Air Cylinder Short Type

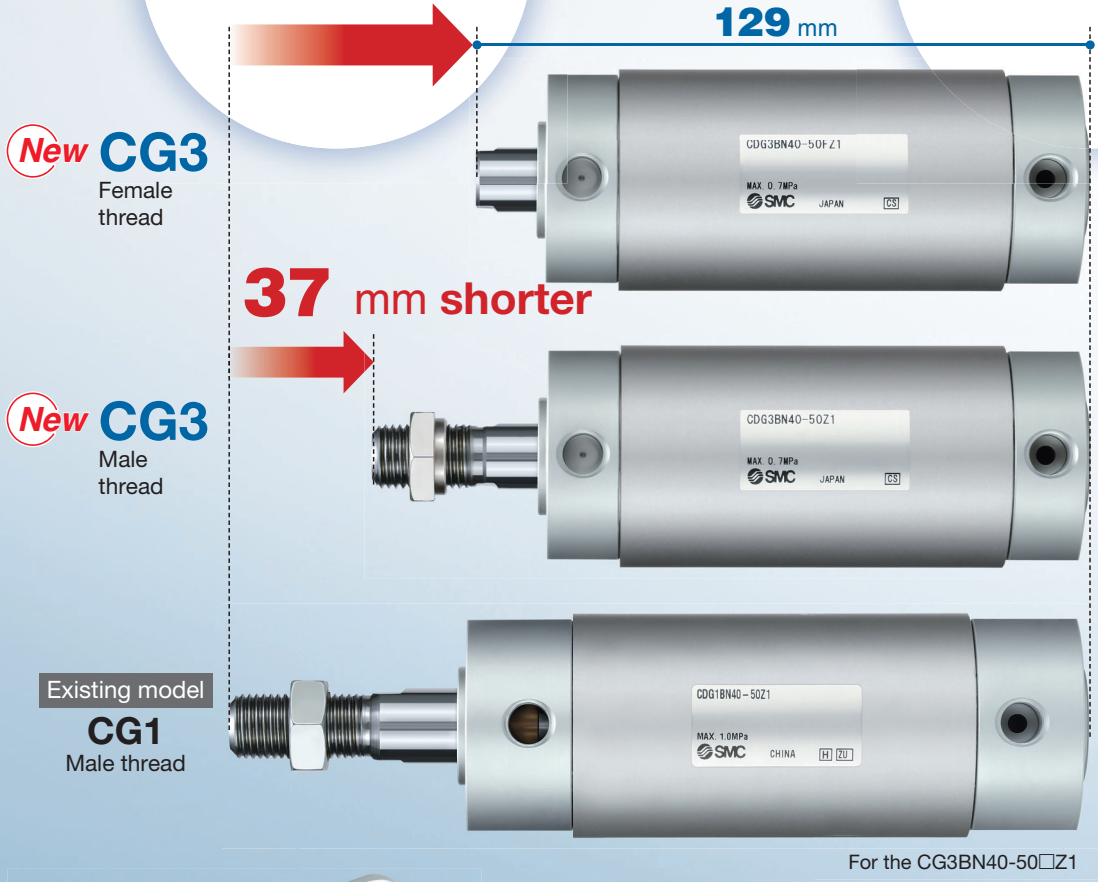
Ø 20, Ø 25, Ø 32, Ø 40 Ø 50, Ø 63, Ø 80, Ø 100

New

RoHS

Overall length
Max.
51 mm shorter

Weight
Max.
24 % lighter



For the CG3BN40-50□Z1

Series Variations

Series	Action	Bore size [mm]								Cushion	Standard stroke [mm]
		20	25	32	40	50	63	80	100		
Air cylinder/Short type **CG3** series 	Double acting, Single rod	●	●	●	●	●	●	●	●	Rubber bumper	Ø 20: 1 to 200 Ø 25 to Ø 100: 1 to 300

CG3 Series

SMC

CAT.EUS20-315A-UK

Air Cylinder Short Type
Standard: Double Acting, Single Rod
CG3 Series

RoHS

Ø 20, Ø 25, Ø 32, Ø 40, Ø 50, Ø 63, Ø 80, Ø 100

How to Order

	CG3	L	N	25	–	100		Z1	–					
With auto switch	CDG3	L	N	25	–	100		Z1	–	M9BW		–		

With auto switch
(Built-in magnet)

Mounting

B	Basic
L	Foot bracket
F	Rod flange
G	Head flange
D	Clevis

∗ Mounting brackets are shipped together with the product but do not come assembled.

Cushion

N	Rubber bumper

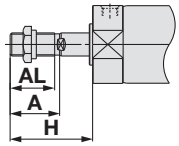
Bore size

20	20 mm	50	50 mm
25	25 mm	63	63 mm
32	32 mm	80	80 mm
40	40 mm	100	100 mm

Rod end thread

–	Male thread
F	Female thread
G	Long male rod end∗1

∗1 G: Same rod end dimensions (A, AL, H) as CG1 series



Cylinder stroke [mm]
Refer to the next page for standard strokes.

Auto switch

–	Without auto switch

∗ For applicable auto switches, refer to the table below.

Number of auto switches

–	2
S	1
n	n

Made to order
For details, refer to page 2.

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) CDG3FN32-100Z1

Applicable Auto Switches / Refer to the **Web Catalogue** for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model: Applicable bore size Ø 20 to Ø 63 Perpendicular	Auto switch model: Applicable bore size Ø 20 to Ø 63 In-line	Auto switch model: Applicable bore size Ø 80, Ø 100 In-line	Lead wire length (m) 0.5 (—)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	–	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	–	**M9NV**	**M9N**	–	●	●	●	○	○	IC circuit	Relay, PLC
								–	–	**G59**	●	–	●	○	○		
				3-wire (PNP)				**M9PV**	**M9P**	–	●	●	●	○	○		
								–	–	**G5P**	●	–	●	○	○		
				2-wire		12 V		**M9BV**	**M9B**	–	●	●	●	○	○	–	
								–	–	**K59**	●	–	●	○	○		
	Diagnostic indication (2-colour indicator)	Grommet		3-wire (NPN)		5 V, 12 V		**M9NWV**	**M9NW**	–	●	●	●	○	○	IC circuit	
								–	–	**G59W**	●	–	●	○	○		
				3-wire (PNP)				**M9PWV**	**M9PW**	–	●	●	●	○	○		
								–	–	**G5PW**	●	–	●	○	○		
				2-wire		12 V		**M9BWV**	**M9BW**	–	●	●	●	○	○	–	
								–	–	**K59W**	●	–	●	○	○		
	Water resistant (2-colour indicator)			3-wire (NPN)		5 V, 12 V		**M9NAV**∗1	**M9NA**∗1	–	○	○	●	○	○	IC circuit	
				3-wire (PNP)				**M9PAV**∗1	**M9PA**∗1	–	○	○	●	○	○		
				2-wire		12 V		**M9BAV**∗1	**M9BA**∗1	–	○	○	●	○	○	–	
								–	–	**G5BA**∗1	–	–	●	○	○		
Reed auto switch	–	Grommet	Yes	3-wire (NPN equivalent)	–	5 V	–	**A96V**	**A96**	–	●	●	●	●	○	IC circuit	–
			Yes	2-wire	24 V	12 V	100 V	**A93V**	**A93**	–	●	●	●	●	○∗2	–	Relay, PLC
			No				100 V or less	**A90V**	**A90**	–	●	●	●	●	○∗2	IC circuit	
			Yes				100 V, 200 V	–	–	**B54**	●	–	●	●	–	–	
			No				200 V or less	–	–	**B64**	●	–	●	–	–		

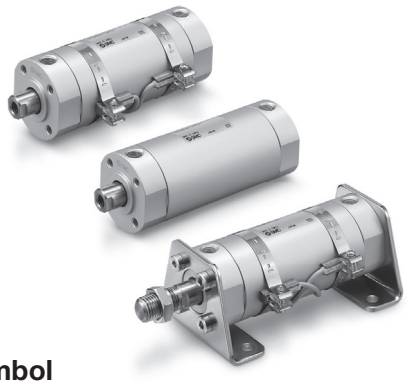
∗1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. A water-resistant type cylinder is recommended for use in an environment which requires water resistance.
∗2 The load voltage used is 24 VDC.

∗ Lead wire length symbols: 0.5 m ·····— (Example) M9NW
1 m ·····M (Example) M9NWM
3 m ·····L (Example) M9NWL
5 m ·····Z (Example) M9NWZ
None ·····N (Example) H7CN

∗ Auto switches marked with a "○" are produced upon receipt of order.

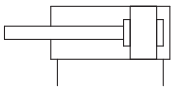
∗ Since there are applicable auto switches other than those listed above, refer to page 12 for details.
∗ For details on auto switches with pre-wired connectors, refer to the **Web Catalogue**.
∗ D-A9□(V)/M9□(V)/M9□W(V)/M9□A(V) auto switches are shipped together with the product but do not come assembled. (Only the auto switch mounting brackets are assembled before shipment.)

SMC



Symbol

Rubber bumper



Refer to pages 9 to 13 for cylinders with auto switches.

- Auto Switch Proper Mounting Position (Detection at stroke end) and Mounting Height
- Minimum Stroke for Auto Switch Mounting
- Auto Switch Mounting Brackets/Part Nos.
- Operating Range
- Cylinder Mounting Bracket, by Stroke/Auto Switch Mounting Surfaces

Made to Order
(For details, refer to the Web Catalogue.)

Symbol	Specifications
-XA□	Change of rod end shape

Specifications

Bore size [mm]	20	25	32	40	50	63	80	100
Action	Double acting, Single rod							
Lubrication	Not required (Non-lube)							
Fluid	Air							
Proof pressure	1.0 MPa							
Max. operating pressure	0.7 MPa							
Min. operating pressure	0.05 MPa							
Ambient and fluid temperatures	Without auto switch: –10 °C to 70 °C (No freezing)							
	With auto switch: –10 °C to 60 °C (No freezing)							
Piston speed∗1	50 to 1000 mm/s						30 to 700 mm/s	
Stroke length tolerance	$^{+1.4}_{0}$ mm							
Cushion	Rubber bumper							
Mounting	Basic, Foot bracket, Rod flange, Head flange, Clevis							

∗ Operate the cylinder within the allowable kinetic energy. Refer to page 4 for details.

Standard Strokes

Bore size [mm]	Standard stroke [mm]∗1
20	25, 50, 75, 100, 125, 150, 200
25	25, 50, 75, 100, 125, 150, 200, 250, 300
32	
40	
50	
63	
80	
100	

∗1 The manufacturing of intermediate strokes in 1 mm increments is possible. (Spacers are not used.)

Accessories

Mounting		Basic	Foot bracket	Rod flange	Head flange	Clevis
Standard	Rod end nut (male thread)	●	●	●	●	●
	Clevis pin	—	—	—	—	●
Option	Single knuckle joint	●	●	●	●	●
	Double knuckle joint (with pin)∗1	●	●	●	●	●
	Pivot bracket	—	—	—	—	●

∗1 A double knuckle joint pin and retaining rings are shipped together.
∗ For part numbers and dimensions, refer to page 8.

Mounting Brackets/Part Nos.

Mounting bracket	Order qty.	Bore size [mm] 20	25	32	40	50	63	80	100	Contents
Foot bracket	2∗1	CG-L020	CG-L025	CG-L032	CG3-L040	CG-L050	CG-L063	CG-L080	CG-L100	2 foot brackets, 8 mounting bolts
Flange	1	CG3-F020A	CG3-F025A	CG-F032	CG3-F040	CG-F050A	CG-F063A	CG-F080	CG-F100	1 flange, 4 mounting bolts
Clevis	1	CG-D020	CG-D025	CG-D032	CG3-D040	CG-D050	CG-D063	CG-D080	CG-D100	1 clevis, 4 mounting bolts, 1 clevis pin, 2 retaining rings
Pivot bracket	1	CG-020-24A	CG-025-24A	CG-032-24A	CG-040-24A	CG-050-24A	CG-063-24A	CG-080-24A	CG-100-24A	1 pivot bracket

∗1 When ordering foot brackets, order two pieces per cylinder.

Mounting Brackets, Accessories/Material, Surface Treatment

Segment	Description	Material	Surface treatment
Mounting brackets	Foot bracket	Carbon steel	Nickel plating
	Flange	Carbon steel (Ø 20 to Ø 63)	Nickel plating
		Cast iron (Ø 80, Ø 100)	Nickel plating
	Clevis	Carbon steel (Ø 20 to Ø 63)	Nickel plating
		Cast iron (Ø 80, Ø 100)	Nickel plating
Accessories	Rod end nut	Carbon steel	Zinc chromating
	Single knuckle joint	Carbon steel (Ø 20 to Ø 32)	Nickel plating
		Cast iron (Ø 40 to Ø 100)	Zinc chromating
	Double knuckle joint	Carbon steel (Ø 20 to Ø 32)	Nickel plating
		Cast iron (Ø 40 to Ø 100)	Zinc chromating
	Rod end	Carbon steel	Zinc plating
	Knuckle pin	Carbon steel	—
	Clevis pin	Carbon steel	—
	Pivot bracket	Carbon steel (Ø 20 to Ø 63)	Nickel plating
		Cast iron (Ø 80, Ø 100)	Nickel plating
	Mounting bolt	Carbon steel	Nickel plating
	Retaining ring	Carbon tool steel	Phosphate coating

Theoretical Output

Unit: N

Bore size **D** [mm]	Rod size **d** [mm]	Operating direction	Piston area [mm^2]	Operating pressure [MPa]					
				0.2	0.3	0.4	0.5	0.6	0.7
20	**8**	OUT	314	62.8	94.2	125.6	157	188.4	219.8
		IN	264	52.8	79.2	105.6	132	158.4	184.8
25	**10**	OUT	491	98.2	147.3	196.4	245.5	294.6	343.7
		IN	412	82.4	123.6	164.8	206	247.2	288.4
32	**12**	OUT	804	160.8	241.2	321.6	402	482.4	562.8
		IN	691	138.2	207.3	276.4	345.5	414.6	483.7
40	**14**	OUT	1257	251.4	377.1	502.8	628.5	754.2	879.9
		IN	1103	220.6	330.9	441.2	551.5	661.8	772.1
50	**18**	OUT	1964	392.8	589.2	785.6	982	1178.4	1374.8
		IN	1709	341.8	512.7	683.6	854.5	1025.4	1196.3
63	**18**	OUT	3117	623.4	935.1	1246.8	1558.5	1870.2	2181.9
		IN	2863	572.6	858.9	1145.2	1431.5	1717.8	2004.1
80	**22**	OUT	5027	1005.4	1508.1	2010.8	2513.5	3016.2	3518.9
		IN	4646	929.2	1393.8	1858.4	2323	2787.6	3252.2
100	**26**	OUT	7854	1570.8	2356.2	3141.6	3927	4712.4	5497.8
		IN	7323	1464.6	2196.9	2929.2	3661.5	4393.8	5126.1

Weight

[kg]

Bore size [mm]		**20**	**25**	**32**	**40**	**50**	**63**	**80**	**100**
Basic weight	Basic	0.09	0.14	0.20	0.32	0.66	0.92	1.75	2.74
	Long male rod end (G)	0.10	0.15	0.21	0.34	0.70	0.97	1.84	2.85
	Female rod end (F)	0.08	0.12	0.19	0.29	0.60	0.85	1.61	2.53
Additional weight for bracket	Foot bracket	0.11	0.13	0.16	0.22	0.48	0.72	0.96	1.75
	Flange	0.08	0.10	0.14	0.20	0.34	0.50	0.71	1.35
	Clevis	0.05	0.08	0.15	0.23	0.40	0.68	0.71	1.28
Pivot bracket		0.08	0.09	0.17	0.25	0.44	0.80	0.98	1.75
Single knuckle joint		0.05	0.09	0.09	0.10	0.22	0.22	0.39	0.57
Double knuckle joint (with pin)		0.05	0.09	0.09	0.13	0.26	0.26	0.64	1.31
Additional weight per 50 mm of stroke		0.05	0.07	0.09	0.13	0.19	0.23	0.31	0.43
Additional weight for switch magnet		0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.04

Calculation: (Example) **CDG3FN20-100Z1** (Built-in magnet, Flange type, Ø 20, 100 mm stroke)

- Basic weight····· 0.09 (Basic type, Ø 20)
- Additional weight for bracket····· 0.08 (Flange)
- Additional weight for stroke····· 0.05/50 mm
- Air cylinder stroke····· 100 mm
- Additional weight for switch magnet···· 0.01

0.09 + 0.08 + 0.05 x (100/50) + 0.01 = 0.28 kg

Allowable Kinetic Energy

Table (1) Max. Allowable Kinetic Energy [J]

Bore size [mm]	20	25	32	40	50	63	80	100
Male rod end	0.2	0.29	0.46	0.84	1.4	2.38	4.13	6.93
Female rod end	0.11	0.18	0.29	0.52	0.91	1.54	2.71	4.54

Kinetic energy E [J] $= \dfrac{(m_1 + m_2)\, V^2}{2}$

m_1: Mass of cylinder movable parts kg
m_2: Load mass kg
V : Piston speed at the end m/s

Table (2) Mass of Cylinder Movable Parts: At Each Rod End/Without Built-in Magnet/0 Stroke [g]

Bore size [mm]	20	25	32	40	50	63	80	100
Basic	30	54	74	121	254	297	603	935
Long male rod end (G)	36	64	89	146	300	343	683	1047
Female rod end (F)	23	40	62	91	184	226	462	728

∗ Mass of the rod end nut is included for the basic type and the long male rod end type (G).

Table (3) Additional Mass [g]

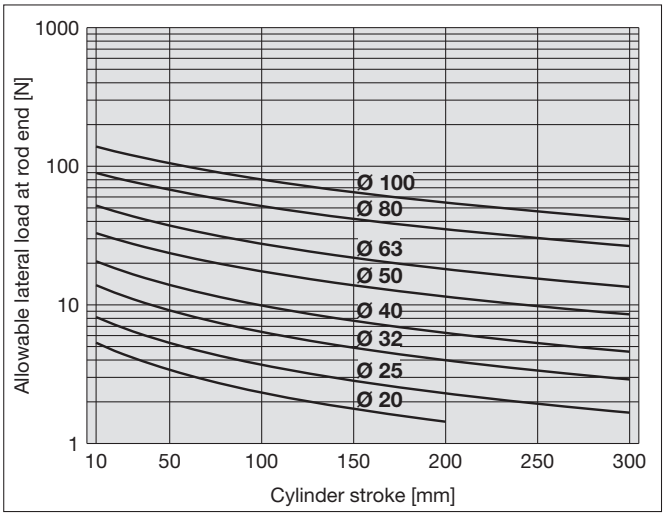
Bore size [mm]	20	25	32	40	50	63	80	100
Additional mass per 50 mm of stroke	20	31	44	61	99	99	148	207
Switch magnet	4	4	9	13	14	22	24	35

∗ Do not apply a lateral load over the allowable range to the rod end when it is mounted horizontally.

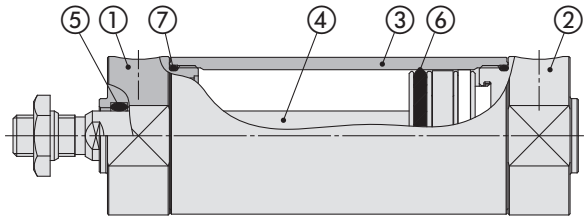
Calculation: (Example) **CDG3BN40-150Z1**
- Standard mass of movable parts: Table (2) Rod end [Basic], Bore size [40]····121 g
- Additional mass: Additional mass of stroke 61 x 150/50 = 183 g ·····183 g
  Switch magnet·····13 g

Total 317 g

Allowable Lateral Load at Rod End



Replacement Parts



Component Parts

No.	Description
1	**Rod cover**
2	**Head cover**
3	**Cylinder tube**
4	**Piston rod assembly**
5	**Rod seal**
6	**Piston seal**
7	**Tube gasket**

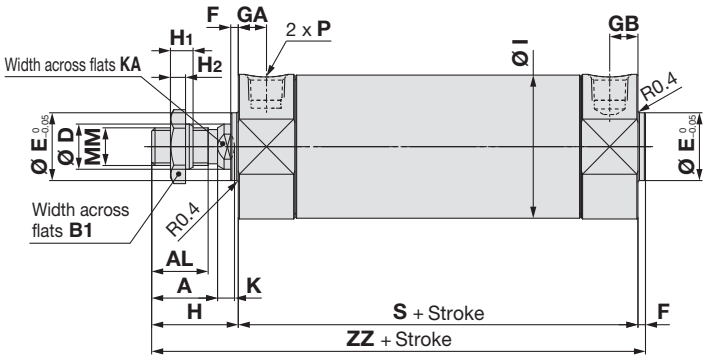
Replacement Parts: Seal Kit

Bore size [mm]	Kit no.	Contents
20	CG3N20-PS	Set of nos. ⑤, ⑥, ⑦
25	CG3N25-PS	
32	CG3N32-PS	
40	CG3N40-PS	

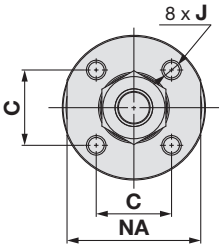
∗ As sizes Ø 50 and larger cannot be disassembled, the seal cannot be replaced.
∗ Refer to the following for disassembly/replacement. Order with the kit number according to the bore size.
∗ The seal kit includes a grease pack (10 g). Order with the following part number when only the grease pack is needed.
Grease pack part number: GR-S-010 (10 g)

Dimensions

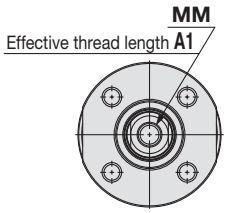
Basic: CG3BN Bore size – Stroke Z1



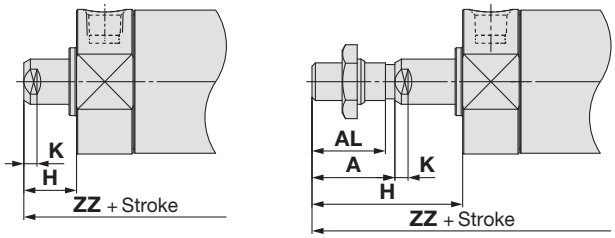
Male rod end



Female rod end



Long male rod end



Female Rod End

[mm]

Bore size [mm]	Standard stroke	A_1	H	MM	ZZ	K
20	Up to 200	8	13	M4 x 0.7	72	3.5
25	Up to 300	8	14	M5 x 0.8	76	3.5
32	Up to 300	12	14	M6 x 1	78	3.5
40	Up to 300	13	15	M8 x 1.25	79	3.5
50	Up to 300	18	16	M10 x 1.5	102	8
63	Up to 300	18	16	M10 x 1.5	102	8
80	Up to 300	21	19	M14 x 1.5	126	8
100	Up to 300	25	22	M16 x 1.5	130	8

Long Male Rod End*1

[mm]

Bore size [mm]	Standard stroke	A	AL	H	ZZ	K
20	Up to 200	18	15.5	35	94	3.5
25	Up to 300	22	19.5	40	102	3.5
32	Up to 300	22	19.5	40	104	3.5
40	Up to 300	30	27	50	114	3.5
50	Up to 300	35	32	58	144	8
63	Up to 300	35	32	58	144	8
80	Up to 300	40	37	71	178	8
100	Up to 300	40	37	71	179	8

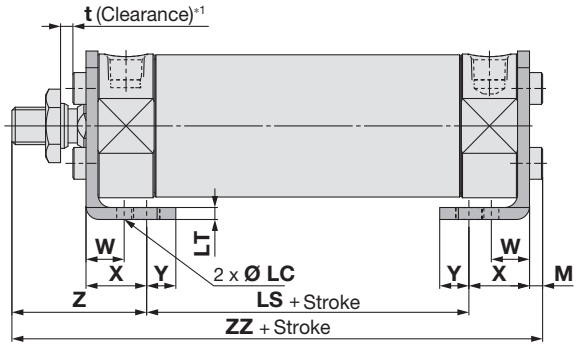
Basic

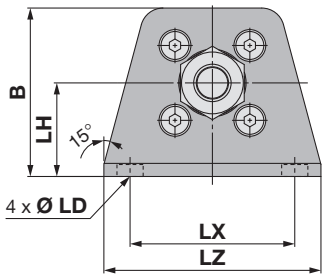
[mm]

Bore size [mm]	A	AL	B_1	C	D	E	F	GA	GB	H	H_1	H_2	I	J	K	KA	MM	NA	P	S	ZZ
20	14.5	12	13	14	8	12	2	7	6	20	5	4	26	M4 x 0.7 depth 7	3.5	6	M8 x 1.25	24	M5 x 0.8	57	79
25	17.5	15	17	16.5	10	14	2	9	7.5	23	6	4	31	M5 x 0.8 depth 7.5	3.5	8	M10 x 1.25	29	M5 x 0.8	60	85
32	17.5	15	17	20	12	18	2	7.5	7.5	23	6	4	38	M5 x 0.8 depth 8	3.5	10	M10 x 1.25	35.5	Rc1/8	62	87
40	23.5	20.5	19	26	14	25	2	7.5	7.5	29	8	5.5	47	M6 x 1 depth 10	3.5	12	M14 x 1.5	44	Rc1/8	62	93
50	29	26	27	32	18	30	2	12	12	35	11	8	58	M8 x 1.25 depth 16	4.5	16	M18 x 1.5	55	Rc1/4	84	121
63	29	26	27	38	18	32	2	12	12	35	11	8	72	M10 x 1.5 depth 16	4.5	16	M18 x 1.5	69	Rc1/4	84	121
80	35.5	32.5	32	50	22	40	3	17	12	44	13	9.5	89	M10 x 1.5 depth 22	4.5	19	M22 x 1.5	86	Rc1/4	104	151
100	35.5	32.5	41	60	26	50	3	15	15	44	16	9.5	110	M12 x 1.75 depth 22	4.5	22	M26 x 1.5	106	Rc3/8	105	152

*1 Long male rod end type (G) is the same rod end dimensions (A, AL, H) as the CG1 series.
* Use a thin wrench when tightening the piston rod.
* When a female thread is used, depending on the material of the workpiece, use a washer etc., to prevent the contact part at the rod end from being deformed.

Foot bracket: CG3LN Bore size – Stroke Z1





*1 The rod end nut should be mounted in the position t (clearance) so that it will have a clearance of 1 mm or more in order to prevent interference of the nut with the bolt for mounting bracket when the rod is retracted.

Foot Bracket

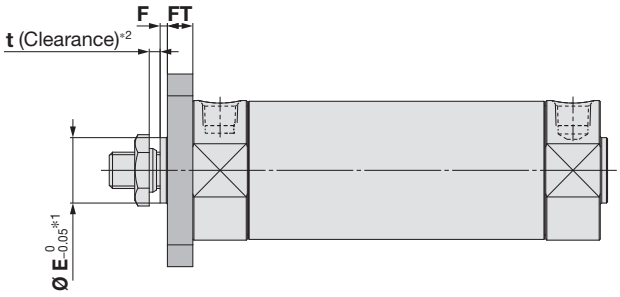
[mm]

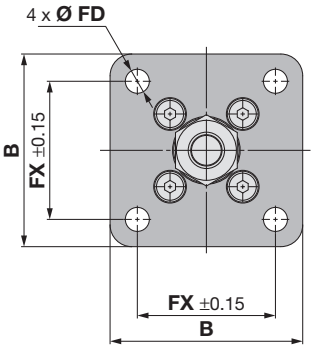
Symbol / Bore size	B	LC	LD	LH	LS	LT	LX	LZ	M	W	X	Y	Z	ZZ
20	34	4	6	20	33	(3)	32	44	3	10	15	7	32	83
25	38.5	4	6	22	36	(3)	36	49	3.5	10	15	7	35	89.5
32	45	4	7	25	36	(3)	44	58	3.5	10	16	8	36	91.5
40	54.5	4	7	30	35	(3)	54	71	4	10	16.5	8.5	42.5	98
50	70.5	5	10	40	49	(4.5)	66	86	5	17.5	22	11	52.5	128.5
63	82.5	5	12	45	49	(4.5)	82	106	5	17.5	22	13	52.5	128.5
80	101	6	11	55	56	(4.5)	100	125	5	20	28.5	14	68	157.5
100	121	6	14	65	57	(6)	120	150	7	20	30	16	68	162

* Use a thin wrench when tightening the piston rod.
* Refer to the dimensions of the basic type for the female rod end type, the long male rod end type, and for other dimensions not shown above.

Dimensions

Rod flange: CG3FN Bore size – Stroke Z1





*1 End boss is machined on the flange for Ø E.
*2 The rod end nut should be mounted in the position t (clearance) so that it will have a clearance of 1 mm or more in order to prevent interference of the nut with the bolt for mounting bracket when the rod is retracted.

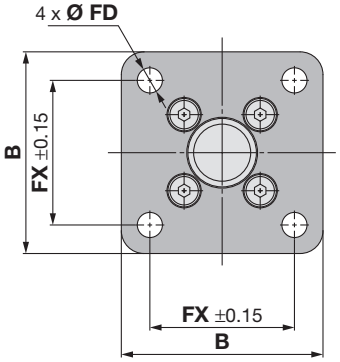
Rod Flange

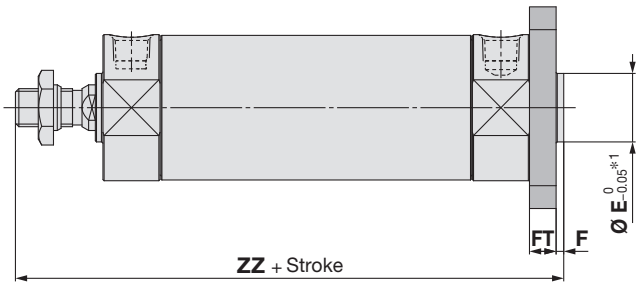
[mm]

Bore size \ Symbol	B	E	FX	FD	FT
20	40	12	28	5.5	6
25	44	14	32	5.5	7
32	53	18	38	6.6	7
40	61	25	46	6.6	8
50	76	30	58	9	9
63	92	32	70	11	9
80	104	40	82	11	11
100	128	50	100	14	14

* Use a thin wrench when tightening the piston rod.
* Refer to the dimensions of the basic type for the female rod end type, the long male rod end type, and for other dimensions not shown above.

Head flange: CG3GN Bore size – Stroke Z1





*1 End boss is machined on the flange for Ø E.

Head Flange

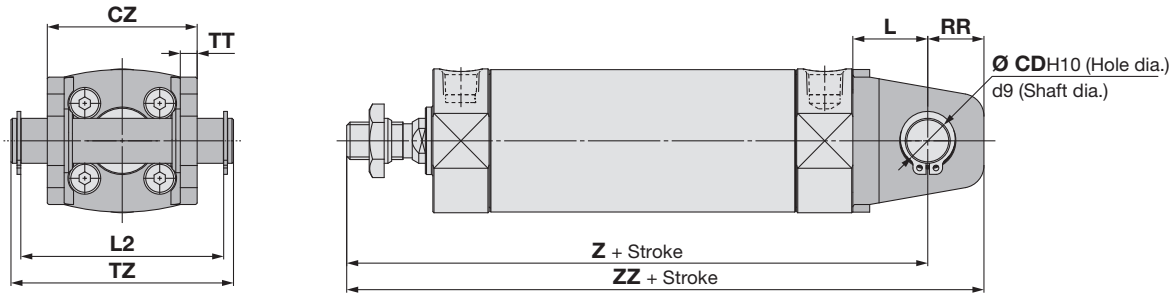
[mm]

Bore size [mm]	B	E	F	FX	FD	FT	ZZ
20	40	12	2	28	5.5	6	85
25	44	14	2	32	5.5	7	92
32	53	18	2	38	6.6	7	94
40	61	25	2	46	6.6	8	101
50	76	30	2	58	9	9	130
63	92	32	2	70	11	9	130
80	104	40	3	82	11	11	162
100	128	50	3	100	14	14	166

* Use a thin wrench when tightening the piston rod.
* Refer to the dimensions of the basic type for the female rod end type, the long male rod end type, and for other dimensions not shown above.

Dimensions

Clevis: CG3DN Bore size – Stroke Z1 (Ø 20 to Ø 63)



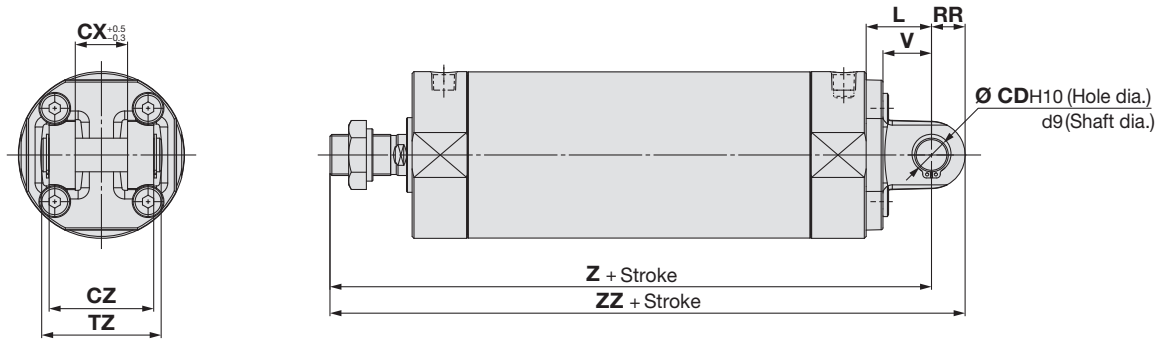
Clevis (Ø 20 to Ø 63)

[mm]

Bore size [mm]	CD	CZ	L	RR	TT	TZ	Z	ZZ	Applicable pin part no.
20	8	(29)	14	11	3.2	43.4	91	112	CD-G02
25	10	(33)	16	13	3.2	48	99	120	CD-G25
32	12	(40)	20	15	4.5	59.4	105	129	CD-G03
40	14	(49)	22	18	4.5	71.4	113	141	CD-G04
50	16	(60)	25	20	6	86	144	176	CD-G05
63	18	(74)	30	22	8	105.4	149	186	CD-G06

∗ Use a thin wrench when tightening the piston rod.
∗ Refer to the dimensions of the basic type for the female rod end type, the long male rod end type, and for other dimensions not shown above.
∗ Refer to page 8 for the pivot bracket.

Clevis: CG3DN Bore size – Stroke Z1 (Ø 80, Ø 100)



Clevis (Ø 80, Ø 100)

[mm]

Bore size [mm]	CD	CX	CZ	L	RR	TZ	V	Z	ZZ	Applicable pin part no.
80	18	28	56	35	18	64	26	183	241.5	IY-G08
100	22	32	64	43	22	72	32	192	268.5	IY-G10

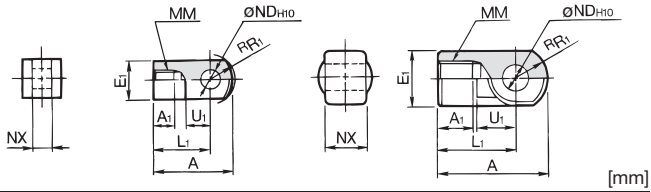
∗ Use a thin wrench when tightening the piston rod.
∗ Refer to the dimensions of the basic type for the female rod end type, the long male rod end type, and for other dimensions not shown above.
∗ Refer to page 8 for the pivot bracket.

Dimensions of Accessories

Single Knuckle Joint

I-G02, I-G03
Material: Carbon steel

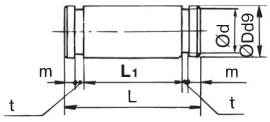
I-G04, I-G05, I-G08, I-G10
Material: Cast iron



[mm]

Part no.	Applicable bore size [mm]	A	A_1	E_1	L_1	MM	R_1	U_1	ND_{H10}	NX
I-G02	20	34	8.5	□16	25	M8 x 1.25	10.3	11.5	$8^{+0.058}_{0}$	$8^{-0.2}_{-0.4}$
I-G03	25, 32	41	10.5	□20	30	M10 x 1.25	12.8	14	$10^{+0.058}_{0}$	$10^{-0.2}_{-0.4}$
I-G04	40	42	14	Ø 22	30	M14 x 1.5	12	14	$10^{+0.058}_{0}$	$18^{-0.3}_{-0.5}$
I-G05	50, 63	56	18	Ø 28	40	M18 x 1.5	16	20	$14^{+0.070}_{0}$	$22^{-0.3}_{-0.5}$
I-G08	80	71	21	Ø 38	50	M22 x 1.5	21	27	$18^{+0.070}_{0}$	$28^{-0.3}_{-0.5}$
I-G10	100	79	21	Ø 44	55	M26 x 1.5	24	31	$22^{+0.084}_{0}$	$32^{-0.3}_{-0.5}$

Knuckle Pin



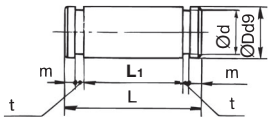
Material: Carbon steel

[mm]

Part no.	Applicable bore size [mm]	Dd9	L	d	L_1	m	t	Included retaining ring
IY-G02	20	$8^{-0.040}_{-0.076}$	21	7.6	16.2	1.5	0.9	Type C8 for axis
IY-G03	25, 32	$10^{-0.040}_{-0.076}$	25.6	9.6	20.2	1.55	1.15	Type C10 for axis
IY-G04	40	$10^{-0.040}_{-0.076}$	41.6	9.6	36.2	1.55	1.15	Type C10 for axis
IY-G05	50, 63	$14^{-0.050}_{-0.093}$	50.6	13.4	44.2	2.05	1.15	Type C14 for axis
IY-G08	80	$18^{-0.050}_{-0.093}$	64	17	56.2	2.55	1.35	Type C18 for axis
IY-G10	100	$22^{-0.065}_{-0.117}$	72	21	64.2	2.55	1.35	Type C22 for axis

∗ Retaining rings are included.

Clevis Pin



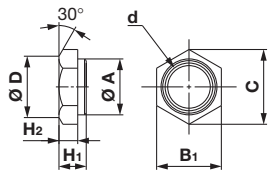
Material: Carbon steel

[mm]

Part no.	Applicable bore size [mm]	Dd9	L	d	L_1	m	t	Included retaining ring
CD-G02	20	$8^{-0.040}_{-0.076}$	43.4	7.6	38.6	1.5	0.9	Type C8 for axis
CD-G25	25	$10^{-0.040}_{-0.076}$	48	9.6	42.6	1.55	1.15	Type C10 for axis
CD-G03	32	$12^{-0.050}_{-0.093}$	59.4	11.5	54	1.55	1.15	Type C12 for axis
CD-G04	40	$14^{-0.050}_{-0.093}$	71.4	13.4	65	2.05	1.15	Type C14 for axis
CD-G05	50	$16^{-0.050}_{-0.093}$	86	15.2	79.6	2.05	1.15	Type C16 for axis
CD-G06	63	$18^{-0.050}_{-0.093}$	105.4	17	97.8	2.45	1.35	Type C18 for axis

∗ Retaining rings are included.
∗ A clevis pin and a knuckle pin are common for the bore size Ø 80 and Ø 100.

Rod End Nut (For Male Thread)



Material: Carbon steel

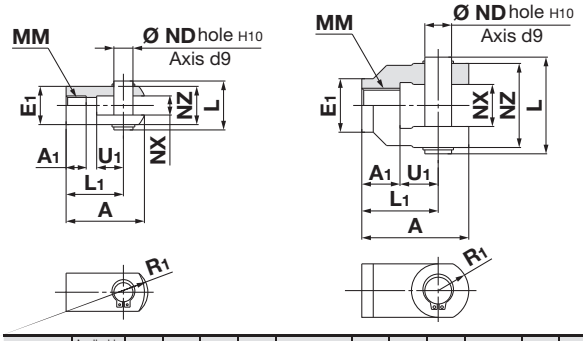
[mm]

Part no.	Applicable bore size [mm]	d	H_1	H_2	B_1	C	Ø D	Ø A
NT-02G3	20	M8 x 1.25	5	4	13	(15)	12.5	10
NT-03G3	25, 32	M10 x 1.25	6	4	17	(19.6)	16.5	12
NT-04G3	40	M14 x 1.5	8	5.5	19	(21.9)	18	16.4
NT-05G3	50, 63	M18 x 1.5	11	8	27	(31.2)	26	20.4
NT-08G3	80	M22 x 1.5	13	9.5	32	(37)	31	28
NT-10G3	100	M26 x 1.5	16	9.5	41	(47.3)	39	33

Double Knuckle Joint

Y-G02, Y-G03
Material: Carbon steel

Y-G04, Y-G05, Y-G08, Y-G10
Material: Cast iron



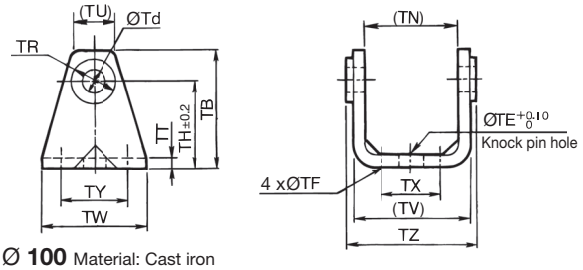
[mm]

Part no.	Applicable bore size [mm]	A	A_1	E_1	L_1	MM	R_1	U_1	ND	NX	NZ	L	Included pin part no.
Y-G02	20	34	8.5	□16	25	M8 x 1.25	10.3	11.5	8	$8^{+0.4}_{+0.2}$	16	21	IY-G02
Y-G03	25, 32	41	10.5	□20	30	M10 x 1.25	12.8	14	10	$10^{+0.4}_{+0.2}$	20	25.6	IY-G03
Y-G04	40	42	16	Ø 22	30	M14 x 1.5	12	14	10	$18^{+0.5}_{+0.3}$	36	41.6	IY-G04
Y-G05	50, 63	56	20	Ø 28	40	M18 x 1.5	16	20	14	$22^{+0.5}_{+0.3}$	44	50.6	IY-G05
Y-G08	80	71	23	Ø 38	50	M22 x 1.5	21	27	18	$28^{+0.5}_{+0.3}$	56	64	IY-G08
Y-G10	100	79	24	Ø 44	55	M26 x 1.5	24	31	22	$32^{+0.5}_{+0.3}$	64	72	IY-G10

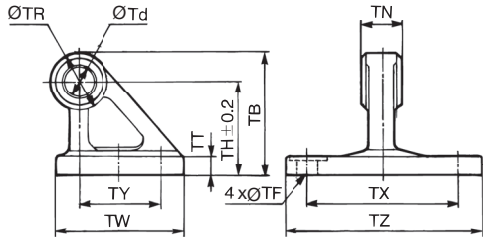
∗ A knuckle pin and retaining rings are included.

Pivot Bracket (Order separately)

Ø 20 to Ø 63 Material: Carbon steel



Ø 80, Ø 100 Material: Cast iron

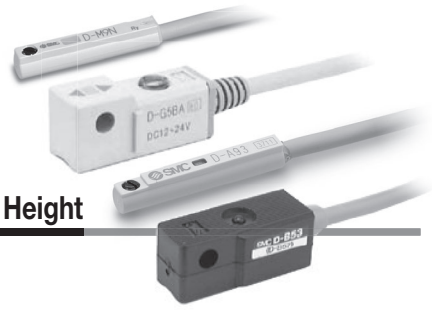


[mm]

Part no.	Applicable bore size [mm]	TB	Td	TE	TF	TH	TN	TR	TT
CG-020-24A	20	36	8	10	5.5	25	(29.3)	13	3.2
CG-025-24A	25	43	10	10	5.5	30	(33.1)	15	3.2
CG-032-24A	32	50	12	10	6.6	35	(40.4)	17	4.5
CG-040-24A	40	58	14	10	6.6	40	(49.2)	21	4.5
CG-050-24A	50	70	16	20	9	50	(60.4)	24	6
CG-063-24A	63	82	18	20	11	60	(74.6)	26	8
CG-080-24A	80	73	18	—	11	55	$28^{-0.1}_{-0.3}$	36	11
CG-100-24A	100	90	22	—	13.5	65	$32^{-0.1}_{-0.3}$	50	12

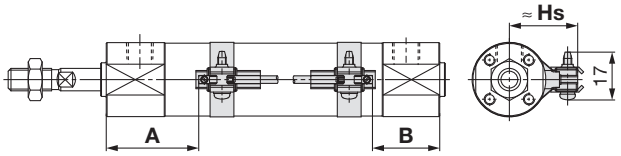
Part no.	Applicable bore size [mm]	TU	TV	TW	TX	TY	TZ	Applicable pin O.D
CG-020-24A	20	(18.1)	(35.8)	42	16	28	38.3	$8d_9^{-0.040}_{-0.076}$
CG-025-24A	25	(20.7)	(39.8)	42	20	28	42.1	$10d_9^{-0.040}_{-0.076}$
CG-032-24A	32	(23.6)	(49.4)	48	22	28	53.8	$12d_9^{-0.050}_{-0.093}$
CG-040-24A	40	(27.3)	(58.4)	56	30	30	64.6	$14d_9^{-0.050}_{-0.093}$
CG-050-24A	50	(29.7)	(72.4)	64	36	36	79.2	$16d_9^{-0.050}_{-0.093}$
CG-063-24A	63	(34.3)	(90.4)	74	46	46	97.2	$18d_9^{-0.050}_{-0.093}$
CG-080-24A	80	—	—	72	85	45	110	$18d_9^{-0.050}_{-0.093}$
CG-100-24A	100	—	—	93	100	60	130	$22d_9^{-0.065}_{-0.117}$

Auto Switch Mounting



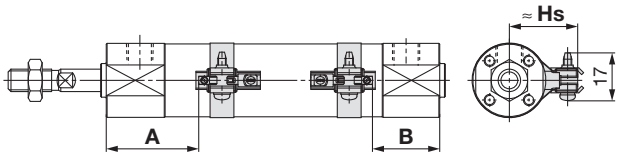
Auto Switch Proper Mounting Position (Detection at stroke end) and Mounting Height

Solid state auto switch
D-M9□, M9□W, M9□A
∅ 20 to ∅ 63



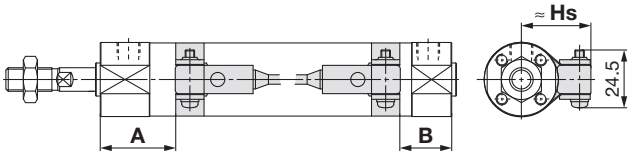
A and B are the dimensions from the end of the head cover/rod cover to the end of the auto switch.

D-M9□V, M9□WV, M9□AV
∅ 20 to ∅ 63

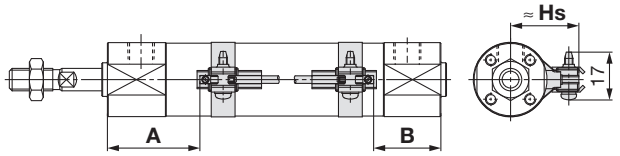


A and B are the dimensions from the end of the head cover/rod cover to the end of the auto switch.

D-G5□, G5□W, K59, K59W
D-G59F, G5BA, G5NT
∅ 20 to ∅ 100

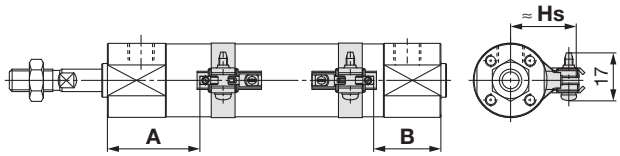


Reed auto switch
D-A9□
∅ 20 to ∅ 63



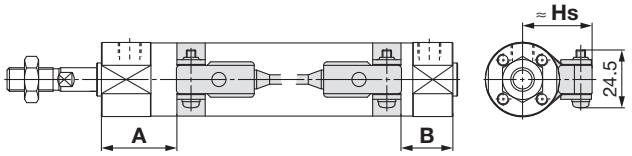
A and B are the dimensions from the end of the head cover/rod cover to the end of the auto switch.

D-A9□V
∅ 20 to ∅ 63



A and B are the dimensions from the end of the head cover/rod cover to the end of the auto switch.

D-B5□, B64, B59W
∅ 20 to ∅ 100



Auto Switch Mounting Position (From the end of the cover) [mm]

Bore size	D-M9□(V) D-M9□W(V) D-M9□A(V)		D-A9□(V)		D-G5□ D-G5□W D-K59 D-K59W D-G59F D-G5BA D-G5NT		D-B5□ D-B64		D-B59W	
	A	B	A	B	A	B	A	B	A	B
20	23.5	21.5	19.5	17.5	15.5	13.5	14	13	17	15
25	24.5	23.5	20.5	19.5	16.5	15.5	15	15	18	17
32	25	25	21	21	17	17	15.5	15.5	18.5	18.5
40	25	25	21	21	17	17	15.5	15.5	18.5	18
50	36.5	35.5	32.5	31.5	28.5	27.5	27	26	30	29
63	36.5	35.5	32.5	31.5	28.5	27.5	27	26	30	29
80	—	—	—	—	39	37	37.5	35.5	40.5	38.5
100	—	—	—	—	39.5	37.5	38	36	41	39

Auto Switch Mounting Height [mm]

Auto switch model / Bore size	D-M9□(V) D-M9□W(V) D-M9□A(V) D-A9□(V)	D-G5□ D-G5□W D-K59 D-K59W D-G59F D-G5BA D-G5NT D-B5□ D-B64 D-B59W
	Hs	Hs
20	26.5	27.5
25	29	30
32	32.5	33.5
40	37	38
50	42.5	43.5
63	49.5	50.5
80	—	59
100	—	69.5

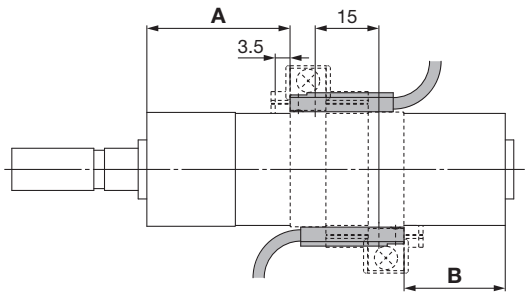
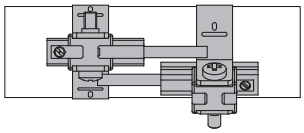
Minimum Stroke for Auto Switch Mounting

n: Number of auto switches [mm]

Auto switch model	Number of auto switches				
	With 1 pc.	With 2 pcs.		With n pcs.	
		Different surfaces	Same surface	Different surfaces	Same surface
D-M9□	5	15*1	40*1	$20 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6⋯)*3	55 + 35 (n – 2) (n = 2, 3, 4, 5⋯)
D-M9□W	10	15*1	40*1	$20 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6⋯)*3	55 + 35 (n – 2) (n = 2, 3, 4, 5⋯)
D-M9□A	10	25	40*1	$25 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6⋯)*3	60 + 35 (n – 2) (n = 2, 3, 4, 5⋯)
D-A9□	5	15	30*1	$15 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6⋯)*3	50 + 35 (n – 2) (n = 2, 3, 4, 5⋯)
D-M9□V	5	20	35	$20 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6⋯)*3	35 + 35 (n – 2) (n = 2, 3, 4, 5⋯)
D-A9□V	5	15	25	$15 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6⋯)*3	25 + 35 (n – 2) (n = 2, 3, 4, 5⋯)
D-M9□WV **D-M9□AV**	10	20	35	$20 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6⋯)*3	35 + 35 (n – 2) (n = 2, 3, 4, 5⋯)
D-G5□ **D-G5□W** **D-K59** **D-K59W** **D-G59F** **D-G5BA** **D-G5NT** **D-B5□** **D-B64**	5	20	75	$20 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6⋯)*3	75 + 55 (n – 2) (n = 2, 3, 4, 5⋯)
D-B59W	10	20	70	$20 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6⋯)*3	70 + 50 (n – 2) (n = 2, 3, 4, 5⋯)

*3 When “n” is an odd number, an even number that is one larger than the odd number is to be used for the calculation.

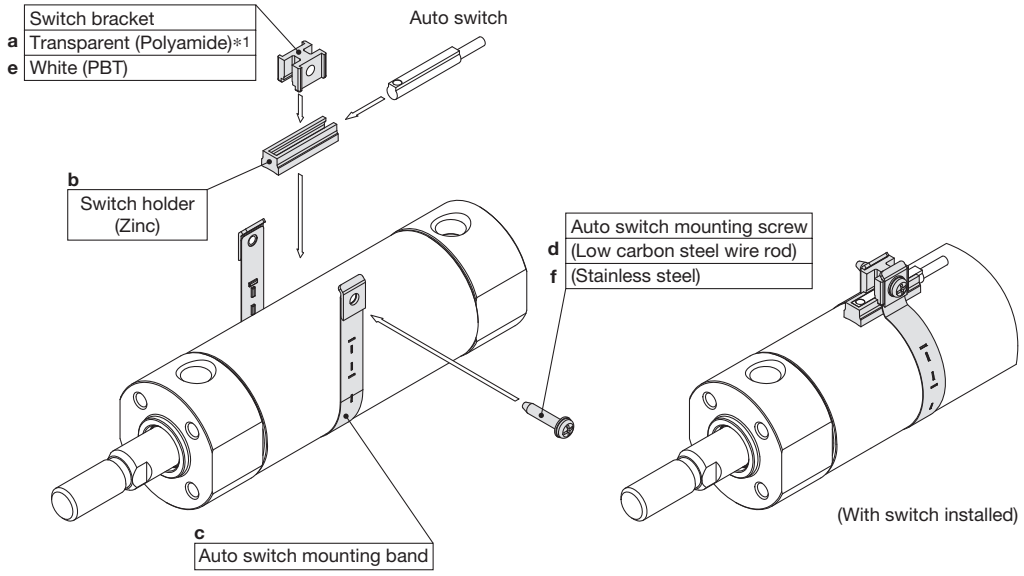
*1 Auto switch mounting

Auto switch model	With 2 auto switches	
	Different surfaces	Same surface
	 Correct auto switch mounting position is 3.5 mm from the back face of the switch holder.	 The auto switch is mounted by slightly displacing it in a direction (cylinder tube circumferential exterior) so that the auto switch and lead wire do not interfere with each other.
D-M9□ **D-M9□W**	Less than 20 mm stroke*2	Less than 55 mm stroke*2
D-M9□A	Less than 20 mm stroke*2	Less than 60 mm stroke*2
D-A9□	—	Less than 50 mm stroke*2

*2 Minimum stroke for auto switch mounting in types other than those mentioned in *1

Auto Switch Mounting Brackets/Part Nos.

Auto switch model	Bore size [mm]					
	20	25	32	40	50	63
D-M9□(V) **D-M9□W(V)** **D-A9□(V)**	∗1 BMA3-020 (A set of a, b, c, d)	∗1 BMA3-025 (A set of a, b, c, d)	∗1 BMA3-032 (A set of a, b, c, d)	∗1 BMA3-040 (A set of a, b, c, d)	∗1 BMA3-050 (A set of a, b, c, d)	∗1 BMA3-063 (A set of a, b, c, d)
D-M9□A(V)∗2	BMA3-020S (A set of b, c, e, f)	BMA3-025S (A set of b, c, e, f)	BMA3-032S (A set of b, c, e, f)	BMA3-040S (A set of b, c, e, f)	BMA3-050S (A set of b, c, e, f)	BMA3-063S (A set of b, c, e, f)



∗ Band (c) is mounted so that the projected part is on the internal side (contact side with the tube).

∗1 Since the switch bracket (made of polyamide) is affected in an environment where chemicals are splashed over, so it cannot be used. (Especially alcohol, chloroform, methylamine, hydrochloric acid, sulfuric acid, etc.)

∗2 When mounting a D-M9□A(V) type auto switch, if the switch bracket is mounted on the indicator light, it may damage the auto switch. Therefore, be sure to avoid mounting the switch bracket on the indicator light.

Band Mounting Brackets Set Part Nos.

Set part no.	Contents
BJ4-1	· Switch bracket (White/PBT) (e) · Switch holder (b)
BJ5-1	· Switch bracket (Transparent/Polyamide) (a) · Switch holder (b)

Operating Range

[mm]

Auto switch model	Bore size							
	20	25	32	40	50	63	80	100
D-M9□(V) **D-M9□W(V)** **D-M9□A(V)**	4.5	5.0	4.5	5.5	5.0	5.5	—	—
D-A9□(V)	7	6	8	8	8	9	—	—
D-G5□/G5□W/K59 **D-K59W/G59F** **D-G5BA/G5NT**	4	4	4.5	5	6	6.5	6.5	7
D-B5□/B64	8	10	9	10	10	11	11	11
D-B59W	13	13	14	14	14	17	16	18

∗ Values which include hysteresis are for reference purposes only. They are not a guarantee (assuming approx. ±30 % dispersion) and may change substantially depending on the ambient environment.

Cylinder Mounting Bracket, by Stroke/Auto Switch Mounting Surfaces

st: Stroke [mm]

Auto switch model	Basic, Foot bracket, Flange, Clevis		
	With 1 pc. (Rod cover side)	With 2 pcs. (Different surfaces)	With 2 pcs. (Same surface)
Switch mounting surface / Switch model	Port surface 	Port surface 	Port surface 
D-M9□(V) **D-M9□W(V)** **D-M9□A(V)** **D-A9□(V)**	10 st or more	15 to 44 st	45 st or more
D-G5□/G5□W/K59 **D-K59W/G59F** **D-G5BA/G5NT** **D-B5□/B64**	10 st or more	15 to 74 st	75 st or more
D-B59W	15 st or more	20 to 74 st	75 st or more

CG3 Series
D-H7, D-C7/C8
Auto Switch Mounting

Other than the applicable auto switches listed in "How to Order," the following auto switches are also mountable.
Refer to the **Web Catalogue** for detailed specifications.

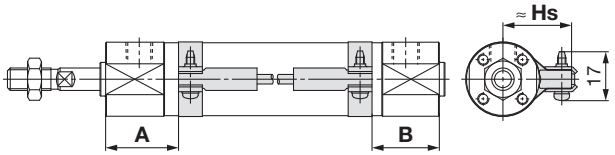
Type	Model	Electrical entry	Features	Applicable bore size
Solid state	D-H7A1, H7A2, H7B	Grommet (In-line)	—	Ø 20 to Ø 63
	D-H7NW, H7PW, H7BW		Diagnostic indication (2-colour indicator)	
	D-H7NF		With diagnostic output (2-colour indicator)	
	D-H7BA		Water resistant (2-colour indicator)	
	D-G5NT		With timer	Ø 20 to Ø 100
Reed	D-C73, C76, B53	Grommet (In-line)	—	Ø 20 to Ø 63
	D-C80		Without indicator light	
	D-B59W		Diagnostic indication (2-colour indicator)	Ø 20 to Ø 100

∗ With pre-wired connector is also available for solid state auto switches. For details, refer to the **Web Catalogue**.
∗ Normally closed (NC = b contact) solid state auto switches (D-M9□E(V)) are also available. For details, refer to the **Web Catalogue**.

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

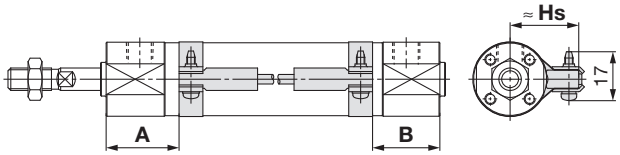
Solid state auto switch

D-H7□, H7□W
D-H7NF, H7BA
Ø 20 to Ø 63



Reed auto switch

D-C7□, C80
Ø 20 to Ø 63



Auto Switch Mounting Position (From the end of the cover) [mm]

Bore size	D-H7□ D-H7□W D-H7NF D-H7BA		D-C7□ D-C80	
	A	B	A	B
20	19	17	20	18
25	20	19	21	20
32	20.5	20.5	21.5	21.5
40	20.5	20.5	21.5	21.5
50	32	31	33	32
63	32	31	33	32

Auto Switch Mounting Height [mm]

Auto switch model / Bore size	D-H7□ D-H7□W D-H7NF D-H7BA D-C7□ D-C80
	Hs
20	26.5
25	29
32	32.5
40	37
50	42.5
63	49.5

Minimum Stroke for Auto Switch Mounting

n: Number of auto switches [mm]

Auto switch model	Number of auto switches				
	With 1 pc.	With 2 pcs.		With n pcs.	
		Different surfaces	Same surface	Different surfaces	Same surface
D-H7□ **D-H7□W** **D-H7NF** **D-H7BA**	10	25	70	$25 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6⋯)∗1	70 + 45 (n – 2) (n = 2, 3, 4, 5⋯)
D-C7□ **D-C80**	5	20	60	$20 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6⋯)∗1	60 + 45 (n – 2) (n = 2, 3, 4, 5⋯)

∗1 When “n” is an odd number, an even number that is one larger than the odd number is to be used for the calculation.

Operating Range

[mm]

Auto switch model	Bore size					
	20	**25**	**32**	**40**	**50**	**63**
D-H7□/H7□W **D-H7NF/H7BA**	4	4	4.5	5	6	6.5
D-C7□/C80	8	10	9	10	10	11

∗ Values which include hysteresis are for reference purposes only. They are not a guarantee (assuming approx. ±30 % dispersion) and may change substantially depending on the ambient environment.

Cylinder Mounting Bracket, by Stroke/Auto Switch Mounting Surfaces

st: Stroke [mm]

Auto switch model	Basic, Foot bracket, Flange, Clevis		
	With 1 pc. (Rod cover side)	With 2 pcs. (Different surfaces)	With 2 pcs. (Same surface)
Switch mounting surface / Switch model	Port surface 	Port surface 	Port surface 
D-H7□/H7□W **D-H7NF/H7BA**	10 st or more	15 to 59 st	60 st or more
D-C7□/C80	10 st or more	15 to 49 st	50 st or more

CG3 Series
Specific Product Precautions

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For actuator and auto switch precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smc.eu

Handling

⚠Warning

1. **The allowable kinetic energy is different between the cylinders with male rod end and with female rod end due to the different thread sizes. Refer to page 4.**
2. **When the cylinder is used as mounted with a single side fixed or free (basic type, flange type), be careful not to apply vibration or impact to the cylinder body. A bending moment will be applied to the cylinder due to the vibration generated at the stroke end, and the cylinder may be damaged. In such a case, mount a bracket to reduce the vibration of the cylinder or use the cylinder at a piston speed low enough to prevent the cylinder from vibrating at the stroke end. Furthermore, when the cylinder is moved or mounted horizontally and with a single side fixed, use a bracket to fix the cylinder.**
3. **When female rod end is used, use a washer, etc., to prevent the contact part at the rod end from being deformed depending on the material of the workpiece.**

⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC) [1], and other safety regulations.

⚠ **Danger:**	**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
⚠ **Warning:**	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠ **Caution:**	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

1) ISO 4414: Pneumatic fluid power – General rules and safety requirements for systems and their components.
ISO 4413: Hydraulic fluid power – General rules and safety requirements for systems and their components.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.
etc.

⚠ Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.
The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.
1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Our products cannot be used beyond their specifications.
Our products are not developed, designed, and manufactured to be used under the following conditions or environments.
Use under such conditions or environments is not covered.
1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogues and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

⚠ Caution

We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing industries.
Use in non-manufacturing industries is not covered.
Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.
The new Measurement Act prohibits use of any unit other than SI units in Japan.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first. [2] Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

2) Vacuum pads are excluded from this 1 year warranty.
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

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