

Air Cylinder

Series CS1

Ø 125, Ø 140, Ø 160, Ø 180, Ø 200, Ø 250, Ø 300

Variations

Series	Action	Style	Basic style	Standard variations	Bore size (mm)	Page
Standard Series CS1  Series CS1  Series CS1W	Double acting	Single rod Series CS1	Lube	•	125 140 160 180 200 250 300	3
			Non-lube	•		
			Air-hydro	•	125 140 160	
		Double rod Series CS1W	Lube	•	125 140 160 180 200 250 300	21
			Non-lube	•		
			Air-hydro	•	125 140 160	
Low friction Series CS1□Q 	Double acting	Single rod Series CS1□Q	Non-lube	•	125 140 160	29

Applicable Auto Switch (Applicable bore size: Ø 125 to Ø 200 only)

Reed switch	Band mounting	D-A3/A4
	Tie rod mounting	D-A5/A6, D-A59W
Solid state switch	Band mounting	D-G3/K3
	Tie rod mounting	D-F5□/J5□, D-F5NT, D-F5□W/J59W, D-F5BA, D-F5□F

Made to Order

Refer to p. 4 for made to order specifications for series CS1.

Series CS1



EMC-CS1-01A-UK

Combinations of Standard Products and Made

Series CS1

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

Symbol	Specification	Applicable bore size	Series		CS1 (Standard)			CS1Q (Low friction)	
			Action/Type		Double acting				
					Single rod				
					Lube	Non-lube	Air-hydro	Double rod	
					Ø 125 to Ø 300		Ø 125 to Ø 160	Ø 125 to Ø 160	
Standard	Standard	Ø 125 to Ø 300			●	●	●	●	
CDS1	Built-in magnet	Ø 125 to Ø 200			●	●	●	●	
CS1□-□ ^J _K	With rod boot	Ø 125 to Ø 300			●	●	●	●	
20-	Copper ^{Note 2)} and Fluorine-free	Ø 125 to Ø 160			—	●	—	—	
XA□	Change of rod end shape	Ø 125 to Ø 300			⊙	⊙	⊙	⊙	
XB5	Oversized rod cylinder	Ø 125 to Ø 200			⊙	⊙	○	○	
XB6	Heat-resistant cylinder (–10 to 150 °C)	Ø 125 to Ø 200			—	⊙	—	—	
XB7	Cold-resistant cylinder	Ø 125 to Ø 300			○	○	—	—	
XB16	Large-bore air-hydro cylinder	Ø 180 to Ø 200			—	—	⊙	⊙	
XC3	Special port location	Ø 125 to Ø 300			⊙	⊙	○	○	
XC4	With heavy duty scraper				⊙	⊙	○	○	
XC5	Heat-resistant cylinder (–10 to 110 °C)				⊙	⊙ ^{Note 1)}	—	—	
XC6	Stainless steel				⊙	⊙	⊙	⊙	
XC7	Tie-rod, cushion valve, tie-rod nut and similar parts made of stainless steel	Ø 125 to Ø 300			○	○	○	○	
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	Ø 125 to Ø 300			⊙	⊙	○	○	
XC12	Tandem cylinder				○	○	○	○	
XC14	Change of trunnion bracket mounting position				⊙	⊙	○	○	
XC15	Change of tie-rod length				⊙	⊙	○	○	
XC22	Fluororubber seal				⊙	⊙ ^{Note 1)}	○	○	
XC26	Clevis pins with flat washer				⊙	⊙	○	○	
XC27	Double clevis pins made of stainless steel (Stainless steel 304)				⊙	⊙	○	○	
XC30	Rod side trunnion mounted on the rod cover front				⊙	⊙	○	○	
XC35	With coil scraper				⊙	⊙	○	○	
XC39	Special trunnion axis				○	○	○	○	
XC40	Clevis hole with bushing				○	○	○	○	
XC50	Knuckle fixed with nuts				○	○	○	○	
XC68	Hard chrome plated stainless steel rod				⊙	⊙	○	○	
XC86	With rod end bracket				⊙	⊙	⊙	⊙	

Note 1) Applicable I.D.: Ø 125 to Ø 200, Ø 250 and Ø 300 are available upon request for special order.

Note 2) Copper-free for the externally exposed part. For details, refer to the **Web Catalogue**.

to Order Specifications

Series **CS1**

	CS1 (Standard)			CS1Q (Low friction)
Double acting				
	Double rod			Single rod
	Lube	Non-lube	Air-hydro	Non-lube
	Ø 125 to Ø 300		Ø 125 to Ø 160	
	●	●	●	●
	●	●	●	●
	●	●	●	●
	—	●	—	—
	⊙	⊙	○	⊙
	○	○	○	○
	—	⊙	—	—
	○	○	—	—
	—	—	○	—
	○	○	○	⊙
	⊙	⊙	○	—
	⊙	⊙	—	—
	⊙	⊙	○	○
	○	○	○	○
	—	—	—	○
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	—	—	—	○
	—	—	—	○
	—	—	—	—
	⊙	⊙	○	⊙
	⊙	⊙	○	⊙
	○	○	○	—
	—	—	—	⊙
	—	—	—	⊙
	⊙	⊙	○	⊙
	⊙	⊙	○	—
	○	○	○	○
	—	—	—	○
	○	○	○	○
	○	○	○	○
	○	○	○	○
	○	○	○	⊙

Air Cylinder/Standard

Series CS1

Lube, Non-lube: Ø 125, Ø 140, Ø 160, Ø 180, Ø 200, Ø 250, Ø 300

Air-hydro: Ø 125, Ø 140, Ø 160

How to Order

CS1 **L** **160** **300** **JR**

Mounting

B	Basic
L	Foot
F	Front flange
G	Rear flange
C	Single clevis
D	Double clevis
T	Centre trunnion

• **Made to order**
Refer to page 4 for details

Rod boot/Cushion

Rod boot	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Cushion	N	No cushion
	R	With cushion on rod side
	H	With cushion on rod side
	—	With both sides cushion (Air-hydro style: No cushion)

* If specifying more than one symbol, please indicate them in alphabetical order.

** The air-hydro style has no cushion. In case of this style, no symbol indicates no cushion.

Cylinder stroke (mm)

(Refer to p.4 for max. stroke table.)

Port thread type

—	Rc
TN	NPT
TF	G

Tubing material

Symbol	Bore size (mm)	Tubing material	Stroke range (mm)
—	125, 140	Aluminum tube	1000 or less
	160		1200 or less
	125, 140	Steel tube	1001 or more
	160		1201 or more
F	180 to 300		All stroke
	125, 140	Steel tube	1000 or less
	160		1200 or less

* Refer to page 4 for the maximum strokes.

Style

—	Lube
N	Non-lube
H	Air-hydro

Bore size

Lube, Non-lube		Air-hydro	
125	125 mm	125	125 mm
140	140 mm	140	140 mm
160	160 mm	160	160 mm
180	180 mm		
200	200 mm		
250	250 mm		
300	300 mm		

Mounting Bracket Part No.

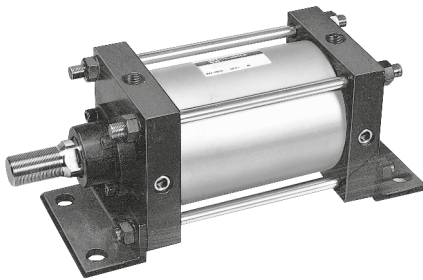
Bore size (mm)	125	140	160	180	200	250	300
Foot*	CS1-L12	CS1-L14	CS1-L16	CS1-L18	CS1-L20	CS1-L25	CS1-L30
Flange	CS1-F12	CS1-F14	CS1-F16	CS1-F18	CS1-F20	CS1-F25	CS1-F30
Single clevis	CS1-C12	CS1-C14	CS1-C16	CS1-C18	CS1-C20	CS1-C25	CS1-C30
Double clevis**	CS1-D12	CS1-D14	CS1-D16	CS1-D18	CS1-D20	CS1-D25	CS1-D30

* Order 2 foot brackets for one cylinder.

** When ordering the double clevis, the clevis pin and the cotter pin (2 pcs.) are attached.

Refer to page 8 for How to Order Auto Switches Style.

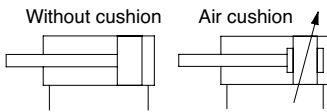
Air Cylinder/Standard *Series CS1*



Specifications

Type	Lube, Non-lube	Air-hydro
Bore size (mm)	Ø 125 to Ø 300	Ø 125, Ø 140, Ø 160
Fluid	Air	Turbine oil
Proof pressure	1.57 MPa	
Maximum operating pressure	0.97 MPa	
Minimum operating pressure	0.05 MPa	0.06 MPa
Piston speed	50 to 500 mm/s	0.5 to 200 mm/s
Cushion	Air cushion	None
Ambient and fluid temperature	0 to 70 °C (No freezing), Air-hydro type: 5 to 60 °C	
Stroke length tolerance (mm)	250 or less st : +1.0 0, 251 to 1,000 st : +1.4 0, 1,001 to 1,500 st : +1.8 0, 1501 to 2000 st : +2.2 0, 2001 to 2400 st : +2.6 0	
Mounting	Basic type, Foot type, Rod side flange type, Head side flange type, Single clevis type, Double clevis type, Centre trunnion type	

Symbol



Made to Order Specifications

Symbol	Specifications
-XA□	Change of rod end shape
-XB5	Oversized rod cylinder
-XB6	Heat-resistant cylinder (-10 to 150 °C)
-XC3	Special port location
-XC4	With heavy duty scraper
-XC5	Heat resistant cylinder (110 °C)
-XC6	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
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC22	Fluororubber seal
-XC26	Clevis pins with flat washer
-XC27	Double clevis pin and double knuckle pin made of stainless steel
-XC30	Rod side trunnion
-XC35	With coil scraper
-XC68	Hard chrome plated stainless steel rod
-XC86	With rod end bracket

Rod Boot Materials

Symbol	Material	Max. ambient temp.
J	Nylon tarpaulin	70 °C
K	Heat resistant tarpaulin	110 °C*

* Max. ambient temperature for the rod boot itself.

Accessories

Mounting	Basic	Foot	Front flange	Rear flange	Single clevis	Double clevis	Centre trunnion
Standard	Clevis pin, Cotter pin	-	-	-	-	●	-
	Rod end nut	●	●	●	●	●	●
	Single knuckle joint	●	●	●	●	●	●
Accessory	Double knuckle joint (Knuckle pin, Cotter pin)	●	●	●	●	●	●
	Rod boot	●	●	●	●	●	●

* In the case of using the rod end nut together with the single knuckle joint or double knuckle joint, refer to page 20.

Maximum Stroke

(mm)

Tubing material	Aluminum tube	Steel tube	
Mounting bracket	Basic type, Head side flange type Single clevis type, Double clevis type Center trunnion type, Foot type Rod side flange type	Basic type Head side flange type Single clevis type Double clevis type Center trunnion type	Foot type Rod side flange type
Bore size (mm)			
125	1000 or less	1000 or less	1600 or less
140	1000 or less	1000 or less	1600 or less
160	1200 or less	1200 or less	1600 or less
180	—	1200 or less	2000 or less ^{Note 1)}
200	—	1200 or less ^{Note 1)}	2000 or less ^{Note 1)}
250	—	1200 or less	2400 or less
300	—	1200 or less	2400 or less

Note 1) Using a stroke of a length which is smaller than the effective cushion length may result in reduced air cushion performance.

Principal Parts Material and Surface Treatment

Description	Material	Note
Cover	Rolled steel plate	Black painted
Tube	Ø 125, Ø 140, Ø 160	Aluminum alloy Hard anodised
	Carbon steel tube	Inside: Hard chrome plated
	Ø 180, Ø 200, Ø 250, Ø 300	Carbon steel tube Inside: Hard chrome plated
Sliding part seal	Lube	NBR JIS B 2401 O-ring
	Non-lube	NBR
	Air-hydro	NBR
Piston rod	Carbon steel	Hard chrome plated
Piston	Lube	Cast iron
	Non-lube	Aluminium alloy casted (Iron tube: Cast iron) Chroaited (In the case of aluminium alloy casted)
	Air-hydro	Aluminium alloy casted (Iron tube: Cast iron) Chromated (In the case of aluminium alloy casted)

Series CS1

Weight/Aluminum Tube: Lube (Non-lube, Air-hydro) (kg)

Bore size (mm)		125	140	160	180	200
Basic weight	Basic type	14.85 (13.73)	17.98 (16.57)	24.77 (23.03)	33.44	41.86
	Foot type	16.48 (15.36)	20.50 (19.09)	27.57 (25.83)	37.64	46.74
	Rod side flange type	17.53 (16.41)	22.98 (21.57)	31.16 (29.42)	43.27	53.77
	Head side flange type	17.53 (16.41)	22.98 (21.57)	31.16 (29.42)	43.27	53.77
	Single clevis type	17.92 (16.80)	22.27 (20.86)	30.26 (28.52)	41.83	51.76
	Double clevis type (Clevis pin, Cotter pin)	18.38 (17.26)	23.02 (21.61)	31.11 (29.37)	43.51	53.79
	Trunnion type	18.98 (17.86)	23.71 (22.30)	32.17 (30.43)	44.06	55.85
Additional weight per each 100 mm of stroke		1.77	1.96	2.39	3.24	3.87
Accessory bracket	Single knuckle	0.91	1.16	1.56	3.07	2.90
	Double knuckle (Knuckle pin, Cotter pin)	1.37	1.81	2.48	4.74	4.59
	Rod end nut	0.16	0.16	0.23	0.32	0.85

*1 (): Denotes the non-lube and air-hydro type.

Calculation example: **CS1L160-500**

- Basic weight.....27.57 (Foot type, Ø 160)
- Additional weight.....2.39/100 stroke
- Cylinder stroke.....500 stroke

$$27.57 + 2.39 \times 500/100 = 39.52 \text{ kg}$$

Warning

Do not use the cylinder as a shock absorber.

- Using the cylinder as a shock absorber may cause damage.

Caution

Do not open the cushion valve excessively.

- If the cushion valve is rotated excessively in the opening direction (counterclockwise), it could be damaged. Be aware that the valve could slip out, or the threads becomes too short.

Regarding the installation of a knuckle joint

- Please contact SMC if a knuckle joint must be installed on the piston rod by using the rod end nut.

Do not place tape or other objects onto the painted surface of the unit.

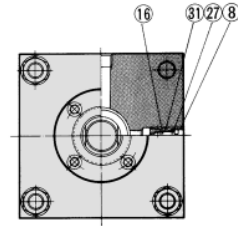
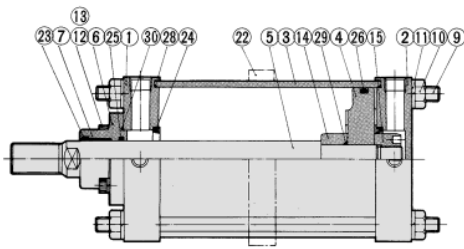
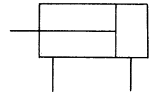
- The paint of the CS cylinder is dried naturally, so it may peel off if tape or another object is placed onto it.

Weight/Steel Tube (kg)

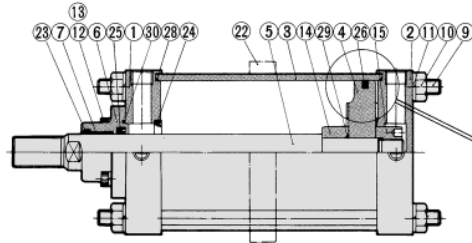
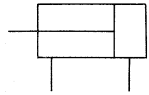
Bore size (mm)		125	140	160	180	200	250	300
Standard weight	Basic type	15.20	18.38	25.24	34.16	42.66	79.78	115.94
	Foot type	16.83	20.90	28.04	38.36	47.54	89.28	133.22
	Rod side flange type	17.88	23.38	31.63	43.99	54.57	101.62	146.14
	Head side flange type	17.88	23.38	31.63	43.99	54.57	101.62	146.14
	Single clevis type	18.27	22.67	30.73	42.55	52.56	98.17	149.22
	Double clevis (Clevis pin, Cotter pin)	18.73	23.42	31.58	44.23	54.59	101.36	154.96
	Trunnion type	19.33	24.11	32.64	44.78	56.65	107.62	156.37
Additional weight per each 100 mm of stroke		2.66	3.01	3.58	4.95	5.75	9.08	12.15
Accessory bracket	Single knuckle	0.91	1.16	1.56	3.07	2.90	5.38	10.82
	Double knuckle (Knuckle pin, Cotter pin)	1.37	1.81	2.48	4.74	4.59	9.22	17.17
	Rod end nut	0.16	0.16	0.23	0.32	0.85	1.26	1.43

Construction

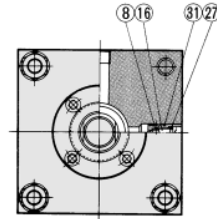
Lube



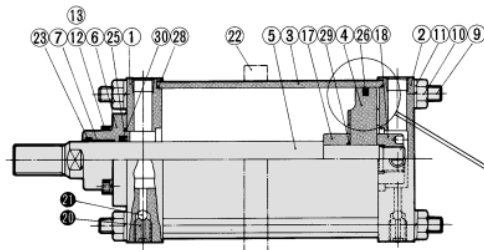
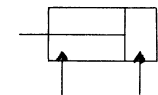
Non-lube



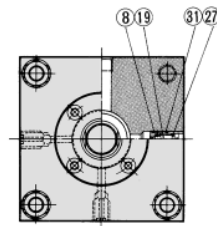
Aluminum tube



Air-hydro



Aluminum tube



Component Parts

No.	Description	Material	Note
①	Rod cover	Rolled steel plate	Black coated
②	Head cover	Rolled steel plate	Black coated
③	Cylinder tube	Aluminium alloy Carbon steel pipe	Hard anodized Inside: Hard chrome plated
④	Piston	Cast iron **	
⑤	Piston rod	Carbon steel	Hard chrome plated
⑥	Holder plate	Cast iron	Black coating
⑦	Bushing	Lead bronze casting	
⑧	Valve guide	Brass	
⑨	Tie rod	Carbon steel	Chromated
⑩	Tie rod nut	Rolled steel	Black zinc chromated
⑪	Spring washer	Steel wire	Black zinc chromated
⑫	Holder plate bolt	Chrome-molybdenum steel	Black zinc chromated
⑬	Spring washer	Steel wire	Black zinc chromated
⑭	Cushion ring A	Rolled steel	Electroless nickel plating
⑮	Cushion ring B	Rolled steel	Electroless nickel plating
⑯	Cushion valve	Rolled steel	Electroless nickel plated
⑰	Spacer A	Rolled steel	Zinc chromated
⑱	Spacer B	Rolled steel	Zinc chromated
⑲	Air releasing valve B	Rolled steel	Zinc chromated
⑳	Air releasing valve A	Chrome-molybdenum steel	
㉑	Check ball	Chrome bearing steel	
㉒	Tie rod reinforcement ring*	Rolled steel	Black coated
㉓	Wear ring	Resin	

* In case of long strokes

** Aluminium tube material of non-lube and air-hydro style is an aluminum alloy die cast.

• Trunnion type should not be disassembled. (Refer to page 36.)

Seal List

No.	Description	Mat'l	Part No.						
			125	140	160	180	200	250	300
㉓	Wiper ring	NBR	SDR-36	SDR-36	SDR-40	SDR-45	SDR-50	SDR-60	SDR-70
㉔**	Cushion seal		DSM-50S	DSM-50S	DSM-50S	DSM-60S	DSM-60S	DSM-75S	PCS-85(R) DSM-75S(H)
㉕	Rod seal		P36	P36	P40	P45	P50A	P60	P70
㉖	Piston seal		P115	P130	P150	P165	P185	P235	P285
㉗	Valve seal		P7	P7	P7	P7	P7	P7	P7
㉘	Tube gasket		C120	C135	C155	C175	C195	CS160-1618-G4	CS160-1618-G5
㉙**	Piston seal		G25	G25	G25	G35	G35	G45	G45
㉚	Holder gasket		G55	G55	G55	G65	G65	G80	G90
㉛**	Guide gasket		N-12.5-1.5	N-12.5-1.5	N-12.5-1.5	N-12.5-1.5	N-12.5-1.5	N-12.5-1.5	N-12.5-1.5

Non-lube style Seals except ㉕ and ㉖ are the same as for the lube-style.

㉕	Rod seal	NBR	PNY-36	PNY-36	PNY-40	PNY-45	PNY-50	PNY-60	PNY-70
㉖	Piston seal		NLP-125A	NLP-140A	NLP-160A	NLP-180A	NLP-200A	NLP-250A	NLP-300A

Air-hydro style Seals except ㉕ and ㉖ are the same as for the lube-style. (Except cushion seal)

㉕	Rod seal	NBR	SKY-36	SKY-36	SKY-40
㉖	Piston seal		RPS-125	RPS-140	RPS-160

Replacement Parts (Seal kits)

- Refer to page 7 for replacement part no. for air cylinder standard style series CS1.
- ** Seal kits does not include cushion seal, piston seal and guide gasket because they are not replacement parts.

Series CS1

Standard Style/Replacement Parts (Seal kits)

When ordering the replacement parts (seal kits) for standard style Series CS1 air cylinders, indicate the order number listed in the table on the right.

Each set of replacement parts contains the following: wiper ring, rod seal, piston seal, valve seal, tube gasket, and push plate gasket (for 1 cylinder).

Standard style (Lube)

Bore (mm)	Kit No.	23	25	26	27	28	30
		Wiper ring	Rod seal	Piston seal	Valve seal	Tube gasket	Holder gasket
125	CS1-125A-PS	SDR-36	P36	P115	P7	C120	G55
140	CS1-140A-PS	SDR-36	P36	P130	P7	C135	G55
160	CS1-160A-PS	SDR-40	P40	P150	P7	C155	G55
180	CS1-180A-PS	SDR-45	P45	P165	P7	C175	G65
200	CS1-200A-PS	SDR-50	P50A	P185	P7	C195	G65
250	CS1-250A-PS	SDR-60	P60	P235	P7	CS160-1618-G4	G80
300	CS1-300A-PS	SDR-70	P70	P285	P7	CS160-1618-G5	G90

* Seal kit includes a grease pack (Ø 125 to 160: 40 g, Ø 180 and 200: 50 g, Ø 250 and 300: 60 g).
Order with the following part number when only the grease pack is needed.

Grease pack part no.: GR-S-010 (10 g), GR-S-020 (20 g)

Standard (Non-lube)

Bore (mm)	Kit No.	23	25	26	27	28	30
		Wiper ring	Rod seal	Piston seal	Valve seal	Tube gasket	Holder gasket
125	CS1N125A-PS	SDR-36	PNY-36	NLP-125A	P7	C120	G55
140	CS1N140A-PS	SDR-36	PNY-36	NLP-140A	P7	C135	G55
160	CS1N160A-PS	SDR-40	PNY-40	NLP-160A	P7	C155	G55
180	CS1N180A-PS	SDR-45	PNY-45	NLP-180A	P7	C175	G65
200	CS1N200A-PS	SDR-50	PNY-50	NLP-200A	P7	C195	G65
250	CS1N250A-PS	SDR-60	PNY-60	NLP-250A	P7	CS160-1618-G4	G80
300	CS1N300A-PS	SDR-70	PNY-70	NLP-300A	P7	CS160-1618-G5	G90

* Seal kit includes a grease pack (Ø 125 to 160: 40 g, Ø 180 and 200: 50 g, Ø 250 and 300: 60 g).
Order with the following part number when only the grease pack is needed.

Grease pack part no.: GR-S-010 (10 g), GR-S-020 (20 g)

Air-hydro

Bore (mm)	Kit No.	Wiper ring	Rod seal	Piston seal	Valve seal	Tube gasket	Holder gasket
125	CS1H125A-PS	SDR-36	SKY-36	RPS-125	P7	C120	G55
140	CS1H140A-PS	SDR-36	SKY-36	RPS-140	P7	C135	G55
160	CS1H160A-PS	SDR-40	SKY-40	RPS-160	P7	C155	G55

Air Cylinder/With Auto Switch

Series CDS1

Ø 125, Ø 140, Ø 160, Ø 180, Ø 200

How to Order

CDS1 **L** **160** **300** **JR** **A53** **—** **—**

Air cylinder with auto switch

Mounting

B	Basic
L	Foot
F	Front flange
G	Rear flange
C	Single clevis
D	Double clevis
T	Centre trunnion

Style

—	Lube
N	Non-lube
H	Air-hydro

Bore size

Lube, Non-lube		Air-hydro	
125	125 mm	125	125 mm
140	140 mm	140	140 mm
160	160 mm	160	160 mm
180	180 mm		
200	200 mm		

Port thread type

—	Rc
TN	NPT
TF	G

Auto switch

—	Without auto switch
---	---------------------

*Select the applicable auto switch from the table below.

Number of auto switches

—	2
3	3
S	1
n	n

Made to Order
(Refer to page 9 for details.)

Rod boot/Cushion

Rod boot	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Cushion	N	No cushion
	R	With cushion on rod side
	H	With cushion on head side
	—	With both sides cushion (Air-hydro style: No cushion)

Built-in magnet cylinder model

If a built-in magnet cylinder without auto switch is required, there is no need to enter the symbol for auto switch. (Example) CDS1B125-200

Cylinder stroke
(Refer to p. 9 for Max./Min. stroke table.)

* If specifying more than one symbol, please indicate them in alphabetical order.
** The air-hydro style has no cushion. No symbol indicates no cushion.

Applicable Auto Switches/Refer to auto switch guide for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)					Pre-wired connector	Applicable load			
					DC		AC	Tie-rod mounting	Band mounting	0.5 (—)	1 (M)	3 (L)	5 (Z)					
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC circuit	Relay, PLC		
		3-wire (PNP)		M9P				—	●	●	●	○	○					
		2-wire		M9B				—	●	●	●	○	○					
	Terminal conduit	3-wire (NPN)		24 V	5 V, 12 V	—		G39	—	—	—	—	—	IC circuit				
		2-wire				—		K39	—	—	—	—	—	—				
	Diagnostic indication (2-color indicator)	Grommet			3-wire (NPN)	5 V, 12 V		M9NW	—	●	●	●	○	○	IC circuit			
					3-wire (PNP)			M9PW	—	●	●	●	○	○	IC circuit			
					2-wire			M9BW	—	●	●	●	○	○			—	
					3-wire (NPN)			M9NA*1	—	○	○	●	○	○			IC circuit	
					3-wire (PNP)			M9PA*1	—	○	○	●	○	○	IC circuit			
					2-wire			M9BA*1	—	○	○	●	○	○				—
					With diagnostic output (2-color indicator)			4-wire (NPN)	5 V, 12 V	F59F	—	●	—	●			○	○
					Magnetic field resistant (2-color indicator)			2-wire (Non-polar)	—	P3DWA	—	●	—	●	●		○	—
	Reed auto switch	—			Grommet	Yes		3-wire (NPN equivalent)	—	5 V	—	A96	—	●	—		●	—
2-wire			24 V	12 V			12 V	100 V	A93	—	●	●	●	●	—	—		
							5 V, 12 V	100 V or less	A90	—	●	—	●	—	—	IC circuit		
							100 V, 200 V	A54	—	●	—	●	●	—	—			
							200 V or less	A64	—	●	—	●	—	—				
							—	—	A33	—	—	—	—	—		PLC		
Terminal conduit		DIN terminal	Yes	100 V, 200 V	—	A34	—	—	—	—	Relay, PLC							
				—	A44	—	—	—	—	—								
Diagnostic indication (2-color indicator)		Grommet	Yes	—	—	A59W	—	●	—	●	—	—						

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

Consult with SMC regarding water resistant types with the above model numbers.

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

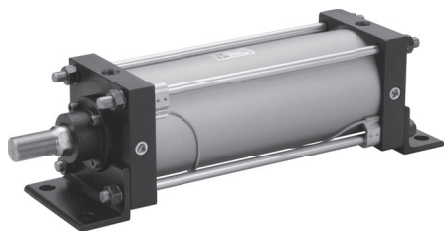
* Solid state auto switches marked with "○" are produced upon receipt of order.

* Since there are other applicable auto switches than listed above, refer to page 34 for details.

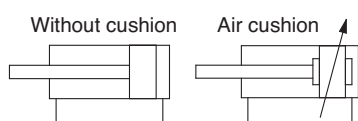
* For details about auto switches with pre-wired connector, refer to auto switch guide.

* D-A9□/M9□/M9□W/M9□A/P3DWA□ auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled before shipped.)

Series CDS1



Symbol



Made to Order Specifications

Symbol	Specifications
-XA□	Change of rod end shape
-XB5	Oversized rod cylinder
-XC3	Special port location
-XC4	With heavy duty scraper
-XC6	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
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC22	Fluororubber seal
-XC26	Clevis pins with flat washer
-XC27	Double clevis pin and double knuckle pin made of stainless steel
-XC30	Rod side trunnion
-XC35	With coil scraper
-XC68	Hard chrome plated stainless steel rod
-XC86	With rod end bracket

Specifications

Style	Lube, Non-lube		Air-hydro
Fluid	Air		Turbine oil
Bore size (mm)	Ø 125, Ø 140, Ø 160	Ø 180, Ø 200	Ø 125, Ø 140, Ø 160
Proof pressure	1.57MPa	1.2MPa	1.57MPa
Max. operating pressure	0.97MPa	0.7MPa	0.97MPa
Min. operating pressure	0.05MPa		0.06MPa
Piston speed	50 to 500 mm/s		0.5 to 200 mm/s
Cushion	With		Without
Ambient and fluid temperature	0 to 60 °C (No freezing), Air-hydro style: 5 to 60 °C		
Thread tolerance	JIS class 2		
Stroke length tolerance (mm)	250 or less: $^{+1.0}_0$, 251 to 1,000: $^{+1.4}_0$, 1,001 to 1,500: $^{+1.8}_0$		
Mounting	Basic, Foot, Front flange, Rear flange, Single clevis, Double clevis, Centre trunnion		

Max. Stroke

(mm)

Bore size	Max. stroke	
	Basic, Rear flange, Single clevis, Double clevis, Centre trunnion	Foot, Front flange
Ø 125, Ø 140	1000 or less	1400 or less
Ø 160	1200 or less	1400 or less
Ø 180	1200 or less	1500 or less
Ø 200	998 or less	998 or less
Note	Ø 200: Cylinders of the stroke range of 998 to 1200 are special products.	Ø 200: Cylinders of the stroke range of 998 to 1500 are special products.

Mounting Bracket Part No.

Bore size (mm)	125	140	160	180	200
Foot*	CS1-L12	CS1-L14	CS1-L16	CS1-L18	CS1-L20
Flange	CS1-F12	CS1-F14	CS1-F16	CS1-F18	CS1-F20
Single clevis	CS1-C12	CS1-C14	CS1-C16	CS1-C18	CS1-C20
Double clevis**	CS1-D12	CS1-D14	CS1-D16	CS1-D18	CS1-D20

* Order 2 foot brackets for one cylinder.

** When ordering the double clevis, the clevis pin and the cotter pin (2 pcs.) are attached.

Dimensions of auto switches style

Refer to page 13 to 19 for dimensions of auto switch style (according to mounting bracket).

Major Materials and Surface Treatments

Description		Material	Note
Cover		Rolled steel	Black coated
Tube	Ø 125, Ø 140, Ø 160 Ø 180, Ø 200	Aluminum alloy	Hard anodized
Sliding seals	Lube	NBR	JIS B2401 O ring*
	Non-lube	NBR	PNY, NLP
	Air-hydro	NBR	SKY, RPS
Piston rod		Carbon steel	Hard chrome plated
Piston		Aluminum alloy cast	Chromated

* Foot, Front flange: In case of bore size of Ø 125 and Ø 140, the stroke range is 1001 to 1400. In case of Ø 160, piston seals of the stroke range 1200 to 1400 are NLP.

* In case of bore size Ø 180 and Ø 200, piston seals are NLP.

Weight

(kg)

Bore size (mm)		Ø 125	Ø 140	Ø 160	Ø 180	Ø 200
Basic weight	Basic	13.79	16.64	23.11	27.55	36.11
	Foot	15.42	19.16	25.91	31.75	40.99
	Front flange	16.47	21.64	29.50	37.38	48.02
	Rear flange	16.47	21.64	29.50	37.38	48.02
	Single clevis	16.86	20.93	28.60	35.94	46.01
	Double clevis (Clevis pin, Cotter pin)	17.32	21.68	29.45	37.62	48.04
	Trunnion	17.92	22.37	30.51	38.71	50.10
Additional weight per 100 stroke		1.77	1.96	2.39	2.85	3.42
Accessory	Single knuckle joint	0.91	1.16	1.56	3.07	2.90
	Double knuckle joint (Knuckle pin, Cotter pin)	1.37	1.81	2.48	4.74	4.59
	Rod end nut	0.16	0.16	0.23	0.32	0.85

Series C□S1

With Auto Switch/Replacement Parts (Seal kits)

When ordering the replacement parts (seal kits) for Series CDS1 cylinder with auto switches, indicate the order number listed in the table on the right.

Each set of replacement parts contains the following: wiper ring, rod seal, piston seal, valve seal, tube gasket, and push plate gasket (for 1 cylinder).

Lube style 1

Bore (mm)	Kit No.	Wiper ring	Rod seal	Piston seal	Valve seal	Tube gasket	Holder plate gasket
125	CS1-125A-PS	SDR-36	P36	P115	P7	C120	G55
140	CS1-140A-PS	SDR-36	P36	P130	P7	C135	G55
160	CS1-160A-PS	SDR-40	P40	P150	P7	C155	G55
180	CDS1-180A-PS	SDR-45	P45	NLP-180A	P7	C175	G65
200	CDS1-200A-PS	SDR-50	P50A	NLP-200A	P7	C195	G65

* Seal kit includes a grease pack (Ø 125 to 160: 40 g, Ø 180 and 200: 50 g). Order with the following part number when only the grease pack is needed.

Grease pack part no.: GR-S-010 (10 g), GR-S-020 (20 g)

Non-lube Style

Bore (mm)	Kit No.	Wiper ring	Rod seal	Piston seal	Valve seal	Tube gasket	Holder plate gasket
125	CS1N125A-PS	SDR-36	PNY-36	NLP-125A	P7	C120	G55
140	CS1N140A-PS	SDR-36	PNY-36	NLP-140A	P7	C135	G55
160	CS1N160A-PS	SDR-40	PNY-40	NLP-160A	P7	C155	G55
180	CS1N180A-PS	SDR-45	PNY-45	NLP-180A	P7	C175	G65
200	CS1N200A-PS	SDR-50	PNY-50	NLP-200A	P7	C195	G65

* Seal kit includes a grease pack (Ø 125 to 160: 40 g, Ø 180 and 200: 50 g). Order with the following part number when only the grease pack is needed.

Grease pack part no.: GR-S-010 (10 g), GR-S-020 (20 g)

Lube Style 2*

Bore (mm)	Kit No.	Wiper ring	Rod seal	Piston seal	Valve seal	Tube gasket	Holder plate gasket
125	CDS1L125A-PS	SDR-36	P36	NLP-125A	P7	C120	G55
140	CDS1L140A-PS	SDR-36	P36	NLP-140A	P7	C135	G55
160	CDS1L160A-PS	SDR-40	P40	NLP-160A	P7	C155	G55

* Foot, Front flange: Ø 125, Ø 140—1001 to 1400 stroke Ø 160—1200 to 1400 stroke

* Seal kit includes a grease pack (Ø 125 to 160: 40 g, Ø 180 and 200: 50 g). Order with the following part number when only the grease pack is needed.

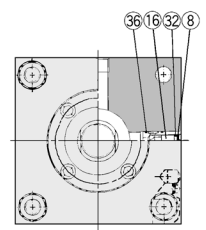
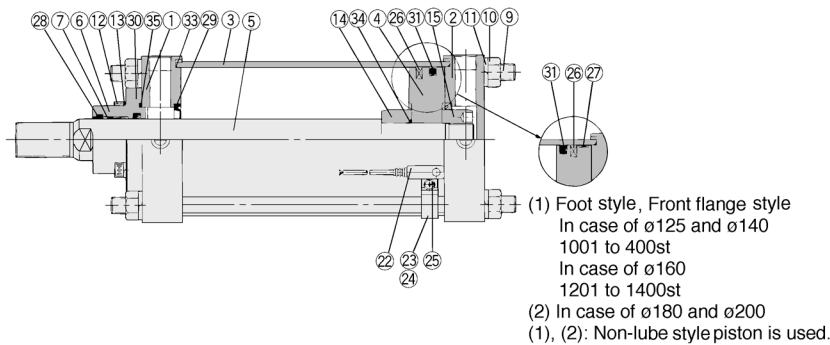
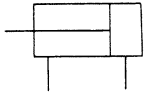
Grease pack part no.: GR-S-010 (10 g), GR-S-020 (20 g)

Air-hydro Style

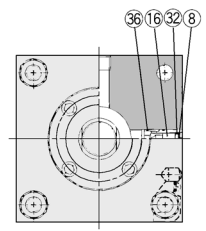
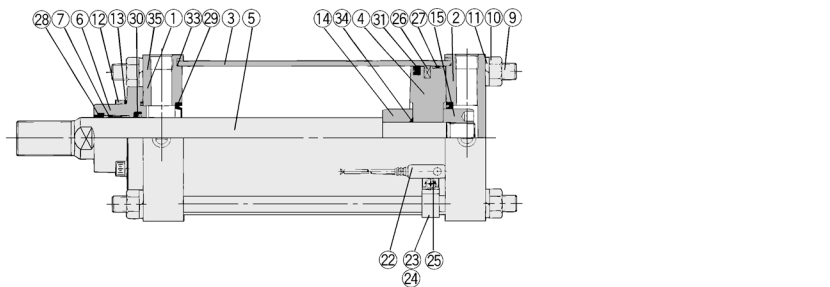
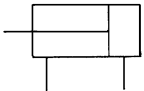
Bore (mm)	Kit No.	Wiper ring	Rod seal	Piston seal	Valve seal	Tube gasket	Holder plate gasket
125	CS1H125A-PS	SDR-36	SKY-36	RPS-125	P7	C120	G55
140	CS1H140A-PS	SDR-36	SKY-36	RPS-140	P7	C135	G55
160	CS1H160A-PS	SDR-40	SKY-40	RPS-160	P7	C155	G55

Construction

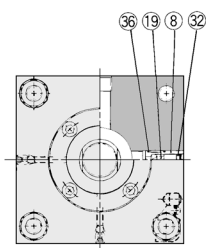
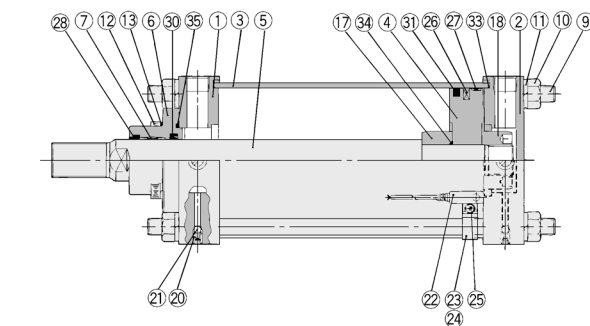
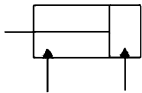
Lube



Non-lube



Air-hydro/ $\phi 125$, $\phi 140$, $\phi 160$



Component Parts

No.	Description	Material	Note
①	Rod cover	Rolled steel	Black coated
②	Head cover	Rolled steel	Black coated
③	Cylinder tube	Aluminum alloy	Hard anodized
④	Piston	Aluminum alloy cast iron	Chromate
⑤	Piston rod	Carbon steel	Hard chrome plated
⑥	Holder plate	Cast iron	Black coated
⑦	Bush	Lead bronze casting	
⑧	Valve guide	Brass	
⑨	Tie rod	Carbon steel	Chromated
⑩	Tie rod nut	Rolled steel	Black zinc chromated
⑪	Spring washer	Steel wire	Black zinc chromated
⑫	Holder plate bolt	Chrome-molybdenum steel	Black zinc chromated
⑬	Spring washer	Steel wire	Black zinc chromated
⑭	Cushion ring A	Rolled steel	Electroless nickel plated
⑮	Cushion ring B	Rolled steel	Electroless nickel plated
⑯	Cushion valve	Rolled steel	Electroless nickel plated
⑰	Spacer A	Rolled steel	Zinc chromated
⑱	Spacer B	Rolled steel	Zinc chromated
⑲	Air releasing valve B	Rolled steel	Zinc chromated
⑳	Air releasing valve A	Chrome-molybdenum steel	
㉑	Check ball	Chrome bearing steel	
㉒	Auto switch	—	
㉓	Set screw	Chrome-molybdenum steel	Zinc chromated
㉔	Switch mounting bracket	Aluminum alloy	
㉕	Switch mounting screw	Copper wire	Nickel plated
㉖	Magnet	—	
㉗	Wear ring	Resin	

* Trunnion type should not be disassembled. (Refer to page 36.)

Seal List

No.	Description	Material	Part No.				
			125	140	160	180	200
Lube Style 1 (Refer to p.1.14-12 for lube-style 2.)							
28	Wiper ring	NBR	SDR-36	SDR-36	SDR-40	SDR-45	SDR-50
29*	Cushion seal		DSM-50S	DSM-50S	DSM-50S	DSM-60S	DSM-60S
30	Rod seal		P36	P36	P40	P45	P50A
31	Piston seal		P115	P130	P150	NLP-180A	NLP-200A
32	Valve seal		P7	P7	P7	P7	P7
33	Tube gasket		C120	C135	C155	C175	C195
34*	Piston gasket		G25	G25	G25	G35	G35
35	Holder plate gasket		G55	G55	G55	G65	G65
36*	Guide gasket		CA50-1607	CA50-1607	CA50-1607	CA50-1607	CA50-1607

Non-lube Style Seals except ㉚ and ㉛ are the same as lube style.

㉚	Rod seal	NBR	PNY-36	PNY-36	PNY-40	PNY-45	PNY-50
㉛	Piston seal		NLP-125A	NLP-140A	NLP-160A	NLP-180A	NLP-200A

Air-hydro Style Seals except ㉚ and ㉛ are the same as lube style.

㉚	Rod seal	NBR	SKY-36	SKY-36	SKY-40
㉛	Piston seal		RPS-125	RPS-140	RPS-160

Replacement Parts (Seal kits)

●Refer to page 11 for replacement part No. (seal kits) of cylinder with auto switch series CDS1.

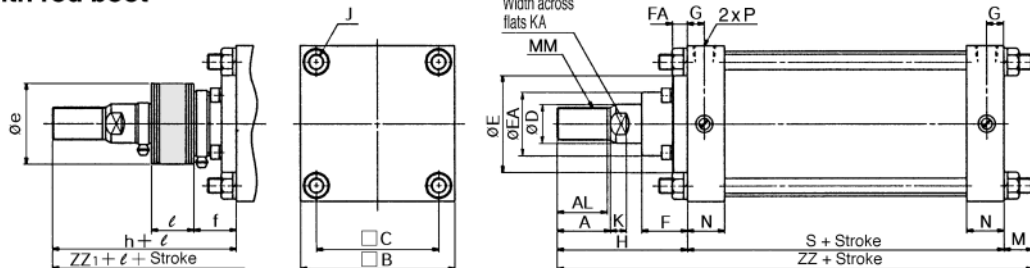
*●Seal kits does not include cushion seal, piston seal and guide gasket because they are not replacement parts.

Series C□S1

Basic/CS1B

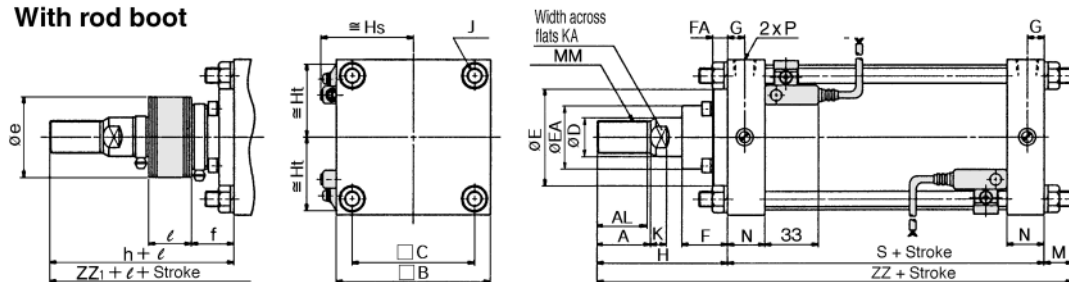
Lube (CS1B), Non-lube (CS1BN), Air-hydro (CS1BH)

With rod boot



With auto switch/CDS1B

With rod boot



Style	Bore (mm)	Stroke range (mm)*	A	AL	□B	□C	D	E	EA	F	FA	G	J	K	KA	M	MM	N	P	S
Lube	125	to 1000	50	47	145	115	36	90	59	43	14	16	M14 X 1.5	15	31	27	M30 X 1.5	35	1/2	98
Non-lube	140	to 1000	50	47	161	128	36	90	59	43	14	16	M14 X 1.5	15	31	27	M30 X 1.5	35	1/2	98
Air-hydro	160	to 1200	56	53	182	144	40	90	59	43	14	18.5	M16 X 1.5	17	36	30.5	M36 X 1.5	39	3/4	106
Lube	180	to 1200	63	60	204	162	45	115	70	48	17	18.5	M18 X 1.5	20	41	35	M40 X 1.5	39	3/4	111
Non-lube	200	to 1200	63	60	226	182	50	115	74	48	17	18.5	M20 X 1.5	20	46	35	M45 X 1.5	39	3/4	111
	250	to 1200	71	67	277	225	60	140	86	60	20	23	M24 X 1.5	25	56	41.5	M56 X 2	49	1	141
	300	to 1200	80	76	330	270	70	140	96	60	20	23	M30 X 1.5	30	65	51.5	M64 X 2	49	1	146

Style	Bore (mm)	W/o rod boot		W/ rod boot				
		H	ZZ	e	f	h	l	ZZ ₁
Lube	125	110	235	75	40	133	0.2 Stroke	258
Non-lube	140	110	235	75	40	133	0.2 Stroke	258
Air-hydro	160	120	256.5	75	40	141	0.2 Stroke	277.5
	180	135	281	85	45	153	0.2 Stroke	299
Lube	200	135	281	90	45	153	0.2 Stroke	299
Non-lube	250	160	342.5	105	55	176	0.17 Stroke	358.5
	300	175	372.5	115	55	190	0.17 Stroke	387.5

* In case of rod boot style, min. stroke is 30 mm or more.

With auto switch/Ø 125 to Ø 200 only

Style	Bore (mm)	Stroke range (mm)*	S	W/o rod boot	W/ rod boot
				ZZ	ZZ ₁
Lube	125	to 1000	98	235	258
Non-lube	140	to 1000	98	235	258
Air-hydro	160	to 1200	106	256.5	277.5
Lube	180	to 1200	115	285	303
Non-lube	200	to 998	120	290	308

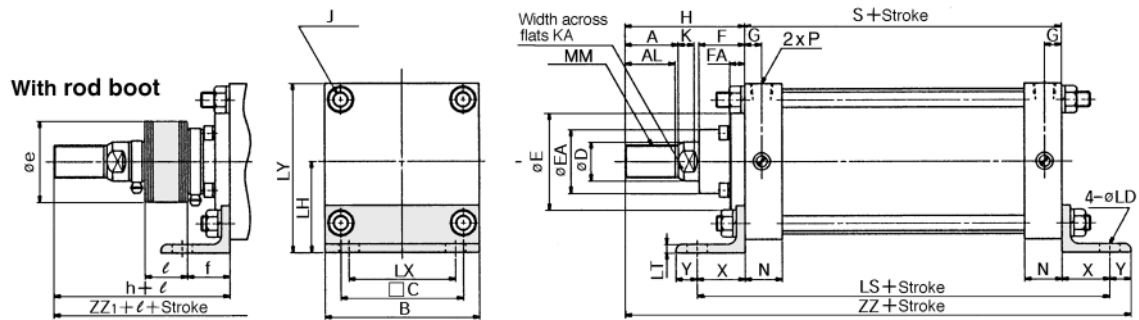
* Other dimensions are the same as standard style.

** Refer to p. 21 for dimensions of auto switch setting position and mounting height.

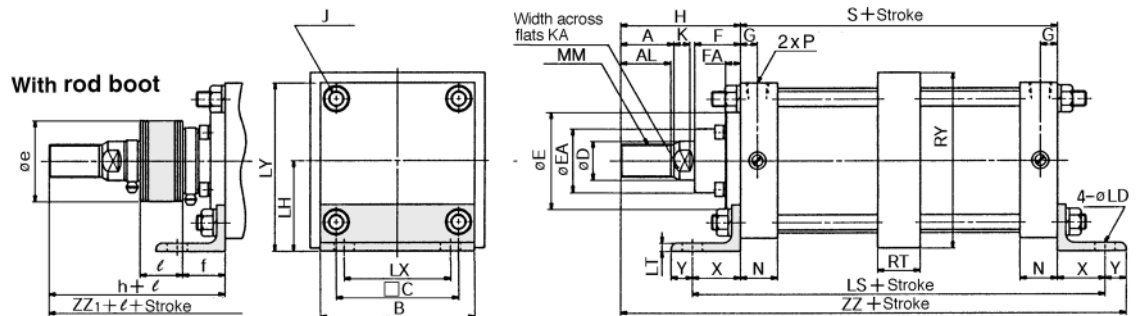
*** Refer to p. 9 for auto switch min. mountable stroke.

Foot/CS1L

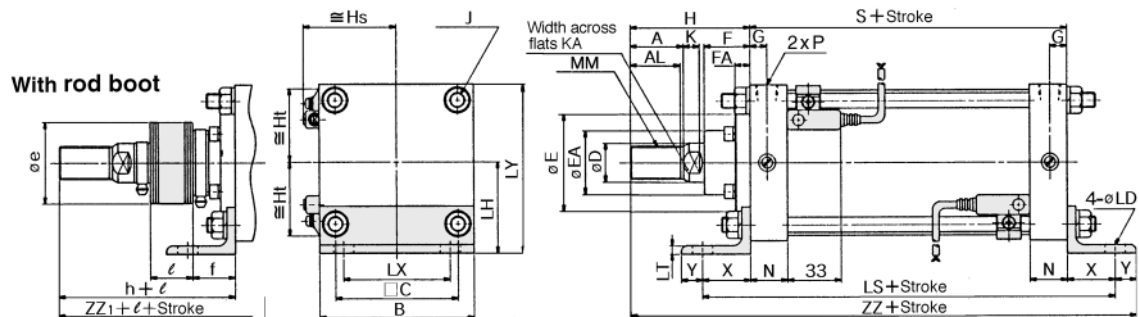
Lube (CS1L), Non-lube (CS1LN), Air-hydro (CS1LH)



Long stroke



With auto switch/CDS1L



Style	Bore (mm)	Stroke range (mm)*	Long stroke range (mm)	A	AL	B	□C	D	E	EA	F	FA	G	J	K	KA	LD	LH	LS	LT	LX	LY	MM	N	P	RT
Lube	125	to 1400	1401 to 1600	50	47	145	115	36	90	59	43	14	16	M14 X 1.5	15	31	19	85	188	8	100	157.5	M30 X 1.5	35	1/2	36
Non-lube	140	to 1400	1401 to 1600	50	47	161	128	36	90	59	43	14	16	M14 X 1.5	15	31	19	100	188	9	112	180.5	M30 X 1.5	35	1/2	36
Air-hydro	160	to 1400	1401 to 1600	56	53	182	144	40	90	59	43	14	18.5	M16 X 1.5	17	36	19	106	206	9	118	197	M36 X 1.5	39	3/4	45
Lube	180	to 1800	1801 to 2000	63	60	204	162	45	115	70	48	17	18.5	M18 X 1.5	20	41	24	125	231	10	132	227	M40 X 1.5	39	3/4	45
Non-lube	200	to 1800	1801 to 2000	63	60	226	182	50	115	74	48	17	18.5	M20 X 1.5	20	46	24	132	231	10	150	245	M45 X 1.5	39	3/4	45
	250	to 2000	2001 to 2400	71	67	277	225	60	140	86	60	20	23	M24 X 1.5	25	56	29	160	301	12	180	298.5	M56 X 2	49	1	55
	300	to 2000	2001 to 2400	80	76	330	270	70	140	96	60	20	23	M30 X 1.5	30	65	33	200	326	15	212	365	M64 X 2	49	1	55

(mm)													
Style	Bore (mm)	RY	S	X	Y	W/o rod boot		W/ rod boot					
						H	ZZ	e	f	h	l	ZZ ₁	
Lube	125	164	98	45	20	110	273	75	40	133	0.2 Stroke	296	
Non-lube	140	184	98	45	30	110	283	75	40	133	0.2 Stroke	306	
Air-hydro	160	204	106	50	25	120	301	75	40	141	0.2 Stroke	322	
Lube Non-lube	180	228	111	60	30	135	336	85	45	153	0.2 Stroke	354	
	200	257	111	60	30	135	336	90	45	153	0.2 Stroke	354	
	250	325	141	80	40	160	421	105	55	176	0.17 Stroke	437	
	300	390	146	90	40	175	451	115	55	190	0.17 Stroke	466	

* In case of rod boot style, min. stroke is 30 mm or more.

With auto switch/Ø 125 to Ø 200 only

Style	Bore (mm)	Stroke range (mm)	S	LS	W/o rod boot	W/ rod boot
					ZZ	ZZ ₁
Lube	125	to 1400	98	188	273	296
Non-lube	140	to 1400	98	188	283	306
Air-hydro	160	to 1400	106	206	301	322
Lube	180	to 1500	115	235	340	358
Non-lube	200	to 998	120	240	345	363

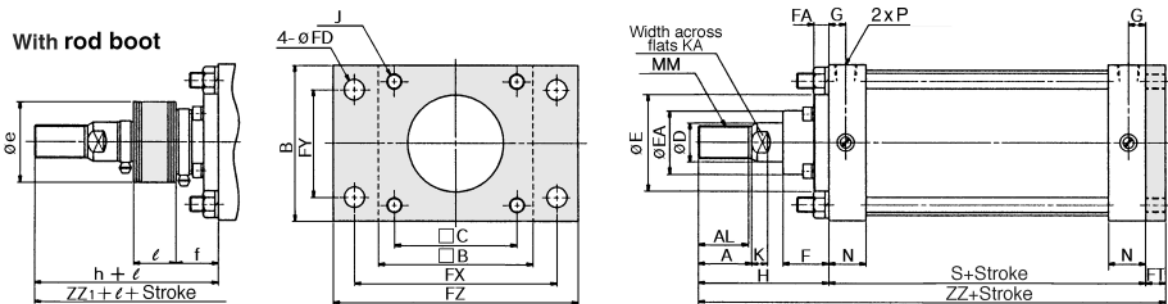
* Other dimensions are the same as standard style.

** Refer to p. 21 for dimensions of auto switch setting position and mounting height.

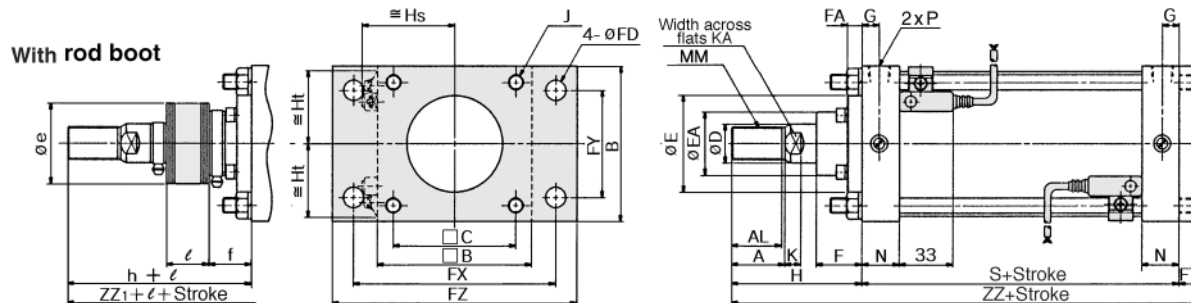
*** Refer to p. 9 for auto switch min. mountable stroke.

Rear Flange/CS1G

Lube (CS1G), Non-lube (CS1GN), Air-hydro (CS1GH)



With auto switch/CDS1G



(mm)																							
Style	Bore (mm)	Stroke range (mm)*	A	AL	B	□B	□C	D	E	EA	F	FA	FD	FT	FX	FY	FZ	G	J	K	KA	MM	P
Lube	125	to 1000	50	47	145	145	115	36	90	59	43	14	19	14	190	100	230	16	M14 X 1.5	15	31	M30 X 1.5	1/2
Non-lube	140	to 1000	50	47	160	161	128	36	90	59	43	14	19	20	212	112	255	16	M14 X 1.5	15	31	M30 X 1.5	1/2
Air-hydro	160	to 1200	56	53	180	182	144	40	90	59	43	14	19	20	236	118	275	18.5	M16 X 1.5	17	36	M36 X 1.5	3/4
	180	to 1200	63	60	200	204	162	45	115	70	48	17	24	25	265	132	320	18.5	M18 X 1.5	20	41	M40 X 1.5	3/4
Lube	200	to 1200	63	60	225	226	182	50	115	74	48	17	24	25	280	150	335	18.5	M20 X 1.5	20	46	M45 X 1.5	3/4
Non-lube	250	to 1200	71	67	275	277	225	60	140	86	60	20	29	30	355	180	420	23	M24 X 1.5	25	56	M56 X 2	1
	300	to 1200	80	76	330	330	270	70	140	96	60	20	33	30	400	212	475	23	M30 X 1.5	30	65	M64 X 2	1

(mm)									
Style	Bore (mm)	S	W/o rod boot		W/ rod boot				
			H	ZZ	e	f	h	l	ZZ ₁
Lube	125	98	110	222	75	40	133	0.2 Stroke	245
Non-lube	140	98	110	228	75	40	133	0.2 Stroke	251
Air-hydro	160	106	120	246	75	40	141	0.2 Stroke	267
	180	111	135	271	85	45	153	0.2 Stroke	289
Lube	200	111	135	271	90	45	153	0.2 Stroke	289
Non-lube	250	141	160	331	105	55	176	0.17 Stroke	347
	300	146	175	351	115	55	190	0.17 Stroke	366

* In case of rod boot style, min. stroke is 30 mm or more.

With auto switch/Ø 125 to Ø 200 only (mm)

Style	Bore (mm)	Stroke range (mm)	S	W/o rod boot	W/ rod boot
				ZZ	ZZ ₁
Lube	125	to 1000	98	222	245
Non-lube	140	to 1000	98	228	251
Air-hydro	160	to 1200	106	246	267
Lube	180	to 1200	115	275	293
Non-lube	200	to 998	120	280	298

* Other dimensions are the same as standard style.

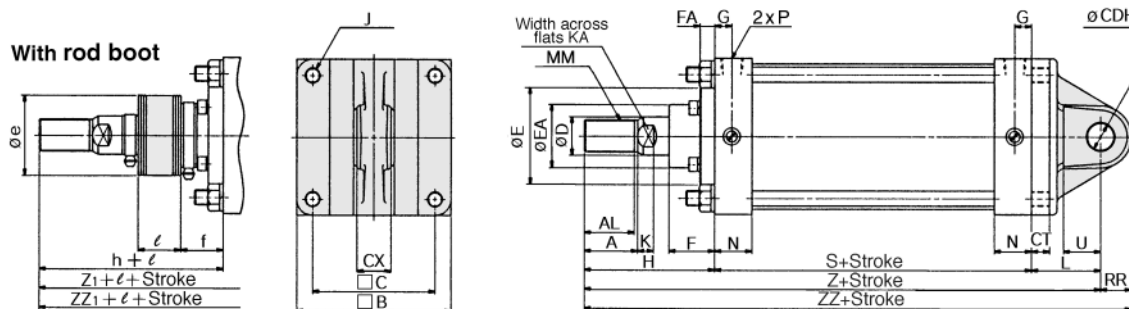
** Refer to p. 21 for dimensions of auto switch setting position and mounting height.

*** Refer to p. 9 for auto switch min. mountable stroke.

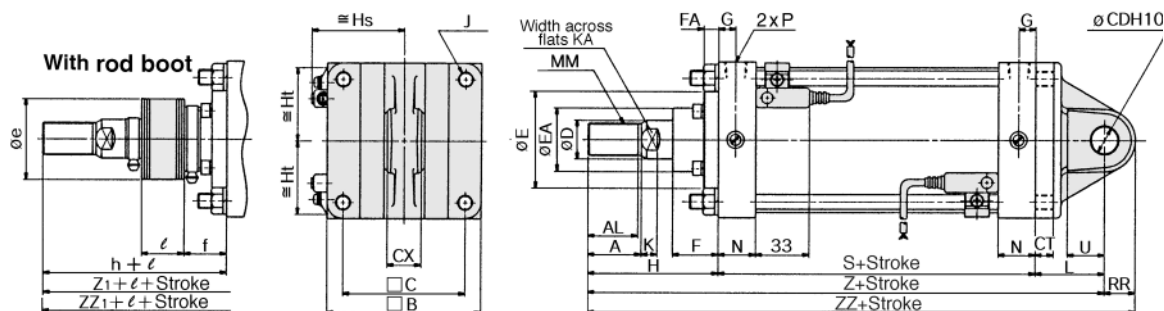
Series C□S1

Single Clevis/CS1C

Lube (CS1C), Non-lube (CS1CN), Air-hydro (CS1CH)



With auto switch/CDS1C



Style	Bore (mm)	Stroke range (mm)*	A	AL	□B	□C	CDH10	CT	CX	D	E	EA	F	FA	G	J	K	KA	L	MM	N	P	RR
Lube	125	to 1000	50	47	145	115	25 ^{+0.084} ₀	17	32 ^{-0.1} _{-0.3}	36	90	59	43	14	16	M14 X 1.5	15	31	65	M30 X 1.5	35	1/2	29
Non-lube	140	to 1000	50	47	161	128	28 ^{+0.084} ₀	17	36 ^{-0.1} _{-0.3}	36	90	59	43	14	16	M14 X .5	15	31	75	M30 X 1.5	35	1/2	32
Air-hydro	160	to 1200	56	53	182	144	32 ^{+0.100} ₀	20	40 ^{-0.1} _{-0.3}	40	90	59	43	14	18.5	M16 X 1.5	17	36	80	M36 X 1.5	39	3/4	36
	180	to 1200	63	60	204	162	40 ^{+0.100} ₀	23	50 ^{-0.1} _{-0.3}	45	115	70	48	17	18.5	M18 X 1.5	20	41	90	M40 X 1.5	39	3/4	44
Lube	200	to 1200	63	60	226	182	40 ^{+0.100} ₀	25	50 ^{-0.1} _{-0.3}	50	115	74	48	17	18.5	M20 X 1.5	20	46	90	M45 X 1.5	39	3/4	44
Non-lube	250	to 1200	71	67	277	225	50 ^{+0.100} ₀	30	63 ^{-0.1} _{-0.3}	60	140	86	60	20	23	M24 X 1.5	25	56	110	M56 X 2	49	1	55
	300	to 1200	80	76	330	270	63 ^{+0.120} ₀	37	80 ^{-0.1} _{-0.3}	70	140	96	60	20	23	M30 X 1.5	30	65	130	M64 X 2	49	1	68

Style	Bore (mm)	S	U	W/o rod boot			W/rod boot					
				H	Z	ZZ	e	f	h	l	Z1	ZZ1
Lube	125	98	35	110	273	302	75	40	133	0.2 Stroke	296	325
Non-lube	140	98	40	110	283	315	75	40	133	0.2 Stroke	306	338
Air-hydro	160	106	45	120	306	342	75	40	141	0.2 Stroke	327	363
	180	111	50	135	336	380	85	45	153	0.2 Stroke	354	398
Lube	200	111	50	135	336	380	90	45	153	0.2 Stroke	354	398
Non-lube	250	141	65	160	411	466	105	55	176	0.17 Stroke	427	482
	300	146	80	175	451	519	115	55	190	0.17 Stroke	466	534

* In case of rod boot style, min. stroke is 30 mm or more.

With auto switch/Ø 125 to Ø 200 only (mm)

Style	Bore (mm)	Stroke range (mm)	S	W/o rod boot		W/ rod boot	
				Z	ZZ	Z1	ZZ1
Lube	125	to 1000	98	273	302	296	325
Non-lube	140	to 1000	98	283	315	306	338
Air-hydro	160	to 1200	106	306	342	327	363
Lube	180	to 1200	115	340	384	358	402
Non-lube	200	to 998	120	345	389	363	407

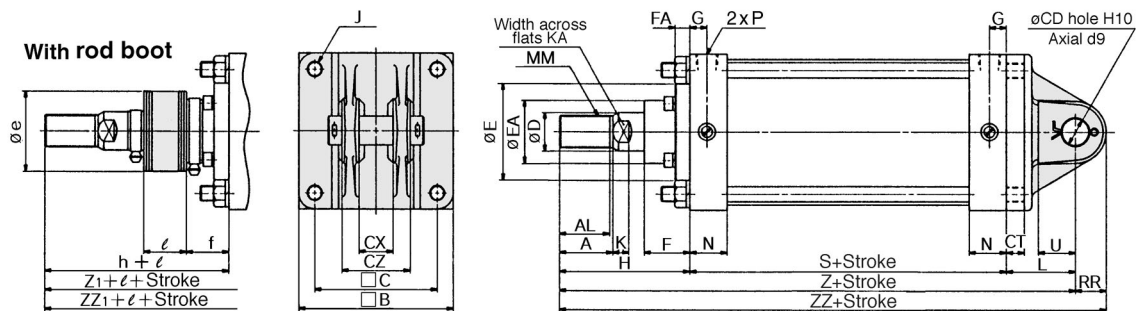
* Other dimensions are the same as standard style.

** Refer to p. 21 for dimensions of auto switch setting position and mounting height.

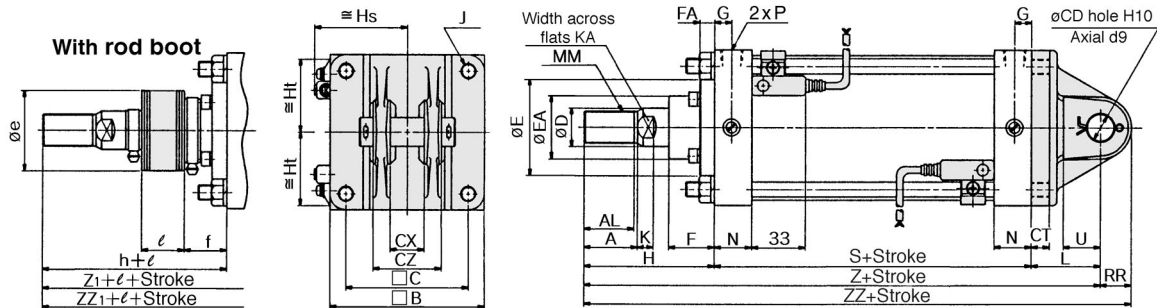
*** Refer to p. 9 for auto switch min. mountable stroke.

Double Clevis/CS1D

Lube (CS1D), Non-lube (CS1DN), Air-hydro (CS1DH)



With auto switch/CDS1D



(mm)																								
Style	Bore (mm)	Stroke range (mm)*	A	AL	□B	□C	CD _H 10	CT	CX	CZ	D	E	EA	F	FA	G	J	K	KA	L	MM	N	P	RR
Lube	125	to 1000	50	47	145	115	25 ^{+0.084 0}	17	32 ^{+0.3 +0.1}	64 ^{0 -0.2}	36	90	59	43	14	16	M14 X 1.5	15	31	65	M30 X 1.5	35	1/2	29
Non-lube	140	to 1000	50	47	161	128	28 ^{+0.084 0}	17	36 ^{+0.3 +0.1}	72 ^{0 -0.2}	36	90	59	43	14	16	M14 X 1.5	15	31	75	M30 X 1.5	35	1/2	32
Air-hydro	160	to 1200	56	53	182	144	32 ^{+0.100 0}	20	40 ^{+0.3 +0.1}	80 ^{0 -0.2}	40	90	59	43	14	18.5	M16 X 1.5	17	36	80	M36 X 1.5	39	3/4	36
Lube Non-lube	180	to 1200	63	60	204	162	40 ^{+0.100 0}	23	50 ^{+0.3 +0.1}	100 ^{-0.1 -0.3}	45	115	70	48	17	18.5	M18 X 1.5	20	41	90	M40 X 1.5	39	3/4	44
	200	to 1200	63	60	226	182	40 ^{+0.100 0}	25	50 ^{+0.3 +0.1}	100 ^{-0.1 -0.3}	50	115	74	48	17	18.5	M20 X 1.5	20	46	90	M45 X 1.5	39	3/4	44
	250	to 1200	71	67	277	225	50 ^{+0.100 0}	30	63 ^{+0.3 +0.1}	126 ^{-0.1 -0.3}	60	140	86	60	20	23	M24 X 1.5	25	56	110	M56 X 2	49	1	55
	300	to 1200	80	76	330	270	63 ^{+0.120 0}	37	80 ^{+0.3 +0.1}	160 ^{-0.1 -0.3}	70	140	96	60	20	23	M30 X 1.5	30	65	130	M64 X 2	49	1	68

(mm)												
Style	Bore (mm)	S	U	W/o rod boot			W/rod boot					
				H	Z	ZZ	e	f	h	l	Z1	ZZ1
Lube	125	98	35	110	273	302	75	40	133	0.2 Stroke	296	325
Non-lube	140	98	40	110	283	315	75	40	133	0.2 Stroke	306	338
Air-hydro	160	106	45	120	306	342	75	40	141	0.2 Stroke	327	363
Lube	180	111	50	135	336	380	85	45	153	0.2 Stroke	354	398
Non-lube	200	111	50	135	336	380	90	45	153	0.2 Stroke	354	398
	250	141	65	160	411	466	105	55	176	0.17 Stroke	427	482
	300	146	80	175	451	519	115	55	190	0.17 Stroke	466	534

* In case of rod boot style, min. stroke is 30 mm or more.

With auto switch/Ø 125 to Ø 200 only (mm)

Style	Bore (mm)	Stroke range (mm)	S	W/o rod boot		W/ rod boot	
				Z	ZZ	Z1	ZZ1
Lube	125	to 1000	98	273	302	296	325
Non-lube	140	to 1000	98	283	315	306	338
Air-hydro	160	to 1200	106	306	342	327	363
Lube	180	to 1200	115	340	384	358	402
Non-lube	200	to 998	120	345	389	363	407

* Other dimensions are the same as standard style.

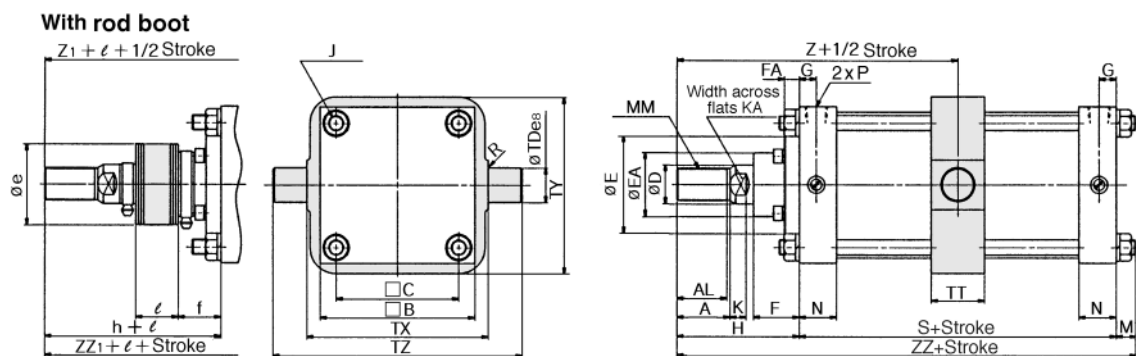
** Refer to p. 21 for dimensions of auto switch setting position and mounting height.

*** Refer to p. 9 for auto switch min. mountable stroke.

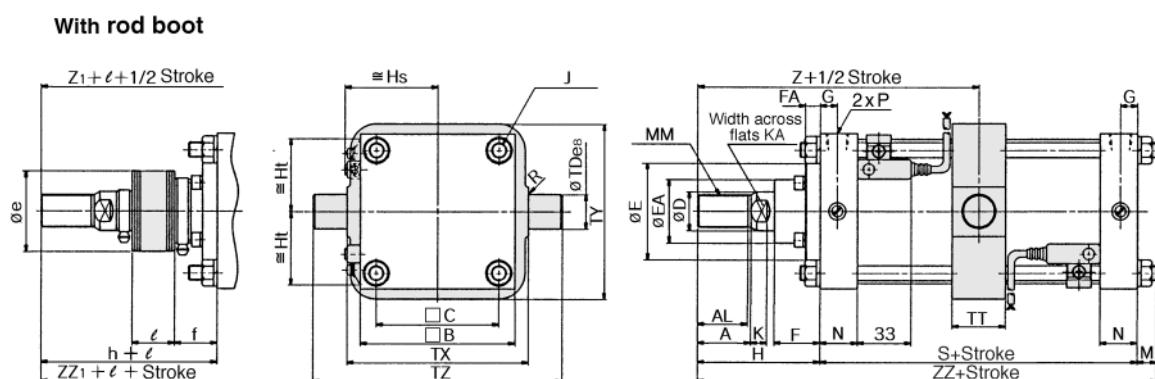
Series C□S1

Centre Trunnion/CS1T

Lube (CS1T), Non-lube (CS1TN), Air-hydro (CS1TH)



With auto switch/CDS1T



Style	Bore (mm)	Stroke range (mm)*	A	AL	□B	□C	D	E	EA	F	FA	G	J	K	KA	M	MM	N	P	R	S	TDes	TT	TX
Lube	125	25 to 1000	50	47	145	115	36	90	59	43	14	16	M14 X 1.5	15	31	19	M30 X 1.5	35	1/2	1	98	32 ^{-0.050} _{-0.089}	50	170
Non-lube	140	30 to 1000	50	47	161	128	36	90	59	43	14	16	M14 X 1.5	15	31	19	M30 X 1.5	35	1/2	1.5	98	36 ^{-0.050} _{-0.089}	55	190
Air-hydro	160	35 to 1200	56	53	182	144	40	90	59	43	14	18.5	M16 X 1.5	17	36	22	M36 X 1.5	39	3/4	1.5	106	40 ^{-0.050} _{-0.089}	60	212
Lube	180	30 to 1200	63	60	204	162	45	115	70	48	17	18.5	M18 X 1.5	20	41	26	M40 X 1.5	39	3/4	2	111	45 ^{-0.050} _{-0.089}	59	236
Non-lube	200	30 to 1200	63	60	226	182	50	115	74	48	17	18.5	M20 X 1.5	20	46	26	M45 X 1.5	39	3/4	2	111	45 ^{-0.050} _{-0.089}	59	265
	250	30 to 1200	71	67	277	225	60	140	86	60	20	23	M24 X 1.5	25	56	30	M56 X 2	49	1	3	141	56 ^{-0.060} _{-0.106}	69	335
	300	35 to 1200	80	76	330	270	70	140	96	60	20	23	M30 X 1.5	30	65	36	M64 X 2	49	1	4	146	67 ^{-0.060} _{-0.106}	79	400

												(mm)
Style	Bore (mm)	TY	TZ	W/o rod boot			W/rod boot					
				H	Z	ZZ	e	f	h	l	Z1	ZZ1
Lube	125	164	234	110	159	227	75	40	133	0.2 Stroke	182	250
Non-lube	140	184	262	110	159	227	75	40	133	0.2 Stroke	182	250
Air-hydro	160	204	292	120	173	248	75	40	141	0.2 Stroke	194	269
Lube Non-lube	180	228	326	135	190.5	272	85	45	153	0.2 Stroke	208.5	290
	200	257	355	135	190.5	272	90	45	153	0.2 Stroke	208.5	290
	250	325	447	160	230.5	331	105	55	176	0.17 Stroke	246.5	347
	300	390	534	175	248	357	115	55	190	0.17 Stroke	263	372

* In case of rod boot style, min. stroke is 30 mm or more.

(In case of rod boot style of bore size Ø 160 and Ø 300, min. stroke is 35 mm or more.)

With auto switch/Ø 125 to Ø 200 only (mm)

Style	Bore (mm)	Stroke range (mm)	S	W/o rod boot		W/ rod boot	
				Z	ZZ	Z1	ZZ1
Lube	125	to 1000	98	159	227	182	250
Non-lube	140	to 1000	98	159	227	182	250
Air-hydro	160	to 1200	106	173	248	194	269
Lube	180	to 1200	115	192.5	276	210.5	294
Non-lube	200	to 998	120	195	281	213	299

* Other dimensions are the same as standard style.

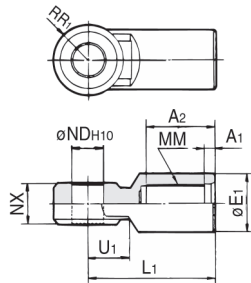
** Refer to p. 21 for dimensions of auto switch setting position and mounting height.

*** Refer to p. 9 for auto switch min. mountable stroke.

Air Cylinder Series CS1 Accessory Dimensions

Accessories

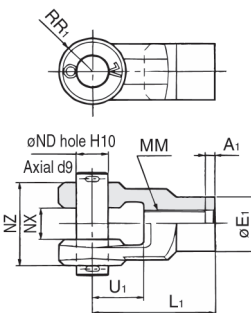
I type single knuckle joint*



Material: Cast iron

Part No.	Bore (mm)	A ₁	A ₂	E ₁	L ₁	MM	ND _{H10}	NX	RR ₁	U ₁
I-12	125	8	54	46	100	M30 X 1.5	25 ^{+0.084} ₀	32 ^{-0.1} _{-0.3}	27	33
I-14	140	8	54	48	105	M30 X 1.5	28 ^{+0.084} ₀	36 ^{-0.1} _{-0.3}	30	39
I-16	160	8	60	55	110	M36 X 1.5	32 ^{+0.1} ₀	40 ^{-0.1} _{-0.3}	34	39
I-18	180	8	67	70	125	M40 X 1.5	40 ^{+0.1} ₀	50 ^{-0.1} _{-0.3}	42.5	44
I-20	200	8	67	70	125	M45 X 1.5	40 ^{+0.1} ₀	50 ^{-0.1} _{-0.3}	42.5	44
I-25	250	9	75.5	86	160	M56 X 2	50 ^{+0.1} ₀	63 ^{-0.1} _{-0.3}	53	66
I-30	300	9	84.5	105	175	M64 X 2	63 ^{+0.12} ₀	80 ^{-0.1} _{-0.3}	66	71

Y type double knuckle joint *



Material: Cast iron

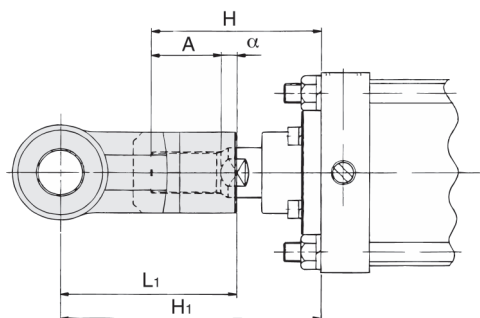
Part No.	Bore (mm)	A ₁	E ₁	L ₁	MM	ND _{H10}	NX	NZ	RR ₁	U ₁
Y-12	125	8	46	100	M30 X 1.5	25 ^{+0.084} ₀	32 ^{+0.3} _{+0.1}	64 ^{-0.1} _{-0.3}	27	42
Y-14	140	8	48	105	M30 X 1.5	28 ^{+0.084} ₀	36 ^{+0.3} _{+0.1}	72 ^{-0.1} _{-0.3}	30	47
Y-16	160	8	55	110	M36 X 1.5	32 ^{+0.1} ₀	40 ^{+0.3} _{+0.1}	80 ^{-0.1} _{-0.3}	34	46
Y-18	180	8	70	125	M40 X 1.5	40 ^{+0.1} ₀	50 ^{+0.3} _{+0.1}	100 ^{-0.1} _{-0.3}	42.5	54
Y-20	200	8	70	125	M45 X 1.5	40 ^{+0.1} ₀	50 ^{+0.3} _{+0.1}	100 ^{-0.1} _{-0.3}	42.5	54
Y-25	250	9	86	160	M56 X 2	50 ^{+0.1} ₀	63 ^{+0.3} _{+0.1}	126 ^{-0.1} _{-0.3}	53	81
Y-30	300	9	105	175	M64 X 2	63 ^{+0.12} ₀	80 ^{+0.3} _{+0.1}	160 ^{-0.1} _{-0.3}	66	87

* Use a single knuckle joint or a double knuckle joint individually.

(Screw it entirely over the rod end threads and tighten it.)

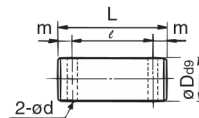
* To use a single knuckle joint or a double knuckle joint concurrently with a rod end nut, extend dimensions A/H.
(To extend dimensions A/H, refer to the table below, and specify the product as Order Made -XAO.)

Single/Double knuckle joint mounting



Symbol	H	A	α	L ₁	H ₁	Applicable knuckle joint part No.	
Bore (mm)						I type single knuckle	Y type double knuckle
125	110	50	3.5	100	156.5	I-12	Y-12
140	110	50	3.5	105	161.5	I-14	Y-14
160	120	56	3.5	110	170.5	I-16	Y-16
180 / 200	135	63	3.5	125	193.5	I-18, I-20	Y-18, Y-20
250	160	71	3.5	160	245.5	I-25	Y-25
300	175	80	3.5	175	266.5	I-30	Y-30

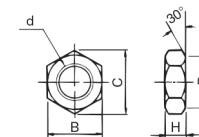
Knuckle pin, Clevis pin



Material: Carbon steel

Part No.	Bore (mm)	Dd9	L	I	m	d (Drill through)	Cotter pin
IY-12	125	25 ^{-0.065} _{-0.117}	79.5	69.5	5	4	ø4 X 40
IY-14	140	28 ^{-0.065} _{-0.117}	86.5	76.5	5	4	ø4 X 40
IY-16	160	32 ^{-0.080} _{-0.142}	94.5	84.5	5	4	ø4 X 40
IY-18	180/200	40 ^{-0.080} _{-0.142}	115	105	5	4	ø4 X 55
IY-25	250	50 ^{-0.080} _{-0.142}	144	132	6	5	ø5 X 65
IY-30	300	63 ^{-0.100} _{-0.174}	178	166	6	5	ø5 X 80

Rod end nut



Material: Rolled steel

Part No.	Bore (mm)	d	H	B	C	D
NT-12	125/140	M30 X 1.5	18	46	53.1	44
NT-16	160	M36 X 1.5	21	55	63.5	53
NT-18	180	M40 X 1.5	23	60	69.3	57
NT-20	200	M45 X 1.5	27	70	80.8	67
NT-25	250	M56 X 2	34	85	98.1	82
NT-30	300	M64 X 2	38	95	110.0	92

A, H dimensions at using both single/double knuckle joint and rod end nut

Bore (mm)	A	H
125	65	125
140	65	125
160	76	140
180	83	155
200	88	160
250	106	195
300	115	210

Air Cylinder/Double Rod

Series CS1W

Lube, Non-lube/Ø 125, Ø 140, Ø 160, Ø 180, Ø 200, Ø 250, Ø 300
Air-hydro/Ø 125, Ø 140, Ø 160

How to Order

Standard CS1W L 125 100

With auto switch CDS1W L 125 100 M9BW

Built in magnet (Ø 125 to Ø 200) (Built-in magnet)

Double rod type

Mounting

B	Basic type
L	Foot type
F	Rod side flange type
T	Center trunnion type

Tubing material

Symbol	Bore size (mm)	Tubing material	Stroke range (mm)	
			Without switch	With switch
-	125, 140	Aluminum tube	1000 or less	1000 or less
	160		1200 or less	1200 or less
	180	Steel tube	1200 or less	1200 or less
	200		1200 or less	998 or less
	250, 300		1200 or less	—
F	125, 140	Steel tube	1000 or less	1000 or less
	160		1200 or less	1200 or less

Port thread type

—	Rc
TN	NPT
TF	G

Bore size

Lube, Non-lube		Air-hydro	
125	125 mm	125	125 mm
140	140 mm	140	140 mm
160	160 mm	160	160 mm
180	180 mm		
200	200 mm		
250*	250 mm		
300*	300 mm		

* It is not available with auto switch.

Type

—	Lube
N	Non-lube
H	Air-hydro

Number of auto switches

—	2 pcs.
3	3 pcs.
S	1 pc.
n	"n" pcs.

Auto switch

— Without auto switch

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

Suffix for cylinder

Rod boot in one side	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Rod boot in both sides	JJ	Nylon tarpaulin
	KK	Heat resistant tarpaulin
Cushion	N	Without cushion
	R	With cushion in rod side
	H	With cushion in head side
	—	With cushion in both sides (Air-hydro type has no cushion.)
	—	With cushion in both sides (Air-hydro type has no cushion.)

Cylinder stroke (mm)

* If specifying more than one symbol, indicate them in alphabetically.
** Air-hydro type has no cushion. No symbol indicates no cushion.

Built-in magnet cylinder model

If a built-in magnet cylinder without auto switch is required, there is no need to enter the symbol for auto switch. (Example) CDS1WB125-100

Applicable Auto Switches/Refer to auto switch guide for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage			Auto switch model		Lead wire length (m)				Pre-wired connector	Applicable load					
					DC		AC	Tie-rod mounting	Band mounting	0.5 (—)	1 (M)	3 (L)	5 (Z)							
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC circuit	Relay, PLC				
				3-wire (PNP)				M9P	—	●	●	●	○	○						
		2-wire		M9B				—	●	●	●	○	○							
		Terminal conduit		3-wire (NPN)	24 V	5 V, 12 V	—	G39	—	—	—	—	—	—	IC circuit					
	2-wire			—			K39	—	—	—	—	—	—	—						
	Diagnostic indication (2-color indicator)	Grommet		3-wire (NPN)			24 V	5 V, 12 V	—	M9NW	—	●	●	●	○		○	IC circuit		
				3-wire (PNP)	M9PW	—				●	●	●	○	○						
				2-wire	M9BW	—				●	●	●	○	○	—					
				3-wire (NPN)	M9NA*1	—				○	○	●	○	○	IC circuit					
				3-wire (PNP)	M9PA*1	—				○	○	●	○	○						
				2-wire	M9BA*1	—				○	○	●	○	○	—					
				With diagnostic output (2-color indicator)	4-wire (NPN)	F59F				—	●	—	●	○	○		IC circuit			
				Magnetic field resistant (2-color indicator)	2-wire (Non-polar)	P3DWA				—	●	—	●	●	○		—			
	Reed auto switch	—		Grommet	Yes	3-wire(NPN equivalent)	24 V	12 V	—	5 V	—	A96	—	●	—		●	—	—	IC circuit
100 V			A93						—	●	●	●	—	—	—					
5 V, 12 V			100 V or less						A90	—	●	—	●	—	—	—	IC circuit			
100 V, 200 V			A54						—	●	—	●	—	—	—					
Terminal conduit		DIN terminal	Yes	2-wire		24 V			12 V	200 V or less	A64	—	●	—	●	—	—	—	—	PLC
										—	A33	—	—	—	—	—	—			
										—	A34	—	—	—	—	—	—			
										—	A44	—	—	—	—	—	—			
										—	A59W	—	●	—	●	—	—			
										—	—	—	—	—	—	—	—			
Diagnostic indication (2-color indicator)	Grommet	—	—	—	—	—	—	—	—	—	—	—	—	Relay, PLC						

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

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

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

* Since there are other applicable auto switches than listed above, refer to page 36 for details.

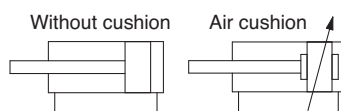
* For details about auto switches with pre-wired connector, refer to auto switch guide.

* D-A9□/M9□/M9□W/M9□A/P3DWA□ auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled before shipped.)

Air Cylinder/Double Rod **Series CS1W**



Symbol



Made to Order Specifications

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat-resistant cylinder (−10 to 150 °C)
-XC4	With heavy duty scraper
-XC5	Heat resistant cylinder (110 °C)
-XC6	Made of stainless steel
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC30	Rod side trunnion
-XC35	With coil scraper

Major Material and Surface Treatments

Description	Material	Note
Cover	Rolled steel plate	Black coated
Tube*	Ø 125, Ø 140, Ø 160	Aluminium alloy
		Hard anodised
	Ø 180, Ø 200, Ø 250, Ø 300	Carbon steel tube
Sliding seals	Lube	NBR
	Non-lube	NBR
	Air-hydro	NBR
Piston rod	Carbon steel tube ^{Note)}	Hard chrome plated
Piston	Lube	Cast iron (With auto switch, Aluminium alloy casting)
	Non-lube	Aluminium alloy cast (Steel tubing: Cast iron)
	Air-hydro	Aluminium alloy cast (Steel tubing: Cast iron)

* In case of an auto switch with bore sizes of Ø 180 and Ø 200, tube material is Aluminium alloy (hard anodised). Piston seal is NLP.

Weight/Steel tubing

Bore size (mm)	Ø 125	Ø 140	Ø 160	Ø 180	Ø 200	Ø 250	Ø 300
Basic weight	Basic	16.85	20.03	27.12	36.90	45.79	85.36
	Foot	18.48	22.55	29.92	41.10	50.67	94.86
	Front flange	19.53	25.03	33.51	46.73	57.70	107.20
	Trunnion	20.98	25.76	34.52	47.52	59.78	113.20
Additional weight per 100stroke		3.46	3.81	4.57	6.20	7.29	11.30
Accessory	Single knuckle joint	0.91	1.16	1.56	3.07	2.90	5.38
	Double knuckle joint (Knuckle pin, Cotter pin)	1.37	1.81	2.48	4.74	4.59	9.22
	Rod end nut	0.16	0.16	0.23	0.32	0.85	1.26

Specifications

Style	Lube/Non-lube	Air-hydro
Fluid	Air	Turbine oil
Proof pressure	1.57 MPa	
Max. operating pressure	0.97 MPa	0.97 MPa
Min. operating pressure	0.05 MPa	0.06 MPa
Piston speed	50 to 500 mm/s	0.5 to 200 mm/s
Cushion	Air cushion	Without
Ambient and fluid temperature	No switch	0 to 70 °C (No condensation)
	With switch	0 to 60 °C (No condensation)
Thread tolerance	JIS 2 class	
Stroke length tolerance	250 or less: $+1.0_0$ 251 to 1,000: $+1.4_0$ 1,001 to 1,200: $+1.8_0$	
Mounting	Basic, Foot, Front flange, Centre trunnion	

Maximum Stroke

Tubing material	Aluminum tube		Steel tube
	Without switch	With switch	Without switch
Bore size (mm)	Basic type, Foot type, Rod side flange type, Center trunnion type		
125, 140	1000 or less	1000 or less	1000 or less
160	1200 or less	1200 or less	1200 or less
180	—	1200 or less	1200 or less
200	—	998 or less ^{Note 1)}	1200 or less
250, 300	—	—	1200 or less

Note 1) For models with a bore size of 200 with auto switches, strokes of 999 to 1200 are available as special orders.

Note 2) Using a stroke of a length which is smaller than the effective cushion length may result in reduced air cushion performance.

Weight/Aluminium tube: Lube style (Non-lube, Air-hydro style) (kg)

Bore size (mm)	Ø 125	Ø 140	Ø 160
Basic weight	Basic	16.51 (15.28)	19.62 (18.12)
	Foot	18.14 (16.91)	22.14 (20.64)
	Front flange	19.19 (17.96)	24.62 (23.12)
	Trunnion	20.64 (19.41)	25.35 (23.85)
Additional weight per 100stroke		2.57	2.76
Accessory	Single knuckle joint	0.91	1.16
	Double knuckle joint (Knuckle pin, Cotter pin)	1.37	1.81
	Rod end nut	0.16	0.16

* () shows non-lube and air-hydro style.

Calculation method: (Example) **CS1WL125-500**

- Basic weight 18.14 (Foot style, Ø 125)
- Additional weight 2.57/100 Stroke
- Cylinder stroke 500 Stroke

$$18.14 + 2.57 \times 500 / 100 = 30.99 \text{ kg}$$

Series CS1W

Rod Boot Materials

Symbol	Material	Max. ambient temp
J	Nylon tarpaulin	60 °C
K	Heat resistant tarpanlin	110 °C*

* Max. ambient temperature for the rod boot itself

Accessories

	Mounting	Basic	Foot	Front flange	Center trunnion
Accessory	Rod end nut	●	●	●	●
	Single knuckle joint	●	●	●	●
	Double knuckle joint (With knuckle pin/cotter pin)	●	●	●	●
	Rod boot	●	●	●	●

Mounting Bracket

Bore size (mm)	125	140	160	180	200	250	300
Foot*	CS1W-L12	CS1W-L14	CS1W-L16	CS1W-L18	CS1W-L20	CS1W-L25	CS1W-L30
Flange	CS1-F12	CS1-F12	CS1-F16	CS1-F18	CS1-F20	CS1-F25	CS1-F30

* Order 2 foot brackets for one cylinder.

Auto Switch Mounting Bracket

Auto switch model	Bore size (mm)				
	125	140	160	180	200
D-A5/A59W/F5□/J5□/F5NT D-F5□W/J59W/F5BA/F5□F	BT-12	BT-12	BT-16	BT-18A	BT-20
D-A3/A44/G39/K39	BS1-125	BS1-140	BS1-160	BS1-180	BS1-200

* Stainless mounting screw set

A set of following stainless steel mounting screws (including a set screw) is attached.

(A switch mounting band is not attached. Please order the band separately.)

BBA1: D-A5/A6/F5/J5

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

When a switch only is shipped, "BBA1" screw is attached.

Double Acting Double Rod Style/Replacement Parts (Seal kits)

When ordering the replacement parts (seal kits) for Series CS1W double rod style cylinder, indicate the order number listed in the table on the right. Each set of replacement parts contains the following: wiper ring, rod seal, piston seal, valve seal, tube gasket, and push plate gasket (for 1 cylinder).

Lube style

Bore (mm)	Kit No.	Wiper ring	Rod seal	Piston seal	Valve seal	Tube gasket	Holder plate gasket
125	CS1W-125A-PS	SDR-36	P36	P115	P7	C120	G55
140	CS1W-140A-PS	SDR-36	P36	P130	P7	C135	G55
160	CS1W-160A-PS	SDR-40	P40	P150	P7	C155	G55
180	CS1W-180A-PS	SDR-45	P45	P165	P7	C175	G65
200	CS1W-200A-PS	SDR-50	P50A	P185	P7	C195	G65
250	CS1W-250A-PS	SDR-60	P60	P235	P7	CS160-1618-G4	G80
300	CS1W-300A-PS	SDR-70	P70	P285	P7	CS160-1618-G5	G90

* Seal kit includes a grease pack (Ø 125 to 160: 40 g, Ø 180 and 200: 50 g, Ø 250 and 300: 60 g). Order with the following part number when only the grease pack is needed.

Grease pack part no.: GR-S-010 (10 g), GR-S-020 (20 g)

Non-lube style/Non-lube style with auto switch

Bore (mm)	Kit No.	Wiper ring	Rod seal	Piston seal	Valve seal	Tube gasket	Holder plate gasket
125	CS1WN125A-PS	SDR-36	PNY-36	NLP-125A	P7	C120	G55
140	CS1WN140A-PS	SDR-36	PNY-36	NLP-140A	P7	C135	G55
160	CS1WN160A-PS	SDR-40	PNY-40	NLP-160A	P7	C155	G55
180	CS1WN180A-PS	SDR-45	PNY-45	NLP-180A	P7	C175	G65
200	CS1WN200A-PS	SDR-50	PNY-50	NLP-200A	P7	C195	G65
250*	CS1WN250A-PS	SDR-60	PNY-60	NLP-250A	P7	CS160-1618-G4	G80
300*	CS1WN300A-PS	SDR-70	PNY-70	NLP-300A	P7	CS160-1618-G5	G90

* It is not available with auto switch.

* Seal kit includes a grease pack (Ø 125 to 160: 40 g, Ø 180 and 200: 50 g, Ø 250 and 300: 60 g). Order with the following part number when only the grease pack is needed.

Grease pack part no.: GR-S-010 (10 g), GR-S-020 (20 g)

Lube style with auto switch

Bore (mm)	Kit No.	Wiper ring	Rod seal	Piston seal	Valve seal	Tube gasket	Holder plate gasket
125	CS1W-125A-PS	SDR-36	P36	P115	P7	C120	G55
140	CS1W-140A-PS	SDR-36	P36	P130	P7	C135	G55
160	CS1W-160A-PS	SDR-40	P40	P150	P7	C155	G55
180	CDS1W180A-PS	SDR-45	P45	NLP-180A	P7	C175	G65
200	CDS1W200A-PS	SDR-50	P50A	NLP-200A	P7	C195	G65

* Seal kit includes a grease pack (Ø 125 to 160: 40 g, Ø 180 and 200: 50 g). Order with the following part number when only the grease pack is needed.

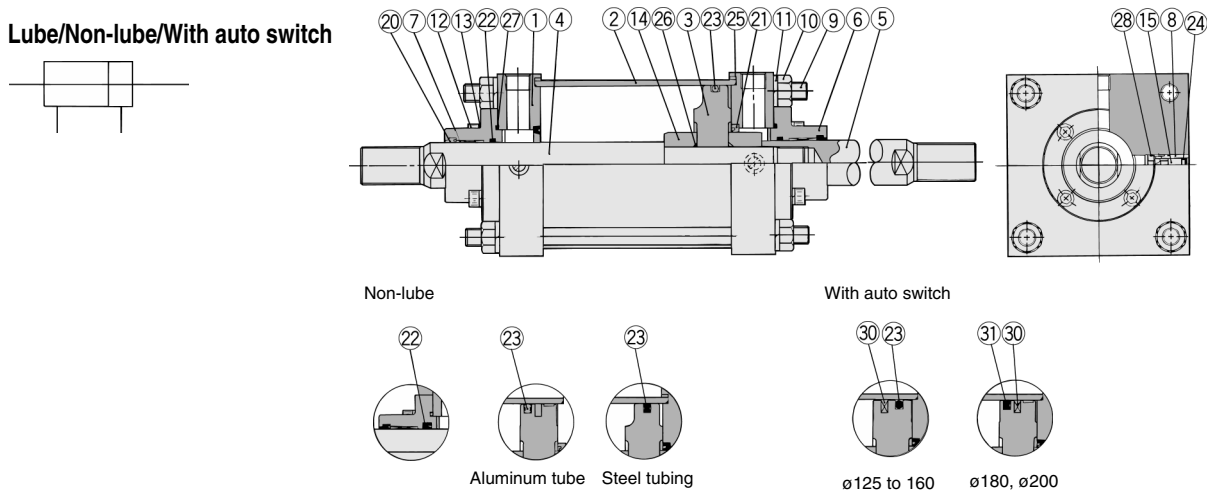
Grease pack part no.: GR-S-010 (10 g), GR-S-020 (20 g)

Air-hydro style

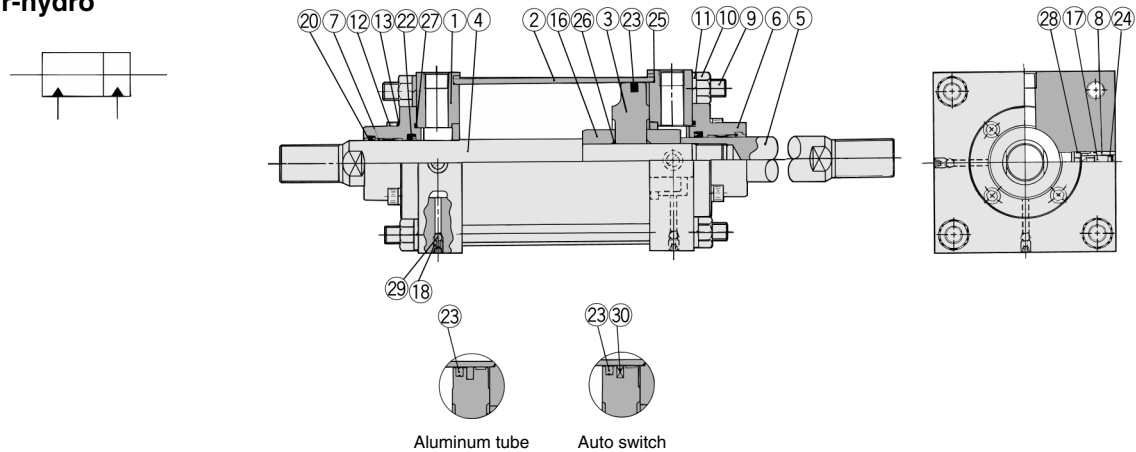
Bore (mm)	Kit No.	Wiper ring	Rod seal	Piston seal	Valve seal	Tube gasket	Holder plate gasket
125	CS1WH125A-PS	SDR-36	SKY-36	RPS-125	P7	C120	G55
140	CS1WH140A-PS	SDR-36	SKY-36	RPS-140	P7	C135	G55
160	CS1WH160A-PS	SDR-40	SKY-40	RPS-160	P7	C155	G55

Construction

Lube/Non-lube/With auto switch



Air-hydro



Component Parts

No.	Description	Material	Note
①	Rod cover	Rolled steel	Black coated
②	Cylinder tube	Ø 125 to Ø 160 Aluminium alloy Ø 125 to Ø 300** Carbon steel tube	Hard anodised Inside: Hard chrome plated
③	Piston	Cast iron**	
④	Piston rod A	Carbon steel	Hard chrome plated
⑤	Piston rod B	Carbon steel	Hard chrome plated
⑥	Holder plate	Cast iron	Black coated
⑦	Bushing	Lead bronze casting	
⑧	Valve guide	Brass	
⑨	Tie rod	Carbon steel	Chromed
⑩	Tie rod nut	Rolled steel	Black zinc chromated
⑪	Spring washer	Steel wire	Black zinc chromated
⑫	Holder plate bolt	Chrome-molybdenum steel	Black zinc chromated
⑬	Spring washer	Steel wire	Black zinc chromated
⑭	Cushion ring A	Rolled steel	Electroless nickel plating
⑮	Cushion valve	Rolled steel	Electroless nickel plating
⑯	Spacer A	Rolled steel	
⑰	Air releasing valve B	Rolled steel	Zinc chromated
⑱	Air releasing valve A	Chrome-molybdenum steel	
⑲	Check ball	Chrome bearing steel	
⑳	Magnet	—	

** In the case of the aluminium tube of non-lube and air-hydro type, piston material is an Aluminium alloy casted. In the case of auto switch bore size Ø 180 and Ø 200, piston material is Aluminium alloy casted and tubing material is Aluminium alloy (hard anodised).

• Trunnion type should not be disassembled. (Refer to page 36.)

Seal List

No.	Description	Mat'l	Part No.						
			125	140	160	180	200	250	300
⑳	Wiper ring	NBR	SDR-36	SDR-36	SDR-40	SDR-45	SDR-50	SDR-60	SDR-70
㉑*	Cushion seal		DSM-50S	DSM-50S	DSM-50S	DSM-60S	DSM-60S	DSM-75S	PCS-85
㉒	Rod seal		P36	P36	P40	P45	P50A	P60	P70
㉓	Piston seal		P115	P130	P150	P165	P185	P235	P285
㉔	Valve seal		P7	P7	P7	P7	P7	P7	P7
㉕	Tube gasket		C120	C135	C155	C175	C195	CS160-1618-G4	CS160-1618-G5
㉖*	Piston gasket		G25	G25	G25	G35	G35	G45	G45
㉗	Holder plate gasket		G55	G55	G55	G65	G65	G80	G90
㉘*	Guide gasket		N-12.5-1.5	N-12.5-1.5	N-12.5-1.5	N-12.5-1.5	N-12.5-1.5	N-12.5-1.5	N-12.5-1.5

Non-lube Style Seals except ㉒ and ㉓ are the same as lube style.

㉒	Rod seal	NBR	PNY-36	PNY-36	PNY-40	PNY-45	PNY-50	PNY-60	PNY-70
㉓	Piston seal		NLP-125A	NLP-140A	NLP-160A	NLP-180A	NLP-200A	NLP-250A	NLP-300A

Air-hydro Style Seals except ㉒ and ㉓ are the same as lube style.

㉒	Rod seal	NBR	SKY-36	SKY-36	SKY-40
㉓	Piston seal		RPS-125	RPS-140	RPS-160

Lube Style (With switch) Seals except ㉓ are the same as lube style.

No.	Description	Mat'l	Part No.	
			180	200
㉓	Piston seal	NBR	NLP-180A	NLP-200A

Replacement Part (Seal kits)

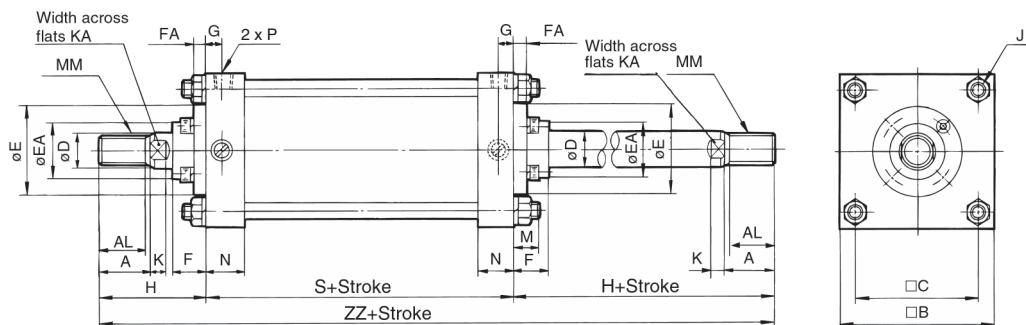
• Refer to page 23 for replacement part no.(seal kits) of double rod style cylinder series CS1W.

** Seal set does not include cushion seal, piston seal and guide gasket because they are not replacement parts.

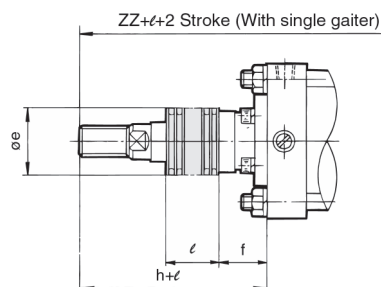
Series CS1W

Basic/CS1WB

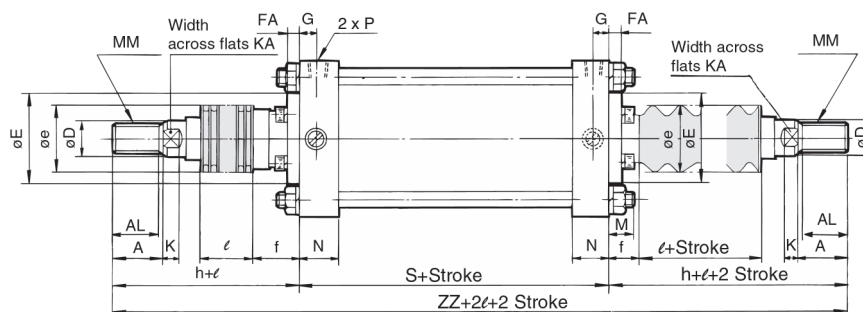
Lube (CS1WB), Non-lube (CS1WBN), Air-hydro (CS1WBH)



With single rod boot



With double rod boot



Style	Bore (mm)	Stroke range (mm)		A	AL	□B	□C	D	E	EA	F	FA	G	J	K	KA	M	MM	N	P	S
		W/o rod boot	W/ rod boot																		
Lube Non-lube Air-hydro	125	to 1000	30 to 1000	50	47	145	115	36	90	59	43	14	16	M14 X 1.5	15	31	27	M30 X 1.5	35	1/2	98
	140	to 1000	30 to 1000	50	47	161	128	36	90	59	43	14	16	M14 X 1.5	15	31	27	M30 X 1.5	35	1/2	98
	160	to 1200	30 to 1200	56	53	182	144	40	90	59	43	14	18.5	M16 X 1.5	17	36	30.5	M36 X 1.5	39	3/4	106
Lube Non-lube	180	to 1200	30 to 1200	63	60	204	162	45	115	70	48	17	18.5	M18 X 1.5	20	41	35	M40 X 1.5	39	3/4	111
	200	to 1200	30 to 1200	63	60	226	182	50	115	74	48	17	18.5	M20 X 1.5	20	46	35	M45 X 1.5	39	3/4	111
	250	to 1200	30 to 1200	71	67	277	225	60	140	86	60	20	23	M24 X 1.5	25	56	41.5	M56 X 2	49	1	141
	300	to 1200	30 to 1200	80	76	330	270	70	140	96	60	20	23	M30 X 1.5	30	65	51.5	M64 X 2	49	1	146

Style	Bore (mm)	(mm)							
		W/o rod boot		W/ rod boot (Single side)				(Both sides)	
		H	ZZ	e	f	h	l	ZZ	ZZ
Lube Non-lube Air-hydro	125	110	318	75	40	133	0.2 Stroke	341	364
	140	110	318	75	40	133	0.2 Stroke	341	364
	160	120	346	75	40	141	0.2 Stroke	367	388
Lube Non-lube	180	135	381	85	45	153	0.2 Stroke	399	417
	200	135	381	90	45	153	0.2 Stroke	399	417
	250	160	461	105	55	176	0.17 Stroke	477	493
	300	175	496	115	55	190	0.17 Stroke	511	526

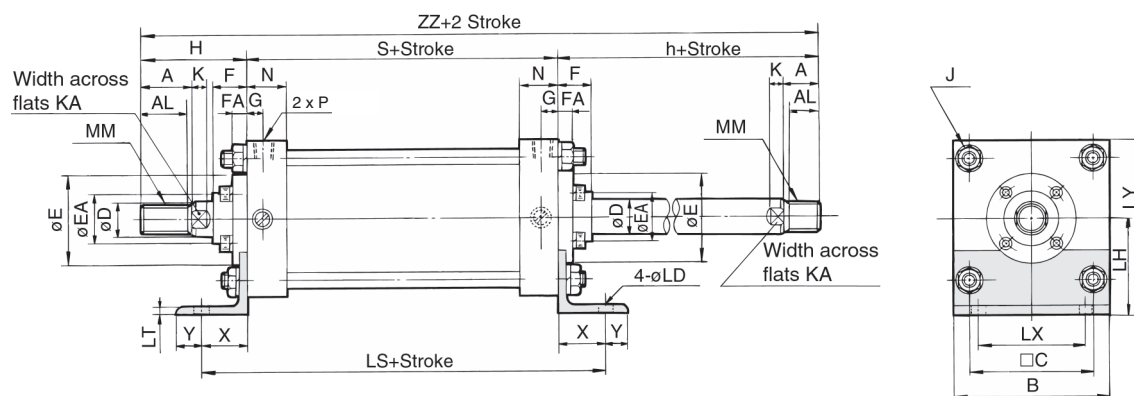
With auto switch/Ø 125 to Ø 200 only

Style	Bore (mm)	Stroke range (mm)		S	(mm)		
		W/o rod boot	W/ rod boot		W/o rod boot	W/ Rod boot (Single side)	W/ Rod boot (Both sides)
					ZZ	ZZ	ZZ
Lube Non-lube Air-hydro	125	to 1000	30 to 1000	98	318	341	364
	140	to 1000	30 to 1000	98	318	341	364
	160	to 1200	30 to 1200	106	346	367	388
Lube Non-lube	180	to 1200	30 to 1200	115	385	403	421
	200	to 998	30 to 998	120	390	408	426

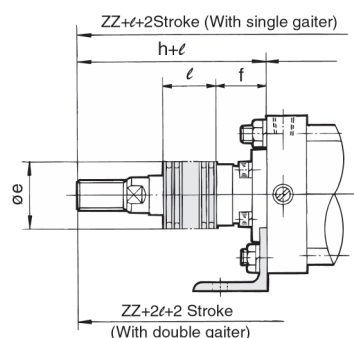
*** Refer to page 9 for auto switch min. mountable stroke.

Foot/CS1WL

Lube (CS1WL), Non-lube (CS1WLN), Air-hydro (CS1WLH)



With rod boot



Style	Bore (mm)	Stroke range (mm)		A	AL	B	□C	D	E	EA	F	FA	G	J	K	KA	LD	LH	LS	LT
		W/o rod boot	W/ rod boot																	
Lube Non-lube Air-hydro	125	to 1000	30 to 1000	50	47	145	115	36	90	59	43	14	16	M14 X 1.5	15	31	19	85	188	8
	140	to 1000	30 to 1000	50	47	161	128	36	90	59	43	14	16	M14 X 1.5	15	31	19	100	188	9
	160	to 1200	30 to 1200	56	53	182	144	40	90	59	43	14	18.5	M16 X 1.5	17	36	19	106	206	9
Lube Non-lube	180	to 1200	30 to 1200	63	60	204	162	45	115	70	48	17	18.5	M18 X 1.5	20	41	24	125	231	10
	200	to 1200	30 to 1200	63	60	226	182	50	115	74	48	17	18.5	M20 X 1.5	20	46	24	132	231	10
	250	to 1200	30 to 1200	71	67	277	225	60	140	86	60	20	23	M24 X 1.5	25	56	29	160	301	12
	300	to 1200	30 to 1200	80	76	330	270	70	140	96	60	20	23	M30 X 1.5	30	65	33	200	326	15

Style	Bore (mm)	LX	LY	MM	N	P	S	X	Y	(mm)						
										W/o rod boot	W/ rod boot (Single side)					
										H	ZZ	e	f	h	l	ZZ
Lube Non-lube Air-hydro	125	100	157.5	M30 X 1.5	35	1/2	98	45	20	110	318	75	40	133	0.2 Stroke	341
	140	112	180.5	M30 X 1.5	35	1/2	98	45	30	110	318	75	40	133	0.2 Stroke	341
	160	118	197	M36 X 1.5	39	3/4	106	50	25	120	346	75	40	141	0.2 Stroke	367
Lube Non-lube	180	132	227	M40 X 1.5	39	3/4	111	60	30	135	381	85	45	153	0.2 Stroke	399
	200	150	245	M45 X 1.5	39	3/4	111	60	30	135	381	90	45	153	0.2 Stroke	399
	250	180	298.5	M56 X 2	49	1	141	80	40	160	461	105	55	176	0.17 Stroke	477
	300	212	365	M64 X 2	49	1	146	90	40	175	496	115	55	190	0.17 Stroke	511

With auto switch/Ø 125 to Ø 200 only

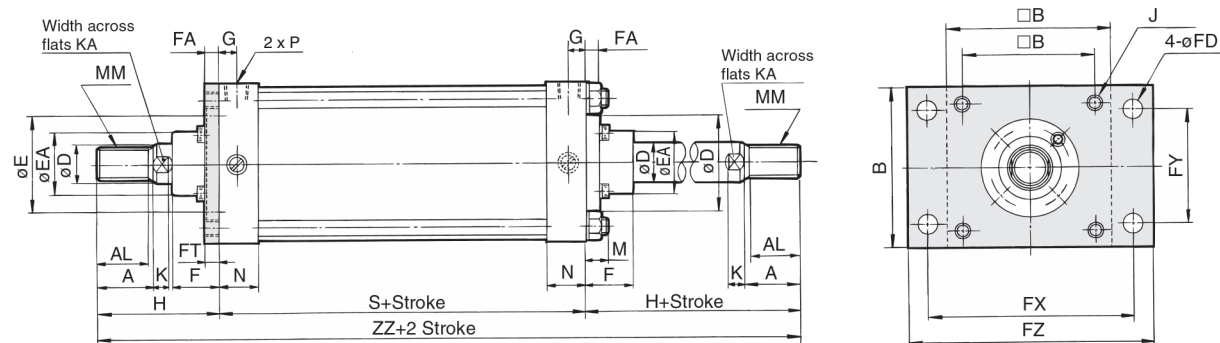
Style	Bore (mm)	Stroke range (mm)		S	LS	W/o rod boot	W/ rod boot (Single side)	W/ rod boot (Both sides)
		W/o rod boot	W/rod boot					
						ZZ	ZZ	ZZ
Lube Non-lube Air-hydro	125	to 1000	30 to 1000	98	188	318	341	364
	140	to 1000	30 to 1000	98	188	318	341	364
	160	to 1200	30 to 1200	106	206	346	367	388
Lube Non-lube	180	to 1200	30 to 1200	115	235	385	403	421
	200	to 998	30 to 998	120	240	390	408	426

*** Refer to page 9 for auto switch min. mountable stroke.

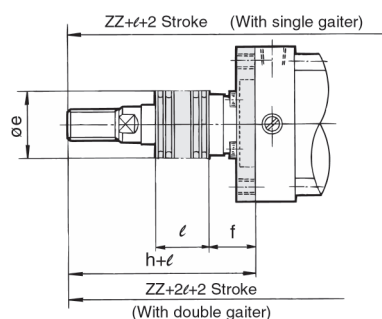
Air Cylinder/Double Rod **Series CS1W**

Front Flange/CS1WF

Lube (CS1WF), Non-lube (CS1WFN), Air-hydro (CS1WFH)



With rod boot



Style	Bore (mm)	Stroke range (mm)		A	AL	B	: B	: C	D	E	EA	F	FA	FD	FT	FX	FY	FZ	G	J
		W/o rod boot	W/ rod boot																	
Lube Non-lube Air-hydro	125	to 1000	30 to 1000	50	47	145	145	115	36	90	59	43	14	19	14	190	100	230	16	M14 X 1.5
	140	to 1000	30 to 1000	50	47	160	161	128	36	90	59	43	14	19	20	212	112	255	16	M14 X 1.5
	160	to 1200	30 to 1200	56	53	180	182	144	40	90	59	43	14	19	20	236	118	275	18.5	M16 X 1.5
Lube Non-lube	180	to 1200	30 to 1200	63	60	200	204	162	45	115	70	48	17	24	25	265	132	320	18.5	M18 X 1.5
	200	to 1200	30 to 1200	63	60	225	226	182	50	115	74	48	17	24	25	280	150	335	18.5	M20 X 1.5
	250	to 1200	30 to 1200	71	67	275	277	225	60	140	86	60	20	29	30	355	180	420	23	M24 X 1.5
	300	to 1200	30 to 1200	80	76	330	330	270	70	140	96	60	20	33	30	400	212	475	23	M30 X 1.5

																(mm)	
Style	Bore (mm)	K	KA	M	MM	N	P	S	W/o rod boot		W/ rod boot (Single side)					Both sides	
									H	ZZ	e	f	h	l	ZZ	ZZ	
Lube Non-lube Air-hydro	125	15	31	30	M30 X 1.5	35	1/2	98	110	318	75	40	133	0.2 Stroke	341	364	
	140	15	31	24	M30 X1.5	35	1/2	98	110	318	75	40	133	0.2 Stroke	341	364	
	160	17	36	26	M36 X 1.5	39	3/4	106	120	346	75	40	141	0.2 Stroke	367	388	
Lube Non-lube	180	20	41	31	M40 X 1.5	39	3/4	111	135	381	85	45	153	0.2 Stroke	399	417	
	200	20	46	31	M45 X 1.5	39	3/4	111	135	381	90	45	153	0.2 Stroke	399	417	
	250	25	56	35	M56 X 2	49	1	141	160	461	105	55	176	0.17 Stroke	477	493	
	300	30	65	48	M64 X 2	49	1	146	175	496	115	55	190	0.17 Stroke	511	526	

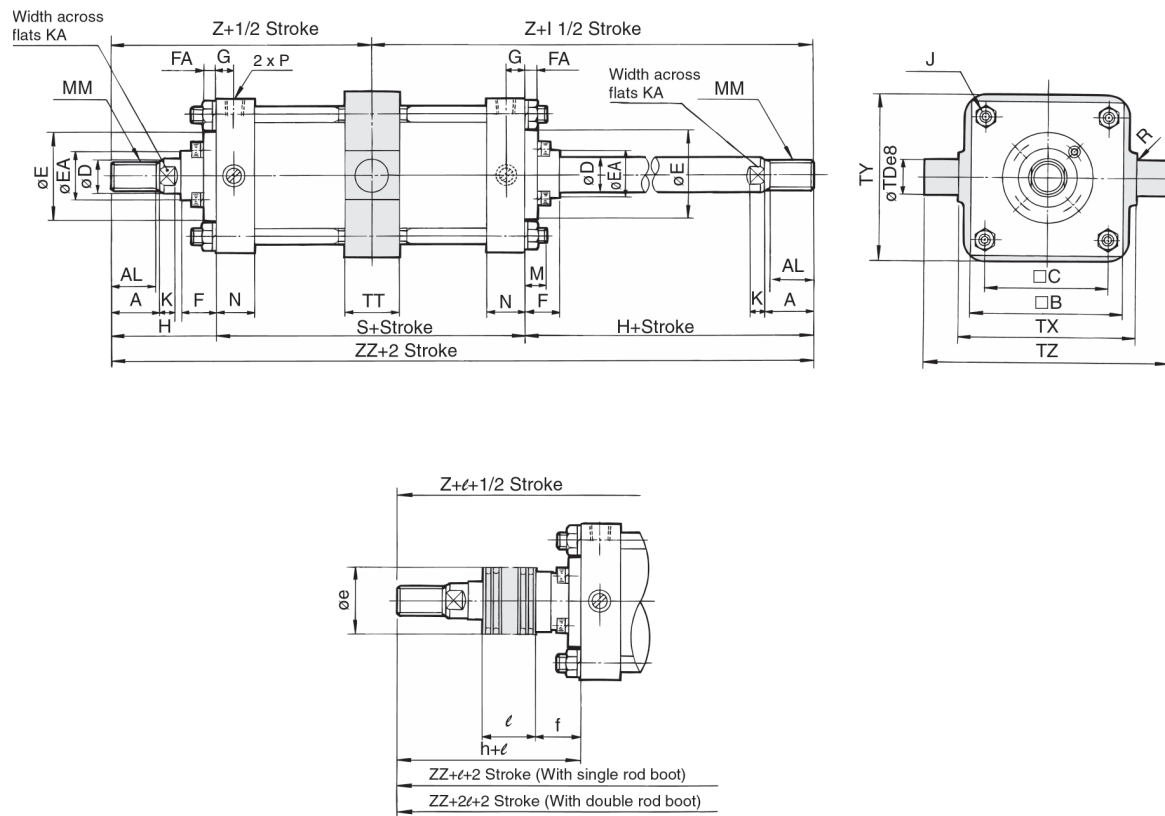
With auto switch/Ø 125 to Ø 200 only

Style	Bore (mm)	Stroke range (mm)		S	W/o rod boot	W/ rod boot (Single side)	W/ rod boot (Both sides)
		W/o rod boot	W/ rod boot				
Lube Non-lube Air-lube	125	to 1000	30 to 1000	98	318	341	364
	140	to 1000	30 to 1000	98	318	341	364
	160	to 1200	30 to 1200	106	346	367	388
Lube Non-lube	180	to 1200	30 to 1200	115	385	403	421
	200	to 998	30 to 998	120	390	408	426

*** Refer to page 9 for auto switch min. mountable stroke.

Center Trunnion/CS1WT

Lube (CS1WT), Non-lube (CS1WTN), Air-hydro (CS1WTH)



Style	Bore (mm)	Stroke range (mm)		A	AL	□B	□C	D	E	EA	F	FA	G	J	K	KA	M	MM	N	P	R	S
		W/o rod boot	W/ rod boot																			
Lube	125	25 to 1000	30 to 1000	50	47	145	115	36	90	59	43	14	16	M14 X 1.5	15	31	19	M30 X 1.5	35	1/2	1	98
Non-lube	140	30 to 1000	30 to 1000	50	47	161	128	36	90	59	43	14	16	M14 X 1.5	15	31	19	M30 X 1.5	35	1/2	1.5	98
Air-hydro	160	35 to 1200	35 to 1200	56	53	182	144	40	90	59	43	14	18.5	M16 X 1.5	17	36	22	M36 X 1.5	39	3/4	1.5	106
Lube Non-lube	180	30 to 1200	30 to 1200	63	60	204	162	45	115	70	48	17	18.5	M18 X 1.5	20	41	26	M40 X 1.5	39	3/4	2	111
	200	30 to 1200	30 to 1200	63	60	226	182	50	115	74	48	17	18.5	M20 X 1.5	20	46	26	M45 X 1.5	39	3/4	2	111
	250	30 to 1200	30 to 1200	71	67	277	225	60	140	86	60	20	23	M24 X 1.5	25	56	30	M56 X 2	49	1	3	141
	300	35 to 1200	35 to 1200	80	76	330	270	70	140	96	60	20	23	M30 X 1.5	30	65	36	M64 X 2	49	1	4	146

(mm)																	
Style	Bore (mm)	TDe ₈	TT	TX	TY	TZ	H	W/o rod boot		W/ rod boot (Single side)						(Both sides)	
								Z	ZZ	e	f	h	l	Z	ZZ	Z	ZZ
Lube Non-lube Air-hydro	125	32 ^{-0.050} _{-0.089}	50	170	164	234	110	159	318	75	40	133	0.2 Stroke	182	341	182	364
	140	36 ^{-0.050} _{-0.089}	55	190	184	262	110	159	318	75	40	133	0.2 Stroke	182	341	182	364
	160	40 ^{-0.050} _{-0.089}	60	212	204	292	120	173	346	75	40	141	0.2 Stroke	194	367	194	388
Lube Non-lube	180	45 ^{-0.050} _{-0.089}	59	236	228	326	135	190.5	381	85	45	153	0.2 Stroke	208.5	399	208.5	417
	200	45 ^{-0.050} _{-0.089}	59	265	257	355	135	190.5	381	90	45	153	0.2 Stroke	208.5	399	208.5	417
	250	56 ^{-0.060} _{-0.106}	69	335	325	447	160	230.5	461	105	55	176	0.17 Stroke	246.5	477	246.5	493
	300	67 ^{-0.060} _{-0.106}	79	400	390	534	175	248	496	115	55	190	0.17 Stroke	263	511	263	526

Auto switch style/Ø 125 to Ø 200 only (mm)

Style	Bore (mm)	Stroke range (mm)		S	W/o rod boot		W/ rod boot (Single side)		W/ rod boot (Both sides)
		W/o rod boot	W/rod boot		Z	ZZ	Z	ZZ	
Lube	125	25 to 1000	30 to 1000	98	159	318	182	341	364
Non-lube	140	30 to 1000	30 to 1000	98	159	318	182	341	364
Air-lube	160	35 to 1200	35 to 1200	106	173	346	194	367	388
Lube	180	30 to 1200	30 to 1200	115	192.5	385	210.5	403	421
Non-lube	200	30 to 998	30 to 998	120	195	390	213	408	426

*** Refer to page 9 for auto switch min. mountable stroke.

Air Cylinder/Low Friction

Series CS1□Q

Non-lube/Ø 125, Ø 140, Ø 160

How to Order

Standard CS1 L Q 160 300 JR

With auto switch CDS1 L Q 160 300 JR A53

Mounting

B	Basic
L	Foot
F	Front flange
G	Rear flange
C	Single clevis
D	Double clevis
T	Centre clevis

Low friction

Bore size

125	125 mm
140	140 mm
160	160 mm

Port thread type

—	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to page 30 for the standard stroke.

Number of auto switches

—	2
S	1
3	3
n	n

Auto switch

—	Without auto switch
---	---------------------

* Select the applicable auto switch from the table below.

Rod boot/Cushion

Rod boot	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Cushion	A	With double cushion
	R	With Front cushion
	H	With rear cushion
	—	Without cushion

* If specifying more than one symbol, please indicate them in alphabetical order.

Made to Order
(Refer to next page for details.)

Built-in magnet cylinder model

If a built-in magnet cylinder without auto switch is required, there is no need to enter the symbol for auto switch. (Example) CDS1WB125-200

Applicable Auto Switches/Refer to auto switch guide for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)				Pre-wired connector	Applicable load					
					DC	AC	Tie-rod mounting	Band mounting	0.5 (—)	1 (M)	3 (L)	5 (Z)							
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC circuit	Relay, PLC			
				3-wire (PNP)				M9P	—	●	●	●	○	○					
		2-wire		M9B				—	●	●	●	○	○						
		Terminal conduit		3-wire (NPN)	24 V	5 V, 12 V	—	G39	—	—	—	—	—	IC circuit					
	2-wire			—			K39	—	—	—	—	—							
	Diagnostic indication (2-color indicator)	Grommet		3-wire (NPN)			5 V, 12 V	—	M9NW	—	●	●	●	○	○		IC circuit		
				3-wire (PNP)					M9PW	—	●	●	●	○	○				
				2-wire					M9BW	—	●	●	●	○	○				
				Water resistant (2-color indicator)					3-wire (NPN)	5 V, 12 V	M9NA*1	—	○	○	●		○	○	IC circuit
									3-wire (PNP)		M9PA*1	—	○	○	●		○	○	
									2-wire		M9BA*1	—	○	○	●		○	○	—
									With diagnostic output (2-color indicator)		4-wire (NPN)	5 V, 12 V	F59F	—	●		—	●	○
				Magnetic field resistant (2-color indicator)						2-wire (Non-polar)	—		P3DWA	—	●		—	●	●
Reed auto switch	—	Grommet	Yes	3-wire(NPN equivalent)	—	5 V	—	A96	—	●	—	●	—	—	IC circuit	—			
				2-wire	24 V	12 V	100 V	A93	—	●	●	●	●	—			—		
						5 V, 12 V	100 V or less	A90	—	●	—	●	—	—			—	IC circuit	
							100 V, 200 V	A54	—	●	—	●	●	—					
							200 V or less	A64	—	●	—	●	—	—					
							—	—	A33	—	—	—	—	—					
	Terminal conduit	Yes	100 V, 200 V			—	—	A34	—	—	—	—	—	PLC					
			—			—	A44	—	—	—	—	—							
	DIN terminal	Yes	Grommet			—	—	A59W	—	●	—	●	—	—	—	Relay, PLC			
						—	—	—	—	—	—	—	—						

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

Consult with SMC regarding water resistant types with the above model numbers.

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

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

* Since there are other applicable auto switches than listed above, refer to page 35 for details.

* For details about auto switches with pre-wired connector, refer to auto switch guide.

* D-A9□/M9□/M9□W/M9□A/P3DWA□ auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled before shipped.)

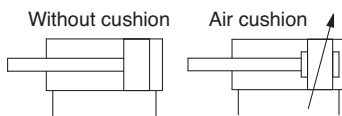
Designed with a low sliding resistance of the piston, this air cylinder is ideal for applications such as contact pressure control, which requires smooth movements at low pressures.

Low sliding resistance
Min. operating pressure – 0.005 MPa

Auto switch mounting is possible.



Symbol



Made to Order Specifications

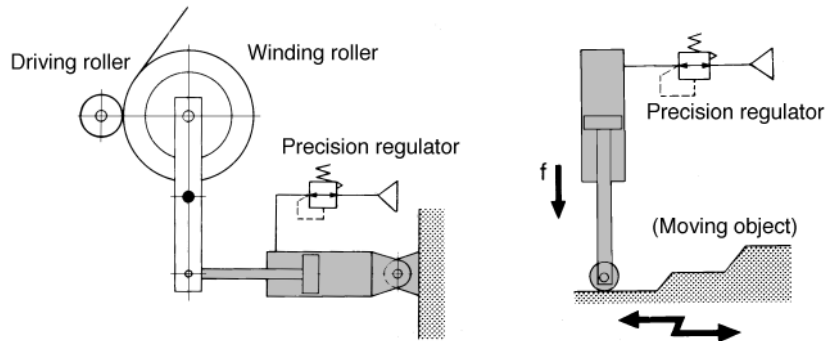
Symbol	Specifications
-XA□	Change of rod end shape
-XC3	Special port location
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC26	Clevis pins with flat washer
-XC27	Double clevis pins made of stainless steel (Stainless steel 304)
-XC30	Rod side trunnion

Cylinder with auto switch

Refer to the standard style double acting single rod (Series CS1) on page 8 for auto switch specifications of low friction style.

Application Example

A low friction cylinder is used in combination with a precision regulator (Series 1R, etc.).



Specifications

Action	Double acting single rod
Direction of low friction	Both directions
Fluid	Air
Proof pressure	1.05 MPa
Max. operating pressure	0.7 MPa
Min. operating pressure	0.005 MPa*
Ambient and fluid temperature	Without auto switch: 0 to 70 °C (No condensation), With auto switch: 0 to 60 °C (No condensation)
Allowable leakage rate	0.5 l/min (ANR) or less
Cushion	None (with air cushion style is available.)
Thread tolerance	JIS 2 class
Lube	Not required (Non-lube)
Bore size (mm)	Ø 125, Ø 140, Ø 160
Mounting	Basic, Foot, Front flange, Rear flange, Single clevis, Double clevis, Centre trunnion

* In case of cushion style, pressure inside cushion stroke is not included.

Max. Stroke

(mm)

Tube material	Aluminum alloy		Carbon steel	
Mounting bracket	Basic, Rear flange, Single clevis, Double clevis, Centre trunnion	Front flange	Basic, Rear flange, Single clevis, Double clevis, Centre trunnion	Foot, Front flange
Bore size (mm)				
125	1000 or less	1400 or less	1000 or less	1600 or less
140	1000 or less	1400 or less	1000 or less	1600 or less
160	1200 or less	1400 or less	1200 or less	1600 or less

Mounting Bracket Part No.

Bore size (mm)	125	140	160
Foot*	CS1-L12	CS1-L14	CS1-L16
Flange	CS1-F12	CS1-F14	CS1-F16
Single clevis	CS1-C12	CS1-C14	CS1-C16
Double clevis	CS1-D12	CS1-D14	CS1-D16

* Order 2 foot brackets for one cylinder.

Series CS1□Q

Accessories

	Mounting	Basic	Foot	Front flange	Rear flange	Single clevis	Double clevis	Center trunnion
Std. equipment	Clevis pin	—	—	—	—	—	●	—
Accessory	Rod end nut	●	●	●	●	●	●	●
	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (Knuckle pin, Cotter pin)	●	●	●	●	●	●	●
	Rod boot	●	●	●	●	●	●	●

Major Material and Surface Treatments

Description	Material	Note
Cover	Rolled steel	Black painted
Tube	Anodised alloy *	Hard anodised
	Carbon steel pipe	Inside: Hard chrome plated
Sliding part seal	NBR	
Piston rod	Carbon steel	Hard chrome plated
Piston	Anodised alloy cast	Chromated

* With auto switch

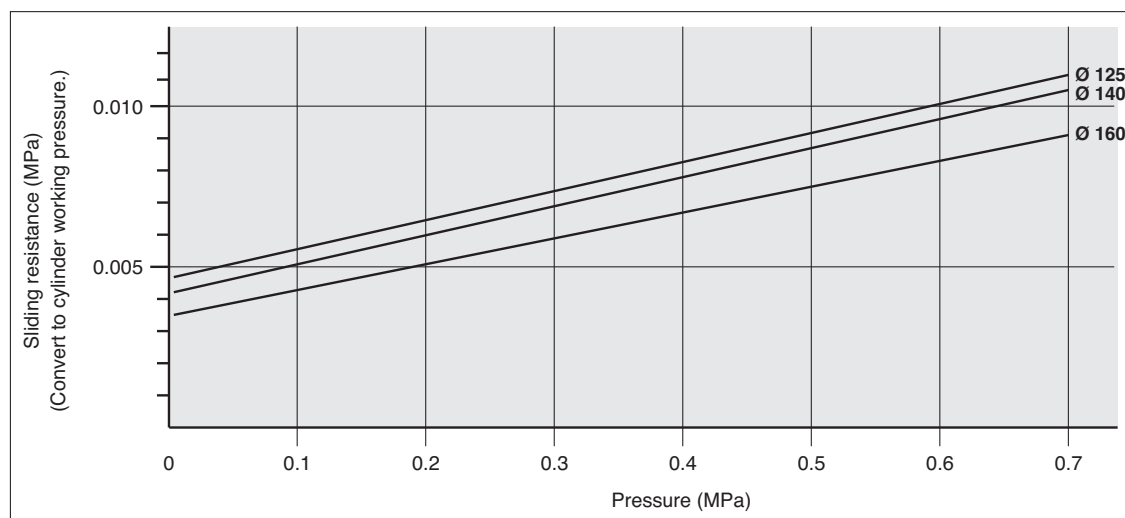
Weight/Steel tube (Refer to p.1.14-6 for anodised tube [With auto switch].) (kg)

Bore size (mm)		Ø 125	Ø 140	Ø 160
Basic weight	Basic	15.20	18.38	25.24
	Foot	16.83	20.90	28.04
	Front flange	17.88	23.38	31.63
	Rear flange	17.88	23.38	31.63
	Single clevis	18.27	22.67	30.73
	Double clevis	18.73	23.42	31.58
	Trunnion	19.33	24.11	32.64
Additional weight per 100 stroke		2.66	3.01	3.58
Accessory	Single knuckle joint	0.91	1.16	1.56
	Double knuckle joint (with pin)	1.37	1.81	2.48

Calculation example: **CS1LQ160, 500** (Foot, Ø 160)

- Basic weight 28.04
 - Additional weight 3.58/100 stroke
 - Cylinder stroke 500 stroke
- 28.04+3.58 X 500/100= 45.94 kg

Sliding Resistance



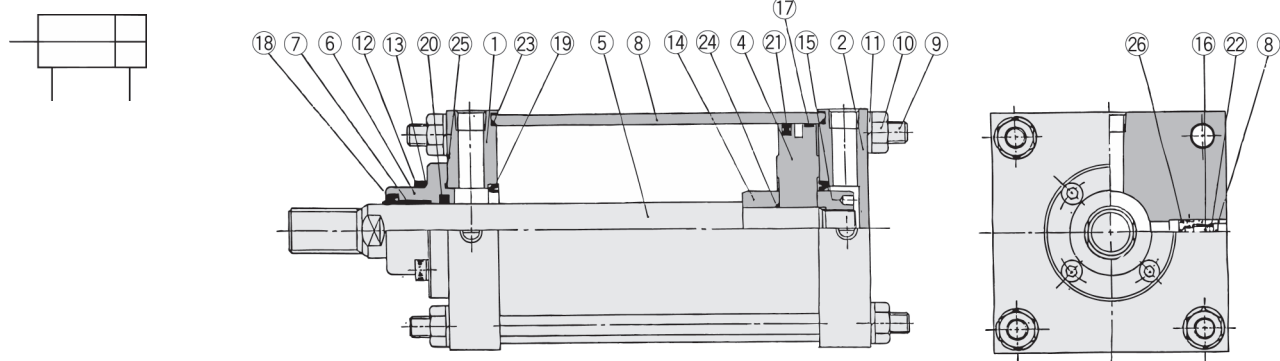
Rod Boot Materials

Symbol	Material	Max. ambient temp
J	Nylon tarpaulin	60 °C
K	Heat resistant tarpaulin	110 °C*

* Max. ambient temperature for the rod boot itself.

Construction

Non-lube



Component Parts

No.	Description	Material	Note
①	Rod cover	Rolled steel plate	Black coated
②	Head cover	Rolled steel plate	Black coated
③	Cylinder tube	Aluminium alloy*	Hard anodised
		Carbon steel pipe	Hard chrome plated
④	Piston	Aluminium alloy die cast	Chromated
⑤	Piston rod	Carbon steel	Hard chrome plated
⑥	Holder plate	Cast iron	Black coated
⑦	Bushing	Lead bronze casting	
⑧	Valve guide	Brass	
⑨	Tie rod	Carbon steel	Chromated
⑩	Tie rod nut	Rolled steel	Black zinc chromated
⑪	Spring washer	Steel wire	Black zinc chromated
⑫	Holder plate bolt	Chrome-molybdenum steel	Black zinc chromated
⑬	Spring washer	Steel wire	Black zinc chromated
⑭	Cushion ring A	Rolled steel	Electroless nickel plating
⑮	Cushion ring B	Rolled steel	Electroless nickel plating
⑯	Cushion valve	Rolled steel	Electroless nickel plating
⑰	Wear ring	Resin	

* With auto switch

Seal List

No.	Description	Mat'l	Part No.		
			125	140	160
⑱	Wiper ring	NBR	SFR-36K	SFR-36K	SFR-40K
⑲	Cushion seal*		DSM-50S	DSM-50S	DSM-50S
⑳	Rod seal		PNY-36	PNY-36	PNY-40
㉑	Piston seal		NLP-125A	NLP-140A	NLP-160A
㉒	Valve seal		P7	P7	P7
㉓	Tube gasket		C120	C135	C155
㉔	Piston gasket		G25		
㉕	Holder plate gasket		G55		
㉖	Guide gasket		N-12.5-1.5		

*It is used in case of cushion style only.

Low Friction Type

Bore size (mm)	Kit no.	Description
125	CS1Q125A-PS	Component part numbers: ⑱, ⑳, ㉑, ㉒, ㉓, ㉔
140	CS1Q140A-PS	
160	CS1Q160A-PS	

* Since the seal kit does not include a grease pack, order it separately.

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

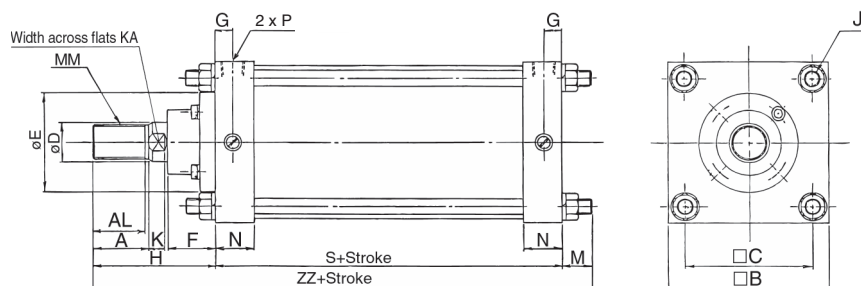
** Seal kits does not include cushion seal, piston gasket and guide gasket because those are not replaceable parts.

• Trunnion type should not be disassembled. (Refer to page 36.)

According to Mounting Brackets/Dimensions

Refer to dimensions of the standard style on page 13 to 19 for those with mounting brackets except the basic style.

Basic/CS1BQ



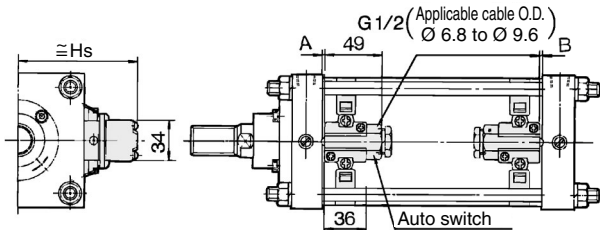
Bore (mm)	Stroke range (mm)	A	AL	□B	□C	D	E	F	G	J	K	KA	M	MM	N	P	S	H	ZZ
125	to 1000	50	47	145	115	36	90	43	16	M14 X 1.5	15	31	27	M30 X 1.5	35	1/2	98	110	235
140	to 1000	50	47	161	128	36	90	43	16	M14 X 1.5	15	31	27	M30 X 1.5	35	1/2	98	110	235
160	to 1200	56	53	182	144	40	90	43	18.5	M16 X 1.5	17	36	30.5	M36 X 1.5	39	3/4	106	120	256.5

Auto Switch Mounting 1

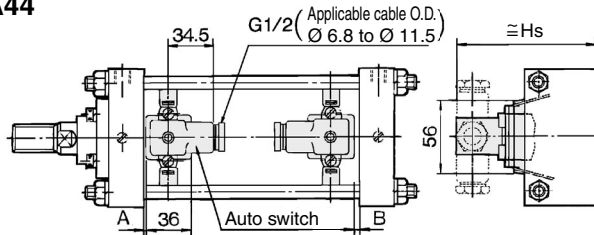
Proper Auto Switch Mounting Position (Detection at stroke end) and Mounting Height

Band mounting type

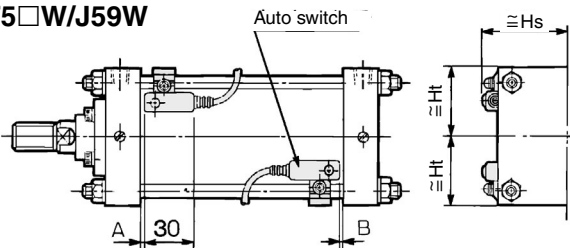
D-A3□
D-G3/K3



D-A44

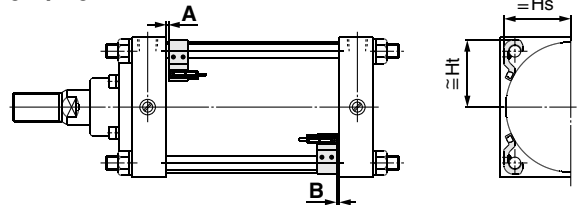


D-F5□/J59/D-F5NT
D-F5BA/F59F
D-F5□W/J59W

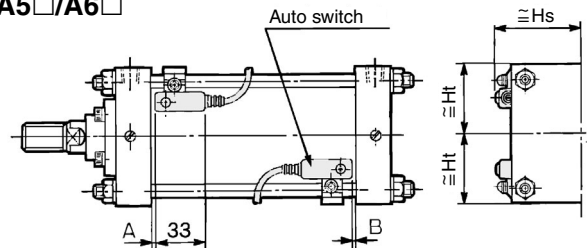


Tie-rod mounting type

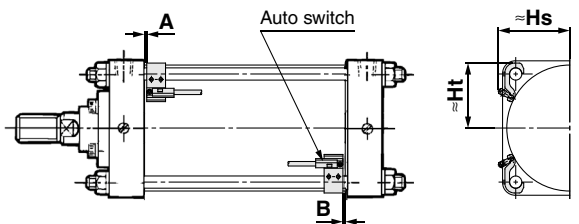
D-M9□/M9□V D-Z7□/Z80
D-M9□W/M9□WV D-Y59□/Y69□/Y7P/Y7PV
D-M9□A/M9□AV D-Y7□W/Y7□WV
D-A9□/A9□V D-Y7BA



D-A5□/A6□



D-P3DWA



Proper Auto Switch Mounting Position

Auto switch model	(mm)															
	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-M9□AV		D-A9□ D-A9□V		D-Z7□/Z80 D-Y5□/Y6□ D-Y7P/Y7PV D-Y7□W D-Y7□WV D-Y7BA		D-A5□ D-A6□ D-A3□ D-A44 D-G39 D-K39		D-A59W		D-F5□W D-J59W D-F5BA D-F5□ D-J59 D-F59F		D-F5NT		D-P3DWA	
Bore size	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
125	8	8	4	4	1.5	1.5	0	0	2	2	4.5	4.5	9.5	9.5	3.5	3.5
140	8	8	4	4	1.5	1.5	0	0	2	2	4.5	4.5	9.5	9.5	3.5	3.5
160	8	8	4	4	1.5	1.5	0	0	2	2	4.5	4.5	9.5	9.5	3.5	3.5
180	13.5	12.5	9.5	7.5	7	5	3.5	1.5	7.5	5.5	10	8	15	13	9	7
200	16	14	12	10	9.5	7.5	6	4	10	8	12.5	10.5	17.5	15.5	11.5	9.5

* The mounting position should be referred for reference only for the auto switch mounting position at the stroke end detection.

Adjust the auto switch after confirming the operation to set actually.

* Low friction type (CDS1□Q): Ø 125, Ø 140, Ø 160

Auto Switch Mounting Height

Auto switch model	(mm)															
	D-M9□ D-M9□W D-M9□A D-A9□ D-A9□V		D-M9□WV D-M9□AV D-M9□V		D-Z7□/Z80 D-Y5□/Y6□ D-Y7P D-Y7PV D-Y7□W D-Y7□WV D-Y7BA		D-A3□ D-G39 D-K39		D-A44		D-A5□ D-A6□ D-A59W		D-F5□ D-J59 D-F5□W D-J59W D-F5BA D-F59F D-F5NT		D-P3DWA	
Bore size	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
125	69	69.5	71.5	69.5	69	69.5	116	126	75.5	69.5	74.5	70	76	69.5		
140	76	76	77.5	76	76	76	124	134	81	76.5	80	76.5	82	76		
160	85	85	86	85	85	85	134.5	144.5	89	87.5	88	87.5	91	85		
180	95	95	95.5	95	95	95	144	154	97	97.5	96	97.5	100	95		
200	106	106	106	106	106	106	154	164	107	108	107.5	108	111	106		

* Low friction type (CDS1□Q): Ø 125, Ø 140, Ø 160

Minimum Stroke for Auto Switch Mounting

n: No. of auto switch (mm)

Auto switch model No.	No. of auto switch mounted	Bracket other than center trunnion	Center trunnion type				
			Ø 125	Ø 140	Ø 160	Ø 180	Ø 200
D-M9□ D-M9□W	2 (Different surfaces, Same surface) 1	15	105	110	115		
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$110 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$115 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		
D-M9□V D-M9□WV	2 (Different surfaces, Same surface) 1	10	80	85	90		
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$80 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$90 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		
D-M9□A	2 (Different surfaces, Same surface) 1	20	115	120			
	n	$20 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$115 + 40 \frac{(n-2)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$120 + 40 \frac{(n-2)}{2}$ (n = 4, 8, 12, 16...) Note 2)			
D-M9□AV	2 (Different surfaces, Same surface) 1	15	90	95			
	n	$15 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$90 + 30 \frac{(n-2)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$95 + 30 \frac{(n-2)}{2}$ (n = 4, 8, 12, 16...) Note 2)			
D-A9□	2 (Different surfaces, Same surface) 1	15	100	105	110		
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$110 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		
D-A9□V	2 (Different surfaces, Same surface) 1	10	75	80	85		
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$80 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		
D-A5□/A6□ D-A59W D-F5□/J59 D-F5□W D-J59W D-F5BA D-F59F	2 (Different surfaces, Same surface) 1	25	125	135		150	
	n (Same surface)	$25 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$125 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$135 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$150 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	
D-F5NT	2 (Different surfaces, Same surface) 1	35	145	155		170	
	n (Same surface)	$35 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$145 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$155 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$170 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	
D-A3□ D-G39 D-K39	2	Different surfaces	35	110			150
		Same surface	100				
	n	Different surfaces	$35 + 30(n-2)$ (n = 2, 3, 4, 5...)	$110 + 30(n-2)$ (n = 2, 4, 6, 8...) Note 1)			$150 + 100(n-2)$ (n = 2, 4, 6, 8...) Note 1)
		Same surface	$100 + 100(n-2)$ (n = 2, 3, 4, 5...)	$110 + 100(n-2)$ (n = 2, 4, 6, 8...) Note 1)			$150 + 30(n-2)$ (n = 2, 4, 6, 8...) Note 1)
D-A44	1	15	110			150	
	2	Different surfaces	35	110			150
		Same surface	55				
	n	Different surfaces	$35 + 30(n-2)$ (n = 2, 3, 4, 5...)	$110 + 30(n-2)$ (n = 2, 4, 6, 8...) Note 1)			$150 + 30(n-2)$ (n = 2, 4, 6, 8...) Note 1)
Same surface		$55 + 55(n-2)$ (n = 2, 3, 4, 5...)	$110 + 50(n-2)$ (n = 2, 4, 6, 8...) Note 1)			$150 + 50(n-2)$ (n = 2, 4, 6, 8...) Note 1)	
D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W	2 (Different surfaces, Same surface) 1	15	105	110	115		
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$110 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$115 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		
D-Y69□ D-Y7PV D-Y7□WV	2 (Different surfaces, Same surface) 1	10	90	95	100		
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$90 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$95 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$100 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		
D-Y7BA	2 (Different surfaces, Same surface) 1	20	115	120	125	130	
	n	$20 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$115 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$120 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$125 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$130 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	
D-P3DWA	2 (Different surfaces, Same surface) 1	20	110	115	120		
	n	$20 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$110 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$115 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$120 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		

* Low friction type (CDS1□Q): Ø 125, Ø 140, Ø 160

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

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

Operating range

Auto switch type	Bore size (mm)				
	125	140	160	180	200
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	6	6.5	6.5	6.5	7
D-A9□/A9□V	12	12.5	11.5	12	12.5
D-Z7□/Z80	14	14.5	13	14	14.5
D-A3□/A44 D-A5□/A6□	10	10	10	10	10
D-A59W	17	17	17	17	17
D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BA	12	13	7	7.5	8
D-F5□/J59/F5□W D-J59W/F5BA D-F5NT/F59F	5	5	5.5	6	6
D-G39/K39	11	11	10	10	10
D-P3DWA	6	6.5	6.5	6.5	7

* 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.

* Low friction type (CDS1□Q): Ø 125, Ø 140, Ø 160

Auto Switch Mounting Bracket: Part No.

Auto switch type	Bore size (mm)				
	Ø 125	Ø 140	Ø 160	Ø 180	Ø 200
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV D-A9□/A9□V	BS5-125	BS5-125	BS5-160	BS5-180	BS5-200
D-A5□/A6□ D-A59W D-F5□/J59 D-F5NT D-F5□W/J59W D-F5BA/F59F	BT-12	BT-12	BT-16	BT-18A	BT-20
D-A3□/A44 D-G39/K39	BS1-125	BS1-140	BS1-160	BS1-180	BS1-200
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BA	BS4-125	BS4-125	BS4-160	BS4-180	BS4-200
D-P3DWA	BS7-125S	BS7-125S	BS7-160S	BS7-180S	BS7-200S

[Stainless Steel Mounting Screw Kit]

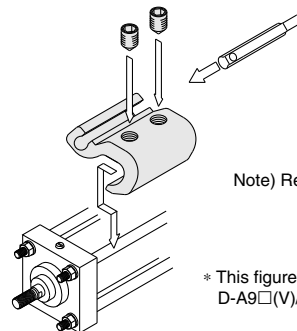
The following set of stainless steel mounting screws is available. Use them in accordance with the operating environment. (Since auto switch brackets are not included, order them separately.)

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

The above stainless steel screws are used when a cylinder is shipped with D-F5BA-type auto switches.

When only a switch is shipped independently, BBA1 screws are attached.

Note) When D-M9□A/M9□AV/Y7BA auto switches are used, do not use steel set screws included in the auto switch mounting brackets above (BS5-□□□ and BS4-□□□). Order the stainless steel screw set BBA1 separately, and use M4 x 8L stainless steel set screws included in BBA1 instead.



Note) Refer to BBA1 screws.

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

Besides the models listed in How to Order, the following auto switches are applicable.

			Without indicator light
			—
Reed	D-A90V	Grommet (perpendicular)	Without indicator light
	D-A93V, A96V	Grommet (in-line)	—
	D-Z73, Z76		Without indicator light
	D-A53, A56		—
	D-A67		Water resistant (2 colors)
	D-Z80		Water resistant (2 colors)
Solid state	D-F59, F5P, J59	Grommet (in-line)	Con temporizador
	D-Y59A, Y59B, Y7P		—
	D-F59W, F5PW, J59W		2-color display
	D-Y7NW, Y7PW, Y7BW		Water resistant (2 colors)
	D-F5BA, Y7BA		—
	D-F5NT	Grommet (perpendicular)	2-color display
	D-M9NV, M9PV, M9BV		Water resistant (2 colors)
	D-Y69A, Y69B, Y7PV		—
	D-M9NWV, M9PWV, M9BWV		—
	D-Y7NWV, Y7PWV, Y7BWV		—
	D-M9NAV, M9PAV, M9BAV		—

* For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to auto switch guide for details.

* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H/Y7G/Y7Htypes) are also available. Refer to auto switch guide for details.



Series CS1

Specific Product Precautions

Be sure to read this before handling the products.

Operating Precautions

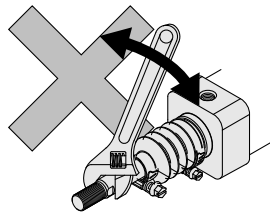
Warning

1. **Do not use the cylinder as a shock absorber.**

Using the cylinder as a shock absorber may cause damage.

Caution

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



4. **Do not open the cushion valve excessively.**

If the cushion valve is rotated excessively in the opening direction (counterclockwise), it could be damaged. Be aware that the valve could slip out, or the threads become too short.

5. **Regarding the installation of a knuckle joint**

Please contact SMC if a knuckle joint must be installed on the piston rod by using the rod end nut.

6. **Do not place tape or other objects onto the painted surface of the unit.**

The paint of the CS cylinder is dried naturally, so it may peel off if tape or another object is placed onto it.

Disassembly/Replacement

Caution

1. **Do not replace the bushing.**

As the bushing is press-fitted, replace the retaining plate assembly when the bushing must be replaced.

2. **Do not replace the cushion seals.**

The cushion seals are press-fitted. To replace them, they must be replaced together as a cover assembly.

3. **When a seal is replaced, apply grease to the new seal before it is assembled.**

Operation of the cylinder without greasing will result in extreme abrasion of the seal, causing premature air leakage.

4. **The trunnion type cylinder requires accuracy in assembly.**

The trunnion type cylinder may lose dimensional accuracy and malfunction when it is disassembled and reassembled because the axial center of the trunnion and that of the cylinder will not be aligned easily.

Safety Instructions

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

-  **Danger:** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
-  **Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
-  **Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

- 1) ISO 4414: Pneumatic fluid power – General rules and safety requirements for systems and their components.
ISO 4413: Hydraulic fluid power – General rules and safety requirements for systems and their components.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.
etc.

Warning

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

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

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

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

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

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

4. Our products cannot be used beyond their specifications.

Our products are not developed, designed, and manufactured to be used under the following conditions or environments.

Use under such conditions or environments is not covered.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogues and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

Caution

We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing industries.

Use in non-manufacturing industries is not covered.

Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.

The new Measurement Act prohibits use of any unit other than SI units in Japan.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first. ²⁾ Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.
- 2) Vacuum pads are excluded from this 1 year warranty. A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

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

Safety Instructions

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

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