

Air Cylinder CDS1 Series

ø125, ø140, ø160, ø180, ø200

How to Order

With auto switch CDS1 **L** **160** - **300** - **M9BW** **3** **1**

With auto switch (Built-in magnet)

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

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

Number of auto switches

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

Auto switch

Nil	Without auto switch
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* 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 cushion in rod side
	H	With cushion in head side
	Nil	With cushion in both sides
	Nil	(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.

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

Cylinder stroke (mm)
(Refer to Maximum Stroke on page 626.)

Applicable Auto Switches

Refer to pages 1271 to 1365 for further information on auto switches.

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

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

* Lead wire length symbols: 0.5 m Nil (Example) M9NW
1 m M (Example) M9NWM
3 m L (Example) M9NWL
5 m Z (Example) M9NWLZ

* 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 653 for details.

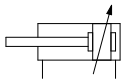
* For details about auto switches with pre-wired connector, refer to pages 1340 and 1341.

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



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
-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 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

Refer to pages 651 to 653 for auto switch specifications.

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

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 $^{+0.15}_{-0.10}$, 251 to 1,000 $^{+0.15}_{-0.10}$, 1,001 to 1,500 $^{+0.15}_{-0.10}$		
Mounting	Basic type, Foot type, Rod side flange type, Head side flange type, Single clevis type, Double clevis type, Center trunnion type		

Maximum Stroke

(mm)

Bore size (mm)	Maximum stroke	
	Basic type, Head side flange type, Single clevis type, Double clevis type, Center trunnion type	Foot type, Rod side flange type
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.

Note) 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.

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	
	Air-hydro type	NBR	
Piston rod		Carbon steel	Hard chrome plated
Piston		Aluminum alloy casted	Chromated

* Foot type, Rod side flange type: In the case of bore size of ø125 and ø140, the stroke 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.

Weight

(kg)

Bore size (mm)		125	140	160	180	200
Basic weight	Basic type	13.79	16.64	23.11	27.55	36.11
	Foot type	15.42	19.16	25.91	31.75	40.99
	Rod side flange type	16.47	21.64	29.50	37.38	48.02
	Head side flange type	16.47	21.64	29.50	37.38	48.02
	Single clevis type	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 type	17.92	22.37	30.51	38.71	50.10
Additional weight 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 type *	CS1-L12	CS1-L14	CS1-L16	CS1-L18	CS1-L20
Flange type	CS1-F12	CS1-F14	CS1-F16	CS1-F18	CS1-F20
Single clevis type	CS1-C12	CS1-C14	CS1-C16	CS1-C18	CS1-C20
Double clevis type **	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.

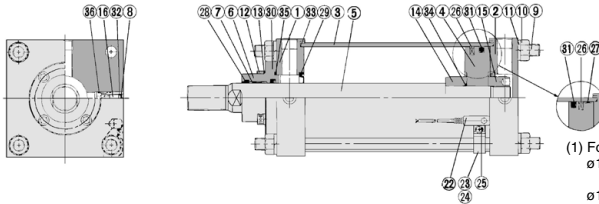
Accessory

* For details about the single knuckle joint, double knuckle joint, knuckle pin, clevis pin, and rod end nut, refer to page 637.

CDS1 Series

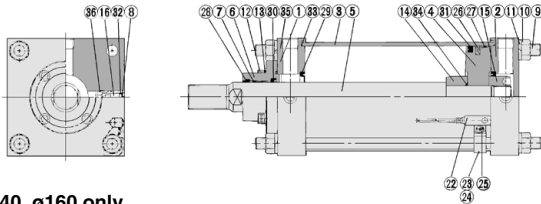
Construction

Lube

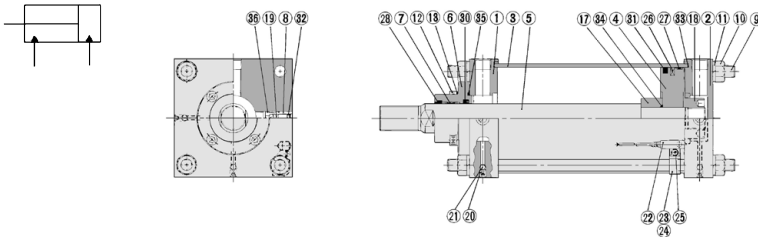


- (1) Foot type: Rod side flange type
 $\phi 125$, $\phi 140$:
 In the case of 1001 to 1400 st
 $\phi 160$:
 In the case of 1201 to 1400 st
 (2) In the case of $\phi 180$, $\phi 200$

Non-lube



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

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

Seal List

No.	Description	Material	Note
28	Wiper ring		
29*	Cushion seal		
30	Rod seal		
31	Piston seal	NBR	
32	Valve seal		
33	Tube gasket		
34*	Piston gasket		
35	Retaining plate gasket		
36*	Guide gasket		

Lube (1) (For lube-type 2, refer to page 629.)

Non-lube Seals except ③ and ⑤ are the same as lube type.

30	Rod seal	NBR	
31	Piston seal		

Air-hydro Seals except ③ and ⑤ are the same as lube type.

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

Replacement Parts (Seal kit)

- For replacement part no. (seal kits) of cylinder with auto switch CDS1 series, refer to page 629.
- *** Seal kits does not include cushion seal, piston gasket and guide gasket because those are not replaceable parts.

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, 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 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

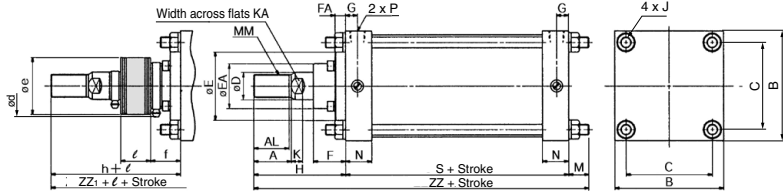
Bore size (mm)	Kit no.	Description
125	CS1H125A-PS	Component part numbers: 28, 30, 31, 32, 33, 35
140	CS1H140A-PS	
160	CS1H160A-PS	

C□S1 Series

Basic Type: CS1B

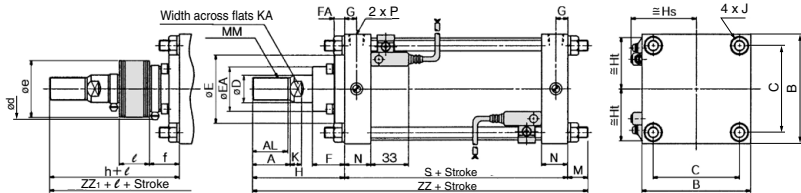
Lube type (CS1B), Non-lube type (CS1BN), Air-hydro type (CS1BH)

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: ø125 to ø200 Only

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

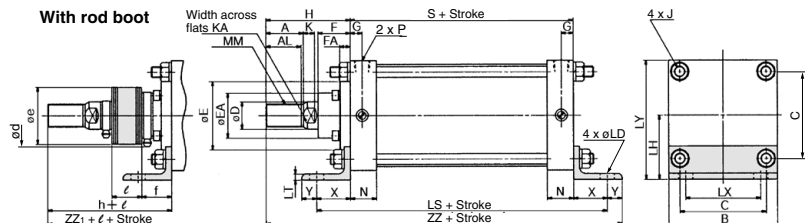
* Dimensions except mentioned above are the same as standard type.

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

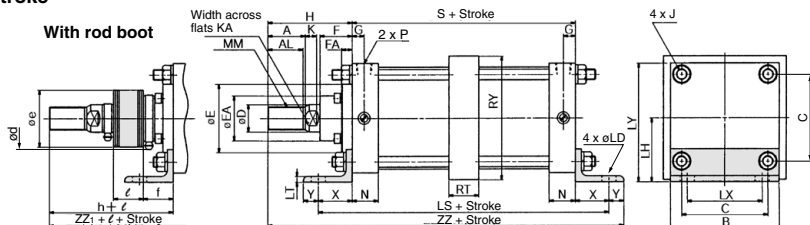
***Refer to "Minimum Stroke for Auto Switch Mounting" on page 652.

Foot Type: CS1L

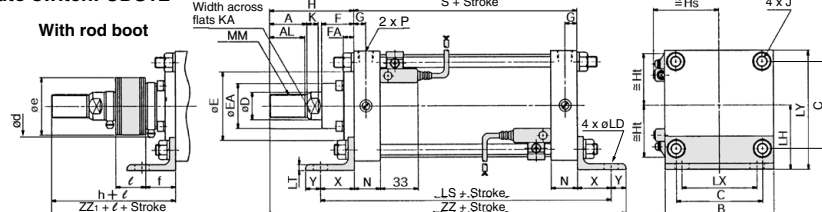
Lube type (CS1L), Non-lube type (CS1LN), Air-hydro type (CS1LH)



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.

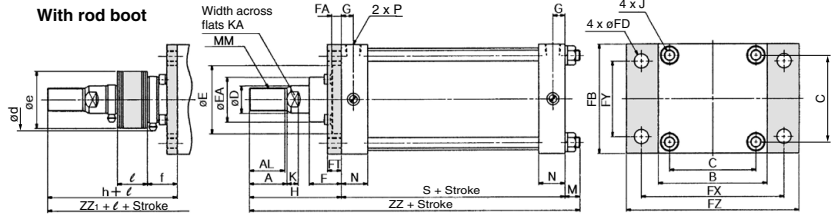
** For the auto switch mounting position and its mounting height, refer to page 651.

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

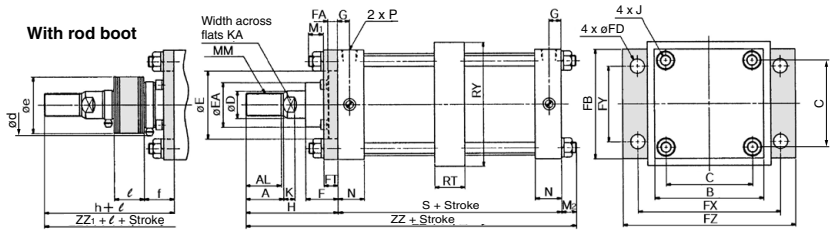
C□S1 Series

Rod Side Flange Type: CS1F

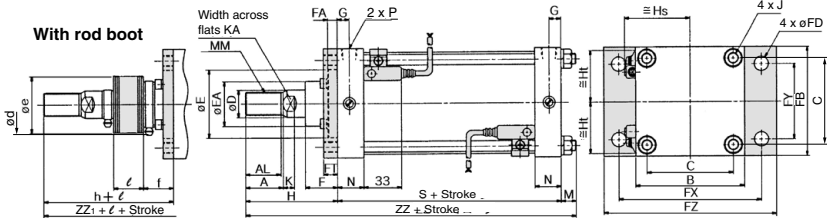
Lube type (CS1F), Non-lube type (CS1FN), Air-hydro type (CS1FH)



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	ZZ1
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	0.2 x	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	0.17 x	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			
			M1	M2	RT	RY	ZZ	ZZ1
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	ZZ1	
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	

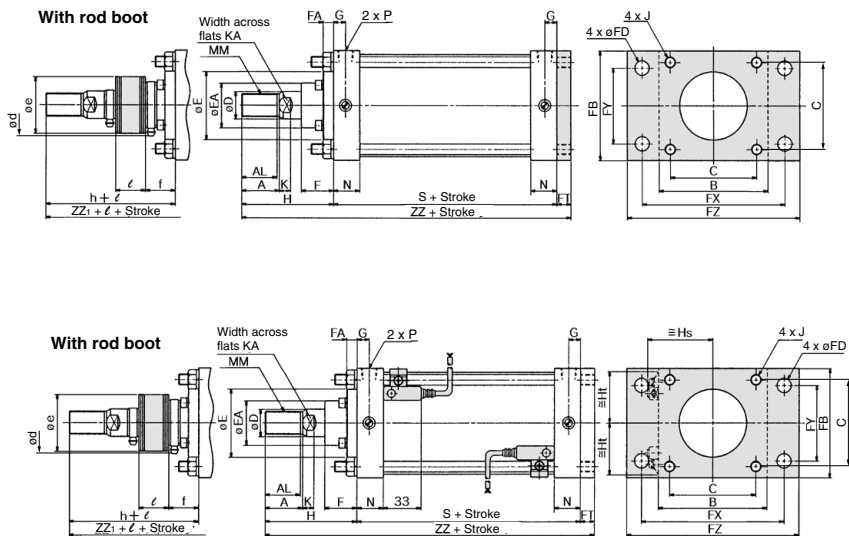
* Dimensions except mentioned above are the same as standard type.

** 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: ø125 to ø200 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.

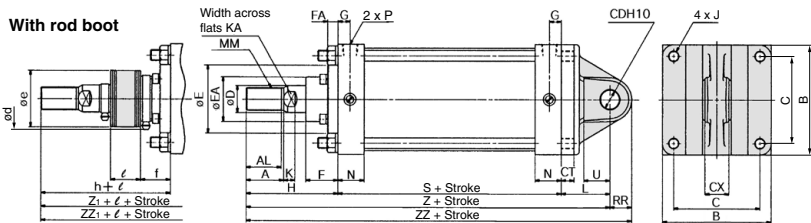
** For the auto switch mounting position and its mounting height, refer to page 651.

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

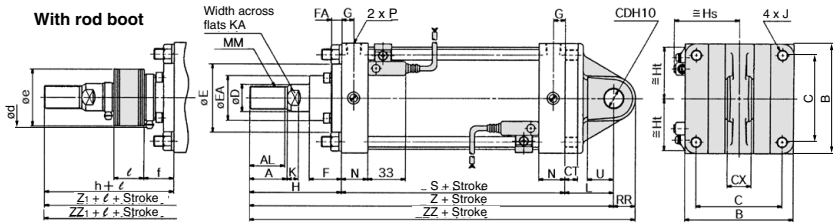
C□S1 Series

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
	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

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

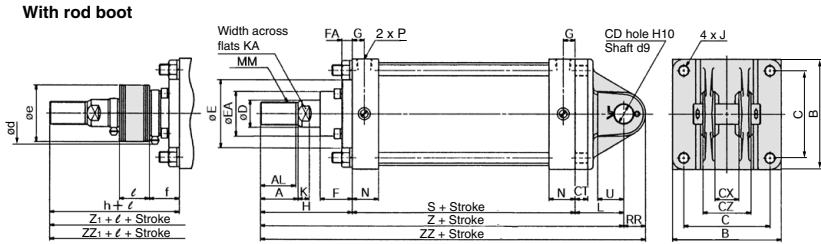
* Dimensions except mentioned above are the same as standard type.

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

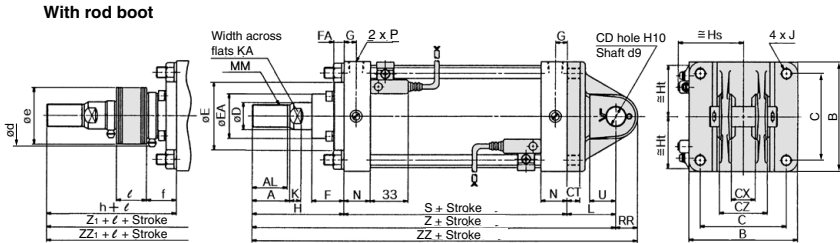
*** Refer to "Minimum Stroke for Auto Switch Mounting" on page 652.

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.

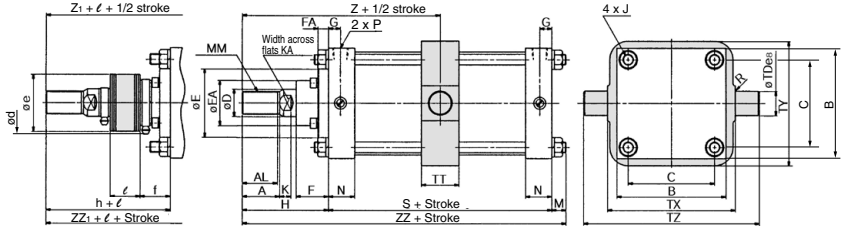
*** Refer to "Minimum Stroke for Auto Switch Mounting" on page 652.

C□S1 Series

Center Trunnion Type: CS1T

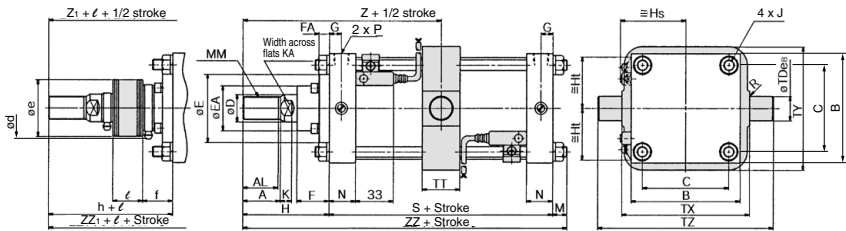
Lube type (CS1T), Non-lube type (CS1TN), Air-hydro type (CS1TH)

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	TD _{es}	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

(mm)

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				

(mm)

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		

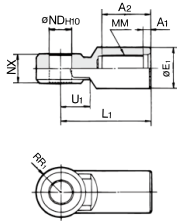
* The minimum stroke with rod boot is 30 mm or more.
 (The minimum stroke with rod boot, but for bore size ø160 and ø300 is 25 mm or more.)

* 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

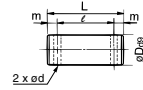
I Type Single Knuckle Joint*



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

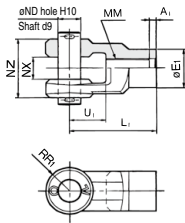


Material: Carbon steel

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.

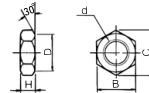
(Screw it entirely over the rod end threads and tighten it.)

* 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

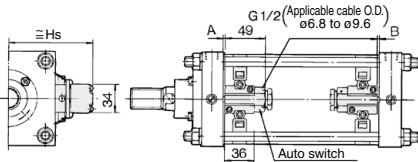
Part no.	Applicable bore size (mm)	d	H	B	C	D
NT-12	125, 140	M30 x 1.5	18	46	53.1	44
NT-16	160	M36 x 1.5	21	55	63.5	53
NT-18	180	M40 x 1.5	23	60	69.3	57
NT-20	200	M45 x 1.5	27	70	80.8	67
NT-25	250	M56 x 2	34	85	98.1	82
NT-30	300	M64 x 2	38	95	110.0	92

Auto Switch Mounting 1

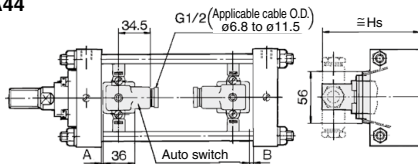
Proper Auto Switch Mounting Position (Detection at stroke end) and Mounting Height

Band mounting type

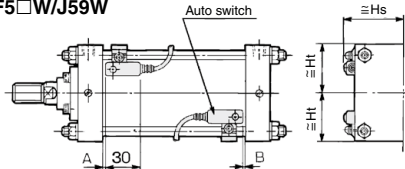
D-A3□
D-G3/K3



D-A44

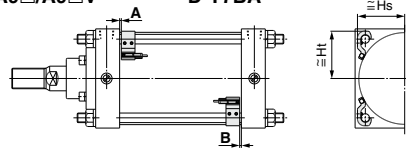


D-F5□/J59/D-F5NT
D-F5BA/F59F
D-F5□W/J59W

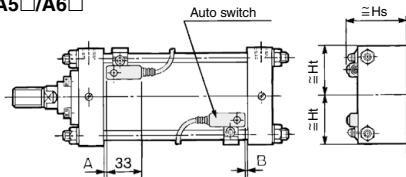


Tie-rod mounting type

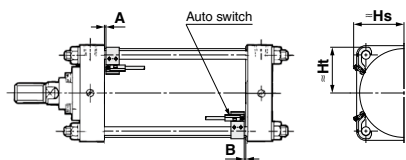
D-M9□/M9□V D-Z7□/Z80
D-M9□W/M9□WV D-Y59□/Y69□/Y7P/Y7PV
D-M9□A/M9□AV D-Y7□W/Y7□WV
D-A9□/A9□V D-Y7BA



D-A5□/A6□



D-P3DWA



Proper Auto Switch Mounting Position

(mm)

Auto switch model	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-M9□AV		D-A9□ D-A9□V		D-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

(mm)

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

CS1 Series Auto Switch Mounting 2

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-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-F59W D-F5BA 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]

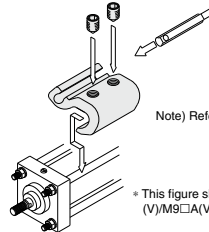
The following set of stainless steel mounting screws is available. Use them in accordance with the operating environment. (Since auto switch brackets are not included, order them separately.)

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.