	50
100	113	60 ^{-0.2} _{-0.6}	89	41	5	25	10	55	20	20	11	12	115	110	60
125	Max.157	70 ^{-0.5} _{-1.2}	110	50	7	30	10	60	25	26	13.5	10	Max.157	130	70

Clevis pivot bracket (E)



Bore size (mm)	Ød ₂	ØCK	ØS5	K ₁	K ₂ (Max.)	l ₃ (Max.)	G ₁	l ₁	G ₂	EM	G ₃ (Max.)	CA	H ₆	R ₁
32	11	10	6.6	38	51	10	21	7	18	26 ^{-0.2} _{-0.6}	31	32	8	10
40	11	12	6.6	41	54	10	24	9	22	28 ^{-0.2} _{-0.6}	35	36	10	11
50	15	12	9	50	65	12	33	11	30	32 ^{-0.2} _{-0.6}	45	45	12	12
63	15	16	9	52	67	14	37	11	35	40 ^{-0.2} _{-0.6}	50	50	12	15
80	18	16	11	66	86	18	47	12.5	40	50 ^{-0.2} _{-0.6}	60	63	14	15
100	18	20	11	76	96	20	55	13.5	50	60 ^{-0.2} _{-0.6}	70	71	15	19
125	20	25	14	94	124	30	70	17	60	70 ^{-0.5} _{-1.5}	90	90	20	22.5

Single clevis with ball joint (CS)

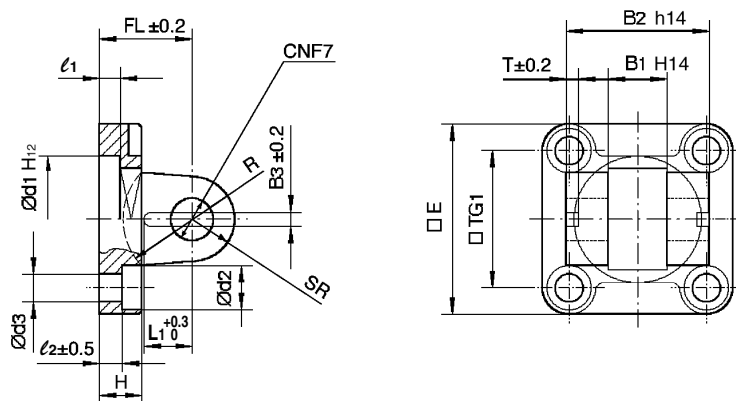


Bore size (mm)	A	B (Max.)	C	ØD _{H7}	EN _{0-0.1} (Max.)	ER _(Max.)	ØFH11	ØE	L	ØM	N	P	H _{±0.5}
32	32.5	10.5	22	10	14	15	30	6.6	45	10.5	5.5	5	—
40	38	12	25	12	16	18	35	6.6	55	11	5.5	5	—
50	46.5	15	27	16	21	20	40	9	65	15	6.5	5	51
63	56.5	15	32	16	21	23	45	9	75	15	6.5	5	—
80	72	18	36	20	25	27	45	11	95	18	10	5	70
100	89	18	41	20	25	30	55	11	115	18	10	5	—
125	110	25	50	30	37	40	60	13.5	140	20	10	7	100

* Black color

Dimensions: Cylinder Mounting Accessories

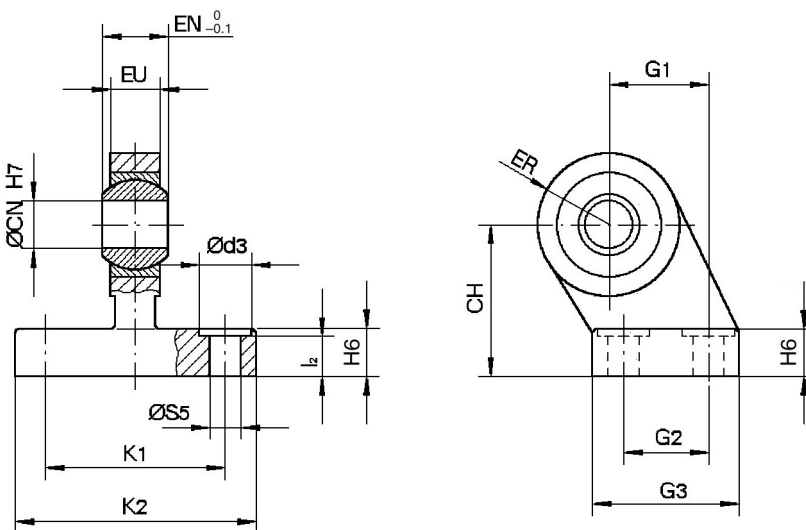
Double clevis (DS)



Bore size (mm)	E	B ₁	B ₂	B ₃	L ₁	TG ₁	T	l ₁ (Min.)	l ₂	FL	H (Max.)	Ød ₁	Ød ₂	Ød ₃	ØCN	SR (Max.)	R
32	45	14	34	3.3	11.5	32.5	3	5	5.5	22	10	30	10.5	6.6	10	11	17
40	55	16	40	4.3	12	38	4	5	5.5	25	10	35	11	6.6	12	13	20
50	65	21	45	4.3	14	46.5	4	5	6.5	27	12	40	15	9	16	18	22
63	75	21	51	4.3	14	56.5	4	5	6.5	32	12	45	15	9	16	18	25
80	95	25	65	4.3	16	72	4	5	10	36	16	45	18	11	20	22	30
100	115	25	75	6.3	16	89	4	5	10	41	16	55	18	11	20	22	32
125	140	37	97	6.3	24	110	6	7	10	50	20	60	20	13.5	30	30	42

* Black color

Clevis pivot bracket with ball joint (ES)

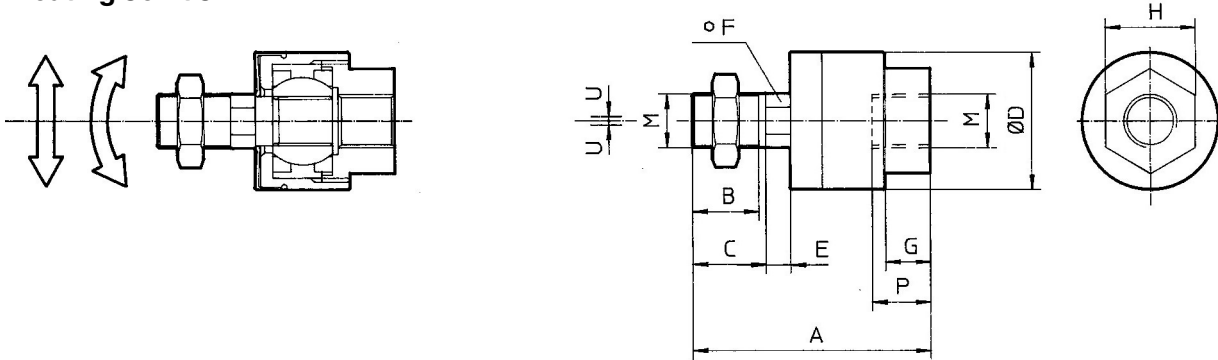


Bore size (mm)	Ød ₃	ØCN	ØS ₅	K ₁	K ₂ (Max.)	l ₂	G ₁	G ₂	G ₃ (Max.)	EN	EU	CH	H ₆	ER (Max.)
32	11	10	6.6	38	51	8.5	21	18	31	14	10.5	32	10	15
40	11	12	6.6	41	54	8.5	24	22	35	16	12	36	10	18
50	15	16	9	50	65	10.5	33	30	45	21	15	45	12	20
63	15	16	9	52	67	10.5	37	35	50	21	15	50	12	23
80	18	20	11	66	86	11.5	47	40	60	25	18	63	14	27
100	18	20	11	76	96	12.5	55	50	70	25	18	71	15	30
125	20	30	13.5	94	124	17	70	60	90	37	25	90	20	40

* Black color

Dimensions: Piston Rod Mounting Accessories

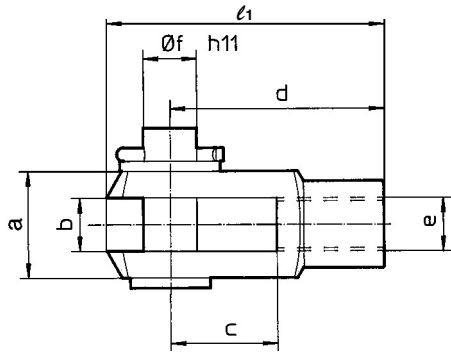
Floating Joint JA



Bore size (mm)	M	Part no.	A	B	C	ØD	E	F	G	H	P	U	Load (kN)	Weight (g)	Angle
32	M10 x 1.25	JA30-10-125	49.5	19.5	—	24	5	8	8	17	9	0.5	2.5	70	±0.5°
40	M12 x 1.25	JA40-12-125	60	20	—	31	6	11	11	22	13	0.75	4.4	160	
50, 63	M16 x 1.5	JA50-16-150	71.5	22	—	41	7.5	14	13.5	27	15	1	11	300	
80, 100	M20 x 1.5	JAH50-20-150	101	28	31	59.5	11.5	24	16	32	18	2	18	1080	
125	M27 x 2	JA125-27-200	123	34	38	66	13	27	20	41	24	2	28	1500	

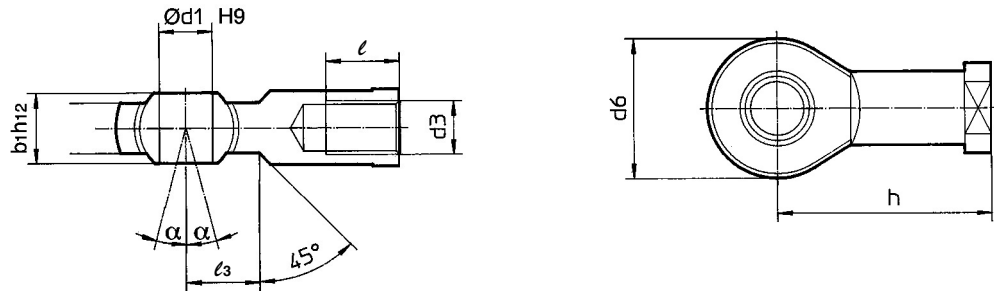
* Black color

Rod Clevis GKM (ISO 8140), Supplied with clevis pin and Safety Device



Bore size (mm)	e	Part no.	b	d	Øf h11 (Shaft)	Øf H9 (Hole)	ℓ ₁	c (Min.)	a (Max.)
32	M10 x 1.25	GKM10-20	10 ^{+0.5/+0.15}	40	10	10	52	20	20
40	M12 x 1.25	GKM12-24	12 ^{+0.5/+0.15}	48	12	12	62	24	24
50, 63	M16 x 1.5	GKM16-32	16 ^{+0.5/+0.15}	64	16	16	83	32	32
80, 100	M20 x 1.5	GKM20-40	20 ^{+0.5/+0.15}	80	20	20	105	40	40
125	M27 x 2	GKM30-54	30 ^{+0.5/+0.15}	110	30	30	148	54	55

Piston Rod Ball Joint KJ (ISO 8139)



Bore size (mm)	d ₃	Part no.	Ød ₁ H9	h	d ₆ (Max.)	b ₁ h ₁₂	ℓ (Min.)	α	ℓ ₃
32	M10 x 1.25	KJ10D	10	43	28	14	20	4°	15
40	M12 x 1.25	KJ12D	12	50	32	16	22	4°	17
50, 63	M16 x 1.5	KJ16D	16	64	42	21	28	4°	23
80, 100	M20 x 1.5	KJ20D	20	77	50	25	33	4°	27
125	M27 x 2	KJ27D	30	110	70	37	51	4°	36

Series CP96/C96

Simple Specials

These changes are dealt with Simple Specials System.

Symbol

1 Change of Rod End Shape

-XA0 to -XA30

Applicable Series

Series	Description	Model	Action	Symbol for change of rod end shape
C96	Standard type	C96S	Double acting, Single rod	XA0 to 30
		C96SW	Double acting, Double rod	XA0 to 30
	Smooth type	C96Y	Double acting, Single rod	XA0 to 30
CP96	Standard type	CP96S	Double acting, Single rod	XA0 to 30
		CP96SW	Double acting, Double rod	XA0 to 30

⚠ Precautions

- SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
- Standard dimensions marked with "*" will be as follows to the rod diameter (D). Enter any special dimension you desire.
 $D \leq 6 \rightarrow D-1 \text{ mm}$ $6 < D \leq 25 \rightarrow D-2 \text{ mm}$ $D > 25 \rightarrow D-4 \text{ mm}$
- In the case of double rod type and single acting retraction type, enter the dimensions when the rod is retracted.
- Only the single side of a double rod is able to manufacture.

Symbol: A0 	Symbol: A1 	Symbol: A2 	Symbol: A3 	Symbol: A4
Symbol: A5 	Symbol: A6 	Symbol: A7 	Symbol: A8 	Symbol: A9
Symbol: A10 	Symbol: A11 	Symbol: A12 	Symbol: A13 	Symbol: A14
Symbol: A15 	Symbol: A16 	Symbol: A17 	Symbol: A18 	Symbol: A19
Symbol: A20 	Symbol: A21 	Symbol: A22 	Symbol: A23 	Symbol: A24
Symbol: A25 	Symbol: A26 	Symbol: A27 	Symbol: A28 	Symbol: A29
Symbol: A30 				

Symbol

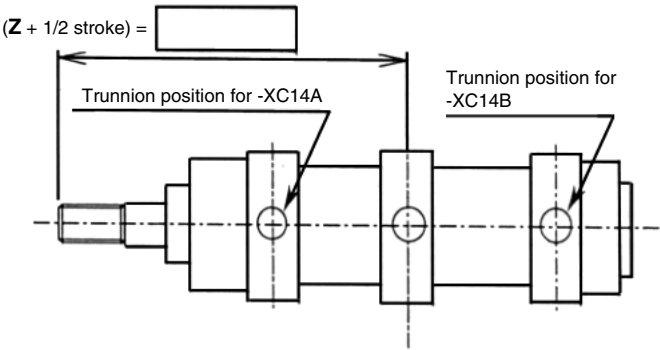
-XC14

2 Change of Trunnion Bracket Mounting Position

The position for mounting the trunnion pivot bracket on the cylinder can be moved from the standard mounting position to any desired position.

Applicable Series

Series	Description	Model	Action	Note
C96	Standard type	C96	Double acting, Single rod	
		C96W	Double acting, Double rod	



⚠ Precautions

1. Specify "Z + 1/2 stroke" in the case the trunnion bracket position is not -XC14A, B or trunnion is not a center trunnion.
2. SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
3. The possible range of trunnion bracket mounting position is indicated in the table below.
4. Some trunnion mounting positions do not allow auto switch mounting. Please consult with SMC for more information.

Series C96

(mm)

Bore size	Symbol	Trunnion bracket position			
		For -XC14		Reference: Standard (Center trunnion)	Minimum stroke
		Minimum	Maximum		
32		89	101 + Stroke	95 + 0.5 stroke	0
40		103	110 + Stroke	106.5 + 0.5 stroke	
50		118	126 + Stroke	122 + 0.5 stroke	
63		128.5	130.5 + Stroke	129.5 + 0.5 stroke	
80		148.5	151.5 + Stroke	150 + 0.5 stroke	
100		161.5	158.5 + Stroke	160 + 0.5 stroke	5
125		202.5	195.5 + Stroke	199 + 0.5 stroke	10

Series CP96/C96

Made to Order

Please contact SMC for detailed dimensions, specifications and lead times.



3 Heat Resistant Cylinder (−10 to 150°C)

Symbol
-XB6

Air cylinder which changed the seal material and grease, so that it could be used even at higher temperature up to 150 from −10°C.

Applicable Series

Series	Description	Model	Action	Note	Page for the standard type
CP96	Air cylinder	CP96S	Double acting, Single rod		Page 43
		CP96SW	Double acting, Double rod		
C96	Air cylinder	C96S	Double acting, Single rod		Page 56
		C96SW	Double acting, Double rod		

How to Order

Standard model no.

-XB6

Heat resistant cylinder ●

Specifications

Ambient temperature range	−10 to 150°C
Seal material	Fluororubber
Grease	Heat resistant grease
Specifications other than above and external dimensions	Same as standard type

Note 1) Operate without lubrication from a pneumatic system lubricator.

Note 2) Please contact SMC for details on the maintenance intervals for this cylinder, which differ from those of the standard cylinder.

Note 3) In principle, it is impossible to make built-in magnet type and the one with auto switch. But, as for the one with auto switch, and the heat resistant cylinder with heat resistant auto switch, since it will be differed depending on the series, please contact SMC.

Note 4) Piston speed is ranged from 50 to 500 mm/s.

Warning

Precautions

Be aware that smoking cigarettes etc. after your hands have come into contact with the grease used in this cylinder can create a gas that is hazardous to humans.

4 Cold Resistant Cylinder (−40 to 70°C)

Symbol
-XB7

Air cylinder which changed the seal material and grease, so that it could be used even at lower temperature down to −40°C.

Applicable Series

Series	Description	Model	Action	Note	Page for the standard type
C96	Air cylinder	C96S	Double acting, Single rod	Except with auto switch. Mounting bracket: Basic type only. Minimum operating pressure 0.2 MPa	Page 56

How to Order

Standard model no.

-XB7

Cold resistant cylinder ●

Specifications

Ambient temperature range	−40 to 70°C
Seal material	Low nitrile rubber
Grease	Cold resistant grease
Auto switch	Not mountable
Dimensions	Same as standard type
Specifications other than above	Same as standard type

Note 1) Operate without lubrication from a pneumatic system lubricator.

Note 2) Use dry air which is suitable for heatless air dryer etc. not to cause the moisture to be frozen.

Note 3) Please contact SMC for details on the maintenance intervals for this cylinder, which differ from those of the standard cylinder.

Note 4) Mounting auto switch is impossible.

Warning

Precautions

Be aware that smoking cigarettes etc. after your hands have come into contact with the grease used in this cylinder can create a gas that is hazardous to humans.

5 With Heavy Duty Scraper

Symbol
-XC4

It is suitable for using cylinders under the environment, where there are much dusts in a surrounding area by using a heavy duty scraper on the wiper ring, or using cylinders under earth and sand exposed to the die-casted equipment, construction machinery, or industrial vehicles.

Applicable Series

Series	Description	Model	Action	Note	Page for the standard type
CP96	Air cylinder	CP96S	Double acting, Single rod	ø32 to ø100	Page 43
		CP96SW	Double acting, Double rod	ø32 to ø100	
C96	Air cylinder	C96S	Double acting, Single rod	ø32 to ø100	Page 56
		C96SW	Double acting, Double rod	ø32 to ø100	

How to Order

Standard model no.

-XC4

With heavy duty scraper
(SCB scraper)

Specifications: Same as standard type

Dimensions: Same as standard type

⚠ Caution

Do not replace heavy duty scrapers.

Since heavy duty scrapers are press-fit, do not replace the cover only, but rather the entire rod cover assembly.

6 Tie-rod, Cushion Valve, Tie-rod Nut, etc. Made of Stainless Steel

Symbol
-XC7

When using in locations where the rust generation or corrosion likelihood exists, the standard parts material have been partly changed to the stainless steel.

Applicable Series

Series	Description	Model	Action	Page for the standard type
CP96	Air cylinder	CP96S	Double acting, Single rod	Page 43
		CP96SW	Double acting, Double rod	
C96	Air cylinder	C96S	Double acting, Single rod	Page 56
		C96SW	Double acting, Double rod	

How to Order

Standard model no.

-XC7

Tie-rod, cushion valve, tie-rod nut, etc.
made of stainless steel

Specifications

Parts changed to stainless steel	Tie-rod, Tie-rod nut, Mounting bracket nut, Spring washer, Cushion valve, Lock nut
Specifications other than above	Same as standard type
Dimensions	Same as standard type

Series C85

Series CP96

Series C96

Series C55

7

Dual Stroke Cylinder/Double Rod Type

Symbol
-XC10

Two cylinders are constructed as one cylinder in a back-to-back configuration allowing the cylinder stroke to be controlled in three steps.

Applicable Series

Series	Description	Model	Action	Note	Page for the standard type
CP96	Air cylinder	CP96S	Double acting, Single rod	Except clevis and trunnion types	Page 43
C96	Air cylinder	C96S	Double acting, Single rod	Except clevis and trunnion types	Page 56

How to Order

CP96S
C96S

Mounting style

Bore size

-

Stroke A

+

Stroke B

-

XC10

Dual stroke cylinder

Specifications

Series	Bore size (mm)	Maximum manufacturable stroke (mm)
CP96	32 to 125	1000
C96		

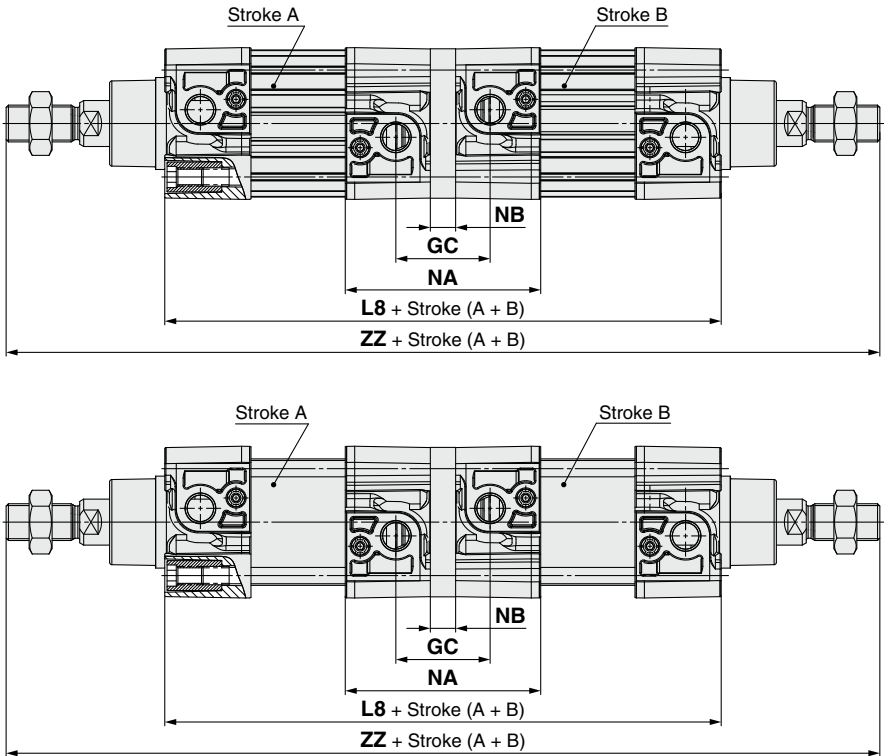
Function

When air pressure is supplied to ports **A** and **B**, both A and B strokes retract.

When air pressure is supplied to ports **B** and **C**, A out strokes.

When air pressure is supplied to ports **C** and **D**, both strokes A and B out strokes.

Dimensions (Dimensions other than below are the same as standard type.)



Bore size (mm)	L8	ZZ	NA	NB	GC
ø32	198	294	74	10	36
ø40	220	328	85	10	38
ø50	222	360	85	10	41
ø63	252	390	100	10	43
ø80	270	442	104	14	52
ø100	290	472	114	14	52
ø125	334	572	130	14	52

8 Dual Stroke Cylinder/Single Rod Type

Two cylinders can be integrated by connecting them in line, and the cylinder stroke can be controlled in two stages in both directions.

Applicable Series

Series	Description	Model	Action	Note	Page for the standard type
CP96	Air cylinder	CP96S	Double acting, Single rod	Except trunnion type	Page 43
C96	Air cylinder	C96S	Double acting, Single rod	Except trunnion type	Page 56

How to Order

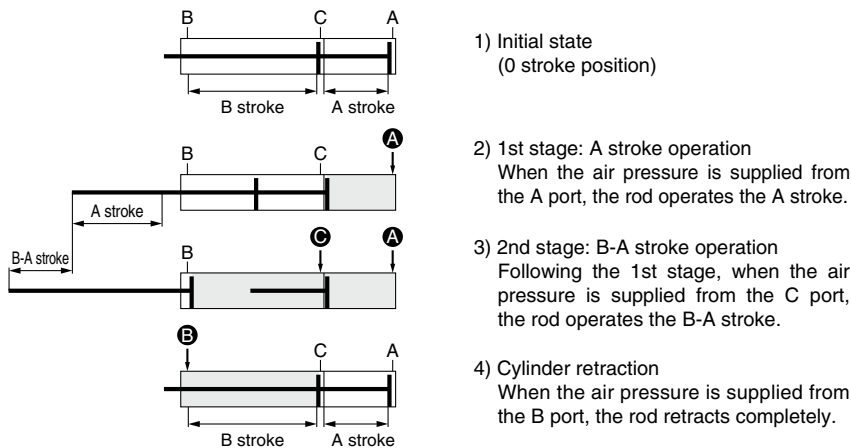
CP96S
C96S **Mounting style** **Bore size** - **Stroke A** + **Stroke B-A** - **XC11**

● Dual stroke cylinder/Single rod type

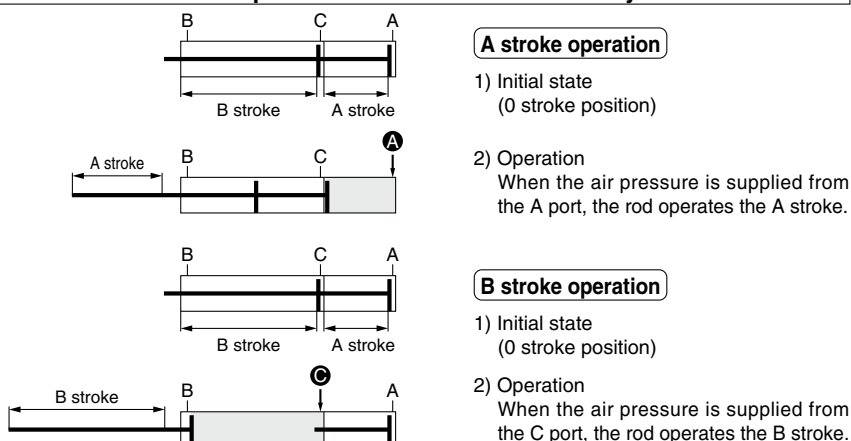
Specifications: Same as standard type

Function

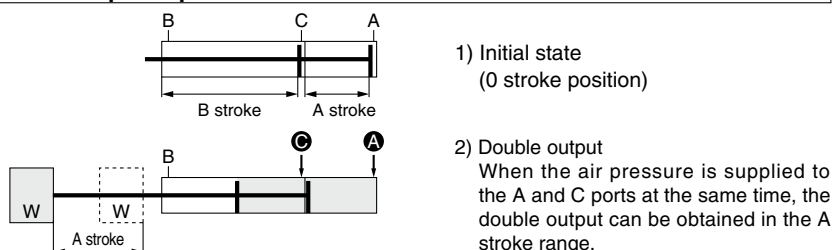
Functional description of dual stroke cylinder



A stroke or B stroke operation can be made individually.



Double output is possible.



Precautions

⚠ Caution

1. Do not supply air until the cylinder is fixed with the attached bolt.
2. If air is supplied without securing the cylinder, the cylinder could lurch, posing the risk of bodily injury or damage to the peripheral equipment.

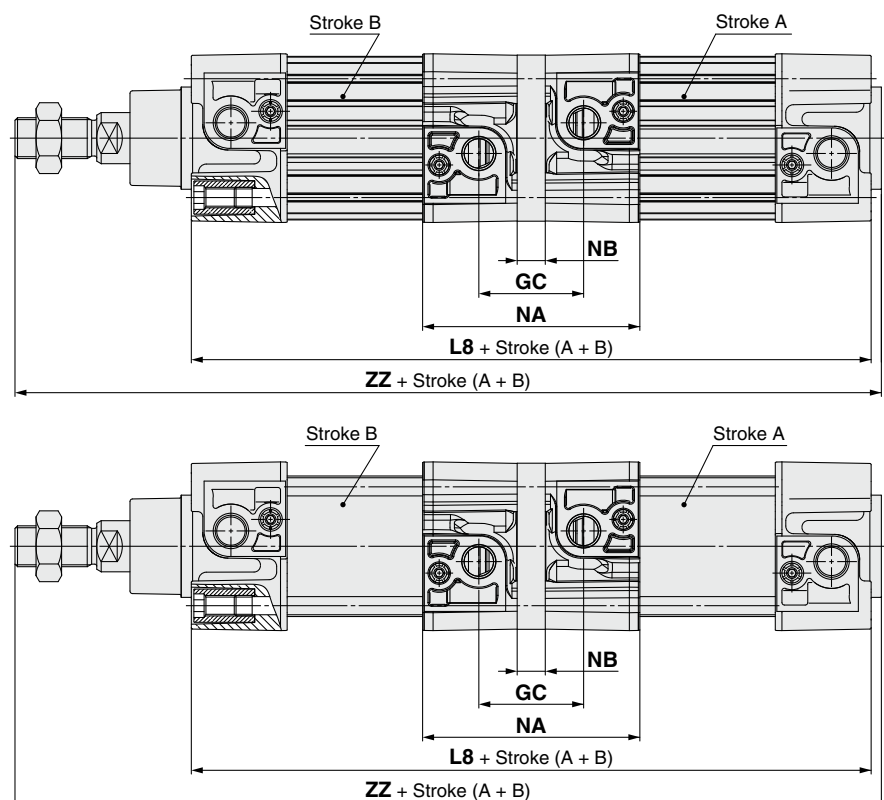
Series CP96/C96

8 Dual Stroke Cylinder/Single Rod Type

Symbol

-XC11

Dimensions (Dimensions other than below are the same as standard type.)



Bore size (mm)	L8	ZZ	NA	NB	GC
ø32	199	251	74	10	36
ø40	221	279	85	10	38
ø50	223	296	85	10	41
ø63	253	326	100	10	43
ø80	271	361	104	14	52
ø100	291	386	114	14	52
ø125	335	460	130	14	52

9 Fluororubber Seal

Symbol

-XC22

Applicable Series

Series	Description	Model	Action	Note	Page for the standard type
CP96	Air cylinder	CP96S	Double acting, Single rod		Page 43
		CP96SW	Double acting, Double rod		
C96	Air cylinder	C96S	Double acting, Single rod		Page 56
		C96SW	Double acting, Double rod		

How to Order

Standard model no.	- XC22
	Fluororubber seal ●

Specifications

Seal material	Fluororubber
Ambient temperature range	With auto switch: -10°C to 60°C (No freezing) ^{Note 1)} Without auto switch: -10°C to 70°C (No freezing)
Specifications other than above and external dimensions	Same as standard type for each series

Note 1) Please contact SMC, as the type of chemical and the operating temperature may not allow the use of this product.

Note 2) Cylinders with auto switches can also be produced; however, auto switch related parts (auto switch units, mounting brackets, built-in magnets) are the same as standard products.

Before using these, please contact SMC regarding their suitability for the operating environment.

10 With Coil Scraper

Symbol
-XC35

It gets rid of frost, ice, weld spatter, cutting chips adhered to the piston rod, and protects the seals etc.

Applicable Series

Series	Description	Model	Action	Note	Page for the standard type
CP96	Air cylinder	CP96S	Double acting, Single rod	ø32 to ø100	Page 43
		CP96SW	Double acting, Double rod	ø32 to ø100	
C96	Air cylinder	C96S	Double acting, Single rod	ø32 to ø100	Page 56
		C96SW	Double acting, Double rod	ø32 to ø100	

How to Order

Standard model no.

– XC35

With coil scraper ●

Specifications: Same as standard type

Dimensions: Same as standard type

11 Made of Stainless Steel (With Hard Chrome Plated Piston Rod)

Symbol
-XC68

Suitable for the cases it is likely to generate rust by being immersed in the water and corrosion.

Applicable Series

Series	Description	Model	Action	Page for the standard type
CP96	Air cylinder	CP96S	Double acting, Single rod	Page 43
		CP96SW	Double acting, Double rod	
C96	Air cylinder	C96S	Double acting, Single rod	Page 56
		C96SW	Double acting, Double rod	

Note) There is a maximum stroke limit for C(P)96 cylinder.

Maximum Stroke

(mm)

Series	Double acting, Single rod	Double acting, Double rod
CP96	ø32: 1800 ø40 to ø100: 1700 ø125: 1600	1000 (Same as standard type)
C96	ø32: 1000 ø40 to ø100: 1700 ø125: 1600	1000 (Same as standard type)

Specifications

Parts changed to stainless steel	Piston rod, Rod end nut
Other specifications and external dimensions	Same as standard type

How to Order

Standard model no.

– XC68

Made of stainless steel ●
(With hard chrome plated piston rod)