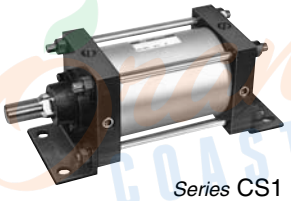
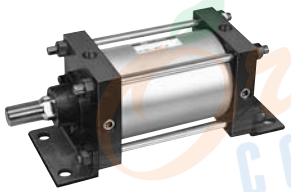
Air Cylinder

Series CS1

ø125, ø140, ø160, ø180, ø200, ø250, ø300

Series Variations

Series	Action	Type		Basic	Standard variations With rod boot	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	412
			Non-lube	●	●		
			Air-hydro	●	●	125 140 160	
		Double rod Series CS1W	Lube	●	●	125 140 160 180 200 250 300	430
			Non-lube	●	●		
			Air-hydro	●	●	125 140 160	
Low Friction *Series* ***CS1□Q*** 	Double acting	Single rod Series CS1□Q	Non-lube	●	●	125 140 160	439

Series CS1

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

Symbol	Specification	Applicable bore size	Series: CS1 (Standard)		
			Action/Type: Double acting, Single rod		
			Lube	Non-lube	Air-hydro
			ø125 to ø300		ø125 to ø160
Standard	Standard	ø125 to ø300	●	●	●
CDS1	Built-in magnet	ø125 to ø200	●	●	●
CS1□-□ J K	With rod boot	ø125 to ø300	●	●	●
20-	Copper and Fluorine-free	ø125 to ø160	—	●	—
XA□	Change of rod end shape	ø125 to ø300	◎	◎	◎
XB5	Oversized rod cylinder	ø125 to ø200	◎	◎	○
XB6	Heat-resistant cylinder (–10 to 150˚C)		—	◎	—
XB7	Cold-resistant cylinder	ø125 to ø300	○	○	—
XB9	Low-speed cylinder (5 to 50 mm/s)		○	○	—
XB16	Large-bore air-hydro cylinder	ø180 to ø200	—	—	◎
XC3	Special port location	ø125 to ø300	◎	◎	○
XC4	With heavy duty scraper		◎	◎	○
XC5	Heat-resistant cylinder (–10 to 110˚C)		◎	◎ Note)	—
XC6	Stainless steel		◎	◎	◎
XC7	Tie-rod, cushion valve, tie-rod nut and similar parts made of stainless steel		○	○	○
XC8	Adjustable stroke cylinder/Adjustable extension type		◎	◎	◎
XC9	Adjustable stroke cylinder/Adjustable retraction type	ø125 to ø160	◎	◎	○
XC10	Dual stroke cylinder/Double rod type	ø125 to ø300	◎	◎	◎
XC11	Dual stroke cylinder/Single rod type		◎	◎	○
XC12	Tandem cylinder		○	○	○
XC14	Change of trunnion bracket mounting position		◎	◎	○
XC15	Change of tie-rod length		◎	◎	○
XC22	Fluororubber seal		◎	◎ Note)	○
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		◎	◎	○

Note) Applicable I.D.: ø125 to ø200, ø250 and ø300 are available upon request for special order.

	CS1 (Standard)			CS1Q (Low friction)
	Double acting			
	Double rod			Single rod
	Lube	Non-lube	Air-hydro	Non-lube
	ø125 to ø300		ø125 to ø160	
	●	●	●	●
	●	●	●	●
	●	●	●	●
	—	●	—	—
	◎	◎	○	◎
	○	○	○	○
	—	◎	—	—
	○	○	—	—
	○	○	—	○
	—	—	○	—
	○	○	○	◎
	◎	◎	○	—
	◎	◎	—	—
	◎	◎	○	○
	○	○	○	○
	—	—	—	○
	—	—	—	○
	—	—	—	○
	—	—	—	○
	—	—	—	—
	◎	◎	○	◎
	◎	◎	○	◎
	○	○	○	—
	—	—	—	◎
	—	—	—	◎
	◎	◎	○	◎
	◎	◎	○	—
	○	○	○	○
	—	—	—	○
	○	○	○	○
	○	○	○	○

Air Cylinder: Standard Type
Lube, Non-lube Type, Air-hydro Type

Series CS1

Lube, Non-lube: ø180, ø200, ø250, ø300
Air-hydro: ø125, ø140, ø160

How to Order

CS1 [L] [ ] [ ] [160] [ ] – [300] [ ] – [ ]

Mounting style

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

Tubing material

Symbol	Bore size (mm)	Tubing material
Nil	ø125 to ø160	Aluminum tube
	ø180 to ø300	Steel tube
F	ø125 to ø160	Steel tube

Type

Nil	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		

Cylinder stroke (mm)
(Refer to "Maximum Stroke" on page 413.)

Port thread type

Nil	Rc
TN	NPT
TF	G

Suffix for cylinder

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

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

Made to Order
(Refer to page 413 for details.)

Mounting Bracket Part No.

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

* Order two foot brackets per cylinder.
** When ordering the double clevis, the clevis pin and the cotter pin (2 pcs.) are attached.

For "How to Order" with auto switch, refer to page 417.

SMC

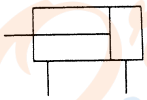
Specifications

Type	Lube, Non-lube	Air-hydro
Bore size (mm)	**ø125 to ø300**	**ø125, ø140, ø160**
Fluid	Air	Turbine oil
Proof pressure	1.57 MPa Note)	
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	Interchangeable	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 style, Foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Center trunnion style	

Note) Item corresponding to Class 2 Pressure Vessel Act is 1.46 MPa.

JIS Symbol

Double acting



Made to Order Specifications

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

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	Piston rod and rod end nut 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

Accessory

Mounting		Basic style	Foot style	Rod side flange style	Head side flange style	Single clevis style	Double clevis style	Center trunnion style
Standard equipment	Clevis pin, Cotter pin	–	–	–	–	–	●	–
Option	Rod end nut	●	●	●	●	●	●	●
	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (Clevis 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 429.

Maximum Stroke

(mm)

Tubing material	Aluminum alloy	Carbon steel tube	
Mounting bracket / Bore size (mm)	Basic style, Head side flange style Single clevis style, Double clevis style Center trunnion style, Foot style Rod side flange style	Basic style Head side flange style Single clevis style Double clevis style Center trunnion style	Foot style Rod side flange style
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
200	—	1200 or less	2000 or less
250	—	1200 or less	2400 or less
300	—	1200 or less	2400 or less

Class 2 Pressure Vessel

In the case of exceeding the following strokes, the cylinder is subject to Class 2 Pressure Vessel Act.

Bore size (mm)	Cylinder stroke (mm)
180	1,569
200	998
250	813
300	564

Rod Boot Material

Symbol	Material	Maximum ambient temperature
J	Nylon tarpaulin	70°C
K	Heat resistant tarpaulin	110°C *

∗ Maximum ambient temperature for the rod boot itself.

Principal Parts Material and Surface Treatment

Description		Material	Note
Cover		Rolled steel plate	Black painted
Tube	ø125, ø140, ø160	Aluminum alloy	Hard anodized
		Carbon steel tube	Inside: Hard chrome plated
	ø180, ø200, ø250, ø300	Carbon steel tube	Inside: Hard chrome plated
Sliding part seal	Lube	NBR	JIS B 2401 O-ring
	Non-lube	NBR	PNY, NLP
	Air-hydro	NBR	SKY, RPS
Piston rod		Carbon steel	Hard chrome plated
Piston	Lube	Cast iron	
	Non-lube	Aluminum alloy casted (Iron tube: Cast iron)	Chromated (In the case of aluminum alloy casted)
	Air-hydro	Aluminum alloy casted (Iron tube: Cast iron)	Chromated (In the case of aluminum alloy casted)

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

(kg)

Bore size (mm)		125	140	160
Basic mass	Basic style	14.85 (13.73)	17.98 (16.57)	24.77 (23.03)
	Foot style	16.48 (15.36)	20.50 (19.09)	27.57 (25.83)
	Rod side flange style	17.53 (16.41)	22.98 (21.57)	31.16 (29.42)
	Head side flange style	17.53 (16.41)	22.98 (21.57)	31.16 (29.42)
	Single clevis style	17.92 (16.80)	22.27 (20.86)	30.26 (28.52)
	Double clevis style (Clevis pin, Cotter pin)	18.38 (17.26)	23.02 (21.61)	31.11 (29.37)
	Trunnion style	18.98 (17.86)	23.71 (22.30)	32.17 (30.43)
Additional mass per each 100 mm of stroke		1.77	1.96	2.39
Accessory bracket	Single knuckle	0.91	1.16	1.56
	Double knuckle (Knuckie pin, Cotter pin)	1.37	1.81	2.48
	Rod end nut	0.16	0.16	0.23

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

Calculation example: **CS1L160-500**

- Basic mass·····27.57 (Foot style, ø160)
- Additional mass·····2.39/100 stroke
- Cylinder stroke·····500 stroke

27.57 + 2.39 x 500/100 = 39.52 kg

Mass/Steel Tube

(kg)

Bore size (mm)		125	140	160	180	200	250	300
Standard mass	Basic style	15.20	18.38	25.24	34.16	42.66	79.78	115.94
	Foot style	16.83	20.90	28.04	38.36	47.54	89.28	133.22
	Rod side flange style	17.88	23.38	31.63	43.99	54.57	101.62	146.14
	Head side flange style	17.88	23.38	31.63	43.99	54.57	101.62	146.14
	Single clevis style	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 style	19.33	24.11	32.64	44.78	56.65	107.62	156.37
Additional mass 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

⚠ Precautions

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

⚠ 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.

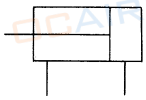
- If the cushion valve is rotated excessively in the opening direction (counterclockwise), it could be damaged. Be aware that the valve could slip out, or the threads becomes too short.

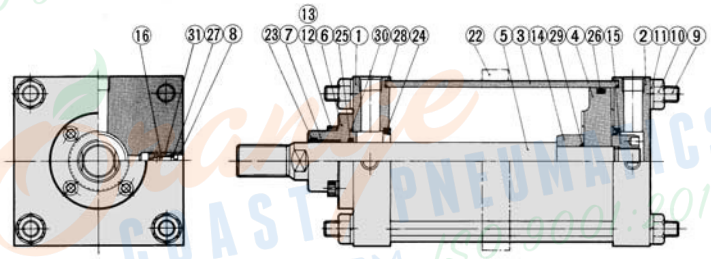
Regarding the installation of a knuckle joint

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

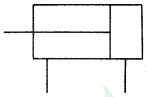
Construction

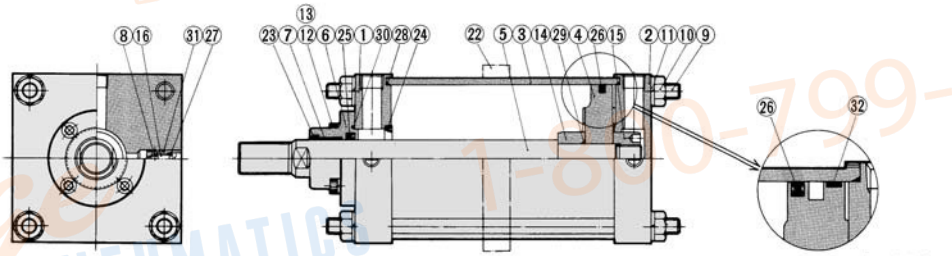
Lube





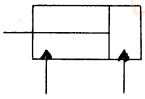
Non-lube

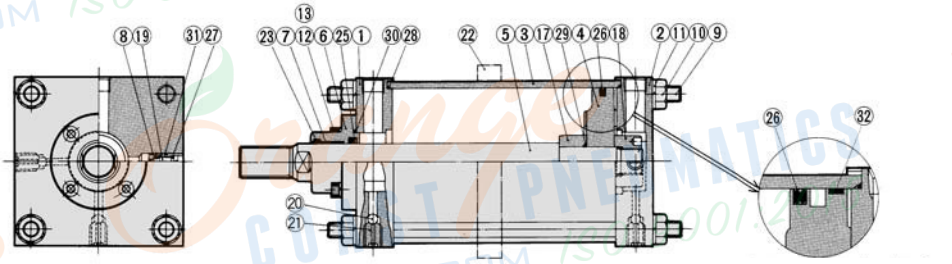




In the case of aluminum tube

Air-hydro





In the case of aluminum tube

Component Parts

No.	Description		Material	Note
1	Rod cover		Rolled steel plate	Black painted
2	Head cover		Rolled steel plate	Black painted
3	Cylinder tube	ø125 to ø160	Aluminum alloy	Hard anodized
		ø125 to ø300	Carbon steel tube	Inside: Hard chrome plated
4	Piston		Cast iron **	
5	Piston rod		Carbon steel	Hard chrome plated
6	Retaining plate		Cast iron	Black painted
7	Bushing		Lead-bronze casted	
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	Retaining plate bolt		Chromium molybdenum steel	Black zinc chromated
13	Spring washer		Steel wire	Black zinc chromated
14	Cushion ring A		Rolled steel	Zinc chromated
15	Cushion ring B		Rolled steel	Zinc chromated
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 B		Rolled steel	Zinc chromated
20	Air releasing A		Chromium molybdenum steel	
21	Check ball		Chrome bearing steel	
22	Tie-rod reinforcement ring *		Rolled steel	Black painted
32	Wear ring		Resin	

* In the case of long strokes
** Aluminum tubing material of non-lube and air-hydro type is an aluminum alloy casted.

Seal List

No.	Description	Material	Note
Lube			
23	Wiper ring	NBR	
24**	Cushion seal		
25	Rod seal		
26	Piston seal		
27	Valve seal		
28	Tube gasket		
29**	Piston gasket		
30	Retaining plate gasket		
31**	Guide gasket		

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

No.	Description	Material	Note
25	Rod seal	NBR	
26	Piston seal		

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

No.	Description	Material	Note
25	Rod seal	NBR	
26	Piston seal		

Replacement Parts (Seal kit)

- For replacement parts no. (seal kit) for air cylinder standard type Series CS1, refer to page 416.

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

Standard/Replacement Parts/Seal Kit

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 (Lube)

Bore size(mm)	Kit no.	Description
125	CS1-125A-PS	Component part numbers: ㉓, ㉕, ㉖, ㉗, ㉘, ㉚
140	CS1-140A-PS	
160	CS1-160A-PS	
180	CS1-180A-PS	
200	CS1-200A-PS	
250	CS1-250A-PS	
300	CS1-300A-PS	

∗ Seal kit includes a grease pack (ø125 to 160: 40 g, ø180 and 200: 50 g, ø250 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 size(mm)	Kit no.	Description
125	CS1N125A-PS	Component part numbers: ㉓, ㉕, ㉖, ㉗, ㉘, ㉚
140	CS1N140A-PS	
160	CS1N160A-PS	
180	CS1N180A-PS	
200	CS1N200A-PS	
250	CS1N250A-PS	
300	CS1N300A-PS	

∗ Seal kit includes a grease pack (ø125 to 160: 40 g, ø180 and 200: 50 g, ø250 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 size(mm)	Kit no.	Description
125	CS1H125A-PS	Component part numbers: ㉓, ㉕, ㉖, ㉗, ㉘, ㉚
140	CS1H140A-PS	
160	CS1H160A-PS	

Low Friction

Bore size(mm)	Kit no.	Description
125	CS1Q125A-PS	Component part numbers: ㉓, ㉕, ㉖, ㉗, ㉘, ㉚
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-020 (20 g)

Air Cylinder
Series CDS1
ø125, ø140, ø160, ø180, ø200

How to Order

With auto switch CDS1 L □ 160 □ – 300 □ – M9BW □ – □

With auto switch (Built-in magnet)

Mounting style

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

Type

Nil	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

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
(Refer to Maximum Stroke on page 418.)

Number of auto switches

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

Auto switch

Nil	Without auto switch

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

Suffix for cylinder

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

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

Made to Order (Refer to page 418 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) CDS1B125-200

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

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

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

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

* Since there are other applicable auto switches than listed above, refer to page 445 for details.
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
* D-A9□/M9□/M9□W/M9□AL auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled before shipped.)

Series CDS1

Specifications

Type	Lube, Non-lube		Air-hydro
Fluid	Air		Turbine oil
Bore size (mm)	125, 140, 160	180, 200	125, 140, 160
Proof pressure	1.57 MPa	1.2 MPa	1.57 MPa
Maximum operating pressure	0.97 MPa	0.7 MPa	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	Interchangeable		None
Ambient and fluid temperature	0 to 60°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 $^{st:}{}^{+1.8}_{0}$		
Mounting	Basic style, Foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Center trunnion style		

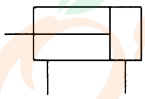
Maximum Stroke

(mm)

Bore size (mm)	Maximum stroke	
	Basic style, Head side flange style, Single clevis style, Double clevis style, Center trunnion style	Foot style, Rod side flange style
125, 140	1000 or less	1400 or less
160	1200 or less	1400 or less
180	1200 or less	1500 or less
200	998 or less	998 or less
Note	ø200: Cylinders of the stroke range of 998 to 1200 are special products.	ø200: Cylinders of the stroke range of 998 to 1500 are special products.

JIS Symbol

Double acting



Made to Order Specifications

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

Symbol	Specifications
—XA□	Change of rod end shape
—XB5	Oversized rod cylinder
—XC3	Special port location
—XC4	With heavy duty scraper
—XC6	Piston rod and rod end nut 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 trunnio 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

Refer to pages 443 to 445 for auto switch specifications.

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

Principal Parts Material and Surface Treatment

Description		Material	Note
Cover		Rolled steel plate	Black painted
Tube	ø125, ø140, ø160 ø180, ø200	Aluminum alloy	Hard anodized
Sliding part seal	Lube type	NBR	JIS B 2401 O-ring *
	Non-lube type	NBR	PNY, NLP
	Air-hydro type	NBR	SKY, RPS
Piston rod		Carbon steel	Hard chrome plated
Piston		Aluminum alloy casted	Chromated

* Foot style, Rod side flange style: In the case of bore size of ø125 and ø140, the stoke range is 1001 to 1400.
In the case of ø160, piston seals of the stroke range 1200 to 1400 are NLP.
* In the case of bore size ø180 and ø200, piston seals are NLP.

Mass

(kg)

Bore size (mm)		125	140	160	180	200
Basic mass	Basic style	13.79	16.64	23.11	27.55	36.11
	Foot style	15.42	19.16	25.91	31.75	40.99
	Rod side flange style	16.47	21.64	29.50	37.38	48.02
	Head side flange style	16.47	21.64	29.50	37.38	48.02
	Single clevis style	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 style	17.92	22.37	30.51	38.71	50.10
Additional mass per each 100 stroke		1.77	1.96	2.39	2.85	3.42
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

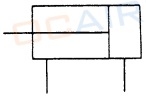
Mounting Bracket Part No.

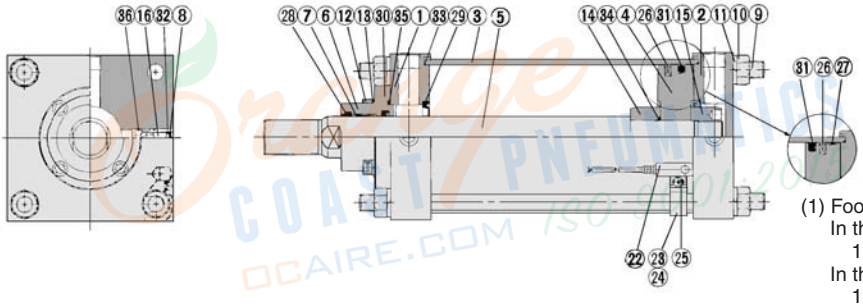
Bore size (mm)	125	140	160	180	200
Foot style *	CS1-L12	CS1-L14	CS1-L16	CS1-L18	CS1-L20
Flange style	CS1-F12	CS1-F14	CS1-F16	CS1-F18	CS1-F20
Single clevis style	CS1-C12	CS1-C14	CS1-C16	CS1-C18	CS1-C20
Double clevis style **	CS1-D12	CS1-D14	CS1-D16	CS1-D18	CS1-D20

* Order two foot brackets per cylinder.
** When ordering the double clevis, the clevis pin and the cotter pin (2 pcs.) are attached.

Construction

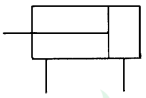
Lube

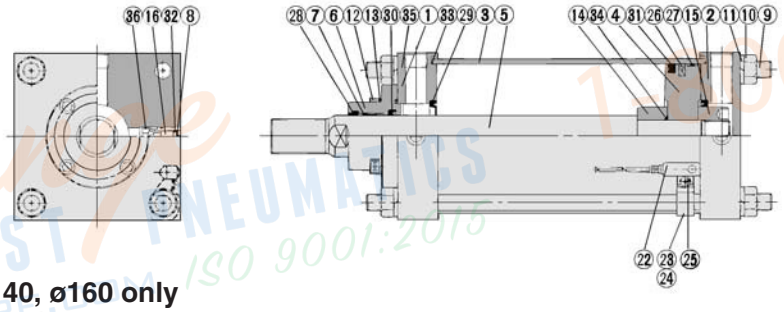




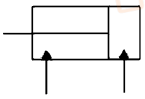
(1) Foot style: Rod side flange style
In the case of ø125, ø140
1001 to 1400 st
In the case of ø160
1201 to 1400 st
(2) In the case of ø180, ø200
(1), (2): Non-lube type is used.

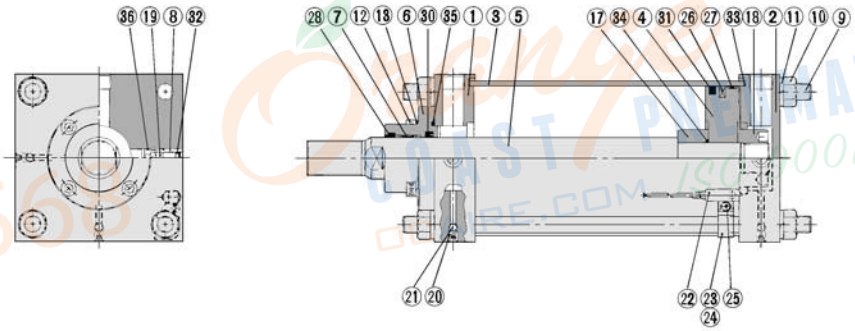
Non-lube





Air-hydro: ø125, ø140, ø160 only





Component Parts

No.	Description	Material	Note
1	Rod cover	Rolled steel plate	Black painted
2	Head cover	Rolled steel plate	Black painted
3	Cylinder tube	Aluminum alloy	Hard anodized
4	Piston	Aluminum alloy casted	Chromated
5	Piston rod	Carbon steel	Hard chrome plated
6	Retaining plate	Cast iron	Black painted
7	Bushing	Lead-bronze casted	
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	Retaining plate bolt	Chromium molybdenum steel	Black zinc chromated
13	Spring washer	Steel wire	Black zinc chromated
14	Cushion ring A	Rolled steel	Zinc chromated
15	Cushion ring B	Rolled steel	Zinc chromated
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 B	Rolled steel	Zinc chromated
20	Air releasing A	Chromium molybdenum steel	
21	Check ball	Chrome bearing steel	
22	Auto switch	—	
23	Set screw	Chromium molybdenum steel	Zinc chromated
24	Switch mounting bracket	Aluminum alloy	
25	Switch mounting screw	Copper wire	Nickel plated
26	Magnet	—	
27	Wear ring	Resin	

Seal List

No.	Description	Material	Note
Lube (1) (For lube-type 2, refer to page 421.)			
28	Wiper ring	NBR	
29*	Cushion seal		
30	Rod seal		
31	Piston seal		
32	Valve seal		
33	Tube gasket		
34*	Piston gasket		
35	Retaining plate gasket		
36*	Guide gasket		
Non-lube Seals except ㉚ and ㉛ are the same as lube type.			
30	Rod seal	NBR	
31	Piston seal		

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

No.	Description	Material	Note
30	Rod seal	NBR	
31	Piston seal		

Replacement Parts (Seal kit)

- For replacement part no. (seal kits) of cylinder with auto switch Series CDS1, refer to page 421.

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

SMC

With Auto Switch/Replacement Parts/Seal Kit

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 (1)

Bore size (mm)	Kit no.	Description
125	CS1-125A-PS	Component part numbers: ㉘, ㉚, ㉛, ㉜, ㉝, ㉟
140	CS1-140A-PS	
160	CS1-160A-PS	
180	CDS1-180A-PS	
200	CDS1-200A-PS	

∗ Seal kit includes a grease pack (ø125 to 160: 40 g, ø180 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

Bore size (mm)	Kit no.	Description
125	CS1N125A-PS	Component part numbers: ㉘, ㉚, ㉛, ㉜, ㉝, ㉟
140	CS1N140A-PS	
160	CS1N160A-PS	
180	CS1N180A-PS	
200	CS1N200A-PS	

∗ Seal kit includes a grease pack (ø125 to 160: 40 g, ø180 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 (2)*

Bore size (mm)	Kit no.	Description
125	CDS1L125A-PS	Component part numbers: ㉘, ㉚, ㉛, ㉜, ㉝, ㉟
140	CDS1L140A-PS	
160	CDS1L160A-PS	

∗ Foot style, Rod side flange style: ø125, ø140—1001 to 1400 stroke, ø160—1201 to 1400 stroke
∗ Seal kit includes a grease pack (ø125 to 160: 40 g, ø180 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)

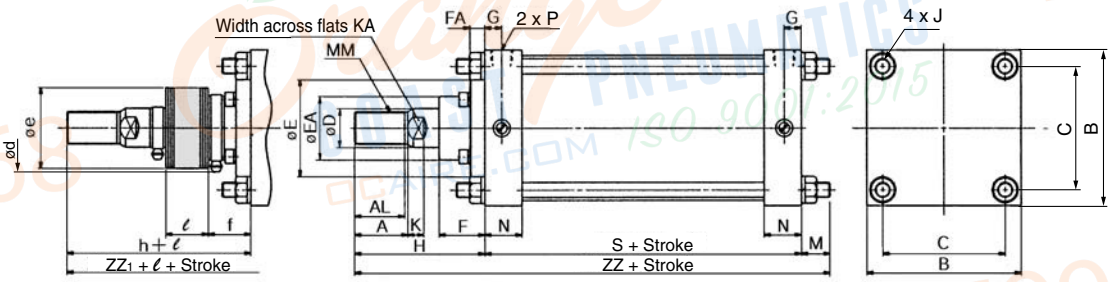
Air-hydro

Bore size (mm)	Kit no.	Description
125	CS1H125A-PS	Component part numbers: ㉘, ㉚, ㉛, ㉜, ㉝, ㉟
140	CS1H140A-PS	
160	CS1H160A-PS	

Basic Style: CS1B

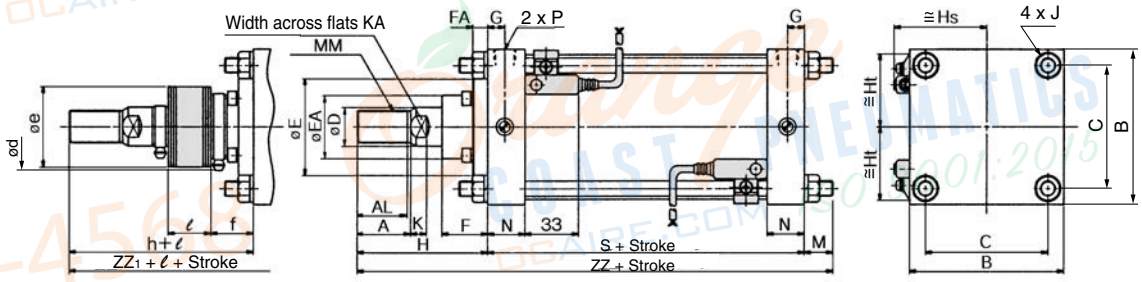
Lube type (CS1B), Non-lube type (CS1BN), Air-hydro type (CS1BH)

With rod boot



With auto switch: CDS1B

With rod boot



(mm)

Type	Bore size (mm)	Stroke range* (mm)	A	AL	B	C	D	E	EA	F	FA	G	J	K	KA	M	MM	N	P	S
Lube Non-lube Air-hydro	**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
	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
	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 Non-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
	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

(mm)

Type	Bore size (mm)	Without rod boot	With rod boot					
		H	ZZ	d	e	f	h	ℓ	ZZ_1
Lube Non-lube Air-hydro	**125**	110	235	82	75	40	133	0.2 stroke	258
	140	110	235	82	75	40	133	0.2 stroke	258
	160	120	256.5	82	75	40	141	0.2 stroke	277.5
Lube Non-lube	**180**	135	281	92	85	45	153	0.2 stroke	299
	200	135	281	96	90	45	153	0.2 stroke	299
	250	160	342.5	108	105	55	176	0.17 stroke	358.5
	300	175	372.5	118	115	55	190	0.17 stroke	387.5

* The minimum stroke with rod boot is 30 mm or more.

With Auto Switch: ø125 to ø200 Only

(mm)

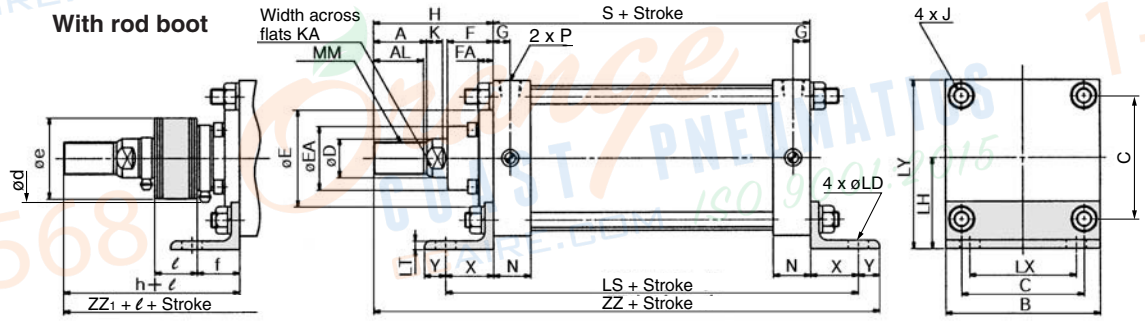
Type	Bore size (mm)	Stroke range (mm)	S	Without rod boot	With rod boot
				ZZ	ZZ_1
Lube Non-lube Air-hydro	**125**	Up to 1000	98	235	258
	140	Up to 1000	98	235	258
	160	Up to 1200	106	256.5	277.5
Lube Non-lube	**180**	Up to 1200	115	285	303
	200	Up to 998	120	290	308

* Dimensions except mentioned above are the same as standard type.
** For the auto switch mounting position and its mounting height, refer to page 443.
***Refer to “Minimum Stroke for Auto Switch Mounting” on page 444.

Foot Style: CS1L

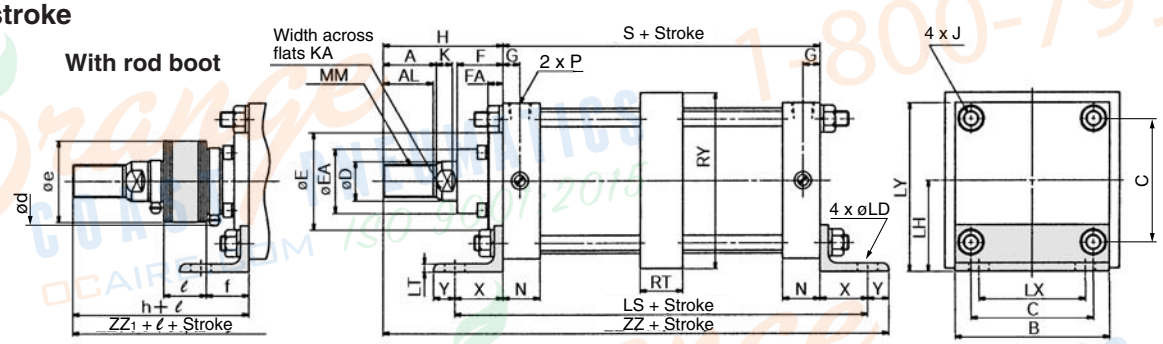
Lube type (CS1L), Non-lube type (CS1LN), Air-hydro type (CS1LH)

With rod boot



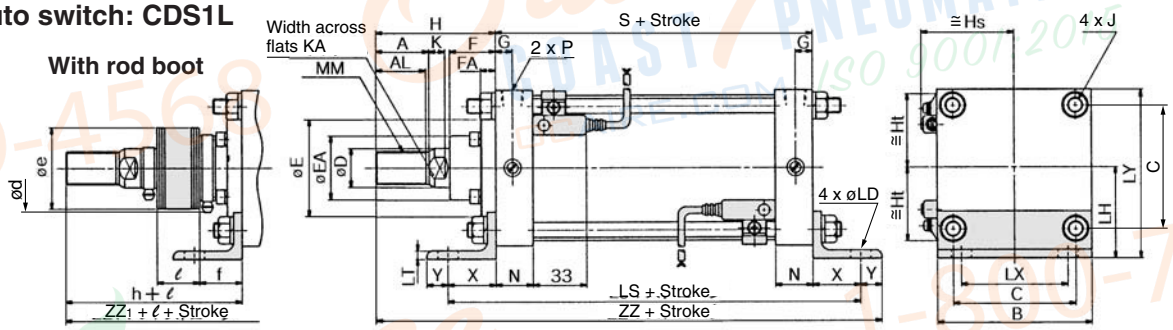
Long stroke

With rod boot



With auto switch: CDS1L

With rod boot



(mm)

Type	Bore size (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 Non-lube Air-hydro	**125**	Up 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
	140	Up 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
	160	Up 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 Non-lube	**180**	Up 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
	200	Up 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	Up 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	Up 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)

Type	Bore size (mm)	RY	S	X	Y	Without rod boot	With rod boot						
						H	ZZ	d	e	f	h	ℓ	ZZ1
Lube Non-lube Air-hydro	**125**	164	98	45	20	110	273	82	75	40	133	0.2 stroke	296
	140	184	98	45	30	110	283	82	75	40	133	0.2 stroke	306
	160	204	106	50	25	120	301	82	75	40	141	0.2 stroke	322
Lube Non-lube	**180**	228	111	60	30	135	336	92	85	45	153	0.2 stroke	354
	200	257	111	60	30	135	336	96	90	45	153	0.2 stroke	354
	250	325	141	80	40	160	421	108	105	55	176	0.17 stroke	437
	300	390	146	90	40	175	451	118	115	55	190	0.17 stroke	466

* The minimum stroke with rod boot is 30 mm or more.

With Auto Switch: ø125 to ø200 Only

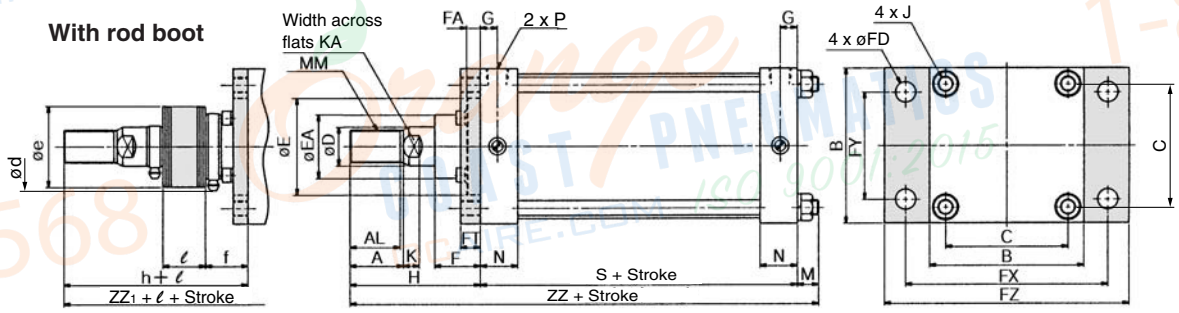
(mm)

Type	Bore size (mm)	Stroke range (mm)	S	LS	Without rod boot	With rod boot
					ZZ	ZZ1
Lube Non-lube Air-hydro	**125**	Up to 1400	98	188	273	296
	140	Up to 1400	98	188	283	306
	160	Up to 1400	106	206	301	322
Lube Non-lube	**180**	Up to 1500	115	235	340	358
	200	Up to 998	120	240	345	363

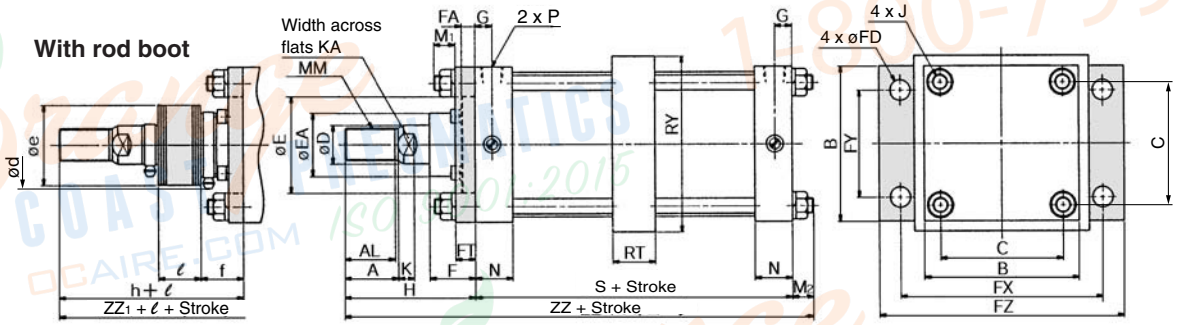
* Dimensions except mentioned above are the same as standard type.
** For the auto switch mounting position and its mounting height, refer to page 443.
*** Refer to "Minimum Stroke for Auto Switch Mounting" on page 444.

Rod Side Flange Style: CS1F

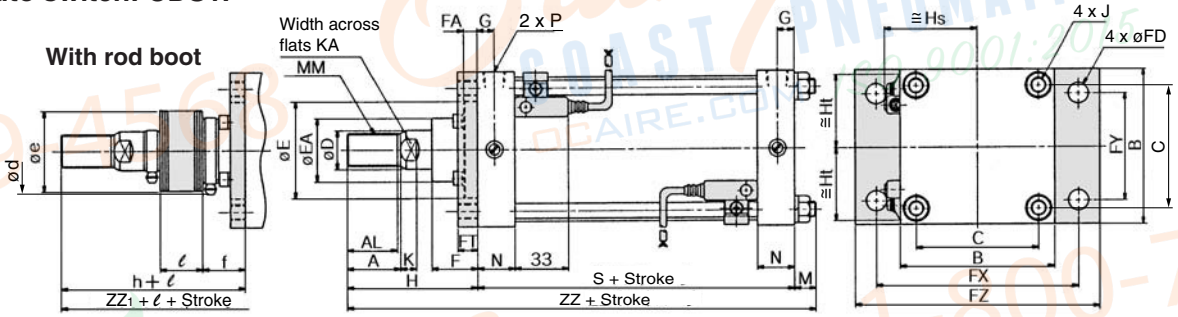
Lube type (CS1F), Non-lube type (CS1FN), Air-hydro type (CS1FH)



Long stroke



With auto switch: CDS1F



(mm)

Type	Bore size (mm)	Stroke* range (mm)	A	AL	B	B	C	D	E	EA	F	FA	FD	FT	FX	FY	FZ	G	J	K	KA	M	S	N	P	MM	Without rod boot H	Without rod boot ZZ	With rod boot d	With rod boot e	With rod boot f	With rod boot h	With rod boot ℓ	With rod boot ZZ1
Lube Non-lube Air-hydro	**125**	Up to 1400	50	47	145	145	115	36	90	59	43	14	19	14	190	100	230	16	M14 x 1.5	15	31	30	98	35	1/2	M30 x 1.5	110	238	82	75	40	133	0.2 x Stroke	261
	140	Up to 1400	50	47	160	161	128	36	90	59	43	14	19	20	212	112	255	16	M14 x 1.5	15	31	24	98	35	1/2	M30 x 1.5	110	232	82	75	40	133		255
	160	Up to 1400	56	53	180	182	144	40	90	59	43	14	19	20	236	118	275	18.5	M16 x 1.5	17	36	26	106	39	3/4	M36 x 1.5	120	252	82	75	40	141		273
Lube Non-lube	**180**	Up to 1800	63	60	200	204	162	45	115	70	48	17	24	25	265	132	320	18.5	M18 x 1.5	20	41	31	111	39	3/4	M40 x 1.5	135	277	92	85	45	153		295
	200	Up to 1800	63	60	225	226	182	50	115	74	48	17	24	25	280	150	335	18.5	M20 x 1.5	20	46	31	111	39	3/4	M45 x 1.5	135	277	96	90	45	153		295
	250	Up to 2000	71	67	275	277	225	60	140	86	60	20	29	30	355	180	420	23	M24 x 1.5	25	56	35	141	49	1	M56 x 2	160	336	108	105	55	176	0.17 x Stroke	352
	300	Up to 2000	80	76	330	330	270	70	140	96	60	20	33	30	400	212	475	23	M30 x 1.5	30	65	48	146	49	1	M64 x 2	175	369	118	115	55	190		384

Long Stroke

(mm)

Type	Bore size (mm)	Long stroke range (mm)	M_1	M_2	RT	RY	Without rod boot ZZ	With rod boot ZZ_1
Lube Non-lube Air-hydro	**125**	1401 to 1600	22	22	36	164	230	253
	140	1401 to 1600	19	19	36	184	227	250
	160	1401 to 1600	22	22	45	204	248	269
Lube Non-lube	**180**	1801 to 2000	26	26	45	228	272	290
	200	1801 to 2000	26	26	45	257	272	290
	250	2001 to 2400	30	30	55	325	331	347
	300	2001 to 2400	36	36	55	390	357	372

∗ The minimum stroke with rod boot is 30 mm or more.

With Auto Switch: ø125 to ø200 Only

(mm)

Type	Bore size (mm)	Stroke range (mm)	S	Without rod boot ZZ	With rod boot ZZ_1
Lube Non-lube Air-hydro	**125**	Up to 1400	98	238	261
	140	Up to 1400	98	232	255
	160	Up to 1400	106	252	273
Lube Non-lube	**180**	Up to 1500	115	281	299
	200	Up to 998	120	286	304

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

∗∗ For the auto switch mounting position and its mounting height, refer to page 443.

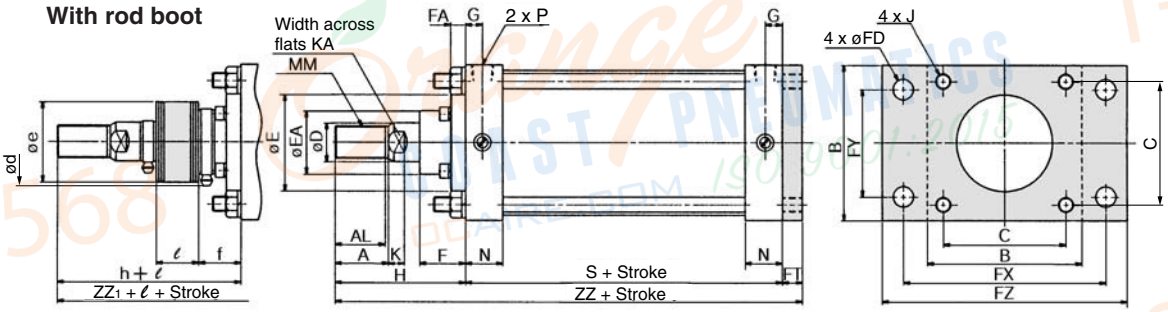
∗∗∗Refer to “Minimum Stroke for Auto Switch Mounting” on page 444.

SMC

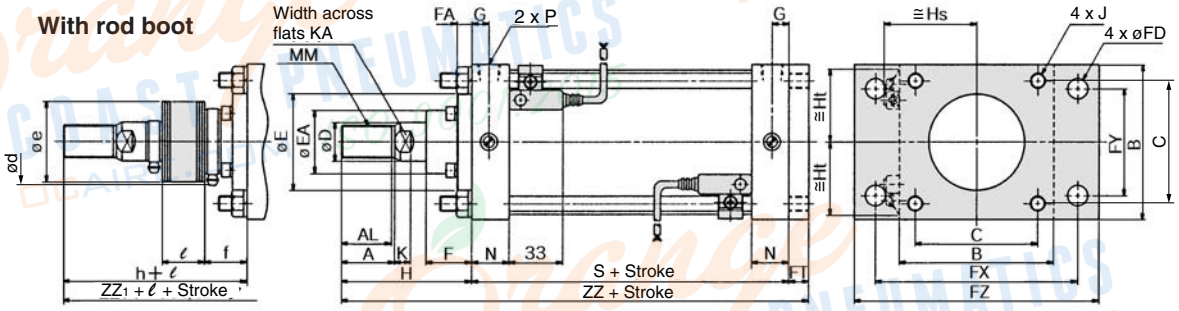
Head Side Flange Style: CS1G

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

With rod boot



With rod boot



(mm)

Type	Bore size (mm)	Stroke range* (mm)	A	AL	B	B	C	D	E	EA	F	FA	FD	FT	FX	FY	FZ	G	J	K	KA	MM	N	P
Lube Non-lube Air-hydro	**125**	Up 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	35	1/2
	140	Up 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	35	1/2
	160	Up 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	39	3/4
Lube Non-lube	**180**	Up 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	39	3/4
	200	Up 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	39	3/4
	250	Up 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	49	1
	300	Up 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	49	1

(mm)

Type	Bore size (mm)	S	Without rod boot	With rod boot						
			H	ZZ	d	e	f	h	ℓ	ZZ_1
Lube Non-lube Air-hydro	**125**	98	110	222	82	75	40	133	0.2 stroke	245
	140	98	110	228	82	75	40	133	0.2 stroke	251
	160	106	120	246	82	75	40	141	0.2 stroke	267
Lube Non-lube	**180**	111	135	271	92	85	45	153	0.2 stroke	289
	200	111	135	271	96	90	45	153	0.2 stroke	289
	250	141	160	331	108	105	55	176	0.17 stroke	347
	300	146	175	351	118	115	55	190	0.17 stroke	366

* The minimum stroke with rod boot is 30 mm or more.

With Auto Switch: ø125 to ø200 Only

(mm)

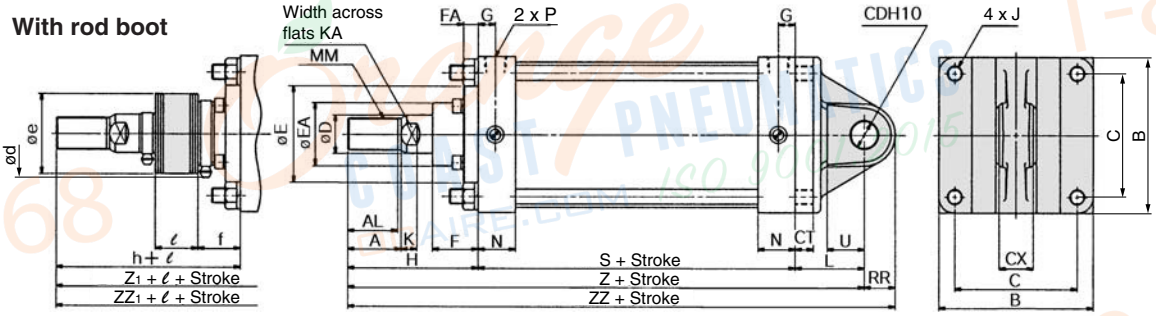
Type	Bore size (mm)	Stroke range (mm)	S	Without rod boot	With rod boot
				ZZ	ZZ_1
Lube Non-lube Air-hydro	**125**	Up to 1000	98	222	245
	140	Up to 1000	98	228	251
	160	Up to 1200	106	246	267
Lube Non-lube	**180**	Up to 1200	115	275	293
	200	Up to 998	120	280	298

* Dimensions except mentioned above are the same as standard type.
** For the auto switch mounting position and its mounting height, refer to page 443.
*** Refer to "Minimum Stroke for Auto Switch Mounting" on page 444.

Single Clevis Style: CS1C

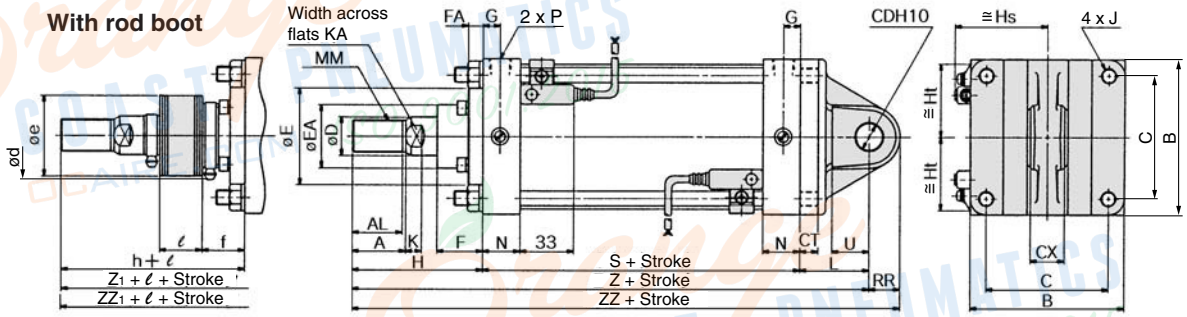
Lube type (CS1C), Non-lube type (CS1CN), Air-hydro type (CS1CH)

With rod boot



With auto switch: CDS1C

With rod boot



(mm)

Type	Bore size (mm)	Stroke range* (mm)	A	AL	B	C	CD_{H10}	CT	CX	D	E	EA	F	FA	G	J	K	KA	L	MM	N	P	RR
Lube Non-lube Air-hydro	**125**	Up 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
	140	Up to 1000	50	47	161	128	$28^{+0.084}_{0}$	17	$36^{-0.1}_{-0.3}$	36	90	59	43	14	16	M14 x 1.5	15	31	75	M30 x 1.5	35	1/2	32
	160	Up 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
Lube Non-lube	**180**	Up 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
	200	Up 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
	250	Up 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	Up 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

(mm)

Type	Bore size (mm)	S	U	Without rod boot	With rod boot							
				H	Z	ZZ	d	e	f	h	l	Z_1	ZZ_1
Lube Non-lube Air-hydro	**125**	98	35	110	273	302	82	75	40	133	0.2 stroke	296	325
	140	98	40	110	283	315	82	75	40	133	0.2 stroke	306	338
	160	106	45	120	306	342	82	75	40	141	0.2 stroke	327	363
Lube Non-lube	**180**	111	50	135	336	380	92	85	45	153	0.2 stroke	354	398
	200	111	50	135	336	380	96	90	45	153	0.2 stroke	354	398
	250	141	65	160	411	466	108	105	55	176	0.17 stroke	427	482
	300	146	80	175	451	519	118	115	55	190	0.17 stroke	466	534

* The minimum stroke with rod boot is 30 mm or more.

With Auto Switch: ø125 to ø200 Only

(mm)

Type	Bore size (mm)	Stroke range (mm)	S	Without rod boot		With rod boot	
				Z	ZZ	Z_1	ZZ_1
Lube Non-lube Air-hydro	**125**	Up to 1000	98	273	302	296	325
	140	Up to 1000	98	283	315	306	338
	160	Up to 1200	106	306	342	327	363
Lube Non-lube	**180**	Up to 1200	115	340	384	358	402
	200	Up to 998	120	345	389	363	407

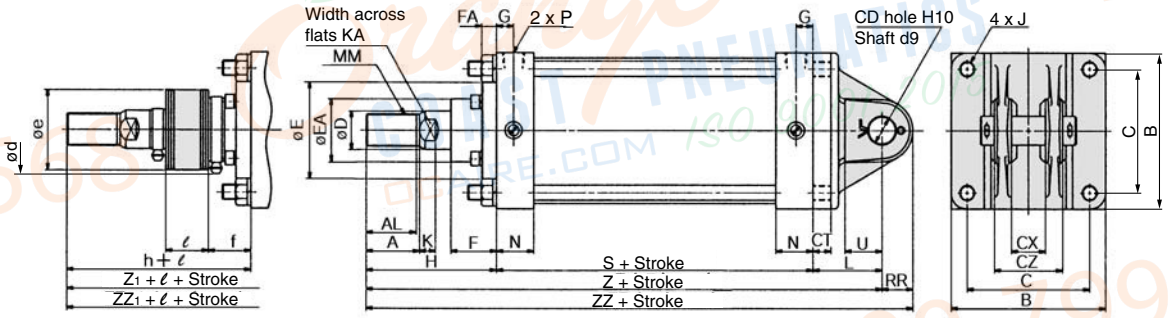
* Dimensions except mentioned above are the same as standard type.
** For the auto switch mounting position and its mounting height, refer to page 443.
*** Refer to "Minimum Stroke for Auto Switch Mounting" on page 444.

SMC

Double Clevis Style: CS1D

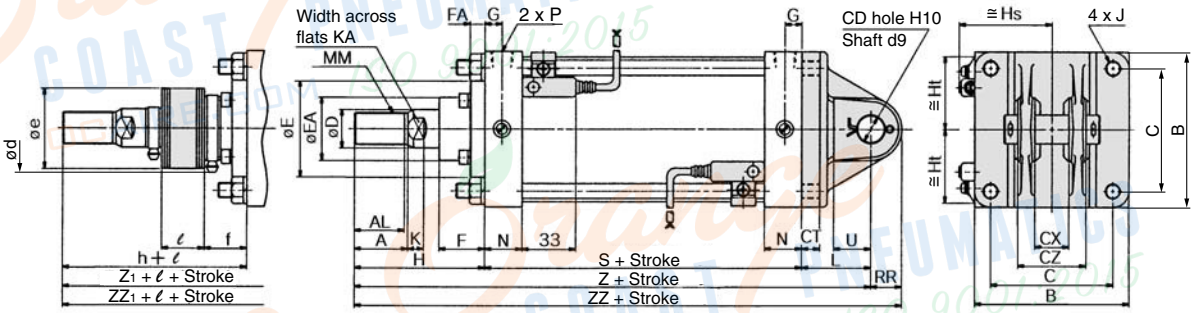
Lube type (CS1D), Non-lube type (CS1DN), Air-hydro type (CS1DH)

With rod boot



With auto switch: CDS1D

With rod boot



Note) Clevis pin and cotter pin are shipped together.

(mm)

Type	Bore size (mm)	Stroke range* (mm)	A	AL	B	C	CD_{H10}	CT	CX	CZ	D	E	EA	F	FA	G	J	K	KA	L	MM	N	P	RR
Lube Non-lube Air-hydro	**125**	Up 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
	140	Up 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
	160	Up 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**	Up 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	Up 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	Up 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	Up 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)

Type	Bore size (mm)	S	U	Without rod boot			With rod boot						
				H	Z	ZZ	d	e	f	h	ℓ	Z_1	ZZ_1
Lube Non-lube Air-hydro	**125**	98	35	110	273	302	82	75	40	133	0.2 stroke	296	325
	140	98	40	110	283	315	82	75	40	133	0.2 stroke	306	338
	160	106	45	120	306	342	82	75	40	141	0.2 stroke	327	363
Lube Non-lube	**180**	111	50	135	336	380	92	85	45	153	0.2 stroke	354	398
	200	111	50	135	336	380	96	90	45	153	0.2 stroke	354	398
	250	141	65	160	411	466	108	105	55	176	0.17 stroke	427	482
	300	146	80	175	451	519	118	115	55	190	0.17 stroke	466	534

* The minimum stroke with rod boot is 30 mm or more.

With Auto Switch: ø125 to ø200 Only

(mm)

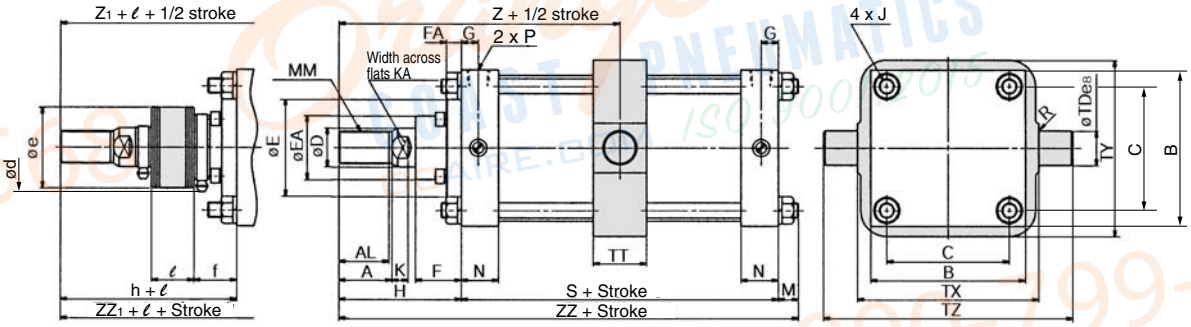
Type	Bore size (mm)	Stroke range (mm)	S	Without rod boot		With rod boot	
				Z	ZZ	Z_1	ZZ_1
Lube Non-lube Air-hydro	**125**	Up to 1000	98	273	302	296	325
	140	Up to 1000	98	283	315	306	338
	160	Up to 1200	106	306	342	327	363
Lube Non-lube	**180**	Up to 1200	115	340	384	358	402
	200	Up to 998	120	345	389	363	407

* Dimensions except mentioned above are the same as standard type.
** For the auto switch mounting position and its mounting height, refer to page 443.
*** Refer to "Minimum Stroke for Auto Switch Mounting" on page 444.

Center Trunnion Style: CS1T

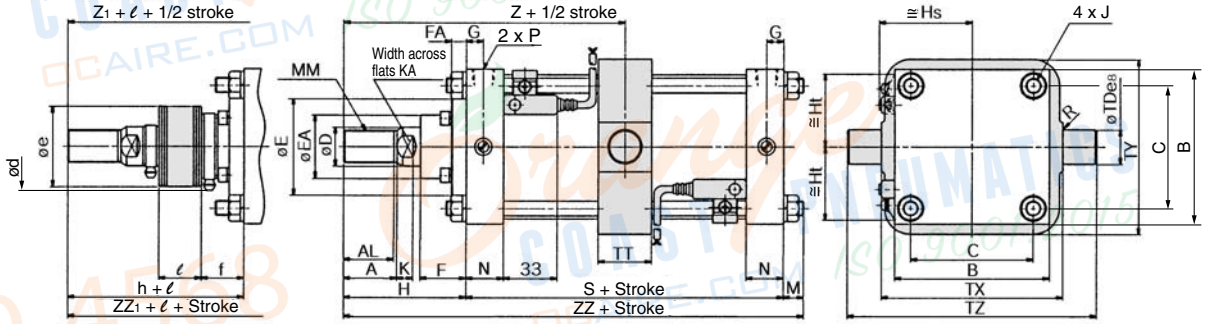
Lube type (CS1T), Non-lube type (CS1TN), Air-hydro type (CS1TH)

With rod boot



With auto switch: CDS1T

With rod boot



(mm)

Type	Bore size (mm)	Stroke range* (mm)	A	AL	B	C	D	E	EA	F	FA	G	J	K	KA	M	MM	N	P	R	S	TDe8	TT	TX
Lube Non-lube Air-hydro	**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
	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
	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 Non-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
	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)

Type	Bore size (mm)	TY	TZ	Without rod boot			With rod boot						
				H	Z	ZZ	d	e	f	h	ℓ	Z1	ZZ1
Lube Non-lube Air-hydro	**125**	164	234	110	159	227	82	75	40	133	0.2 stroke	182	250
	140	184	262	110	159	227	82	75	40	133	0.2 stroke	182	250
	160	204	292	120	173	248	82	75	40	141	0.2 stroke	194	269
Lube Non-lube	**180**	228	326	135	190.5	272	92	85	45	153	0.2 stroke	208.5	290
	200	257	355	135	190.5	272	96	90	45	153	0.2 stroke	208.5	290
	250	325	447	160	230.5	331	108	105	55	176	0.17 stroke	246.5	347
	300	390	534	175	248	357	118	115	55	190	0.17 stroke	263	372

* The minimum stroke with rod boot is 30 mm or more.
(The minimum stroke with rod boot, but for bore size ø160 and ø300 is 35 mm or more.)

With Auto Switch: ø125 to ø200 Only

(mm)

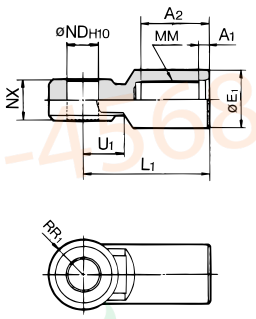
Type	Bore size (mm)	Stroke range (mm)	S	Without rod boot		With rod boot	
				Z	ZZ	Z1	ZZ1
Lube Non-lube Air-hydro	**125**	UP to 1000	98	159	227	182	250
	140	UP to 1000	98	159	227	182	250
	160	UP to 1200	106	173	248	194	269
Lube Non-lube	**180**	UP to 1200	115	192.5	276	210.5	294
	200	UP to 998	120	195	281	213	299

* Dimensions except mentioned above are the same as standard type.
** For the auto switch mounting position and its mounting height, refer to page 443.
*** Refer to "Minimum Stroke for Auto Switch Mounting" on page 444.

SMC

Accessory Bracket Dimensions

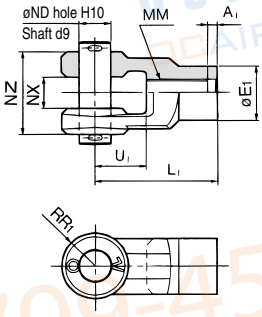
I Type Single Knuckle Joint*



Material: Cast iron

Part no.	Applicable bore size (mm)	A1	A2	E1	L1	MM	NDH10	NX	RR1	U1
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*

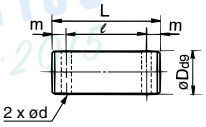


Material: Cast iron

Part no.	Applicable bore size (mm)	A1	E1	L1	MM	NDH10	NX	NZ	RR1	U1
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.)
* Extend the dimensions of **A, H**. when using a single/double knuckle joint together with a rod end nut.
(To extend dimensions **A/H**, refer to the table below, and specify the product as Made-to-order **-XAO**.)
* Pin and cotter pin are attached for double knuckle joint.

Knuckle Pin, Clevis Pin

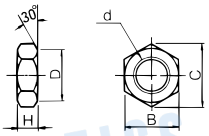


Material: Carbon steel

Part no.	Applicable bore size (mm)	Dd9	L	ℓ	m	d (Drill through)	Applicable 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

* IY-□□ includes a pin and 2 cotter pins.

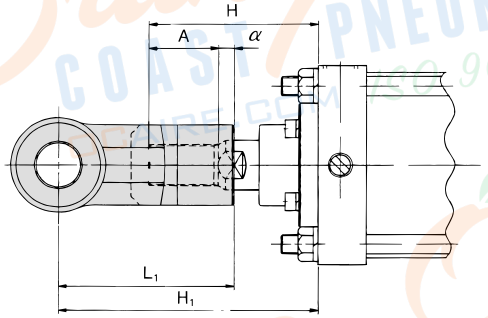
Rod End Nut



Material: Rolled steel

Part no.	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

Single/Double Knuckle Joint Mounting Method



Symbol / Bore size (mm)	H	A	α	L1	H1	Applicable knuckle joint part number	
						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

A, H Dimensions when Mounting a Single/Double Knuckle Joint together with a Rod End Nut

Bore size (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 Type

Series CS1W

Lube, Non-lube: ø125, ø140, ø160, ø180, ø200, ø250, ø300
Air-hydro: ø125, ø140, ø160

How to Order

CS1W L ☐ ☐ 125 ☐ –100 ☐ –☐

With auto switch CDS1W L ☐ 125 ☐ –100 ☐ –M9BW ☐ –☐

Built in magnet
(ø125 to ø200)

Double rod type

Mounting style

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

Tubing material

Symbol	Bore size (mm)	Tubing material
Nil	ø125 to ø160	Aluminum tube
	ø180 to ø300	Steel tube
F	ø125 to ø160	Steel tube

Type

Nil	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		

* It is not available with auto switch.

Cylinder stroke (mm)

Port thread type

Nil	Rc
TN	NPT
TF	G

Auto switch

Nil	Without auto switch

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

Number of auto swithes

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

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
	Nil	With cushion in both sides (Air-hydro type has no cushion.)

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

Made to Order
(Refer to page 431 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) CDS1WB125-100

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

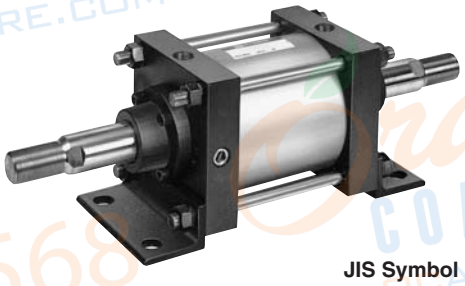
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Tie-rod mounting	Auto switch model: Band mounting	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state switch	——	Grommet	Yes	3-wire (NPN)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

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

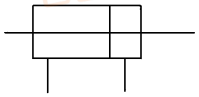
* Solid state auto switches marked with "○" are produced upon receipt of order.

* Since there are other applicable auto switches than listed above, refer to page 445 for details.
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
* D-A9□/M9□/M9□W/M9□AL auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled before shipped.)

SMC



JIS Symbol



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

Symbol	Specifications
—XA□	Change of rod end shape
—XB6	Heat-resistant cylinder (–10 to 150°C)
—XC4	With heavy duty scraper
—XC5	Heat resistant cylinder (110°C)
—XC6	Piston rod and rod end nut 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

Principal Parts Material and Surface Treatment

Description		Material	Note
Cover		Rolled steel plate	Black painted
Tube *	ø125, ø140, ø160	Aluminum alloy	Hard anodized
		Carbon steel tube	Hard chrome plated
	ø180, ø200, ø250, ø300	Carbon steel tube	Hard chrome plated
Sliding seal	Lube	NBR	JIS B 2401 O-ring *
	Non-lube	NBR	PNY, NLP
	Air-hydro	NBR	SKY, RPS
Piston rod		Carbon steel	Hard chrome plated
Piston	Lube	Cast iron (With auto switch: Aluminum alloy casted)	Chromated (In the case of aluminum alloy casted)
	Non-lube	Aluminum alloy casted (Iron tube: Cast iron)	Chromated (In the case of aluminum alloy casted)
	Air-hydro	Aluminum alloy casted (Iron tube: Cast iron)	Chromated (In the case of aluminum alloy casted)

* In the case of an auto switch with bore sizes ø180 and ø200, tubing material is aluminum alloy (hard anodized). Piston seal is NLP.

Refer to pages 443 to 445 for auto switch specifications.

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

Specifications

Type	Lube, Non-lube		Air-hydro
Fluid	Air		Turbine oil
Proof pressure	1.57 MPa Note)		
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	Interchangeable		None
Ambient and fluid temperature	Without switch	0 to 70°C (No freezing)	Air-hydro 5 to 60°C
	With switch	0 to 60°C (No freezing)	
Stroke length tolerance	250 st or less: $^{+1.0}_{0}$ 251 to 1,000 st: $^{+1.4}_{0}$ 1,001 to 1,200 st: $^{+1.8}_{0}$		
Mounting	Basic style, Foot style, Rod side flange style, Center trunnion style		

Note) Item corresponding to Class 2 Pressure Vessel Act is 1.46 MPa.

Mass/Aluminum Tube: Lube Type (Non-lube, Air-hydro)

(kg)

Bore size (mm)		ø125	ø140	ø160
Basic mass	Basic style	16.51 (15.28)	19.62 (18.12)	26.65 (24.79)
	Foot style	18.14 (16.91)	22.14 (20.64)	29.45 (27.59)
	Rod side flange style	19.19 (17.96)	24.62 (23.12)	33.04 (31.18)
	Trunnion style	20.64 (19.41)	25.35 (23.85)	34.05 (32.19)
Add'l mass per each 100 mm stroke		2.57	2.76	3.38
Accessory bracket	Single knuckle	0.91	1.16	1.56
	Double knuckle (Knuckle pin, Cotter pin)	1.37	1.81	2.48
	Rod end nut	0.16	0.16	0.23

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

Calculation: (Example) **CS1WL125-500**
- Basic mass ·····18.14 (Foot style, ø125)
- Additional mass·····2.57/100 stroke
- Cylinder stroke·····500 stroke

18.14 + 2.57 x 500/100 = 30.99 kg

Class 2 Pressure Vessel

In the case of exceeding the following strokes, the cylinder is subject to Class 2 Pressure Vessel Act.	
Bore size (mm)	Cylinder stroke (mm)
200	998
250	813
300	564

Mass/Steel Tube

(kg)

Bore size (mm)		ø125	ø140	ø160	ø180	ø200	ø250	ø300
Basic mass	Basic style	16.85	20.03	27.12	36.90	45.79	85.36	122.39
	Foot style	18.48	22.55	29.92	41.10	50.67	94.86	139.67
	Rod side flange style	19.53	25.03	33.51	46.73	57.70	107.20	152.59
	Trunnion style	20.98	25.76	34.52	47.52	59.78	113.20	162.82
Additional weight per each 100 mm stroke		3.46	3.81	4.57	6.20	7.29	11.30	15.17
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

Rod Boot Material

Symbol	Material	Maximum ambient temperature
J	Nylon tarpaulin	70°C
K	Heat resistant tarpaulin	110°C *

* Maximum ambient temperature for the rod boot itself.

Accessory

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

Minimum Stroke for Auto Switch Mounting

Refer to “Minimum Stroke for Auto Switch Mounting” on page 444.

Mounting Bracket Part No.

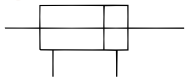
Bore size (mm)	125	140	160	180	200	250	300
Foot style *	CS1W-L12	CS1W-L14	CS1W-L16	CS1W-L18	CS1W-L20	CS1W-L25	CS1W-L30
Flange style	CS1-F12	CS1-F12	CS1-F16	CS1-F18	CS1-F20	CS1-F25	CS1-F30

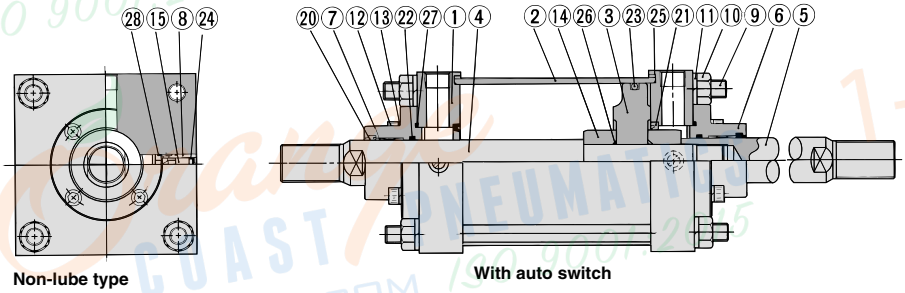
* Order two foot brackets per cylinder.

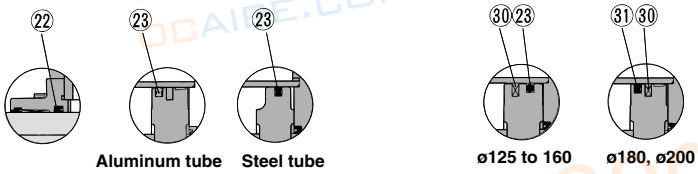
SMC

Construction

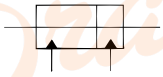
Lube, Non-lube
With auto switch

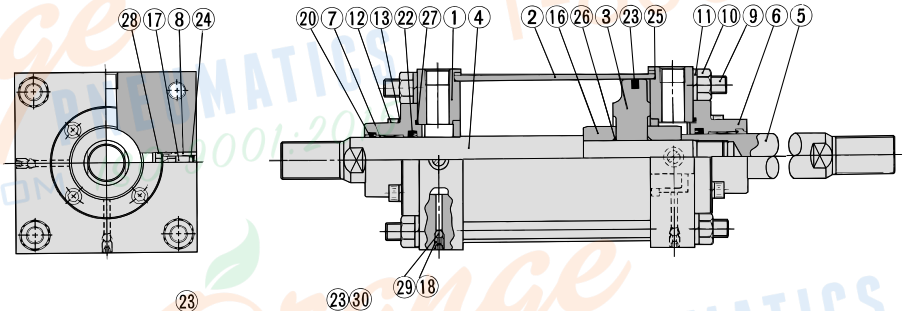






Air-hydro





Component Parts

No.	Description	Material		Note
1	Rod cover	Rolled steel		Black painted
2	Cylinder tube	ø125 to ø160	Aluminum alloy	Hard anodized
		ø125 to ø300*	Carbon steel tube	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	Retaining plate	Cast iron		Black painted
7	Bushing	Lead-bronze casted		
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	Retaining plate bolt	Chromium molybdenum steel		Black zinc chromated
13	Spring washer	Steel wire		Black zinc chromated
14	Cushion ring A	Rolled steel		Zinc chromated
15	Cushion valve	Rolled steel		Electroless nickel plated
16	Spacer A	Rolled steel		
17	Air releasing B	Rolled steel		Zinc chromated
18	Air releasing A	Chromium molybdenum steel		
29	Check ball	Chrome bearing steel		
30	Magnet	—		

* In the case of the aluminum tube of non-lube and air-hydro type, piston material is an aluminum alloy casted. In the case of auto switch bore size ø180 and ø200, piston material is aluminum alloy casted and tubing material is aluminum alloy (hard anodized).

Seal List

No.	Description	Material	Note
Lube			
20	Wiper ring	NBR	
21*	Cushion seal		
22	Rod seal		
23	Piston seal		
24	Valve seal		
25	Tube gasket		
26*	Piston gasket		
27	Retaining plate gasket		
28*	Guide gasket		

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

No.	Description	Material	Note
22	Rod seal	NBR	
23	Piston seal		

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

No.	Description	Material	Note
22	Rod seal	NBR	
23	Piston seal		

Lube (With switch)
Seals except ㉛ are the same as lube type.

No.	Description	Material	Note
31	Piston seal	NBR	

Replacement Parts (Seal kit)

- For replacement parts no. (seal kits) of double rod style cylinder for Series CS1W, refer to page 434.

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

Double Acting, Double Rod/Replacement Parts /Seal kit

When ordering the replacement parts (seal kits) for Series CS1W double rod type cylinder, indicate the order number listed in the table at 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

Bore size (mm)	Kit no.	Description
125	CS1W-125A-PS	Component part numbers: ⑳, ㉒, ㉓, ㉔, ㉕, ㉗
140	CS1W-140A-PS	
160	CS1W-160A-PS	
180	CS1W-180A-PS	
200	CS1W-200A-PS	
250	CS1W-250A-PS	
300	CS1W-300A-PS	

∗ Seal kit includes a grease pack (ø125 to 160: 40 g, ø180 and 200: 50 g, ø250 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 with Auto Switch

Bore size (mm)	Kit no.	Description
125	CS1WN125A-PS	Component part numbers: ⑳, ㉒, ㉓, ㉔, ㉕, ㉗
140	CS1WN140A-PS	
160	CS1WN160A-PS	
180	CS1WN180A-PS	
200	CS1WN200A-PS	
250∗	CS1WN250A-PS	
300∗	CS1WN300A-PS	

∗ It is not available with auto switch.
∗ Seal kit includes a grease pack (ø125 to 160: 40 g, ø180 and 200: 50 g, ø250 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 with Auto Switch

Bore size (mm)	Kit no.	Description
125	CS1W125A-PS	Component part numbers: ⑳, ㉒, ㉔, ㉕, ㉗, ㉛
140	CS1W140A-PS	
160	CS1W160A-PS	
180	CDS1W180A-PS	
200	CDS1W200A-PS	

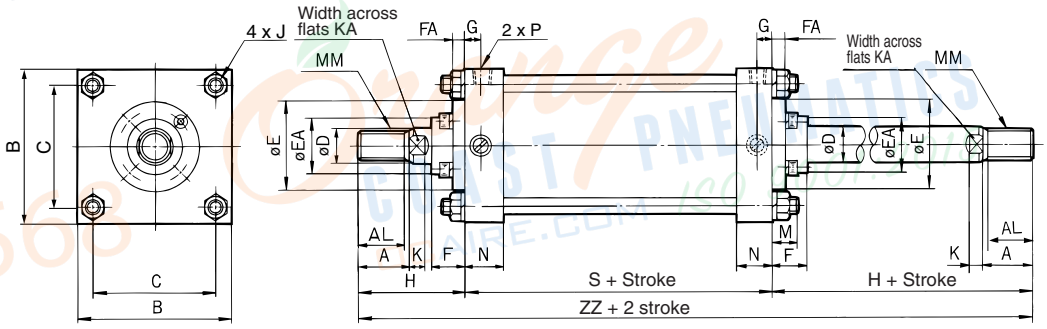
∗ Seal kit includes a grease pack (ø125 to 160: 40 g, ø180 and 200: 50 g). Order with the following part number when only the grease pack is needed.
Grease pack part no.: GR-S-010 (10 g)**, GR-S-020** (20 g)

Air-hydro

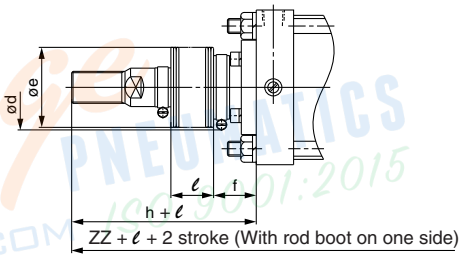
Bore size (mm)	Kit no.	Description
125	CS1WH125A-PS	Component part numbers: ⑳, ㉒, ㉓, ㉔, ㉕, ㉗
140	CS1WH140A-PS	
160	CS1WH160A-PS	

Basic Style: CS1WB

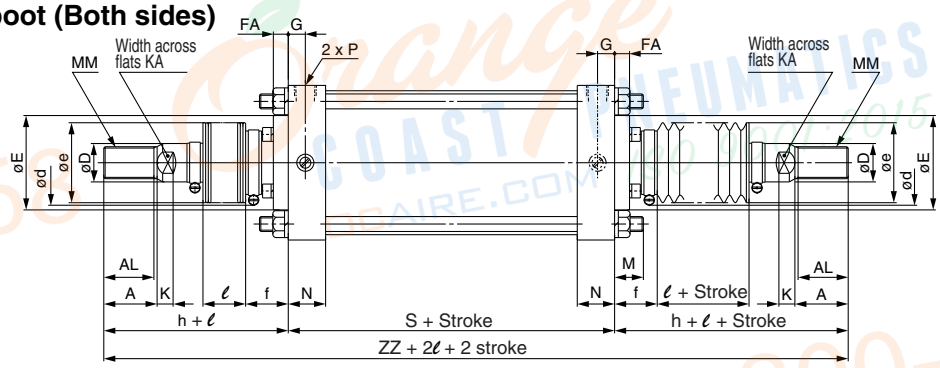
Lube type (CS1WB), Non-lube type (CS1WBN), Air-hydro type (CS1WBH)



With rod boot (One side)



With rod boot (Both sides)



(mm)

Type	Bore size (mm)	Stroke range (mm)		A	AL	B	C	D	E	EA	F	FA	G	J	K	KA	M	MM	N	P	S
		Without rod boot	With rod boot																		
Lube Non-lube Air-hydro	**125**	Up 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	Up 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	Up 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**	Up 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	Up 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	Up 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	Up 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

(mm)

Type	Bore size (mm)	Without rod boot		With rod boot (Single side)						(Both sides)
		H	ZZ	d	e	f	h	ℓ	ZZ	ZZ
Lube Non-lube Air-hydro	**125**	110	318	82	75	40	133	0.2 stroke	341	364
	140	110	318	82	75	40	133	0.2 stroke	341	364
	160	120	346	82	75	40	141	0.2 stroke	367	388
Lube Non-lube	**180**	135	381	92	85	45	153	0.2 stroke	399	417
	200	135	381	96	90	45	153	0.2 stroke	399	417
	250	160	461	108	105	55	176	0.17 stroke	477	493
	300	175	496	118	115	55	190	0.17 stroke	511	526

With Auto Switch: ø125 to ø200 Only

(mm)

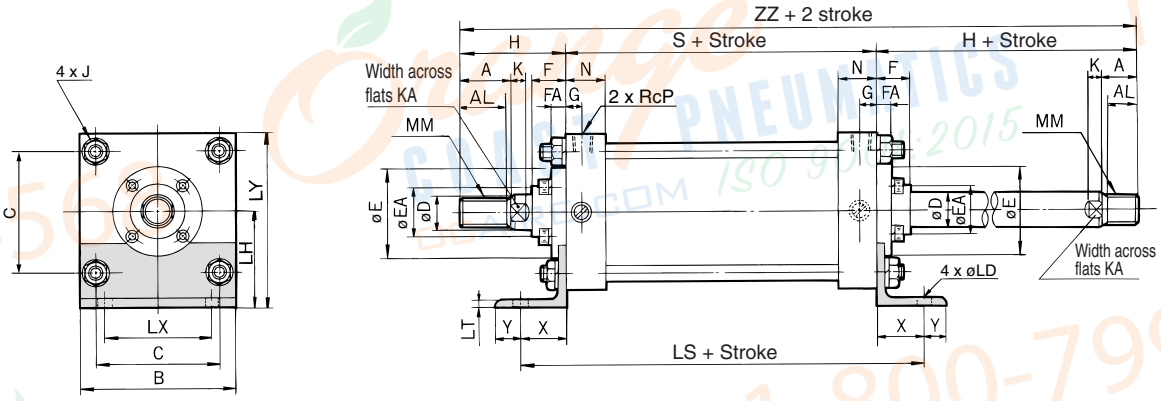
Type	Bore size (mm)	Stroke range (mm)		S	Without rod boot	With rod boot (Single side)	With rod boot (Both sides)
		Without rod boot	With rod boot		ZZ	ZZ	ZZ
Lube Non-lube Air-hydro	**125**	Up to 1000	30 to 1000	98	318	341	364
	140	Up to 1000	30 to 1000	98	318	341	364
	160	Up to 1200	30 to 1200	106	346	367	388
Lube Non-lube	**180**	Up to 1200	30 to 1200	115	385	403	421
	200	Up to 998	30 to 998	120	390	408	426

*** Refer to “Minimum Stroke for Auto Switch Mounting” on page 444.

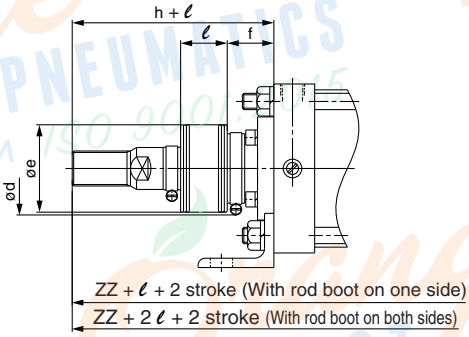
CJ1
CJP
CJ2
CM2
CG1
MB
MB1
CA2
CS1
CS2
D-□
-X□
Individual -X□
Technical data

Foot Style: CS1WL

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



With rod boot



(mm)

Type	Bore size (mm)	Stroke range (mm)		A	AL	B	C	D	E	EA	F	FA	G	J	K	KA	LD	LH	LS	LT
		Without rod boot	With rod boot																	
Lube Non-lube Air-hydro	**125**	Up 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	Up 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	Up 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**	Up 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	Up 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	Up 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	Up 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

(mm)

Type	Bore size (mm)	LX	LY	MM	N	P	S	X	Y	Without rod boot		With rod boot (Single side)						(Both sides)
										H	ZZ	d	e	f	h	ℓ	ZZ	ZZ
Lube Non-lube Air-hydro	**125**	100	157.5	M30 x 1.5	35	1/2	98	45	20	110	318	82	75	40	133	0.2 stroke	341	364
	140	112	180.5	M30 x 1.5	35	1/2	98	45	30	110	318	82	75	40	133	0.2 stroke	341	364
	160	118	197	M36 x 1.5	39	3/4	106	50	25	120	346	82	75	40	141	0.2 stroke	367	388
Lube Non-lube	**180**	132	227	M40 x 1.5	39	3/4	111	60	30	135	381	92	85	45	153	0.2 stroke	399	417
	200	150	245	M45 x 1.5	39	3/4	111	60	30	135	381	96	90	45	153	0.2 stroke	399	417
	250	180	298.5	M56 x 2	49	1	141	80	40	160	461	108	105	55	176	0.17 stroke	477	493
	300	212	365	M64 x 2	49	1	146	90	40	175	496	118	115	55	190	0.17 stroke	511	526

With Auto Switch: ø125 to ø200 Only

(mm)

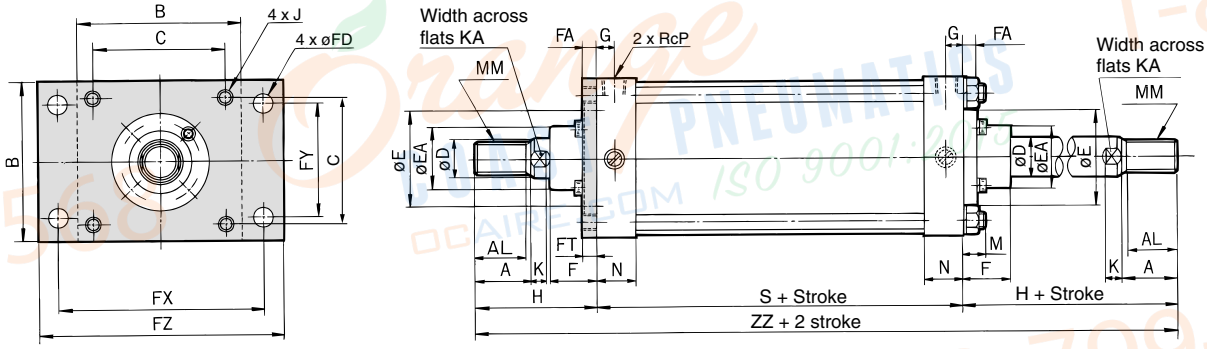
Type	Bore size (mm)	Stroke range (mm)		S	LS	Without rod boot	With rod boot (Single side)	With rod boot (Both sides)
		Without rod boot	With rod boot			ZZ	ZZ	ZZ
Lube Non-lube Air-hydro	**125**	Up to 1000	30 to 1000	98	188	318	341	364
	140	Up to 1000	30 to 1000	98	188	318	341	364
	160	Up to 1200	30 to 1200	106	206	346	367	388
Lube Non-lube	**180**	Up to 1200	30 to 1200	115	235	385	403	421
	200	Up to 998	30 to 998	120	240	390	408	426

*** Refer to “Minimum Stroke for Auto Switch Mounting” on page 444.

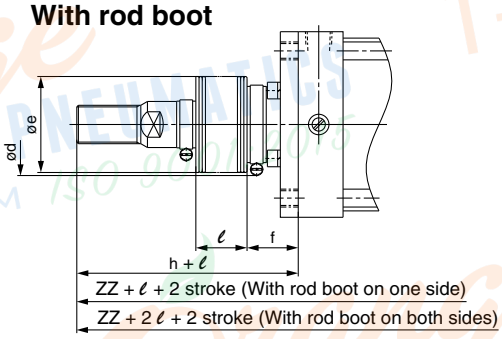
SMC

Rod Side Flange Style: CS1WF

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



With rod boot



(mm)

Type	Bore size (mm)	Stroke range (mm)		A	AL	B	B	C	D	E	EA	F	FA	FD	FT	FX	FY	FZ	G	J
		Without rod boot	With rod boot																	
Lube Non-lube Air-hydro	**125**	Up 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	Up 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	Up 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**	Up 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	Up 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	Up 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	Up 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)

Type	Bore size (mm)	K	KA	M	MM	N	P	S	Without rod boot	With rod boot (Single side)							(Both sides)
									H	ZZ	d	e	f	h	ℓ	ZZ	ZZ
Lube Non-lube Air-hydro	**125**	15	31	30	M30 x 1.5	35	1/2	98	110	318	82	75	40	133	0.2 stroke	341	364
	140	15	31	24	M30 x 1.5	35	1/2	98	110	318	82	75	40	133	0.2 stroke	341	364
	160	17	36	26	M36 x 1.5	39	3/4	106	120	346	82	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	92	85	45	153	0.2 stroke	399	417
	200	20	46	31	M45 x 1.5	39	3/4	111	135	381	96	90	45	153	0.2 stroke	399	417
	250	25	56	35	M56 x 2	49	1	141	160	461	108	105	55	176	0.17 stroke	477	493
	300	30	65	48	M64 x 2	49	1	146	175	496	118	115	55	190	0.17 stroke	511	526

With Auto Switch: ø125 to ø200 Only

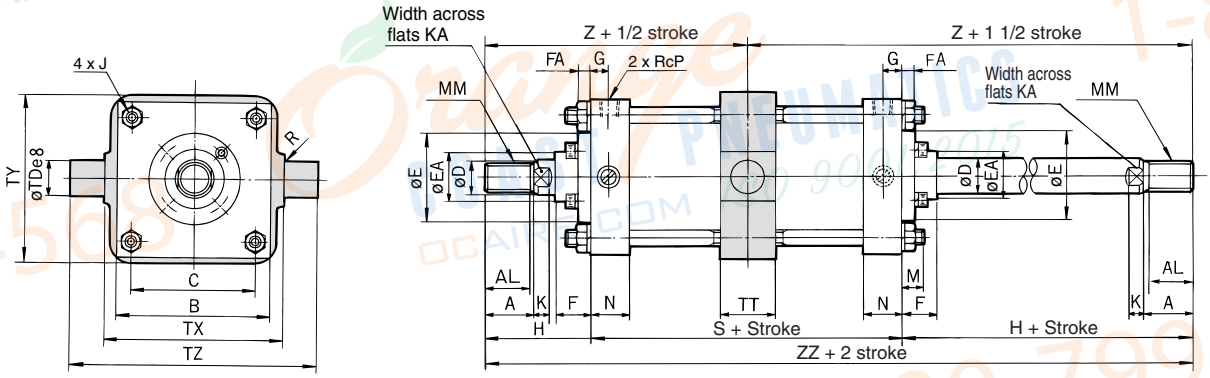
(mm)

Type	Bore size (mm)	Stroke range (mm)		S	Without rod boot	With rod boot (Single side)	With rod boot (Both sides)
		Without rod boot	With rod boot		ZZ	ZZ	ZZ
Lube Non-lube Air-hydro	**125**	Up to 1000	30 to 1000	98	318	341	364
	140	Up to 1000	30 to 1000	98	318	341	364
	160	Up to 1200	30 to 1200	106	346	367	388
Lube Non-lube	**180**	Up to 1200	30 to 1200	115	385	403	421
	200	Up to 998	30 to 998	120	390	408	426

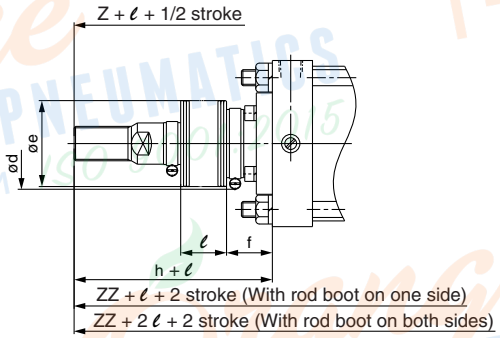
*** Refer to “Minimum Stroke for Auto Switch Mounting” on page 444.

Center Trunnion Style: CS1WT

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



With rod boot



(mm)

Type	Bore size (mm)	Stroke range (mm)		A	AL	B	C	D	E	EA	F	FA	G	J	K	KA	M	MM	N	P	R	S
		Without rod boot	With rod boot																			
Lube Non-lube Air-hydro	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
	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
	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)

Type	Bore size (mm)	TDe8	TT	TX	TY	TZ	H	Without rod boot		With rod boot (Single side)							(Both sides)	
								Z	ZZ	d	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	82	75	40	133	0.2 stroke	182	341	182	364
	140	36 $^{-0.050}_{-0.089}$	55	190	184	262	110	159	318	82	75	40	133	0.2 stroke	182	341	182	364
	160	40 $^{-0.050}_{-0.089}$	60	212	204	292	120	173	346	82	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	92	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	96	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	108	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	118	115	55	190	0.17 stroke	263	511	263	526

With Auto Switch: ø125 to ø200 Only

(mm)

Type	Bore size (mm)	Stroke range (mm)		S	Without rod boot		With rod boot (Single side)		With rod boot (Both sides)
		Without rod boot	With rod boot		Z	ZZ	Z	ZZ	ZZ
Lube Non-lube Air-hydro	125	25 to 1000	30 to 1000	98	159	318	182	341	364
	140	30 to 1000	30 to 1000	98	159	318	182	341	364
	160	35 to 1200	35 to 1200	106	173	346	194	367	388
Lube Non-lube	180	30 to 1200	30 to 1200	115	192.5	385	210.5	403	421
	200	30 to 998	30 to 998	120	195	390	213	408	426

*** Refer to “Minimum Stroke for Auto Switch Mounting” on page 444.

SMC

Air Cylinder: Low Friction Type
Non-lube Type
Series CS1□Q
ø125, ø140, ø160

How to Order

CS1 L Q 160 □ – 300 □ – □

With auto switch CDS1 L Q 160 □ – 300 □ – M9BW □ – □

With auto switch (Built-in magnet)

Mounting style

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

Low friction type

Clinder tube bore size

125	125 mm
140	140 mm
160	160 mm

Port thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 440.

Number of auto switches

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

Auto switch

Nil	Without auto switch

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

Suffix for cylinder

Rod boot	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
Cushion	A	With cushion in both sides
	R	With cushion in rod side
	H	With cushion in head side
	Nil	Without cushion

* If specifying more than one symbol, indicate them alphabetically.

Made to Order
(Refer to page 440 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) CDS1LQ125-200

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

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Tie-rod mounting	Auto switch model: Band mounting	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state switch	——	Grommet	Yes	3-wire (NPN)	24V	5V,12V	M9N	—	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)			M9P	—	●	●	●	○	○		
				2-wire	—	12V	M9B	—	●	●	●	○	○	—	
					—	100V, 200V	J51	—	●	—	●	○	—		
		Terminal conduit		3-wire (NPN)	24V	5V,12V	—	G39	—	—	—	—	—	IC circuit	
				2-wire		12V	—	K39	—	—	—	—	—	—	
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5V,12V	M9NW	—	●	●	●	○	○	IC circuit	
				3-wire (PNP)			M9PW	—	●	●	●	○	○		
				2-wire		12V	M9BW	—	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)		5V,12V	M9NA	—	○	○	●	○	○	IC circuit	
				3-wire (PNP)			M9PA	—	○	○	●	○	○		
				2-wire		12V	M9BA	—	○	○	●	○	○	—	
	With diagnostic output (2-color indication)			4-wire (NPN)		5V,12V	F59F	—	●	—	●	○	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire(NPN equivalent)	—	5V	A96	—	●	—	●	—	—	IC circuit	—
			Yes	2-wire	24V	12V	A93	—	●	—	●	—	—	—	Relay, PLC
			No			5V,12V	A90	—	●	—	●	—	—	IC circuit	
			Yes			12V	A54	—	●	—	●	●	—	—	
			No				A64	—	●	—	●	—	—		
		Terminal conduit	Yes			—	—	A33	—	—	—	—	—	—	PLC
		DIN terminal					100V, 200V	—	A34	—	—	—	—	—	Relay, PLC
								—	A44	—	—	—	—	—	
	Diagnostic indication (2-color indication)	Grommet				—	—	A59W	—	●	—	●	—	—	

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

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

* Since there are other applicable auto switches than listed above, refer to page 445 for details.
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
* D-A9□/M9□/M9□W/M9□AL auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled before shipped.)

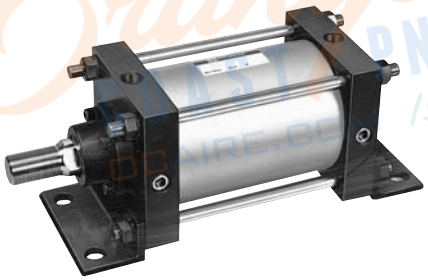
D-□ -X□ Individual -X□ Technical data

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

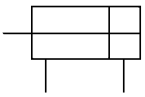
Min. operating pressure –0.005 MPa

Auto switch mounting is possible.



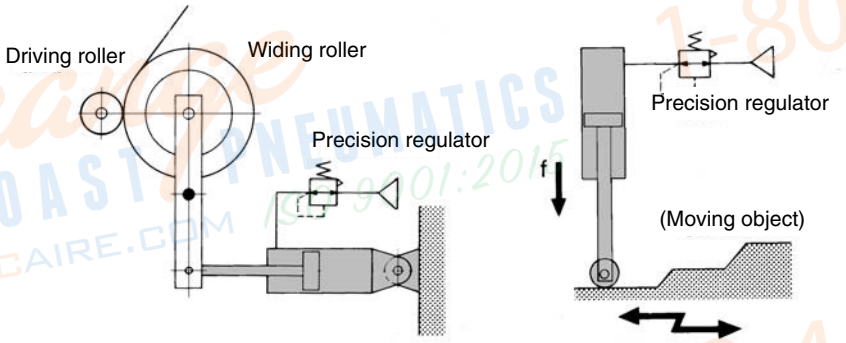
JIS Symbol

Double acting



Application Example

Low friction cylinder is used in combination with precision regulator (Series IR).



Specifications

Action	Double acting, Single rod
Direction of low friction	Both directions
Fluid	Air
Proof pressure	1.05 MPa
Maximum operating pressure	0.7 MPa
Minimum operating pressure	0.005 MPa *
Ambient and fluid temperature	Without auto switch: 0 to 70°C (No freezing) With auto switch: 0 to 60°C (No freezing)
Allowable leakage	0.5ℓ/min (ANR) or less
Cushion	None (With cushion is available.)
Lubrication	Not required (Non-lube)
Bore size (mm)	125, 140, 160
Mounting	Basic style, Foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Center trunnion style

* In the case of w/ cushion, pressure inside cushion stroke is not included.

Maximum Stroke

(mm)

Tubing material	Aluminum alloy	Carbon steel tube	
Mounting bracket / Bore size (mm)	Basic style, Head side flange style Single clevis style, Double clevis style Center trunnion style Rod side flange style	Basic style, Head side flange style Single clevis style Double clevis style Center trunnion style	Foot style Rod side flange style
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

Made to Order Specifications

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

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

Refer to pages 443 to 445 for auto switch specifications.

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

Mounting Bracket Part No.

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

* Order two foot brackets per cylinder.

Rod Boot Material

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

* Maximum ambient temperature for the rod boot itself.

Accessory

Mounting style		Basic style	Foot style	Rod side flange style	Head side flange style	Single clevis style	Double clevis style	Center trunnion style
Standard equipment	Clevis pin	–	–	–	–	–	●	–
Option	Rod end nut	●	●	●	●	●	●	●
	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (Knuckle pin, Cotter pin)	●	●	●	●	●	●	●
	Rod boot	●	●	●	●	●	●	●

Principal Parts Material and Surface Treatment

Description	Material	Note
Cover	Rolled steel plate	Black painted
Tube	Aluminum alloy *	Hard anodized
	Carbon steel tube	Inside: Hard chrome plated
Sliding part seal	NBR	PNY, NLP
Piston rod	Carbon steel	Hard chrome plated
Piston	Aluminum alloy casted	Chromated

* With auto switch

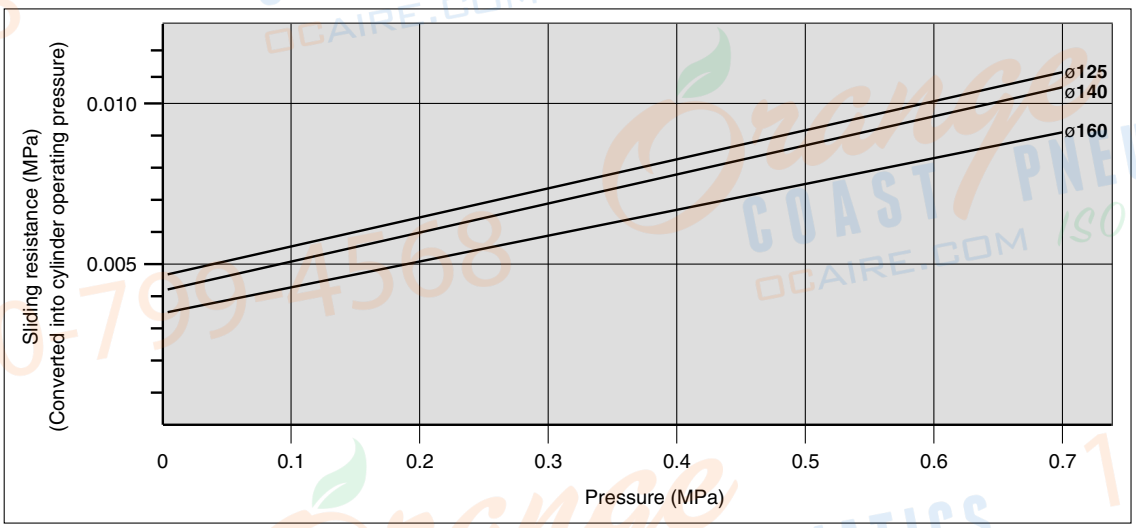
Mass/Steel Tube (For aluminum tube [with auto switch], refer to page 419.)

(kg)

Bore size (mm)		125	140	160
Basic mass	Basic style	15.20	18.38	25.24
	Foot style	16.83	20.90	28.04
	Rod side flange style	17.88	23.38	31.63
	Head side flange style	17.88	23.38	31.63
	Single clevis style	18.27	22.67	30.73
	Double clevis style	18.73	23.42	31.58
	Trunnion style	19.33	24.11	32.64
Additional mass per each 100 mm of stroke		2.66	3.01	3.58
Accessory bracket	Single knuckle	0.91	1.16	1.56
	Double knuckle (With pin)	1.37	1.81	2.48

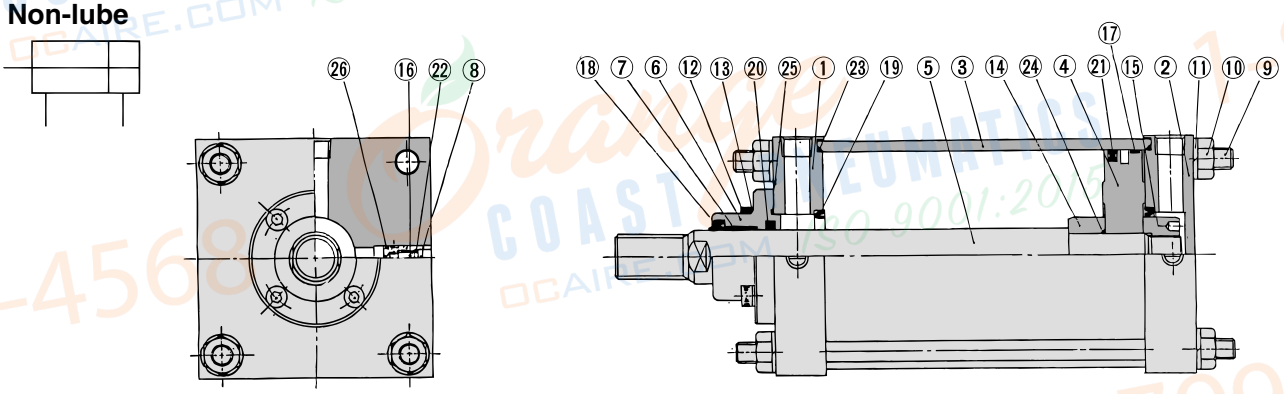
Calculation: (Example) **CS1LQ160, 500** (Foot style, ø160)
- Basic mass ····· 28.04
- Additional mass ····· 3.58/100 stroke
- Cylinder stroke····· 500 stroke, 28.04 + 3.58 x 500/100 = 45.94 kg

Sliding Resistance



Construction

Non-lube



Component Parts

No.	Description	Material	Note
1	**Rod cover**	Rolled steel plate	Black painted
2	**Head cover**	Rolled steel plate	Black painted
3	**Cylinder tube**	Aluminum alloy *	Hard anodized
		Carbon steel tube	Hard chrome plated
4	**Piston**	Aluminum alloy casted	Chromated
5	**Piston rod**	Carbon steel	Hard chrome plated
6	**Retaining plate**	Cast iron	Black painted
7	**Bushing**	Lead-bronze casted	
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	**Retaining plate bolt**	Chromium molybdenum steel	Black zinc chromated
13	**Spring washer**	Steel wire	Black zinc chromated
14	**Cushion ring A**	Rolled steel	Zinc chromated
15	**Cushion ring B**	Rolled steel	Zinc chromated
16	**Cushion valve**	Rolled steel	Electroless nickel plated
17	**Wear ring**	Resin	

* With auto switch

Seal List

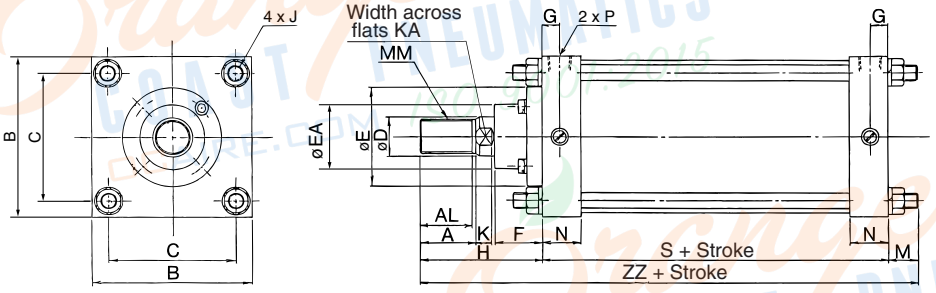
No.	Description	Material	Note
18	**Wiper ring**	NBR	
19	**Cushion seal** *		
20	**Rod seal**		
21	**Piston seal**		
22	**Valve seal**		
23	**Tube gasket**		
24	**Piston gasket**		
25	**Retaining plate gasket**		
26	**Guide gasket**		

* It is used only in the case of w/ cushion type.

Dimensions: According to Mounting Brackets

External dimensions for each mounting bracket other than basic style are the same as standard type. Refer to pages 422 to 428.

Basic Style: CS1BQ



(mm)

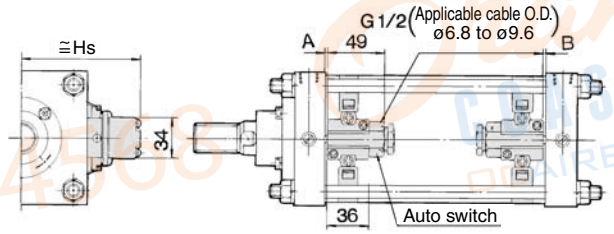
Bore size (mm)	Stroke range (mm)	A	AL	B	C	D	E	EA	F	G	J	K	KA	M	MM	N	P	S	H	ZZ
125	Up to 1000	50	47	145	115	36	90	59	43	16	M14 x 1.5	15	31	27	M30 x 1.5	35	1/2	98	110	235
140	Up to 1000	50	47	161	128	36	90	59	43	16	M14 x 1.5	15	31	27	M30x 1.5	35	1/2	98	110	235
160	Up to 1200	56	53	182	144	40	90	59	43	18.5	M16 x 1.5	17	36	30.5	M36 x 1.5	39	3/4	106	120	256.5

SMC

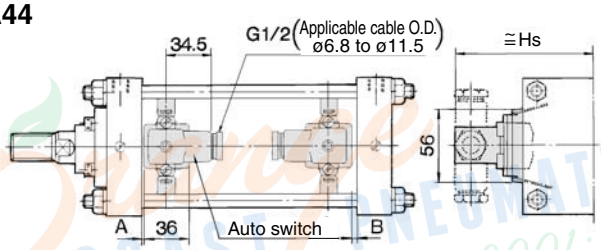
Proper Auto Switch Mounting Position (Detection at stroke end) and Mounting Height

Band mounting type

D-A3□
D-G3/K3

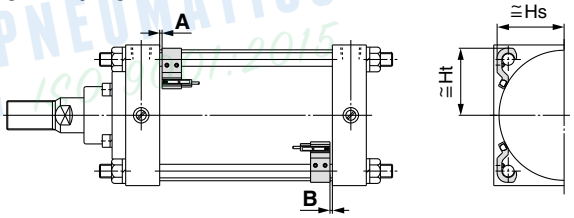


D-A44

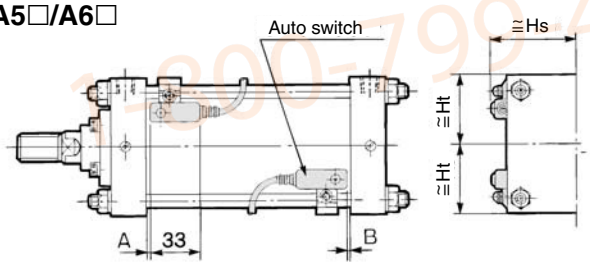


Tie-rod mounting type

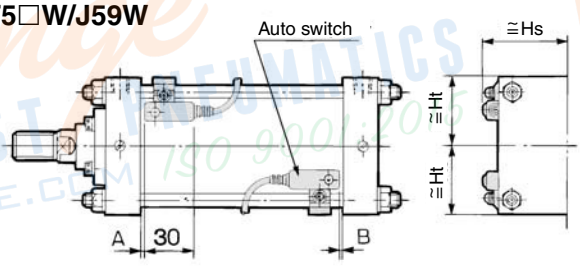
D-A9□A9□V
D-M9□/M9□V
D-M9□W/M9□WV
D-M9□AL/M9□AVL
D-Z7□/Z80
D-Y59□/Y69□/Y7P/Y7PV
D-Y7□W/Y7□WV
D-Y7BAL



D-A5□/A6□



D-F5□/J5□/D-F5NTL
D-F5BAL/F59F
D-F5□W/J59W



Proper Auto Switch Mounting Position

(mm)

Auto switch model / Bore size	D-A9□ D-A9□V		D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□AL D-M9□AVL		D-Z7□/Z80 D-Y5□/Y6□ D-Y7P/Y7PV D-Y7□W D-Y7□WV D-Y7BAL		D-A5□ D-A6□ D-A3□ D-A44 D-G39 D-K39		D-A59W		D-F5□W D-J59W D-F5BAL D-F5□ D-J5□ D-F59F		D-F5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
125	4	4	8	8	1.5	1.5	0	0	2	2	4.5	4.5	9.5	9.5
140	4	4	8	8	1.5	1.5	0	0	2	2	4.5	4.5	9.5	9.5
160	4	4	8	8	1.5	1.5	0	0	2	2	4.5	4.5	9.5	9.5
180	9.5	7.5	13.5	12.5	7	5	3.5	1.5	7.5	5.5	10	8	15	13
200	12	10	16	14	9.5	7.5	6	4	10	8	12.5	10.5	17.5	15.5

∗ 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): ø125, ø140, ø160

Auto Switch Mounting Height

(mm)

Auto switch model / Bore size	D-A9□ D-A9□V D-M9□ D-M9□W D-M9□AL		D-M9□V D-M9□WV D-M9□AVL		D-Z7□/Z80 D-Y5□/Y6□ D-Y7P D-Y7PV D-Y7□W D-Y7□WV D-Y7BAL		D-A3□ D-G39 D-K39	D-A44	D-A5□ D-A6□ D-A59W		D-F5□ D-J5□ D-F5□W D-J59W D-F5BAL D-F59F D-F5NTL	
	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
140	76	76	77.5	76	76	76	124	134	81	76.5	80	76.5
160	85	85	86	85	85	85	134.5	144.5	89	87.5	88	87.5
180	95	95	95.5	95	95	95	144	154	97	97.5	96	97.5
200	106	106	106	106	106	106	154	164	107	108	107.5	108

∗ Low friction type (CDS1□Q): ø125, ø140, ø160

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				
				ø125	ø140	ø160	ø180	ø200
D-A9□	2 (Different surfaces, Same surface) 1		15	100	105	110		
	n		$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…)	$100 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$105 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$110 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)		
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…)	$75 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$80 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$85 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)		
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…)	$105 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$110 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$115 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)		
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…)	$80 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$85 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$90 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)		
D-M9□AL	2 (Different surfaces, Same surface) 1		20	115	120			
	n		$20 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…)	$115 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…)	$120 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8)			
D-M9□AVL	2 (Different surfaces, Same surface) 1		15	90	95			
	n		$15 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…)	$90 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…)	$95 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8)			
D-A5□/A6□ D-A59W D-F5□/J5□ D-F5□W D-J59W D-F5BAL 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…)	$125 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$135 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)		$150 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	
D-F5NTL	2 (Different surfaces, Same surface) 1		35	145	155		170	
	n (Same surface)		$35 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…)	$145 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$155 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)		$170 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	
D-A3□ D-G39 D-K39	2	Different surfaces	35	110				150
		Same surface	100					
	n	Different surfaces	35 + 30(n–2)	110 + 30(n–2) (n = 2, 4, 6, 8…)				150 + 100(n–2) (n = 2, 4, 6, 8…)
		Same surface	100 + 100(n–2)	110 + 100(n–2) (n = 2, 4, 6, 8…)				150 + 30(n–2) (n = 2, 4, 6, 8…)
	1		15	110				150
D-A44	2	Different surfaces	35	110				150
		Same surface	55					
	n	Different surfaces	35 + 30(n–2)	110 + 30(n–2) (n = 2, 4, 6, 8…)				150 + 30(n–2) (n = 2, 4, 6, 8…)
		Same surface	55 + 55(n–2)	110 + 50(n–2) (n = 2, 4, 6, 8…)				150 + 50(n–2) (n = 2, 4, 6, 8…)
	1		15	110				150
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…)	$105 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$110 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$115 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)		
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…)	$90 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$95 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$100 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)		
D-Y7BAL	2 (Different surfaces, Same surface) 1		20	115	120	125	130	
	n		$20 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6, 8…)	$115 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$120 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$125 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	$130 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16…)	

∗ Low friction type (CDS1□Q): ø125, ø140, ø160

Operating range

(mm)

Auto switch model	Bore size				
	125	140	160	180	200
D-A9□/A9□V	12	12.5	11.5	12	12.5
D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	6	6.5	6.5	6.5	7
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-Y7BAL	12	13	7	7.5	8
D-F5□/J5□/F5□W D-J59W/F5BAL D-F5NTL/F59F	5	5	5.5	6	6
D-G39/K39	11	11	10	10	10

∗ 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): ø125, ø140, ø160

Auto Switch Mounting Bracket: Part No.

Auto switch model	Bore size (mm)				
	ø125	ø140	ø160	ø180	ø200
D-A9□/A9□V D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL	BS5-125	BS5-125	BS5-160	BS5-180	BS5-200
D-A5□/A6□ D-A59W D-F5□/J5□ D-F5NTL D-F5□W/J59W D-F5BAL/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-Y7BAL	BS4-125	BS4-125	BS4-160	BS4-180	BS4-200

[Stainless Steel Mounting Screw Kit]

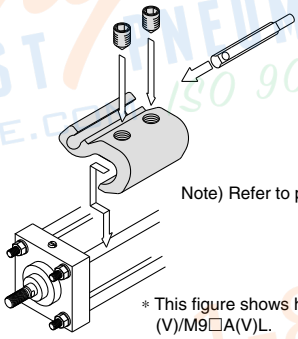
The following set of stainless steel mounting screws is available. Use them in accordance with the operating environment. (Since auto switch brackets are not included, order them separately.)

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

The above stainless steel screws are used when a cylinder is shipped with D-F5BAL-type auto switches.

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

Note) When D-M9□AL/M9□AVL/Y7BAL 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 page 1365 for the details of BBA1 screws.

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

Besides the models listed in How to Order, the following auto switches are applicable.
Refer to pages 1263 to 1371 for the detailed specifications.

Auto switch type	Part no.	Electrical entry (Fetching direction)	Features
Reed	D-A90V	Grommet (perpendicular)	Without indicator light
	D-A93V, A96V	Grommet (in-line)	—
	D-Z73, Z76		
	D-A53, A56		
	D-A67		Without indicator light
	D-Z80		
Solid state	D-F59, F5P, J59	Grommet (in-line)	—
	D-Y59A, Y59B, Y7P		
	D-F59W, F5PW, J59W		2-color display
	D-Y7NW, Y7PW, Y7BW		
	D-F5BAL, Y7BAL		Water resistant (2 colors)
	D-F5NTL		With timer
	D-M9NV, M9PV, M9BV	Grommet (perpendicular)	—
	D-Y69A, Y69B, Y7PV		
	D-M9NWV, M9PWV, M9BWV		2-color display
	D-Y7NWV, Y7PWV, Y7BWV		
	D-M9NAVL, M9PAVL, M9BAVL		Water resistant (2 colors)

∗ For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 1328 and 1329 for details.
∗ Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H/Y7G/Y7H types) are also available. Refer to page 1290 and 1292 for details.