

Air Cylinder

ø40, ø50, ø63, ø80, ø100

New

RoHS

Reduced weight by changing the shape of the rod cover and head cover.

Weight reduced by up to

15% lighter

(ø63-50 stroke)

1.31 kg
New CA2

(1.54 kg)
Existing model



Easy air cushion control

Number of cushion valve adjustment rotations increased from 1 rotation to **3 rotations**.

Fine adjustment becomes easy, **ensuring smooth operation at the stroke end.**



Cushion valve

Hexagon wrench

Various switches such as compact auto switches and magnetic field resistant auto switches can be mounted.

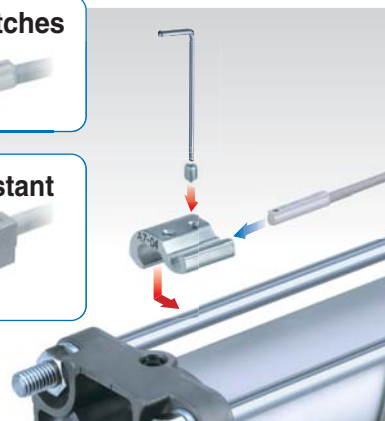
Compact auto switches

- D-M9□
- D-A9□



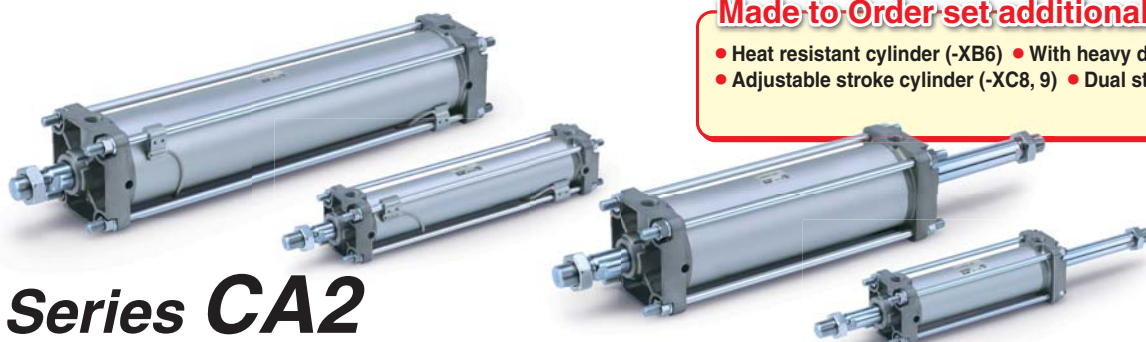
Magnetic field resistant auto switches

- D-P3DW
- D-P4DW



Made-to-Order set additionally

- Heat resistant cylinder (-XB6)
- With heavy duty scraper (-XC4)
- Adjustable stroke cylinder (-XC8, 9)
- Dual stroke cylinder (-XC10, 11) etc. are added.



Series CA2



Air Cylinder

Part numbers with rod end bracket and/or pivot bracket available

Not necessary to order a bracket for the applicable cylinder separately
 Note) Mounting bracket is shipped together with the product, but not assembled.

Example) CDA2 **D** 40-100Z- **N** **W** -M9BW

• Mounting

Pivot bracket	
—	None
N	Pivot bracket is shipped together with the product, but not assembled.

* Applicable to only mounting D (Double clevis) and T (Centre trunnion).

N: Kit of pivot bracket and double clevis



Kit of pivot bracket and trunnion



Rod end bracket

—	None
V	Single knuckle joint
W	Double knuckle joint

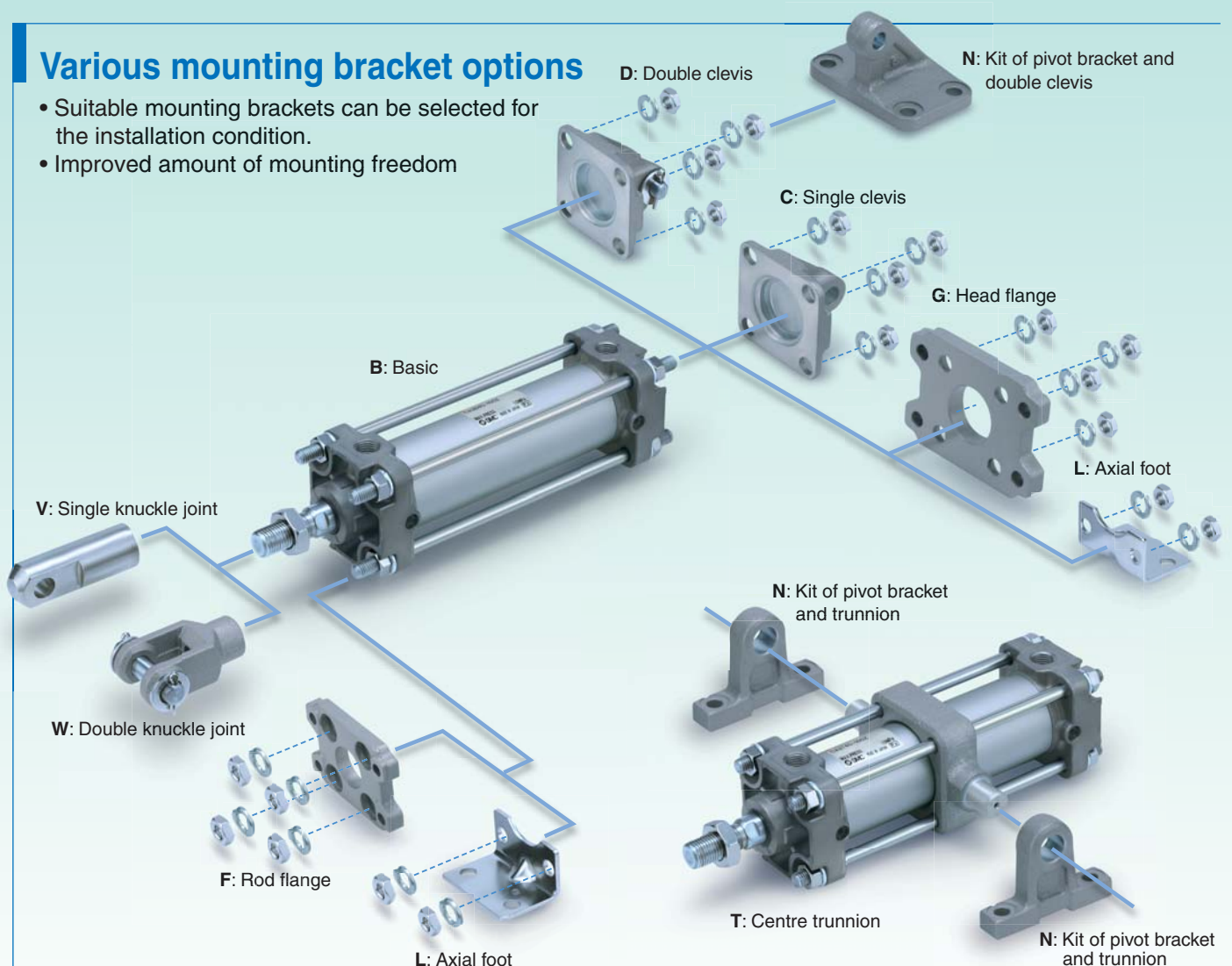
With rod end bracket

V: Single knuckle joint **W: Double knuckle joint**



Various mounting bracket options

- Suitable mounting brackets can be selected for the installation condition.
- Improved amount of mounting freedom



Reduced weight by changing the shape of the rod cover and head cover.

Bore size [mm]	New CA2	Reduction rate	Existing model
40	0.93	12%	1.06
50	1.31	15%	1.54
63	1.84	14%	2.15
80	3.17	11%	3.56
100	4.29	10%	4.76

* Compared to 50 stroke for each size

No substances hazardous to the environment are used.

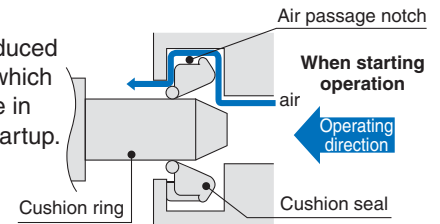
Lead free bushing is used as sliding material.
Compliant with EU RoHS directive.

Mounting dimensions are the same as the existing product.



Piston rod lurching reduced

Piston lurching is reduced by the construction which minimises resistance in the air passage at startup.



Stroke Variations

Bore size [mm]	Standard stroke																Maximum manufacturable stroke (L and F only)
	25	50	75	100	125	150	175	200	250	300	350	400	450	500	600	700	
40	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	1800
50	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
63	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
80	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
100	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	

Series Variations

Series CA2-Z

Series	Type	Bore size [mm]					Variations		Page
		40	50	63	80	100	With rod boot	Water resistant	
Standard CA2-Z 	Single rod	●	●	●	●	●	●	●	Page 1
	Double rod	●	●	●	●	●	●	●	Page 12

* For details about the clean series, refer to the catalogue in our website www.smc.eu.

Series CA2

Non-rotating rod CA2K 	Single rod	●	●	●			●		 www.smc.eu
	Double rod	●	●	●			●		
With end lock CBA2 	Single rod	●	●	●	●	●	●		
Air-hydro CA2□H 	Single rod	●	●	●	●	●	●		
	Double rod	●	●	●	●	●	●		

Combinations of Standard Products and Made to Order Specifications

Series CA2

- : Standard
- ◎ : Made to Order
- : Special product (Please contact SMC for details.)
- : Not available

Series	CA2 (Standard type)	
Action/ Type	Double acting	
	Single rod	Double rod
Page	Page 1	Page 12

Symbol	Specifications	Applicable bore size	—	
Standard	Standard	ø40 to ø100	●	●
CDA2-□Z	Built-in magnet		●	●
Long st	Long stroke		●	●
CA2□-□JZ	With rod boot (Nylon tarpaulin)		●	●
CA2□-□KZ	With rod boot (Heat resistant tarpaulin)		●	●
25A-	Copper (Cu) and Zinc (Zn)-free ^{Note 1)}		●	○
20-	Copper ^{Note 2)} and Fluorine-free		●	●
CA2□R	Water resistant (NBR seal)		●	○
CA2□V	Water resistant (FKM seal)		●	○
XA□	Change of rod end shape	ø40 to ø100	◎	◎
XB6	Heat resistant cylinder (–10 to 150°C)		◎	◎
XC4	With heavy duty scraper		◎	◎
XC5	Heat resistant cylinder (–10 to 110°C)		◎	◎
XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel		◎	◎
XC8	Adjustable stroke cylinder/ Adjustable extension type		◎	—
XC9	Adjustable stroke cylinder/ Adjustable retraction type		◎	—
XC10	Dual stroke cylinder/Double rod type		◎	—
XC11	Dual stroke cylinder/Single rod type		◎	○
XC12	Tandem cylinder		◎	○
XC14	Change of trunnion bracket mounting position		◎	◎
XC15	Change of tie-rod length		◎	◎
XC22	Fluororubber seal		◎	◎
XC27	Double clevis and double knuckle joint pins made of stainless steel		◎	—
XC28	Compact flange made of SS400		◎	◎
XC29	Double knuckle joint with spring pin		◎	○
XC30	Rod trunnion		◎	○
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		◎	◎
X1184	Cylinder with heat resistant reed auto switch (–10 to 120°C)		◎	○

Note 1) For details, refer to the catalogue in our website www.smc.eu.

Note 2) Copper-free for the externally exposed part

Air Cylinder: Standard Type Double Acting, Single Rod

Series CA2

ø40, ø50, ø63, ø80, ø100

RoHS

How to Order

CA2 **L** **50** **-100** **Z** **-** **-** **-**

With auto switch **CDA2** **D** **50** **-100** **Z** **-N** **W** **-M9BW** **-** **-**

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	Centre trunnion

Tube material

—	Aluminium tube
F*	Steel tube

* Not available with auto switch.

Bore size

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

Port thread type

—	Rc
TN	NPT
TF	G

Bracket 1

—	Without bracket
N	Pivot bracket

* Only for D and T mounting types.
* Pivot bracket is shipped together with the product, but not assembled.

Cylinder suffix

Rod boot	—	Without
	J	Nylon tarpaulin
	K	Heat resistant tarpaulin

Cylinder stroke (mm)
For details, refer to the next page.

Auto switch

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

Made to Order
For details, refer to the next page.

Bracket 2

—	Without bracket
V	Single knuckle joint
W	Double knuckle joint

* A knuckle joint pin is not provided with the single knuckle joint.
* Rod end bracket is shipped together with the product, but not assembled.

Number of auto switches

—	2 pcs.
S	1 pc.
3	3 pcs.
n	"n" pcs.

Applicable Auto Switches/Refer to the **Auto Switch Guide** 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 (—)	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)				—	G59	●	—	●	○	○										
		2-wire		—	12 V	M9P	—	●	—	●	○	○												
						—	G5P	●	—	●	○	○												
	Terminal conduit	3-wire (NPN)		100 V, 200 V	M9B	—	●	●	●	○	○	—												
					2-wire	—	K59	●	—	●	○		○											
	Diagnostic indication (2-colour indication)	Grommet		3-wire (NPN)	24 V	5 V, 12 V	—	J51	—	●	—	●	○	—	IC circuit									
				2-wire				G39C	G39	—	—	—	—	—										
				3-wire (NPN)				K39C	K39	—	—	—	—	—										
				3-wire (PNP)				M9NW	—	●	●	●	○	○										
				2-wire				—	G59W	●	—	●	○	○										
								—	M9PW	—	●	●	●	○			○							
				3-wire (NPN)				—	G5PW	—	●	—	●	○			○							
								3-wire (PNP)	M9BW	—	●	●	●	○			○							
	Water resistant (2-colour indication)	Grommet		2-wire	12 V	—	K59W	●	—	●	○	○	—											
				3-wire (NPN)		M9NA**	—	○	○	●	○	○												
With diagnostic output (2-colour indication)	Grommet	3-wire (PNP)	24 V	5 V, 12 V	—	M9PA**	—	○	○	●	○	○	IC circuit											
		2-wire				M9BA**	—	○	○	●	○	○												
		4-wire (NPN)				—	G5BA**	—	—	—	●	○		○										
		2-wire (Non-polar)				F59F	G59F	●	—	●	○	○												
Magnetic field resistant (2-colour indication)	Grommet	Yes	2-wire	24 V	12 V	—	P3DW	—	●	—	●	●	○	—										
							P4DW	—	—	—	●	●	○											
							Reed auto switch	—	Grommet	Yes	2-wire	24 V	12 V		—	100 V	A96	—	●	—	●	—	IC circuit	—
																	No	A93	—	●	—	●		
Yes	100 V or less	A90	—	●	—	●								—			—							
No	100 V, 200 V	A54	B54	●	—	●								●				—						
Diagnostic indication (2-colour)	Terminal conduit	Yes	2-wire	24 V	12 V	—	100 V, 200 V	A64	B64	●	—	●	—	—	PLC									
								—	A33C	A33	—	—	—			—		—						
								—	A34C	A34	—	—	—			—	—							
								—	A44C	A44	—	—	—			—			—					
Diagnostic indication (2-colour)	DIN terminal	Yes	2-wire	24 V	12 V	—	100 V, 200 V	A59W	B59W	●	—	●	—	—	Relay, PLC									
								—	—	—	—	—	—			—		—						
								—	—	—	—	—	—			—	—							
								—	—	—	—	—	—			—			—					

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

A water-resistant type cylinder is recommended for use in an environment which requires water resistance.

* Lead wire length symbols: 0.5 m..... (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 then listed above, refer to page 23 for details.

* For details about auto switches with pre-wired connector, refer to **Auto Switch Guide**

For the D-P3DW□, refer to the **Auto Switch Guide**.

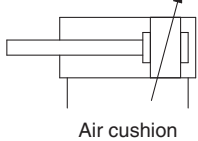
* The D-A9□/M9□□□/3PDW□ auto switches are shipped together, (but not assembled). (However, auto switch mounting brackets are assembled for the D-A9□/M9□□□ before shipment.)

Series CA2



Symbol

Double acting



Air cushion



Made to Order

(For details, refer to pages 25 to 37.)

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat resistant cylinder (−10 to 150°C)
-XC4	With heavy duty scraper
-XC5	Heat resistant cylinder (−10 to 110°C)
-XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel
-XC8	Adjustable stroke cylinder/Adjustable extension type
-XC9	Adjustable stroke cylinder/Adjustable retraction type
-XC10	Dual stroke cylinder/Double rod type
-XC11	Dual stroke cylinder/Single rod type
-XC12	Tandem cylinder
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC22	Fluororubber seal
-XC27	Double clevis and double knuckle joint pins made of stainless steel
-XC28	Compact flange made of SS400
-XC29	Double knuckle joint with spring pin
-XC30	Rod trunnion
-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
-X1184	Cylinder with heat resistant reed auto switch (−10 to 120°C)

For special port location (-XC3), the mounting bracket and port location can be determined using the standard product corresponding to the operating conditions.

For made of stainless steel (-XC6), use made of stainless steel (with hard chrome plated piston rod) (-XC68) that the surface treatment is performed on the piston rod with the same specifications.

Refer to pages 19 to 23 for cylinders with auto switches.

- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Minimum stroke for auto switch mounting
- Operating range
- Auto switch mounting brackets/Part no.

Specifications

Bore size [mm]		40	50	63	80	100
Fluid		Air				
Action		Double acting				
Proof pressure		1.5 MPa				
Maximum operating pressure		1.0 MPa				
Ambient and fluid temperature		Without auto switch: −10 to 70°C ^{Note 1)} With auto switch : −10 to 60°C ^{Note 1)}				
Minimum operating pressure		0.05 MPa				
Piston speed		50 to 500 mm/s				
Cushion		Air cushion				
Stroke length tolerance		Up to 250 st: ^{+1.0} ₀ 251 to 1000 st: ^{+1.4} ₀ 1001 to 1500 st: ^{+1.8} ₀				
Lubrication		Not required (Non-lube)				
Mounting		Basic, Foot, Rod flange, Head flange Single clevis, Double clevis, Centre trunnion				
Allowable kinetic energy (J) ^{Note 2)}	When air cushion is activated	2.8	4.6	7.8	16	29
	When air cushion is not activated	0.33	0.56	0.91	1.50	2.68

Note 1) No freezing

Note 2) Activate the air cushion when operating the cylinder. If this is not done, the piston rod assembly or the tie-rods will be damaged when the allowable kinetic energy exceeds the values shown in the table above.

Standard Strokes

Bore size	Standard stroke Note 1)	Max. manufacturable stroke [mm]
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500	1800
50, 63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600	1800
80, 100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700	1800

Note 1) Intermediate strokes not listed above are produced upon receipt of order.

Minimum Stroke for Auto Switch Mounting

⚠ Caution

The minimum stroke for mounting varies with the auto switch type and cylinder mounting type. In particular, the centre trunnion type needs careful attention. (For details, refer to pages 21 and 22.)

Rod Boot Material

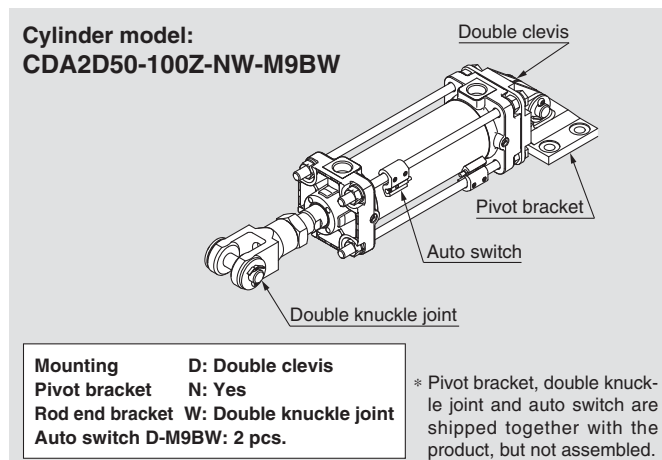
Symbol	Rod boot material	Max. ambient temperature
J	Nylon tarpaulin	70°C
K	Heat resistant tarpaulin	110°C*

* Maximum ambient temperature for the rod boot

Accessories

Mounting	Basic	Axial foot	Rod flange	Head flange	Single clevis	Double clevis	Centre trunnion
Standard							
	Rod end nut	●	●	●	●	●	●
	Clevis pin	—	—	—	—	●	—
Option							
	Single knuckle joint	●	●	●	●	●	●
	Double knuckle joint (with pin)	●	●	●	●	●	●
	With rod boot	●	●	●	●	●	●

Ordering Example of Cylinder Assembly



Weights/Aluminium Tube (Steel Tube)

Bore size [mm]			40	50	63	80	100
Basic weight	Basic	Aluminium tube	0.73	1.06	1.53	2.73	3.71
		Steel tube	0.78	1.12	1.62	2.91	3.98
	Axial foot	Aluminium tube	0.91	1.25	1.83	3.40	4.64
		Steel tube	0.96	1.31	1.92	3.58	4.91
	Flange	Aluminium tube	1.09	1.48	2.28	4.18	5.57
		Steel tube	1.14	1.54	2.37	4.36	5.84
	Single clevis	Aluminium tube	0.95	1.37	2.12	3.84	5.43
		Steel tube	1.00	1.43	2.21	4.02	5.70
	Double clevis	Aluminium tube	0.99	1.46	2.28	4.13	5.95
		Steel tube	1.04	1.52	2.37	4.31	6.22
	Trunnion	Aluminium tube	1.08	1.51	2.29	4.28	5.93
		Steel tube	1.13	1.57	2.38	4.46	6.20
Additional weight per 50 mm of stroke	All mounting brackets	Aluminium tube	0.20	0.25	0.31	0.46	0.58
		Steel tube	0.28	0.35	0.43	0.7	0.87
Accessories	Single knuckle		0.23	0.26	0.26	0.60	0.83
	Double knuckle (with pin)		0.37	0.43	0.43	0.87	1.27

Calculation:

Example) **CA2L40-100Z**

(Axial foot, $\varnothing 40$, 100 stroke)

- Basic weight.....0.91 kg
 - Additional weight....0.20/50 stroke
 - Cylinder stroke 100 stroke
-
- $0.91 + 0.20 \times 100/50 = \mathbf{1.31 \text{ kg}}$

Water Resistant

CDA2 **Mounting style** – **Bore size** **Port thread type** **R** – **Stroke** **Suffix** **Z** – **M9** **A(V)** **L** **-XC68**

With auto switch
(Built-in magnet)

Water resistant air cylinder

R	NBR seal (Nitrile rubber)
V	FKM seal (Fluororubber)

Water resistant
2-colour indication
solid state auto switch

Made to Order

Specifications

Action	Double acting, Single rod
Bore size [mm]	40, 50, 63, 80, 100
Cushion	Air cushion
Auto switch mounting	Tie-rod mounting
Made to Order	XC68: Made of stainless steel (with hard chrome plated piston rod)

* Specifications other than the above are the same as the standard basic type.
Note 1) Excluding the air-hydro type and the type with a rod boot of the CA2 series.
Note 2) Combination of auto switches and steel tube is not available.

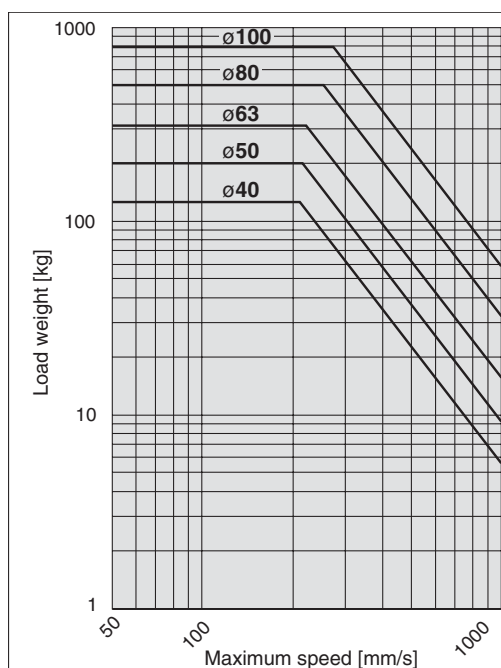
Mounting Brackets/Part No.

Bore size [mm]	40	50	63	80	100
Axial foot*	CA2-L04	CA2-L05	CA2-L06	CA2-L08	CA2-L10
Flange (Stroke of 1000 or less)	CA2-F04	CA2-F05	CA2-F06	CA2-F08	CA2-F10
Flange (Stroke of 1001 or more)	CA2-F04-L	CA2-F05-L	CA2-F06-L	CA2-F08-L	CA2-F10-L
Single clevis	CA2-C04	CA2-C05	CA2-C06	CA2-C08	CA2-C10
Double clevis**	CA2-D04	CA2-D05	CA2-D06	CA2-D08	CA2-D10

* When axial foot brackets are used, order two pieces per cylinder.

** A clevis pin, flat washers and split pins are shipped together with double clevis.

Allowable Kinetic Energy



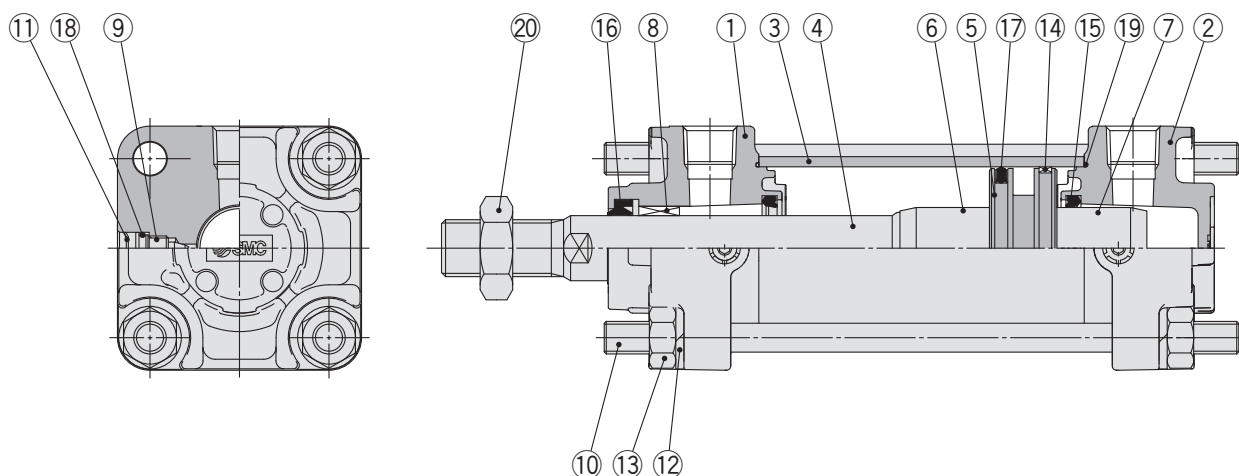
(Example) Find the upper limit of rod end load when an air cylinder of $\phi 63$ is operated at 500 mm/s.
From a point indicating 500 mm/s on the axis of abscissas, extend a line upward and find a point where it intersects with a line for the 63 mm bore size. Extend a line from the intersection to the left and find a load weight 60 kg.

Dimensions

* The dimensions are the same as the standard double acting, single rod type. Refer to page 5 for details.

Series CA2

Construction



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminium die-casted	Trivalent chromated
2	Head cover	Aluminium die-casted	Trivalent chromated
3	Cylinder tube	Aluminium alloy	Hard anodised
4	Piston rod	Carbon steel	Hard chrome plating
5	Piston	Aluminium alloy	
6	Cushion ring	Aluminium alloy	anodised
7	Cushion ring B	Aluminium alloy	anodised
8	Bushing	Bearing alloy	
9	Cushion valve	Steel wire	Trivalent zinc chromated
10	Tie-rod	Carbon steel	Trivalent zinc chromated
11	Retaining ring	Spring steel	Phosphate coating
12	Spring washer	Steel wire	Trivalent zinc chromated
13	Tie-rod nut	Rolled steel	Trivalent zinc chromated
14	Wear ring	Resin	
15	Cushion seal	Urethane	
16	Rod seal	NBR	
17	Piston seal	NBR	
18	Cushion valve seal	NBR	
19	Cylinder tube gasket	NBR	
20	Rod end nut	Rolled steel	Trivalent zinc chromated

Replacement Parts/Seal Kit

Bore size [mm]	Kit no.	Contents
40	CA2-40Z-PS	Set of the nos. ⑮, ⑯, ⑰, ⑱
50	CA2-50Z-PS	
63	CA2-63Z-PS	
80	CA2-80Z-PS	
100	CA2-100Z-PS	

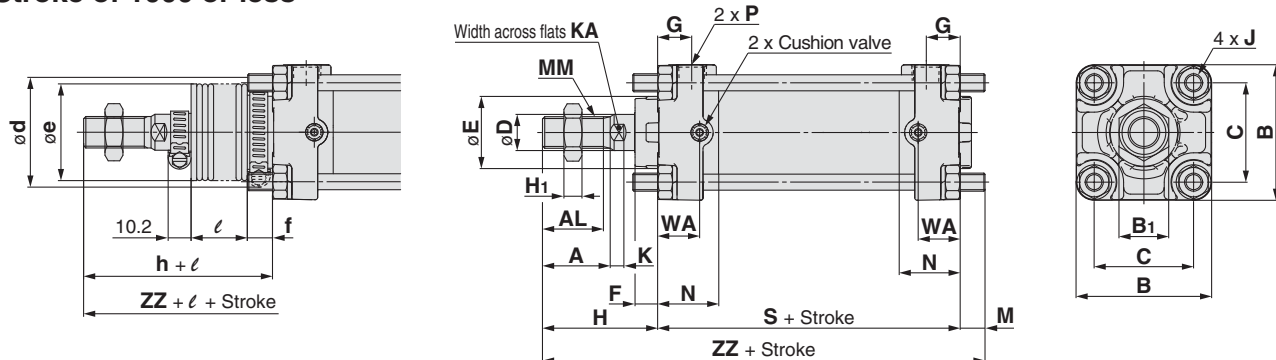
* Seal kit includes ⑮, ⑯, ⑰, ⑱. Order the seal kit based on each bore size.

* Do not disassemble the trunnion type. Refer to page 38.

* Seal kit includes a grease pack (ø40, 50: 10 g, ø63, 80: 20 g, ø100: 30 g).

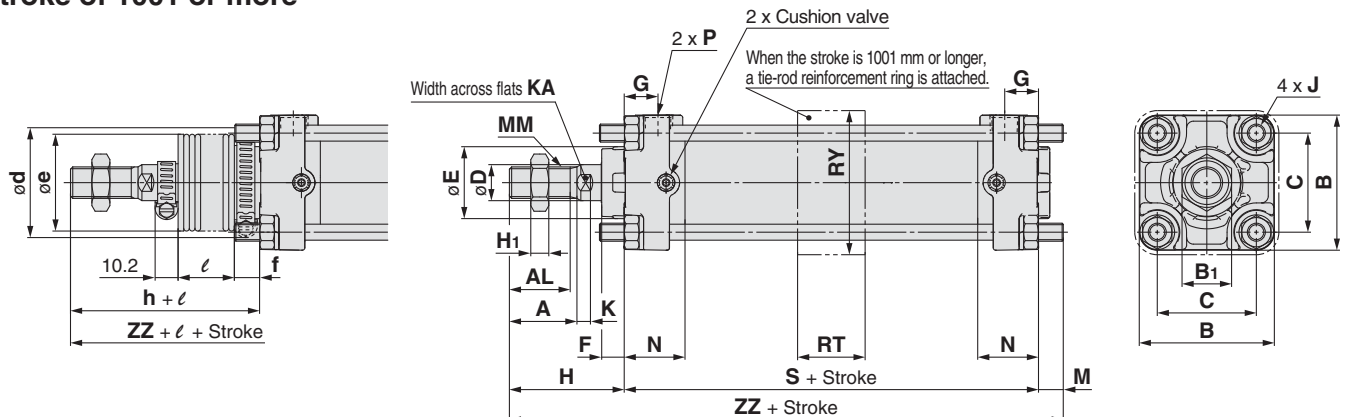
Order with the following part number when only the grease pack is needed.

Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)

Basic: CA2B
Stroke of 1000 or less


Bore size [mm]	A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	M
40	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	11
50	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	11
63	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	14
80	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	17
100	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	17

Bore size [mm]	MM	N	P	S	WA	Without rod boot		With rod boot							
						H	ZZ	d	e	f	h	ℓ	ZZ		
40	M14 x 1.5	27	1/4	84	18.5	51	146	56	43	11.2	59	1/4 stroke	154		
50	M18 x 1.5	30	3/8	90	18.5	58	159	64	52	11.2	66	1/4 stroke	167		
63	M18 x 1.5	31	3/8	98	23	58	170	64	52	11.2	66	1/4 stroke	178		
80	M22 x 1.5	37	1/2	116	28.5	71	204	76	65	12.5	80	1/4 stroke	213		
100	M26 x 1.5	40	1/2	126	28.5	72	215	76	65	14	81	1/4 stroke	224		

Stroke of 1001 or more


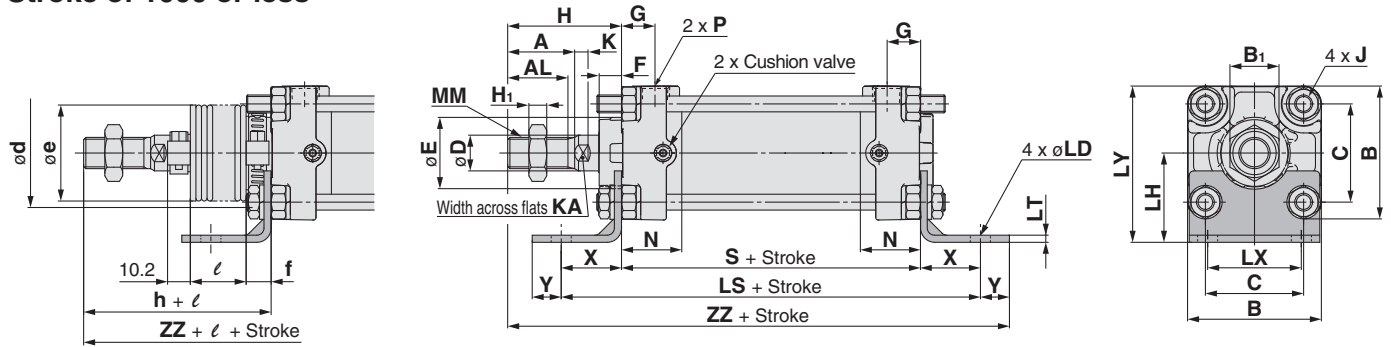
Bore size [mm]	A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	M	
														Without reinforcement ring	With reinforcement ring
40	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	11	11
50	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	11	12
63	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	14	15
80	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	17	19
100	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	17	19

Bore size [mm]	MM	N	P	RT	RY	S	Without rod boot		With rod boot							
							H	ZZ	d	e	f	h	ℓ	ZZ		
40	M14 x 1.5	27	1/4	30	64	84	51	146	56	43	11.2	59	1/4 stroke	154		
50	M18 x 1.5	30	3/8	30	76	90	58	159	64	52	11.2	66	1/4 stroke	167		
63	M18 x 1.5	31	3/8	40	92	98	58	170	64	52	11.2	66	1/4 stroke	178		
80	M22 x 1.5	37	1/2	45	112	116	71	204	76	65	12.5	80	1/4 stroke	213		
100	M26 x 1.5	40	1/2	50	136	126	72	215	76	65	14	81	1/4 stroke	224		

Series CA2

Axial Foot: CA2L

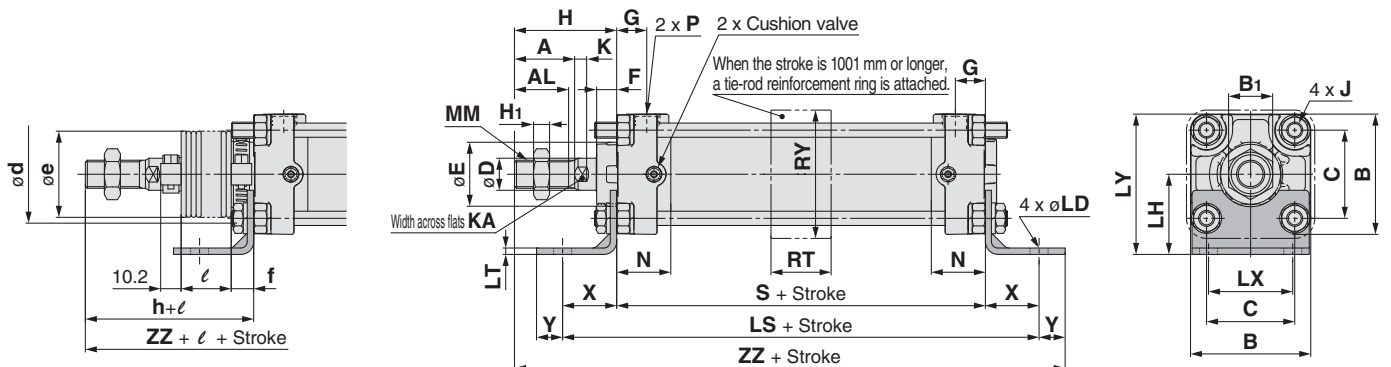
Stroke of 1000 or less



[mm]																		
Bore size [mm]	A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	LD	LH	LS	LT	LX
40	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	9	40	138	3.2	42
50	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	9	45	144	3.2	50
63	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	11.5	50	166	3.2	59
80	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	13.5	65	204	4.5	76
100	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	13.5	75	212	6	92

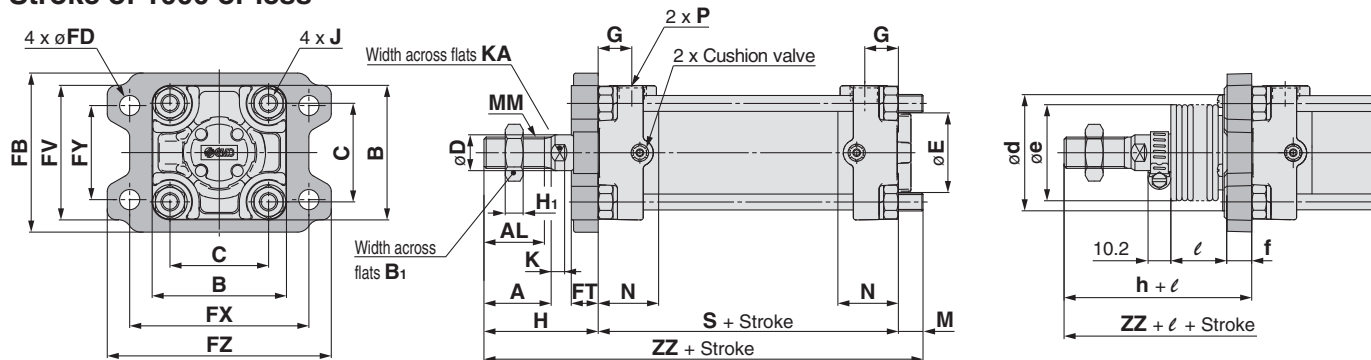
Bore size [mm]	LY	MM	N	P	S	X	Y	Without rod boot		With rod boot						
								H	ZZ	d	e	f	h	ℓ	ZZ	
40	70	M14 x 1.5	27	1/4	84	27	13	51	175	56	43	11.2	59	1/4 stroke	183	
50	80	M18 x 1.5	30	3/8	90	27	13	58	188	64	52	11.2	66	1/4 stroke	196	
63	93	M18 x 1.5	31	3/8	98	34	16	58	206	64	52	11.2	66	1/4 stroke	214	
80	116	M22 x 1.5	37	1/2	116	44	16	71	247	76	65	12.5	80	1/4 stroke	256	
100	133	M26 x 1.5	40	1/2	126	43	17	72	258	76	65	14.0	81	1/4 stroke	267	

Stroke of 1001 or more



[mm]																		
Bore size [mm]	A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	LD	LH	LS	LT	LX
40	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	9	40	138	3.2	42
50	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	9	45	144	3.2	50
63	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	11.5	50	166	3.2	59
80	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	13.5	65	204	4.5	76
100	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	13.5	75	212	6	92

Bore size [mm]	MM	N	P	S	X	Y	RT	RY	Without rod boot		With rod boot						
									H	ZZ	d	e	f	h	ℓ	ZZ	
40	M14 x 1.15	27	1/4	84	27	13	30	64	51	175	56	43	11.2	59	1/4 stroke	183	
50	M18 x 1.15	30	3/8	90	27	13	30	76	58	188	64	52	11.2	66	1/4 stroke	196	
63	M18 x 1.15	31	3/8	98	34	16	40	92	58	206	64	52	11.2	66	1/4 stroke	214	
80	M22 x 1.15	37	1/2	116	44	16	45	112	71	247	76	65	12.5	80	1/4 stroke	256	
100	M26 x 1.15	40	1/2	126	43	17	50	136	72	258	76	65	14.0	81	1/4 stroke	267	

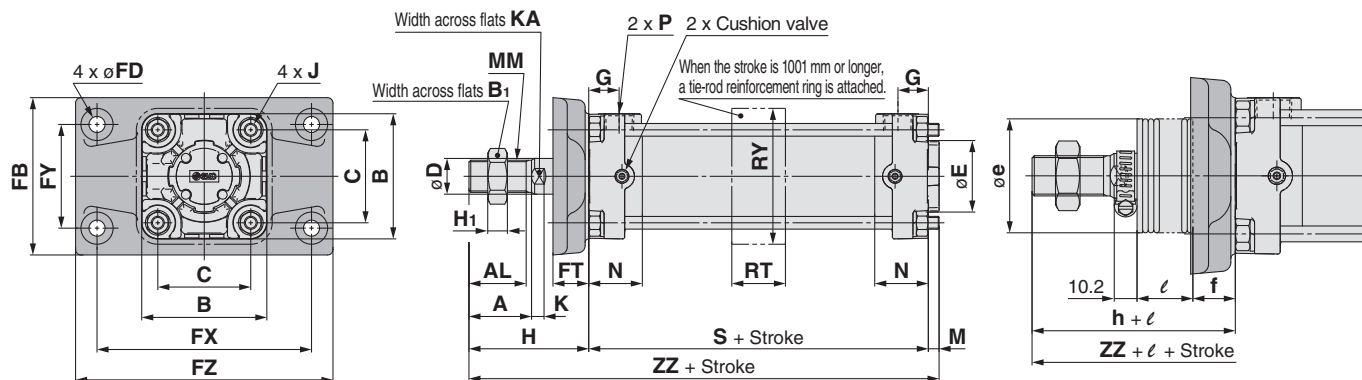
Rod Flange: CA2F
Stroke of 1000 or less


																			[mm]
Bore size [mm]	A	AL	B	B ₁	C	D	E	FB	FD	FT	FV	FX	FY	FZ	G	H ₁	J	K	KA
40	30	27	60	22	44	16	32	71	9	12	60	80	42	100	15	8	M8 x 1.25	6	14
50	35	32	70	27	52	20	40	81	9	12	70	90	50	110	17	11	M8 x 1.25	7	18
63	35	32	85	27	64	20	40	101	11.5	15	86	105	59	130	17	11	M10 x 1.25	7	18
80	40	37	102	32	78	25	52	119	13.5	18	102	130	76	160	21	13	M12 x 1.75	10	22
100	40	37	116	41	92	30	52	133	13.5	18	116	150	92	180	21	16	M12 x 1.75	10	26

Bore size [mm]	M	MM	N	P	S	Without rod boot		With rod boot					
						H	ZZ	d*	e	f	h	ℓ	ZZ
40	11	M14 x 1.5	27	1/4	84	51	146	52	43	15	59	1/4 stroke	154
50	11	M18 x 1.5	30	3/8	90	58	159	58	52	15	66	1/4 stroke	167
63	14	M18 x 1.5	31	3/8	98	58	170	58	52	17.5	66	1/4 stroke	178
80	17	M22 x 1.5	37	1/2	116	71	204	80	65	21.5	80	1/4 stroke	213
100	17	M26 x 1.5	40	1/2	126	72	215	80	65	21.5	81	1/4 stroke	224

★ For installing an air cylinder, when a hole must be made to accommodate the rod portion, make sure to machine a hole that is larger than the outside diameter of the boot mounting bracket ød.

★ For installing an air cylinder, when a hole must be made to accommodate the rod portion, make sure to machine a hole that is larger than the outside diameter of the boot mounting bracket ød.

Stroke of 1001 or more


Bore size [mm]	A	AL	B	B ₁	C	D	E	FB	FD	FT	FX	FY	FZ	G	H ₁	J	K	KA	M
40	30	27	60	22	44	16	32	71	9	12	80	42	100	15	8	M8 x 1.25	6	14	11
50	35	32	70	27	52	20	40	88	9	20	120	58	144	17	11	M8 x 1.25	7	18	6
63	35	32	85	27	64	20	40	105	11.5	23	140	64	170	17	11	M10 x 1.25	7	18	10
80	40	37	102	32	78	25	52	124	13.5	28	164	84	198	21	13	M12 x 1.75	10	22	12
100	40	37	116	41	92	30	52	140	13.5	29	180	100	220	21	16	M12 x 1.75	10	26	12

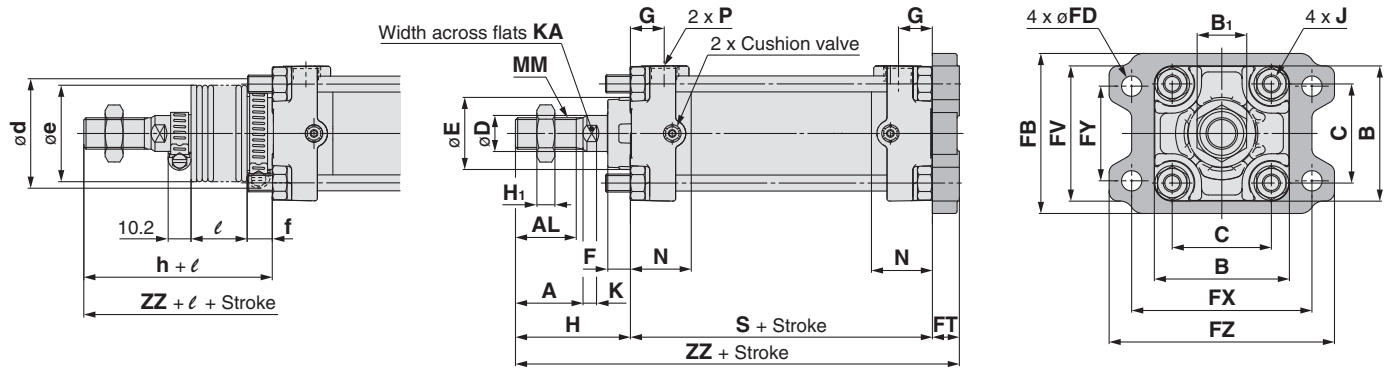
Bore size [mm]	MM	N	P	RT	RY	S	Without rod boot		With rod boot				
							H	ZZ	e*	f	h	ℓ	ZZ
40	M14 x 1.5	27	1/4	30	64	84	51	146	52	19	66	1/4 stroke	162
50	M18 x 1.5	30	3/8	30	76	90	67	163	52	19	66	1/4 stroke	162
63	M18 x 1.5	31	3/8	40	92	98	71	179	52	19	66	1/4 stroke	174
80	M22 x 1.5	37	1/2	45	112	116	87	215	65	21	80	1/4 stroke	208
100	M26 x 1.5	40	1/2	50	136	126	89	227	65	21	81	1/4 stroke	219

★ For installing an air cylinder, when a hole must be made to accommodate the rod portion, make sure to machine a hole that is larger than the outer diameter of the boot øe.

Note) The flange shape for bore size 40 is the same as the flange used in 1000 mm stroke or less.

Series CA2

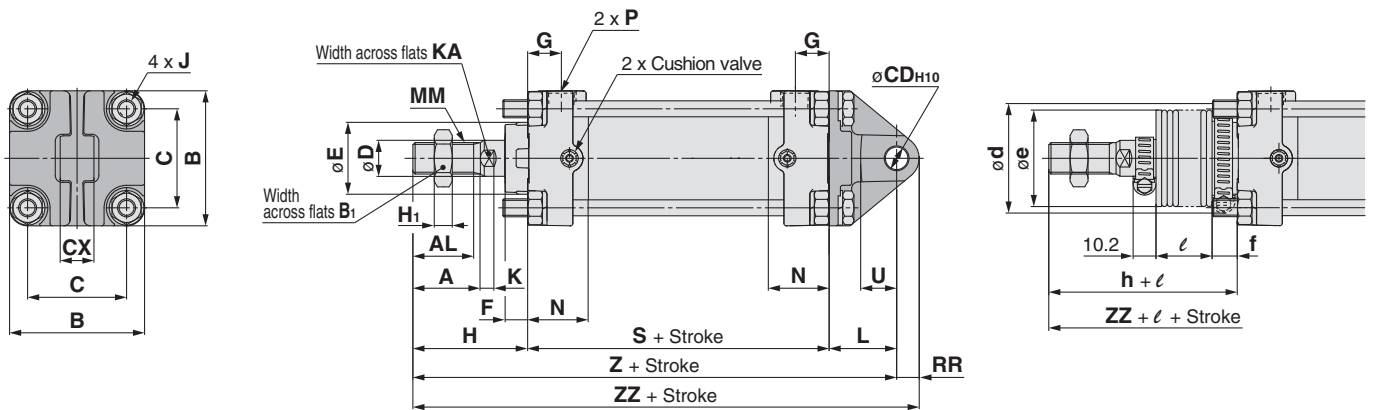
Head Flange: CA2G



[mm]																		
Bore size [mm]	A	AL	B	B ₁	C	D	E	F	FB	FD	FT	FV	FX	FY	FZ	G	H ₁	J
40	30	27	60	22	44	16	32	10	71	9	12	60	80	42	100	15	8	M8 x 1.25
50	35	32	70	27	52	20	40	10	81	9	12	70	90	50	110	17	11	M8 x 1.25
63	35	32	85	27	64	20	40	10	101	11.5	15	86	105	59	130	17	11	M10 x 1.25
80	40	37	102	32	78	25	52	14	119	13.5	18	102	130	76	160	21	13	M12 x 1.75
100	40	37	116	41	92	30	52	14	133	13.5	18	116	150	92	180	21	16	M12 x 1.75

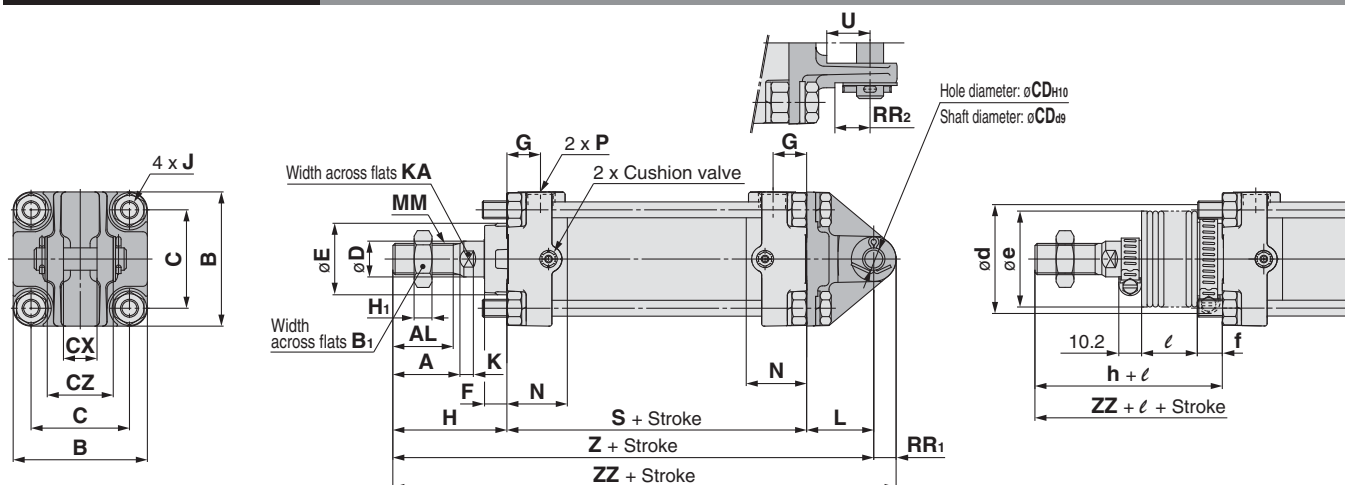
Bore size [mm]	K	KA	MM	N	P	S	Without rod boot		With rod boot					
							H	ZZ	d	e	f	h	ℓ	ZZ
40	6	14	M14 x 1.5	27	1/4	84	51	147	56	43	11.2	59	1/4 stroke	155
50	7	18	M18 x 1.5	30	3/8	90	58	160	64	52	11.2	66	1/4 stroke	168
63	7	18	M18 x 1.5	31	3/8	98	58	171	64	52	11.2	66	1/4 stroke	179
80	10	22	M22 x 1.5	37	1/2	116	71	205	76	65	12.5	80	1/4 stroke	214
100	10	26	M26 x 1.5	40	1/2	126	72	216	76	65	14.0	81	1/4 stroke	225

Single Clevis: CA2C



Bore size [mm]	A	AL	B	B ₁	C	CD _{H10}	CX	D	E	F	G	H ₁	J	K	KA	L
40	30	27	60	22	44	10 ^{+0.058} ₀	15 ^{-0.1} _{-0.3}	16	32	10	15	8	M8 x 1.25	6	14	30
50	35	32	70	27	52	12 ^{+0.070} ₀	18 ^{-0.1} _{-0.3}	20	40	10	17	11	M8 x 1.25	7	18	35
63	35	32	85	27	64	16 ^{+0.070} ₀	25 ^{-0.1} _{-0.3}	20	40	10	17	11	M10 x 1.25	7	18	40
80	40	37	102	32	78	20 ^{+0.084} ₀	31.5 ^{-0.1} _{-0.3}	25	52	14	21	13	M12 x 1.75	10	22	48
100	40	37	116	41	92	25 ^{+0.084} ₀	35.5 ^{-0.1} _{-0.3}	30	52	14	21	16	M12 x 1.75	10	26	58

Bore size [mm]	MM	N	P	RR	S	U	Without rod boot		With rod boot						
							H	Z	ZZ	d	e	f	h	l	ZZ
40	M14 x 1.5	27	1/4	10	84	16	51	165	175	56	43	11.2	59	1/4 stroke	173
50	M18 x 1.5	30	3/8	12	90	19	58	183	195	64	52	11.2	66	1/4 stroke	191
63	M18 x 1.5	31	3/8	16	98	23	58	196	212	64	52	11.2	66	1/4 stroke	204
80	M22 x 1.5	37	1/2	20	116	28	71	235	255	76	65	12.5	80	1/4 stroke	244
100	M26 x 1.5	40	1/2	25	126	36	72	256	281	76	65	14.0	81	1/4 stroke	265

Double Clevis: CA2D


* A pin and retaining rings are shipped together with double clevis and/or double knuckle joint.

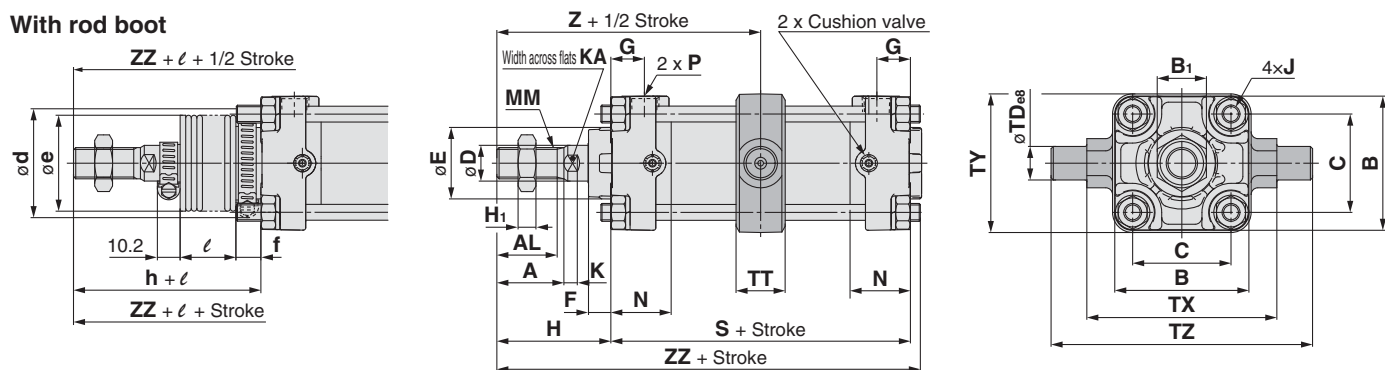
Bore size [mm]	A	AL	B	B ₁	C	CD _{H10}	CX	CZ	D	E	F	G	H ₁	J	K	KA	L
40	30	27	60	22	44	10 ^{+0.058} ₀	15 ^{+0.3} _{+0.1}	29.5	16	32	10	15	8	M8 x 1.25	6	14	30
50	35	32	70	27	52	12 ^{+0.070} ₀	18 ^{+0.3} _{+0.1}	38	20	40	10	17	11	M8 x 1.25	7	18	35
63	35	32	85	27	64	16 ^{+0.070} ₀	25 ^{+0.3} _{+0.1}	49	20	40	10	17	11	M10 x 1.25	7	18	40
80	40	37	102	32	78	20 ^{+0.084} ₀	31.5 ^{+0.3} _{+0.1}	61	25	52	14	21	13	M12 x 1.75	10	22	48
100	40	37	116	41	92	25 ^{+0.084} ₀	35.5 ^{+0.3} _{+0.1}	64	30	52	14	21	16	M12 x 1.75	10	26	58

Bore size [mm]	MM	N	P	RR ₁	RR ₂	S	U	Without rod boot			With rod boot						
								H	Z	ZZ	d	e	f	h	l	Z	ZZ
40	M14 x 1.5	27	1/4	10	16	84	16	51	165	175	56	43	11.2	59	1/4 stroke	173	183
50	M18 x 1.5	30	3/8	12	19	90	19	58	183	195	64	52	11.2	66	1/4 stroke	191	203
63	M18 x 1.5	31	3/8	16	23	98	23	58	196	212	64	52	11.2	66	1/4 stroke	204	220
80	M22 x 1.5	37	1/2	20	28	116	28	71	235	255	76	65	12.5	80	1/4 stroke	244	264
100	M26 x 1.5	40	1/2	25	23.5	126	36	72	256	281	76	65	14.0	81	1/4 stroke	265	290

* A clevis pin, flat washers and split pins are included.

Centre Trunnion: CA2T

With rod boot



Bore size [mm]	A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	MM	N	P	S
40	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	M14 x 1.5	27	1/4	84
50	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	M18 x 1.5	30	3/8	90
63	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	M18 x 1.5	31	3/8	98
80	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	M22 x 1.5	37	1/2	116
100	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	M26 x 1.5	40	1/2	126

Bore size [mm]	TD _{ø8}	TT	TX	TY	TZ	Without rod boot			With rod boot						
						H	Z	ZZ	d	e	f	h	l	Z	ZZ
40	15 ^{-0.032} _{-0.059}	22	85	62	117	51	93	140	56	43	11.2	59	1/4 stroke	101	148
50	15 ^{-0.032} _{-0.059}	22	95	74	127	58	103	154	64	52	11.2	66	1/4 stroke	111	162
63	18 ^{-0.032} _{-0.059}	28	110	90	148	58	107	162	64	52	11.2	66	1/4 stroke	115	170
80	25 ^{-0.040} _{-0.073}	34	140	110	192	71	129	194	76	65	12.5	80	1/4 stroke	138	203
100	25 ^{-0.040} _{-0.073}	40	162	130	214	72	135	206	76	65	14.0	81	1/4 stroke	144	215

* Do not disassemble the trunnion type. Refer to page 38.

Series CA2

Trunnion and Double Clevis Pivot Bracket

- Strength is the same as cylinder brackets.

Applicable Series

Bracket type	Applicable series
Trunnion pivot bracket	CA2
Double clevis pivot bracket	CA2

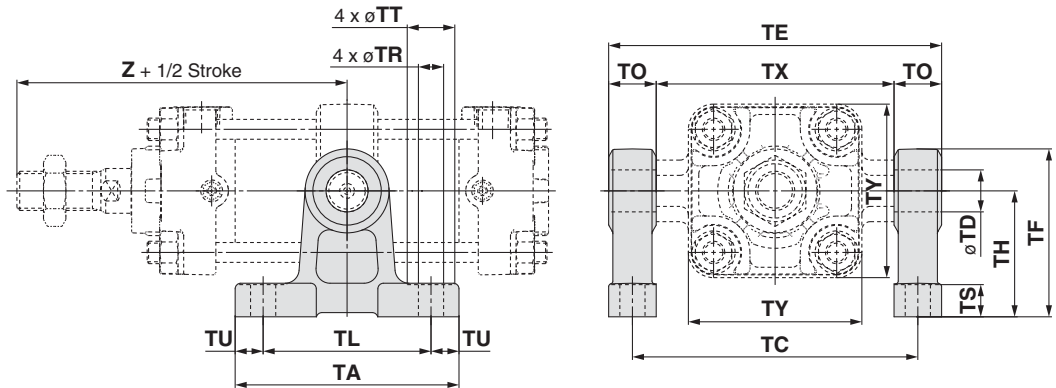
* Please contact SMC at the time of mounting.

Bore size	CA2□40	CA2□50	CA2□63	CA2□80	CA2□100
Description	CA2-S04			MB-S10	
Trunnion pivot bracket	CA2-S04			MB-S10	
Double clevis pivot bracket	CA2-B04	CA2-B05	CA2-B06	CA2-B08	CA2-B10

* Order 2 trunnion pivot brackets per cylinder.

Trunnion pivot bracket

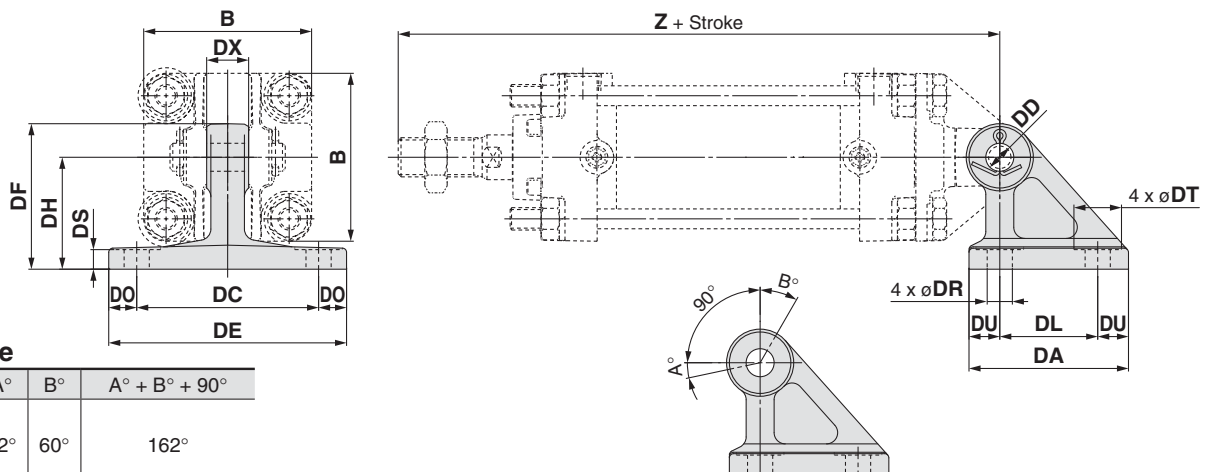
Material: Cast iron



Part no.	Bore size [mm]	TA	TL	TU	TC	TX	TE	TO	TR	TT	TS	TH	TF	TY	Z	TD-H10 (Hole)
CA2-S04	40	80	60	10	102	85	119	17	9	17	12	45	60	62	93	15 ^{+0.070} ₀
	50	80	60	10	112	95	129	17	9	17	12	45	60	74	103	15 ^{+0.070} ₀
CA2-S06	63	100	70	15	130	110	150	20	11	22	14	55	73	90	107	18 ^{+0.070} ₀
MB-S10	80	120	90	15	166	140	192	26	13.5	24	17	75	100	110	129	25 ^{+0.084} ₀
	100	120	90	15	188	162	214	26	13.5	24	17	75	100	130	135	25 ^{+0.084} ₀

Double clevis pivot bracket

Material: Cast iron



Rotating Angle

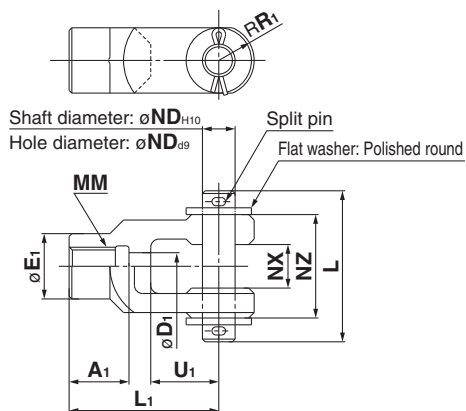
Bore size [mm]	A°	B°	A° + B° + 90°
40 to 100	12°	60°	162°

Part no.	Bore size [mm]	DA	DL	DU	DC	DX	DE	DO	DR	DT	DS	DH	DF	B	Z	DDH10 (Hole)
CA2-B04	40	57	35	11	65	15	85	10	9	17	8	40	52	60	165	10 ^{+0.058} ₀
CA2-B05	50	57	35	11	65	18	85	10	9	17	8	40	52	70	183	12 ^{+0.070} ₀
CA2-B06	63	67	40	13.5	80	25	105	12.5	11	22	10	50	66	85	196	16 ^{+0.070} ₀
CA2-B08	80	93	60	16.5	100	31.5	130	15	13.5	24	12	65	90	102	235	20 ^{+0.084} ₀
CA2-B10	100	93	60	16.5	100	35.5	130	15	13.5	24	12	65	90	116	256	25 ^{+0.084} ₀

Series CA2

Dimensions of Accessories

Y Type Double Knuckle Joint

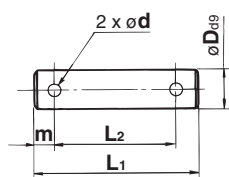


Material: Cast iron

Part no.	Applicable bore size	A ₁	E ₁	D ₁	L ₁	MM	R ₁	U ₁	ND	NX	NZ	L	Split pin size	Flat washer size
Y-04D	40	22	24	10	55	M14 x 1.5	13	25	12	16 ^{+0.3} _{+0.1}	38	55.5	$\phi 3 \times 18L$	Polished round 12
Y-05D	50, 63	27	28	14	60	M18 x 1.5	15	27	12	16 ^{+0.3} _{+0.1}	38	55.5	$\phi 3 \times 18L$	Polished round 12
Y-08D	80	37	36	18	71	M22 x 1.5	19	28	18	28 ^{+0.3} _{+0.1}	55	76.5	$\phi 4 \times 25L$	Polished round 18
Y-10D	100	37	40	21	83	M26 x 1.5	21	38	20	30 ^{+0.3} _{+0.1}	61	83	$\phi 4 \times 30L$	Polished round 20

* A knuckle pin, split pins and flat washers are included.

Clevis Pin/Knuckle Pin

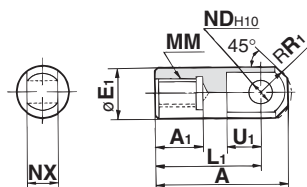


Material: Carbon steel

Part no.	Applicable bore size		Dd9	L ₁	L ₂	m	d Drill through	Included split pin	Included flat washer
	Clevis	Knuckle							
CDP-2A	40	—	10 ^{-0.040} _{-0.076}	46	38	4	3	$\phi 3 \times 18L$	Polished round 10
CDP-3A	50	40, 50, 63	12 ^{-0.050} _{-0.093}	55.5	47.5	4	3	$\phi 3 \times 18L$	Polished round 12
CDP-4A	63	—	16 ^{-0.050} _{-0.093}	71	61	5	4	$\phi 4 \times 25L$	Polished round 16
CDP-5A	—	80	18 ^{-0.050} _{-0.093}	76.5	66.5	5	4	$\phi 4 \times 25L$	Polished round 18
CDP-6A	80	100	20 ^{-0.065} _{-0.117}	83	73	5	4	$\phi 4 \times 30L$	Polished round 20
CDP-7A	100	—	25 ^{-0.065} _{-0.117}	88	78	5	4	$\phi 4 \times 36L$	Polished round 24

* Split pins and flat washers are included.

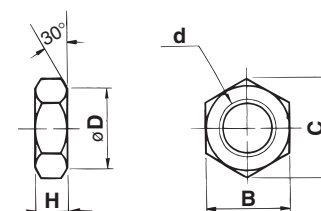
I Type Single Knuckle Joint



Material: Free cutting sulfur steel

Part no.	Applicable bore size	A	A ₁	E ₁	L ₁	MM	R ₁	U ₁	ND _{H10}	NX
I-04A	40	69	22	24	55	M14 x 1.5	15.5	20	12 ^{+0.070} ₀	16 ^{-0.1} _{-0.3}
I-05A	50, 63	74	27	28	60	M18 x 1.5	15.5	20	12 ^{+0.070} ₀	16 ^{-0.1} _{-0.3}
I-08A	80	91	37	36	71	M22 x 1.5	22.5	26	18 ^{+0.070} ₀	28 ^{-0.1} _{-0.3}
I-10A	100	105	37	40	83	M26 x 1.5	24.5	28	20 ^{+0.084} ₀	30 ^{-0.1} _{-0.3}

Rod End Nut (Standard)



Material: Rolled steel

Part no.	Applicable bore size	d	H	B	C	D
NT-04	40	M14 x 1.5	8	22	25.4	21
NT-05	50, 63	M18 x 1.5	11	27	31.2	26
NT-08	80	M22 x 1.5	13	32	37.0	31
NT-10	100	M26 x 1.5	16	41	47.3	39

Air Cylinder: Standard Type Double Acting, Double Rod Series CA2W

ø40, ø50, ø63, ø80, ø100

RoHS

How to Order

CA2W **L** **50** **-100** **Z** **-**

With auto switch **CDA2W** **L** **50** **-100** **Z** **-M9BW** **-**

With auto switch
(Built-in magnet)

Built-in Magnet Cylinder Model
If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CDA2WL40-100Z

Double rod

Mounting

B	Basic
L	Axial foot
F	Rod flange
T	Centre trunnion

Tube material

—	Aluminium tube
F*	Steel tube

* Not available with auto switch.

Port thread type

—	Rc
TN	NPT
TF	G

Bore size

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

Cylinder stroke [mm]
For details, refer to the next page.

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

Cylinder suffix

One end rod boot	—	Without rod boot
	J	Nylon tarpaulin
Both ends rod boot	K	Heat resistant tarpaulin
	—	Without rod boot
	JJ	Nylon tarpaulin
	KK	Heat resistant tarpaulin

Made to Order
For details, refer to the next page.

Number of auto switches

—	2 pcs.
S	1 pc.
3	3 pcs.
n	"n" pcs.

* When more than one symbol is to be specified, indicate them in alphabetical order.

Applicable Auto Switches/Refer to the Auto Switch Guide 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 (—)	1 (M)	3 (L)	5 (Z)								
Solid state auto switch	—	Grommet		3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC circuit	Relay, PLC				
				3-wire (PNP)				—	G59	●	—	●	○	○						
				2-wire	12 V	M9P		—	●	●	●	○	○							
						M9B		—	●	●	●	○	○							
		Terminal conduit		3-wire (NPN)	100 V, 200 V	J51	—	●	—	●	○	—	—							
				2-wire		G39C	G39	—	—	—	—									
	Diagnostic indication (2-colour indication)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	K39C	K39	—	—	—	—	IC circuit						
				3-wire (PNP)				M9NW	—	●	●	●	○		○					
				2-wire				M9PW	—	●	●	●	○		○					
				M9BW				—	●	●	●	○	○							
				3-wire (NPN)				—	K59W	●	—	●	○		○					
				3-wire (PNP)				M9NA**	—	○	○	●	○		○					
	Water resistant (2-colour indication)	Grommet		3-wire (PNP)	24 V	5 V, 12 V	—	M9PA**	—	○	○	●	○	○	—					
				2-wire				M9BA**	—	○	○	●	○	○						
				With diagnostic output (2-colour indication)					4-wire (NPN)	5 V, 12 V	F59F	G59F	●	—			●	○	○	IC circuit
									2-wire (Non-polar)	—	P3DW	—	●	—			●	●	○	—
	Reed auto switch	—	Grommet	Yes	3-wire (NPN equiv.)	24 V	12 V	—	A96	—	●	—	●	—	—		IC circuit	—		
					No				100 V or less	A93	—	●	—	●	●		—		—	
Yes					100 V, 200 V				A90	—	●	—	●	—	—	IC circuit				
No					200 V or less				A54	B54	●	—	●	●	—	—				
									A64	B64	●	—	●	—	—					
Terminal conduit					Yes					—	A33C	A33	—	—	—	—	—			
			100 V, 200 V	A34C			A34	—		—	—	—								
			A44C	A44			—	—		—	—	—								
			DIN terminal				A59W	B59W		●	—	●	—	—	Relay, PLC					
							—	—		—	—	—	—	—						
			Diagnostic indication (2-colour indication)	Grommet				—		—	A59W	B59W	●	—	●	—		—	Relay, PLC	

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

A water-resistant type cylinder is recommended for use in an environment which requires water resistance.

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

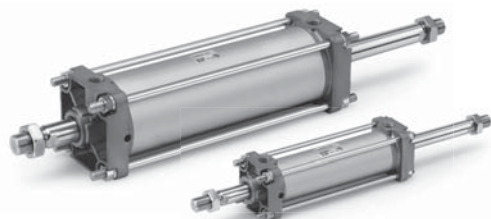
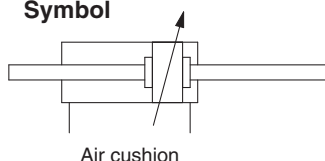
* Solid state auto switches marked with "○" are produced upon receipt of order.

* Since there are other applicable auto switches then listed above, refer to page 23 for details.

* For details about auto switches with pre-wired connector, refer to the Auto Switch Guide.

For the D-P3DW□, refer to the Auto Switch Guide.

* The D-A9□/M9□□□/P3DW□ auto switches are shipped together, (but not assembled). (However, auto switch mounting brackets are assembled for the D-A9□/M9□□□ before shipment.)


Symbol


Air cushion


Made to Order

(For details, refer to pages 25 to 37.)

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat resistant cylinder (-10 to 150°C)
-XC4	With heavy duty scraper
-XC5	Heat resistant cylinder (-10 to 110°C)
-XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC22	Fluororubber seal
-XC28	Compact flange made of SS400
-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

For special port location (-XC3), the mounting bracket and port location can be determined using the standard product corresponding to the operating conditions.

For made of stainless steel (-XC6), use made of stainless steel (with hard chrome plated piston rod) (-XC68) that the surface treatment is performed on the piston rod with the same specifications.

Refer to pages 19 to 23 for cylinders with auto switches.

- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Minimum stroke for auto switch mounting
- Operating range
- Auto switch mounting brackets/Part no.

Specifications

Bore size [mm]	40	50	63	80	100
Fluid	Air				
Action	Double acting				
Proof pressure	1.5 MPa				
Maximum operating pressure	1.0 MPa				
Minimum operating pressure	0.08 MPa				
Piston speed	50 to 500 mm/s				
Ambient and fluid temperature	Without auto switch: -10 to 70°C* With auto switch : -10 to 60°C*				
Cushion	Air cushion				
Stroke length tolerance	Up to 250 st: $^{+1.0}_0$ 251 to 1000 st: $^{+1.4}_0$				
Lubrication	Not required (Non-lube)				
Mounting	Basic, Axial foot, Rod flange, Centre trunnion				

* No freezing

Standard Strokes

Bore size	Standard stroke	Max. manufacturable stroke [mm]
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500	1000
50, 63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600	1000
80, 100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700	1000

* Intermediate strokes not listed above are produced upon receipt of order.
The minimum stroke with rod boot is 20 mm.

Minimum Stroke for Auto Switch Mounting

⚠ Caution

The minimum stroke for mounting varies with the auto switch type and cylinder mounting type. In particular, the centre trunnion type needs careful attention. (For details, refer to pages 21 and 22.)

Rod Boot Material

Symbol	Rod boot material	Max. ambient temperature
J	Nylon tarpaulin	70°C
K	Heat resistant tarpaulin	110°C*

* Maximum ambient temperature for the rod boot

Accessories

Mounting		Basic	Foot	Flange	Centre trunnion
Standard	Rod end nut	●	●	●	●
	Single knuckle joint	●	●	●	●
	Double knuckle joint (with pin)	●	●	●	●
	With rod boot	●	●	●	●

* The above brackets have the same dimensions as those for the standard double acting single rod CA2 series. Refer to page 11.

Weights/Aluminium Tube (Steel Tube)

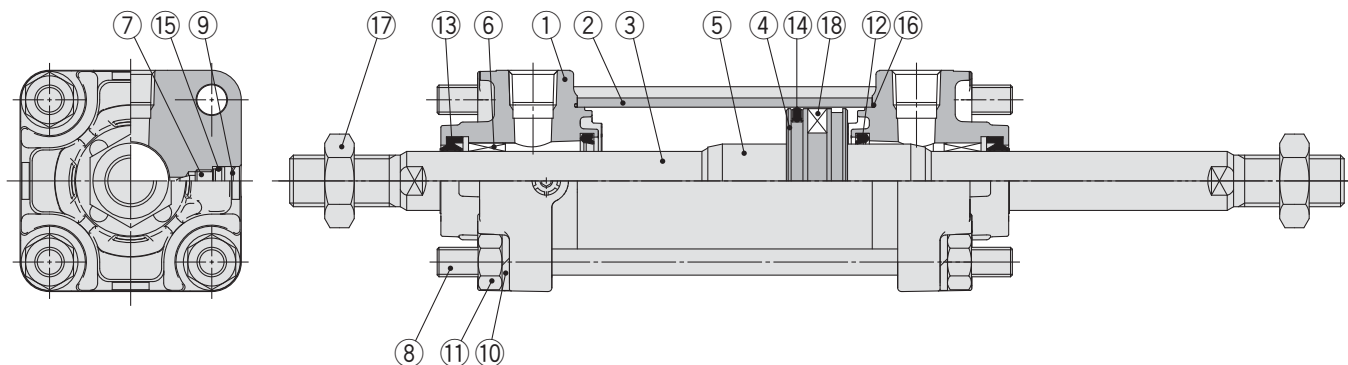
							[kg]
Bore size [mm]			40	50	63	80	100
Basic weight	Basic	Aluminium tube	0.92	1.38	1.86	3.32	4.55
		Steel tube	0.97	1.44	1.96	3.5	4.83
	Axial foot	Aluminium tube	1.11	1.6	2.19	3.99	5.54
		Steel tube	1.16	1.66	2.29	4.17	5.82
	Flange	Aluminium tube	1.29	1.83	2.65	4.77	6.47
		Steel tube	1.34	1.89	2.75	4.95	6.75
	Trunnion	Aluminium tube	1.28	1.86	2.66	4.87	6.83
		Steel tube	1.33	1.92	2.76	5.05	7.11
Additional weight per 50 mm of stroke	All mounting brackets	Aluminium tube	0.28	0.37	0.44	0.66	0.86
		Steel tube	0.35	0.47	0.55	0.89	1.15
Accessories	Single knuckle		0.23	0.26	0.26	0.60	0.83
	Double knuckle (with pin)		0.37	0.43	0.43	0.87	1.27

Calculation: (Example) **CA2WL40-100Z**
(Axial foot, ø40, 100 stroke)

- Basic weight1.18 (Axial foot, ø40)
 - Additional weight ...0.28/50 stroke
 - Cylinder stroke100 stroke
- $1.18 + 0.28 \times 100/50 = 1.74 \text{ kg}$

Series CA2W

Construction



Component Parts

No.	Description	Material	Q'ty	Note
1	Rod cover	Aluminium die-casted	2	Chromated
2	Cylinder tube	Aluminium alloy	1	Hard anodised
3	Piston rod	Carbon steel	1	Hard chrome plating
4	Piston	Aluminium alloy	1	
5	Cushion ring	Aluminium alloy	2	Anodised
6	Bushing	Bearing alloy	1	
7	Cushion valve	Steel wire	2	Trivalent zinc chromated
8	Tie-rod	Carbon steel	4	Trivalent zinc chromated
9	Retaining ring	Spring steel	2	Phosphate coating
10	Spring washer	Steel wire	8	Trivalent zinc chromated
11	Tie-rod nut	Rolled steel	8	Trivalent zinc chromated
12	Cushion seal	Urethane	2	
13	Rod seal	NBR	2	
14	Piston seal	NBR	1	
15	Cushion valve seal	NBR	2	
16	Cylinder tube gasket	NBR	2	
17	Rod end nut	Rolled steel	2	Trivalent zinc chromated
18	Magnet	—	(1)	

Replacement Parts/Seal Kit

Bore size [mm]	Kit no. Pneumatic type	Contents
40	CA2W40Z-PS	Set of the nos. ⑫, ⑬, ⑭, ⑯
50	CA2W50Z-PS	
63	CA2W63Z-PS	
80	CA2W80Z-PS	
100	CA2W100Z-PS	

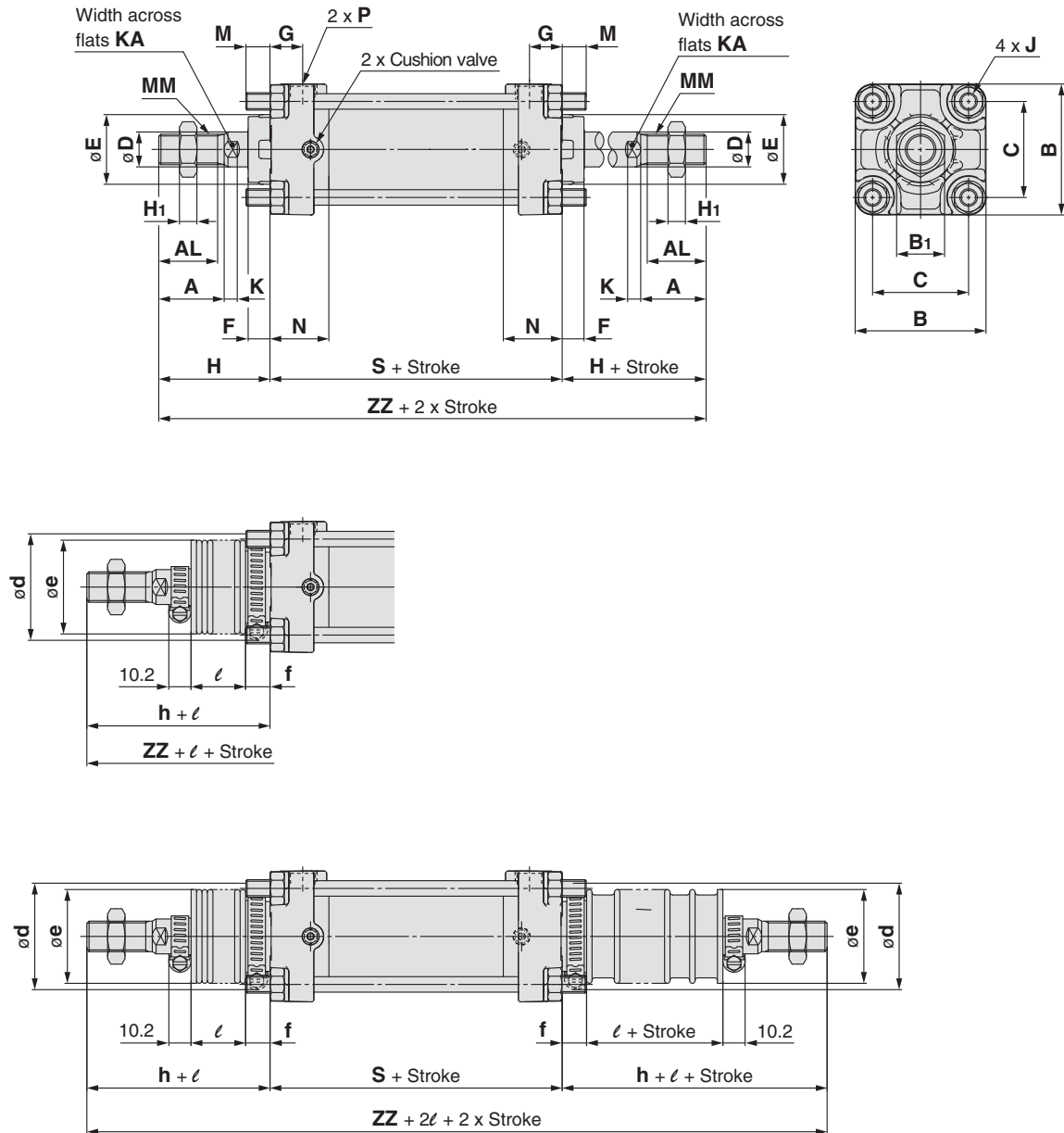
* Do not disassemble the trunnion type. Refer to page 38.

* Seal kit includes ⑫, ⑬, ⑭, ⑯. Order the seal kit based on each bore size.

* Seal kit includes a grease pack (ø40, 50: 10 g, ø63, 80: 20 g, ø100: 30 g).

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)

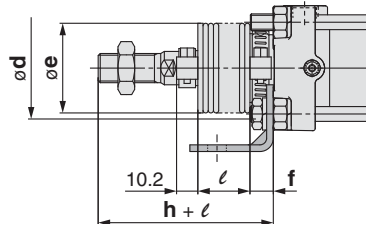
Basic: CA2WB

 Standard
 Double Acting, Double Rod

CA2W
Auto Switch
Made to Order

Bore size [mm]	A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	M	MM
40	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	11	M14 x 1.5
50	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	11	M18 x 1.5
63	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	14	M18 x 1.5
80	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	17	M22 x 1.5
100	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	17	M26 x 1.5

Bore size [mm]	N	P	S	Without rod boot		With rod boot (Single side)						(Both sides)	
				H	ZZ	d	e	f	h	ℓ	ZZ	ZZ	ZZ
40	27	1/4	84	51	186	56	43	11.2	59	M14 x 1.5	194	202	
50	30	3/8	90	58	206	64	52	11.2	66	M18 x 1.5	214	222	
63	31	3/8	98	58	214	64	52	11.2	66	M18 x 1.5	222	230	
80	37	1/2	116	71	258	76	65	12.5	80	M22 x 1.5	267	276	
100	40	1/2	126	72	270	76	65	14.0	81	M26 x 1.5	279	288	

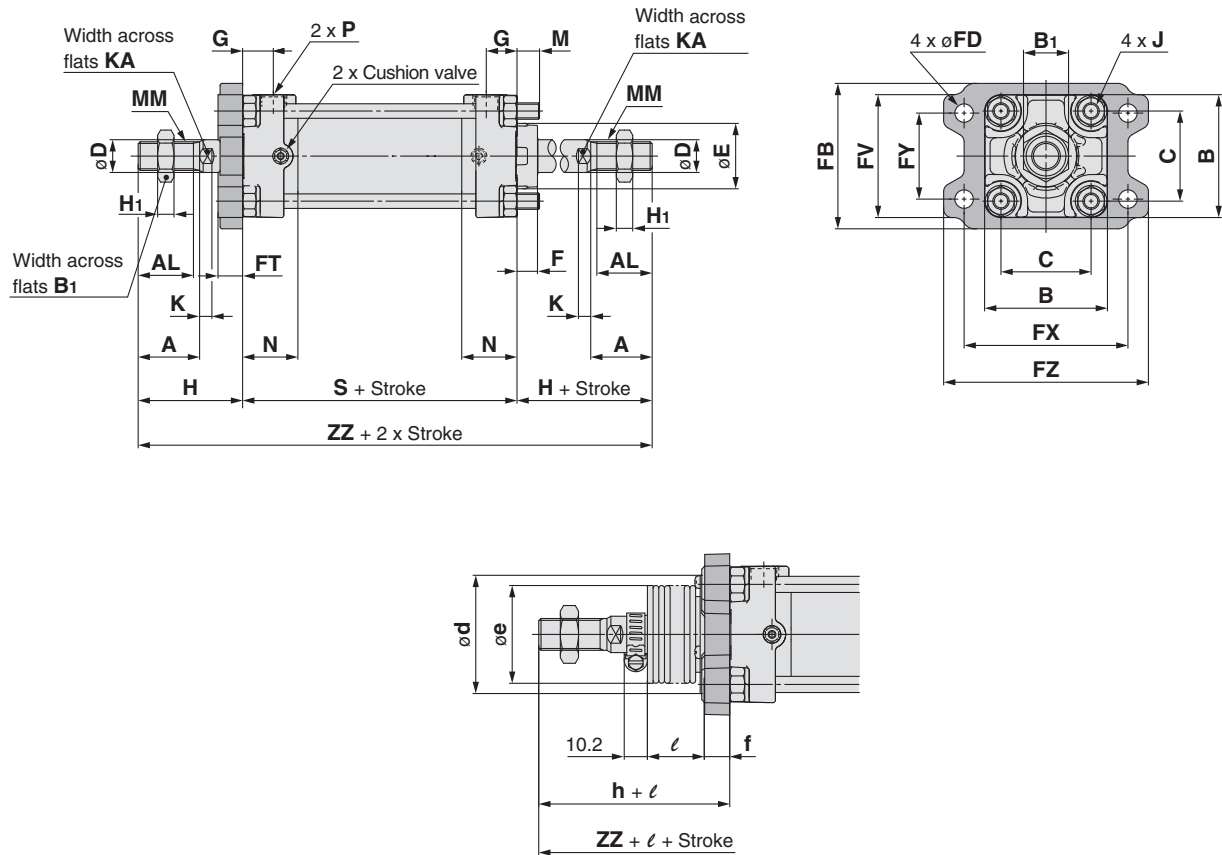
[mm]



[mm]																		
Bore size [mm]	A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	LD	LH	LS	LT	LX
40	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	9	40	138	3.2	42
50	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	9	45	144	3.2	50
63	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	11.5	50	166	3.2	59
80	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	13.5	65	204	4.5	76
100	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	13.5	75	212	6	92

Bore size [mm]	LY	MM	N	P	S	X	Y	Without rod boot		With rod boot (Single side)						(Both sides)	
								H	ZZ	d	e	f	h	ℓ	ZZ	ZZ	
40	70	M14 x 1.5	27	1/4	84	27	13	51	186	56	43	11.2	59	1/4 stroke	194	202	
50	80	M18 x 1.5	30	3/8	90	27	13	58	206	64	52	11.2	66	1/4 stroke	214	222	
63	93	M18 x 1.5	31	3/8	98	34	16	58	214	64	52	11.2	66	1/4 stroke	222	230	
80	116	M22 x 1.5	37	1/2	116	44	16	71	258	76	65	12.5	80	1/4 stroke	267	276	
100	133	M26 x 1.5	40	1/2	126	43	17	72	270	76	65	14.0	81	1/4 stroke	279	288	

Rod Flange: CA2WF



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★ For installing an air cylinder, when a hole must be made to accommodate the rod portion, make sure to machine a hole that is larger than the outer diameter of the boot mounting bracket ød.

 Standard
 Double Acting, Single Rod
CA2

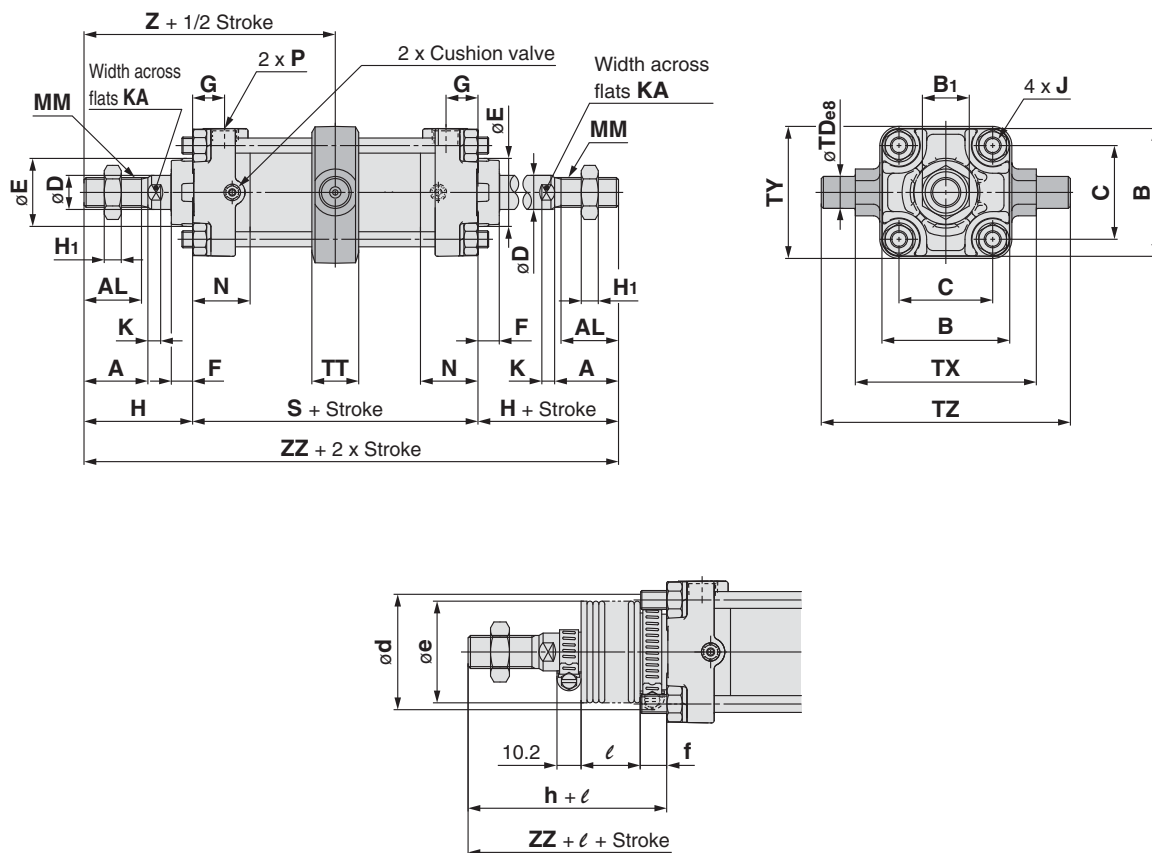
 Double Acting, Double Rod
CA2W

Auto Switch

Made to Order

Series CA2W

Center Trunnion: CA2WT



[mm]																		
Bore size [mm]	A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	MM	N	P	S	TD _{e8}
40	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	M14 x 1.5	27	1/4	84	15 ^{-0.032} _{-0.059}
50	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	M18 x 1.5	30	3/8	90	15 ^{-0.032} _{-0.059}
63	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	M18 x 1.5	31	3/8	98	18 ^{-0.032} _{-0.059}
80	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	M22 x 1.5	37	1/2	116	25 ^{-0.040} _{-0.073}
100	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	M26 x 1.5	40	1/2	126	25 ^{-0.040} _{-0.073}

Bore size [mm]	TT	TX	TY	TZ	Without rod boot			With rod boot (Single side)							(Both sides)	
					H	Z	ZZ	d	e	f	h	ℓ	Z	ZZ	Z	ZZ
40	22	85	62	117	51	93	186	56	43	11.2	59	1/4 stroke	101	194	101	202
50	22	95	74	127	58	103	206	64	52	11.2	66	1/4 stroke	111	214	111	222
63	28	110	90	148	58	107	214	64	52	11.2	66	1/4 stroke	115	222	115	230
80	34	140	110	192	71	129	258	76	65	12.5	80	1/4 stroke	138	267	138	276
100	40	162	130	214	72	135	270	76	65	14.0	81	1/4 stroke	144	279	144	288

* Do not disassemble the trunnion type. Refer to page 38.

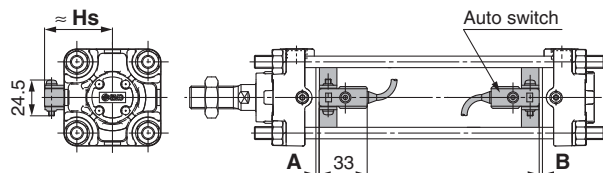
Series CA2

Auto Switch Mounting

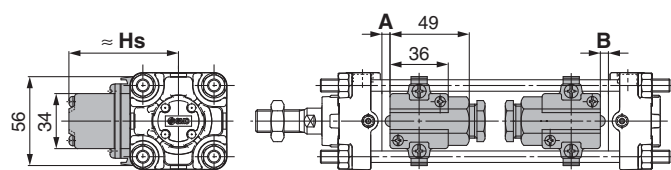
Auto Switch Proper Mounting Position (Detection at stroke end) and Its Mounting Height

<Band mounting>

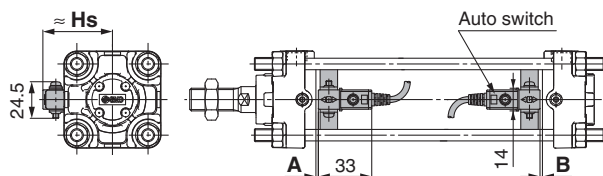
D-B5□/B64/B59W



D-A3□
D-G39/K39



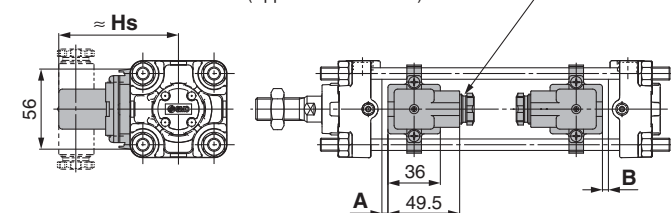
D-G5□/K59
D-G5□W/K59W



D-G5BAL
D-G59F/G5NTL

D-A44

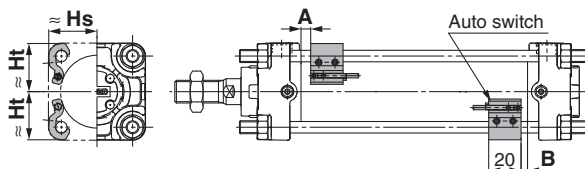
G1/2
(Applicable cable O.D.) ø6.8 to ø11.5



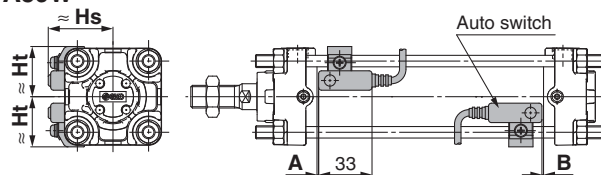
<Tie-rod mounting>

D-A9□/A9□V
D-M9□/M9□V
D-M9□W/M9□WV
D-M9□A/M9□AV

D-Z7□/Z80
D-Y59□/Y69□/Y7P/Y7PV
D-Y7□W/Y7□WV
D-Y7BA

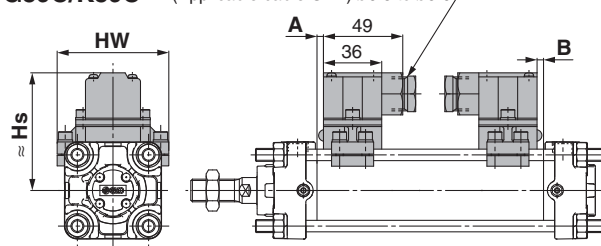


D-A5□/A6□
D-A59W



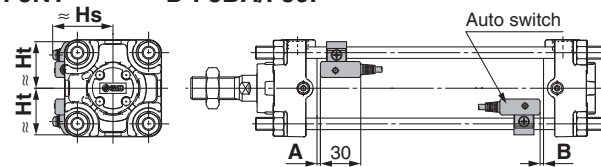
D-A3□C
D-G39C/K39C

G1/2
(Applicable cable O.D.) ø6.8 to ø9.6



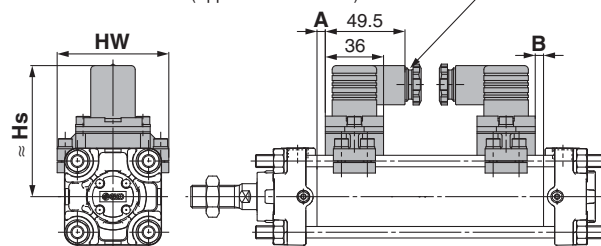
D-F5□/J5□
D-F5NT

D-F5□W/J59W
D-F5BA/F59F

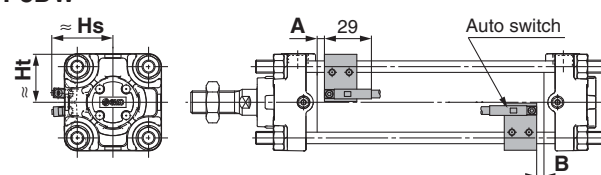


D-A44C

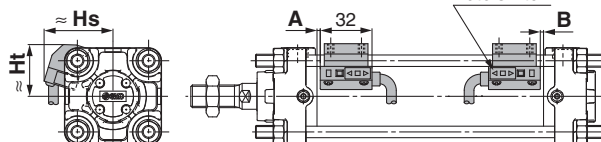
G1/2
(Applicable cable O.D.) ø6.8 to ø11.5



D-P3DW



D-P4DW



Series CA2

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

Auto Switch Proper Mounting Position

[mm]

Auto switch model	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-M9□AV		D-A9□ D-A9□V D-J51		D-Y59□ D-Y69□ D-Y7P D-Y7PV D-Y7□W D-Y7□WV D-Y7BA D-Z7□ D-Z80 D-B59W		D-P3DW		D-P4DW		D-F5□ D-J59 D-F59F D-F5□W D-J59W D-F5BA		D-A59W		D-F5NT		D-G39 D-G39C D-K39 D-K39C D-A5□ D-A6□ D-A3□ D-A3□C D-A44 D-A44C		D-G5□ D-K59 D-G5NT D-G5□W D-K59W D-G5BA D-G59F		D-B5□ D-B64	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
40	9	9	5	5	2.5	2.5	4.5	4.5	2	2	5.5	5.5	3	3	10.5	10.5	0	0	1	1	0	0
50	9.5	8.5	5.5	4.5	3	2	5	4	2.5	1.5	6	5	3.5	2.5	11	10	0	0	1.5	0.5	0	0
63	12.5	11.5	8.5	7.5	6	5	3	2.5	5.5	4.5	9	8	6.5	5.5	14	13	2.5	1.5	4.5	3.5	3	2
80	16.5	13.5	12.5	9.5	10	7	7.5	4	9.5	6.5	13	10	10.5	7.5	18	15	6.5	3.5	8.5	5.5	7	4
100	18	16	14	12	11.5	9.5	9	6.5	11	9	14.5	12.5	12	10	19.5	17.5	8	6	10	8	8.5	6.5

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

Auto Switch Mounting Height

[mm]

Auto switch model	D-A9□ D-M9□ D-M9□W D-M9□A		D-A9□V		D-M9□V D-M9□WV D-M9□AV		D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7BA D-Y7□W		D-Y69□ D-Y7PV D-Y7□WV		D-P3DW		D-P4DW		D-B5□ D-B64 D-B59W D-G5□ D-K59 D-G5NTL D-G5□W D-K59W D-G5BAL D-G59F	D-A3□ D-G39 D-K39	D-A44	D-A5□ D-A6□ D-A59W		D-F5□ D-J59 D-F5□W D-J59W D-F5BA D-F59F D-F5NT		D-A3□C D-G39C D-K39C		D-A44C	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Hs	Hs	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
40	30	30	31	30	34	30	30	30	30	30	38	30	42.5	33	37	71.5	81.5	38.5	31.5	38	31.5	73	69	81	69
50	34	34	35	34	38	34	34	34	34	34	42	34	46.5	37.5	42	76.5	86.5	42	35.5	42	35.5	78.5	77	86.5	77
63	41	41	41.5	41	44	41	41	41	41	41	49	41	52	43	49	83.5	93.5	46.5	43	47	43	85.5	91	93.5	91
80	49.5	49	50	49	52.5	49	49.5	49	49.5	49	56	49	58.5	51.5	57.5	92	102	53.5	51	53.5	51	94	107	102	107
100	56.5	56	58.5	56	61	56	56.5	55.5	57.5	55.5	65	56	66	58.5	68	102.5	112.5	61.5	57.5	61	57.5	104	121	112	121

Operating Range

[mm]

Auto switch model	Bore size				
	40	50	63	80	100
D-A9□/A9□V	7.5	8.5	9.5	9.5	10.5
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	4.5	5	5.5	5	6
D-Z7□/Z80	8.5	7.5	9.5	9.5	10.5
D-A3□/A44 D-A3□C/A44C	9	10	11	11	11
D-A5□/A6□					
D-B5□/B64					
D-A59W	13	13	14	14	15
D-B59W	14	14	17	16	18

Auto switch model	Bore size				
	40	50	63	80	100
D-Y59□/Y69□ D-Y7P/Y7□V D-Y7□W/Y7□WV D-Y7BA	8	7	5.5	6.5	6.5
D-F5□/J5□/F5□W D-J59W/F5BA D-F5NT/F59F	4	4	4.5	4.5	4.5
D-G5□/K59/G5□W D-K59W/G5BA D-G5NT/G59F	5	6	6.5	6.5	7
D-G5NBL	35	35	40	40	40
D-G39/K39 D-G39C/K39C	9	9	10	10	11
D-P3DW	4.5	5	6	5.5	6
D-P4DW	4	4	4.5	4	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.

Minimum Stroke for Auto Switch Mounting

n: Number of auto switches [mm]								
Auto switch model	Number of auto switches		Brackets other than centre trunnion	Centre trunnion				
				ø40	ø50	ø63	ø80	ø100
D-A9□	2 (Different surfaces and same surface) 1		15	75		80	85	90
	n		$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$75 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-A9□V	2 (Different surfaces and same surface) 1		10	50		55	60	65
	n		$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$50 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$55 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-M9□ D-M9□W	2 (Different surfaces and same surface) 1		15	80		85	90	95
	n		$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-M9□V D-M9□WV	2 (Different surfaces and same surface) 1		10	55		60	65	70
	n		$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$55 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$70 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-M9□A	2 (Different surfaces and same surface) 1		15	80		85	95	100
	n		$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-M9□AV	2 (Different surfaces and same surface) 1		10	60		65	70	75
	n		$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$70 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-A5□/A6 D-F5□/J5 D-F5□W/J59W D-F5BA/F59F	2 (Different surfaces and same surface) 1		15	90		100	110	120
	n (Same surface)		$15 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$90 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$100 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-A59W	2 (Different surfaces and same surface) 1		20	90		100	110	120
	n (Same surface)		$20 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$90 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$100 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
	1		15	90		100	110	120
D-F5NT	2 (Different surfaces and same surface) 1		25	110		120	130	140
	n (Same surface)		$25 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$130 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$140 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-B5□/B64 D-G5□/K59 D-G5□W D-K59W D-G5BA D-G59F D-G5NT	2	Different surfaces	15	90		100	110	
		Same surface	75					
	n	Different surfaces	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$90 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$100 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$110 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	
		Same surface	$75 + 50 (n - 2)$ (n = 2, 3, 4...)	$90 + 50 (n - 2)$ (n = 2, 4, 6, 8...) Note 1)		$100 + 50 (n - 2)$ (n = 2, 4, 6, 8...) Note 1)	$110 + 50 (n - 2)$ (n = 2, 4, 6, 8...) Note 1)	
	1		10	90		100	110	
D-B59W	2	Different surfaces	20	90		100	110	
		Same surface	75					
	n	Different surfaces	$20 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$90 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$100 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$110 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	
		Same surface	$75 + 50 (n - 2)$ (n = 2, 3, 4...)	$90 + 50 (n - 2)$ (n = 2, 4, 6, 8...) Note 1)		$100 + 50 (n - 2)$ (n = 2, 4, 6, 8...) Note 1)	$110 + 50 (n - 2)$ (n = 2, 4, 6, 8...) Note 1)	
	1		15	90		100	110	

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

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

Standard
Double Acting, Single Rod
CA2

Double Acting, Double Rod
CA2W

Auto Switch

Made to Order

Minimum Stroke for Auto Switch Mounting

n: Number of auto switches [mm]

Auto switch model	Number of auto switches	Brackets other than centre trunnion	Center trunnion				
			ø40	ø50	ø63	ø80	ø100
D-A3□ D-G39 D-K39	2	Different surfaces	35		75	80	90
		Same surface	100		100	100	100
	n	Different surfaces	$35 + 30(n - 2)$ (n = 2, 3, 4...)		$75 + 30(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$80 + 30(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$90 + 30(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}
		Same surface	$100 + 100(n - 2)$ (n = 2, 3, 4...)		$100 + 100(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}		
	1	10	75		80	90	
D-A44	2	Different surfaces	35		75	80	90
		Same surface	55		100	100	100
	n	Different surfaces	$35 + 3(n - 2)$ (n = 2, 3, 4...)		$75 + 30(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$80 + 30(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$90 + 30(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}
		Same surface	$55 + 50(n - 2)$ (n = 2, 3, 4...)		$75 + 50(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$80 + 50(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$90 + 50(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}
	1	10	75		80	90	
D-A3□C D-G39C D-K39C	2	Different surfaces	20		75	80	90
		Same surface	100		100	100	100
	n	Different surfaces	$20 + 35(n - 2)$ (n = 2, 3, 4...)		$75 + 35(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$80 + 35(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$90 + 35(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}
		Same surface	$100 + 100(n - 2)$ (n = 2, 3, 4, 5...)		$100 + 100(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}		
	1	10	75		80	90	
D-A44C	2	Different surfaces	20		75	80	90
		Same surface	55		100	100	100
	n	Different surfaces	$20 + 35(n - 2)$ (n = 2, 3, 4...)		$75 + 35(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$80 + 35(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$90 + 35(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}
		Same surface	$55 + 50(n - 2)$ (n = 2, 3, 4...)		$75 + 50(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$80 + 50(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$90 + 50(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}
	1	10	75		80	90	
D-Z7□/Z80 D-Y59□/Y7P D-Y7□W	2 (Different surfaces and same surface) 1	15	80	85	90	95	105
	n	$15 + 40 \frac{(n - 2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1)}	$80 + 40 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}	$85 + 40 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}	$90 + 40 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}	$95 + 40 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}	$105 + 40 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}
D-Y69□/Y7PV D-Y7□WV	2 (Different surfaces and same surface) 1	10	65		75	80	90
	n	$10 + 30 \frac{(n - 2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1)}	$65 + 30 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}		$75 + 30 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}	$80 + 30 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}	$90 + 30 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}
D-Y7BA	2 (Different surfaces and same surface) 1	20	95		100	105	110
	n	$20 + 45 \frac{(n - 2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1)}	$95 + 45 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}		$100 + 45 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}	$105 + 45 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}	$110 + 45 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}
D-P3DW	2 (Different surfaces and same surface) 1	15	85				
	n	$15 + 50 \frac{(n - 2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1)}	$85 + 50 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}				
D-P4DW	2 (Different surfaces and same surface) 1	15	120		130	140	
	n	$15 + 65 \frac{(n - 2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1)}	$120 + 65 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}		$130 + 65 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}	$140 + 65 \frac{(n - 4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2)}	

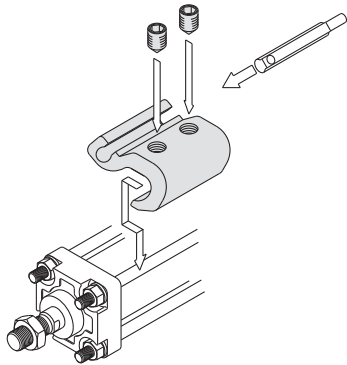
Note 1) When "n" is an odd number, an even number that is one larger than this odd number is used for the calculation.

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

Auto Switch Mounting Brackets/Part No.

<Tie-rod mounting>

Auto switch model	Bore size (mm)				
	40	50	63	80	100
D-A9□/A9□V D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	BA7-040	BA7-040	BA7-063	BA7-080	BA7-080
D-A5□/A6□ D-A59W D-F5□/J5□ D-F5□W/J59W D-F59F/F5NT	BT-04	BT-04	BT-06	BT-08	BT-08
D-A3□C/A44C D-G39C/K39C	BA3-040	BA3-050	BA3-063	BA3-080	BA3-100
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BA	BA4-040	BA4-040	BA4-063	BA4-080	BA4-080
D-P3DW	BMB9-050S	BMB9-050S	BA9T-063S	BA9T-080S	BA9T-080S
D-P4DW	BAP2-040	BAP2-040	BAP2-063	BAP2-080	BAP2-080



* The figure shows the mounting example for the D-A9□(V)/M9□(V)/M9□W(V)/M9□A(V)L types.

<Band mounting>

Auto switch model	Bore size (mm)				
	40	50	63	80	100
D-A3□/A44 D-G39/K39	BDS-04M	BDS-05M	BMB1-063	BMB1-080	BMB1-100
D-B5□/B64 D-B59W D-G5□/K59 D-G5□W/K59W D-G59F D-G5NT D-G5NB	BH2-040	BA5-050	BAF-06	BAF-08	BAF-10

Note 1) Auto switch brackets are included in the D-A3□C/A44C/G39C/K39C types. Specify the part number as follows depending on the cylinder size when ordering.
(Example) ø40: D-A3□C-4, ø50: D-A3□C-5, ø63: D-A3□C-6, ø80: D-A3□C-8, ø100: D-A3□C-10

[Stainless Steel Mounting Screw]

The following stainless steel mounting screw kit (including set screws) is also 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 types
BBA3: For D-B5/B6/G5/K5 types

Note 2) Refer to the **WEB catalog** or Best Pneumatics No. 2 for details on the BBA1 and BBA3.

The above stainless steel screws are used when a cylinder is shipped with D-F5BA or G5BA auto switches. When only an auto switch is shipped independently, the BBA1 or BBA3 is attached.

Note 3) When using the D-M9□A(V) or Y7BA, do not use the steel set screws which are included with the auto switch mounting brackets above (BA7-□□□, BA4-□□□). Order a stainless steel screw kit (BBA1) separately, and use the M4 x 6L stainless steel set screws included in the BBA1.

Note 4) There is a difference in the cylinder tube thickness depending on the cylinder model. When a band mounting type is used as an applicable auto switch and a cylinder model is changed, use caution.

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

Refer to the **Auto Switches Guide** for the detailed specifications.

Type	Model	Electrical entry	Features
Reed	D-A93V/A96V	Grommet (Perpendicular)	—
	D-A90V		Without indicator light
	D-A53/A56/B53/Z73/Z76	Grommet (In-line)	—
	D-A67/Z80		Without indicator light
Solid state	D-M9NV/M9PV/M9BV	Grommet (Perpendicular)	—
	D-Y69A/Y69B/Y7PV		—
	D-M9NWV/M9PWV/M9BWV		Diagnostic indication (2-color indication)
	D-Y7NWV/Y7PWV/Y7BWV		Water resistant (2-color)
	D-M9NAV/M9PAV/M9BAV		—
	D-Y59A/Y59B/Y7P	Grommet (In-line)	—
	D-F59/F5P/J59		—
	D-Y7NW/Y7PW/Y7BW		Diagnostic indication (2-color indication)
	D-F59W/F5PW/J59W		Water resistant (2-color)
	D-F5BA/Y7BA		With timer
	D-F5NT/G5NT		—
	D-P5DW		Magnetic field resistant (2-color)

* With pre-wired connector is also available for solid state auto switches. For details, refer to the **Auto Switches Guide**.

* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H/Y7G/Y7H) are also available. For details, refer to **Auto Switches Guide**.

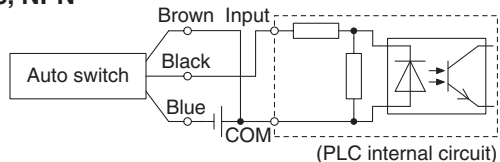
* Wide range detection type, solid state auto switch (D-G5NBL) is also available. For details, refer to the **Auto Switches Guide**.

Prior to Use

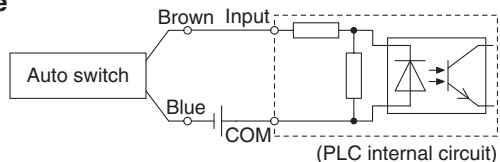
Auto Switch Connection and Example

Sink Input Specifications

3-wire, NPN

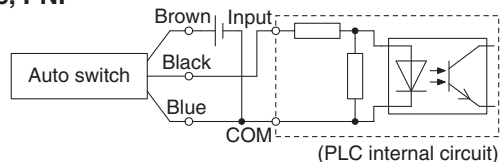


2-wire

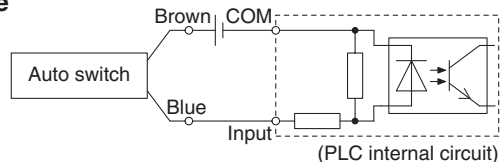


Source Input Specifications

3-wire, PNP



2-wire

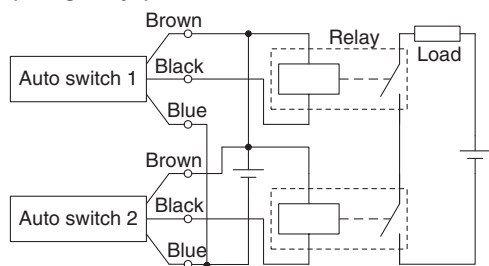


Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

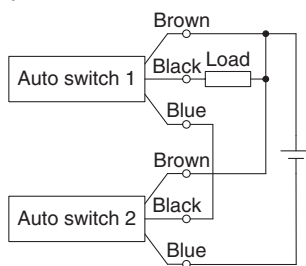
Example of AND (Series) and OR (Parallel) Connection

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

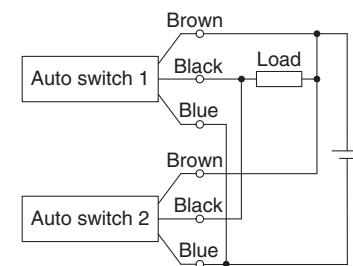
3-wire AND connection for NPN output (Using relays)



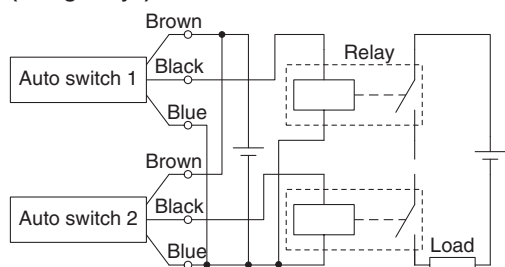
(Performed with auto switches only)



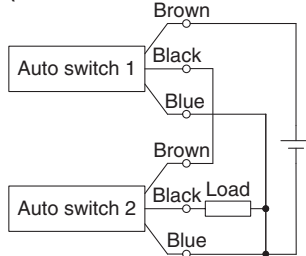
3-wire OR connection for NPN output



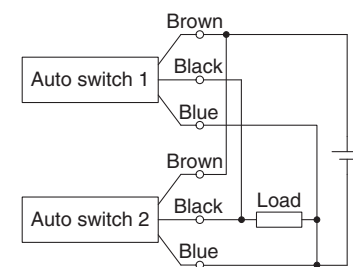
3-wire AND connection for PNP output (Using relays)



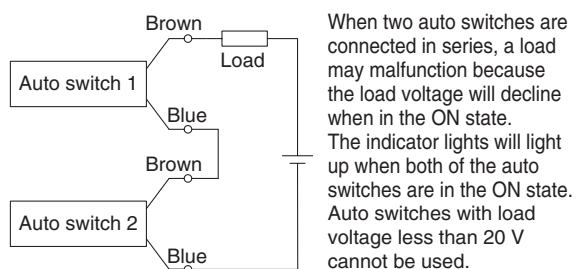
(Performed with auto switches only)



3-wire OR connection for PNP output



2-wire AND connection

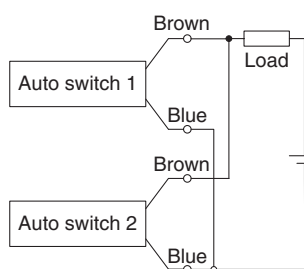


When two auto switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state. The indicator lights will light up when both of the auto switches are in the ON state. Auto switches with load voltage less than 20 V cannot be used.

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

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

2-wire OR connection



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

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

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

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



Simple Specials

The following special specifications can be ordered as a simplified Made-to-Order.

There is a specification sheet available on paper and CD-ROM. Please contact your SMC sales representatives if necessary.

Symbol	Specifications	CA2 (Standard type) Double acting		Page
		Single rod	Double rod	
-XA0 to 30	Change of rod end shape	●	●	Page 26
-XC14	Change of trunnion bracket mounting position	●	●	Page 28
-XC15	Change of tie-rod length	●	●	Page 28

Made to Order

Symbol	Specifications	CA2 (Standard type) Double acting		Page
		Single rod	Double rod	
-XB6	Heat resistant cylinder (−10 to 150°C)	●	●	Page 29
-XC4	With heavy duty scraper	●	●	Page 29
-XC5	Heat resistant cylinder (−10 to 110°C)	●	●	Page 29
-XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel	●	●	Page 30
-XC8	Adjustable stroke cylinder/Adjustable extension type	●	●	Page 30
-XC9	Adjustable stroke cylinder/Adjustable retraction type	●	●	Page 31
-XC10	Dual stroke cylinder/Double rod type	●	●	Page 31
-XC11	Dual stroke cylinder/Single rod type	●	●	Page 32
-XC12	Tandem cylinder	●	●	Page 33
-XC22	Fluororubber seal	●	●	Page 33
-XC27	Double clevis and double knuckle joint pins made of stainless steel	●	●	Page 33
-XC28	Compact flange made of SS400	●	●	Page 34
-XC29	Double knuckle joint with spring pin	●	●	Page 34
-XC30	Rod trunnion	●	●	Page 35
-XC35	With coil scraper	●	●	Page 35
-XC65	Made of stainless steel (Combination of XC7 and XC68)	●	●	Page 35
-XC68	Made of stainless steel (with hard chrome plated piston rod)	●	●	Page 36
-XC85	Grease for food processing equipment	●	●	Page 36
-X1184	Cylinder with heat resistant reed auto switch (−10 to 120°C)	●	●	Page 37

1 Change of Rod End Shape

-XA0 to XA30

Series		Action	Symbol for change of rod end shape	Note
CA2-Z	Standard type	CA2	Double acting, Single rod	XA0 to 30
		CA2W	Double acting, Double rod	XA0 to 30

Precautions

- SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
- Standard dimensions marked with "*" will be as follows to the rod diameter (D). Enter any special dimension you desire.

- $D \leq 6 \rightarrow D - 1 \text{ mm}$, $6 < D \leq 25 \rightarrow D - 2 \text{ mm}$, $D > 25 \rightarrow D - 4 \text{ mm}$
- In the case of double rod type and single acting retraction type, enter the dimensions when the rod is retracted.

Symbol: A0	Symbol: A1	Symbol: A2	Symbol: A3
Symbol: A4	Symbol: A5	Symbol: A6	Symbol: A7
Symbol: A8	Symbol: A9	Symbol: A10	Symbol: A11
Symbol: A12	Symbol: A13	Symbol: A14	Symbol: A15

<p>Symbol: A16</p>	<p>Symbol: A17</p>	<p>Symbol: A18</p>	<p>Symbol: A19</p>
<p>Symbol: A20</p>	<p>Symbol: A21</p>	<p>Symbol: A22</p>	<p>Symbol: A23</p>
<p>Symbol: A24</p>	<p>Symbol: A25</p>	<p>Symbol: A26</p>	<p>Symbol: A27</p>
<p>Symbol: A28</p>	<p>Symbol: A29</p>	<p>Symbol: A30</p>	

2 Change of Trunnion Bracket Mounting Position

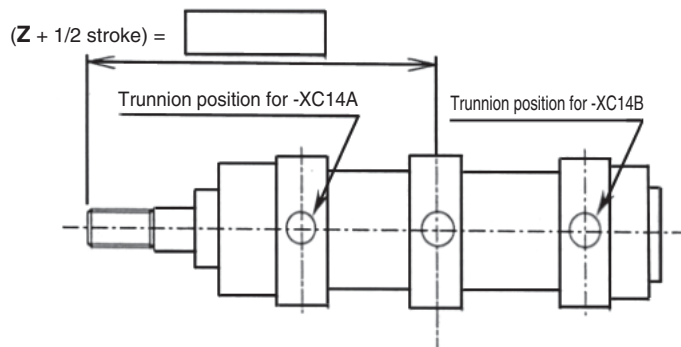
Symbol
-XC14

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

Series	Description	Model	Action	Note
CA2-Z	Standard type	CA2	Double acting, Single rod	
		CA2W	Double acting, Double rod	

Precautions

1. Specify "Z + 1/2 stroke" in the case the trunnion bracket position is not -XC14A, B or trunnion is not a centre 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.



Symbol Bore size		Z + 1/2 stroke				
		For -XC14A	For -XC14B	For -XC14		Reference Standard (Centre trunnion)
Minimum	Maximum					
40	89	97 + Stroke	89.5	96.5 + Stroke	93 + 1/2 stroke	1
50	99	107 + Stroke	99.5	106.5 + Stroke	103 + 1/2 stroke	1
63	103	111 + Stroke	103.5	110.5 + Stroke	107 + 1/2 stroke	1
80	125	133 + Stroke	125.5	132.5 + Stroke	129 + 1/2 stroke	1
100	132	138 + Stroke	132.5	137.5 + Stroke	135 + 1/2 stroke	1

3 Change of Tie-rod Length

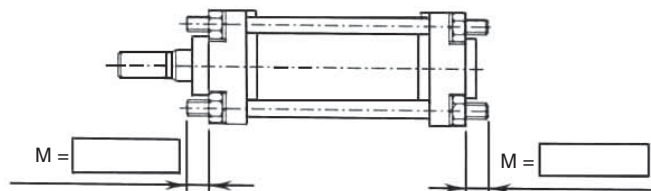
Symbol
-XC15

Cylinder with M dimension for tie-rod length changed from the standard length.

Series	Description	Model	Action	Note
CA2-Z	Standard type	CA2	Double acting, Single rod	
		CA2W	Double acting, Double rod	

Precautions

1. To order, specify the M dimension as well as the part number.
2. SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
3. Tie-rod length changeable range is described in the below.
4. The M dimension of the bracket mounting side of Flange (F, G), Clevis (C, D) types cannot be specified.



Tie-rod Length Changeable Range

Bore size	All bore size
M Min.	0
M Max.	300



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 from −10°C.

Applicable Series

Series	Description	Model	Action	Note
CA2-Z	Standard type	CA2	Double acting, Single rod	Except with auto switch
		CA2W	Double acting, Double rod	Except with auto switch

Note 1) Operate without lubrication from a pneumatic system lubricator.
 Note 2) Please contact SMC for details on the maintenance intervals for this cylinder, which differ from those of the standard cylinder.
 Note 3) In principle, it is impossible to make built-in magnet type and the one with auto switch. But, as for the one with auto switch, and the heat resistant cylinder with heat resistant auto switch, please contact SMC.
 Note 4) Piston speed is ranged from 50 to 500 mm/s.

How to Order

Standard model no. **- XB6**

Heat resistant cylinder

Specifications

Ambient temperature range	−10°C to 150°C
Seals materials	Fluororubber
Grease	Heat resistant grease
Specifications other than above and external dimensions	Same as 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.

2 With Heavy Duty Scraper

Symbol
-XC4

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

Applicable Series

Series	Description	Model	Action	Note
CA2-Z	Standard type	CA2	Double acting, Single rod	
		CA2W	Double acting, Double rod	

How to Order

Standard model no. **- XC4**

With heavy duty scraper
(SCB scraper)

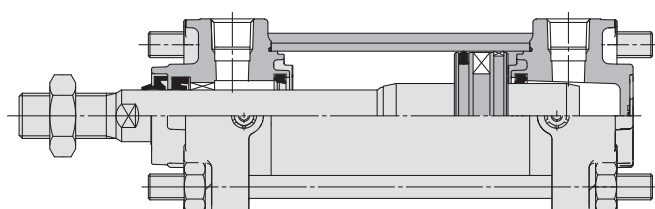
Specifications: Same as standard type

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.

Construction (Dimensions are the same as standard.)



3 Heat Resistant Cylinder (−10 to 110°C)

Symbol
-XC5

Cylinder which changed the seal material for heat resistance (up to 110°C) in order to use under the severe ambient temperature condition which exceeds the standard specifications of −10 to 70°C.

Applicable Series

Series	Description	Model	Action
CA2-Z	Standard type	CA2	Double acting, Single rod
		CA2W	Double acting, Double rod

How to Order

Standard model no. **- XC5**

Heat resistant cylinder

Specifications

Ambient temperature range	−10°C to 110°C
Seal material	Fluororubber
With auto switch	Unavailable Note 2)
Specifications other than above and external dimensions	Same as standard type

Note 1) Please contact SMC for details on the maintenance intervals for this cylinder, which differ from those of the standard cylinder.
 Note 2) Manufacturing built-in magnet type and the one with auto switch is impossible.
 Note 3) Material of rod boot is heat resistant tarpaulin.

Standard
Double Acting, Single Rod
CA2

Standard
Double Acting, Double Rod
CA2W

Auto Switch

Made to Order

Series CA2

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

Symbol
-XC7

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

Applicable Series

Series	Description	Model	Action
CA2-Z	Standard type	CA2	Double acting, Single rod
		CA2W	Double acting, Double rod

Specifications

Component parts changed to stainless steel	Tie-rod, Tie-rod nut, Mounting bracket nut, Cushion valve, Lock nut
Additional specifications	Same as standard type
Dimensions	Same as standard type

How to Order

Standard model no. **- XC7**

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

5 Adjustable Stroke Cylinder/Adjustable Extension Type

Symbol
-XC8

It adjusts the extending stroke by the stroke adjustable mechanism equipped in the head side. (After the stroke is adjusted, with cushion on both sides is altered to single-sided, with cushion.)

Applicable Series

Series	Description	Model	Action	Note
CA2-Z	Standard type	CA2	Double acting	

Specifications

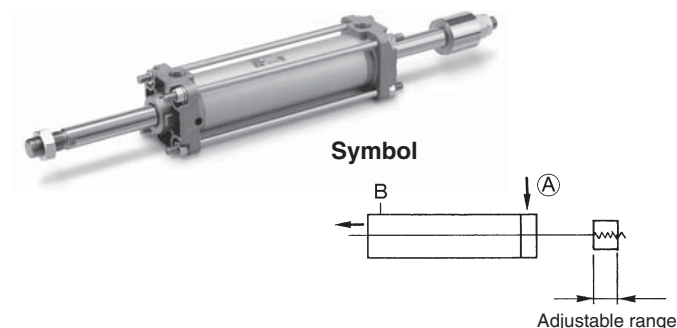
Stroke adjustment symbol	A	B
Stroke adjustment range [mm]	0 to 25	0 to 50
Additional specifications	Same as standard type	

How to Order

CA2 Mounting style Bore size - Stroke Suffix Stroke adjustment symbol **Z - XC8**

* Except head side flange and clevis types

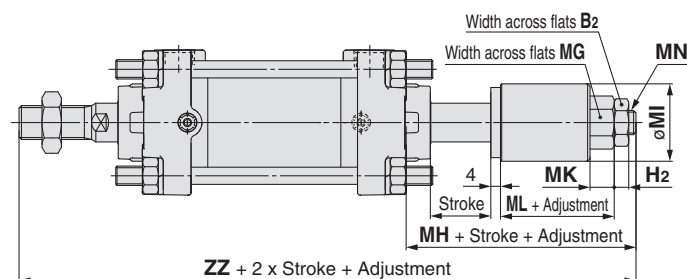
Adjustable stroke cylinder/Adjustable extension type



Warning Precautions

- When the cylinder is operating, if something gets caught between the stopper bracket for adjusting the stroke and the cylinder body, it could cause bodily injury or damage the peripheral equipment. Therefore, take preventive measures as necessary, such as installing a protective cover.
- To adjust the stroke, make sure to secure the wrench flats of the stopper bracket by a wrench, etc. before loosening the lock nut. If the lock nut is loosened without securing the stopper bracket, be aware that the area that joins the load to the piston rod or the area in which the piston rod is joined with the load side and the stopper bracket side could loosen first. It may cause an accident or malfunction.

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



Bore size	H ₂	MG	MH	MI	MK	ML	MN	ZZ
40	6	19	45	32	10	22	M10 x 1.25	180
50	8	24	49	38	13	24	M14 x 1.5	197
63	8	24	49	38	13	24	M14 x 1.5	205
80	10	27	66	45	14	32	M16 x 1.5	253
100	12	32	69	55	17	35	M20 x 1.5	267

6 Adjustable Stroke Cylinder/Adjustable Retraction Type

Symbol
-XC9

The retract stroke of the cylinder can be adjusted by the adjusting bolt.

Applicable Series

Series	Description	Model	Action	Note
CA2-Z	Standard type	CA2	Double acting, Single rod	Except head flange and clevis types

How to Order

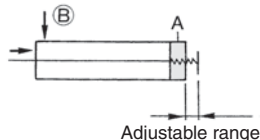
CA2 **Mounting style** **Type** **Bore size** - **Stroke** **Suffix** **Stroke adjustment symbol** **Z - XC9**

* Except head flange and clevis types

(After the stroke is adjusted, with cushion on both sides is altered to single-sided, with cushion.)



Symbol

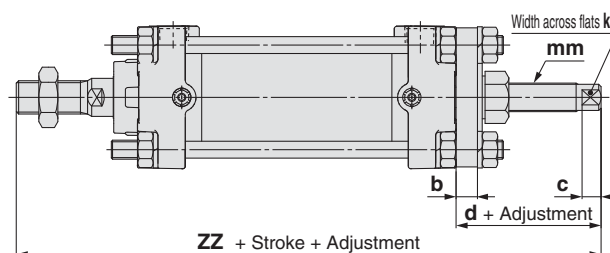


Specifications

Stroke adjustment symbol	A	B
Stroke adjustment range [mm]	0 to 25	0 to 50
Additional specifications	Same as standard type	

Adjustable stroke cylinder/Adjustable retraction type

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



Bore size	b	c	d	ka	MM	ZZ
40	9	8	36	8	M12 x 1.25	171
50	11	8	42	13	M16 x 1.5	190
63	11	8	44	17	M20 x 1.5	200
80	15	10	54	19	M24 x 1.5	241
100	15	10	55.5	19	M24 x 1.5	253.5

Caution Precautions

- When air is supplied to the cylinder, if the stroke adjusting bolt is loosened in excess of the allowable stroke adjustment amount, be aware that the stroke adjusting bolt could fly out or air could be discharged, which could injure personnel or damage the peripheral equipment.
- Adjust the stroke when the cylinder is not pressurised.
If it is adjusted in the pressurised state, the seal of the adjustment section could become deformed, leading to air leakage.

7 Dual Stroke Cylinder/Double Rod Type

Symbol
-XC10

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

Applicable Series

Series	Description	Model	Action	Note
CA2-Z	Standard type	CA2	Double acting, Single rod	Except clevis and trunnion types

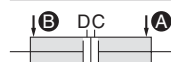
How to Order

CA2 **Mounting style** **Type** **Bore size** - **Stroke A** **Suffix** + **Stroke B** **Suffix** **Z - XC10**

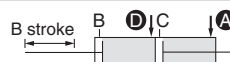
* Except clevis and trunnion types

Dual stroke cylinder

Function



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



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

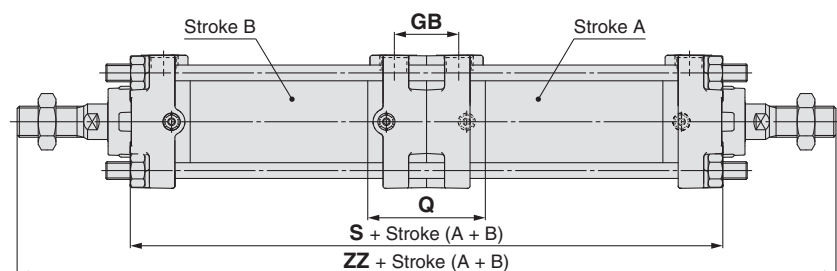


When air pressure is supplied to ports **B** and **C**, A out strokes.



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

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



Bore size	GB	Q	S	ZZ
40	29	53	167	269
50	33	59	179	295
63	33	61	195	311
80	41	73	231	373
100	41	79	251	395

8 Dual Stroke Cylinder/Single Rod Type

Symbol
-XC11

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

Applicable Series

Series	Description	Model	Action	Note
CA2-Z	Standard type	CA2	Double acting, Single rod	Except trunnion type

Specifications: Same as standard type

* Please contact SMC for each manufacturable stroke length.

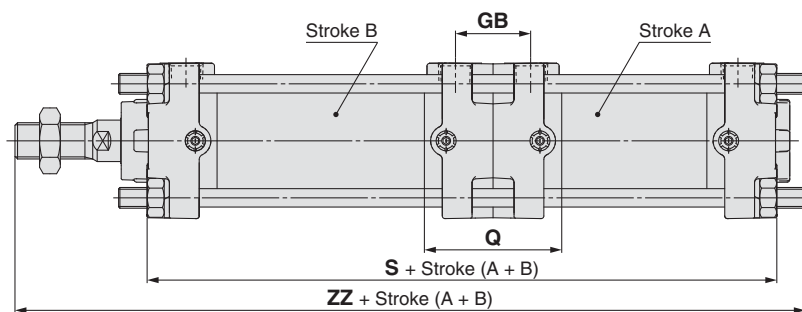
How to Order

CA2 Mounting style Type Bore size - Stroke A Suffix + Stroke B-A Suffix Z - XC11

Dual stroke cylinder/Single rod

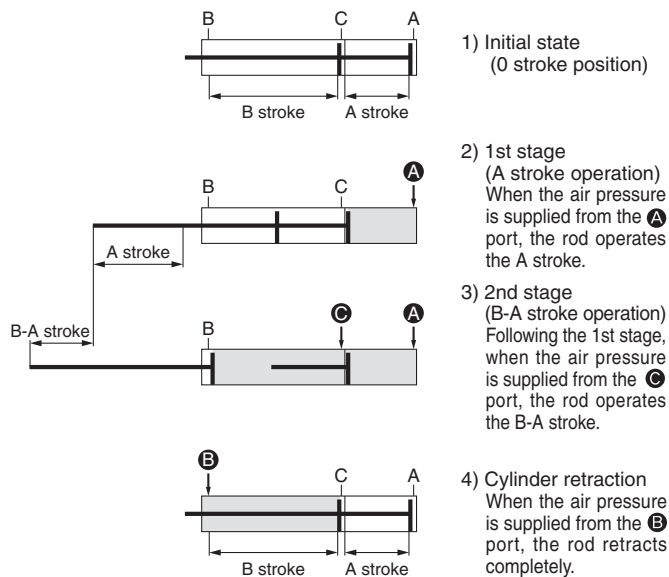
* Except trunnion type

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

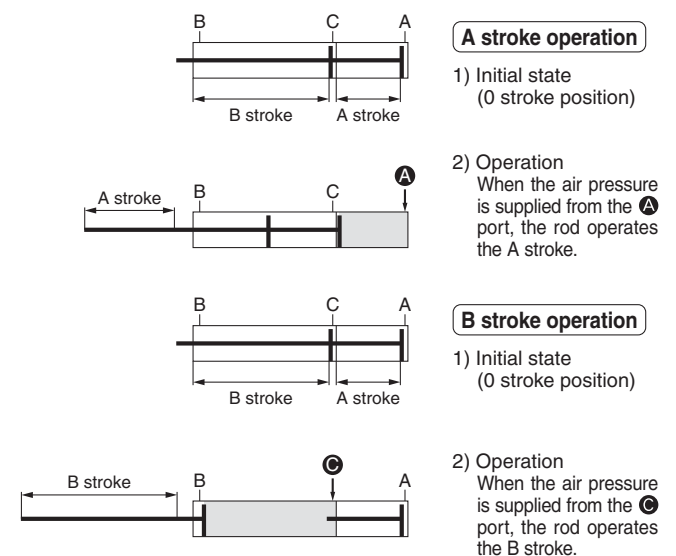


Bore size	GB	Q	S	ZZ
40	29	53	168	230
50	33	59	180	249
63	33	61	196	268
80	41	73	232	320
100	41	79	252	341

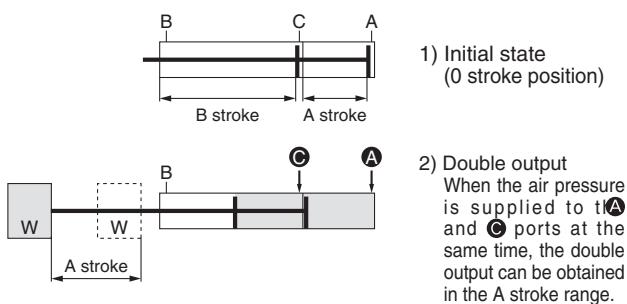
Functional description of dual stroke cylinder



A stroke or B stroke operation can be made individually.



Double output is possible.



Caution Precautions

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.

9 Tandem Cylinder

Symbol
-XC12

This is a cylinder produced with two air cylinders in line allowing double the output force.

Applicable Series

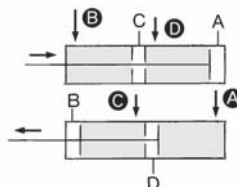
Series	Description	Model	Action	Note
CA2-Z	Standard type	CA2	Double acting, Single rod	

How to Order

Standard model no. **-XC12**
Tandem cylinder

Specifications: Same as standard type

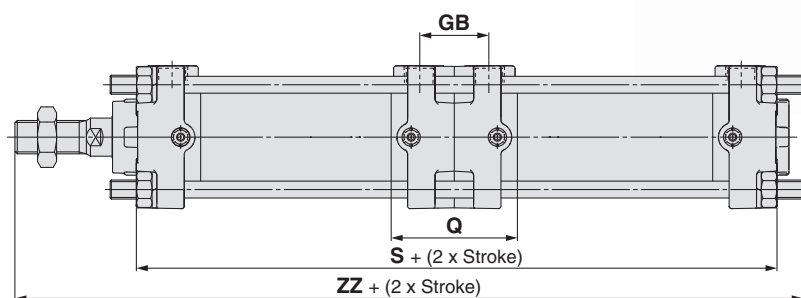
Function



When air pressure is supplied to ports **B** and **D**, the output force is doubled in the retract stroke.

When air pressure is supplied to ports **A** and **C**, the output force is doubled in the out stroke.

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



Bore size	GB	Q	S	ZZ
40	29	53	169	231
50	33	59	181	250
63	33	61	197	269
80	41	73	233	321
100	41	79	253	342

10 Fluororubber Seal

Symbol
-XC22

Applicable Series

Series	Description	Model	Action	Note
CA2-Z	Standard type	CA2	Double acting, Single rod	
		CA2W	Double acting, Double rod	

How to Order

Standard model no. **-XC22**
Fluororubber seal

Specifications

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

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

Note 2) Cylinders with auto switches can also be produced; however, auto switch related parts (auto switch units, mounting brackets, built-in magnets) are the same as standard products. Before using these, please contact SMC regarding their suitability for the operating environment.

11 Double Clevis and Double Knuckle Joint Pins Made of Stainless Steel

Symbol
-XC27

To prevent the oscillating portion of the double clevis or the double knuckle joint from rusting, the material of the pin and the retaining ring has been changed to stainless steel.

Applicable Series

Series	Description	Model	Action
CA2-Z	Standard type	CA2	Double acting, Single rod

Specifications

Mounting style	Only double clevis type (D), double knuckle joint
Pin and retaining ring material	Stainless steel 304
Specifications other than above	Same as standard type

How to Order

CA2D **Standard model no. -XC27**
Double clevis type Double clevis pin made of stainless steel

Y **04D, 05D, 08D, 10D -XC27**
Double knuckle joint Double knuckle joint pin made of stainless steel

CDP **2A, 3A, 4A, 5A, 6A, 7A -XC27**
Clevis pin Knuckle pin Clevis pin Knuckle pin made of stainless steel

Series CA2

12 Compact Flange Made of SS400

Symbol

-XC28

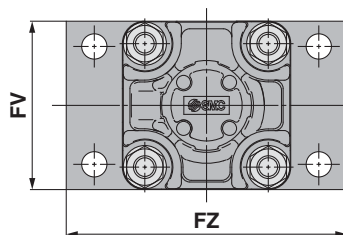
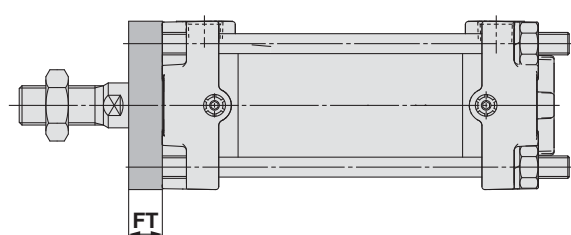
Width of a flange bracket on the rod and head side has the same dimensions as the cylinder's rod cover to save the mounting space. (Flange shape and FV-dimensions are only different from the standard type.)

Applicable Series

Series	Description	Model	Action
CA2-Z	Standard type	CA2	Double acting, Single rod
		CA2W	Double acting, Double rod

Specifications: Same as standard type

Dimensions



Bore size	FT	FV	FZ
40	12	60	100
50	12	70	110
63	15	85	130
80	18	102	160
100	18	116	180

* Other dimensions are the same as flange on the rod side and head side of standard type.
(Figure is the case of flange on the rod side.)

How to Order

CA2 CA2W	F	Standard model no.	- XC28
		Compact flange made of SS400	
		● Mounting style	
	F	Rod flange	
	G	Head flange	

13 Double Knuckle Joint with Spring Pin

Symbol

-XC29

To prevent loosening of the double knuckle joint of standard air cylinder.

Applicable Series

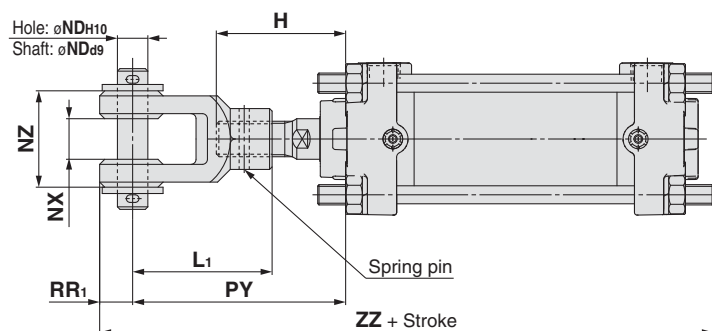
Series	Description	Model	Action
CA2-Z	Standard type	CA2	Double acting, Single rod

Specifications: Same as standard type

How to Order

Standard model no.	- XC29
Double knuckle joint with spring pin	

Dimensions (For mounting bracket, pin is shipped together.)



Bore size	H	L1	øND _{d9}	øND _{H10}	NX	NZ	PY	RR1	ZZ
40	51	55	12 ^{-0.050} _{-0.093}	12 ^{+0.070} ₀	16 ^{+0.3} _{+0.1}	38	84	13	192
50	58	60	12 ^{-0.050} _{-0.093}	12 ^{+0.070} ₀	16 ^{+0.3} _{+0.1}	38	91	15	207
63	58	60	12 ^{-0.050} _{-0.093}	12 ^{+0.070} ₀	16 ^{+0.3} _{+0.1}	38	91	15	218
80	71	71	18 ^{-0.050} _{-0.093}	18 ^{+0.070} ₀	28 ^{+0.3} _{+0.1}	55	105	19	257
100	72	83	20 ^{-0.065} _{-0.117}	20 ^{+0.084} ₀	30 ^{+0.3} _{+0.1}	61	118	21	282

* Dimensions except mentioned above are the same as standard type.

14 Rod Trunnion

Symbol
-XC30

This cylinder shortens the distance between the fulcrum and the rod end by installing a trunnion bracket in front of the rod side cover.

Applicable Series

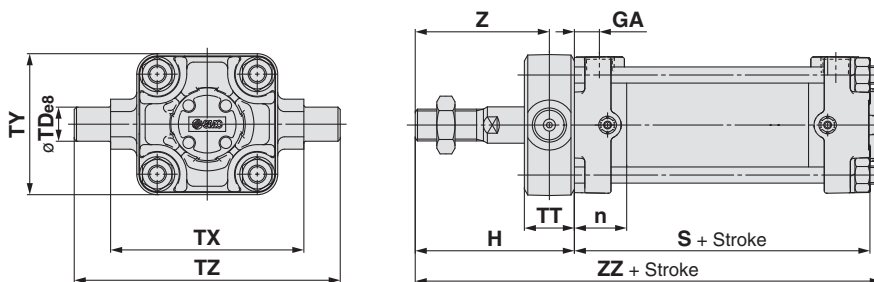
Series	Description	Model	Action
CA2-Z	Standard type	CA2	Double acting, Single rod

How to Order

CA2 T Standard model no. - XC30
 Trunnion bracket Rod trunnion

Specifications: Same as standard type

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



Symbol Bore size	Stroke range	n	GA	H	S	TD _{e8}	TT	TX	TY	TZ	Z	ZZ
40	Up to 1000	23	11	66	80	15 ^{-0.032} _{-0.059}	22	85	62	117	55	151
50	Up to 1000	26	13	71	86	15 ^{-0.032} _{-0.059}	22	95	74	127	60	163
63	Up to 1000	27	13	79	94	18 ^{-0.032} _{-0.059}	28	110	90	148	65	179
80	Up to 1000	32	16	94.5	111	25 ^{-0.040} _{-0.073}	34	140	110	192	77.5	212.5
100	Up to 1000	35	16	100	121	25 ^{-0.040} _{-0.073}	40	162	130	214	80	229

[mm]

15 With Coil Scraper

Symbol
-XC35

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

Applicable Series

Series	Description	Model	Action	Note
CA2-Z	Standard type	CA2	Double acting, Single rod	
		CA2W	Double acting, Double rod	

Specifications: Same as standard type

Dimensions: Same as the standard type

How to Order

Standard model no. - XC35
 With coil scraper

16 Made of Stainless Steel (Combination of XC7 and XC68)

Symbol
-XC65

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

Applicable Series

Series	Description	Model	Action
CA2-Z	Standard type	CA2	Double acting, Single rod
		CA2W	Double acting, Double rod

Specifications

Parts changed to stainless steel	Tie-rod, Tie-rod nut, Cushion valve, Piston rod (with hard chrome plated)
Specifications other than above and external dimensions	Same as standard type

How to Order

Standard model no. - XC65
 Made of stainless steel (Combination of XC7 and XC68)

Standard
Double Acting, Single Rod
CA2
Double Acting, Double Rod
CA2W
Auto Switch
Made to Order

Series CA2

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

Symbol
-XC68

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

Applicable Series

Series	Description	Model	Action
CA2-Z	Standard type	CA2	Double acting, Single rod
		CA2W	Double acting, Double rod

How to Order

Standard model no.	- XC68
<p>Made of stainless steel (With hard chrome plated piston rod)</p>	

Specifications

Parts changed to stainless steel	Piston rod
Specifications other than above and external dimensions	Same as standard type

Maximum Stroke

	[mm]
Double acting, Single rod	1600
Double acting single rod with rod boot	1400

18 Grease for Food Processing Equipment

Symbol
-XC85

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

Applicable Series

Series	Description	Model	Action	Note
CA2-Z	Standard type	CA2	Double acting, Single rod	
		CA2W	Double acting, Double rod	

How to Order

Standard model no.	- XC85
<p>Grease for food processing equipment</p>	

Specifications

Ambient temperature range	-1°C to 70°C
Seal material	Nitrile rubber
Grease	Grease for food
Auto switch	Mountable
Dimensions	Same as standard type
Additional specifications	Same as 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 zone

Food zone.....An environment where food which will be sold as merchandise, directly touches the cylinder's components.
 Splash zone.....An environment where food which will not be sold as merchandise, directly touches the cylinder's components.

Installable zone

Non-food zone.....An environment where there is no contact with food.

Note 1) Avoid using this product in the food zone.
(Refer to the figure on the right.)

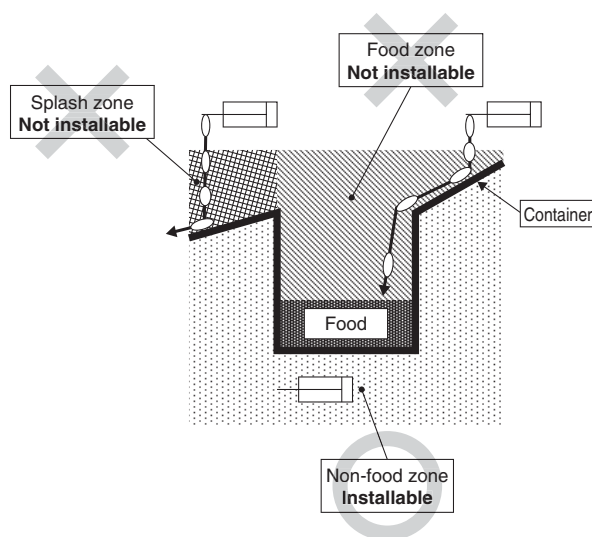
Note 2) When the product is used in an area of liquid splash, or a water resistant function is required for the product, please consult with SMC.

Note 3) Operate without lubrication from a pneumatic system lubricator.

Note 4) Use the following grease pack for the maintenance work.

GR-H-010 (Grease: 10 g)

Note 5) Please contact SMC for details about the maintenance intervals for this cylinder, which differ from those of the standard cylinder.



19 Cylinder with Heat Resistant Reed Auto Switch (−10 to 120°C)

Symbol
-X1184

How to Order

CDA2 Standard model no. Z - Heat resistant reed auto switch - X1184

Switch model

Symbol	Description
—	Without switch
B30	D-B30
B30J	D-B30J
B31	D-B31
B31J	D-B31J
B35	D-B35
B35J	D-B35J

• For heat resistant auto switches (D-B3□)
(with built-in magnet)

Number of switches

Symbol	Description
S	1 pc.
—	2 pcs.
n	n pcs.

* Refer to Auto Switch Guide for details of auto switches.

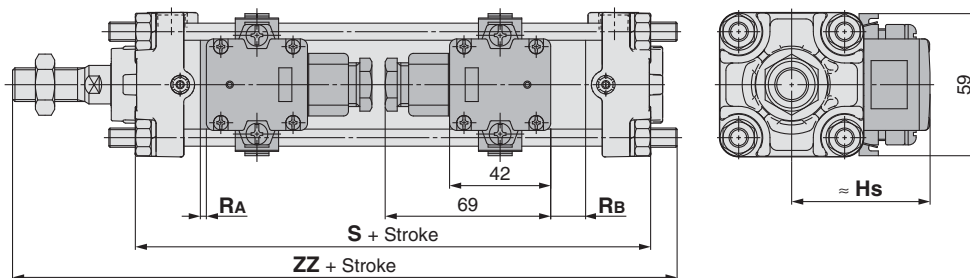
Specifications

Ambient temperature range	−10°C to 120°C
Seal material	Fluororubber
Grease	Heat resistant grease

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.

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



Bore size	Hs	RA	RB	S	ZZ	Minimum mounting stroke		Auto switch mounting bracket part number
						Other than centre trunnion	Centre trunnion	
40	57.5	4	13	99	161	1 pc. : 50 st or more 2 pcs.: Different surfaces 50 st or more 2 pcs.: Same surface 220 st or more	180 st or more	BD1-04M
50	62.5	4	13	105	174		180 st or more	BD1-05M
63	69	7	16	113	185		190 st or more	BD1-06M
80	78	5.5	23.5	131	219		200 st or more	BD1-08M
100	88.5	7.5	25.5	141	230		210 st or more	BD1-10M

[mm]

Standard
Double Acting, Single Rod

Double Acting, Double Rod

CA2

CA2W

Auto Switch

Made to Order



Specific Product Precautions

Be sure to read before handling. Refer to back cover for Safety Instructions. For Actuator and Auto Switch Precautions, refer to "Handling Precaution for SMC Products" and the Operation Manual on SMC website, <http://www.smcworld.com>

Operating Precautions

⚠ Caution

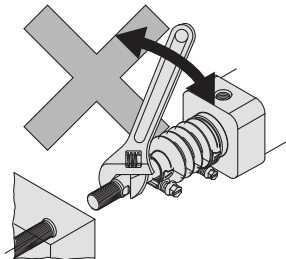
1. **Do not open the cushion valve beyond the stopper.**
A retaining ring is installed as a cushion valve retention mechanism. Do not open the cushion valve beyond it.
If not operated in accordance with the above precautions, the cushion valve may be ejected from the cover when air pressure is supplied.

Bore size [mm]	Width across flats	Socket wrench
40, 50	2.5	JIS 4648 Hexagonal wrench key 2.5
63, 80, 100	4	JIS 4648 Hexagonal wrench key 4

2. **Use the air cushion at the end of cylinder stroke.**
Otherwise, the tie-rod or piston rod assembly will be damaged.

⚠ Caution

1. **Do not use a pneumatic type as an air-hydro cylinder. It can cause oil leakage.**
2. **Do not rotate the piston rod when the rod boot is fixed.**
Before rotating the piston rod, loosen the band to avoid twisting the rod boot.
3. **Install the rod boot with the breathing hole facing downwards or in a direction suitable to prevent dust, moisture etc. from entering easily into the rod boot.**



Disassembly/Replacement

⚠ Caution

1. **Use a socket wrench when the bracket is replaced.**
If other tools are used, the nut or other parts may be deformed or the work efficiency may decrease.
For applicable sockets, refer to the table below.

Bore size [mm]	Nut	Width across flats	Socket
40, 50	DA00040	13	JIS B4636
	(M8 x 1.25, Hexagon nut 3 types)		+ Two-angle socket 13
63	DA00010	17	JIS B4636
	(M10 x 1.25, Hexagon nut 3 types)		+ Two-angle socket 17
80, 100	DA00131	19	JIS B4636
	(M12 x 1.75, Hexagon nut 3 types)		+ Two-angle socket 19

2. **Do not replace the bushing.**
As the bushing is press-fit, replace the cover assembly when the bushing must be replaced.
3. **When a seal is replaced, apply grease to the new seal before it is assembled.**
Operation of the cylinder without greasing will result in extreme abrasion of the seal, causing premature air leakage.
4. **The trunnion type cylinder requires accuracy in assembly.**
The trunnion type cylinder may lose dimensional accuracy and malfunction when it is disassembled and reassembled because the axial centre of the trunnion and that of the cylinder will not be aligned easily.

Water Resistant Air Cylinder

Water resistant air cylinders are also available in Series CA2, which are suitable for use on machine tools, where exposure to coolant is possible and applicable for food machinery and automobile washing equipment in an environment where water splashes. Please contact SMC for more information.

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.



Caution:

Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.



Warning:

Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.



Danger:

Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

- *1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots - Safety.
etc.



Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

- The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
- When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
- Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

- Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
- Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalogue.
- An application which could have negative effects on people, property, or animals requiring special safety analysis.
- Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.



Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

Limited warranty and Disclaimer

- The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
- For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
- Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

*2) Vacuum pads are excluded from this 1 year warranty.

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

- The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
- The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.



Safety Instructions

Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.

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