

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

CS1 Series

Lube/Non-lube: $\varnothing 125, \varnothing 140, \varnothing 160, \varnothing 180, \varnothing 200, \varnothing 250, \varnothing 300$
Air-hydro: $\varnothing 125, \varnothing 140, \varnothing 160$

For the aluminum tubing of bore sizes 125, 140 and 160, a new "CS2 series"(P.655) model is now available with reduced weight and self weight deflection. Please consider using the CS2 series.

How to Order

CS1 **L** **160** - **300** - - **V**

Mounting

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

Class 2 Pressure Vessel

(Subject to or not subject to)

Nil	Applicable
V	Not applicable

* This indicates whether or not the cylinder stroke is applicable to the Class 2 Pressure Vessel Act and whether or not the product is made in Japan.

* "-V" is not put on a product with a stroke not applicable to the Class 2 Pressure Vessel Act. For details, refer to page 622.

Tubing material

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

* Refer to page 621 for the maximum strokes.

Note) The tubing material of items with a bore size of 180 and 200 corresponding to the Class 2 Pressure Vessel Act is aluminum tubing.

Type

Nil	Lube
N	Non-lube
H	Air-hydro

Made to Order

(Refer to page 621 for details.)

Suffix for cylinder

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

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

** Air-hydro type has no cushion. No symbol indicates no cushion.

Cylinder stroke (mm)

(Refer to "Maximum Stroke" on page 621.)

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		

Port thread type

Nil	Rc
TN	NPT
TF	G

Mounting Bracket Part No.

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

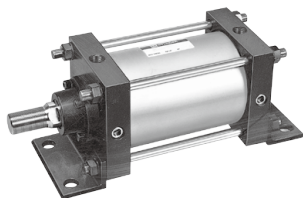
* Order two foot brackets per cylinder.

** 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 625.

Air Cylinder: Standard Type Lube/Non-lube Type, Air-hydro Type **CS1 Series**

Specifications

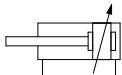


Type	Lube, Non-lube	Air-hydro
Bore size (mm)	ø125 to ø300	ø125, ø140, ø160
Fluid	Air	Turbine oil
Proof pressure	1.57 MPa ^{Note)}	
Maximum operating pressure	0.97 MPa	
Minimum operating pressure	0.05 MPa	0.06 MPa
Piston speed	50 to 500 mm/s	0.5 to 200 mm/s
Cushion	Interchangeable	None
Ambient and fluid 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 type, Foot type, Rod side flange type, Head side flange type, Single clevis type, Double clevis type, Center trunnion type	

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

Symbol

Double acting, Air cushion



Made to Order Specifications
[Click here for details](#)

Symbol	Specifications
-XA□	Change of rod end shape
-XB5	Oversized rod cylinder
-XB6	Heat-resistant cylinder (-10 to 150°C)
-XC3	Special port location
-XC4	With heavy duty scraper
-XC5	Heat resistant cylinder (110°C)
-XC6	Made of stainless steel
-XC8	Adjustable stroke cylinder/Adjustable extension type
-XC9	Adjustable stroke cylinder/Adjustable retraction type
-XC10	Dual stroke cylinder/Double rod type
-XC11	Dual stroke cylinder/Single rod type
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC22	Fluororubber seal
-XC26	Clevis pins with flat washer
-XC27	Double clevis pin and double knuckle pin made of stainless steel
-XC30	Rod side trunnion
-XC35	With coil scraper
-XC68	Hard chrome plated stainless steel rod
-XC86	With rod end bracket

Rod Boot 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.

Maximum Stroke

(mm)

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

Note 1) The tubing material of items with a bore size of 180 and 200 corresponding to the Class 2 Pressure Vessel Act is aluminum tubing.

Note 2) Using a stroke of a length which is smaller than the effective cushion length may result in reduced air cushion performance. Refer to "Technical Data 1" on page 1573 for details on the effective cushion length.

Accessory

Mounting	Basic type	Foot type	Rod side flange type	Head side flange type	Single clevis type	Double clevis type	Center trunnion type
Clevis pin, Cotter pin	—	—	—	—	—	●	—
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 637.

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
Sliding part seal	ø180, ø200, ø250, ø300	Carbon steel tube ^{Note)}	Inside: Hard chrome plated ^{Note)}
		Lube	NBR
		Non-lube	NBR
Piston rod	Lube	Carbon steel	Hard chrome plated
		Cast iron	
Piston	Non-lube	Aluminum alloy casted (Iron tube: Cast iron)	Chromated (In the case of aluminum alloy casted)
		Aluminum alloy casted (Iron tube: Cast iron)	Chromated (In the case of aluminum alloy casted)
		Air-hydro	

Note) For items with a bore size of ø180 and ø200 corresponding to the Class 2 Pressure Vessel Act, the material is "Aluminum alloy" and the note should state "Hard anodized".



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

Bore size (mm)		125	140	160	180 ^{*2}	200 ^{*2}
Basic weight	Basic type	14.85 (13.73)	17.98 (16.57)	24.77 (23.03)	33.44	41.86
	Foot type	16.48 (15.36)	20.50 (19.09)	27.57 (26.83)	37.64	46.74
	Rod side flange type	17.53 (16.41)	22.98 (21.57)	31.16 (29.42)	43.27	53.77
	Head side flange type	17.53 (16.41)	22.98 (21.57)	31.16 (29.42)	43.27	53.77
	Single clevis type	17.92 (16.80)	22.27 (20.86)	30.26 (28.52)	41.83	51.76
	Double clevis type (Clevis pin, Cotter pin)	18.38 (17.26)	23.02 (21.61)	31.11 (29.37)	43.51	53.79
	Trunnion type	18.98 (17.86)	23.71 (22.30)	32.17 (30.43)	44.06	55.85
	Additional weight per each 100 mm of stroke	1.77	1.96	2.39	3.24	3.87
Accessory bracket	Single knuckle	0.91	1.16	1.56	3.07	2.90
	Double knuckle (Knuckle pin, Cotter pin)	1.37	1.81	2.48	4.74	4.59
	Rod end nut	0.16	0.16	0.23	0.32	0.85

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

*2 The aluminum tubes with a bore size of 180 or 200 are subject to the Class 2 Pressure Vessel Act. (Common to lube and non-lube types)

Calculation example: **CS1L160-500**

- Basic weight.....27.57 (Foot type, σ160)
 - Additional weight.....2.39/100 stroke
 - Cylinder stroke.....500 stroke
- 27.57 + 2.39 x 500/100 = 39.52 kg

Weight/Steel Tube (kg)

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

⚠ Precautions

Be sure to read this before handling the products.
Refer to page 20 for safety instructions and pages 21 to 30 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.

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

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

Regulations/Class 2 Pressure Vessel Act

The air cylinder uses the compressed air, but may become applicable to the regulations depending on the cylinder size.

So, please fully understand the regulations before using the cylinder.

Regulations regarding Class 2 Pressure Vessel

- As specified in Articles 42 and 44 of the Industrial Safety and Health Act, the individual examination shall be conducted in conformity with the Class 2 Pressure Vessel Act. If the pressure vessel structure does not satisfy the Class 2 Pressure Vessel Act, it shall not be transferred, leased or installed.

2. About Class 2 Pressure Vessel

The Class 2 Pressure Vessel is a vessel (except for Class 1 Pressure Vessel) that contains the gas with a gauge pressure of 0.2 MPa or more and satisfies the conditions shown below.

- Vessel with an inside capacity of 0.04 m³ or more
- Vessel with a shell inside diameter of 200 mm or more and a length of 1000 mm or more (extracted from Article 1-7 of the Industrial Safety and Health Act.)

The following shows SMC products that are applicable to the Class 2 Pressure Vessel Act.

Products applicable to the Class 2 Pressure Vessel Act

If the stroke exceeds the level shown below, the cylinder is applicable to the Class 2 Pressure Vessel Act.

Bore size (mm)	Cylinder stroke (mm)
180	1569
200	998
250	813
300	564

3 Periodical Self Inspection

As specified in Article 45 of the Industrial Safety and Health Act, it is obligated to conduct the periodical self inspection of the product applicable to the Class 2 Pressure Vessel Act and keep the inspection records when using it. (Related laws: Articles 88 and 89 of the Ordinance on Safety of Boilers and Pressure Vessels) After the use of the product applicable to the Class 2 Pressure Vessel Act has been started, the self inspection of the following points is conducted once a year and the inspection results are recorded.

- Check the main body for damage.
- Check the lid tightening bolt for wear.
- Check the pipe and valve for damage.

4 Products not applicable to the Class 2 Pressure Vessel Act

According to Articles 13 and 14 of the Industrial Safety and Health Act, when it is obvious that the product is not used in Japan, it is not necessary to examine the product in conformity with the Class 2 Pressure Vessel Act. Additionally, when it is obvious that the product is not used in Japan, the product is exempted from the machine applicable to Articles 42 and 44 of the Industrial Safety and Health Act.

Please order the air cylinder with "V" put at the end of the part number.

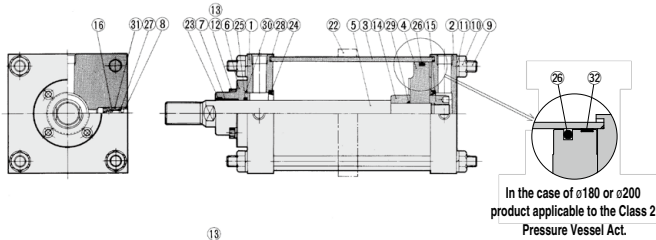
(The symbol "V" is not put on a product with a stroke not applicable to the Class 2 Pressure Vessel Act.)

The cylinders manufactured in SMC overseas factories are not examined in conformity with the Class 2 Pressure Vessel Act. When using the cylinder in Japan, be sure to use the cylinder made in Japan that has been examined in conformity with the Class 2 Pressure Vessel Act.

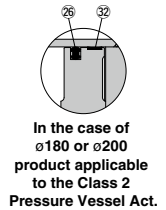
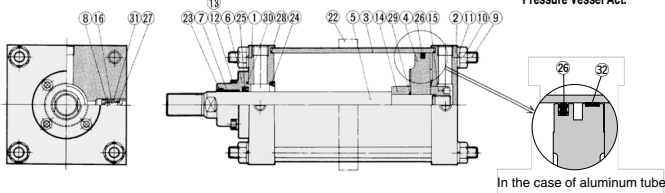
- A safety valve is installed on the upstream side of the piping so that any pressure exceeding the maximum operating pressure of the cylinder applicable to the Class 2 Pressure Vessel Act is not applied.

Construction

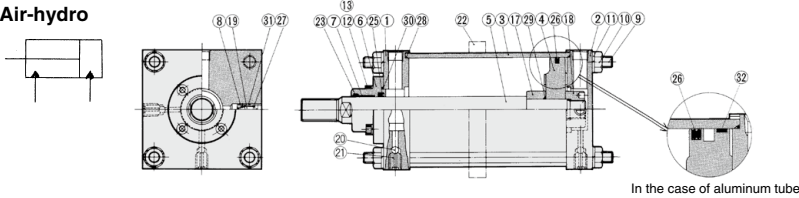
Lube



Non-lube



Air-hydro



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	$\phi 125$ to $\phi 160$	Aluminum alloy
		$\phi 125$ to $\phi 300$	Carbon steel tube
4	Piston	Cast iron **	
5	Piston rod	Carbon steel	Hard chrome plated
6	Retaining plate	Cast iron	Black painted
7	Bushing	Bearing alloy	
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.

• Trunnion type should not be disassembled. (Refer to page 654.)

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			
25	Rod seal	NBR	
26	Piston seal		

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

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 CS1 series, refer to page 624.
- ** Seal kits do not include cushion seal, piston gasket and guide gasket because those are not replaceable parts.

CS1 Series

Standard/Replacement Parts/Seal Kit

When ordering the replacement parts (seal kits) for standard type CS1 series 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	

With Auto Switch/Replacement Parts/Seal Kit

When ordering the replacement parts (seal kits) for the CDS1 series 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, 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, 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, ③①, ③②, ③③, ③⑤
140	CDS1L140A-PS	
160	CDS1L160A-PS	

* Foot type, Rod side flange type: 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

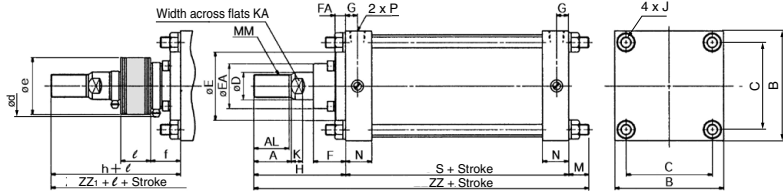
Bore size (mm)	Kit no.	Description
125	CS1H125A-PS	Component part numbers: ②⑧, ③①, ③②, ③③, ③⑤
140	CS1H140A-PS	
160	CS1H160A-PS	

C□S1 Series

Basic Type: CS1B

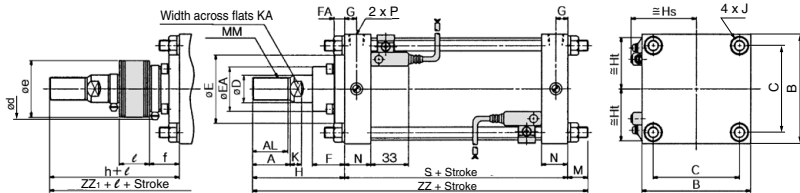
Lube type (CS1B), Non-lube type (CS1BN), Air-hydro type (CS1BH)

With rod boot



With auto switch: CDS1B

With rod boot



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	125	to 1000	50	47	145	115	36	90	59	43	14	16	M14 x 1.5	15	31	27	M30 x 1.5	35	1/2	98
Non-lube	140	to 1000	50	47	161	128	36	90	59	43	14	16	M14 x 1.5	15	31	27	M30 x 1.5	35	1/2	98
Air-hydro	160	to 1200	56	53	182	144	40	90	59	43	14	18.5	M16 x 1.5	17	36	30.5	M36 x 1.5	39	3/4	106
	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
Lube	200	to 1200	63	60	226	182	50	115	74	48	17	18.5	M20 x 1.5	20	46	35	M45 x 1.5	39	3/4	111
Non-lube	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

Type	Bore size (mm)	Without rod boot		With rod boot					
		H	ZZ	d	e	f	h	ℓ	ZZ ₁
Lube	125	110	235	82	75	40	133	0.2 stroke	258
Non-lube	140	110	235	82	75	40	133	0.2 stroke	258
Air-hydro	160	120	256.5	82	75	40	141	0.2 stroke	277.5
	180	135	281	92	85	45	153	0.2 stroke	299
Lube	200	135	281	96	90	45	153	0.2 stroke	299
Non-lube	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: $\phi 125$ to $\phi 200$ Only

Type	Bore size (mm)	Stroke range (mm)	S	Without rod boot		With rod boot	
				ZZ	ZZ ₁	ZZ	ZZ ₁
Lube	125	Up to 1000	98	235	258	235	258
Non-lube	140	Up to 1000	98	235	258	235	258
Air-hydro	160	Up to 1200	106	256.5	277.5	256.5	277.5
Lube	180	Up to 1200	115	285	303	285	303
Non-lube	200	Up to 998	120	290	308	290	308

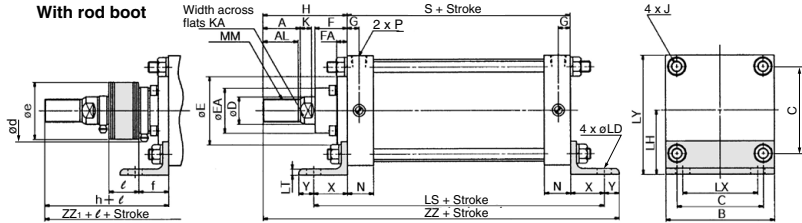
* Dimensions except mentioned above are the same as standard type.

** For the auto switch mounting position and its mounting height, refer to page 651.

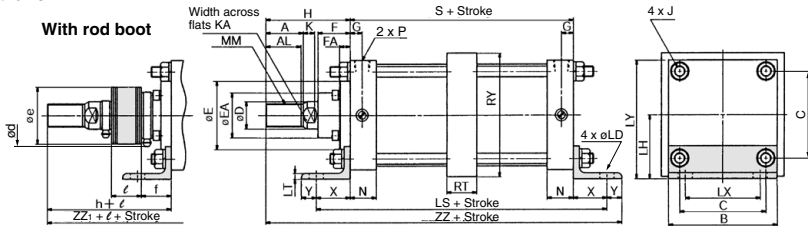
***Refer to "Minimum Stroke for Auto Switch Mounting" on page 652.

Foot Type: CS1L

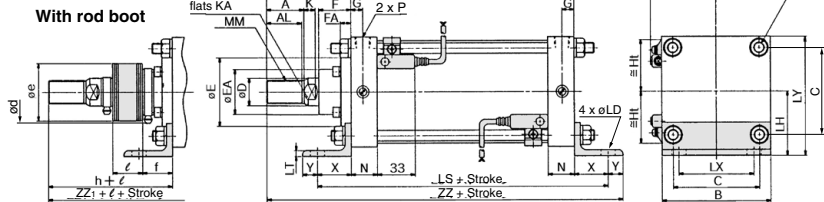
Lube type (CS1L), Non-lube type (CS1LN), Air-hydro type (CS1LH)



Long stroke



With auto switch: CDS1L



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	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
Non-lube	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
Air-hydro	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
	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
Lube	200	Up to 1800	1801 to 2000	60	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
Non-lube	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

Type	Bore size (mm)	RY	S	X	Y	Without rod boot		With rod boot						
						H	ZZ	d	e	f	h	l	ZZ1	
Lube	125	164	98	45	20	110	273	82	75	40	133	0.2 stroke	296	
Non-lube	140	184	98	45	30	110	283	82	75	40	133	0.2 stroke	306	
Air-hydro	160	204	106	50	25	120	301	82	75	40	141	0.2 stroke	322	
	180	228	111	60	30	135	336	92	85	45	153	0.2 stroke	354	
Lube	200	257	111	60	30	135	336	96	90	45	153	0.2 stroke	354	
Non-lube	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 ZZ	With rod boot ZZ1
Lube	125	Up to 1400	98	188	273	296
Non-lube	140	Up to 1400	98	188	283	306
Air-hydro	160	Up to 1400	106	206	301	322
Lube	180	Up to 1500	115	235	340	358
Non-lube	200	Up to 998	120	240	345	363

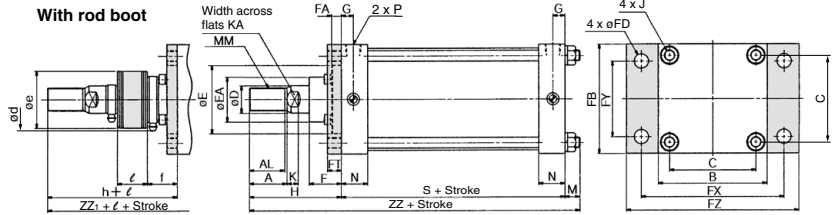
* Dimensions except mentioned above are the same as standard type.
 ** For the auto switch mounting position and its mounting height, refer to page 651.
 *** Refer to "Minimum Stroke for Auto Switch Mounting" on page 652.



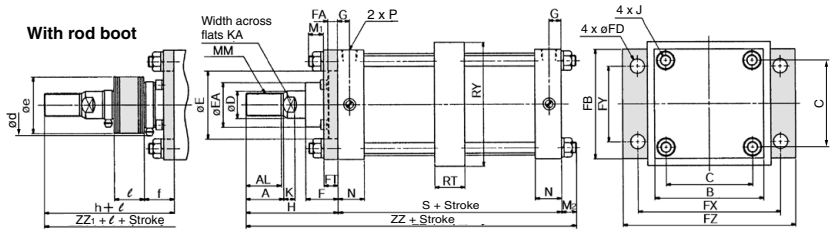
C□S1 Series

Rod Side Flange Type: CS1F

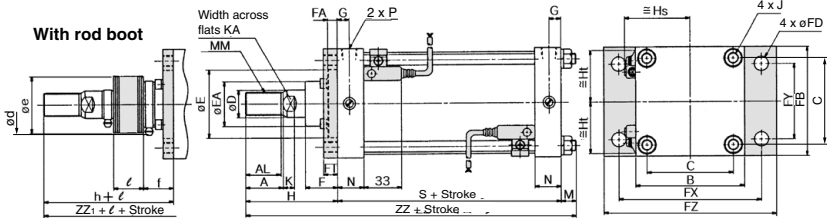
Lube type (CS1F), Non-lube type (CS1FN), Air-hydro type (CS1FH)



Long stroke



With auto switch: CDS1F



Type	Bore size (mm)	Stroke* range (mm)	Without rod boot																	With rod boot														
			A	AL	B	C	D	E	EA	F	FA	FB	FD	FT	FX	FY	FZ	G	J	K	KA	M	S	N	P	MM	H	ZZ	d	e	f	h	ℓ	ZZ ₁
Lube	125	Up to 1400	50	47	145	115	36	90	59	43	14	145	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		261
Non-lube	140	Up to 1400	50	47	161	128	36	90	59	43	14	160	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
Air-hydro	160	Up to 1400	56	53	182	144	40	90	59	43	14	180	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
	180	Up to 1800	63	60	204	162	45	115	70	48	17	200	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
Lube	200	Up to 1800	63	60	226	182	50	115	74	48	17	225	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
Non-lube	250	Up to 2000	71	67	277	225	60	140	86	60	20	275	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		352
	300	Up to 2000	80	76	330	270	70	140	96	60	20	330	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

Type	Bore size (mm)	Long stroke range (mm)	Without rod boot		With rod boot			
			M ₁	M ₂	RT	RY	ZZ	ZZ ₁
Lube	125	1401 to 1600	22	22	36	164	230	253
Non-lube	140	1401 to 1600	19	19	36	184	227	250
Air-hydro	160	1401 to 1600	22	22	45	204	248	269
	180	1801 to 2000	26	26	45	228	272	290
Lube	200	1801 to 2000	26	26	45	257	272	290
Non-lube	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

Type	Bore size (mm)	Stroke range (mm)	Without rod boot		With rod boot	
			S	ZZ	ZZ ₁	
Lube	125	Up to 1400	98	238	261	
Non-lube	140	Up to 1400	98	232	255	
Air-hydro	160	Up to 1400	106	252	273	
Lube	180	Up to 1500	115	281	299	
Non-lube	200	Up to 998	120	286	304	

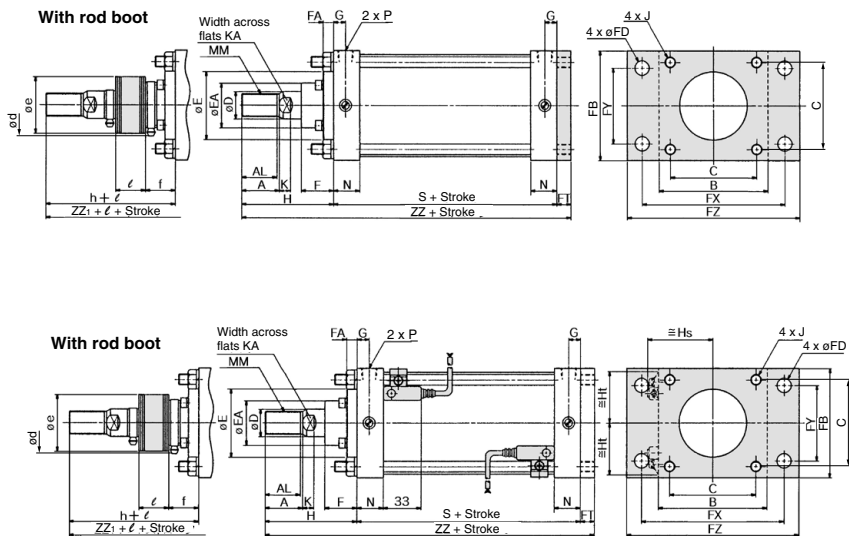
* Dimensions except mentioned above are the same as standard type.

** For the auto switch mounting position and its mounting height, refer to page 651.

***Refer to "Minimum Stroke for Auto Switch Mounting" on page 652.

Head Side Flange Type: CS1G

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



Type	Bore size (mm)	Stroke range* (mm)	A	AL	B	C	D	E	EA	F	FA	FB	FD	FT	FX	FY	FZ	G	J	K	KA	MM	N	P
Lube	125	Up to 1000	50	47	145	115	36	90	59	43	14	145	19	14	190	100	230	16	M14 x 1.5	15	31	M30 x 1.5	35	1/2
Non-lube	140	Up to 1000	50	47	161	128	36	90	59	43	14	160	19	20	212	112	255	16	M14 x 1.5	15	31	M30 x 1.5	35	1/2
Air-hydro	160	Up to 1200	56	53	182	144	40	90	59	43	14	180	19	20	236	118	275	18.5	M16 x 1.5	17	36	M36 x 1.5	39	3/4
	180	Up to 1200	63	60	204	162	45	115	70	48	17	200	24	25	265	132	320	18.5	M18 x 1.5	20	41	M40 x 1.5	39	3/4
Lube	200	Up to 1200	63	60	226	182	50	115	74	48	17	225	24	25	280	150	335	18.5	M20 x 1.5	20	46	M45 x 1.5	39	3/4
Non-lube	250	Up to 1200	71	67	277	225	60	140	86	60	20	275	29	30	355	180	420	23	M24 x 1.5	25	56	M56 x 2	49	1
	300	Up to 1200	80	76	330	270	70	140	96	60	20	330	33	30	400	212	475	23	M30 x 1.5	30	65	M64 x 2	49	1

Type	Bore size (mm)	S	Without rod boot		With rod boot						
			H	ZZ	d	e	f	h	ℓ	ZZ ₁	
Lube	125	98	110	222	82	75	40	133	0.2 stroke	245	
Non-lube	140	98	110	228	82	75	40	133	0.2 stroke	251	
Air-hydro	160	106	120	246	82	75	40	141	0.2 stroke	267	
	180	111	135	271	92	85	45	153	0.2 stroke	289	
Lube	200	111	135	271	96	90	45	153	0.2 stroke	289	
Non-lube	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: $\phi 125$ to $\phi 200$ Only (mm)

Type	Bore size (mm)	Stroke range (mm)	S	Without rod boot		With rod boot	
				ZZ	ZZ ₁		
Lube	125	Up to 1000	98	222	245		
Non-lube	140	Up to 1000	98	228	251		
Air-hydro	160	Up to 1200	106	246	267		
Lube	180	Up to 1200	115	275	293		
Non-lube	200	Up to 998	120	280	298		

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

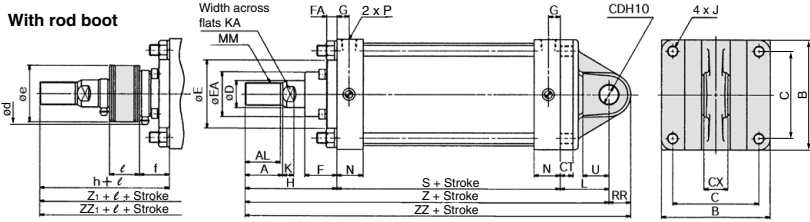
** For the auto switch mounting position and its mounting height, refer to page 651.

*** Refer to "Minimum Stroke for Auto Switch Mounting" on page 652.

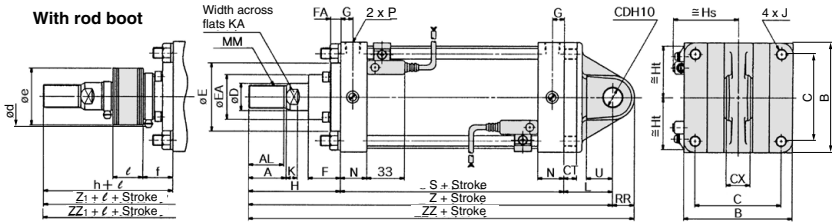
C□S1 Series

Single Clevis Type: CS1C

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



With auto switch: CDS1C



Type	Bore size (mm)	Stroke range* (mm)	A	AL	B	C	CDH10	CT	CX	D	E	EA	F	FA	G	J	K	KA	L	MM	N	P	RR
Lube	125	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
Non-lube	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
Air-hydro	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	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
Non-lube	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
Lube	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
Non-lube	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

Type	Bore size (mm)	S	U	(mm)									
				Without rod boot				With rod boot					
				H	Z	ZZ	d	e	f	h	l	Z1	ZZ1
Lube	125	98	35	110	273	302	82	75	40	133	0.2 stroke	296	325
Non-lube	140	98	40	110	283	315	82	75	40	133	0.2 stroke	306	338
Air-hydro	160	106	45	120	306	342	82	75	40	141	0.2 stroke	327	363
Lube	180	111	50	135	336	380	92	85	45	153	0.2 stroke	354	398
Non-lube	200	111	50	135	336	380	96	90	45	153	0.2 stroke	354	398
Lube	250	141	65	160	411	466	108	105	55	176	0.17 stroke	427	482
Non-lube	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	Z1	ZZ1		
				Lube	125	Up to 1000	98	273	302
Non-lube	140	Up to 1000	98	283	315	306	338		
Air-hydro	160	Up to 1200	106	306	342	327	363		
Lube	180	Up to 1200	115	340	384	358	402		
Non-lube	200	Up to 998	120	345	389	363	407		

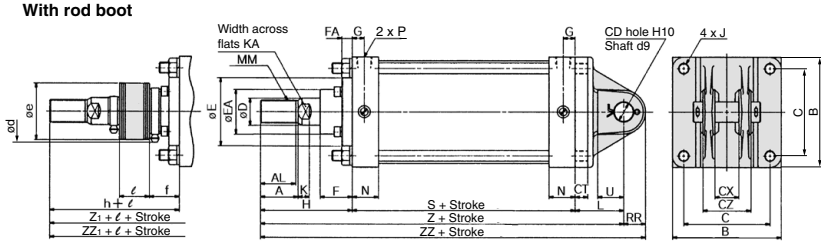
* Dimensions except mentioned above are the same as standard type.

** For the auto switch mounting position and its mounting height, refer to page 651.

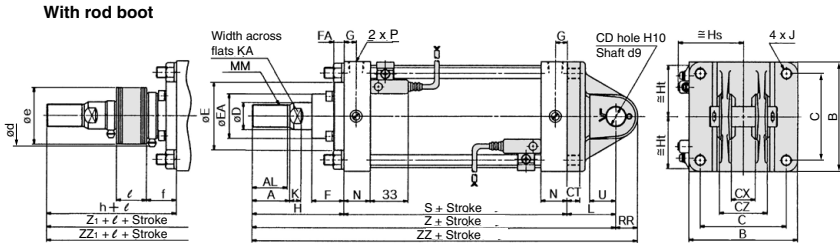
*** Refer to "Minimum Stroke for Auto Switch Mounting" on page 652.

Double Clevis Type: CS1D

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



With auto switch: CDS1D



Note) Clevis pin and cotter pin are shipped together.

Type	Bore size (mm)	Stroke range ^{a)} (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	125	Up to 1000	50	47	145	115	25 ^{+0.084} _{-0.1}	17	32 ^{+0.3} _{-0.1}	64 ⁰ _{-0.2}	36	90	59	43	14	16	M14 x 1.5	15	31	65	M30 x 1.5	35	1/2	29
Non-lube	140	Up to 1000	50	47	161	128	28 ^{+0.084} _{-0.1}	17	36 ^{+0.3} _{-0.1}	72 ⁰ _{-0.2}	36	90	59	43	14	16	M14 x 1.5	15	31	75	M30 x 1.5	35	1/2	32
Air-hydro	160	Up to 1200	56	53	182	144	32 ^{+0.100} _{-0.1}	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
	180	Up to 1200	63	60	204	162	40 ^{+0.100} _{-0.1}	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
Lube	200	Up to 1200	63	60	226	182	40 ^{+0.100} _{-0.1}	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
Non-lube	250	Up to 1200	71	67	277	225	50 ^{+0.100} _{-0.1}	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} _{-0.1}	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

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	125	98	35	110	273	302	82	75	40	133	0.2 stroke	296	325	
Non-lube	140	98	40	110	283	315	82	75	40	133	0.2 stroke	306	338	
Air-hydro	160	106	45	120	306	342	82	75	40	141	0.2 stroke	327	363	
	180	111	50	135	336	380	92	85	45	153	0.2 stroke	354	398	
Lube	200	111	50	135	336	380	96	90	45	153	0.2 stroke	354	398	
Non-lube	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	125	Up to 1000	98	273	302	296	325
Non-lube	140	Up to 1000	98	283	315	306	338
Air-hydro	160	Up to 1200	106	306	342	327	363
Lube	180	Up to 1200	115	340	384	358	402
Non-lube	200	Up to 998	120	345	389	363	407

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

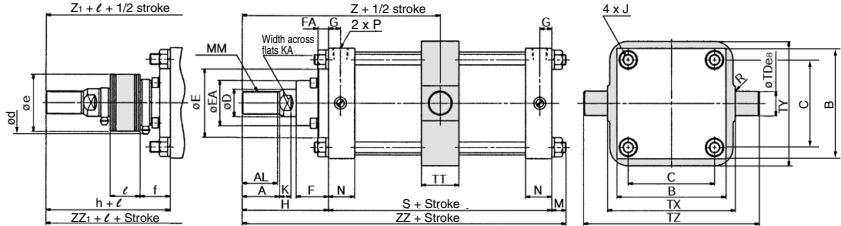
** For the auto switch mounting position and its mounting height, refer to page 651.

*** Refer to "Minimum Stroke for Auto Switch Mounting" on page 652.

Center Trunnion Type: CS1T

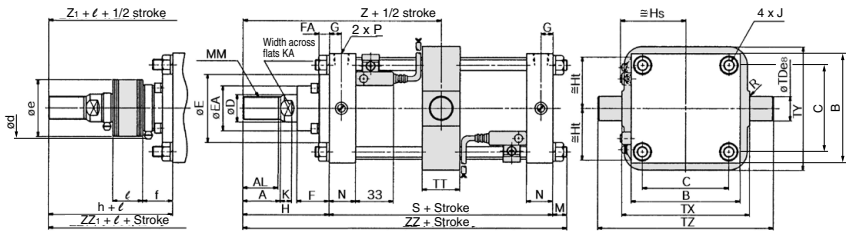
Lube type (CS1T), Non-lube type (CS1TN), Air-hydro type (CS1TH)

With rod boot



With auto switch: CDS1T

With rod boot



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	TD88	TT	TX	
Lube	125	25 to 1000	50	47	145	115	36	90	59	43	14	16	M14 x 1.5	15	31	19	M30 x 1.5	35	1/2	1	98	32	-0.050 -0.089	50	170
Non-lube	140	30 to 1000	50	47	161	128	36	90	59	43	14	16	M14 x 1.5	15	31	19	M30 x 1.5	35	1.5	98	36	-0.050 -0.089	55	190	
Air-hydro	160	35 to 1200	56	53	182	144	40	90	59	43	14	18.5	M16 x 1.5	17	36	22	M36 x 1.5	39	3/4	1.5	106	40	-0.050 -0.089	60	212
	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
Lube	200	30 to 1200	63	60	226	182	50	115	74	48	17	18.5	M20 x 1.5	20	46	26	M45 x 1.5	39	3/4	2	111	45	-0.050 -0.089	59	265
Non-lube	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

Type	Bore size (mm)	TV	TZ	Without rod boot			With rod boot									
				H	Z	ZZ	d	e	f	h	ℓ	Z ₁	ZZ ₁			
Lube	125	164	234	110	159	227	82	75	40	133	0.2 stroke	182	250			
Non-lube	140	184	262	110	159	227	82	75	40	133	0.2 stroke	182	250			
Air-hydro	160	204	292	120	173	248	82	75	40	141	0.2 stroke	194	269			
	180	228	326	135	190.5	272	92	85	45	153	0.2 stroke	208.5	290			
Lube	200	257	355	135	190.5	272	96	90	45	153	0.2 stroke	208.5	290			
Non-lube	250	325	447	160	200.5	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 25 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	125	UP to 1000	98	159	227	182	250	
Non-lube	140	UP to 1000	98	159	227	182	250	
Air-hydro	160	UP to 1200	106	173	248	194	269	
Lube	180	UP to 1200	115	192.5	276	210.5	294	
Non-lube	200	UP to 998	120	195	281	213	299	

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

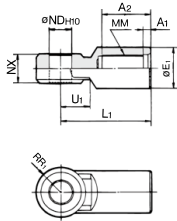
** For the auto switch mounting position and its mounting height, refer to page 651.

*** Refer to "Minimum Stroke for Auto Switch Mounting" on page 652.

CS1 Series

Accessory Bracket Dimensions

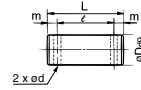
I Type Single Knuckle Joint*



Material: Cast iron

Part no.	Applicable bore size (mm)	A1	A2	E1	L1	MM	ND _{H10}	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

Knuckle Pin, Clevis Pin

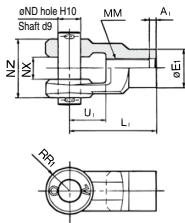


Material: Carbon steel

Part no.	Applicable bore size (mm)	Dd9	L	ℓ	m	d	Applicable cotter pin
IY-12	125	25 ^{-0.065} _{-0.117}	79.5	69.5	5	4	φ4 x 40
IY-14	140	28 ^{-0.065} _{-0.117}	86.5	76.5	5	4	φ4 x 40
IY-16	160	32 ^{-0.080} _{-0.142}	94.5	84.5	5	4	φ4 x 40
IY-18	180, 200	40 ^{-0.080} _{-0.142}	115	105	5	4	φ4 x 55
IY-25	250	50 ^{-0.080} _{-0.142}	144	132	6	5	φ5 x 65
IY-30	300	63 ^{-0.100} _{-0.176}	178	166	6	5	φ5 x 80

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

Y Type Double Knuckle Joint*



Material: Cast iron

Part no.	Applicable bore size (mm)	A1	E1	L1	MM	ND _{H10}	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.

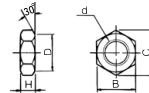
(Screw it entirely over the rod end threads and tighten it.)

* Extend the dimensions of A, H, when using a single/double knuckle joint together with a rod end nut.

* Pin and cotter pin are attached for double knuckle joint.

● The rod end bracket type is available as Made to Order "-XC86" when ordering the cylinder and attached mounting brackets. Refer to page 1551.

Rod End Nut



Material: Rolled steel

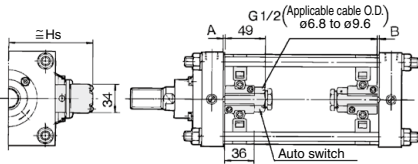
Part no.	Applicable bore size (mm)	d	H	B	C	D
NT-12	125, 140	M30 x 1.5	18	46	53.1	44
NT-16	160	M36 x 1.5	21	55	63.5	53
NT-18	180	M40 x 1.5	23	60	69.3	57
NT-20	200	M45 x 1.5	27	70	80.8	67
NT-25	250	M56 x 2	34	85	98.1	82
NT-30	300	M64 x 2	38	95	110.0	92

Auto Switch Mounting 1

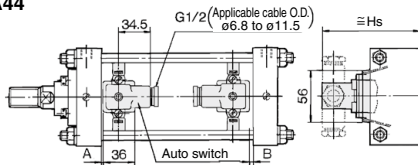
Proper Auto Switch Mounting Position (Detection at stroke end) and Mounting Height

Band mounting type

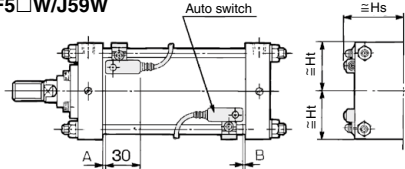
D-A3□
D-G3/K3



D-A44

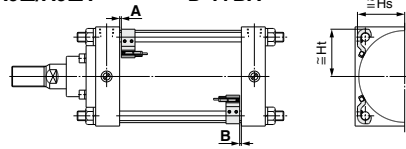


D-F5□/J59/D-F5NT
D-F5BA/F59F
D-F5□W/J59W

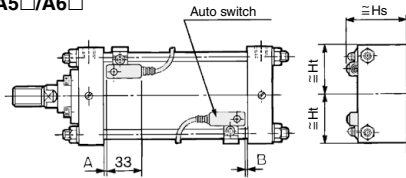


Tie-rod mounting type

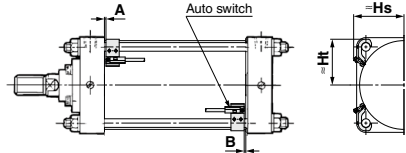
D-M9□/M9□V D-Z7□/Z80
D-M9□W/M9□WV D-Y59□/Y69□/Y7P/Y7PV
D-M9□A/M9□AV D-Y7□W/Y7□WV
D-A9□/A9□V D-Y7BA



D-A5□/A6□



D-P3DWA



Proper Auto Switch Mounting Position

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

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

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

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

Auto Switch Mounting Height

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

* 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
D-M9□ D-M9□W	2 (Different surfaces, Same surface)	15	105	110		115
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$110 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}		$115 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-M9□V D-M9□WV	2 (Different surfaces, Same surface)	10	80	85		90
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	$80 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}		$90 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-M9□A	2 (Different surfaces, Same surface)	20	115		120	
	n	$20 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	$115 + 40 \frac{(n-2)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}		$120 + 40 \frac{(n-2)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	
D-M9□AV	2 (Different surfaces, Same surface)	15	90		95	
	n	$15 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	$90 + 30 \frac{(n-2)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}		$95 + 30 \frac{(n-2)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	
D-A9□	2 (Different surfaces, Same surface)	15	100	105		110
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	$100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}		$110 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-A9□V	2 (Different surfaces, Same surface)	10	75	80		85
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$80 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}		$85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-A5□/A6□ D-A59W D-F5□/J59 D-F5□W D-F59A D-F59F	2 (Different surfaces, Same surface)	25	125	135		150
	n (Same surface)	$25 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	$125 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$135 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}		$150 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-F5NT	2 (Different surfaces, Same surface)	35	145	155		170
	n (Same surface)	$35 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	$145 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$155 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}		$170 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-A3□ D-G39 D-K39	2	Different surfaces	35	110		150
		Same surface	100			
	n	Different surfaces	$35 + 30(n-2)$ (n = 2, 3, 4, 5...)	$110 + 30(n-2)$ (n = 2, 4, 6, 8...) ^{Note 1}		$150 + 100(n-2)$ (n = 2, 4, 6, 8...) ^{Note 1}
		Same surface	$100 + 100(n-2)$ (n = 2, 3, 4, 5...)	$110 + 100(n-2)$ (n = 2, 4, 6, 8...) ^{Note 1}		$150 + 30(n-2)$ (n = 2, 4, 6, 8...) ^{Note 1}
D-A44	2	Different surfaces	35	110		150
		Same surface	55			
	n	Different surfaces	$35 + 30(n-2)$ (n = 2, 3, 4, 5...)	$110 + 30(n-2)$ (n = 2, 4, 6, 8...) ^{Note 1}		$150 + 30(n-2)$ (n = 2, 4, 6, 8...) ^{Note 1}
		Same surface	$55 + 55(n-2)$ (n = 2, 3, 4, 5...)	$110 + 50(n-2)$ (n = 2, 4, 6, 8...) ^{Note 1}		$150 + 50(n-2)$ (n = 2, 4, 6, 8...) ^{Note 1}
1	15	110		150		
D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W	2 (Different surfaces, Same surface)	15	105	110		115
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$110 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}		$115 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-Y69□ D-Y7PV D-Y7□WV	2 (Different surfaces, Same surface)	10	90	95		100
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	$90 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$95 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}		$100 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-Y7BA	2 (Different surfaces, Same surface)	20	115	120	125	130
	n	$20 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	$115 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$120 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$125 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$130 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}
D-P3DWA	2 (Different surfaces, Same surface)	20	110	115		120
	n	$20 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	$110 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$115 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}		$120 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}

* Low friction type (CDS□□): ø125, ø140, ø160

Note 1) When "n" is an odd number, an even number that is one larger than this odd number is used for the calculation.
Note 2) When "n" is an odd number, a multiple of 4 that is larger than this odd number is used for the calculation.

Operating range

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

- * Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion.)
There may be the case it will vary substantially depending on an ambient environment.
- * Low friction type (CDS1□Q): ø125, ø140, ø160

Auto Switch Mounting Bracket: Part No.

Auto switch model	Bore size (mm)				
	ø125	ø140	ø160	ø180	ø200
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV D-A9□/A9□V	BS5-125	BS5-125	BS5-160	BS5-180	BS5-200
D-A5□/A6□ D-A59W D-F5□/J59 D-F5NT D-F5□W/J59W D-F5BA/F59F	BT-12	BT-12	BT-16	BT-18A	BT-20
D-A3□/A44 D-G39/K39	BS1-125	BS1-140	BS1-160	BS1-180	BS1-200
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BA	BS4-125	BS4-125	BS4-160	BS4-180	BS4-200
D-P3DWA	BS7-125S	BS7-125S	BS7-160S	BS7-180S	BS7-200S

[Stainless Steel Mounting Screw Kit]

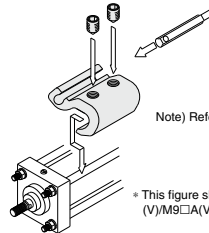
The following set of stainless steel mounting screws is available. Use them in accordance with the operating environment. (Since auto switch brackets are not included, order them separately.)

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

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

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

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



Note) Refer to page 1377 for the details of BBA1 screws.

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

Besides the models listed in How to Order, the following auto switches are applicable. Refer to pages 1271 to 1365 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				
	D-Z73, Z76				
	D-A53, A56				
	D-A67				
	D-Z80				
Solid state	D-F59, F5P, J59	Grommet (in-line)	Without indicator light		
	D-Y59A, Y59B, Y7P				
	D-F59W, F5PW, J59W				
	D-Y7NW, Y7PW, Y7BW				
	D-F5BA, Y7BA				
	D-F5NT				
	D-M9NV, M9PV, M9BV			Grommet (perpendicular)	2-color display
	D-Y69A, Y69B, Y7PV				
	D-M9NWV, M9PWV, M9BWW				
	D-Y7NWV, Y7PWV, Y7BWW				
	D-M9NAV, M9PAV, M9BAV				
		Water resistant (2 colors)			

* For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 1340 and 1341 for details.

* Normally closed (NC = b contact) solid state auto switches (D-M9□E(V)/Y7G/Y7H) are also available. Refer to pages 1290 and 1292 for details.