

Fine Lock Cylinder

Double Acting, Double Rod

Series CLA2W

Non-lube Type: Ø40, Ø50, Ø63, Ø80, Ø100

How to Order

CLA2W **L** **40** **-200** **JJ** **-E** **-**

With auto switch **CDLA2W** **L** **40** **-200** **JJ** **-E** **-M9BW** **-**

With auto switch (Built-in magnet) **Double rod type**

Mounting

B	Basic
L	Axial foot
F	Rod flange
T	Center trunnion

Tube material

Nil	Aluminum tube
F*	Steel tube

* Not available with auto switch.

Bore size

40	40 mm	80	80 mm
50	50 mm	100	100 mm
63	63 mm		

Port thread type

Nil	Rc
TN	NPT

Auto switch

Nil Without auto switch
* For applicable auto switches, refer to the table below.

Lock operation

E	Spring locking (Exhaust locking)
P	Pneumatic locking (Pressure locking)
D	Spring and pneumatic locking

Number of auto switches

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

Made to Order
For details, refer to page 13.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CDLA2WL40-100-E

Cylinder stroke [mm]
For details, refer to page 13.

With rod boot/cushion**

Rod boot	One side*	Nil	Without rod boot	Cushion	Nil	With cushion on both sides
		J	Nylon tarpaulin		N	Without cushion
	Both sides	KK	Heat resistant tarpaulin			

* In case of one side, it is in the lock side.
** When the symbols are two or more, indicate them alphabetically.

Applicable Auto Switches/Refer to the Best Pneumatics No. 3 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)				—	G59	●	—	●	○			○		
		Terminal conduit		2-wire	12 V	M9P		—	●	●	●	○	○	○				
				3-wire (NPN)		M9B		—	●	●	●	○	○					
	Diagnostic indication (2-color indication)	Grommet	2-wire	24 V	5 V, 12 V	—	G39C	G39	—	—	—	—	—	—	—			
			3-wire (NPN)				K39C	K39	—	—	—	—	—					
			3-wire (PNP)				M9NW	—	●	●	●	○	○			IC circuit		
			2-wire				—	G59W	●	—	●	○	○					
			3-wire (NPN)				—	M9PW	—	●	●	●	○				○	—
			3-wire (PNP)				—	G5PW	●	—	●	○	○					
			2-wire				M9BW	—	●	●	●	○	○			—		
			3-wire (NPN)				—	K59W	●	—	●	○	○					
	Water resistant (2-color indication)	3-wire (PNP)	5 V, 12 V	M9NA**	—	○	○	●	○	○	—							
		2-wire		M9PA**	—	○	○	●	○	○								
	With diagnostic output (2-color indication)	Grommet	Yes	24 V	5 V, 12 V	—	M9BA**	—	○	○	●	○	○	—				
							2-wire	—	G5BA**	—	—	●	○		○			
Magnetic field resistant (2-color indication)	Grommet	Yes	24 V	5 V, 12 V	—	F59F	G59F	●	—	●	○	○	IC circuit					
						3-wire (NPN equivalent)	P3DWA	—	—	—	●	●		○	—			
Reed auto switch	—	Grommet	Yes	2-wire	24 V	12 V	A96	—	●	—	●	—	—	—	IC circuit			
							A93	—	●	—	●	—	—			—		
		Terminal conduit					100 V or less	A90	—	●	—	●	—	—		—	—	
							100 V, 200 V	A54	B54	●	—	●	●	—		—		
	DIN terminal	200 V or less	A64	B64	●	—	●	—	—	—								
		Grommet	—	A33C	A33	—	—	—	—		—	—						
	Diagnostic indication (2-color indication)		100 V, 200 V	A34C	A34	—	—	—	—	—	—							
		Grommet	—	A44C	A44	—	—	—	—	—		—						
	Diagnostic indication (2-color indication)		—	A59W	B59W	●	—	●	—	—	—							
		Grommet	—	—	—	—	—	—	—	—		—						

** Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Please contact 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) M9NWX

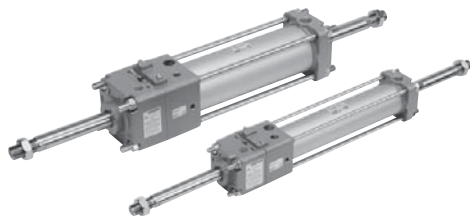
* Since there are other applicable auto switches than listed above, refer to page 23 for details.

* For details about auto switches with pre-wired connector, refer to the Best Pneumatics No. 3. For the D-P3DWA□, refer to the **WEB catalog**.

* The D-A9□/M9□□□/P3DWA□ auto switches are shipped together, (but not assembled). (However, auto switch mounting brackets are assembled for the D-A9□/M9□□□ before shipment.)

Fine Lock Cylinder: Double Acting, Double Rod *Series CLA2W*

Provided with a compact lock mechanism,
it is suitable for intermediate stop,
emergency stop, and drop prevention.



Made to Order

Symbol	Specifications
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length

Caution

Recommended Pneumatic Circuit/Caution on Handling

For detailed specifications mentioned above,
refer to "Specific Product Precautions 3".

Refer to pages 18 to 23 for cylinders with
auto switches.

- Minimum stroke for auto switch mounting
- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Operating range
- Auto switch mounting brackets/Part no.

Minimum Stroke for Auto Switch Mounting

Caution

- The minimum stroke for mounting varies with the auto switch type and cylinder mounting type. In particular, the center trunnion type needs careful attention. (For details, refer to pages 20 and 21.)

Rod Boot Material

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

* Maximum ambient temperature for the rod boot

Specifications

Bore size [mm]	40	50	63	80	100
Action	Double acting, Double rod				
Lock operation	Spring locking, Pneumatic locking, Spring and pneumatic locking				
Type	Non-lube				
Proof pressure	1.5 MPa				
Maximum operating pressure	1.0 MPa				
Minimum operating pressure	0.1 MPa				
Piston speed	50 to 500 mm/sec*				
Ambient and fluid temperature	Without auto switch: -10°C to 70°C (No freezing) With auto switch: 10°C to 60°C				
Cushion	Air cushion				
Stroke length tolerance	Up to 250: $^{+1.0}_0$, 251 to 750: $^{+1.4}_0$				
Mounting	Basic, Axial foot, Rod flange, Center trunnion				

* Constraints associated with the allowable kinetic energy are imposed on the speeds at which the piston can be locked.

Lock Specifications

Lock operation	Spring locking (Exhaust locking)	Spring and pneumatic locking	Pneumatic locking (Pressure locking)
Unlocking pressure [MPa]	0.3 or more		0.1 or more
Lock starting pressure [MPa]	0.25 or less		0.05 or more
Maximum operating pressure [MPa]	1.0	0.5	
Locking direction	Both directions		

Accessories/For details, refer to page 11.

Mounting	Basic	Axial foot	Rod flange	Center trunnion
Standard	●	●	●	●
Option	Single knuckle joint	●	●	●
	Double knuckle joint (with pin)	●	●	●
	Rod boot	●	●	●

* Dimensions of accessories are the same as the standard type of the CLA2 series. (Refer to page 11.)

Standard Strokes

[mm]

Bore size [mm]	Standard stroke [mm]
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500
50, 63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600
80, 100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700

Note) Intermediate strokes not listed above are produced upon receipt of order. Spacers are not used for intermediate strokes.

Mounting Brackets/Part No.

Bore size [mm]	40	50	63	80	100
Axial foot*	CA2-L04	CA2-L05	CA2-L06	CA2-L08	CA2-L10
Flange	CA2-F04	CA2-F05	CA2-F06	CA2-F08	CA2-F10

* When axial foot brackets are used, order two pieces per cylinder.

Weights

[kg]

Bore size [mm]			40	50	63	80	100
Basic weight	Basic	Aluminum tube	1.92	2.92	4.55	7.44	10.61
		Steel tube	1.97	2.97	4.59	7.60	10.83
	Axial foot	Aluminum tube	2.11	3.14	4.89	8.11	11.60
		Steel tube	2.16	3.19	4.93	8.27	11.82
	Flange	Aluminum tube	2.29	3.39	5.34	8.89	12.53
		Steel tube	2.34	3.42	5.38	9.06	12.75
	Center trunnion	Aluminum tube	2.37	3.45	5.44	9.14	13.01
		Steel tube	2.47	3.56	5.64	9.43	13.40
Additional weight per 50 mm of stroke	All mounting brackets	Aluminum tube	0.28	0.37	0.44	0.66	0.86
		Steel tube	0.35	0.47	0.55	0.89	1.15
Accessories	Single knuckle		0.23	0.26	0.26	0.60	0.83
	Double knuckle (with pin)		0.37	0.43	0.43	0.87	1.27

Calculation: (Example) **CLA2WL40-100-E** Basic weight.....2.11 (Axial foot, ø40)
Additional weight.....0.28/50 stroke
Cylinder stroke.....100 stroke
 $2.11 + 0.28 \times 100/50 = 2.67$ kg

Series CLA2W

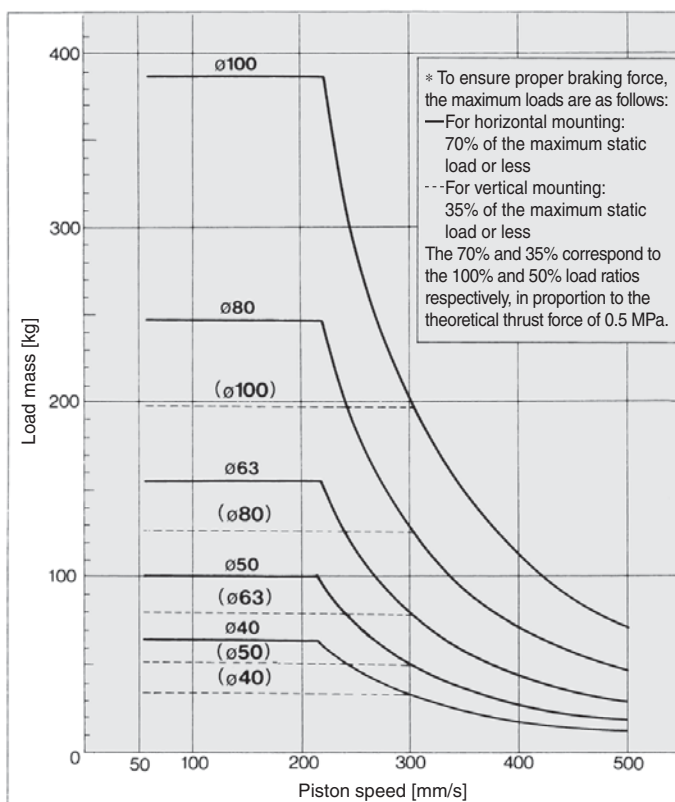
⚠ Caution/Allowable Kinetic Energy when Locking

Bore size [mm]	40	50	63	80	100
Allowable kinetic energy [J]	1.42	2.21	3.53	5.69	8.83

- In terms of specific load conditions, the allowable kinetic energy indicated in the table above is equivalent to a 50% load ratio at 0.5 MPa, and a piston speed of 300 mm/s. Therefore, if the operating conditions are below these values, calculations are unnecessary.
- Apply the following formula to obtain the kinetic energy of the load.

$$E_k = \frac{1}{2} m v^2$$

Ek: Kinetic energy of load [J]
m: Load mass [kg]
v: Piston speed [m/s]
- The piston speed will exceed the average speed immediately before locking. To determine the piston speed for the purpose of obtaining the kinetic energy of load, use 1.2 times the average speed as a guide.
- The relationship between the speed and the load is indicated in the diagram below. The area below the line is the allowable kinetic energy range.
- Even within a given allowable kinetic energy level, there is an upper limit to the size of the load that can be sustained. Thus, a horizontally mounted cylinder must be operated below the solid line, and a vertically mounted cylinder must be operated below the dotted line.



Stopping Accuracy (Not including tolerance of control system) [mm]

Locking method	Piston speed [mm/sec]			
	50	100	300	500
Spring locking	±0.4	±0.5	±1.0	±2.0
Pneumatic locking Spring and pneumatic locking	±0.2	±0.3	±0.5	±1.5

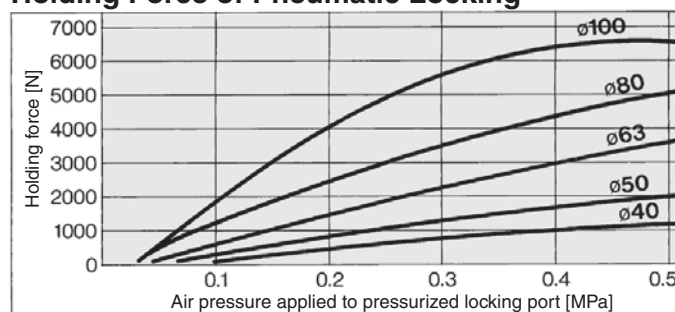
Conditions/Load: 25% of output at 0.5 MPa
Solenoid valve: Mounted to the lock port

Holding Force of Spring Locking (Maximum static load)

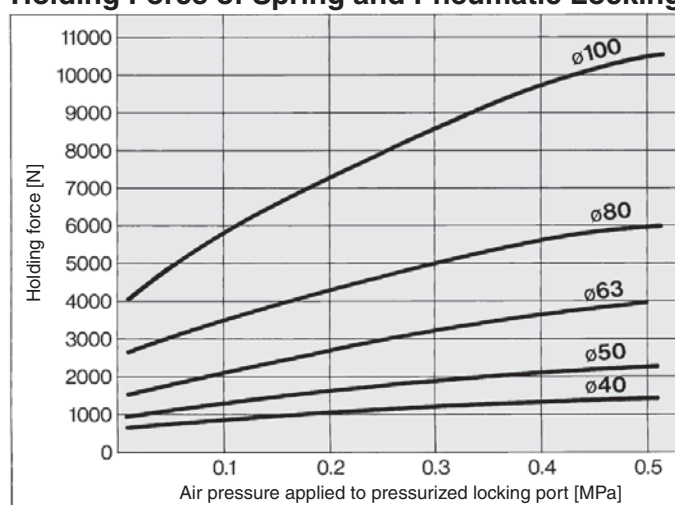
Bore size [mm]	40	50	63	80	100
Holding force [N]	882	1370	2160	3430	5390

Note) Holding force at piston rod retracted side decreases approximately 15%.

Holding Force of Pneumatic Locking



Holding Force of Spring and Pneumatic Locking



* When selecting a cylinder, refer to the Actuator Precautions on pages 3 and 4 in Best Pneumatics No. 3, Specific Product Precautions and Allowable Kinetic Energy when Locking.

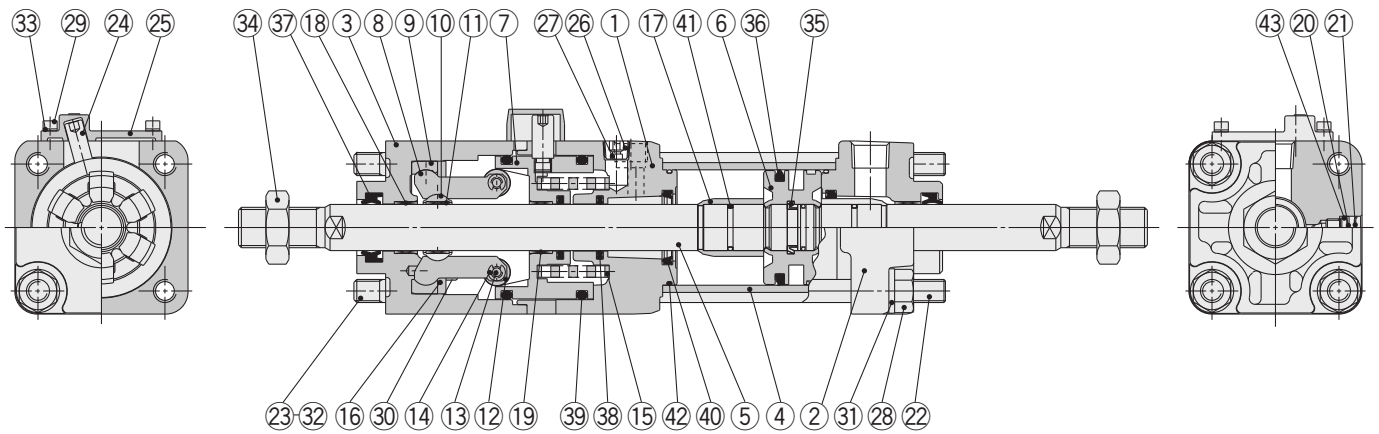
⚠ Caution

Caution when Locking

Holding force (maximum static load) means the maximum capability of holding a static load that is not accompanied by vibration or impact under the condition that no load is applied. Therefore, it does not refer to a load that can be held constantly. When using (selecting) this product, carefully check the following points.

- If the piston rod slips because the lock's holding force has been exceeded, the brake shoe could be damaged, resulting in a reduced holding force or shortened life.
- The upper limit of the load that is used under the conditions not associated with the kinetic energy when locking, such as drop prevention must be 35% or less of the holding force.
- Do not use the cylinder in the locked state to sustain a load that involves impact.

Construction



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Metallic painted after hard anodized
2	Rod cover	Aluminum alloy	Metallic painted
3	Cover	Aluminum alloy	Metallic painted after hard anodized
4	Cylinder tube	Aluminum alloy	Hard anodized
5	Piston rod	Carbon steel	Hard chrome plating
6	Piston	Aluminum alloy	Chromated
7	Brake piston	Carbon steel	Nitriding
8	Brake arm	Carbon steel	Nitriding
9	Arm holder	Carbon steel	Nitriding
10	Brake shoe holder	Carbon steel	Nitriding
11	Brake shoe	Special friction material	
12	Roller	Chromium molybdenum steel	Nitriding
13	Pin	Chrome bearing steel	Heat treated
14	Retaining ring	Carbon tool steel	
15	Brake spring	Steel wire	Anti-corrosive treatment: Except type P
16	Retaining plate	Rolled steel	Zinc chromated
17	Cushion ring	Aluminum alloy	Anodized
18	Bushing	Copper alloy	
19	Bushing	Copper alloy	
20	Cushion valve	Steel wire	Electroless nickel plating
21	Retaining ring	Spring steel	
22	Tie-rod	Carbon steel	Zinc chromated
23	Unit holding tie-rod	Carbon steel	Chromated
24	Non-rotating pin	Carbon steel	Heat treated
25	Pin guide	Carbon steel	Metallic painted after nitriding
26	Hexagon socket head plug	Carbon steel	Type E only
27	Element	Bronze	Type E only
28	Tie-rod nut	Rolled steel	
29	Hexagon socket head cap screw	Chromium molybdenum steel	
30	Retaining plate mounting bolt	Chromium molybdenum steel	
31	Spring washer	Steel wire	
32	Spring washer	Steel wire	
33	Spring washer	Steel wire	

No.	Description	Material	Note
34	Rod end nut	Rolled steel	
35	Piston holder	Urethane	
36	Piston seal	NBR	
37	Rod seal A	NBR	
38	Rod seal B	NBR	
39	Brake piston seal	NBR	
40	Cushion seal	Urethane	
41	Piston gasket	NBR	
42	Tube gasket	NBR	
43	Cushion valve seal	NBR	

Replacement Parts: Seal Kit

Bore size [mm]	Kit no.	Contents
40	MBW 40-PS	Set of the nos. 36, 37, 40, 42
50	MBW 50-PS	
63	MBW 63-PS	
80	MBW 80-PS	
100	MBW100-PS	

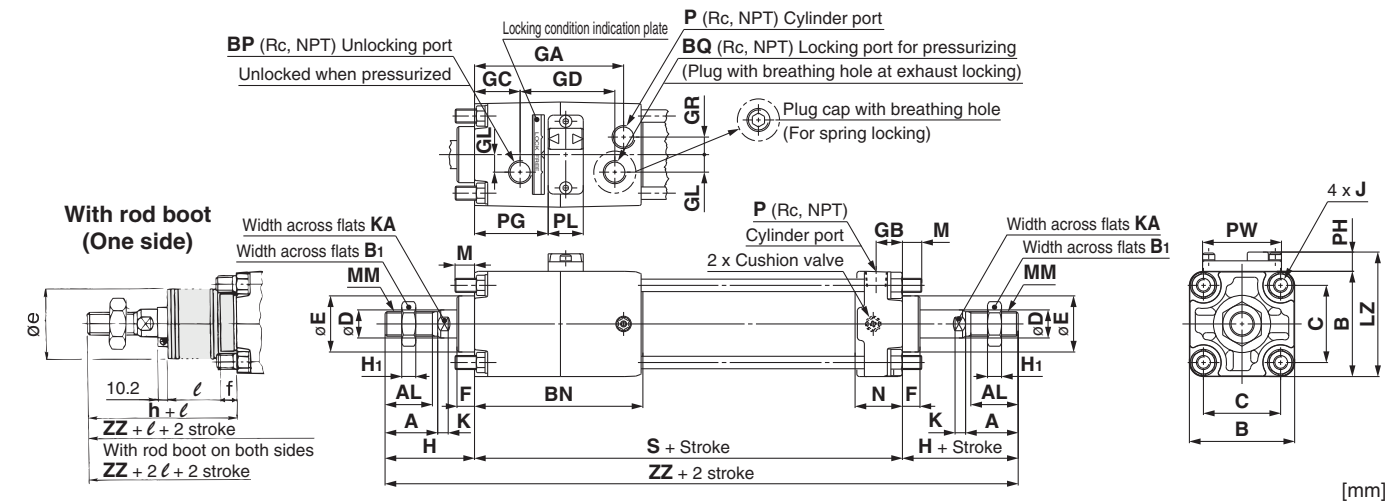
* Since the lock of the CLA2 series cannot be disassembled and is normally replaced as a unit, kits are for the cylinder section only. These can be ordered using the order number for each bore size.

* Seal kit includes a grease pack (ø40, ø50: 10 g, ø63, ø80: 20 g, ø100: 30 g). Order with the following part number when only the grease pack is needed.

Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)

Series CLA2W

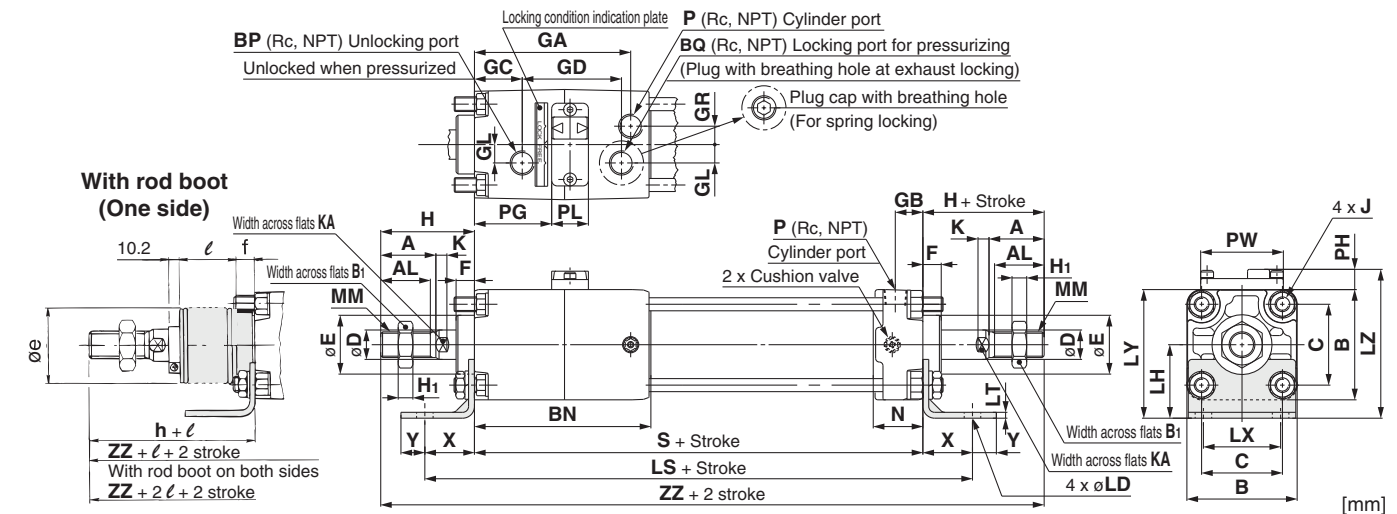
Basic: CLA2WB



Bore size [mm]	Stroke range [mm]		A	AL	B	B ₁	BN	BP	BQ	C	D	E	F	GA	GB	GC	GD	GL	GR	H ₁	J
	Without rod boot	With rod boot																			
40	Up to 500	20 to 500	30	27	60	22	96	1/4	1/4	44	16	32	10	85	15	26	54	10	10	8	M8 x 1.25
50	Up to 600	20 to 600	35	32	70	27	108	1/4	1/4	52	20	40	10	95	17	27	59	13	12	11	M8 x 1.25
63	Up to 600	20 to 600	35	32	86	27	115	1/4	1/4	64	20	40	10	102	17	26	67	18	15	11	M10 x 1.25
80	Up to 750	20 to 750	40	37	102	32	129	1/4	1/4	78	25	52	14	113	21	30	72	23	17	13	M12 x 1.75
100	Up to 750	20 to 750	40	37	116	41	140	1/4	1/4	92	30	52	14	124	21	31	76	25	19	16	M12 x 1.75

Bore size [mm]	K	KA	LZ	M	MM	N	P	PG	PH	PL	PW	S	Without rod boot		With rod boot (One side)						(Both sides)	
													H	ZZ	e	f	h	ℓ	ZZ	ZZ		
40	6	14	71	11	M14 x 1.5	27	1/4	42	11	20	45	153	51	255	43	11.2	59	1/4 stroke	263	271		
50	7	18	80	11	M18 x 1.5	30	3/8	46	10	21	50	168	58	284	52	11.2	66	1/4 stroke	292	300		
63	7	18	99	14	M18 x 1.5	31	3/8	48.5	13	23	60	182	58	298	52	11.2	66	1/4 stroke	306	314		
80	10	22	117	17	M22 x 1.5	37	1/2	55	15	23	70	208	71	350	65	12.5	80	1/4 stroke	359	368		
100	10	26	131	17	M26 x 1.5	40	1/2	56.5	15	25	80	226	72	370	65	14	81	1/4 stroke	379	388		

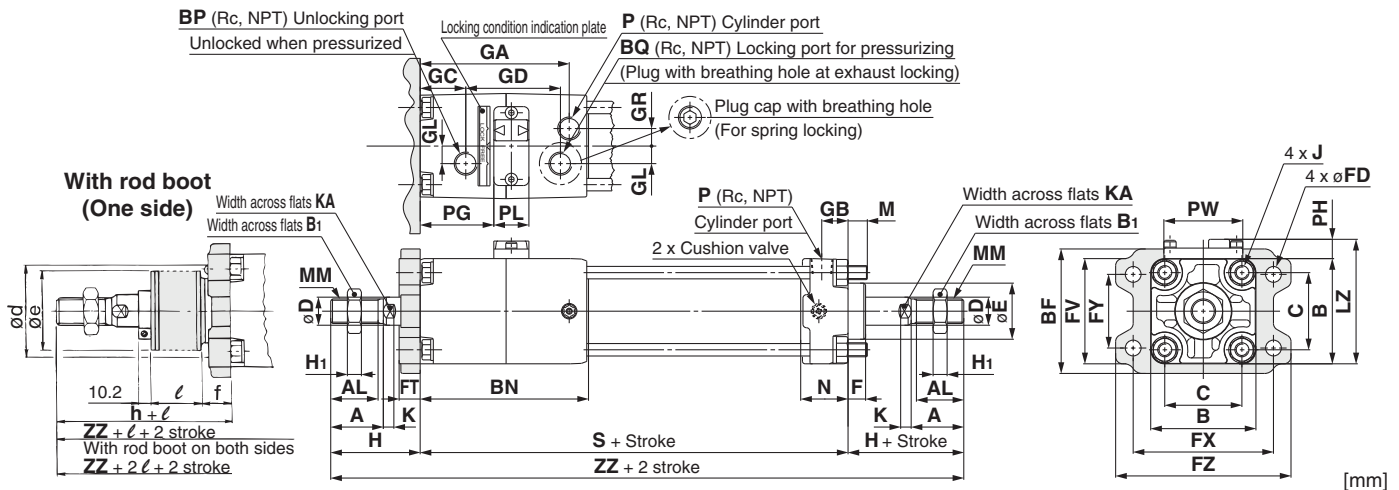
Axial Foot: CLA2WL



Bore size [mm]	Stroke range [mm]		A	AL	B	B ₁	BN	BP	BQ	C	D	E	F	GA	GB	GC	GD	GL	GR	H ₁	J	K	KA	LD
	Without rod boot	With rod boot																						
40	Up to 500	20 to 500	30	27	60	22	96	1/4	1/4	44	16	32	10	85	15	26	54	10	10	8	M8 x 1.25	6	14	9
50	Up to 600	20 to 600	35	32	70	27	108	1/4	1/4	52	20	40	10	95	17	27	59	13	12	11	M8 x 1.25	7	18	9
63	Up to 600	20 to 600	35	32	86	27	115	1/4	1/4	64	20	40	10	102	17	26	67	18	15	11	M10 x 1.25	7	18	11.5
80	Up to 750	20 to 750	40	37	102	32	129	1/4	1/4	78	25	52	14	113	21	30	72	23	17	13	M12 x 1.75	10	22	13.5
100	Up to 750	20 to 750	40	37	116	41	140	1/4	1/4	92	30	52	14	124	21	31	76	25	19	16	M12 x 1.75	10	26	13.5

Bore size [mm]	LH	LS	LT	LX	LY	LZ	MM	N	P	PG	PH	PL	PW	S	X	Y	Without rod boot		With rod boot (One side)						(Both sides)	
																	H	ZZ	e	f	h	ℓ	ZZ	ZZ		
40	40	207	3.2	42	70	81	M14 x 1.5	27	1/4	42	11	20	45	153	27	13	51	255	43	11.2	59	1/4 stroke	263	271		
50	45	222	3.2	50	80	90	M18 x 1.5	30	3/8	46	10	21	50	168	27	13	58	284	52	11.2	66	1/4 stroke	292	300		
63	50	250	3.2	59	93	106	M18 x 1.5	31	3/8	48.5	13	23	60	182	34	16	58	298	52	11.2	66	1/4 stroke	306	314		
80	65	296	4.5	76	116	131	M22 x 1.5	37	1/2	55	15	23	70	208	44	16	71	350	65	12.5	80	1/4 stroke	359	368		
100	75	312	6	92	133	148	M26 x 1.5	40	1/2	56.5	15	25	80	226	43	17	72	370	65	14.0	81	1/4 stroke	379	388		

Rod Flange: CLA2WF

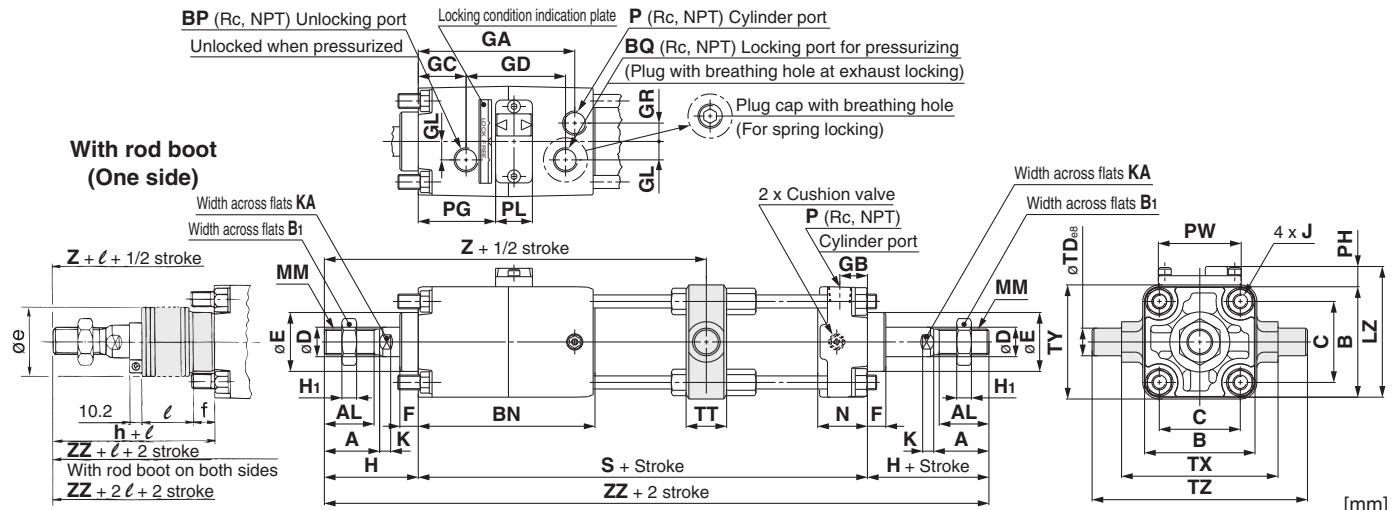


Bore size [mm]	Stroke range [mm]		A	AL	B	B ₁	BF	BN	BP	BQ	C	D	E	FV	FD	FT	FX	FY	FZ	GA	GB	GC	GD	GL	GR
	Without rod boot	With rod boot																							
40	Up to 500	20 to 500	30	27	60	22	71	96	1/4	1/4	44	16	32	60	9	12	80	42	100	85	15	26	54	10	10
50	Up to 600	20 to 600	35	32	70	27	81	108	1/4	1/4	52	20	40	70	9	12	90	50	110	95	17	27	59	13	12
63	Up to 600	20 to 600	35	32	86	27	101	115	1/4	1/4	64	20	40	86	11.5	15	105	59	130	102	17	26	67	18	15
80	Up to 750	20 to 750	40	37	102	32	119	129	1/4	1/4	78	25	52	102	13.5	18	130	76	160	113	21	30	72	23	17
100	Up to 750	20 to 750	40	37	116	41	133	140	1/4	1/4	92	30	52	116	13.5	18	150	92	180	124	21	31	76	25	19

Bore size [mm]	H ₁	J	K	KA	LZ	M	MM	N	P	PG	PH	PL	PW	S	Without rod boot		With rod boot (One side)								(Both sides)	
															H	ZZ	d*	e	f	h	ℓ	ZZ	ZZ			
40	8	M8 x 1.25	6	14	71	11	M14 x 1.5	27	1/4	42	11	20	45	153	51	255	52	43	15	59	1/4 stroke	263	271			
50	11	M8 x 1.25	7	18	80	11	M18 x 1.5	30	3/8	46	10	21	50	168	58	284	58	52	15	66	1/4 stroke	292	300			
63	11	M10 x 1.25	7	18	99	14	M18 x 1.5	31	3/8	48.5	13	23	60	182	58	298	58	52	17.5	66	1/4 stroke	306	314			
80	13	M12 x 1.75	10	22	117	17	M22 x 1.5	37	1/2	55	15	23	70	208	71	350	80	65	21.5	80	1/4 stroke	359	368			
100	16	M12 x 1.75	10	26	131	17	M26 x 1.5	40	1/2	56.5	15	25	80	226	72	370	80	65	21.5	81	1/4 stroke	379	388			

* When a hole must be made to accommodate the rod portion, make sure to machine a hole that is larger than the outer diameter of the boot mounting bracket ød.

Center Trunnion: CLA2WT



Bore size [mm]	Stroke range [mm]		A	AL	B	B ₁	BN	BP	BQ	C	D	E	F	GA	GB	GC	GD	GL	GR	H ₁	J	K	KA	LZ
	Without rod boot	With rod boot																						
40	25 to 500	25 to 500	30	27	60	22	96	1/4	1/4	44	16	32	10	85	15	26	54	10	10	8	M8 x 1.25	6	14	71
50	25 to 600	25 to 600	35	32	70	27	108	1/4	1/4	52	20	40	10	95	17	27	59	13	12	11	M8 x 1.25	7	18	80
63	32 to 600	32 to 600	35	32	86	27	115	1/4	1/4	64	20	40	10	102	17	26	67	18	15	11	M10 x 1.25	7	18	99
80	41 to 750	41 to 750	40	37	102	32	129	1/4	1/4	78	25	52	14	113	21	30	72	23	17	13	M12 x 1.75	10	22	117
100	45 to 750	45 to 750	40	37	116	41	140	1/4	1/4	92	30	52	14	124	21	31	76	25	19	16	M12 x 1.75	10	26	131

Bore size [mm]	MM	N	P	PG	PH	PL	PW	S	TD _{e8}	TT	TX	TY	TZ	Without rod boot			With rod boot (One side)						(Both sides)	
														H	Z	ZZ	e	f	h	ℓ	Z	ZZ	Z	ZZ
40	M14 x 1.5	27	1/4	42	11	20	45	153	15 ^{-0.032} _{-0.059}	22	85	62	117	51	162	255	43	11.2	59	1/4 stroke	170	263	170	271
50	M18 x 1.5	30	3/8	46	10	21	50	168	15 ^{-0.032} _{-0.059}	22	95	74	127	58	181	284	52	11.2	66	1/4 stroke	189	292	189	300
63	M18 x 1.5	31	3/8	48.5	13	23	60	182	18 ^{-0.032} _{-0.059}	28	110	90	148	58	191	298	52	11.2	66	1/4 stroke	199	306	199	314
80	M22 x 1.5	37	1/2	55	15	23	70	208	25 ^{-0.040} _{-0.073}	34	140	110	192	71	221	350	65	12.5	80	1/4 stroke	230	359	230	368
100	M26 x 1.5	40	1/2	56.5	15	25	80	226	25 ^{-0.040} _{-0.073}	40	162	130	214	72	235	370	65	14.0	81	1/4 stroke	244	379	244	388

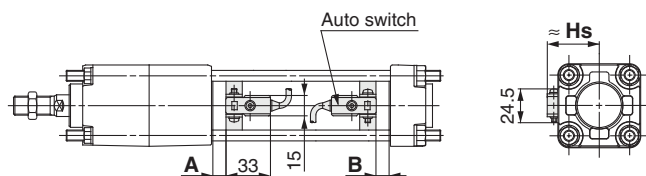
Series CLA2

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

<Band mounting>

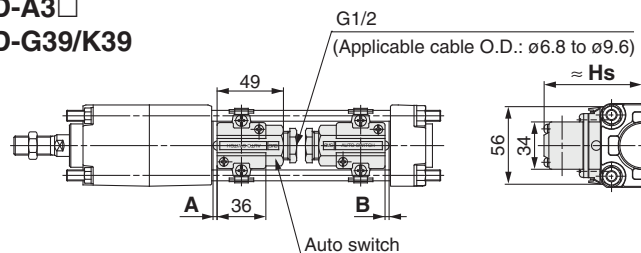
D-B5□/B64

D-B59W



D-A3□

D-G39/K39

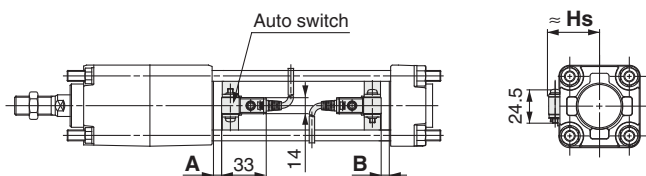


D-G5□/K59

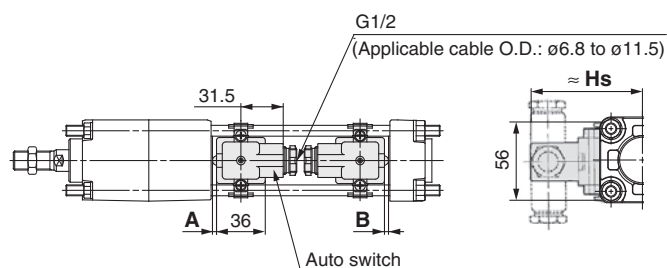
D-G5□W/K59W

D-G5BA

D-G59F/G5NT



D-A44



<Tie-rod mounting>

D-M9□/M9□V

D-M9□W/M9□WV

D-M9□A/M9□AV

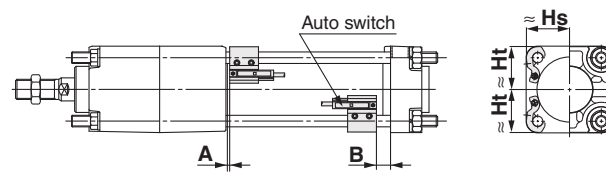
D-A9□/A9□V

D-Z7□/Z80

D-Y59□/Y69□/Y7P/Y7PV

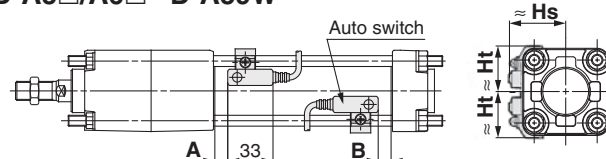
D-Y7□W/Y7□WV

D-Y7BA

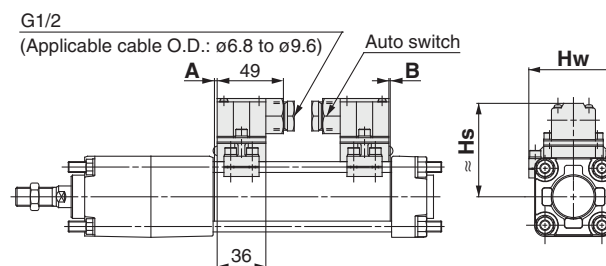


D-A5□/A6□

D-A59W



D-A3□C D-G39C/K39C

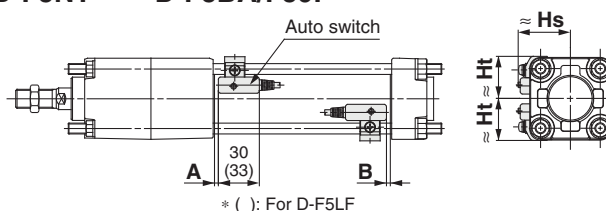


D-F5□/J59

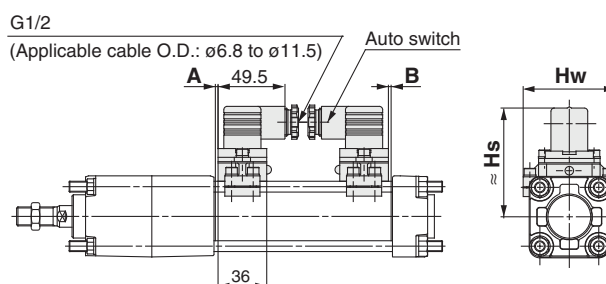
D-F5□W/J59W

D-F5NT

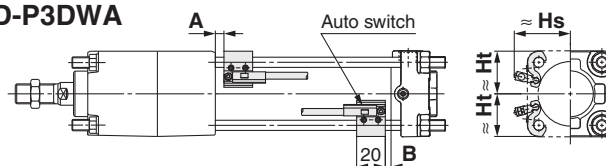
D-F5BA/F59F



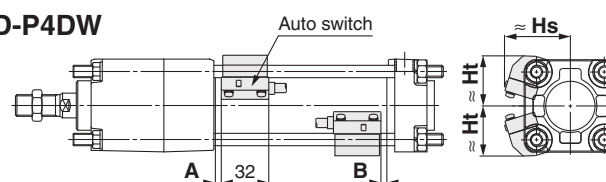
D-A44C



D-P3DWA



D-P4DW



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

Auto Switch Proper Mounting Position

[mm]

Auto switch model Bore size	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-M9□AV		D-A9□ D-A9□V		D-B59W D-Z7□ D-Z80 D-Y59□ D-Y69□ D-Y7P D-Y7PV D-Y7□W D-Y7□WV D-Y7BA		D-P3DWA		D-P4DW		D-A5□ D-A6□ D-A3□ D-A3□C D-A44 D-A44C D-G39 D-G39C D-K39 D-K39C		D-B5□ D-B64		D-F5□ D-J59 D-F59F D-F5□W D-J59W D-F5BA		D-G5□ D-K59 D-G5NT D-G5□W D-K59W D-G5BA D-G59F		D-A59W		D-F5NT	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
40	10	8	6	4	4	1	5.5	3.5	3.5	0.5	0.5	0	1	0	7	4	2.5	0	4.5	1.5	12	9
50	10	8	6	4	3.5	1.5	5.5	3.5	3	1	0	0	0.5	0	6.5	4.5	2	0	4	2	11.5	9.5
63	12.5	11.5	8.5	7.5	6	5	8	7	5.5	4.5	2.5	1.5	3	2	9	8	4.5	3.5	6.5	5.5	14	13
80	16	14	12	10	9.5	7.5	11.5	9.5	9	7	6	4	6.5	4.5	12.5	10.5	8	6	10	8	17.5	15.5
100	17.5	16.5	13.5	12.5	11	10	13	12	10.5	9.5	7.5	6.5	8	7	14	13	9.5	8.5	11.5	10.5	19	18

Note) Adjust the auto switch after confirming the operating conditions in the actual setting.

Auto Switch Proper Mounting Height

[mm]

Auto switch model	D-M9□ D-M9□W D-M9□A D-A9□		D-M9□V D-M9□WV D-M9□AV		D-A9□V		D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7BA D-Y7□W		D-Y69□ D-Y7PV D-Y7□WV		D-P3DWA		D-P4DW		D-B5□ D-B64 D-B59W D-G5□ D-K59 D-G5NT D-G5□W D-K59W D-G5BA D-G59F	D-A3□ D-G39 D-K39	D-A44	D-A5□ D-A6□ D-A59W	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Hs	Hs	Hs	Ht
40	30	30	34	30	31	30	30	30	30	30	37.5	35	42.5	33	37	71.5	81.5	38.5	31.5
50	34	34	38	34	35	34	34	34	34	34	41.5	39	46.5	37.5	42	76.5	86.5	42	35.5
63	41	41	44	41	41.5	41	41	41	41	41	50	41	52	43	49	83.5	93.5	46.5	43
80	49.5	49	52.5	49	50	49	49.5	49	49.5	49	58	49	58.5	51.5	57.5	92	102	53.5	51
100	56.5	56	61	56	58.5	56	56.5	55.5	57.5	55.5	66	56	66	58.5	68	102.5	112.5	61.5	57.5

Auto switch model Bore size	D-F5□ D-J59 D-F5□W D-J59W D-F5BA D-F59F D-F5NT		D-A3□C D-G39C D-K39C		D-A44C	
	Hs	Ht	Hs	Hw	Hs	Hw
40	38	31.5	73	69	81	69
50	42	35.5	78.5	77	86.5	77
63	47	43	85.5	91	93.5	91
80	53.5	51	94	107	102	107
100	61	57.5	104	121	112	121

Minimum Stroke for Auto Switch Mounting

n: Number of auto switches [mm]							
Auto switch model	Number of auto switches	Brackets other than center trunnion	Center trunnion				
			ø40	ø50	ø63	ø80	ø100
D-M9□ D-M9□W D-M9□A	2 (Different surfaces, same surface), 1	15	80		95	110	115
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$95 + 40 \frac{(n-4)}{2}$ (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 D-M9□AV	2 (Different surfaces, same surface), 1	10	80		95	110	115
	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)		$95 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$110 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$115 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-A9□	2 (Different surfaces, same surface), 1	15	75		90	100	110
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$75 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$110 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-A9□V	2 (Different surfaces, same surface), 1	10	75		90	100	110
	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)		$90 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$100 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$110 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-A5□/A6□ D-F5□/J59 D-F5□W/J59W D-F5BA/F59F	2 (Different surfaces, same surface), 1	15	90		100	110	120
	n (Same surface)	$15 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$90 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$100 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-A59W	2 (Different surfaces, same surface)	20	90		100	110	120
	n (Same surface)	$20 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$90 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$100 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
	1	15	90		100	110	120
D-F5NT	2 (Different surfaces, same surface), 1	25	110		120	130	140
	n (Same surface)	$25 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$110 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$120 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$130 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$140 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-B5□/B64 D-G5□/K59 D-G5□W D-K59W D-G5BA D-G59F D-G5NT	2	Different surfaces	15	90		100	
		Same surface	75				
	n	Different surfaces	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 1)	$90 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)		$100 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)	$110 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)
		Same surface	$75 + 50 (n-2)$ (n = 2, 3, 4, ...) Note 1)	$90 + 50 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)		$100 + 50 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$110 + 50 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)
	1	10	90		100	110	
D-B59W	2	Different surfaces	20	90		100	
		Same surface	75				
	n	Different surfaces	$20 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 1)	$90 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)		$100 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)	$110 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)
		Same surface	$75 + 50 (n-2)$ (n = 2, 3, 4, ...) Note 1)	$90 + 50 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)		$100 + 50 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$110 + 50 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)
	1	15	90		100	110	
D-A3□ D-G39 D-K39	2	Different surfaces	35	100		100	
		Same surface	100				
	n	Different surfaces	$35 + 30 (n-2)$ (n = 2, 3, 4, ...) Note 1)	$100 + 30 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)		$100 + 30 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$110 + 30 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)
		Same surface	$100 + 100 (n-2)$ (n = 2, 3, 4, ...) Note 1)	$100 + 100 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)		$100 + 100 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$110 + 100 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)
	1	10	100		100	110	
D-A44	2	Different surfaces	35	100		100	
		Same surface	55				
	n	Different surfaces	$35 + 30 (n-2)$ (n = 2, 3, 4, ...) Note 1)	$100 + 30 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)		$100 + 30 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$110 + 30 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)
		Same surface	$55 + 50 (n-2)$ (n = 2, 3, 4, ...) Note 1)	$100 + 50 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)		$100 + 50 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$110 + 50 (n-2)$ (n = 2, 4, 6, 8, ...) Note 1)
	1	10	100		100	110	

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.

Minimum Stroke for Auto Switch Mounting

n: Number of auto switches [mm]

Auto switch model	Number of auto switches	Brackets other than center trunnion	Center trunnion				
			ø40	ø50	ø63	ø80	ø100
D-A3□C D-G39C D-K39C	2	Different surfaces	100		100	120	
		Same surface	100		100	120	
	n	Different surfaces	$100 + 35(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)		$100 + 35(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$120 + 35(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	
		Same surface	$100 + 100(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)		$100 + 100(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$120 + 100(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	
	1	10	100		100	120	
D-A44C	2	Different surfaces	100		100	120	
		Same surface	55		100	120	
	n	Different surfaces	$100 + 35(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)		$100 + 35(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$120 + 35(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	
		Same surface	$55 + 50(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)		$100 + 50(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	$120 + 50(n-2)$ (n = 2, 4, 6, 8, ...) Note 1)	
	1	10	100		100	120	
D-Z7□/Z80 D-Y59□/Y7P D-Y7□W	2 (Different surfaces, same surface), 1	15	80	85	90	95	105
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 1)	$80 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)	$85 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)	$90 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)
	2 (Different surfaces, same surface), 1	10	65		75	80	90
D-Y69□/Y7PV D-Y7□WV	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 1)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)		$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)	$80 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)	$90 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)
D-Y7BA	2 (Different surfaces, same surface), 1	20	95		100	105	110
	n	$20 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 1)	$95 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)		$100 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)	$105 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)	$110 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)
D-P3DWA	2 (Different surfaces, same surface), 1	15	85			95	100
	n	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 1)	$85 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)			$95 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)	$100 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)
D-P4DW	2 (Different surfaces, same surface), 1	15	120		130	140	
	n	$15 + 65 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ...) Note 1)	$120 + 65 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)		$130 + 65 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ...) Note 2)	$140 + 65 \frac{(n-4)}{2}$ (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.

Operating Range

Auto switch model	Bore size					[mm]
	40	50	63	80	100	
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	4.5	5	5.5	5	6	
D-A9□/A9□V	7.5	8.5	9.5	9.5	10.5	
D-Z7□/Z80	8.5	7.5	9.5	9.5	10.5	
D-A3□/A44 D-A3□C/A44C	9	10	11	11	11	
D-A5□/A6□						
D-B5□/B64						
D-A59W	13	13	14	14	15	
D-B59W	14	14	17	16	18	
D-Y59□/Y69□ D-Y7P/Y7□V D-Y7□W/Y7□WV D-Y7BA	8	7	5.5	6.5	6.5	

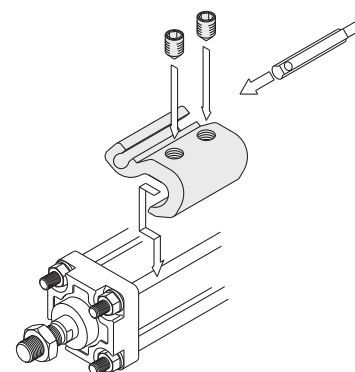
Auto switch model	Bore size					[mm]
	40	50	63	80	100	
D-F5□/J59/F59F D-F5□W/J59W D-F5BA/F5NT	4	4	4.5	4.5	4.5	
D-G5□/K59/G59F D-G5□W/K59W D-G5NT/G5BA	5	6	6.5	6.5	7	
D-G5NB	35	35	40	40	40	
D-G39/K39 D-G39C/K39C	9	9	10	10	11	
D-P3DWA	4.5	4.5	5.5	5.5	5.5	
D-P4DW	4	4	4.5	4	4.5	

* Values which include hysteresis are for guideline purposes only, they are not a guarantee (assuming approximately ±30% dispersion) and may change substantially depending on the ambient environment.

Auto Switch Mounting Brackets/Part No.

<Tie-rod mounting>

Auto switch model	Bore size [mm]				
	ø40	ø50	ø63	ø80	ø100
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV D-A9□/A9□V	BA7-040	BA7-040	BA7-063	BA7-080	BA7-080
D-A5□/A6□/A59W D-F5□/J59/F5□W/J59W D-F5NT/F5BA/F59F	BT-04	BT-04	BT-06	BT-08	BT-08
D-A3□C/A44C/G39C/K39C	BA3-040	BA3-050	BA3-063	BA3-080	BA3-100
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BA	BA4-040	BA4-040	BA4-063	BA4-080	BA4-080
D-P3DWA	BK7-040S	BK7-040S	BA10-063S	BA10-080S	BA10-080S
D-P4DW	BAP2-040	BAP2-040	BAP2-063	BAP2-080	BAP2-080



• The figure shows the mounting example for the D-A9□(V)/M9□(V)/M9□W(V)/M9□A(V) types.

<Band mounting>

Auto switch model	Bore size [mm]				
	40	50	63	80	100
D-A3□/A44 D-G39/K39	BDS-04M	BDS-05M	BMB1-063	BMB1-080	BMB1-100
D-B5□/B64 D-B59W D-G5□/K59 D-G5□W/K59W D-G59F D-G5NT D-G5NB	BH2-040	BA5-050	BAF-06	BAF-08	BAF-10

* Auto switch brackets are included in the D-A3□C/A44C/G39C/K39C types. Specify the part number as follows depending on the cylinder size when ordering.

(Example) ø40: D-A3□C-4, ø50: D-A3□C-5

ø63: D-A3□C-6, ø80: D-A3□C-8, ø100: D-A3□C-10

To order the auto switch mounting bracket separately, use the part number as shown above.

[Stainless Steel Mounting Screw]

The following stainless steel mounting screw kit (including set screws) is also available. Use it in accordance with the operating environment.

(Since the mounting bracket and band are not included, order them separately.)

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

BBA3: D-B5/B6/G5/K5 types

The above stainless steel screws are used when a cylinder is shipped with D-F5BA or G5BA auto switches. When only an auto switch is shipped independently, the BBA1 or BBA3 is attached.

Note 1) Refer to the Best Pneumatics No. 2 for details on the BBA1 and BBA3.

Note 2) When using the D-M9□A, D-M9□AV or Y7BA, do not use the steel set screws which are included with the above auto switch mounting brackets (BA7-□□□, BA4-□□□). Order a stainless steel screw kit (BBA1) separately, and use the M4 x 6 L stainless steel set screws included in the BBA1.

Other than the applicable auto switches listed in “How to Order”, the following auto switches are mountable. Refer to the Best Pneumatics No. 3 for the detailed specifications.

Type	Model	Electrical entry	Features
Reed	D-A93V, A96V	Grommet (Perpendicular)	—
	D-A90V		Without indicator light
	D-A53, A56, B53, Z73, Z76	Grommet (In-line)	—
	D-A67, Z80		Without indicator light
Solid state	D-M9NV, M9PV, M9BV	Grommet (Perpendicular)	—
	D-Y69A, Y69B, Y7PV		Diagnostic indication (2-color indication)
	D-M9NWV, M9PWV, M9BWV		
	D-Y7NWV, Y7PWV, Y7BWV		Water resistant (2-color indication)
	D-M9NAV, M9PAV, M9BAV	Grommet (In-line)	—
	D-Y59A, Y59B, Y7P		Diagnostic indication (2-color indication)
	D-F59, F5P, J59		
	D-Y7NW, Y7PW, Y7BW		Water resistant (2-color indication)
	D-F59W, F5PW, J59W		With timer
	D-F5BA, Y7BA		Magnetic field resistant (2-color indication)
	D-F5NT, G5NT		
	D-P4DW, P5DW		

* With pre-wired connector is also available for solid state auto switches. For details, refer to the Best Pneumatics No. 3.

* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H/Y7G/Y7H) are also available. For details, refer to the Best Pneumatics No. 3.

* Wide range detection type, solid state auto switch (D-G5NB) is also available. For details, refer to the Best Pneumatics No. 3.