ISO Cylinder ISO Standard (15552)

C96 Series

ø32, ø40, ø50, ø63, ø80, ø100, ø125

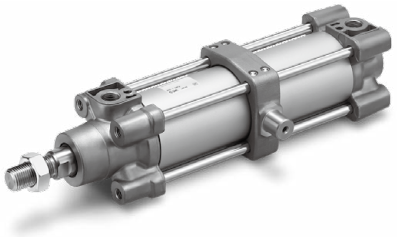
RoHS

Lightweight Up to 17% Weight reduced

∗ Compared with the previous C96 series (ø40, 100 mm stroke)

New

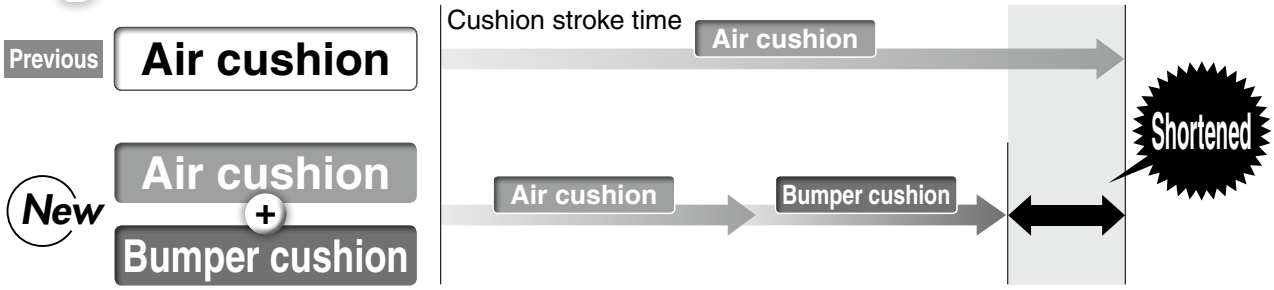
An adjustable position trunnion has been added.



By adopting a new cushion method (Air cushion + Bumper cushion),

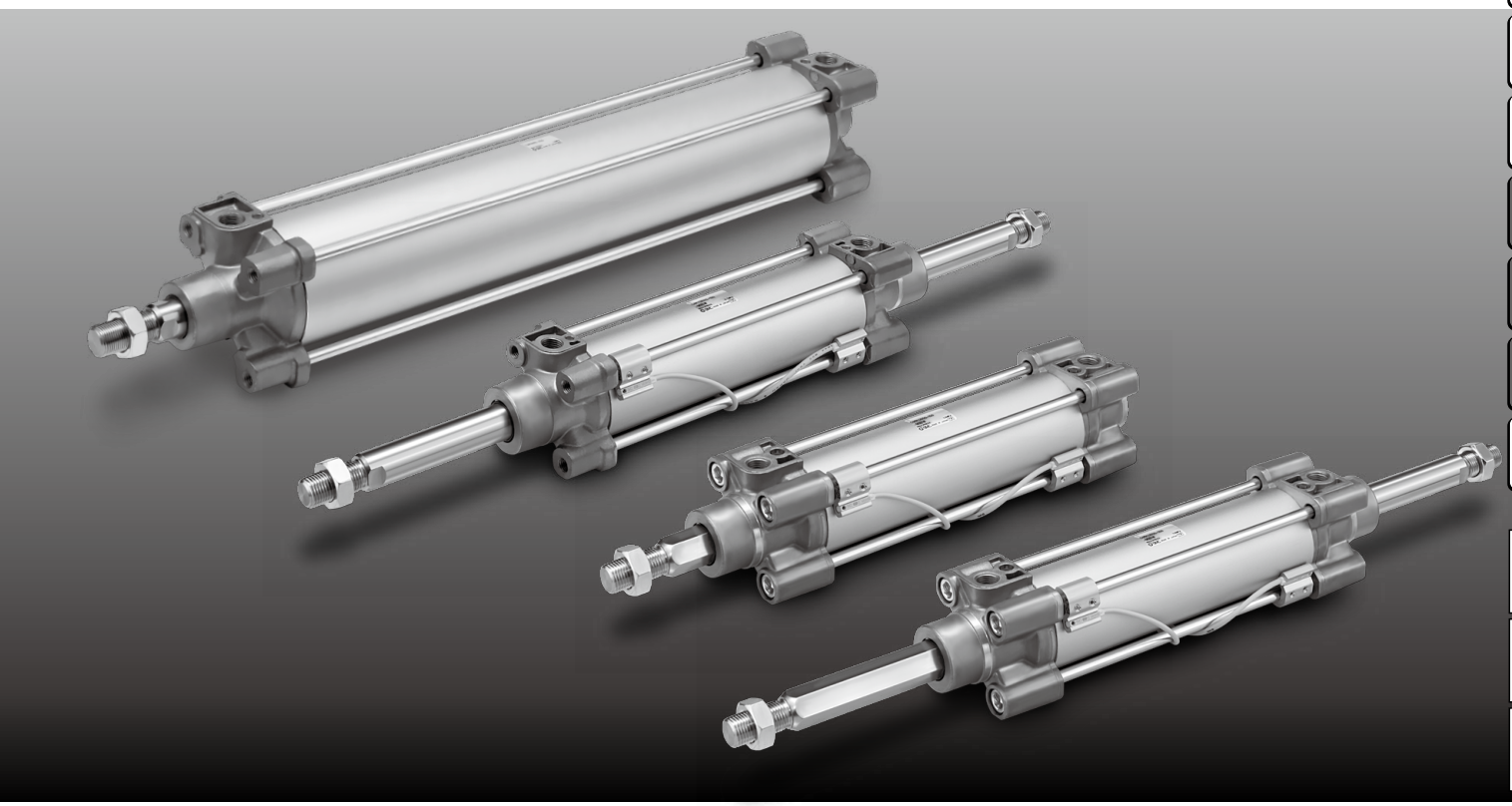
Cycle time shortened

(Applicable cylinder: ø32 to ø100)



Bumper cushion reduces the metal noise that occurs when piston stops

(Applicable cylinder: ø32 to ø100)



Weight reduced

Achieved weight reduction by changing rod cover shape and piston structure

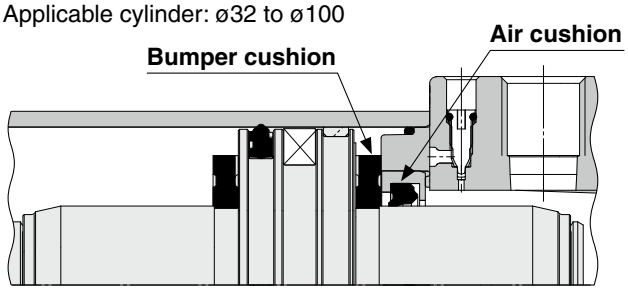
Bore size [mm]	C96 [kg]	Reduction rate [%]
32	0.65	13
40	0.96	17
50	1.57	13
63	1.94	14
80	3.12	13
100	4.03	12

∗ Compared with the previous C96 series (100 mm stroke)

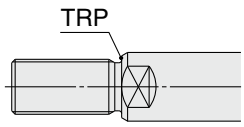
Air cushion + Bumper cushion Combined structure

- The cushion stroke time can now be reduced with the double cushioning, which improves the cycle time.
- The bumper cushion reduces the metal noise that occurs when the piston stops at the end of the stroke.

Applicable cylinder: ø32 to ø100



Rod end nut can be screwed up to TRP.

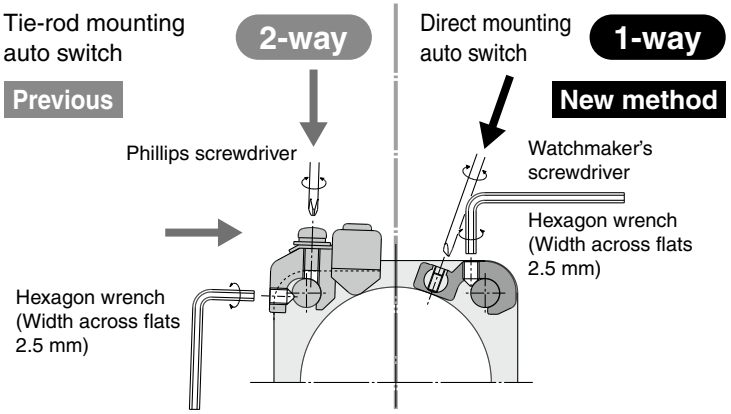


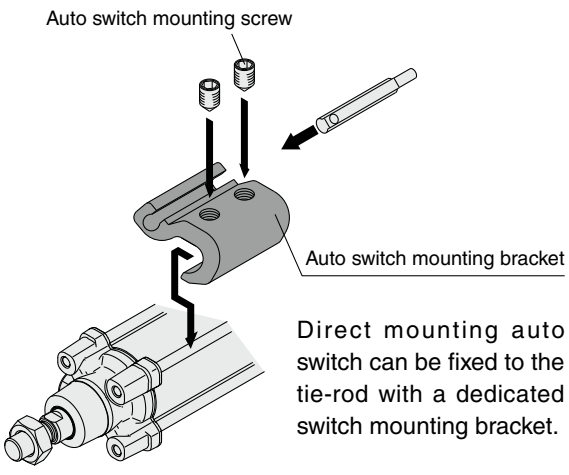
Small sized auto switch can be attached.

Solid state: D-M9□ Reed: D-A9□
D-M9□W

Improved handling performance

Auto switch mounting and mounting position adjustment can be made in a one way direction.

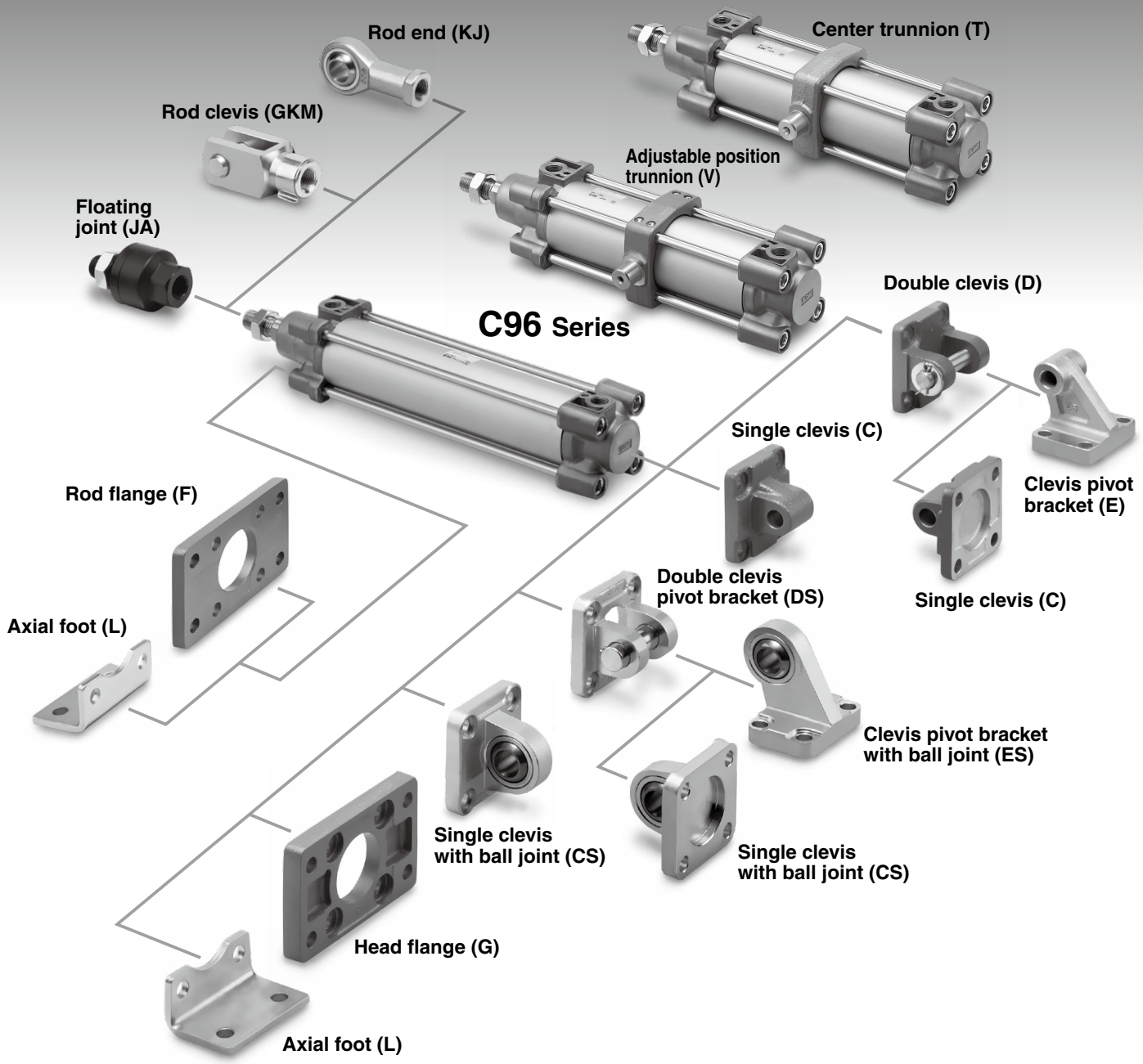




Direct mounting auto switch can be fixed to the tie-rod with a dedicated switch mounting bracket.

Various mounting bracket options

Mounting brackets can be combined according to the operating conditions.



Series Variations

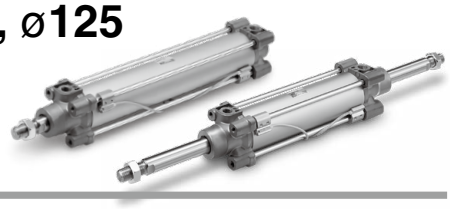
ISO Standards	Type	Action	Bore size [mm] 32	40	50	63	80	100	125	Page
ISO 15552	Standard C96 Series	Double acting, Single rod	●	●	●	●	●	●	●	161
		Double acting, Double rod	●	●	●	●	●	●	●	
	Non-rotating rod C96K Series	Double acting, Single rod	●	●	●	●	●	●		173
		Double acting, Double rod	●	●	●	●	●	●		
	Smooth Cylinder C96Y Series	Double acting, Single rod	●	●	●	●	●	●	●	177

ISO Standard (15552)

Air Cylinder: Standard Type
Double Acting, Single/Double Rod

RoHS

C96 Series
ø32, ø40, ø50, ø63, ø80, ø100, ø125



How to Order

C96S **B** **32** – **100** **C** **J** **W** – [ ]

With auto switch **C96SD** **B** **32** – **100** **C** **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
T	Center trunnion
V	Adjustable position trunnion

∗ Mounting brackets are shipped together, but not assembled. (Excludes the center trunnion type and the adjustable position trunnion type)

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 162.

Cushion

Symbol	Cushion	Bore size [mm]
C	Air cushion on both ends + Bumper cushion	ø32 to ø100
Nil	Air cushion	ø125

Rod

Nil	Single rod
W	Double rod

Rod boot

Nil	Without rod boot
J	Nylon tarpaulin (One end)
JJ	Nylon tarpaulin (Both ends)
K	Heat-resistant tarpaulin (One end)
KK	Heat-resistant tarpaulin (Both ends)

Number of auto switches

Nil	2
S	1
3	3
n	n

Made to Order
Refer to page 162 for details.

Auto switch

Nil	Without auto switch

∗ For applicable auto switches, refer to the table below.

Applicable Auto Switches/Refer to the **Web Catalog** or Best Pneumatics for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Tie-rod mounting	Auto switch model: Band mounting	Lead wire length [m]: 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	**M9N**	—	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)			**M9P**	—	●	●	●	○	○		
				2-wire	12 V		**M9B**	—	●	●	●	○	○	—	
		Terminal conduit		3-wire (NPN)	5 V, 12 V		—	**G39**	—	—	—	—	—	IC circuit	
				2-wire	12 V		—	**K39**	—	—	—	—	—	—	
	Diagnostic indication (2-color indicator)	Grommet		3-wire (NPN)	5 V, 12 V		**M9NW**	—	●	●	●	○	○	IC circuit	
				3-wire (PNP)			**M9PW**	—	●	●	●	○	○		
				2-wire	24 V	12 V	—	**M9BW**	—	●	●	●	○	○	—
	Water-resistant (2-color indicator)			3-wire (NPN)	5 V, 12 V		**M9NA**∗1	—	○	○	●	○	○	IC circuit	
				3-wire (PNP)			**M9PA**∗1	—	○	○	●	○	○		
				2-wire	12 V		**M9BA**∗1	—	○	○	●	○	○	—	
	With diagnostic output (2-color indicator)			4-wire (NPN)	5 V, 12 V		**F59F**	—	●	—	●	○	○	IC circuit	
	Magnetic field resistant (2-color indicator)			2-wire (Non-polar)	—		**P4DW**	—	—	—	●	●	○	—	
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96**	—	●	—	●	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	**A93**	—	●	●	●	●	—	—	
			Yes				100 V or less	**A90**	—	●	—	●	—	IC circuit	Relay, PLC
			No				100 V, 200 V	**A54**	—	●	—	●	●	—	
			Yes				200 V or less	**A64**	—	●	—	●	—	—	
		Terminal conduit					—	—	**A33**	—	—	—	—	—	PLC
		DIN terminal	Yes				100 V, 200 V	—	**A34**	—	—	—	—	—	Relay, PLC
								—	**A44**	—	—	—	—	—	
	Diagnostic indication (2-color indicator)	Grommet			—	—	**A59W**	—	●	—	●	—	—		

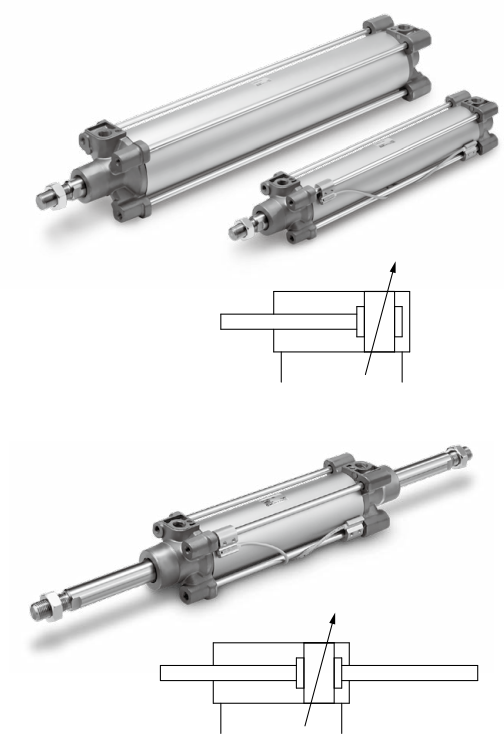
∗1 Water-resistant type auto switches can be mounted on the above models, but SMC cannot guarantee water resistance.

∗ 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 page 185 for details.
∗ The D-A9□/M9□/M9□W/M9□A auto switches are shipped together, but not assembled. (Only the auto switch mounting brackets are assembled before shipment.)
∗ The adjustable position trunnion (V) mounting bracket only supports D-A9□, M9□, M9□W, and M9□A auto switches.

SMC



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 temperatures		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 500**	$^{+2}_{0}$						$^{+1.0}_{0}$
	501 to 1000	$^{+2.4}_{0}$						$^{+1.4}_{0}$
	1001 to 1500	$^{+2.8}_{0}$						$^{+1.8}_{0}$
	1501 to 2000	$^{+3.2}_{0}$						$^{+2.2}_{0}$
Cushion		Air cushion on both ends + Bumper 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, Adjustable position trunnion						

Standard Strokes

Bore size [mm]	Standard stroke [mm]	Max. stroke
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

∗ Aside from the standard strokes, intermediate strokes are also available in 1 mm increments and are produced upon receipt of order.
∗ Strokes exceeding the max. stroke are available as a special order.

Accessories

Mounting		Basic	Foot	Rod flange	Head flange	Single clevis	Double clevis	Center trunnion	Adjustable position trunnion
Standard	Rod end nut	●	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—	—
Option	Rod end	●	●	●	●	●	●	●	●
	Rod clevis	●	●	●	●	●	●	●	●
	Rod boot	●	●	●	●	●	●	●	●

∗ Do not use a rod end (or floating joint) together with a single clevis with a ball joint (or clevis pivot bracket with a ball joint).
∗ Refer to pages 169 to 172 for dimensions and part numbers of the accessories.

⚠ Precautions

Be sure to read this before handling the products. Refer to page 219 for safety instructions. For actuator and auto switch precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: http://www.smcworld.com

Made to Order

Made to Order
(For details, refer to pages 190 to 199.)

Symbol	Specifications
-XA□	Change of rod end shape
-XC14	Change of trunnion bracket mounting position
-XB6	Heat-resistant cylinder (–10 to 150°C)
-XB7	Cold-resistant cylinder (–40 to 70°C)
-XC4	With heavy duty scraper
-XC7	Tie-rod, 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
-XC65	Made of stainless steel (Combination of -XC7 and -XC68)
-XC68	Made of stainless steel (with hard chrome plated piston rod)
-XC85	Grease for food processing equipment
-XC88	Spatter-resistant coil scraper, Lube-retainer, grease for welding (Piston rod: Stainless steel 304)
-XC89	Spatter-resistant coil scraper, Lube-retainer, grease for welding (Piston rod: S45C)

Refer to pages 181 to 185 for cylinders with auto switches.

· Auto Switch Proper Mounting Position (Detection at stroke end) and Mounting Height
· Minimum Stroke for Auto Switch Mounting
· Auto Switch Mounting Brackets/Part No.
· Operating Range

Theoretical Output



[N]

Bore size [mm]	Rod size [mm]	Operating direction	Piston area [mm²]	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

∗ Theoretical output [N] = Pressure [MPa] x Piston area [mm²]

Weight (Guide)

[kg]

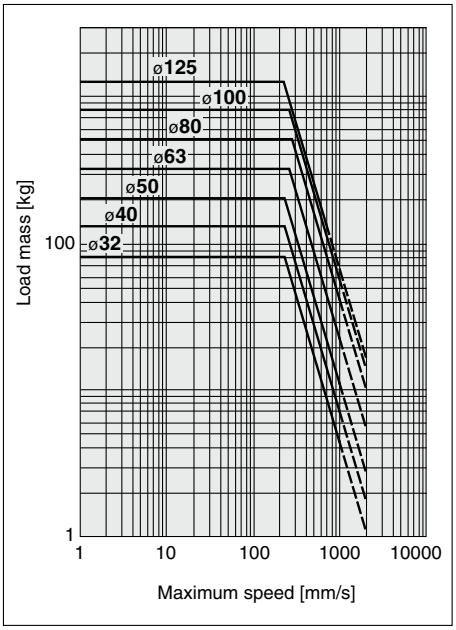
Bore size [mm]		**32**	**40**	**50**	**63**	**80**	**100**	**125**
Basic weight	Basic	0.43	0.64	1.09	1.42	2.32	3.15	6.70
	Foot	0.59	0.84	1.47	1.88	3.21	4.24	9.30
	Flange	0.63	0.87	1.56	2.00	3.62	4.96	10.80
	Single clevis	0.59	0.87	1.46	2.02	3.39	4.88	10.85
	Double clevis	0.63	0.96	1.54	2.13	3.60	5.26	10.95
	Center trunnion	0.71	1.10	1.73	2.48	4.25	5.95	9.68
	Adjustable position trunnion	0.71	1.10	1.73	2.48	4.25	5.95	9.68
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	Rod end	0.07	0.11	0.22		0.40		1.20
	Rod clevis	0.09	0.15	0.34		0.69		1.84

Calculation: Example) **C96SD40-100C**

- Basic weight ····· 0.96 [kg] (Double clevis, ø40)
- Additional weight ····· 0.16 (kg/50 st)
- Cylinder stroke ····· 100 [st]

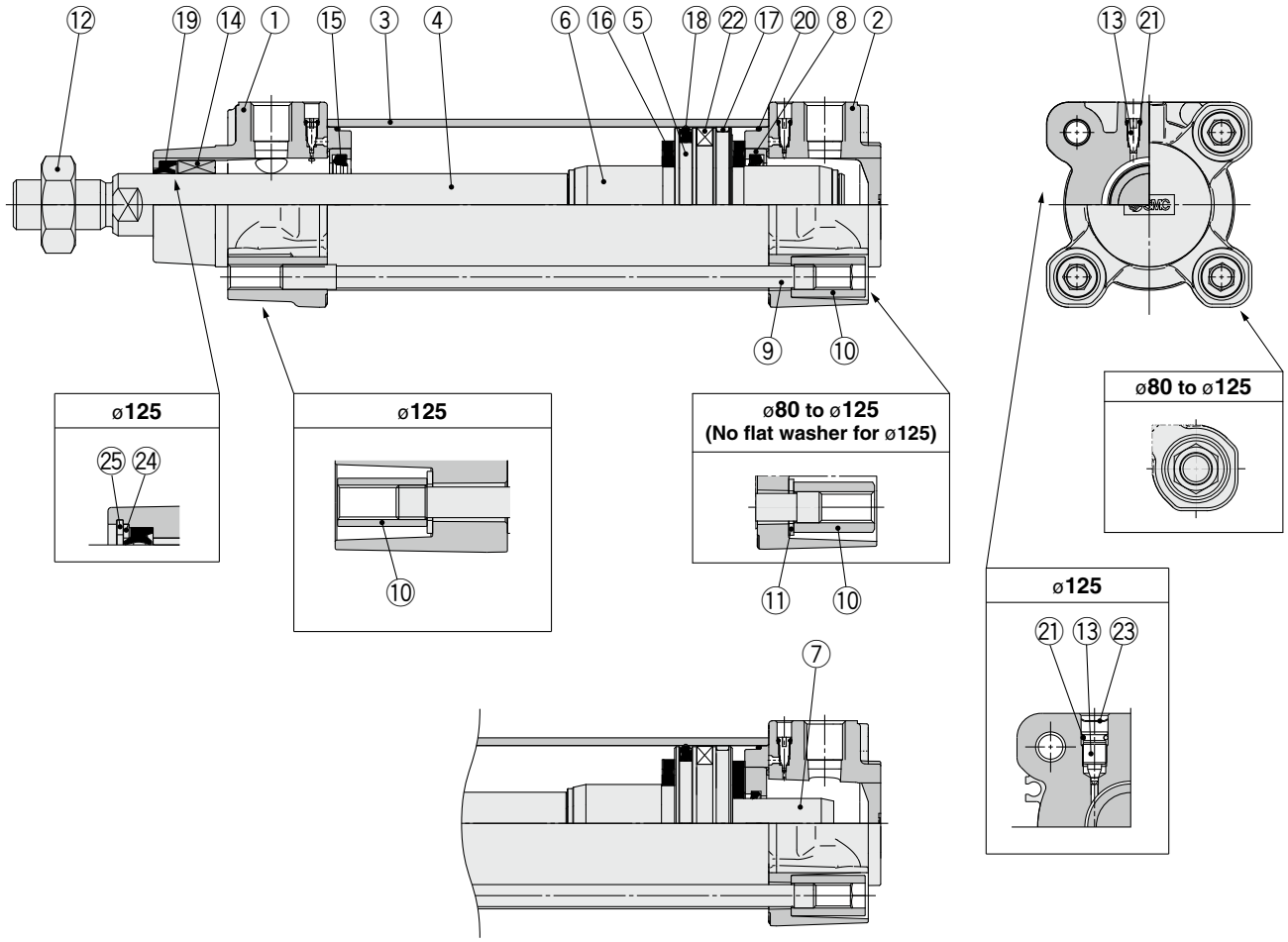
0.96 + 0.16 x 100 ÷ 50 = **1.28 [kg]**

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	ø32 to ø63, ø125
		Aluminum die-cast	ø80, ø100
6	**Cushion ring A**	Aluminum alloy	
7	**Cushion ring B**	Aluminum alloy	
8	**Cushion seal holder**	Aluminum alloy	ø32 to ø100
9	**Tie-rod**	Carbon steel	
10	**Tie-rod nut**	Steel	
11	**Flat washer**	Steel	ø80, ø100
12	**Rod end nut**	Steel	
13	**Cushion valve**	Resin	ø32 to ø100
		Steel wire	ø125
14	**Bushing**	Bearing alloy	
15	**Cushion seal**	Urethane	
16	**Bumper**	Urethane	ø32 to ø100
17	**Wear ring**	Resin	
18	**Piston seal**	NBR	
19	**Rod seal**	NBR	
20	**Cylinder tube gasket**	NBR	
21	**Cushion valve seal**	NBR	
22	**Magnet**		
23	**Retaining ring**	Steel for spring	ø125
24	**Rod seal holder**	Stainless steel	ø125
25	**Retaining ring**	Steel for spring	ø125

Replacement Parts/Seal Kit (Single rod)

Bore size [mm]	Kit no.	Contents
32	CS95-32	Kits include items ⑮, ⑰ 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 ⑮, ⑰ 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-S-010 (10 g), **GR-S-020** (20 g)

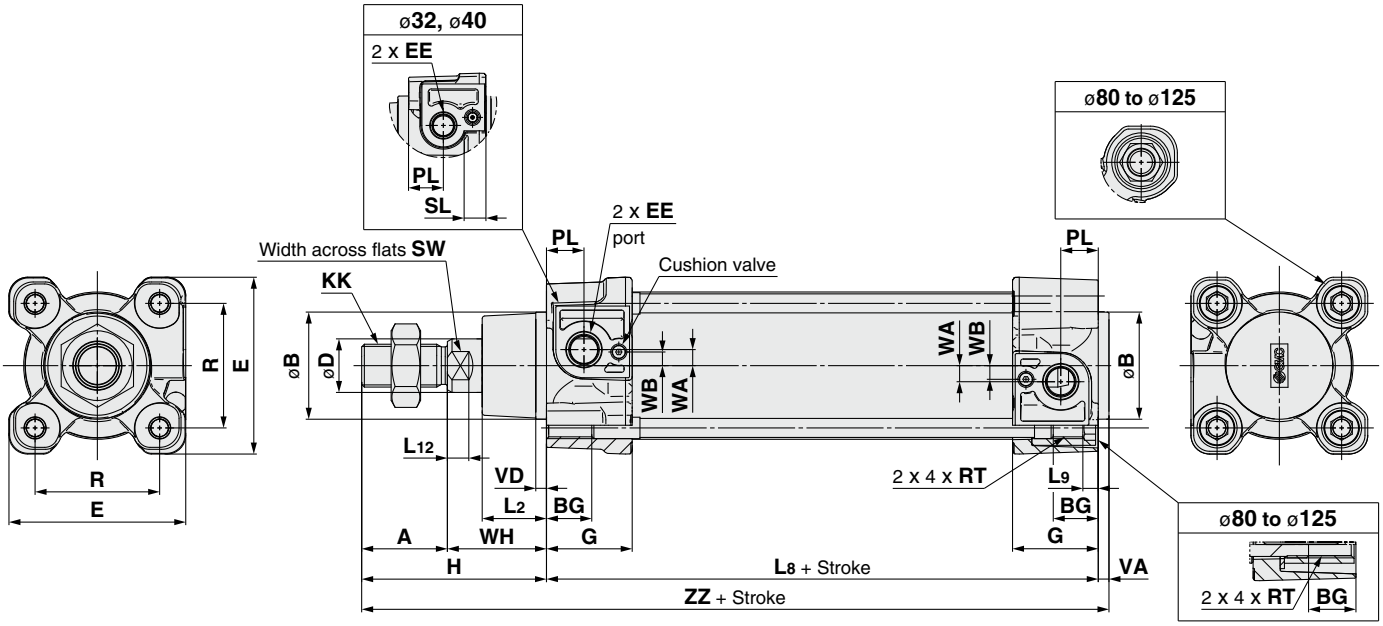
Seal Kit (Double rod)

Bore size [mm]	Kit no.	Contents
32	CS95W-32	Kits include items ⑮, ⑱ to ⑳
40	CS95W-40	
50	CS95W-50	
63	CS95W-63	
80	CS95W-80	
100	CS96W-100	
125	CS96W-125	

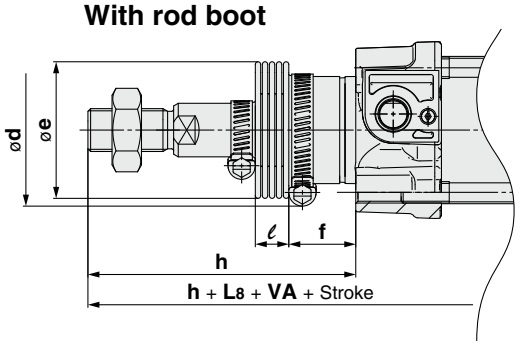
* Seal kits consist of items ⑮, ⑱ to ⑳ and can be ordered by using the seal kit number corresponding to each bore size.
* The seal kit includes a grease pack (10 g for ø32 to ø50, 20 g for ø63 and ø80, 30 g for ø100 and ø125).
  Order with the following part number when only the grease pack is needed.
  Grease pack part number: GR-S-010 (10 g), **GR-S-020** (20 g)

Dimensions

Basic: C96S (D) B Bore size – Stroke C (J)



With rod boot



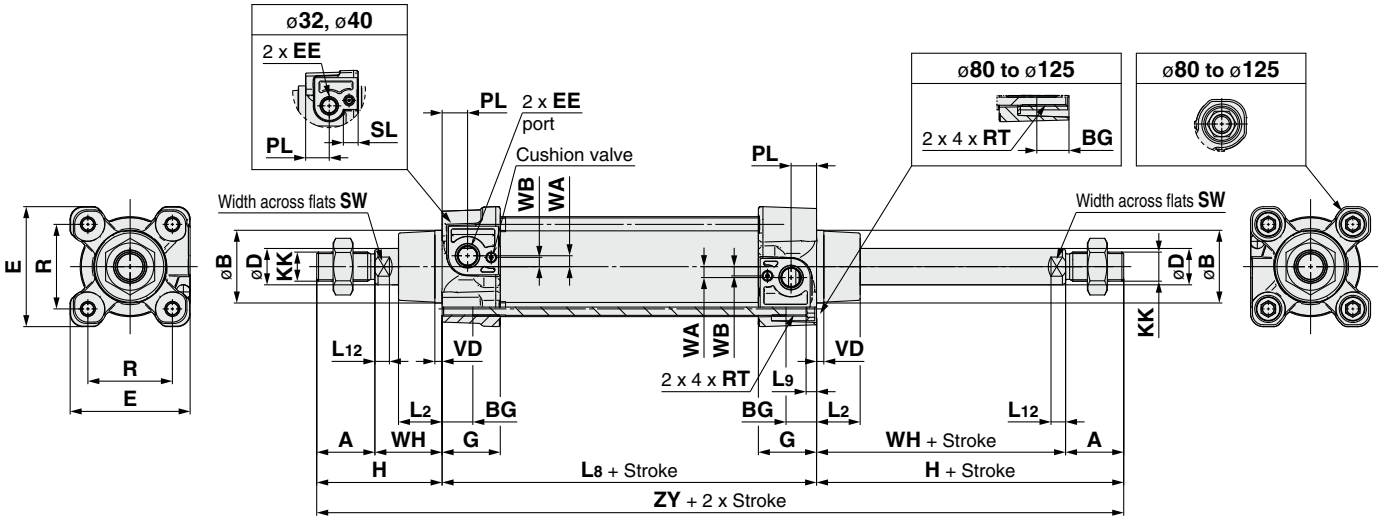
Bore size [mm]	Stroke range*1 [mm] Without rod boot	Stroke range*1 [mm] With rod boot	A	øB d11	BG	øD	E	EE	G	H	KK	L2	L8	L9	L12	PL	R	RT	SL	SW	VA	VD	WA	WB	WH	ZZ
32	Up to 1000	Up to 1000	22	30	16	12	47	G 1/8	28.9	48	M10 x 1.25	15	94	4	6	13	32.5	M6 x 1	8	10	4	4	4	7	26	146
40	Up to 1900	Up to 1000	24	35	16	16	54	G 1/4	32.6	54	M12 x 1.25	17	105	4	6.5	14	38	M6 x 1	8	13	4	4	5	8.9	30	163
50	Up to 1900	Up to 1000	32	40	16	20	66	G 1/4	32	69	M16 x 1.5	24	106	5	8	14	46.5	M8 x 1.25	–	17	4	4	6	5.1	37	179
63	Up to 1900	Up to 1000	32	45	16	20	77	G 3/8	38.6	69	M16 x 1.5	24	121	5	8	16	56.5	M8 x 1.25	–	17	4	4	9	6.3	37	194
80	Up to 1900	Up to 1000	40	45	17	25	99	G 3/8	38.4	86	M20 x 1.5	30	128	–	10	16	72	M10 x 1.5	–	22	4	4	11.5	6	46	218
100	Up to 1900	Up to 1000	40	55	17	25	118	G 1/2	42.9	91	M20 x 1.5	32	138	–	10	18	89	M10 x 1.5	–	22	4	4	17	10	51	233
125	Up to 2000	Up to 1000	54	60	20	32	144	G 1/2	58	119	M27 x 2	40	160	—	13	19	110	M12 x 1.75	—	27	6	6	17	15	65	285

*1 Minimum stroke for trunnion mounting: 1 mm for bore size 32 to 80, 5 mm for bore size 100, 10 mm for bore size 125

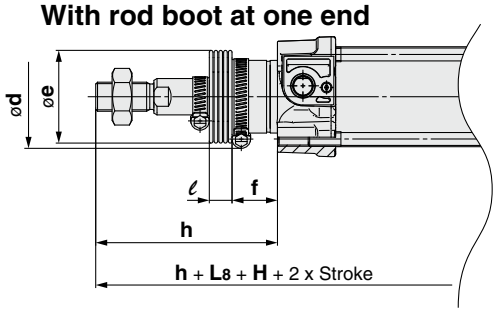
Bore size [mm]	ød	øe	f	ℓ 1 to 50	ℓ 51 to 100	ℓ 101 to 150	ℓ 151 to 200	ℓ 201 to 300	ℓ 301 to 400	ℓ 401 to 500	ℓ 501 to 600	ℓ 601 to 700	ℓ 701 to 800	ℓ 801 to 900	ℓ 901 to 1000	h 1 to 50	h 51 to 100	h 101 to 150	h 151 to 200	h 201 to 300	h 301 to 400	h 401 to 500	h 501 to 600	h 601 to 700	h 701 to 800	h 801 to 900	h 901 to 1000
32	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	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	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	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	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	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	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 C (J) W



With rod boot at one end



Bore size [mm]	Stroke range*1 [mm]	A	øB d11	BG	øD	E	EE	G	H	KK	L2	L8	L9	L12	PL	R	RT	SL	SW	VD	WA	WB	WH	ZY
32	Up to 1000	22	30	16	12	47	G 1/8	28.9	48	M10 x 1.25	15	94	4	6	13	32.5	M6 x 1	8	10	4	4	7	26	190
40	Up to 1000	24	35	16	16	54	G 1/4	32.6	54	M12 x 1.25	17	105	4	6.5	14	38	M6 x 1	8	13	4	5	8.9	30	213
50	Up to 1000	32	40	16	20	66	G 1/4	32	69	M16 x 1.5	24	106	5	8	14	46.5	M8 x 1.25	—	17	4	6	5.1	37	244
63	Up to 1000	32	45	16	20	77	G 3/8	38.6	69	M16 x 1.5	24	121	5	8	16	56.5	M8 x 1.25	—	17	4	9	6.3	37	259
80	Up to 1000	40	45	17	25	99	G 3/8	38.4	86	M20 x 1.5	30	128	—	10	16	72	M10 x 1.5	—	22	4	11.5	6	46	300
100	Up to 1000	40	55	17	25	118	G 1/2	42.9	91	M20 x 1.5	32	138	—	10	18	89	M10 x 1.5	—	22	4	17	10	51	320
125	Up to 1000	54	60	20	32	144	G 1/2	58	119	M27 x 2	40	160	—	13	19	110	M12 x 1.75	—	27	6	17	15	65	398

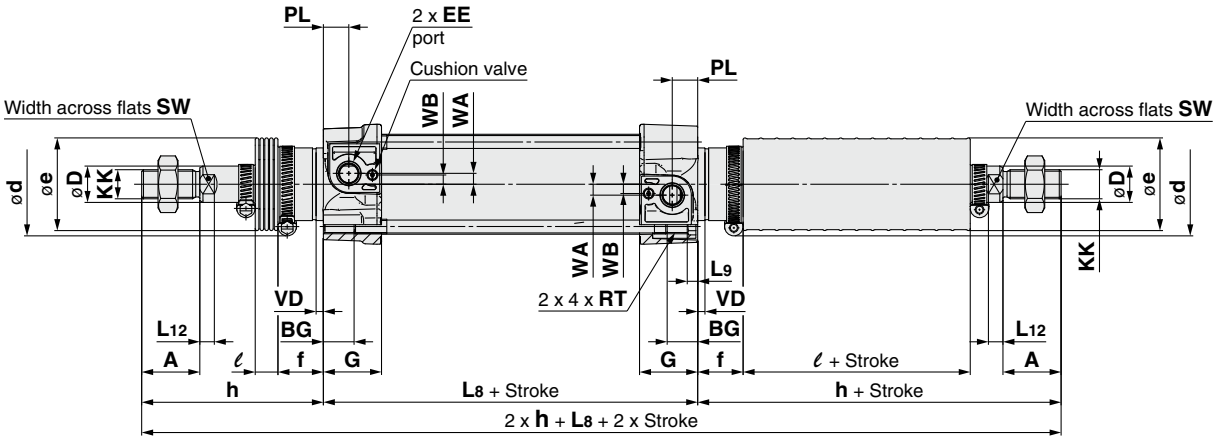
*1 Minimum stroke for trunnion mounting: 1 mm for bore size 32 to 80, 5 mm for bore size 100, 10 mm for bore size 125

Bore size [mm]	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	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	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	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	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	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	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	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 C (JJ) W

With rod boot at both ends



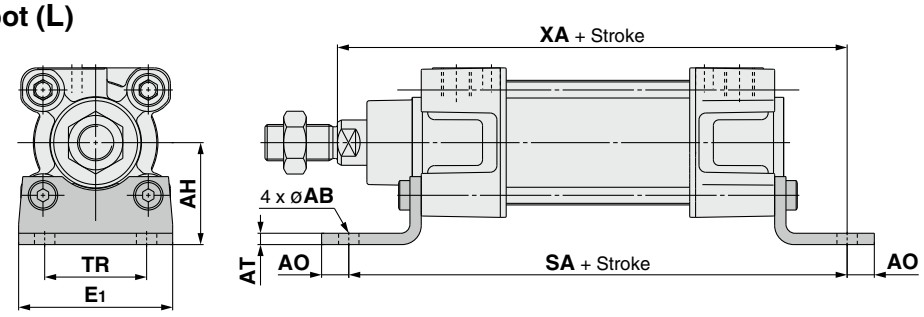
Bore size [mm]	Stroke range*1 [mm]	A	BG	øD	E	EE	G	KK	L_8	L_9	L_{12}	PL	R	RT	SL	SW	VD	WA	WB
32	Up to 1000	22	16	12	47	G 1/8	28.9	M10 x 1.25	94	4	6	13	32.5	M6 x 1	8	10	4	4	7
40	Up to 1000	24	16	16	54	G 1/4	32.6	M12 x 1.25	105	4	6.5	14	38	M6 x 1	8	13	4	5	8.9
50	Up to 1000	32	16	20	66	G 1/4	32	M16 x 1.5	106	5	8	14	46.5	M8 x 1.25	—	17	4	6	5.1
63	Up to 1000	32	16	20	77	G 3/8	38.6	M16 x 1.5	121	5	8	16	56.5	M8 x 1.25	—	17	4	9	6.3
80	Up to 1000	40	17	25	99	G 3/8	38.4	M20 x 1.5	128	—	10	16	72	M10 x 1.5	—	22	4	11.5	6
100	Up to 1000	40	17	25	118	G 1/2	42.9	M20 x 1.5	138	—	10	18	89	M10 x 1.5	—	22	4	17	10
125	Up to 1000	54	20	32	144	G 1/2	58	M27 x 2	160	—	13	19	110	M12 x 1.75	—	27	6	17	15

*1 Minimum stroke for trunnion mounting: 1 mm for bore size 32 to 80, 5 mm for bore size 100, 10 mm for bore size 125

Bore size [mm]	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	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	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	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	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	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	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	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: With Mounting Bracket (Dimensions are common to single rod and double rod.)

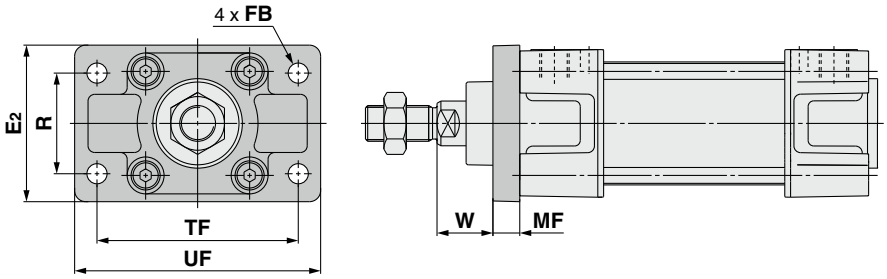
Axial foot (L)



[mm]

Bore size [mm]	E1	TR	AH	AO	AT	AB	SA	XA
32	48	32	32	10	4.5	7	142	144
40	55	36	36	11	4.5	10	161	163
50	68	45	45	12	5.5	10	170	175
63	80	50	50	12	5.5	10	185	190
80	100	63	63	14	6.5	12	210	215
100	120	75	71	16	6.5	14.5	220	230
125	Max. 157	90	90	Max. 25	8	16	250	270

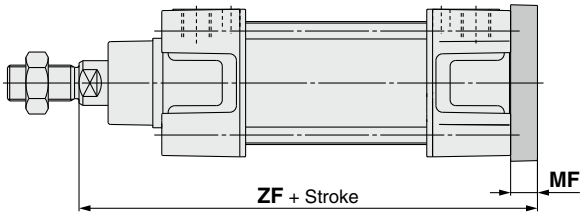
Rod flange (F)



[mm]

Bore size [mm]	R	TF	FB	E2	UF	W	MF
32	32	64	7	50	79	16	10
40	36	72	9	55	90	20	10
50	45	90	9	70	110	25	12
63	50	100	9	80	120	25	12
80	63	126	12	100	153	30	16
100	75	150	14	120	178	35	16
125	90	180	16	Max. 157	Max. 224	45	20

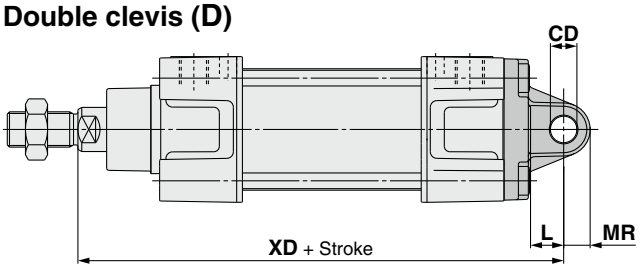
Head flange (G)

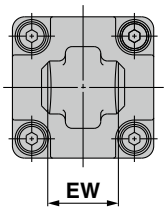


[mm]

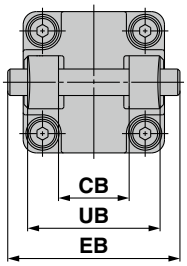
Bore size [mm]	MF	ZF
32	10	130
40	10	145
50	12	155
63	12	170
80	16	190
100	16	205
125	20	245

Single clevis (C)
Double clevis (D)





Single clevis (C)



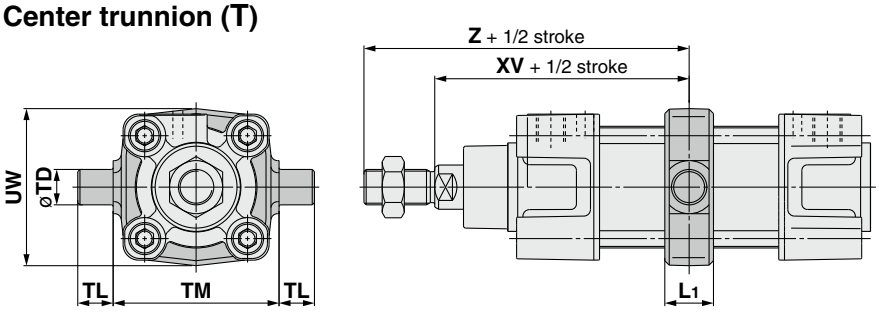
Double clevis (D)

[mm]

Bore size [mm]	EW	CD H9	L	MR	XD	UB h14	CB H14	EB
32	$26^{-0.2}_{-0.6}$	10	12	9.5	142	45	26	65
40	$28^{-0.2}_{-0.6}$	12	15	12	160	52	28	75
50	$32^{-0.2}_{-0.6}$	12	15	12	170	60	32	80
63	$40^{-0.2}_{-0.6}$	16	20	16	190	70	40	90
80	$50^{-0.2}_{-0.6}$	16	20	16	210	90	50	110
100	$60^{-0.2}_{-0.6}$	20	25	20	230	110	60	140
125	$70^{-0.5}_{-1.2}$	25	Min. 30	Max. 26	275	130	70	Max. 157

Dimensions: With Mounting Bracket (Dimensions are common to single rod and double rod.)

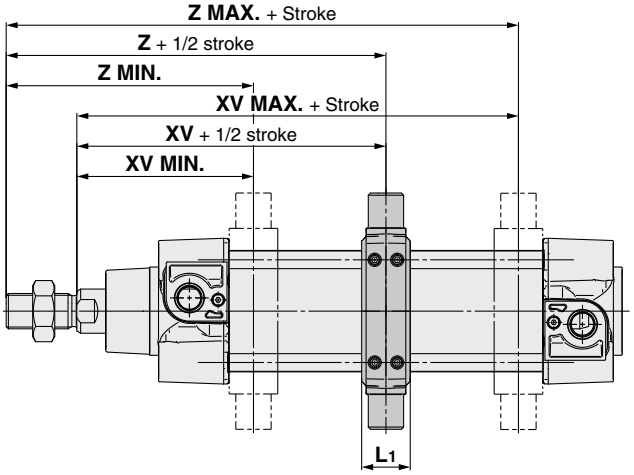
Center trunnion (T)



[mm]

Bore size [mm]	TM	TL	TD e8	UW	L1	XV	Z
32	50	12	12	49	17	73	95
40	63	16	16	58	22	82.5	106.5
50	75	16	16	71	22	90	122
63	90	20	20	87	28	97.5	129.5
80	110	20	20	110	34	110	150
100	132	25	25	136	40	120	160
125	160	25	25	Max. 160	50	145	199

Adjustable position trunnion (V)

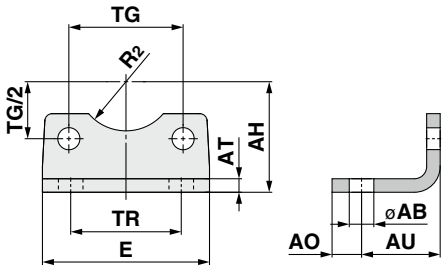


[mm]

Bore size [mm]	Minimum		Middle		Maximum		Trunnion holding force
	XV MIN.	Z MIN.	XV	Z	XV MAX.	Z MAX.	
32	63.4	85.4	73	95	82.6	104.6	5700 N
40	73.6	97.6	82.5	106.5	90.4	114.4	5700 N
50	80	112	90	122	100	132	10600 N
63	89.6	121.6	97.5	129.5	105.4	137.4	10600 N
80	97.8	137.8	110	150	122.2	162.2	25100 N
100	113.9	153.9	120	160	126.1	166.1	25100 N
125	148	202	145	199	142	196	42200 N

Dimensions: Mounting Brackets

Axial foot (L)

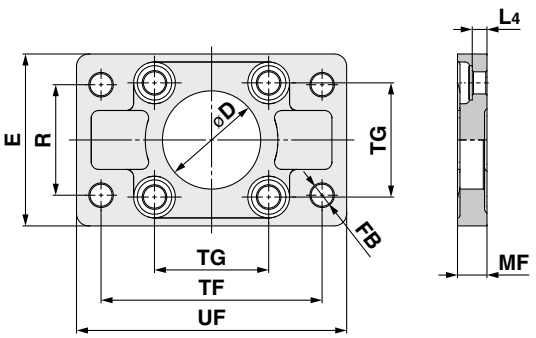


[mm]

Bore size [mm]	Part no.	AB	TG ±0.2	E	TR	AO	AU	AH	AT	R2	Screw size
32	**L5032**	7	32.5	48	32	10	24	32	4.5	15	M6 x 16L
40	**L5040**	10	38	55	36	11	28	36	4.5	17.5	M6 x 16L
50	**L5050**	10	46.5	68	45	12	32	45	5.5	20	M8 x 20L
63	**L5063**	10	56.5	80	50	12	32	50	5.5	22.5	M8 x 20L
80	**L5080**	12	72	100	63	14	41	63	6.5	22.5	M10 x 20L
100	**L5100**	14.5	89	120	75	16	41	71	6.5	27.5	M10 x 20L
125	**L5125**	16	110	Max. 157	90	Max. 25	45	90	8	30	M12 x 25L

∗ Supplied with 2 foot brackets and 4 mounting screws.

Flange (F, G)

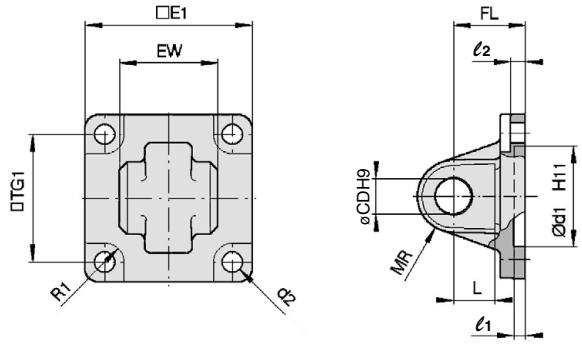


[mm]

Bore size [mm]	Part no.	D H11	øFB	TG ±0.2	E	R	MF	TF	UF	L4	Screw size
32	**F5032**	30	7	32.5	50	32	10	64	79	5	M6 x 20L
40	**F5040**	35	9	38	55	36	10	72	90	5	M6 x 20L
50	**F5050**	40	9	46.5	70	45	12	90	110	6.5	M8 x 20L
63	**F5063**	45	9	56.5	80	50	12	100	120	6.5	M8 x 20L
80	**F5080**	45	12	72	100	63	16	126	153	9	M10 x 25L
100	**F5100**	55	14	89	120	75	16	150	178	9	M10 x 25L
125	**F5125**	60	16	110	Max. 157	90	20	180	Max. 224	10.5	M12 x 25L

∗ Supplied with 4 mounting screws.

Single clevis (C)



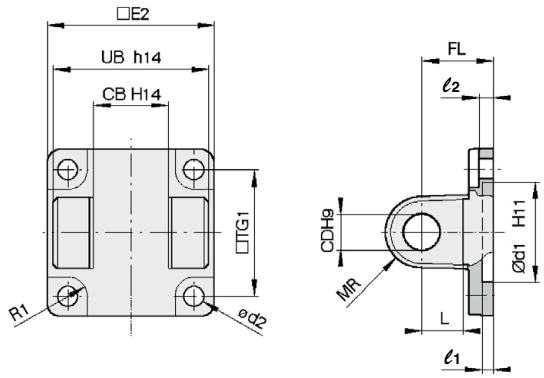
[mm]

Bore size [mm]	Part no.	E1	EW	TG1	FL	ℓ1	L	ℓ2	ød1	øCD	MR	ød2	R1
32	**C5032**	45	$26^{-0.2}_{-0.6}$	32.5	22	5	12	5.5	30	10	9.5	6.6	6.5
40	**C5040**	51	$28^{-0.2}_{-0.6}$	38	25	5	15	5.5	35	12	12	6.6	6.5
50	**C5050**	64	$32^{-0.2}_{-0.6}$	46.5	27	5	15	6.5	40	12	12	9	8.5
63	**C5063**	74	$40^{-0.2}_{-0.6}$	56.5	32	5	20	6.5	45	16	16	9	8.5
80	**C5080**	94	$50^{-0.2}_{-0.6}$	72	36	5	20	10	45	16	16	11	11
100	**C5100**	113	$60^{-0.2}_{-0.6}$	89	41	5	25	10	55	20	20	11	12
125	**C5125**	Max. 157	$70^{-0.5}_{-1.2}$	110	50	7	30	10	60	25	26	13.5	10

∗ Supplied with 4 mounting screws.

Dimensions: Mounting Brackets, Pivot Brackets for Cylinder Mounting

Double clevis (D)

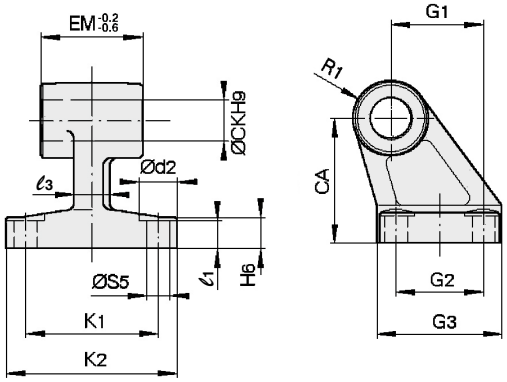


[mm]

Bore size [mm]	Part no.	TG1	FL	ℓ1	L	ℓ2	ød1	øCD	MR	ød2	R1	E2	UB	CB
32	D5032	32.5	22	5	12	5.5	30	10	9.5	6.6	6.5	48	45	26
40	D5040	38	25	5	15	5.5	35	12	12	6.6	6.5	56	52	28
50	D5050	46.5	27	5	15	6.5	40	12	12	9	8.5	64	60	32
63	D5063	56.5	32	5	20	6.5	45	16	16	9	8.5	75	70	40
80	D5080	72	36	5	20	10	45	16	16	11	11	95	90	50
100	D5100	89	41	5	25	10	55	20	20	11	12	115	110	60
125	D5125	110	50	7	30	10	60	25	26	13.5	10	Max. 157	130	70

∗ Supplied with 4 mounting screws, clevis pin, and clevis pin bracket.

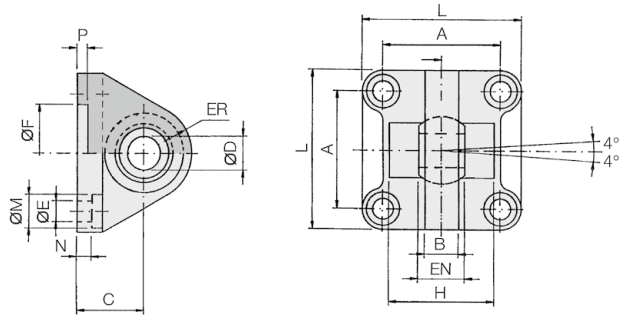
Clevis pivot bracket (E)



[mm]

Bore size [mm]	Part no.	ød2	øCK	øS5	K1	K2 (Max.)	ℓ3 (Max.)	G1	ℓ1	G2	EM	G3 (Max.)	CA	H6	R1
32	E5032	11	10	6.6	38	51	10	21	7	18	$26^{-0.2}_{-0.6}$	31	32	8	10
40	E5040	11	12	6.6	41	54	10	24	9	22	$28^{-0.2}_{-0.6}$	35	36	10	11
50	E5050	15	12	9	50	65	12	33	11	30	$32^{-0.2}_{-0.6}$	45	45	12	12
63	E5063	15	16	9	52	67	14	37	11	35	$40^{-0.2}_{-0.6}$	50	50	12	15
80	E5080	18	16	11	66	86	18	47	12.5	40	$50^{-0.2}_{-0.6}$	60	63	14	15
100	E5100	18	20	11	76	96	20	55	13.5	50	$60^{-0.2}_{-0.6}$	70	71	15	19
125	E5125	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)



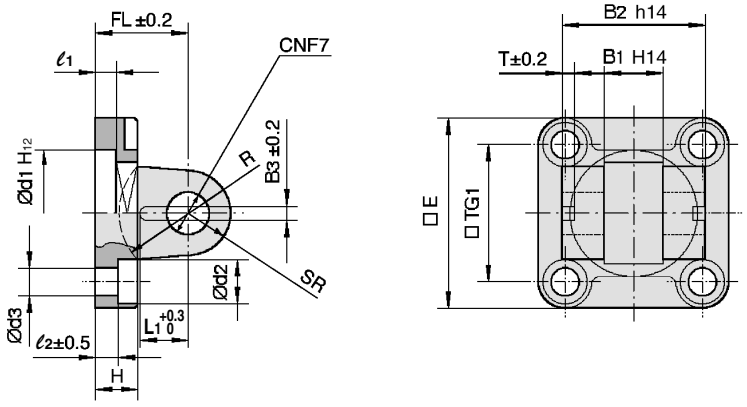
[mm]

Bore size [mm]	Part no.	A	B (Max.)	C	øDH7	EN 0 −0.1	ER (Max.)	øFH11	øE	L	øM	N	P	H ±0.5
32	CS5032	32.5	10.5	22	10	14	15	30	6.6	45	10.5	5.5	5	—
40	CS5040	38	12	25	12	16	18	35	6.6	55	11	5.5	5	—
50	CS5050	46.5	15	27	16	21	20	40	9	65	15	6.5	5	51
63	CS5063	56.5	15	32	16	21	23	45	9	75	15	6.5	5	—
80	CS5080	72	18	36	20	25	27	45	11	95	18	10	5	70
100	CS5100	89	18	41	20	25	30	55	11	115	18	10	5	—
125	CS5125	110	25	50	30	37	40	60	13.5	140	20	10	7	100

∗ Supplied with 4 mounting screws.

Dimensions: Pivot Brackets for Cylinder Mounting

Double clevis pivot bracket (DS)/for ES accessory

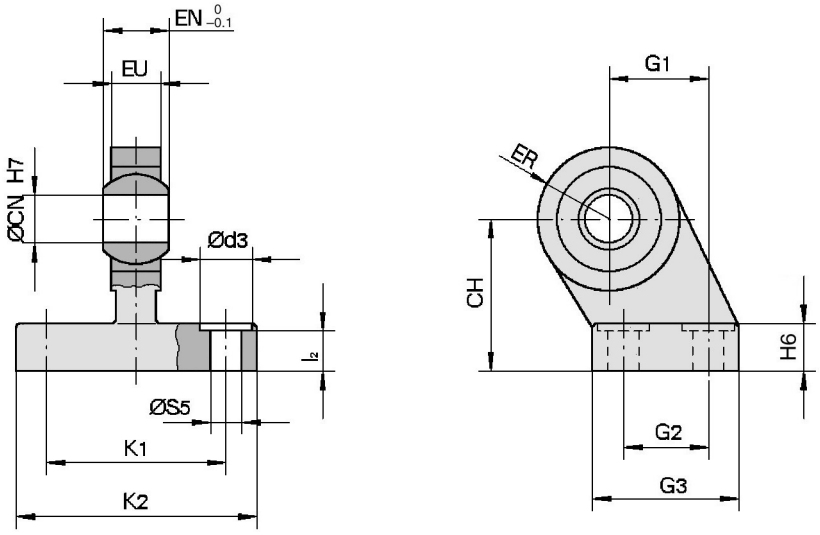


[mm]

Bore size [mm]	Part no.	E	B1	B2	B3	L1	TG1	T	ℓ1 (Min.)	ℓ2	FL	H (Max.)	ød1	ød2	ød3	øCN	SR (Max.)	R
32	**DS5032**	45	14	34	3.3	11.5	32.5	3	5	5.5	22	10	30	10.5	6.6	10	11	17
40	**DS5040**	55	16	40	4.3	12	38	4	5	5.5	25	10	35	11	6.6	12	13	20
50	**DS5050**	65	21	45	4.3	14	46.5	4	5	6.5	27	12	40	15	9	16	18	22
63	**DS5063**	75	21	51	4.3	14	56.5	4	5	6.5	32	12	45	15	9	16	18	25
80	**DS5080**	95	25	65	4.3	16	72	4	5	10	36	16	45	18	11	20	22	30
100	**DS5100**	115	25	75	6.3	16	89	4	5	10	41	16	55	18	11	20	22	32
125	**DS5125**	140	37	97	6.3	24	110	6	7	10	50	20	60	20	13.5	30	30	42

∗ Supplied with 4 mounting screws, clevis pin, and clevis pin bracket.

Clevis pivot bracket with ball joint (ES)

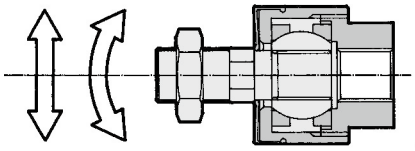


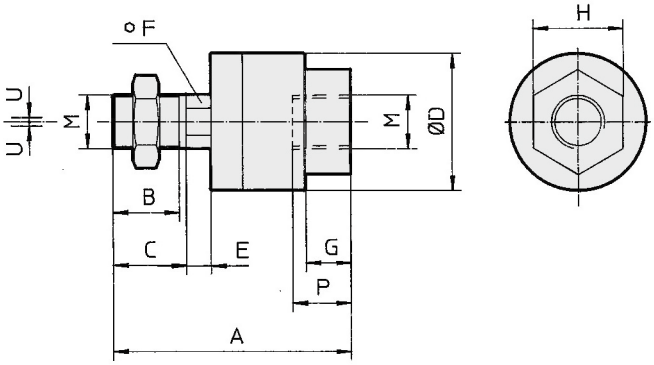
[mm]

Bore size [mm]	Part no.	ød3	øCN	øS5	K1	K2 (Max.)	ℓ2	G1	G2	G3 (Max.)	EN	EU	CH	H6	ER (Max.)
32	**ES5032**	11	10	6.6	38	51	8.5	21	18	31	14	10.5	32	10	15
40	**ES5040**	11	12	6.6	41	54	8.5	24	22	35	16	12	36	10	18
50	**ES5050**	15	16	9	50	65	10.5	33	30	45	21	15	45	12	20
63	**ES5063**	15	16	9	52	67	10.5	37	35	50	21	15	50	12	23
80	**ES5080**	18	20	11	66	86	11.5	47	40	60	25	18	63	14	27
100	**ES5100**	18	20	11	76	96	12.5	55	50	70	25	18	71	15	30
125	**ES5125**	20	30	13.5	94	124	17	70	60	90	37	25	90	20	40

Dimensions: Piston Rod Accessories

Floating joint: JA



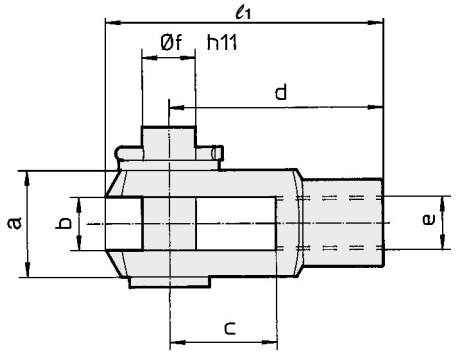


[mm]

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

∗ Black color

Rod clevis: GKM (ISO 8140)

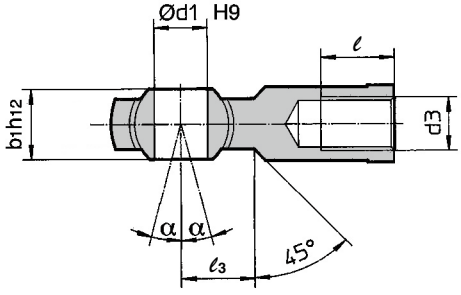


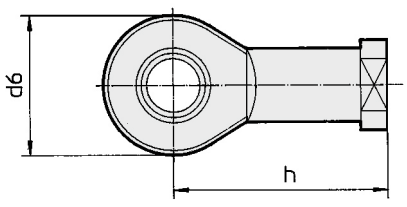
[mm]

Bore size [mm]	Part no.	e	b	d	øf h11 (Shaft)	øf H9 (Hole)	ℓ1	c (Min.)	a (Max.)
32	**GKM10-20**	M10 x 1.25	$10^{+0.5}_{+0.15}$	40	10	10	52	20	20
40	**GKM12-24**	M12 x 1.25	$12^{+0.5}_{+0.15}$	48	12	12	62	24	24
50, 63	**GKM16-32**	M16 x 1.5	$16^{+0.5}_{+0.15}$	64	16	16	83	32	32
80, 100	**GKM20-40**	M20 x 1.5	$20^{+0.5}_{+0.15}$	80	20	20	105	40	40
125	**GKM30-54**	M27 x 2	$30^{+0.5}_{+0.15}$	110	30	30	148	54	55

∗ Supplied with clevis pin and clevis pin bracket.

Rod end: KJ (ISO 8139)





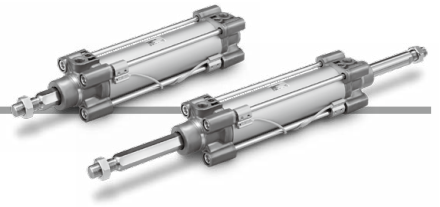
[mm]

Bore size [mm]	Part no.	d3	ød1 H9	h	d6 (Max.)	b1 h12	ℓ (Min.)	α	ℓ3
32	**KJ10D**	M10 x 1.25	10	43	28	14	20	4°	15
40	**KJ12D**	M12 x 1.25	12	50	32	16	22	4°	17
50, 63	**KJ16D**	M16 x 1.5	16	64	42	21	28	4°	23
80, 100	**KJ20D**	M20 x 1.5	20	77	50	25	33	4°	27
125	**KJ27D**	M27 x 2	30	110	70	37	51	4°	36

ISO (15552) Standard

Air Cylinder: Non-rotating Rod Type
Double Acting, Single/Double Rod
C96K Series
ø32, ø40, ø50, ø63, ø80, ø100

RoHS



How to Order

	C96K	B	32	–	100	C	W							
With auto switch	C96KD	B	32	–	100	C	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
T	Center trunnion
V	Adjustable position trunnion

∗ Mounting brackets are shipped together, but not assembled. (Excludes the center trunnion type and the adjustable position trunnion type)

Bore size

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

Cylinder stroke [mm]
Refer to "Maximum Strokes" on page 174.

Air cushion on both ends + Bumper cushion

Rod

Nil	Single rod
W	Double rod

Auto switch

Nil	Without auto switch

∗ For applicable auto switches, refer to the table below.

Number of auto switches

Nil	2
S	1
3	3
n	n

Applicable Auto Switches/Refer to the **Web Catalog** or Best Pneumatics 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	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**M9N**	—	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				**M9P**	—	●	●	●	○	○		
				2-wire		12 V		**M9B**	—	●	●	●	○	○	—	
		Terminal conduit		3-wire (NPN)		5 V, 12 V		—	**G39**	—	—	—	—	—	IC circuit	
				2-wire		12 V		—	**K39**	—	—	—	—	—	—	
	Diagnostic indication (2-color indicator)	Grommet		3-wire (NPN)		5 V, 12 V		**M9NW**	—	●	●	●	○	○	IC circuit	
				3-wire (PNP)				**M9PW**	—	●	●	●	○	○		
				2-wire		12 V		**M9BW**	—	●	●	●	○	○	—	
	Water-resistant (2-color indicator)			3-wire (NPN)		5 V, 12 V		**M9NA**∗1	—	○	○	●	○	○	IC circuit	
				3-wire (PNP)				**M9PA**∗1	—	○	○	●	○	○		
				2-wire		12 V		**M9BA**∗1	—	○	○	●	○	○	—	
	With diagnostic output (2-color indicator)			4-wire (NPN)		5 V, 12 V		**F59F**	—	●	—	●	○	○	IC circuit	
	Magnetic field resistant (2-color indicator)			2-wire (Non-polar)		—		**P4DW**	—	—	—	●	●	○	—	
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96**	—	●	—	●	—	—	IC circuit	—
			Yes	2-wire	24 V	12 V	100 V	**A93**	—	●	●	●	●	—	—	Relay, PLC
			No				100 V or less	**A90**	—	●	—	●	—	—	IC circuit	
			Yes				100 V, 200 V	**A54**	—	●	—	●	●	—	—	
			No				200 V or less	**A64**	—	●	—	●	—	—		
		Terminal conduit	Yes				—	—	**A33**	—	—	—	—	—	—	PLC
		DIN terminal					100 V, 200 V	—	**A34**	—	—	—	—	—	—	Relay, PLC
								—	**A44**	—	—	—	—	—		
	Diagnostic indication (2-color indicator)	Grommet				—	—	**A59W**	—	●	—	●	—	—		

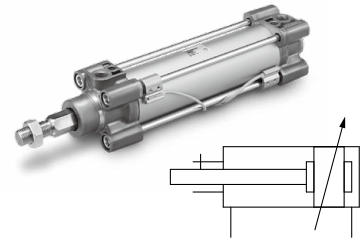
∗1 Water-resistant type auto switches can be mounted on the above models, but SMC cannot guarantee water resistance. Please contact SMC regarding water-resistant types with the above model numbers.

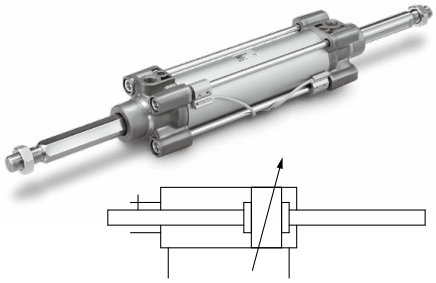
∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

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

∗ Since there are other applicable auto switches than listed above, refer to page 185 for details.
∗ The D-A9□/M9□/M9□W/M9□A auto switches are shipped together, but not assembled. (Only the auto switch mounting brackets are assembled before shipment.)
∗ The adjustable position trunnion (V) mounting bracket only supports D-A9□, M9□, M9□W, and M9□A auto switches.

SMC





Specifications

Bore size [mm]	32	40	50	63	80	100
Action	Double acting					
Fluid	Air					
Proof pressure	1.5 MPa					
Maximum operating pressure	1.0 MPa					
Minimum operating pressure	0.05 MPa					
Ambient and fluid temperatures	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					
Allowable stroke tolerance	Up to 500 stroke: $^{+2}_{0}$, 501 to 1000 stroke: $^{+2.4}_{0}$					
Cushion	Air cushion on both ends + Bumper cushion					
Port size	G 1/8	G 1/4	G 1/4	G 3/8	G 3/8	G 1/2
Mounting	Basic, Axial foot, Rod flange, Head flange, Single clevis, Double clevis, Center trunnion, Adjustable position trunnion					
Non-rotating accuracy	±0.5°		±0.5°		±0.3°	
Allowable rotational torque [N·m]	0.25	0.45	0.64		0.79	

Maximum Strokes

Bore size [mm]	Maximum stroke
32	500
40	500
50	600
63	600
80	800
100	800

∗ Aside from the standard strokes, intermediate strokes are also available in 1 mm increments and are produced upon receipt of order.
∗ Strokes exceeding the max. stroke are available as a special order.

Accessories

Mounting		Basic	Foot	Rod flange	Head flange	Single clevis	Double clevis	Center trunnion	Adjustable position trunnion
Standard	Rod end nut	●	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—	—
Option	Rod end	●	●	●	●	●	●	●	●
	Rod clevis	●	●	●	●	●	●	●	●
	Rod boot	—	—	—	—	—	—	—	—

∗ Do not use a rod end (or floating joint) together with a single clevis with a ball joint (or clevis pivot bracket with a ball joint).
∗ Refer to pages 169 to 172 for dimensions and part numbers of the accessories.

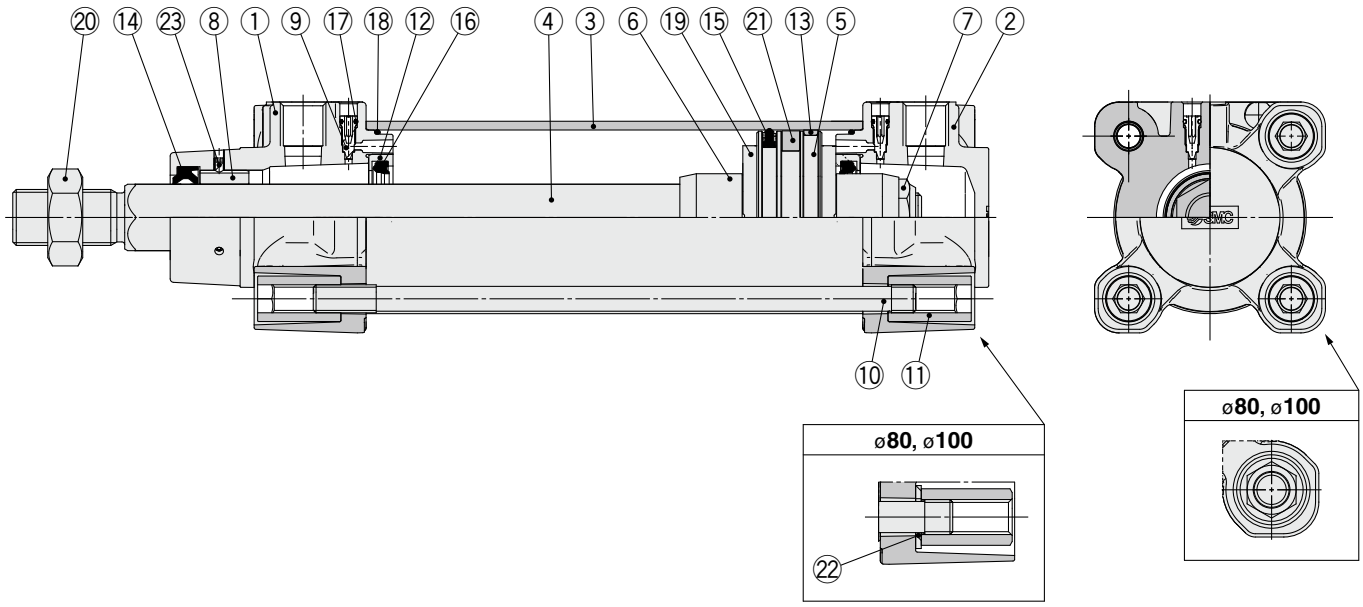
⚠ Precautions

Be sure to read this before handling the products. Refer to page 219 for safety instructions. For actuator and auto switch precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: http://www.smcworld.com

Refer to pages 181 to 185 for cylinders with auto switches.

- Auto Switch Proper Mounting Position (Detection at stroke end) and Mounting Height
- Minimum Stroke for Auto Switch Mounting
- Auto Switch Mounting Brackets/Part No.
- Operating Range

Construction



Component Parts

No.	Description	Material	Q'ty	Note
1	**Rod cover**	Aluminum die-cast	1	Trivalent chromated
2	**Head cover**	Aluminum die-cast	1	Trivalent chromated
3	**Cylinder tube**	Aluminum alloy	1	Hard anodized
4	**Piston rod**	Stainless steel	1	
5	**Piston**	Aluminum alloy	1	
6	**Cushion ring**	Rolled steel	2	Trivalent zinc chromated
7	**Piston nut**	Rolled steel	1	Trivalent zinc chromated
8	**Non-rotating guide**	Bearing alloy	1	
9	**Cushion valve**	Resin	2	
10	**Tie-rod**	Carbon steel	4	Trivalent zinc chromated
11	**Tie-rod nut**	Rolled steel	8	Trivalent zinc chromated
12	**Cushion seal holder**	Aluminum alloy	2	Anodized
13	**Wear ring**	Resin	1	
14	**Rod seal**	NBR	1	
15	**Piston seal**	NBR	1	
16	**Cushion seal**	Urethane	2	
17	**Cushion valve seal**	NBR	2	
18	**Cylinder tube gasket**	NBR	2	
19	**Bumper**	Urethane	2	
20	**Rod end nut**	Rolled steel	1	Trivalent zinc chromated
21	**Magnet**	—	(1)	
22	**Flat washer**	Steel	8	For ø80, ø100
23	**Hexagon socket head set screw**	Steel wire	2	Trivalent black zinc chromated

Replacement Parts/Seal Kit (Single rod)

Bore size [mm]	Kit no.	Contents
32	CK95-32	Kits include items ⑬ to ⑯, ⑱.
40	CK95-40	
50	CK95-50	
63	CK95-63	
80	CK95-80	
100	CK96-100	

* Seal kits consist of items ⑬ to ⑯, ⑱ 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).
  Order with the following part number when only the grease pack is needed.
  Grease pack part number: GR-S-010 (10 g), **GR-S-020** (20 g)

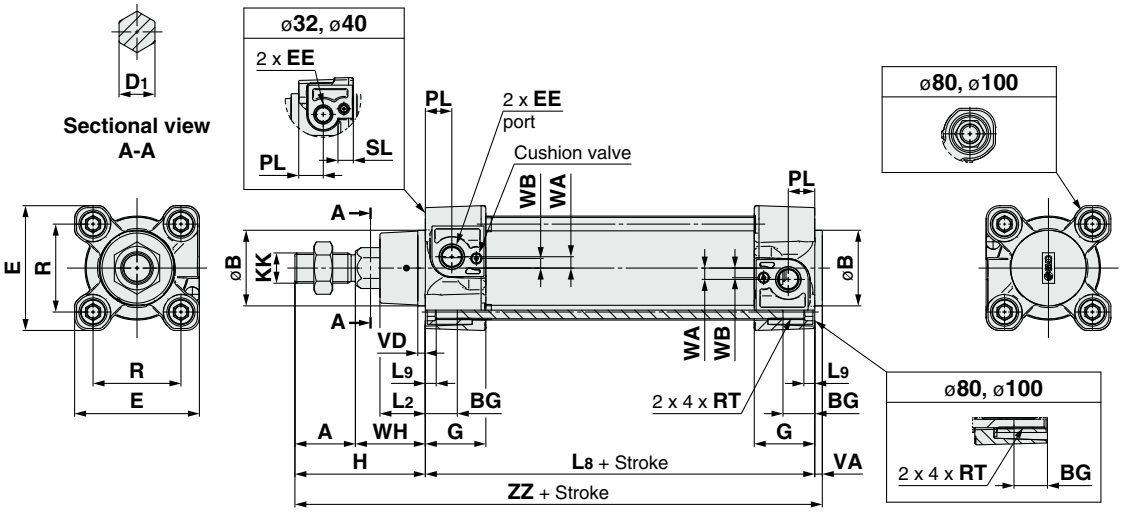
Seal Kit (Double rod)

Bore size [mm]	Kit no.	Contents
32	CK95W-32	Kits include items ⑭ to ⑯, ⑱.
40	CK95W-40	
50	CK95W-50	
63	CK95W-63	
80	CK95W-80	
100	CK96W-100	

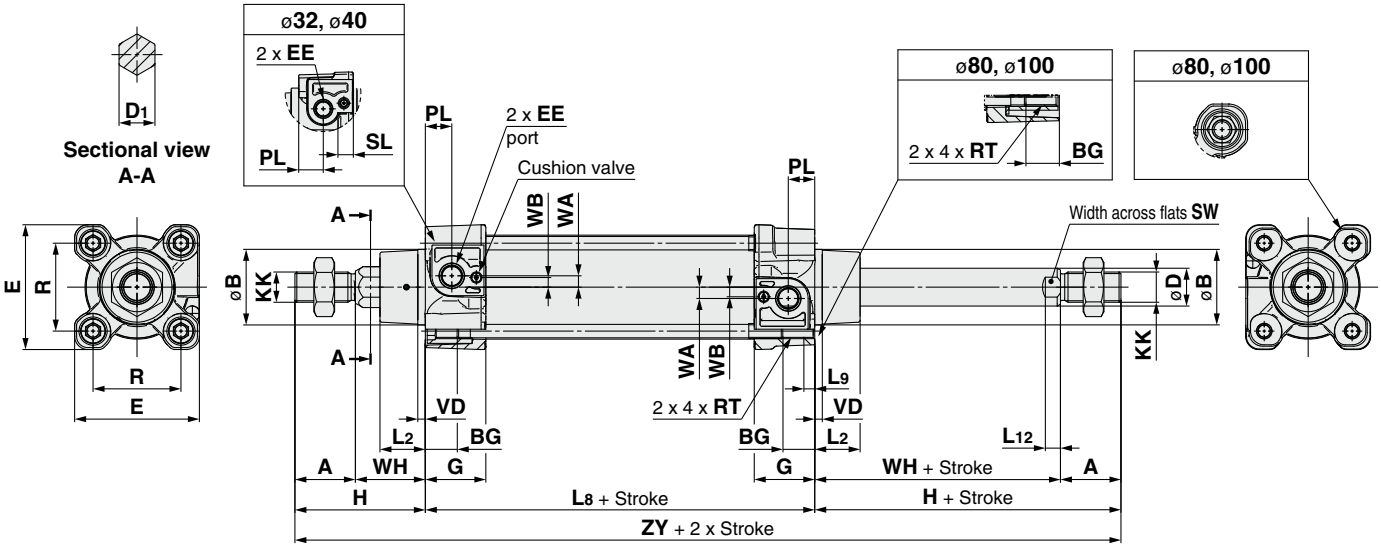
* Seal kits consist of items ⑭ to ⑯, ⑱ and can be ordered by using the seal kit number corresponding to each bore size.
* The seal kit includes a grease pack (10 g for ø32 to ø50, 20 g for ø63 and ø80, 30 g for ø100).
  Order with the following part number when only the grease pack is needed.
  Grease pack part number: GR-S-010 (10 g), **GR-S-020** (20 g)

Dimensions (Without mounting bracket)

C96K (D) B Bore size – Stroke C



C96K (D) B Bore size – Stroke CW



∗ Mounting brackets are the same as standard type. Refer to page 168 for details.

Bore size [mm]	Stroke range [mm]	A	øB d11	D1	øD	EE	PL	RT	L12	KK	SW	G	BG	L8	VD	VA	WA	WB	WH	ZZ	ZY	E	R	L2	L9	H	SL
32	Up to 500	22	30	12.2	12	G 1/8	13	M6 x 1	6	M10 x 1.25	10	28.9	16	94	4	4	4	7	26	146	190	47	32.5	15	4	48	8
40	Up to 500	24	35	14.2	16	G 1/4	14	M6 x 1	6.5	M12 x 1.25	13	32.6	16	105	4	4	5	8.9	30	163	213	54	38	17	4	54	8
50	Up to 600	32	40	19	20	G 1/4	14	M8 x 1.25	8	M16 x 1.5	17	32	16	106	4	4	6	5.1	37	179	244	66	46.5	24	5	69	—
63	Up to 600	32	45	19	20	G 3/8	16	M8 x 1.25	8	M16 x 1.5	17	38.6	16	121	4	4	9	6.3	37	194	259	77	56.5	24	5	69	—
80	Up to 800	40	45	23	25	G 3/8	16	M10 x 1.5	10	M20 x 1.5	22	38.4	17	128	4	4	11.5	6	46	218	300	99	72	30	—	86	—
100	Up to 800∗1	40	55	23	25	G 1/2	18	M10 x 1.5	10	M20 x 1.5	22	42.9	17	138	4	4	17	10	51	233	320	118	89	32	—	91	—

∗1 Minimum stroke for trunnion mounting: 1 mm for bore size 32 to 80, 5 mm for bore size 100

ISO (15552) Standard

Smooth Cylinder
Double Acting, Single Rod
C96Y Series
ø32, ø40, ø50, ø63, ø80, ø100, ø125



RoHS

How to Order

C96Y **B** **32** – **100** **C** – ☐

With auto switch **C96YD** **B** **32** – **100** **C** – **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
T	Center trunnion
V	Adjustable position trunnion

∗ Mounting brackets are shipped together, but not assembled. (Excludes the center trunnion type and the adjustable position trunnion type)

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 "Maximum Strokes" on page 178.

Cushion

Symbol	Cushion	Bore size [mm]
C	Bumper cushion	ø32 to ø100
Nil	Without cushion	ø125

Auto switch

Nil	Without auto switch

∗ For applicable auto switches, refer to the table below.

Number of auto switches

Nil	2
S	1
3	3
n	n

Made to Order
Refer to page 178 for details.

Applicable Auto Switches/Refer to the **Web Catalog** or Best Pneumatics for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Tie-rod mounting	Auto switch model: Band mounting	Lead wire length [m]: 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	**M9N**	—	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)			**M9P**	—	●	●	●	○	○		
				2-wire	12 V		**M9B**	—	●	●	●	○	○		
		Terminal conduit		3-wire (NPN)	5 V, 12 V		—	**G39**	—	—	—	—	—	IC circuit	
				2-wire	12 V		—	**K39**	—	—	—	—	—	—	
	Diagnostic indication (2-color indicator)	Grommet		3-wire (NPN)	5 V, 12 V		**M9NW**	—	●	●	●	○	○	IC circuit	
				3-wire (PNP)			**M9PW**	—	●	●	●	○	○		
				2-wire	12 V		**M9BW**	—	●	●	●	○	○	—	
	Water-resistant (2-color indicator)			3-wire (NPN)	5 V, 12 V		**M9NA**∗1	—	○	○	●	○	○	IC circuit	
				3-wire (PNP)			**M9PA**∗1	—	○	○	●	○	○		
				2-wire	12 V		**M9BA**∗1	—	○	○	●	○	○	—	
	With diagnostic output (2-color indicator)			4-wire (NPN)	5 V, 12 V		**F59F**	—	●	—	●	○	○	IC circuit	
	Magnetic field resistant (2-color indicator)			2-wire (Non-polar)	—		**P4DW**	—	—	—	●	●	○	—	
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96**	—	●	—	●	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	**A93**	—	●	●	●	●	—	—	
			No				100 V or less	**A90**	—	●	—	●	—	IC circuit	Relay, PLC
			Yes				100 V, 200 V	**A54**	—	●	—	●	●	—	
			No				200 V or less	**A64**	—	●	—	●	—	—	
		Terminal conduit	Yes				—	—	**A33**	—	—	—	—	—	PLC
							—	**A34**	—	—	—	—	—	—	
		DIN terminal					100 V, 200 V	—	**A44**	—	—	—	—	—	Relay, PLC
	Diagnostic indication (2-color indicator)	Grommet				—	—	**A59W**	—	●	—	●	—	—	

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

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

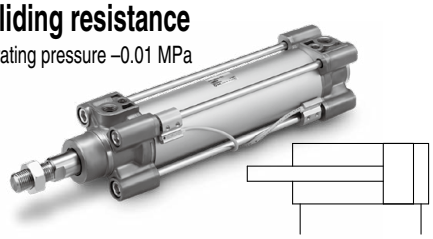
∗ Solid state auto switches marked with "○" are produced upon receipt of order.

∗ Since there are other applicable auto switches than listed above, refer to page 185 for details.
∗ The D-A9□/M9□/M9□W/M9□A auto switches are shipped together, but not assembled. (Only the auto switch mounting brackets are assembled before shipment.)
∗ The adjustable position trunnion (V) mounting bracket only supports D-A9□, M9□, M9□W, and M9□A auto switches.

Designed with a low sliding resistance of the piston, this air cylinder is ideal for applications such as contact pressure control, which requires smooth movements at low pressure.

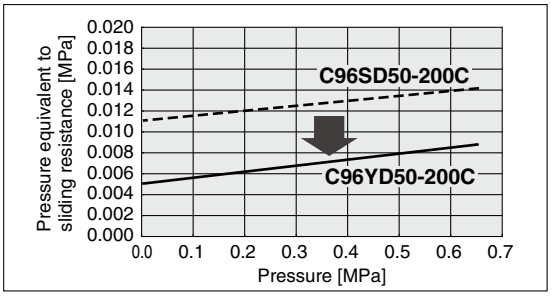
Low sliding resistance

Min. operating pressure –0.01 MPa



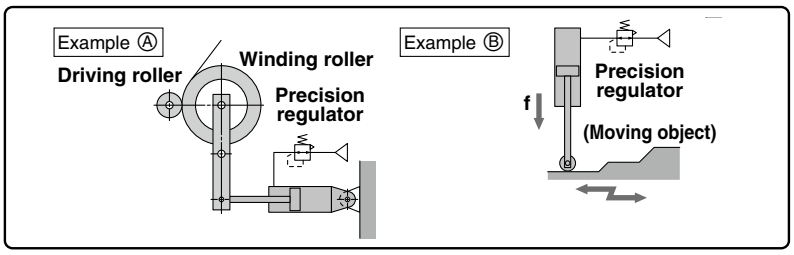
Sliding resistance Bi-directional low-friction operation possible.

Pressure can be controlled regardless of its direction.



Application Example

Smooth cylinder combined with precision regulator (e.g. IR Series)



Made to Order

Made to Order

(For details, refer to pages 190 to 199.)

Symbol	Specifications
-XA□	Change of rod end shape
-XC14	Change of trunnion bracket mounting position
-XC7	Tie-rod, tie-rod nut, etc. made of stainless steel
-XC10	Dual stroke cylinder/Double rod type
-XC65	Made of stainless steel (Combination of -XC7 and -XC68)
-XC68	Made of stainless steel (with hard chrome plated piston rod)

Refer to pages 181 to 185 for cylinders with auto switches.

- Auto Switch Proper Mounting Position (Detection at stroke end) and Mounting Height
- Minimum Stroke for Auto Switch Mounting
- Auto Switch Mounting Brackets/Part No.
- Operating Range

Dimensions are the same as standard type. For details, refer to pages 165 to 167.

Replacement Parts/Seal Kit

Bore size [mm]	Kit no.	Contents
32	C96Y32-PS	Rod seal 1 pc. Piston seal 1 pc. Cylinder tube gasket 2 pcs. Grease pack (10 g) 1 pc.
40	C96Y40-PS	
50	C96Y50-PS	
63	C96Y63-PS	
80	C96Y80-PS	
100	C96Y100-PS	
125	C96Y125-PS	

∗ Seal kits consist of items shown above, and can be ordered by using the seal kit number corresponding to each bore size.

∗ Only use the grease recommended by SMC. Order using the following part numbers when only maintenance grease is needed.

Volume	Part no.
5 g	GR-L-005
10 g	GR-L-010
150 g	GR-L-150

Specifications

Bore size [mm]		32	40	50	63	80	100	125
Action		Double acting						
Fluid		Air						
Proof pressure		1.05 MPa						
Maximum operating pressure		0.7 MPa						
Minimum operating pressure		0.02 MPa		0.01 MPa				
Ambient and fluid temperatures		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		5 to 500 mm/s						
Allowable stroke tolerance	**Up to 500**	$^{+2}_{0}$						$^{+1.0}_{0}$
	501 to 1000	$^{+2.4}_{0}$						$^{+1.4}_{0}$
Cushion		Bumper						
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, Adjustable position trunnion						
Allowable leakage rate		0.5 L/min (ANR)						

Maximum Strokes

Bore size [mm]	Maximum stroke
32	800
40	800
50	1000
63	1000
80	1000
100	1000
125	1000

∗ Aside from the standard strokes, intermediate strokes are also available in 1 mm increments and are produced upon receipt of order.

∗ Strokes exceeding the max. stroke are available as a special order.

Accessories

Mounting		Basic	Foot	Rod flange	Head flange	Single clevis	Double clevis	Center trunnion	Adjustable position trunnion
Standard	Rod end nut	●	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—	—
Option	Rod end	●	●	●	●	●	●	●	●
	Rod clevis	●	●	●	●	●	●	●	●
	Rod boot	—	—	—	—	—	—	—	—

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

∗ Refer to pages 169 to 172 for dimensions and part numbers of the accessories.

Smooth Cylinders
Specific Product Precautions 1

Be sure to read this before handling the products. Refer to page 219 for safety instructions. For actuator and auto switch precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: http://www.smcworld.com

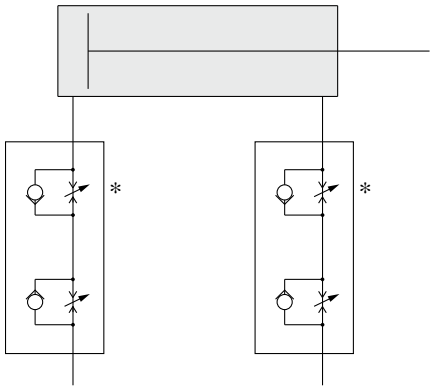
Recommended Pneumatic Circuit

Refer to the diagrams below when controlling speed with the smooth cylinder.

⚠Warning

Horizontal Operation (Speed control)

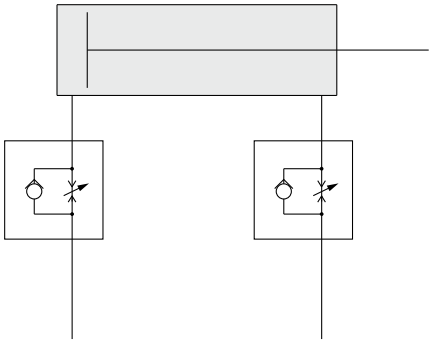
Ⅰ



Dual speed controller

Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.* More stable low speed operation can be achieved than meter-in circuit alone.

Ⅱ

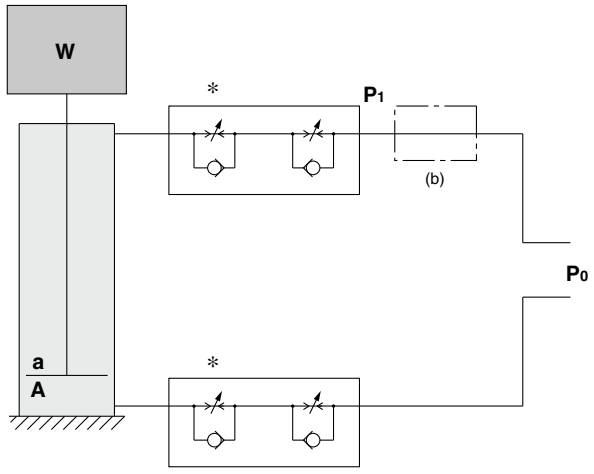


Meter-in speed controller

Meter-in speed controllers can reduce lurching while controlling the speed. The two adjustment needles facilitate adjustment.

Vertical Operation (Speed control)

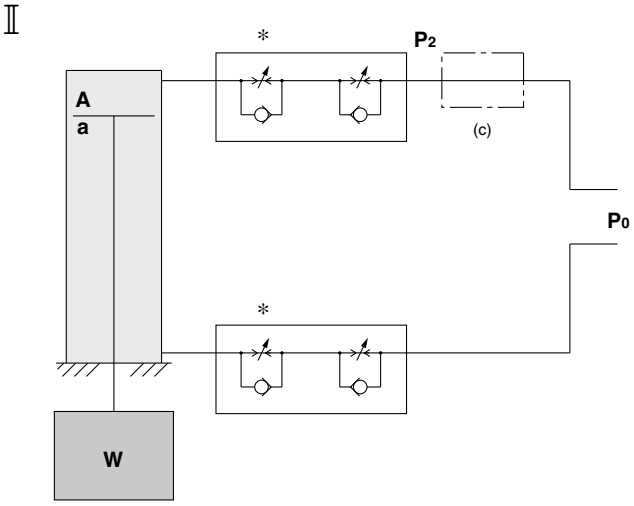
Ⅰ



(1) Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.*

(2) Depending on the size of the load, installing a regulator with check valve at position (b) can reduce lurching during descent and operation delay during ascent.
As a guide,
when **W + P0a > P0A**,
adjust **P1** to make **W + P1a = P0A**.

Ⅱ



(1) Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.*

(2) Installing a regulator with check valve at position (c) can reduce lurching during descent and operation delay during ascent.
As a guide,
adjust **P2** to make **W + P2A = P0a**.

W: Load [N] **P0**: Operating pressure [MPa] **P1**, **P2**: Reduced pressure [MPa] **a**: Rod side piston area [mm²] **A**: Head side piston area [mm²]

Smooth Cylinders
Specific Product Precautions 2

Be sure to read this before handling the products. Refer to page 219 for safety instructions. For actuator and auto switch precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: http://www.smcworld.com

Lubrication

⚠Caution

1. Operate without lubrication from a pneumatic system lubricator.

A malfunction may occur when lubricated in this fashion.

2. Only use the grease recommended by SMC.

The use of grease other than the specified type can cause a malfunction.

- Order using the following part numbers when only maintenance grease is needed.

Grease

Volume	Part no.
5 g	GR-L-005
10 g	GR-L-010
150 g	GR-L-150

3. Do not wipe out the grease in the sliding part of the air cylinder.

Wiping grease from the sliding part of the air cylinder forcefully may cause malfunction.

Air Supply

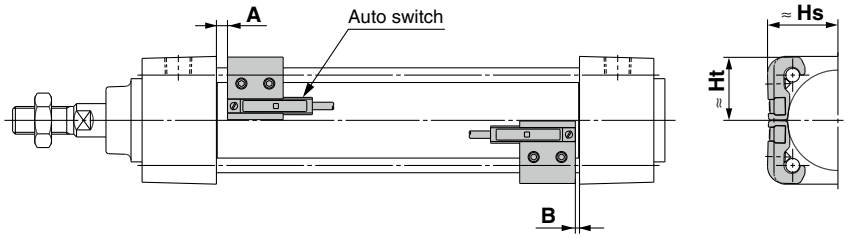
⚠Caution

1. Take measures to prevent pressure fluctuation.

A malfunction may occur with the fluctuation of pressure.

C96 Series
Auto Switch Mounting

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



Auto Switch Proper Mounting Position

[mm]

Auto switch model / Bore size	D-M9□(V) D-M9□W(V) D-M9□A(V)		D-A9□(V)		D-F5□ D-F5□W D-J59 D-J59W D-F59F D-F5BAL		D-F5NTL		D-A5□ D-A6□		D-A59W		D-Y59□ D-Y69□ D-Y7P(V) D-Y7□W(V) D-Y7BAL D-Z7□ D-Z80		D-G39 D-K39 D-A3□ D-A44		D-P4DW	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
32	14	10.5	10	6.5	10.5	7	15.5	12	4	0	8	4.5	7.5	4	4	0	7	3.5
40	14	14	10	10	10.5	10.5	15.5	15.5	4	4	8	8	7.5	7.5	4	4	7	7
50	15.5	14.5	11.5	10.5	12	11	17	16	5.5	4.5	9.5	8.5	9	8	5.5	4.5	8.5	7.5
63	16.5	15.5	12.5	11.5	13	12	18	17	6.5	5.5	10.5	9.5	10	9	6.5	5.5	9.5	8.5
80	21.5	18	17.5	14	18	14.5	23	19.5	11.5	8	15.5	12	15	11.5	11.5	8	14.5	11
100	21.5	19	17.5	15	18	15.5	23	20.5	11.5	9	15.5	13	15	12.5	11.5	9	14.5	12
125	16	16	12	12	12.5	12.5	17.5	17.5	6	6	10	10	9.5	9.5	6	6	9	9

∗ Adjust the auto switch after confirming the operating conditions in the actual setting.

Auto Switch Mounting Height

[mm]

Auto switch model / Bore size	D-M9□ D-M9□W D-M9□A D-A9□		D-M9□V D-M9□WV D-M9□AV D-A9□V		D-F5□ D-F5□W D-J59 D-J59W D-F59F D-F5BAL D-F5NTL		D-A5□ D-A6□ D-A59W		D-Y59□ D-Y7P D-Y7□W D-Y7BAL D-Z7□ D-Z80		D-Y69□ D-Y7PV D-Y7□WV		D-G39 D-K39 D-A3□		D-A44		D-P4DW	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
32	24.5	23	30.5	23	32.5	25	35	24.5	25.5	23	26.5	23	67	27.5	77	27.5	38	31
40	28.5	25.5	34	25.5	36.5	27.5	38.5	27.5	29.5	26	30	26	71.5	27.5	81.5	27.5	42	33
50	33.5	31	38.5	31	41	34	43.5	34.5	33.5	31	34.5	31	77	—	87	—	46.5	39
63	38.5	36	43	36	46	39	48.5	39.5	39	36	40	36	83.5	—	93.5	—	51.5	44
80	46.5	45	52	45	52.5	46.5	55	46.5	47.5	45	48.5	45	92.5	—	103	—	58	51.5
100	54	53.5	59.5	53.5	59.5	55	62	55	55.5	53.5	56.5	53.5	103	—	113.5	—	65.5	60.5
125	65.5	64.5	71	64.5	70.5	66.5	71.5	66.5	67.5	65	68.5	65	116	—	126	—	76.5	72

Minimum Stroke for Auto Switch Mounting

[mm]

Auto switch model	Number of auto switches	Support bracket other than center trunnion					
		ø32	ø40	ø50	ø63	ø80, ø100	ø125
D-M9□ D-M9□W	2 (Different surfaces, Same surface) 1	10					15
	n	10 + 40 (n – 2) /2 n = 2,4, 6, 8···					15 + 40 (n – 2) /2 n = 2, 4, 6, 8···
D-M9□V D-M9□WV	2 (Different surfaces, Same surface) 1	10					
	n	10 + 30 (n – 2) /2 n = 2, 4, 6, 8···					
D-M9□A	2 (Different surfaces, Same surface) 1	15	10				15
	n	15 + 40 (n – 2) /2 n = 2, 4, 6, 8···	10 + 40 (n – 2) /2 n = 2, 4, 6, 8···				15 + 40 (n – 2) /2 n = 2, 4, 6, 8···
D-M9□AV	2 (Different surfaces, Same surface) 1	10					15
	n	10 + 30 (n – 2) /2 n = 2, 4, 6, 8···					15 + 30 (n – 2) /2 n = 2, 4, 6, 8···
D-A9□	2 (Different surfaces, Same surface) 1	10					15
	n	10 + 40 (n – 2) /2 n = 2, 4, 6, 8···					15 + 40 (n – 2) /2 n = 2, 4, 6, 8···
D-A9□V	2 (Different surfaces, Same surface) 1	10					
	n	10 + 30 (n – 2) /2 n = 2, 4, 6, 8···					
D-F5□ D-F5□W D-J59 D-J59W D-F5BAL D-F59F	1	10					25
	2 (Different surfaces, Same surface)	15					25
	n	15 + 55 (n – 2) /2 n = 2, 4, 6, 8···					25 + 55 (n – 2) /2 n = 2, 4, 6, 8···
D-F5NTL	1	10				20	30
	2 (Different surfaces, Same surface)	15				20	30
	n	15 + 55 (n – 2) /2 n = 2, 4, 6, 8···				20 + 55 (n – 2) /2 n = 2, 4, 6, 8···	30 + 55 (n – 2) /2 n = 2, 4, 6, 8···
D-A5□ D-A6□	2 (Different surfaces, Same surface) 1	15				10	20
	n	15 + 55 (n – 2) /2 n = 2, 4, 6, 8···				10 + 55 (n – 2) /2 n = 2, 4, 6, 8···	20 + 55 (n – 2) /2 n = 2, 4, 6, 8···
D-A59W	1	15				25	
	2 (Different surfaces, Same surface)	20			15		25
	n	20 + 55 (n – 2) /2 n = 2, 4, 6, 8···			15 + 55 (n – 2) /2 n = 2, 4, 6, 8···		25 + 55 (n – 2) /2 n = 2, 4, 6, 8···
D-Y59□ D-Y7P D-Y7□W D-Z7□ D-Z80	2 (Different surfaces, Same surface) 1	15	10				15
	n	15 + 40 (n – 2) /2 n = 2, 4, 6, 8···	10 + 40 (n – 2) /2 n = 2, 4, 6, 8···				15 + 40 (n – 2) /2 n = 2, 4, 6, 8···
D-Y69□ D-Y7PV D-Y7□WV	2 (Different surfaces, Same surface) 1	10					
	n	10 + 30 (n – 2) /2 n = 2, 4, 6, 8···					
D-Y7BAL	2 (Different surfaces, Same surface) 1	20					
	n	20 + 45 (n – 2) /2 n = 2, 4, 6, 8···					
D-P4DW	2 (Different surfaces, Same surface) 1	15					20
	n	15 + 65 (n – 2) /2 n = 2, 4, 6, 8···					20 + 65 (n – 2) /2 n = 2, 4, 6, 8···
D-G39 D-K39 D-A3□	1	10					
	2 (Different surfaces)	35					
	2 (Same surface)	100					
	n (Different surfaces)	35 + 30 (n – 2) n = 2, 3, 4, 5···					
	n (Same surface)	100 + 100 (n – 2) n = 2, 3, 4, 5···					
D-A44	1	10					
	2 (Different surfaces)	35					
	2 (Same surface)	50					
	n (Different surfaces)	35 + 30 (n – 2) n = 2, 3, 4, 5···					
	n (Same surface)	50 + 50 (n – 2) n = 2, 3, 4, 5···					

∗ n = 3, 4, 5···

Minimum Stroke for Auto Switch Mounting

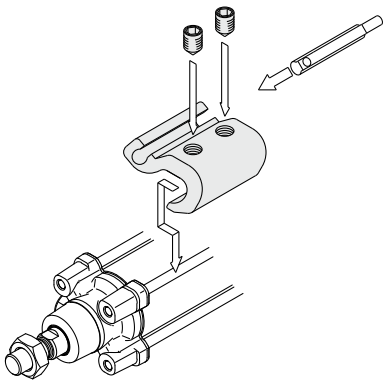
[mm]

Auto switch model	Number of auto switches	Center trunnion						
		ø32	ø40	ø50	ø63	ø80	ø100	ø125
D-M9□ D-M9□W	2 (Different surfaces, Same surface) 1	75			85	90	95	105
	n	75 + 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···
D-M9□V D-M9□WV	2 (Different surfaces, Same surface) 1	50	55		60	65	70	80
	n	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···
D-M9□A	2 (Different surfaces, Same surface) 1	80			85	95	100	110
	n	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···	110 + 40 (n – 4) /2 n = 4, 8, 12, 16···
D-M9□AV	2 (Different surfaces, Same surface) 1	55			65	70	75	85
	n	55 + 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···
D-A9□	2 (Different surfaces, Same surface) 1	70	75		80	85	95	100
	n	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···
D-A9□V	2 (Different surfaces, Same surface) 1	45	50		55	60	70	75
	n	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···
D-F5□ D-F5□W D-J59 D-J59W D-F5BAL D-F59F	1	90	95		100	110	115	130
	2 (Different surfaces, Same surface)	90	95		100	110	115	130
	n	90 + 55 (n – 4) /2 n = 4, 8, 12, 16···	95 + 55 (n – 4) /2 n = 4, 8, 12, 16···		100 + 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···	130 + 55 (n – 4) /2 n = 4, 8, 12, 16···
D-F5NTL	1	100	105		110	120	125	140
	2 (Different surfaces, Same surface)	100	105		110	120	125	140
	n	100 + 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···	120 + 55 (n – 4) /2 n = 4, 8, 12, 16···	125 + 55 (n – 4) /2 n = 4, 8, 12, 16···	140 + 55 (n – 4) /2 n = 4, 8, 12, 16···
D-A5□ D-A6□	2 (Different surfaces, Same surface) 1	60		80	95	105	110	130
	n	60 + 55 (n – 4) /2 n = 4, 8, 12, 16···		80 + 55 (n – 4) /2 n = 4, 8, 12, 16···	95 + 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···	130 + 55 (n – 4) /2 n = 4, 8, 12, 16···
D-A59W	1	60	70	85	105	110	115	140
	2 (Different surfaces, Same surface)	60	70	85	105	110	115	140
	n	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···	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···	140 + 55 (n – 4) /2 n = 4, 8, 12, 16···
D-Y59□ D-Y7P D-Y7□W D-Z7□ D-Z80	2 (Different surfaces, Same surface) 1	75	80		85	95	100	105
	n	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···	105 + 40 (n – 4) /2 n = 4, 8, 12, 16···
D-Y69□ D-Y7PV D-Y7□WV	2 (Different surfaces, Same surface) 1	55			60	70	75	85
	n	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···	85 + 30 (n – 4) /2 n = 4, 8, 12, 16···
D-Y7BAL	2 (Different surfaces, Same surface) 1	85	90		100	105	110	115
	n	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···
D-P4DW	2 (Different surfaces, Same surface) 1	110			115	125	130	150
	n	110 + 65 (n – 4) /2 n = 4, 8, 12, 16···			115 + 65 (n – 4) /2 n = 4, 8, 12, 16···	125 + 65 (n – 4) /2 n = 4, 8, 12, 16···	130 + 65 (n – 4) /2 n = 4, 8, 12, 16···	150 + 65 (n – 4) /2 n = 4, 8, 12, 16···
D-G39 D-K39 D-A3□	1	60	65		75	80	85	90
	2 (Different surfaces)	60	65		75	80	85	90
	2 (Same surface)	90	95		100	105	110	125
	n (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···
	n (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···
D-A44	1	70			75	80	85	90
	2 (Different surfaces)	70			75	80	85	90
	2 (Same surface)	70			75	80	85	90
	n (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···
	n (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···

∗ n = 3, 4, 5···

Auto Switch Mounting Brackets/Part No.

Auto switch model	Bore size [mm]						
	32	40	50	63	80	100	125
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV D-A9□/A9□V	BMB5-032	BMB5-032	BA7-040	BA7-040	BA7-063	BA7-063	BA7-080
D-F5□/F5□W D-J59/J59W D-F5BAL D-F59F/F5NTL D-A5□/A6□ D-A59W	BT-03	BT-03	BT-05	BT-05	BT-06	BT-06	BT-08
D-Y59□/Y69□ D-Y7P(V)/Y7□W(V) D-Y7BAL D-Z7□/Z80	BMB4-032	BMB4-032	BMB4-050	BMB4-050	BA4-063	BA4-063	BA4-080
D-G39/K39 D-A3□/A44	BMB2-032	BMB2-040	BMB1-050	BMB1-063	BMB1-080	BMB1-100	BS1-125
D-P4DW	BMB3T-040	BMB3T-040	BMB3T-050	BMB3T-050	BMB3T-080	BMB3T-080	BAP2T-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

∗ For details on BBA1, refer to the **Web Catalog** or Best Pneumatics.
The D-F5BA auto 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.

∗ When using the 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.

∗ When selecting the adjustable position trunnion (V) mounting bracket for use with D-M9□(V), M9□W(V), M9□A(V), and A9□(V) auto switches, suffix a "V" to the end of the auto switch mounting bracket part number.
For example, for the type for a bore size ø32 cylinder, use the part number "BMB5-032V."

Operating Range

[mm]

Auto switch model	Bore size						
	32	40	50	63	80	100	125
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	4	4.5	5	6	6	6	7
D-A9□/A9□V	7	7.5	8.5	9.5	9.5	10.5	12
D-F5□/F5□W D-J59/J59W D-F5BAL D-F59F/F5NTL	3.5	4	4	4.5	4.5	4.5	5
D-A5□/A6□	9	9	10	11	11	11	10
D-A59W	13	13	13	14	14	15	17
D-Y59□/Y69□ D-Y7P(V)/Y7□W(V) D-Y7BAL	5.5	5.5	7	7.5	6.5	5.5	7
D-Z7□/Z80	7.5	8.5	7.5	9.5	9.5	10.5	13
D-G39/K39	9	9	9	10	10	11	11
D-A3□/A44	9	9	10	11	11	11	10
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 **Web Catalog** or Best Pneumatics for the detailed specifications.

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

* Normally closed (NC = b contact) solid state auto switches (D-M9□E(V)/Y7G/Y7H) are also available. For details, refer to the **Web Catalog** or Best Pneumatics.
* With pre-wired connector is also available for solid state auto switches. For details, refer to the **Web Catalog** or Best Pneumatics.

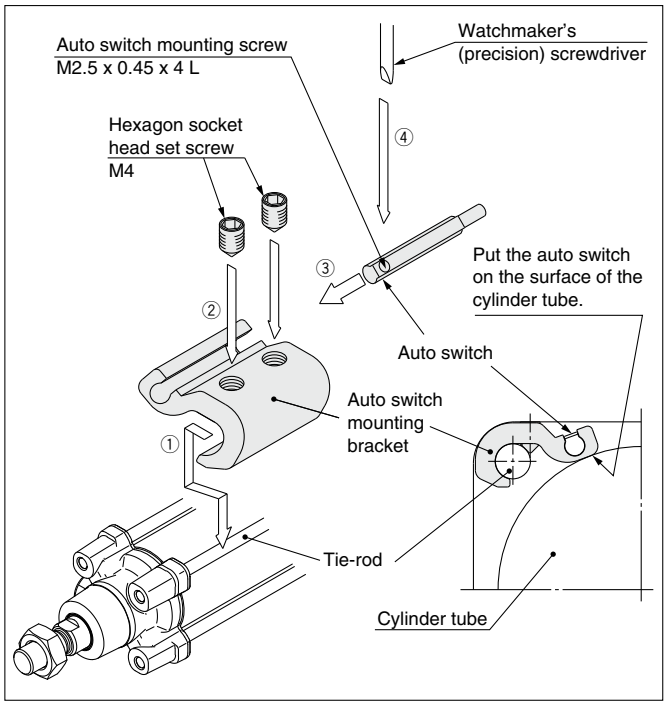
C96 Series
How to Mount and Move the Auto Switch

Mounting Bracket Tie-rod Mounting Type

<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.

∗ 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.
∗ Set the tightening torque of a hexagon socket head set screw (M4) to be 1.0 to 1.2 N·m.
∗ When tightening an auto switch mounting screw (M2.5), 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)

Applicable bore size [mm]						
32	**40**	**50**	**63**	**80**	**100**	**125**
BMB5 -032	BMB5 -032	BA7 -040	BA7 -040	BA7 -063	BA7 -063	BA7 -080

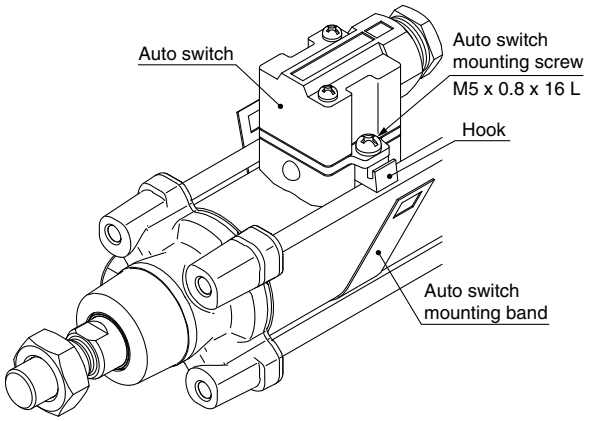
∗ When using the D-M9□A(V), please order stainless steel screw set BBA1 separately (page 184), and use the stainless steel set screws, after selecting set screws of the appropriate length for the cylinder series—as shown in the table above.
∗ Color or gloss differences in the metal surfaces have no effect 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.
∗ When selecting the adjustable position trunnion (V) mounting bracket for use with D-M9□(V), M9□W(V), M9□A(V), and A9□(V) auto switches, suffix a "V" to the end of the auto switch mounting bracket part number.
For example, for the type for a bore size ø32 cylinder, use the part number "BMB5-032V."

<Applicable Auto Switch>

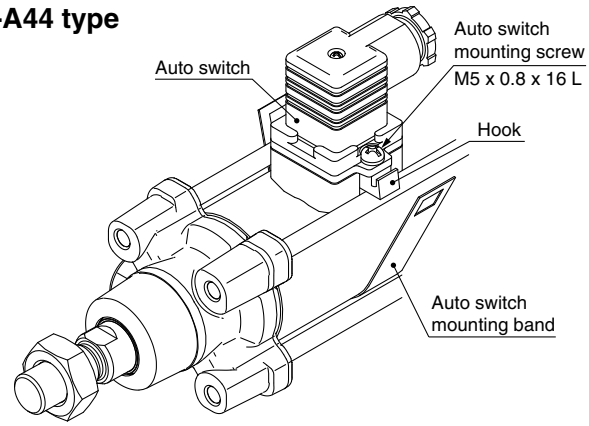
Solid state switch ··· D-G39, D-K39
Reed switch ····· D-A33, D-A34, D-A44

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. When changing the detecting position, carry out in the state of 3.

Auto Switch Mounting Bracket Part No. (Band)

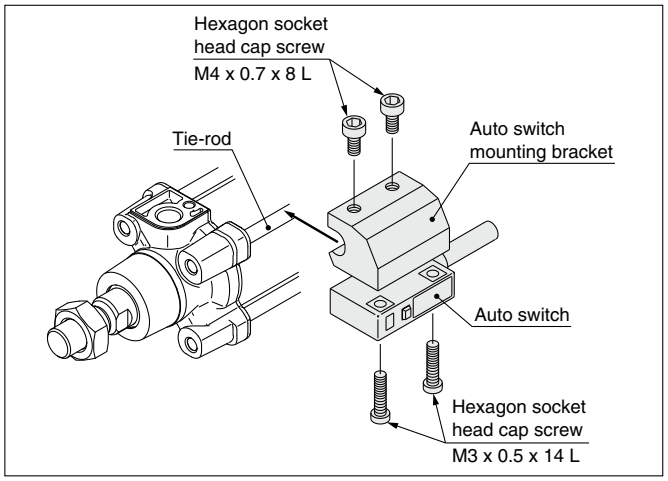
Applicable bore size [mm]						
32	**40**	**50**	**63**	**80**	**100**	**125**
BMB2 -032	BMB2 -040	BMB1 -050	BMB1 -063	BMB1 -080	BMB1 -100	BS1 -125

Mounting Bracket Tie-rod Mounting Type

<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.)

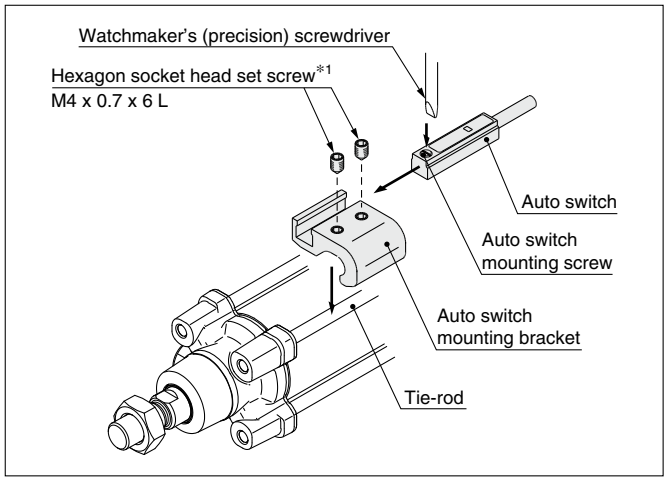
Auto Switch Mounting Bracket Part No. (Including Bracket, Screw)

Applicable bore size [mm]						
32	**40**	**50**	**63**	**80**	**100**	**125**
BMB3T -040	BMB3T -040	BMB3T -050	BMB3T -050	BMB3T -080	BMB3T -080	BAP2T -080

<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



* **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)

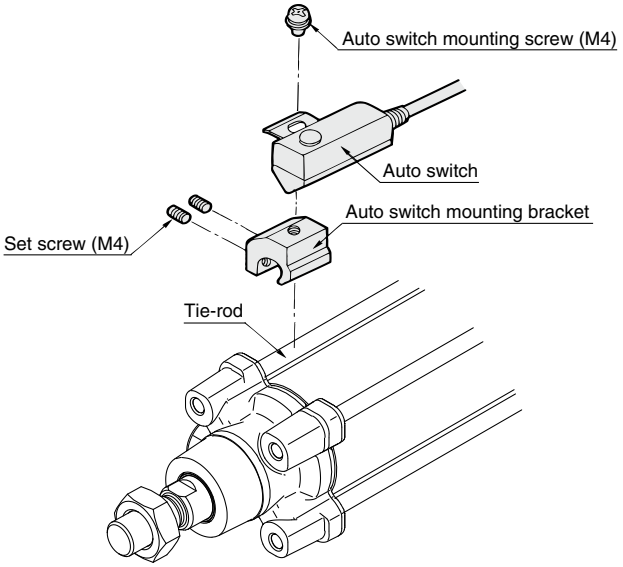
Applicable bore size [mm]						
32	**40**	**50**	**63**	**80**	**100**	**125**
BMB4 -032	BMB4 -032	BMB4 -050	BMB4 -050	BA4 -063	BA4 -063	BA4 -080

*1 When using the D-Y7BA, please order stainless steel screw set BBA1 separately (page 184), 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.

Mounting Bracket Tie-rod Mounting Type

<Applicable Auto Switch>

Solid state switch ··· D-F59, D-F5P
D-J59, 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)

Applicable bore size [mm]						
32	**40**	**50**	**63**	**80**	**100**	**125**
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

The D-F5BA auto 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

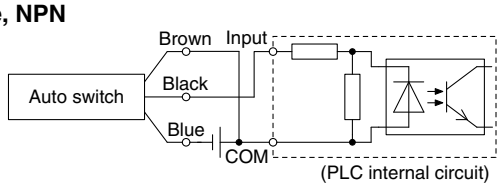
Part no.	Contents				Applicable auto switch mounting bracket part no.	Applicable auto switch
	No.	Description	Size	Q'ty		
BBA1	1	Auto switch mounting screw	M4 x 0.7 x 8 L	1	BT-□□	D-A5, A6 D-F5, J5
	2	Set screw	M4 x 0.7 x 6 L	2	BT-03, BT-04, BT-05 BT-06, BT-08, BT-12	D-A5, A6 D-F5, J5
					BA4-040, BA4-063, BA4-080 BMB4-032, BMB4-050	D-Z7, Z8 D-Y5, Y6, Y7
					BMB5-032 BA7-040, BA7-063, BA7-080	D-A9 D-M9
	3	Set screw	M4 x 0.7 x 8 L	2	BT-16, BT-18A, BT-20	D-A5, A6 D-F5, J5
					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

∗ 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.

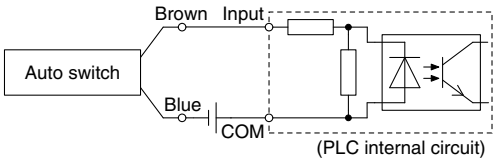
Prior to Use
Auto Switch Connections and Examples

Sink Input Specifications

3-wire, NPN

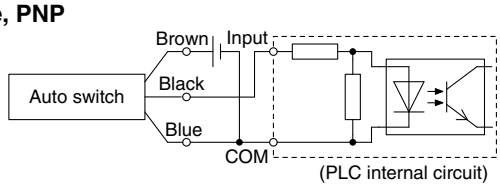


2-wire

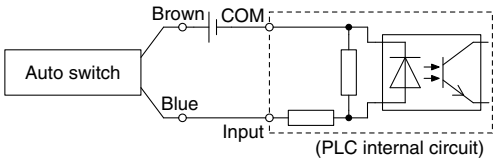


Source Input Specifications

3-wire, PNP



2-wire



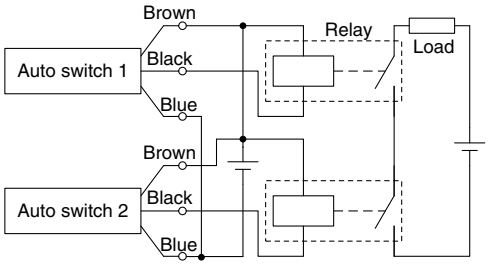
Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

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

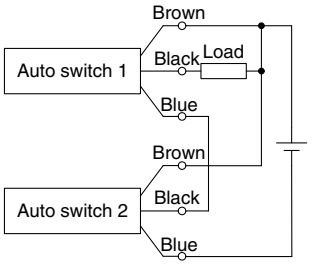
∗ When using solid state auto switches, ensure the application is set up so the signals for the first 50 ms are invalid.

3-wire AND connection for NPN output

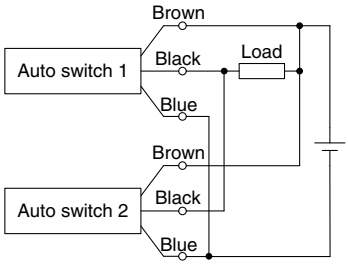
(Using relays)



(Performed with auto switches only)

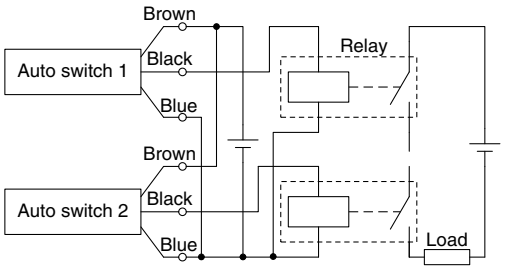


3-wire OR connection for NPN output

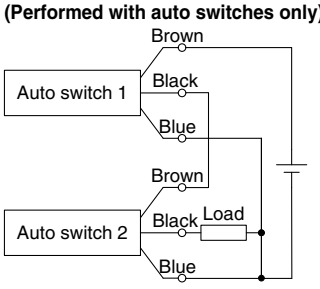


3-wire AND connection for PNP output

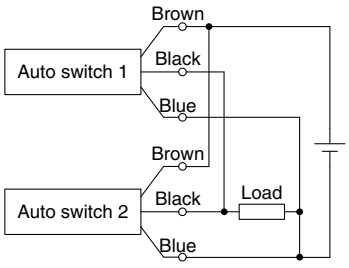
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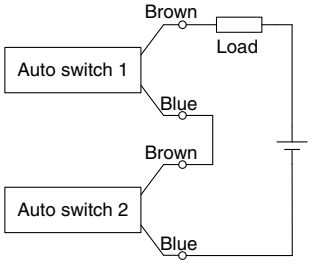
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3-wire OR connection for PNP output



2-wire AND connection

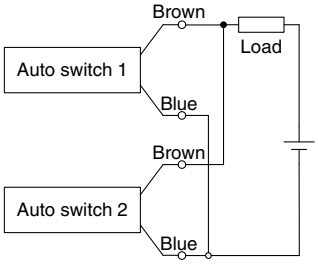


When two auto switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state.
The indicator lights will light up when both of the auto switches are in the ON state.
Auto switches with a load voltage less than 20 V cannot be used.

Load voltage at ON = Power supply voltage – Residual voltage x 2 pcs.
= 24 V – 4 V x 2 pcs.
= 16 V

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.

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

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

Simple Specials/Made to Order

Made to Order

Please contact SMC for detailed specifications, delivery, and prices.

■ Simple Specials

The following special specifications can be ordered as a simplified Made-to-Order.
Please contact your local sales representative for more details.

Symbol	Specifications	C96 (Standard type) Double acting Single rod	C96 (Standard type) Double acting Double rod	C96Y (Smooth cylinder) Double acting Single rod	Page
-XA0 to 30	Change of rod end shape	●	●	●	191
-XC14	Change of trunnion bracket mounting position	●	●	●	192

■ Made to Order

Symbol	Specifications	C96 (Standard type) Double acting Single rod	C96 (Standard type) Double acting Double rod	C96Y (Smooth cylinder) Double acting Single rod	Page
-XB6	Heat-resistant cylinder (–10 to 150°C)*1	●	●		193
-XB7	Cold-resistant cylinder (–40 to 70°C)*1	●	●		193
-XC4	With heavy duty scraper	●	●		194
-XC7	Tie-rod, tie-rod nut, etc. made of stainless steel	●	●	●	194
-XC10	Dual stroke cylinder/Double rod type	●		●	195
-XC11	Dual stroke cylinder/Single rod type	●			196
-XC22	Fluororubber seal	●	●		197
-XC35	With coil scraper	●	●		197
-XC65	Made of stainless steel (Combination of -XC7 and -XC68)	●	●	●	198
-XC68	Made of stainless steel (with hard chrome plated piston rod)	●	●	●	198
-XC88	Spatter-resistant coil scraper, Lube-retainer, grease for welding (Piston rod: Stainless steel 304)	●	●		199
-XC89	Spatter-resistant coil scraper, Lube-retainer, grease for welding (Piston rod: S45C)	●	●		199

*1 The products with an auto switch are not compatible.

C96 Series
Simple Specials

The following changes are dealt with through the Simple Specials System.

For details, refer to the Simple Specials in the Web Catalog.
http://www.smcworld.com

1 Change of Rod End Shape

Symbol
-XA0 to -XA30

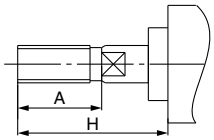
Applicable Series

Description	Model	Action	Symbol for change of rod end shape
Standard type	**C96S**	Double acting, Single rod	XA0 to 30
	C96S-W	Double acting, Double rod	XA0 to 30
Smooth type	**C96Y**	Double acting, Single rod	XA0 to 30

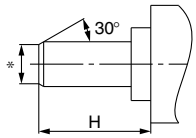
⚠ Precautions

1. SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
2. Standard dimensions marked with "∗" will be as follows to the rod diameter (D). Enter any special dimension you require.
   $D \leq 6 \rightarrow D - 1$ mm, $6 < D \leq 25 \rightarrow D - 2$ mm, $D > 25 \rightarrow D - 4$ mm
3. In the case of the double rod type and single acting retraction type, enter the dimensions when the rod is retracted.
4. Only one side of a double rod can be manufactured.
5. "A0" is the same shape as the standard type. (The specifications of A0 are that only dimensions A and H are changed from the standard type.)

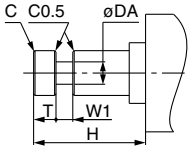
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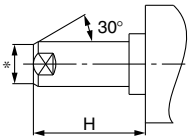
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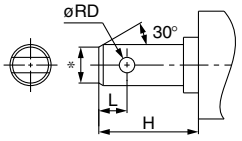
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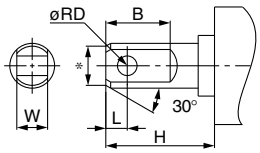
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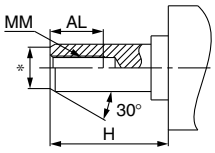
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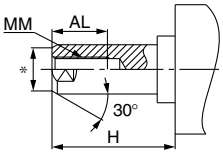
Symbol: A5



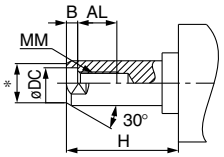
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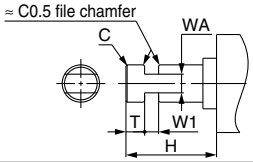
Symbol: A7



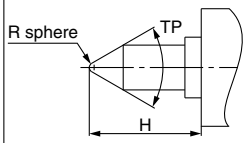
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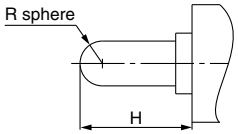
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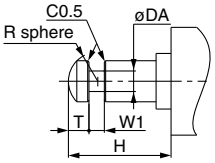
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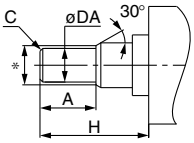
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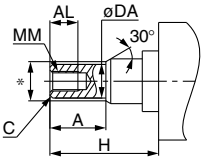
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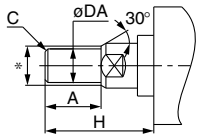
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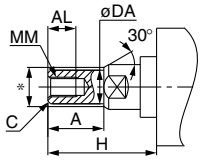
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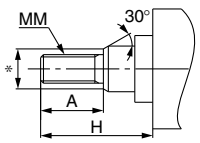
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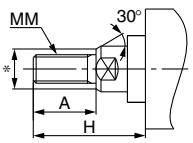
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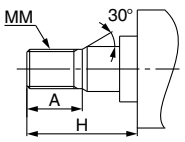
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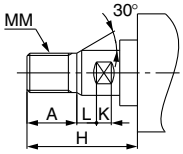
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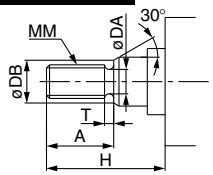
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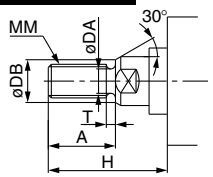
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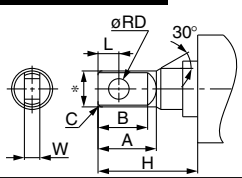
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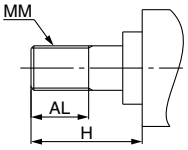
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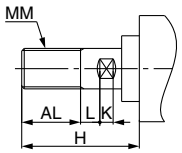
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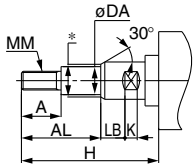
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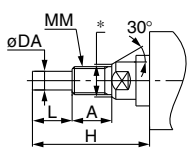
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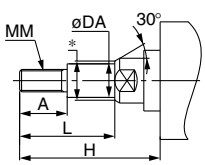
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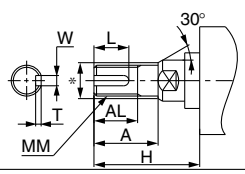
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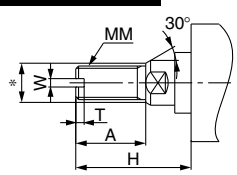
Symbol: A28



Symbol: A29



Symbol: A30



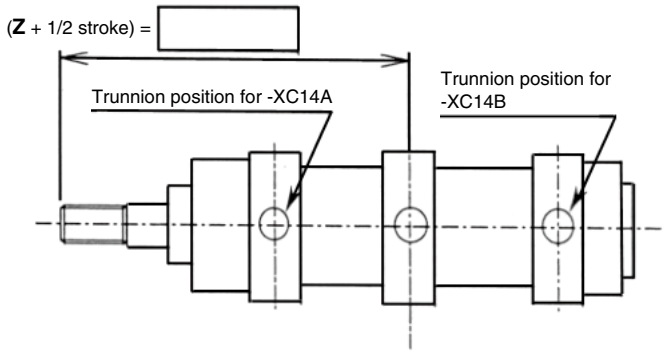
Symbol

2 Change of Trunnion Bracket Mounting Position -XC14

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

Applicable Series

Description	Model	Action
Standard type	**C96S**	Double acting, Single rod
	C96S-W	Double acting, Double rod
Smooth type	**C96Y**	Double acting, Single 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.

C96 Series

[mm]

Symbol / Bore size	**Z** + 1/2 stroke					
	For -XC14A	For -XC14B	For -XC14		Reference: Standard (Center trunnion)	Minimum stroke
			Minimum	Maximum		
32	85.4	104.6 + Stroke	85.9	104.1 + Stroke	95 + 0.5 stroke	0
40	97.6	115.4 + Stroke	98.1	114.9 + Stroke	106.5 + 0.5 stroke	
50	112	132 + Stroke	112.5	131.5 + Stroke	122 + 0.5 stroke	
63	121.6	137.4 + Stroke	122.1	136.9 + Stroke	129.5 + 0.5 stroke	
80	141.4	158.6 + Stroke	141.9	158.1 + Stroke	150 + 0.5 stroke	
100	153.9	166.1 + Stroke	154.4	165.6 + Stroke	160 + 0.5 stroke	5
125	202	196 + Stroke	202.5	195.5 + Stroke	201 + 0.5 stroke	10

C96 Series
Made to Order

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

Made to Order

1 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°C.

Applicable Series

Description	Model	Action
Standard type	**C96S**	Double acting, Single rod
	C96S-W	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

* Operate without lubrication from a pneumatic system lubricator.
* Please contact SMC for details on the maintenance intervals for this cylinder, which differ from those of the standard cylinder.
* 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.
* 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.

2 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

Description	Model	Action	Note
Standard type	**C96S**	Double acting, Single rod	Excluding with auto switch. Mounting bracket: Basic type only Minimum operating pressure 0.2 MPa
	C96S-W	Double acting, Double rod	

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

* Operate without lubrication from a pneumatic system lubricator.
* Use dry air which is suitable for heatless air dryer etc. not to cause the moisture to be frozen.
* Please contact SMC for details on the maintenance intervals for this cylinder, which differ from those of the standard cylinder.
* 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.

Symbol
-XC4

3 With Heavy Duty Scraper

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

Description	Model	Action	Note
Standard type	**C96S**	Double acting, Single rod	ø32 to ø100
	C96S-W	Double acting, Double rod	ø32 to ø100

How to Order

Standard model no. **–XC4**

With heavy duty 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.

Symbol
-XC7

4 Tie-rod, Tie-rod Nut, etc. Made of Stainless Steel

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

Description	Model	Action
Standard type	**C96S**	Double acting, Single rod
	C96S-W	Double acting, Double rod
Smooth type	**C96Y**	Double acting, Single rod

How to Order

Standard model no. **–XC7**

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

Specifications

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

∗ For bore size ø125, the cushion valve, rod seal holder, and retaining ring will also be stainless steel.

Symbol

5 Dual Stroke Cylinder/Double Rod Type -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

Description	Model	Action	Note
Standard type	**C96S**	Double acting, Single rod	Excludes the clevis type, trunnion type, and adjustable position trunnion type
Smooth type	**C96Y**	Double acting, Single rod	Excludes the clevis type, trunnion type, and adjustable position trunnion type

How to Order

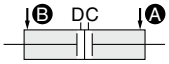
C96S / C96Y [Mounting type] [Bore size] – [Stroke A] + [Stroke B] **C – XC10**

Dual stroke cylinder

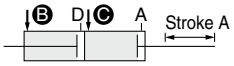
Specifications

Maximum manufacturable stroke [mm]
1000

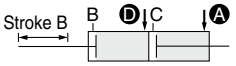
Function



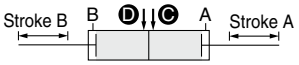
When air pressure is supplied to ports A and B, both strokes A and B retract.



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

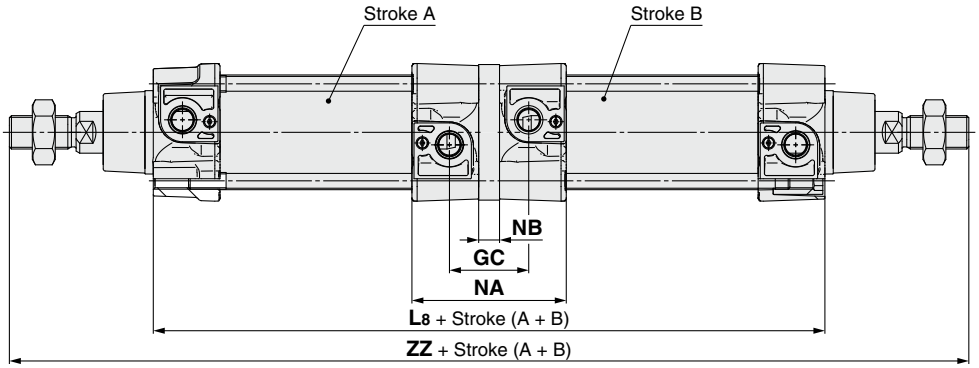


When air pressure is supplied to ports A and D, B out strokes.



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]	L_8	ZZ	NA	NB	GC
32	198	294	67.8	10	36
40	220	328	75.2	10	38
50	222	360	74	10	38
63	252	390	87.2	10	42
80	270	442	90.8	14	46
100	290	472	99.8	14	50
125	334	572	130	14	52

Symbol
-XC11

6 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

Description	Model	Action	Note
Standard type	**C96S**	Double acting, Single rod	Excludes the trunnion type and the adjustable position trunnion type

How to Order

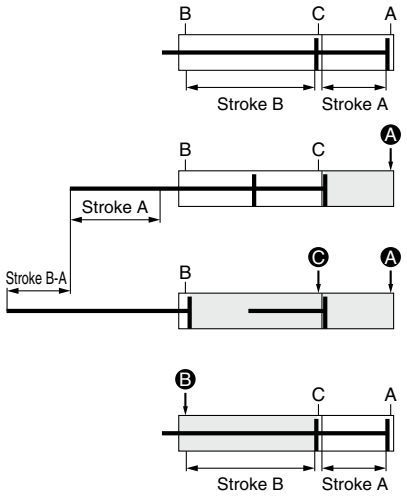
Specifications: Same as standard type

C96S | **Mounting type** | **Bore size** | **–** | **Stroke A** | **+** | **Stroke B-A** | **C – XC11**

Dual stroke cylinder/Single rod type

Function

Functional description of dual stroke cylinder



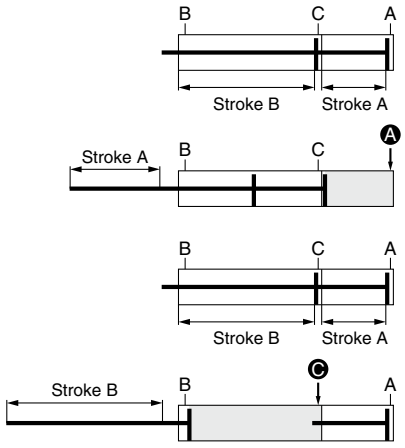
1) Initial state
(0 stroke position)

2) 1st stage: Stroke A operation
When the air pressure is supplied from the A port, the rod operates the stroke A.

3) 2nd stage: Stroke B-A operation
Following the 1st stage, when the air pressure is supplied from the C port, the rod operates the stroke B-A.

4) Cylinder retraction
When the air pressure is supplied from the B port, the rod retracts completely.

Stroke A or Stroke B operation can be made individually.



Stroke A operation

1) Initial state
(0 stroke position)

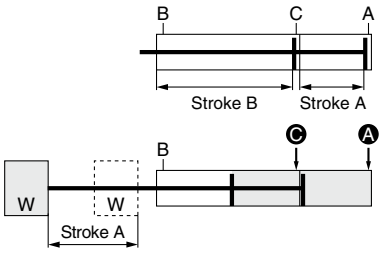
2) Operation
When the air pressure is supplied from the A port, the rod operates the stroke A.

Stroke B operation

1) Initial state
(0 stroke position)

2) Operation
When the air pressure is supplied from the C port, the rod operates the stroke B.

Double output is possible.



1) Initial state
(0 stroke position)

2) Double output
When the air pressure is supplied to the A and C ports at the same time, the double output can be obtained in the stroke A range.

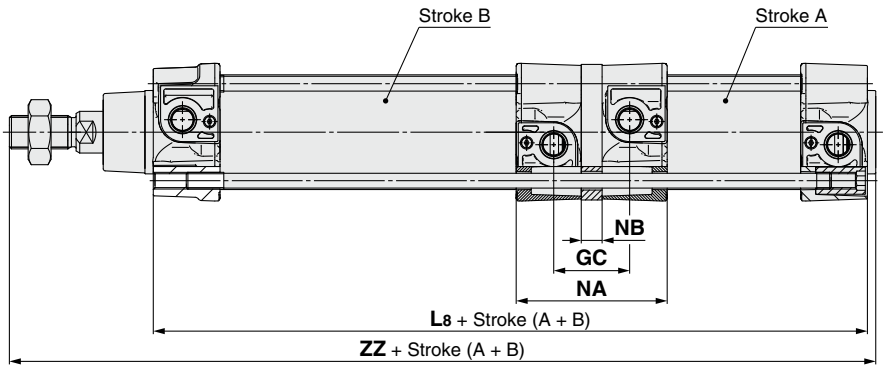
Precautions

⚠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.

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



Bore size [mm]	L8	ZZ	NA	NB	GC
32	199	251	67.2	10	35.4
40	221	279	74.6	10	37.4
50	223	296	73.4	10	37.4
63	253	326	86.6	10	41.4
80	271	361	90.2	14	45.4
100	291	386	99.2	14	49.4
125	335	460	130	14	52

Symbol

7 Fluororubber Seal -XC22

Applicable Series

Description	Model	Action
Standard type	**C96S**	Double acting, Single rod
	C96S-W	Double acting, Double rod

How to Order

Standard model no. – XC22

Fluororubber seal (including bumper)

Specifications

Seal material	Fluororubber
Ambient temperature range	With auto switch: –10°C to 60°C (No freezing)*1 Without auto switch: –10°C to 70°C (No freezing)
Specifications other than above and external dimensions	Same as standard type

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

* 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.

Symbol

8 With Coil Scraper -XC35

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

Applicable Series

Description	Model	Action	Note
Standard type	**C96S**	Double acting, Single rod	ø32 to ø100
	C96S-W	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

Symbol
-XC65

9 Made of Stainless Steel (Combination of -XC7 and -XC68)

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

Applicable Series

Description	Model	Action	Note
Standard type	**C96S**	Double acting, Single rod	
	C96S-W	Double acting, Double rod	
Smooth type	**C96Y**	Double acting, Single rod	

∗ There is a maximum stroke limit for C96 cylinder.

Maximum Stroke

[mm]

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

Specifications

Parts changed to stainless steel	Piston rod, Rod end nut, Tie-rod, Tie-rod nut, Mounting bracket nut, Spring washer, Lock nut
Other specifications and external dimensions	Same as standard type

∗ For bore size ø125, the cushion valve, rod seal holder, and retaining ring will also be stainless steel.

How to Order

Standard model no. **– XC65**

Made of stainless steel
(Combination of -XC7 and -XC68)

Symbol
-XC68

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

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

Applicable Series

Description	Model	Action	Note
Standard type	**C96S**	Double acting, Single rod	
	C96S-W	Double acting, Double rod	
Smooth type	**C96Y**	Double acting, Single rod	

∗ There is a maximum stroke limit.

Maximum Stroke

[mm]

Double acting, Single rod	Double acting, Double rod
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)

Symbol
11 Grease for Food Processing Equipment -XC85

Food grade grease (certified by NSF-H1) is used as lubricant.

Applicable Series

Description	Model	Action	Note
Standard type	**C96S**	Double acting, Single rod	ø32 to ø100
	C96S-W	Double acting, Double rod	ø32 to ø100

How to Order

Standard model no. – **XC85**

Grease for food processing equipment

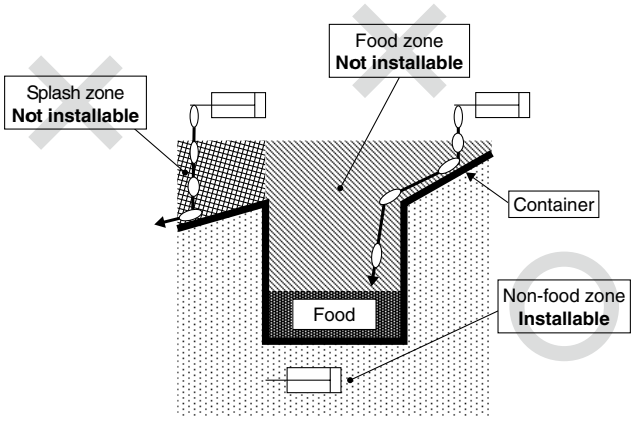
Specifications

Seal material	Nitrile rubber
Grease	Grease for food processing equipment
Auto switch	Mountable
Dimensions	Same as those of the standard type
Specifications other than the above	Same as those of the standard type

⚠ 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.

<Not installable>
Food zone·····An environment where food which will be sold as merchandize, directly touches the cylinder's components
Splash zone·····An environment where food which will not be sold as merchandize, directly touches the cylinder's components
<Installable>
Non-food zone·····An environment where there is no contact with food



* Avoid using this product in the food zone. (Refer to the figure above.)
* When the product is used in an area of liquid splash, or a water resistant function is required for the product, please consult SMC.
* Operate without lubrication from a pneumatic system lubricator.
* Use the following grease pack for the maintenance work.
  GR-H-010 (Grease: 10 g)
* Please contact SMC for details on the maintenance intervals for this cylinder, which differ from those of the standard cylinder.

Symbol
12 Spatter-resistant Coil Scraper, Lube-retainer, Grease for Welding (Piston rod: Stainless steel 304) -XC88

Reduces spatter adhesion and improves durability by the use of the coil scraper, Lube-retainer and grease for welding.

Applicable Series

Description	Model	Action	Note
Standard type	**C96S**	Double acting, Single rod	ø32 to ø100
	C96S-W	Double acting, Double rod	ø32 to ø100

How to Order

Standard model no. – **XC88**

Spatter-resistant coil scraper, Lube-retainer, grease for welding (Piston rod: Stainless steel 304)

Specifications

Piston rod	Stainless steel 304 (With hard chrome plated)
Scraper	With coil scraper, With Lube-retainer
Grease	Grease for welding
Other specifications and external dimensions	Same as standard type

Symbol

13 Spatter-resistant Coil Scraper, Lube-retainer, Grease for Welding (Piston rod: S45C) -XC89

Reduces spatter adhesion and improves durability by the use of the coil scraper, Lube-retainer and grease for welding.

Applicable Series

Description	Model	Action	Note
Standard type	**C96S**	Double acting, Single rod	ø32 to ø100
	C96S-W	Double acting, Double rod	ø32 to ø100

How to Order

Standard model no. – XC89

● **Spatter-resistant coil scraper, Lube-retainer, grease for welding (Piston rod: S45C)**

Specifications

Piston rod	S45C (With hard chrome plated)
Scraper	With coil scraper, With Lube-retainer
Grease	Grease for welding
Other specifications and external dimensions	Same as standard type

Specific Product Precautions

Be sure to read this before handling the products. Refer to page 219 for safety instructions. For actuator and auto switch precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: http://www.smcworld.com

Adjustment

⚠Warning

1. Do not open the cushion valve more than the allowable number of rotations (following table).

Although the cushion valve is caulked as a retaining mechanism, do not open the cushion valve more than the allowable number of rotations. If air is supplied and operation started without confirming the above condition, the cushion valve may be ejected from the cover.

The allowable number of rotations refers to the number of rotations until the restrictor of the cushion valve is completely opened from the completely closed state.

2. Keep the screwing torque and the unscrewing torque of the cushion valve to the allowable torque or below (following table).

If a screwing torque or unscrewing torque beyond the allowable torque is applied, the valve will be damaged when the valve is closed completely or exceeds the retaining mechanism when the valve is opened completely, which will dislocate the engagement of the screw and eject the valve.

Bore size [mm]	Cushion valve width across flats	Hexagon wrench	Allowable number of rotations	Allowable torque [N·m]
32, 40	2	JIS 4648 Hexagon wrench key 2	4	0.02
50, 63	2	JIS 4648 Hexagon wrench key 2	4.5	0.02
80, 100	3	JIS 4648 Hexagon wrench key 3	5.5	0.06
125	4	JIS 4648 Hexagon wrench key 4	5	0.10

3. Be certain to activate the air cushion at the stroke end.

When the air cushion is inactivated, if the allowable kinetic energy exceeds the value on page 163, the piston rod assembly or the tie-rod may be damaged. Set the air cushion to valid when operating the cylinder.

⚠Caution

1. When mounting a foot, flange, single clevis, or double clevis mounting bracket to the cylinder, use a hexagon wrench of the size stated in the table below.

Bore size [mm]	Width across flats	Tightening torque [N·m]
32, 40	4	4.8
50, 63	5	10.4
80, 100	6	18.2
125	10	30.1

2. To adjust the adjustable position trunnion mounting bracket, use a hexagon wrench of the size stated in the table below.

Bore size [mm]	Width across flats	Tightening torque [N·m]
32, 40	2.5	2.9
50, 63	3	5.8
80, 100	4	17.0
125	5	33.2