

Air Cylinder






Series CA2

ø40, ø50, ø63, ø80, ø100

Standard cylinder with a rectangular cover and tie-rods



Series Variations

Series	Type	Bore size (mm)	Standard variations				Page
			With rod boot	Clean Series	Copper/Fluorine-free	Water resistant	
Standard Series CA2 	Single rod Series CA2	40-50 63-80 100	●	●	●	●	P.356
	Double rod Series CA2W		(For ø40 and ø63 only)	●	●	●	P.368
Standard/Non-rotating rod Series CA2K 	Single rod Series CA2K	40 50 63	●	●	●	●	P.373
	Double rod Series CA2KW		●	●	●	●	P.377
Low friction Series CA2□Q 	Use the new "Smooth Cylinder Series CA2Y " to realize dual-side low friction and low-speed operation. (Refer to Best Pneumatics No. 3.)					P.381	
End lock Series CBA2 	Single rod Series CBA2	40-50 63-80 100	●	●	●	●	P.382
Air-hydro Series CA2□H 	Single rod Series CA2□H	40-50 63-80 100	●	●	●	●	P.388
	Double rod Series CA2□WH		●	●	●	●	P.396

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual
-X□

Technical
data

Combinations of Standard Products and Made

Series CA2

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

Symbol	Specification	Applicable bore size	Series		CA2 (Standard)		CA2K (Non-rotating)	
			Action/Type	Double acting				
				Single rod	Double rod	Single rod	Double rod	
Standard	Standard							
CDA2	Built-in magnet	ø40 to ø100	●	●	●	●	●	
Long st	Long stroke		●	●	○	○		
CA2□-□J	With rod boot (Nylon tarpaulin)		●	●	●	●		
CA2□-□K	With rod boot (Heat resistant tarpaulin)	ø40 to ø100	●	●	●	●	●	
10-, 11-	Clean Series		●	○	—	—		
20-	Copper and Fluorine-free		●	●	●	●		
CA2□R	Water resistant (NBR seal)	ø40 to ø100	●	○	—	—		
CA2□V	Water resistant (FKM seal)		●	○	—	—		
XA□	Change of rod end shape	ø40 to ø100	◎	◎	◎	◎	○	
XB5	Oversized rod cylinder		◎	○	—	—		
XB6	Heat-resistant cylinder (–10 to 150 °C)		◎	◎	—	—		
XC3	Special port position		◎	◎	○	○		
XC4	With heavy duty scraper		◎	◎	—	—		
XC5	Heat-resistant cylinder (–10 to 110 °C)		◎	◎	—	—		
XC6	Made of stainless steel		◎	◎	—	—		
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 pins made of stainless steel (Stainless steel 304)		◎	—	◎	—		
XC28	Change of flange material to SS400 (Compact flange)		◎	◎	◎	◎		
XC29	Double knuckle joint with spring pin		◎	○	○	○		
XC30	Rod side trunnion		◎	○	○	○		
XC35	With coil scraper		◎	◎	—	—		
XC58	Water resistant/ Built-in hard plastic magnet		◎	◎	—	—		
XC59	Fluororubber seal/ Built-in hard plastic magnet		◎	◎	—	—		
XC65	XC6 + XC7 specifications		◎	◎	—	—		
X1184	Cylinder with heat-resistant reed auto switch		◎	○	—	—		

Note 1) Standard for the air-hydro type.
 Note 2) With lock on head side only.
 Note 3) With lock on rod side only.

to Order Specifications

Series CA2

Use the new "Smooth Cylinder **Series CA2Y**" to realize dual-side low friction and low-speed operation. (Refer to Best Pneumatics No. 3.)

	CA2Q (Low friction)	CA2H (Air-hydro)	CBA2 (End lock)
Double acting			
	Single rod	Single rod	Double rod
	Single rod	Double rod	Single rod
	●	●	●
	●	●	●
	○	●	●
	○	●	●
	○	●	●
	—	—	● Note 2)
	—	○	○
	—	○	● Note 2)
	—	○	● Note 2)
	◎	◎	○
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	—	◎ Note 1)	◎ Note 1)
	—	—	◎ Note 2)
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	◎	○	○
	○	○	◎ Note 2)
	◎	○	◎ Note 3)
	◎	○	◎
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	◎	○	◎
	◎	○	◎
	◎	○	◎
	—	—	○
	—	—	○
	◎	○	○
	—	—	○

- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2**
- CS1
- CS2

- D-□
- X□
- Individual -X□
- Technical data

Air Cylinder: Standard Type Double Acting, Single Rod Series CA2

ø40, ø50, ø63, ø80, ø100

How to Order

CA2 L 50 - 100 Made to Order
For details, refer to page 357.

With auto switch **CDA2 L 50 - 100 - 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) CDA2L40-100

Mounting style

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

Port thread type

Nil	Rc
TN	NPT
TF	G

Bore size

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

Tube material

Nil	Aluminum tube
F*	Steel tube

* Not available with auto switch.

Auto switch

Nil	Without auto switch
-----	---------------------

* Refer to the table below for the applicable auto switch model.

Cylinder suffix

Rod boot	Nil	Without
	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Cushion	Nil	With cushion on both sides
	N	Without cushion

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

Number of auto switches

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

Cylinder stroke (mm)
For more information, please refer to the next page.

Applicable Auto Switch/Refer to page 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator/light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)				Pre-wired connector	Applicable load		
					DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	1 (M)	3 (L)	5 (Z)				
Solid state switch	—	Grommet	—	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC circuit	—
				3-wire (PNP)				M9P	—	●	●	●	○	○		
				2-wire	M9B	—	●	●	●	○	○					
		—		K59	—	●	—	●	○	○						
		Terminal conduit		3-wire (NPN)	12 V	100 V, 200 V	J51	—	●	—	●	○	—			
		2-wire		G39C			G39	—	—	—	—	—				
	Diagnostic indication (2-color indication)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NW	—	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				—	●	—	●	○	○			
				2-wire	M9PW	—	●	●	●	○	○					
				—	G59W	—	●	—	●	○	○					
				—	G5PW	—	●	—	●	○	○					
				—	M9BW	—	●	●	●	○	○					
Water resistant (2-color indication)	Grommet	—	3-wire (NPN)	24 V	5 V, 12 V	—	M9NA	—	○	○	●	○	○	—	—	
			3-wire (PNP)				M9PA	—	○	○	●	○	○			
			2-wire	M9BA	—	○	○	●	○	○						
			—	G5BA	—	—	—	—	—	—						
			With diagnostic output (2-color indication)	4-wire (NPN)	5 V, 12 V	F59F	G59F	●	—	●	○	○	IC circuit			
			Magnetic field resistant (2-color indication)	2-wire (Non-polar)	—	P4DW	—	—	—	●	●	○	—			
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	24 V	5 V	—	A96	—	●	—	●	—	IC circuit	—	
				—				A93	—	●	—	●	—			—
				No	2-wire	12 V	100 V	A90	—	●	—	●	—	IC circuit	Relay, PLC	
				100 V or less			A54	B54	●	—	●	●	—			
				100 V, 200 V			A64	B64	●	—	●	—	—			
		200 V or less		A33C	A33	—	—	—	—	—	—	PLC				
		—		A34C	A34	—	—	—	—	—						
		100 V, 200 V		A44C	A44	—	—	—	—	—						
		Terminal conduit		—	A59W	B59W	●	—	●	—	—	Relay, PLC				
		DIN terminal		—	—	—	—	—	—	—	—					
Diagnostic indication (2-color indication)	Grommet	—	—	—	—	—	—	—	—	—						

* Lead wire length symbols: 0.5m..... Nil (Example)M9NW
1m..... M (Example)M9NWM
3m..... L (Example)M9NWL
5m..... Z (Example)M9NWX

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

* In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 406.

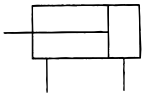
* Refer to pages 1328 and 1329 for the details about auto switches with a pre-wired connector.

* D-A9□/M9□/M9□W/M9□AL auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

Specifications



JIS symbol
Double acting type



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* With auto switch: -10 to 60°C*				
Minimum operating pressure	0.05 MPa				
Piston speed	50 to 500 mm/s				
Cushion	Air cushion				
Stroke length tolerance	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 style, Foot style, Rod side flange style, Head side flange style Single clevis style, Double clevis style, Center trunnion style				

* With no freezing.

Standard Stroke In case of a type with auto switch, please also refer to the table of minimum auto switch mounting strokes on pages 403 and 404.

Bore size	Standard stroke*	Long stroke (L and F only)
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500	800
50, 63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 500, 600	1200
80, 100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700	ø80: 1400 ø100: 1500

* Intermediate strokes not listed above are produced upon receipt of order.

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 itself.

Accessory

Mounting		Basic style	Axial foot style	Rod side flange style	Head side flange style	Single clevis style	Double clevis style	Center trunnion style
Standard equipment	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
Options	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (With pin)	●	●	●	●	●	●	●
	With rod boot	●	●	●	●	●	●	●

Minimum Stroke for Auto Switch Mounting

⚠ Caution

1. The minimum stroke for mounting varies with the auto switch type and mounting style of the cylinder. In particular, the center trunnion style needs careful attention. (For more information, refer to pages 403 to 404.)



Made to Order Specifications

For details, please refer to pages 1373 to 1565.

Symbol	Specifications
-XA□	Change of rod end shape
-XB5	Oversized rod
-XB6	Heat resistant (150°C)
-XC3	Special port positions
-XC4	With heavy duty scraper
-XC5	Heat resistant (110°C)
-XC6	Piston rod and rod end nut made of stainless steel
-XC7	Tie-rod, cushion valve, tie rod nut, etc. made of stainless steel
-XC8	Adjustable stroke/Extension
-XC9	Adjustable stroke/Retraction
-XC10	Dual stroke/Double rod
-XC11	Dual stroke/Single rod
-XC12	Tandem type
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC22	Fluororubber seal
-XC27	Double clevis pin and double knuckle pin made of stainless steel
-XC28	Compact flange made of SS400
-XC29	Double knuckle joint with spring pin
-XC30	Rod side trunnion
-XC35	With coil scraper
-XC58	Water resistant/Built-in hard plastic magnet
-XC59	Fluororubber seal/Built-in hard plastic magnet
-XC65	-XC6 + -XC7
-X1184	Cylinder with heat-resistant reed auto switch

Refer to pages 401 to 406 for cylinders with auto switches.

- Minimum auto switch mounting stroke
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

Technical

data

Series CA2

Mass/Aluminum Tube (Steel tube)

Bore size (mm)			40	50	63	80	100	
Basic mass	Basic style	Aluminum tube	0.86	1.29	1.84	3.10	4.18	
		Steel tube	0.92	1.35	1.93	3.30	4.45	
	Axial foot style	Aluminum tube	1.05	1.51	2.18	3.77	5.17	
		Steel tube	1.11	1.57	2.27	3.97	5.44	
	Flange style	Aluminum tube	1.23	1.74	2.63	4.55	6.10	
		Steel tube	1.29	1.80	2.72	4.75	6.37	
	Single clevis style	Aluminum tube	1.09	1.63	2.47	4.21	5.96	
		Steel tube	1.15	1.69	2.56	4.41	6.23	
	Double clevis style	Aluminum tube	1.13	1.72	2.63	4.50	6.48	
		Steel tube	1.19	1.78	2.72	4.70	6.75	
	Trunnion style	Aluminum tube	1.22	1.77	2.64	4.65	6.46	
		Steel tube	1.28	1.83	2.73	4.85	6.73	
	Add'l mass by each 50 mm stroke	All mounting brackets		0.20	0.25	0.31	0.46	0.58
			Steel tube	0.28	0.35	0.43	0.70	0.87
Accessory	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) **CA2L40-100** (Axial foot style, $\phi 40$, 100st)

- Basic mass 1.05 kg
 - Additional mass 0.20/50st
 - Cylinder stroke 100st
- $$1.05 + 0.20 \times 100 / 50 = 1.45 \text{ kg}$$

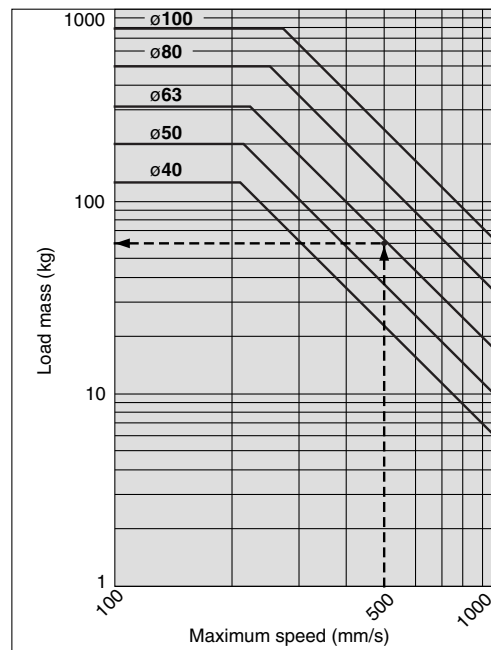
Mounting Bracket

Bore size (mm)	40	50	63	80	100
Axial foot*	CA2-L04	CA2-L05	CA2-L06	CA2-L08	CA2-L10
Flange	CA2-F04	CA2-F05	CA2-F06	CA2-F08	CA2-F10
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, two pieces should be ordered for each cylinder.

** Double clevis type is packed with clevis pin, flat washer and cotter pin.

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 mass 60 kg.

Clean Series

10-CA2 Mounting Bore size Port thread type - Stroke Suffix

Clean Series
with relief port

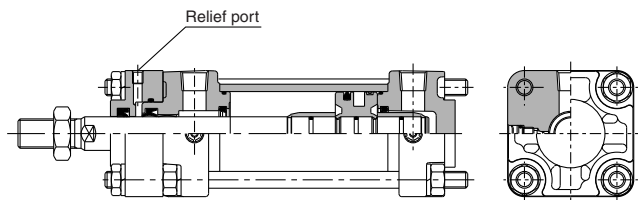
This cylinder can be operated in a class 100 clean room. The rod portion of the actuator has a double seal construction and a relief port is provided to discharge the exhaust air directly outside of the clean room.

Specifications

Action	Double acting, Single rod
Bore size (mm)	40, 50, 63
Maximum operating pressure	1.0 MPa
Minimum operating pressure	0.05 MPa
Cushion	Air cushion
Piping	Screw-in piping
Relief port size	M5 x 0.8
Piston speed	50 to 500 mm/s*
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style

* Auto switch capable
★ Operate within the range of absorbable kinetic energy. (Refer to page 358.)

Construction



Copper and Fluorine-free (Applicable to CRT production)

20-CA2 Mounting Bore size Port thread type - Stroke Suffix

Copper and Fluorine-free

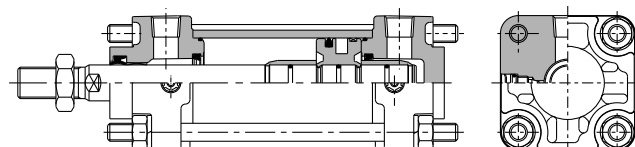
To eliminate any influences of copper ions or fluororesin on color CRTs, copper materials have been nickel plated or replaced with non-copper materials, thus preventing the generation of copper ions.

Specifications

Action	Double acting, Single rod
Bore size (mm)	40, 50, 63, 80, 100
Maximum operating pressure	1.0 MPa
Minimum operating pressure	0.05 MPa
Cushion	Air cushion
Piping	Screw-in piping
Piston speed	50 to 500 mm/s*
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Center trunnion style

* Auto switch capable
★ Operate within the range of absorbable kinetic energy. (Refer to page 358.)

Construction



Water Resistant

CDA2 Mounting Bore size Port thread type **R** - Stroke Suffix - M9□A(V)L -XC6

With auto switch
(Built-in magnet)

Water resistant 2-color indication
solid state auto switch

Made to order

Water resistant air cylinder

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

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	Piston rods, rod end nuts made of stainless steel (-XC6)

* 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 Series CA2.
Note 2) Combination of auto switches and steel tube is not available. Refer to page 895 for details.

Dimensions

*The dimensions are the same as the standard double acting, single rod type.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

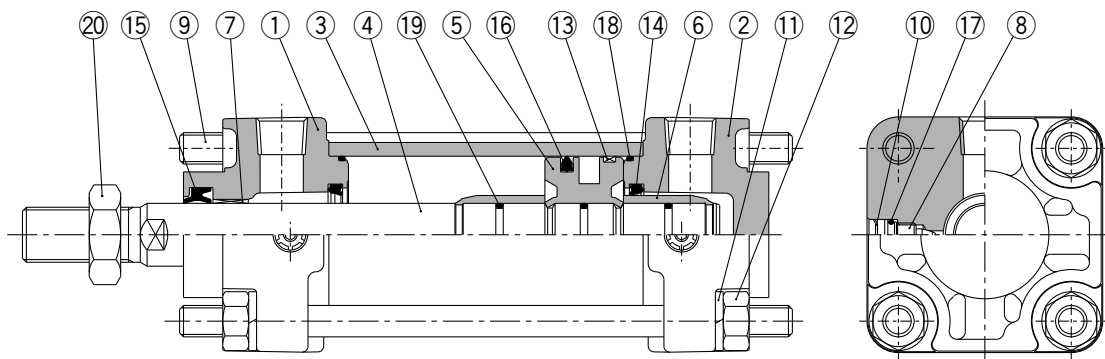
-X□

Individual
-X□

Technical
data

Series CA2

Construction



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum die-casted	Metallic painted
2	Head cover	Aluminum die-casted	Metallic painted
3	Cylinder tube	Aluminum alloy	Hard anodized
4	Piston rod	Carbon steel	Hard chromium electroplated
5	Piston	Aluminum alloy	Chromated
6	Cushion ring	Brass	
7	Bushing	Lead-bronze casted	
8	Cushion valve	Steel wire	Nickel plated
9	Tie-rod	Carbon steel	Zinc chromated
10	Retaining ring	Spring steel	
11	Spring washer	Steel wire	Chromated
12	Tie-rod nut	Rolled steel	Nickel plated
13	Wear ring	Resin	
14	Cushion seal	Urethane	
15	Rod seal	NBR	
16	Piston seal	NBR	
17	Cushion valve seal	NBR	
18	Cylinder tube gasket	NBR	
19	Piston gasket	NBR	O-ring
20	Rod end nut	Rolled steel	Nickel plated

Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.	Content
	Air cylinder	
40	MB40-PS	Set of nos. above 14, 15, 16, 18.
50	MB50-PS	
63	MB63-PS	
80	MB80-PS	
100	MB100-PS	

* Seal kit includes 14, 15, 16 and 18. Order the seal kit based on each bore size.

* Do not disassemble the trunnion style. Refer to page 407.

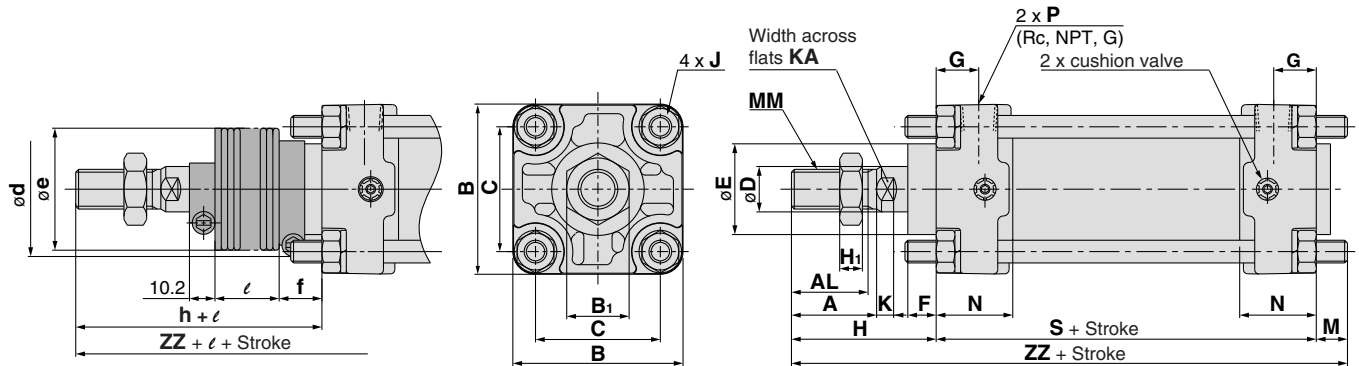
* Seal kit includes a grease pack (ø40, 50: 10 g, ø63, 80: 20 g, ø100: 30 g).

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 Style: CA2B

With rod boot



Bore size (mm)	Stroke range (mm)		A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	M	MM	N	P
	Without rod boot	With rod boot																	
40	Up to 500	20 to 500	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	11	M14 x 1.5	27	1/4
50	Up to 600	20 to 600	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	11	M18 x 1.5	30	3/8
63	Up to 600	20 to 600	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	14	M18 x 1.5	31	3/8
80	Up to 750	20 to 750	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	17	M22 x 1.5	37	1/2
100	Up to 750	20 to 750	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	17	M26 x 1.5	40	1/2

Bore size (mm)	S	Without rod boot		With rod boot					
		H	ZZ	d	e	f	h	ℓ	ZZ
40	84	51	146	56	43	11.2	59	1/4 stroke	154
50	90	58	159	64	52	11.2	66	1/4 stroke	167
63	98	58	170	64	52	11.2	66	1/4 stroke	178
80	116	71	204	76	65	12.5	80	1/4 stroke	213
100	126	72	215	76	65	14	81	1/4 stroke	224

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

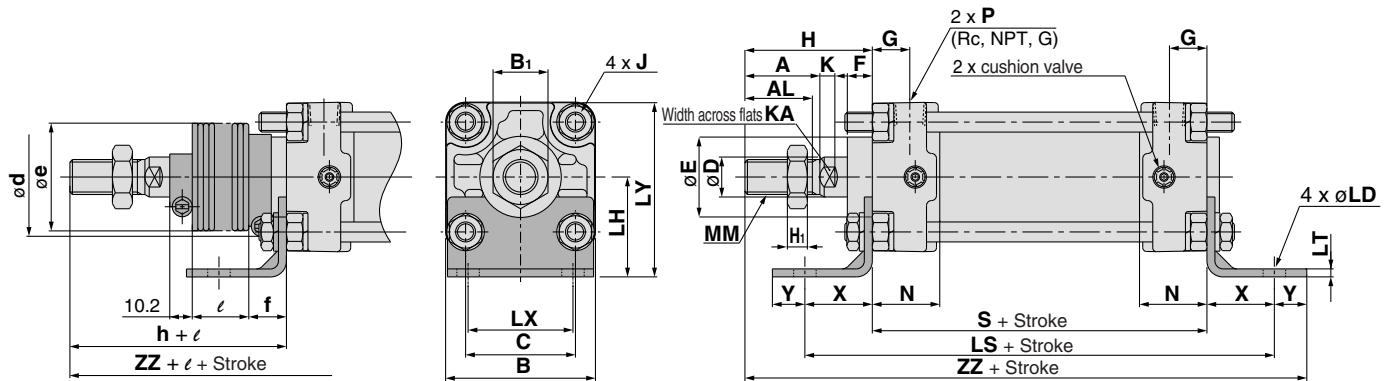
Individual
-X□

Technical
data

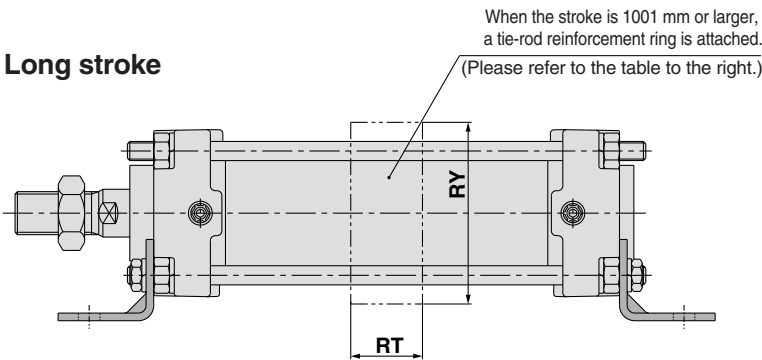
Series CA2

Axial Foot Style: CA2L

With rod boot



Long stroke

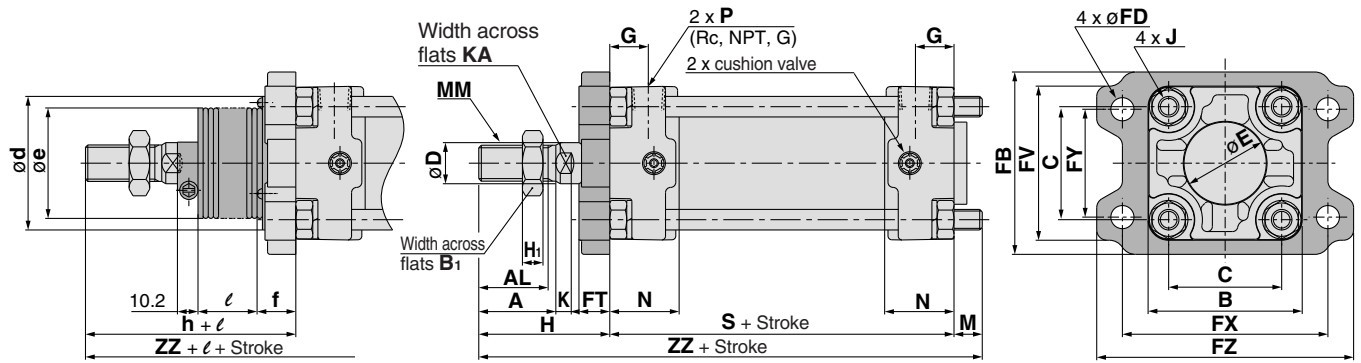


Bore size (mm)	Stroke range (mm)		A	AL	B	B ₁	C	D	E	F	G	H _i	J	K	KA	LD	LH	LS	LT
	Without rod boot	With rod boot																	
40	Up to 800	20 to 800	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	9.0	40	138	3.2
50	Up to 1200	20 to 1200	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	9.0	45	144	3.2
63	Up to 1200	20 to 1200	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	11.5	50	166	3.2
80	Up to 1400	20 to 1400	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	13.5	65	204	4.5
100	Up to 1500	20 to 1500	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	13.5	75	212	6.0

Bore size (mm)	LX	LY	MM	N	P	S	X	Y	RT	RY	Without rod boot		With rod boot					
											H	ZZ	d	e	f	h	ℓ	ZZ
40	42	70	M14 x 1.5	27	1/4	84	27	13	—	—	51	175	56	43	11.2	59	1/4 stroke	183
50	50	80	M18 x 1.5	30	3/8	90	27	13	30	76	58	188	64	52	11.2	66	1/4 stroke	196
63	59	93	M18 x 1.5	31	3/8	98	34	16	40	92	58	206	64	52	11.2	66	1/4 stroke	214
80	76	116	M22 x 1.5	37	1/2	116	44	16	45	112	71	247	76	65	12.5	80	1/4 stroke	256
100	92	133	M26 x 1.5	40	1/2	126	43	17	50	136	72	258	76	65	14.0	81	1/4 stroke	267

Rod Side Flange Style: CA2F

With rod boot



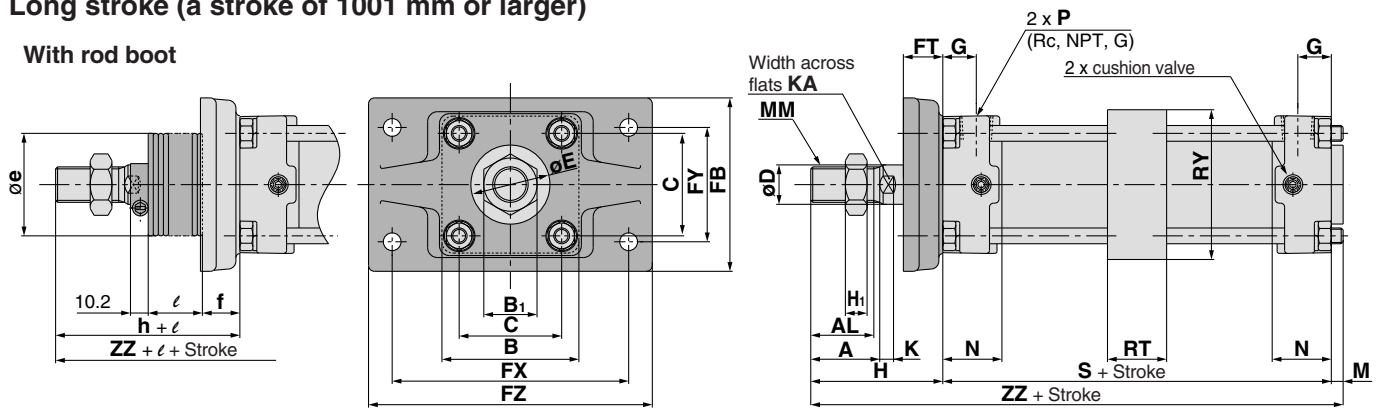
Bore size (mm)	Stroke range (mm)		A	AL	FB	B	B ₁	C	D	E	FV	FD	FT	FX	FY	FZ	G	H ₁	J
	Without rod boot	With rod boot																	
40	Up to 800	20 to 800	30	27	71	60	22	44	16	32	60	9.0	12	80	42	100	15	8	M8 x 1.25
50	Up to 1000	20 to 1000	35	32	81	70	27	52	20	40	70	9.0	12	90	50	110	17	11	M8 x 1.25
63	Up to 1000	20 to 1000	35	32	101	85	27	64	20	40	86	11.5	15	105	59	130	17	11	M10 x 1.25
80	Up to 1000	20 to 1000	40	37	119	102	32	78	25	52	102	13.5	18	130	76	160	21	13	M12 x 1.75
100	Up to 1000	20 to 1000	40	37	133	116	41	92	30	52	116	13.5	18	150	92	180	21	16	M12 x 1.75

Bore size (mm)	K	KA	M	MM	N	P	S	Without rod boot		With rod boot					
								H	ZZ	d*	e	f	h	ℓ	ZZ
40	6	14	11	M14 x 1.5	27	1/4	84	51	146	52	43	15	59	1/4 stroke	154
50	7	18	11	M18 x 1.5	30	3/8	90	58	159	58	52	15	66	1/4 stroke	167
63	7	18	14	M18 x 1.5	31	3/8	98	58	170	58	52	17.5	66	1/4 stroke	178
80	10	22	17	M22 x 1.5	37	1/2	116	71	204	80	65	21.5	80	1/4 stroke	213
100	10	26	17	M26 x 1.5	40	1/2	126	72	215	80	65	21.5	81	1/4 stroke	224

★ If a hole is provided to accommodate the rod boot when the air cylinder is mounted, make the hole diameter larger than the outside diameter of the rod boot mounting bracket ød.

Long stroke (a stroke of 1001 mm or larger)

With rod boot



Bore size (mm)	Stroke range (mm)	A	AL	FB	B	B ₁	C	D	E	FD	FT	FX	FY	FZ	G	H ₁	J	K	KA
63	1001 to 1200	35	32	105	85	27	64	20	40	11.5	23	140	64	170	17	11	M10 x 1.25	7	18
80	1001 to 1400	40	37	124	102	32	78	25	52	13.5	28	164	84	198	21	13	M12 x 1.75	10	22
100	1001 to 1500	40	37	140	116	41	92	30	52	13.5	29	180	100	220	21	16	M12 x 1.75	10	26

Bore size (mm)	M	MM	N	P	RT	RY	S	Without rod boot		With rod boot					
								H	ZZ	e*	f	h	ℓ	ZZ	
50	6	M18 x 1.5	30	3/8	30	76	90	67	163	52	19	66	1/4 stroke	162	
63	10	M18 x 1.5	31	3/8	40	92	98	71	179	52	19	66	1/4 stroke	174	
80	12	M22 x 1.5	37	1/2	45	112	116	87	215	65	21	80	1/4 stroke	208	
100	12	M26 x 1.5	40	1/2	50	136	126	89	227	65	21	81	1/4 stroke	219	

★ If a hole is provided to accommodate the rod boot when the air cylinder is mounted, make the hole diameter larger than the outside diameter of the rod boot øe.

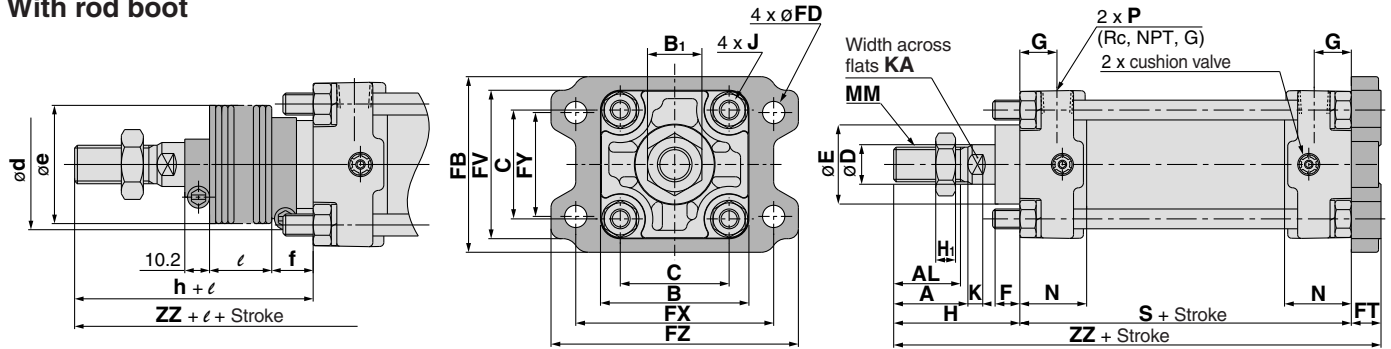
- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2**
- CS1
- CS2

- D-□
- X□
- Individual
- X□
- Technical data

Series CA2

Head Side Flange Style: CA2G

With rod boot



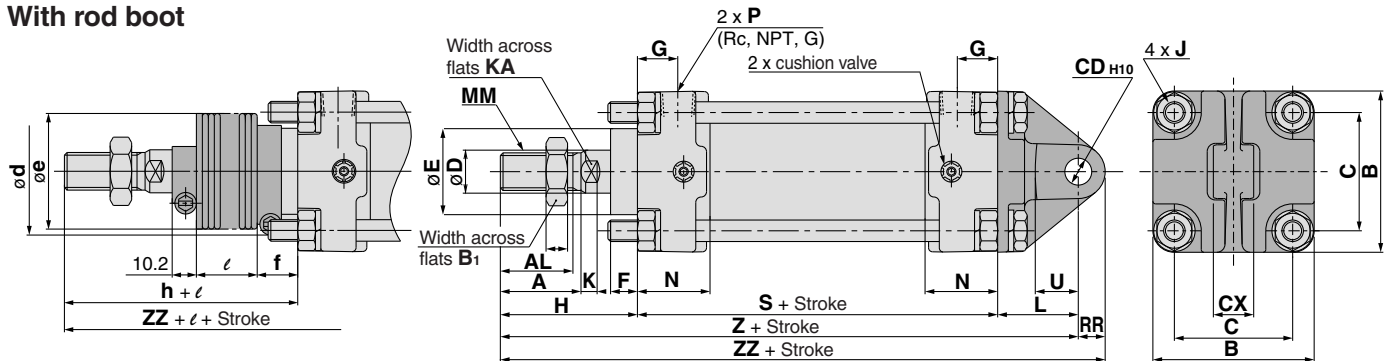
(mm)

Bore size (mm)	Stroke range (mm)		A	AL	FB	B	B ₁	C	D	E	F	FV	FD	FT	FX	FY	FZ	G	H ₁	J
	Without rod boot	With rod boot																		
40	Up to 500	20 to 500	30	27	71	60	22	44	16	32	10	60	9.0	12	80	42	100	15	8	M8 x 1.25
50	Up to 600	20 to 600	35	32	81	70	27	52	20	40	10	70	9.0	12	90	50	110	17	11	M8 x 1.25
63	Up to 600	20 to 600	35	32	101	85	27	64	20	40	10	86	11.5	15	105	59	130	17	11	M10 x 1.25
80	Up to 750	20 to 750	40	37	119	102	32	78	25	52	14	102	13.5	18	130	76	160	21	13	M12 x 1.75
100	Up to 750	20 to 750	40	37	133	116	41	92	30	52	14	116	13.5	18	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 Style: CA2C

With rod boot



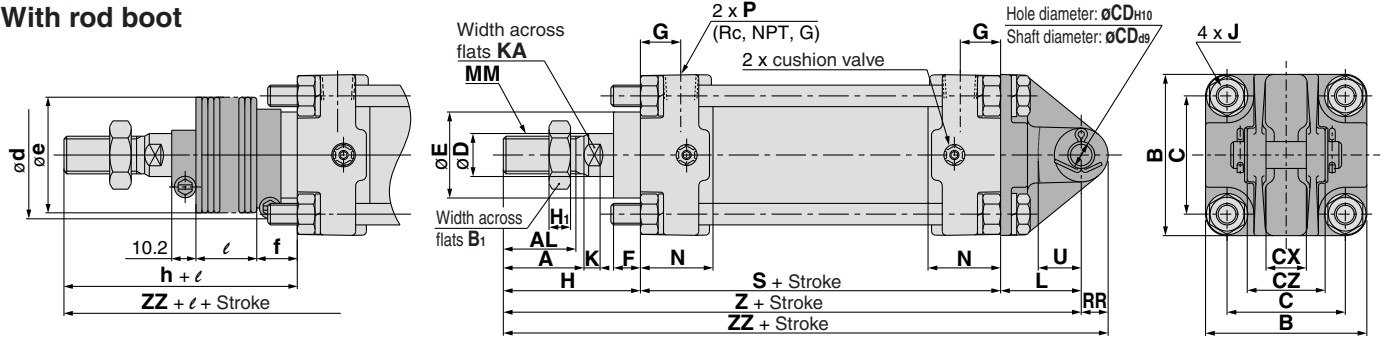
(mm)

Bore size (mm)	Stroke range (mm)		A	AL	B	B ₁	C	CD ^{H10}	CX	D	E	F	G	H ₁	J	K	KA
	Without rod boot	With rod boot															
40	Up to 500	20 to 500	30	27	60	22	44	10 ^{+0.058} ₀	15.0 ^{-0.1} _{-0.3}	16	32	10	15	8	M8 x 1.25	6	14
50	Up to 600	20 to 600	35	32	70	27	52	12 ^{+0.070} ₀	18.0 ^{-0.1} _{-0.3}	20	40	10	17	11	M8 x 1.25	7	18
63	Up to 600	20 to 600	35	32	85	27	64	16 ^{+0.070} ₀	25.0 ^{-0.1} _{-0.3}	20	40	10	17	11	M10 x 1.25	7	18
80	Up to 750	20 to 750	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
100	Up to 750	20 to 750	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

Bore size (mm)	L	MM	N	P	RR	S	U	Without rod boot			With rod boot						
								H	Z	ZZ	d	e	f	h	ℓ	Z	ZZ
40	30	M14 x 1.5	27	1/4	10	84	16	51	165	175	56	43	11.2	59	1/4 stroke	173	183
50	35	M18 x 1.5	30	3/8	12	90	19	58	183	195	64	52	11.2	66	1/4 stroke	191	203
63	40	M18 x 1.5	31	3/8	16	98	23	58	196	212	64	52	11.2	66	1/4 stroke	204	220
80	48	M22 x 1.5	37	1/2	20	116	28	71	235	255	76	65	12.5	80	1/4 stroke	244	264
100	58	M26 x 1.5	40	1/2	25	126	36	72	256	281	76	65	14.0	81	1/4 stroke	265	290

Double Clevis Style: CA2D

With rod boot



* Double clevis and double knuckle joint types are packed with pins and retaining rings.

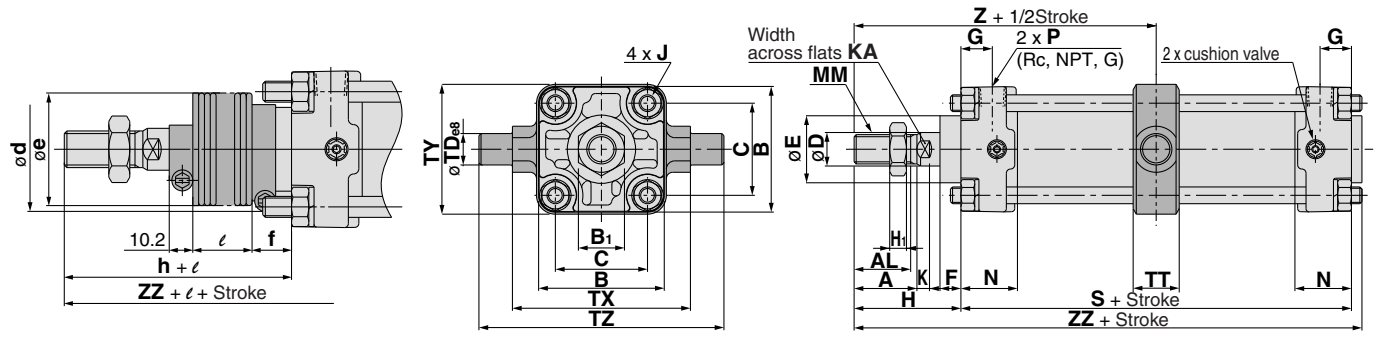
Bore size (mm)	Stroke range (mm)		A	AL	B	B ₁	C	CD	CX	CZ	D	E	F	G	H ₁	J	K	KA
	Without rod boot	With rod boot																
40	Up to 500	20 to 500	30	27	60	22	44	10 ^{+0.058} ₀	15.0 ^{+0.3} _{0.1}	29.5	16	32	10	15	8	M8 x 1.25	6	14
50	Up to 600	20 to 600	35	32	70	27	52	12 ^{+0.070} ₀	18.0 ^{+0.3} _{0.1}	38	20	40	10	17	11	M8 x 1.25	7	18
63	Up to 600	20 to 600	35	32	85	27	64	16 ^{+0.070} ₀	25.0 ^{+0.3} _{0.1}	49	20	40	10	17	11	M10 x 1.25	7	18
80	Up to 750	20 to 750	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
100	Up to 750	20 to 750	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

Bore size (mm)	L	MM	N	P	RR	S	U	Without rod boot			With rod boot						
								H	Z	ZZ	d	e	f	h	ℓ	Z	ZZ
40	30	M14 x 1.5	27	1/4	10	84	16	51	165	175	56	43	11.2	59	1/4 stroke	173	183
50	35	M18 x 1.5	30	3/8	12	90	19	58	183	195	64	52	11.2	66	1/4 stroke	191	203
63	40	M18 x 1.5	31	3/8	16	98	23	58	196	212	64	52	11.2	66	1/4 stroke	204	220
80	48	M22 x 1.5	37	1/2	20	116	28	71	235	255	76	65	12.5	80	1/4 stroke	244	264
100	58	M26 x 1.5	40	1/2	25	126	36	72	256	281	76	65	14.0	81	1/4 stroke	265	290

* Packed with clevis pin, flat washer and cotter pin.

Center Trunnion Style: CA2T

With rod boot



Bore size (mm)	Stroke range (mm)		A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	MM	N	P
	Without rod boot	With rod boot																
40	Up to 500	20 to 500	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	M14 x 1.5	27	1/4
50	Up to 600	20 to 600	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	M18 x 1.5	30	3/8
63	Up to 600	20 to 600	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	M18 x 1.5	31	3/8
80	Up to 750	20 to 750	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	M22 x 1.5	37	1/2
100	Up to 750	20 to 750	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	M26 x 1.5	40	1/2

Bore size (mm)	S	TDe8	TT	TX	TY	TZ	Without rod boot			With rod boot						
							H	Z	ZZ	d	e	f	h	ℓ	Z	ZZ
40	84	15 ^{+0.032} _{0.059}	22	85	62	117	51	93	140	56	43	11.2	59	1/4 stroke	101	148
50	90	15 ^{+0.032} _{0.059}	22	95	74	127	58	103	154	64	52	11.2	66	1/4 stroke	111	162
63	98	18 ^{+0.032} _{0.059}	28	110	90	148	58	107	162	64	52	11.2	66	1/4 stroke	115	170
80	116	25 ^{+0.040} _{0.073}	34	140	110	192	71	129	194	76	65	12.5	80	1/4 stroke	138	203
100	126	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 style. Refer to page 407.

- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Individual -X□
- Technical data

Series CA2

Trunnion and Double Clevis Mounting Bracket

• Strength is the same as cylinder brackets.

Applicable Series

Bracket type	Applicable series
Trunnion mounting bracket	CA2, CA2W, CA2WK CA2K, CA2Q, CBA2
Double clevis bracket	CA2, CA2K, CA2Q, CBA2

Description	Bore size	CA2□40	CA2□50	CA2□63	CA2□80	CA2□100
Trunnion mounting bracket		CA2-S04		CA2-S06	MB-S10	
Double clevis bracket		CA2-B04	CA2-B05	CA2-B06	CA2-B08	CA2-B10

Note) 1. The above brackets cannot be specified in the part number of the cylinder.

2. They must be ordered separately from the cylinder.

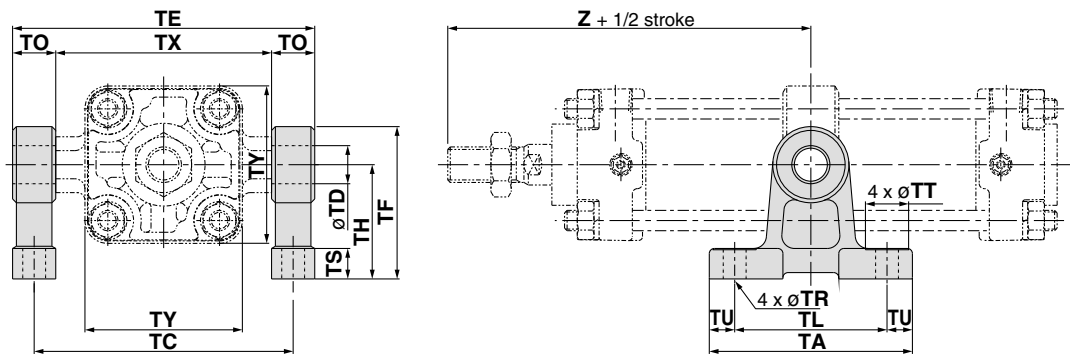
3. When the trunnion brackets are specified, two pieces should be ordered for each cylinder.

* Please confirm SMC at the time of mounting.

Trunnion bracket

Material: Cast iron

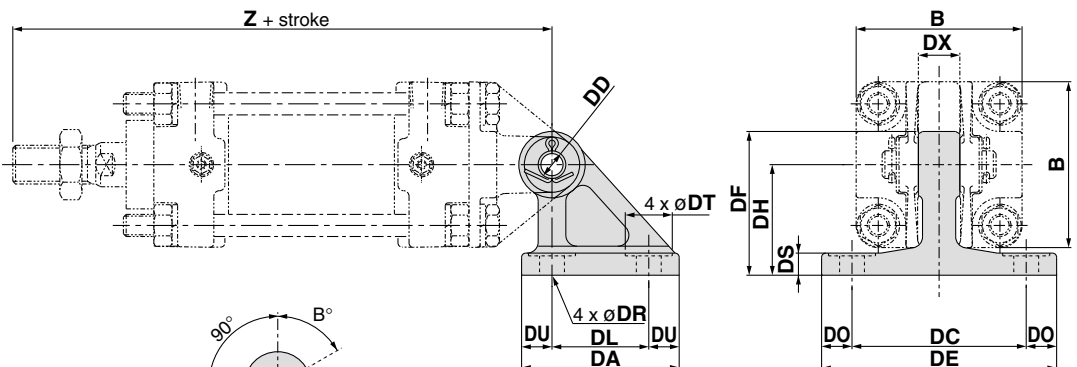
* This assembly drawing is provided as a reference. The trunnion bracket must be ordered separately.



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 bracket

Material: Cast iron



Rotation

Bore size (mm)	A°	B°	A° + B° + 90°
40 to 100	12°	60°	162°

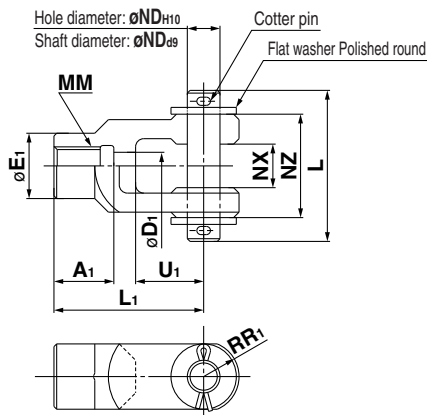
Note) This assembly drawing is provided as a reference. The trunnion bracket must be ordered separately.

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

Accessory Dimensions

Y Type Double Knuckle Joint



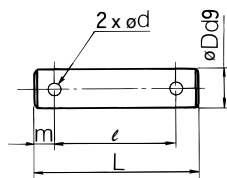
Material: Cast iron

(mm)

Part no.	Applicable bore size (mm)	A1	E1	D1	L1	MM	RR1	U1	ND	NX	NZ	L	Cotter pin size	Flat washer size
Y-05D	50, 63	27	28	14	60	M18 x 1.5	15	27	12	$16^{+0.3}_{+0.1}$	38	55.5	$\phi 3 \times 18\ell$	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	$\phi 4 \times 25\ell$	Polished round 18
Y-10D	100	37	40	21	83	M26 x 1.5	21	38	20	$30^{+0.3}_{+0.1}$	61	83	$\phi 4 \times 30\ell$	Polished round 20

* Knuckle pins, cotter pins and flat washers are shipped with the product.

Clevis Pin/Knuckle Pin



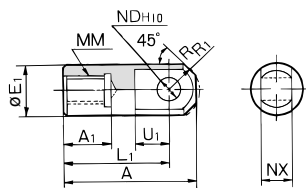
Material: Carbon steel

(mm)

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

* Cotter pins and flat washers are shipped with the product.

I Type Single Knuckle Joint

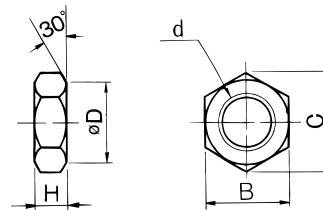


Material: Free cutting sulfur steel

(mm)

Part no.	Applicable bore size (mm)	A	A1	E1	L1	MM	R1	U1	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 option)



Material: Rolled steel

(mm)

Part no.	Applicable bore size (mm)	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

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

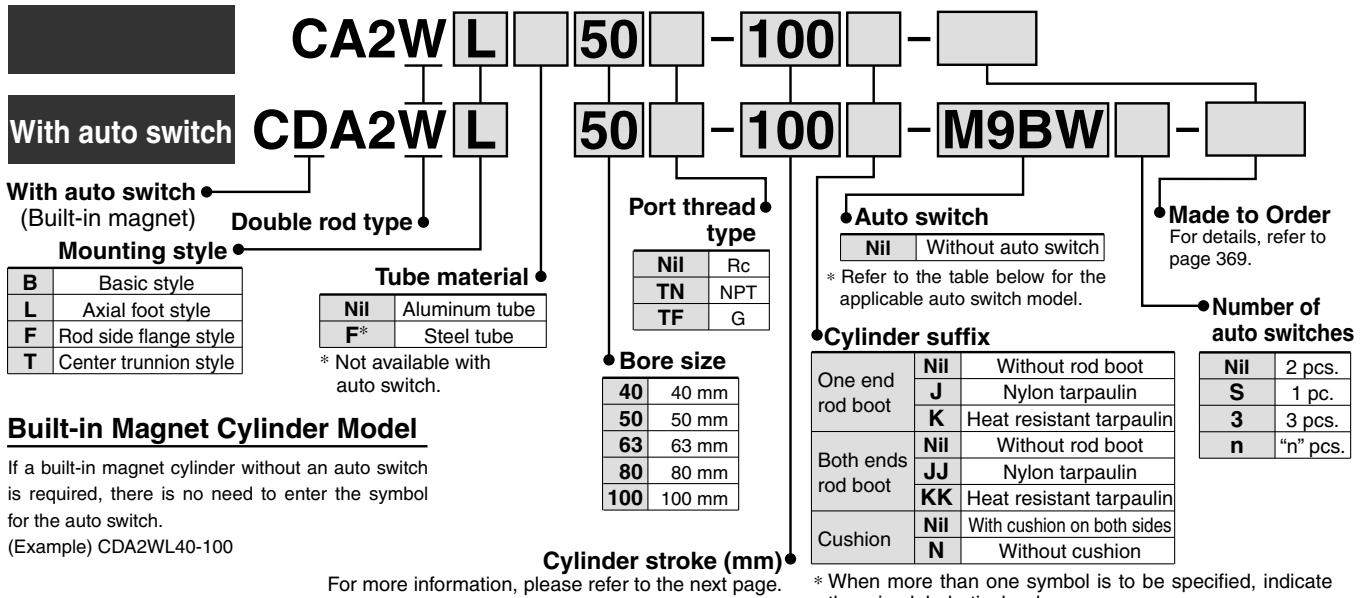
Individual
-X□

Technical
data

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

ø40, ø50, ø63, ø80, ø100

How to Order



Applicable Auto Switch / Refer to pages 1263 to 1371 for further information on auto switches.

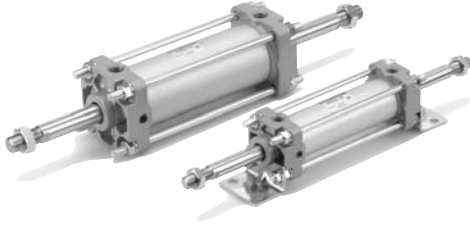
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)					Pre-wired connector	Applicable load			
					DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	1 (M)	3 (L)	5 (Z)						
Solid state switch	—	Grommet	—	3-wire(NPN)	24 V	5 V, 12 V	—	M9N	●	●	●	○	○	IC circuit	Relay, PLC			
				3-wire(PNP)				M9P	●	●	●	○						
				2-wire				M9B	●	●	●	○						
		Terminal conduit		3-wire(NPN)	12 V	J51	●	●	●	○	○							
				2-wire		G39C	—	—	—	—	—							
				—		K39C	—	—	—	—	—							
	Diagnostic indication (2-color indication)	Grommet	Yes	3-wire(NPN)	24 V	5 V, 12 V	—	M9NW	●	●	●	○	○	IC circuit				
				3-wire(NPN)				—	●	●	●	○						
				2-wire				M9PW	●	●	●	○						
				Water resistant (2-color indication)	3-wire(NPN)	12 V	M9BW	●	●	●	○	○						
					3-wire(PNP)		—	●	●	●	○							
					2-wire		M9NA	—	○	○	●	○	○					
With diagnostic output (2-color indication)	3-wire(NPN)	5 V, 12 V	M9PA	—	○	○	●	○	○									
	3-wire(PNP)		M9BA	—	○	○	●	○	○									
	2-wire		—	●	●	●	○	○										
Reed switch	—	Grommet	Yes	4-wire(NPN)	24 V	12 V	—	M9BA	—	○	○	●	○	○	IC circuit			
				2-wire (Non-polar)				—	○	○	●	○						
				3-wire (NPN equiv.)				—	○	○	●	○						
				Terminal conduit	5 V, 12 V	100 V, 200 V	F59F	●	—	●	○	○						
					—		P4DW	—	—	—	●	●	○					
					—		—	—	—	—	—	—						
		DIN terminal	Yes	2-wire	24 V	12 V	100 V, 200 V	—	A96	—	●	—	●	—	○	IC circuit		
									100 V	A93	—	●	—	●			—	
									100 V or less	A90	—	●	—	●			—	
									100 V, 200 V	A54	B54	●	—	●			●	—
									200 V or less	A64	B64	●	—	●			—	—
									—	A33C	A33	—	—	—			—	—
Grommet	Yes	2-wire	24 V	12 V	100 V, 200 V	—	A34C	A34	—	—	—	—	—	PLC				
							A44C	A44	—	—	—	—						
							A59W	B59W	●	—	●	—			—			

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

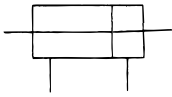
* Solid state auto switches marked with "○" are produced upon receipt of order.

* In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 406.
 * Refer to pages 1328 and 1329 for the details about auto switches with a pre-wired connector.
 * D-A9□/M9□/M9□W/M9□A(V)L auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

Specifications



JIS Symbol



Made to Order Specifications

(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat resistant (150°C)
-XC3	Special port positions
-XC4	With heavy duty scraper
-XC5	Heat resistant (110°C)
-XC6	Piston rod and rod end nut made of stainless steel
-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
-XC58	Coolant resistant
-XC59	Coolant resistant
-XC65	-XC6 + -XC7 specifications

Minimum Stroke for Auto Switch Mounting

⚠ Caution

- The minimum stroke for mounting varies with the auto switch type and mounting style of the cylinder. In particular, the center trunnion style needs careful attention. (For more information, refer to pages 403 and 404.)

Refer to pages 401 to 406 for cylinders with auto switches.

- Minimum auto switch mounting stroke
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

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	to 250 st : $^{+1.0}_0$ 251 to 750 st : $^{+1.4}_0$				
Lubrication	Not required (Non-lube)				
Mounting	Basic style, Axial foot style, Rod side flange style, Center trunnion style				

* With no freezing.

In case of a type with auto switch, also refer to the table of minimum Standard Stroke/strokes for auto switch mounting on pages 403 and 404.

Bore size (mm)	Standard stroke (mm)
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500
50, 63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600
80, 100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700

* Intermediate strokes not listed above are produced upon receipt of order.

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 itself.

Accessory

Mounting		Basic style	Foot style	Flange style	Center trunnion style
Options	Standard equipment	●	●	●	●
	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 Series CA2. Please refer to page 367.

Mass/Aluminum Tube (Steel tube)

Bore size (mm)		40	50	63	80	100		
Basic mass	Basic style	Aluminum tube	0.99	1.51	2.10	3.56	4.88	
		Steel tube	1.05	1.58	2.18	3.76	5.16	
	Axial foot style	Aluminum tube	1.18	1.73	2.43	4.23	5.87	
		Steel tube	1.24	1.80	2.51	4.43	6.15	
	Flange style	Aluminum tube	1.36	1.96	2.89	5.01	6.80	
		Steel tube	1.42	2.03	2.97	5.21	7.08	
	Trunnion style	Aluminum tube	1.35	1.99	2.90	5.11	7.16	
		Steel tube	1.41	2.06	2.98	5.31	7.44	
	Additional mass per each 50 mm stroke	All mounting brackets	Aluminum tube	0.28	0.37	0.44	0.66	0.86
			Steel tube	0.35	0.47	0.55	0.89	1.15
Accessory	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) **CA2WL40-100** (Axial foot style, ø40, 100st)

- Basic mass 1.18 (Axial foot, ø40)
- Additional mass 0.28/50st
- Cylinder stroke 100st

$$1.18 + 0.28 \times 100/50 = 1.74 \text{ kg}$$

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

Technical data

Series CA2W

Copper and Fluorine-free

20 – CA2W Mounting Model Bore size Port thread type — Stroke Suffix

↓ Copper and Fluorine-free

To eliminate any influences of copper ions or fluororesin on color CRTs, copper materials have been nickel plated or replaced with non-copper materials, thus preventing the generation of copper ions.

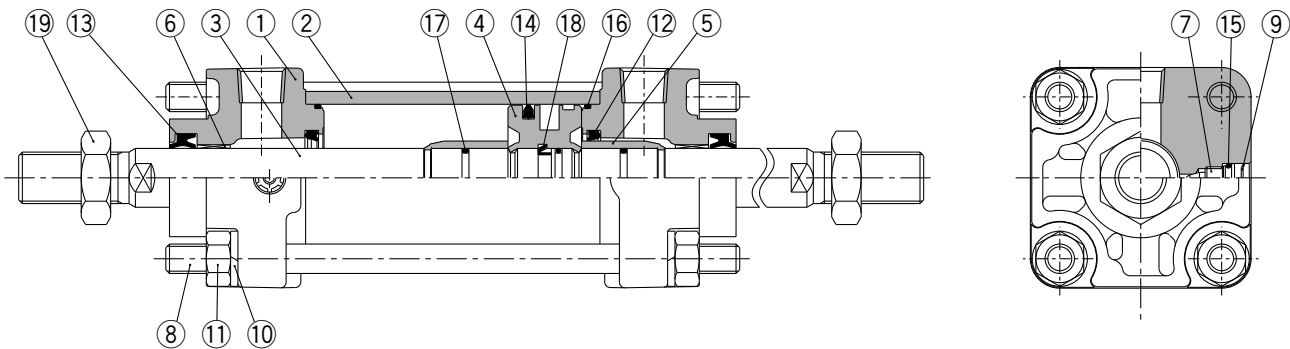
Specifications

Action	Double acting, Double rod
Bore size	ø40, ø50, ø63, ø80, ø100
Maximum operating pressure	1.0 MPa
Minimum operating pressure	0.08 MPa
Cushion	Air cushion
Piping	Screw-in piping
Piston speed	50 to 500 mm/s*
Mounting	Basic style, Axial foot style Rod side flange style, Center trunnion style

* Auto switch capable

★ Operate within the range of absorbed energy. (Refer to page 358.)

Construction



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum die-casted	Metallic painted
2	Cylinder tube	Aluminum alloy	Hard anodized
3	Piston rod	Carbon steel	Hard chromium electroplated
4	Piston	Aluminum alloy	Chromated
5	Cushion ring	Brass	
6	Bushing	Lead-bronze cased	
7	Cushion valve	Steel wire	Nickel plated
8	Tie-rod	Carbon steel	Zinc chromated
9	Retaining ring	Spring steel	
10	Spring washer	Rolled steel	Chromated
11	Tie-rod nut	Rolled steel	Nickel plated
12	Cushion seal	Urethane	
13	Rod seal	NBR	
14	Piston seal	NBR	
15	Cushion valve seal	NBR	O-ring
16	Cylinder tube gasket	NBR	
17	Piston gasket	NBR	
18	Piston holder	Urethane	
19	Rod end nut	Rolled steel	Nickel plated

Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.	Content
	Air cylinder	
40	MBW40-PS	Set of nos. above ⑫, ⑬, ⑭, ⑯.
50	MBW50-PS	
63	MBW63-PS	
80	MBW80-PS	
100	MBW100-PS	

* Do not disassemble the trunnion style. Refer to page 407.

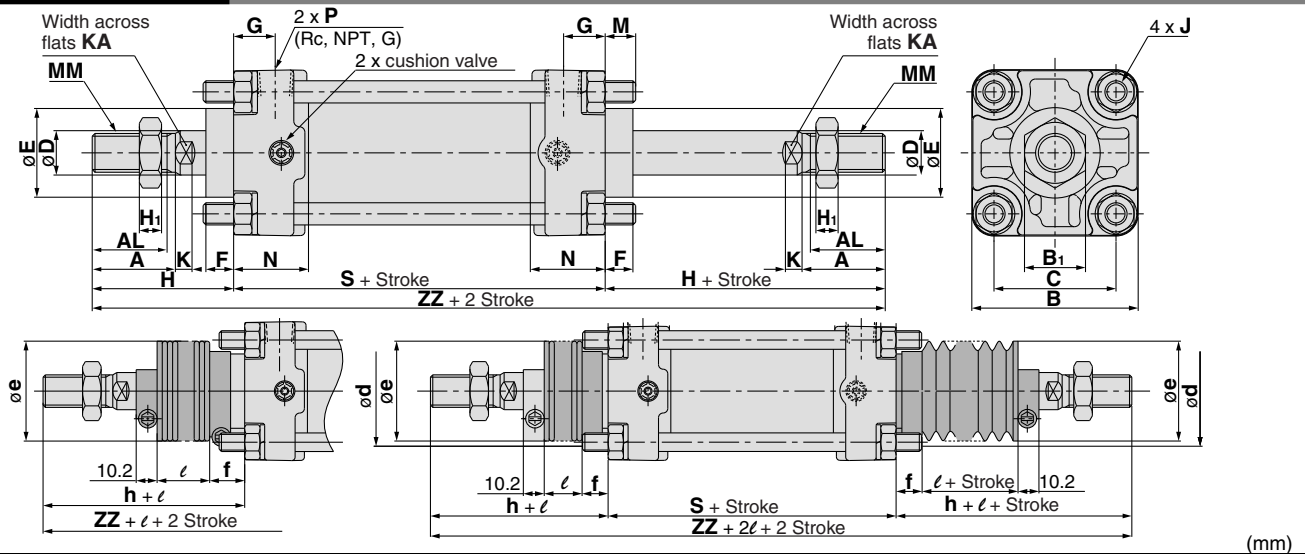
* Seal kit includes ⑫, ⑬, ⑭ and ⑯. Order the seal kit based on each bore size.

* 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)

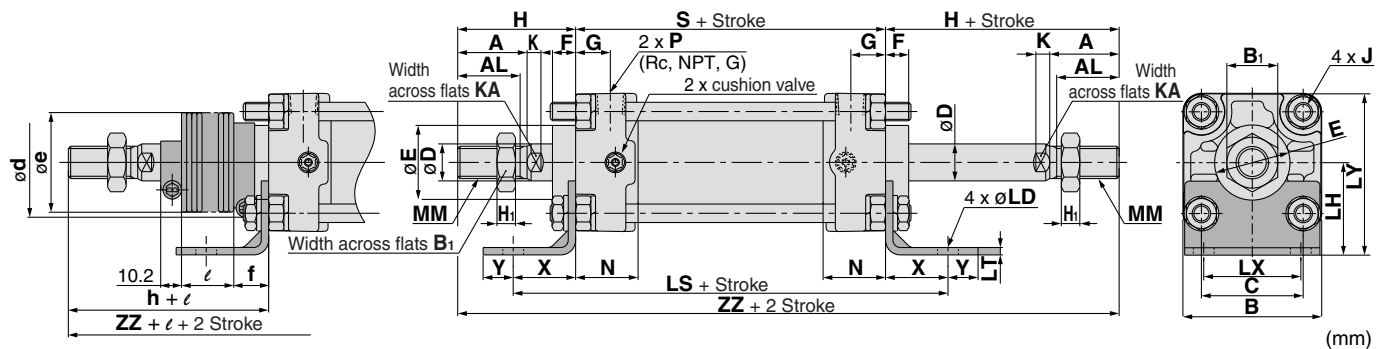
Basic Style: CA2WB



Bore size (mm)	Stroke range (mm)		A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	M	MM	N
	Without rod boot	With rod boot																
40	Up to 500	20 to 500	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	11	M14 x 1.5	27
50	Up to 600	20 to 600	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	11	M18 x 1.5	30
63	Up to 600	20 to 600	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	14	M18 x 1.5	31
80	Up to 750	20 to 750	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	17	M22 x 1.5	37
100	Up to 750	20 to 750	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	17	M26 x 1.5	40

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

Axial Foot Style: CA2WL



Bore size (mm)	Stroke range (mm)		A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	LD	LH	LS	LT
	Without rod boot	With rod boot																	
40	Up to 500	20 to 500	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	9	40	138	3.2
50	Up to 600	20 to 600	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	9	45	144	3.2
63	Up to 600	20 to 600	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	11.5	50	166	3.2
80	Up to 750	20 to 750	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	13.5	65	204	4.5
100	Up to 750	20 to 750	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	13.5	75	212	6.0

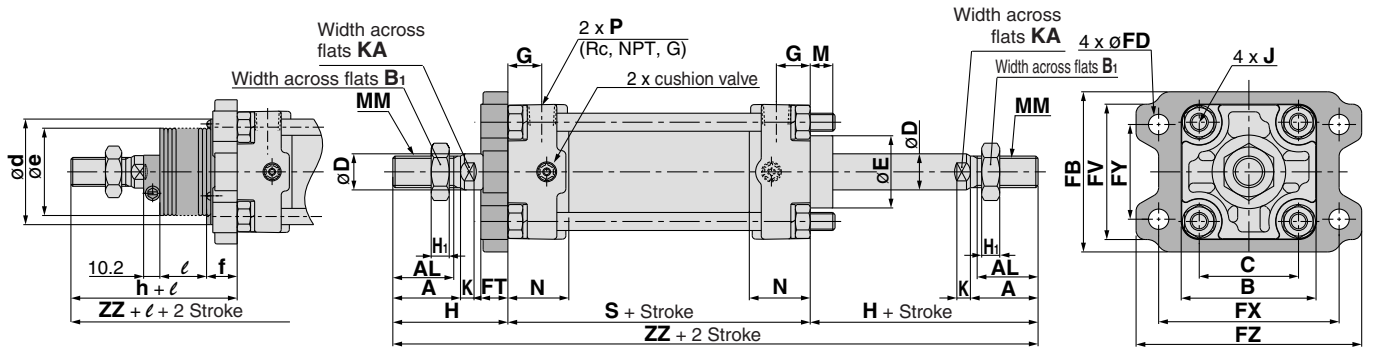
Bore size (mm)	LX	LY	MM	N	P	S	X	Y	Without rod boot		With rod boot (Single side)						(Both sides)	
									H	ZZ	d	e	f	h	l	ZZ	ZZ	
40	42	70	M14 x 1.5	27	1/4	84	27	13	51	186	56	43	11.2	59	1/4 stroke	194	202	
50	50	80	M18 x 1.5	30	3/8	90	27	13	58	206	64	52	11.2	66	1/4 stroke	214	222	
63	59	93	M18 x 1.5	31	3/8	98	34	16	58	214	64	52	11.2	66	1/4 stroke	222	230	
80	76	116	M22 x 1.5	37	1/2	116	44	16	71	258	76	65	12.5	80	1/4 stroke	267	276	
100	92	133	M26 x 1.5	40	1/2	126	43	17	72	270	76	65	14.0	81	1/4 stroke	279	288	

- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2**
- CS1
- CS2

- D-□
- X□
- Individual -X□
- Technical data

Series CA2W

Rod Side Flange Style: CA2WF

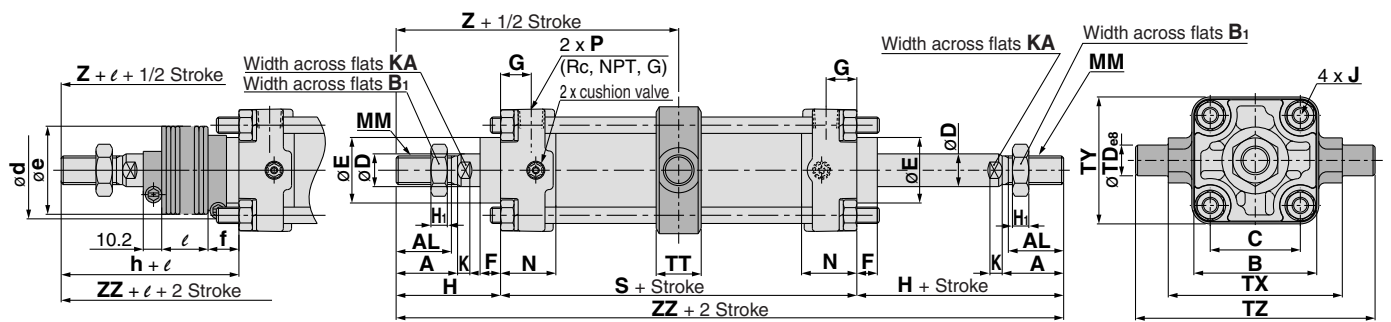


Bore size (mm)	Stroke range (mm)		(mm)																	
	Without rod boot	With rod boot	A	AL	FB	B	B ₁	C	D	E	FD	FT	FX	FY	FZ	FV	G	H ₁	J	K
40	Up to 500	20 to 500	30	27	71	60	22	44	16	32	9.0	12	80	42	100	60	15	8	M8 x 1.25	6
50	Up to 600	20 to 600	35	32	81	70	27	52	20	40	9.0	12	90	50	110	70	17	11	M8 x 1.25	7
63	Up to 600	20 to 600	35	32	101	85	27	64	20	40	11.5	15	105	59	130	86	17	11	M10 x 1.25	7
80	Up to 750	20 to 750	40	37	119	102	32	78	25	52	13.5	18	130	76	160	102	21	13	M12 x 1.75	10
100	Up to 750	20 to 750	40	37	133	116	41	92	30	52	13.5	18	150	92	180	116	21	16	M12 x 1.75	10

Bore size (mm)	KA	M	MM	N	P	S	Without rod boot		With rod boot (Single side)							(Both sides)
							H	ZZ	d*	e	f	h	ℓ	ZZ	ZZ	
40	14	11	M14 x 1.5	27	1/4	84	51	186	52	43	15	59	1/4 stroke	194	202	
50	18	11	M18 x 1.5	30	3/8	90	58	206	58	52	15	66	1/4 stroke	214	222	
63	18	14	M18 x 1.5	31	3/8	98	58	214	58	52	17.5	66	1/4 stroke	222	230	
80	22	17	M22 x 1.5	37	1/2	116	71	258	80	65	21.5	80	1/4 stroke	267	276	
100	26	17	M26 x 1.5	40	1/2	126	72	270	80	65	21.5	81	1/4 stroke	279	288	

★ If a hole is provided to accommodate the boot when the air cylinder is mounted, make the hole diameter larger than the outside diameter of the boot øD.

Center Trunnion Style: CA2WT



Bore size (mm)	Stroke range (mm)		(mm)																
	Without rod boot	With rod boot	A	AL	B	B ₁	C	D	E	F	G	J	K	MM	N	P	S		
40	Up to 500	20 to 500	30	27	60	22	44	16	32	10	15	M8 x 1.25	6	M14 x 1.5	27	1/4	84		
50	Up to 600	20 to 600	35	32	70	27	52	20	40	10	17	M8 x 1.25	7	M18 x 1.5	30	3/8	90		
63	Up to 600	20 to 600	35	32	85	27	64	20	40	10	17	M10 x 1.25	7	M18 x 1.5	31	3/8	98		
80	Up to 750	20 to 750	40	37	102	32	78	25	52	14	21	M12 x 1.75	10	M22 x 1.5	37	1/2	116		
100	Up to 750	20 to 750	40	37	116	41	92	30	52	14	21	M12 x 1.75	10	M26 x 1.5	40	1/2	126		

Bore size (mm)	TD _{ø8}	TT	TX	TY	TZ	Without rod boot		With rod boot (Single side)							(Both sides)		
						H	Z	d	e	f	h	ℓ	Z	ZZ	Z	ZZ	
40	15 ^{-0.032} _{-0.059}	22	85	62	117	51	93	186	56	43	11.2	59	1/4 stroke	101	194	101	202
50	15 ^{-0.032} _{-0.059}	22	95	74	127	58	103	206	64	52	11.2	66	1/4 stroke	111	214	111	222
63	18 ^{-0.032} _{-0.059}	28	110	90	148	58	107	214	64	52	11.2	66	1/4 stroke	115	222	115	230
80	25 ^{-0.040} _{-0.073}	34	140	110	192	71	129	258	76	65	12.5	80	1/4 stroke	138	267	138	276
100	25 ^{-0.040} _{-0.073}	40	162	130	214	72	135	270	76	65	14.0	81	1/4 stroke	144	279	144	288

*Do not disassemble the trunnion style. Refer to page 407.

Air Cylinder: Non-rotating Rod Type

Double Acting, Single Rod

Series CA2K

ø40, ø50, ø63

How to Order

CA2K L 40 - 200

With auto switch CDA2K L 40 - 200 - M9BW

With auto switch (Built-in magnet) Non-rotating rod

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) CDA2KL40-100

Mounting style

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

Port thread type

Nil	Rc
TN	NPT
TF	G

Bore size

40	40 mm
50	50 mm
63	63 mm

Cylinder stroke (mm)
For more information, please refer to the next page.

Auto switch

Nil Without auto switch
* Refer to the table below for the applicable auto switch model.

Made to Order
For details, refer to page 374.

Number of auto switches

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

Cylinder suffix

Rod boot	Nil	Without
	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Cushion	Nil	With cushion on both sides
	N	Without cushion

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

Applicable Auto Switch/Refer to page 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)				Pre-wired connector	Applicable load				
					DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	1 (M)	3 (L)	5 (Z)						
Solid state switch	—	Grommet	—	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	●	●	●	○	○	IC circuit				
				3-wire (PNP)				M9P	●	●	●	○			○			
				2-wire	—	100 V, 200 V	M9B	●	●	●	○	○	—					
		3-wire (NPN)		J51			●	—	●	○	—							
		2-wire		G39C			G39	—	—	—	—	—						
		Diagnostic indication (2-color indication)		Grommet	Yes	3-wire (NPN)	24 V	12 V	—	K39C	K39	—	—	—	—	○	IC circuit	
	3-wire (PNP)		M9NW			—				●	●	●	○	○				
	2-wire		—			—	M9PW	—	●	●	●	○	○	—				
	3-wire (NPN)						M9BW	—	●	●	●	○	○					
	3-wire (PNP)						K59W	—	●	—	●	○	○					
	2-wire						M9NA	—	○	○	●	○	○					
	Water resistant (2-color indication)	Grommet	—	3-wire (NPN)	24 V	12 V	—	M9PA	—	○	○	●	○	—				
3-wire (PNP)				M9BA				—	○	○	●	○	○					
With diagnostic output (2-color indication)	Grommet	—	2-wire	—	—	—	—	G5BA	—	—	●	○	—					
			4-wire (NPN)				F59F	G59F	●	—	●	○		○				
Magnetic field resistant (2-color indication)	Grommet	—	2-wire (Non-polar)	—	—	—	P4DW	—	—	—	●	●	○	—				
			—				—	—	—	—	—	—			—			
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	24 V	5 V	—	A96	—	●	—	●	—	—	IC circuit			
				—				A93	—	●	—	●	—			—		
				Terminal conduit	No	2-wire	100 V	12 V	—	—	A90	—	●	—	●	—	—	IC circuit
							100 V or less				A54	B54	●	—	●	●		
		DIN terminal		Yes	2-wire	100 V, 200 V	—	—	—	A64	B64	●	—	●	—	—	—	
						200 V or less				A33C	A33	—	—	—	—			—
		Diagnostic indication (2-color indication)		Grommet	—	—	—	—	—	A34C	A34	—	—	—	—	—	—	
										—	A44C	A44	—	—	—			—
—	Grommet	—	—	—	—	—	A59W	B59W	●	—	●	—	—	—				
							—	—	—	—	—	—			—	—		

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

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

* In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 406.

* Refer to pages 1328 and 1329 for the details about auto switches with a pre-wired connector.

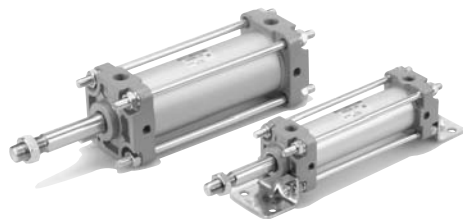
* D-A9□/M9□/M9□W/M9□AL auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

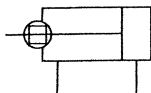
- D-□
- X□
- Individual -X□
- Technical data

Series CA2K

Non-rotating accuracy: $\pm 0.8^\circ$
Same mounting dimensions as those of standard cylinder



JIS Symbol



Made to Order Specifications

(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
-XA□	Change of rod end shape
-XC7	Tie-rod, cushion valve, and tie-rod nut and similar parts made of stainless steel
-XC8	Adjustable stroke/Extension adjustment
-XC9	Adjustable stroke/Retraction adjustment
-XC10	Dual stroke/Double rod
-XC11	Dual stroke cylinder/Single rod
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC27	Tie-rod, cushion valve, tie rod nut, etc. made of stainless steel
-XC28	Compact flange made of SS400

Refer to pages 401 to 406 for cylinders with auto switches.

- Minimum auto switch mounting stroke
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Specifications

Bore size (mm)	40	50	63
Fluid	Air		
Proof pressure	1.5 MPa		
Maximum operating pressure	1.0 MPa		
Minimum operating pressure	0.05 MPa		
Ambient and fluid temperature	Without auto switch: -10 to 70°C^* With auto switch: -10 to 60°C		
Piston speed	50 to 500 mm/s		
Cushion	Air cushion		
Stroke length tolerance	To 250 st : $+1.0$, 251 to 600 st : $+1.4$		
Rod non-rotating accuracy	$\pm 0.8^\circ$		
Allowable rotational torque	0.44 N·m or less		
Lubrication	Not required (Non-lube)		
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style Single clevis style, Double clevis style, Center trunnion style		

* With no freezing.

Standard Stroke In case of a type with auto switch, please also refer to the table of minimum strokes for auto switch mounting on pages 403 and 404.

Bore size (mm)	Standard stroke (mm)
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500*
50, 63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600*

* Intermediate strokes not listed above are also available.

Please consult with SMC for longer strokes than the strokes marked with “*”.

Mass

Bore size (mm)		40	50	63
Basic mass	Basic style	0.88	1.32	1.91
	Axial foot style	1.07	1.54	2.25
	Flange style	1.25	1.77	2.70
	Single clevis style	1.11	1.66	2.54
	Double clevis style	1.15	1.75	2.70
	Trunnion style	1.24	1.80	2.71
Additional mass per each 50 mm stroke		0.20	0.25	0.30
Accessory	Single knuckle	0.23	0.26	0.26
	Double knuckle (With pin)	0.37	0.43	0.43

Calculation: (Example) CA2KL40-100

- Basic mass 1.07 (Axial foot style $\phi 40$)
- Additional mass $0.20/50^{\text{st}}$
- Cylinder stroke 100^{st}

$$1.07 + 0.20 \times 100/50 = 1.47 \text{ kg}$$

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 itself.

Minimum Stroke for Auto Switch Mounting

⚠ Caution

1. The minimum stroke for mounting varies with the auto switch type and mounting style of the cylinder. In particular, the center trunnion style needs careful attention. (For more information, please refer to pages 403 and 404.)

Copper and Fluorine-free

20 — CA2K Mounting Bore size Port thread type — Stroke Suffix

• Copper and Fluorine-free

To eliminate any influences of copper ions or fluororesin on color CRTs, copper materials have been nickel plated or replaced with non-copper materials, thus preventing the generation of copper ions.

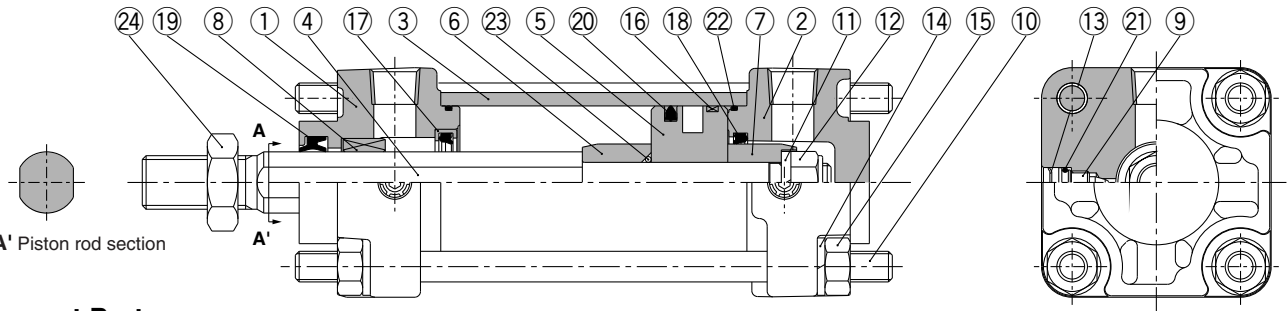
Specifications

Action	Double acting, Single rod
Bore size (mm)	ø40, ø50, ø63
Maximum operating pressure	1 MPa
Minimum operating pressure	0.05 MPa
Cushion	Air cushion
Piston speed	50 to 500 mm/s*
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Center trunnion style

★ Operate within the range of absorbable kinetic energy. (Refer to page 358.)

* Auto switch capable

Construction



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Metallic painted
2	Head cover	Aluminum die-casted	Metallic painted
3	Cylinder tube	Aluminum alloy	Hard anodized
4	Piston rod	Carbon steel	Hard chromium electroplated
5	Piston	Aluminum alloy	Chromated
6	Cushion ring A	Rolled steel	Zinc chromated
7	Cushion ring B	Rolled steel	Zinc chromated
8	Non-rotating guide	Sintered alloy	
9	Cushion valve	Steel wire	Nickel plated
10	Tie-rod	Carbon steel	Zinc chromated
11	Spring washer	Steel wire	Zinc chromated
12	Piston nut	Rolled steel	Zinc chromated
13	Retaining ring	Spring steel	
14	Spring washer	Steel wire	Chromated
15	Tie-rod nut	Rolled steel	Zinc chromated
16	Wear ring	Resin	

⚠ Precautions

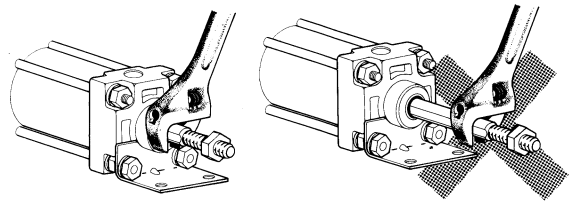
Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Operating Precautions

⚠ Caution

Avoid applications in which rotational torque is applied to the piston rod.

1. If rotational torque is applied, the non-rotating guide will be deformed, resulting in a loss of non-rotating accuracy. Also, to screw a bracket or a nut onto the threaded portion at the end of the piston rod, make sure that the piston rod is fully retracted, and place a wrench on the parallel section of the rod that protrudes. To tighten, take precautions to prevent the tightening torque from being applied to the non-rotating guide.



Disassembly/Replacement

1. Please consult with SMC when the rod seal is to be replaced.

A rod seal may allow air leakage depending on the position where it is installed. Therefore, please consult with SMC when a rod seal is to be replaced.

2. Do not replace the non-rotating guide.

Since the non-rotating guide is press fitted, the entire cover assembly needs to be replaced instead of a single part.

No.	Description	Material	Note
17	Cushion seal holder	Aluminum alloy	
18	Cushion seal	Urethane	
19	Rod seal	NBR	
20	Piston seal	NBR	
21	Cushion valve seal	NBR	
22	Cylinder tube gasket	NBR	
23	Piston gasket	NBR	O-ring
24	Rod end nut	Rolled steel	Nickel plated

Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.	Content
40	CA2K40-PS	Set of nos. above 18, 19, 20, 22.
50	CA2K50-PS	
63	CA2K63-PS	

* Seal kit includes 18, 19, 20 and 22. Order the seal kit based on each bore size.

* Do not disassemble the trunnion style. Refer to page 407.

* Seal kit includes a grease pack (ø40, 50: 10 g, over ø63: 20 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)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

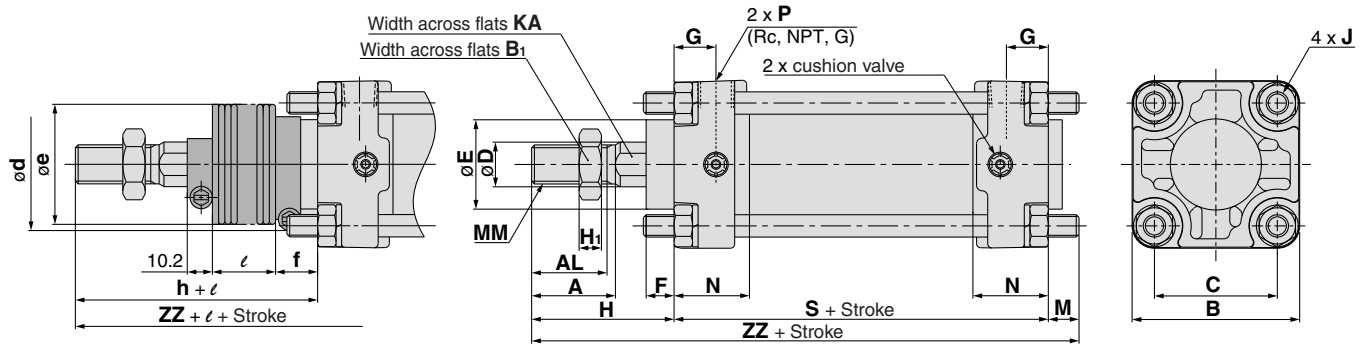
Technical

data

Series CA2K

Basic Style: CA2KB

With rod boot



(mm)

Bore size (mm)	Stroke range (mm)		A	AL	B	B ₁	C	D	E	F	G	H ₁	J	KA	M	MM
	Without rod boot	With rod boot														
40	Up to 500	20 to 500	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	14	11	M14 x 1.5
50	Up to 600	20 to 600	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	18	11	M18 x 1.5
63	Up to 600	20 to 600	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	18	14	M18 x 1.5

Bore size (mm)	N	P	S	Without rod boot		With rod boot					
				H	ZZ	d	e	f	h	l	ZZ
40	27	1/4	84	51	146	56	43	11.2	59	1/4 stroke	154
50	30	3/8	90	58	159	64	52	11.2	66	1/4 stroke	167
63	31	3/8	98	58	170	64	52	11.2	66	1/4 stroke	178

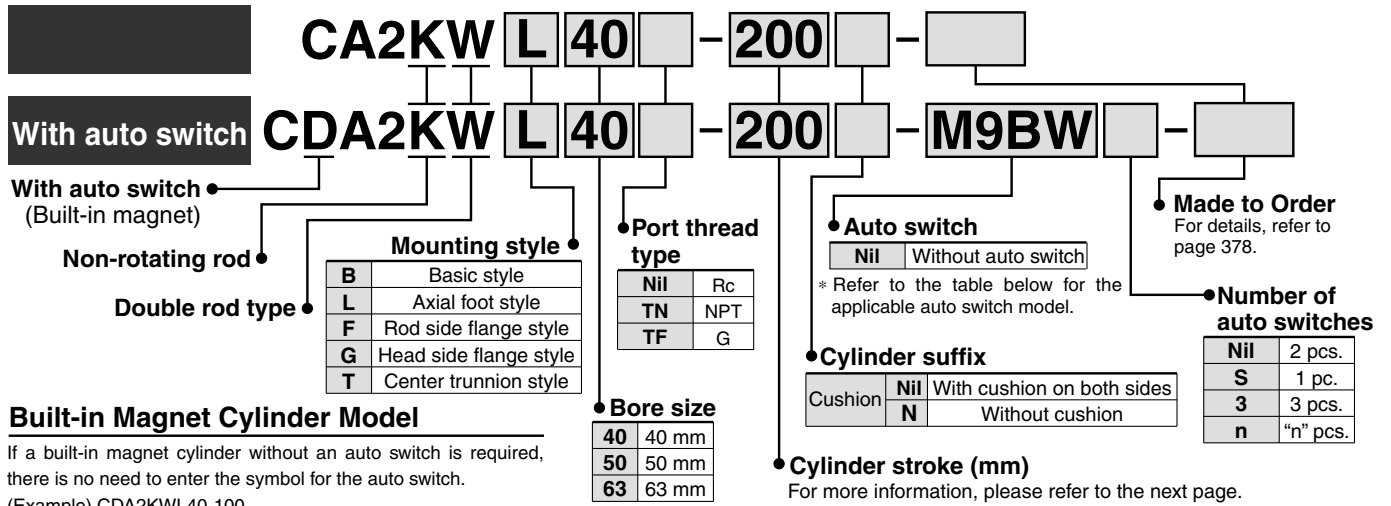
The dimensions for each mounting type are the same as those for the standard double acting single rod model. Refer to pages 361 to 365.

Air Cylinder: Non-rotating Rod Type Double Acting, Double Rod

Series CA2KW

ø40, ø50, ø63

How to Order



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) CDA2KWL40-100

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator/light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)				Pre-wired connector	Applicable load				
					DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	1 (M)	3 (L)	5 (Z)						
Solid state switch	—	Grommet	—	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	●	●	●	○	—	IC circuit				
				3-wire (PNP)				M9P	●	●	●	○						
				2-wire	M9B	●		●	●	○								
		Terminal conduit		—	—	100 V, 200 V		J51	●	●	●	○			—			
								3-wire (NPN)	G39C	G39	—	—				—	—	
								2-wire	K39C	K39	—	—				—	—	
	Diagnostic indication (2-color indication)	Grommet	Yes	—	3-wire (NPN)	24 V	5 V, 12 V	—	M9NW	●	●	●	○	—	IC circuit			
					3-wire (NPN)				M9PW	●	●	●	○					
					2-wire	M9BW	●		●	●	○							
					—	K59W	●		—	●	○							
	Water resistant (2-color indication)	Grommet	—	—	3-wire (NPN)	24 V	5 V, 12 V	—	M9NA	—	○	○	●	—	—			
					3-wire (PNP)				M9PA	—	○	○	●			○		
					2-wire	M9BA	—		○	○	●	○	○					
					—	G5BA	—		—	●	○	○						
With diagnostic output (2-color indication)	Grommet	—	—	4-wire (NPN)	24 V	5 V, 12 V	—	F59F	G59F	●	—	●	○	—	IC circuit			
2-wire (Non-polar)				P4DW				—	—	—	●	●	○					
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	24 V	5 V	—	A96	—	●	—	●	—	—	IC circuit			
				No				2-wire	12 V	100 V	A93	—	●			—	●	—
				Yes						100 V or less	A90	—	●			—	●	—
				No						100 V, 200 V	A54	B54	●			—	●	—
		Terminal conduit		Yes	—	—		200 V or less	A64	B64	●	—	●	—				
								—	A33C	A33	—	—	—	—				
								100 V, 200 V	A34C	A34	—	—	—	—				
								—	A44C	A44	—	—	—	—				
Diagnostic indication (2-color indication)	Grommet	—	—	—	—	—	A59W	B59W	●	—	●	—	—	—				

* Lead wire length symbols: 0.5m..... Nil (Example)M9NW * Solid state auto switches marked with "○" are produced upon receipt of order.
1m..... M (Example)M9NWM
3m..... L (Example)M9NWL
5m..... Z (Example)M9NWX

* In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 406.

* Refer to pages 1328 and 1329 for the details about auto switches with a pre-wired connector.

* D-A9□/M9□/M9□W/M9□AL auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

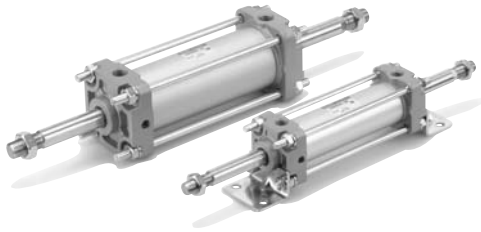
Technical

data

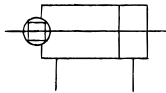
Series CA2KW

Non-rotating accuracy: $\pm 0.8^\circ$

Same mounting dimensions as those of standard cylinder



JIS Symbol



Made to Order Specifications
(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
-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
-XC28	Compact flange made of SS400

Refer to pages 401 to 406 for cylinders with auto switches.

- Minimum auto switch mounting stroke
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Specifications

Bore size (mm)	40	50	63
Fluid	Air		
Proof pressure	1.5 MPa		
Maximum operating pressure	1.0 MPa		
Minimum operating pressure	0.08 MPa		
Ambient and fluid temperature	Without auto switch: -10 to 70°C With auto switch: -10 to 60°C^*		
Piston speed	50 to 500 mm/s		
Cushion	Air cushion		
Stroke length tolerance	To 250 st : $+1.0$, 251 to 600 st : $+1.4$		
Rod non-rotating accuracy	$\pm 0.8^\circ$		
Allowable rotational torque	0.44 N·m or less		
Lubrication	Not required (Non-lube)		
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Center trunnion style		

* With no freezing.

Standard Stroke In case of a type with auto switch, also refer to the table of minimum strokes for auto switch mounting on pages 403 and 404.

Bore size (mm)	Standard stroke (mm)
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500*
50, 63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600*

* Intermediate strokes not listed above are also available.

Please consult with SMC for longer strokes than the strokes marked with “*”.

Mass/Aluminum Tube

		(kg)		
Bore size (mm)		40	50	63
Basic mass	Basic style	1.01	1.54	2.17
	Axial foot style	1.20	1.76	2.50
	Flange style	1.38	1.99	2.96
	Trunnion style	1.37	2.02	2.97
Additional mass per each 50 mm stroke		0.27	0.36	0.42
Accessory	Single knuckle	0.23	0.26	0.26
	Double knuckle (with pin)	0.37	0.43	0.43

Calculation: (Example) Mass CA2KWL40-100

- Basic mass 1.20 (Axial foot style $\phi 40$)
 - Additional mass $0.27/50^{\text{st}}$
 - Cylinder stroke 100^{st}
- $$1.20 + 0.27 \times 100/50 = 1.74 \text{ kg}$$

Production of Types with Rod Boot

Series CA2KW is also available with rod boot. Please consult with SMC for more information.

Minimum Stroke for Auto Switch Mounting

⚠ Caution

1. The minimum stroke for mounting varies with the auto switch type and mounting style of the cylinder. In particular, the center trunnion style needs careful attention. (For more information, please refer to pages 403 to 404.)

Copper and Fluorine-free

20 — CA2KW Mounting Bore size Port thread type Stroke Suffix

Copper and Fluorine-free

To eliminate any influences of copper ions or fluororesin on color CRTs, copper materials have been nickel plated or replaced with non-copper materials, thus preventing the generation of copper ions.

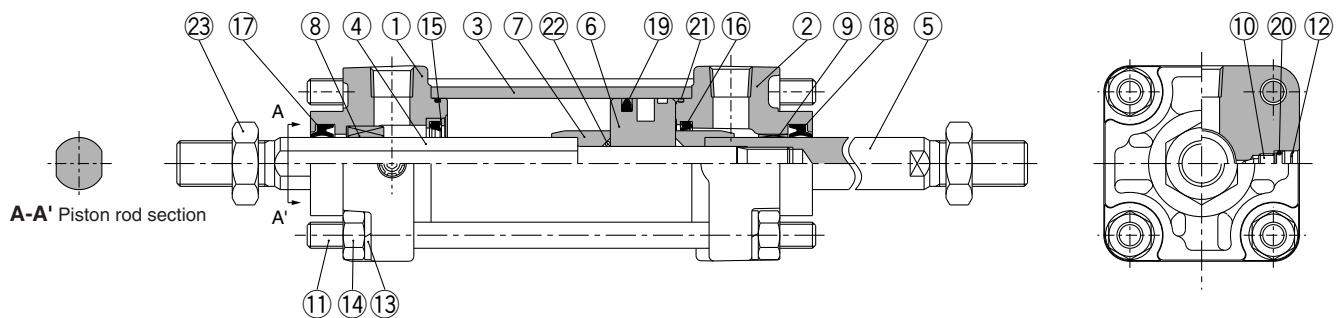
Specifications

Action	Double acting, Double rod
Bore size	ø40, ø50, ø63
Maximum operating pressure	1.0 MPa
Minimum operating pressure	0.08 MPa
Cushion	Air cushion
Piston speed	50 to 500 mm/s*
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Center trunnion style

* Operate within the range of absorbable energy. (Refer to page 358.)

* Auto switch capable

Construction



Component Parts

No.	Description	Material	Note
1	Rod cover A	Aluminum alloy	Metallic painted
2	Rod cover B	Aluminum die-casted	Metallic painted
3	Cylinder tube	Aluminum alloy	Hard anodized
4	Piston rod A	Carbon steel	Hard chromium electroplated
5	Piston rod B	Carbon steel	Hard chromium electroplated
6	Piston	Aluminum alloy	Chromated
7	Cushion ring	Rolled steel	Zinc chromated
8	Non-rotating guide	Sintered alloy	
9	Bushing	Lead-bronze casted	
10	Cushion valve	Steel wire	Nickel plated
11	Tie-rod	Carbon steel	Zinc chromated
12	Retaining ring	Spring steel	
13	Spring washer	Steel wire	Chromated
14	Tie-rod nut	Rolled steel	Nickel plated
15	Cushion seal holder	Aluminum alloy	
16	Cushion seal	Urethane	
17	Rod seal A	NBR	
18	Rod seal B	NBR	
19	Piston seal	NBR	
20	Cushion valve seal	NBR	
21	Cylinder tube gasket	NBR	
22	Piston gasket	NBR	O-ring
23	Rod end nut	Rolled steel	Nickel plated

Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.	Content
40	CA2KW40-PS	Set of nos. above 16, 17, 18, 19, 21.
50	CA2KW50-PS	
63	CA2KW63-PS	

* Seal kit includes 16, 17, 18, 19, and 21. Order the seal kit based on each bore size.

* Do not disassemble the trunnion style. Refer to page 407.

* 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)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

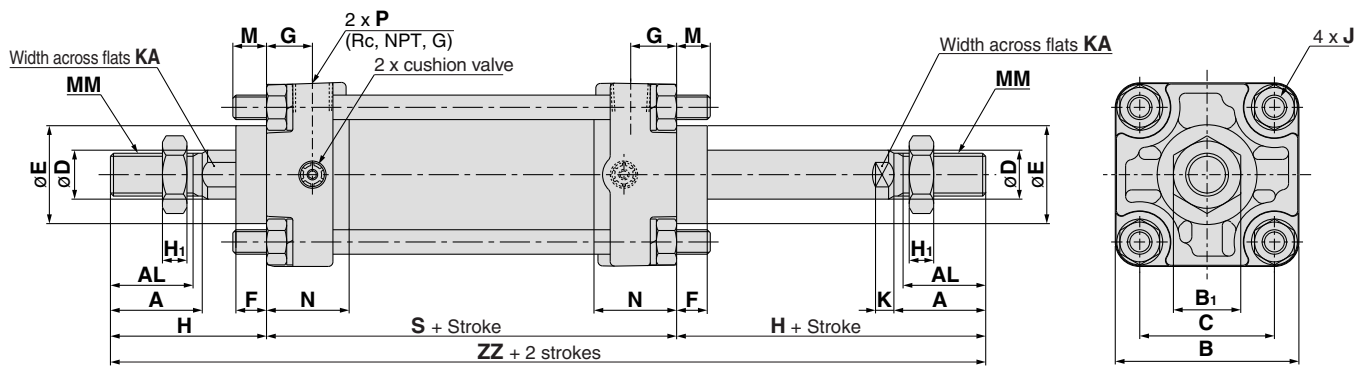
Individual

-X□

Technical data

Series CA2KW

Basic Style: CA2KWB



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	M	MM	N	P	S	H	ZZ
40	Up to 500	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	11	M14 x 1.5	27	1/4	84	51	186
50	Up to 600	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	11	M18 x 1.5	30	3/8	90	58	206
63	Up to 600	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	14	M18 x 1.5	31	3/8	98	58	214

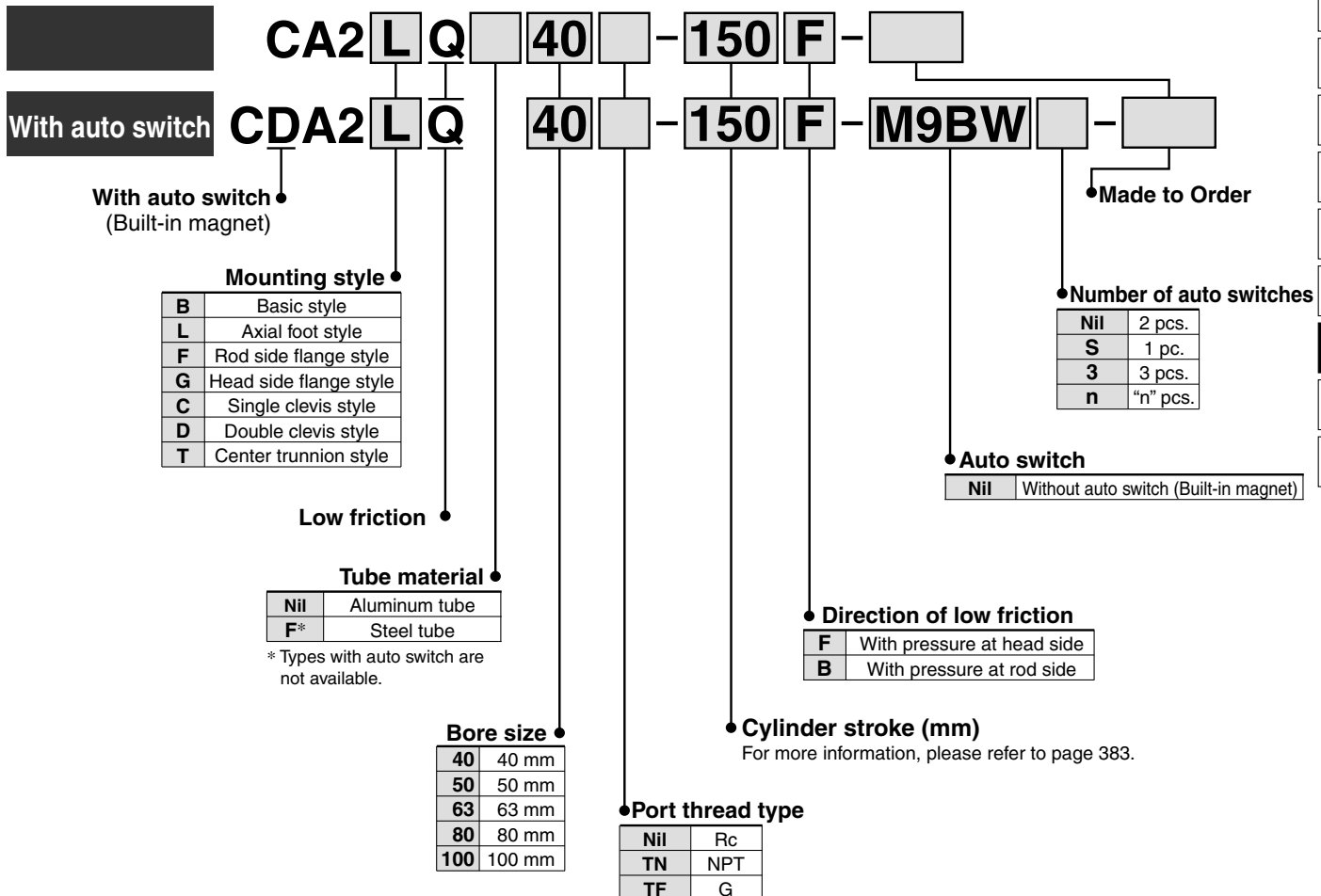
The dimensions for each mounting type are the same as those for the standard double acting double rod model. Refer to pages 371 and 372.

Air Cylinder: Low Friction Type Double Acting, Single Rod Series CA2□Q

ø40, ø50, ø63, ø80, ø100

Use the new "Smooth Cylinder Series CA2Y" to realize dual-side low friction and low-speed operation. (Refer to Best Pneumatics No. 3.)

How to Order



- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2**
- CS1
- CS2

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) CDA2BQ40-100

- D-□
- X□
- Individual -X□
- Technical data

Air Cylinder: With End Lock

Series CBA2

ø40, ø50, ø63, ø80, ø100

How to Order

CBA2 L **50** - **150** - **H N**

With auto switch CDBA2 L **50** - **150** - **H N** - **M9BW**

With auto switch (Built-in magnet) Mounting style

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

Tube material

Nil	Aluminum tube
F*	Steel tube

* Types with auto switch are not available.

Cylinder stroke (mm)
For more information, please refer to the next page.

Port thread type

Nil	Rc
TN	NPT
TF	G

Lock position

H	Head side end lock
R	Rod side end lock
W	Double end lock

Manual release type

N	Non-lock type
L	Lock type

Made to Order
For details, refer to page 383.

Number of auto switches

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

Auto switch

Nil	Without auto switch
------------	---------------------

Bore size

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

Cylinder suffix

Rod boot	Nil	Without rod boot
	J	Nylon tarpaulin
Cushion	K	Heat resistant tarpaulin
	Nil	With cushion on both sides
	N	Without cushion

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) CDBA2L40-100-HN

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)					Pre-wired connector	Applicable load
					DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	1 (M)	3 (L)	5 (Z)			
Solid state switch	—	Grommet	—	3-wire(NPN)	24 V	5 V, 12 V	—	M9N	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire(PNP)				M9P	●	●	●	○	○		
				2-wire				M9B	●	●	●	○	○		
		Terminal conduit		3-wire(NPN)	J51	●	●	●	○	○					
				2-wire	G39C	—	—	—	—	—					
				3-wire(NPN)	K39C	—	—	—	—	—					
	Diagnostic indication (2-color indication)	Grommet	Yes	3-wire(NPN)	24 V	5 V, 12 V	—	M9NW	●	●	●	○	○	IC circuit	
				3-wire(NPN)				M9PW	●	●	●	○	○		
				2-wire				M9BW	●	●	●	○	○		
				3-wire(NPN)				M9NA	○	○	●	○	○		
				3-wire(PNP)				M9PA	○	○	●	○	○		
				2-wire				M9BA	○	○	●	○	○		
Water resistant (2-color indication)	Grommet	—	3-wire(NPN)	24 V	5 V, 12 V	—	M9NA	○	○	●	○	○	—		
			3-wire(PNP)				M9PA	○	○	●	○	○			
			2-wire				M9BA	○	○	●	○	○			
			4-wire(NPN)				G5BA	—	—	●	○	○			
			2-wire (Non-polar)				F59F	●	—	●	○	○			
			3-wire (NPN equiv.)				P4DW	—	—	●	●	○			
Reed switch	—	Grommet	Yes	2-wire	24 V	12 V	—	A96	●	—	●	—	—	IC circuit	Relay, PLC
								A93	●	—	●	—	—		
								A90	●	—	●	—	—		
								A54	●	—	●	●	—		
								A64	●	—	●	—	—		
		Terminal conduit		A33C	—	—	—	—	—						
				A34C	—	—	—	—	—						
				A44C	—	—	—	—	—						
				A59W	●	—	●	—	—						
				B59W	●	—	●	—	—						
DIN terminal	Yes	—	2-wire	24 V	12 V	100 V, 200 V	—	A34C	—	—	—	—	—	—	
								A44C	—	—	—	—	—		
								A59W	●	—	●	—	—		
								B59W	●	—	●	—	—		
								A59W	●	—	●	—	—		

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

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

* In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 406.
 * Refer to pages 1328 and 1329 for the details about auto switches with a pre-wired connector.
 * D-A9□/M9□/M9□W/M9□AL auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

Maintains the cylinder's original position even if the air supply is interrupted.

When air is discharged at the stroke end position, the lock engages to maintain the rod in that position.

Same dimensions as those of the standard cylinder (Series CA2)

Non-lock and lock types are standard for manual release.



Specifications

Bore size (mm)	40	50	63	80	100
Fluid	Air				
Proof pressure	1.5 MPa				
Maximum operating pressure	1.0 MPa				
Minimum operating pressure	0.15 MPa*				
Ambient and fluid temperature	Without auto switch: -10 to 70°C (With no freezing) With auto switch: -10 to 60°C (With no freezing)				
Piston speed	50 to 500 mm/s				
Cushion	Interchangeable				
Stroke length tolerance	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 style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Center trunnion style				

* 0.05 MPa except locking parts.

Lock Specifications

Lock position	Head side end, Rod side end, Double end				
	ø40	ø50	ø63	ø80	ø100
Holding force (Max.) (N)	860	1340	2140	3450	5390
Backlash	2 mm or less				
Manual release	Non-lock type, Lock type				

Accessory/For more information, refer to page 367.

Made to Order Specifications
(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat resistant (150°C)
-XC3	Special port position
-XC4*1	With heavy duty scraper
-XC6*1	Piston rod, rod end nut made of stainless steel
-XC7	Tie-rod, cushion valve, tie rod nut, etc. made of stainless steel
-XC8*1	Adjustable stroke/Extension adjustment
-XC9*2	Adjustable stroke/Retraction adjustment
-XC10	Dual stroke/Double rod
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC22	Fluororubber seal
-XC27	Double clevis pin and double knuckle pin made of stainless steel
-XC28	Compact flange made of SS400
-XC29	Double knuckle joint with spring pin
-XC35*1	With coil scraper

*1: For head side end lock type only

*2: For rod side end lock type only

Refer to pages 401 to 406 for cylinders with auto switches.

- Minimum auto switch mounting stroke
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Accessory	Standard			Option		
	Rod end nut	Clevis pin	Lock release bolt (N type only)	Single knuckle joint	Double knuckle joint (With pin)	Rod boot
Mounting						
Basic style	●	—	●	●	●	●
Axial foot style	●	—	●	●	●	●
Rod side flange style	●	—	●	●	●	●
Head side flange style	●	—	●	●	●	●
Single clevis style	●	—	●	●	●	●
Double clevis style*	●	●	●	●	●	●
Center trunnion style	●	—	●	●	●	●

* Double clevis and double knuckle joint types are packed with pin, cotter pin and flat washer.

Standard Stroke

Bore size (mm)	Standard stroke (mm)
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500
50, 63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600
80, 100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700

* Types with auto switch have different minimum strokes. Please refer to pages 403 and 404.

Rod Boot Material

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

* Maximum ambient temperature for the rod boot itself.

Minimum Stroke for Auto Switch Mounting

⚠ Caution

1. The minimum stroke for mounting varies with the auto switch type and mounting style of the cylinder. In particular, the center trunnion style needs careful attention. (For more information, please refer to pages 403 and 404.)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

Technical data

Series CBA2

Mass/Aluminum Tube (Steel tube)

Bore size (mm)		40	50	63	80	100
Basic mass	Basic style	0.89 (0.94)	1.36 (1.40)	2.00 (2.04)	3.48 (3.63)	4.87 (5.07)
	Axial foot style	1.08 (1.13)	1.58 (1.62)	2.34 (2.38)	4.15 (4.30)	5.86 (6.06)
	Flange style	1.26 (1.30)	1.81 (1.86)	2.79 (2.84)	4.93 (5.08)	6.79 (6.99)
	Single clevis style	1.12 (1.17)	1.70 (1.74)	2.63 (2.67)	4.59 (4.74)	6.65 (6.86)
	Double clevis style	1.16 (1.21)	1.79 (1.84)	2.79 (2.83)	4.88 (5.03)	7.17 (7.38)
	Trunnion style	1.25 (1.35)	1.84 (1.94)	2.80 (3.00)	5.03 (5.32)	7.15 (7.54)
Additional mass per each 50 mm stroke	All mounting brackets (Except steel tube trunnion)	0.22 (0.28)	0.28 (0.35)	0.37 (0.43)	0.52 (0.70)	0.65 (0.87)
	Steel tube trunnion	(0.36)	(0.46)	(0.65)	(0.86)	(1.07)
Accessory	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

* Values inside the parentheses are those for the steel tube type.

Lock Unit Additional Mass

Bore size (mm)		40	50	63	80	100
Manual release Non-lock type (N)	Head side end lock (H)	0.02	0.03	0.03	0.10	0.12
	Rod side end lock (R)	0.02	0.02	0.02	0.07	0.06
	Double end lock (W)	0.04	0.05	0.05	0.17	0.18
Manual release lock type (L)	Head side end lock (H)	0.04	0.05	0.05	0.13	0.15
	Rod side end lock (R)	0.04	0.04	0.04	0.10	0.09
	Double end lock (W)	0.08	0.09	0.09	0.23	0.24

Calculation: (Example) **CBA2L40-100-HN**

• Basic mass 1.08kg (ø40 Axial foot style)

• Additional mass 0.22/50st

• Cylinder stroke 100st

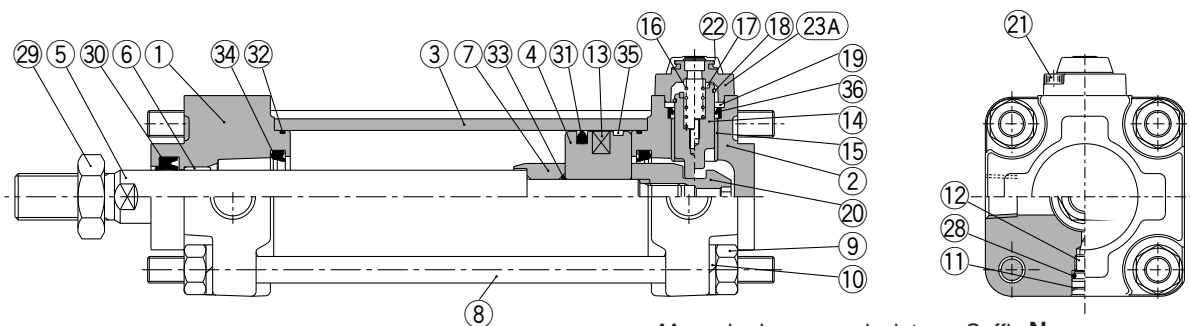
• Lock mass 0.02 kg

(Head side end lock, Manual release, Non-lock)

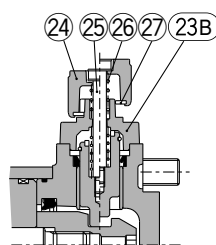
$1.08 + 0.22 \times 100/50 + 0.02 = 1.54$ kg

Construction

Head side end lock



Manual release non-lock type: Suffix N



Manual release lock type: Suffix L

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum die-casted	Metallic painted
2	Head cover	Aluminum die-casted	Metallic painted
3	Cylinder tube	Aluminum alloy	Hard anodized
4	Piston	Aluminum alloy	Chromated
5	Piston rod	Carbon steel	Hard chromium electroplated
6	Bushing	Lead-bronze casted	
7	Cushion ring A	Rolled steel	Electroless nickel plated
8	Tie-rod	Carbon steel	Zinc chromated
9	Tie-rod nut	Rolled steel	Nickel plated
10	Spring washer	Steel wire	Chromated
11	Retaining ring	Spring steel	
12	Cushion valve	Steel wire	Nickel plated
13	Magnet*	—	With auto switch*
14	Lock piston	Carbon steel	Quench hard chrome plated
15	Lock bushing	Lead-bronze casted	
16	Lock spring	Stainless steel	
17	Bumper	Urethane	
18	C-ring	Steel wire	Zinc chromated
19	Seal retainer	Rolled steel	Zinc chromated
20	Cushion ring nut	Chromium molybdenum steel	Quench, Electroless nickel plated
21	Hexagon socket head cap screw	Chromium molybdenum steel	Black zinc chromated
22	Rubber cap	Chloroprene rubber	
23A	Cap A	Aluminum casted	Black coated
23B	Cap B	Carbon steel	Oxide film treated

No.	Description	Material	Note
24	M/O knob	Zinc die-casted	Black coated
25	M/O bolt	Chromium molybdenum steel	Black zinc chromated, Red painted
26	M/O spring	Steel wire	Zinc chromated
27	Stopper ring	Carbon steel	Zinc chromated
28	Cushion valve seal	NBR	
29	Rod end nut	Rolled steel	Nickel plated
30	Rod seal	NBR	
31	Piston seal	NBR	
32	Cylinder tube gasket	NBR	
33	Piston gasket	NBR	
34	Cushion seal	NBR	
35	Wear ring	Resin	
36	Lock piston seal	NBR	

Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.		Content
	Single end lock	Double end lock	
40	MBB40-PS	MBB40-PS-W	Set of nos. above 30, 31, 32, 34, 36.
50	MBB50-PS	MBB50-PS-W	
63	MBB63-PS	MBB63-PS-W	
80	MBB80-PS	MBB80-PS-W	
100	MBB100-PS	MBB100-PS-W	

* Seal kit includes 30, 31, 32, 34 and 36. Order the seal kit based on each bore size.

* Do not disassemble the trunnion style. Refer to page 407.

* 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 park part number: GR-S-010 (10 g), GR-S-020 (20 g)

D-□

-X□

Individual

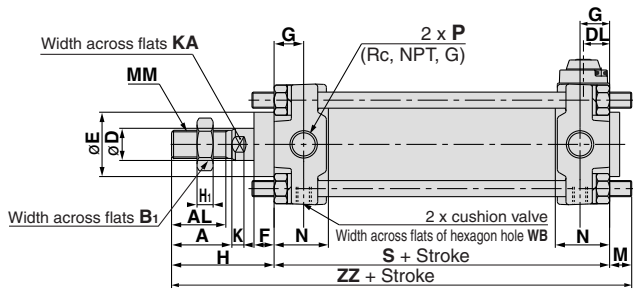
-X□

Technical data

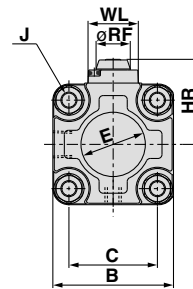
Series CBA2

Basic Style (Dimensions are common to rear end lock, front end lock and double end lock types.)

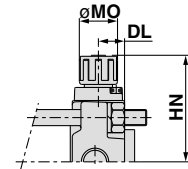
Head side end lock: CBA2B Bore size – Stroke -HN



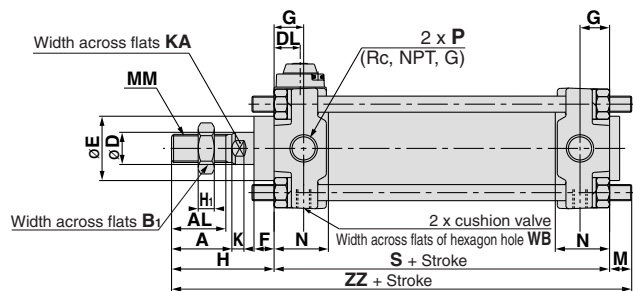
Manual release (Non-lock type):
Suffix N



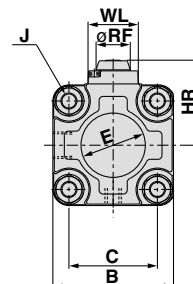
Manual release (Non-lock type):
Suffix L



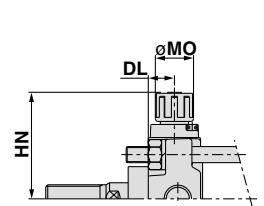
Rod side end lock: CBA2B Bore size – Stroke -RN



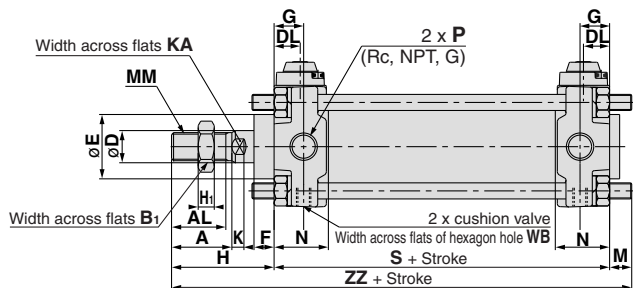
Manual release (Non-lock type):
Suffix N



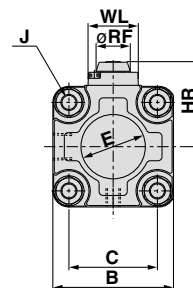
Manual release (Lock type):
Suffix L



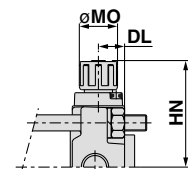
Double lock: CBA2B Bore size – Stroke -WN



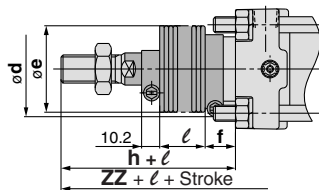
Manual release (Non-lock type):
Suffix N



Manual release (Lock type):
Suffix L



With rod boot



Bore size (mm)	Stroke range	A	AL	B	B ₁	C	D	DL	E	F	G	H	H ₁	HR	HN (MAX)	J	K	KA	M	MM	MO	N	P	RF	S	WB	WL	ZZ
40	Up to 500	30	27	60	22	44	16	13	32	10	15	51	8	42.3	56	M8 x 1.25	6	14	11	M14 x 1.5	19	27	1/4	17	84	2.5	25	146
50	Up to 600	35	32	70	27	52	20	13	40	12	17	58	11	47.3	61	M8 x 1.25	7	18	11	M18 x 1.5	19	30	3/8	17	90	2.5	25	159
63	Up to 600	35	32	85	27	64	20	15.5	40	10	17	58	11	54.8	68.5	M10 x 1.25	7	18	14	M18 x 1.5	19	31	3/8	17	98	4	25	170
80	Up to 750	40	37	102	32	78	25	18.5	52	14	21	71	13	65.8	80.5	M12 x 1.75	11	22	17	M22 x 1.5	23	37	1/2	21	116	4	40	204
100	Up to 750	40	37	116	41	92	30	20	52	14	21	72	16	72.8	87.5	M12 x 1.75	11	26	17	M26 x 1.5	23	40	1/2	21	126	4	40	215

* For more information about the rod end nut and accessories, refer to page 367.

With Rod Boot

Bore size (mm)	Stroke range (mm)	d	e	f	h	l	ZZ
40	20 to 500	56	43	11.2	59	1/4 stroke	154
50	20 to 600	64	52	11.2	66	1/4 stroke	167
63	20 to 600	64	52	11.2	66	1/4 stroke	178
80	20 to 750	76	65	12.5	80	1/4 stroke	213
100	20 to 750	76	65	14	81	1/4 stroke	224

Dimensions of the mounting brackets are the same as those of the standard double acting single rod type. Refer to pages 361 to 365.



Series CBA2 Specific Product Precautions

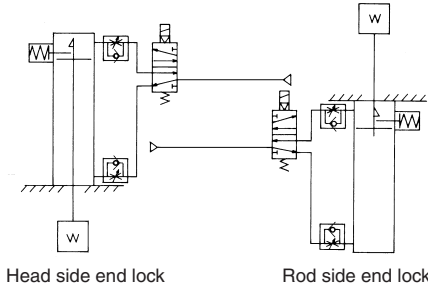
Be sure to read before handling.

Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Use the Recommended Pneumatic Circuit.

⚠ Caution

They are required to engage and disengage the locks correctly.



Operation

⚠ Caution

1. Do not use a 3 position solenoid valve.

Avoid using this cylinder in combination with a 3 position solenoid valve (particularly the closed center metal seal type). If air pressure becomes sealed inside the port on the side that contains the lock mechanism, the lock will not engage. Even if the lock is engaged at first, the air that leaks from the solenoid valve could enter the cylinder and cause the lock to disengage as time elapses.

2. Back pressure is required when releasing the lock.

Before starting, make sure that air is supplied to the side that is not equipped with a lock mechanism as shown in the diagram above (or the side on which the piston rod is unlocked, if both sides are equipped with a lock). Otherwise, the lock may not disengage.

3. Release the lock when mounting or adjusting the cylinder.

The lock may not disengage if the cylinder is installed with its lock engaged.

4. Operate with a load ratio of 50% or less.

The lock may not disengage or may become damaged if the load exceeds 50%.

5. Do not operate multiple synchronized cylinders.

Avoid applications in which two or more end lock cylinders are synchronized to move one work piece, as one of the cylinder locks may not be disengaged when required.

6. Use a speed controller with meter-out control.

If operated under meter-in control, the lock may not disengage.

7. Be sure to operate completely to the cylinder stroke end on the side with the lock.

The lock may not engage or disengage if the piston in the cylinder has not reached the stroke end.

Operating Pressure

⚠ Caution

- Supply air pressure of 0.15 MPa or higher to the port on the side that has the lock mechanism, as it is necessary for disengaging the lock.

Exhaust Speed

⚠ Caution

- When the pressure on the side with the lock mechanism drops to 0.05 MPa or below, the lock engages automatically. If the piping on the side with the lock mechanism is thin and long, or if the speed controller is away from the cylinder port, the lock engagement may take some due to decline of the exhaust speed. The same result will be caused by clogging of the silencer installed at the EXH port of the solenoid valve.

Relation to Cushion

⚠ Caution

- When the cushion valve on the side with the lock mechanism is fully closed or almost closed, the piston rod may not be able to reach the stroke end, resulting in lock engagement failure. Furthermore, if the lock becomes engaged while the cushion valve is almost fully closed, it may become impossible to be disengaged. Therefore, the cushion valve must be adjusted properly.

Releasing the Lock

⚠ Caution

- To disengage the lock, make sure to supply air pressure to the port on the side without a lock mechanism, thus preventing the load from being applied to the lock mechanism. (Refer to the recommended air pressure circuit.) If the lock is disengaged, while the port on the side without a lock mechanism is in the exhausted state and the load is being applied to the lock mechanism, undue force may be applied to the lock mechanism, causing the lock mechanism to be damaged. Also, it could be extremely dangerous, because the piston rod could move suddenly.

Manual Release

⚠ Caution

1. Non-lock type manual release

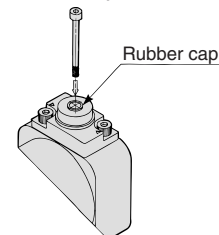
Insert the bolt, which is provided as an accessory part, through the rubber cap (it is not necessary to remove the rubber cap). Screw the bolt into the lock piston and pull the bolt to disengage the lock. Releasing the bolt will re-engage the lock.

The bolt size, pulling force, and the stroke are listed below.

Bore size (mm)	Thread size	Pulling force	Stroke (mm)
40, 50, 63	M3 x 0.5 x 30ℓ or more	10 N	3
80, 100	M5 x 0.8 x 40ℓ or more	24.5 N	3

* Remove the bolt for normal operation.

* It can cause lock malfunction or faulty release.

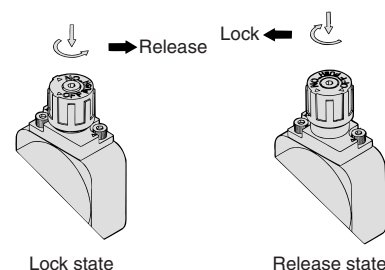


2. Manual release lock type

Push the M/O knob and turn it 90° counterclockwise. The lock disengages when the ▲ mark on the cap is aligned with the ▼ OFF mark on the M/O knob (and the lock will remain disengaged).

To engage the lock, push the M/O knob all the way in and turn it 90° clockwise to align the ▲ mark on the cap with the ▼ ON mark on the M/O knob. At this time, make sure that the knob stops by clicking into place.

Failure to click it into place properly can cause the lock to disengage.



CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

Technical

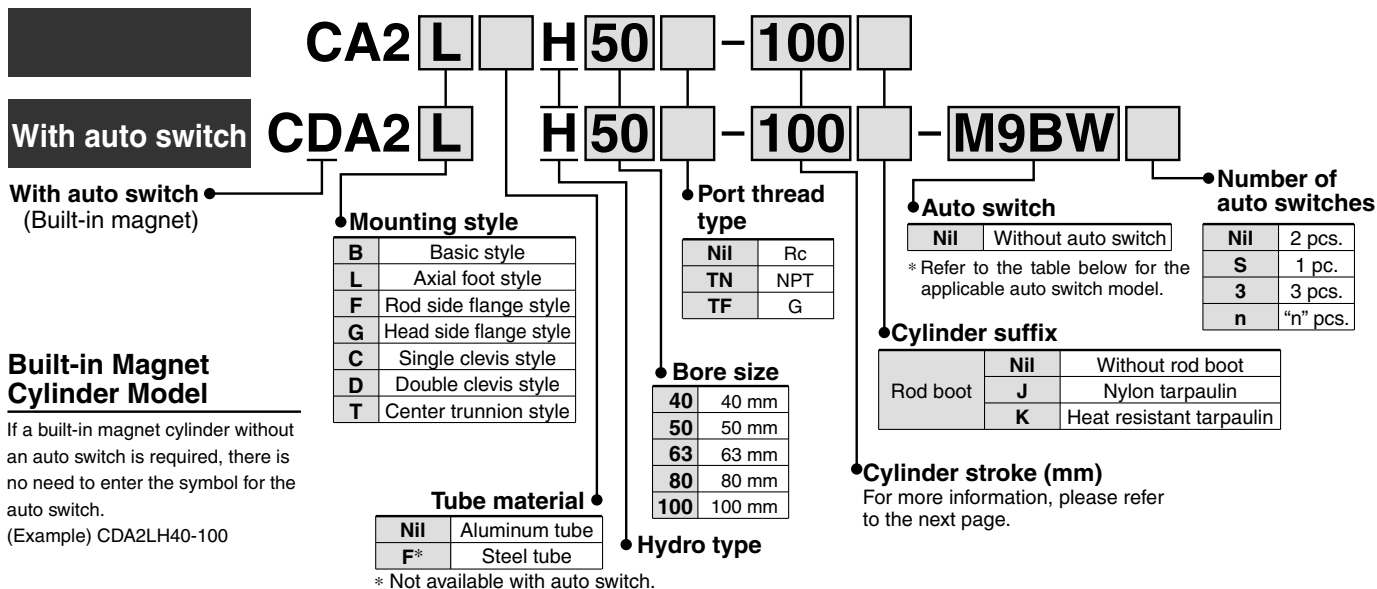
data

Air-hydro Cylinder: Air-hydro Type Double Acting, Single Rod

Series CA2□H

ø40, ø50, ø63, ø80, ø100

How to Order



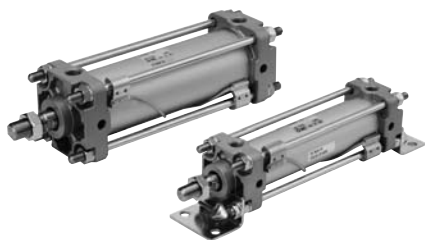
Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)				Pre-wired connector	Applicable load								
					DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	1 (M)	3 (L)	5 (Z)		IC circuit	Relay, PLC							
Solid state switch	—	Grommet	—	3-wire(NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC circuit	—						
				3-wire(PNP)				M9P	—	●	—	●	○	○								
				2-wire	—	—	100 V, 200 V	M9B	—	●	●	●	○	○								
				—				K59	—	●	—	●	○	○								
				Diagnostic indication (2-color indication)	Grommet	Yes	3-wire(NPN)	24 V	12 V	—	G39C	G39	—	—			—	—	—	IC circuit	Relay, PLC	
							2-wire				K39C	K39	—	—			—	—				
	3-wire(NPN)	5 V, 12 V	M9NW				—	●	●	●	○	○										
	3-wire(NPN)		—				G59W	—	●	—	●	○	○									
	2-wire	24 V	12 V				—	M9PW	—	●	●	●	○	○								
	3-wire(NPN)							—	G5PW	—	●	—	●	○	○							
	3-wire(PNP)	5 V, 12 V	M9BW	—	●	●	●	○	○													
	2-wire		—	K59W	—	●	—	●	○	○												
Reed switch	—	Grommet	Yes	3-wire(NPN)	24 V	12 V	—	M9NA	—	○	○	●	○	○	IC circuit	Relay, PLC						
				3-wire(PNP)				M9PA	—	○	○	●	○	○								
				2-wire	5 V, 12 V	M9BA	—	○	○	●	○	○										
				—		G5BA	—	○	—	●	○	○										
				4-wire(NPN)	5 V, 12 V	F59F	G59F	●	—	●	○	○										
				2-wire (Non-polar)		P4DW	—	—	—	●	●	○	○									
				3-wire (NPN equiv.)	—	5 V	—	A96**	—	●	—	●	—	—			—	IC circuit	—			
				—				A93**	—	●	—	●	—	—			—	—				
				Diagnostic indication (2-color indication)	Grommet	No	2-wire	24 V	12 V	100 V	100 V or less	A90**	—	●			—	●	—	—	IC circuit	Relay, PLC
												100 V, 200 V	A54	B54			●	—	●	—		
200 V or less	A64	B64	●										—	●	—	—						
	—	A33C	A33									—	—	—	—	—						
100 V, 200 V		A34C	A34									—	—	—	—	—						
	—	A44C	A44									—	—	—	—	—						
—		A59W	B59W									●	—	●	—	—						

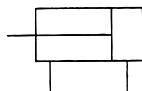
* Lead wire length symbols: 0.5m..... Nil (Example)M9NW
 1m..... M (Example)M9NWM
 3m..... L (Example)M9NWL
 5m..... Z (Example)M9NWX

* Solid state auto switches marked with "○" are produced upon receipt of order.
 **D-A9□ and D-A9□V types cannot be mounted on ø50. Use D-Z7□ and D-Z80 instead

* In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 406.
 * Refer to pages 1328 and 1329 for the details about auto switches with a pre-wired connector.
 * D-A9□/M9□/M9□W/M9□AL auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)



JIS Symbol
Double acting type



Made to Order Specifications
(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
-XA□	Change of rod end shape
-XC6	Piston rod and rod end nut made of stainless steel
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length

Note) Since a heavy duty scraper (-XC4) is installed as standard, there is no need to specify it.

⚠ Precautions

Setting

⚠ Caution

- Do not use the cylinder near fire or on equipment or machinery whose ambient temperature exceeds 60°C. Since the air-hydro cylinder uses flammable hydraulic fluid, there is danger of potential fire.

Selection

⚠ Caution

- Keep the air-hydro cylinder load at 50% or less than the theoretical output. For the air-hydro cylinder to achieve performance that is close to that of the hydraulic cylinder in constant-speed operation and stopping accuracy, the load must be kept at 50% or less than theoretical output.

Minimum Stroke for Auto Switch Mounting

⚠ Caution

- The minimum stroke for mounting varies with the auto switch type and mounting style of the cylinder. In particular, the center trunnion style needs careful attention. (For more information, please refer to pages 403 and 404.)

Refer to pages 401 to 406 for cylinders with auto switches.

- Minimum auto switch mounting stroke
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Specifications

Bore size (mm)	40	50	63	80	100
Type	Air-hydro				
Fluid	Turbine oil				
Action	Double acting				
Proof pressure	1.5 MPa				
Maximum operating pressure	1.0 MPa				
Ambient and fluid temperature	5 to 60°C				
Minimum operating pressure	0.1 MPa				
Piston speed	0.5 to 300 mm/s				
Cushion	Without				
Stroke length tolerance	To 250 st : ^{+1.0} / ₀ 251 to 1.000 st : ^{+1.4} / ₀ 1.001 to 1.500 st : ^{+1.8} / ₀				
Mounting	Basic style, Foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Center trunnion style				

Standard Stroke In case of a type with auto switch, also refer to the table of minimum strokes for auto switch mounting on pages 403 and 404.

Bore size (mm)	Standard stroke (mm) ^{Note)}	Long stroke (L and F only)
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500	800
50, 63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 500, 600	1200
80, 100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700	ø80: 1400 ø100: 1500

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

Accessory

Mounting	Basic style	Axial foot style	Rod side flange style	Head side flange style	Single clevis style	Double clevis style	Center trunnion style
Standard equipment	Rod end nut ●	●	●	●	●	●	●
	Clevis pin —	—	—	—	—	●	—
Options	Single knuckle joint ●	●	●	●	●	●	●
	Double knuckle joint (With pin) ●	●	●	●	●	●	●
	With rod boot ●	●	●	●	●	●	●

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 itself.

Mass/Aluminum Tube (Steel tube)

Bore size (mm)	40	50	63	80	100	(kg)	
Basic mass	Basic style	0.89 (0.94)	1.36 (1.40)	2.00 (2.04)	3.48 (3.63)	4.87 (5.07)	Calculation: (Example) CA2LH40-100 (Axial foot style, ø40, 100 st) • Basic mass 1.08 kg • Additional mass 0.22/50 st • Cylinder stroke 100 st = 1.08 + 0.22 x 100/50 = 1.52 kg
	Axial foot style	1.08 (1.13)	1.58 (1.62)	2.34 (2.38)	4.15 (4.30)	5.86 (6.06)	
	Flange style	1.26 (1.30)	1.81 (1.86)	2.79 (2.84)	4.93 (5.08)	6.79 (6.99)	
	Single clevis style	1.12 (1.17)	1.70 (1.74)	2.63 (2.67)	4.59 (4.74)	6.65 (6.86)	
	Double clevis style	1.16 (1.21)	1.79 (1.83)	2.79 (2.83)	4.88 (5.03)	7.17 (7.38)	
	Trunnion style	1.25 (1.35)	1.84 (1.94)	2.80 (3.00)	5.03 (5.32)	7.15 (7.54)	
Additional mass per each 50 mm stroke	All mounting brackets (Except steel tube trunnion)	0.22 (0.28)	0.28 (0.35)	0.37 (0.43)	0.52 (0.70)	0.65 (0.87)	* Values inside the parentheses are those for the steel tube type.
	Steel tube trunnion	(0.36)	(0.46)	(0.65)	(0.86)	(1.07)	
Accessory	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	

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

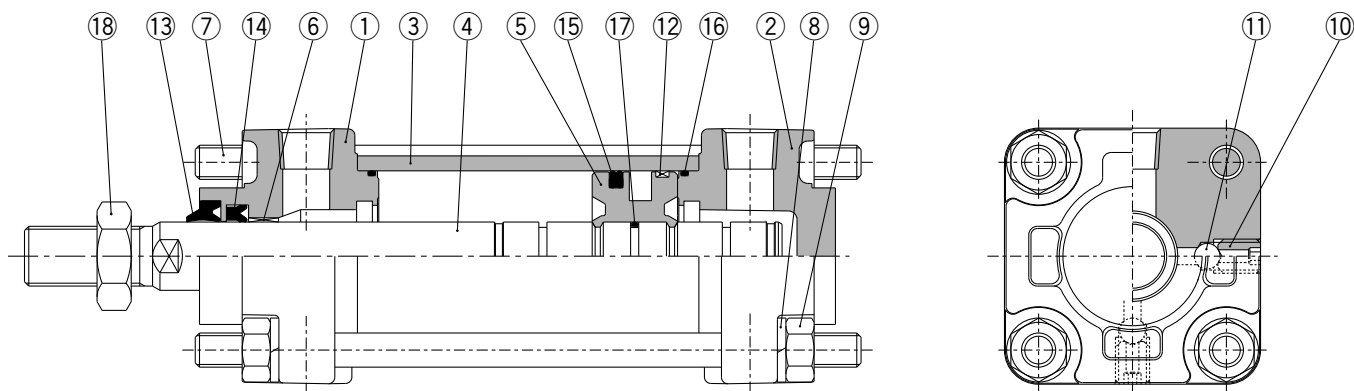
Individual

-X□

Technical data

Series CA2□H

Construction



Component Parts

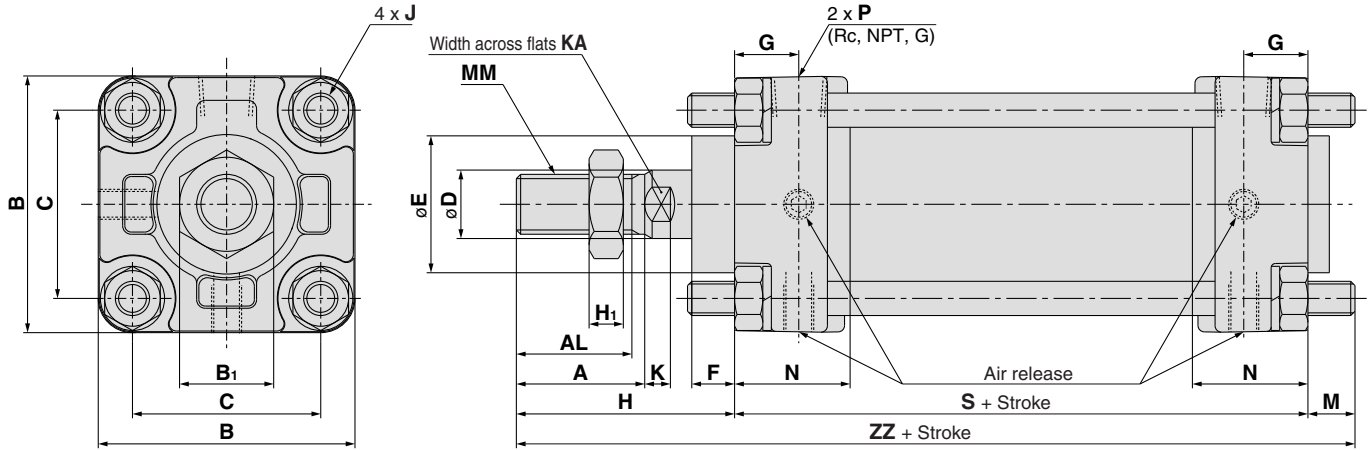
No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Metallic painted
2	Head cover	Aluminum alloy	Metallic painted
3	Cylinder tube	Aluminum alloy	Hard anodized
4	Piston rod	Carbon steel	Hard chromium electroplated
5	Piston	Aluminum alloy	Chromated
6	Bushing	Lead-bronze casted	
7	Tie-rod	Carbon steel	Zinc chromated
8	Spring washer	Rolled steel	Chromated
9	Tie-rod nut	Rolled steel	Nickel plated
10	Air release valve	Chromium molybdenum steel	Black zinc chromated
11	Check ball	Bearing steel	
12	Wear ring	Resin	
13	Scraper	NBR	
14	Rod seal	NBR	
15	Piston seal	NBR	
16	Cylinder tube gasket	NBR	
17	Piston gasket	NBR	
18	Rod end nut	Rolled steel	Nickel plated

Replacement Parts: Seal Kit

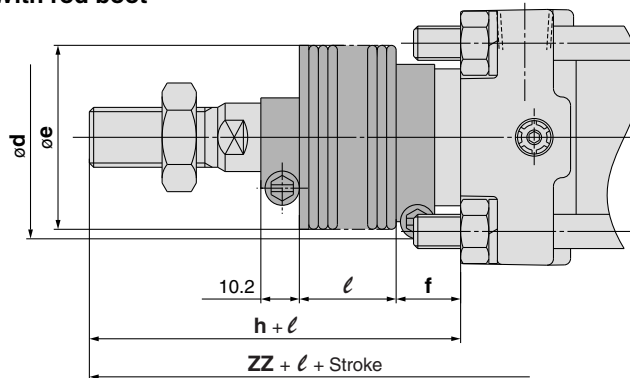
Bore size (mm)	Seal kit no.	Content
	Air-hydro type	
40	CA2H40A-PS	Set of nos. above 14, 15, 16.
50	CA2H50A-PS	
63	CA2H63A-PS	
80	CA2H80A-PS	
100	CA2H100A-PS	

* Do not disassemble the trunnion style. Refer to page 407.
 * Seal kit includes 14, 15 and 16. Order the seal kit based on each bore size.
 * Seal kit includes a grease pack (ø40, 50: 10 g, ø63: 20 g).
 Order with the following part number when only the grease pack is needed.
Grease park part number: GR-S-010 (10 g), GR-S-020 (20 g)

Basic Style: CA2BH



With rod boot



- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

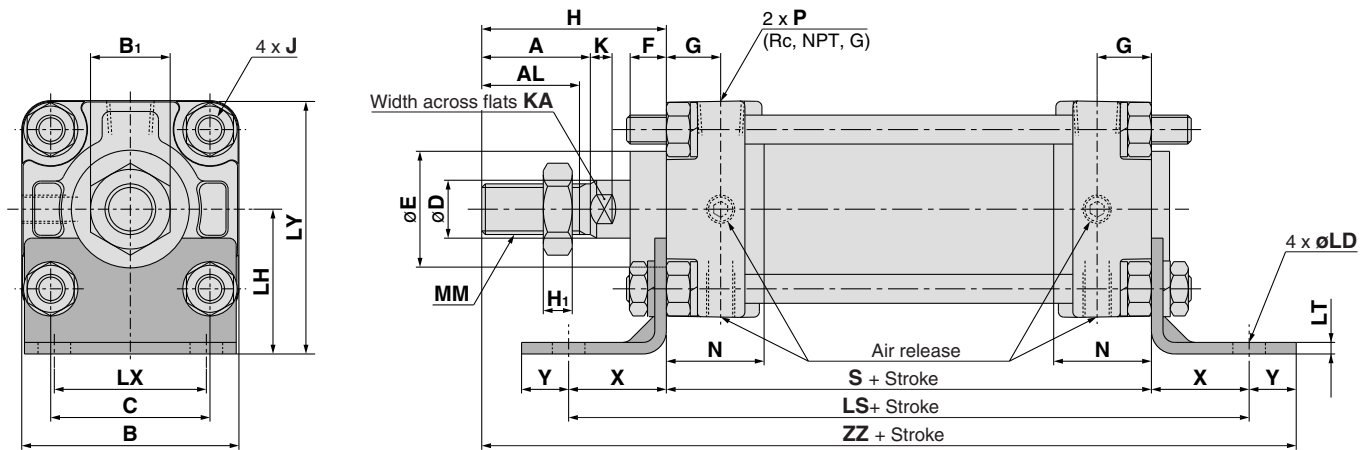
Bore size (mm)	Stroke range (mm)		(mm)																
	Without rod boot	With rod boot	A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	M	MM	N	P
40	Up to 500	20 to 500	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	11	M14 x 1.5	27	1/4
50	Up to 600	20 to 600	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	11	M18 x 1.5	30	3/8
63	Up to 600	20 to 600	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	14	M18 x 1.5	31	3/8
80	Up to 750	20 to 750	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	17	M22 x 1.5	37	1/2
100	Up to 750	20 to 750	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	17	M26 x 1.5	40	1/2

Bore size (mm)	S	Without rod boot		With rod boot					
		H	ZZ	d	e	f	h	l	ZZ
40	84	51	146	56	43	11.2	59	1/4 stroke	154
50	90	58	159	64	52	11.2	66	1/4 stroke	167
63	98	58	170	64	52	11.2	66	1/4 stroke	178
80	116	71	204	76	65	12.5	80	1/4 stroke	213
100	126	72	215	76	65	14	81	1/4 stroke	224

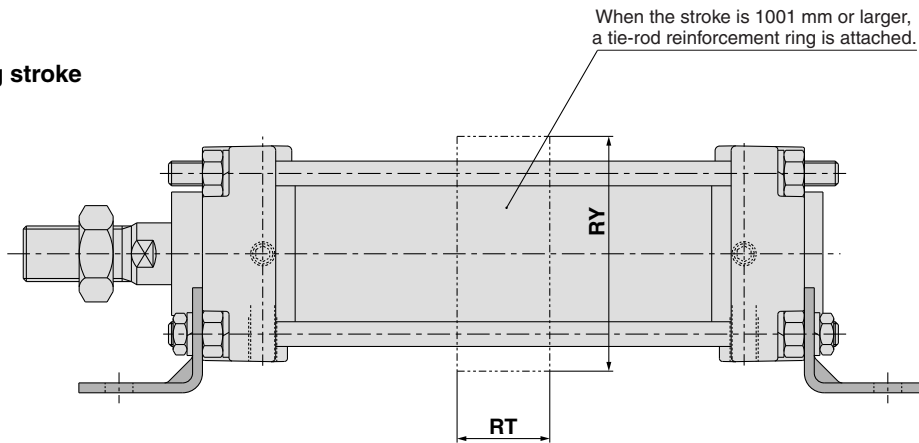
- D-□
- X□
- Individual
- Technical data

Series CA2□H

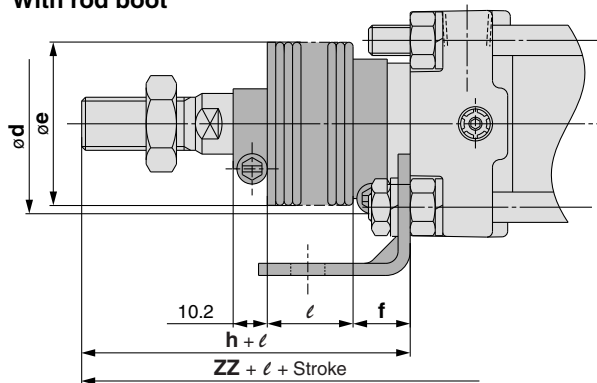
Axial Foot Style: CA2LH



Long stroke



With rod boot



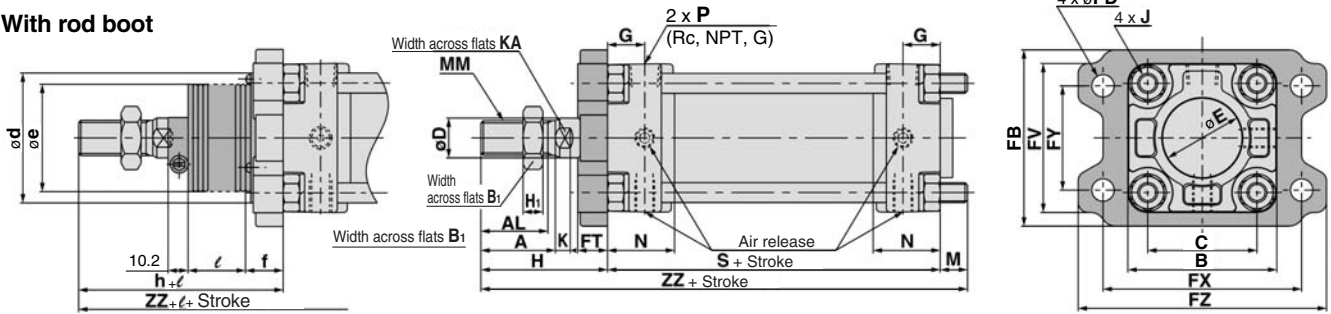
Bore size (mm)	Stroke range (mm)		A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	LD	LH	LS	LT
	Without rod boot	With rod boot																	
40	Up to 800	20 to 800	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	9	40	138	3.2
50	Up to 1200	20 to 1200	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	9	45	144	3.2
63	Up to 1200	20 to 1200	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	11.5	50	166	3.2
80	Up to 1400	20 to 1400	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	13.5	65	204	4.5
100	Up to 1500	20 to 1500	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	13.5	75	212	6

(mm)

Bore size (mm)	LX	LY	MM	N	P	S	X	Y	RT	RY	Without rod boot		With rod boot					
											H	ZZ	d	e	f	h	l	ZZ
40	42	70	M14 x 1.5	27	1/4	84	27	13	—	—	51	175	56	43	11.2	59	1/4 stroke	183
50	50	80	M18 x 1.5	30	3/8	90	27	13	30	76	58	188	64	52	11.2	66	1/4 stroke	196
63	59	93	M18 x 1.5	31	3/8	98	34	16	40	92	58	206	64	52	11.2	66	1/4 stroke	214
80	76	116	M22 x 1.5	37	1/2	116	44	16	45	112	71	247	76	65	12.5	80	1/4 stroke	256
100	92	133	M26 x 1.5	40	1/2	126	43	17	50	136	72	258	76	65	14.0	81	1/4 stroke	267

Front Flange Style: CA2FH

With rod boot



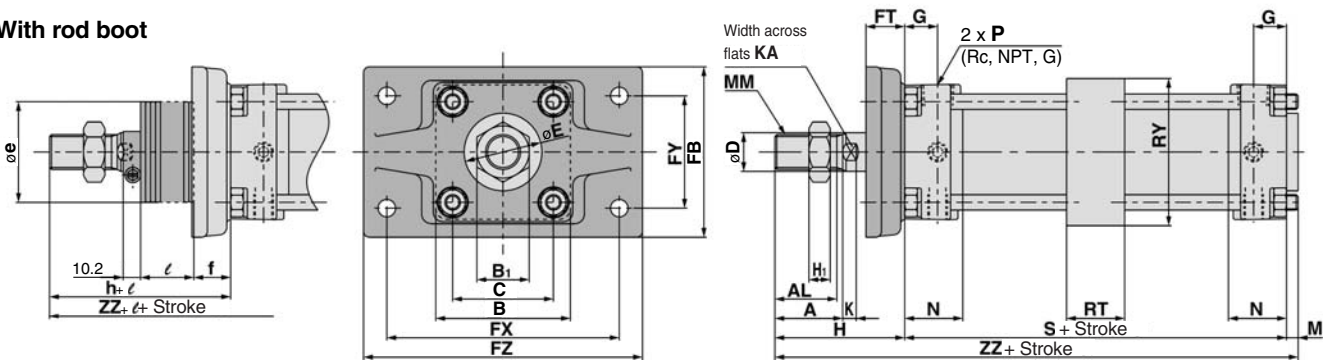
Bore size (mm)	Stroke range (mm)		A	AL	FB	B	B ₁	C	D	E	FV	FD	FT	FX	FY	FZ	G	H ₁	J
	Without rod boot	With rod boot																	
40	Up to 800	20 to 800	30	27	71	60	22	44	16	32	60	9	12	80	42	100	15	8	M8 x 1.25
50	Up to 1000	20 to 1000	35	32	81	70	27	52	20	40	70	9	12	90	50	110	17	11	M8 x 1.25
63	Up to 1000	20 to 1000	35	32	101	85	27	64	20	40	86	11.5	15	105	59	130	17	11	M10 x 1.25
80	Up to 1000	20 to 1000	40	37	119	102	32	78	25	52	102	13.5	18	130	76	160	21	13	M12 x 1.75
100	Up to 1000	20 to 1000	40	37	133	116	41	92	30	52	116	13.5	18	150	92	180	21	16	M12 x 1.75

Bore size (mm)	K	KA	M	MM	N	P	S	Without rod boot		With rod boot					
								H	ZZ	d*	e	f	h	ℓ	ZZ
40	6	14	11	M14 x 1.5	27	1/4	84	51	146	52	43	15	59	1/4 stroke	154
50	7	18	11	M18 x 1.5	30	3/8	90	58	159	58	52	15	66	1/4 stroke	167
63	7	18	14	M18 x 1.5	31	3/8	98	58	170	58	52	17.5	66	1/4 stroke	178
80	10	22	17	M22 x 1.5	37	1/2	116	71	204	80	65	21.5	80	1/4 stroke	213
100	10	26	17	M26 x 1.5	40	1/2	126	72	215	80	65	21.5	81	1/4 stroke	224

* If a hole is provided to accommodate the boot when the air-hydro cylinder is mounted, make the hole diameter larger than the outside diameter of the boot mounting bracket ød.

Long stroke (When the stroke is 1001 mm or larger)

With rod boot



Bore size (mm)	Stroke range (mm)	A	AL	FB	B	B ₁	C	D	E	FD	FT	FX	FY	FZ	GA	GB	H ₁	J	K	KA
63	1001 to 1200	35	32	105	85	27	64	20	40	11.5	23	140	64	170	17	17	11	M10 x 1.25	7	18
80	1001 to 1400	40	37	124	102	32	78	25	52	13.5	28	164	84	198	21	21	13	M12 x 1.75	10	22
100	1001 to 1500	40	37	140	116	41	92	30	52	13.5	29	180	100	220	21	21	16	M12 x 1.75	10	26

Bore size (mm)	M	MM	N	P	RT	RY	S	Without rod boot		With rod boot				
								H	ZZ	e*	f	h	ℓ	ZZ
50	6	M18 x 1.5	30	3/8	30	76	90	67	163	52	19	66	1/4 stroke	162
63	10	M18 x 1.5	31	3/8	40	92	98	71	179	52	19	66	1/4 stroke	174
80	12	M22 x 1.5	37	1/2	45	112	116	87	215	65	21	80	1/4 stroke	208
100	12	M26 x 1.5	40	1/2	50	136	126	89	227	65	21	81	1/4 stroke	219

* If a hole is provided to accommodate the boot when the air-hydro cylinder is mounted, make the hole diameter larger than the outside diameter of the boot mounting bracket øe.

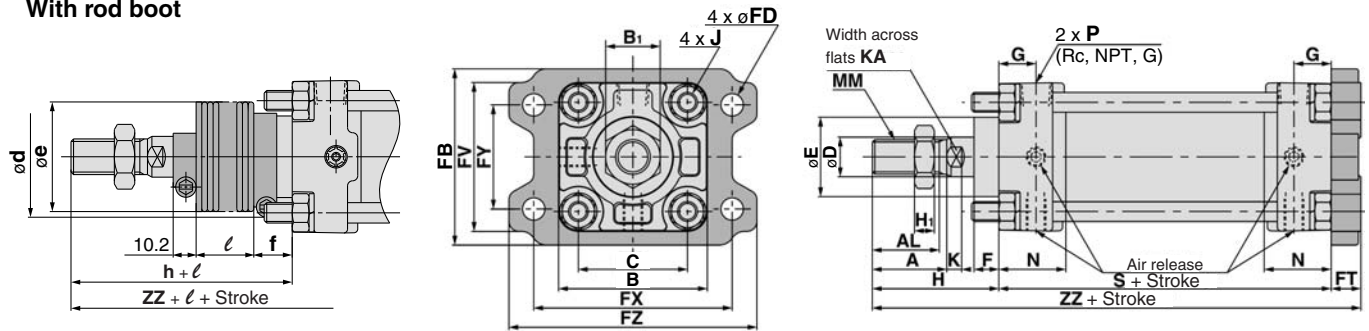
- CJ1**
- CJP**
- CJ2**
- CM2**
- CG1**
- MB**
- MB1**
- CA2**
- CS1**
- CS2**

- D-□**
- X□**
- Individual
- X□**
- Technical data

Series CA2□H

Rear Flange Style/ CA2GH

With rod boot



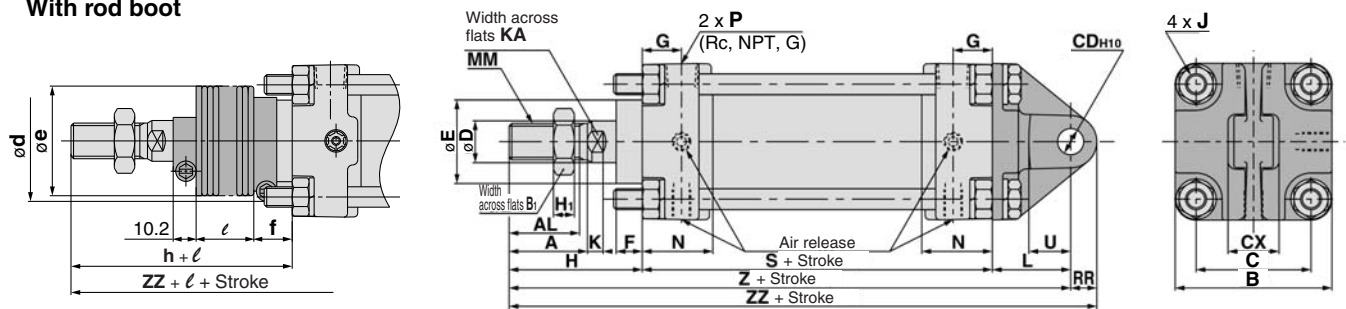
(mm)

Bore size (mm)	Stroke range (mm)		A	AL	FB	B	B ₁	C	D	E	F	FV	FD	FT	FX	FY	FZ	G	H ₁	J
	Without rod boot	With rod boot																		
40	Up to 500	20 to 500	30	27	71	60	22	44	16	32	10	60	9	12	80	42	100	15	8	M8 x 1.25
50	Up to 600	20 to 600	35	32	81	70	27	52	20	40	10	70	9	12	90	50	110	17	11	M8 x 1.25
63	Up to 600	20 to 600	35	32	101	85	27	64	20	40	10	86	11.5	15	105	59	130	17	11	M10 x 1.25
80	Up to 750	20 to 750	40	37	119	102	32	78	25	52	14	102	13.5	18	130	76	160	21	13	M12 x 1.75
100	Up to 750	20 to 750	40	37	133	116	41	92	30	52	14	116	13.5	18	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 Style/ CA2CH

With rod boot



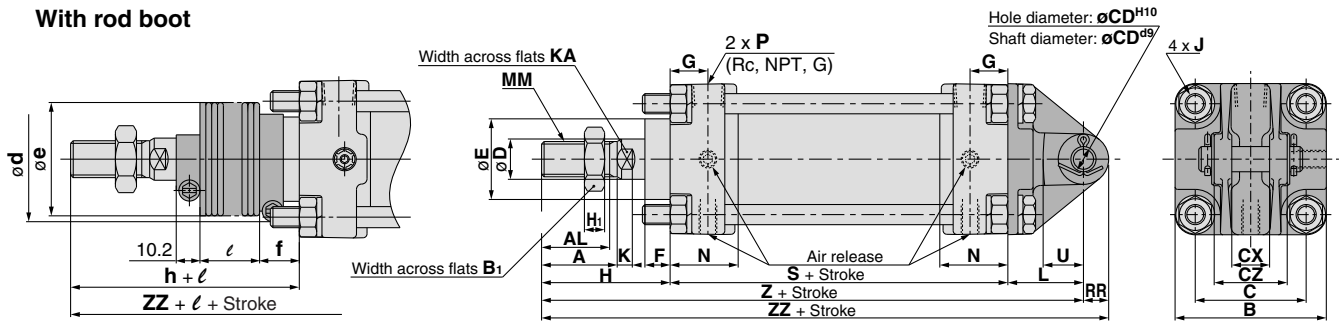
(mm)

Bore size (mm)	Stroke range (mm)		A	AL	B	B ₁	C	CD ^{H10}	CX	D	E	F	G	H ₁	J	K	KA
	Without rod boot	With rod boot															
40	Up to 500	20 to 500	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
50	Up to 600	20 to 600	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
63	Up to 600	20 to 600	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
80	Up to 750	20 to 750	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
100	Up to 750	20 to 750	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

Bore size (mm)	L	MM	N	P	RR	S	U	Z	Without rod boot			With rod boot						
									H	Z	ZZ	d	e	f	h	ℓ	Z	ZZ
40	30	M14 x 1.5	27	1/4	10	84	16	165	51	165	175	56	43	11.2	59	1/4 stroke	173	183
50	35	M18 x 1.5	30	3/8	12	90	19	183	58	183	195	64	52	11.2	66	1/4 stroke	191	203
63	40	M18 x 1.5	31	3/8	16	98	23	196	58	196	212	64	52	11.2	66	1/4 stroke	204	220
80	48	M22 x 1.5	37	1/2	20	116	28	235	71	235	255	76	65	12.5	80	1/4 stroke	244	264
100	58	M26 x 1.5	40	1/2	25	126	36	256	72	256	281	76	65	14.0	81	1/4 stroke	265	290

Double Clevis Style: CA2DH

With rod boot



* Double clevis and double knuckle joint types are packed with pins and retaining rings.

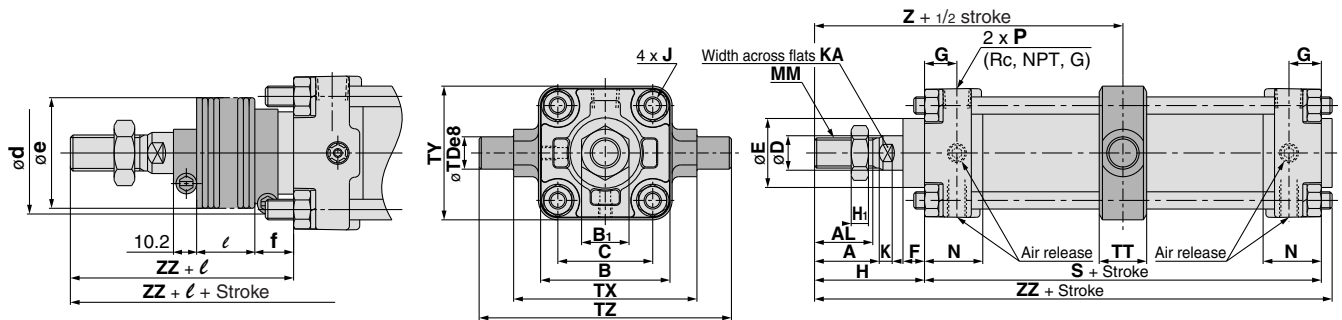
Bore size (mm)	Stroke range (mm)		A	AL	B	B ₁	C	CD ^{H10}	CX	CZ	D	E	F	G	H ₁	J	K	KA
	Without rod boot	With rod boot																
40	Up to 500	20 to 500	30	27	60	22	44	10 ^{+0.058} ₀	15 ^{+0.3} _{-0.1}	29.5	16	32	10	15	8	M8 x 1.25	6	14
50	Up to 600	20 to 600	35	32	70	27	52	12 ^{+0.070} ₀	18 ^{+0.3} _{-0.1}	38	20	40	10	17	11	M8 x 1.25	7	18
63	Up to 600	20 to 600	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
80	Up to 750	20 to 750	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
100	Up to 750	20 to 750	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

Bore size (mm)	L	MM	N	P	RR	S	U	Z	Without rod boot			With rod boot						
									H	Z	ZZ	d	e	f	h	ℓ	Z	ZZ
40	30	M14 x 1.5	27	1/4	10	84	16	165	51	165	175	56	43	11.2	59	1/4 stroke	173	183
50	35	M18 x 1.5	30	3/8	12	90	19	183	58	183	195	64	52	11.2	66	1/4 stroke	191	203
63	40	M18 x 1.5	31	3/8	16	98	23	196	58	196	212	64	52	11.2	66	1/4 stroke	204	220
80	48	M22 x 1.5	37	1/2	20	116	28	235	71	235	255	76	65	12.5	80	1/4 stroke	244	264
100	58	M26 x 1.5	40	1/2	25	126	36	256	72	256	281	76	65	14.0	81	1/4 stroke	265	290

* Packed with clevis pin, flat washer and cotter pin.

Center Trunnion Style: CA2TH

With rod boot



Bore size (mm)	Stroke range (mm)		A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	MM	N	P
	Without rod boot	With rod boot																
40	Up to 500	20 to 500	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	M14 x 1.5	27	1/4
50	Up to 600	20 to 600	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	M18 x 1.5	30	3/8
63	Up to 600	20 to 600	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	M18 x 1.5	31	3/8
80	Up to 750	20 to 750	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	M22 x 1.5	37	1/2
100	Up to 750	20 to 750	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	M26 x 1.5	40	1/2

Bore size (mm)	S	TDe8	TT	TX	TY	TZ	Z	Without rod boot			With rod boot						
								H	Z	ZZ	d	e	f	h	ℓ	Z	ZZ
40	84	15 ^{+0.032} _{-0.059}	22	85	62	117	93	51	93	140	56	43	11.2	59	1/4 stroke	101	148
50	90	15 ^{+0.032} _{-0.059}	22	95	74	127	103	58	103	154	64	52	11.2	66	1/4 stroke	111	162
63	98	18 ^{+0.032} _{-0.059}	28	110	90	148	107	58	107	162	64	52	11.2	66	1/4 stroke	115	170
80	116	25 ^{+0.040} _{-0.073}	34	140	110	192	129	71	129	194	76	65	12.5	80	1/4 stroke	138	203
100	126	25 ^{+0.040} _{-0.073}	40	162	130	214	135	72	135	206	76	65	14.0	81	1/4 stroke	144	215

* Do not disassemble the trunnion style. Refer to page 407.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

Technical

data

Air-hydro Cylinder: Air-hydro Type Double Acting, Double Rod

Series CA2W□H

ø40, ø50, ø63, ø80, ø100

How to Order

CA2W **L** **H** **50** - **100**

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

With auto switch (Built-in magnet)
Double rod type
Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
T	Center trunnion style

Tube material

Nil	Aluminum tube
F*	Steel tube

* Not available with auto switch.

Port thread type

Nil	Rc
TN	NPT
TF	G

Bore size

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

Auto switch

Nil	Without auto switch
------------	---------------------

* Refer to the table below for the applicable auto switch model.

Number of auto switches

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

Cylinder suffix

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

Built-in Magnet Cylinder Model Hydro type

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) CDA2WLH40-100

Cylinder stroke (mm)
For more information, please refer to the next page.

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)				Pre-wired connector	Applicable load		
					DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	1 (M)	3 (L)	5 (Z)		IC circuit	Relay, PLC	
Solid state switch	—	Grommet	—	3-wire(NPN)	24 V	5 V, 12 V	—	M9N	●	●	●	○	○			IC circuit
				3-wire(PNP)				M9P	●	—	●	○		○		
				2-wire	12 V	M9B	●	●	●	○	○					
		Terminal conduit		3-wire(NPN)	12 V	100 V, 200 V	J51	●	—	●	○	○	—			
				2-wire			G39C	G39	—	—	—	—				
				3-wire(NPN)	24 V	5 V, 12 V	—	K39C	K39	—	—	—		—		
	3-wire(NPN)	M9NW	●	●				●	○	○						
	Diagnostic indication (2-color indication)	Grommet	Yes	24 V	2-wire	12 V	—	M9PW	●	●	●	○	○	IC circuit	Relay, PLC	
					3-wire(NPN)			M9BW	●	●	●	○	○			
					3-wire(NPN)	5 V, 12 V	—	M9NA	—	○	○	●	○			○
					2-wire			M9PA	—	○	○	●	○			○
					Water resistant (2-color indication)	12 V	—	M9BA	—	○	○	●	○			○
3-wire(NPN)					M9PW			●	●	●	○	○				
3-wire(PNP)	5 V, 12 V	—	M9BA	—	○	○	●	○	○							
2-wire	12 V	—	M9BA	—	○	○	●	○	○							
With diagnostic output (2-color indication)	Grommet	—	24 V	4-wire(NPN)	5 V, 12 V	—	F59F	G59F	●	—	●	○	○	IC circuit	—	
Magnetic field resistant (2-color indication)				2-wire (Non-polar)	—	P4DW	—	—	—	●	●	○	—			
Reed switch	—	Grommet	Yes	2-wire	24 V	12 V	—	A96**	●	—	●	—	—	IC circuit	—	
								A93**	—	●	—	●	—	—		
								A90**	—	●	—	●	—	—		
								A54	B54	●	—	●	●	—		
								A64	B64	●	—	●	—	—		
		Terminal conduit		Yes	100 V, 200 V	A33C	A33	—	—	—	—	—				
						A34C	A34	—	—	—	—	—				
						A44C	A44	—	—	—	—	—				
						A59W	B59W	●	—	●	—	—				
						A44C	A44	—	—	—	—	—				

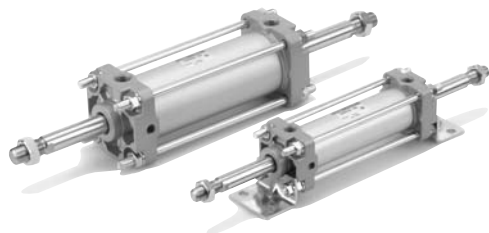
* Lead wire length symbols: 0.5m..... Nil (Example)M9NW
1m..... M (Example)M9NWM
3m..... L (Example)M9NWL
5m..... Z (Example)M9NWX

* Solid state auto switches marked with "○" are produced upon receipt of order.
**D-A9□ and D-A9□V types cannot be mounted on ø50. Use D-Z7□ and D-Z80 instead

* In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 406.
* Refer to pages 1328 and 1329 for the details about auto switches with a pre-wired connector.
* D-A9□/M9□/M9□W/M9□AL auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

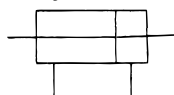
Air-hydro Cylinder: Air-hydro Type Double Acting, Double Rod **Series CA2W□H**

Specifications



Bore size (mm)	40	50	63	80	100
Type	Air-hydro				
Fluid	Turbine oil				
Action	Double acting				
Proof pressure	1.5 MPa				
Maximum operating pressure	1.0 MPa				
Minimum operating pressure	0.16 Mpa				
Piston speed	0.5 to 300 mm/s				
Ambient and fluid temperature	5°C to 60°C				
Cushion	Without				
Stroke length tolerance	To 250 st : +1.0 ₀ , 251 to 750 st : +1.4 ₀				
Mounting	Basic style, Axial foot style, Rod side flange style, Center trunnion style				

JIS Symbol



Minimum Stroke for Auto Switch Mounting

⚠ Caution

1. The minimum stroke for mounting varies with the auto switch type and mounting style of the cylinder.

In particular, the center trunnion style needs careful attention. (For more information, please refer to page 403.)

Refer to pages 401 to 406 for cylinders with auto switches.

- Minimum auto switch mounting stroke
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Standard Stroke In case of a type with auto switch, please also refer to the table of minimum strokes for auto switch mounting on pages 403 and 404.

Bore size (mm)	Standard strokes (mm)
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500
50, 63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600
80, 100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700

* Intermediate strokes not listed above are produced upon receipt of order.

Rod Boot Material

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

* Maximum ambient temperature for the rod boot itself.

Accessory

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

* The above brackets have the same dimensions as those for the standard double acting single rod Series CA2. Please refer to page 397.

Mass/Aluminum Tube (Steel tube)

Bore size (mm)		40	50	63	80	100
Basic mass	Basic	1.03 (1.08)	1.59 (1.64)	2.26 (2.30)	3.94 (4.09)	5.57 (5.78)
	Axial foot	1.22 (1.27)	1.81 (1.86)	2.59 (2.63)	4.61 (4.76)	6.65 (6.77)
	Flange	1.40 (1.45)	2.05 (2.09)	3.05 (3.09)	5.39 (5.55)	7.49 (7.70)
	Trunnion	1.39 (1.49)	2.07 (2.18)	3.06 (3.25)	5.49 (5.78)	7.85 (8.24)
Additional mass per each 50 mm stroke	All mounting brackets (Except steel tube trunnion)	0.30 (0.35)	0.40 (0.47)	0.50 (0.55)	0.71 (0.89)	0.92 (1.15)
	Steel tube trunnion	(0.44)	(0.58)	(0.77)	(1.06)	(1.35)
Accessory	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) **CA2WLH40-100** (Axial foot style, ø40, 100st)
 • Basic mass 1.22 (Axial foot style, ø40)
 • Additional mass 0.30/50st
 • Cylinder stroke 100st
 1.22 + 0.30 x 100/50 = 1.82 kg

* Values inside the parentheses are those for the steel tube type.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

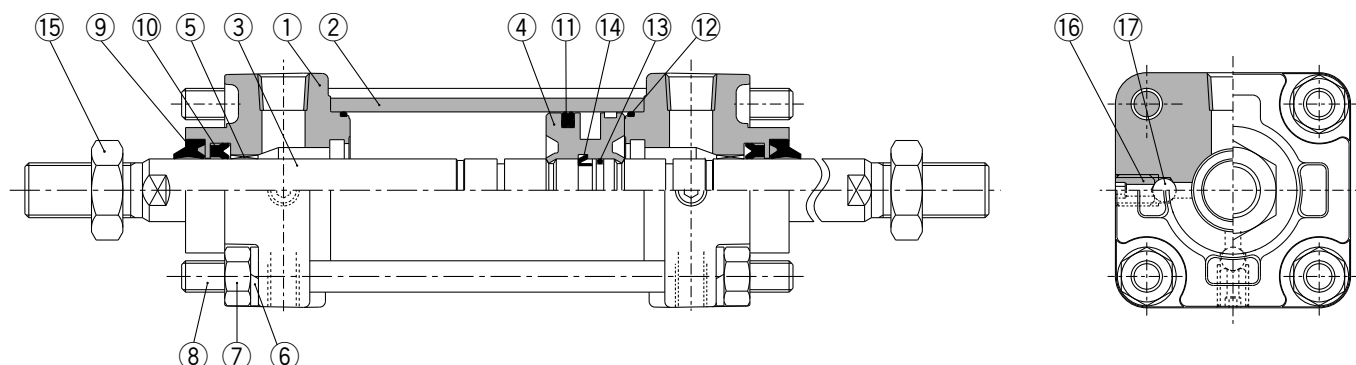
Individual

-X□

Technical data

Series CA2W□H

Construction



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Metallic painted
2	Cylinder tube	Aluminum alloy	Hard anodized
3	Piston rod	Carbon steel	Hard chromium electroplated
4	Piston	Aluminum alloy	Chromated
5	Bushing	Lead-bronze casted	
6	Spring washer	Rolled steel	Chromated
7	Tie-rod nut	Rolled steel	Nickel plated
8	Tie-rod	Carbon steel	Zinc chromated
9	Scraper	NBR	
10	Rod seal	NBR	
11	Piston seal	NBR	
12	Cylinder tube gasket	NBR	
13	Piston gasket	NBR	
14	Piston holder	Urethane	
15	Rod end nut	Rolled steel	Nickel plated
16	Air release valve	Chromium molybdenum steel	Black zinc chromated
17	Check ball	Bearing steel	

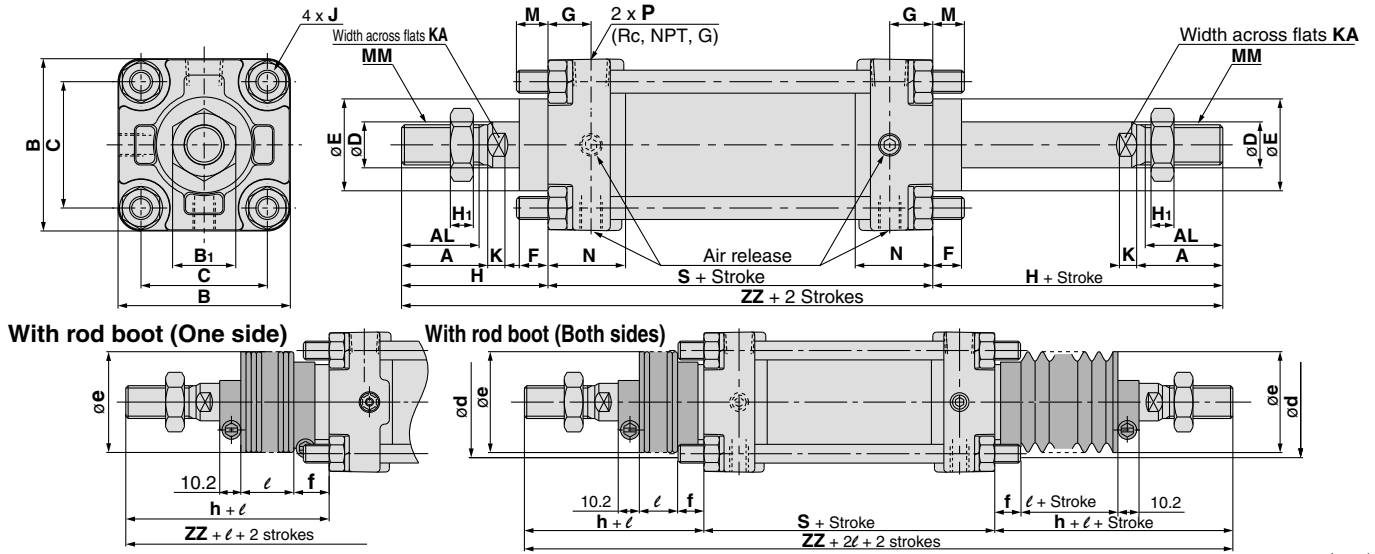
Replacement Parts: Seal Kit

Bore size (mm)	Seal kit no.	Content
	Air-hydro type	
40	CA2WH40A-PS	Set of nos. above ⑩, ⑪, ⑫.
50	CA2WH50A-PS	
63	CA2WH63A-PS	
80	CA2WH80A-PS	
100	CA2WH100A-PS	

* Do not disassemble the trunnion style. Refer to page 407.
 * Seal kit includes ⑩, ⑪ and ⑫. Order the seal kit based on each bore size.
 * Seal kit includes a grease pack (ø40, 50: 10 g, ø63 or more: 20 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)

Air-hydro Cylinder: Air-hydro Type Double Acting, Double Rod **Series CA2W□H**

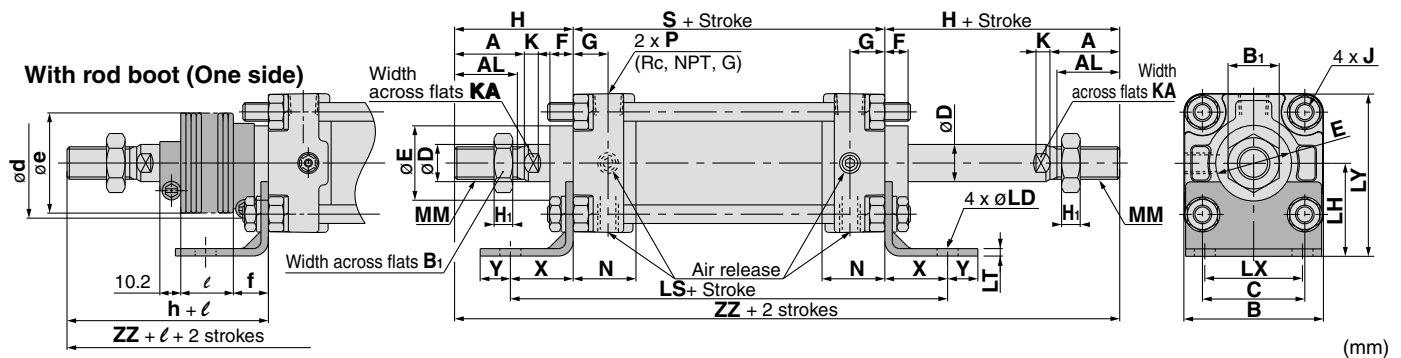
Basic Style: CA2WBH



Bore size (mm)	Stroke range (mm)		A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	M	MM	N
	Without rod boot	With rod boot																
40	Up to 500	20 to 500	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	11	M14 x 1.5	27
50	Up to 600	20 to 600	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	11	M18 x 1.5	30
63	Up to 600	20 to 600	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	14	M18 x 1.5	31
80	Up to 750	20 to 750	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	11	22	17	M22 x 1.5	37
100	Up to 750	20 to 750	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	11	26	17	M26 x 1.5	40

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

Axial Foot Style/ CA2WLH



Bore size (mm)	Stroke range (mm)		A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	LD	LH	LS	LT
	Without rod boot	With rod boot																	
40	Up to 500	20 to 500	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	9	40	138	3.2
50	Up to 600	20 to 600	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	9	45	144	3.2
63	Up to 600	20 to 600	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	11.5	50	166	3.2
80	Up to 750	20 to 750	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	11	22	13.5	65	204	4.5
100	Up to 750	20 to 750	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	11	26	13.5	75	212	6.0

Bore size (mm)	LX	LY	MM	N	P	S	W	X	Y	Without rod boot		With rod boot (Single side)					(Both sides)	
										H	ZZ	d	e	f	h	ℓ	ZZ	ZZ
40	42	70	M14 x 1.5	27	1/4	84	8	27	13	51	186	56	43	11.2	59	1/4 stroke	194	202
50	50	80	M18 x 1.5	30	3/8	90	0	27	13	58	206	64	52	11.2	66	1/4 stroke	214	222
63	59	93	M18 x 1.5	31	3/8	98	0	34	16	58	214	64	52	11.2	66	1/4 stroke	222	230
80	76	116	M22 x 1.5	37	1/2	116	0	44	16	71	258	76	65	12.5	80	1/4 stroke	267	276
100	92	133	M26 x 1.5	40	1/2	126	0	43	17	72	270	76	65	14.0	81	1/4 stroke	279	288

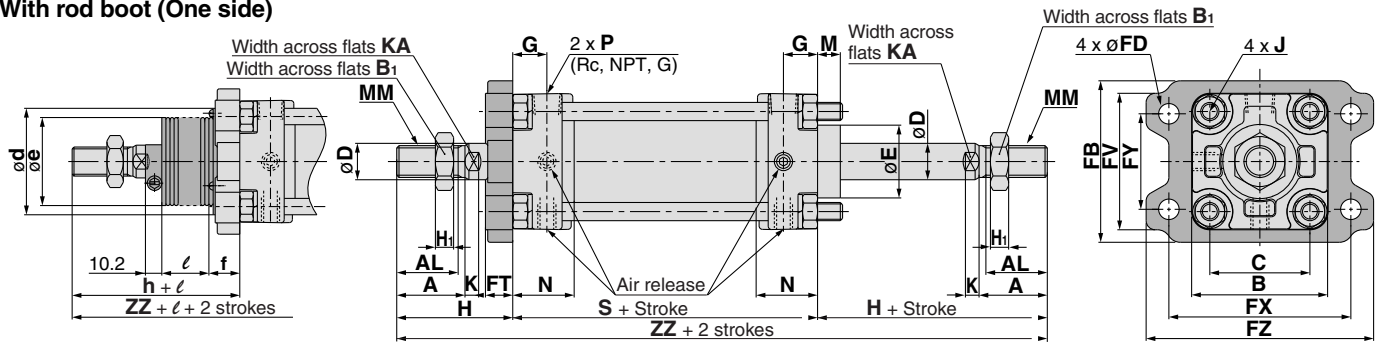
- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

- D-□
- X□
- Individual
- X□
- Technical data

Series CA2W□H

Front Flange Style: CA2WFH

With rod boot (One side)



(mm)

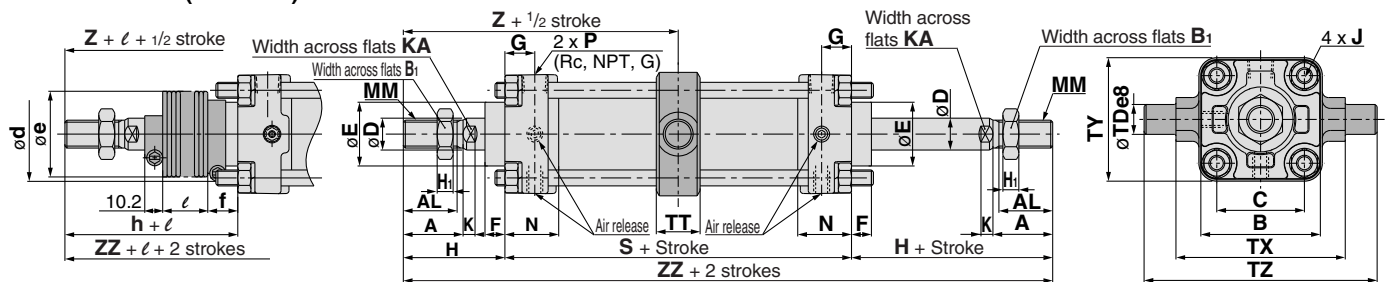
Bore size (mm)	Stroke range (mm)		A	AL	FB	B	B ₁	C	D	E	FD	FT	FX	FY	FZ	FV	G	H ₁	J	K
	Without rod boot	With rod boot																		
40	Up to 500	20 to 500	30	27	71	60	22	44	16	32	9.0	12	80	42	100	60	15	8	M8 x 1.25	6
50	Up to 600	20 to 600	35	32	81	70	27	52	20	40	9.0	12	90	50	110	70	17	11	M8 x 1.25	7
63	Up to 600	20 to 600	35	32	101	85	27	64	20	40	11.5	15	105	59	130	86	17	11	M10 x 1.25	7
80	Up to 750	20 to 750	40	37	119	102	32	78	25	52	13.5	18	130	76	160	102	21	13	M12 x 1.75	11
100	Up to 750	20 to 750	40	37	133	116	41	92	30	52	13.5	18	150	92	180	116	21	16	M12 x 1.75	11

Bore size (mm)	KA	M	MM	N	P	S	Without rod boot		With rod boot (Single side)						Both sides	
							H	ZZ	d*	e	f	h	ℓ	ZZ	ZZ	
40	14	11	M14 x 1.5	27	1/4	84	51	186	52	43	15	59	1/4 stroke	194	202	
50	18	11	M18 x 1.5	30	3/8	90	58	206	58	52	15	66	1/4 stroke	214	222	
63	18	14	M18 x 1.5	31	3/8	98	58	214	58	52	17.5	66	1/4 stroke	222	230	
80	22	17	M22 x 1.5	37	1/2	116	71	258	80	65	21.5	80	1/4 stroke	267	276	
100	26	17	M26 x 1.5	40	1/2	126	72	270	80	65	21.5	81	1/4 stroke	279	288	

★ If a hole is provided to accommodate the boot when the air-hydro cylinder is mounted, make the hole diameter larger than the outside diameter of the boot mounting bracket ød.

Center Trunnion Style: CA2WTH

With rod boot (One side)



(mm)

Bore size (mm)	Stroke range (mm)		A	AL	B	B ₁	C	D	E	F	G	J	K	MM	N	P	S	TDe8
	Without rod boot	With rod boot																
40	Up to 500	20 to 500	30	27	60	22	44	16	32	10	15	M8 x 1.25	6	M14 x 1.5	27	1/4	84	15 ^{-0.032} _{-0.059}
50	Up to 600	20 to 600	35	32	70	27	52	20	40	10	17	M8 x 1.25	7	M18 x 1.5	30	3/8	90	15 ^{-0.032} _{-0.059}
63	Up to 600	20 to 600	35	32	85	27	64	20	40	10	17	M10 x 1.25	7	M18 x 1.5	31	3/8	98	18 ^{-0.032} _{-0.059}
80	Up to 750	20 to 750	40	37	102	32	78	25	52	14	21	M12 x 1.75	11	M22 x 1.5	37	1/2	116	25 ^{-0.040} _{-0.073}
100	Up to 750	20 to 750	40	37	116	41	92	30	52	14	21	M12 x 1.75	11	M26 x 1.5	40	1/2	126	25 ^{-0.040} _{-0.073}

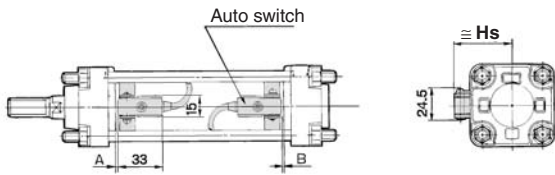
Bore size (mm)	TT	TX	TY	TZ	Without rod boot		With rod boot (Single side)						Both sides			
					H	Z	ZZ	d	e	f	h	ℓ	Z	ZZ	Z	ZZ
40	22	85	62	117	51	93	186	56	43	11.2	59	1/4 stroke	101	194	101	202
50	22	95	74	127	58	103	206	64	52	11.2	66	1/4 stroke	111	214	111	222
63	28	110	90	148	58	107	214	64	52	11.2	66	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 style. Refer to page 407.

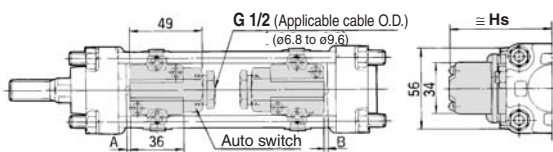
Proper Auto Switches Mounting Position (Detection at stroke end) and Its Mounting Height

<Band mount type>

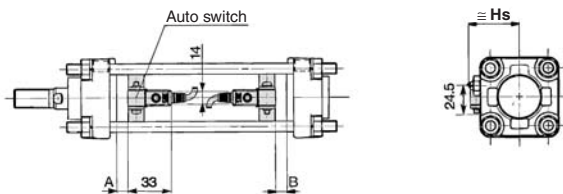
D-B5□/B64/B59W



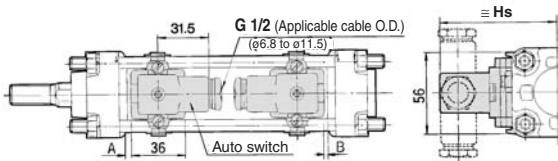
D-A3□
D-G39/K39



D-G5□/K59
D-G5□W/K59W
D-G5BAL
D-G59F/G5NTL



D-A44



<Tie-rod mount type>

D-A9□/A9□V

D-M9□/M9□V

D-M9□W/M9□WV

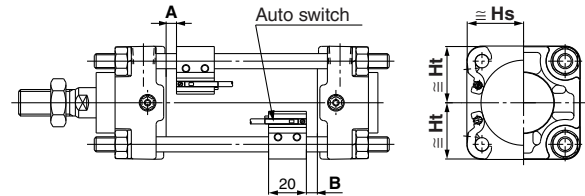
D-M9□AL/M9□AVL

D-Z7□/Z80

D-Y59□/Y69□/Y7P/Y7PV

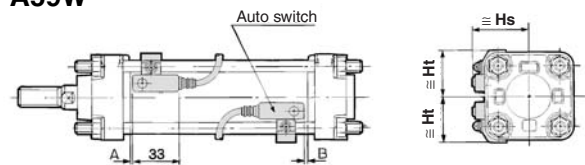
D-Y7□W/Y7□WV

D-Y7BAL



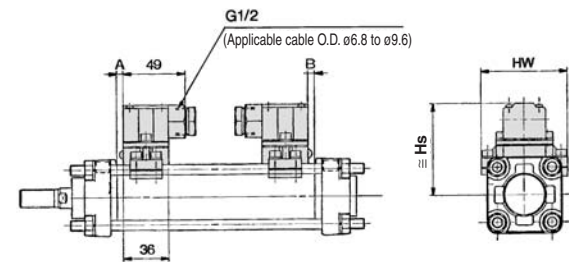
D-A5□/A6□

D-A59W



D-A3□C

D-G39C/K39C

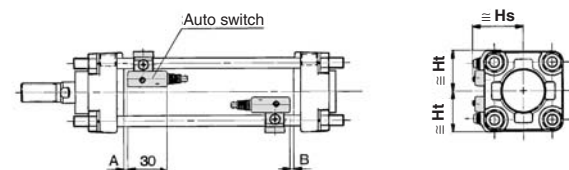


D-F5□/J5□

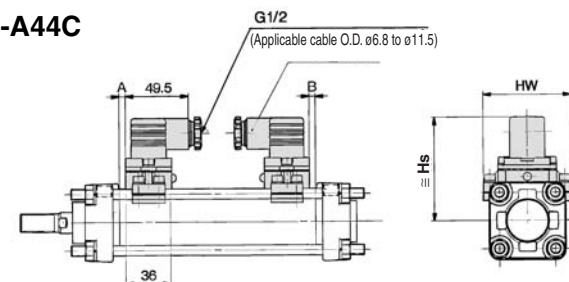
D-F5NTL

D-F5□W/J59W

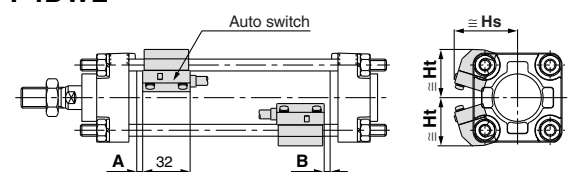
D-F5BAL/F59F



D-A44C



D-P4DWL



CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

Technical

data

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

Proper Auto Switch Mounting Position (Except low friction, air-hydro cylinders)

(mm)

Auto switch model	D-A9□ D-A9□V		D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□AL D-M9□AVL		D-B59W D-Z7□ D-Z80 D-Y59□ D-Y69□ D-Y7P D-Y7PV D-Y7□W D-Y7□WV D-Y7BAL		D-P4DWL		D-A5□ D-A6□ D-A3□ D-A3□C D-A44 D-A44C D-G39 D-G39C D-K39 D-K39C		D-B5□ D-B64		D-F5□ D-J5□ D-F59F D-F5□W D-J59W D-F5BAL		D-G5□ D-K59 D-G5NTL D-G5□W D-K59W D-G5BAL D-G59F		D-A59W		D-F5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
40	6	4	10	8	4	1	3.5	0.5	0.5	0	1	0	7	4	2.5	0	4.5	1.5	12	9
50	6	4	10	8	3.5	1.5	3	1	0	0	0.5	0	6.5	4.5	2	0	4	2	11.5	9.5
63	8.5	7.5	12.5	11.5	6	5	5.5	4.5	2.5	1.5	3	2	9	8	4.5	3.5	6.5	5.5	14	13
80	12	10	16	14	9.5	7.5	9	7	6	4	6.5	4.5	12.5	10.5	8	6	10	8	17.5	15.5
100	13.5	12.5	17.5	16.5	11	10	10.5	9.5	7.5	6.5	8	7	14	13	9.5	8.5	11.5	10.5	19	18

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

Auto Switch Mounting Height (Except low friction, air-hydro cylinders)

(mm)

Auto switch model	D-A9□ D-M9□ D-M9□W D-M9□AL		D-A9□V		D-M9□V D-M9□WV D-M9□AVL		D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7BAL D-Y7□W		D-Y69□ D-Y7PV D-Y7□WV		D-P4DWL		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-F5BAL D-F59F D-F5NTL		D-A3□C D-G39C D-K39C		D-A44C	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Hs	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Hw	Hs	Hw		
40	30	30	31	30	34	30	30	30	30	30	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	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	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	49.5	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	66	58.5	68	102.5	112.5	61.5	57.5	61	57.5	104	121	112	121			

Proper Auto Switch Mounting Position (Air-hydro cylinders/ CDA2□H)

(mm)

Auto switch model	D-A9□ D-A9□V		D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□AL D-M9□AVL		D-B59W D-Z7□ D-Z80 D-Y59□ D-Y69□ D-Y7P D-Y7PV D-Y7□W D-Y7□WV D-Y7BAL		D-P4DWL		D-A5□ D-A6□ D-A3□ D-A3□C D-A44 D-A44C D-G39 D-G39C D-K39 D-K39C		D-B5□ D-B64		D-F5□ D-J5□ D-F59F D-F5□W D-J59W D-F5BAL		D-G5□ D-K59 D-G5NTL D-G5□W D-K59W D-G5BAL D-G59F		D-A59W		D-F5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
40	6	4	10	8	3.5	1.5	3	1	0	0	0.5	0	6.5	4.5	2	0	4	2	11.5	9.5
50	—	—	10	8	3.5	1.5	3	1	0	0	0.5	0	6.5	4.5	2	0	4	2	11.5	9.5
63	8.5	7.5	12.5	11.5	6	5	5.5	4	2.5	1.5	3	2	9	8	4.5	3.5	6.5	5.5	14	13
80	12	10	16	14	9.5	7.5	9	7	6	4	6.5	4.5	4.5	12.5	8	6	10	8	17.5	15.5
100	13.5	12.5	17.5	16.5	11	10	10.5	9	7.5	6.5	8	7	14	13	9.5	8.5	11.5	10.5	19	18

* D-A9□ and D-A9□V types cannot be mounted on ø50.

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

Auto Switch Mounting Height (Air-hydro cylinders/ CDA2□H)

Auto switch model	D-A9□ D-M9□ D-M9□W D-M9□AL		D-A9□V		D-M9□V D-M9□WV D-M9□AVL		D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7BAL D-Y7□W		D-Y69□ D-Y7PV D-Y7□WV		D-P4DWL		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-F5BAL D-F59F D-F5NTL		D-A3□C D-G39C D-K39C		D-A44C	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Hs	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Hw	Hs	Hw		
40	30	30	32	30	35	30	30	30	30	30.5	30	43	33.5	38	72.5	80.5	40	31	38.5	31	73	69	81	69		
50	34	34	36.5	34	39	34	34	34	34	35	34	47	38	43.5	78	86	43.5	35	42.5	35	78.5	77	86.5	77		
63	41	41	43.5	41	46	41	41	41	41	42.5	41	53	44	50.5	85	93	49	42	48	42	85.5	91	93.5	91		
80	49.5	49	51.5	49	54	49	49.5	48.5	51	48.5	60	52	59	93.5	101.5	55.5	50	54	50	94	107	102	107			
100	57	56	59.5	56	62.5	56	58.5	56	59	56	67	59	69.5	104	112	63	57.5	62	57.5	104	121	112	121			

* D-A9□ and D-A9□V types cannot be mounted on ø50.

Minimum Auto Switch Mounting Stroke

n: Number of auto switches (mm)

Auto switch model	Number of auto switch	Brackets other than center trunnion	Center 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...)	$75 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
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...)	$50 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$55 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
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...)	$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
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...)	$55 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$70 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-M9□AL	2 (Different surfaces and same surface) 1	15	80		85	95	100
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-M9□AVL	2 (Different surfaces and same surface) 1	10	60		65	70	75
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$70 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-A5□/A6 D-F5□/J5 D-F5□W/J59W D-F5BAL/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...)	$90 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$100 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
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...)	$90 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$100 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
	1	15	90		100	110	120
D-F5NTL	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...)	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$130 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$140 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-B5□/B64 D-G5□/K59 D-G5□W D-K59W D-G5BAL D-G59F D-G5NTL	2	Different surfaces	15		90	100	110
		Same surface	75				
	n	Different surfaces	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...)	$90 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...)		$100 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...)	$110 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
		Same surface	$75 + 50(n-2)$ (n = 2, 3, 4, ...)	$90 + 50(n-2)$ (n = 2, 4, 6, 8, ...)		$100 + 50(n-2)$ (n = 2, 4, 6, 8, ...)	$110 + 50(n-2)$ (n = 2, 4, 6, 8, ...)
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, ...)	$90 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...)		$100 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...)	$110 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...)
		Same surface	$75 + 50(n-2)$ (n = 2, 3, 4, ...)	$90 + 50(n-2)$ (n = 2, 4, 6, 8, ...)		$100 + 50(n-2)$ (n = 2, 4, 6, 8, ...)	$110 + 50(n-2)$ (n = 2, 4, 6, 8, ...)
1	15	90		100	110		
D-A3□ D-G39 D-K39	2	Different surfaces	35		80	90	
		Same surface	100		100	100	
	n	Different surfaces	$35 + 30(n-2)$ (n = 2, 3, 4, ...)	$75 + 30(n-2)$ (n = 2, 4, 6, 8, ...)		$80 + 30(n-2)$ (n = 2, 4, 6, 8, ...)	$90 + 30(n-2)$ (n = 2, 4, 6, 8, ...)
		Same surface	$100 + 100(n-2)$ (n = 2, 3, 4, ...)			$100 + 100(n-2)$ (n = 2, 4, 6, 8, ...)	
1	10	75		80	90		

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual
-X□

Technical
data

Minimum Auto Switch Mounting Stroke

n: Number of auto switches (mm)

Auto switch model	Number of auto switch	Brackets other than center trunnion	Center trunnion				
			ø40	ø50	ø63	ø80	ø100
D-A44	2	Different surfaces	35	75	80	90	
		Same surface	55				
	n	Different surfaces	$35 + 30(n - 2)$ (n = 2, 3, 4, ...)	$75 + 30(n - 2)$ (n = 2, 4, 6, 8, ...)	$80 + 30(n - 2)$ (n = 2, 4, 6, 8, ...)	$90 + 30(n - 2)$ (n = 2, 4, 6, 8, ...)	
		Same surface	$55 + 50(n - 2)$ (n = 2, 3, 4, ...)	$75 + 50(n - 2)$ (n = 2, 4, 6, 8, ...)	$80 + 50(n - 2)$ (n = 2, 4, 6, 8, ...)	$90 + 50(n - 2)$ (n = 2, 4, 6, 8, ...)	
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, ...)	$80 + 35(n - 2)$ (n = 2, 4, 6, 8, ...)	$90 + 35(n - 2)$ (n = 2, 4, 6, 8, ...)	
		Same surface	$100 + 100(n - 2)$ (n = 2, 3, 4, 5...)		$100 + 100(n - 2)$ (n = 2, 4, 6, 8, ...)		
1	10	75	80	90			
D-A44C	2	Different surfaces	20	75	80	90	
		Same surface	55				
	n	Different surfaces	$20 + 35(n - 2)$ (n = 2, 3, 4, ...)	$75 + 35(n - 2)$ (n = 2, 4, 6, 8, ...)	$80 + 35(n - 2)$ (n = 2, 4, 6, 8, ...)	$90 + 35(n - 2)$ (n = 2, 4, 6, 8, ...)	
		Same surface	$55 + 50(n - 2)$ (n = 2, 3, 4, ...)	$75 + 50(n - 2)$ (n = 2, 4, 6, 8, ...)	$80 + 50(n - 2)$ (n = 2, 4, 6, 8, ...)	$90 + 50(n - 2)$ (n = 2, 4, 6, 8, ...)	
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...)	$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
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...)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$80 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$90 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	
D-Y7BAL	2 (Different surfaces and same surface) 1	20	95	100	105	110	
	n	$20 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$95 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$100 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$105 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$110 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	
D-P4DWL	2 (Different surfaces and same surface) 1	15	120	130	140		
	n	$15 + 65 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$120 + 65 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$130 + 65 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$140 + 65 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		

Operating Range

Auto switch model	Bore size					Auto switch model	Bore size						
	40	50	63	80	100		40	50	63	80	100		
D-A9□/A9□V	7.5 (7)	8.5 (—)	9.5 (9)	9.5 (9)	10.5 (9)	D-Y59□/Y69□ D-Y7P/Y7□V D-Y7□W/Y7□WV D-Y7BAL	8	7	5.5	6.5	6.5		
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	4.5	5	5.5	5	6		D-F5□/J5□/F5□W D-J59W/F5BAL D-F5NTL/F59F	4	4	4.5	4.5	4.5	
D-Z7□/Z80	8.5	7.5	9.5	9.5	10.5			D-G5□/K59/G5□W D-K59W/G5BAL D-G5NTL/G59F	5	6	6.5	6.5	7
D-A3□/A44 D-A3□C/A44C	9	10	11	11	11				D-G39/K39 D-G39C/K39C D-P4DWL	9	9	10	10
D-A5□/A6□ D-B5□/B64	13	13	14	14	15	4	4	4.5		4	4.5		
D-A59W D-B59W	14	14	17	16	18								

* Since the operating range is provided as a guideline including hysteresis, it cannot be guaranteed (assuming approximately ±30% dispersion). It may vary substantially depending on an ambient environment.

Note 1) () : For Series CDA2□Q, CDA2□H and CDA2W□H.

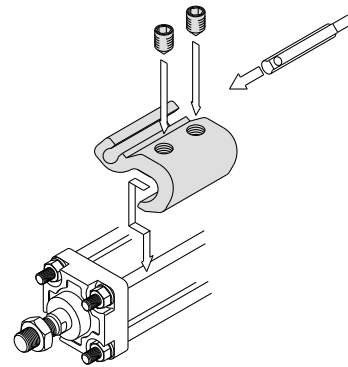
Note 2) D-A9□ and D-A9□V types cannot be mounted on ø50 of Series CDA2□Q, CDA2□H and CDA2W□H.

Note 3) D-A3□/A3□C/G39/G39C/A44/A44C/G5□W/K59W/G5BAL/G59F/P4DWL types cannot be mounted on ø40 and ø50 of Series CDA2□Q.

Auto Switch Mounting Bracket: Part No.

<Tie-rod mount>

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□AL/M9□AVL	BA7-040	BA7-040	BA7-063	BA7-080	BA7-080
D-A5□/A6□ D-A59W D-F5□/J5□ D-F5□W/J59W D-F59F/F5NTL	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-Y7BAL	BA4-040	BA4-040	BA4-063	BA4-080	BA4-080
D-P4DWL	BAP2-040	BAP2-040	BAP2-063	BAP2-080	BAP2-080



* The figure shows how to mount D-A9□(V)/M9□(V)/M9□W(V)/M9□A(V)L types.

<Band mount>

Except low friction, air-hydro cylinders

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-G5NTL	BH2-040	BA5-050	BAF-06	BAF-08	BAF-10

Note 1) Auto switch brackets are included in 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

[Mounting screw set made of stainless steel]

The following set of mounting screws made of stainless steel (including set screws) is also available. Use it in accordance with the operating environment. (Please order the auto switch mounting bracket separately, since it is not included.)

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

BBA3: For D-B5/B6/G5/K5 types

Note 2) Refer to pages 1357 and 1365 for the details about BBA1 and BBA3. The above stainless steel screws are used when a cylinder is shipped with D-F5BAL and D-G5BAL type auto switches. When only an auto switch is shipped independently, BBA1 or BBA3 is attached.

Note 3) When using D-M9□A(V)L/Y7BAL, do not use the steel set screws which is included with the auto switch mounting brackets above (BA7-□□□, BA4-□□□). Order a stainless steel screw set (BBA1) separately, and select 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.

Air-hydro cylinders/ CDA2□H, Low friction

Auto switch model	Bore size (mm)				
	40	50	63	80	100
D-A3□/A44 D-G39/K39	BD1-04M	BD1-05M	BD1-06M	BD1-08M	BD1-10M
D-B5□/B64 D-B59W D-G5□/K59 D-G5□W/K59W D-G59F D-G5NTL	BA-04	BA-05	BA-06	BA-08	BA-10

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

Technical data

Other than the applicable auto switches listed in “How to Order”, the following auto switches can be mounted. For detailed specifications, refer to pages 1263 to 1371.

Type	Model	Electrical entry (Fetching direction)	Features
Reed auto switch	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 auto switch	D-M9NV, M9PV, M9BV	Grommet (Perpendicular)	—
	D-Y69A, Y69B, Y7PV		Diagnostic indication (2-color)
	D-M9NWV, M9PWV, M9BWV		
	D-Y7NWV, Y7PWV, Y7BWV		
	D-M9NAVL, M9PAVL, M9BAVL	Grommet (In-line)	Water resistant (2-color indication)
	D-Y59A, Y59B, Y7P		—
	D-F59, F5P, J59		Diagnostic indication (2-color)
	D-Y7NW, Y7PW, Y7BW		
	D-F59W, F5PW, J59W		Water resistant (2-color indication)
	D-F5BAL, Y7BAL		
	D-F5NTL, G5NTL		With timer
	D-P5DWL		Magnetic field resistant (2-color indication)

* For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 1328 and 1329 for details.

* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H/Y7G/Y7H types) are also available. Refer to pages 1290 and 1292 for details.

* A wide range detection type, solid state auto switch (D-G5NBL type) is also available. Refer to page 1320 for details.



Series CA2 Specific Product Precautions

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Operation

⚠ Caution

1. Do not open the cushion valve beyond the stopper.
A snap 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	Hexagon wrench
40, 50	2.5	JIS 4648 Hexagon wrench key 2.5
63, 80, 100	4	JIS 4648 Hexagon 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. Mount the rod boot so that it will not be twisted.
The boot rod may be damaged if twisted on installation.

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, please refer to the table below.

Bore size (mm)	Nut	Width across flats	Socket
40, 50	JIS B 1181 Class 3 Intermediate M8 x 1.25	13	JIS B4636 + Two-angle socket 13
63	JIS B 1181 Class 3 Intermediate M10 x 1.25	17	JIS B4636 + Two-angle socket 17
80, 100	JIS B 1181 Class 3 Intermediate M12 x 1.75	19	JIS B4636 + Two-angle socket 19

2. Do not replace the bushing.
Since the bushing is press fitted, the entire cover assembly instead of a single part needs to 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 mounting accuracy.
The trunnion type cylinder may lose dimensional accuracy and malfunction when it is disassembled and reassembled because the axial center of the trunnion and that of the cylinder will not be aligned easily.

Water Resistant Air Cylinders

Series CA2 air cylinders with improved water tight are also available. Because they provide better coolant resistance than the standard cylinders, they are ideal for use in a machine tool environment exposed to coolant. They are also well suited for use in areas in which water splashes, such as food processing equipment or car washers. Please contact SMC for more information.

Auto Switch Mounting Band Selection

1. Series CDA2 cylinders vary in their bore sizes because of difference in the thickness of their tube walls among different models.
The part number of the auto switch mounting band thus varies depending on the cylinder type.
When an auto switch mounting band is ordered alone, please confirm the cylinder type and refer to the table below.

<Cylinder model>

Standard: CDA2/CDA2W
Non-rotating rod: CDA2K/CDA2KW
End lock: CDBA2

Auto switch model (Band mounting type)	Band part no.				
	Cylinder 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-G5NTL	BH2-040	BA5-050	BAF-06	BAF-08	BAF-10

<Cylinder model>

Air-hydro: CDA2□H/CDA2W□H, Low friction

Auto switch model (Band mounting type)	Band part no.				
	Cylinder bore size (mm)				
	40	50	63	80	100
D-A3□/A44 D-G39/K39	BD1-04M	BD1-05M	BD1-06M	BD1-08M	BD1-10M
D-B5□/B64 D-B59W D-G5□/K59 D-G5□W/K59W D-G59F D-G5NTL	BA-04	BA-05	BA-06	BA-08	BA-10

2. Interchangeability of band with Series CDA1 (conventional model)
Take precautions since some cylinder models lack interchangeability of auto switch mounting band because they have thinner cylinder tube walls than the conventional Series CAD1.

Cylinder model	Interchangeability of auto switch mounting band
Standard: CDA2/CDA2W Non-rotating rod end type: CDA2K/CDA2KW End lock: CDBA2	Without
Low friction: CDA2□Q Air-hydro: CDA2□H/CDA2W□H	Interchangeable (Same part number as that of CDA1)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual
-X□

Technical
data

Smooth Cylinder

Series CA2Y

ø40, ø50, ø63, ø80, ø100

How to Order

CA2Y L 40 [] - 150 - []

With auto switch CDA2Y L 40 [] - 150 - M9BW [] []

With auto switch (Built-in magnet)

Mounting style

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

Bore size

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

Thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 1095.

Number of auto switches

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

Auto switch

Nil	Without auto switch
-----	---------------------

Made to Order
For details, refer to page 1095.

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) CDA2YB40-100

Applicable Auto Switch/Refer to pages 1719 to 1827 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire (m)				Pre-wired connector	Applicable load						
					DC	AC	Tie-rod mounting	Band mounting	0.5 (Nil)	1 (M)	3 (L)	5 (Z)								
Solid state switch	—	Grommet	—	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	—	IC circuit	—				
								—	G59	●	—	●	○				○			
				3-wire (PNP)	—	—	—	—	—	—	M9P	—	●	●	●	○	—	—	—	
											—	G5P	●	—	●	○				○
				2-wire	—	—	—	—	—	100 V, 200 V	M9B	—	●	●	●	○	—	—	—	
											—	K59	●	—	●	○				○
	Terminal conduit	—	—	Yes	3-wire (NPN)	—	12 V	—	G39C	G39	—	—	—	—	—	—	Relay, PLC			
									—	K39	—	—	—	—				—		
	Diagnostic indication (2-color)	Grommet	—	—	3-wire (NPN)	24 V	5 V, 12 V	—	M9NW	—	●	●	●	○	—	IC circuit	—			
									—	G59W	●	—	●	○				○		
3-wire (PNP)					—	—	—	—	—	—	M9PW	—	●	●	●	○	—	—	—	
											—	G5PW	●	—	●	○				○
2-wire					—	—	—	—	—	—	M9BW	—	●	●	●	○	—	—	—	
											—	K59W	●	—	●	○				○
With diagnostic output (2-color)					—	—	—	4-wire(NPN)	—	5 V, 12 V	—	F59F	G59F	●	—	●	○	—	IC circuit	—
												—	P4DW	—	—	—	●			
Magnetic field resistant (2-color)	Grommet	—	Yes	3-wire (Equiv. NPN)	—	5 V	—	A96**	—	●	—	●	—	—	IC circuit	—				
								—	A93**	—	●	—	●				—			
Reed switch	—	Grommet	No	2-wire	24 V	12 V	—	100 V	A90**	—	●	—	●	—	—	IC circuit	Relay, PLC			
								100 V or less	A90**	—	●	—	●	—						
								100 V, 200 V	A54	B54	●	—	●	●				—		
								200 V or less	A64	B64	●	—	●	—				—		
								—	A33C	A33	—	—	—	—				—		
								—	A34C	A34	—	—	—	—				—		
								—	A44C	A44	—	—	—	—				—		
100 V, 200 V	A59W	B59W	●	—	●	—	—													
Terminal conduit	—	—	Yes	2-wire	—	—	—	—	—	—	—	—	—	PLC	Relay, PLC					
DIN terminal	—	—	Yes	2-wire	—	—	—	—	—	—	—	—								
Diagnostic indication (2-color)	Grommet	—	—	2-wire	—	—	—	—	—	—	—	—	—	—	—	—				

* Lead wire length symbols: 0.5 m Nil (Example) M9NW * ○: Manufactured upon receipt of order.
 1 m M (Example) M9NWM ** D-A9□/A9□V types cannot be mounted on ø50.
 3 m L (Example) M9NWL
 5 m Z (Example) M9NWZ

* In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 1108.

* Refer to pages 1784 and 1785 for details of auto switches with a pre-wired connector.

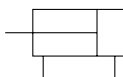
* D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled before shipped.)

Specifications



Bore size (mm)	40	50	63	80	100
Action	Double acting				
Operating piston speed	5 to 500 mm/s				
Fluid	Air				
Proof pressure	1.05 MPa				
Maximum operating pressure	0.7 MPa				
Ambient and fluid temperature	Without auto switch -10 to 70°C (with no freezing)				
	With auto switch -10 to 60°C (with no freezing)				
Cushion	None				
Lubrication	Not required (Non-lube)				
Mounting	Basic, Axial foot, Front flange, Rear flange, Single clevis, Double clevis, Center trunnion				
Allowable leakage rate	0.5 ℓ/min (ANR)				

JIS Symbol



Minimum Operating Pressure

Unit: MPa					
Bore size (mm)	40	50	63	80	100
Minimum operating pressure	0.02	0.01			

Standard Stroke

Bore size (mm)	Standard stroke (mm)
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500
50, 63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600
80, 100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700



- Note 1) Intermediate strokes not listed above are also available. Please consult with SMC for strokes outside the above ranges.
- Note 2) As the stroke increases, more sliding resistance may result due to the deflection of the piston rod and other factors. Take measures such as the installation of a guide.

Accessory

Mounting		Basic	Foot	Front flange	Rear flange	Single clevis	Double clevis	Center trunnion
Standard	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (with pin)	●	●	●	●	●	●	●



Made to Order
(For details, refer to pages 1829 to 1954.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC6	Made of stainless steel
—XC7	Tie-rod, cushion valve and tie-rod nut made of stainless steel
—XC9	Adjustable stroke cylinder/adjustable retraction type
—XC14	Change of trunnion bracket mounting position
—XC15	Change of tie-rod length
—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 side trunnion
—XC65	-XC6 + -XC7

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
40	CA2Y40-PS	Rod seal 1 pc.
50	CA2Y50-PS	Piston seal 1 pc.
63	CA2Y63-PS	Cylinder tube gasket 2 pcs.
80	CA2Y80-PS	Grease pack (10 g) 1 pc.
100	CA2Y100-PS	

When only grease for maintenance is necessary, please order by the following part numbers.

Grease pack part no.: GR-L-005 (5 g)
GR-L-010 (10 g)
GR-L-150 (150 g)

REA

REB

REC

C□Y

C□X

MQ

RHC

RZQ

D-□

-X□

Individual
-X□

Series CA2Y

Mass

(kg)

Bore size (mm)		40	50	63	80	100
Basic mass	Basic style	0.89	1.36	2.00	3.48	4.87
	Axial foot style	1.08	1.58	2.34	4.15	5.86
	Flange style	1.26	1.81	2.79	4.93	6.79
	Single clevis style	1.12	1.70	2.63	4.59	6.65
	Double clevis style	1.16	1.79	2.79	4.88	7.17
	Trunnion style	1.25	1.84	2.80	5.03	7.15
Additional mass per each 50 mm of stroke		0.22	0.28	0.37	0.52	0.65
Accessory	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) CA2YL40-100/Axial foot

- Basic mass.....1.08 kg
 - Additional mass.....0.22/50 stroke
 - Cylinder stroke.....100 stroke
- $$1.08 + 0.22 \times 100/50 = 1.52 \text{ kg}$$

Low Friction Cylinder Mounting (Accessory)

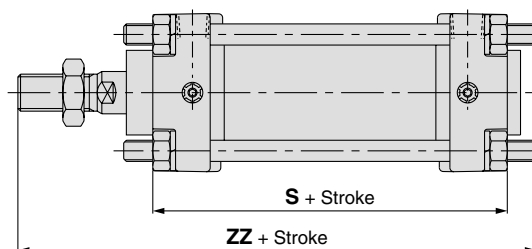
CDA2Y Mounting style Bore size - Stroke - X1854

↓ Same mounting specification as CDA2Q

In order to adjust the mounting dimensions of the low friction cylinder (CDA2Q), extend the longitudinal dimension (S, ZZ) by 10 mm.

* Cylinders without a built-in magnet can be interchangeable.

Dimensions

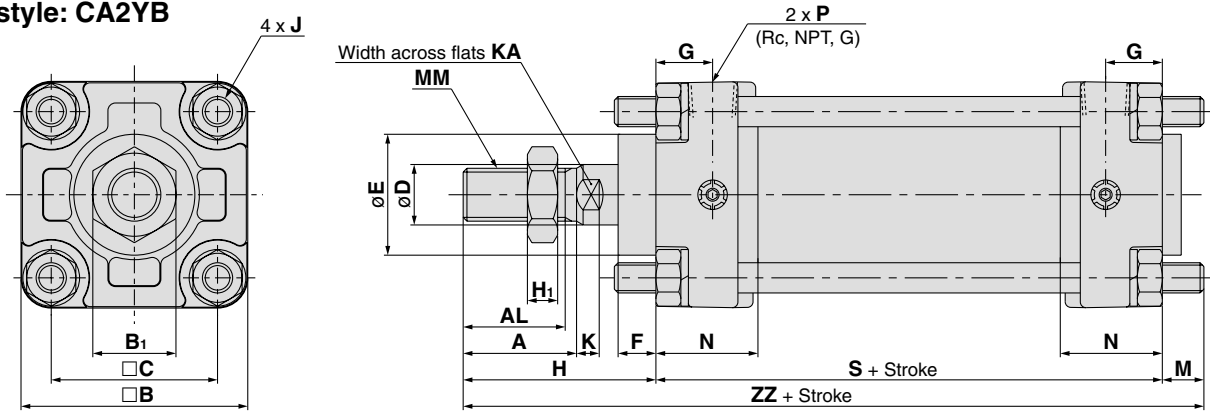


Bore size (mm)	S	ZZ
40	94	156
50	100	169
63	108	180
80	126	214
100	136	225

* Add 10 mm to S and ZZ dimensions of the double acting, single rod type on pages 1097 to 1101 for the dimensions for each mounting bracket other than the basic style.

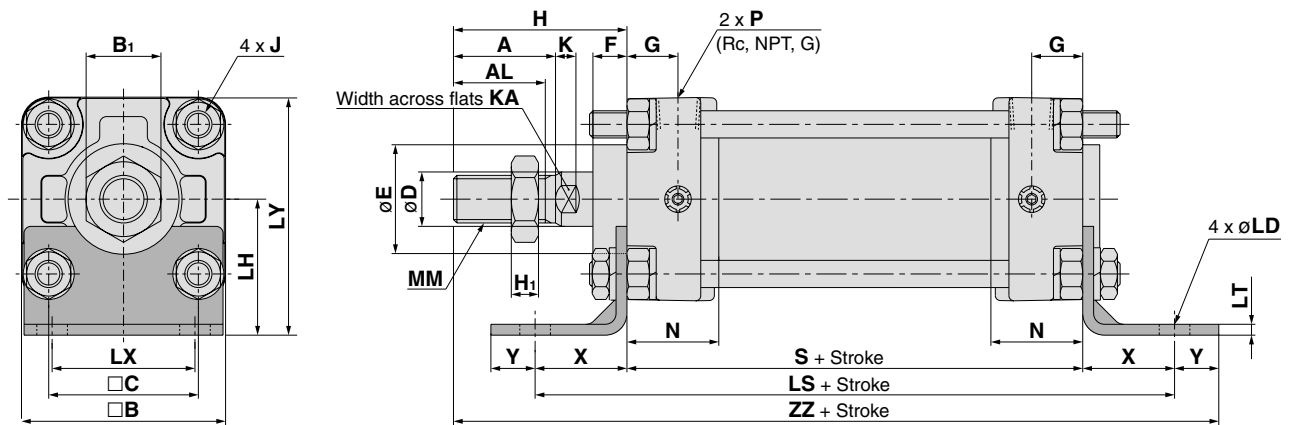
Dimensions: ø40 to ø100

Basic style: CA2YB



Bore size (mm)	Stroke range	A	AL	□B	B ₁	□C	D	E	F	G	H	H ₁	J	K	KA	M	MM	N	P	S	ZZ
40	Up to 500	30	27	60	22	44	16	32	10	15	51	8	M8 x 1.25	6	14	11	M14 x 1.5	27	1/4	84	146
50	Up to 600	35	32	70	27	52	20	40	10	17	58	11	M8 x 1.25	7	18	11	M18 x 1.5	30	3/8	90	159
63	Up to 600	35	32	85	27	64	20	40	10	17	58	11	M10 x 1.25	7	18	14	M18 x 1.5	31	3/8	98	170
80	Up to 700	40	37	102	32	78	25	52	14	21	71	13	M12 x 1.75	10	22	17	M22 x 1.5	37	1/2	116	204
100	Up to 700	40	37	116	41	92	30	52	14	21	72	16	M12 x 1.75	10	26	17	M26 x 1.5	40	1/2	126	215

Axial foot: CA2YL



Bore size (mm)	A	AL	B	B ₁	C	D	E	F	G	H ₁	J	K	KA	LD	LH	LS	LT	LX	LY
40	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	9.0	40	138	3.2	42	70
50	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	9.0	45	144	3.2	50	80
63	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	11.5	50	166	3.2	59	93
80	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	13.5	65	204	4.5	76	116
100	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	13.5	75	212	6.0	92	133

Bore size (mm)	MM	N	P	S	X	Y	H	ZZ
40	M14 x 1.5	27	1/4	84	27	13	51	175
50	M18 x 1.5	30	3/8	90	27	13	58	188
63	M18 x 1.5	31	3/8	98	34	16	58	206
80	M22 x 1.5	37	1/2	116	44	16	71	247
100	M26 x 1.5	40	1/2	126	43	17	72	258

REA

REB

REC

C□Y

C□X

MQ

RHC

RZQ

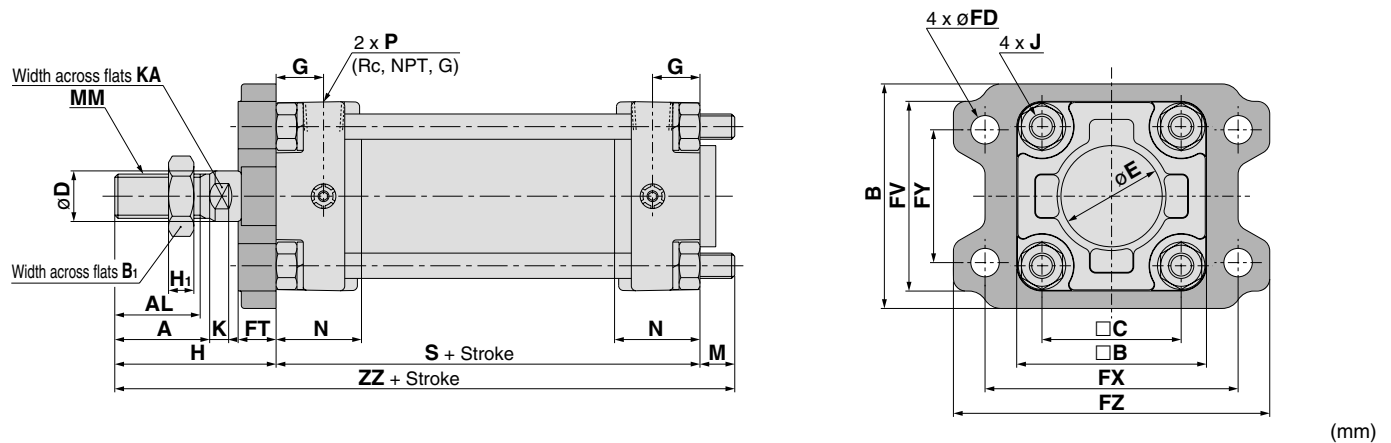
D-□

-X□

Individual
-X□

Series CA2Y

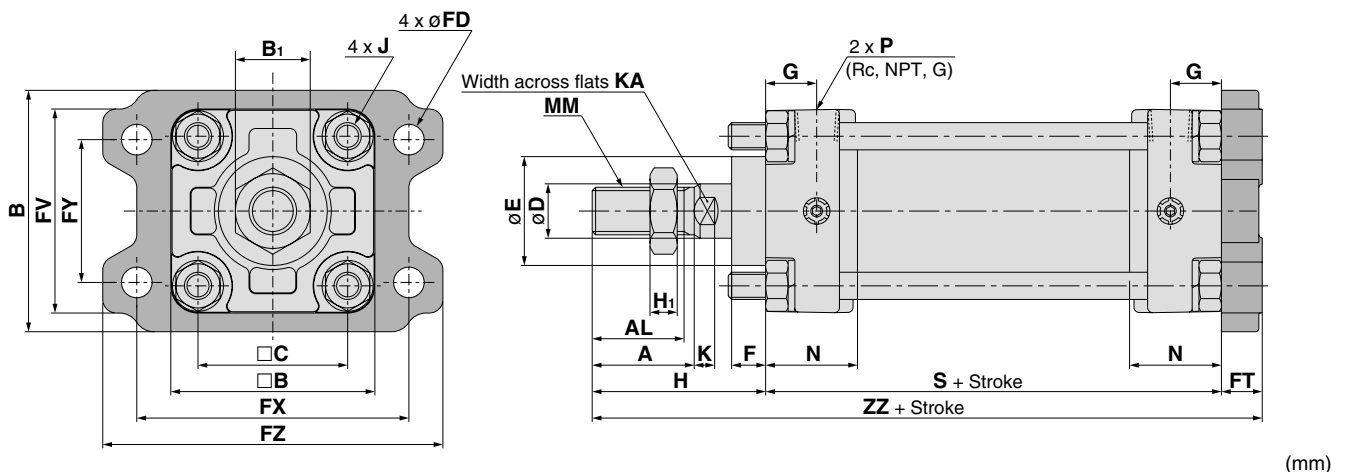
Rod Side Flange Style: CA2YF



Bore size (mm)	A	AL	FB	B	B ₁	C	D	E	FV	FD	FT	FX	FY	FZ	G	H ₁	J	K	KA	M	MM
40	30	27	71	60	22	44	16	32	60	9.0	12	80	42	100	15	8	M8 x 1.25	6	14	11	M14 x 1.5
50	35	32	81	70	27	52	20	40	70	9.0	12	90	50	110	17	11	M8 x 1.25	7	18	11	M18 x 1.5
63	35	32	101	85	27	64	20	40	86	11.5	15	105	59	130	17	11	M10 x 1.25	7	18	14	M18 x 1.5
80	40	37	119	102	32	78	25	52	102	13.5	18	130	76	160	21	13	M12 x 1.75	10	22	17	M22 x 1.5
100	40	37	133	116	41	92	30	52	116	13.5	18	150	92	180	21	16	M12 x 1.75	10	26	17	M26 x 1.5

Bore size (mm)	N	P	S	H	ZZ
40	27	1/4	84	51	146
50	30	3/8	90	58	159
63	31	3/8	98	58	170
80	37	1/2	116	71	204
100	40	1/2	126	72	215

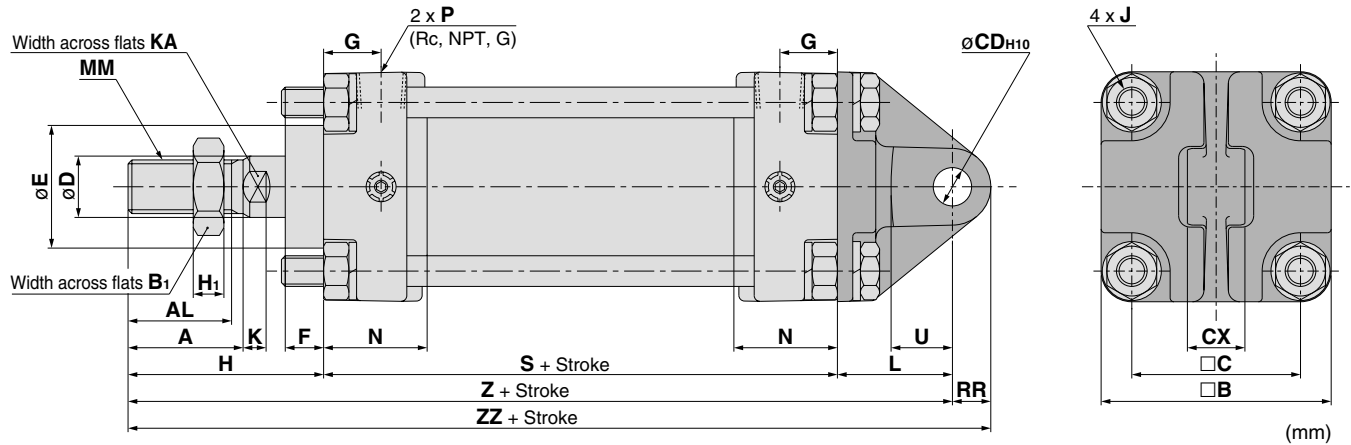
Head Side Flange Style: CA2YG



Bore size (mm)	A	AL	FB	B	B ₁	C	D	E	F	FV	FD	FT	FX	FY	FZ	G	H ₁	J	K	KA
40	30	27	71	60	22	44	16	32	10	60	9.0	12	80	42	100	15	8	M8 x 1.25	6	14
50	35	32	81	70	27	52	20	40	10	70	9.0	12	90	50	110	17	11	M8 x 1.25	7	18
63	35	32	101	85	27	64	20	40	10	86	11.5	15	105	59	130	17	11	M10 x 1.25	7	18
80	40	37	119	102	32	78	25	52	14	102	13.5	18	130	76	160	21	13	M12 x 1.75	10	22
100	40	37	133	116	41	92	30	52	14	116	13.5	18	150	92	180	21	16	M12 x 1.75	10	26

Bore size (mm)	MM	N	P	S	H	ZZ
40	M14 x 1.5	27	1/4	84	51	147
50	M18 x 1.5	30	3/8	90	58	160
63	M18 x 1.5	31	3/8	98	58	171
80	M22 x 1.5	37	1/2	116	71	205
100	M26 x 1.5	40	1/2	126	72	216

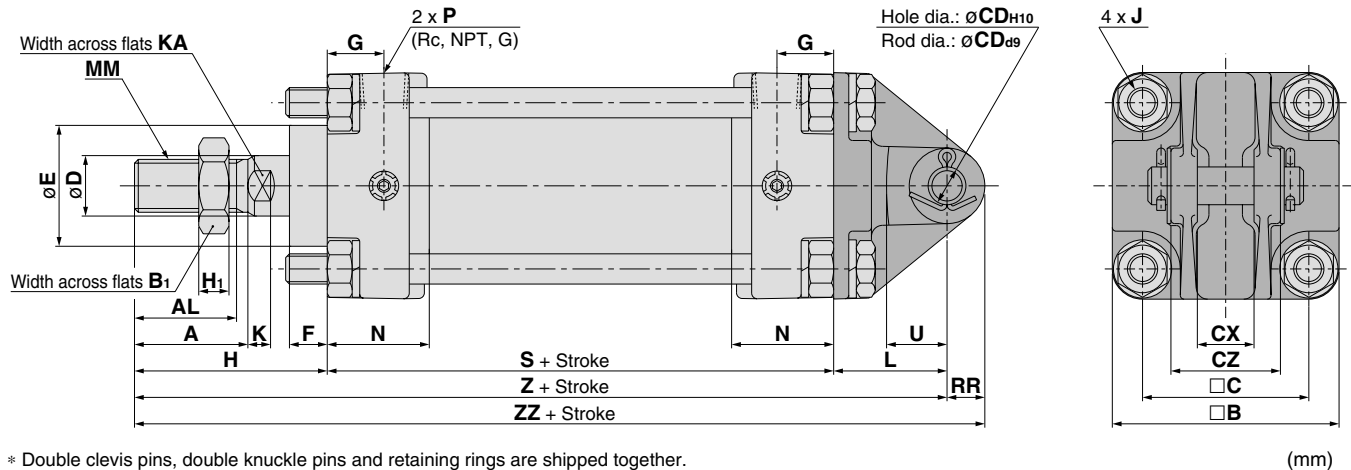
Single Clevis Style: CA2YC



Bore size (mm)	A	AL	B	B ₁	C	CD ^{H10}	CX	D	E	F	G	H ₁	J	K	KA	L	MM
40	30	27	60	22	44	10 ^{+0.058} ₀	15.0 ^{-0.1} _{-0.3}	16	32	10	15	8	M8 x 1.25	6	14	30	M14 x 1.5
50	35	32	70	27	52	12 ^{+0.070} ₀	18.0 ^{-0.1} _{-0.3}	20	40	10	17	11	M8 x 1.25	7	18	35	M18 x 1.5
63	35	32	85	27	64	16 ^{+0.070} ₀	25.0 ^{-0.1} _{-0.3}	20	40	10	17	11	M10 x 1.25	7	18	40	M18 x 1.5
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	M22 x 1.5
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	M26 x 1.5

Bore size (mm)	N	P	RR	S	U	H	Z	ZZ
40	27	1/4	10	84	16	51	165	175
50	30	3/8	12	90	19	58	183	195
63	31	3/8	16	98	23	58	196	212
80	37	1/2	20	116	28	71	235	255
100	40	1/2	25	126	36	72	256	281

Double Clevis Style: CA2YD



* Double clevis pins, double knuckle pins and retaining rings are shipped together.

Bore size (mm)	A	AL	B	B ₁	C	CD	CX	CZ	D	E	F	G	H ₁	J	K	KA	L	MM
40	30	27	60	22	44	10 ^{+0.058} ₀	15.0 ^{+0.3} _{+0.1}	29.5	16	32	10	15	8	M8 x 1.25	6	14	30	M14 x 1.5
50	35	32	70	27	52	12 ^{+0.070} ₀	18.0 ^{+0.3} _{+0.1}	38	20	40	10	17	11	M8 x 1.25	7	18	35	M18 x 1.5
63	35	32	85	27	64	16 ^{+0.070} ₀	25.0 ^{+0.3} _{+0.1}	49	20	40	10	17	11	M10 x 1.25	7	18	40	M18 x 1.5
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	M22 x 1.5
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	M26 x 1.5

Bore size (mm)	N	P	RR	S	U	H	Z	ZZ
40	27	1/4	10	84	16	51	165	175
50	30	3/8	12	90	19	58	183	195
63	31	3/8	16	98	23	58	196	212
80	37	1/2	20	116	28	71	235	255
100	40	1/2	25	126	36	72	256	281

* Clevis pins, flat washers and cotter pins are included.

REA

REB

REC

C□Y

C□X

MQ

RHC

RZQ

D-□

-X□

Individual
-X□

Trunnion and Double Clevis Mounting Bracket

- Strength is the same as cylinder brackets.

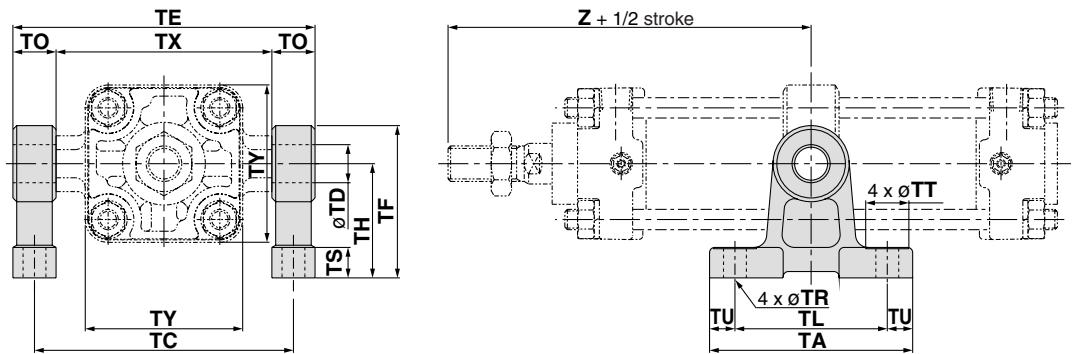
Description	Bore size		40	50	63	80	100
Trunnion mounting bracket			CA2-S04		CA2-S06	MB-S10	
Double clevis bracket	CA2-B04	CA2-B05	CA2-B06	CA2-B08	CA2-B10		

- Note) 1. The above brackets cannot be specified in the part number of the cylinder.
 2. They must be ordered separately from the cylinder.
 3. When the trunnion brackets are specified, two pieces should be ordered for each cylinder.

Trunnion bracket

Material: Cast iron

* This assembly drawing is provided as a reference. The trunnion bracket must be ordered separately.

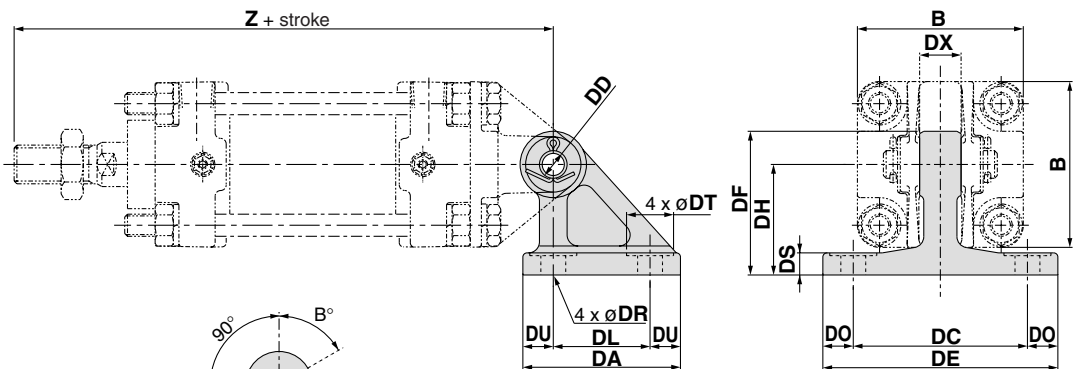


(mm)

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 bracket

Material: Cast iron



Rotation

Bore size (mm)	A°	B°	A° + B° + 90°
40 to 100	12°	60°	162°

Note) This assembly drawing is provided as a reference. The trunnion bracket must be ordered separately.

(mm)

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

REA

REB

REC

Y

X

MQ

RHC

RZQ

D

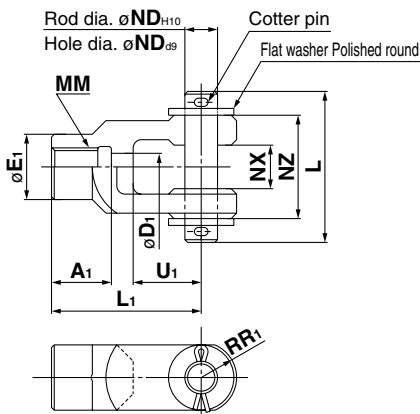
-X

Individual
 -X

Series CA2Y

Accessory Dimensions

Y Type Double Knuckle Joint



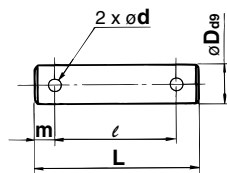
Material: Cast iron

(mm)

Part no.	Applicable bore size (mm)	A1	E1	D1	L1	MM	RR1	U1	ND	NX	NZ	L	Cotter pin size	Flat washer size
Y-05D	50, 63	27	28	14	60	M18 x 1.5	15	27	12	16 ^{+0.3} _{-0.1}	38	55.5	ø3 x 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	ø4 x 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	ø4 x 30ℓ	Polished round 20

* Knuckle pin, cotter pin and flat washer are included.

Clevis Pin/Knuckle Pin



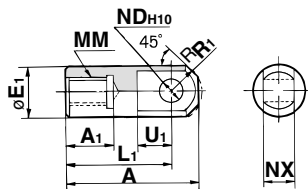
Material: Carbon steel

(mm)

Part no.	Applicable bore size (mm)		Dd9	L	ℓ	m	d drill through	Applicable cotter pin	Applicable flat washer
	Clevis	Knuckle							
CDP-2A	40	—	10 ^{-0.040} _{-0.076}	46	38	4	3	ø3 x 18ℓ	Polished round 10
CDP-3A	50	40, 50, 63	12 ^{-0.050} _{-0.093}	55.5	47.5	4	3	ø3 x 18ℓ	Polished round 12
CDP-4A	63	—	16 ^{-0.050} _{-0.093}	71	61	5	4	ø4 x 25ℓ	Polished round 16
CDP-5A	—	80	18 ^{-0.050} _{-0.093}	76.5	66.5	5	4	ø4 x 25ℓ	Polished round 18
CDP-6A	80	100	20 ^{-0.065} _{-0.117}	83	73	5	4	ø4 x 30ℓ	Polished round 20
CDP-7A	100	—	25 ^{-0.065} _{-0.117}	88	78	5	4	ø4 x 36ℓ	Polished round 24

* Cotter pin and flat washer are included.

I Type Single Knuckle Joint

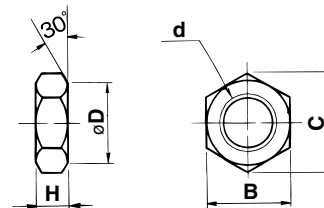


Material: Free cutting sulfur steel

(mm)

Part no.	Applicable bore size (mm)	A	A1	E1	L1	MM	R1	U1	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 option)



Material: Rolled steel

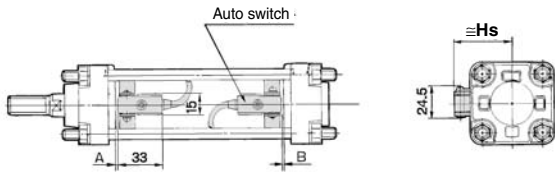
(mm)

Part no.	Applicable bore size (mm)	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

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

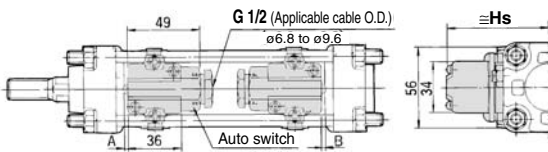
<Band mount type>

D-B5□/B64/B59W



D-A3□

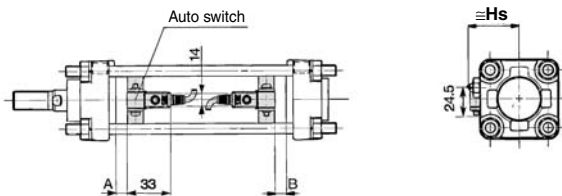
D-G39/K39



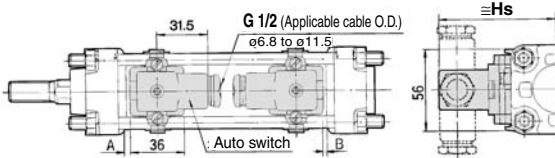
D-G5□/K59

D-G5□W/K59W

D-G59F/G5NTL



D-A44



<Tie-rod mount type>

D-A9□/A9□V

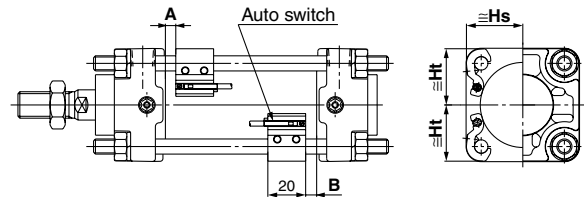
D-M9□/M9□V

D-M9□W/M9□WV

D-Z7□/Z80

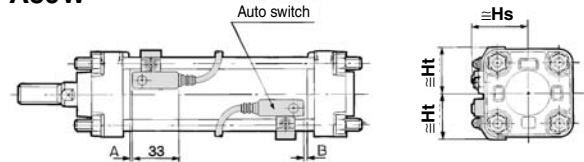
D-Y59□/Y69□/Y7P/Y7PV

D-Y7□W/Y7□WV



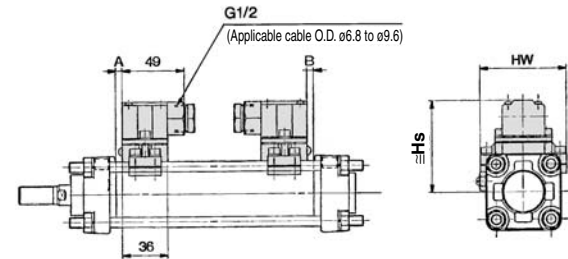
D-A5□/A6□

D-A59W



D-A3□C

D-G39C/K39C

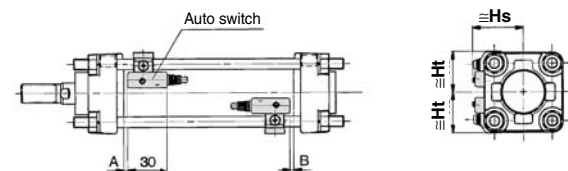


D-F5□/J5□

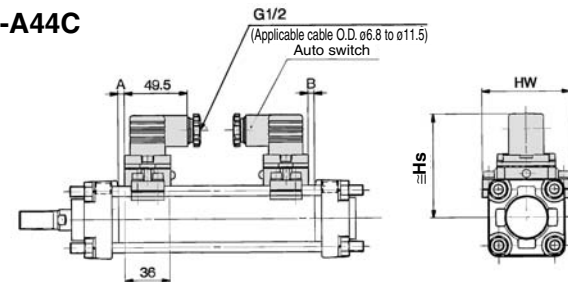
D-F5NTL

D-F5□W/J59W

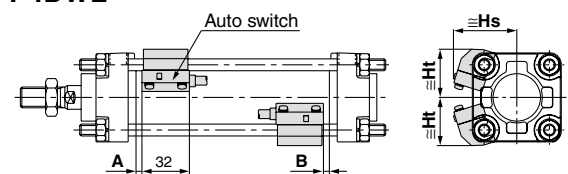
D-F59F



D-A44C



D-P4DWL



REA

REB

REC

Y

X

MQ

RHC

RZQ

D-

-X

Individual
-X

Series CA2Y

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

Auto Switch Proper Mounting Position

(mm)

Auto switch model	Note 2) D-A9□ D-A9□V		D-M9□ D-M9□V D-M9□W D-M9□WV		D-B59W D-Z7□ D-Z80 D-Y59□ D-Y69□ D-Y7P D-Y7PV D-Y7□W D-Y7□WV		D-P4DWL		D-A5□ D-A6□ D-A3□ D-A3□C D-A44 D-A44C D-G39 D-G39C D-K39 D-K39C		D-B5□ D-B64		D-F5□ D-J5□ D-F59F D-F5□W D-J59W		D-G5□ D-K59 D-G5NTL D-G5□W D-K59W D-G59F		D-A59W		D-F5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
40	6	4	10	8	3.5	1.5	3	1	0	0	0.5	0	6.5	4.5	2	0	4	2	11.5	9.5
50	—	—	10	8	3.5	1.5	3	1	0	0	0.5	0	6.5	4.5	2	0	4	2	11.5	9.5
63	8.5	7.5	12.5	11.5	6	5	5.5	4	2.5	1.5	3	2	9	8	4.5	3.5	6.5	5.5	14	13
80	12	10	16	14	9.5	7.5	9	7	6	4	6.5	4.5	4.5	12.5	8	6	10	8	17.5	15.5
100	13.5	12.5	17.5	16.5	11	10	10.5	9	7.5	6.5	8	7	14	13	9.5	8.5	11.5	10.5	19	18

Note 1) Adjust the auto switch after confirming the operating conditions in the actual setting.

Auto Switch Mounting Height

(mm)

Auto switch model	Note 2) D-A9□ D-M9□ D-M9□W		Note 2) D-A9□V		D-M9□V D-M9□WV		D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W		D-Y69□ D-Y7PV D-Y7□WV		D-P4DWL		D-B5□ D-B64 D-B59W D-G5□ D-K59 D-G5NTL D-G5□W D-K59W 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-F59F D-F5NTL		D-A3□C D-G39C D-K39C		D-A44C	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Hs	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Hw	Hs	Hw	Hs	Hw
40	30	30	31	30	34	30	30	30	30	30	30	42.5	33	37	71.5	81.5	38.5	31.5	38	31.5	73	69	81	69		
50	34	34	—	—	38	34	34	34	34	34	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	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	49.5	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	66	58.5	68	102.5	112.5	61.5	57.5	61	57.5	104	121	112	121			

Note 2) D-A9□/A9□V types cannot be mounted on ø50.

Minimum Auto Switch Mounting Stroke

Auto switch model	Number of auto switch	Brackets other than center trunnion	Center trunnion (mm)				
			ø40	ø50	ø63	ø80	ø100
D-A9□	2 (Different surfaces and same surface) With 1	15	75	—	80	85	90
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$75 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-A9□V	2 (Different surfaces and same surface) With 1	10	50	—	55	60	65
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$50 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$55 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-M9□ D-M9□W	2 (Different surfaces and same surface) With 1	15	80		85	90	95
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-M9□V D-M9□WV	2 (Different surfaces and same surface) With 1	10	55		60	65	70
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$55 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$70 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-A5□/A6 D-F5□/J5 D-F5□W/J59W D-F59F	2 (Different surfaces and same surface) With 1	15	90		100	110	120
	n (Same surface)	$15 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$90 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$100 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-A59W	2 (Different surfaces and same surface)	20	90		100	110	120
	n (Same surface)	$20 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$90 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$100 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
	1	15	90		100	110	120
D-F5NTL	2 (Different surfaces and same surface) With 1	25	110		120	130	140
	n (Same surface)	$25 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$130 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$140 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-B5□/B64 D-G5□/K59 D-G5□W D-K59W D-G59F D-G5NTL	With 2	Different surfaces	15	90		100	110
		Same surface	75	90		100	110
	With n	Different surfaces	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...)	$90 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...)		$100 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...)	$110 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
		Same surface	$75 + 50 (n-2)$ (n = 2, 3, 4, ...)	$90 + 50 (n-2)$ (n = 2, 4, 6, 8, ...)		$100 + 50 (n-2)$ (n = 2, 4, 6, 8, ...)	$110 + 50 (n-2)$ (n = 2, 4, 6, 8, ...)
	1	10	90		100	110	
D-B59W	With 2	Different surfaces	20	90		100	110
		Same surface	75	90		100	110
	With n	Different surfaces	$20 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...)	$90 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...)		$100 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...)	$110 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...)
		Same surface	$75 + 50 (n-2)$ (n = 2, 3, 4, ...)	$90 + 50 (n-2)$ (n = 2, 4, 6, 8, ...)		$100 + 50 (n-2)$ (n = 2, 4, 6, 8, ...)	$110 + 50 (n-2)$ (n = 2, 4, 6, 8, ...)
	1	15	90		100	110	
D-A3□ D-G39 D-K39	With 2	Different surfaces	35	75	80	90	
		Same surface	100	100	100	100	
	With n	Different surfaces	$35 + 30 (n-2)$ (n = 2, 3, 4, ...)	$75 + 30 (n-2)$ (n = 2, 4, 6, 8, ...)	$80 + 30 (n-2)$ (n = 2, 4, 6, 8, ...)	$90 + 30 (n-2)$ (n = 2, 4, 6, 8, ...)	
		Same surface	$100 + 100 (n-2)$ (n = 2, 3, 4, ...)	$100 + 100 (n-2)$ (n = 2, 4, 6, 8, ...)		$100 + 100 (n-2)$ (n = 2, 4, 6, 8, ...)	
	1	10	75	80	90		
D-A44	With 2	Different surfaces	35	75	80	90	
		Same surface	55	75	80	90	
	With n	Different surfaces	$35 + 30 (n-2)$ (n = 2, 3, 4, ...)	$75 + 30 (n-2)$ (n = 2, 4, 6, 8, ...)	$80 + 30 (n-2)$ (n = 2, 4, 6, 8, ...)	$90 + 30 (n-2)$ (n = 2, 4, 6, 8, ...)	
		Same surface	$55 + 50 (n-2)$ (n = 2, 3, 4, ...)	$75 + 50 (n-2)$ (n = 2, 4, 6, 8, ...)	$80 + 50 (n-2)$ (n = 2, 4, 6, 8, ...)	$90 + 50 (n-2)$ (n = 2, 4, 6, 8, ...)	
	1	10	75	80	90		

- REA**
- REB**
- REC**
- C□Y**
- C□X**
- MQ**
- RHC**
- RZQ**
- D-□**
- X□**
- Individual
-X□

Series CA2Y

Minimum Auto Switch Mounting Stroke

(mm)

Auto switch model	Number of auto switch		Brackets other than center trunnion	Center trunnion				
				ø40	ø50	ø63	ø80	ø100
D-A3□C D-G39C D-K39C	With 2	Different surfaces	20	75		80	90	
		Same surface	100	100		100	100	
	With n	Different surfaces	$20 + 35(n - 2)$ (n = 2, 3, 4, ...)	$75 + 35(n - 2)$ (n = 2, 4, 6, 8, ...)		$80 + 35(n - 2)$ (n = 2, 4, 6, 8, ...)	$90 + 35(n - 2)$ (n = 2, 4, 6, 8, ...)	
		Same surface	$100 + 100(n - 2)$ (n = 2, 3, 4, 5...)			$100 + 100(n - 2)$ (n = 2, 4, 6, 8, ...)		
	1	10	75		80	90		
D-A44C	With 2	Different surfaces	20	75		80	90	
		Same surface	55					
	With n	Different surfaces	$20 + 35(n - 2)$ (n = 2, 3, 4, ...)	$75 + 35(n - 2)$ (n = 2, 4, 6, 8, ...)		$80 + 35(n - 2)$ (n = 2, 4, 6, 8, ...)	$90 + 35(n - 2)$ (n = 2, 4, 6, 8, ...)	
		Same surface	$55 + 50(n - 2)$ (n = 2, 3, 4, ...)	$75 + 50(n - 2)$ (n = 2, 4, 6, 8, ...)		$80 + 50(n - 2)$ (n = 2, 4, 6, 8, ...)	$90 + 50(n - 2)$ (n = 2, 4, 6, 8, ...)	
	1	10	75		80	90		
D-Z7□/Z80 D-Y59□/Y7P D-Y7□W	2 (Different surfaces and same surface) With 1		15	80	85	90	95	105
	n		$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-Y69□/Y7PV D-Y7□WV	2 (Different surfaces and same surface) With 1		10	65		75	80	90
	n		$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$80 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$90 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)
D-P4DWL	2 (Different surfaces and same surface) With 1		15	120		130	140	
	n		$15 + 65 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)	$120 + 65 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)		$130 + 65 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	$140 + 65 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)	

Operating Range

Auto switch model	Bore size (mm)				
	40	50	63	80	100
D-A9□/A9□V	7	—	9	9	9
D-M9□/M9□V D-M9□W/M9□WV	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
D-Y59□/Y69□ D-Y7P/Y7□V D-Y7□W/Y7□WV	8	7	5.5	6.5	6.5

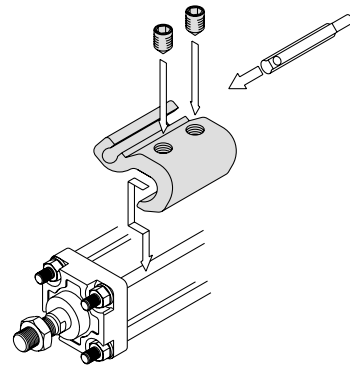
Auto switch model	Bore size (mm)				
	40	50	63	80	100
D-F5□/J5□/F5□W D-J59W D-F5NTL/F59F	4	4	4.5	4.5	4.5
D-G5□/K59/G5□W D-K59W D-G5NTL/G59F	5	6	6.5	6.5	7
D-G39/K39 D-G39C/K39C	9	9	10	10	11
D-P4DWL	4	4	4.5	4	4.5

* Since this is a guideline including hysteresis, not meant to be guaranteed. (assuming approximately ±30% dispersion.)
There may be the case it will vary substantially depending on an ambient environment.
Note) D-A9□/A9□V types cannot be mounted on ø50.

Auto Switch Mounting Bracket/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	BA7-040	BA7-040	BA7-063	BA7-080	BA7-080
D-A5□/A6□ D-A59W D-F5□/J5□ D-F5□W/J59W D-F59F/F5NTL	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	BA4-040	BA4-040	BA4-063	BA4-080	BA4-080
D-P4DWL	BAP2-040	BAP2-040	BAP2-063	BAP2-080	BAP2-080



• Mounting example of D-A9□(V)/M9□(V)/M9□W(V)

<Band mounting>

Auto switch model	Bore size (mm)				
	40	50	63	80	100
D-A3□/A44 D-G39/K39	BD1-04M	BD1-05M	BD1-06M	BD1-08M	BD1-10M
D-B5□/B64 D-B59W D-G5□/K59 D-G5□W/K59W D-G59F D-G5NTL	BA-04	BA-05	BA-06	BA-08	BA-10

* Auto switch mounting brackets are included in D-A3□C/A44C/G39C/K39C types. Indicate 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

REA

REB

REC

Y

X

MQ

RHC

RZQ

D-□

-X□

Individual
-X□

Series CA2Y

Other than the applicable auto switches listed in “How to Order”, the following auto switches can be mounted. For detailed specifications, refer to pages 1719 to 1827.

Auto switch type	Model	Electrical entry (Direction)	Features	Applicable bore size
Reed	D-A93V, A96V	Grommet (Perpendicular)	—	ø40, ø63, ø80, ø100
	D-A90V		Without indicator light	
	D-A53, A56, B53, Z73, Z76	Grommet (In-line)	—	ø40 to ø100
	D-A67, Z80		Without indicator light	
Solid state	D-M9NV, M9PV, M9BV	Grommet (Perpendicular)	—	ø40 to ø100
	D-Y69A, Y69B, Y7PV		Diagnostic indication (2-color indication)	
	D-M9NWV, M9PWV, M9BWV			
	D-Y7NWV, Y7PWV, Y7BWV			
	D-Y59A, Y59B, Y7P	Grommet (In-line)	—	
	D-F59, F5P, J59		Diagnostic indication (2-color indication)	
	D-Y7NW, Y7PW, Y7BW			
	D-F59W, F5PW, J59W		With timer	
	D-F5NTL, G5NTL		Magnetic field resistant (2-color indication)	
	D-P5DWL			

* With pre-wired connector is available for solid state auto switches. For details, refer to pages 1784 and 1785.

* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H/Y7G/Y7H types) are also available. Refer to pages 1746 and 1748 for details.

* Wide range detection type, solid state auto switches (D-G5NBL type) are also available. Refer to page 1776 for details.



Smooth Cylinder Specific Product Precautions 1

Be sure to read before handling.

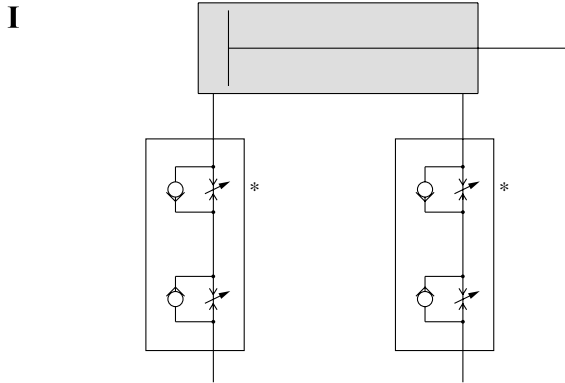
Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Recommended Pneumatic Circuit

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

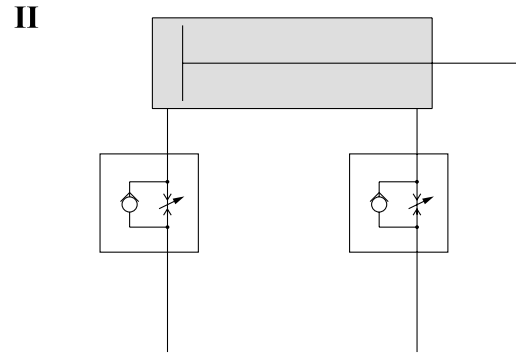
Warning

Horizontal operation (Speed control)



Dual speed controller

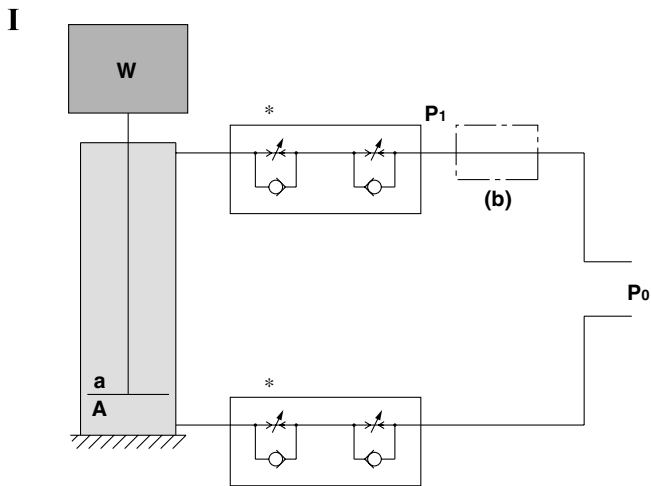
Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip. More stable low speed operation can be achieved than meter-in circuit alone.



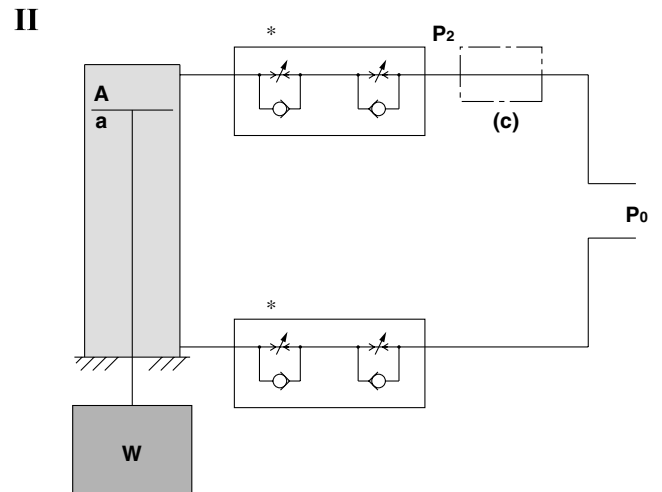
Meter-in speed controller

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

Vertical operation (Speed control)



- (1) Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.*
- (2) Depending on the size of the load, installing a regulator with check valve at position (b) can reduce lurching during descent and operation delay during ascent.
As a guide,
when $W + P_0a > P_0A$,
adjust P_1 to make $W + P_1a = P_0A$.



- (1) Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.*
- (2) Installing a regulator with check valve at position (c) can reduce lurching during descent and operation delay during ascent.
As a guide,
adjust P_2 to make $W + P_2A = P_0a$.

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

REA

REB

REC

C□Y

C□X

MQ

RHC

RZQ

D-□

-X□

Individual
-X□



Smooth Cylinder Specific Product Precautions 2

Be sure to read before handling.

Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Lubricant

Caution

1. Operate without lubrication.

Lubrication may cause malfunction.

2. Do not use grease not specified by SMC.

Using grease other than that specified may cause malfunction.

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

Grease

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

3. Do not wipe off grease from the sliding part of the air cylinder.

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

Air Source

Caution

1. Take measure to prevent pressure fluctuations.

Pressure fluctuations may cause malfunction.