

Cylinder with Lock Double Acting, Single Rod

CLS Series

∅125, ∅140, ∅160, ∅180, ∅200, ∅250

How to Order

CLS L 125 100 D M9B V

With Auto Switch CDLS L 125 100 M9BW D M9B V

With auto switch (Built-in magnet)

Mounting type

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

Tube material

Symbol	Bore size	Without magnet	Built-in magnet
Nil	125, 140	Aluminum tube (1000 st or less)	Aluminum tube
		Steel tube (1001 st or more)	
	160	Aluminum tube (1200 st or less)	Aluminum tube
		Steel tube (1201 st or more)	
180, 200	Steel tube *2		
	250	Steel tube	
F *1	125 to 160	Steel tube	

Port thread type

Nil Rc
TN NPT
TF G

Cylinder stroke (mm)

Refer to the maximum stroke table on page 983.

Bore size

Symbol	Without auto switch	With auto switch
125	125 mm	125 mm
140	140 mm	140 mm
160	160 mm	160 mm
180	180 mm	180 mm
200	200 mm	200 mm
250	250 mm	—

Cylinder unit auto switch

Nil Without auto switch

* Select applicable auto switches from the table below.

Number of auto switches

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

Lock unit auto switch

Nil Without auto switch

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

Lock unit built-in magnet

Nil Without magnet (Without auto switch)
D Built-in magnet

Made to Order

Refer to page 983 for details.

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 984.

*1 Auto switches are not available with steel tube.
*2 For items corresponding to the Class 2 Pressure Vessel Act, the material is aluminum.

Cylinder Unit/Applicable Auto Switches

Refer to pages 1119 to 1245 for detailed auto switch specifications.

Type	Special function	Electrical entry	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	3-wire (NPN) 3-wire (PNP) 2-wire	24 V	5 V, 12 V 12 V	—	M9N	●	●	●	○	○	○	IC circuit	Relay, PLC
							M9P	●	●	●	○	○			
	Terminal conduit	3-wire (NPN) 2-wire	24 V	12 V	G39	—	—	—	—	—	—	—	—		
					K39	—	—	—	—	—	—	—			
	With diagnostic output (2-color indicator)	Grommet	3-wire (NPN) 3-wire (PNP) 2-wire	24 V	5 V, 12 V 12 V	—	M9NW	●	●	●	○	○	○	IC circuit	
							M9PW	—	—	—	—	—	—		
	Water resistant (2-color indicator)	Grommet	3-wire (NPN) 3-wire (PNP) 2-wire	24 V	5 V, 12 V 12 V	—	M9NA *1	—	○	○	●	○	○	—	
							M9PA *1	—	○	○	●	○	○		
	With diagnostic output (2-color indicator)	Terminal conduit	4-wire (NPN) 2-wire (Non-polar)	24 V	5 V, 12 V —	—	M9BA *1	—	○	○	●	○	○	IC circuit	
							F59F	—	—	—	—	—	—		
With diagnostic output (2-color indicator)	Magnetic field resistant (2-color indicator)	2-wire (NPN equiv.)	24 V	5 V 12 V	—	P3DWA	—	●	—	●	○	—	—		
						A96	—	●	—	●	—	—			
Reed auto switch	—	—	2-wire	24 V	5 V, 12 V 100 V or less	100 V, 200 V	A93	—	●	●	●	—	IC circuit	Relay, PLC	
							A90	—	●	—	—	—			
	Terminal conduit	—	2-wire	24 V	12 V	100 V, 200 V	A54	—	●	—	●	—	—		
							A33	—	—	—	—	—			
	DIN terminal	—	2-wire	24 V	12 V	100 V, 200 V	A34	—	—	—	—	—	—		
							A44	—	—	—	—	—			
	Diagnostic indication (2-color indicator)	Grommet	2-wire	24 V	12 V	100 V, 200 V	A59W	—	●	—	●	—	—		
							A93	—	●	—	●	—		—	

*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 symbol: 0.5 m Nil (Example) M9NW
1 m M (Example) M9NWM
3 m L (Example) M9NWL
5 m Z (Example) M9NWZ

* Solid state auto switches marked with "○" are produced upon receipt of order.
* There are applicable auto switches other than listed above. For details, refer to page 998.
* For details about auto switches with pre-wired connector, refer to pages 1192 and 1193.
* D-A9□/M9□/M9□/W/M9□/A/P3DWA□ auto switches are shipped together (not assembled). (Only auto switch brackets are assembled at the time of shipment.)

Lock Unit/Applicable Auto Switches

Auto switch type	Special function	Electrical entry	Wiring (output)	Load voltage		Auto switch model	Lead wire length (m)					Applicable load	
				DC	AC		0.5 (Nil)	1 (M)	3 (L)	5 (Z)			
Solid state	Grommet	Yes	3-wire (NPN) 3-wire (PNP)	24 V	5 V, 12 V 12 V	—	M9N	●	●	●	○	IC circuit	Relay, PLC
							M9P	●	●	●	○		
							M9B	●	●	●	○		
Reed	—	No Yes	2-wire	24 V	5 V, 12 V 12 V	100 V or less 100 V	A90	●	●	●	—	IC circuit	Relay, PLC
							A93	●	●	●	—		

*D-A9□/M9□ auto switches are shipped together (not assembled).



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

Symbol	Specifications
-XA□	Change of rod end type
-XC3	Special port location
-XC14	Change of trunnion bracket mounting position (125, 140, 160 only)
-XC35	With coil scraper (125, 140, 160 only)*

* ø180 to ø250 come with a coil scraper as standard.

Stopping Accuracy

Lock type	Piston speed (mm/s)		
	100	300	500
Spring lock	±0.5	±1.0	±2.0

Conditions:
Horizontal, Supply pressure P = 0.5 MPa
Load mass Upper limit of allowed value
Solenoid valve for locking ... Mounted directly to unlocking port
Maximum value from range of 100 measured stopping positions

Class 2 Pressure Vessel

A Class 2 Pressure Vessel will be required for strokes exceeding those shown below.

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

Refer to pages 995 to 998 for cylinders with auto switches.

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

Rod Boot Material

Symbol	Material	Max. ambient temperature
J	Nylon tarpaulin	20°C
K	Heat resistant tarpaulin	110°C*

* Maximum ambient temperature for the rod boot itself.

Cylinder Specifications

Bore size (mm)	125	140	160	180	200	250
Type	Not required (Non-lube)					
Fluid	Air					
Proof pressure	1.57 MPa, 1.2 MPa*					
Max. operating pressure	0.97 MPa, 0.7 MPa*					
Min. operating pressure	0.08 MPa					
Piston speed	50 to 500 mm/s**					
Cushion	Yes					
Ambient and fluid temperature	Without auto switch: 0°C to 70°C With auto switch: 0°C to 60°C (with no freezing)					
Stroke length tolerance	to 250: $^{+1.0}_0$, 251 to 1000: $^{+1.4}_0$, 1001 to 1500: $^{+1.8}_0$, 1501 to 2000: $^{+2.0}_0$, 2001 to 2400: $^{+2.5}_0$					
Mounting	Basic type, Foot type, Rod flange type, Head flange type, Single clevis type, Double clevis type, Center trunnion type					

* For ø180 and ø200 with auto switches.

** There are load limitations depending on the piston speed when locked, the mounting method, and the operating pressure.

Lock Specifications

Bore size (mm)	125	140	160	180	200	250
Locking action	Spring locking (exhaust locking)					
Unlocking pressure	0.25 MPa or more					
Locking pressure	0.20 MPa or less					
Max. operating pressure	1.0 MPa					
Locking direction	Both directions					
Holding force (max. static load) kN†	8.4	10.5	13.8	17.4	21.5	33.6

† The holding force (max. static load) shows the maximum capability and does not show the normal holding capability. So, select an appropriate cylinder while referring to page 980.

Cylinder Stroke

Tube material	Aluminum alloy		Carbon steel tube	
	Basic type, Head flange type, Single clevis type, Double clevis type, Center trunnion type, Foot type, Rod flange type	Basic type, Head flange type, Single clevis type, Double clevis type, Center trunnion type	Foot type Rod flange type	Foot type Rod flange type
125, 140	1000 or less	1000 or less	1600 or less	1600 or less
160	1200 or less	1200 or less	1600 or less	1600 or less
180	—	1200 or less	2000 or less	2000 or less
200	—	1200 or less ^{Note)}	2000 or less	2000 or less
250	—	1200 or less	2400 or less	2400 or less

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.

Cylinder Stroke/Auto Switch Mounting on Cylinder Unit (Built-in Magnet)

Refer to the minimum auto switch mounting stroke (page 996) for those with an auto switch.

Bore size (mm)	Basic type, Head flange type, Single clevis type, Double clevis type, Center trunnion type	Foot type Rod 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	For ø200, 998 to 1200 strokes are available as made to order.	For ø200, 998 to 1500 strokes are available as made to order.

Mounting Bracket Part No.

Bore size (mm)	125	140	160	180	200	250
Foot type ^{Note 1)}	CS1-L12	CS1-L14	CS1-L16	CS1-L18	CS1-L20	CS1-L25
Rod flange type ^{Note 2)}	CS1-FL12	CS1-FL14	CS1-FL16	CS1-FL18	CS1-FL20	CS1-FL25
Head flange type	CS1-F12	CS1-F14	CS1-F16	CS1-F18	CS1-F20	CS1-F25
Single clevis type	CS1-C12	CS1-C14	CS1-C16	CS1-C18	CS1-C20	CS1-C25
Double clevis ^{Note 3)}	CS1-D12	CS1-D14	CS1-D16	CS1-D18	CS1-D20	CS1-D25

Note 1) When ordering foot brackets, 2 pcs. should be ordered for each cylinder.

Note 2) ø125 to ø250 front flange types use CS1 series long stroke flanges.

Note 3) A clevis pin and cotter pins (2 pcs.) are packed with the double clevis type.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA2

CNS

CLS

CLQ

RLQ

MLU

MLGP

MLTC

D-□

-X□

Accessories

Mounting brackets	Basic type	Foot type	Rod flange type	Head flange type	Single clevis type	Double clevis type	Center trunnion type
Standard equipment	Clevis pin	—	—	—	—	●	—
Options	Rod end nut	●	●	●	●	●	●
	Single knuckle joint	●	●	●	●	●	●
	Double knuckle joint (with pin)	●	●	●	●	●	●
	With rod boot	●	●	●	●	●	●

* Refer to the accessory models and dimensions on page 993.

** Refer to page 994 when the rod end nut, and the single and double knuckle joints are used together.

Weight/Numbers inside () are for steel tube

Unit: kg

Bore size (mm)	125	140	160	180	200	250	
Lock unit weight	9.40	11.37	16.93	26.20	36.4	61.70	
Basic weight	Basic type	23.49 (24.96)	28.30 (30.11)	40.87 (43.08)	57.30 (63.91)	75.46 (82.01)	— (138.94)
		Foot type	25.12 (26.59)	30.82 (32.63)	43.67 (45.88)	61.50 (68.11)	80.34 (86.89)
	Flange type	26.17 (27.64)	33.30 (35.11)	47.26 (49.47)	67.13 (73.74)	87.37 (93.92)	— (160.78)
		Single clevis type	26.56 (28.03)	32.59 (34.40)	46.36 (48.57)	65.69 (72.30)	85.36 (91.91)
	Double clevis type (includes clevis pin & cotter pin)	27.02 (28.49)	33.34 (35.15)	47.21 (49.42)	67.37 (73.98)	87.39 (93.94)	— (160.52)
	Center trunnion type	27.62 (29.09)	34.03 (35.84)	48.27 (50.48)	68.46 (75.07)	89.45 (96.00)	— (166.78)
	Additional weight per 100 mm of stroke	1.77 (2.66)	1.96 (3.01)	2.39 (3.58)	2.85 (4.95)	3.42 (5.75)	— (9.08)
Accessories	Single knuckle	0.91	1.16	1.56	3.07	2.90	5.38
	Double knuckle (with pin)	1.37	1.81	2.48	4.74	4.59	9.22
	Rod end nut	0.16	0.16	0.23	0.33	0.56	1.01

Calculation (Ex.) CLSL140-100 Basic weight 30.82 (foot type, ϕ 140)
 Additional weight 1.96/100 mm stroke
 Cylinder stroke 100 mm stroke
 $30.82 + 1.96 \times 100/100 = 32.78$ kg

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

1. 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.

① Vessel with an inside capacity of 0.04 m³ or more

② 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.

- 1 Check the main body for damage.
- 2 Check the lid tightening bolt for wear.
- 3 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.

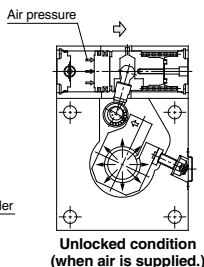
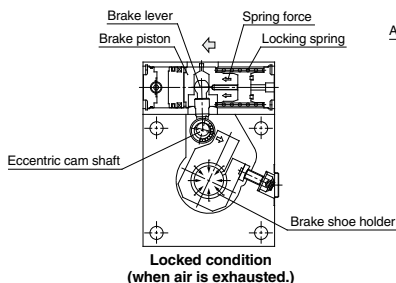
Please order the air cylinder with "V" put at the end of the part number.

(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.

5 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 Principle



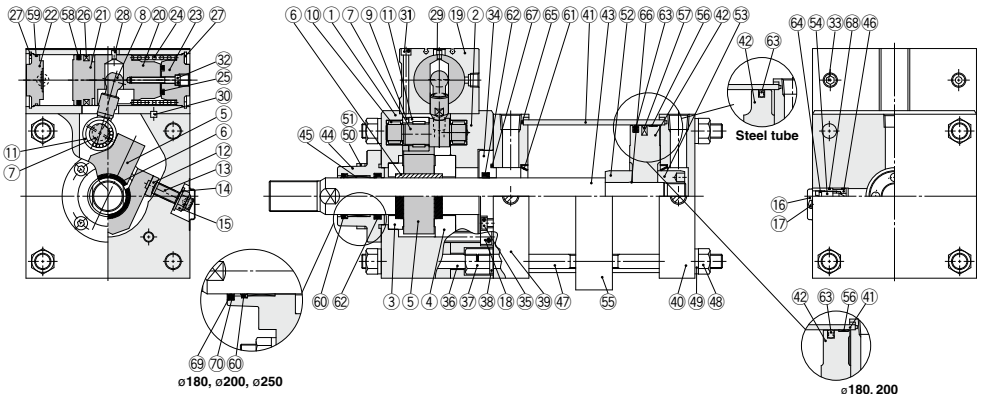
Spring locking (exhaust locking)

The brake piston actuated by the force of the spring turns the eccentric cam shaft via the brake lever. This turning force distorts the brake shoe holder due to the wedge effect of the cam, acting on the brake shoe and locking the piston rod by tightening on it with a large force.

Unlocking occurs when air pressure is supplied to the unlocking port, causing the brake piston to counteract the force of the spring and push the brake lever back. This removes the force which is distorting the shoe holder and unlocks the piston rod.

Cylinder with Lock Double Acting, Single Rod **CLS Series**

Construction



Component Parts

No.	Description	Material	Note
1	Cover A	Aluminum alloy	Black hard anodized (ø125, ø140, ø160) Hard anodized & coated (ø180, ø200, ø250)
2	Cover B	Aluminum alloy	Black hard anodized (ø125, ø140, ø160) Hard anodized & coated (ø180, ø200, ø250)
3	Thrust washer A	Carbon steel	Electroless nickel plated (ø125, ø140, ø160) Special treatment (ø180, ø200, ø250)
4	Thrust washer B	Carbon steel	Electroless nickel plated (ø125, ø140, ø160)
5	Brake shoe holder A	Chromium molybdenum steel	Special treatment
6	Brake shoe	Special friction material	
7	Eccentric cam shaft	Special steel	
8	Brake lever	Chromium molybdenum steel	Zinc chromated
9	Washer	Carbon steel	Zinc chromated
10	Needle bearing	—	
11	Needle bearing	—	
12	Stopper	Special steel	Electroless nickel plated
13	Adjustment screw	Chromium molybdenum steel	Zinc chromated
14	Conical spring washer	Spring steel	
15	U nut	Carbon steel	
16	Cover	Steel plate	Black zinc chromated
17	Cover holding screw	Carbon steel	
18	Cover holding bolt	Chromium molybdenum steel	
19	Brake tube	Aluminum alloy	Clear hard anodized
20	Brake piston A	Carbon steel	Nitriding
21	Brake piston B	Aluminum alloy	Chromated
22	Bottom plate	Aluminum alloy	Black anodized
23	Spring collar	Aluminum alloy	Black anodized
24	Brake spring	Steel wire	Zinc chromated
25	Bumper B	Polyurethane rubber	
26	Magnet	—	(Built-in magnet for lock unit)
27	Retaining ring	Carbon tool steel	Phosphate coated
28	Marker	Resin	White
29	Trim plate	Resin	
30	Key	Carbon steel	
31	Brake tube holding bolt	Chromium molybdenum steel	
32	Manual release bolt	Chromium molybdenum steel	
33	Plug with breathing hole	—	
34	Retaining plate B	Aluminum alloy	
35	Retaining plate holding bolt	Chromium molybdenum steel	
36	Unit holding tie-rod	Carbon steel	Chromated
37	Wing nut	Carbon steel	
38	Conical spring washer	Spring steel	
39	Rod cover	Rolled steel plate	Black coated
40	Head cover	Rolled steel plate	Black coated
41	Cylinder tube	Aluminum alloy Carbon steel pipe	Hard anodized (ø125 to ø200) Hard chrome plated (ø125 to ø250)

Component Parts

No.	Description	Material	Note
42	Piston	Aluminum alloy casting	In case of aluminum tube
43	Piston rod	Cast iron	In case of steel tube
44	Retaining plate	Cast iron	Black coated (ø125, ø140, ø160)
45	Bushing	Bearing alloy	
46	Valve guide	Brass	
47	Tie-rod	Carbon steel	Chromated
48	Tie-rod nut	Rolled steel plate	
49	Spring washer	Steel wire	
50	Retaining plate bolt	Chromium molybdenum steel	
51	Spring washer	Steel wire	
52	Cushion ring A	Rolled steel	Zinc chromated
53	Cushion ring B	Rolled steel	Zinc chromated
54	Cushion valve	Rolled steel	Electroless nickel plated
55	Tie-rod reinforcement ring	Rolled steel	Black coated (long stroke)
56	Wear ring	Resin	In case of aluminum tube
57	Magnet	—	For built-in magnet type
58	Piston seal	NBR	
59	Tube gasket	NBR	
60	Wiper ring	NBR	
61	Cushion seal	NBR	
62	Rod seal	NBR	
63	Piston seal	NBR	
64	Valve seal	NBR	
65	Tube gasket	NBR	
66	Piston gasket	NBR	
67	Retaining plate gasket	NBR	
68	Guide gasket	NBR	
69	Coil scraper	Phosphor bronze	(ø180, ø200, ø250)
70	Coil scraper holder	Aluminum alloy	Black anodized (ø180, ø200, ø250)

Replacement Parts: Seal Kit

Bore size (mm)	Order No.	Contents
125	CLS125-PS	A set of above Nos. 60, 62, 63, 64, 65 & 67
140	CLS140-PS	
160	CLS160-PS	
180	CLS180-PS	
200	CLS200-PS	
250	CLS250-PS	

* Since the lock section for CLS series is normally replaced as a unit, replacement seal kits are for the cylinder section only.

** Seal kits are sets consisting of items 60, 62, 63, 64, 65 and 67, which can be ordered using the order number for each cylinder bore size.

* Seal kit includes a grease pack (ø125 to ø160: 40 g, ø180, ø200: 50 g, ø250: 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)

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA2

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

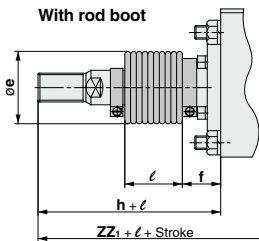
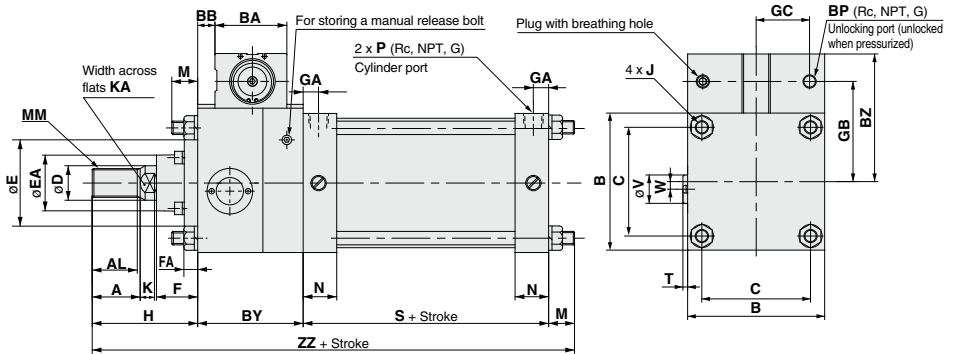
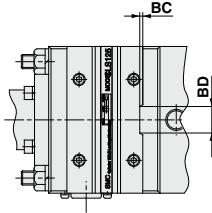
D-□

X-□

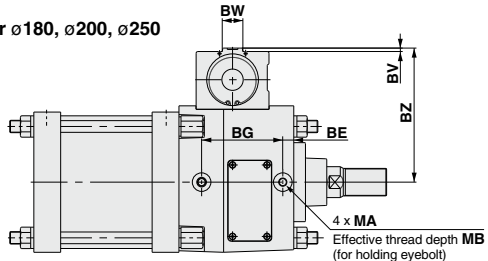
CLS Series

Dimensions

Basic type(B)



For $\phi 180, \phi 200, \phi 250$



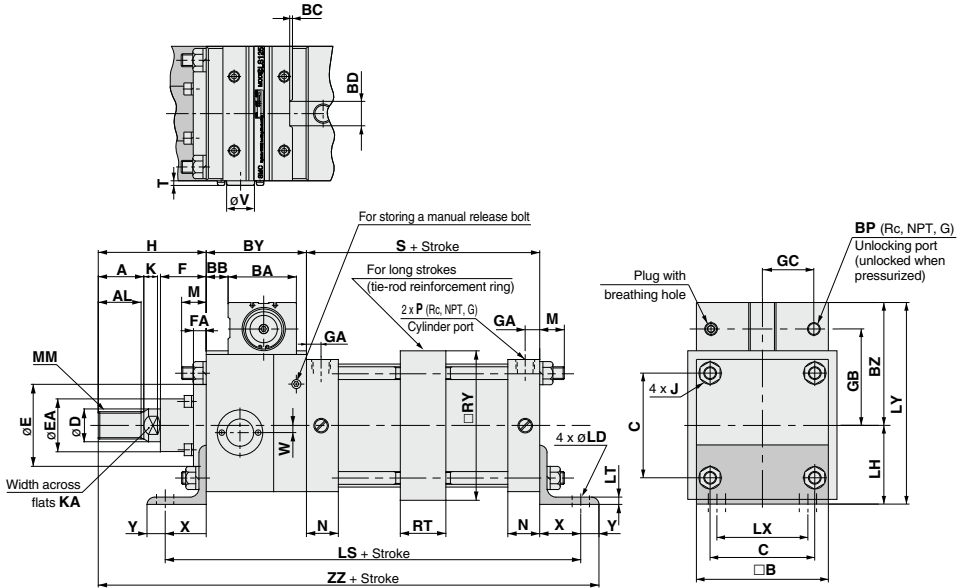
Bore size (mm)	Stroke range (mm)	(mm)																															
		A	AL	B	BA	BB	BC	BD	BE	BG	BY	BZ	BV	BW	BP	C	D	E	EA	F	FA	GA	GB	GC	H	J	K	KA	M	MM	MA	MB	N
125	Up to 1000	50	47	145	75	18	—	—	—	110	136	—	—	1/4	115	36	90	59	43	14	16	107	58	110	M14 x 1.5	15	31	27	M30 x 1.5	—	—	35	
140	Up to 1000	50	47	161	78	18	3	30	—	110	146	—	—	1/4	128	36	90	59	43	14	16	114	64	110	M14 x 1.5	15	31	27	M30 x 1.5	—	—	35	
160	Up to 1200	56	53	182	95	23	5	46	—	132	169	—	—	1/4	144	40	90	59	43	14	18.5	130	74	120	M16 x 1.5	17	36	30.5	M36 x 1.5	—	—	39	
180	Up to 1200	63	60	204	106	36	—	—	16	118	167	195	5	30	3/8	162	45	115	70	48	17	18.5	149	86	135	M18 x 1.5	20	41	35	M40 x 1.5	M12 x 1.75	25	39
200	Up to 1200	63	60	226	124	40.5	—	—	21	131	187	216	5.5	34	3/8	182	50	115	74	48	17	18.5	165	97	135	M20 x 1.5	20	46	35	M45 x 1.5	M16 x 2	31	39
250	Up to 1200	71	67	277	152	58	—	—	35	155	237	281.5	6	42	1/2	225	60	140	86	60	20	23	200	117	160	M24 x 1.5	25	56	41.5	M56 x 2	M20 x 2.5	41	49

(mm)						
Bore size (mm)	P	S	T	V	W	ZZ
125	1/2	98	5	30	—	345
140	1/2	98	5	30	8	345
160	3/4	106	5	30	9	388.5
180	3/4	111	—	—	—	448
200	3/4	111	—	—	—	468
250	1	141	—	—	—	578.5

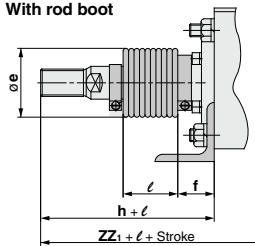
With Rod Boot (mm)						
Bore size (mm)	Stroke range (mm)	e	f	h	ℓ	ZZ ₁
125	30 to 1000	75	40	133	0.2 stroke	368
140	30 to 1000	75	40	133	0.2 stroke	368
160	30 to 1200	75	40	141	0.2 stroke	439.5
180	30 to 1200	85	45	153	0.2 stroke	466
200	30 to 1200	90	45	153	0.2 stroke	486
250	30 to 1200	105	55	176	0.17 stroke	555.5

With Auto Switch (mm)			
Bore size (mm)	Stroke range (mm)	S	Without rod boot ZZ / With rod boot ZZ ₁
125	Up to 1000	98	345 / 368
140	Up to 1000	98	345 / 368
160	Up to 1200	106	388.5 / 409.5
180	Up to 1200	115	452 / 470
200	Up to 1200	120	477 / 495

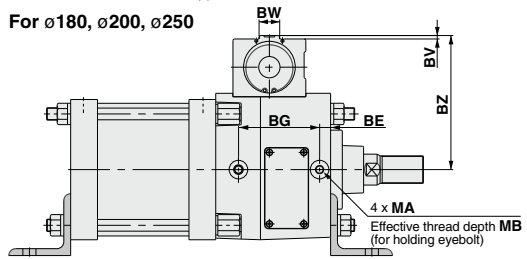
Axial foot type(L)



With rod boot



For $\phi 180, \phi 200, \phi 250$



Bore size (mm)	Stroke range (mm)	Long stroke range (mm)	(mm)																																	
			A	AL	B	BAB	BC	BD	BE	BG	BY	BZ	BV	BW	BP	C	D	E	EA	F	FAG	AG	BGC	H	J	K	KAL	DH	LS	LT	LX	LY	M			
125	Up to 1400	1401 to 1600	50	47	145	75	18	—	—	—	110	136	—	—	1/4	115	36	90	59	43	14	16	107	58	110	M14 x 1.5	15	31	19	85	298	8	100	221	27	
140	Up to 1400	1401 to 1600	50	47	161	78	18	3	30	—	110	146	—	—	1/4	128	36	90	59	43	14	16	114	64	110	M14 x 1.5	15	31	19	100	298	9	112	266	27	
160	Up to 1400	1401 to 1600	56	53	182	95	23	5	46	—	132	169	—	—	1/4	144	40	90	59	43	14	18.5	130	74	120	M16 x 1.5	17	36	19	106	338	9	118	275	30.5	
180	Up to 1800	1801 to 2000	63	60	204	106	36	—	—	16	118	167	195	5	30	3/8	182	45	115	70	48	17	18.5	149	86	135	M18 x 1.5	20	41	24	125	398	10	132	301	35
200	Up to 1800	1801 to 2000	63	60	226	124	40.5	—	—	21	131	187	216	5.5	34	3/8	182	50	115	74	48	17	18.5	165	97	135	M20 x 1.5	20	46	24	132	418	10	150	348	35
250	Up to 2000	2001 to 2400	71	67	277	152	58	—	—	35	155	237	281.5	6	42	1/2	225	60	140	86	60	20	23	200	117	160	M24 x 1.5	25	56	29	160	538	12	180	421.5	41.5

Bore size (mm)	(mm)													
	MM	MA	MN	P	R	RY	S	T	V	W	X	Y	ZZ	
125	M30 x 1.5	—	—	35	1/2	36	164	98	5	30	—	45	20	383
140	M30 x 1.5	—	—	35	1/2	36	184	98	5	30	8	45	30	393
160	M36 x 1.5	—	—	39	3/4	45	204	106	5	30	9	50	25	433
180	M40 x 1.5	M12 x 1.75	25	39	3/4	45	228	111	—	—	—	60	30	503
200	M45 x 1.5	M16 x 2	31	39	3/4	45	257	111	—	—	—	60	30	523
250	M56 x 2	M20 x 2.5	41	49	1	55	325	141	—	—	—	80	40	658

With Rod Boot (mm)							
Bore size (mm)	Stroke range (mm)	e	f	h	ℓ	ZZ ₁	
125	30 to 1400	75	40	133	0.2 stroke	406	
140	30 to 1400	75	40	133	0.2 stroke	416	
160	30 to 1400	75	40	141	0.2 stroke	454	
180	30 to 1800	85	45	153	0.2 stroke	521	
200	30 to 1800	90	45	153	0.2 stroke	541	
250	30 to 2000	105	55	176	0.17 stroke	674	

With Auto Switch (mm)							
Bore size (mm)	Stroke range (mm)	S	LS	Without rod boot ZZ	With rod boot ZZ		
125	Up to 1400	98	298	383	406		
140	Up to 1400	98	298	393	416		
160	Up to 1400	106	338	433	454		
180	Up to 1500	115	402	507	525		
200	Up to 998	120	427	532	550		

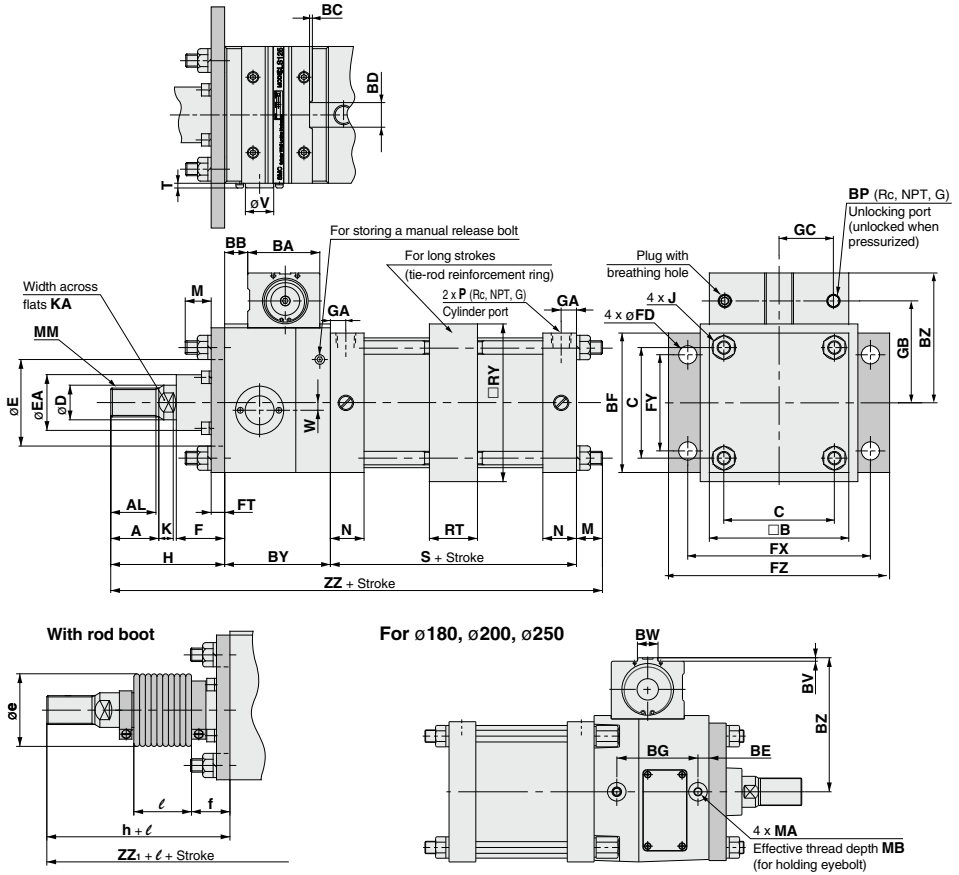
- CLJ2
- CLM2
- CLG1
- CL1
- MLGC
- CNG
- MNB
- CNA2
- CNS
- CLS**
- CLQ
- RLQ
- MLU
- MLGP
- ML1C

- D-□
- X□

CLS Series

Dimensions

Rod flange type (F)



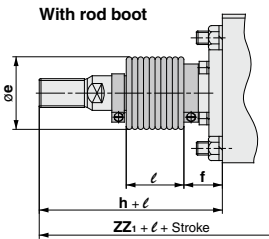
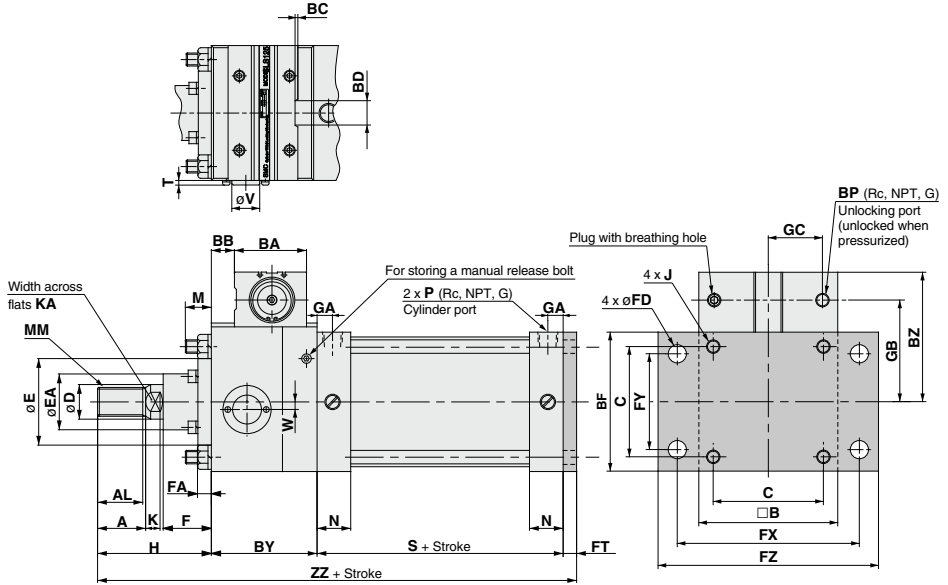
Bore size (mm)	Stroke range (mm)	Long stroke range (mm)	A	AL	B	BA	BB	BC	BD	BE	BG	BF	BY	BZ	BV	BW	BP	C	D	E	EA	F	FD	FT	FY	FZ	G	AG	BG	H	J	K	KA	M	
125	Up to 1400	1401 to 1600	50	47	145	75	18	—	—	—	145	110	136	—	1/4	115	36	90	59	43	19	14	190	100	230	16	107	58	110	M14 x 1.5	15	31	19		
140	Up to 1400	1401 to 1600	50	47	161	78	18	3	30	—	160	110	146	—	1/4	128	36	90	59	43	19	20	212	112	255	16	114	64	110	M14 x 1.5	15	31	19		
160	Up to 1400	1401 to 1600	56	53	182	95	23	5	46	—	180	132	169	—	1/4	144	40	90	59	43	19	20	236	118	275	18.5	130	74	120	M16 x 1.5	17	36	22		
180	Up to 1800	1801 to 2000	63	60	204	106	36	—	—	16	118	200	167	195	5	30	3/8	162	45	115	70	48	24	25	265	132	320	18.5	149	86	135	M18 x 1.5	20	41	26
200	Up to 1800	1801 to 2000	63	60	226	124	40.5	—	—	21	131	225	187	216	5.5	34	3/8	182	50	115	74	48	24	25	280	150	335	18.5	165	97	135	M20 x 1.5	20	46	26
250	Up to 2000	2001 to 2400	71	67	277	152	58	—	—	35	155	275	237	281.5	6	42	1/2	225	60	140	86	60	29	30	355	180	420	23	200	117	160	M24 x 1.5	25	56	30

Bore size (mm)	MM	MA	MB	N	P	RT	RS	S	T	V	W	ZZ
125	M30 x 1.5	—	—	35	1/2	36	164	98	5	30	—	337
140	M30 x 1.5	—	—	35	1/2	36	184	98	5	30	8	337
160	M36 x 1.5	—	—	39	3/4	45	204	106	5	30	9	380
180	M40 x 1.5	M12 x 1.75	25	39	3/4	45	228	111	—	—	—	439
200	M45 x 1.5	M16 x 2	31	39	3/4	45	257	111	—	—	—	459
250	M56 x 2	M20 x 2.5	41	49	1	55	325	141	—	—	—	588

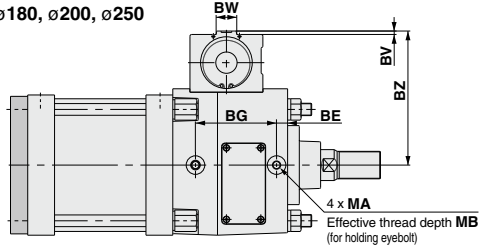
Bore size (mm)	Stroke range (mm)	e	f	h	ℓ	ZZ1
125	30 to 1400	75	40	133	0.2 stroke	360
140	30 to 1400	75	40	133	0.2 stroke	360
160	30 to 1400	75	40	141	0.2 stroke	401
180	30 to 1800	85	45	153	0.2 stroke	457
200	30 to 1800	90	45	153	0.2 stroke	477
250	30 to 2000	105	55	176	0.17 stroke	584

Bore size (mm)	Stroke range (mm)	S	Without rod boot ZZ	With rod boot ZZ1
125	Up to 1400	98	337	360
140	Up to 1400	98	337	360
160	Up to 1400	106	380	401
180	Up to 1500	115	443	461
200	Up to 998	120	468	486

Head flange type/(G)



For ø180, ø200, ø250



Bore size (mm)	Stroke range (mm)	(mm)																																	
		A	AL	B	BA	BB	BC	BD	BE	BG	BF	BY	BZ	BV	BW	BP	C	D	E	EA	F	FA	FD	FT	FX	FY	FZ	GA	GB	GC	H	J	K	KA	M
125	Up to 1000	50	47	145	75	18	—	—	—	—	145	110	136	—	—	1/4	115	36	90	59	43	14	19	14	190	100	230	16	107	58	110	M14 x 1.5	15	31	19
140	Up to 1000	50	47	161	78	18	3	30	—	—	160	110	146	—	—	1/4	128	36	90	59	43	14	19	20	212	112	255	16	114	64	110	M14 x 1.5	15	31	19
160	Up to 1200	56	53	182	95	23	5	46	—	—	180	132	169	—	—	1/4	144	40	90	59	43	14	19	20	236	118	275	18.5	130	74	120	M16 x 1.5	17	36	22
180	Up to 1200	63	60	204	106	36	—	—	16	118	200	167	195	5	30	3/8	162	45	115	70	48	17	24	25	265	132	320	18.5	149	86	135	M18 x 1.5	20	41	26
200	Up to 1200	63	60	226	124	40.5	—	—	21	131	225	187	216	5.5	34	3/8	182	50	115	74	48	17	24	25	280	150	335	18.5	165	97	135	M20 x 1.5	20	46	26
250	Up to 1200	71	67	277	152	58	—	—	35	155	275	237	261.5	6	42	1/2	225	60	140	86	60	20	29	30	355	180	420	23	200	117	160	M24 x 1.5	25	56	30

		(mm)									
Bore size (mm)		MM	MA	MB	N	P	S	T	V	W	ZZ
125	M30 x 1.5	—	—	35	1/2	98	5	30	—	—	332
140	M30 x 1.5	—	—	35	1/2	98	5	30	8	—	338
160	M36 x 1.5	—	—	39	3/4	106	5	30	9	—	378
180	M40 x 1.5	M12 x 1.75	25	39	3/4	111	—	—	—	—	438
200	M45 x 1.5	M16 x 2	31	39	3/4	111	—	—	—	—	458
250	M56 x 2	M20 x 2.5	41	49	1	141	—	—	—	—	568

		(mm)					
Bore size (mm)	Stroke range (mm)	e	f	h	ℓ	ZZ ₁	
125	30 to 1000	75	40	133	0.2 stroke	355	
140	30 to 1000	75	40	133	0.2 stroke	361	
160	30 to 1200	75	40	141	0.2 stroke	399	
180	30 to 1200	85	45	153	0.2 stroke	456	
200	30 to 1200	90	45	153	0.2 stroke	476	
250	30 to 1200	105	55	176	0.17 stroke	584	

		(mm)			
Bore size (mm)	Stroke range (mm)	S	Without rod boot ZZ	With rod boot ZZ ₁	
125	Up to 1000	98	332	355	
140	Up to 1000	98	338	361	
160	Up to 1200	106	378	399	
180	Up to 1200	115	442	460	
200	Up to 998	120	467	485	

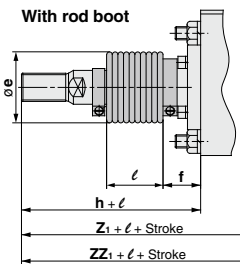
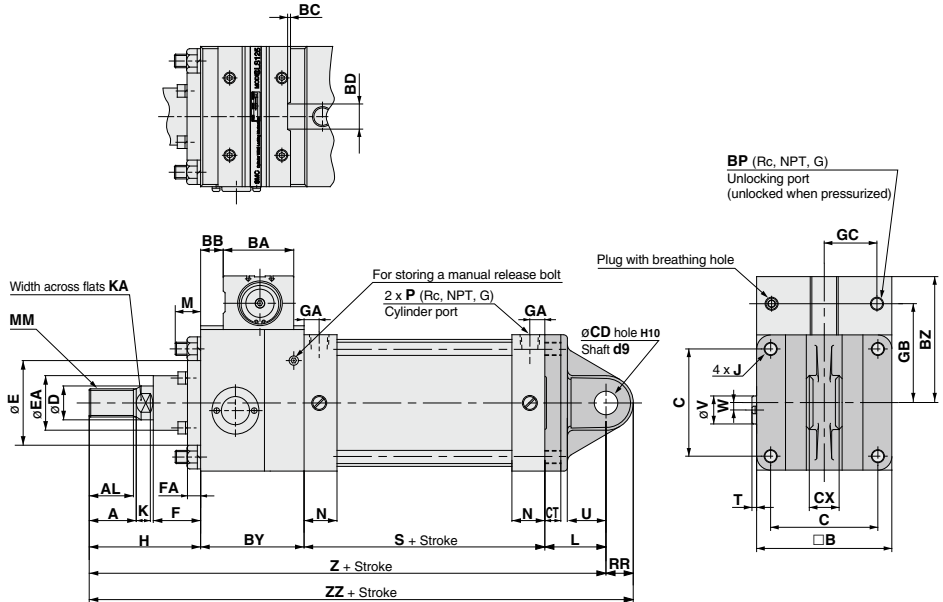
- CLJ2
- CLM2
- CLG1
- CL1
- MLGC
- CNG
- MNB
- CNA2
- CNS
- CLS**
- CLQ
- RLQ
- MLU
- MLGP
- ML1C

- D-□
- X□

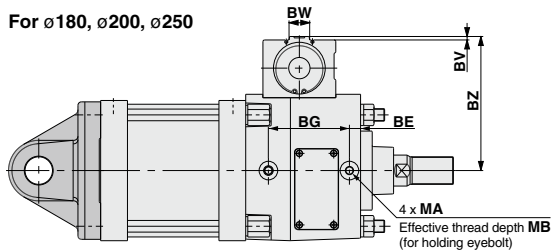
CLS Series

Dimensions

Single clevis type/(C)



For ø180, ø200, ø250



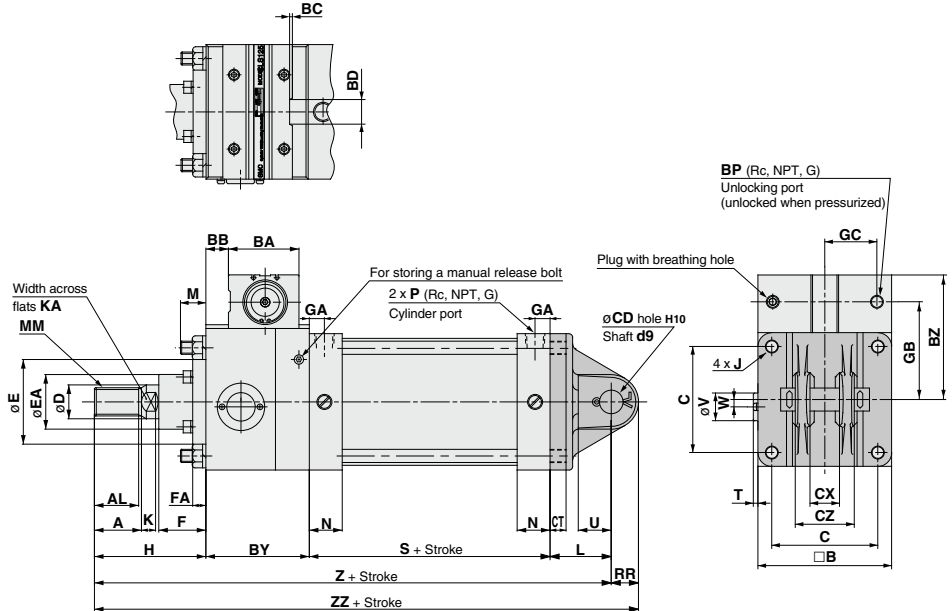
Bore size (mm)	Stroke range (mm)	(mm)																															
		A	AL	B	BA	BB	BC	BD	BE	BG	BY	BZ	BV	BW	BP	C	CD ^{H10}	CT	CX	D	E	EA	F	FA	GA	GB	GCC	H	J	K	KA	L	M
125	Up to 1000	50	47	145	75	18	—	—	—	—	110	136	—	—	1/4	115	25 ^{+0.084} ₀	17	32 ^{-0.1} _{-0.3}	36	90	59	43	14	16	107	58	110	M14 x 1.5	15	31	65	19
140	Up to 1000	50	47	161	78	18	3	30	—	—	110	146	—	—	1/4	128	28 ^{+0.084} ₀	17	36 ^{-0.1} _{-0.3}	36	90	59	43	14	16	114	64	110	M14 x 1.5	15	31	75	19
160	Up to 1200	56	53	182	95	23	5	46	—	—	132	169	—	—	1/4	144	32 ^{+0.100} ₀	20	40 ^{-0.1} _{-0.3}	40	90	59	43	14	18.5	130	74	120	M16 x 1.5	17	36	80	22
180	Up to 1200	63	60	204	106	36	—	—	16	118	167	195	5	30	3/8	162	40 ^{+0.100} ₀	23	50 ^{-0.1} _{-0.3}	45	115	70	48	17	18.5	149	86	135	M18 x 1.5	20	41	90	26
200	Up to 1200	63	60	226	124	40.5	—	—	21	131	187	216	5.5	34	3/8	182	40 ^{+0.100} ₀	25	50 ^{-0.1} _{-0.3}	50	115	74	48	17	18.5	165	97	135	M20 x 1.5	20	46	90	26
250	Up to 1200	71	67	277	152	58	—	—	35	155	237	281.5	6	42	1/2	225	50 ^{+0.100} ₀	30	63 ^{-0.1} _{-0.3}	60	140	86	60	20	23	200	117	160	M24 x 1.5	25	56	110	30

Bore size (mm)	MM	MA	MB	N	P	RR	S	T	U	V	W	Z	ZZ	(mm)	
														Z ₁	Z ₂
125	M30 x 1.5	—	—	35	1/2	29	98	5	35	30	—	383	412	—	—
140	M30 x 1.5	—	—	35	1/2	32	98	5	40	30	8	393	425	—	—
160	M36 x 1.5	—	—	39	3/4	36	106	5	45	30	9	438	474	—	—
180	M40 x 1.5	M12 x 1.75	25	39	3/4	44	111	—	50	—	—	503	547	—	—
200	M45 x 1.5	M16 x 2	31	39	3/4	44	111	—	50	—	—	523	567	—	—
250	M56 x 2	M20 x 2.5	41	49	1	55	141	—	65	—	—	648	703	—	—

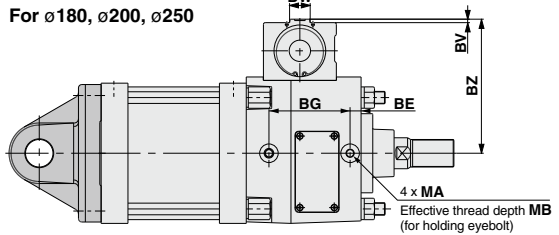
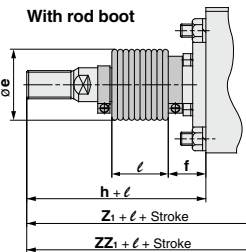
Bore size (mm)	Stroke range (mm)	(mm)						
		e	f	h	l	Z ₁	Z ₂	
125	30 to 1000	75	40	133	0.2 stroke	406	435	
140	30 to 1000	75	40	133	0.2 stroke	416	448	
160	30 to 1200	75	40	141	0.2 stroke	459	495	
180	30 to 1200	85	45	153	0.2 stroke	521	565	
200	30 to 1200	90	45	153	0.2 stroke	541	585	
250	30 to 1200	105	55	176	0.17 stroke	684	719	

Bore size (mm)	Stroke range (mm)	(mm)				
		S	Without rod boot	With rod boot	Z ₁	Z ₂
125	Up to 1000	98	383	412	406	435
140	Up to 1000	98	393	425	416	448
160	Up to 1200	106	438	474	459	495
180	Up to 1200	115	507	551	525	569
200	Up to 998	120	532	576	550	594

Double clevis type/(D)



- CLJ2
- CLM2
- CLG1
- CL1
- MLGC
- CNG
- MNB
- CNA2
- CNS
- CLS**
- CLQ
- RLQ
- MLU
- MLGP
- ML1C



Bore size (mm)	Stroke range (mm)	A	AL	B	BA	BB	BC	BD	BE	BG	BY	BZ	BV	BW	BP	C	CD ^{H10}	CT	CX	CZ	D	E	EA	FA	G	AG	BGC	H	J	K	KA	L		
125	Up to 1000	50	47	145	75	18	—	—	—	110	138	—	—	1/4	115	25 ^{+0.084/0}	17	32 ^{+0.3/+0.1}	64	0 ^{-0.2}	36	90	59	43	14	16	107	58	110	M14 x 1.5	15	31	65	
140	Up to 1000	50	47	161	78	18	3	30	—	110	146	—	—	1/4	128	28 ^{+0.084/0}	17	36 ^{+0.3/+0.1}	72	0 ^{-0.2}	36	90	59	43	14	16	114	64	110	M14 x 1.5	15	31	75	
160	Up to 1200	56	53	182	95	23	5	46	—	132	169	—	—	1/4	144	32 ^{+0.100/0}	20	40 ^{+0.3/+0.1}	80	0 ^{-0.2}	40	90	59	43	14	18.5	130	74	120	M16 x 1.5	17	36	80	
180	Up to 1200	63	60	204	106	36	—	—	16	118	167	195	5	30	3/8	162	40 ^{+0.100/0}	23	50 ^{+0.3/+0.1}	100	-0.1/-0.3	45	115	70	48	17	18.5	149	86	135	M18 x 1.5	20	41	90
200	Up to 1200	63	60	226	124	40.5	—	—	21	131	187	216	5.5	34	3/8	182	40 ^{+0.100/0}	25	50 ^{+0.3/+0.1}	100	-0.1/-0.3	50	115	74	48	17	18.5	165	97	135	M20 x 1.5	20	46	90
250	Up to 1200	71	67	277	152	58	—	—	35	155	237	261.5	6	42	1/2	225	50 ^{+0.100/0}	30	63 ^{+0.3/+0.1}	126	-0.1/-0.3	60	140	86	60	20	23	200	117	160	M24 x 1.5	25	56	110

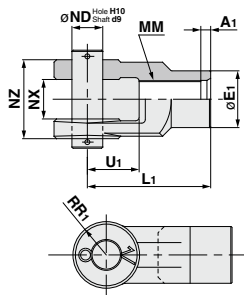
Bore size (mm)		(mm)															With Rod Boot		(mm)		With Auto Switch					(mm)										
Bore size (mm)	Stroke range (mm)	M	MA	MB	MM	N	P	RR	S	T	U	V	W	Z	ZZ	Bore size (mm)	Stroke range (mm)	e	f	h	ℓ	Z ₁	ZZ ₁	Bore size (mm)	Stroke range (mm)	S	Z	Z ₁	Z ₂	Z ₃	Z ₄	With rod boot (mm)	With rod boot (mm)			
125	19	—	—	M30 x 1.5	35	1/2	29	98	5	35	30	—	—	383	412	125	30 to 1000	75	40	133	0.2 stroke	406	435	125	Up to 1000	98	383	412	406	435	—	—	—	—	—	—
140	19	—	—	M30 x 1.5	35	1/2	32	98	5	40	30	8	393	425	—	140	30 to 1000	75	40	133	0.2 stroke	416	448	140	Up to 1000	98	393	425	416	448	—	—	—	—	—	—
160	22	—	—	M36 x 1.5	39	3/4	36	106	5	45	30	9	438	474	—	160	30 to 1200	75	40	141	0.2 stroke	459	495	160	Up to 1200	106	438	474	459	495	—	—	—	—	—	—
180	26	M12 x 1.75	25	M40 x 1.5	39	3/4	44	111	—	50	—	—	503	547	—	180	30 to 1200	85	45	153	0.2 stroke	521	565	180	Up to 1200	115	507	551	525	569	—	—	—	—	—	—
200	26	M16 x 2	31	M45 x 1.5	39	3/4	44	111	—	50	—	—	523	567	—	200	30 to 1200	90	45	153	0.2 stroke	541	585	200	Up to 1200	110	507	551	525	569	—	—	—	—	—	—
250	30	M20 x 2.5	41	M56 x 2	49	1	55	141	—	65	—	—	648	703	—	250	30 to 1200	105	55	176	0.17 stroke	664	719	250	Up to 998	120	532	576	550	594	—	—	—	—	—	—

* Clevis pins and cotter pins are included.

- D
- X

Accessory Dimensions 1

Y Type Double Knuckle Joint

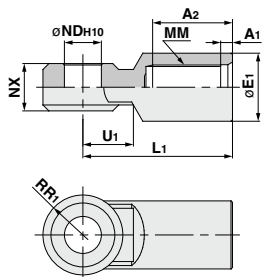


Material: Cast iron

Model	Applicable bore size (mm)	A1	E1	L1	MM	NDH10	NX	NZ	RR1	U1
Y-12	125	8	46	100	M30 x 1.5	25 ^{+0.084} ₀	32 ^{+0.3} _{-0.1}	64 ^{-0.1} _{-0.3}	27	42
Y-14	140	8	48	105	M30 x 1.5	28 ^{+0.084} ₀	36 ^{+0.3} _{-0.1}	72 ^{-0.1} _{-0.3}	30	47
Y-16	160	8	55	110	M36 x 1.5	32 ^{+0.1} ₀	40 ^{+0.3} _{-0.1}	80 ^{-0.1} _{-0.3}	34	46
Y-18	180	8	70	125	M40 x 1.5	40 ^{+0.1} ₀	50 ^{+0.3} _{-0.1}	100 ^{-0.1} _{-0.3}	42.5	54
Y-20	200	8	70	125	M45 x 1.5	40 ^{+0.1} ₀	50 ^{+0.3} _{-0.1}	100 ^{-0.1} _{-0.3}	42.5	54
Y-25	250	9	86	160	M56 x 2	50 ^{+0.1} ₀	63 ^{+0.3} _{-0.1}	126 ^{-0.1} _{-0.3}	53	81

* Knuckle pins and cotter pins are included.

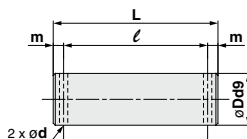
I Type Single Knuckle Joint



Material: Cast iron

Model	Applicable bore size (mm)	A1	A2	E1	L1	MM	NDH10	NX	RR1	U1
I-12	125	8	54	46	100	M30 x 1.5	25 ^{+0.084} ₀	32 ^{-0.1} _{-0.3}	27	33
I-14	140	8	54	48	105	M30 x 1.5	28 ^{+0.084} ₀	36 ^{-0.1} _{-0.3}	30	39
I-16	160	8	60	55	110	M36 x 1.5	32 ^{+0.1} ₀	40 ^{-0.1} _{-0.3}	34	39
I-18	180	8	67	70	125	M40 x 1.5	40 ^{+0.1} ₀	50 ^{-0.1} _{-0.3}	42.5	44
I-20	200	8	67	70	125	M45 x 1.5	40 ^{+0.1} ₀	50 ^{-0.1} _{-0.3}	42.5	44
I-25	250	9	75.5	86	160	M56 x 2	50 ^{+0.1} ₀	63 ^{-0.1} _{-0.3}	53	66

Clevis Pin/Knuckle Pin

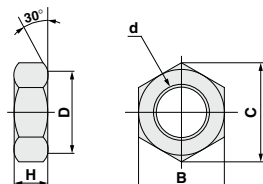


Material: Carbon steel

Model	Applicable bore size (mm)	d (drill through)	Dd9	L	ℓ	m	Cotter pin
IY-12	125	4	25 ^{-0.065} _{-0.117}	79.5	69.5	5	ø4 x 40 L
IY-14	140	4	28 ^{-0.065} _{-0.117}	86.5	76.5	5	ø4 x 40 L
IY-16	160	4	32 ^{-0.080} _{-0.142}	94.5	84.5	5	ø4 x 40 L
IY-18	180, 200	4	40 ^{-0.080} _{-0.142}	115	105	5	ø4 x 55 L
IY-25	250	5	50 ^{-0.080} _{-0.142}	144	132	6	ø5 x 65 L

* Cotter pins (2 pcs.) are included.

Rod End Nut



Material: Rolled steel

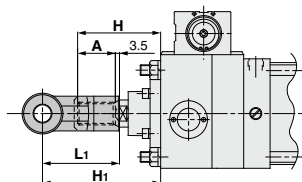
Model	Applicable bore size (mm)	d	H	B	C	D
NT-12	125, 140	M30 x 1.5	18	46	53.1	44
NT-16	160	M36 x 1.5	21	55	63.5	53
NT-18	180	M40 x 1.5	23	60	69.3	57
NT-20	200	M45 x 1.5	27	70	80.8	67
NT-25	250	M56 x 2	34	85	98.1	82

- CLJ2
- CLM2
- CLG1
- CL1
- MLGC
- CNG
- MNB
- CNA2
- CNS
- CLS
- CLQ
- RLQ
- MLU
- MLGP
- ML1C

- D-□
- X□

Accessory Dimensions 2

Single/Double Knuckle Joint Mounting



Bore size (mm)	Symbol	H	A	L1	H1	Applicable knuckle joint part nos.	
						I type single knuckle	Y type double knuckle
125		110	50	100	156.5	I-12	Y-12
140		110	50	105	161.5	I-14	Y-14
160		120	56	110	170.5	I-16	Y-16
180		135	63	125	193.5	I-18	Y-18
200		135	63	125	193.5	I-20	Y-20
250		160	71	160	245.5	I-25	Y-25

**A, H dimensions when single/
double knuckle joint and rod end
nut are mounted together.**

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

* Single knuckle joint and double knuckle joint should be used separately.
(Fasten by screwing completely into the rod end threads.)

* When using a single/double knuckle joint together with a rod end nut, the A and H dimensions should be extended.

(For extension of A and H dimensions, refer to the table above and specify with "Simple Specials -XA0" (page 1254).)

Auto Switch Mounting 2

Minimum Stroke for Auto Switch Mounting

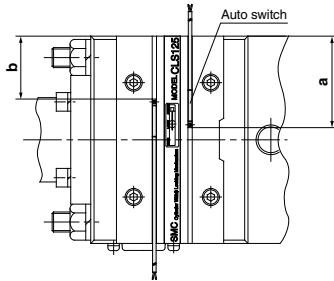
n: No. of auto switches (mm)

Auto switch model	No. of auto switches mounted	Mounting brackets other than center trunnion	Center trunnion type				
			ø125	ø140	ø160	ø180	ø200
D-M9□ D-M9□W	2 pcs. (Different surfaces, Same surface), 1 pc.	15	105	110		115	
	"n" pcs.	$15 + 40 \frac{(n-2)}{2}$ (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 pcs. (Different surfaces, Same surface), 1 pc.	10	80	85		90	
	"n" pcs.	$10 + 30 \frac{(n-2)}{2}$ (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 pcs. (Different surfaces, Same surface), 1 pc.	20	115			120	
	"n" pcs.	$20 + 40 \frac{(n-2)}{2}$ (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 pcs. (Different surfaces, Same surface), 1 pc.	15	90			95	
	"n" pcs.	$15 + 30 \frac{(n-2)}{2}$ (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 pcs. (Different surfaces, Same surface), 1 pc.	15	100	105		110	
	"n" pcs.	$15 + 40 \frac{(n-2)}{2}$ (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 pcs. (Different surfaces, Same surface), 1 pc.	10	75	80		85	
	"n" pcs.	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) ^{Note 1}	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	$80 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}		$85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) ^{Note 2}	
D-A5□/A6□ D-A59W D-F5□/J59 D-F5□W D-J59W D-F5BA D-F59F	2 pcs. (Different surfaces, Same surface), 1 pc.	25	125		135		150
	"n" pcs. (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 pcs. (Different surfaces, Same surface), 1 pc.	35	145		155		170
	"n" pcs. (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 pcs. $\frac{ø}{2}$ $\frac{ø}{4}$ $\frac{ø}{4}$	Different surfaces	35		110		150
		Same surface	100				
	"n" pcs.	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	$100 + 100(n-2)$ (n = 2, 3, 4, 5...)		$110 + 100(n-2)$ (n = 2, 4, 6, 8...) ^{Note 1}		$150 + 100(n-2)$ (n = 2, 4, 6, 8...) ^{Note 1}
1 pc.	15		110		150		
D-A44	2 pcs. $\frac{ø}{2}$ $\frac{ø}{4}$ $\frac{ø}{4}$	Different surfaces	35		110		150
		Same surface	55				
	"n" pcs.	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 pc.	15		110		150		
D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W	2 pcs. (Different surfaces, Same surface), 1 pc.	15	105	110		115	
	"n" pcs.	$15 + 40 \frac{(n-2)}{2}$ (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 pcs. (Different surfaces, Same surface), 1 pc.	10	90	95		100	
	"n" pcs.	$10 + 30 \frac{(n-2)}{2}$ (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 pcs. (Different surfaces, Same surface), 1 pc.	20	115	120	125		130
	"n" pcs.	$20 + 45 \frac{(n-2)}{2}$ (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 pcs. (Different surfaces, Same surface), 1 pc.	20	110	115		120	
	"n" pcs.	$20 + 50 \frac{(n-2)}{2}$ (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}	

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.

Proper Mounting Positions for Lock Unit Auto Switches

The operating status (at the unlocked end) of the lock unit (brake piston) can be detected by a signal from the auto switch, which is mounted on the brake cylinder of the CLS series.



Auto switch model	(mm)			
	D-A90 D-A93		D-M9N D-M9P D-M9B	
Bore size	a	b	a	b
125	62	42	58	46
140	70.5	50.5	66.5	54.5
160	70.5	50.5	66.5	54.5
180	80.5	60.5	76.5	64.5
200	86	66	82	70
250	102	82	98	86

* Be sure to confirm operation after mounting.

Operating Range

Auto switch model	(mm)				
	125	140	160	180	200
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	7	6.5	6.5	7	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/F59F D-F5□W/J59W D-F5BA/F5NT	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 to change substantially depending on an ambient environment.

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-F5□W/J59W D-F5BA D-F59F/F5NT	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-Y5□/Y6□ 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

[Mounting screw set made of stainless steel]

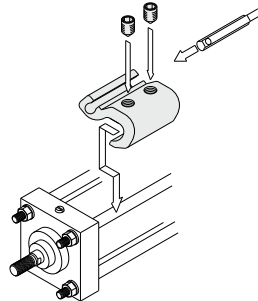
The following set of mounting screws made of stainless steel (including nuts) is available. Use it in accordance with the operating environment. (Please order the auto switch mounting bracket separately, since it is not included.)

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

D-F5BA auto switch is set on the cylinder with the stainless steel screws above when shipped. When an auto switch is shipped independently, BBA1 is attached.

Note 1) Refer to page 1233 for the details of BBA1.

Note 2) When using D-M9□A(V)/Y7BA, do not use the steel set screws which is included with the auto switch mounting brackets above (BS5-□□□, BS4-□□□). Order a stainless steel screw set (BBA1) separately, and select and use the M4 x 8L stainless steel set screws included in the BBA1.



* The above figure shows the mounting example of D-A9□(V)/M9□(V)/M9□W(V)/M9□A(V).

- CLJ2
- CLM2
- CLG1
- CL1
- MLGC
- CNG
- MNB
- CNA2
- CNS
- CLS
- CLQ
- RLQ
- MLU
- MLGP
- ML1C

- D-□
- X□

Auto Switch Mounting 3

Besides the models listed in How to Order, the following auto switches are applicable.
Refer to page 1119 to 1245 for the detailed specifications.

Auto switch type	Model	Electrical entry (Fetching direction)	Features
Reed	D-A90V	Grommet (Perpendicular)	Without indicator light
	D-A93V, A96V		—
	D-Z73, Z76		
	D-A53, A56	Grommet (In-line)	
	D-A64, A67		Without indicator light
	D-Z80		
Solid state	D-M9NV, M9PV, M9BV	Grommet (Perpendicular)	—
	D-Y69A, Y69B, Y7PV		2-color indicator
	D-M9NWV, M9PWV, M9BWW		
	D-Y7NWW, Y7PWW, Y7BWW		Water resistant (2-color indicator)
	D-M9NAV, M9PAV, M9BAV		
	D-F59, F5P, J59		Grommet (In-line)
	D-Y59A, Y59B, Y7P	2-color indicator	
	D-F59W, F5PW, J59W		
	D-Y7NW, Y7PW, Y7BW	Water resistant (2-color indicator)	
	D-F5BA, Y7BA		
	D-F5NT	With timer	

* For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 1192 and 1193.

* Normally closed (NC = b contact) solid state auto switches (D-M9□E(V)/Y7G/Y7H) are also available. Refer to pages 1592-1 and 1139 for details.