

Smooth Cylinder

Series CA2Y

Ø 40, Ø 50, Ø 63, Ø 80, Ø 100

RoHS

How to Order

CA2Y L 40 - 150 Z -

With auto switch CDA2Y L 40 - 150 Z - M9BW -

With auto switch (Built-in magnet)

Mounting

B	Basic
L	Axial foot
F	Rod flange
G	Head flange
C	Single clevis
D	Double clevis
T	Centre trunnion

Bore size

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

Cylinder stroke [mm]
Refer to "Standard Strokes" on page 2.

Port thread type

—	Rc
TN	NPT
TF	G

Made to Order
Refer to page 2 for details.

Number of auto switches

—	2 pcs.
S	1 pc.
3	3 pcs.
n	"n" pcs.

Auto switch

—	Without auto switch
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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) CDA2YB40-100Z

Applicable Auto Switches/Refer to the Auto Switch Guide for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length [g]				Pre-wired connector	Applicable load				
					DC	AC	Tie-rod mounting	Band mounting	0.5 (—)	1 (M)	3 (L)	5 (Z)						
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	—	●	○	○	IC circuit	Relay, PLC		
				3-wire (PNP)				—	G59	●	—	●	○	○				
				2-wire				—	G5P	●	—	●	○	○				
		Terminal conduit		3-wire (NPN)	12 V	—	K59	●	—	●	○	○	—					
	2-wire			G39C		G39	—	—	—	—	—							
	Diagnostic indication (2-colour indication)	Grommet		3-wire (NPN)	24 V	5 V, 12 V	—	K39C	K39	—	—	—	—	IC circuit				
				3-wire (PNP)				M9NW	—	●	●	●	○		○			
				2-wire				—	G59W	●	—	●	○		○			
				3-wire (PNP)				M9PW	—	●	●	●	○		○			
				Water resistant (2-colour indication)				Grommet	2-wire	M9BW	—	●	●	●	○		○	—
									3-wire (NPN)	—	K59W	●	—	●	○		○	
									3-wire (PNP)	M9NA***	—	○	○	●	○		○	
									2-wire	M9PA***	—	○	○	●	○		○	
	With diagnostic output (2-colour indication) Magnetic field resistant (2-colour indication)	Grommet		2-wire	5 V, 12 V	—	M9PA***	—	○	○	●	○	○	IC circuit				
				4-wire (NPN)			F59F	G59F	●	—	●	○	○					
				2-wire (Non-polar)			P3DWA	—	●	—	●	●	○					
P4DW			—	—			—	●	●	○								
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	24 V	12 V	—	A96	—	●	—	●	—	—	IC circuit	Relay, PLC		
				2-wire				100 V	A93	—	●	—	●	●	—		—	
								100 V or less	A90	—	●	—	●	—	IC circuit			
								100 V, 200 V	A54	B54	●	—	●	●				—
		200 V or less						A64	B64	●	—	●	—	—				
		Terminal conduit		Yes				—	A33C	A33	—	—	—	—			—	PLC
	100 V, 200 V							A34C	A34	—	—	—	—					
	A44C							A44	—	—	—	—	—					
	Diagnostic indication (2-colour indication)							Grommet	—	—	A59W	B59W	●	—	●			

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

* Lead wire length symbols: 0.5 m..... — (Example) M9NW
1 m..... M (Example) M9NWM
3 m..... L (Example) M9NWL
5 m..... Z (Example) M9NWX

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

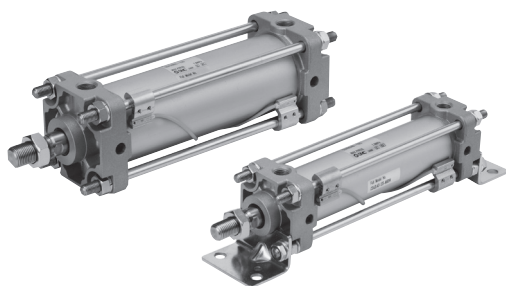
* Since there are other applicable auto switches then listed above, refer to page 13 for details.

* For details about auto switches with pre-wired connector, refer to the Auto Switch Guide.

For the D-P3DW□, refer to the Auto Switch Guide.

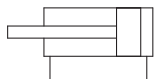
* The D-A9□/M9□□□/P3DWA□ auto switches are shipped together, (but not assembled). (However, only the auto switch mounting brackets are assembled for the D-A9□/M9□□□ before shipment.)

Series CA2Y



Symbol

Without cushion



Made to Order

Symbol	Specifications
-XA□	Change of rod end shape
-XC7	Tie-rod, Cushion valve, Tie-rod nut, etc. made of stainless steel
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC27	Double clevis and double knuckle joint pins made of stainless steel
-XC28	Compact flange made of SS400
-XC29	Double knuckle joint with spring pin
-XC30	Rod trunnion
-XC65	Made of stainless steel (Combination of XC7 and XC68)
-XC68	Made of stainless steel (with hard chrome plated piston rod)

Replacement Parts/Seal Kit

Bore size [mm]	Kit no.	Contents
40	CA2Y40Z-PS	Rod seal 1 pc.
50	CA2Y50Z-PS	Piston seal 1 pc.
63	CA2Y63Z-PS	Cylinder tube gasket 2 pcs.
80	CA2Y80Z-PS	Grease pack (10 g) 1 pc.
100	CA2Y100Z-PS	

When maintenance requires only grease, use the following part numbers to order.

Grease pack part number: GR-L-005 (5 g)
GR-L-010 (10 g)
GR-L-150 (150 g)

Specifications

Bore size [mm]	40	50	63	80	100
Action	Double acting				
Piston speed	5 to 500 mm/s				
Fluid	Air				
Proof pressure	1.05 MPa				
Maximum operating pressure	0.7 MPa				
Ambient and fluid temperature	Without auto switch: -10 °C to 70 °C With auto switch: -10 °C to 60 °C (No freezing)				
Cushion	None				
Lubrication	Not required (Non-lube)				
Mounting	Basic, Axial foot, Rod flange, Head flange Single clevis, Double clevis, Centre trunnion				
Allowable leakage rate	0.5 l/min (ANR)				

Minimum Operating Pressure

Bore size [mm]	40	50	63	80	100
Minimum operating pressure	0.02	0.01			

Unit: MPa

Standard Strokes

Bore size [mm]	Standard stroke [mm]	Max. manufacturable stroke [mm]
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500	1000
50, 63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600	1000
80, 100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700	1000

Note 1) Intermediate strokes not listed above are also available.

Please consult with SMC for strokes outside the above ranges.

Note 2) As the stroke increases, more sliding resistance may result due to the deflection of the piston rod and other factors. Take measures such as the installation of a guide.

Accessories

Mounting	Basic	Foot	Rod flange	Head flange	Single clevis	Double clevis	Centre trunnion
Standard							
Rod end nut	●	●	●	●	●	●	●
Clevis pin	—	—	—	—	—	●	—
Option							
Single knuckle joint	●	●	●	●	●	●	●
Double knuckle joint (with pin)	●	●	●	●	●	●	●

Weights/Aluminium Tube

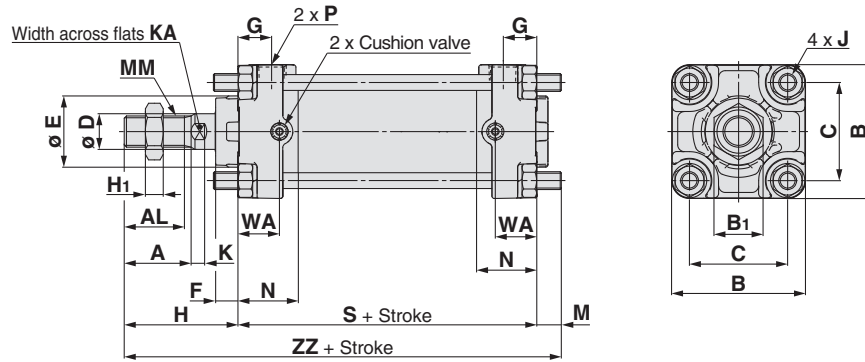
Bore size [mm]	40	50	63	80	100
(kg)					
Basic weight	Basic	0.73	1.06	1.53	2.73
	Axial foot	0.91	1.25	1.83	3.40
	Flange	1.09	1.48	2.28	4.18
	Single clevis	0.95	1.37	2.12	3.84
	Double clevis	0.99	1.46	2.28	4.13
	Trunnion	1.08	1.51	2.29	4.28
Additional weight per 50 mm of stroke	All mounting brackets	0.20	0.25	0.31	0.46
Accessories	Single knuckle joint	0.23	0.26	0.26	0.60
	Double knuckle joint (with pin)	0.37	0.43	0.43	0.87

Calculation (Example) CA2YL40-100Z (Axial foot, Ø 40, 100 st)

- Basic weight.....0.91kg
- Additional weight.....0.20/50 stroke
- Cylinder stroke.....100 stroke

$$0.91 + 0.20 \times 100/50 = 1.31 \text{ kg}$$

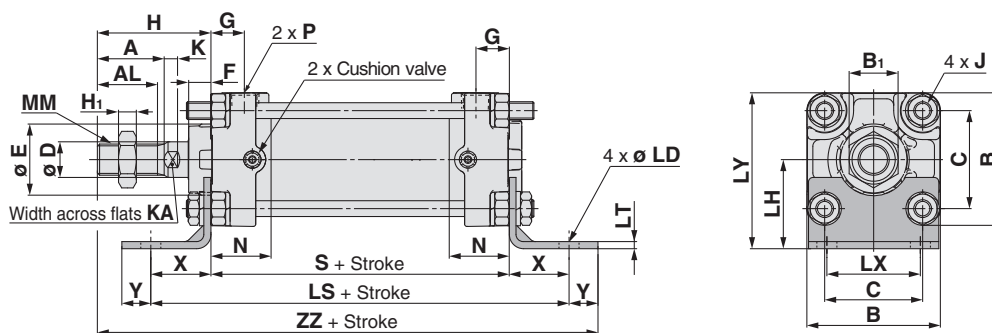
Basic: CA2YB



Bore size [mm]	A	AL	B	B ₁	C	D	E	F	G	H	H ₁	J	K	KA
40	30	27	60	22	44	16	32	10	15	51	8	M8 x 1.25	6	14
50	35	32	70	27	52	20	40	10	17	58	11	M8 x 1.25	7	18
63	35	32	85	27	64	20	40	10	17	58	11	M10 x 1.25	7	18
80	40	37	102	32	78	25	52	14	21	71	13	M12 x 1.75	10	22
100	40	37	116	41	92	30	52	14	21	72	16	M12 x 1.75	10	26

Bore size [mm]	M	MM	N	P	S	WA	ZZ
40	11	M14 x 1.5	27	1/4	84	18.5	146
50	11	M18 x 1.5	30	3/8	90	18.5	159
63	14	M18 x 1.5	31	3/8	98	23	170
80	17	M22 x 1.5	37	1/2	116	28.5	204
100	17	M26 x 1.5	40	1/2	126	28.5	215

Axial Foot: CA2YL

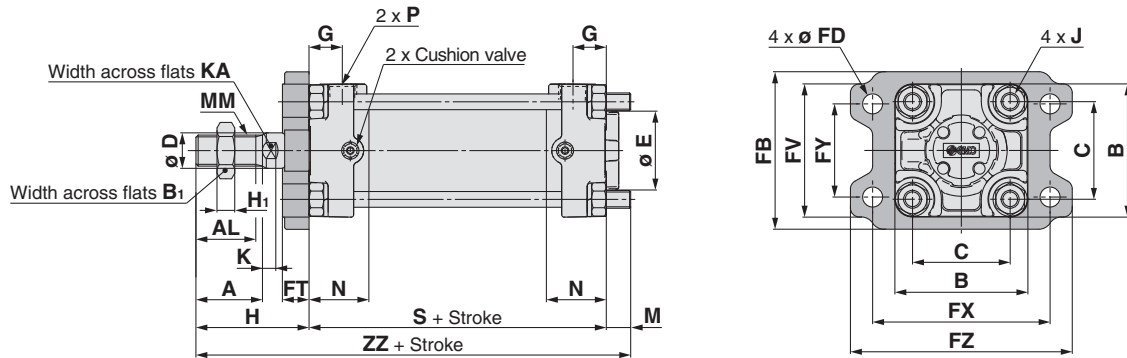


Bore size [mm]	A	AL	B	B ₁	C	D	E	F	G	H	H ₁	J	K	KA	LD	LH	LS	LT
40	30	27	60	22	44	16	32	10	15	51	8	M8 x 1.25	6	14	9	40	138	3.2
50	35	32	70	27	52	20	40	10	17	58	11	M8 x 1.25	7	18	9	45	144	3.2
63	35	32	85	27	64	20	40	10	17	58	11	M10 x 1.25	7	18	11.5	50	166	3.2
80	40	37	102	32	78	25	52	14	21	71	13	M12 x 1.75	10	22	13.5	65	204	4.5
100	40	37	116	41	92	30	52	14	21	72	16	M12 x 1.75	10	26	13.5	75	212	6

Bore size [mm]	LX	LY	MM	N	P	S	X	Y	ZZ
40	42	70	M14 x 1.5	27	1/4	84	27	13	175
50	50	80	M18 x 1.5	30	3/8	90	27	13	188
63	59	93	M18 x 1.5	31	3/8	98	34	16	206
80	76	116	M22 x 1.5	37	1/2	116	44	16	247
100	92	133	M26 x 1.5	40	1/2	126	43	17	258

Series CA2Y

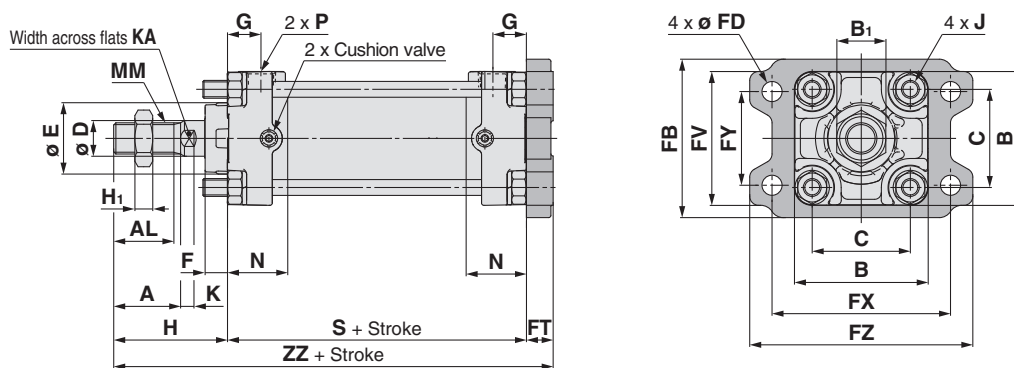
Rod Flange: CA2YF



Bore size [mm]	A	AL	B	B ₁	C	D	E	FB	FD	FT	FV	FX	FY	FZ	G	H	H ₁	J	K
40	30	27	60	22	44	16	32	71	9	12	60	80	42	100	15	51	8	M8 x 1.25	6
50	35	32	70	27	52	20	40	81	9	12	70	90	50	110	17	58	11	M8 x 1.25	7
63	35	32	85	27	64	20	40	101	11.5	15	86	105	59	130	17	58	11	M10 x 1.25	7
80	40	37	102	32	78	25	52	119	13.5	18	102	130	76	160	21	71	13	M12 x 1.75	10
100	40	37	116	41	92	30	52	133	13.5	18	116	150	92	180	21	72	16	M12 x 1.75	10

Bore size [mm]	KA	M	MM	N	P	S	ZZ
40	14	11	M14 x 1.5	27	1/4	84	146
50	18	11	M18 x 1.5	30	3/8	90	159
63	18	14	M18 x 1.5	31	3/8	98	170
80	22	17	M22 x 1.5	37	1/2	116	204
100	26	17	M26 x 1.5	40	1/2	126	215

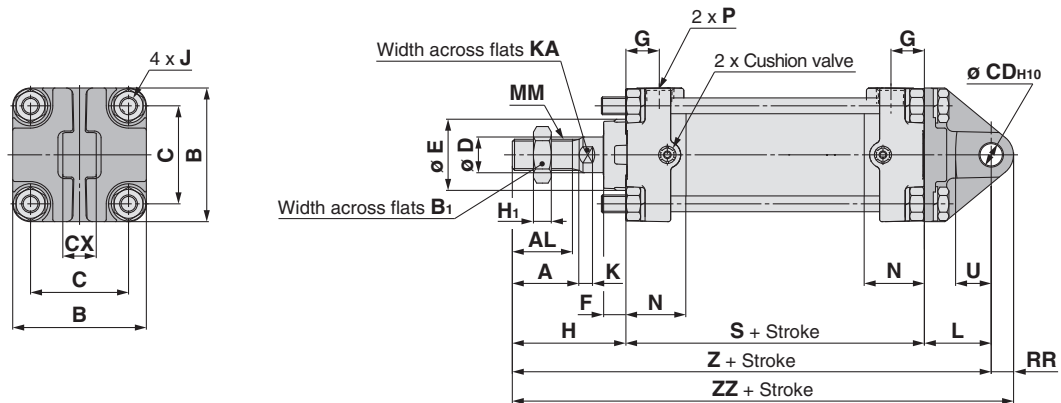
Head Flange: CA2YG



Bore size [mm]	A	AL	B	B ₁	C	D	E	F	FB	FD	FT	FV	FX	FY	FZ	G	H	H ₁
40	30	27	60	22	44	16	32	10	71	9	12	60	80	42	100	15	51	8
50	35	32	70	27	52	20	40	10	81	9	12	70	90	50	110	17	58	11
63	35	32	85	27	64	20	40	10	101	11.5	15	86	105	59	130	17	58	11
80	40	37	102	32	78	25	52	14	119	13.5	18	102	130	76	160	21	71	13
100	40	37	116	41	92	30	52	14	133	13.5	18	116	150	92	180	21	72	16

Bore size [mm]	J	K	KA	MM	N	P	S	ZZ
40	M8 x 1.25	6	14	M14 x 1.5	27	1/4	84	147
50	M8 x 1.25	7	18	M18 x 1.5	30	3/8	90	160
63	M10 x 1.25	7	18	M18 x 1.5	31	3/8	98	171
80	M12 x 1.75	10	22	M22 x 1.5	37	1/2	116	205
100	M12 x 1.75	10	26	M26 x 1.5	40	1/2	126	216

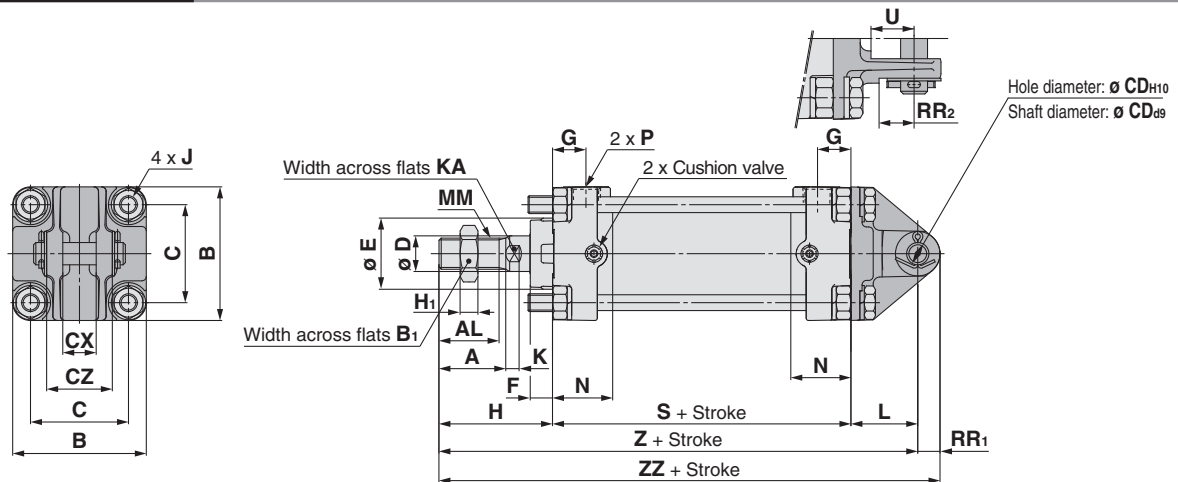
Single Clevis: CA2YC



Bore size [mm]	A	AL	B	B ₁	C	CD _{H10}	CX	D	E	F	G	H	H ₁	J	K	KA
40	30	27	60	22	44	10 ^{+0.058} ₀	15 ^{+0.1} _{-0.3}	16	32	10	15	51	8	M8 x 1.25	6	14
50	35	32	70	27	52	12 ^{+0.070} ₀	18 ^{+0.1} _{-0.3}	20	40	10	17	58	11	M8 x 1.25	7	18
63	35	32	85	27	64	16 ^{+0.070} ₀	25 ^{+0.1} _{-0.3}	20	40	10	17	58	11	M10 x 1.25	7	18
80	40	37	102	32	78	20 ^{+0.084} ₀	31.5 ^{+0.1} _{-0.3}	25	52	14	21	71	13	M12 x 1.75	10	22
100	40	37	116	41	92	25 ^{+0.084} ₀	35.5 ^{+0.1} _{-0.3}	30	52	14	21	72	16	M12 x 1.75	10	26

Bore size [mm]	L	MM	N	P	RR	S	U	Z	ZZ
40	30	M14 x 1.5	27	1/4	10	84	16	165	175
50	35	M18 x 1.5	30	3/8	12	90	19	183	195
63	40	M18 x 1.5	31	3/8	16	98	23	196	212
80	48	M22 x 1.5	37	1/2	20	116	28	235	255
100	58	M26 x 1.5	40	1/2	25	126	36	256	281

Double Clevis: CA2YD



* A pin and retaining rings are shipped together with double clevis and/or double knuckle joint.

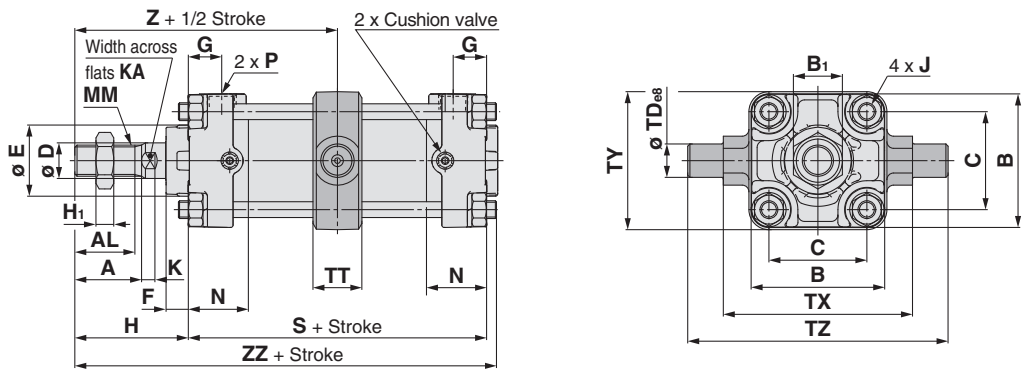
Bore size [mm]	A	AL	B	B ₁	C	CD _{H10}	CX	CZ	D	E	F	G	H	H ₁	J	K	KA
40	30	27	60	22	44	10 ^{+0.058} ₀	15 ^{+0.3} _{+0.1}	29.5	16	32	10	15	51	8	M8 x 1.25	6	14
50	35	32	70	27	52	12 ^{+0.070} ₀	18 ^{+0.3} _{+0.1}	38	20	40	10	17	58	11	M8 x 1.25	7	18
63	35	32	85	27	64	16 ^{+0.070} ₀	25 ^{+0.3} _{+0.1}	49	20	40	10	17	58	11	M10 x 1.25	7	18
80	40	37	102	32	78	20 ^{+0.084} ₀	31.5 ^{+0.3} _{+0.1}	61	25	52	14	21	71	13	M12 x 1.75	10	22
100	40	37	116	41	92	25 ^{+0.084} ₀	35.5 ^{+0.3} _{+0.1}	64	30	52	14	21	72	16	M12 x 1.75	10	26

Bore size [mm]	L	MM	N	P	RR ₁	RR ₂	S	U	Z	ZZ
40	30	M14 x 1.5	27	1/4	10	16	84	16	165	175
50	35	M18 x 1.5	30	3/8	12	19	90	19	183	195
63	40	M18 x 1.5	31	3/8	16	23	98	23	196	212
80	48	M22 x 1.5	37	1/2	20	28	116	28	235	255
100	58	M26 x 1.5	40	1/2	25	23.5	126	36	256	281

* A clevis pin, flat washers and split pins are included.

Series CA2Y

Centre Trunnion: CA2YT



[mm]																	
Bore size [mm]	A	AL	B	B ₁	C	D	E	F	G	H	H ₁	J	K	KA	MM	N	P
40	30	27	60	22	44	16	32	10	15	51	8	M8 x 1.25	6	14	M14 x 1.5	27	1/4
50	35	32	70	27	52	20	40	10	17	58	11	M8 x 1.25	7	18	M18 x 1.5	30	3/8
63	35	32	85	27	64	20	40	10	17	58	11	M10 x 1.25	7	18	M18 x 1.5	31	3/8
80	40	37	102	32	78	25	52	14	21	71	13	M12 x 1.75	10	22	M22 x 1.5	37	1/2
100	40	37	116	41	92	30	52	14	21	72	16	M12 x 1.75	10	26	M26 x 1.5	40	1/2

Bore size [mm]	S	TD _{e8}	TT	TX	TY	TZ	Z	ZZ
40	84	15 ^{-0.032} _{-0.059}	22	85	62	117	93	140
50	90	15 ^{-0.032} _{-0.059}	22	95	74	127	103	154
63	98	18 ^{-0.032} _{-0.059}	28	110	90	148	107	162
80	116	25 ^{-0.040} _{-0.073}	34	140	110	192	129	194
100	126	25 ^{-0.040} _{-0.073}	40	162	130	214	135	206

* Do not disassemble the trunnion type. (Refer to the standard type.)

Trunnion and Double Clevis Pivot Bracket

- Strength is the same as cylinder brackets.

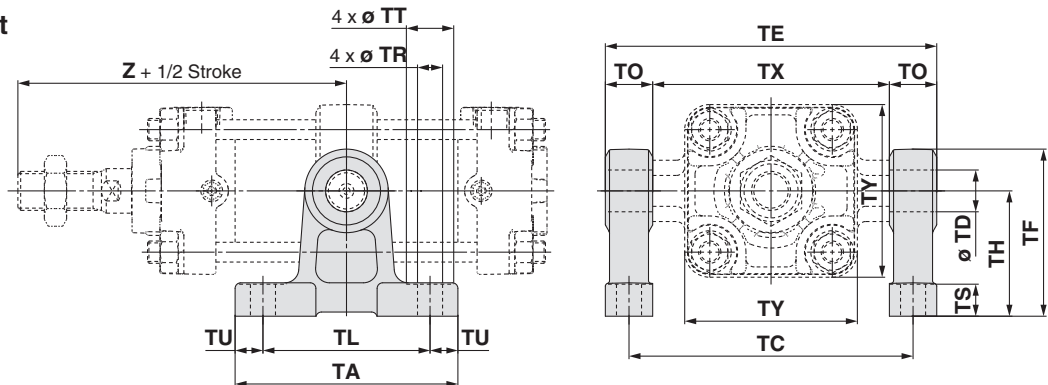
Type

Bore size	CA2□40	CA2□50	CA2□63	CA2□80	CA2□100
Description	CA2-S04		CA2-S06	MB-S10	
Trunnion pivot bracket	CA2-S04		CA2-S06	MB-S10	
Double clevis pivot bracket	CA2-B04	CA2-B05	CA2-B06	CA2-B08	CA2-B10

* Order 2 trunnion pivot brackets per cylinder.

Trunnion pivot bracket

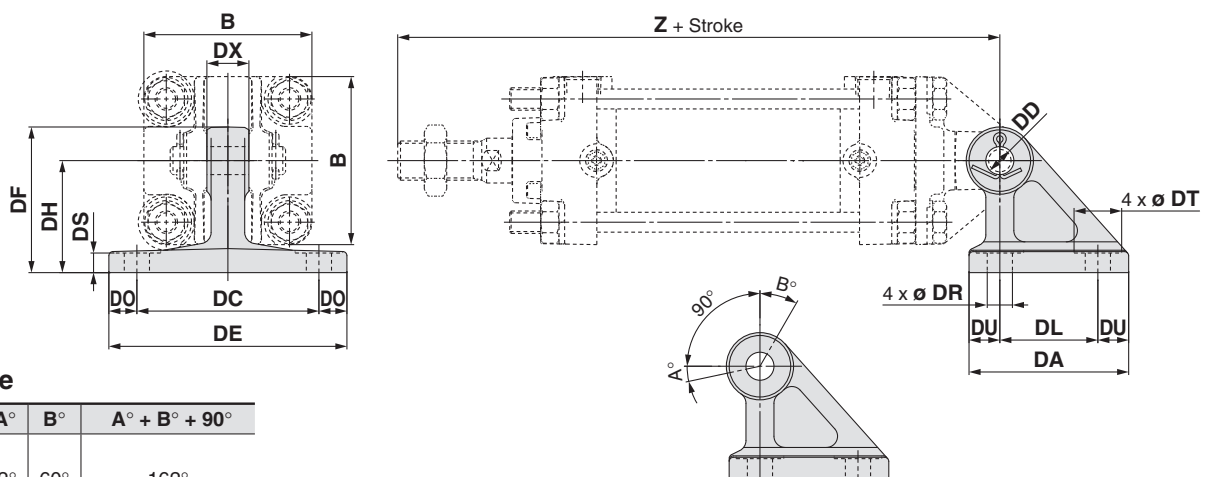
Material: Cast iron



Part no.	Bore size [mm]	TA	TL	TU	TC	TX	TE	TO	TR	TT	TS	TH	TF	TY	Z	TD-H10 (Hole)
CA2-S04	40	80	60	10	102	85	119	17	9	17	12	45	60	62	93	15 ^{+0.070} ₀
	50	80	60	10	112	95	129	17	9	17	12	45	60	74	103	15 ^{+0.070} ₀
CA2-S06	63	100	70	15	130	110	150	20	11	22	14	55	73	90	107	18 ^{+0.070} ₀
MB-S10	80	120	90	15	166	140	192	26	13.5	24	17	75	100	110	129	25 ^{+0.084} ₀
	100	120	90	15	188	162	214	26	13.5	24	17	75	100	130	135	25 ^{+0.084} ₀

Double clevis pivot bracket

Material: Cast iron



Rotating Angle

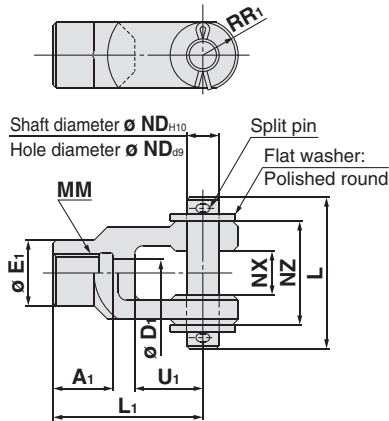
Bore size [mm]	A°	B°	A° + B° + 90°
40 to 100	12°	60°	162°

Part no.	Bore size [mm]	DA	DL	DU	DC	DX	DE	DO	DR	DT	DS	DH	DF	B	Z	DDH10 (Hole)
CA2-B04	40	57	35	11	65	15	85	10	9	17	8	40	52	60	165	10 ^{+0.058} ₀
CA2-B05	50	57	35	11	65	18	85	10	9	17	8	40	52	70	183	12 ^{+0.070} ₀
CA2-B06	63	67	40	13.5	80	25	105	12.5	11	22	10	50	66	85	196	16 ^{+0.070} ₀
CA2-B08	80	93	60	16.5	100	31.5	130	15	13.5	24	12	65	90	102	235	20 ^{+0.084} ₀
CA2-B10	100	93	60	16.5	100	35.5	130	15	13.5	24	12	65	90	116	256	25 ^{+0.084} ₀

Series CA2Y

Dimensions of Accessories

Y Type Double Knuckle Joint



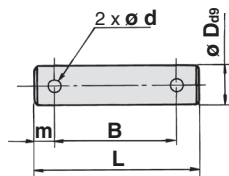
Material: Cast iron

[mm]

Part no.	Applicable bore size [mm]	A ₁	E ₁	D ₁	L ₁	MM	RR ₁	U ₁	ND	NX	NZ	L	Split pin size	Flat washer size
Y-04D	40	22	24	10	55	M14 x 1.5	13	25	12	16 ^{+0.3} _{-0.1}	38	55.5	Ø 3 x 18	Polished round 12
Y-05D	50, 63	27	28	14	60	M18 x 1.5	15	27	12	16 ^{+0.3} _{-0.1}	38	55.5	Ø 3 x 18	Polished round 12
Y-08D	80	37	36	18	71	M22 x 1.5	19	28	18	28 ^{+0.3} _{-0.1}	55	76.5	Ø 4 x 25	Polished round 18
Y-10D	100	37	40	21	83	M26 x 1.5	21	38	20	30 ^{+0.3} _{-0.1}	61	83	Ø 4 x 30	Polished round 20

* A knuckle pin, split pins and flat washers are included.

Clevis Pin/Knuckle Pin



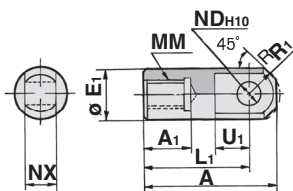
Material: Carbon steel

[mm]

Part no.	Applicable bore size		Dd9	L	B	m	d Drill through	Included split pin	Included flat washer
	Clevis	Knuckle							
CDP-2A	40	—	10 ^{-0.040} _{-0.076}	46	38	4	3	Ø 3 x 18 B	Polished round 10
CDP-3A	50	40, 50, 63	12 ^{-0.050} _{-0.093}	55.5	47.5	4	3	Ø 3 x 18 B	Polished round 12
CDP-4A	63	—	16 ^{-0.050} _{-0.093}	71	61	5	4	Ø 4 x 25 B	Polished round 16
CDP-5A	—	80	18 ^{-0.050} _{-0.093}	76.5	66.5	5	4	Ø 4 x 25 B	Polished round 18
CDP-6A	80	100	20 ^{-0.065} _{-0.117}	83	73	5	4	Ø 4 x 30 B	Polished round 20
CDP-7A	100	—	25 ^{-0.065} _{-0.117}	88	78	5	4	Ø 4 x 36 B	Polished round 24

* Split pins and flat washers are included.

I Type Single Knuckle Joint

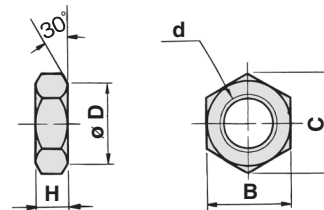


Material: Free cutting sulfur steel

[mm]

Part no.	Applicable bore size [mm]	A	A ₁	E ₁	L ₁	MM	R ₁	U ₁	ND _{H10}	NX
I-04A	40	69	22	24	55	M14 x 1.5	15.5	20	12 ^{+0.070} ₀	16 ^{+0.1} _{-0.3}
I-05A	50, 63	74	27	28	60	M18 x 1.5	15.5	20	12 ^{+0.070} ₀	16 ^{+0.1} _{-0.3}
I-08A	80	91	37	36	71	M22 x 1.5	22.5	26	18 ^{+0.070} ₀	28 ^{+0.1} _{-0.3}
I-10A	100	105	37	40	83	M26 x 1.5	24.5	28	20 ^{+0.084} ₀	30 ^{+0.1} _{-0.3}

Rod End Nut (Standard)



Material: Rolled steel

[mm]

Part no.	Applicable bore size [mm]	d	H	B	C	D
NT-04	40	M14 x 1.5	8	22	25.4	21
NT-05	50, 63	M18 x 1.5	11	27	31.2	26
NT-08	80	M22 x 1.5	13	32	37.0	31
NT-10	100	M26 x 1.5	16	41	47.3	39

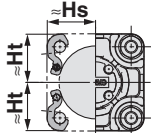
Series CA2Y

Auto Switch Mounting

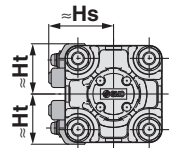
Auto Switch Proper Mounting Position (Detection at stroke end) and Its Mounting Height

<Tie-rod mounting>

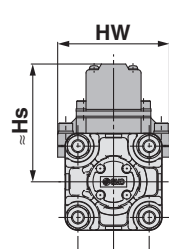
D-M9□/M9□V
D-M9□W/M9□WV
D-M9□A/M9□AV
D-A9□/A9□V



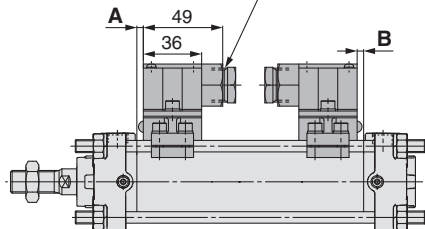
D-A5□/A6□
D-A59W



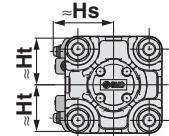
D-A3□C
D-G39C/K39C



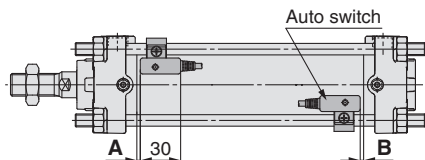
G 1/2
Applicable cable O.D.: Ø 6.8 to Ø 9.6



D-F5□/J5□
D-F5NT

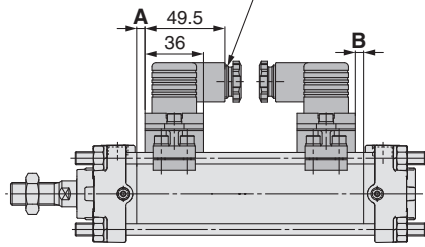
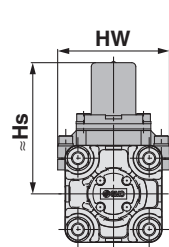


D-F5□W/J59W
D-F5BA/F59F

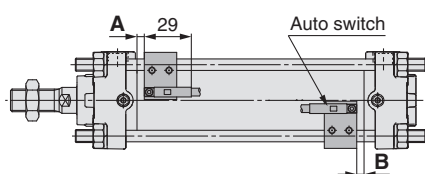
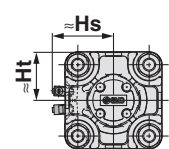


D-A44C

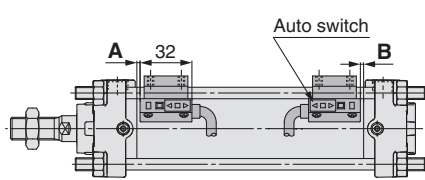
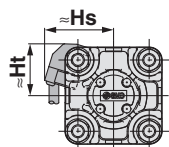
G 1/2
Applicable cable O.D.: Ø 6.8 to Ø 11.5



D-P3DWA

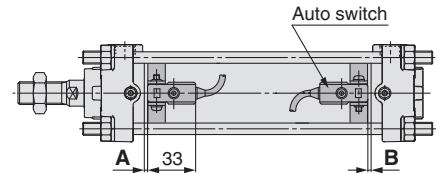
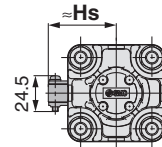


D-P4DW



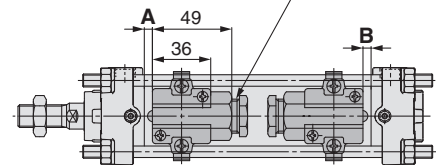
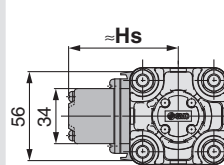
<Band mounting>

D-B5□/B64/B59W

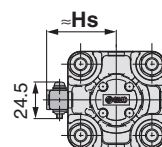


D-A3□
D-G39/K39

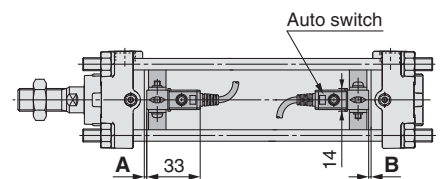
G 1/2
Applicable cable O.D.: Ø 6.8 to Ø 9.6



D-G5□/K59
D-G5□W/K59W

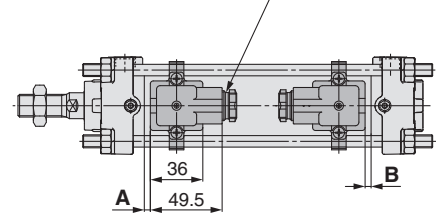
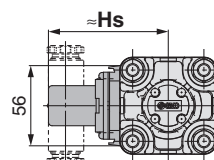


D-G5BAL
D-G59F/G5NTL



D-A44

G 1/2
Applicable cable O.D.: Ø 6.8 to Ø 11.5



Series CA2Y

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

Auto Switch Proper 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-J51		D-Y59□ D-Y69□ D-Y7P D-Y7PV D-Y7□W D-Y7□WV D-Y7BA D-Z7□ D-Z80 D-B59W		D-P3DWA		D-P4DW		D-F5□ D-J59 D-F59F D-F5□W D-J59W D-F5BA		D-A59W		D-F5NT		D-G39 D-G39C D-K39 D-K39C D-A5□ D-A6□ D-A3□ D-A3□C D-A44 D-A44C		D-G5□ D-K59 D-G5NT D-G5□W D-K59W D-G5BA D-G59F		D-B5□ D-B64	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
40	9	9	5	5	2.5	2.5	4.5	4.5	2	2	5.5	5.5	3	3	10.5	10.5	0	0	1	1	0	0
50	9.5	8.5	5.5	4.5	3	2	5	4	2.5	1.5	6	5	3.5	2.5	11	10	0	0	1.5	0.5	0	0
63	12.5	11.5	8.5	7.5	6	5	8	7	5.5	4.5	9	8	6.5	5.5	14	13	2.5	1.5	4.5	3.5	3	2
80	16.5	13.5	12.5	9.5	10	7	12	9	9.5	6.5	13	10	10.5	7.5	18	15	6.5	3.5	8.5	5.5	7	4
100	18	16	14	12	11.5	9.5	13.5	12.5	11	9	14.5	12.5	12	10	19.5	17.5	8	6	10	8	8.5	6.5

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

Auto Switch Mounting Height

[mm]

Auto switch model	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-A9□		D-A9□V		D-M9□V D-M9□WV D-M9□AV		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-G5NTL D-G5□W D-K59W D-G5BAL D-G59F		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-A3□C D-G39C D-K39C		D-A44C	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Hs	Hs	Hs	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
40	30	30	31	30	34	30	30	30	30	30	37.5	35	42.5	33	37	71.5	81.5	81.5	38.5	31.5	38	31.5	73	69	81	69		
50	34	34	35	34	38	34	34	34	34	34	41.5	39	46.5	37.5	42	76.5	86.5	86.5	42	35.5	42	35.5	78.5	77	86.5	77		
63	41	41	41.5	41	44	41	41	41	41	41	50	41	52	43	49	83.5	93.5	93.5	46.5	43	47	43	85.5	91	93.5	91		
80	49.5	49	50	49	52.5	49	49.5	49	49.5	49	58	49	58.5	51.5	57.5	92	102	102	53.5	51	53.5	51	94	107	102	107		
100	56.5	56	58.5	56	61	56	56.5	55.5	57.5	55.5	66	56	66	58.5	68	102.5	112.5	112.5	61.5	57.5	61	57.5	104	121	112	121		

Operating Range

[mm]

Auto switch model	Bore size				
	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

Auto switch model	Bore size				
	40	50	63	80	100
D-Y59□/Y69□ D-Y7P/Y7□V D-Y7□W/Y7□WV D-Y7BA	8	7	5.5	6.5	6.5
D-F5□/J5□/F5□W D-J59W/F5BA D-F5NT/F59F	4	4	4.5	4.5	4.5
D-G5□/K59/G5□W D-K59W/G5BA D-G5NT/G59F	5	6	6.5	6.5	7
D-G5NBL	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.

Minimum Stroke for Auto Switch Mounting

n: Number of auto switches [mm]							
Auto switch model	Number of auto switches mounted	Mounting brackets other than centre trunnion	Centre trunnion				
			Ø 40	Ø 50	Ø 63	Ø 80	Ø 100
D-M9□ D-M9□W	2 (Different surfaces and same surface) 1	15	80		85	90	95
	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)
D-M9□V D-M9□WV	2 (Different surfaces and same surface) 1	10	55		60	65	70
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$55 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$70 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-M9□A	2 (Different surfaces and same surface) 1	15	80		85	95	100
	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)	$95 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-M9□AV	2 (Different surfaces and same surface) 1	10	60		65	70	75
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$70 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-A9□	2 (Different surfaces and same surface) 1	15	75		80	85	90
	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)		$80 + 40 \frac{(n-4)}{2}$ (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)
D-A9□V	2 (Different surfaces and same surface) 1	10	50		55	60	65
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...) Note 1)	$50 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)		$55 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$60 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)	$65 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...) Note 2)
D-A5□/A6 D-F5□/J5 D-F5□W/J59W D-F5BA/F59F	2 (Different surfaces and 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 and same surface) 1	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 and 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	110	
		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...)	$90 + 50 (n - 2)$ (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	110	
		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...)	$90 + 50 (n - 2)$ (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	

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 mounted	Mounting brackets other than centre trunnion	Centre trunnion				
			Ø 40	Ø 50	Ø 63	Ø 80	Ø 100
D-A3□ D-G39 D-K39	2	Different surfaces	35		75	80	90
		Same surface	100		100	100	100
	n	Different surfaces	$35 + 30(n - 2)$ (n = 2, 3, 4...)		$75 + 30(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$80 + 30(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$90 + 30(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}
		Same surface	$100 + 100(n - 2)$ (n = 2, 3, 4...)		$100 + 100(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}		
	1	10	75		80	90	
D-A44	2	Different surfaces	35		75	80	90
		Same surface	55		100	100	100
	n	Different surfaces	$35 + 3(n - 2)$ (n = 2, 3, 4...)		$75 + 30(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$80 + 30(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$90 + 30(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}
		Same surface	$55 + 50(n - 2)$ (n = 2, 3, 4...)		$75 + 50(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$80 + 50(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$90 + 50(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}
	1	10	75		80	90	
D-A3□C D-G39C D-K39C	2	Different surfaces	20		75	80	90
		Same surface	100		100	100	100
	n	Different surfaces	$20 + 35(n - 2)$ (n = 2, 3, 4...)		$75 + 35(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$80 + 35(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$90 + 35(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}
		Same surface	$100 + 100(n - 2)$ (n = 2, 3, 4, 5...)		$100 + 100(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}		
	1	10	75		80	90	
D-A44C	2	Different surfaces	20		75	80	90
		Same surface	55		100	100	100
	n	Different surfaces	$20 + 35(n - 2)$ (n = 2, 3, 4...)		$75 + 35(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$80 + 35(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$90 + 35(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}
		Same surface	$55 + 50(n - 2)$ (n = 2, 3, 4...)		$75 + 50(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$80 + 50(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}	$90 + 50(n - 2)$ (n = 2, 4, 6, 8...) ^{Note 1)}
	1	10	75		80	90	
D-Z7□/Z80 D-Y59□/Y7P D-Y7□W	2 (Different surfaces and 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)}
D-Y69□/Y7PV D-Y7□WV	2 (Different surfaces and same surface) 1	10	65		75	80	90
	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 and 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 and same surface) 1	15	85				
	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)}				
D-P4DW	2 (Different surfaces and 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)}	

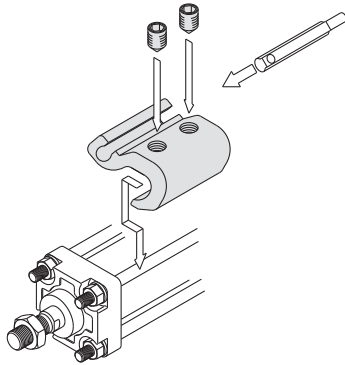
Note 1) When "n" is an odd number, an even number that is one larger than this odd number is used for the calculation.

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

Auto Switch Mounting Brackets/Part No.

<Tie-rod mounting>

Auto switch model	Bore size [mm]				
	40	50	63	80	100
D-A9□/A9□V D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	BA7-040	BA7-040	BA7-063	BA7-080	BA7-080
D-A5□/A6□ D-A59W D-F5□/J5□ D-F5□W/J59W D-F59F/F5NT	BT-04	BT-04	BT-06	BT-08	BT-08
D-A3□C/A44C D-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)L 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

Note 1) The auto switch mounting bracket is included in the D-A3□C/A44C/G39C/K39C types. Specify the part number as follows depending on the cylinder size when ordering.
(Example) Ø 40: D-A3□C-4, Ø 50: D-A3□C-5, Ø 63: D-A3□C-6, Ø 80: D-A3□C-8, Ø 100: D-A3□C-10

[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 auto switch mounting bracket is not included, order it separately.)

BBA1: For D-A5/A6/F5/J5 types
BBA3: For D-B5/B6/G5/K5 types

Note 2) Refer to the **Auto Switch Guide** for details on the BBA1 and BBA3.

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

Note 4) There is a difference in the cylinder tube thickness depending on the cylinder model. When a band mounting type is used as an applicable auto switch and a cylinder model is changed, use caution.

Other than the applicable auto switches listed in “How to Order”, the following auto switches are mountable.

Refer to the **Auto Switch Guide** 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		—
	D-M9NWV/M9PWV/M9BWV		Diagnostic indication (2-colour indication)
	D-Y7NWV/Y7PWV/Y7BWV		Water resistant (2-colour)
	D-M9NAV/M9PAV/M9BAV		—
	D-Y59A/Y59B/Y7P	Grommet (In-line)	—
	D-F59/F5P/J59		—
	D-Y7NW/Y7PW/Y7BW		Diagnostic indication (2-colour indication)
	D-F59W/F5PW/J59W		Water resistant (2-colour)
	D-F5BA/Y7BA		With timer
	D-F5NT/G5NT		—
	D-P5DW		Magnetic field resistant (2-colour)

* With pre-wired connector is also available for solid state auto switches. For details, refer to the **Auto Switch Guide**.

* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H/Y7G/Y7H) are also available. For details, refer to the **Auto Switch Guide**.

* Wide range detection type, solid state auto switch (D-G5NBL) is also available. For details, refer to the **Auto Switch Guide**.



Smooth Cylinders/Low Speed Cylinders Specific Product Precautions 1

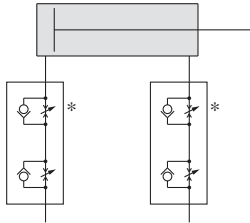
Be sure to read before handling. Refer to back cover for Safety Instructions. For Actuator and Auto Switch Precautions, refer to “Handling Precautions for SMC Products” and the Operation Manual on SMC website, <http://www.smcworld.com>

Recommended Pneumatic Circuit

Warning

Horizontal Operation

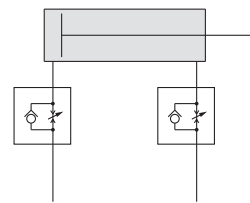
I



Dual speed controller

Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip. More stable low speed operation can be achieved than meter-in circuit alone.

II

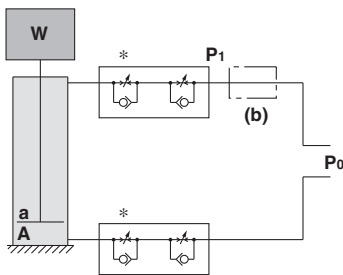


Meter-in speed controller

Meter-in speed controllers can reduce lurching while controlling the speed. The two adjustment needles facilitate adjustment.

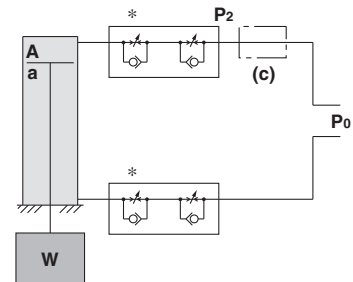
Vertical Operation

I



- (1) Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.*
- (2) Depending on the size of the load, installing a regulator with check valve at position (b) can reduce lurching during descent and operation delay during ascent.
As a guide,
when $W + P_0a > P_0A$,
adjust P_1 to make $W + P_1a = P_0A$.

II



- (1) Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.*
- (2) Installing a regulator with check valve at position (c) can reduce lurching during descent and operation delay during ascent.
As a guide,
adjust P_2 to make $W + P_2A = P_0a$.

W: Load [N] P₀: Operating pressure [MPa] P₁, P₂: Reduced pressure [MPa] a: Rod side piston area [mm²] A: Head side piston area [mm²]



Smooth Cylinders/Low Speed Cylinders Specific Product Precautions 2

Be sure to read before handling. Refer to back cover for Safety Instructions. For Actuator and Auto Switch Precautions, refer to “Handling Precautions for SMC Products” and the Operation Manual on SMC website, <http://www.smcworld.com>

Design

⚠ Caution

- 1. Provide a construction that does not apply a lateral load to the cylinder.**
Applying a lateral load to the cylinder may cause a malfunction.
(Only for low speed cylinders)
- 2. Design the system to prevent vibration from being applied to the cylinder.**
A malfunction may occur due to the vibration.
- 3. Avoid using a guide with obvious variations in operating resistance.**
Operation may become unstable when using a guide that manifests variations in operating resistance, or when the external load changes.
- 4. Avoid a system structure in which the mounting orientation changes.**
Operation may become unstable if the mounting orientation changes.
- 5. Avoid operation where the temperature fluctuates greatly. Also, when using at low temperatures, make sure that frost does not form inside the cylinder and on the piston rod.**
Operation may become unstable.
- 6. Do not use the product at a high frequency.**
Use it at 30 cpm or less as a guideline.
- 7. Adjust the speed in accordance with the operating environment.**
When the operating environment changes, the speed adjustment will be off unless it is reset to reflect operation in the new environment.
- 8. For cylinders with long strokes, sliding resistance will increase due to the deflection of the piston rod and other factors. Take measures such as the installation of a guide. (Only for smooth cylinders)**
- 9. Do not apply excessive lateral load to the piston rod. (Only for smooth cylinders)** ^{Note 1)}
Note 1) Easy checking method
Minimum operating pressure after the cylinder is mounted to the equipment [MPa] = Minimum operating pressure of cylinder [MPa] + {Load weight [kg] x Friction coefficient of guide/Sectional area of cylinder [mm²]}
If smooth operation is confirmed within the above value, the load on the cylinder is the resistance of the thrust only and it can be judged as having no lateral load.

Pneumatic Circuit

⚠ Caution

- 1. The piping length between the speed controller and the cylinder port must be kept as short as possible.**
If the speed controller and the cylinder port are far apart, speed adjustment may be unstable.
- 2. Use a speed controller for low speed operation to easily adjust for low speed operation or a dual speed controller (Series ASD) to prevent cylinders from popping out.**
(When the speed controller for low speed operation is used, the maximum speed may be limited.)
Refer to “Recommended Pneumatic Circuit” on page 14.

Mounting

⚠ Caution

- 1. Do not apply a lateral load to the piston rod.**
Applying a lateral load to the piston rod may cause a malfunction. (Only for low speed cylinders)
- 2. Do not apply excessive lateral load to the piston rod. (Only for smooth cylinders)** ^{Note 1)}
Note 1) Easy checking method
Minimum operating pressure after the cylinder is mounted to the equipment [MPa] = Minimum operating pressure of cylinder [MPa] + {Load weight [kg] x Friction coefficient of guide/Sectional area of cylinder [mm²]}
If smooth operation is confirmed within the above value, the load on the cylinder is the resistance of the thrust only and it can be judged as having no lateral load.

Lubrication

⚠ Caution

- 1. Operate without lubrication from a pneumatic system lubricator.**
A malfunction may occur when lubricated in this fashion.
- 2. Only use the grease recommended by SMC.**
The low speed cylinder and the low speed cylinder with clean room specifications use different types of grease. The use of grease other than the specified type can cause a malfunction and particulate generation.
 - Order using the following part numbers when only maintenance grease is needed.

Volume	Part no.
5 g	GR-L-005
10 g	GR-L-010
150 g	GR-L-150
- 3. Do not wipe out the grease in the sliding part of the air cylinder.**
Doing so may cause a malfunction.

Air Supply

⚠ Caution

- 1. Take measures to prevent pressure fluctuation.**
A malfunction may occur with the fluctuation of pressure.