

Air Cylinder

Series CG1

ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

Series Variations

Series	Action	Rod	Cushion	Basic	Standard variations					Bore size (mm)	Page
					Built-in One-touch fittings	With rod boot	Air-hydro type	Clean series	Copper/Fluorine-free		
Standard Series CG1  Substantially shorter length: ø20 to ø40... -15 to -30 mm (in comparison with Series CM2) ø40 to ø63... -17 to -28 mm (in comparison with Series CA2) ø80, ø100... -9 to -33 mm (in comparison with Series CA2)	Double acting	Single rod	Rubber	●	●	●	●	●	20 to 100	222	
			Air	●	●	●	●	●		238	
	Double rod	Rubber	●	●	●	●	●	20 to 40	245		
		Air	●	●	●	●	●				
Non-rotating Rod Series CG1K 	Double acting	Single rod	Rubber	●				●	20 to 63	250	
			Air	●					40 to 63		
	Double rod	Rubber	●					20 to 63	255		
Direct Mount Series CG1R 	Double acting	Single rod	Rubber	●			●	●	20 to 63	259	
			Air	●				●			
Direct Mount, Non-rotating Rod Series CG1KR 	Double acting	Single rod	Rubber	●					20 to 63	264	
Low Friction Series CG1□Q 				Use the new series “Smooth Cylinder Series CG1Y” to realize both-direction low friction and low-speed operation. (Refer to Best Pneumatics No. 3.)							267
With End Lock Series CBG1 	Double acting	Single rod	Rubber	●		●			20 to 100	268	
			Air	●		●					

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual
-X□

Technical
data

Combinations of Standard Products and Made to Order Specifications

Series CG1

Series CG1

- :Standard
- ⊙ :Made to Order specifications
- :Special product (Contact SMC for details.)
- :Not available

Use the new series “Smooth Cylinder Series CG1Y” to realize both-direction low friction and low-speed operation. (Refer to Best Pneumatics No. 3.)

Series	Action/type	Cushion	CG1 (Standard)						CG1K (Non-rotating rod)				CG1R (Direct mount)		CG1KR (Non-rotating rod, direct mount)	CG1□Q (Low friction)	CBG1 (End lock)	
			Double acting				Single acting		Double acting			Single acting	Double acting		Double acting	Double acting	Double acting	
			Single rod		Double rod		Single rod		Single rod		Double rod	Single rod	Single rod		Single rod	Single rod	Single rod	
			Rubber	Air	Rubber	Air	Rubber		Rubber	Air	Rubber	Rubber	Rubber	Air	Rubber	—	Rubber	Air
Symbol	Specification Applicable	Bore size	ø20 to ø100				ø20 to ø40		ø20 to ø63	ø40 to ø63	ø20 to ø63	ø20 to ø40	ø20 to ø63		ø20 to ø63	ø20 to ø100		
Standard	Standard	ø20 to ø100	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●
Long st	Long stroke		●	●	●	●	○		●	●	●	○	○	○	○	●	●	●
D	Built-in magnet		●	●	●	●	●		●	●	●	●	●	●	●	●	●	●
CG1□F	One-touch fittings	ø20 to ø63	●	○	○	○	○		○	○	○	○	○	○	○	○	○	○
CG1□-□ $\frac{J}{K}$	With rod boot	ø20 to ø100	●	●	●	●	○		○	○	○	○	○	○	○	○	●	●
CG1□H	Air-hydro type	ø20 to ø63	●	—	●	—	—		—	—	—	—	○	—	—	—	—	—
10-, 11-	Clean series	ø20 to ø100	●	● ^{Note 1)}	●	● ^{Note 1)}	○		○	○		○	●	○	—	—	○	○
20-	Copper and Fluorine-free		●	●	●	●	○		●	○	●	○	●	●	●	—	○	○
CG1□ $\frac{R}{V}$	Water resistant	ø32 to ø100	●	●	●	●	○		—	—	—	—	○	○	—	—	○	○
XB6	Heat-resistant cylinder (−10 to 150°C) ^{Note 7)}	ø20 to ø100	⊙ ^{Note 2)}	⊙	⊙ ^{Note 2)}	⊙	○		○	○	○	○	⊙ ^{Note 2)}	⊙	○	—	○	○
XB7	Cold-resistant cylinder ^{Note 7)}		⊙ ^{Note 2)}	○	⊙ ^{Note 2)} ⊙ ^{Note 5)}	○	○		○	○	○	○	⊙ ^{Note 2)}	○	○	—	—	—
XB9	Low-speed cylinder (5 to 50 mm/s)		⊙	○	○	○	—		—	—	—	—	⊙	○	○	—	○	○
XB13	Low-speed cylinder (5 to 50 mm/s)		⊙	○	○	○	—		—	—	—	—	⊙	○	○	—	—	—
XC4	With heavy duty scraper	ø32 to ø63	⊙	⊙	○	○	○		—	—	—	—	○	○	—	—	○	○
XC6	Stainless steel rod and rod end nut	ø20 to ø100	⊙	⊙	⊙	⊙	⊙		—	—	—	—	⊙	⊙	—	⊙	○	○
XC8	Adjustable stroke cylinder/Adjustable retraction type	ø20 to ø63	⊙	⊙	—	—	○		⊙	○	—	○	⊙	○	⊙	○	○ ^{Note 9)}	○ ^{Note 9)}
XC9	Adjustable stroke cylinder/Adjustable extension type		⊙	⊙	—	—	○		⊙	○	—	○	⊙	○	⊙	○	○ ^{Note 10)}	○ ^{Note 10)}
XC10	Dual stroke cylinder/Double rod type		⊙	⊙	—	—	○		⊙	○	—	○	○	○	○	○	○	○
XC11	Dual stroke cylinder/Single rod type		⊙	⊙	—	—	○		⊙	○	—	○	○	○	○	○	○	○
XC12	Tandem type cylinder		⊙	○	○	○	○		⊙	○	○	○	○	○	○	—	○	○
XC13	Auto switch rail mounting	ø20 to ø100	⊙	⊙	⊙ ^{Note 5)}	⊙ ^{Note 5)}	○		⊙	○	○	○	⊙	○	○	○	⊙	⊙
XC20	Head cover axial port	ø20 to ø63	⊙	○	—	—	⊙		⊙	○	—	○	⊙	○	⊙	○	○	○
XC22	Fluororubber seal	ø20 to ø100	⊙	⊙	⊙	⊙	⊙		○	○	○	○	⊙	⊙	○	—	○	○
XC27	Stainless steel double clevis pin/double knuckle pin		⊙	⊙	○	○	○		○	○	○	○	○	○	○	○	○	○
XC29	Double knuckle joint with spring pin		⊙	⊙	○	○	○		○	○	○	○	○	○	○	○	○	○
XC35	With coil scraper	ø20 to ø63	⊙	⊙	○	○	○		—	—	—	—	○	○	—	—	○	○
XC37	Larger throttle diameter of connecting port		⊙	⊙	⊙	⊙	⊙		○	○	○	○	○	○	○	○	○	○
XC42	Built-in rear shock absorber		⊙	⊙	—	—			⊙	○	—	○	○	○	○	—	○	○
XC70	End lock cylinder for MGG ^{Note 8)}	ø20 to ø100	—	—	—	—	—		—	—	—	—	—	—	—	—	⊙	○

Note 1) ø40 to ø63 only.
Note 2) Without bumper
Note 3) ø32 to ø100 only.
Note 4) SV type only. (Heat-resistant grease is used.)
Note 5) ø20 to ø63 only.
Note 6) Single acting/spring return type (S) only
Note 7) The products with an auto switch are not compatible.
Note 8) Since this is used for a guide, a cover port and an end lock will be on the same side.
Note 9) Available only for locking at head end.
Note 10) Available only for locking on rod side.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual
-X□

Technical
data

Air Cylinder: Standard Type Double Acting, Single Rod Series *CG1*

ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order



CG1 L N 25 - **100** -

With auto switch **CDG1 L N 25** - **100** - **M9BW** -

With auto switch
(Built-in magnet)

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
U*	Rod side trunnion style
T*	Head side trunnion style
D	Clevis style

* Not available for ø80 or ø100.
Note) Mounting brackets are shipped together, (but not assembled).

Type

N	Rubber bumper
A	Air cushion

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

Port thread type

Rubber bumper

Nil	Rc	ø20 to ø100
TN	NPT	ø20 to ø100
TF	M5 x 0.8	ø20, ø25
	G	ø32 to ø100

Air Cushion

Nil	M5 x 0.8	ø20, ø25
	Rc	ø32 to ø100
TN	NPT	ø32 to ø100
TF	M5 x 0.8	ø20, ø25
	G	ø32 to ø100

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 223.

Auto switch

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

Suffix for cylinder (Rod boot (at one end))

Nil	Without rod boot
J	Nylon tarpaulin
K	Heat resistant tarpaulin

* In the case of w/ rod boot, and a foot bracket or rod side flange as a bracket, those parts are to be assembled at the time of shipment.

Number of auto switches

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

Made to Order
Refer to page 223 for details.

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) CDG1F32-100

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Refer to page 223 for details.

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	Applicable bore size (mm) ø20 to ø63 ø80, ø100		0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)						
Solid state switch	_____	Grommet	Yes	3-wire (NPN)	5V, 12V	—	M9N	—	●	●	●	○	—	○	IC circuit	Relay, PLC			
				3-wire (PNP)			—	G59	●	—	●	○	—	○					
		Connector		2-wire			12V	M9P	—	●	●	●	○	—			○		
				—				G5P	●	—	●	○	—	○					
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	24V		—	M9B	—	●	●	●	○	—	○		—		
				3-wire (PNP)				—	K59	●	—	●	○	—	○				
				2-wire				5V, 12V	M9NW	—	●	●	●	○	—			○	IC circuit
									—	G59W	●	—	●	○	—			○	
				2-wire	12V			M9PW	—	●	●	●	○	—	○		—		
								—	G5PW	●	—	●	○	—	○				
				Water resistant (2-color indication)	Grommet			2-wire	12V	M9BW	—	●	●	●	○		—	○	—
										—	K59W	●	—	●	○		—	○	
	With diagnostic output (2-color indication)	Grommet		4-wire (NPN)	5V, 12V		H7BA	G5BA	—	—	●	○	—	○	IC circuit				
H7NF			G59F			●	—	●	○	—	○								
Reed switch	_____	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	A96	—	●	—	●	—	—	—	IC circuit	Relay, PLC		
				2-wire	24V	12V	100V	A93	—	●	—	●	—	—	—	—			
							100V or less	A90	—	●	—	●	—	—	—	—			
							100V, 200V	B54		●	—	●	●	—	—	—			
							200V or less	B64		●	—	●	—	—	—	—			
							—	C73C	—	●	—	●	●	●	—	—			
		Connector	24V or less	C80C	—	●	—	●	●	●	—	—	IC circuit						
				Grommet	Yes	—	—	B59W		●	—	●	—	—	—				
						—	—	B59W		●	—	●	—	—	—				

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

* Solid state auto switches marked with "○" are produced upon receipt of order.
* D-A9□V/M9□V/M9□WV and D-M9□A(V)L cannot be mounted.

* Since there are other applicable auto switches than listed, refer to page 283 for details.

* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.

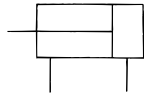
* D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled before shipped.)

Substantially shorter length:

ø20 to ø40... -15 to -30 mm
 (in comparison with Series CM2)
 ø40 to ø63... -17 to -28 mm
 (in comparison with Series CA2)
 ø80, ø100... -9 to -33 mm
 (in comparison with Series CA2)

JIS Symbol

Double acting



Made to Order

(Refer to pages 1373 to 1498 for details.)

Symbol	Specifications
—XA□	Change of rod end shape
—XB6	Heat resistant cylinder (150°C) *1
—XB7	Cold resistant cylinder
—XB9	Low speed cylinder (10 to 50 mm/s) *3
—XB13	Low speed cylinder (5 to 50 mm/s) *3
—XC4	With heavy duty scraper
—XC6	Piston rod and rod end nut made of stainless steel
—XC8	Adjustable stroke cylinder/Adjustable extension type
—XC9	Adjustable stroke cylinder/Adjustable retraction type
—XC10	Dual stroke cylinder/Double rod type
—XC11	Dual stroke cylinder/Single rod type
—XC12	Tandem type cylinder *3
—XC13	Auto switch rail mounting style
—XC20	Head cover axial port *3
—XC22	Fluororubber seals
—XC27	Stainless steel double clevis pin
—XC29	Double knuckle joint with spring pin
—XC35	With coil scraper
—XC37	Larger throttle diameter of connecting port
—XC42	Built-in rear shock absorber

- * 1 Cylinders with rubber bumper have no bumper.
- * 2 Compatible with cylinders with rubber bumper, but has no bumper.
- * 3 Compatible with cylinders with rubber bumper only.

Refer to pages 279 to 283 for cylinders with auto switches.

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

Specifications

Bore size (mm)	20	25	32	40	50	63	80	100
Action	Double acting, Single rod							
Lubricant	Not required (Non-lube)							
Fluid	Air							
Proof pressure	1.5 MPa							
Maximum operating pressure	1.0 MPa							
Minimum operating pressure	0.05 MPa							
Ambient and fluid temperature	Without auto switch: -10 to 70°C (No freezing)							
	With auto switch: -10 to 60°C (No freezing)							
Piston speed	50 to 1000 mm/s						50 to 700 mm/s	
Stroke length tolerance	Up to 1000 ^{st+1.4} ₀ mm, Up to 1200 ^{st+1.8} ₀ mm						Up to 1000 ^{st+1.4} ₀ mm Up to 1500 ^{st+1.8} ₀ mm	
Cushion	Rubber bumper, Air cushion							
Mounting *	Basic style, Axial foot style, Rod side flange style, Head side flange style, Rod side trunnion style, Head side trunnion style, Clevis style (Used for changing the port location by 90°.)							



Rod/Head side trunnion styles are not available for bore sizes ø80 and ø100.

Accessory

Mounting	Basic style	Axial foot style	Rod side flange style	Head side flange style	Rod side trunnion style	Head side trunnion style	Clevis style
Standard equipment	Rod end nut	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●
Option	Single knuckle joint	●	●	●	●	●	●
	Double knuckle joint (With pin) **	●	●	●	●	●	●
	Pivot bracket	—	—	—	● *	● *	●
	Rod boot	●	●	●	●	●	●

* Trunnion bracket is not available for ø80 and ø100.

** Pin and retaining ring are shipped together with double knuckle joint.

Standard Stroke

Bore size (mm)	Standard stroke ⁽¹⁾ (mm)	Long stroke ⁽²⁾ (mm)	Maximum manufacturable stroke (mm)
20	25, 50, 75, 100, 125, 150, 200	201 to 350	1500
25	25, 50, 75, 100, 125, 150, 200, 250, 300	301 to 400	
32		301 to 450	
40		301 to 800	
50, 63		301 to 1200	
80		301 to 1400	
100		301 to 1500	



Note 1) Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Note 2) Long stroke is compatible with the axial foot and rod side flange types. When other mounting brackets are used or the long stroke exceeds the limit, the allowable maximum stroke length is determined using the stroke selection table (front matter 28)

Rod Boot Material

Symbol	Rod boot material	Maximum operating temperature
J	Nylon tarpaulin	70°C
K	Heat resistant tarpaulin	110°C *

* Maximum ambient temperature for the rod boot itself.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual
-X□

Technical
data

Series CG1

Mounting Bracket Part No.

Mounting bracket	Min. order	Bore size (mm)								Description
		20	25	32	40	50	63	80	100	
Foot	Note) 2	CG-L020	CG-L025	CG-L032	CG-L040	CG-L050	CG-L063	CG-L080	CG-L100	Foot x 2, Mounting bolt x 8
Flange	1	CG-F020	CG-F025	CG-F032	CG-F040	CG-F050	CG-F063	CG-F080	CG-F100	Flange x 1, Mounting bolt x 4
Trunnion pin	1	CG-T020	CG-T025	CG-T032	CG-T040	CG-T050	CG-T063	—	—	Trunnion pin x 2, Trunnion bolt x 2, Flat washer x 2
Clevis	1	CG-D020	CG-D025	CG-D032	CG-D040	CG-D050	CG-D063	CG-D080	CG-D100	Clevis x 1, Mounting bolt x 4, Clevis pin x 1, Retaining ring x 2
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	Pivot bracket x 1

Note) Order two foot brackets per cylinder.

Mass

Bore size (mm)		20	25	32	40	50	63	80	100
Basic mass	Basic style	0.10	0.17	0.26	0.41	0.77	1.07	2.04	3.17
	Axial foot style	0.21	0.30	0.42	0.63	1.25	1.79	3.00	4.92
	Flange style	0.18	0.27	0.40	0.61	1.11	1.57	2.75	4.52
	Trunnion style	0.11	0.19	0.29	0.46	0.91	1.21	—	—
	Clevis style	0.15	0.25	0.41	0.64	1.17	1.75	2.75	4.45
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 mass per each 50 mm of stroke		0.05	0.07	0.09	0.15	0.22	0.26	0.35	0.49
Additional mass with air cushion		0.01	0.01	0.02	0.02	0.03	0.03	0.03	0.03
Additional mass for long stroke		0.01	0.01	0.02	0.03	0.06	0.10	0.19	0.26

Calculation: (Example) **CG1LA20-100** (Foot style, ø20, 100 st)

- Basic mass..... 0.21 kg (Foot, ø20)
- Additional mass..... 0.05 kg/50 stroke
- Cylinder stroke.....100 stroke
- Additional mass by air cushion.....0.01 kg

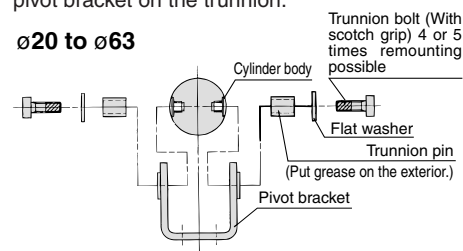
$$0.21 + 0.05 \times 100/50 + 0.01 = 0.32 \text{ kg}$$

Mounting Procedure

Mounting procedure for trunnion

Follow the procedures below when mounting a pivot bracket on the trunnion.

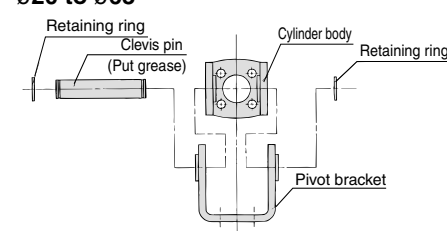
ø20 to ø63



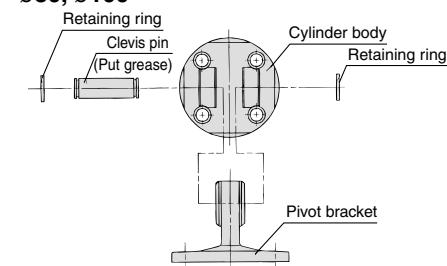
Mounting procedure for clevis

Follow the procedures below when mounting a pivot bracket on the clevis style.

ø20 to ø63



ø80, ø100



Built-in One-touch Fittings

CG1 **Mounting style N** **Bore size** **F** — **Stroke**
Built-in One-touch fittings

This type has the One-touch fittings integrated in a cylinder, which enables to reduce the piping labor and installing space dramatically.

Specifications

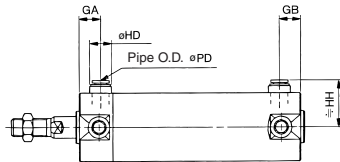
Bore size (mm)	20, 25, 32, 40, 50, 63
Action	Double acting
Fluid	Air
Maximum operating pressure	1.0 MPa
Minimum operating pressure	0.05 MPa
Piston speed	50 to 750 mm/s
Cushion	Rubber bumper
Mounting	Basic style, Axial foot style, Rod side flange style Head side flange style, Rod side trunnion style Head side trunnion style, Clevis style (Used for changing the port location by 90°.)

* Auto switch can be mounted.

Applicable Tubing O.D./I.D.

Bore size (mm)	20	25	32	40	50	63
Applicable tubing O.D. (mm)	6/4	6/4	6/4	8/6	10/7.5	10/7.5
Applicable tubing material	Can be used for either nylon, soft nylon or polyurethane tubing.					

* For other specifications, refer to page 223.



* Other dimensions are the same as the double acting single rod standard type.

Bore size (mm)	GA	GB	HD	HH	PD
20	12	12	13	24.2	6
25	12	10(12)	13	26.7	6
32	12	10(12)	13	30.2	6
40	12	10(12)	16	34.6	8
50	13	13	20	40.6	10
63	13	13	20	47.1	10

Note (): Long stroke

Air-hydro

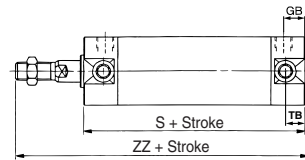
CG1 **Mounting style H** **Bore size** — **Stroke**
Air-hydro

Low pressure hydraulic cylinder of 1.0 MPa or less
When used together with a Series CC air-hydro unit, constant and low speed actuation and intermediate stopping similar to hydraulic units are possible with the use of valves and other pneumatic equipment.

Specifications

Type	Air-hydro
Bore size (mm)	20, 25, 32, 40, 50, 63
Action	Double acting
Fluid	Turbine oil
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Minimum operating pressure	0.18 MPa
Piston speed	15 to 300 mm/s
Cushion	None
Ambient and fluid temperature	5 to 60°C
Mounting	Basic style, Axial foot style, Rod side flange style Head side flange style, Rod side trunnion style Head side trunnion style, Clevis style (Used for changing the port location by 90°.)

* Auto switch can be mounted.



* Other dimensions are the same as the double acting single rod standard type.

Bore size (mm)	GB	TB	S	ZZ
20	12	11	77	114
25	12	11	77	119
32	12	11	79	121
40	13	12	87	139
50	14	13	102	162
63	14	13	102	162

Clean Series

10-CG1 **Mounting style N** **Bore size** — **Stroke**
Clean series (With relief port)

The type which is applicable for using inside the clean room graded Class 100 by making an actuator's rod section a double seal construction and discharging by relief port directly to the outside of clean room.

Specifications

Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100
Action	Double acting
Fluid	Air
Maximum operating pressure	1.0 MPa
Minimum operating pressure	0.05 MPa
Cushion	Rubber bumper
Piston speed	30 to 400 mm/s
Relief port size	M5 x 0.8
Mounting	Basic style, Axial foot style, Rod side flange style Head side flange style

* Auto switch can be mounted.

Copper and Fluorine-free

20-CG1 **Mounting style** **Type** **Port thread type** — **Stroke**
Copper/Fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.

Specifications

Bore size (mm)	20, 25, 32, 40, 50, 63, 80, 100
Action	Double acting
Fluid	Air
Maximum operating pressure	1.0 MPa
Minimum operating pressure	0.05 MPa
Cushion	Type N With rubber bumper Type A With air cushion
Piston speed	ø20 to 63 50 to 1000 mm/s ø80-100 50 to 700 mm/s
Mounting *	Basic style, Axial foot style, Rod side flange style Head side flange style, Rod side trunnion style Head side trunnion style, Clevis style (Used for changing the port location by 90°.)

* Dimensions are the same as double acting single rod, standard type.

* Auto switch can be mounted.

For details, refer to the separate catalog, "Pneumatic Clean Series".

Water Resistant

CDG1 Mounting style Style Bore size Port thread type **R** Stroke H7BAL -XC6

With auto switch
(Built-in magnet)

Water resistant cylinder

R	NBR seals (Nitrile rubber)
V	FKM seals (Fluoro rubber)

Water resistant 2-color indication, Solid state switch

H7BAL	ø32 to ø63
G5BAL	ø80, ø100

Caution
Since the scraper is press-fit into the rod cover, it cannot be replaced.

Made to Order

Applicable for use in an environment with water splashing such as food processing and car wash equipment, etc.

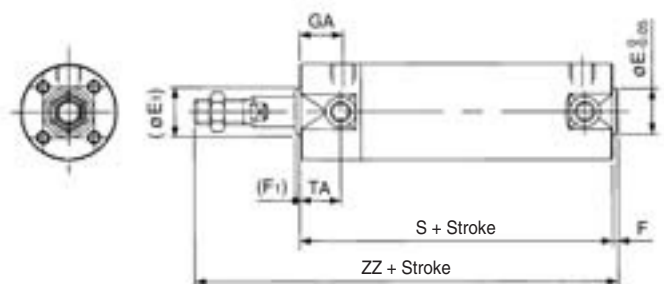
Specifications

Bore size (mm)	32, 40, 50, 63, 80, 100
Action	Double acting, Single rod
Cushion	Rubber bumper/Air cushion
Auto switch mounting	Band mounting style
Made to order	Piston rod/Rod end nut material: Stainless steel (-XC6)

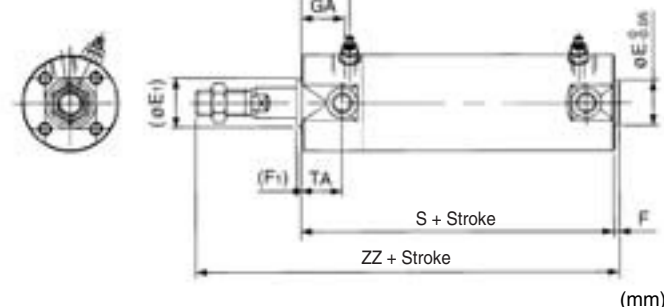
* Specifications other than above are the same as standard, basic style.

Dimensions

With rubber bumper



With air cushion



Bore size (mm)	(E1)	E*	(F1)	F*	GA	S	TA	WA	ZZ
32	17	18	2	2	18	77 (85)	17	22	119 (127)
40	21	25	2	2	19	84 (93)	18	22	136 (145)
50	26	30	2	2	21	97 (109)	20	25	157 (169)
63	26	32	2	2	21	97 (109)	20	25	157 (169)
80	32	40	3	3	28	116 (130)	-	30	190 (204)
100	37	50	3	3	29	117 (131)	-	31	191 (205)

* Other dimensions are the same as the double acting single rod standard type.

* (): Denotes the dimensions for long stroke.

Refer to page 895 for details.

Precautions

Be sure to read before handling.

Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Operating Precautions

Warning

1. Do not operate the cushion valve in the fully closed or fully opened state.

Using it in the fully closed state will cause the cushion seal to be damaged. Using it in the fully opened state will cause the piston rod assembly or the cover to be damaged.

2. Operate within the specified cylinder speed.

Otherwise, cylinder and seal damage may occur.

3. When the cylinder is used as mounted with a single side fixed or free (basic type, flange type), 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 the long stroke cylinder is mounted horizontally and with a single side fixed, use a bracket to fix the cylinder.

Caution

1. Do not use the air cylinder as an air-hydro cylinder.

This will cause an oil leak.

2. Install a rod boot without twisting.

If the cylinder is installed with its bellows twisted, it could damage the bellows.

3. Tighten clevis bracket mounting bolts with the following proper tightening torque.

ø20: 1.5N·m, ø25 to 32: 2.9N·m, ø40: 4.9N·m,
ø50: 11.8N·m, ø63 to 80: 24.5N·m, ø100: 42.2N·m

Disassembly/Replacement

Caution

1. Do not replace the bushings.

The bushings are press-fit. To replace them, they must be replaced together with the cover assembly.

2. To replace a seal, apply grease to the new seal before installing it.

If the cylinder is put into operation without applying grease to the seal, it could cause the seal to wear significantly, leading to premature air leakage.

3. Do not replace One-touch fittings.

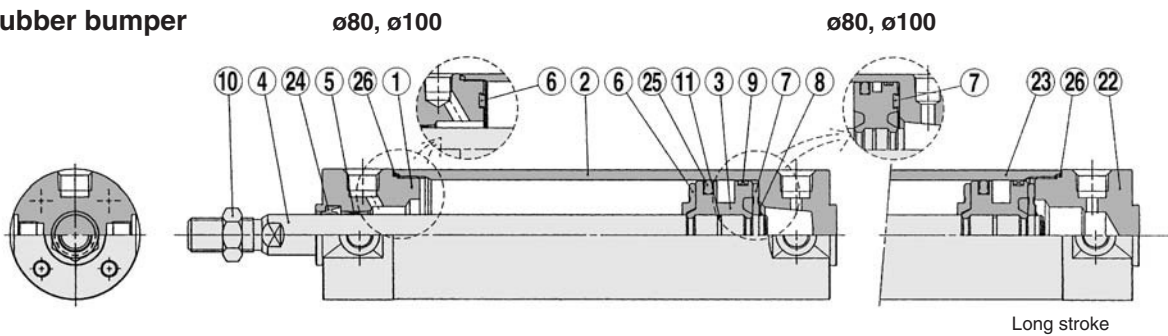
Because pipe fittings are press-fit, they must be replaced together with the cover assembly.

4. Those with a bore of ø50 or more cannot be disassembled.

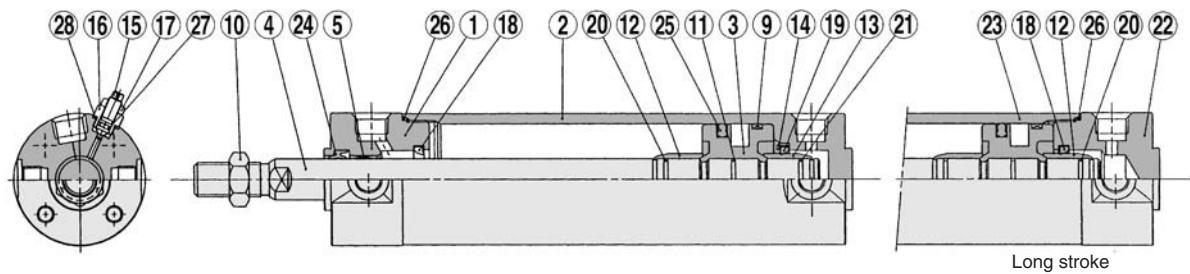
When disassembling cylinders with bore sizes of ø20 through ø40, grip the double flat part of either the head cover or the rod cover with a vise and loosen the other side with a wrench or a monkey wrench, etc., and then remove the cover. When re-tightening, tighten approximately 2 degrees more than the original position. (Cylinders with ø50 or larger bore sizes are tightened with a large tightening torque and cannot be disassembled. Please contact SMC when disassembly is required.)

Construction

With rubber bumper



With air cushion



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Clear hard anodized
2	Tube cover	Aluminum alloy	Clear hard anodized
3	Piston	Aluminum alloy	Chromated
4	Piston rod	Carbon steel*	Hard chrome plated*
5	Bushing	Copper oil-impregnated sintered alloy	ø40 or more: Copper alloy
6	Bumper A	Urethane	
7	Bumper B	Urethane	ø40 or larger: The same as bumper A
8	Retaining ring	Stainless steel	Except ø80 and ø100
9	Wear ring	Resin	
10	Rod end nut	Rolled steel	Nickel plated
11	Piston gasket	NBR	
12	Cushion ring A	Aluminum alloy	Anodized
13	Cushion ring B	Aluminum alloy	ø32 or larger: The same as A, Anodized
14	Seal retainer	Rolled steel	Nickel plated/Except long stroke
15	Cushion valve	Rolled steel	Electroless nickel plated
16	Valve retainer	Rolled steel	Electroless nickel plated
17	Lock nut	Rolled steel	Nickel plated
18	Cushion seal A	Urethane	
19	Cushion seal B	Urethane	ø32 or larger: The same as A
20	Cushion ring gasket A	NBR	
21	Cushion ring gasket B	NBR	ø32 or larger: The same as A
22	Head cover	Aluminum alloy	Clear hard anodized
23	Cylinder tube	Aluminum alloy	Hard anodized
24	Rod seal	NBR	
25	Piston seal	NBR	
26	Tube gasket	NBR	
27	Valve seal	NBR	
28	Valve retaining gasket	NBR	

Note) In the case of cylinders with auto switches, magnets are installed in the piston.

* The material is stainless steel on auto switch equipped styles ø20 and ø25.

Replacement Parts/Seal Kit

• For rubber bumper

Bore size (mm)	Kit no.	Contents
20	CG1N20-PS	Set of the nos. 24, 25, 26
25	CG1N25-PS	
32	CG1N32-PS	
40	CG1N40-PS	

• For air cushion

Bore size (mm)	Kit no.	Contents
20	CG1A20-PS	Set of the nos. 24, 25, 26, 27, 28
25	CG1A25-PS	
32	CG1A32-PS	
40	CG1A40-PS	

Note) Refer to the Specific Product Precautions on page 226 for Disassembly/Replacement.
Order with a part number for each type and 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 no.: GR-S-010 (10 g)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

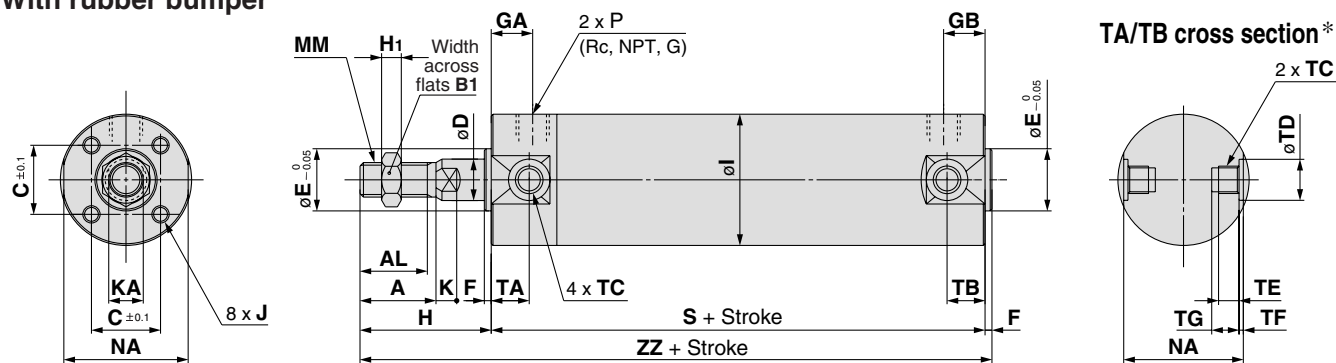
Individual
-X□

Technical
data

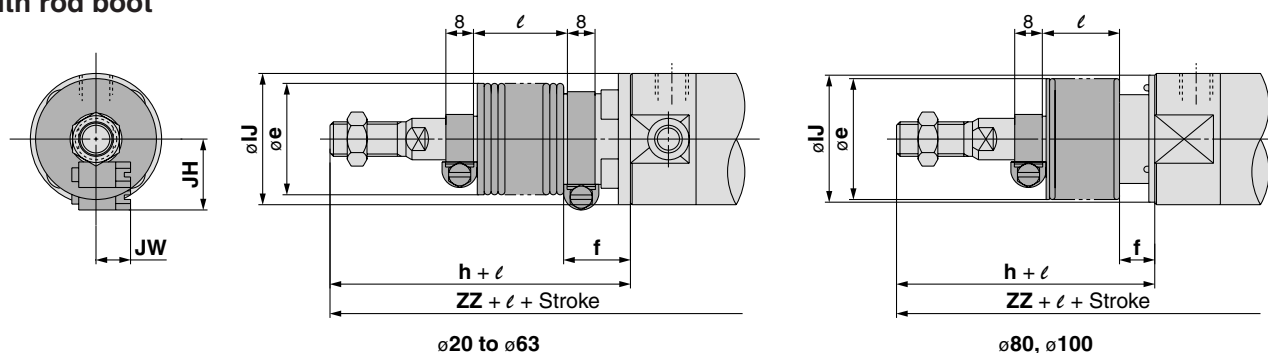
Series CG1

Basic Style:CG1B□

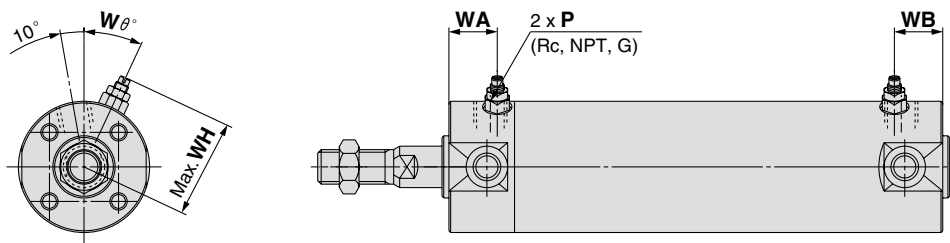
With rubber bumper



With rod boot



With air cushion



Bore size (mm)	Stroke range (mm)		Rc, NPT port			G port																							
	Standard	Long stroke	GA	GB	P	GA	GB	P	A	AL	B ₁	C	D	E	F	H	H ₁	I	J	K	KA	MM	NA	S	TA	TB	ZZ		
20	Up to 200	201 to 350	12	10(12)	1/8	12	10(12)	M5 x 0.8	18	15.5	13	14	8	12	2	35	5	26	M4 x 0.7 depth 7	5	6	M8 x 1.25	24	69(77)	11	11	106(114)		
25	Up to 300	301 to 400	12	10(12)	1/8	12	10(12)	M5 x 0.8	22	19.5	17	16.5	10	14	2	40	6	31	M5 x 0.8 depth 7.5	5.5	8	M10 x 1.25	29	69(77)	11	11	111(119)		
32	Up to 300	301 to 450	12	10(12)	1/8	10	9(10)	1/8	22	19.5	17	20	12	18	2	40	6	38	M5 x 0.8 depth 8	5.5	10	M10 x 1.25	35.5	71(79)	11	10(11)	113(121)		
40	Up to 300	301 to 800	13	10(13)	1/8	10	9(10)	1/8	30	27	19	26	16	25	2	50	8	47	M6 x 1 depth 12	6	14	M14 x 1.5	44	78(87)	12	10(12)	130(139)		
50	Up to 300	301 to 1200	14	12(14)	1/4	12	11(12)	1/4	35	32	27	32	20	30	2	58	11	58	M8 x 1.25 depth 16	7	18	M18 x 1.5	55	90(102)	13	12(13)	150(162)		
63	Up to 300	301 to 1200	14	12(14)	1/4	12	11(12)	1/4	35	32	27	38	20	32	2	58	11	72	M10 x 1.5 depth 16	7	18	M18 x 1.5	69	90(102)	13	12(13)	150(162)		
80	Up to 300	301 to 1400	20	16(20)	3/8	17	16(17)	3/8	40	37	32	50	25	40	3	71	13	89	M10 x 1.5 depth 22	10	22	M22 x 1.5	80	108(122)	—	—	182(196)		
100	Up to 300	301 to 1500	20	16(20)	1/2	17	16(17)	1/2	40	37	41	60	30	50	3	71	16	110	M12 x 1.75 depth 22	10	26	M26 x 1.5	100	108(122)	—	—	182(196)		

Note) (): Denotes the dimensions for long stroke.

TA/TB Sectional View (mm)

Bore size (mm)	TC *	TD	TE	TF	TG
20	M5 x 0.8	8 ^{+0.08} ₀	4	0.5	5.5
25	M6 x 0.75	10 ^{+0.08} ₀	5	1	6.5
32	M8 x 1.0	12 ^{+0.08} ₀	5.5	1	7.5
40	M10 x 1.25	14 ^{+0.08} ₀	6	1.25	8.5
50	M12 x 1.25	16 ^{+0.08} ₀	7.5	2	10
63	M14 x 1.5	18 ^{+0.08} ₀	11.5	3	14.5
80	—	—	—	—	—
100	—	—	—	—	—

* Trunnion mounting taps with width across flats
NA are not attached for bore size ø80 and ø100.

With Rod Boot (mm)

Bore size (mm)	e	f	h	IJ	JH (Reference)	JW (Reference)	l	ZZ
20	30	18	55	27	15.5	10.5	1/4 stroke	126(134)
25	30	19	62	32	16.5	10.5		133(141)
32	35	19	62	38	18.5	10.5		135(143)
40	35	19	70	48	21.5	10.5		150(159)
50	40	19	78	59	24	10.5		170(182)
63	40	20	78	72	24	10.5		170(182)
80	52	10	80	59	—	—		191(205)
100	62	7	80	71	—	—		191(205)

* The minimum stroke with rod boot is 20 mm.

With Air Cushion (mm)

Bore size (mm)	Rc, NPT, G P	WA	WB	WH	Wθ
20	M5 x 0.8	16	15(16)	23	30°
25	M5 x 0.8	16	15(16)	25	30°
32	1/8	16	15(16)	28.5	25°
40	1/8	16	15(16)	33	20°
50	1/4	18	17(18)	40.5	20°
63	1/4	18	17(18)	47.5	20°
80	3/8	22	22	60.5	20°
100	1/2	22	22	71	20°

With rubber bumper



Ø20 to Ø63

(mm)

(mm)								
Bore size (mm)	MM	NA	S	W	X	Y	Z	ZZ
20	M8 x 1.25	24	69(77)	10	15	7	47	110(118)
25	M10 x 1.25	29	69(77)	10	15	7	52	115.5(123.5)
32	M10 x 1.25	35.5	71(79)	10	16	8	53	117.5(125.5)
40	M14 x 1.5	44	78(87)	10	16.5	8.5	63.5	135(144)
50	M18 x 1.5	55	90(102)	17.5	22	11	75.5	157.5(169.5)
63	M18 x 1.5	69	90(102)	17.5	22	13	75.5	157.5(169.5)
80	M22 x 1.5	80	108(122)	20	28.5	14	95	188.5(202.5)
100	M26 x 1.5	100	108(122)	20	30	16	95	192(206)

With Rod Boot							(mm)			
Bore size (mm)	e	f	h	IJ	JH Reference	JW Reference	1/4 stroke	ℓ	Z	ZZ
20	30	18	55	27	15.5	10.5		67	130(138)	
25	30	19	62	32	16.5	10.5		74	137.5(145.5)	
32	35	19	62	38	18.5	10.5		75	139.5(147.5)	
40	35	19	70	48	21.5	10.5		83.5	155(164)	
50	40	19	78	59	24	10.5		95.5	177.5(189.5)	
63	40	20	78	72	24	10.5		95.5	177.5(189.5)	
80	52	10	80	59	—	—		104	197.5(211.5)	
100	62	7	80	71	—	—	104	201(215)		

Bore size (mm)	R _c , NPT, G	WA	WB	WH	Wθ
	P				
20	M5 x 0.8	16	15(16)	23	30°
25	M5 x 0.8	16	15(16)	25	30°
32	1/8	16	15(16)	28.5	25°
40	1/8	16	15(16)	33	20°
50	1/4	18	17(18)	40.5	20°
63	1/4	18	17(18)	47.5	20°
80	3/8	22	22	60.5	20°
100	1/2	22	22	71	20°

* The minimum stroke with rod boot is 20 mm.

D- ☐

-X ☐

Individual

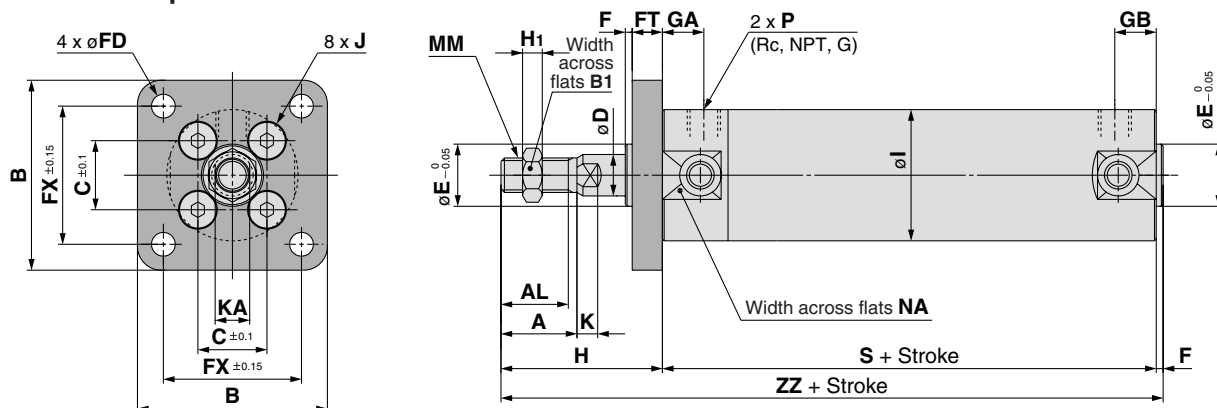
-X ☐

Technical data

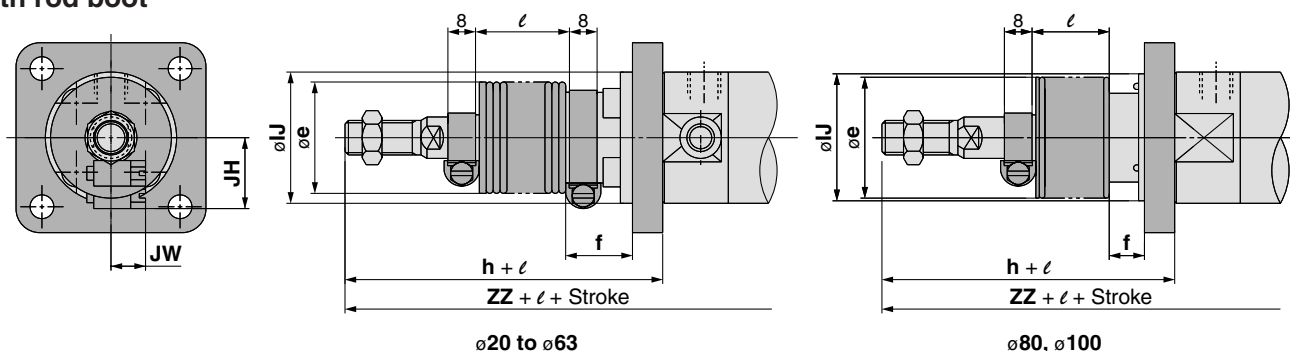
Series CG1

Rod Side Flange Style:CG1F□

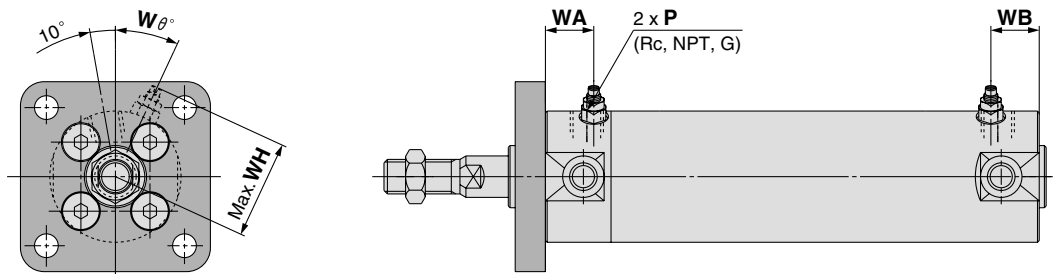
With rubber bumper



With rod boot



With air cushion



(mm)																										
Bore size (mm)	Stroke range (mm)		Rc, NPT port			G port			A	AL	B ₁	B	C	D	E	F	FX	FD	FT	H	H ₁	I	J	K	KA	MM
	Standard	Long stroke	GA	GB	P	GA	GB	P																		
20	Up to 200	201 to 350	12	10(12)	1/8	12	10(12)	M5 x 0.8	18	15.5	13	40	14	8	12	2	28	5.5	6	35	5	26	M4 x 0.7	5	6	M8 x 1.25
25	Up to 300	301 to 400	12	10(12)	1/8	12	10(12)	M5 x 0.8	22	19.5	17	44	16.5	10	14	2	32	5.5	7	40	6	31	M5 x 0.8	5.5	8	M10 x 1.25
32	Up to 300	301 to 450	12	10(12)	1/8	10	9(10)	1/8	22	19.5	17	53	20	12	18	2	38	6.6	7	40	6	38	M5 x 0.8	5.5	10	M10 x 1.25
40	Up to 300	301 to 800	13	10(13)	1/8	10	9(10)	1/8	30	27	19	61	26	16	25	2	46	6.6	8	50	8	47	M6 x 1	6	14	M14 x 1.5
50	Up to 300	301 to 1200	14	12(14)	1/4	12	11(12)	1/4	35	32	27	76	32	20	30	2	58	9	9	58	11	58	M8 x 1.25	7	18	M18 x 1.5
63	Up to 300	301 to 1200	14	12(14)	1/4	12	11(12)	1/4	35	32	27	92	38	20	32	2	70	11	9	58	11	72	M10 x 1.5	7	18	M18 x 1.5
80	Up to 300	301 to 1400	20	16(20)	3/8	17	16(17)	3/8	40	37	32	104	50	25	40	3	82	11	11	71	13	89	M10 x 1.5	10	22	M22 x 1.5
100	Up to 300	301 to 1500	20	16(20)	1/2	17	16(17)	1/2	40	37	41	128	60	30	50	3	100	14	14	71	16	110	M12 x 1.75	10	26	M26 x 1.5

Bore size (mm)	NA	S	ZZ
20	24	69(77)	106(114)
25	29	69(77)	111(119)
32	35.5	71(79)	113(121)
40	44	78(87)	130(139)
50	55	90(102)	150(162)
63	69	90(102)	150(162)
80	80	108(122)	182(196)
100	100	108(122)	182(196)

Bore size (mm)	e	f	h	IJ	JH (Reference)	JW (Reference)	l	ZZ
20	30	18	55	27	15.5	10.5		126(134)
25	30	19	62	32	16.5	10.5		133(141)
32	35	19	62	38	18.5	10.5		135(143)
40	35	19	70	48	21.5	10.5		150(159)
50	40	19	78	59	24	10.5		170(182)
63	40	20	78	72	24	10.5		170(182)
80	52	10	80	59	—	—		191(205)
100	62	7	80	71	—	—		191(205)

Bore size (mm)	Rc, NPT, G P	WA	WB	WH	Wθ
20	M5 x 0.8	16	15(16)	23	30°
25	M5 x 0.8	16	15(16)	25	30°
32	1/8	16	15(16)	28.5	25°
40	1/8	16	15(16)	33	20°
50	1/4	18	17(18)	40.5	20°
63	1/4	18	17(18)	47.5	20°
80	3/8	22	22	60.5	20°
100	1/2	22	22	71	20°

Note) (): Denotes the dimensions for long stroke.

* The minimum stroke with rod boot is 20 mm.

With rubber bumper



(mm)																										
Bore size (mm)	Stroke range (mm)		Rc, NPT port			G port			A	AL	B ₁	B	C	D	E	F	FX	FD	FT	H	H ₁	I	J	K	KA	MM
	Standard	Long stroke	GA	GB	P	GA	GB	P																		
20	Up to 200	—	12	10	1/8	12	10	M5 x 0.8	18	15.5	13	40	14	8	12	2	28	5.5	6	35	5	26	M4 x 0.7	5	6	M8 x 1.25
25	Up to 300	—	12	10	1/8	12	10	M5 x 0.8	22	19.5	17	44	16.5	10	14	2	32	5.5	7	40	6	31	M5 x 0.8	5.5	8	M10 x 1.25
32	Up to 300	—	12	10	1/8	10	9	1/8	22	19.5	17	53	20	12	18	2	38	6.6	7	40	6	38	M5 x 0.8	5.5	10	M10 x 1.25
40	Up to 300	301 to 500	13	10(13)	1/8	10	9(10)	1/8	30	27	19	61	26	16	25	2	46	6.6	8	50	8	47	M6 x 1	6	14	M14 x 1.5
50	Up to 300	301 to 600	14	12(14)	1/4	12	11(12)	1/4	35	32	27	76	32	20	30	2	58	9	9	58	11	58	M8 x 1.25	7	18	M18 x 1.5
63	Up to 300	301 to 600	14	12(14)	1/4	12	11(12)	1/4	35	32	27	92	38	20	32	2	70	11	9	58	11	72	M10 x 1.5	7	18	M18 x 1.5
80	Up to 300	301 to 750	20	16(20)	3/8	17	16(17)	3/8	40	37	32	104	50	25	40	3	80	11	11	71	13	89	M10 x 1.5	10	22	M22 x 1.5
100	Up to 300	301 to 750	20	16(20)	1/2	17	16(17)	1/2	40	37	41	128	60	30	50	3	100	14	14	71	16	110	M12 x 1.75	10	26	M26 x 1.5

(mm)			
Bore size (mm)	NA	S	ZZ
20	24	69	112
25	29	69	118
32	35.5	71	120
40	44	78(87)	138(147)
50	55	90(102)	159(171)
63	69	90(102)	159(171)
80	80	108(122)	193(207)
100	100	108(122)	196(210)

With Rod Boot

Bore size (mm)	e	f	h	IJ	JH (Reference)	JW (Reference)	ϵ	ZZ
20	30	18	55	27	15.5	10.5	1/4 stroke	132
25	30	19	62	32	16.5	10.5		140
32	35	19	62	38	18.5	10.5		142
40	35	19	70	48	21.5	10.5		158(167)
50	40	19	78	59	24	10.5		179(191)
63	40	20	78	72	24	10.5		179(191)
80	52	10	80	59	—	—		202(216)
100	62	7	80	71	—	—		205(219)

With Air Cushion

Bore size (mm)	Rc, NPT, G	WA	WB	WH	W θ
	P				
20	M5 x 0.8	16	15	23	30°
25	M5 x 0.8	16	15	25	30°
32	1/8	16	15	28.5	25°
40	1/8	16	15(16)	33	20°
50	1/4	18	17(18)	40.5	20°
63	1/4	18	17(18)	47.5	20°
80	3/8	22	22	60.5	20°
100	1/2	22	22	71	20°

D- ☐

-X ☐

Individual

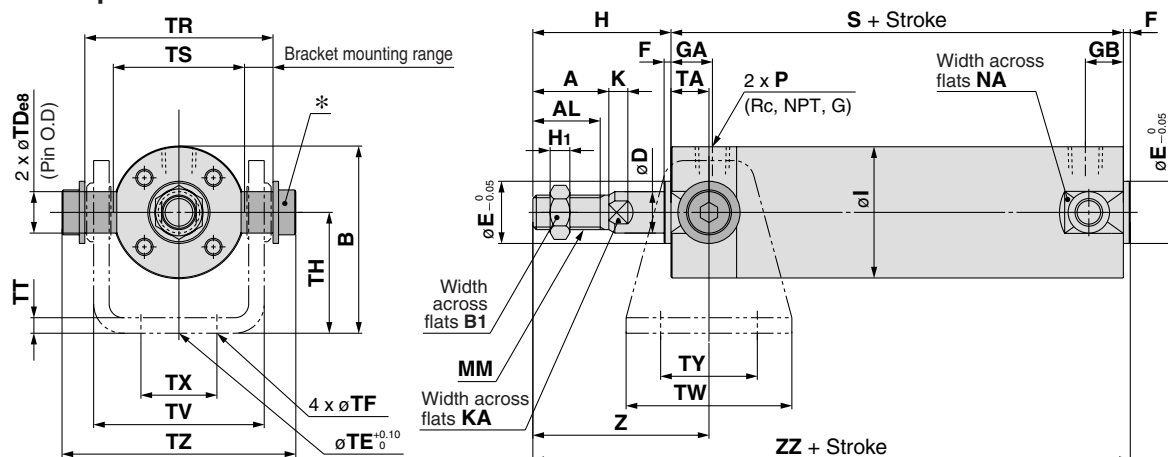
-X ☐

Technical data

Series CG1

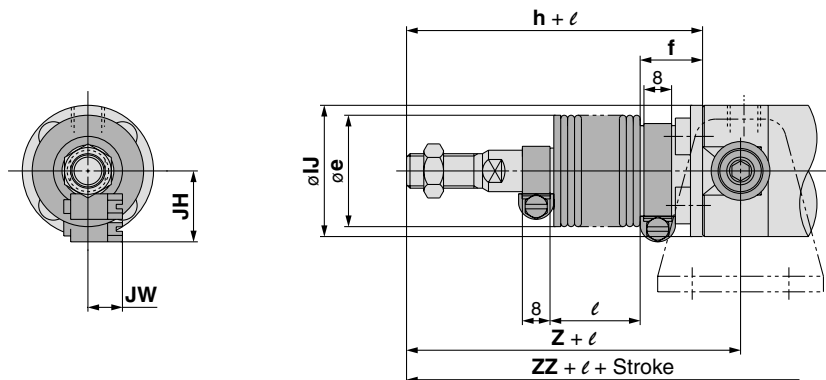
Rod Side Trunnion Style:CG1U□

With rubber bumper

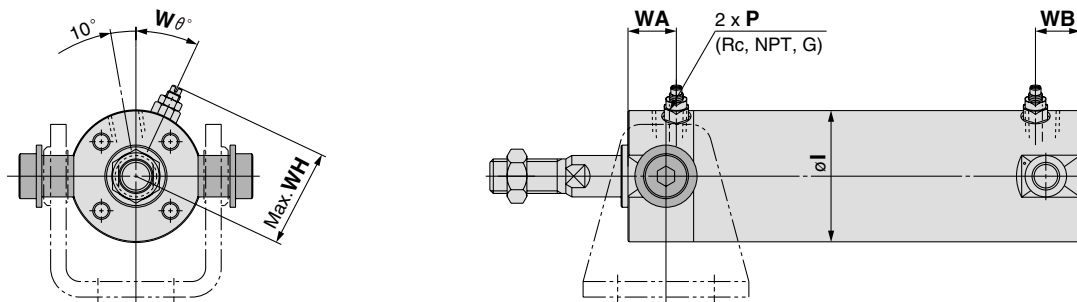


* Consists of pins, flat washers and hexagon socket head cap bolts.

With rod boot



With air cushion



(mm)																											
Bore size (mm)	Stroke range (mm)		Rc, NPT port			G port			A	AL	B	B ₁	D	E	F	H	H ₁	I	K	KA	MM	NA	S	TA	TD _{e8}	TE	TF
	Standard	Long stroke	GA	GB	P	GA	GB	P																			
20	Up to 200	—	12	10	1/8	12	10	M5 x 0.8	18	15.5	38	13	8	12	2	35	5	26	5	6	M8 x 1.25	24	69	11	8 ^{+0.025 -0.047}	10	5.5
25	Up to 300	—	12	10	1/8	12	10	M5 x 0.8	22	19.5	45.5	17	10	14	2	40	6	31	5.5	8	M10 x 1.25	29	69	11	10 ^{+0.025 -0.047}	10	5.5
32	Up to 300	—	12	10	1/8	10	9	1/8	22	19.5	54	17	12	18	2	40	6	38	5.5	10	M10 x 1.25	35.5	71	11	12 ^{+0.032 -0.059}	10	6.6
40	Up to 300	301 to 500	13	10(13)	1/8	10	9(10)	1/8	30	27	63.5	19	16	25	2	50	8	47	6	14	M14 x 1.5	44	78(87)	12	14 ^{+0.032 -0.059}	10	6.6
50	Up to 300	301 to 600	14	12(14)	1/4	12	11(12)	1/4	35	32	79	27	20	30	2	58	11	58	7	18	M18 x 1.5	55	90(102)	13	16 ^{+0.032 -0.059}	20	9
63	Up to 300	301 to 600	14	12(14)	1/4	12	11(12)	1/4	35	32	96	27	20	32	2	58	11	72	7	18	M18 x 1.5	69	90(102)	13	18 ^{+0.032 -0.059}	20	11

												(mm)
Bore size (mm)	TH	TR	TS	TT	TV	TW	TX	TY	TZ	Z	ZZ	
20	25	39	28	3.2	(35.8)	42	16	28	47.6	46	106	
25	30	43	33	3.2	(39.8)	42	20	28	53	51	111	
32	35	54.5	40	4.5	(49.4)	48	22	28	67.7	51	113	
40	40	65.5	49	4.5	(58.4)	56	30	30	78.7	62	130(139)	
50	50	80	60	6	(72.4)	64	36	36	98.6	71	150(162)	
63	60	98	74	8	(90.4)	74	46	46	119.2	71	150(162)	

Note) (): Denotes the dimensions for long stroke.
Refer to page 237 for pivot bracket.

With Rod Boot

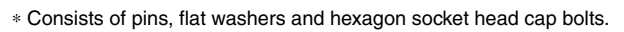
With Rod Boot										(mm)	
Bore size (mm)	e	f	h	IJ	JH Reference	JW Reference	1/4 stroke	ℓ	Z	ZZ	
20	30	18	55	27	15.5	10.5		66	126		
25	30	19	62	32	16.5	10.5		73	133		
32	35	19	62	38	18.5	10.5		73	135		
40	35	19	70	48	21.5	10.5		82	150(159)		
50	40	19	78	59	24	10.5		91	170(182)		
63	40	20	78	72	24	10.5	91	170(182)			

* The minimum stroke with rod boot is 20 mm.

With Air Cushion

With Air Cushion					(mm)
Bore size (mm)	Rc, NPT, G	WA	WB	WH	W θ
	P				
20	M5 x 0.8	16	15	23	30°
25	M5 x 0.8	16	15	25	30°
32	1/8	16	15	28.5	25°
40	1/8	16	15(16)	33	20°
50	1/4	18	17(18)	40.5	20°
63	1/4	18	17(18)	47.5	20°

With rubber bumper



Technical drawing of a hydraulic cylinder showing front and side views with dimension labels:

- Front View (Left):**
 - $\varnothing D$: Bore diameter
 - JH : Mounting height
 - JW : Mounting width
- Side View (Right):**
 - $\varnothing d$: Piston rod diameter
 - $\varnothing e$: Thread diameter
 - 8 : Flange thickness
 - ℓ : Piston rod length
 - $h + \ell$: Total length
 - $Z + \ell + \text{Stroke}$: Total length with stroke
 - $ZZ + \ell + \text{Stroke}$: Total length with stroke and mounting
 - f : Flange offset

(mm)

(mm)

(mm)

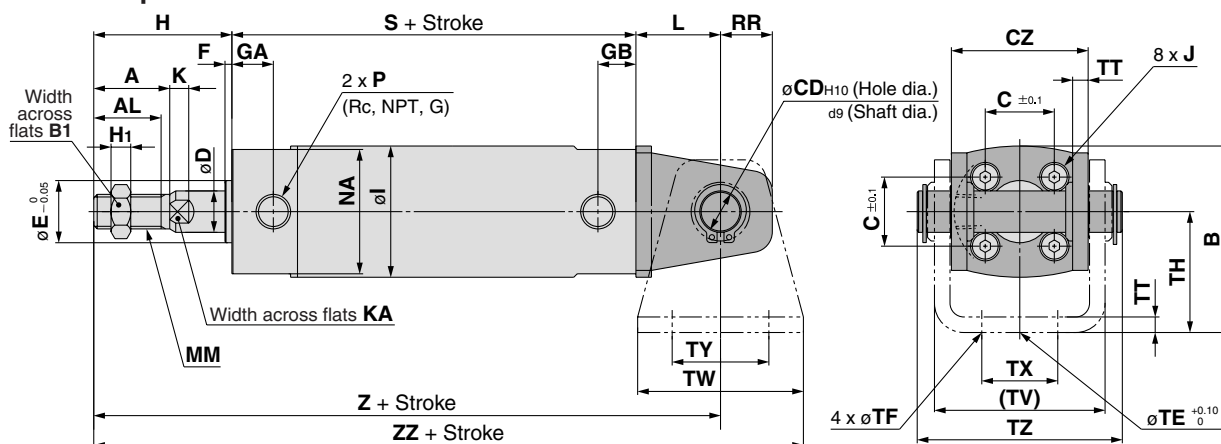
(mm)

* The minimum stroke with rod boot is 20 mm.

Series CG1

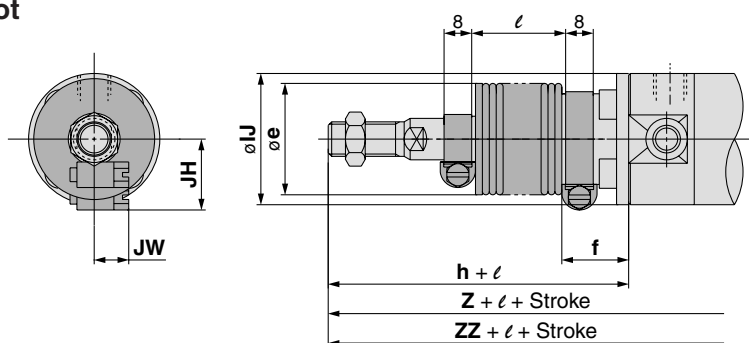
Clevis Style:CG1D□ (ø20 to ø63)

With rubber bumper

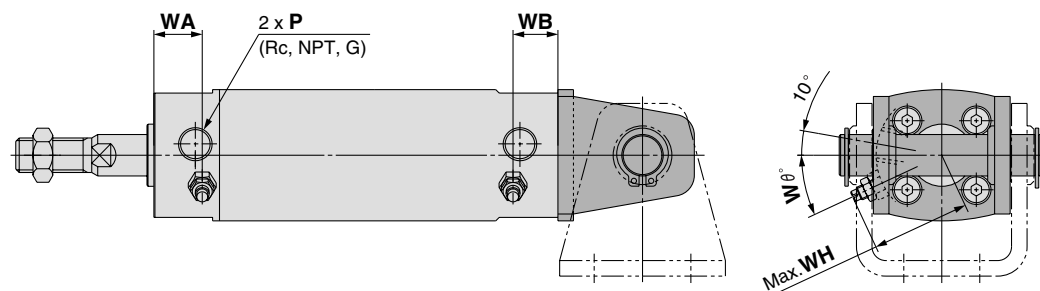


* The above shows the case port location is changed by 90°

With rod boot



With air cushion



(mm)																														
Bore size (mm)	Stroke range (mm)		Rc, NPT port			G port			A	AL	B	B ₁	C	CD	CZ	D	E	F	H	H ₁	I	J	K	KA	MM	NA	RR	S	L	TE
	Standard	Long stroke	GA	GB	P	GA	GB	P																						
20	Up to 200	—	12	10	1/8	12	10	M5 x 0.8	18	15.5	38	13	14	8	29	8	12	2	35	5	26	M4 x 0.7	5	6	M8 x 1.25	24	11	69	14	10
25	Up to 300	—	12	10	1/8	12	10	M5 x 0.8	22	19.5	45.5	17	16.5	10	33	10	14	2	40	6	31	M5 x 0.8	5.5	8	M10 x 1.25	29	13	69	16	10
32	Up to 300	—	12	10	1/8	10	9	1/8	22	19.5	54	17	20	12	40	12	18	2	40	6	38	M5 x 0.8	5.5	10	M10 x 1.25	35.5	15	71	20	10
40	Up to 300	301 to 500	13	10(13)	1/8	10	9(10)	1/8	30	27	63.5	19	26	14	49	16	25	2	50	8	47	M6 x 1	6	14	M14 x 1.5	44	18	78(87)	22	10
50	Up to 300	301 to 600	14	12(14)	1/4	12	11(12)	1/4	35	32	79	27	32	16	60	20	30	2	58	11	58	M8 x 1.25	7	18	M18 x 1.5	55	20	90(102)	25	20
63	Up to 300	301 to 600	14	12(14)	1/4	12	11(12)	1/4	35	32	96	27	38	18	74	20	32	2	58	11	72	M10 x 1.5	7	18	M18 x 1.5	69	22	90(102)	30	20

										(mm)
Bore size (mm)	TH	TT	TV	TW	TX	TY	TZ	Z	ZZ	Applicable pin part no.
20	25	3.2	35.8	42	16	28	43.4	118	139	CD-G02
25	30	3.2	39.8	42	20	28	48	125	146	CD-G25
32	35	4.5	49.4	48	22	28	59.4	131	155	CD-G03
40	40	4.5	58.4	56	30	30	71.4	150(159)	178(187)	CD-G04
50	50	6	72.4	64	36	36	86	173(185)	205(217)	CD-G05
63	60	8	90.4	74	46	46	105.4	178(190)	215(227)	CD-G06

Note) (): Denotes the dimensions for long stroke.
Refer to page 237 for pivot bracket.

With Rod Boot

With Rod Boot							(mm)			
Bore size (mm)	e	f	h	IJ	JH (Reference)	JW (Reference)	$\frac{1}{4}$ stroke	ℓ	Z	ZZ
20	30	18	55	27	15.5	10.5		138	159	
25	30	19	62	32	16.5	10.5		147	168	
32	35	19	62	38	18.5	10.5		153	177	
40	35	19	70	48	21.5	10.5		170(179)	198(207)	
50	40	19	78	59	24	10.5		193(205)	225(237)	
63	40	20	78	72	24	10.5		198(210)	235(247)	

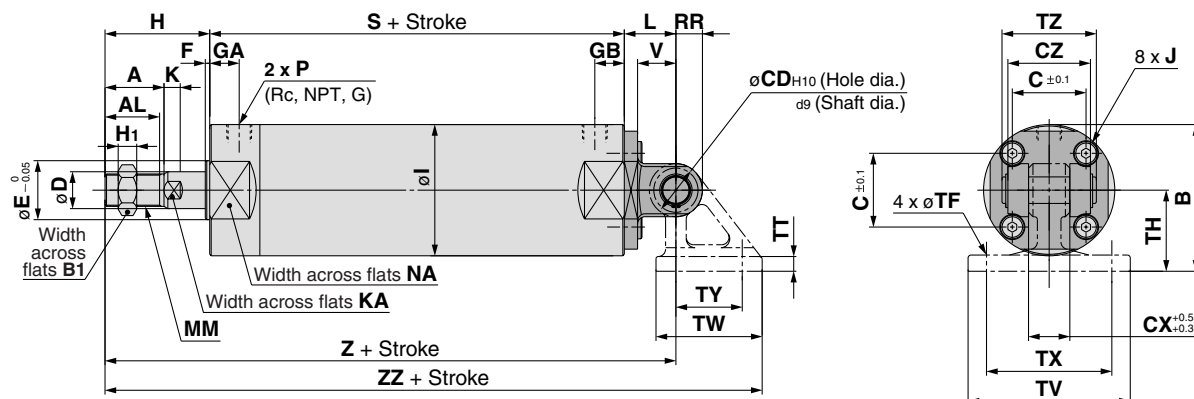
* The minimum stroke with rod boot is 20 mm.

With Air Cushion

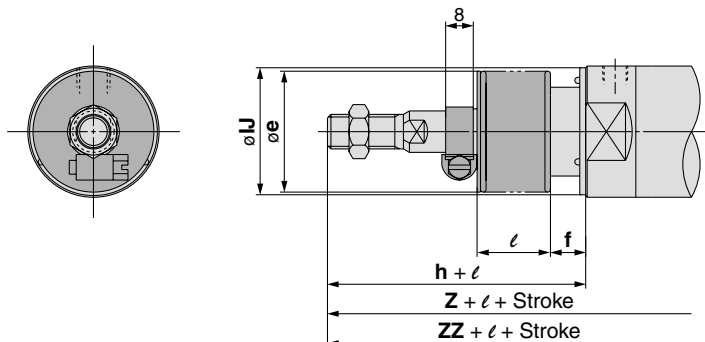
Bore size (mm)	Rc, NPT, G P					
	WA	WB	WH	Wθ		
20	M5 x 0.8	16	15	23	30°	
25	M5 x 0.8	16	15	25	30°	
32	1/8	16	15	28.5	25°	
40	1/8	16	15(16)	33	20°	
50	1/4	18	17(18)	40.5	20°	
63	1/4	18	17(18)	47.5	20°	

Clevis Style:CG1D□(ø80, ø100)

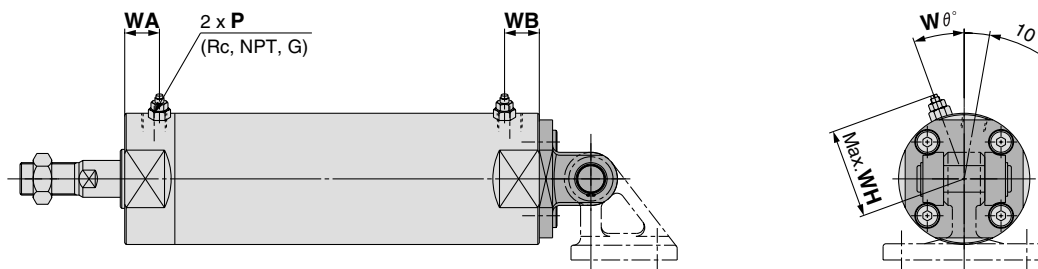
With rubber bumper



With rod boot



With air cushion



(mm)																										
Bore size (mm)	Stroke range (mm)		Rc, NPT port			G port			A	AL	B	B ₁	C	CD	CX	CZ	D	E	F	H	H ₁	I	J	K	KA	L
	Standard	Long stroke	GA	GB	P	GA	GB	P																		
80	Up to 300	301 to 750	20	16 (20)	3/8	17	16 (17)	3/8	40	37	99.5	32	50	18	28	56	25	40	3	71	13	89	M10 x 1.5	10	22	35
100	Up to 300	301 to 750	20	16 (20)	1/2	17	16 (17)	1/2	40	37	120	41	60	22	32	64	30	50	3	71	16	110	M12 x 1.75	10	26	43

Bore size (mm)	MM	NA	RR	S	TF	TH	TT	TV	TW	TX	TY	TZ	V	Z	ZZ	Applicable pin part no.
80	M22 x 1.5	80	18	108 (122)	11	55	11	110	72	85	45	64	26	214 (228)	272.5 (286.5)	IY-G08
100	M26 x 1.5	100	22	108 (122)	13.5	65	12	130	93	100	60	72	32	222 (236)	298.5 (312.5)	IY-G10

Note) () : Denotes the dimensions for long stroke. Refer to page 237 for pivot bracket.

With Rod Boot

Bore size (mm)	e	f	h	IJ	l	Z	ZZ
80	52	10	80	59	1/4 stroke	223 (237)	281.5 (295.5)
100	62	7	80	71		231 (245)	307.5 (321.5)

* The minimum stroke with rod boot is 20 mm.

With Air Cushion

Bore size (mm)	Rc, NPT, G	WA	WB	WH	Wθ
80	3/8	22	22	60.5	20°
100	1/2	22	22	71	20°

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

Technical
data

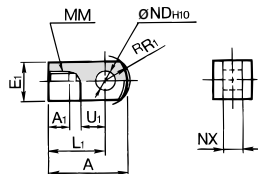
Series CG1

Accessory Bracket Dimensions

Single Knuckle Joint

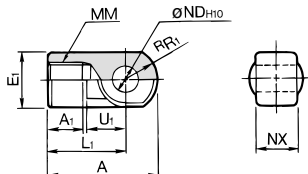
I-G02, G03

Material: Rolled steel



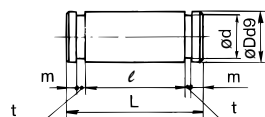
I-G04, G05, G08, G10

Material: Cast iron



Part no.	Applicable bore (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	□22	30	M14 x 1.5	12	14	10 ^{+0.058} ₀	18 ^{-0.3} _{-0.5}
I-G05	50,63	56	18	□28	40	M18 x 1.5	16	20	14 ^{+0.070} ₀	22 ^{-0.3} _{-0.5}
I-G08	80	71	21	□38	50	M22 x 1.5	21	27	18 ^{+0.070} ₀	28 ^{-0.3} _{-0.5}
I-G10	100	79	21	□44	55	M26 x 1.5	24	31	22 ^{+0.084} ₀	32 ^{-0.3} _{-0.5}

Knuckle Pin

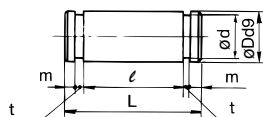


Material: Carbon steel

Part no.	Applicable bore (mm)	Dd ₉	L	d	ℓ	m	t	Applicable snap ring
IY-G02	20	8 ^{-0.040} _{-0.076}	21	7.6	16.2	1.5	0.9	Type C 8 for axis
IY-G03	25,32	10 ^{-0.040} _{-0.076}	25.6	9.6	20.2	1.55	1.15	Type C 10 for axis
IY-G04	40	10 ^{-0.040} _{-0.076}	41.6	9.6	36.2	1.55	1.15	Type C 10 for axis
IY-G05	50,63	14 ^{-0.050} _{-0.093}	50.6	13.4	44.2	2.05	1.15	Type C 14 for axis
IY-G08	80	18 ^{-0.050} _{-0.093}	64	17	56.2	2.55	1.35	Type C 18 for axis
IY-G10	100	22 ^{-0.065} _{-0.117}	72	21	64.2	2.55	1.35	Type C 22 for axis

* Retaining rings are shipped together.

Clevis Pin



Material: Carbon steel

Part no.	Applicable bore (mm)	Dd ₉	L	d	ℓ	m	t	Applicable snap ring
CD-G02	20	8 ^{-0.040} _{-0.076}	43.4	7.6	38.6	1.5	0.9	Type C 8 for axis
CD-G25	25	10 ^{-0.040} _{-0.076}	48	9.6	42.6	1.55	1.15	Type C 10 for axis
CD-G03	32	12 ^{-0.050} _{-0.093}	59.4	11.5	54	1.55	1.15	Type C 12 for axis
CD-G04	40	14 ^{-0.050} _{-0.093}	71.4	13.4	65	2.05	1.15	Type C 14 for axis
CD-G05	50	16 ^{-0.050} _{-0.093}	86	15.2	79.6	2.05	1.15	Type C 16 for axis
CD-G06	63	18 ^{-0.050} _{-0.093}	105.4	17	97.8	2.45	1.35	Type C 18 for axis

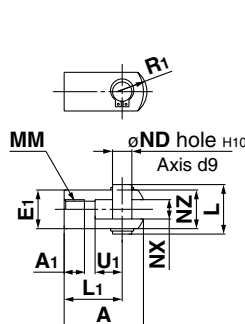
* Retaining rings are shipped together.

* Clevis pin and knuckle pin are common for bore size ø80 and ø100.

Double Knuckle Joint

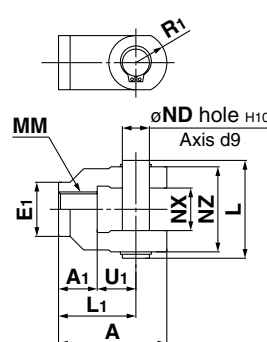
Y-G02, G03

Material: Rolled steel



Y-G04, G05, G08, G10

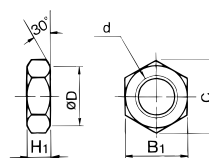
Material: Cast iron



Part no.	Applicable bore (mm)	A	A ₁	E ₁	L ₁	MM	R ₁	U ₁	ND	NX	NZ	L	Applicable 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	□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	□28	40	M18 x 1.5	16	20	14	22 ^{+0.5} _{-0.3}	44	50.6	IY-G05
Y-G08	80	71	23	□38	50	M22 x 1.5	21	27	18	28 ^{+0.5} _{-0.3}	56	64	IY-G08
Y-G10	100	79	24	□44	55	M26 x 1.5	24	31	22	32 ^{+0.5} _{-0.3}	64	72	IY-G10

* Knuckle pin and retaining ring are shipped together.

Rod End Nut



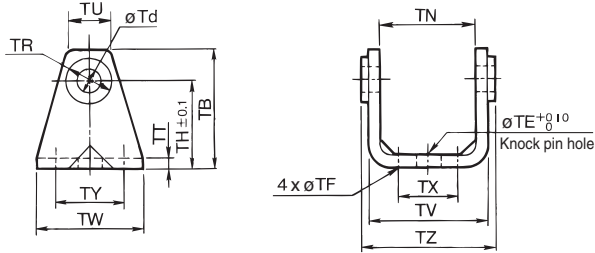
Material: Rolled steel

Part no.	Applicable bore (mm)	d	H ₁	B ₁	C	D
NT-02	20	M8 x 1.25	5	13	(15)	12.5
NT-03	25,32	M10 x 1.25	6	17	(19.6)	16.5
NT-G04	40	M14 x 1.5	8	19	(21.9)	18
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

Pivot Bracket (Order separately)

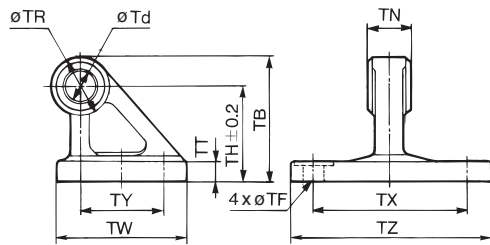
ø20 to ø63

Material: Rolled steel



ø80, ø100

Material: Cast iron



(mm)

Part no.	Applicable bore (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 ⁻⁰¹ ₋₀₃	36	11
CG-100-24A	100	90	22	—	13.5	65	32 ⁻⁰¹ ₋₀₃	50	12

Part no.	Applicable bore (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

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual
-X□

Technical
data

Air Cylinder: Standard Type Double Acting, Double Rod Series **CG1W** ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

CG1W L N 25 - 100 - **□** - **□**

With auto switch **CDG1W L N 25 - 100** - **□** - **M9BW** - **□** - **□**

With auto switch
(Built-in magnet)

Double acting, double rod type

Mounting style

B	Basic style
L	Axial foot style
F	Flange style
U*	Trunnion style

Type

N	Rubber bumper
A	Air cushion

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

* Not available for bore size ø80 and ø100.
Note) Mounting brackets are shipped together, (but not assembled).

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) CDG1WFA32-100

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 239.

Auto switch

Nil	Without auto switch
------------	---------------------

* For the applicable auto switch model, refer to the table below.

Suffix for cylinder (Rod boot)

Nil	Without rod boot
J	Nylon tarpaulin
K	Heat resistant tarpaulin
JJ	Nylon tarpaulin
KK	Heat resistant tarpaulin

Note) When equipped with a rod boot, foot and rod side flange type brackets are attached before shipment.

Number of auto switches

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

Made to Order
Refer to page 239 for details.

Applicable Auto Switch/Refer to pages 1263 to 1371 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	Applicable bore size (mm) ø20 to ø63 ø80, ø100		0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)					
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5V, 12V	—	M9N	—	●	●	●	○	—	○	IC circuit	Relay, PLC		
				3-wire (PNP)			—	G59	●	—	●	○	—	○				
	Connector	2-wire		12V	M9P		—	●	●	●	○	—	○	—				
					—		G5P	●	—	●	○	—	○					
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	5V, 12V		M9B	—	●	●	●	○	—	○	IC circuit			
							—	K59	●	—	●	○	—	○				
				3-wire (PNP)	H7C		—	●	—	●	●	●	—	—				
					—		G59W	●	—	●	○	—	○					
				2-wire	12V		M9PW	—	●	●	●	○	—	○	—			
							—	G5PW	●	—	●	○	—	○				
				Water resistant (2-color indication)	Grommet		2-wire	12V	M9BW	—	●	●	●	○	—		○	—
									—	K59W	●	—	●	○	—		○	
	With diagnostic output (2-color indication)	Grommet		4-wire (NPN)	5V, 12V		H7BA	G5BA	—	—	●	○	—	○	IC circuit			
							—	H7NF	G59F	●	—	●	○	—			○	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	A96	—	●	—	●	—	—	—	IC circuit	—	
				2-wire	24V	12V	100V	A93	—	●	—	●	—	—	—	—	—	
	100V or less	A90					—	●	—	●	—	—	—	—	—	IC circuit		
	100V, 200V	B54					●	—	●	●	—	—	—	Relay, PLC				
	200V or less	B64					●	—	●	—	—	—						
	—	C73C					—	●	—	●	●	●			—			
	Diagnostic indication (2-color indication)	Grommet					Yes	2-wire	24V	12V	24V or less	C80C	—	●	—	●	●	●
				—	B59W						●	—	●	—	—	—	—	

* Lead wire length symbols: 0.5 m Nil (Example) M9NW
1 m L (Example) M9NWM
3 m L (Example) M9NWL
5 m Z (Example) M9NWZ
None N (Example) H7CN

* Solid state auto switches marked with "○" are produced upon receipt of order.
* D-A9□V/M9□V/M9□WV and D-M9□A(V)L cannot be mounted.

* Since there are other applicable auto switches than listed, refer to page 283 for details.

* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.

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

Air Cylinder: Standard Type Double Acting, Double Rod *Series CG1W*



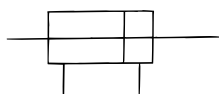
Specifications

Bore size (mm)	20	25	32	40	50	63	80	100
Action	Double acting, Double rod							
Lubricant	Not required (Non-lube)							
Fluid	Air							
Proof pressure	1.5 MPa							
Maximum operating pressure	1.0 MPa							
Minimum operating pressure	0.08 MPa							
Ambient and fluid temperature	Without auto switch: -10 to 70°C (No freezing)							
	With auto switch: -10 to 60°C (No freezing)							
Piston speed	50 to 1000 mm/s						50 to 700 mm/s	
Stroke length tolerance	up to 1000 ^{+1.4} ₀ mm, up to 1200 ^{+1.8} ₀ mm						up to 1000 ^{+1.4} ₀ mm, up to 1500 ^{+1.8} ₀ mm	
Cushion	Rubber bumper, Air cushion							
Mounting *	Basic style, Axial foot style, Rod side flange style, Rod side trunnion style							



* Rod side trunnion style is not available for bore sizes ø80 and ø100.

JIS Symbol



Made to Order Specifications
(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
—XA□	Change of rod end shape
—XB6	Heat resistant cylinder (150°C)*1
—XB7	Cold resistant cylinder*2
—XC6	Piston rod and rod end nut made of stainless steel
—XC13	Auto switch rail mounting style
—XC22	Fluororubber seals
—XC37	Large throttle diameter of connecting port

* 1 Cylinders with rubber bumper have no bumper.

* 2 Compatible with cylinders with rubber bumper, but has no bumper.

Refer to pages 279 to 283 for cylinders with auto switches.

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

Accessory

Mounting		Basic style	Axial foot style	Rod side flange style	Rod side trunnion style
Standard equipment	Rod end nut	●	●	●	●
	Single knuckle joint	●	●	●	●
Option	Double knuckle joint (With pin)**	●	●	●	●
	Pivot bracket *	—	—	—	●*
	Rod boot	●	●	●	●

* Not available for bore size ø80 and ø100.

** Pin and retaining ring are shipped together with double knuckle joint.

Standard Stroke

Bore size (mm)	Standard stroke (mm) ⁽¹⁾	Long stroke (mm)	Maximum manufacturable stroke
20	25, 50, 75, 100, 125, 150, 200	201 to 350	1500
25	25, 50, 75, 100, 125, 150, 200 250, 300	301 to 400	
32		301 to 450	
40		301 to 800	
50, 63		301 to 1200	
80		301 to 1400	
100		301 to 1500	

Note 1) Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Note 2) Long stroke is compatible with the axial foot and rod side flange types. When other mounting brackets are used or the long stroke exceeds the limit, the allowable maximum stroke length is determined using the stroke selection table (front matter 28)

Rod Boot Material

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

* Maximum ambient temperature for the rod boot itself.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

Technical data

Series CG1W

Mass

(kg)

Bore size (mm)		20	25	32	40	50	63	80	100
Basic mass	Basic style	0.13	0.22	0.33	0.55	1.02	1.37	2.64	4.09
	Axial foot style	0.24	0.35	0.49	0.77	1.50	2.09	3.60	5.84
	Flange style	0.21	0.32	0.47	0.75	1.36	1.87	3.35	5.44
	Trunnion style	0.14	0.24	0.36	0.60	1.16	1.51	—	—
Pivot bracket		0.08	0.09	0.17	0.25	0.44	0.80	—	—
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 mass per each 50 mm of stroke		0.07	0.10	0.13	0.23	0.34	0.38	0.54	0.77
Additional mass with air cushion		0.01	0.01	0.02	0.02	0.03	0.03	0.09	0.10

Calculation: (Example) **CG1WLN32-100** (Foot style, ø32, 100 st)

- Basic mass.....0.49 (Foot, ø32)
- Cylinder stroke.....100 st
- Additional mass.....0.13/50 st

$$0.49 + 0.13 \times 100/50 = 0.75 \text{ kg}$$



Precautions

- Be sure to read before handling.
- Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Mounting Bracket Part No.

Mounting bracket	Min. order	Bore size(mm)								Description
		20	25	32	40	50	63	80	100	
Axial foot	Note) 2	CG-L020	CG-L025	CG-L032	CG-L040	CG-L050	CG-L063	CG-L080	CG-L100	Foot x 2, Mounting bolt x 8
Flange	1	CG-F020	CG-F025	CG-F032	CG-F040	CG-F050	CG-F063	CG-F080	CG-F100	Flange x 1, Mounting bolt x 4
Trunnion pin	1	CG-T020	CG-T025	CG-T032	CG-T040	CG-T050	CG-T063	—	—	Trunnion pin x 2, Trunnion bolt x 2, Flat washer x 2
Pivot bracket	1	CG-020-24A	CG-025-24A	CG-032-24A	CG-040-24A	CG-050-24A	CG-063-24A	—	—	Pivot bracket x 1

Note) Order two foot brackets per cylinder.

Air-hydro

CG1 **Mounting style** H **Bore size** — **Stroke**

↓
Air-hydro

Low pressure hydraulic cylinder of 1.0 MPa or less

When used together with a Series CC air-hydro unit, constant and low speed actuation and intermediate stopping similar to hydraulic units are possible with the use of valves and other pneumatic equipment.

Specifications

Type	Air-hydro
Bore size (mm)	20, 25, 32, 40, 50, 63
Action	Double acting
Fluid	Turbine oil
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Minimum operating pressure	0.18 MPa
Piston speed	15 to 300 mm/s
Cushion	None
Ambient and fluid temperature	+5 to 60°C
Mounting	Basic style, Axial foot style, Flange style, Trunnion style

* Auto switch can be mounted.

* Dimensions are the same as the double rod standard type on page 242.

Copper and Fluorine-free

20-CG1 **Mounting style** **Type** **Bore size** — **Stroke**

↓
Copper/Fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.

Specifications

Bore size (mm)		20, 25, 32, 40, 50, 63, 80, 100
Action		Double acting
Fluid		Air
Maximum operating pressure		1.0 MPa
Minimum operating pressure		0.08 MPa
Cushion	Type N	With rubber bumper
	Type A	With air cushion
Piston speed	ø20 to 63	50 to 1000 mm/s
	ø80-100	50 to 700 mm/s
Mounting *		Basic style, Axial foot style Flange style, Trunnion style

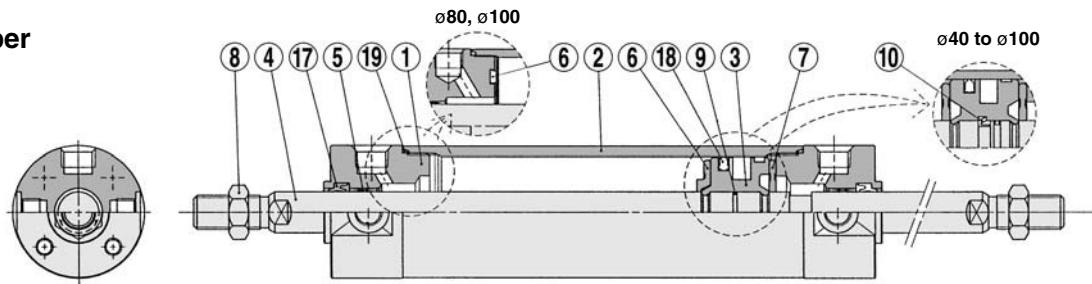
* Rod side trunnion style is not available for bore sizes ø80 and ø100.

Dimensions are the same as the double rod standard type. Refer to page 242.

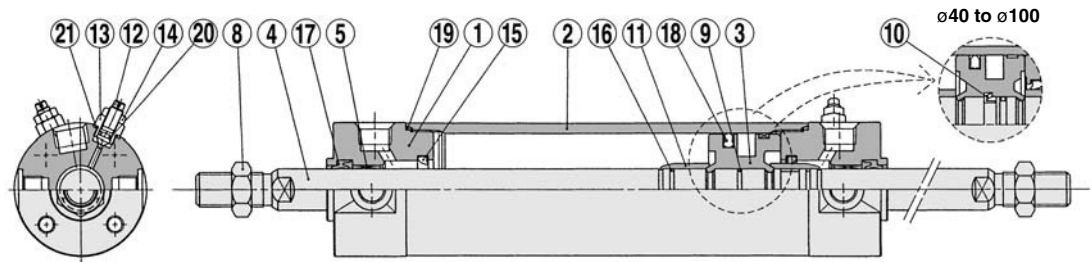
* Auto switch can be mounted.

Construction

With rubber bumper



With air cushion



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Clear hard anodized
2	Cylinder tube	Aluminum alloy	Hard anodized
3	Piston	Aluminum alloy	Chromated *
4	Piston rod	Carbon steel *	Hard chrome plated
5	Bushing	Copper oil-impregnated sintered alloy	ø40 or more: Copper alloy
6	Bumper A	Urethane	
7	Bumper B	Urethane	ø40 or larger: The same as bumper A
8	Rod end nut	Rolled steel	Nickel plated
9	Piston gasket	NBR	
10	Piston holder	Urethane	ø40 or more *
11	Cushion ring	Aluminum alloy	Anodized
12	Cushion valve	Rolled steel	Electroless nickel plated
13	Valve retainer	Rolled steel	Nickel plated
14	Lock nut	Carbon steel	
15	Cushion seal	Urethane	
16	Cushion ring gasket	NBR	
17	Rod seal	NBR	
18	Piston seal	NBR	
19	Tube gasket	NBR	
20	Valve seal	NBR	
21	Valve retaining gasket	NBR	

Note) In the case of cylinders with auto switches, magnets are installed in the piston.

* The material is stainless steel on auto switch equipped styles ø20 and ø25.

Replacement Parts/Seal Kit

• For rubber bumper

Bore size (mm)	Kit no.	Contents
20	CG1WN20-PS	Set of the nos. ⑬, ⑭, ⑰
25	CG1WN25-PS	
32	CG1WN32-PS	
40	CG1WN40-PS	

• For air cushion

Bore size (mm)	Kit no.	Contents
20	CG1WA20-PS	Set of the nos. ⑰, ⑱, ⑲, ⑳, ㉑
25	CG1WA25-PS	
32	CG1WA32-PS	
40	CG1WA40-PS	

Note) Refer to the Specific Product Precautions on page 226 for Disassembly/Replacement.

Order with a part number for each type and 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 no.: GR-S-010 (10 g)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

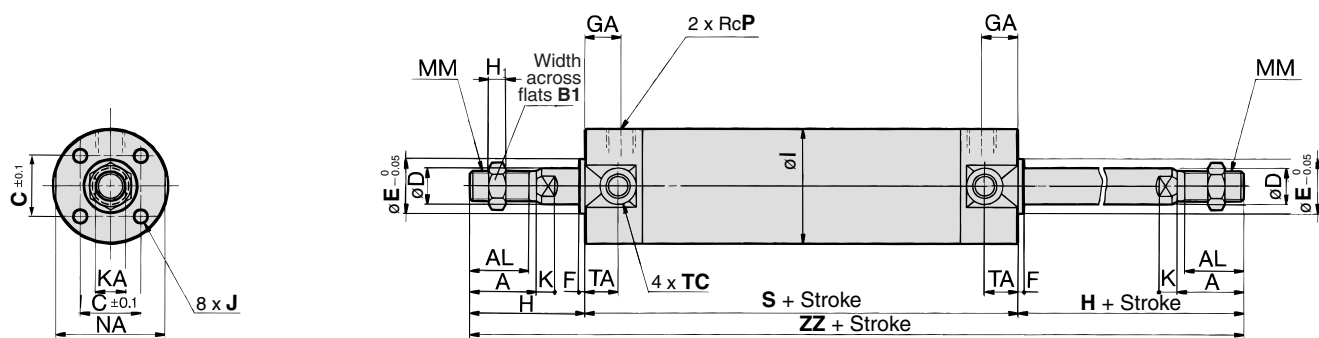
-X□

Individual
-X□

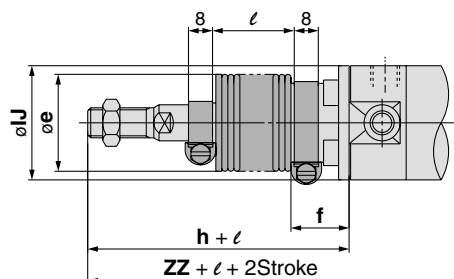
Technical
data

Series CG1W

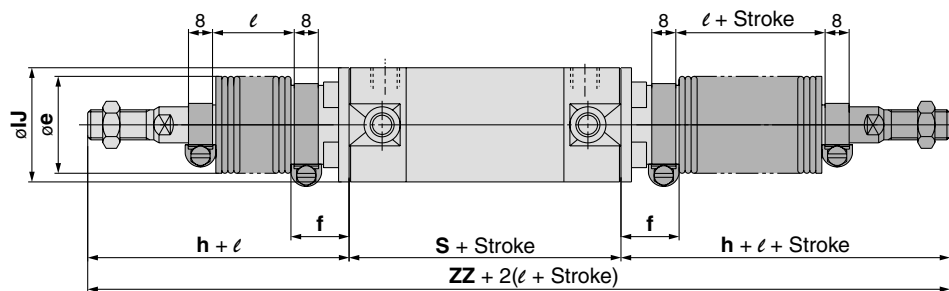
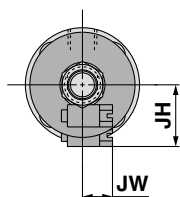
Basic Style with Rubber Bumper: CG1WBN



<With rod boot at one end>



<With rod boot at both ends>



(mm)																		
Bore size (mm)	Stroke range (mm)	A	AL	B ₁	C	D	E	F	GA	H ₁	I	J	K	KA	MM	NA	P	S
20	Up to 350	18	15.5	13	14	8	12	2	12	5	26	M4 x 0.7 depth 7	5	6	M8 x 1.25	24	1/8	77
25	Up to 400	22	19.5	17	16.5	10	14	2	12	6	31	M5 x 0.8 depth 7.5	5.5	8	M10 x 1.25	29	1/8	77
32	Up to 450	22	19.5	17	20	12	18	2	12	6	38	M5 x 0.8 depth 8	5.5	10	M10 x 1.25	35.5	1/8	79
40	Up to 800	30	27	19	26	16	25	2	13	8	47	M6 x 1 depth 12	6	14	M14 x 1.5	44	1/8	87
50	Up to 1200	35	32	27	32	20	30	2	14	11	58	M8 x 1.25 depth 16	7	18	M18 x 1.5	55	1/4	102
63	Up to 1200	35	32	27	38	20	32	2	14	11	72	M10 x 1.5 depth 16	7	18	M18 x 1.5	69	1/4	102
80	Up to 1400	40	37	32	50	25	40	3	20	13	89	M10 x 1.5 depth 22	10	22	M22 x 1.5	80	3/8	122
100	Up to 1500	40	37	41	60	30	50	3	20	16	110	M12 x 1.75 depth 22	10	26	M26 x 1.5	100	1/2	122

Bore size (mm)	TA	TC **	Without rod boot							With rod boot on one side *					With rod boot on both sides *	
			H	ZZ	e	f	h	IJ	JH (Reference)	JW (Reference)	l	ZZ	ZZ	ZZ	ZZ	ZZ
20	11	M5 x 0.8	35	147	30	18	55	27	15.5	10.5	1/4 stroke	167	187			
25	11	M6 x 0.75	40	157	30	19	62	32	16.5	10.5		179	201			
32	11	M8 x 1.0	40	159	35	19	62	38	18.5	10.5		181	203			
40	12	M10 x 1.25	50	187	35	19	70	48	21.5	10.5		207	227			
50	13	M12 x 1.25	58	218	40	19	78	59	24	10.5		238	258			
63	13	M14 x 1.5	58	218	40	20	78	72	24	10.5		238	258			
80	—	—	71	264	52	10	80	59	—	—		273	282			
100	—	—	71	264	62	7	80	71	—	—		273	282			

Air-hydro

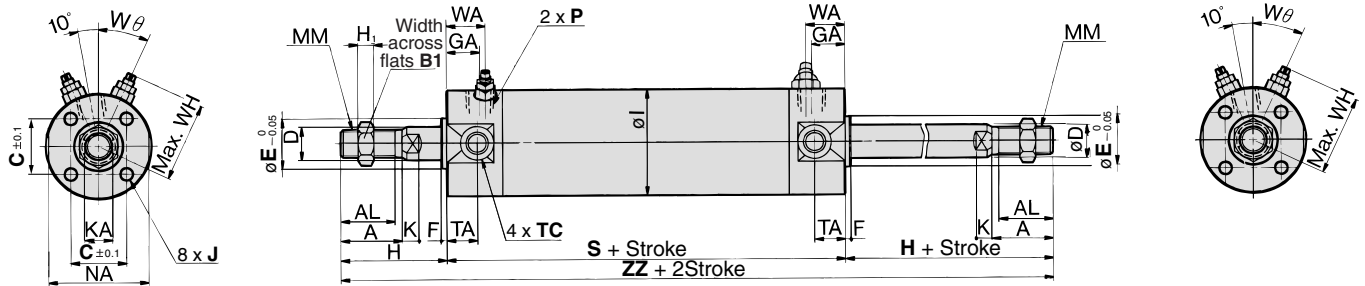
Bore size (mm)	S	ZZ
20	77	147
25	77	157
32	79	159
40	87	187
50	102	218
63	102	218



* The minimum stroke with rod boot is 20 mm.

** Trunnion mounting taps with width across flats NA are not attached for bore sizes ø80 and ø100.

Basic Style with Air Cushion: CG1WBA



* For the one with rod boot, refer to w/ rubber bumper. (mm)

Bore size (mm)	Standard stroke range (mm)	Long stroke range (mm)	A	AL	B ₁	C	D	E	F	GA	H	H ₁	I	J	K	KA
20	Up to 200	201 to 350	18	15.5	13	14	8	12	2	12	35	5	26	M4 x 0.7 depth 7	5	6
25	Up to 300	301 to 400	22	19.5	17	16.5	10	14	2	12	40	6	31	M5 x 0.8 depth 7.5	5.5	8
32	Up to 300	301 to 450	22	19.5	17	20	12	18	2	12	40	6	38	M5 x 0.8 depth 8	5.5	10
40	Up to 300	301 to 800	30	27	19	26	16	25	2	13	50	8	47	M6 x 1 depth 12	6	14
50	Up to 300	301 to 1200	35	32	27	32	20	30	2	14	58	11	58	M8 x 1.25 depth 16	7	18
63	Up to 300	301 to 1200	35	32	27	38	20	32	2	14	58	11	72	M10 x 1.5 depth 16	7	18
80	Up to 300	301 to 1400	40	37	32	50	25	40	3	20	71	13	89	M10 x 1.5 depth 22	10	22
100	Up to 300	301 to 1500	40	37	41	60	30	50	3	20	71	16	110	M12 x 1.75 depth 22	10	26

Bore size (mm)	MM	NA	P	S	TA	TC **	ZZ	WA	WH	Wθ
20	M8 x 1.25	24	M5 x 0.8	77	11	M5 x 0.8	147	16	23	30°
25	M10 x 1.25	29	M5 x 0.8	77	11	M6 x 0.75	157	16	25	30°
32	M10 x 1.25	35.5	Rc 1/8	79	11	M8 x 1.0	159	16	28.5	25°
40	M14 x 1.5	44	Rc 1/8	87	12	M10 x 1.25	187	16	33	20°
50	M18 x 1.5	55	Rc 1/4	102	13	M12 x 1.25	218	18	40.5	20°
63	M18 x 1.5	69	Rc 1/4	102	13	M14 x 1.5	218	18	47.5	20°
80	M22 x 1.5	80	Rc 3/8	122	—	—	264	22	60.5	20°
100	M26 x 1.5	100	Rc 1/2	122	—	—	264	22	71	20°



* For mounting brackets, refer to page 244.

** Trunnion mounting taps with width across flats NA are not attached for bore sizes ø80 and ø100.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

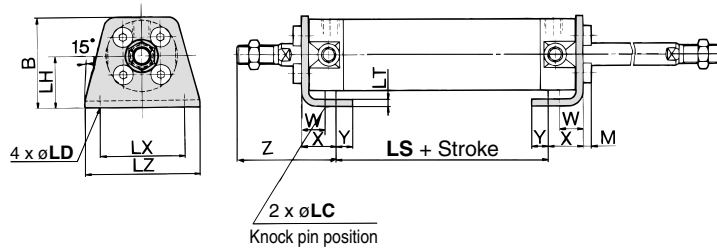
Individual
-X□

Technical
data

Series CG1W

With Mounting Bracket

Axial foot style: CG1WL□

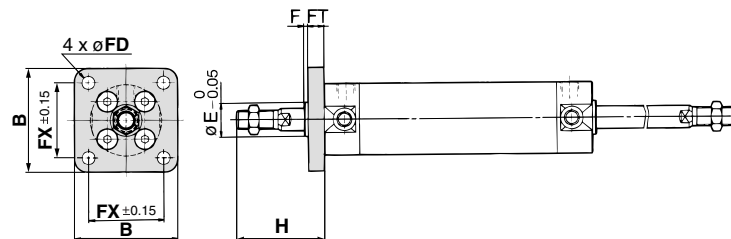


Foot Style

Bore size (mm)	Stroke range (mm)	B	LC	LD	LH	LS	LT	LX	LZ	M	W	X	Y	Z
20	Up to 350	34	4	6	20	53	3	32	44	3	10	15	7	47
25	Up to 400	38.5	4	6	22	53	3	36	49	3.5	10	15	7	52
32	Up to 450	45	4	7	25	53	3	44	58	3.5	10	16	8	53
40	Up to 800	54.5	4	7	30	60	3	54	71	4	10	16.5	8.5	63.5
50	Up to 1200	70.5	5	10	40	67	4.5	66	86	5	17.5	22	11	75.5
63	Up to 1200	82.5	5	12	45	67	4.5	82	106	5	17.5	22	13	75.5
80	Up to 1400	101	6	11	55	74	4.5	100	125	5	20	28.5	14	95
100	Up to 1500	121	6	14	65	74	6	120	150	7	20	30	16	95

* Other dimensions are the same as basic style.

Flange style: CG1WF□



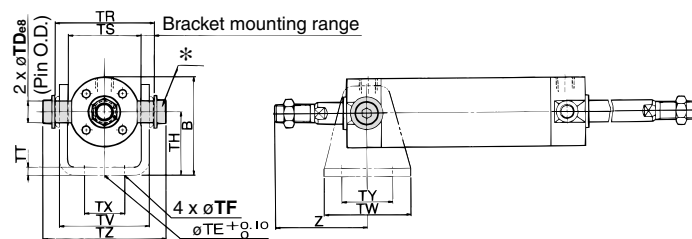
Flange Style

Bore size (mm)	Stroke range (mm)	B	E	F	FX	FD	FT	H
20	Up to 350	40	12	2	28	5.5	6	35
25	Up to 400	44	14	2	32	5.5	7	40
32	Up to 450	53	18	2	38	6.6	7	40
40	Up to 800	61	25	2	46	6.6	8	50
50	Up to 1200	76	30	2	58	9	9	58
63	Up to 1200	92	32	2	70	11	9	58
80	Up to 1400	104	40	3	82	11	11	71
100	Up to 1500	128	50	3	100	14	14	71

* End boss is machined on the flange for øE.

* Other dimensions are the same as basic style.

Trunnion style: CG1WU□



Trunnion Style

Bore size (mm)	Stroke range (mm)	B	TDe8	TE	TF	TH	TR	TS
20	Up to 200	38	8 ^{-0.025} _{-0.047}	10	5.5	25	39	28
25	Up to 300	45.5	10 ^{-0.025} _{-0.047}	10	5.5	30	43	33
32	Up to 300	54	12 ^{-0.032} _{-0.059}	10	6.6	35	54.5	40
40	Up to 500	63.5	14 ^{-0.032} _{-0.059}	10	6.6	40	65.5	49
50	Up to 600	79	16 ^{-0.032} _{-0.059}	20	9	50	80	60
63	Up to 600	96	18 ^{-0.032} _{-0.059}	20	11	60	98	74

Bore size (mm)	TT	TV	TW	TX	TY	TZ	Z
							Without rod boot
20	3.2	(35.8)	42	16	28	47.6	66 + ℓ
25	3.2	(39.8)	42	20	28	53	73 + ℓ
32	4.5	(49.4)	48	22	28	67.7	73 + ℓ
40	4.5	(58.4)	56	30	30	78.7	82 + ℓ
50	6	(72.4)	64	36	36	98.6	91 + ℓ
63	8	(90.4)	74	46	46	119.2	91 + ℓ

* Consists of pin, flat washer and hexagon socket head cap bolt.

* Other dimensions are the same as basic style.

Air Cylinder: Standard Type Single Acting, Spring Return/Extend

Series CG1

ø20, ø25, ø32, ø40

How to Order

CG1 L N 25-100 S - []

With auto switch **CDG1 L N 25-100 S** - **M9BW** [] - []

With auto switch
(Built-in magnet)

Mounting style

B	Basic style	U	Rod side trunnion style
L	Axial foot style	T	Head side trunnion style
F	Rod side flange style	D	Clevis style
G	Head side flange style		

Note) Mounting brackets are shipped together, (but not assembled).

Type

N	Rubber bumper
----------	---------------

Bore size

20	20 mm
25	25 mm
32	32 mm
40	40 mm

Action

S	Single acting, Spring return
T	Single acting, Spring extend

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 246.

Auto switch

Nil	Without auto switch
------------	---------------------

* For the applicable auto switch model, refer to the table below.

Number of auto switches

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

Made to Order
Refer to page 246 for details.

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) CDG1FN32-100T

Applicable Auto Switch/Refer to pages 1263 to 1371 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	Applicable bore size (mm)	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)				
							ø20 to ø40									
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5V,12V	—	M9N	●	●	●	○	—	○	IC circuit	Relay, PLC	
		3-wire (PNP)		M9P			●	●	●	○	—	○				
	Connector	2-wire		12V	M9B		●	●	●	○	—	○	—			
		H7C		●	—		●	●	●	—	—					
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	5V,12V		M9NW	●	●	●	○	—	○	IC circuit		
				3-wire (PNP)			M9PW	●	●	●	○	—	○			
				2-wire	12V		M9BW	●	●	●	○	—	○	—		
					H7BA		—	—	●	○	—	○				
				Water resistant (2-color indication)	4-wire (NPN)		5V,12V	H7NF	●	—	●	○	—	○		IC circuit
				With diagnostic output (2-color indication)												
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	A96	●	—	●	—	—	—	IC circuit	Relay, PLC
				2-wire	24V	12V	100V	A93	●	—	●	—	—	—	—	
							100V or less	A90	●	—	●	—	—	—	IC circuit	
							100V, 200V	B54	●	—	●	●	—	—	—	
							200V or less	B64	●	—	●	—	—	—		
							—	C73C	●	—	●	●	●	—	IC circuit	
		24V or less	C80C				●	—	●	●	●	—				
		Connector	None	—	—	B59W	●	—	●	—	—	—	—			
				Diagnostic indication (2-color indication)	Grommet	Yes										

* Lead wire length symbols: 0.5 m Nil
1 m M
3 m L
5 m Z
None N

(Example) M9NW
(Example) M9NWM
(Example) M9NWL
(Example) M9NWZ
(Example) H7CN

* Solid state auto switches marked with "O" are produced upon receipt of order.
* D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L cannot be mounted.

* Since there are other applicable auto switches than listed, refer to page 283 for details.
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
* D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled before shipped.)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual
-X□

Technical
data

Series CG1



Specifications

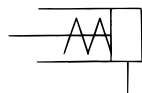
Bore size (mm)	20	25	32	40	20	25	32	40
Action	Single acting, Spring return				Single acting, Spring extend			
Lubricant	Not required (Non-lube)							
Fluid	Air							
Proof pressure	1.5 MPa							
Maximum operating pressure	1.0 MPa							
Minimum operating pressure	0.18 MPa				0.23 MPa			
Ambient and fluid temperature	Without auto switch: -10 to 70°C (No freezing)							
	With auto switch: -10 to 60°C (No freezing)							
Piston speed	50 to 1000 mm/s							
Stroke length tolerance	Up to 200 ^{st+1.4} ₀ mm							
Cushion	Rubber bumper							
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Rod side trunnion style, Head side trunnion style, Clevis style (Used for changing the port location by 90°.)							

Accessory

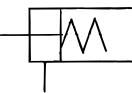
Mounting		Basic style	Axial foot style	Rod side flange style	Head side flange style	Rod side trunnion style	Head side trunnion style	Clevis style
Standard equipment	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	—	●
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint* (With pin)	●	●	●	●	●	●	●
	Pivot bracket	—	—	—	—	●	●	●

* Pin and retaining ring are shipped together with double knuckle joint.

JIS Symbol
Spring return



Spring extend



Made to Order Specifications

(For details, refer to pages 1426 and 1461.)

Symbol	Specifications
—XC6	Piston rod and rod end nut made of stainless steel
—XC20	Head cover axial port

Refer to pages 279 to 283 for cylinders with auto switches.

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



Precautions

Be sure to read before handling.
Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Standard Stroke

Bore size (mm)	Standard stroke (mm) ⁽¹⁾
20	25,50,75,100,125
25, 32, 40	25,50,75,100,125,150,200

Note 1) Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Theoretical Output

Refer to page 1574 (Theoretical Output Table 2).

Spring Reaction Force

Refer to page 1570 (Table (3) Spring Reaction Force).

Mounting Bracket Part No.

Mounting bracket	Min. order	Bore size (mm)				Description
		20	25	32	40	
Axial foot	Note) 2	CG-L020	CG-L025	CG-L032	CG-L040	Foot x 2, Mounting bolt x 8
Flange	1	CG-F020	CG-F025	CG-F032	CG-F040	Flange x 1, Mounting bolt x 4
Trunnion pin	1	CG-T020	CG-T025	CG-T032	CG-T040	Trunnion pin x 2, Trunnion bolt x 2, Flat washer x 2
Clevis	1	CG-D020	CG-D025	CG-D032	CG-D040	Clevis x 1, Mounting bolt x 4, Clevis pin x 1, Retaining ring x 2
Pivot bracket	1	CG-020-24A	CG-025-24A	CG-032-24A	CG-040-24A	Pivot bracket x 1

Note) Order two foot brackets per cylinder.

Air Cylinder: Standard Type Single Acting, Spring Return/Extend **Series CG1**

Mass

(kg)

Spring return					
Bore size (mm)		20	25	32	40
Basic mass	25 stroke	0.17	0.27	0.40	0.63
	50 stroke	0.19	0.30	0.45	0.71
	75 stroke	0.26	0.40	0.58	0.91
	100 stroke	0.28	0.43	0.62	0.99
	125 stroke	0.35	0.53	0.76	1.20
	150 stroke	—	0.56	0.81	1.28
	200 stroke	—	0.69	0.98	1.56
Mounting bracket mass	Axial foot style	0.11	0.13	0.16	0.22
	Flange style	0.08	0.10	0.14	0.20
	Trunnion style	0.01	0.02	0.03	0.05
	Clevis style	0.05	0.08	0.15	0.23
Accessory bracket	Pivot bracket	0.08	0.09	0.17	0.25
	Single knuckle joint	0.05	0.09	0.09	0.10
	Double knuckle (With pin)	0.05	0.09	0.09	0.13

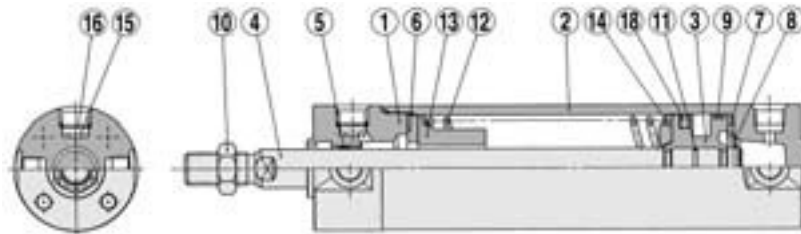
Calculation: (Example) **CG1LN20-100S** (Foot style, ø20, 100 st)
 • Basic mass.....0.28 kg (ø20) • Mounting bracket mass.....0.11 kg (Foot)
 0.28 + 0.11 = 0.39 kg

Spring extend					
Bore size (mm)		20	25	32	40
Basic mass	25 stroke	0.16	0.25	0.38	0.59
	50 stroke	0.18	0.28	0.43	0.67
	75 stroke	0.24	0.37	0.54	0.83
	100 stroke	0.26	0.40	0.58	0.91
	125 stroke	0.32	0.48	0.69	1.08
	150 stroke	—	0.50	0.72	1.12
	200 stroke	—	0.63	0.89	1.40
Mounting bracket mass	Axial foot style	0.11	0.13	0.16	0.22
	Flange style	0.08	0.10	0.14	0.20
	Trunnion style	0.01	0.02	0.03	0.05
	Clevis style	0.05	0.08	0.15	0.23
Accessory bracket	Pivot bracket	0.08	0.09	0.17	0.25
	Single knuckle joint	0.05	0.09	0.09	0.10
	Double knuckle (With pin)	0.05	0.09	0.09	0.13

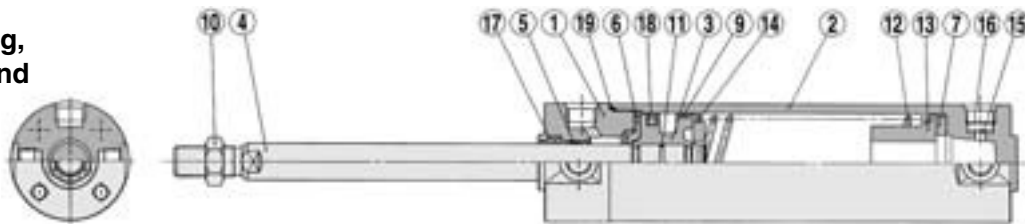
Calculation: (Example) **CG1LN20-100T** (Foot style, ø20, 100 st)
 • Basic mass.....0.26 kg (ø20) • Mounting bracket mass.....0.11 kg (Foot)
 0.26 + 0.11 = 0.37 kg

Construction

Single acting, Spring return



Single acting, Spring extend



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Clear hard anodized
2	Tube cover	Aluminum alloy	Clear hard anodized
3	Piston	Aluminum alloy	Chromated
4	Piston rod	Carbon steel *	Hard chrome plated *
5	Bushing	Copper oil-impregnated sintered alloy	ø40 or more: Copper alloy
6	Bumper A	Urethane	
7	Bumper B	Urethane	
8	Retaining ring	Stainless steel	
9	Wear ring	Resin	Nickel plated
10	Rod end nut	Rolled steel	
11	Piston gasket	NBR	Zinc chromated
12	Return spring	Steel wire	Chromated
13	Spring guide	Aluminum alloy	Chromated
14	Spring seat	Aluminum alloy	
15	Element	Oil-impregnated sintered alloy	
16	Retaining ring	Copper wire	
17	Rod seal	NBR	
18	Piston seal	NBR	
19	Tube gasket	NBR	

Note) In the case of cylinders with auto switches, rubber magnets are installed in the piston.

* The material is stainless steel on auto switch equipped styles ø20 and ø25.

Replacement Parts/Seal

• For single acting, spring return

No.	Description	Material	Part no.			
			20	25	32	40
18	Piston seal	NBR	PPD-20	PPD-25-19	PPD-32	PPD-40

* Since the seal kit does not include a grease pack, order it separately.

Grease pack part no.: GR-S-010 (10 g)

• For single acting, spring extend

Replacement parts/Seal kits are the same as standard type, double acting, single rod (with rubber bumper). Refer to page 227.

Note) Refer to the Specific Product Precautions on page 226 for Disassembly/Replacement.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

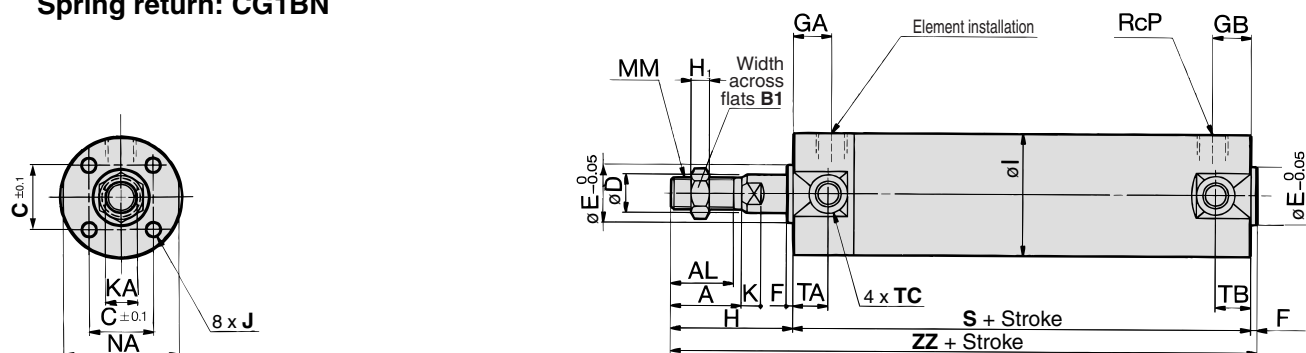
Individual
-X□

Technical
data

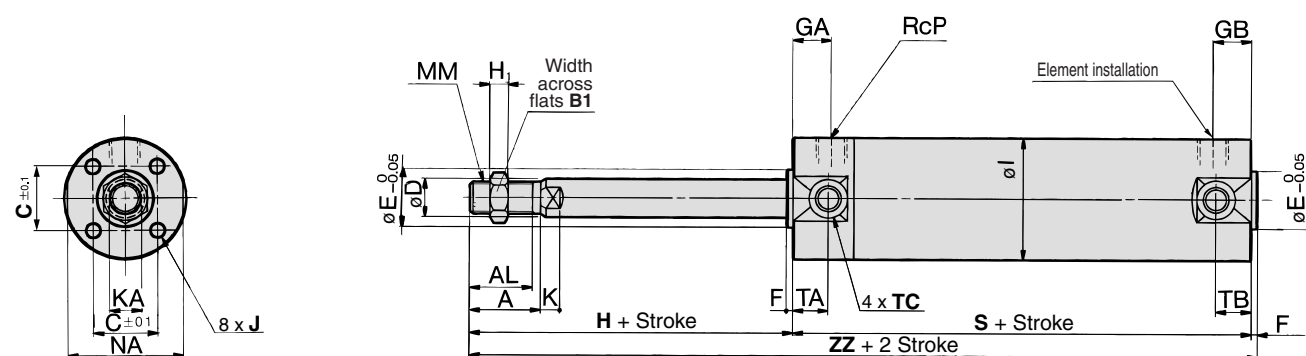
Series CG1

Basic Style

Spring return: CG1BN



Spring extend: CG1BN

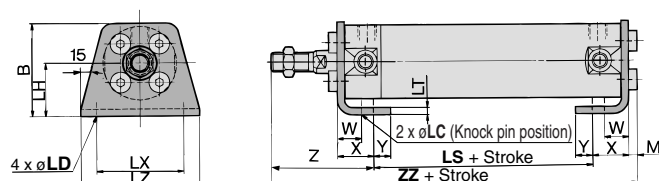


Bore size (mm)	Stroke range (mm)	A	AL	B1	C	D	E	F	GA	GB	H	H1	I	J	K	KA	MM	NA	P
20	Up to 125	18	15.5	13	14	8	12	2	12	10	35	5	26	M4 x 0.7 depth 7	5	6	M8 x 1.25	24	1/8
25	Up to 200	22	19.5	17	16.5	10	14	2	12	10	40	6	31	M5 x 0.8 depth 7.5	5.5	8	M10 x 1.25	29	1/8
32	Up to 200	22	19.5	17	20	12	18	2	12	10	40	6	38	M5 x 0.8 depth 8	5.5	10	M10 x 1.25	35.5	1/8
40	Up to 200	30	27	19	26	16	25	2	13	10	50	8	47	M6 x 1 depth 12	6	14	M14 x 1.5	44	1/8

Bore size (mm)	TA	TB	TC	1 to 50st		51 to 100st		101 to 125st		126 to 200st	
				S	ZZ	S	ZZ	S	ZZ	S	ZZ
20	11	11	M5 x 0.8	94	131	119	156	144	181	—	—
25	11	11	M6 x 0.75	94	136	119	161	144	186	169	211
32	11	10	M8 x 1.0	96	138	121	163	146	188	171	213
40	12	10	M10 x 1.25	103	155	128	180	153	205	178	230

With Mounting Bracket (Note) The drawing below shows the single acting/spring return style. The rod is in retracted state for spring extend type.

Axial foot style: CG1LN



Axial Foot Style

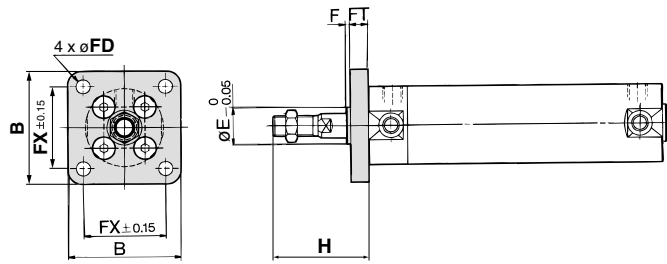
Bore size (mm)	Stroke range (mm)	B	M	LC	LD	LH	LT	LX	LZ	W	X	Y	Z
20	Up to 125	34	3	4	6	20	3	32	44	10	15	7	47
25	Up to 200	38.5	3.5	4	6	22	3	36	49	10	15	7	52
32	Up to 200	45	3.5	4	7	25	3	44	58	10	16	8	53
40	Up to 200	54.5	4	4	7	30	3	54	71	10	16.5	8.5	63.5

Bore size (mm)	1 to 50st		51 to 100st		101 to 125st		126 to 200st	
	LS	ZZ	LS	ZZ	LS	ZZ	LS	ZZ
20	70	135	95	160	120	185	—	—
25	70	140.5	95	165.5	120	190.5	145	215.5
32	70	142.5	95	167.5	120	192.5	145	217.5
40	76	160	101	185	126	210	151	235

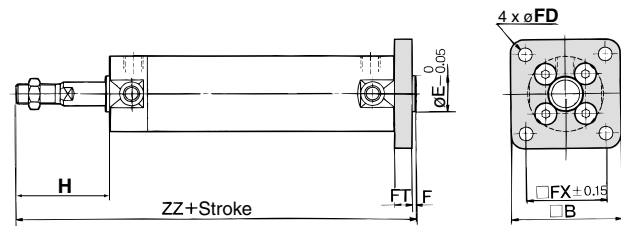
* Other dimensions are the same as basic style.

With Mounting Bracket

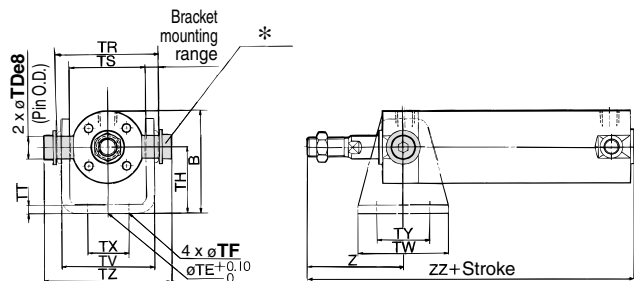
Rod side flange style: CG1FN



Head side flange style: CG1GN

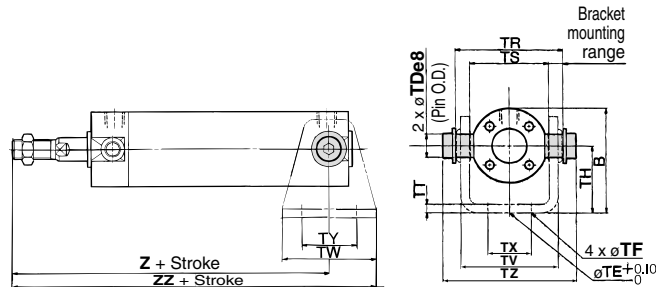


Rod side trunnion style: CG1UN

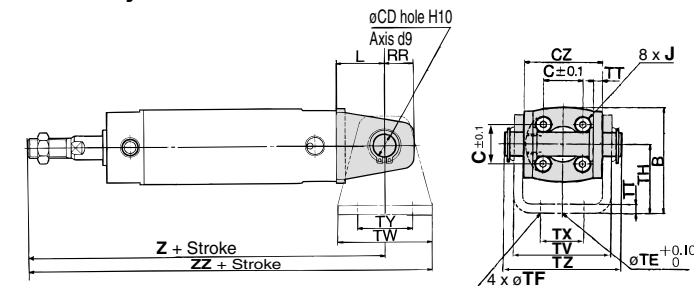


* Clevis pin and retaining ring are shipped together.

Head side trunnion style: CG1TN



Clevis style: CG1DN



(The above shows the case port location is changed by 90°.)

Bore size (mm)	Stroke range (mm)	B	E	F	FX	FD	FT	H
20	Up to 125	40	12	2	28	5.5	6	35
25	Up to 200	44	14	2	32	5.5	7	40
32	Up to 200	53	18	2	38	6.6	7	40
40	Up to 200	61	25	2	46	6.6	8	50

* End boss is machined on the flange for øE.

* Other dimensions are the same as basic style.

Rod Side Flange Style (mm)

Bore size (mm)	ZZ			
	1 to 50st	51 to 100st	101 to 125st	126 to 200st
20	131	156	181	—
25	136	161	186	211
32	138	163	188	213
40	155	180	205	230

Head Side Flange Style (mm)

Bore size (mm)	ZZ			
	1 to 50st	51 to 100st	101 to 125st	126 to 200st
20	137	162	187	—
25	143	168	193	218
32	145	170	195	220
40	163	188	213	238

Bore size (mm)	Stroke range (mm)	B	TDe8	TE	TF	TH	TR	TS	TT	TV	TW	TX	TY	TZ
20	Up to 125	38	8 $\begin{smallmatrix} -0.025 \\ -0.047 \end{smallmatrix}$	10	5.5	25	39	28	3.2	(35.8)	42	16	28	47.6
25	Up to 200	45.5	10 $\begin{smallmatrix} -0.025 \\ -0.047 \end{smallmatrix}$	10	5.5	30	43	33	3.2	(39.8)	42	20	28	53
32	Up to 200	54	12 $\begin{smallmatrix} -0.032 \\ -0.059 \end{smallmatrix}$	10	6.6	35	54.5	40	4.5	(49.4)	48	22	28	67.7
40	Up to 200	63.5	14 $\begin{smallmatrix} -0.032 \\ -0.059 \end{smallmatrix}$	10	6.6	40	65.5	49	4.5	(58.4)	56	30	30	78.7

* Consists of pin, flat washer and hexagon socket head cap bolt.

* Other dimensions are the same as basic style.

Rod Side Trunnion Style (mm)

Bore size (mm)	Z	ZZ			
		1 to 50st	51 to 100st	101 to 125st	126 to 200st
20	46	131	156	181	—
25	51	136	161	186	211
32	51	138	163	188	213
40	62	155	180	205	230

Head Side Trunnion Style (mm)

Bore size (mm)	1 to 50st	51 to 100st	101 to 125st	126 to 200st
	Z	ZZ	Z	ZZ
20	118	139	143	168
25	123	144	148	173
32	126	150	151	176
40	143	171	168	196

Clevis Style (mm)

Bore size (mm)	Stroke range (mm)	B	CD	CZ	L	RR	TE	TF	H	TT	TV
20	Up to 125	38	8	29	14	11	10	5.5	25	3.2	(35.8)
25	Up to 200	45.5	10	33	16	13	10	5.5	30	3.2	(39.8)
32	Up to 200	54	12	40	20	15	10	6.6	35	4.5	(49.4)
40	Up to 200	63.5	14	49	22	18	10	6.6	40	4.5	(58.4)

Bore size (mm)	TW	TX	TY	TZ	1 to 50st	51 to 100st	101 to 125st	126 to 200st
					Z	ZZ	Z	ZZ
20	42	16	28	43.4	143	164	168	189
25	42	20	28	48	150	171	175	196
32	48	22	28	59.4	156	180	181	205
40	56	30	30	71.4	175	200	200	228

* For dimensions of pivot bracket, refer to page 237.

* Other dimensions are the same as basic style.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

Technical data

Air Cylinder: Non-rotating Rod Type Double Acting

Series *CG1K*

ø20, ø25, ø32, ø40, ø50, ø63

How to Order

CG1K L N 25 - 100 -

With auto switch **CDG1K L N 25 - 100 - M9BW**

With auto switch
(Built-in magnet)

Double acting: non-rotating rod type

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
U	Rod side trunnion style
T	Head side trunnion style
D	Clevis style

Type

N	Rubber bumper
A	Air cushion (ø40 to ø63 only)

Bore size

20	20 mm
25	25 mm
32	32 mm
40	40 mm
50	50 mm
63	63 mm

Number of auto switches

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

Auto switch

Nil	Without auto switch
------------	---------------------

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 251.

Made to Order
Refer to page 251 for details.

Note) Mounting brackets are shipped together, (but not assembled).

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) CDG1KFA32-100

Applicable Auto Switch/Refer to pages 1263 to 1371 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	Applicable bore size (mm)	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)				
							ø20 to ø63									
Solid state switch	_____	Grommet	Yes	3-wire (NPN)	5V,12V	—	M9N	●	●	●	○	—	○	IC circuit	Relay, PLC	
		3-wire (PNP)		M9P			●	●	●	○	—	○				
	Connector	2-wire		12V	M9B		●	●	●	○	—	○	—			
		2-wire		12V	H7C		●	—	●	●	●	—				
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	5V,12V		M9NW	●	●	●	○	—	○	IC circuit		
				3-wire (PNP)	M9PW		●	●	●	○	—	○				
				2-wire	12V		M9BW	●	●	●	○	—	○	—		
				2-wire	12V		H7BA	—	—	●	○	—	○			
	Water resistant (2-color indication)	Grommet		4-wire (NPN)	5V,12V		H7NF	●	—	●	○	—	○	IC circuit		
	With diagnostic output (2-color indication)															
Reed switch	_____	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	A96	●	—	●	—	—	—	IC circuit	Relay, PLC
			2-wire	24V	12V	100V	A93	●	—	●	—	—	—	—		
						100V or less	A90	●	—	●	—	—	—	—		
						100V, 200V	B54	●	—	●	●	—	—	—		
						200V or less	B64	●	—	●	—	—	—	—		
						—	C73C	●	—	●	●	●	—	—		
		24V or less				C80C	●	—	●	●	●	—	—			
		Connector	Yes													
			None													
		Diagnostic indication (2-color indication)	Grommet	Yes												

* Lead wire length symbols: 0.5 m Nil (Example) M9NW * Solid state auto switches marked with "○" are produced upon receipt of order.
1 m M (Example) M9NWM * D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L cannot be mounted.
3 m L (Example) M9NWL
5 m Z (Example) M9NWZ
None N (Example) H7CN

* Since there are other applicable auto switches than listed, refer to page 283 for details.

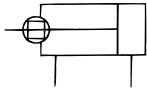
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.

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

Air Cylinder: Non-rotating Rod Type Double Acting **Series CG1K**



JIS Symbol



Made to Order Specifications (For details, refer to pages 1373 to 1498.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC8	Adjustable stroke cylinder/Adjustable extension type*1
—XC9	Adjustable stroke cylinder/Adjustable retraction type*1
—XC10	Dual stroke cylinder/Double rod type*1
—XC11	Dual stroke cylinder/Single rod type*1
—XC12	Tandem type cylinder*1
—XC13	Auto switch rail mounting style*1
—XC20	Head cover axial port*1

*1 Compatible with cylinders with a rubber bumper only.

Refer to pages 279 to 283 for cylinders with auto switches.

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

Specifications

Bore size (mm)	20	25	32	40	50	63
Action	Double acting, Single rod					
Lubricant	Not required (Non-lube)					
Fluid	Air					
Proof pressure	1.5 MPa					
Maximum operating pressure	1.0 MPa					
Minimum operating pressure	0.05 MPa					
Ambient and fluid temperature	Without auto switch: -10 to 70°C (No freezing)					
	With auto switch: -10 to 60°C (No freezing)					
Piston speed	50 to 500 mm/s					
Stroke length tolerance	Up to 600 ^{st+1.4} mm					
Cushion	Rubber bumper, Air cushion (ø40 to ø63 only)					
Rod non-rotating accuracy	±1°	±0.8°	±0.8°	±0.5°	±0.5°	±0.5°
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Rod side trunnion style, Head side trunnion style, Clevis style (Used for changing the port location by 90°.)					

Accessory

Mounting		Basic style	Axial foot style	Rod side flange style	Head side flange style	Rod side trunnion style	Head side trunnion style	Clevis style
Standard equipment	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	—	●
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint* (With pin)	●	●	●	●	●	●	●
	Pivot bracket	—	—	—	—	●	●	●

* Pin and retaining ring are shipped together with double knuckle joint.

Standard Stroke

Bore size (mm)	Standard stroke (mm) ⁽¹⁾	Long stroke (mm)
20	25, 50, 75, 100, 125, 150, 200	—
25	25, 50, 75, 100, 125, 150, 200, 250, 300	—
32		—
40		301 to 500
50, 63		301 to 600



- Note 1) Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)
Note 2) The maximum limit is 1500 stroke, but the products that exceed the standard or the long stroke limit are not guaranteed.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual
-X□

Technical
data

Series CG1K

Mass

(kg)

Bore size (mm)		20	25	32	40	50	63
Basic mass	Basic style	0.10	0.17	0.26	0.41	0.77	1.07
	Axial foot style	0.21	0.30	0.42	0.63	1.25	1.79
	Flange style	0.18	0.27	0.40	0.61	1.11	1.57
	Trunnion style	0.11	0.19	0.29	0.46	0.91	1.21
	Clevis style	0.15	0.25	0.41	0.64	1.17	1.75
Pivot bracket		0.08	0.09	0.17	0.25	0.44	0.80
Single knuckle joint		0.05	0.09	0.09	0.10	0.22	0.22
Double knuckle joint (With pin)		0.05	0.09	0.09	0.13	0.26	0.26
Additional mass per each 50 mm of stroke		0.05	0.07	0.09	0.15	0.22	0.26
Additional mass with air cushion		—	—	—	0.02	0.03	0.03
Additional mass for long stroke		—	—	—	0.03	0.06	0.10

Calculation: (Example) **CG1KLN20-100** • Basic mass..... 0.21 (Foot, ø20)
 (Foot style, ø20, 100 st) • Additional mass..... 0.05/50 st
 • Cylinder stroke..... 100 st
 $0.21 + 0.05 \times 100/50 = 0.31$ kg

Copper and Fluorine-free

20-CG1K **Mounting style** N **Bore size** — **Stroke**

Copper/Fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.

Specifications

Bore size (mm)	20, 25, 32, 40, 50, 63
Action	Double acting
Fluid	Air
Maximum operating pressure	1.0 MPa
Minimum operating pressure	0.05 MPa
Piston speed	50 to 500 mm/s
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Rod side trunnion style, Head side trunnion style, Clevis style (Used for changing the port location by 90°.)

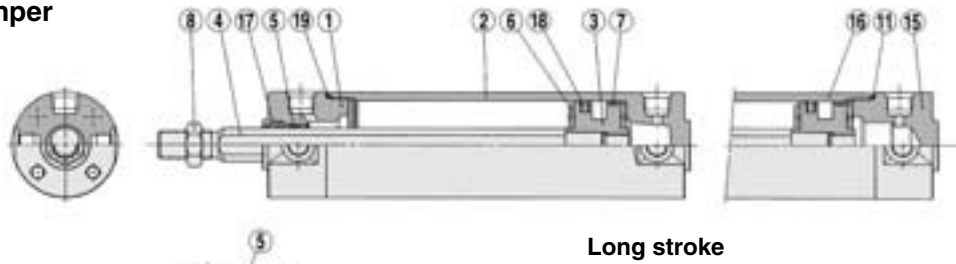
Mounting Bracket Part No.

Mounting bracket	Min. order	Bore size (mm)						Description
		20	25	32	40	50	63	
Axial foot	Note) 2	CG-L020	CG-L025	CG-L032	CG-L040	CG-L050	CG-L063	Foot x 2, Mounting bolt x 8
Flange	1	CG-F020	CG-F025	CG-F032	CG-F040	CG-F050	CG-F063	Flange x 1, Mounting bolt x 4
Trunnion pin	1	CG-T020	CG-T025	CG-T032	CG-T040	CG-T050	CG-T063	Trunnion pin x 2, Trunnion bolt x 2, Flat washer x 2
Clevis	1	CG-D020	CG-D025	CG-D032	CG-D040	CG-D050	CG-D063	Clevis x 1, Mounting bolt x 4, Clevis pin x 1, Retaining ring x 2
Pivot bracket	1	CG-020-24A	CG-025-24A	CG-032-24A	CG-040-24A	CG-050-24A	CG-063-24A	Pivot bracket x 1

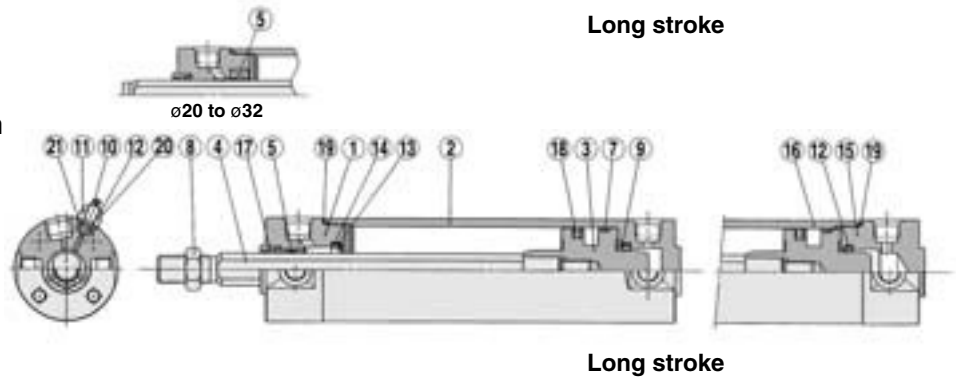
Note) Order two foot brackets per cylinder.

Construction

With rubber bumper



With air cushion



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Clear hard anodized
2	Tube cover	Aluminum alloy	Clear hard anodized
3	Piston	Aluminum alloy	Chromated. Hard anodized (In case of air cushion)
4	Piston rod	Carbon steel *	Hard chrome plated *
5	Non-rotating guide	Copper oil-impregnated sintered alloy	
6	Bumper	Urethane	
7	Wear ring	Resin	
8	Rod end nut	Rolled steel	Nickel plated
9	Seal retainer	Rolled steel	Nickel plated (Except long stroke)
10	Cushion valve	Rolled steel	Electroless nickel plated
11	Valve retainer	Rolled steel	Electroless nickel plated
12	Lock nut	Carbon steel	Nickel plated
13	Cushion seal	NBR	
14	Cushion seal holder	Aluminum alloy	
15	Head cover	Aluminum alloy	Clear hard anodized
16	Cylinder tube	Aluminum alloy	Hard anodized
17	Rod seal	NBR	
18	Piston seal	NBR	
19	Tube gasket	NBR	
20	Valve seal	NBR	
21	Valve retaining gasket	NBR	

Note) In the case of cylinders with auto switches, rubber magnets are installed in the piston.
* The material is stainless steel for ø20 to ø32.

Replacement Parts/Seal Kit

• For rubber bumper		
Bore size (mm)	Kit no.	Contents
20	CG1N20-PS	Set of the nos. ⑰, ⑱, ㉑
25	CG1N25-PS	
32	CG1N32-PS	
40	CG1N40-PS	
• For air cushion		
Bore size (mm)	Kit no	Contents
40	CG1KA40-PS	Set of the nos. ⑰, ⑱, ㉑, ㉒, ㉓

Note) Refer to the Specific Product Precautions on page 226 for Disassembly/Replacement.
Order with a part number for each type and 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 no.: GR-S-010 (10 g)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

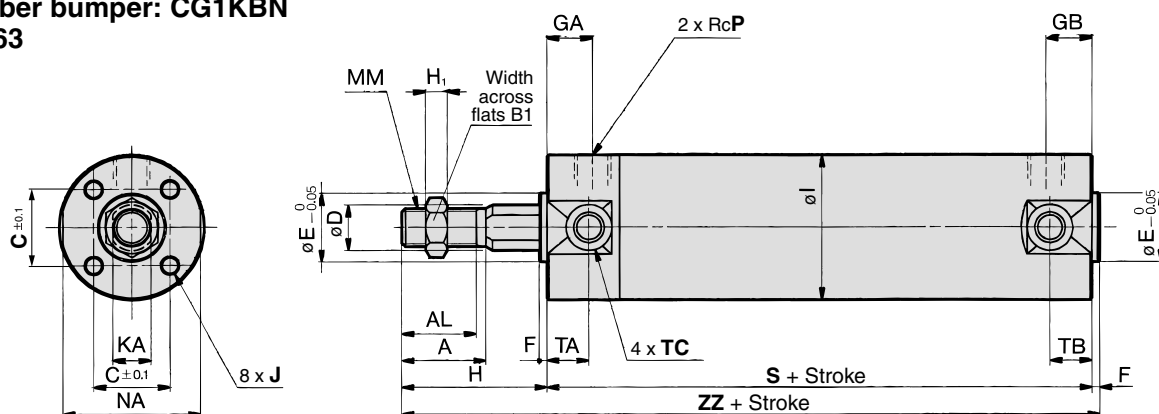
Individual
-X□

Technical
data

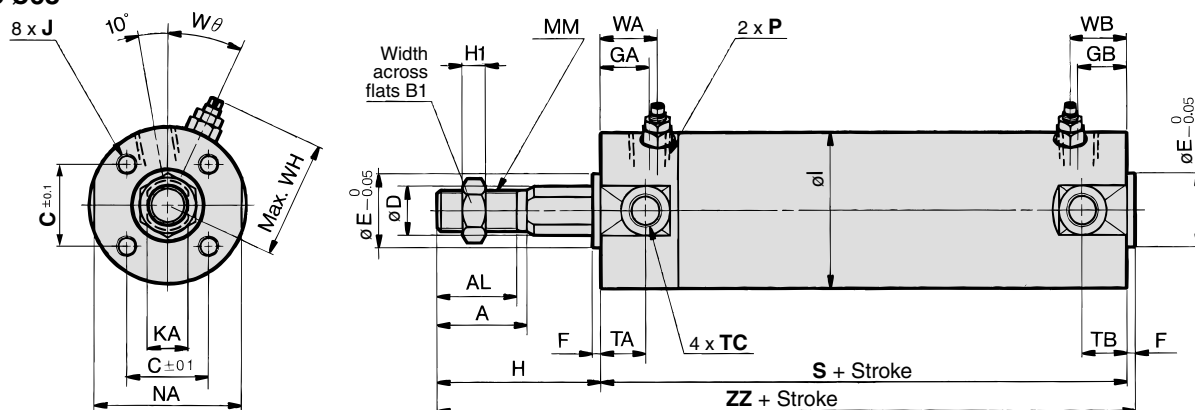
Series CG1K

Basic Style

With rubber bumper: CG1KBN
 ø20 to ø63



With air cushion: CG1KBA
 ø40 to ø63



Bore size (mm)	Stroke range (mm)	A	AL	B1	C	D	E	F	GA	GB	H	H1	I	J	KA	MM	NA	P	S	TA	TB	TC	ZZ
20	Up to 200	18	15.5	13	14	9.2	12	2	12	10	35	5	26	M4 x 0.7 depth 7	8	M8 x 1.25	24	1/8	69	11	11	M5 x 0.8	106
25	Up to 300	22	19.5	17	16.5	11	14	2	12	10	40	6	31	M5 x 0.8 depth 7.5	10	M10 x 1.25	29	1/8	69	11	11	M6 x 0.75	111
32	Up to 300	22	19.5	17	20	12	18	2	12	10	40	6	38	M5 x 0.8 depth 8	10	M10 x 1.25	35.5	1/8	71	11	10	M8 x 1.0	113
40	Up to 300(500)	30	27	19	26	16	25	2	13	10(13)	50	8	47	M6 x 1 depth 12	14	M14 x 1.5	44	1/8	78(87)	12	10(12)	M10 x 1.25	130(139)
50	Up to 300(600)	35	32	27	32	20	30	2	14	12(14)	58	11	58	M8 x 1.25 depth 16	18	M18 x 1.5	55	1/4	90(102)	13	12(13)	M12 x 1.25	150(162)
63	Up to 300(600)	35	32	27	38	20	32	2	14	12(14)	58	11	72	M10 x 1.5 depth 16	18	M18 x 1.5	69	1/4	90(102)	13	12(13)	M14 x 1.5	150(162)

Note 1) Dimensions for each mounting bracket are the same as those for CG1 standard or long stroke model. Refer to pages 229 to 234.

Note 2) (): Denotes the dimensions for long stroke.

With Air Cushion

Bore size (mm)	P	WA	WB	WH	Wθ
40	Rc 1/8	16	15(16)	33	20°
50	Rc 1/4	18	17(18)	40.5	20°
63	Rc 1/4	18	17(18)	47.5	20°

Note) (): Denotes the dimensions for long stroke.

⚠ Precautions

Be sure to read before handling.

Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Caution on Handling/Disassembly

⚠ Caution

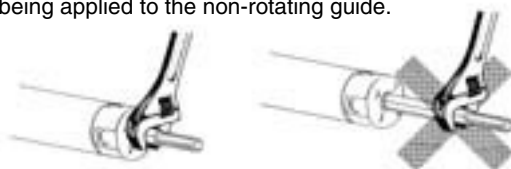
1. Avoid using the air cylinder in such a way that rotational torque would be applied to the piston rod.

- If rotational torque is applied, the non-rotating guide will become deformed, thus affecting the non-rotating accuracy. Refer to the table below for the approximate values of the allowable range of rotational torque.

Allowable rotational torque (N·m or less)	ø20	ø25, ø32	ø40, ø50, ø63
	0.2	0.25	0.44

- To screw a bracket or a nut onto the piston rod, make sure to retract the piston rod entirely, and place a wrench over the flat portion of the rod that protrudes.

Tighten it by giving consideration to prevent the tightening torque from being applied to the non-rotating guide.



2. When replacing rod seals, please contact SMC.

Air leakage may be happened, depending on the position in which a rod seal is fitted. Thus, please contact SMC when replacing them.

Air Cylinder: Non-rotating Rod Type Double Acting, Double Rod Series **CG1KW** ø20, ø25, ø32, ø40, ø50, ø63

How to Order

CG1KW L N 25 - 100

With auto switch **CDG1KW L N 25 - 100 - M9BW**

With auto switch (Built-in magnet)
Non-rotating rod type
Double acting, double rod type
Mounting style

B	Basic style
L	Axial foot style
F	Flange style
U	Trunnion style

Type

N	Rubber bumper
----------	---------------

Bore size

20	20 mm
25	25 mm
32	32 mm
40	40 mm
50	50 mm
63	63 mm

Number of auto switches

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

Auto switch

Nil	Without auto switch
------------	---------------------

* For the applicable auto switch model, refer to the table below.

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 256.

Note) Mounting brackets are shipped together, (but not assembled).

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) CDG1KWFN32-100

Applicable Auto Switch/Refer to page 1263 to 1371 for further information on auto switches.

Applicable Auto Switch Model to pages 1266 to 1271 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	Applicable bore size (mm) ø20 to ø63		0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)			
Solid state switch	_____	Grommet	Yes	3-wire (NPN)	24V	5V,12V	_____	M9N	●	●	●	○	○	○	IC circuit	Relay, PLC
		3-wire (PNP)		M9P				●	●	●	○	○	○			
	Connector	2-wire		12V	M9B	●	●	●	○	○	○	—				
		3-wire (NPN)		5V,12V	H7C	●	—	●	●	●	●					
	Diagnostic indication (2-color indication)	Grommet		3-wire (PNP)	5V,12V	M9NW	●	●	●	○	○	○	IC circuit			
				M9PW	●	●	●	○	○	○						
				2-wire	12V	M9BW	●	●	●	○	○	○	—			
				H7BA	—	—	●	○	○	○						
	Water resistant (2-color indication)	With diagnostic output (2-color indication)		4-wire (NPN)	5V,12V	H7NF	●	—	●	○	○	○	IC circuit			
Reed switch	_____	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	A96	●	—	●	—	—	—	IC circuit	Relay, PLC
				2-wire	24V	12V	100V	A93	●	—	●	—	—	—	—	
	100V or less	A90					●	—	●	—	—	—	—	IC circuit		
	100V, 200V	B54					●	—	●	●	—	—	—	—		
	200V or less	B64					●	—	●	—	—	—	—			
	—	C73C					●	—	●	●	●	—	—			
	24V or less	C80C					●	—	●	●	●	—	—		IC circuit	
	Diagnostic indication (2-color indication)	Grommet					Yes	—	—	—	B59W	●	—	●	—	

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

* Since there are other applicable auto switches than listed, refer to page 283 for details.

* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.

* D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L cannot be mounted.

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

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

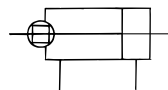
Technical

data

Series CG1KW



JIS Symbol



Refer to pages 279 to 283 for cylinders with auto switches.

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

Specifications

Bore size (mm)	20	25	32	40	50	63
Action	Double acting, Double rod					
Lubricant	Not required (Non-lube)					
Fluid	Air					
Proof pressure	1.5 MPa					
Maximum operating pressure	1.0 MPa					
Minimum operating pressure	0.08 MPa					
Ambient and fluid temperature	Without auto switch: -10 to 70°C (No freezing)					
	With auto switch: -10 to 60°C (No freezing)					
Piston speed	50 to 500 mm/s					
Stroke length tolerance	Up to 600 ^{st+1.4} ₀ mm					
Cushion	Rubber bumper					
Rod non-rotating accuracy	±1°	±0.8°	±0.8°	±0.5°	±0.5°	±0.5°
Mounting	Basic style, Axial foot style, Flange style, Trunnion style					

Accessory

Mounting		Basic style	Axial foot style	Flange style	Trunnion style
Standard equipment	Rod end nut	●	●	●	●
Option	Single knuckle joint	●	●	●	●
	Double knuckle joint (With pin) *	●	●	●	●
	Pivot bracket	—	—	—	●

* Pin and retaining ring are shipped together with double knuckle joint.

Standard Stroke

Bore size (mm)	Standard stroke (mm) ⁽¹⁾	Long stroke (mm)
20	25, 50, 75, 100, 125, 150, 200	—
25	25, 50, 75, 100, 125, 150, 200, 250, 300	—
32		—
40		301 to 500
50, 63		301 to 600

Note 1) Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Note 2) The maximum limit is 1500 stroke, but the products that exceed the standard or the long stroke limit are not guaranteed.

Air Cylinder: Non-rotating Rod Type Double Acting, Double Rod *Series CG1KW*

Mass

(kg)

Bore size (mm)		20	25	32	40	50	63
Basic mass	Basic style	0.13	0.22	0.33	0.55	1.02	1.37
	Axial foot style	0.24	0.35	0.49	0.77	1.50	2.09
	Flange style	0.21	0.32	0.47	0.75	1.36	1.87
	Trunnion style	0.14	0.24	0.36	0.60	1.16	1.51
Pivot bracket		0.08	0.09	0.17	0.25	0.44	0.80
Single knuckle joint		0.05	0.09	0.09	0.10	0.22	0.22
Double knuckle joint (With pin)		0.05	0.09	0.09	0.13	0.26	0.26
Additional mass per each 50 mm of stroke		0.07	0.10	0.13	0.23	0.34	0.38

Calculation: (Example) **CG1KWLN32-100** (Foot style, ø32, 100 st)

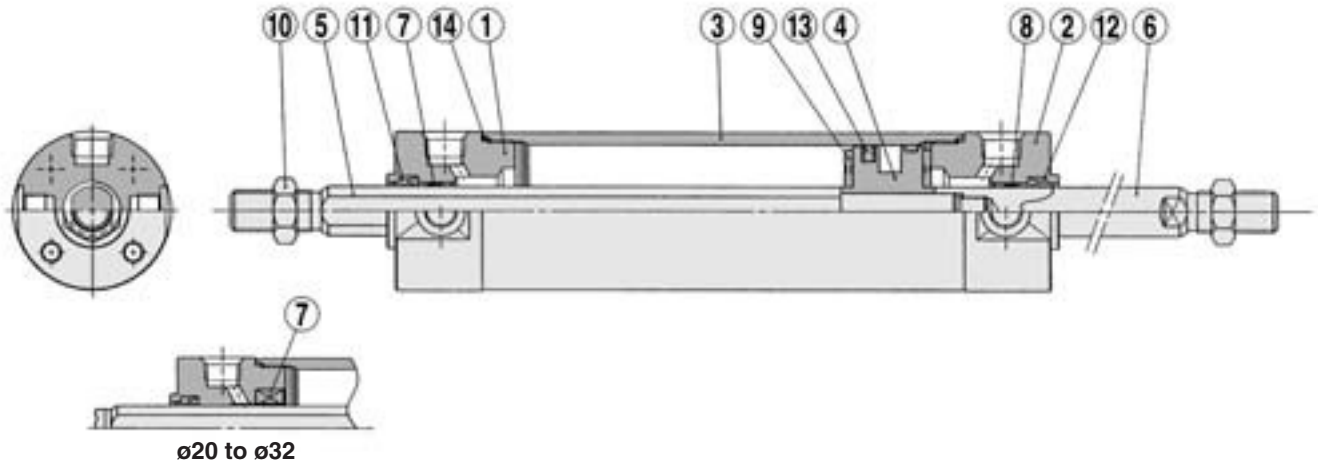
- Basic mass..... 0.49 (Foot, ø32) • Cylinder stroke.....100 st
- Additional mass..... 0.13/50 st 0.49 + 0.13 x 100/50 = 0.75 kg

Mounting Bracket Part No.

Mounting bracket	Min. order	Bore size (mm)						Description
		20	25	32	40	50	63	
Axial foot	Note) 2	CG-L020	CG-L025	CG-L032	CG-L040	CG-L050	CG-L063	Foot x 2, Mounting bolt x 8
Flange	1	CG-F020	CG-F025	CG-F032	CG-F040	CG-F050	CG-F063	Flange x 1, Mounting bolt x 4
Trunnion pin	1	CG-T020	CG-T025	CG-T032	CG-T040	CG-T050	CG-T063	Trunnion pin x 2, Trunnion bolt x 2, Flat washer x 2
Pivot bracket	1	CG-020-24A	CG-025-24A	CG-032-24A	CG-040-24A	CG-050-24A	CG-063-24A	Pivot bracket x 1

Note) Order two foot brackets per a cylinder.

Construction



Component Parts

No.	Description	Material	Note
1	Rod cover A	Aluminum alloy	Clear hard anodized
2	Rod cover B	Aluminum alloy	Clear hard anodized
3	Cylinder tube	Aluminum alloy	Hard anodized
4	Piston	Aluminum alloy	Chromated
5	Piston rod A	Carbon steel *	Hard chrome plated *
6	Piston rod B	Carbon steel **	Hard chrome plated **
7	Non-rotating guide	Copper oil-impregnated sintered alloy	
8	Bushing	Copper oil-impregnated sintered alloy	ø40 or more: Copper alloy
9	Bumper	Urethane	
10	Rod end nut	Rolled steel	
11	Rod seal A	NBR	
12	Rod seal B	NBR	
13	Piston seal	NBR	
14	Tube gasket	NBR	

* The material is stainless steel for ø20 to ø32.

** The material is stainless steel on auto switch equipped style ø20 and ø25.

*** A magnet is equipped on the piston of the cylinder with auto switch.

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
20	CG1KWN20-PS	Set of the nos. ①, ②, ③, ④
25	CG1KWN25-PS	
32	CG1KWN32-PS	
40	CG1KWN40-PS	

Note) Refer to the Specific Product Precautions on page 226 for Disassembly/Replacement.
Order with a part number for each type and 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 no.: GR-S-010 (10 g)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

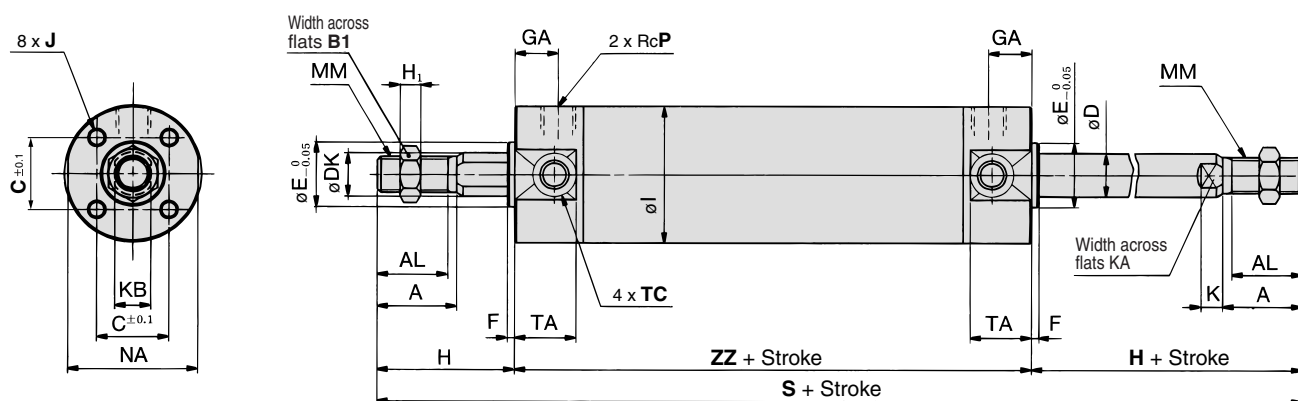
Individual

-X□

Technical data

Series CG1KW

Basic Style with Rubber Bumper: CG1KWBN



Bore size (mm)	Stroke range (mm)	A	AL	B ₁	C	D	DK	E	F	GA	H ₁	I	J	K	KA	KB	MM	NA	P	S
20	Up to 200	18	15.5	13	14	8	9.2	12	2	12	5	26	M4 x 0.7 depth 7	5	6	8	M8 x 1.25	24	1/8	77
25	Up to 300	22	19.5	17	16.5	10	11	14	2	12	6	31	M5 x 0.8 depth 7.5	5.5	8	10	M10 x 1.25	29	1/8	77
32	Up to 300	22	19.5	17	20	12	12	18	2	12	6	38	M5 x 0.8 depth 8	5.5	10	10	M10 x 1.25	35.5	1/8	79
40	Up to 500	30	27	19	26	16	16	25	2	13	8	47	M6 x 1 depth 12	6	14	14	M14 x 1.5	44	1/8	87
50	Up to 600	35	32	27	32	20	20	30	2	14	11	58	M8 x 1.25 depth 16	7	18	18	M18 x 1.5	55	1/4	102
63	Up to 600	35	32	27	38	20	20	32	2	14	11	72	M10 x 1.5 depth 16	7	18	18	M18 x 1.5	69	1/4	102

Bore size (mm)	TA	TC	H	ZZ
20	11	M5 x 0.8	35	147
25	11	M6 x 0.75	40	157
32	11	M8 x 1.0	40	159
40	12	M10 x 1.25	50	187
50	13	M12 x 1.25	58	218
63	13	M14 x 1.5	58	218

Note) Dimensions are the same as CG1W standard type.
Refer to page 244.
• Old number is CG1□N□-□-XC21 as made-to-order.

⚠ Precautions

Be sure to read before handling.

Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Caution on Handling/Disassembly

⚠ Caution

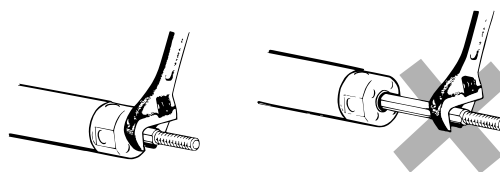
1. Avoid using the air cylinder in such a way that rotational torque would be applied to the piston rod.

- If rotational torque is applied, the non-rotating guide will become deformed, thus affecting the non-rotating accuracy. Refer to the table below for the approximate values of the allowable range of rotational torque.

Allowable rotational torque (N·m or less)	ø20	ø25, ø32	ø40, ø50, ø63
	0.2	0.25	0.44

- To screw a bracket or a nut onto the piston rod, make sure to retract the piston rod entirely, and place a wrench over the flat portion of the rod that protrudes.

Tighten it by giving consideration to prevent the tightening torque from being applied to the non-rotating guide.



2. When replacing rod seals, please contact SMC.

Air leakage may be happened, depending on the position in which a rod seal is fitted. Thus, please contact SMC when replacing them.

Air Cylinder: Direct Mount Type Double Acting

Series *CG1R*

ø20, ø25, ø32, ø40, ø50, ø63

How to Order

CG1R **N** **25** - **100** - **□**

With auto switch **CDG1R** **N** **25** - **100** - **M9BW** **□** - **□**

With auto switch
(Built-in magnet)

Type

N	Rubber bumper
A	Air cushion

Bore size

20	20 mm
25	25 mm
32	32 mm
40	40 mm
50	50 mm
63	63 mm

Number of auto switches

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

Auto switch

Nil	Without auto switch
------------	---------------------

* For the applicable auto switch model, refer to the table below.

Made to Order
Refer to page 260 for details.

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 260.

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) CDG1RA32-100

Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Applicable load																	
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	Applicable bore size (mm)	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)					
							ø20 to ø63										
Solid state switch	_____	Grommet	Yes	3-wire (NPN)	24V	5V, 12V	—	M9N	●	●	●	○	○	○	IC circuit	Relay, PLC	
		3-wire (PNP)		12V		M9P		●	●	●	○	○	○				
		2-wire				M9B		●	●	●	○	○	○				
						H7C		●	—	●	●	●	—				
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	5V, 12V	M9NW	●	●	●	○	○	○	IC circuit				
				3-wire (PNP)	M9PW	●	●	●	○	○	○						
				2-wire	M9BW	●	●	●	○	○	○						
					H7BA	—	—	●	○	○	○						
	Water resistant (2-color indication)	Connector		4-wire (NPN)	5V, 12V	H7NF	●	—	●	○	○	○	IC circuit				
	With diagnostic output (2-color indication)																
Reed switch	_____	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	A96	●	—	●	—	—	—	IC circuit	Relay, PLC	
				2-wire	24V	12V	100V	A93	●	—	●	—	—	—	—		
							100V or less	A90	●	—	●	—	—	—	—		
							100V, 200V	B54	●	—	●	●	—	—	—		
							200V or less	B64	●	—	●	—	—	—	—		
							—	C73C	●	—	●	●	●	—	—		
		24V or less	C80C				●	—	●	●	●	—	IC circuit				
		Connector	None				—	—	B59W	●	—	●	—	—	—		—
							Diagnostic indication (2-color indication)	Grommet	Yes								

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

* Solid state auto switches marked with "○" are produced upon receipt of order.
* D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L cannot be mounted.

* Since there are other applicable auto switches than listed, refer to page 283 for details.
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
* D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled before shipped.)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

Technical

data

Series CG1R

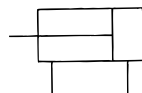
Series CG1R direct mount cylinder can be installed directly through the use of a square rod cover.

Space-saving has been realized.

Because it is a directly mounted style without using brackets, its overall length is shorter, and its installation pitch can be made smaller. Thus, the space that is required for installation has been dramatically reduced.



JIS Symbol



Made to Order Specifications
(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
—XA□	Change of rod end shape
—XB6	Heat resistant cylinder (150°C) *1
—XB7	Cold resistant cylinder *2
—XB9	Low speed cylinder (10 to 50 mm/s) *3
—XB13	Low speed cylinder (5 to 50 mm/s) *3
—XC6	Piston rod and rod end nut made of stainless steel
—XC8	Adjustable stroke cylinder/Adjustable extension type *3
—XC9	Adjustable stroke cylinder/Adjustable retraction type *3
—XC13	Auto switch rail mounting *3
—XC20	Head cover axial port *3
—XC22	Fluororubber seals

* 1 Cylinders with rubber bumper have no bumper.

* 2 Compatible with cylinders with rubber bumper, but has no bumper.

* 3 Compatible with cylinders with rubber bumper only.

Refer to pages 279 to 283 for cylinders with auto switches.

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

Specifications

Bore size (mm)	20	25	32	40	50	63
Action	Double acting, Single rod					
Lubricant	Not required (Non-lube)					
Fluid	Air					
Proof pressure	1.5 MPa					
Maximum operating pressure	1.0 MPa					
Minimum operating pressure	0.05 MPa					
Ambient and fluid temperature	Without auto switch: -10 to 70°C (No freezing)					
	With auto switch: -10 to 60°C (No freezing)					
Piston speed	50 to 1000 mm/s					
Stroke length tolerance	Up to 300 ^{st+1.4} ₀ mm					
Cushion	Rubber bumper, Air cushion					

Mass

(kg)

Bore size (mm)	20	25	32	40	50	63
Basic mass	0.14	0.23	0.35	0.57	1.04	1.49
Single knuckle joint	0.05	0.09	0.09	0.10	0.22	0.22
Double knuckle joint (With pin)	0.05	0.09	0.09	0.13	0.26	0.26
Additional mass per each 50 mm of stroke	0.05	0.07	0.09	0.15	0.22	0.26
Additional mass with air cushion	0.01	0.01	0.02	0.02	0.03	0.03

Calculation: (Example) **CG1RN32-100**
(ø32, 100 st)

- Basic mass..... 0.35
- Additional mass..... 0.09/50 st
- Cylinder stroke..... 100 st

$$0.35 + 0.09 \times 100/50 = 0.53 \text{ kg}$$

Accessory

	Mounting	Basic style
Standard equipment	Rod end nut	●
	Single knuckle joint	●
Option	Double knuckle joint * (With pin)	●

* Pin and retaining ring are shipped together with double knuckle joint.

Standard Stroke

Bore size (mm)	Standard stroke * (mm)
20	25, 50, 75, 100, 125, 150
25, 32	25, 50, 75, 100, 125, 150, 200
40, 50, 63	25, 50, 75, 100, 125, 150, 200, 250, 300

* Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

* Long strokes are not available.

Clean Series

10-CG1RN Bore size — Stroke

Clean Series (With relief port)

The rod portion of the actuator has a double seal construction, and a relief port is provided to discharge the exhaust air directly outside of the clean room.

Thus, it can be used in a Class 100 clean room.

Specifications

Bore size (mm)	ø20, ø25, ø32, ø40, ø50, ø63
Action	Double acting
Fluid	Air
Maximum operating pressure	1.0 MPa
Minimum operating pressure	0.05 MPa
Cushion	Rubber bumper
Piston speed	50 to 400 mm/s
Relief port size	M5 x 0.8

* Auto switch can be mounted.

For details, refer to the separate catalog, "Pneumatic Clean Series".



Precautions

Be sure to read before handling.
Refer to front matters 54 and 55 for
Safety Instructions and pages 3 to 11
for Actuator and Auto Switch
Precautions.

Copper and Fluorine-free

20-CG1R Type — Bore size — Stroke

Copper/Fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.

Specifications

Bore size (mm)		ø20, ø25, ø32, ø40, ø50, ø63
Action		Double acting
Fluid		Air
Maximum operating pressure		1.0 MPa
Minimum operating pressure		0.05 MPa
Cushion	Type N	With rubber bumper
	Type A	With air cushion
Piston speed		50 to 1000 mm/s

* Auto switch can be mounted.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

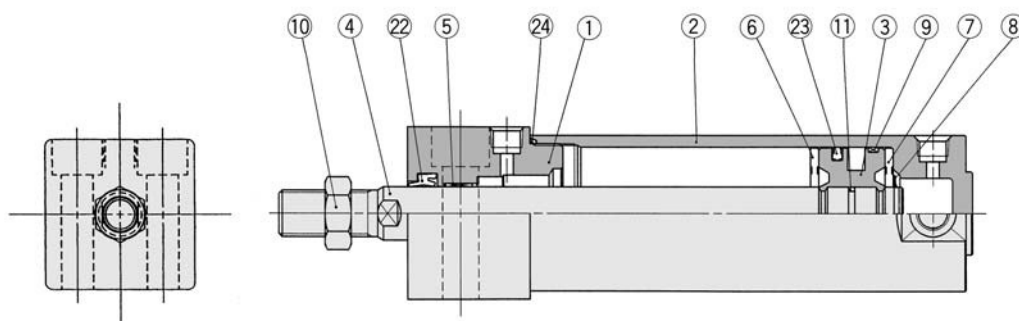
-X□

Individual
-X□

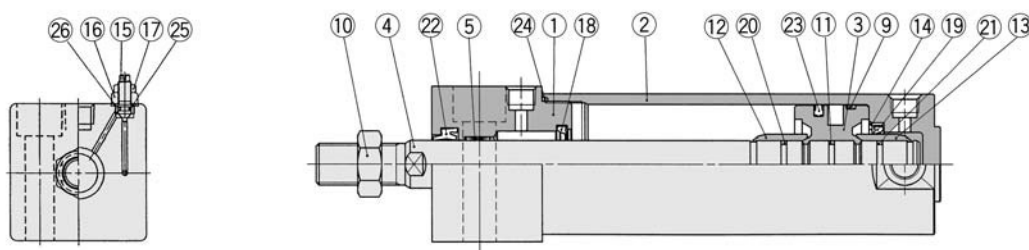
Technical
data

Construction

Basic style: Bottom mounting style/with rubber bumper



With air cushion



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Clear hard anodized
2	Tube cover	Aluminum alloy	Clear hard anodized
3	Piston	Aluminum alloy	Chromated
4	Piston rod	Carbon steel *	Hard chrome plated *
5	Bushing	Copper oil-impregnated sintered alloy	ø40 or larger: Copper alloy
6	Bumper A	Urethane	
7	Bumper B	Urethane	ø40 or larger: The same as bumper A
8	Retaining ring	Stainless steel	
9	Wear ring	Resin	
10	Rod end nut	Rolled steel	Nickel plated
11	Piston gasket	NBR	
12	Cushion ring A	Aluminum alloy	Anodized
13	Cushion ring B	Aluminum alloy	ø32 or larger: The same as A, Anodized

No.	Description	Material	Note
14	Seal retainer	Rolled steel	
15	Cushion valve	Rolled steel	Electroless nickel plated
16	Valve retainer	Rolled steel	Electroless nickel plated
17	Lock nut	Carbon steel	Nickel plated
18	Cushion seal A	Urethane	
19	Cushion seal B	Urethane	
20	Cushion ring gasket A	NBR	
21	Cushion ring gasket B	NBR	ø32 or larger: The same as A
22	Rod seal	NBR	
23	Piston seal	NBR	
24	Tube gasket	NBR	
25	Valve seal	NBR	
26	Valve retaining gasket	NBR	

Note) In the case of cylinders with auto switches, rubber magnets are installed in the piston.

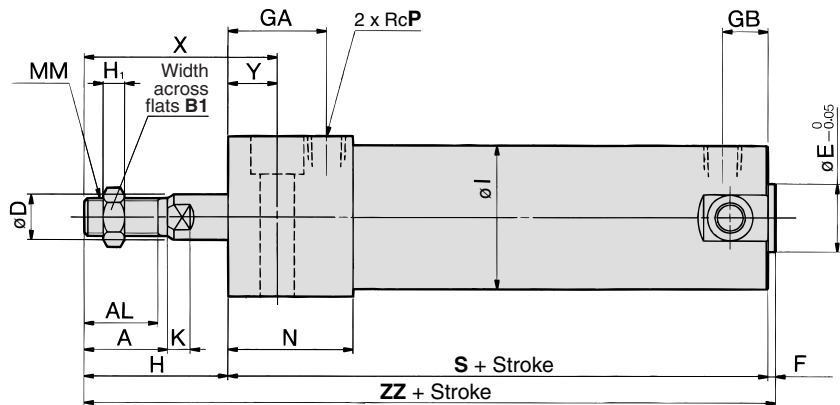
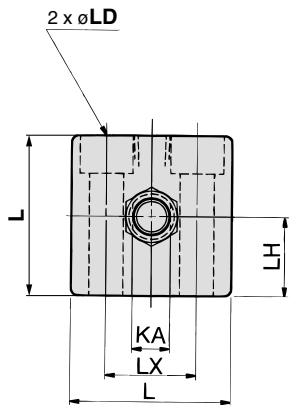
* The material is stainless steel on auto switch equipped styles ø20 and ø25.

Replacement parts/Seal kit are the same as standard type, double acting, single rod. Refer to page 227.

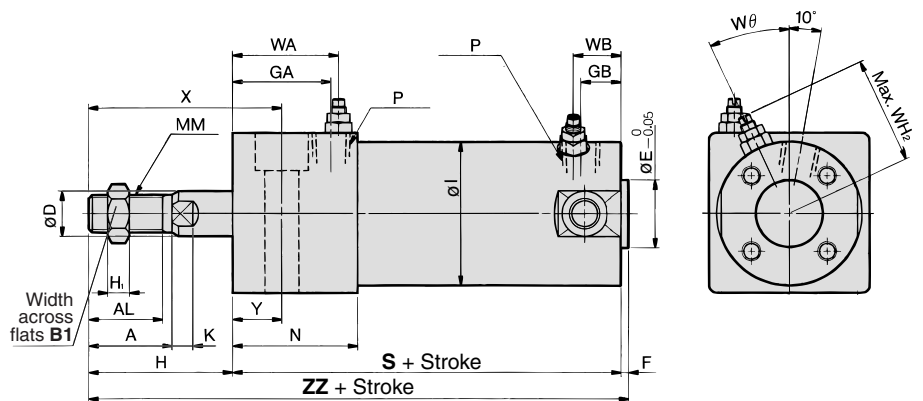
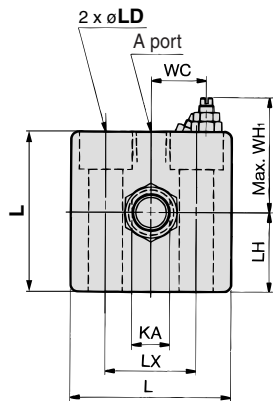
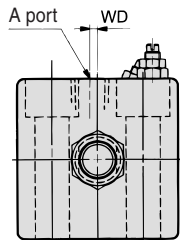
Note) Refer to the Specific Product Precautions on page 226 for Disassembly/Replacement.

Basic Style with Bottom Mounting

With rubber bumper: CG1RN



With air cushion CG1RA



Bore size (mm)	Stroke range (mm)	A	AL	B ₁	D	E	F	GA	GB	H	H ₁	I	K	KA	L	LD	LH	LX	MM	N	P	S	X	Y	ZZ
20	Up to 150	18	15.5	13	8	12	2	20	10	27	5	26	5	6	30.4	ø5.5, ø9.5 counterbore depth 6	15	18	M8 x 1.25	27	1/8	75	38	11	104
25	Up to 200	22	19.5	17	10	14	2	22	10	32	6	31	5.5	8	36.4	ø6.6, ø11 counterbore depth 7	18	22	M10 x 1.25	29	1/8	77	44	12	111
32	Up to 200	22	19.5	17	12	18	2	26	10	32	6	38	5.5	10	42.4	ø9, ø14 counterbore depth 9	21	24	M10 x 1.25	33	1/8	83	45	13	117
40	Up to 300	30	27	19	16	25	2	30	10	39	8	47	6	14	52.4	ø11, ø17.5 counterbore depth 12	26	32	M14 x 1.5	37	1/8	94	55	16	135
50	Up to 300	35	32	27	20	30	2	33	12	45	11	58	7	18	64.5	ø14, ø20 counterbore depth 14	32	41	M18 x 1.5	44	1/4	108	62	17	155
63	Up to 300	35	32	27	20	32	2	39	12	45	11	72	7	18	76.6	ø18, ø26 counterbore depth 18	38	46	M18 x 1.5	50	1/4	114	64	19	161

With air cushion

(mm)

Bore size (mm)	Stroke range (mm)	P	WA	WB	WC	WD	WH	WH ₂	Wθ
20	Up to 150	M5 x 0.8	22	15	8.5	2	25	23	30°
25	Up to 200	M5 x 0.8	24	15	11	2	27.5	25	30°
32	Up to 200	Rc 1/8	28	15	14.5	—	30.5	28.5	25°
40	Up to 300	Rc 1/8	32	15	18.5	—	35.5	33	20°
50	Up to 300	Rc 1/4	36	17	22	—	43.5	40.5	20°
63	Up to 300	Rc 1/4	42	17	29	—	49.5	47.5	20°

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

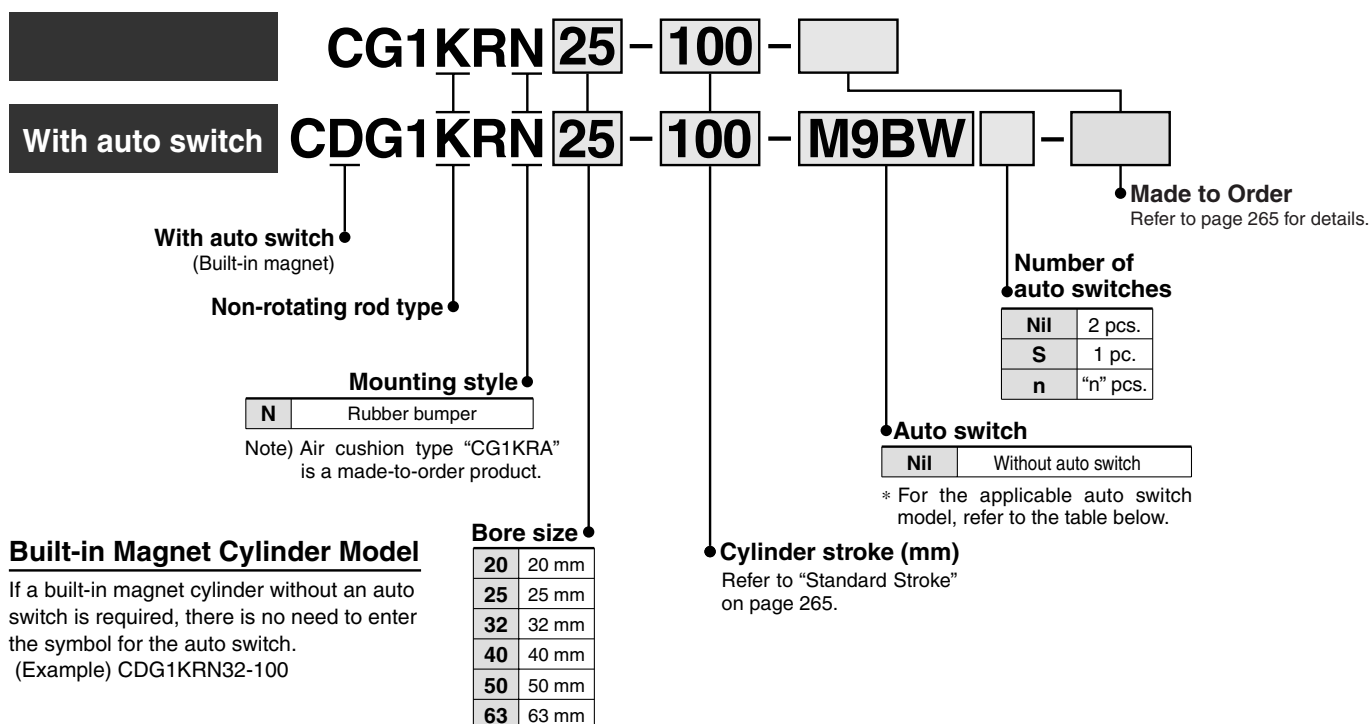
Technical data

Air Cylinder: Direct Mount, Non-rotating Rod Type

Series **CG1KR**

ø20, ø25, ø32, ø40, ø50, ø63

How to Order



Applicable Auto Switch/Refer to pages 1263 to 1371 for further information on auto switches.

Applicable load																		
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		Applicable bore size (mm) ø20 to ø63	0.5 (Nil)	1 (M)	3 (L)	5 (Z)				None (N)		
Solid state switch	_____	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	_____	M9N	●	●	●	○	—	○	IC circuit	Relay, PLC		
		3-wire (PNP)		M9P				●	●	●	○	—	○					
		Connector		2-wire				12 V	M9B	●	●	●	○	—	○		—	
				H7C				●	—	●	●	●	—					
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)				5 V, 12 V	M9NW	●	●	●	○	—	○		IC circuit	
				3-wire (PNP)					M9PW	●	●	●	○	—	○			
				2-wire					12 V	M9BW	●	●	●	○	—		○	—
				H7BA					—	—	●	○	—	○				
	Water resistant (2-color indication)	Grommet		4-wire (NPN)	5 V, 12 V	H7NF	●	—	●	○	—	○	IC circuit					
	With diagnostic output (2-color indication)																	
Reed switch	_____	Grommet	Yes	3-wire (NPN equivalent)	24 V	5 V	_____	A96	●	—	●	—	—	—	IC circuit	Relay, PLC		
				2-wire				100 V	A93	●	—	●	—	—	—		—	
								100 V or less	A90	●	—	●	—	—	—		—	IC circuit
								100 V, 200 V	B54	●	—	●	●	—	—		—	
								200 V or less	B64	●	—	●	—	—	—			
								—	C73C	●	—	●	●	●	—			
		Connector	None	24 V or less	C80C	●	—	●	●	●	—	IC circuit						
				Diagnostic indication (2-color indication)	Grommet	Yes	—	—	B59W	●	—	●	—	—	—		—	

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

* Solid state auto switches marked with "○" are produced upon receipt of order.
* D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L cannot be mounted.

* Since there are other applicable auto switches than listed, refer to page 283 for details.

* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.

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

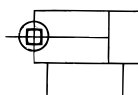
Air Cylinder: Direct Mount, Non-rotating Rod Type **Series CG1KR**

Series CG1KR direct mount, non-rotating rod type cylinder can be installed directly through the use of a square rod cover.

Space-saving has been realized. Because it is a directly mounted style without using brackets, its overall length is shorter, and its installation pitch can be made smaller. Thus, the space that is required for installation has been dramatically reduced.



JIS Symbol



Made to Order Specifications
(For details, refer to pages 1430, 1436 and 1461.)

Symbol	Specifications
—XC8	Adjustable stroke cylinder/Adjustable extension type*1
—XC9	Adjustable stroke cylinder/Adjustable retraction type*1
—XC20	Head cover axial port*1

*1 Compatible with cylinders with rubber bumper only.

Refer to pages 279 to 283 for cylinders with auto switches.

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

Specifications

Bore size (mm)	20	25	32	40	50	63
Action	Double acting, Single rod					
Lubricant	Not required (Non-lube)					
Fluid	Air					
Proof pressure	1.5 MPa					
Maximum operating pressure	1.0 MPa					
Minimum operating pressure	0.05 MPa					
Ambient and fluid temperature	Without auto switch: -10 to 70°C (No freezing)					
	With auto switch: -10 to 60°C (No freezing)					
Piston speed	50 to 500 mm/s					
Stroke length tolerance	Up to 300 ^{+1.4} ₀ mm					
Cushion	Rubber bumper					
Rod non-rotating accuracy	±1°	±0.8°	±0.8°	±0.5°	±0.5°	±0.5°

Mass

Bore size (mm)	20	25	32	40	50	63
Basic mass	0.14	0.24	0.35	0.56	1.04	1.48
Single knuckle joint	0.05	0.09	0.09	0.10	0.22	0.22
Double knuckle (With pin)	0.05	0.09	0.09	0.13	0.26	0.26
Additional mass per each 50 mm of stroke	0.05	0.07	0.09	0.15	0.22	0.26

Calculation: (Example) **CG1KRN32-100**
(ø32, 100 st)

- Basic mass.....0.35
 - Additional mass.....0.09/50 st
 - Cylinder stroke.....100 st
- 0.35 + 0.09 x 100/50 = 0.53 kg

Standard Stroke

Bore size (mm)	Standard stroke (mm) *
20	25, 50, 75, 100, 125, 150
25-32	25, 50, 75, 100, 125, 150, 200
40-50-63	25, 50, 75, 100, 125, 150, 200, 250, 300

- * Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)
- * Long strokes are not available.

Accessory

Mounting		Basic style
Standard equipment	Rod end nut	●
	Single knuckle joint	●
Option	Double knuckle joint * (With pin)	●

* Pin and retaining ring are shipped together with double knuckle joint.

⚠ Precautions

Be sure to read before handling.

Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Caution on Handling/Disassembly

⚠ Caution

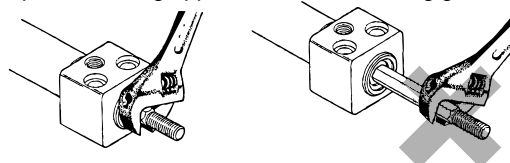
1. Avoid using the air cylinder in such a way that rotational torque would be applied to the piston rod.

- If rotational torque is applied, the non-rotating guide will become deformed, thus affecting the non-rotating accuracy. Refer to the table below for the allowable range of the allowable range of rotational torque.

Allowable rotational torque (N·m or less)	ø20	ø25, ø32	ø40, ø50, ø63
	0.2	0.25	0.44

- To screw a bracket or a nut onto the piston rod, make sure to retract the piston rod entirely, and place a wrench over the flat portion of the rod that protrudes.

Tighten it by giving consideration to prevent the tightening torque from being applied to the non-rotating guide.



2. When replacing rod seals, please contact SMC.

Air leakage may be happened, depending on the position in which a rod seal is fitted. Thus, please contact SMC when replacing them.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

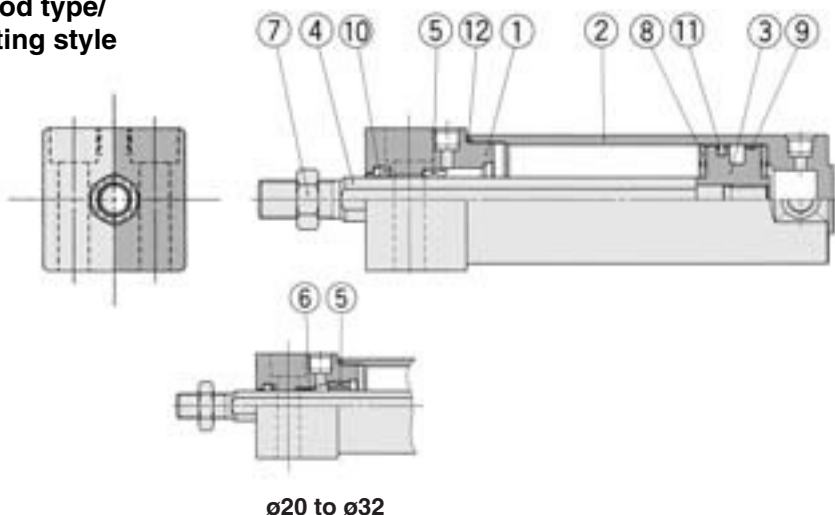
Technical

data

Series CG1KR

Construction

Non-rotating rod type/ Bottom mounting style



Component Parts

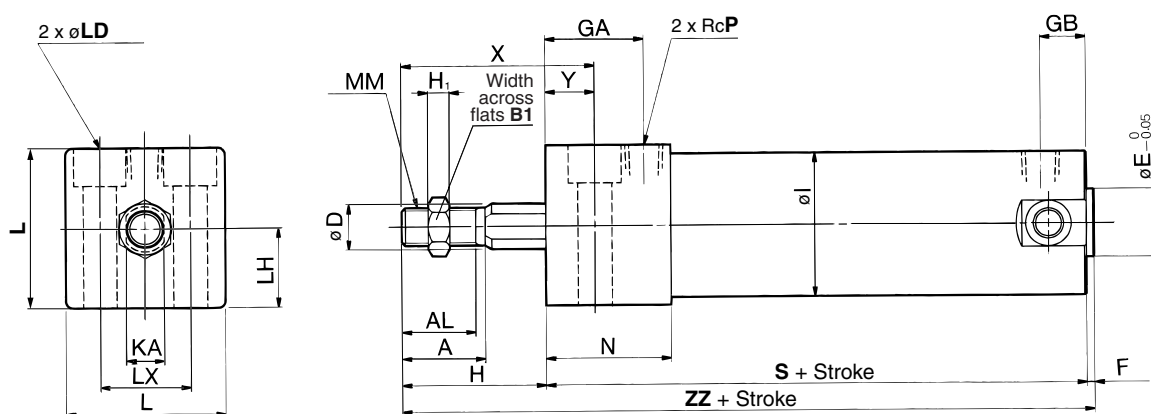
No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Clear hard anodized
2	Tube cover	Aluminum alloy	Clear hard anodized
3	Piston	Aluminum alloy	Chromated
4	Piston rod	Carbon steel *	Hard chrome plated *
5	Non-rotating guide	Copper oil-impregnated sintered alloy	
6	Bushing	Copper oil-impregnated sintered alloy	ø20 to ø32 only
7	Rod end nut	Rolled steel	Nickel plated
8	Bumper	Urethane	
9	Wear ring	Resin	
10	Rod seal	NBR	
11	Piston seal	NBR	
12	Tube gasket	NBR	

* The material is stainless steel for ø20, ø25 and ø32.

Replacement parts/Seal kits are the same as double acting, non-rotating rod type. Refer to page 253.

Note) Refer to the Specific Product Precautions on page 226 for Disassembly/Replacement.

Basic Style with Bottom Mounting: CG1KRN



Bore size (mm)	Stroke range (mm)	A	AL	B ₁	D	E	GA	GB	H	H ₁	I	KA	L	LD	LH	LX	MM	N	P	S	X	Y	ZZ
20	Up to 150	18	15.5	13	9.2	12	20	10	27	5	26	8	30.4	ø5.5, ø9.5 counterbore depth 6	15	18	M8 x 1.25	27	1/8	75	38	11	104
25	Up to 200	22	19.5	17	11	14	22	10	32	6	31	10	36.4	ø6.6, ø11 counterbore depth 7	18	22	M10 x 1.25	29	1/8	77	44	12	111
32	Up to 200	22	19.5	17	12	18	26	10	32	6	38	10	42.4	ø9, ø14 counterbore depth 9	21	24	M10 x 1.25	33	1/8	83	45	13	117
40	Up to 300	30	27	19	16	25	30	10	39	8	47	14	52.4	ø11, ø17.5 counterbore depth 12	26	32	M14 x 1.5	37	1/8	94	55	16	135
50	Up to 300	35	32	27	20	30	33	12	45	11	58	18	64.5	ø14, ø20 counterbore depth 14	32	41	M18 x 1.5	44	1/4	108	62	17	155
63	Up to 300	35	32	27	20	32	39	12	45	11	72	18	76.6	ø18, ø26 counterbore depth 18	38	46	M18 x 1.5	50	1/4	114	64	19	161

Auto switch mounting position is the same as that on page 281.

Air Cylinder: Low Friction Type Double Acting, Single Rod

Series *CG1* ☐ *Q*

ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

Use the new series
“Smooth Cylinder Series CG1Y”
to realize both-direction low friction and low-speed operation.
(Refer to **Best Pneumatics No. 3.**)

How to Order

CG1 **L** **Q** **25** - **100** **F** - ☐

With auto switch **CDG1** **L** **Q** **25** - **100** **F** - **M9BW** ☐ - ☐

With auto switch
(Built-in magnet)

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
U*	Rod side trunnion style
T*	Head side trunnion style
D	Clevis style

* Not available for ø80 and ø100.
Note) Mounting brackets are shipped together, (but not assembled).

Low friction type

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) CDG1FQ32-100B

Bore size

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

Cylinder stroke (mm)

Low friction direction

F	When pressurized at head end
B	When pressurized at rod end

Auto switch

Nil	Without auto switch
------------	---------------------

* For the applicable auto switch model, refer to the table below.

Number of auto switches

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

Made to Order

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-☐

-X☐

Individual
-X☐

Technical
data

End Lock Cylinder Series *CBG1*

ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

CBG1 **L** **N** **25** - **100** **□** - **H** **N** - **□**

CDBG1 **L** **N** **25** - **100** **□** - **H** **N** - **M9BW** **□** - **□**

With auto switch
(Built-in magnet)

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
U*	Rod side trunnion style
T*	Head side trunnion style
D	Clevis style

* Not available for bore size ø80 and ø100.
Besides, trunnion cannot be attached in the side to which an end lock is attached.
Note) Mounting brackets are shipped together, (but not assembled).

Type

N	Rubber bumper
A	Air cushion

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

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 269.

Manual release type

N	Non-lock type
L	Lock type

Lock position

H	Head end lock
R	Rod end lock
W	Double end lock

With rod boot

Nil	Without rod boot
J	Nylon tarpaulin
K	Heat resistant tarpaulin

* In the case of w/ rod boot, and a foot bracket or rod side flange as a bracket, those parts are to be assembled at the time of shipment.

Number of auto switches

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

Auto switch

Nil	Without auto switch
------------	---------------------

* For the applicable auto switch model, refer to the table below.

Made to Order
Refer to page 269 for details.

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) CDBG1FA32-100-RL

Applicable Auto Switch/Refer to pages 1263 to 1371 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	Applicable bore size (mm)		0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)						
							ø20 to ø63	ø80, ø100											
Solid state switch	_____	Grommet	Yes	3-wire (NPN)	5V, 12V	—	M9N	—	●	●	●	○	—	○	IC circuit	Relay, PLC			
				3-wire (PNP)			M9P	—	●	●	●	○	—	○					
				2-wire			12V	M9B	—	●	●	●	○	—			○		
		Connector		3-wire (NPN)	5V, 12V		H7C	—	●	—	●	●	—	○	IC circuit				
				3-wire (PNP)			M9NW	—	●	●	●	○	—	○					
				2-wire			12V	M9PW	—	●	●	●	○	—			○		
	Diagnostic indication (2-color indication)	Grommet		24V	5V, 12V		—	M9BW	—	●	●	●	○	—	○		—		
								—	K59W	●	—	●	○	—	○				
								—	G5PW	●	—	●	○	—	○				
								—	K59W	●	—	●	○	—	○				
	Water resistant (2-color indication)	Grommet		24V	5V, 12V	—	H7BA	G5BA	—	—	●	○	—	○	IC circuit				
	With diagnostic output (2-color indication)						4-wire (NPN)	H7NF	G59F	●	—	●	○	—		○			
	Reed switch	_____		Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	A96	—	●	—	●	—	—	—	IC circuit	Relay, PLC
						2-wire	24V	12V	100V	A93	—	●	—	●	—	—	—	—	
100V or less			A90						—	●	—	●	—	—	—	—			
100V, 200V			B54						●	—	●	●	—	—					
200V or less			B64						●	—	●	—	—	—					
—			C73C						—	●	—	●	●	—	—				
Connector			24V or less	C80C		—	●	—	●	●	—	—	IC circuit						
			Grommet	—		—	B59W		●	—	●	—	—	—	—				

* Lead wire length symbols: 0.5 m Nil (Example) M9NW * Solid state auto switches marked with "○" are produced upon receipt of order.
1 m M (Example) M9NWM * D-A9□V/M9□V/M9□WV and D-M9□A(V)L cannot be mounted.
3 m L (Example) M9NWL
5 m Z (Example) M9NWZ
None N (Example) H7CN

* Since there are other applicable auto switches than listed, refer to page 283 for details.

* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.

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



Specifications

Bore size (mm)	20	25	32	40	50	63	80	100
Action	Double acting, Single rod							
Lubricant	Not required (Non-lube)							
Fluid	Air							
Proof pressure	1.5 MPa							
Maximum operating pressure	1.0 MPa							
Minimum operating pressure	0.15 MPa *							
Ambient and fluid temperature	Without auto switch: -10 to 70°C (No freezing)							
	With auto switch: -10 to 60°C (No freezing)							
Piston speed	50 to 1000 mm/s						50 to 700 mm/s	
Stroke length tolerance	Up to 1000 ^{st+1.4} ₀ mm, to 1200 ^{st+1.8} ₀ mm						Up to 1000 ^{st+1.4} ₀ mm Up to 1500 ^{st+1.8} ₀ mm	
Cushion	Rubber bumper, Air cushion							
Mounting **	Basic style, Axial foot style, Rod side flange style Head side flange style, Rod side trunnion style Head side trunnion style, Clevis style (Used for changing the port location by 90°.)							



* 0.05 MPa except locking parts.

** Rod/Head side trunnion styles are not available for bore sizes ø80 and ø100.
Trunnion is not attached for a cover on which lock mechanism is equipped.

Lock Specifications

Lock position	Head end, Rod end, Double end							
Holding force (Max.) (N)	ø20	ø25	ø32	ø40	ø50	ø63	ø80	ø100
	215	330	550	860	1340	2140	3450	5390
Backlash	2 mm or less							
Manual release	Non-lock type, Lock type							

Adjust the switch position so that it operates upon movement to both the stroke end and backlash (2 mm) positions.

Standard Stroke

Bore size (mm)	Standard stroke (mm) ⁽¹⁾	Long stroke (mm)	Maximum manufacturable stroke (mm)
20	25, 50, 75, 100, 125, 150, 200	201 to 350	1500
25	25, 50, 75, 100, 125, 150, 200, 250, 300	301 to 400	
32		301 to 450	
40		301 to 800	
50, 63		301 to 1200	
80		301 to 1400	
100		301 to 1500	



Note 1) Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Note 2) Long stroke applies to the axial foot style and the rod side flange style.

If other mounting brackets are used, or the length exceeds the long stroke limit, the stroke should be determined based on the stroke selection table in the technical data. (Refer to front matter 28.)

Rod Boot Material

Symbol	Rod boot material	Maximum operating temperature
J	Nylon tarpaulin	70°C
K	Heat resistant tarpaulin	110°C *

* Maximum ambient temperature for the rod boot itself.



Made to Order Specifications
(For details, refer to pages 1380 and 1454.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC13	Auto switch rail mounting

Refer to pages 279 to 283 for cylinders with auto switches.

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

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

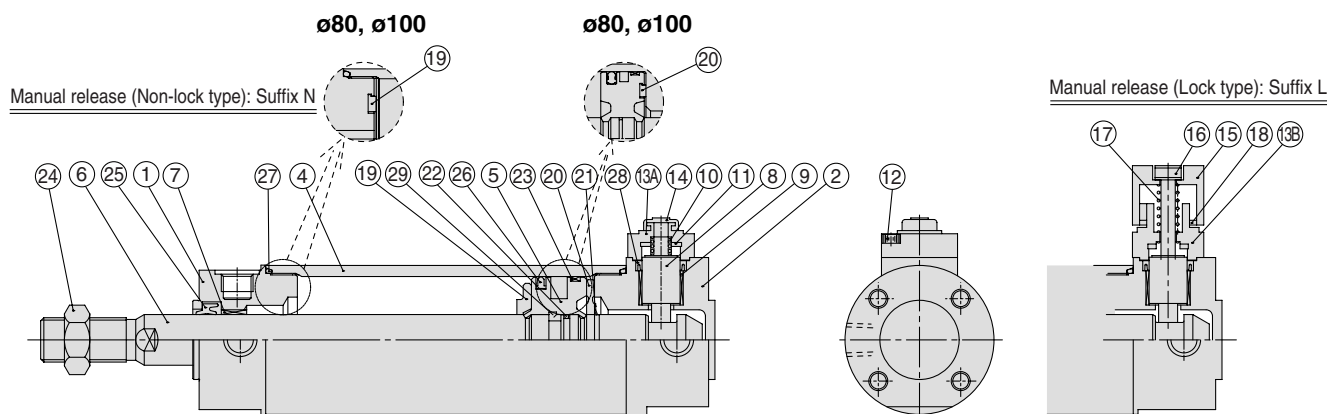
-X□

Technical data

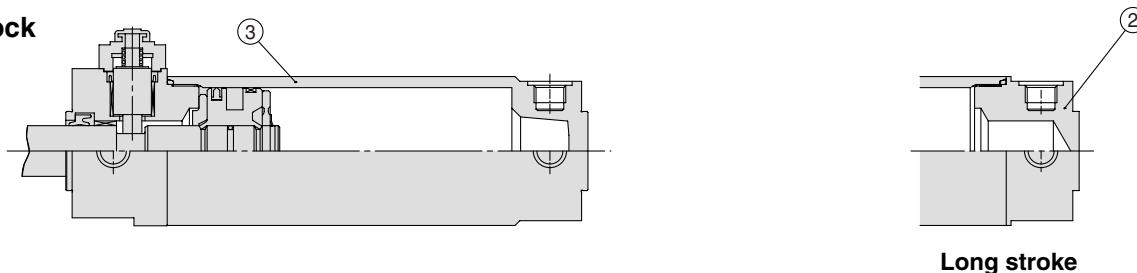
Series CBG1

Construction: With Rubber Bumper

Head end lock



Rod end lock



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Clear hard anodized
2	Head cover	Aluminum alloy	Clear hard anodized
3	Tube cover	Aluminum alloy	Clear hard anodized
4	Cylinder tube	Aluminum alloy	Hard anodized
5	Piston	Aluminum alloy	Chromated
6	Piston rod	Carbon steel *	Hard chrome plated
7	Bushing	Copper oil-impregnated sintered alloy	ø40 or larger: Copper alloy
8	Lock piston	Carbon steel	Hard chrome plated, Heat treated
9	Lock bushing	Copper alloy	
10	Lock spring	Stainless steel	
11	Bumper	Urethane	
12	Hexagon socket head cap screw	Alloy steel	Black zinc chromated
13A	Cap A	Aluminum die-casted	Black painted
13B	Cap B	Carbon steel	Oxide film treated
14	Rubber cap	Synthetic rubber	
15	M/O knob	Zinc die-casted	Black painted
16	M/O bolt	Alloy steel	Black zinc chromated, Red painted
17	M/O spring	Steel wire	Zinc chromated
18	Stopper ring	Carbon steel	Zinc chromated
19	Bumper A	Urethane	
20	Bumper B	Urethane	ø40 or larger: the same as bumper A

Note) In the case of cylinders with auto switches, magnets are installed in the piston.

* The material is stainless steel on auto switch equipped styles ø20 and ø25.

Replacement Parts/Seal Kit (With lock at single end)

Series	Bore size (mm)	Kit no.	Contents
CBG1□N Rubber bumper type	20	CBG1N20-PS	Set of nos. above (25, 26, 27, 28) and grease pack
	25	CBG1N25-PS	
	32	CBG1N32-PS	
	40	CBG1N40-PS	

Order seal kit in accordance with 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 no.: GR-S-010 (10 g)

⚠ Caution

When disassembling cylinders with bore sizes of ø20 through ø40, grip the double flat part of either the head cover or the rod cover with a vise and loosen the other side with a wrench or an adjustable angle wrench, etc., and then remove the cover.

When re-tightening, tighten approximately 2 degrees more than the original position. (Cylinders with ø50 or larger bore sizes are tightened with a large tightening torque and cannot be disassembled. Please contact SMC when disassembly is required.)

No.	Description	Material	Note
21	Retaining ring	Stainless steel	None for ø80, ø100
22	Piston gasket	NBR	
23	Wear ring	Resin	
24	Rod end nut	Rolled steel	Nickel plated
25	Rod seal	NBR	
26	Piston seal	NBR	
27	Cylinder tube gasket	NBR	1 pc. when using tube cover
28	Lock piston seal	NBR	2 pcs. for with locks in both sides
29	Piston holder	Urethane	ø40 to ø100, head end lock only

Replacement Parts/Seal Kit (With lock at double end)

Series	Bore size (mm)	Kit no.	Contents
CBG1□N Rubber bumper type	20	CBG1N20-PS-W	Set of nos. above (25, 26, 27, 28) and grease pack
	25	CBG1N25-PS-W	
	32	CBG1N32-PS-W	
	40	CBG1N40-PS-W	

Order seal kit in accordance with the bore size.

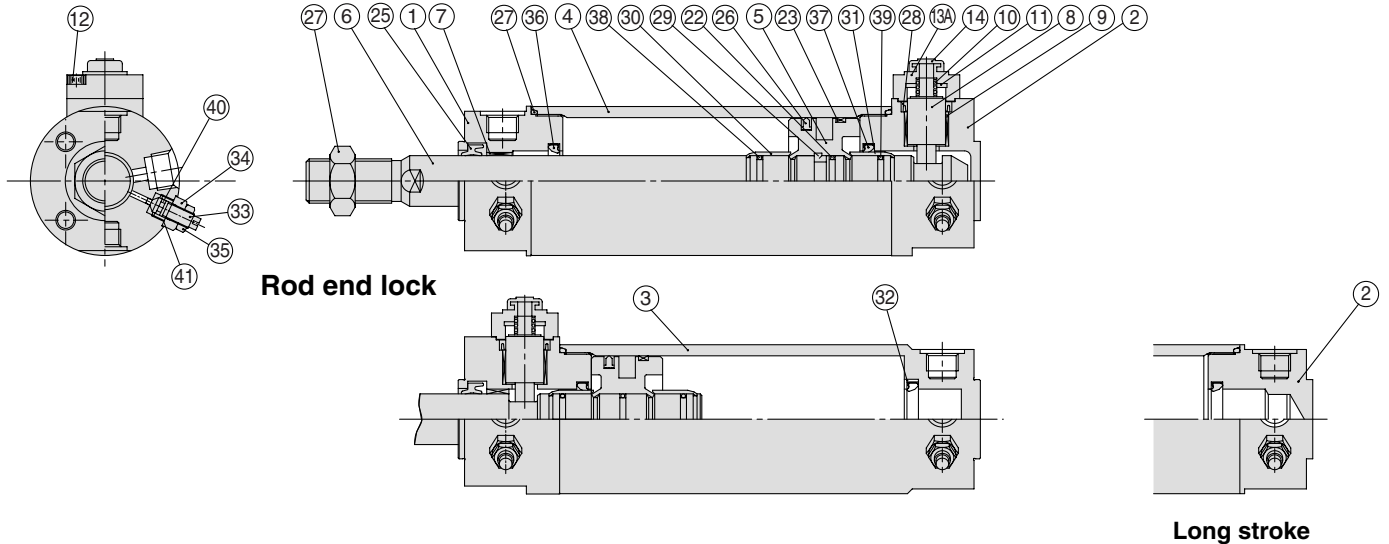
* The seal kit includes a grease pack (10 g). Order with the following part number when only the grease pack is needed.

Grease pack part no.: GR-S-010 (10 g)

Construction: With Air Cushion

With air cushion Head end lock

Manual release (Non-lock type): Suffix N



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Clear hard anodized
2	Head cover	Aluminum alloy	Clear hard anodized
3	Tube cover	Aluminum alloy	Clear hard anodized
4	Cylinder tube	Aluminum alloy	Hard anodized
5	Piston	Aluminum alloy	Chromated
6	Piston rod	Carbon steel *	Hard chrome plated *
7	Bushing	Oil-impregnated sintered alloy	ø40 and larger are lead-bronze casted
8	Lock piston	Carbon steel	Hard chrome plated, Heat treated
9	Lock bushing	Copper alloy	
10	Lock spring	Stainless steel	
11	Bumper	Urethane	
12	Hexagon socket head cap screw	Alloy steel	Black zinc chromated
13A	Cap A	Aluminum die-casted	Black painted
13B	Cap B	Carbon steel	Oxide film treated
14	Rubber cap	Synthetic rubber	
15	M/O knob	Zinc die-casted	Black painted
16	M/O bolt	Alloy steel	Black zinc chromated, Red painted
17	M/O spring	Steel wire	Zinc chromated
18	Stopper ring	Carbon steel	Zinc chromated

Note) In the case of cylinders with auto switches, magnets are installed in the piston.
* The material is stainless steel on auto switch equipped styles ø20 and ø25.

No.	Description	Material	Note
22	Piston gasket	NBR	
23	Wear ring	Resin	
24	Rod end nut	Rolled steel	Nickel plated
25	Rod seal	NBR	
26	Piston seal	NBR	
27	Cylinder tube gasket	NBR	1 pc. when using tube cover
28	Lock piston seal	NBR	2 pcs. for with locks in both sides
29	Piston holder	Urethane	ø40 to ø100 only
30	Cushion ring A	Aluminum alloy	Anodized
31	Cushion ring B	Aluminum alloy	Anodized
32	Seal retainer	Rolled steel	Only when using nickel plated, tube cover
33	Cushion valve	Rolled steel	Electroless nickel plated
34	Valve retainer	Rolled steel	Electroless nickel plated
35	Lock nut	Rolled steel	Nickel plated
36	Cushion seal A	Urethane	
37	Cushion seal B	Urethane	ø32 or larger: The same as A
38	Cushion ring gasket A	NBR	
39	Cushion ring gasket B	NBR	ø32 or larger: The same as A
40	Valve seal	NBR	
41	Valve retaining gasket	NBR	

Replacement Parts/Seal Kit (With lock at single end)

Series	Bore size (mm)	Kit no.	Contents
CBG1□A Air cushion type	20	CBG1A20-PS	Set of nos. above
	25	CBG1A25-PS	(25, 26, 27, 28,
	32	CBG1A32-PS	(40, 41)
	40	CBG1A40-PS	and grease pack

Order seal kit in accordance with 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 no.: GR-S-010 (10 g)

⚠ Caution

When disassembling cylinders with bore sizes of ø20 through ø40, grip the double flat part of either the head cover or the rod cover with a vise and loosen the other side with a wrench or an adjustable angle wrench, etc., and then remove the cover.

When re-tightening, tighten approximately 2 degrees more than the original position. (Cylinders with ø50 or larger bore sizes are tightened with a large tightening torque and cannot be disassembled. Please contact SMC when disassembly is required.)

Replacement Parts/Seal Kit (With lock at double end)

Series	Bore size (mm)	Kit no.	Contents
CBG1□A Air cushion type	20	CBG1A20-PS-W	Set of nos. above
	25	CBG1A25-PS-W	(25, 26, 27, 28,
	32	CBG1A32-PS-W	(40, 41)
	40	CBG1A40-PS-W	and grease pack

Order seal kit in accordance with 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 no.: GR-S-010 (10 g)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

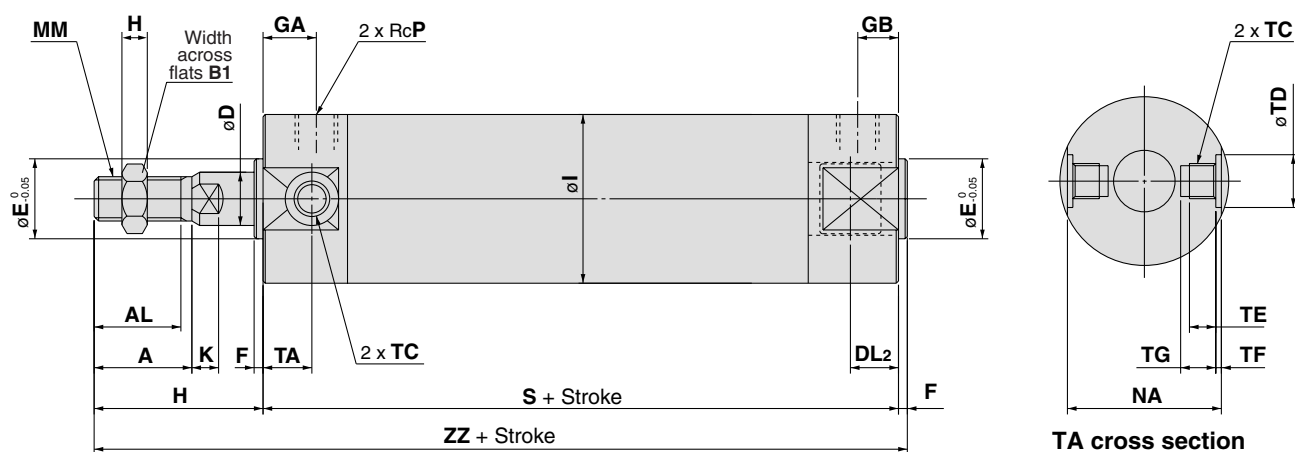
CS1

CS2

Series CBG1

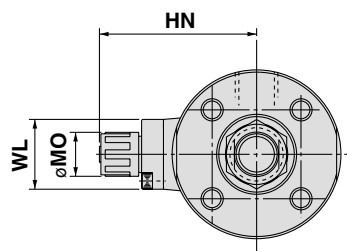
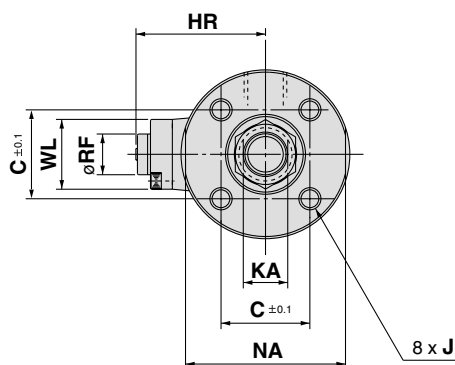
Rubber Bumper Type: CBG1BN

Head end lock: CBG1BN Bore size — Stroke — H□



Manual release (Non-lock type): Suffix N

Manual release (Lock type): Suffix L



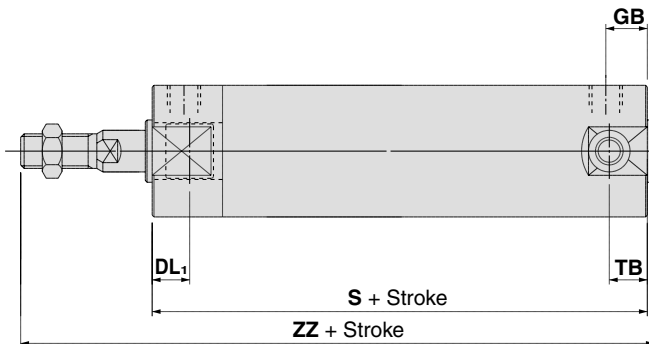
(mm)

Bore size (mm)	Stroke range	A	AL	B ₁	C	D	DL ₂	E	F	GA	GB	H	H ₁	HR	HN (Max.)	I	J
20	Up to 350	18	15.5	13	14	8	12.5	12	2	12	12	35	5	25.3	37	26	M4 x 0.7 depth 7
25	Up to 400	22	19.5	17	16.5	10	12.5	14	2	12	12	40	6	28.3	40	31	M5 x 0.8 depth 7.5
32	Up to 450	22	19.5	17	20	12	12	18	2	12	12	40	6	31.3	43	38	M5 x 0.8 depth 8
40	Up to 800	30	27	19	26	16	15	25	2	13	13	50	8	38.3	52.5	47	M6 x 1 depth 12
50	Up to 1200	35	32	27	32	20	16.5	30	2	14	14	58	11	44.5	58.5	58	M8 x 1.25 depth 16
63	Up to 1200	35	32	27	38	20	16.5	32	2	14	14	58	11	45	59	72	M10 x 1.5 depth 16
80	Up to 1400	40	37	32	50	25	19	40	3	20	20	71	13	53.5	68	89	M10 x 1.5 depth 22
100	Up to 1500	40	37	41	60	30	20	50	3	20	20	71	16	64.5	79	110	M12 x 1.75 depth 22

Bore size (mm)	K	KA	MM	MO	NA	P	RF	S	TA	TC	TD	TE	TF	TG	WL	ZZ
20	5	6	M8 x 1.25	15	24	1/8	11	81	11	M5 x 0.8	8 ^{+0.08} ₀	4	0.5	5.5	15	118
25	5.5	8	M10 x 1.25	15	29	1/8	11	81	11	M6 x 0.75	10 ^{+0.08} ₀	5	1	6.5	15	123
32	5.5	10	M10 x 1.25	15	35.5	1/8	11	81	11	M8 x 1.0	12 ^{+0.08} ₀	5.5	1	7.5	24	123
40	6	14	M14 x 1.5	19	44	1/8	11	92	12	M10 x 1.25	14 ^{+0.08} ₀	6	1.25	8.5	24	144
50	7	18	M18 x 1.5	19	55	1/4	11	107	13	M12 x 1.25	16 ^{+0.08} ₀	7.5	2	10	24	167
63	7	18	M18 x 1.5	19	69	1/4	11	107	13	M14 x 1.5	18 ^{+0.08} ₀	11.5	3	14.5	24	167
80	10	22	M22 x 1.5	23	80	3/8	21	130	—	—	—	—	—	—	40	204
100	10	26	M26 x 1.5	23	100	1/2	21	130	—	—	—	—	—	—	40	204

Rubber Bumper Type: CBG1BN

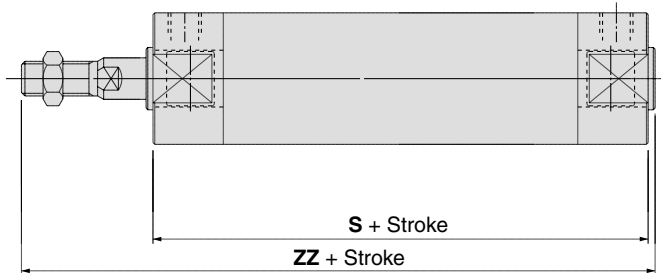
Rod end lock: CBG1BN Bore size Stroke R ☐



Bore size (mm)	DL1	GB	S	TB	ZZ
20	19.5	10(12)	80(88)	11	117(125)
25	19.5	10(12)	80(88)	11	122(130)
32	20	10(12)	81(89)	10(11)	123(131)
40	19	10(13)	87(96)	10(12)	139(148)
50	23.5	12(14)	102(114)	12(13)	162(174)
63	23.5	12(14)	102(114)	12(13)	162(174)
80	27	16(20)	124(138)	—	198(212)
100	30	16(20)	124(138)	—	198(212)

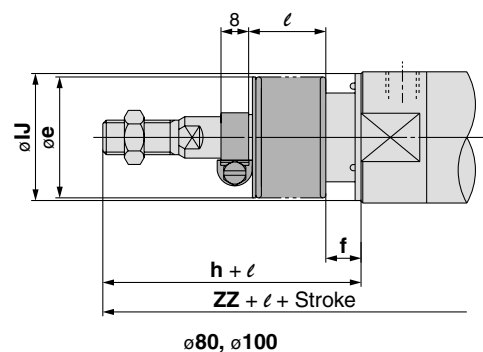
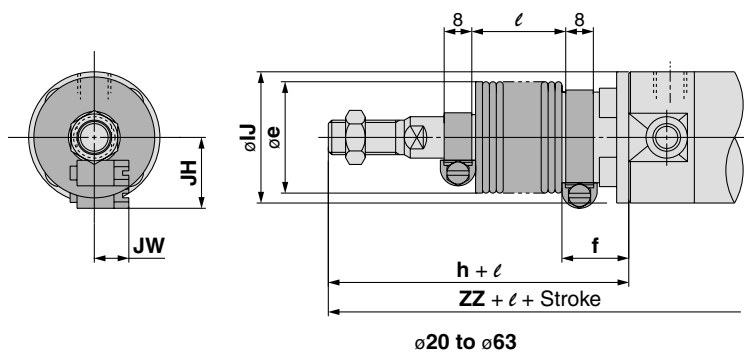
* (): Denotes the dimensions for long stroke.

Double end lock: CBG1BN Bore size Stroke W ☐



Bore size (mm)	S	ZZ
20	92	129
25	92	134
32	91	133
40	101	153
50	119	179
63	119	179
80	146	220
100	146	220

With rod boot



Bore size (mm)	e	f	h	IJ	JH (Reference)	JW (Reference)	ℓ	Head end lock (-H□)	Rod end lock (-R□)	Double end lock (-W□)
20	30	18	55	27	15.5	10.5	1/4 stroke	ZZ	ZZ	ZZ
25	30	19	62	32	16.5	10.5	1/4 stroke	138	137(145)	149
32	35	19	62	38	18.5	10.5	1/4 stroke	145	144(152)	156
40	35	19	70	48	21.5	10.5	1/4 stroke	145	145(153)	155
50	40	19	78	59	24	10.5	1/4 stroke	164	159(168)	173
63	40	20	78	72	24	10.5	1/4 stroke	187	182(194)	199
80	52	10	80	59	—	—	1/4 stroke	187	182(194)	199
100	62	7	80	71	—	—	1/4 stroke	213	207(221)	229
							1/4 stroke	213	207(221)	229

* (): Denotes the dimensions for long strokes.

** The minimum stroke with rod boot is 20 mm.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

Technical

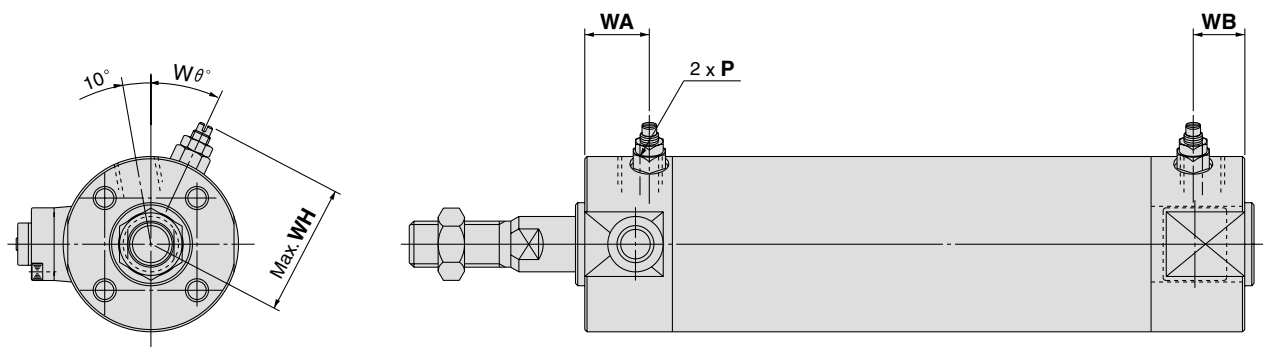
data

Series CBG1

Air Cushion Type: CBG1BA

Head end lock: CBG1BA Bore size Stroke H ☐

Rod end lock: CBG1BA Bore size Stroke R ☐



Head End Lock: -H ☐

(mm)

Bore size (mm)	P	WA	WB	WH	Wθ
20	M5 x 0.8	16	16	23	30°
25	M5 x 0.8	16	16	25	30°
32	Rc 1/8	16	16	28.5	25°
40	Rc 1/8	16	16	33	20°
50	Rc 1/4	18	18	40.5	20°
63	Rc 1/4	18	18	47.5	20°
80	Rc 3/8	22	22	60.5	20°
100	Rc 1/2	22	22	71	20°

* For dimensions other than listed above, refer to the dimensions with rubber bumper.

Rod End Lock: -R ☐

(mm)

Bore size (mm)	P	WA	WB	WH	Wθ
20	M5 x 0.8	16	15(16)	23	30°
25	M5 x 0.8	16	15(16)	25	30°
32	Rc 1/8	16	15(16)	28.5	25°
40	Rc 1/8	16	15(16)	33	20°
50	Rc 1/4	18	17(18)	40.5	20°
63	Rc 1/4	18	17(18)	47.5	20°
80	Rc 3/8	22	22	60.5	20°
100	Rc 1/2	22	22	71	20°

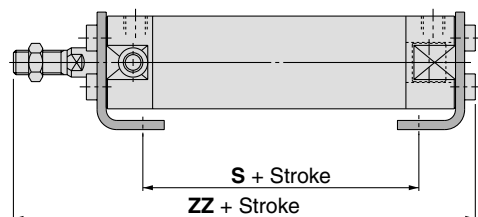
* (): Denotes the dimensions for long strokes.

** For dimensions other than the listed above, refer to the dimensions with rubber bumper.

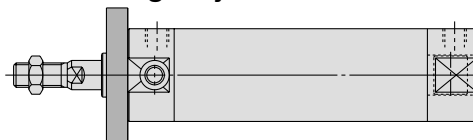
With Mounting Bracket

(For dimensions other than listed below, refer to pages 272 to 274, 229 to 233.)

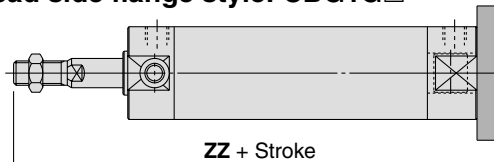
Axial foot style: CBG1L□



Rod side flange style: CBG1F□



Head side flange style: CBG1G□



Foot Style

Bore size (mm)	Head end lock: -H□			Rod end lock: -R□			Double end lock: -W□		
	LS	ZZ		LS	ZZ		LS	ZZ	
	—	Without rod boot	With rod boot	—	Without rod boot	With rod boot	—	Without rod boot	With rod boot
20	57	122	142 + ℓ	56(64)	121(129)	141(149) + ℓ	68	133	153 + ℓ
25	57	127.5	149.5 + ℓ	56(64)	126.5(134.5)	148.5(156.5) + ℓ	68	138.5	160.5 + ℓ
32	55	127.5	149.5 + ℓ	55(63)	127.5(135.5)	149.5(157.5) + ℓ	65	137.5	159.5 + ℓ
40	65	149	169 + ℓ	60(69)	144(153)	164(173) + ℓ	74	158	178 + ℓ
50	72	174.5	194.5 + ℓ	67(79)	169.5(181.5)	189.5(201.5) + ℓ	84	186.5	206.5 + ℓ
63	72	174.5	194.5 + ℓ	67(79)	169.5(181.5)	189.5(201.5) + ℓ	84	186.5	206.5 + ℓ
80	82	210.5	219.5 + ℓ	76(90)	204.5(218.5)	213.5(227.5) + ℓ	98	226.5	235.5 + ℓ
100	82	214	223 + ℓ	76(90)	208(222)	217(231) + ℓ	98	230	239 + ℓ

* (): Denotes the dimensions for long stroke.

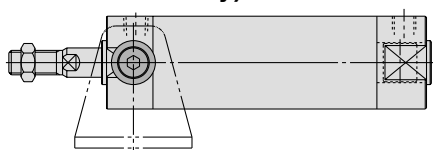
Rod Side Flange Style Overall length is the same as basic style.

Head Side Flange Style

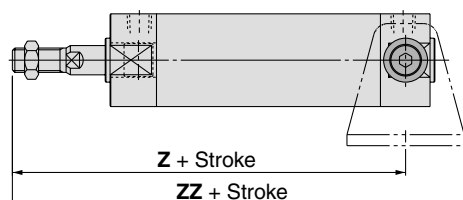
Bore size (mm)	Head end lock: -H□		Rod end lock: -R□		Double end lock: -W□	
			ZZ (Head side flange)			
	Without rod boot	With rod boot	Without rod boot	With rod boot	Without rod boot	With rod boot
20	124	144 + ℓ	123	143 + ℓ	135	155 + ℓ
25	130	152 + ℓ	129	151 + ℓ	141	163 + ℓ
32	130	152 + ℓ	130	152 + ℓ	140	162 + ℓ
40	152	172 + ℓ	147(156)	167(176) + ℓ	161	181 + ℓ
50	176	196 + ℓ	171(183)	191(203) + ℓ	188	208 + ℓ
63	176	196 + ℓ	171(183)	191(203) + ℓ	188	208 + ℓ
80	215	224 + ℓ	209(223)	218(232) + ℓ	231	240 + ℓ
100	218	227 + ℓ	212(226)	221(235) + ℓ	234	243 + ℓ

* (): Denotes the dimensions for long stroke.

Rod side trunnion style: CBG1U□ (Rod end lock-H□ only)



Head side trunnion style: CBG1T□ (Rod end lock -R□ only)



Rod Side Trunnion Style Overall length is the same as basic style. Head Side Trunnion Style

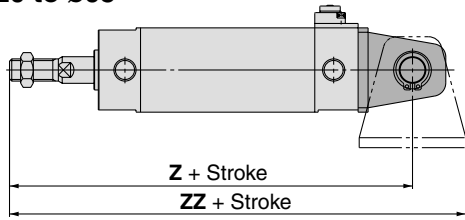
Bore size (mm)	Rod end lock: -R□			
	Z (Head side trunnion)		ZZ (Head side trunnion)	
	Without rod boot	With rod boot	Without rod boot	With rod boot
20	104	124 + ℓ	125	145 + ℓ
25	109	131 + ℓ	130	152 + ℓ
32	111	133 + ℓ	135	157 + ℓ
40	127(134)	147(154) + ℓ	155(162)	175(182) + ℓ
50	148(159)	168(179) + ℓ	180(191)	200(211) + ℓ
63	148(159)	168(179) + ℓ	185(196)	205(216) + ℓ

* (): Denotes the dimensions for long stroke.

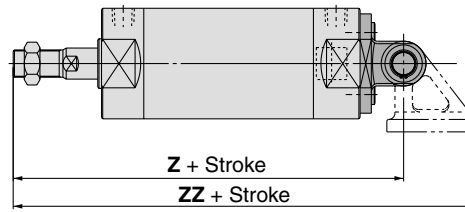
Series CBG1

With Mounting Bracket

Clevis style: CBG1D□
ø20 to ø63



Clevis style: CBG1D□
ø80 to ø100



Clevis Style

(mm)

Bore size (mm)	Head end lock: -H□				Rod end lock: -R□			
	Z		ZZ		Z		ZZ	
	Without rod boot	With rod boot	Without rod boot	With rod boot	Without rod boot	With rod boot	Without rod boot	With rod boot
20	130	150 + ℓ	151	171 + ℓ	129	149 + ℓ	150	170 + ℓ
25	137	159 + ℓ	158	180 + ℓ	136	158 + ℓ	157	179 + ℓ
32	141	163 + ℓ	165	187 + ℓ	141	163 + ℓ	165	187 + ℓ
40	164	184 + ℓ	192	212 + ℓ	159 (168)	179 (188) + ℓ	187 (196)	207 (216) + ℓ
50	190	210 + ℓ	222	242 + ℓ	185 (197)	205 (217) + ℓ	217 (229)	237 (249) + ℓ
63	195	215 + ℓ	232	252 + ℓ	190 (202)	210 (222) + ℓ	227 (239)	247 (259) + ℓ
80	236	245 + ℓ	294.5	303.5 + ℓ	230 (244)	239 (253) + ℓ	288.5 (302.5)	297.5 (311.5) + ℓ
100	244	253 + ℓ	320.5	329.5 + ℓ	238 (252)	247 (261) + ℓ	314.5 (328.5)	323.5 (337.5) + ℓ

Bore size (mm)	Double end lock: -W□			
	Z		ZZ	
	Without rod boot	With rod boot	Without rod boot	With rod boot
20	141	161 + ℓ	162	182 + ℓ
25	148	170 + ℓ	169	191 + ℓ
32	151	173 + ℓ	175	197 + ℓ
40	173	193 + ℓ	201	221 + ℓ
50	202	222 + ℓ	234	254 + ℓ
63	207	227 + ℓ	244	264 + ℓ
80	252	261 + ℓ	310.5	319.5 + ℓ
100	260	269 + ℓ	336.5	345.5 + ℓ

* (): Denotes the dimensions for long stroke.



Series CBG1 Specific Product Precautions 1

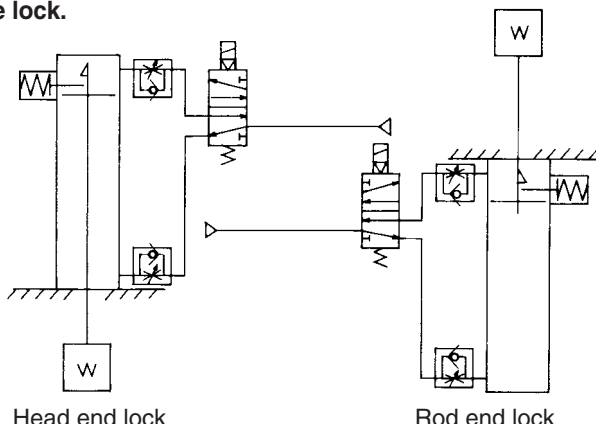
Be sure to read before handling.

Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Use the Recommended Pneumatic Circuit

⚠ Caution

- This is necessary for proper operation and release of the lock.



Operating Precautions

⚠ Caution

- Do not use 3 position solenoid valves.**
Avoid use in combination with 3 position solenoid valves (especially closed center metal seal types). If pressure is trapped in the port on the lock mechanism side, the cylinder cannot be locked. Furthermore, even after being locked, the lock may be released after some time, due to air leaking from the solenoid valve and entering the cylinder.
- Back pressure is required when releasing the lock.**
Be sure air is supplied to side of cylinder without the locking mechanism, as above, prior to supplying air pressure to the side with end lock or lock may not be released. (⇒ Refer to "Releasing the Lock".)
- Release the lock when mounting or adjusting the cylinder.**
If mounting or other work is performed when the cylinder is locked, the lock unit may be damaged.
- Operate with a load ratio of 50% or less.**
If the load ratio exceeds 50%, this may cause problems such as failure of the lock to release, or damage to the lock unit.
- Do not operate multiple cylinders in synchronization.**
Avoid applications in which two or more end lock cylinders are synchronized to move one workpiece, as one of the cylinder locks may not be able to release when required.
- Use a speed controller with meter-out control.**
Lock cannot be released occasionally by meter-in control.
- Be sure to operate completely to the cylinder stroke end on the side with the lock.**
If the cylinder piston does not reach the end of the stroke, locking and unlocking may not be possible.
- Do not use an air cylinder as an air-hydro cylinder.**
This could result in leakage of oil.
- Install a rod boot without twisting.**
If the cylinder is installed with its bellows twisted, it could damage the bellows.
- Adjust an auto switch position so that it operates for movement to both the stroke end and backlash (2 mm) positions.**
When a 2-color indication switch is adjusted for green indication at the stroke end, it may change to red for the backlash return, but this is not abnormal.

Operating Precautions

⚠ Warning

- Do not operate the cushion valve in the fully closed or fully opened state.**
Using it in the fully closed state will cause the cushion seal to be damaged. Using it in the fully opened state will cause the piston rod assembly or the cover to be damaged.
- Operate within the specified cylinder speed.**
Otherwise, cylinder and seal damage may occur.

Operating Pressure

⚠ Caution

- Use pressures over 0.15 MPa at port with locking mechanism. This is required to release the lock.

Exhaust Speed

⚠ Caution

- Locking will occur automatically if the pressure applied to the port on the lock mechanism side falls to 0.05 MPa or less. In cases where the piping on the lock mechanism side is long and thin, or the speed controller is separated at some distance from the cylinder port, the exhaust speed will be reduced. Take note that some time may be required for the lock to engage. In addition, clogging of a silencer mounted on the solenoid valve exhaust port can produce the same effect.

Relation to Cushion

⚠ Caution

- When cushion valve at side with locking mechanism is fully opened or closed, piston rod may reached at stroke end. Thus lock is not established. And when locking is done at cushion valve fully closed, adjust cushion valve since lock may not be released.

Releasing the Lock

⚠ Warning

- Before releasing the lock, be sure to supply air to the side without the lock mechanism, so that there is no load applied to the lock mechanism when it is released. (Refer to the recommended pneumatic circuits.) If the lock is released when the port on the other side is in an exhaust state, and with a load applied to the lock unit, the lock unit may be subjected to an excessive force and be damaged. Furthermore, sudden movement of the piston rod is very dangerous.

Disassembly/Replacement

⚠ Caution

- Do not replace the bushings or the cushion seals.**
The bushings are press-fit. To replace them, they must be replaced together with the cover assembly.
- To replace a seal, apply grease to the new seal before installing it.**
If the cylinder is put into operation without applying grease to the seal, it could cause the seal to wear significantly, leading to premature air leakage.
- Those with a bore of ø50 or more cannot be disassembled.**
When disassembling cylinders with bore sizes of ø20 through ø40, grip the double flat part of either the head cover or the rod cover with a vise and loosen the other side with a wrench or an adjustable angle wrench, etc., and then remove the cover.
When re-tightening, tighten approximately 2 degrees more than the original position. (Cylinders with ø50 or larger bore sizes are tightened with a large tightening torque and cannot be disassembled. Please contact SMC when disassembly is required.)

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

Technical

data



Series CBG2

Specific Product Precautions 2

Be sure to read before handling.

Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Manual Release

⚠ Caution

1. Manual release non-lock type

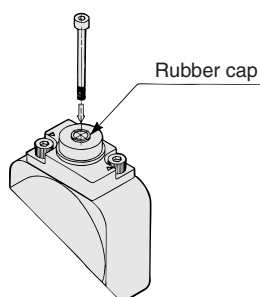
Insert the accessory bolt from the top of the rubber cap (it is not necessary to remove the rubber cap), and after screwing it into the lock piston, pull it to release the lock. If you stop pulling the bolt, the lock will return to an operational state.

Thread sizes, pulling forces and strokes are as shown below.

Bore size (mm)	Thread size	Pulling force	Stroke (mm)
20, 25, 32	M2.5 x 0.45 x 25 or more	4.9N	2
40, 50, 63	M3 x 0.5 x 30 or more	10N	3
80, 100	M5 x 0.8 x 40 or more	24.5N	3

Remove the bolt for normal operation.

It can cause lock malfunction or faulty release.

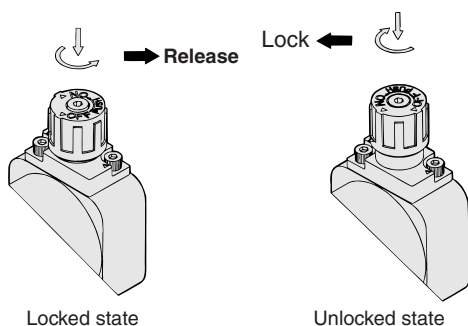


2. Manual release lock type

While pushing the M/O knob, turn it 90° counterclockwise. The lock is released (and remains in a released state) by aligning the ▲ mark on the cap with the ▼ OFF mark on the M/O knob.

When locking is desired, turn the M/O knob 90° clockwise while pushing completely down, and align the ▲ mark on the cap with the ▼ ON mark on the M/O knob. The correct position is confirmed by a clicking sound.

Failure to click it into place properly can cause the lock to disengage.

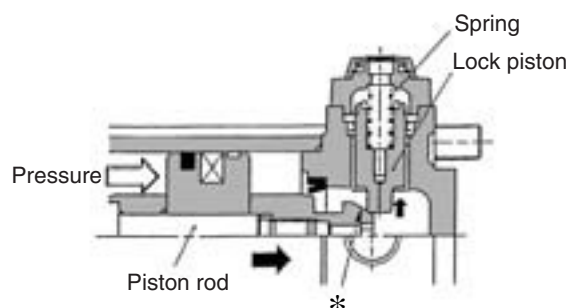


Working Principle

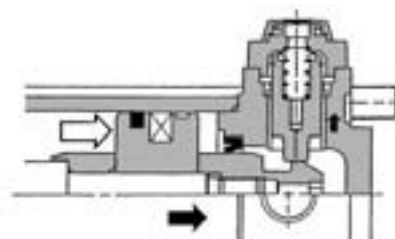
* The figures below are the same as those for Series CBA2.

● Head end lock (Rod end lock is the same.)

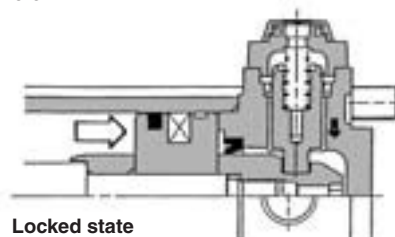
1. When the piston rod is getting closer to the stroke end, the taper part (*) of the piston rod edge will push the lock piston up.



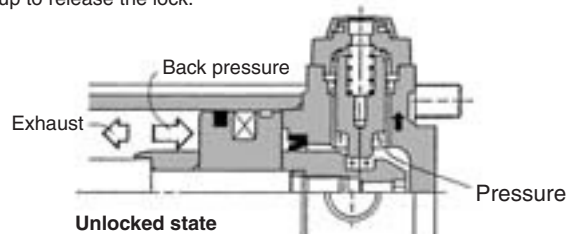
2. The lock piston is pushed up further.



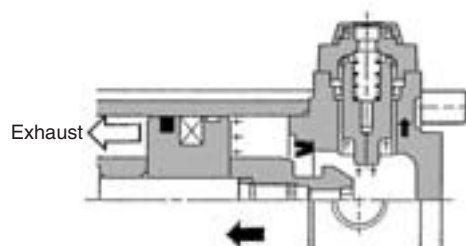
3. The lock piston is pushed up into the groove of the piston rod to lock it. (The lock piston is pushed up by spring force.) At this time, it is exhausted from the port on the head side and introduced into the atmosphere.



4. When pressure is supplied in the head side, lock piston will be pushed up to release the lock.



5. When the lock is released, the cylinder will move forward.

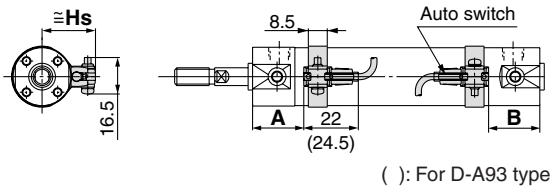


Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height

Reed auto switch

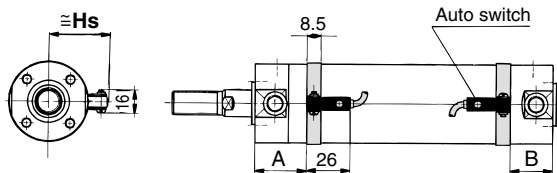
D-A9□

ø20 to ø63



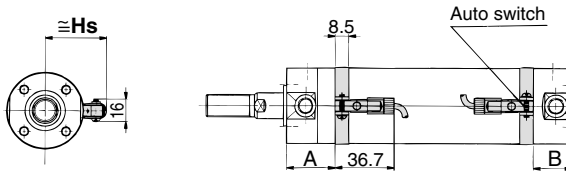
D-C7, C8

ø20 to ø63



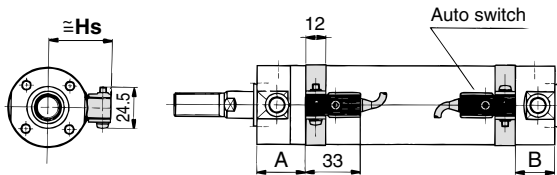
D-C73C, C80C

ø20 to ø63



D-B5, B6, B59W

ø20 to ø100

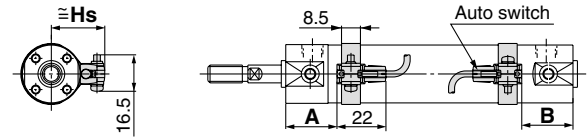


Solid state auto switch

D-M9□

D-M9□W

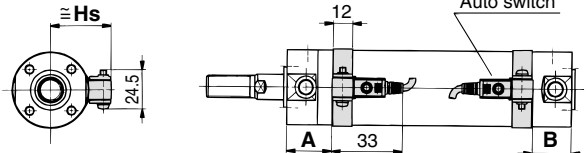
ø20 to ø63



D-G5, K5, G5□W, G5BAL

D-K59W, D-G59F, D-G5NTL

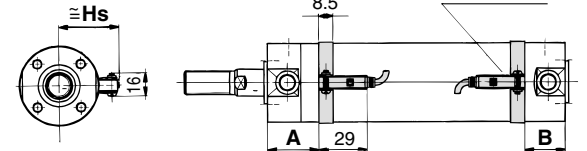
ø20 to ø100



D-H7□, H7□W

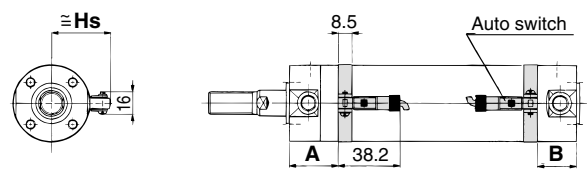
D-H7NF, H7BAL

ø20 to ø63



D-H7C

ø20 to ø63



Auto Switch Mounting Position /

Except Single Acting/Direct Mount Type (CG1R, CG1KR), End Lock Cylinder (CBG1) (mm)

Auto switch model	D-A9□		D-M9□ D-M9□W		D-C7/C8 D-C73C D-C80C		D-B5 D-B6		D-B59W		D-H7□ D-H7C D-H7□W D-H7BAL D-H7NF		D-G5□W D-K59W D-G59F D-G5 D-K5 D-G5NTL D-G5BAL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
20	29	20 (28)	33	24 (32)	29.5	20.5 (28.5)	23.5	14.5 (22.5)	26.5	17.5 (25.5)	28.5	19.5 (27.5)	25	16 (24)
25	29	20 (28)	33	24 (32)	29.5	20.5 (28.5)	23.5	14.5 (22.5)	26.5	17.5 (25.5)	28.5	19.5 (27.5)	25	16 (24)
32	30	21 (29)	34	25 (33)	30.5	21.5 (29.5)	24.5	15.5 (23.5)	27.5	18.5 (26.5)	29.5	20.5 (28.5)	26	17 (25)
40	35	23 (32)	39	27 (36)	35.5	23.5 (32.5)	29.5	17.5 (26.5)	32	20.5 (29.5)	34.5	22.5 (31.5)	31	19 (28)
50	42	28 (40)	46	32 (44)	42.5	28.5 (40.5)	36.5	22.5 (34.5)	39.5	25.5 (37.5)	41.5	27.5 (39.5)	38	24 (36)
63	42	28 (40)	46	32 (44)	42.5	28.5 (40.5)	36.5	22.5 (34.5)	39.5	25.5 (37.5)	41.5	27.5 (39.5)	38	24 (36)
80	—	—	—	—	—	—	46.5	30.5 (44.5)	49.5	33.5 (47.5)	—	—	48	32 (46)
100	—	—	—	—	—	—	46.5	30.5 (44.5)	49.5	33.5 (47.5)	—	—	48	32 (46)

Note 1) Figures in parentheses are for the long stroke, double rod type.

Note 2) In the actual setting, adjust them after confirming the auto switch operating condition.

Operating Range

Auto switch model	D-A9□ D-M9□ D-M9□W	D-C7/C8 D-H7□ D-H7□W D-H7NF D-H7BAL	D-C73C D-C80C	D-B5/B6 D-B59W D-G59F D-G5/K5 D-H7C D-G5□W D-G5BAL D-K59W
Bore size (mm)	Hs	Hs	Hs	Hs
20	24	24.5	27	27.5
25	26.5	27	29.5	30
32	30	30.5	33	33.5
40	34.5	35	37.5	38
50	40	40.5	43	43.5
63	47	47.5	50	50.5
80	—	—	—	59
100	—	—	—	69.5

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

-X□

Individual

-X□

Technical

data

Series CG1

Proper Auto Switch Mounting Position (Detection at stroke end) Single Acting, Spring Return Types (S)/Spring Extend Type (T)

Proper Auto Switch Mounting Position: Single Acting/Spring Return Type (S)

(mm)

Auto switch model	Bore size	A Dimensions							B
		Up to 25 st	26 to 50 st	51 to 75 st	76 to 100 st	101 to 125 st	126 to 150 st	151 to 200 st	
D-A9□	20	54	54	79	79	104	—	—	20
	25	54	54	79	79	104	129	129	20
	32	55	55	80	80	105	130	130	21
	40	59.5	59.5	84.5	84.5	109.5	134.5	134.5	23
D-M9□ D-M9□W	20	58	58	83	83	108	—	—	24
	25	58	58	83	83	108	133	133	24
	32	59	59	84	84	109	134	134	25
	40	63.5	63.5	88.5	88.5	113.5	138.5	138.5	27
D-C7 D-C8 D-C73C D-C80C	20	54.5	54.5	79.5	79.5	104.5	—	—	20.5
	25	54.5	54.5	79.5	79.5	104.5	129.5	129.5	20.5
	32	55.5	55.5	80.5	80.5	105.5	130.5	130.5	21.5
	40	60	60	85	85	110	135	135	23.5
D-H7□W D-H7□ D-H7C D-H7BAL D-H7NF	20	53.5	53.5	78.5	78.5	103.5	—	—	19.5
	25	53.5	53.5	78.5	78.5	103.5	128.5	128.5	19.5
	32	54.5	54.5	79.5	79.5	109.5	129.5	129.5	20.5
	40	59	59	84	84	109	134	134	22.5
D-B5 D-B6	20	48.5	48.5	73.5	73.5	98.5	—	—	14.5
	25	48.5	48.5	73.5	73.5	98.5	123.5	123.5	14.5
	32	49.5	49.5	74.5	74.5	99.5	124.5	124.5	15.5
	40	54	54	79	79	104	129	129	17.5
D-G5NTL D-G59F	20	50	50	75	75	100	—	—	16
	25	50	50	75	75	100	125	125	16
	32	51	51	76	76	101	126	126	17
	40	55.5	55.5	80.5	80.5	105.5	130.5	130.5	19
D-B59W	20	51.5	51.5	76.5	76.5	101.5	—	—	17.5
	25	51.5	51.5	76.5	76.5	101.5	126.5	126.5	17.5
	32	52.5	52.5	77.5	77.5	102.5	127.5	127.5	18.5
	40	56.5	56.5	81.5	81.5	106.5	131.5	131.5	20.5

Note) In the actual setting, adjust them after confirming the auto switch operating condition.

Proper Auto Switch Mounting Position: Single Acting/Spring Extend Type (T)

(mm)

Auto switch model	Bore size	A	B Dimensions						
			Up to 25 st	26 to 50 st	51 to 75 st	76 to 100 st	101 to 125 st	126 to 150 st	151 to 200 st
D-A9□	20	29	45	45	70	70	95	—	—
	25	29	45	45	70	70	95	120	120
	32	30	46	46	71	71	96	121	121
	40	35	47.5	47.5	72.5	72.5	97.5	122.5	122.5
D-M9□ D-M9□W	20	33	49	49	74	74	99	—	—
	25	33	49	49	74	74	99	124	124
	32	34	50	50	75	75	100	125	125
	40	39	51.5	51.5	76.5	76.5	101.5	126.5	126.5
D-C7 D-C8 D-C73C D-C80C	20	29.5	45.5	45.5	70.5	70.5	95.5	—	—
	25	29.5	45.5	45.5	70.5	70.5	95.5	120.5	120.5
	32	30.5	46.5	46.5	71.5	71.5	96.5	121.5	121.5
	40	35.5	48	48	73	73	98	123	123
D-H7□W D-H7□ D-H7C D-H7BAL D-H7NF	20	28.5	44.5	44.5	69.5	69.5	94.5	—	—
	25	28.5	44.5	44.5	69.5	69.5	94.5	119.5	119.5
	32	29.5	45.5	45.5	70.5	70.5	95.5	120.5	120.5
	40	34.5	47	47	72	72	97	122	122
D-B5 D-B6	20	23.5	39.5	39.5	64.5	64.5	89.5	—	—
	25	23.5	39.5	39.5	64.5	64.5	89.5	114.5	114.5
	32	24.5	40.5	40.5	65.5	65.5	90.5	115.5	115.5
	40	29.5	42	42	67	67	92	117	117
D-G5NTL D-G59F	20	25	41	41	66	66	91	—	—
	25	25	41	41	66	66	91	116	116
	32	26	42	42	67	67	92	117	117
	40	31	43.5	43.5	68.5	68.5	93.5	118.5	118.5
D-B59W	20	26.5	42.5	42.5	67.5	67.5	92.5	—	—
	25	26.5	42.5	42.5	67.5	67.5	92.5	117.5	117.5
	32	27.5	43.5	43.5	68.5	68.5	93.5	118.5	118.5
	40	32	45	45	70	70	95	120	120

Note) In the actual setting, adjust them after confirming the auto switch operating condition.

Proper Auto Switch Mounting Position (Detection at stroke end)**Proper Auto Switch Mounting Position: Direct Mount Type (CG1R, CG1KR)**

(mm)

Auto switch model Bore size	D-A9□		D-M9□ D-M9□W		D-C7 D-C8 D-C73C D-C80C		D-B5 D-B6		D-B59W		D-H7□W D-H7NF D-H7BAL D-H7□ D-H7C		D-G59F D-G5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
20	8	20	12	24	8.5	20.5	2.5	14.5	5.5	17.5	7.5	19.5	4	16
25	8	20	12	24	8.5	20.5	2.5	14.5	5.5	17.5	7.5	19.5	4	16
32	9	21	13	25	9.5	21.5	3.5	15.5	6.5	18.5	8.5	20.5	5	17
40	14	23	18	27	14.5	23.5	8.5	17.5	11.5	20.5	13.5	22.5	10	19
50	16	28	20	32	16.5	28.5	10.5	22.5	13.5	25.5	17.5	27.5	14	24
63	16	28	20	32	16.5	28.5	10.5	22.5	13.5	25.5	17.5	27.5	14	24

Note) In the actual setting, adjust them after confirming the auto switch operating condition.

Proper Auto Switch Mounting Position: End Lock Cylinder (CBG1)

(mm)

Auto switch model Bore size	Locking position	D-A9□		D-M9□ D-M9□W		D-C7 D-C8 D-C73C D-C80C		D-B5 D-B6		D-B59W		D-H7□ D-H7C D-H7□W D-H7BAL D-H7NF		D-G5□W D-K59W D-G59F D-G5 D-K5 D-G5NTL D-G5BAL	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
20	Head side	29	32	33	36	29.5	32.5	23.5	26.5	26.5	29.5	28.5	31.5	25	28
	Rod side	40	20 (28)	44	24 (32)	40.5	20.5 (28.5)	34.5	14.5 (22.5)	37.5	17.5 (25.5)	39.5	19.5 (27.5)	36	16 (24)
	Double sides	40	32	44	36	40.5	32.5	34.5	26.5	37.5	29.5	39.5	31.5	36	28
25	Head side	29	32	33	36	29.5	32.5	23.5	26.5	26.5	29.5	28.5	31.5	25	28
	Rod side	40	20 (28)	44	24 (32)	40.5	20.5 (28.5)	34.5	14.5 (22.5)	37.5	17.5 (25.5)	39.5	19.5 (27.5)	36	16 (24)
	Double sides	40	32	44	36	40.5	32.5	34.5	26.5	37.5	29.5	39.5	31.5	36	28
32	Head side	30	31	34	35	30.5	31.5	24.5	25.5	27.5	28.5	29.5	30.5	26	27
	Rod side	40	21 (29)	44	25 (33)	40.5	21.5 (29.5)	34.5	15.5 (23.5)	37.5	18.5 (26.5)	39.5	20.5 (28.5)	36	17 (25)
	Double sides	40	31	44	35	40.5	31.5	34.5	25.5	37.5	28.5	39.5	30.5	36	27
40	Head side	35	37	39	41	35.5	37.5	29.5	31.5	32	34.5	34.5	36.5	31	33
	Rod side	44	23 (32)	48	27 (36)	44.5	23.5 (32.5)	38.5	17.5 (26.5)	41	20.5 (29.5)	43.5	22.5 (31.5)	40	19 (28)
	Double sides	44	37	48	41	44.5	37.5	38.5	31.5	41	34.5	43.5	36.5	40	33
50	Head side	42	45	46	49	42.5	45.5	36.5	39.5	39.5	42.5	41.5	44.5	38	41
	Rod side	54	28 (40)	58	32 (44)	54.5	28.5 (40.5)	48.5	22.5 (34.5)	51.5	25.5 (37.5)	53.5	27.5 (39.5)	50	24 (36)
	Double sides	54	45	58	49	54.5	45.5	48.5	39.5	51.5	42.5	53.5	44.5	50	41
63	Head side	42	45	46	49	42.5	45.5	36.5	39.5	39.5	42.5	41.5	44.5	38	41
	Rod side	54	28 (40)	58	32 (44)	54.5	28.5 (40.5)	48.5	22.5 (34.5)	51.5	25.5 (37.5)	53.5	27.5 (39.5)	50	24 (36)
	Double sides	54	45	58	49	54.5	45.5	48.5	39.5	51.5	42.5	53.5	44.5	50	41
80	Head side							46.5	52.5	49.5	55.5			48	54
	Rod side	—	—	—	—	—	—	62.5	30.5 (44.5)	65.5	33.5 (47.5)	—	—	64	32 (46)
	Double sides							62.5	52.5	65.5	55.5			64	54
100	Head side							46.5	52.5	49.5	55.5			48	54
	Rod side	—	—	—	—	—	—	62.5	30.5 (44.5)	65.5	33.5 (47.5)	—	—	64	32 (46)
	Double sides							62.5	52.5	65.5	55.5			64	54

Note 1) Figures in parentheses are for the long stroke type.

Note 2) In the actual setting, adjust them after confirming the auto switch operating condition.

CJ1

CJP

CJ2

CM2

CG1

MB

MB1

CA2

CS1

CS2

D-□

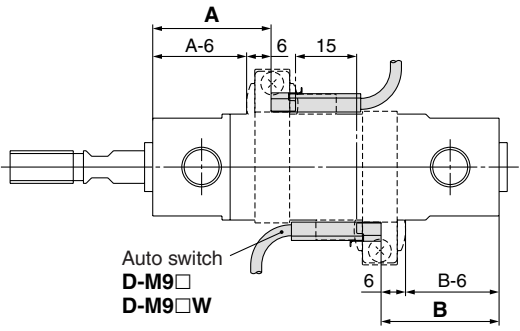
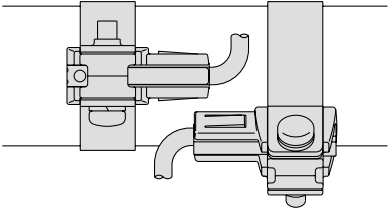
-X□

Individual
-X□Technical
data

Minimum Auto Switch Mounting Stroke

Auto switch model	No. of auto switch mounted				
	1	2		n	
		Different surfaces	Same surface	Different surfaces	Same surface
D-A9□ D-M9□ D-M9□W	10	15 ⁽¹⁾	45 ⁽¹⁾	$15 + 45 \frac{(n-2)}{2}$ (n=2, 4, 6...)	45 + 45(n-2)
D-C7□ D-C80	10	15	50	$15 + 45 \frac{(n-2)}{2}$ (n=2, 4, 6...)	50 + 45(n-2)
D-H7□ D-H7□W D-H7BAL D-H7NF	10	15	60	$15 + 45 \frac{(n-2)}{2}$ (n=2, 4, 6...)	60 + 45(n-2)
D-C73C D-C80C	10	15	65	$15 + 50 \frac{(n-2)}{2}$ (n=2, 4, 6...)	65 + 50(n-2)
D-B5□ D-B64 D-G5□ D-K59□	10	15	75	$15 + 50 \frac{(n-2)}{2}$ (n=2, 4, 6...)	75 + 55(n-2)
D-B59W	15	20	75	$20 + 50 \frac{(n-2)}{2}$ (n=2, 4, 6...)	75 + 55(n-2)

Note 1) Auto switch mounting

Auto switch model	With 2 auto switches	
	Different surfaces ⁽¹⁾	Same surface ⁽¹⁾
	 The proper auto switch mounting position is 6 mm inward from the switch holder edge.	 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-A93	—	Less than 50 stroke ⁽²⁾
D-M9□ D-M9□W	Less than 20 stroke ⁽²⁾	Less than 55 stroke ⁽²⁾

Note 2) Minimum stroke for mounting auto switches in the other mounting styles mentioned in note 1.

Operating range

Auto switch model	(mm)							
	Bore size							
	20	25	32	40	50	63	80	100
D-A9□	7	6	8	8	8	9	—	—
D-M9□ D-M9□W	4.5	5.0	4.5	5.5	5.0	5.5	—	—
D-C7/C80 D-C73C/C80C	8	10	9	10	10	11	—	—
D-B5□/B64	8	10	9	10	10	11	11	11
D-B59W	13	13	14	14	14	17	16	18
D-H7□/H7□W D-H7NF/H7BAL	4	4	4.5	5	6	6.5	—	—
D-H7C	7	8.5	9	10	9.5	10.5	—	—
D-G5□/G5□W/G59F D-G5BAL/K59/K59W	4	4	4.5	5	6	6.5	6.5	7
D-G5NTL	4	4	4.5	5	6	6.5	6.5	7
D-G5NBL	35	40	40	45	45	45	45	50

* Since this is a guideline including hysteresis, not meant to be guaranteed.
(Assuming approximately ±30% dispersion.) There may be the case it will vary substantially depending on an ambient environment.

Auto Switch Mounting Bracket: Part No.

Auto switch model	Bore size (mm)							
	ø20	ø25	ø32	ø40	ø50	ø63	ø80	ø100
D-A9□ D-M9□ D-M9□W	Note 1) ① BMA2-020 ② BJ3-1	Note 1) ① BMA2-025 ② BJ3-1	Note 1) ① BMA2-032 ② BJ3-1	Note 1) ① BMA2-040 ② BJ3-1	Note 1) ① BMA2-050 ② BJ3-1	Note 1) ① BMA2-063 ② BJ3-1	—	—
D-C7□/C80 D-C73C D-C80C D-H7□ D-H7□W D-H7BAL D-H7NF	BMA2-020	BMA2-025	BMA2-032	BMA2-040	BMA2-050	BMA2-063	—	—
D-B5□/B64 D-B59W D-G5□/K59 D-G5□W/K59W D-G5BAL/G59F D-G5NTL D-G5NBL	BA-01	BA-02	BA-32	BA-04	BA-05	BA-06	BA-08	BA-10

Note 1) Two kinds of auto switch bracket are used as a set.

[Stainless Steel Mounting Screw Kit]

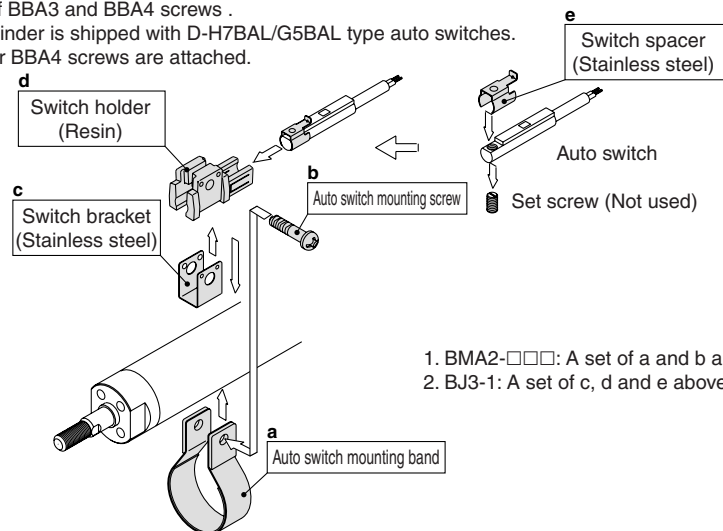
The following set of stainless steel mounting screws is available. Use them in accordance with the operating environment. (Since auto switch brackets are not included, order them separately.)

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

BBA4: For D-C7/C8/H7 types

Note 2) Refer to page 1357 and 1358 for the details of BBA3 and BBA4 screws.

The above stainless steel screws are used when a cylinder is shipped with D-H7BAL/G5BAL type auto switches. When only a switch is shipped independently, BBA3 or BBA4 screws are attached.



Cylinder Bracket, by Stroke/Auto Switch Mounting Surfaces

st: Stroke (mm)

Auto switch model	Basic style, Foot style, Flange style, Clevis style			Trunnion style		
	1 (Rod cover side)	2 (Different surfaces)	2 (Same surface)	1 (Rod cover side)	2 (Different surfaces)	2 (Same surface)
Switch mounting surface	Port surface	Port surface	Port surface			
Switch type						
D-A9□ D-M9□ D-M9□W	10st or more	15 to 44st	45st or more	10st or more	15 to 44st	45st or more
D-C7/C8	10st or more	15 to 49st	50st or more	10st or more	15 to 49st	50st or more
D-H7□/H7□W D-H7BAL/H7NF	10st or more	15 to 59st	60st or more	10st or more	15 to 59st	60st or more
D-C73C/C80C/H7C	10st or more	15 to 64st	65st or more	10st or more	15 to 64st	65st or more
D-B5/B6/G5/K5 D-G5□W/K59W/G5BAL D-G59F/G5NTL	10st or more	15 to 74st	75st or more	10st or more	15 to 74st	75st or more
D-B59W	15st or more	20 to 74st	75st or more	15st or more	20 to 74st	75st or more

* Trunnion style is not available for bore sizes ø80 and ø100.

Other than the applicable auto switches listed in “How to Order”, the following auto switches can be mounted. For detailed specifications, refer to pages 1263 to 1371.

Type	Model	Electrical entry	Features	Applicable bore size (mm)
Reed auto switch	D-C73, C76	Grommet (In-line)	—	ø20 to ø63
	D-C80		Without indicator light	
	D-B53		—	ø20 to ø100
Solid state auto switch	D-H7A1, H7A2, H7B		—	ø20 to ø63
	D-H7NW, H7PW, H7BW		Diagnostic indication (2-color indication)	
	D-G5NTL		With timer	ø20 to ø100

* For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 1328 and 1329 for details.

* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H types) are also available. Refer to page 1290 for details

* Wide range detection type, solid state switches (D-G5NBL type) are also available. Refer to page 1320 for details.

Fine Lock Cylinders/Lock-up Cylinder

Series CL

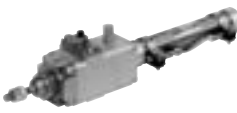
ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100, ø125, ø140, ø160

Locking method	Spring locking	Pneumatic locking	Spring and pneumatic locking
Features	Unlocking Discharging the air causes the lock to operate.	Pressure locking The holding power can be varied according to the air pressure that is applied to the port.	- Pressure locking The holding power can be varied according to the air pressure that is applied to the port. - Unlocking Discharging the air causes the lock to operate.

(Lock-up cylinders are spring locking only.)

Locking in both directions is possible.
Locking in either side of cylinder stroke is possible, too.
(The lock-up cylinder can be locked only in one direction.)

Series Variations

Series			Standard variations		Locking direction	Locking method			Bore size (mm)	Standard stroke (mm)	Page
Action	Rod	Auto switch built-in magnet	With rod boot	Spring locking		Pneumatic locking	Spring and Pneumatic locking				
Fine lock cylinders											
Series CLJ2 	Double acting	Single rod	●		Both directions	●	●	●	16	15 to 200	601
Series CLM2 	Double acting	Single rod	●	●	Both directions	●	●	●	20 25 32 40	25 to 300	611
Series CLG1 	Double acting	Single rod	●	●	Both directions	●	●	●	20 25 32 40	25 to 200 25 to 300	625
Lock-up cylinder											
Series CL1 	Double acting	Single rod	●	●	One direction	●			40 50, 63 80, 100 125, 140 160	25 to 500 25 to 600 25 to 700 Up to 1000 Up to 1200	636

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-☐

-X☐

Individual
-X☐



Series CL

Specific Product Precautions 1

Be sure to read before handling.

The precautions on these pages are for the fine lock cylinders and the lock-up cylinders.
For general actuator precautions, refer to Actuator Precautions on pages 3 to 7.

Design of Equipment and Machinery

Warning

- Construct so that the human body will not come into direct contact with driven objects or the moving parts of locking cylinders. If there is a risk of contact, provide safety measures such as a cover or a system that uses sensors that will activate an emergency stop before contact is made.
- Use a balance circuit in which lurching of the piston is taken into consideration. If the lock is applied at a desired position of a stroke and compressed air is applied to only one side of the cylinder, the piston will lurch at a high speed the moment the lock is disengaged. In such a situation, there is a risk of injury to humans, or equipment damage. To prevent the piston from lurching, use a balance circuit such as the recommended pneumatic circuit (P. 598). If an air-hydro fine lock cylinder is used, make sure to operate the lock portion through air pressure. Never use oil on the lock-up cylinder because the lock-up cylinder is a non-lube style. Failure to observe this could cause the lock to malfunction.

Selection

Warning

Refer to the following criteria for the maximum load in the locked state, and set.

When a cylinder is in a no-load and locked state, the holding force (maximum static load) is the lock's ability to hold a static load that does not involve vibrations or shocks. To ensure braking force, the maximum load must be set as described below.

- For constant static loads, such as for drop prevention:
 - Fine lock series (Series CLJ2/CLM2/CLG1)
35% or less of the holding force (maximum static load)
Note) For applications such as drop prevention, consider situations in which the air source is shut off, and make selections based on the holding force of the spring locked state. Do not use the pneumatic lock for drop prevention purposes.
 - Lock-up series (Series CL1)
50% or less of the holding force (maximum static load)

- When kinetic energy acts upon the cylinder, such as when effecting an intermediate stop, there are constraints in terms of the allowable kinetic energy that can be applied to the cylinder in a locked state. Therefore, refer to the allowable kinetic energy of the respective series. Furthermore, during locking, the mechanism must sustain the thrust of the cylinder itself, in addition to absorbing the kinetic energy. Therefore, even within a given allowable kinetic energy level, there is an upper limit to the amount of the load that can be sustained.

- Fine lock series (Series CLJ2/CLM2/CLG1)

Maximum load at horizontal mounting:
70% or less of the holding force (Maximum static load) for spring lock

Maximum load at vertical mounting: 35% or less of the holding force (Maximum static load) for spring lock

- Lock-up series (Series CL1)

Maximum load at horizontal mounting:
50% or less of the holding force (Maximum static load)

Maximum load at vertical mounting: 25% or less of the holding force (Maximum static load)

- In a locked state, do not apply impacts, strong vibrations or rotational forces.

Do not apply a impacts, strong vibrations or rotational forces from external sources, because this could damage or shorten the life of the lock unit.

- The locking of the fine lock cylinder is directional.

Although the fine lock cylinder can be locked in both directions, be aware that its holding force is smaller in one of the directions.

CLJ2/CLM2/CLG1.... Holding force at piston rod extended side decreases approx. 15%.

- The locking of the lock-up cylinder is unidirectional.

Because the locking direction of the lock-up cylinder is unidirectional, select the locking direction in accordance with the particular operating conditions. It is also possible to manufacture a bidirectional lock-up cylinder. For details, refer to "Made to Order" on page 1989. Due to the nature of its construction, a lock-up cylinder has a play of approximately 0.5 mm to 1 mm in the axial direction. Therefore, if an external stopper is used to stop the piston rod and the lock is engaged, the piston rod will shift in the amount of its axial play.

- To effect an intermediate stop, take the cylinder's stopping precision and overrun amount into consideration.

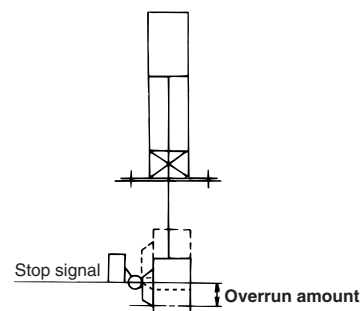
Because the lock is applied by mechanical means, the piston will not stop immediately in response to a stopping signal, but only after a time lag. This lag determines the amount of the overrun of the piston stroke. Thus, the range of the maximum and minimum amounts of the overrun is the stopping precision.

- Place the limit switch before the desired stopping position, only in the amount of the overrun.

- The limit switch must have a detection length (dog length) of the overrun amount + α .

- For SMC's auto switches, the operating range are between 8 and 14 mm. (It varies depending on a switch model.) When the overrun amount exceeds this range, self-holding of the contact should be performed at the switch load side.

* For stopping accuracy, refer to Series CLJ (P. 603), Series CLM2 (P. 614), Series CLG1 (P. 627), and Series CL1 (P. 637) respectively.



- In order to further improve stopping accuracy, the time from the stop signal to the operation of the lock should be shortened as much as possible.

To accomplish this, use a device such as a highly responsive electric control circuit or solenoid valve driven by direct current, and place the solenoid valve as close as possible to the cylinder.

- Be aware that the stopping accuracy is influenced by changes in the piston speed. The variance in the stopping position increases if the piston speed changes, such as due to load fluctuations during the reciprocal movement of the piston. Therefore, take measures to ensure a constant piston speed immediately preceding the stopping position. Furthermore, the variances in the stopping position increases when the piston is effecting a cushioning stroke or during acceleration after starting its movement.

- When unlocking is performed, if the thrust is applied to the piston, unlocking will not be easily done. To avoid that, ensure that unlocking should be performed before the thrust is applied to the piston.



Series CL Specific Product Precautions 2

Be sure to read before handling.

The precautions on these pages are for the fine lock cylinders and the lock-up cylinders.
For general actuator precautions, refer to Actuator Precautions on pages 3 to 7.

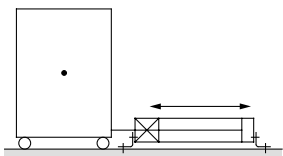
Mounting

⚠ Warning

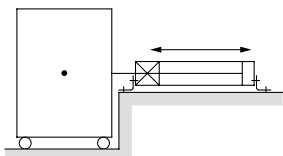
- Be certain to connect the rod end to the load with the lock released.
 - If this is performed with the lock engaged, a load that exceeds the allowable rotational force or holding force would be applied to the piston rod, which could damage the locking mechanism. The fine lock and Series CL1 with $\varnothing 40$ to $\varnothing 100$ cylinders have a built-in manual unlocking mechanism. Therefore, they can be maintained in the unlocked state without supplying air. For Series CL1 with $\varnothing 125$ to $\varnothing 160$ cylinders, simply connect piping to the lock-up port, and supply air pressure of 0.2 MPa or more to disengage the lock in order to attach a load.

⚠ Caution

- Do not apply offset loads on the piston rod.
 - Pay particular attention to aligning the center of gravity of the load with the axial center of the cylinder. If there is a large amount of deviation, the piston rod could become unevenly worn or damaged due to the inertial moment that is created when the piston rod is stopped by the lock.



X Load center of gravity and cylinder shaft center are not matched.



○ Load center of gravity and cylinder shaft center are matched.

Note) Can be used if all of the generated moment is absorbed by an effective guide.

Adjustment

⚠ Caution

- Place it in the locked position. (Excluding the series CL1 $\varnothing 125$ to $\varnothing 160$.)
 - The locks are manually disengaged at the time the cylinders are shipped from the factory. Therefore, make sure to change them to the locked state before using the cylinders. For procedures to effect the change, refer to page 599 for the fine lock series. Be aware that the lock will not operate properly if the change is not performed correctly.
 - Adjust the cylinder's air balance. In the state in which a load is attached to the cylinder, disengage the lock and adjust the air pressure at the rod side and the head side of the cylinder to obtain a load balance. By maintaining a proper air balance, the piston rod can be prevented from lurching when the lock is disengaged.
- Adjust the mounting position of detections such as those of the auto switches. To effect an intermediate stop, adjust the mounting position of the auto switch detection by taking the amount of overrun into consideration in relation to the desired stopping position.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual
-X□



Series CL

Specific Product Precautions 3

Be sure to read before handling.

The precautions on these pages are for the fine lock cylinders and the lock-up cylinders.
For general actuator precautions, refer to Actuator Precautions on pages 3 to 7.

Pneumatic Circuit

Warning

1. Be certain to use a pneumatic circuit which will apply balancing pressure to both sides of the piston when in a locked stop.

In order to prevent cylinder lurching after a lock stop, when restarting or when manually unlocking, a circuit should be used to which will apply balancing pressure to both sides of the piston, thereby canceling the force generated by the load in the direction of piston movement.

2. Use a solenoid valve for unlocking which has a large effective area, as a rule 50% or more of the effective area of the cylinder drive solenoid valve.

The larger the effective area is, the shorter the locking time will be (the overrun amount will be shorter), and stopping accuracy will be improved.

3. Place the solenoid valve for unlocking close to the cylinder, and no farther than the cylinder drive solenoid valve.

The shorter the distance from the cylinder (the shorter the piping), the shorter the overrun amount will be, and stopping accuracy will be improved.

4. Allow at least 0.5 seconds from a locked stop (intermediate stop of the cylinder) until release of the lock.

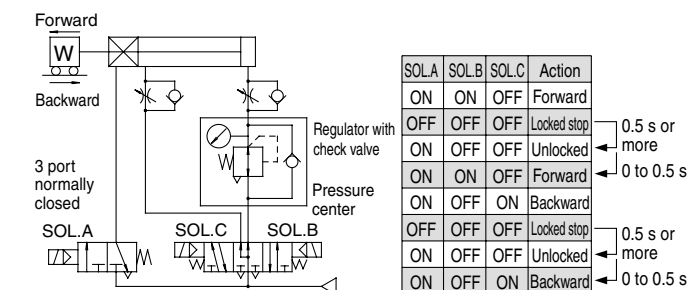
When the locked stop time is too short, the piston rod (and load) may lurch at a speed greater than the control speed of the speed controller.

5. When restarting, control the switching signal for the unlocking solenoid valve so that it acts before or at the same time as the cylinder drive solenoid valve.

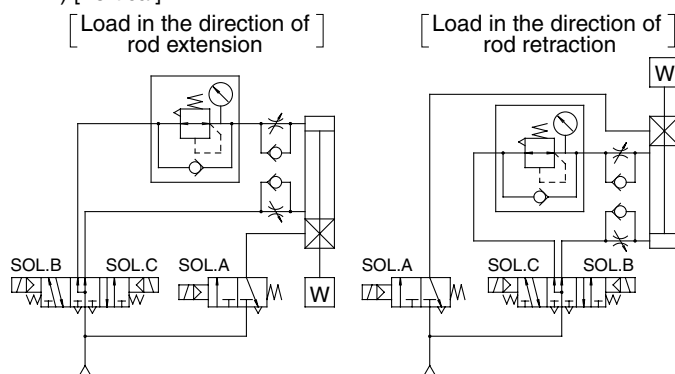
If the signal is delayed, the piston rod (and load) may lurch at a speed greater than the control speed of the speed controller.

6. Basic circuit

1) [Horizontal]

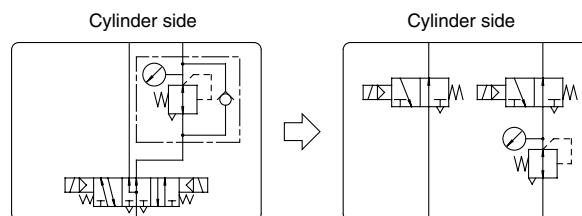


2) [Vertical]



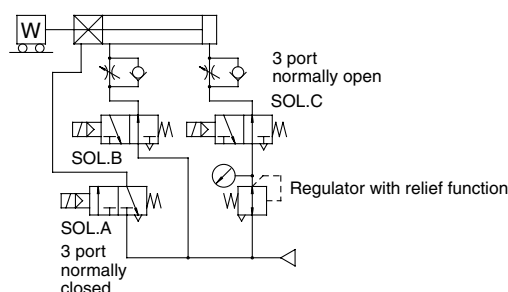
Caution

1. A 3 position pressure center solenoid valve and regulator with check valve can be replaced with two 3 port normally open valves and a regulator with relief function.



[Example]

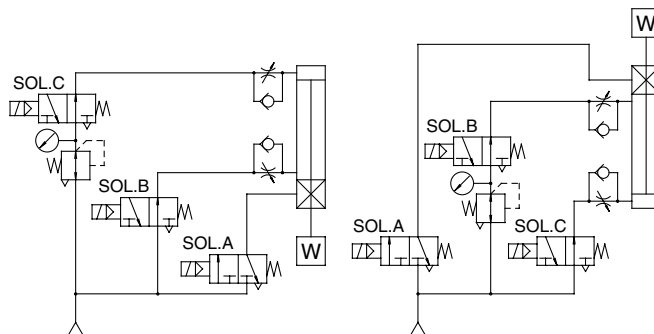
1) [Horizontal]



2) [Vertical]

[Load in the direction of rod extension]

[Load in the direction of rod retraction]





Series CL

Specific Product Precautions 4

Be sure to read before handling.

The precautions on these pages are for the fine lock cylinders and the lock-up cylinders.
For general actuator precautions, refer to Actuator Precautions on pages 3 to 7.

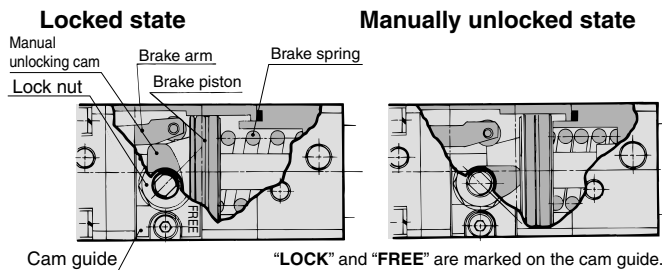
How to Manually Disengage the Lock and Change from the Unlocked to the Locked State

The lock is manually disengaged at the time the cylinder is shipped from the factory. Because the lock will not operate in this state, make sure to change it to the locked state before operation, after having adjusted the axial center for installation.

How to Change from Unlocked to Locked State

1. Series CLJ2, CLM2, CLG1

- 1) Loose locking nut.
 - 2) Turn the wrench flats section of the manual unlocking cam to the LOCK position that is marked on the cam guide.
 - 3) While keeping the wrench flats section in place, tighten the lock nut.
- Note) The manual unlocking cam will rotate approximately 180°. Do not rotate the wrench flats section excessively.



Manually Unlocking

The lock of a fine lock series cylinder can be disengaged manually through the procedure described below. However, make sure to disengage the lock pneumatically before operating the cylinder.

Note) Manual disengagement of the lock could create a greater cylinder sliding resistance than pneumatic disengagement of the lock.

1. Series CLJ2, CLM2, CLG1

- 1) Loose locking nut.
- 2) Supply air pressure of 0.3 MPa or more to the lock release port.
- 3) Turn the wrench flats section of the manual unlocking cam until it stops at the FREE position that is marked on the cam guide.
- 4) While keeping the wrench flats section in place, tighten the lock nut.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-☐

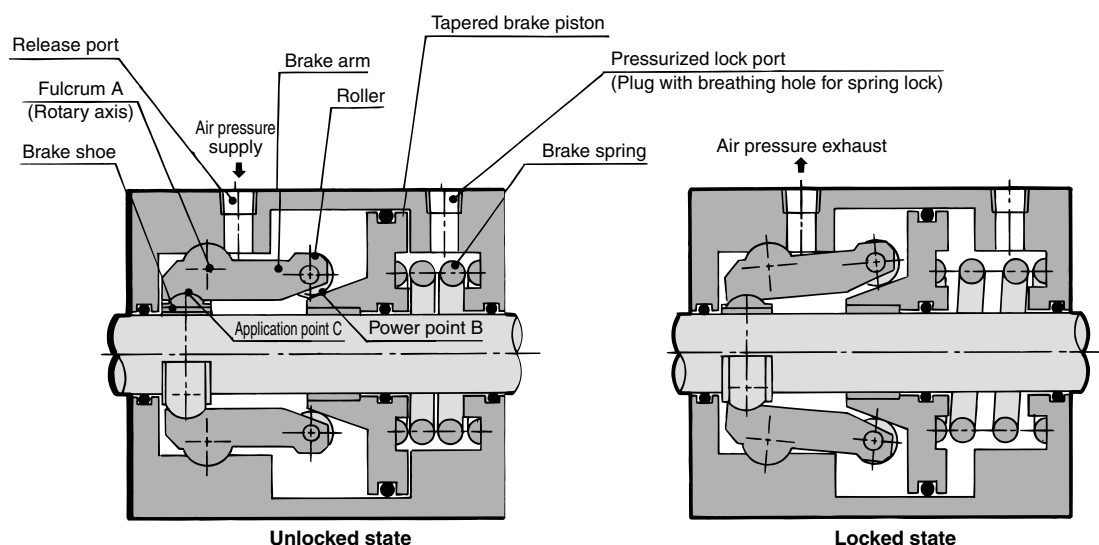
-X☐

Individual
-X☐

Prior to Use

Construction Principle/Applicable Series: CLJ2, CLM2, CLG1, MLGC

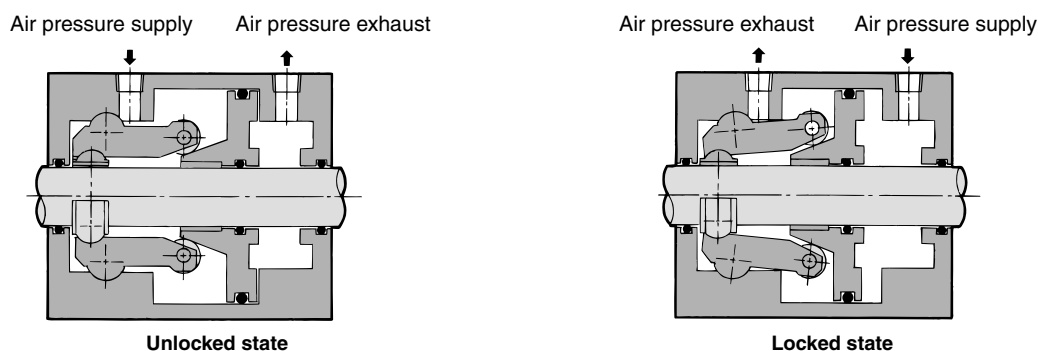
Spring locking type



Spring locking (Exhaust locking)

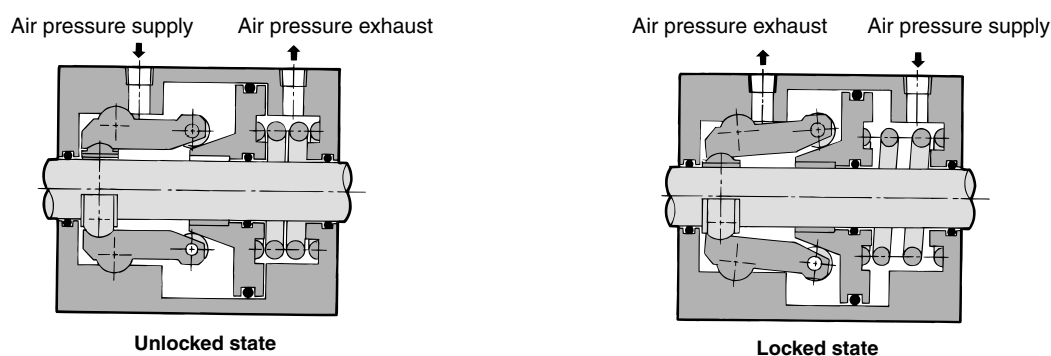
The spring force that is applied to the tapered brake piston becomes amplified through the wedge effect. This force becomes further amplified to the power of AB/AC through the mechanical advantage of a lever and acts on the brake shoe, which in turn, applies a large force to tighten and lock the piston rod. To disengage the lock, air pressure is supplied through the unlocking port, thus disengaging the brake spring force.

Pneumatic locking type



Brake piston is operated by air pressure.

Spring and pneumatic locking type



Brake piston is operated by air pressure and spring force.

Fine Lock Cylinder

Double Acting, Single Rod

Series CLG1

ø20, ø25, ø32, ø40

How to Order

CLG1 L N 25 - 100 - E -

With auto switch **CDLG1 L N 25 - 100 - E - M9BW -**

With auto switch
(Built-in magnet)

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
U	Rod side trunnion style
T	Head side trunnion style
D	Clevis style

Type

N	Non-lube/Rubber bumper
A	Non-lube/Air cushion

Bore size

20	20 mm
25	25 mm
32	32 mm
40	40 mm

Port thread type

Nil	Rc
TN	NPT

Cylinder stroke (mm)

Bore size (mm)	Standard stroke (mm)	Long stroke (mm)
20	25, 50, 75, 100, 125, 150, 200	201 to 350
25	25, 50, 75, 100, 125, 150, 200, 250, 300	301 to 400
32		301 to 450
40		301 to 800

Number of auto switches

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

Auto switch

Nil	Without auto switch
-----	---------------------

* For the applicable auto switch model, refer to the table below.

Lock operation

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

Cylinder symbol

Nil	Without rod boot
J	Nylon tarpaulin
K	Heat resistant tarpaulin

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) CDLG1FA32-100-P

* Intermediate stroke is available, too.

Applicable Auto Switch/Refer to pages 1719 to 1827 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	Applicable bore size	0.5	1	3	5	None				
							ø20 to ø40	(Nil)	(M)	(L)	(Z)	(N)				
Solid state switch	_____	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	●	●	●	○	—	○	IC circuit	Relay, PLC
	3-wire (PNP)	M9P		●				●	●	○	—	○				
	Connector	2-wire		12 V	M9B	●		●	●	○	—	○	—			
		3-wire (NPN)		5 V, 12 V	H7C	●		—	●	●	●	—				
	Grommet	3-wire (PNP)		12 V	M9NW	●		●	●	○	—	○	IC circuit			
		2-wire		5 V, 12 V	M9PW	●		●	●	○	—	○				
		Water resistant (2-color indication)		12 V	M9BW	●		●	●	○	—	○	—			
		With diagnostic output (2-color indication)		5 V, 12 V	H7BA	—		—	●	○	—	○				
	H7NF	●		—	●	○	—	○	IC circuit							
Reed switch	_____	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96	●	—	●	—	—	—	—	—
	No		2-wire	24 V	12 V	100 V	A93	●	—	●	—	—	—	—		
	Yes					100 V or less	A90	●	—	●	—	—	—	IC circuit		
	No					100 V, 200 V	B54	●	—	●	●	—	—	—		
	Yes	200 V or less				B64	●	—	●	—	—	—				
	No	—				C73C	●	—	●	●	●	—				
	Connector	No	24 V or less	C80C	●	—	●	●	●	—	IC circuit					
		Yes	—	—	B59W	●	—	●	—	—	—	—				

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

* Solid state auto switches marked with "○" are produced upon receipt of order.
* D-A9□V/M9□V/M9□WV/M9□A(V)L types cannot be mounted.

* Since there are other applicable auto switches than listed above, refer to page 635 for details.
* For details about auto switches with pre-wired connector, refer to pages 1784 and 1785.
* D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled at the time of shipment.)

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual

-X□

Series CLG1

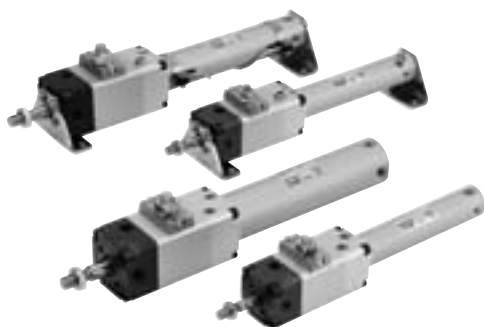
Provided with a compact lock mechanism, it is suitable for intermediate stop, emergency stop, and drop prevention.

Locking in both directions

The piston rod can be locked in either direction of its cylinder stroke.

Maximum piston speed: 500 mm/s

It can be used at 50 to 500 mm/s provided that it is within the allowable kinetic energy range.



Made to Order Specifications
(For details, refer to page 1836.)

Symbol	Specifications
—XA□	Change of rod end shape

Mass

(kg)

Bore size (mm)		20	25	32	40
Basic mass	Basic style	0.61	0.97	1.06	1.35
	Axial foot style	0.72	1.10	1.22	1.57
	Flange style	0.73	1.15	1.23	1.58
	Trunnion style	0.62	0.99	1.09	1.40
	Clevis style	0.66	1.05	1.21	1.58
Rod side pivot bracket		0.11	0.13	0.20	0.27
Head side pivot bracket		0.08	0.09	0.17	0.25
Single knuckle joint		0.05	0.09	0.09	0.10
Double knuckle joint (with pin)		0.05	0.09	0.09	0.13
Additional mass per each 50 mm of stroke		0.05	0.07	0.09	0.15
Additional mass with air cushion		0.01	0.01	0.02	0.02
Additional mass for long stroke		0.01	0.01	0.02	0.03

Calculation: (Example)

CLG1LA20-100 (Foot Style, ø20, 100 st)

- Basic mass..... 0.72
 - Additional mass..... 0.05/50 st
 - Air cylinder stroke..... 100 st
 - Additional mass of air cushion..... 0.01 kg
- $$0.72 + 0.05 \times 100/50 + 0.01 = 0.83 \text{ kg}$$

Model

Series	Type	Action	Cushion	Bore size (mm)	Lock operation
CLG1□N	Non-lube	Double acting	Rubber bumper	20, 25	Spring locking (Exhaust locking) Pneumatic locking (Pressure locking) Spring and pneumatic locking
CLG1□A			Air cushion	32, 40	

Specifications

Bore size (mm)	20	25	32	40
Fluid	Air			
Proof pressure	1.5 MPa			
Maximum operating pressure	1 MPa			
Minimum operating pressure	0.08 MPa			
Ambient and fluid temperature	Without auto switch: -10 to 70°C (No freezing) With auto switch: -10 to 60°C (No freezing)			
Piston speed	50 to 500 mm/sec *			
Stroke length tolerance	Up to 1000 st $+1.4_{-0}^{+1.8}$ mm			
Cushion	Rubber bumper, Air cushion			
Mounting **	Basic style, Axial foot style, Rod side flange style, Head side flange style, Rod side trunnion style, Head side trunnion style, Clevis style (Used when port position is changed to 90°.)			

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

The maximum speed of 1000 mm/s can be accommodated if the piston is to be locked in the stationary state for the purpose of drop prevention.

** The long stroke style is applicable to the axial foot style, and the rod side flange style.

Fine Lock Specifications

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

Accessory

Mounting		Basic style	Axial foot style	Rod side flange style	Head side flange style	Rod side trunnion style	Head side trunnion style	Clevis style
Standard equipment	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	—	●
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint* (With pin)	●	●	●	●	●	●	●
	Pivot bracket	—	—	—	—	●	●	●
	Rod boot	●	●	●	●	●	●	●

* Pins and retaining rings are shipped together with double knuckle joints.

Standard Stroke

Refer to the minimum auto switch mounting stroke (page 634) for those with an auto switch.

Bore size (mm)	Standard stroke (mm)	Long stroke (mm)	Maximum manufacturable stroke (mm)
20	25, 50, 75, 100, 125, 150, 200	201 to 350	1500
25	25, 50, 75, 100, 125, 150, 200,	301 to 400	
32	250, 300	301 to 450	
40		301 to 800	

* Intermediate stroke is available, too. Spacers are not used.

* Long strokes are applicable for the axial foot and rod side flange styles. If other mounting brackets are used or the length exceeds the long stroke limit, the maximum stroke should be determined based on the stroke selection table (technical data).

Rod Boot Material

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

* Maximum ambient temperature for the rod boot itself.

Refer to pages 633 to 635 for cylinders with auto switches.
• Minimum auto switch mounting stroke • Proper auto switch mounting position (detection at stroke end) and mounting height • Operating range • Switch mounting bracket: Part no.

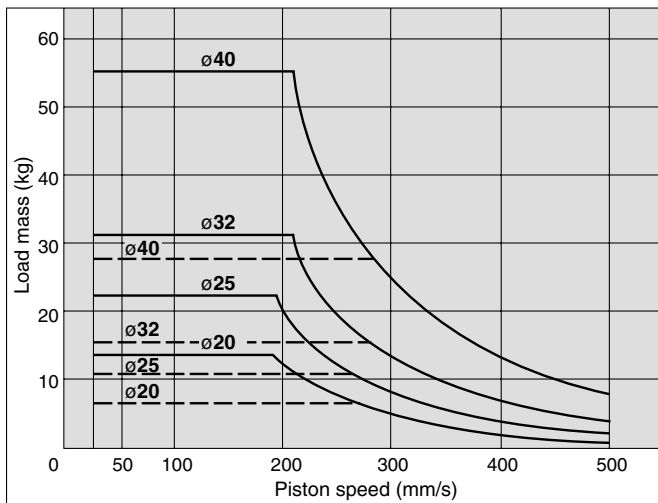
⚠ Caution/Allowable Kinetic Energy when Locking

Bore size (mm)	20	25	32	40
Allowable kinetic energy (J)	0.26	0.42	0.67	1.19

- 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/sec. 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) (Average speed x 1.2 times)
- 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 relation between the speed and the load of the respective tube bores is indicated in the diagram below. Use the cylinder in the range below the line.
- During locking, the lock mechanism must sustain the thrust of the cylinder itself, in addition to absorbing the energy of the load. Therefore, 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.

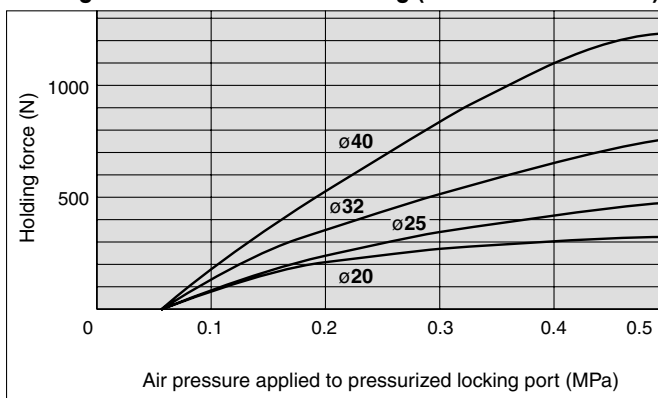


Holding Force of Spring Locking (Maximum static load)

Bore size (mm)	20	25	32	40
Holding force (N)	196	313	443	784

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

Holding Force of Pneumatic Locking (Maximum static load)



* When selecting cylinders, refer to the Precautions and allowable kinetic energy when locking on page 596, and then select a cylinder.

⚠ Caution

Caution when Locking

Holding force is the force which can hold a static load given no vibration or impact, in a locked state. Therefore, do not use cylinders around the maximum holding force. Note 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.
- To use the lock for drop prevention purposes, the load to be attached to the cylinder must be within 35% of the cylinder's holding force.
- Do not use the cylinder in the locked state to sustain a load that involves impact.

Stopping Accuracy (Not including tolerance of control system.) (mm)

Locking method	Piston speed (mm/s)			
	50	100	300	500
Spring locking (Exhaust locking)	±0.4	±0.5	±1.0	±2.0
Pneumatic locking (Pressure locking)	±0.2	±0.3	±0.5	±1.5

Condition/load: 25% of thrust force at 0.5 MPa Solenoid valve: Mounted to the lock port

⚠ Caution

Recommended Pneumatic Circuit/Caution on Handling

For detailed specifications of the fine lock cylinder, Series CLG1 mentioned above, refer to pages 596 to 599.

Mounting Bracket Part No.

Mounting bracket	Bore size (mm)			
	20	25	32	40
Axial foot *	CNG-L020	CNG-L025	CNG-L032	CNG-L040
Flange	CNG-F020	CNG-F025	CNG-F032	CNG-F040
Trunnion pin	CG-T020	CG-T025	CG-T032	CG-T040
Clevis **	CG-D020	CG-D025	CG-D032	CG-D040
Rod side pivot bracket	CNG-020-24	CNG-025-24	CNG-032-24	CNG-040-24
Head side pivot bracket	CG-020-24A	CG-025-24A	CG-032-24A	CG-040-24A

* When ordering foot bracket, order 2 pieces per cylinder.

** For the clevis style, clevis pins, retaining rings and mounting bolts are included.

*** Mounting bolts are shipped together for the foot and flange styles.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

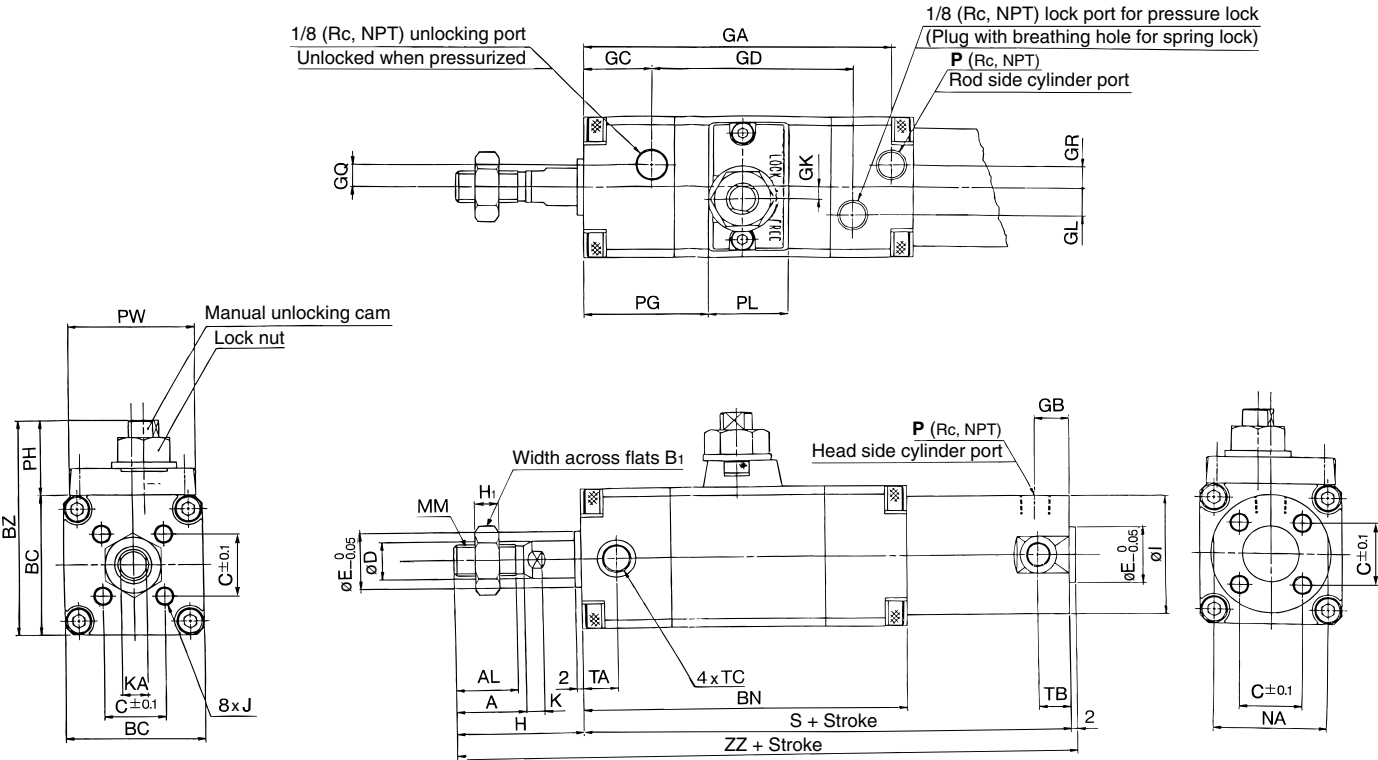
D-☐

-X☐

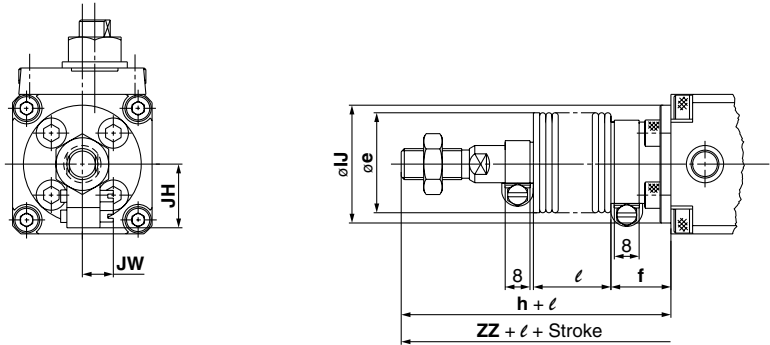
Individual
-X☐

Series CLG1

Basic Style: CLG1BN



CLG1 With rod boot (Mounting bracket: Basic style)



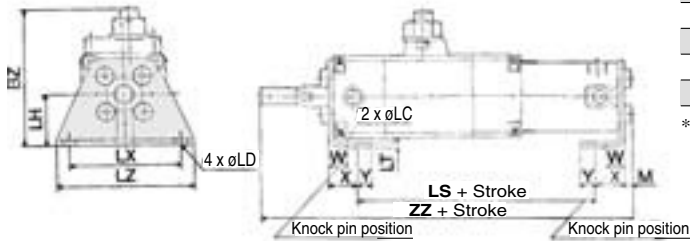
Bore size (mm)	Stroke range	AL	A	B ₁	BC	BN	BZ	C	D	E	GA	GB	GC	GD	GK	GL	GQ	GR	I	J	K	KA	MM
20	Up to 200	15.5	18	13	38	91	57.5	14	8	12	84	10	19	54	3.5	5.5	4	4	26	M4 x 0.7 depth 7	5	6	M8 x 1.25
25	Up to 300	19.5	22	17	45	101	69	16.5	10	14	94	10	20	62	4	9	7	7	31	M5 x 0.8 depth 7.5	5	8	M10 x 1.25
32	Up to 300	19.5	22	17	45	102	69	20	12	18	95	10	21	62	4	9	7	7	38	M5 x 0.8 depth 8	5.5	10	M10 x 1.25
40	Up to 300	27	30	19	52	111	76	26	16	25	103	10	23	67	4	11	8	7	47	M6 x 1 depth 12	6	14	M14 x 1.5

Bore size (mm)	Stroke range	H ₁	NA	P	PG	PH	PL	PW	S	TA	TB	TC	Without rod boot		With rod boot									
													H	ZZ	IJ	JH (Reference)	JW (Reference)	e	f	h	ℓ	ZZ		
20	Up to 200	5	24	1/8	33	19.5	20	38	141	11	11	M5 x 0.8	35	178	27	15.5	10.5	30	18	55				
25	Up to 300	6	29	1/8	38	24	24	41	151	11	11	M6 x 0.75	40	193	32	16.5	10.5	30	19	62				
32	Up to 300	6	35.5	1/8	39	24	24	41	154	11	10	M8 x 1	40	196	38	18.5	10.5	35	19	62				
40	Up to 300	8	44	1/8	44	24	24	41	169	12	10	M10 x 1.25	50	221	48	21.5	10.5	35	19	70				

For long stroke refer to page 630.
** The minimum stroke for cylinders with a rod boot is 20 mm.

With Mounting Bracket

Foot style: CLG1LN

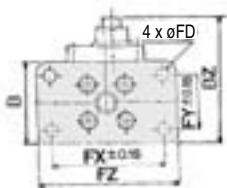


Foot Style

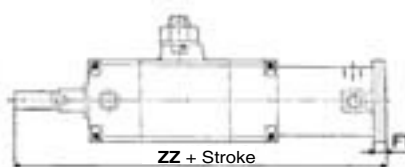
Bore size (mm)	BZ	M	W	X	Y	LC	LD	LH	LS	LT	LX	LZ	Without rod boot ZZ	With rod boot ZZ
20	63.5	3	10	15	7	4	6	25	117	3	50	62	182	202
25	74.5	3.5	10	15	7	4	6	28	127	3	57	70	197.5	219.5
32	74.5	3.5	10	16	8	4	7	28	128	3	60	74	200.5	222.5
40	83	4	10	16.5	8.5	4	7	33	142	3	68	84	226	246

* For long stroke, refer to page 630.

Rod side flange style: CLG1FN



Head side flange style: CLG1GN

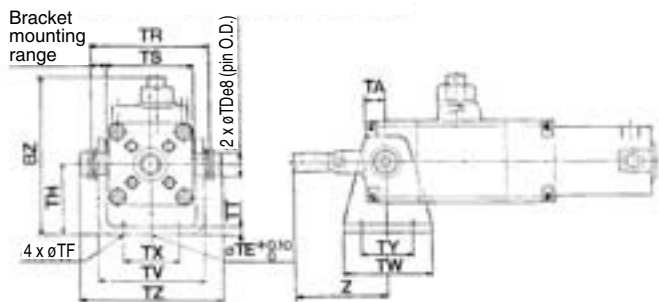


Rod Side Flange Style

Bore size (mm)	B	BZ	FD	FT	FX	FY	FZ
20	38	57.5	5.5	6	52	25	65
25	45	69	5.5	7	60	30	75
32	45	69	6.6	7	60	30	75
40	52	76	6.6	8	66	36	82

* For long stroke, refer to page 630.

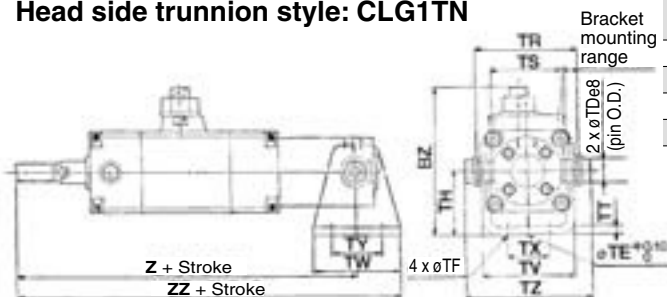
Rod side trunnion style: CLG1UN



Rod Side Trunnion Style

Bore size (mm)	BZ	TDe8	TE	TF	TH	TR	TS	TT	TV	TW	TX	TY	TZ	Without rod boot Z	With rod boot Z
20	69.5	8 ^{-0.025} _{-0.047}	10	5.5	31	51	40	3.2	47.8	42	26	28	59.6	46	66
25	83.5	10 ^{-0.025} _{-0.047}	10	5.5	37	58	47	3.2	54.8	42	28	28	68	51	73
32	85	12 ^{-0.032} _{-0.059}	10	6.6	38.5	62.5	47	4.5	57.4	48	28	28	75.7	51	73
40	92.5	14 ^{-0.032} _{-0.059}	10	6.6	42.5	72.5	54	4.5	65.4	56	36	30	85.7	62	82

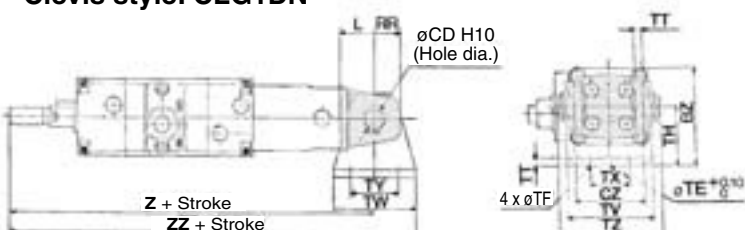
Head side trunnion style: CLG1TN



Head Side Trunnion Style

Bore size (mm)	BZ	TDe8	TE	TF	TH	TR	TS	TT	TV	TW	TX	TY	TZ	Without rod boot Z	With rod boot Z	ZZ
20	63.5	8 ^{-0.025} _{-0.047}	10	5.5	25	39	28	3.2	35.8	42	16	28	47.6	165	186	206
25	76.5	10 ^{-0.025} _{-0.047}	10	5.5	30	43	33	3.2	39.8	42	20	28	53	180	201	223
32	81.5	12 ^{-0.032} _{-0.059}	10	6.6	35	54.5	40	4.5	49.4	48	22	28	67.7	184	208	230
40	90	14 ^{-0.032} _{-0.059}	10	6.6	40	65.5	49	4.5	58.4	56	30	30	78.7	209	237	257

Clevis style: CLG1DN



Clevis Style

Bore size (mm)	BZ	CD _{H10}	CZ	L	RR	TE	TF	TH	TT	TV	TW	TX	TY	TZ
20	44	8 ^{-0.058} ₀	29	14	11	10	5.5	25	3.2	35.8	42	16	28	43.4
25	52.5	10 ^{-0.058} ₀	33	16	13	10	5.5	30	3.2	39.8	42	20	28	48
32	57.5	12 ^{-0.070} ₀	40	20	15	10	6.6	35	4.5	49.4	48	22	28	59.4
40	66	14 ^{-0.070} ₀	49	22	18	10	6.6	40	4.5	58.4	56	30	30	71.4

Bore size (mm)	Without rod boot Z	With rod boot ZZ	Z	ZZ
20	190	211	210	231
25	207	228	229	250
32	214	238	236	260
40	241	269	261	289

* Clevis pin and retaining ring are attached.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

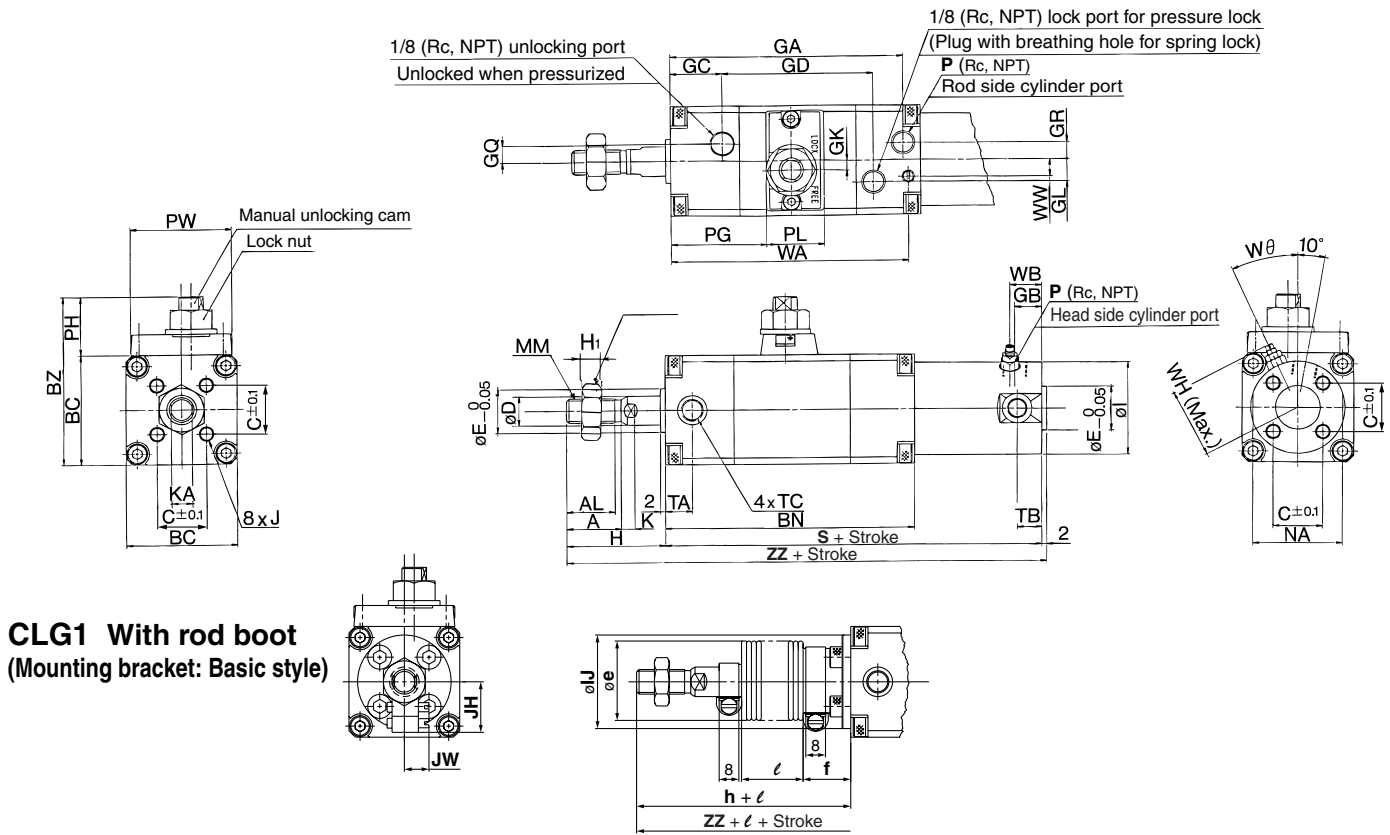
-X□

Individual
-X□

Series CLG1

Basic Style with Air Cushion: CLG1BA

* Refer to page 629 for mounting bracket, since the dimensions except GA, P, WA, WB, WH, WW, Wθ are the same.



CLG1 With rod boot
(Mounting bracket: Basic style)

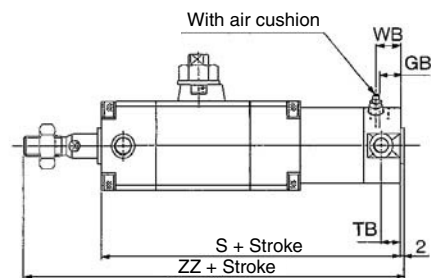
Bore size (mm)	Stroke range	AL	A	B1	BC	BN	BZ	C	D	E	GA	GB	GC	GD	GK	GL	GQ	GR	I	J	K	KA	MM	NA	H1
20	Up to 200	15.5	18	13	38	91	57.5	14	8	12	85	10	19	54	3.5	5.5	4	4	26	M4 x 0.7 depth 7	5	6	M8 x 1.25	24	5
25	Up to 300	19.5	22	17	45	101	69	16.5	10	14	95	10	20	62	4	9	7	7	31	M5 x 0.8 depth 7.5	5.5	8	M10 x 1.25	29	6
32	Up to 300	19.5	22	17	45	102	69	20	12	18	95	10	21	62	4	9	7	7	38	M5 x 0.8 depth 8	5.5	10	M10 x 1.25	35.5	6
40	Up to 300	27	30	19	52	111	76	26	16	25	103	10	23	67	4	11	8	7	47	M6 x 1 depth 12	6	14	M14 x 1.5	44	8

Bore size (mm)	Stroke range	P	PG	PH	PL	PW	S	TA	TB	TC	WA	WW	WB	WH	W θ	Without rod boot		With rod boot									
																H	ZZ	IJ	JH (Reference)	JW (Reference)	e	f	h	ℓ	ZZ		
20	Up to 200	M5 x 0.8	33	19.5	20	38	141	11	11	M5 x 0.8	86	5.5	15	23	30°	35	178	27	15.5	10.5	30	18	55	1/4 stroke	198 (206)		
25	Up to 300	M5 x 0.8	38	24	24	41	151	11	11	M6 x 0.75	96	6	15	25	30°	40	193	32	16.5	10.5	30	19	62		215 (223)		
32	Up to 300	1/8	39	24	24	41	154	11	10	M8 x 1	97	6	15	28.5	25°	40	196	38	18.5	10.5	35	19	62		218 (226)		
40	Up to 300	1/8	44	24	24	41	169	12	10	M10 x 1.25	106	8	15	33	20°	50	221	48	21.5	10.5	35	19	70		241 (250)		

* The minimum stroke for cylinders with a rod boot is 20 mm.

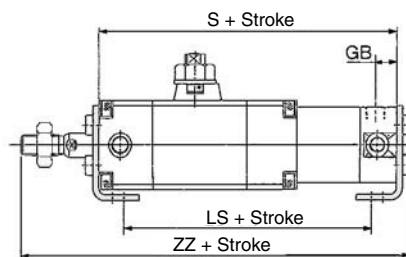
Long Stroke/Refer to pages 628 to 630 for mounting dimensions except the table below.

Basic style



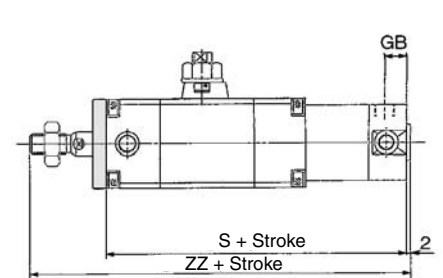
Bore size (mm)	Stroke range	GB	S	Without rod boot ZZ	With rod boot ZZ	TB	WB
20	201 to 350	12	149	186	206	11	16
25	301 to 400	12	159	201	223	11	16
32	301 to 450	12	162	204	226	11	16
40	301 to 800	13	178	230	250	12	16

Foot style



Bore size (mm)	Stroke range	GB	S	LS	Without rod boot ZZ	With rod boot ZZ
20	201 to 350	12	149	125	190	210
25	301 to 400	12	159	135	205.5	227.5
32	301 to 450	12	162	136	208.5	230.5
40	301 to 800	13	178	151	235	255

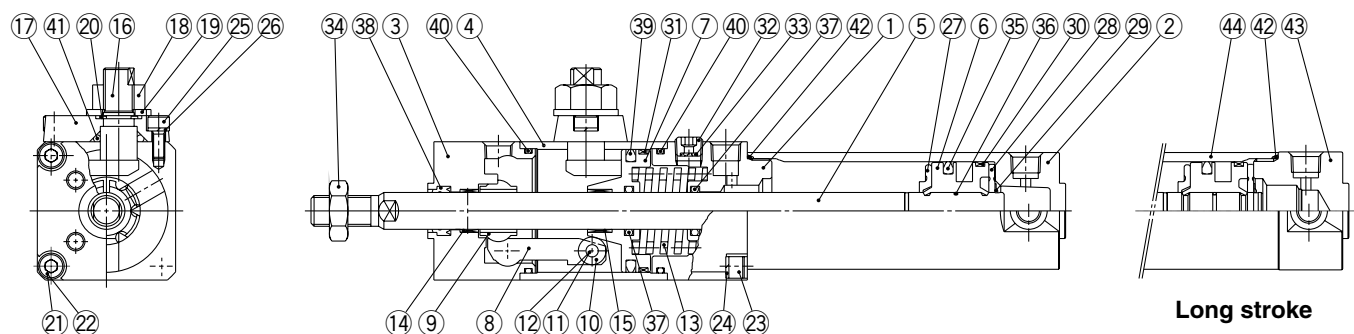
Rod side flange style



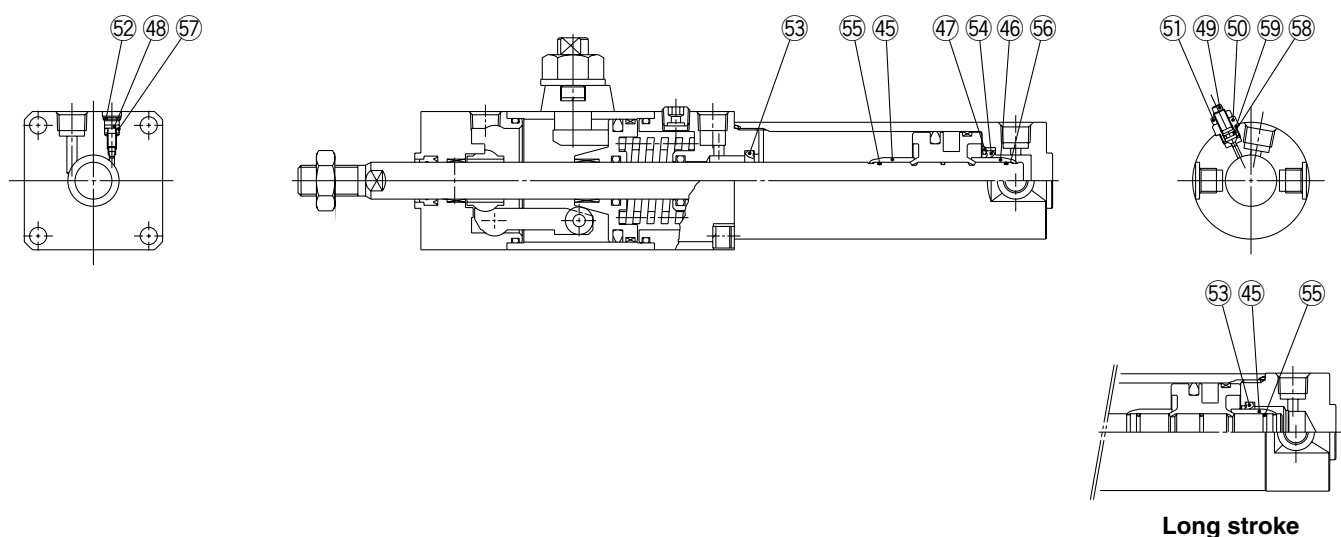
Bore size (mm)	Stroke range	GB	S	Without rod boot ZZ	With rod boot ZZ
20	201 to 350	12	149	186	206
25	301 to 400	12	159	201	223
32	301 to 450	12	162	204	226
40	301 to 800	13	178	230	250

Construction

With rubber bumper: CLG1BN



With air cushion: CLG1BA



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Clear hard anodized
2	Tube cover	Aluminum alloy	Hard anodized
3	Cover	Carbon steel	Nitrided
4	Intermediate cover	Aluminum alloy	Clear hard anodized
5	Piston rod	Carbon steel	Hard chromated
6	Piston	Aluminum alloy	Chromated
7	Brake piston	Carbon steel	Nitrided
8	Brake arm	Carbon steel	Nitrided
9	Brake shoe	Special friction material	
10	Roller	Carbon steel	Nitrided
11	Pin	Carbon steel	Heat treated
12	Retaining ring	Stainless steel	
13	Brake spring	Spring steel wire	Dacrodized: Types C, E only
14	Bushing	Oil-impregnated sintered alloy	
15	Bushing	Oil-impregnated sintered alloy	
16	Manual lock release cam	Chromium molybdenum steel	Nitrided, nickel plated
17	Cam guide	Carbon steel	Nitrided, painted
18	Lock nut	Rolled steel	Nickel plated
19	Flat washer	Rolled steel	Nickel plated
20	Retaining ring	Stainless steel	
21	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated
22	Spring washer	Steel wire	Nickel plated
23	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated
24	Spring washer	Steel wire	Nickel plated
25	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated
26	Spring washer	Steel wire	Nickel plated
27	Bumper A	Urethane	
28	Bumper B	Urethane	
29	Retaining ring	Stainless steel	
30	Wear ring	Resin	

No.	Description	Material	Note
31	Wear ring	Resin	
32	Hexagon socket head plug	Carbon steel	Nickel plated type E only
33	Element	Bronze	Type E only
34	Rod end nut	Rolled steel	Nickel plated
35	Piston seal	NBR	
36	Piston gasket	NBR	
37	Rod seal A	NBR	
38	Rod seal B	NBR	
39	Brake piston seal	NBR	
40	Intermediate cover gasket	NBR	
41	Cam gasket	NBR	
42	Cylinder tube gasket	NBR	
43	Head cover	Aluminum alloy	Clear hard anodized
44	Cylinder tube	Aluminum alloy	Hard anodized
45	Cushion ring A	Aluminum alloy	Anodized
46	Cushion ring B	Aluminum alloy	Anodized
47	Seal retaining	Rolled steel	Zinc chromated
48	Cushion valve A	Chromium molybdenum steel	Electroless nickel plated
49	Cushion valve B	Rolled steel	Electroless nickel plated
50	Valve retaining	Rolled steel	Electroless nickel plated
51	Lock nut	Rolled steel	Electroless nickel plated
52	Retaining ring	Stainless steel	
53	Cushion seal A	Urethane	
54	Cushion seal B	Urethane	
55	Cushion ring gasket A	NBR	
56	Cushion ring gasket B	NBR	
57	Valve seal A	NBR	
58	Valve seal B	NBR	
59	Valve retaining gasket	NBR	

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual

-X□

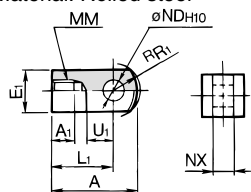
Series CLG1

Accessory Bracket Dimensions

Single Knuckle Joint

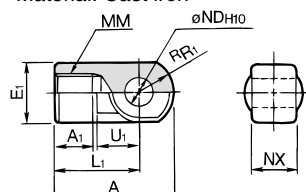
I-G02/G03

Material: Rolled steel



I-G04

Material: Cast iron

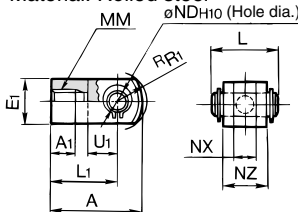


Part no.	Applicable bore size (mm)	A	A1	E1	L1	MM	R _{R1}	U1	NDH10	NX
I-G02	20	34	8.5	16	25	M8 x 1.25	10.3	11.5	8 ^{+0.058} ₀	8 ^{-0.2} _{-0.4}
I-G03	25, 32	41	10.5	20	30	M10 x 1.25	12.8	14	10 ^{+0.058} ₀	10 ^{-0.2} _{-0.4}
I-G04	40	42	14	22	30	M14 x 1.5	12	14	10 ^{+0.058} ₀	18 ^{-0.3} _{-0.5}

Double Knuckle Joint * Knuckle pin and retaining ring are packaged.

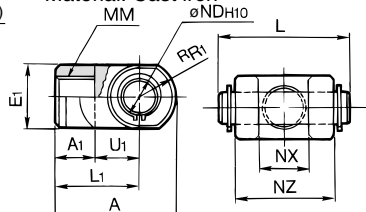
Y-G02/G03

Material: Rolled steel



Y-G04

Material: Cast iron

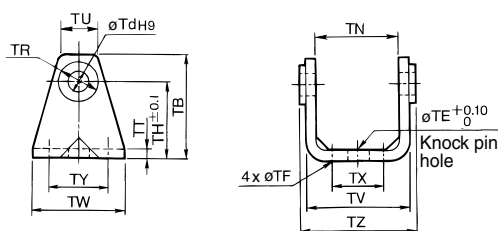


Part no.	Applicable bore size (mm)	A	A1	E1	L1	MM	R _{R1}	U1	NDH10	NX	NZ	L	Applicable pin part no.
Y-G02	20	34	8.5	16	25	M8 x 1.25	10.3	11.5	8 ^{+0.058} ₀	8 ^{+0.4} _{+0.2}	16	21	IY-G02
Y-G03	25, 32	41	10.5	20	30	M10 x 1.25	12.8	14	10 ^{+0.058} ₀	10 ^{+0.4} _{+0.2}	20	25.6	IY-G03
Y-G04	40	42	16	22	30	M14 x 1.5	12	14	10 ^{+0.058} ₀	18 ^{+0.5} _{+0.3}	36	41.6	IY-G04

Rod Side Pivot Bracket

ø20 to ø40

Material:
Rolled steel



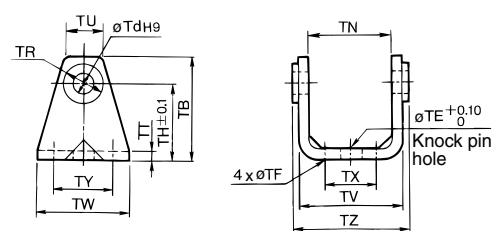
Part no.	Applicable bore size (mm)	TB	TdH9	TE	TF	TH	TN
CNG-020-24	20	42	8 ^{+0.036} ₀	10	5.5	31	40
CNG-025-24	25	48	10 ^{+0.036} ₀	10	5.5	37	47
CNG-032-24	32	53	12 ^{+0.043} ₀	10	6.6	38.5	47
CNG-040-24	40	60	14 ^{+0.043} ₀	10	6.6	42.5	55

Part no.	Applicable bore size (mm)	TR	TT	TU	TV	TW	TX	TY	TZ
CNG-020-24	20	13	3.2	21.2	47.8	42	26	28	50
CNG-025-24	25	15	3.2	21.3	54.8	42	28	28	57
CNG-032-24	32	17	4.5	25.6	57.4	48	28	28	61.4
CNG-040-24	40	21	4.5	26.3	65.4	56	36	30	71.4

Head Side Pivot Bracket

ø20 to ø40

Material:
Rolled steel

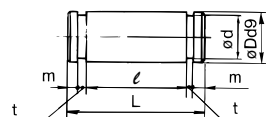


Part no.	Applicable bore size (mm)	TB	Td	TE	TF	TH	TN
CG-020-24A	20	36	8	10	5.5	25	(29.3)
CG-025-24A	25	43	10	10	5.5	30	(33.1)
CG-032-24A	32	50	12	10	6.6	35	(40.4)
CG-040-24A	40	58	14	10	6.6	40	(49.2)

Part no.	Applicable bore size (mm)	TR	TT	TU	TV	TW	TX	TY	TZ
CG-020-24A	20	13	3.2	18.1	35.8	42	16	28	38.3
CG-025-24A	25	15	3.2	20.7	39.8	42	20	28	42.1
CG-032-24A	32	17	4.5	23.6	49.4	48	22	28	53.8
CG-040-24A	40	21	4.5	27.3	58.4	56	30	30	64.6

Knuckle Pin

Material: Carbon steel

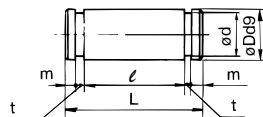


Part no.	Applicable bore size (mm)	Dd9	L	d	l	m	t	Applicable retaining ring
IY-G02	20	8 ^{-0.040} _{-0.076}	21	7.6	16.2	1.5	0.9	Type C 8 for axis
IY-G03	25, 32	10 ^{-0.040} _{-0.076}	25.6	9.6	20.2	1.55	1.15	Type C 10 for axis
IY-G04	40	10 ^{-0.040} _{-0.076}	41.6	9.6	36.2	1.55	1.15	Type C 10 for axis

* Retaining rings are included.

Clevis Pin

Material: Carbon steel

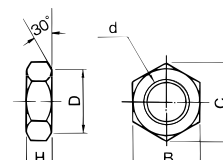


Part no.	Applicable bore size (mm)	Dd9	L	d	l	m	t	Applicable retaining ring
CD-G02	20	8 ^{-0.040} _{-0.076}	43.4	7.6	38.6	1.5	0.9	Type C 8 for axis
CD-G25	25	10 ^{-0.040} _{-0.076}	48	9.6	42.6	1.55	1.15	Type C 10 for axis
CD-G03	32	12 ^{-0.050} _{-0.093}	59.4	11.5	54	1.55	1.15	Type C 12 for axis
CD-G04	40	14 ^{-0.050} _{-0.093}	71.4	13.4	65	2.05	1.15	Type C 14 for axis

* Retaining rings are included.

Rod End Nut

Material:
Carbon steel

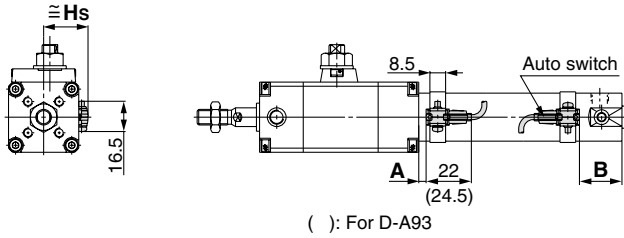


Part no.	Applicable bore size (mm)	B	C	D	d	H
NT-02	20	13	15.0	12.5	M8 x 1.25	5
NT-03	25, 32	17	19.6	16.5	M10 x 1.25	6
NT-G04	40	19	21.9	18	M14 x 1.5	8

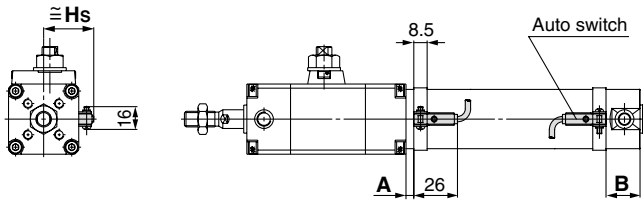
Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

Reed auto switch

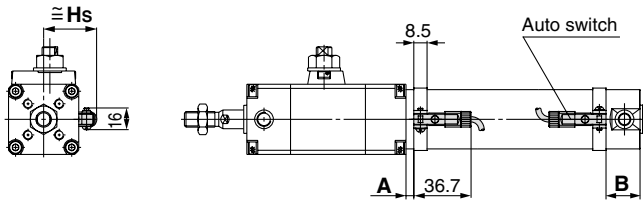
D-A9□



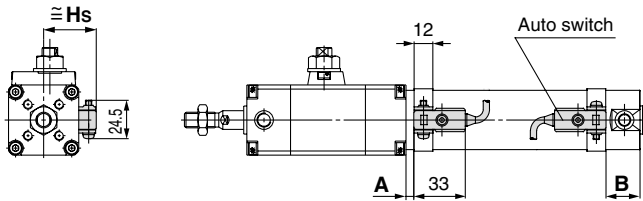
D-C7/C8



D-C73C/C80C



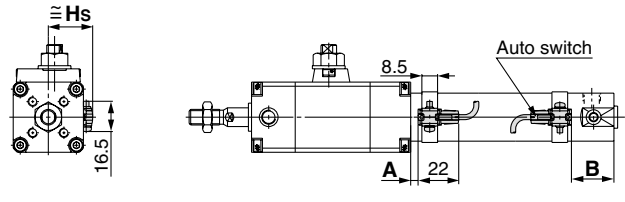
D-B5/B6/B59W



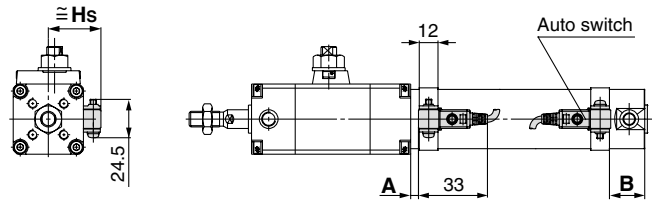
Solid state auto switch

D-M9□

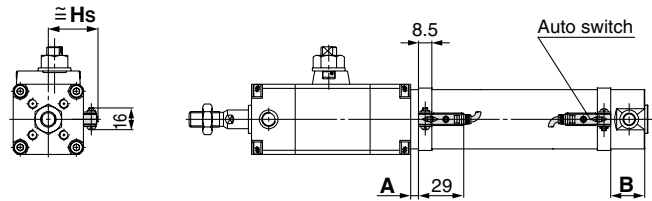
D-M9□W



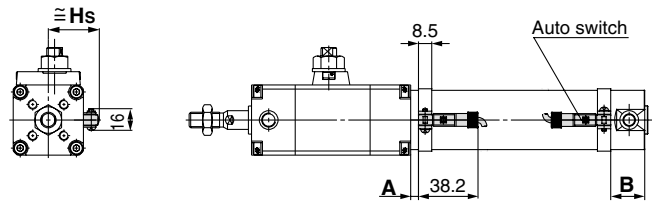
D-G5NTL



D-H7□/H7□W
D-H7NF/H7BAL



D-H7C



Auto Switch Proper Mounting Position

(mm)

Auto switch model Bore size (mm)	D-A9□		D-M9□ D-M9□W		D-C7□ D-C80 D-C73C D-C80C		D-H7□ D-H7C D-H7□W D-H7BAL D-H7NF		D-B5□ D-B64		D-B59W		D-G5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
20	6.5	23 (31)	10.5	27 (35)	7	23.5 (31.5)	6	22.5 (30.5)	1	17.5 (25.5)	4	20.5 (28.5)	2.5	19 (27)
25	6.5	23 (31)	10.5	27 (35)	7	23.5 (31.5)	6	22.5 (30.5)	1	17.5 (25.5)	4	20.5 (28.5)	2.5	19 (27)
32	6.5	25 (33)	10.5	29 (37)	7	25.5 (33.5)	6	24.5 (32.5)	1	19.5 (27.5)	4	22.5 (30.5)	2.5	21 (29)
40	9.5	28 (37)	13.5	32 (41)	10	28.5 (37.5)	9	27.5 (36.5)	4	22.5 (31.5)	7	25.5 (34.5)	5.5	24 (33)

* (): Values for long strokes

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

Auto Switch Mounting Height

(mm)

Auto switch model Bore size (mm)	D-A9□ D-M9□ D-M9□W	D-C7□ D-C80 D-H7□ D-H7□W D-H7NF D-H7BAL	D-C73C D-C80C	D-B5□ D-B64 D-B59W D-H7C D-G5NTL
	Hs	Hs	Hs	Hs
20	24	24.5	27	27.5
25	26.5	27	29.5	30
32	30	30.5	33	33.5
40	34.5	35	37.5	38

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual
-X□

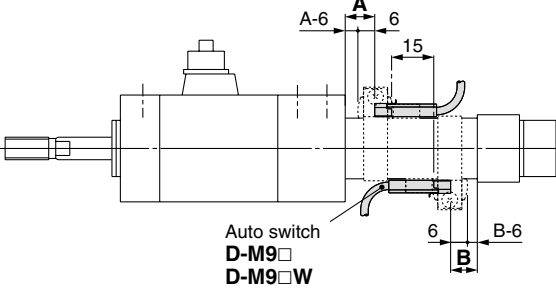
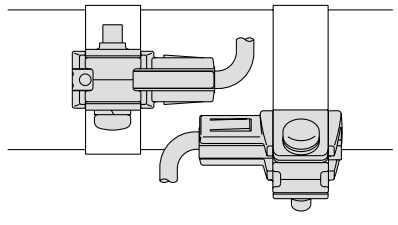
Series CLG1

Minimum Auto Switch Mounting Stroke

n: No. of auto switches (mm)

Auto switch model	No. of auto switches mounted				
	1	2		n	
		Different surfaces	Same surface	Different surfaces	Same surface
D-A9□ D-M9□ D-M9□W	10	15 Note 1)	45 Note 1)	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	45 + 45 (n - 2)
D-C7□ D-C80	10	15	50	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	50 + 45 (n - 2)
D-H7□ D-H7□W D-H7BAL D-H7NF	10	15	60	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	60 + 45 (n - 2)
D-C73C D-C80C	10	15	65	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	65 + 50 (n - 2)
D-B5□ D-B64 D-G5NTL	10	15	75	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	75 + 55 (n - 2)
D-B59W	15	20	75	$20 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	75 + 55 (n - 2)

Note 1) Auto switch mounting

Auto switch model	With 2 auto switches	
	Different surfaces Note 1)	Same surface Note 1)
	 The proper auto switch mounting position is 6 mm inward from the switch holder edge.	 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-A93	—	Less than 50 strokes Note 2)
D-M9□ D-M9□W	Less than 20 strokes Note 2)	Less than 55 strokes Note 2)

Note 2) Minimum stroke for mounting auto switches in the other mounting styles mentioned in note 1.

Operating range

(mm)

Auto switch model	Bore size (mm)			
	20	25	32	40
D-A9□	7	6	8	8
D-M9□ D-M9□W	4.5	5	4.5	5.5
D-C7□/C-80 D-C73C/C-80C	8	10	9	10
D-B5□/B64	8	10	9	10
D-B59W	13	13	14	14
D-H7□/H7□W D-H7BAL/H7NF	4	4	4.5	5
D-H7C	7	8.5	9	10
D-G5NTL	4	4	4.5	5
D-G5NBL	35	40	40	45

* Since the operating range is provided as a guideline including hysteresis, it cannot be guaranteed (assuming approximately ±30% dispersion).
It may vary substantially depending on an ambient environment.

Auto Switch Mounting Bracket: Part No.

Auto switch model	Bore size (mm)			
	ø20	ø25	ø32	ø40
D-A9□ D-M9□ D-M9□W	(1) ① BMA2-020 ② BJ3-1	(1) ① BMA2-025 ② BJ3-1	(1) ① BMA2-032 ② BJ3-1	(1) ① BMA2-040 ② BJ3-1
D-C7□/C80 D-C73C/C80C D-H7□ D-H7□W D-H7BAL D-H7NF	BMA2-020	BMA2-025	BMA2-032	BMA2-040
D-B5□/B64 D-B59W D-G5NTL D-G5NBL	BA-01	BA-02	BA-32	BA-04

Note) Two kinds of auto switch mounting brackets are used as a set.

[Mounting screw set made of stainless steel]

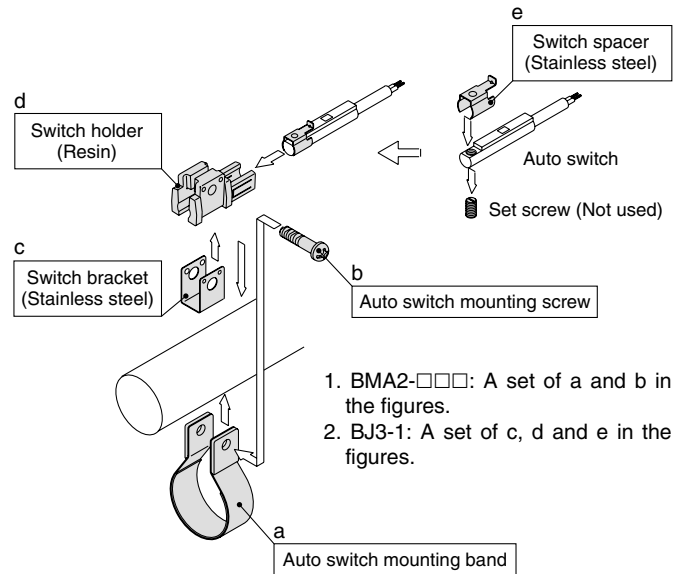
The following set of mounting screws made of stainless steel is available. Use it in accordance with the operating environment. (Please order the auto switch mounting bracket separately, since it is not included.)

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

BBA4: For D-C7/C8/H7 types

D-H7BAL/G5BAL auto switches are set on the cylinder with the stainless steel screws above when shipped. When an auto switch is shipped independently, BBA3 or BBA4 is attached.

Note 2) Refer to pages 1813 and 1814 for the details of BBA3 and BBA4.



Cylinder Bracket/Stroke: Auto Switch Mounting Surface

Mounting bracket	Basic, Foot, Flange, Clevis			Trunnion			st: Stroke (mm)
	1 (Rod cover side)	2 (Different surfaces)	2 (Same surface)	1 (Rod cover side)	2 (Different surfaces)	2 (Same surface)	
No. of auto switches							
Switch mounting surface	Port side	Port side	Port side				
Switch model							
D-A9□ D-M9□ D-M9□W	10 st or more	15 to 44 st	45 st or more	10 st or more	15 to 44 st	45 st or more	
D-C7□/C80	10 st or more	15 to 49 st	50 st or more	10 st or more	15 to 49 st	50 st or more	
D-H7□/H7□W D-H7BAL/H7NF	10 st or more	15 to 59 st	60 st or more	10 st or more	15 to 59 st	60 st or more	
D-C73C/C80C/H7C	10 st or more	15 to 64 st	65 st or more	10 st or more	15 to 64 st	65 st or more	
D-B5□/B64/G5NTL	10 st or more	15 to 74 st	75 st or more	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	15 st or more	20 to 74 st	75 st or more	

Besides the models listed in How to Order, the following auto switches are applicable.
Refer to pages 1719 to 1827 for the detailed specifications.

Auto switch type	Part no.	Electrical entry (Fetching direction)	Features	Applicable bore size
Reed	D-B53, C73, C76	Grommet (In-line)	—	ø20 to ø40
	D-C80		Without indicator light	
Solid state	D-H7A1, H7A2, H7B		—	
	D-H7NW, H7PW, H7BW		Diagnostic indication (2-color indication)	
	D-G5NTL		With timer	

* For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 1784 and 1785 for details.

* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H types) are also available. Refer to page 1746 for details.

* Wide range detection type, solid state auto switches (D-G5NBL type) are also available. Refer to page 1776 for details.

Cylinder with Lock

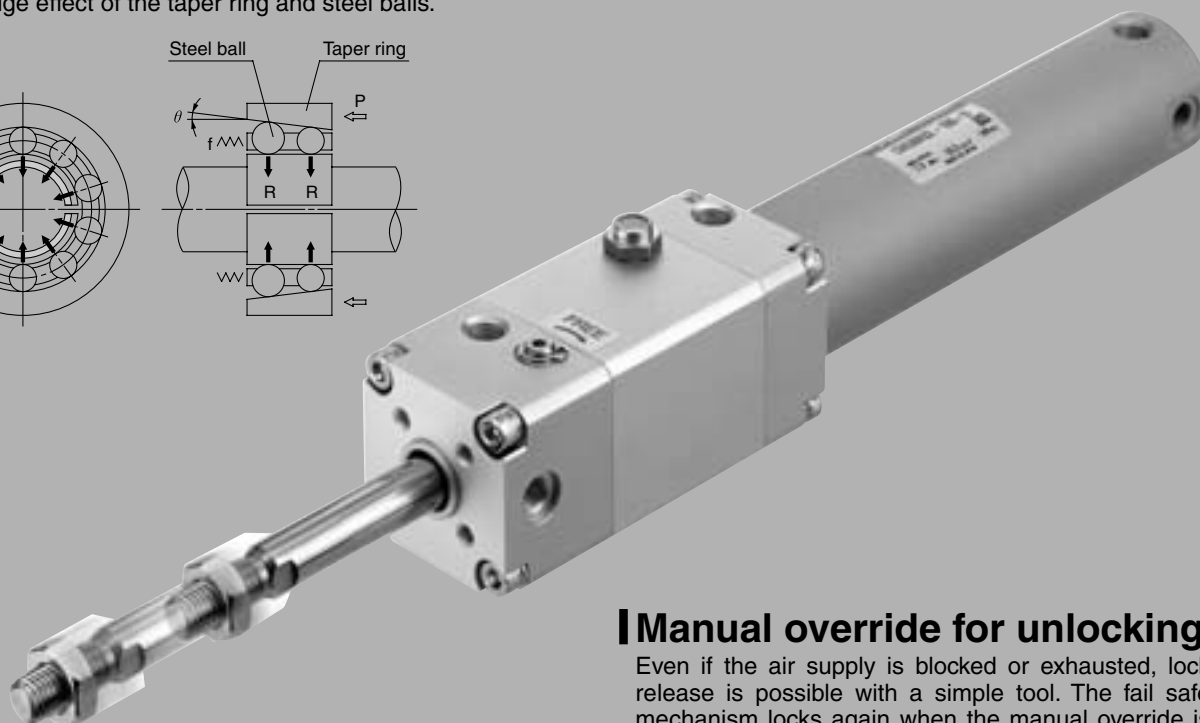
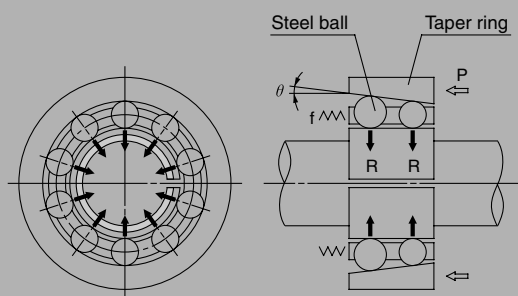
Series CNG

ø20, ø25, ø32, ø40

A locking cylinder ideal for intermediate stops, emergency stops and drop prevention.

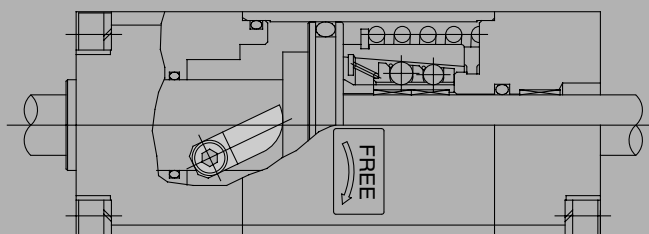
Simple construction

A force magnifying mechanism is employed based on the wedge effect of the taper ring and steel balls.



Manual override for unlocking

Even if the air supply is blocked or exhausted, lock release is possible with a simple tool. The fail safe mechanism locks again when the manual override is released.



High locking efficiency

Greater locking efficiency as well as stable locking and unlocking operation has been achieved by arranging a large number of steel ball bearings in circular rows. (Unlocking pressure of 0.25 MPa 0.05 MPa lower than conventional SMC products) In addition, both alignability and stable locking force with respect to piston rod eccentricity are obtained by allowing the taper ring to float.

High reliability and stable holding force

Outstanding durability and stable holding force are maintained by the use of a brake shoe having superior wear resistance, which has also been substantially lengthened (double the conventional SMC product).

Design minimizes the influences of unlocking air quality

A construction which is strong against moisture and drainage in the compressed air has been realized by separating the locking mechanism and the unlocking chamber.

Series Variations

Series	Action	Cushion type		With rod boot	Bore size (mm)	Lock holding force (N)	Stroke (mm)
		Rubber bumper	Air cushion				
Cylinder with lock Series CNG	Double acting, Single rod	●	●	●	20	215	Max. Up to 1500
		●	●	●	25	335	
		●	●	●	32	550	
		●	●	●	40	860	

Can be locked in both directions

Holding force is equal on either extend or retract.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual -X□

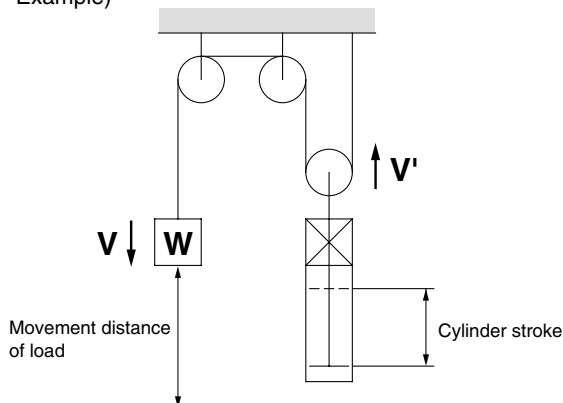
Series CNG Model Selection

Precautions on Model Selection

⚠ Caution

1. In order that the originally selected maximum speed is not exceeded, be certain to use a speed controller to adjust the total movement distance of the load so that movement takes place in no less than the applicable movement time.
The movement time is the time that is necessary for the load to travel the total movement distance from the start without any intermediate stops.
2. In cases where the cylinder stroke and the movement distance of the load are different (double speed mechanism, etc.), use the movement distance of the load for selection purposes.

Example)



3. The following selection example and procedures are based on use at the intermediate stop (including emergency stops during operation). However, when the cylinder is in a locked state, kinetic energy does not act upon it. Under these conditions, use the load mass at the maximum speed (V) of 100 mm/s shown in graphs (5) to (7) depending on the operating pressure and select models.

Selection Example

- Load mass: $m = 12 \text{ kg}$
- Movement distance: $st = 200 \text{ mm}$
- Movement time: $t = 0.8 \text{ s}$
- Load condition: Vertical downward = Load in direction of rod extension
- Operating pressure: $P = 0.4 \text{ MPa}$

Step (1): From graph (1) find the maximum movement speed of the load.

∴ Maximum speed $V \approx 350 \text{ mm/s}$

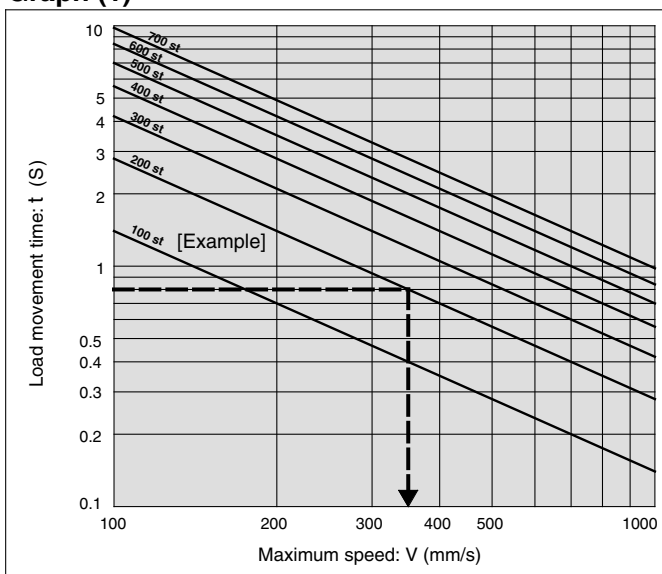
Step (2): Select graph (6) based upon the load condition and operating pressure, and then from the intersection of the maximum speed $V = 350 \text{ mm/s}$ found in Step (1), and the load mass $m = 12 \text{ kg}$

∴ $\phi 32 \rightarrow$ select a CNG32 or larger bore size.

Step (1) Find the maximum load speed V.

Find the maximum load speed: V (mm/s) from the load movement time: t (s) and the movement distance: st (mm).

Graph (1)

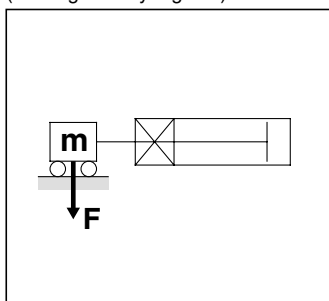


Step (2) Find the bore size.

Select a graph based upon the load condition and operating pressure, and then find the point of intersection for the maximum speed found in Step (1) and the load mass. Select the bore size on the above the point of intersection.

Load Condition

Load in the direction at the right angle to rod
(* Being held by a guide)



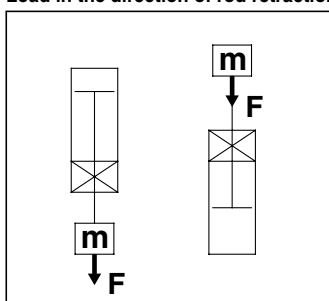
Operating Pressure

$0.3 \text{ MPa} \leq$ → Graph (2)

$0.4 \text{ MPa} \leq$ → Graph (3)

$0.5 \text{ MPa} \leq$ → Graph (4)

Load in the direction of rod extension
Load in the direction of rod retraction



$0.3 \text{ MPa} \leq$ → Graph (5)

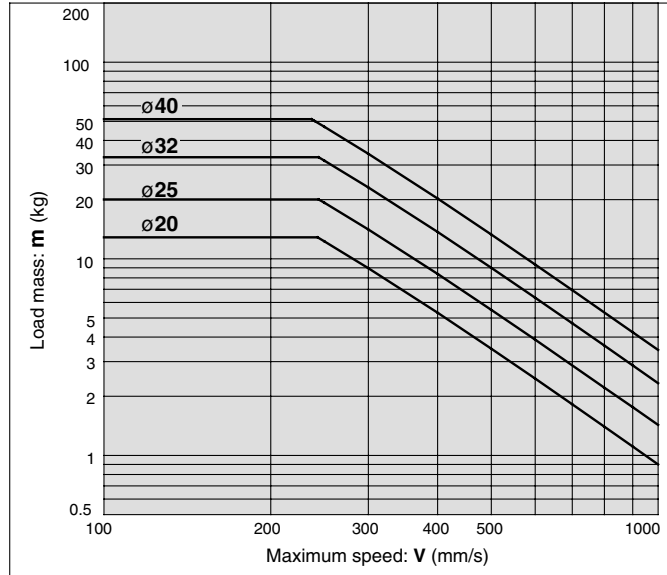
$0.4 \text{ MPa} \leq$ → Graph (6)

$0.5 \text{ MPa} \leq$ → Graph (7)

Selection Graph

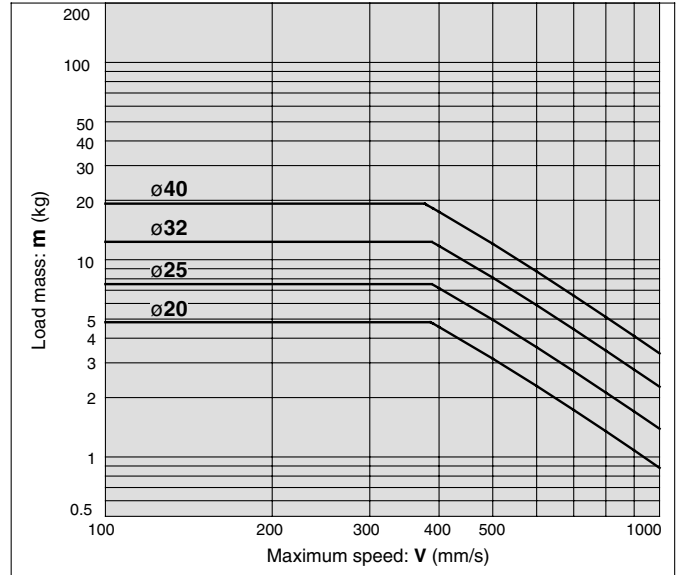
Graph (2)

$0.3 \text{ MPa} \leq P < 0.4 \text{ MPa}$



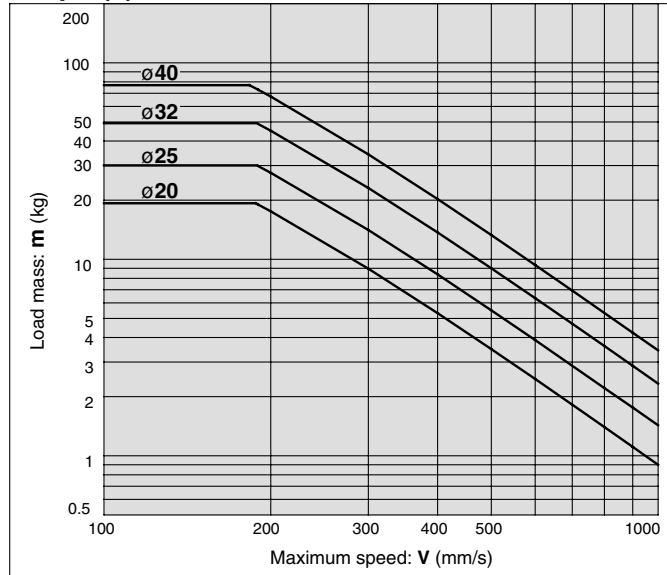
Graph (5)

$0.3 \text{ MPa} \leq P < 0.4 \text{ MPa}$



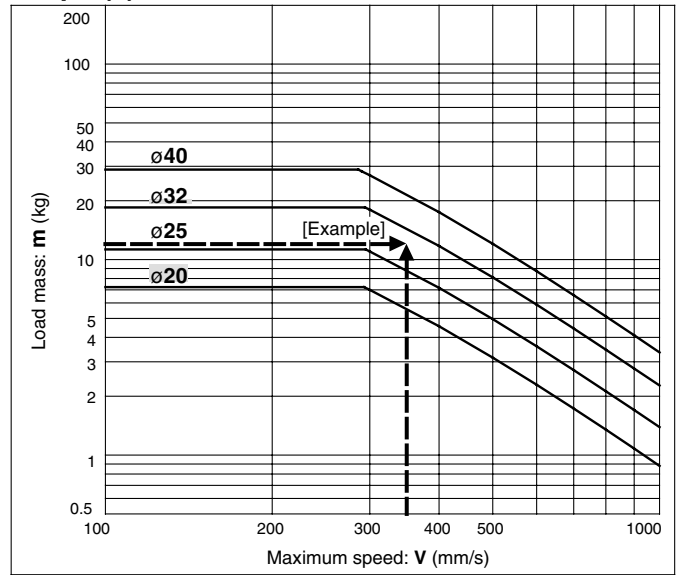
Graph (3)

$0.4 \text{ MPa} \leq P < 0.5 \text{ MPa}$



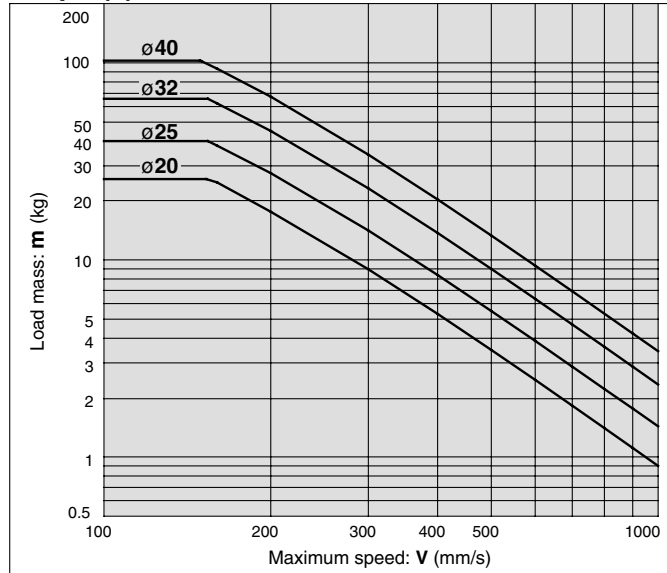
Graph (6)

$0.4 \text{ MPa} \leq P < 0.5 \text{ MPa}$



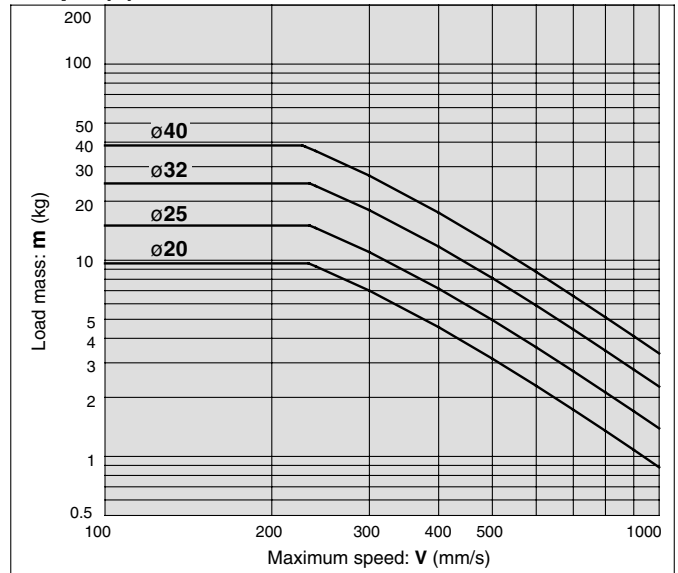
Graph (4)

$0.5 \text{ MPa} \leq P$



Graph (7)

$0.5 \text{ MPa} \leq P$



CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-☐

-X☐

Individual

-X☐

Cylinder with Lock Double Acting, Single Rod Series *CNG* ø20, ø25, ø32, ø40

How to Order

CNG **L** **N** **32** **-** **100** **-** **D** **-**

With auto switch **CDNG** **L** **N** **32** **-** **100** **-** **D** **-** **M9BW** **-**

With auto switch
(Built-in magnet)

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
U	Rod side trunnion style
T	Head side trunnion style
D	Clevis style

* Mounting brackets are shipped together, (but not assembled).

Cushion type

N	Rubber bumper
A	Air cushion

Port thread type

Nil	Rc
TN	NPT

Bore size

20	20 mm
25	25 mm
32	32 mm
40	40 mm

Cylinder stroke (mm)

Refer to "Standard Stroke" on page 673.

Auto switch

Nil	Without auto switch
------------	---------------------

* For the applicable auto switch model, refer to the table below.

Locking direction

D	Both directions
----------	-----------------

Number of auto switches

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

Made to Order
Refer to page 673 for details.

Cylinder suffix

Rod boot	Nil	None
	J	Nylon tarpaulin
	K	Heat resistant tarpaulin

* When equipped with rod boot, foot and rod side flange type brackets are attached before shipment.

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) CDNGLN40-100-D

Applicable Auto Switch/Refer to pages 1719 to 1827 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	Applicable bore size	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)				
							ø20 to ø40									
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9N	●	●	●	○	—	○	IC circuit	Relay, PLC	
				3-wire (PNP)			M9P	●	●	●	○	—	○			
		Connector		2-wire	12 V		M9B	●	●	●	○	—	○	—		
				H7C	●		—	●	●	●	—					
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	5 V, 12 V		M9NW	●	●	●	○	—	○	IC circuit		
				3-wire (PNP)			M9PW	●	●	●	○	—	○			
				2-wire	12 V		M9BW	●	●	●	○	—	○	—		
				H7BA	—		—	●	○	—	○					
				Water resistant (2-color indication)	H7NF		●	—	●	○	—	○	IC circuit			
				With diagnostic output (2-color indication)												
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96	●	—	●	—	—	—	IC circuit	Relay, PLC
				2-wire	24 V	12 V	100 V	A93	●	—	●	—	—	—	—	
							100 V or less	A90	●	—	●	—	—	—	IC circuit	
							100 V, 200 V	B54	●	—	●	●	—	—	—	
							200 V or less	B64	●	—	●	—	—	—		
							—	C 73C	●	—	●	●	●	—		
		24 V or less	C80C				●	—	●	●	●	—	IC circuit			
		Connector	No													
			No													
		Diagnostic indication (2-color indication)	Grommet	Yes												

* Lead wire length symbols: 0.5 m Nil
1 m M
3 m L
5 m Z
None N

(Example) M9NW
(Example) M9NWM
(Example) M9NWL
(Example) M9NWZ
(Example) H7CN

* Solid state auto switches marked with "○" are produced upon receipt of order.
* D-A9□V□/M9□V□/M9□WV and D-M9□A(V)L types cannot be mounted.

* Since there are other applicable auto switches than listed, refer to page 687 for details.
* For details about auto switches with pre-wired connector, refer to pages 1784 and 1785.
* D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (Only auto switch brackets are assembled at the time of shipment.)

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



JIS Symbol



Made to Order Specifications
(For details, refer to pages 1836, 1876 and 1926.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC4*	With heavy duty scraper
—XC35	With coil scraper

* -XC4 (with heavy duty scraper) is available only for ø32 and ø40.

Model

Series	Type	Lock operation
CNG	Non-lube	Spring locking

Cylinder Specifications

Bore size (mm)	20	25	32	40
Lubrication	Not required (Non-lube)			
Proof pressure	1.5 MPa			
Max. operating pressure	1.0 MPa			
Min. operating pressure	0.08 MPa			
Piston speed	50 to 1000mm/s *			
Ambient and fluid temperature	Without auto switch: -10 to 70°C (No freezing) With auto switch: -10 to 60°C (No freezing)			
Cushion	Rubber bumper, Air cushion			
Stroke length tolerance (mm)	Up to 800st: $+1.4_0$			
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Rod side trunnion style, Head side trunnion style, Clevis style (used for 90° change of port position)			

* When the piston is locked, the load mass is limited by the mounting orientation and the operating pressure.

Lock Specifications

Bore size (mm)	20	25	32	40
Locking action	Spring locking (Exhaust locking)			
Unlocking pressure	0.20 MPa or more	0.25 MPa or more		
Lock starting pressure	0.15 MPa or less	0.20 MPa or less		
Operating pressure range	0.2 to 1.0 MPa	0.25 to 1.0 MPa		
Locking direction	Both directions			
Holding force	215	335	550	860

* Be sure to select cylinders in accordance with the procedures on page 670.

Rod Boot Material

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

* Maximum ambient temperature for the rod boot itself.

Refer to pages 685 to 687 for cylinders with auto switches.

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

Standard Stroke

Refer to the minimum auto switch mounting stroke (page 686) for cylinders with an auto switch.

Bore size (mm)	Standard stroke (mm) ⁽¹⁾	Long stroke (mm)	Max. manufacturable stroke (mm)
20	25, 50, 75, 100, 125, 150, 200	201 to 350	1500
25	25, 50, 75, 100, 125, 150, 200, 250, 300	301 to 400	
32		301 to 450	
40		301 to 800	

Note 1) Intermediate strokes other than the above are produced upon receipt of order. Spacers are not used for intermediate strokes.

Note 2) Long strokes are applicable to the axial foot style and rod side flange style.

In the case of other mounting brackets or when long stroke limits are exceeded, the maximum useable stroke is determined by the stroke selection table (information edition).

Stopping Accuracy

Lock type	Piston speed (mm/s)			
	100	300	500	1000
Spring locking	± 0.3	± 0.6	± 1.0	± 2.0

Condition: Lateral, Supply pressure P = 0.5 MPa

Load mass Upper limit of allowed value

Solenoid valve for locking: Mounted directly to unlocking port

Maximum value of stopping position dispersion from 100 measurements

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual

-X□

Series CNG

Mounting Bracket Part No.

Mounting bracket	Bore size (mm)			
	20	25	32	40
Axial foot *	CNG-L020	CNG-L025	CNG-L032	CNG-L040
Flange	CNG-F020	CNG-F025	CNG-F032	CNG-F040
Trunnion pin	CG-T020	CG-T025	CG-T032	CG-T040
Clevis **	CG-D020	CG-D025	CG-D032	CG-D040
Rod side pivot bracket	CNG-020-24	CNG-025-24	CNG-032-24	CNG-040-24
Head side pivot bracket	CG-020-24A	CG-025-24A	CG-032-24A	CG-040-24A

* When ordering foot bracket, order 2 pieces per cylinder.

** Clevis pin, retaining ring, and mounting bolt are shipped together with clevis style.

*** Mounting bolts are included with the foot and flange styles.

Accessory

Mounting		Basic style	Axial foot style	Rod side flange style	Head side flange style	Rod side trunnion style	Head side trunnion style	Clevis style
Standard equipment	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	—	●
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (with pin) *	●	●	●	●	●	●	●
	Pivot bracket	—	—	—	—	●	●	●
	Rod boot	●	●	●	●	●	●	●

* Pin and retaining ring are shipped together with double knuckle joint.

Mass

Bore size (mm)		20	25	32	40
Basic mass	Basic style	0.52	0.83	0.91	1.24
	Axial foot style	0.63	0.96	1.07	1.46
	Flange style	0.64	1.01	1.08	1.47
	Trunnion style	0.53	0.85	0.94	1.29
	Clevis style	0.57	0.91	1.06	1.47
Rod side pivot bracket		0.11	0.13	0.20	0.27
Head side pivot bracket		0.08	0.09	0.17	0.25
Single knuckle joint		0.05	0.09	0.09	0.10
Double knuckle joint (with pin)		0.05	0.09	0.09	0.13
Additional mass per each 50 mm of stroke		0.05	0.07	0.09	0.15
Additional mass with air cushion		0.01	0.01	0.02	0.02
Additional mass for long stroke		0.01	0.01	0.02	0.03

Calculation: (Example) **CNGLA20-100-D** (Foot style, ø20, 100 st)

Basic mass..... 0.63 kg (Foot style, ø20)

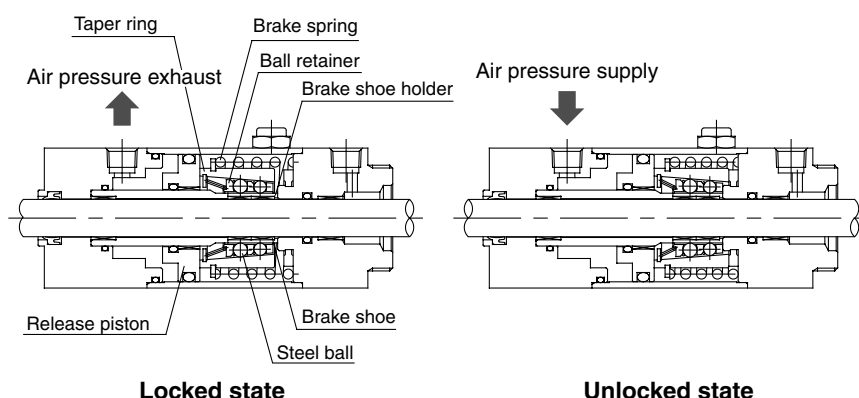
Additional mass 0.05 kg/50 st

Air cylinder stroke 100 st

Air cushion additional mass 0.01 kg

$0.63 + 0.05 \times 100/50 + 0.01 = 0.74$ kg

Construction Principle



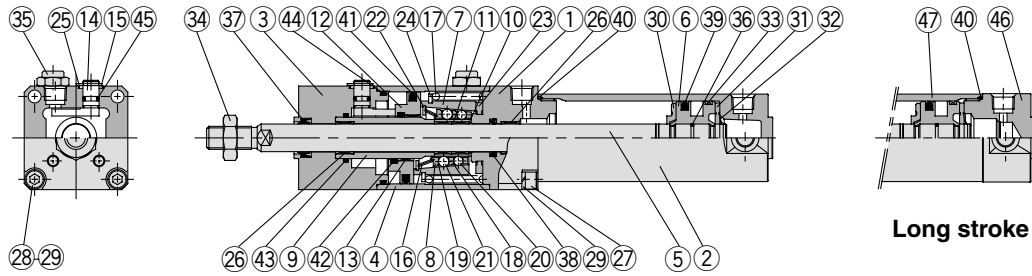
Spring locking (Exhaust locking)

The spring force which acts upon the taper ring is magnified by a wedge effect, and is conveyed to all of the numerous steel balls which are arranged in two circles. These act on the brake shoe holder and brake, which locks the piston rod by tightening against it with a large force.

Unlocking is accomplished when air pressure is supplied to the unlocking port. The release piston and taper ring oppose the spring force, moving to the right side, and the ball retainer strikes the cover section. The braking force is released as the steel balls are removed from the taper ring by the ball retainer.

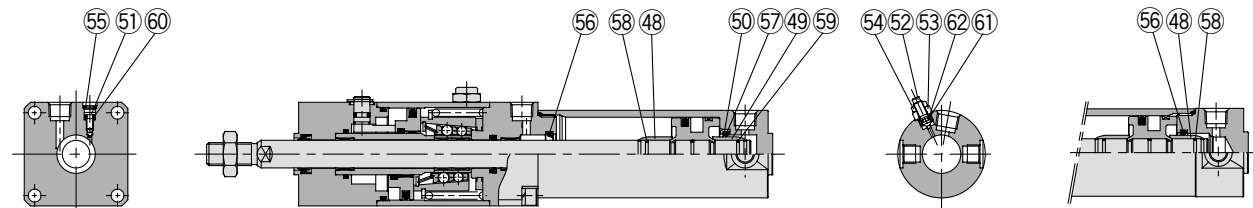
Construction

With rubber bumper: CNGBN



Long stroke

With air cushion: CNGBA



Long stroke

Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Clear hard anodized
2	Tube cover	Aluminum alloy	Clear hard anodized
3	Cover	Aluminum alloy	Clear hard anodized
4	Intermediate cover	Aluminum alloy	Clear hard anodized
5	Piston rod	Carbon steel*	Hard chrome plated
6	Piston	Aluminum alloy	Chromated
7	Taper ring	Carbon steel	Heat treated
8	Ball retainer	Special resin	
9	Piston guide	Carbon steel	Zinc chromated
10	Brake shoe holder	Special steel	Heat treated
11	Brake shoe	Special friction material	
12	Release piston	Carbon steel	Zinc chromated
13	Release piston bushing	ø20	Oil-impregnated sintered alloy
		ø25, ø32, ø40	Steel + Special resin
14	Unlocking cam	Chromium molybdenum steel	Electroless nickel plated
15	Washer	Rolled steel plate	Electroless nickel plated
16	Retainer pre-load spring	Steel wire	Zinc chromated
17	Brake spring	Steel wire	Zinc chromated
18	Clip A	Stainless steel	ø25, ø32 only
19	Clip B	Stainless steel	ø25, ø32 only
20	Steel ball A	Carbon steel	
21	Steel ball B	Carbon steel	
22	Tooth ring	Stainless steel	
23	Bumper	Urethane	
24	Type C retaining ring for taper ring	Carbon steel	
25	Type C retaining ring for unlocking cam shaft	Carbon steel	
26	Bushing	Oil-impregnated sintered alloy	ø40: Copper alloy
27	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated
28	Hexagon socket head cap screw	Chromium molybdenum steel	Nickel plated
29	Spring washer for hex. socket head cap screw	Steel wire	Nickel plated
30	Bumper A	Urethane	
31	Bumper B	Urethane	ø40 is the same as bumper A
32	Retaining ring	Stainless steel	
33	Wear ring	Resin	
34	Rod end nut	Rolled steel	Nickel plated
35	BC element	Bronze	
36	Piston gasket	NBR	

Note) In the case of cylinders with auto switches, magnets are installed in the piston.

* The material for ø20 and ø25 cylinders equipped with auto switches is stainless steel.

Component Parts

No.	Description	Material	Note
37	Rod seal A	NBR	
38	Rod seal B	NBR	
39	Piston seal	NBR	
40	Cylinder tube gasket	NBR	
41	Release piston seal	NBR	
42	Rod seal C	NBR	
43	Piston guide gasket	NBR	
44	Intermediate cover gasket	NBR	
45	Unlocking cam gasket	NBR	
46	Head cover	Aluminum alloy	Clear hard anodized
47	Cylinder tube	Aluminum alloy	Hard anodized
48	Cushion ring A	Aluminum alloy	Anodized
49	Cushion ring B	Aluminum alloy	Same anodized as cushion ring A except ø20, 25 standard stroke
50	Seal retainer	Rolled steel	Zinc chromated long strokes not available
51	Cushion valve A	Chromium molybdenum steel	Electroless nickel plated
52	Cushion valve B	Rolled steel	Electroless nickel plated
53	Valve retainer	Rolled steel	Electroless nickel plated
54	Lock nut	Rolled steel	Nickel plated
55	Retaining ring	Stainless steel	
56	Cushion seal A	Urethane	
57	Cushion seal B	Urethane	Same as cushion seal A except ø20, 25 standard stroke
58	Cushion ring gasket A	NBR	
59	Cushion ring gasket B	NBR	Same as cushion ring gasket A except ø20, 25 standard stroke
60	Valve seal A	NBR	
61	Valve seal B	NBR	
62	Valve retainer gasket	NBR	

Replacement Parts: Seal Kit

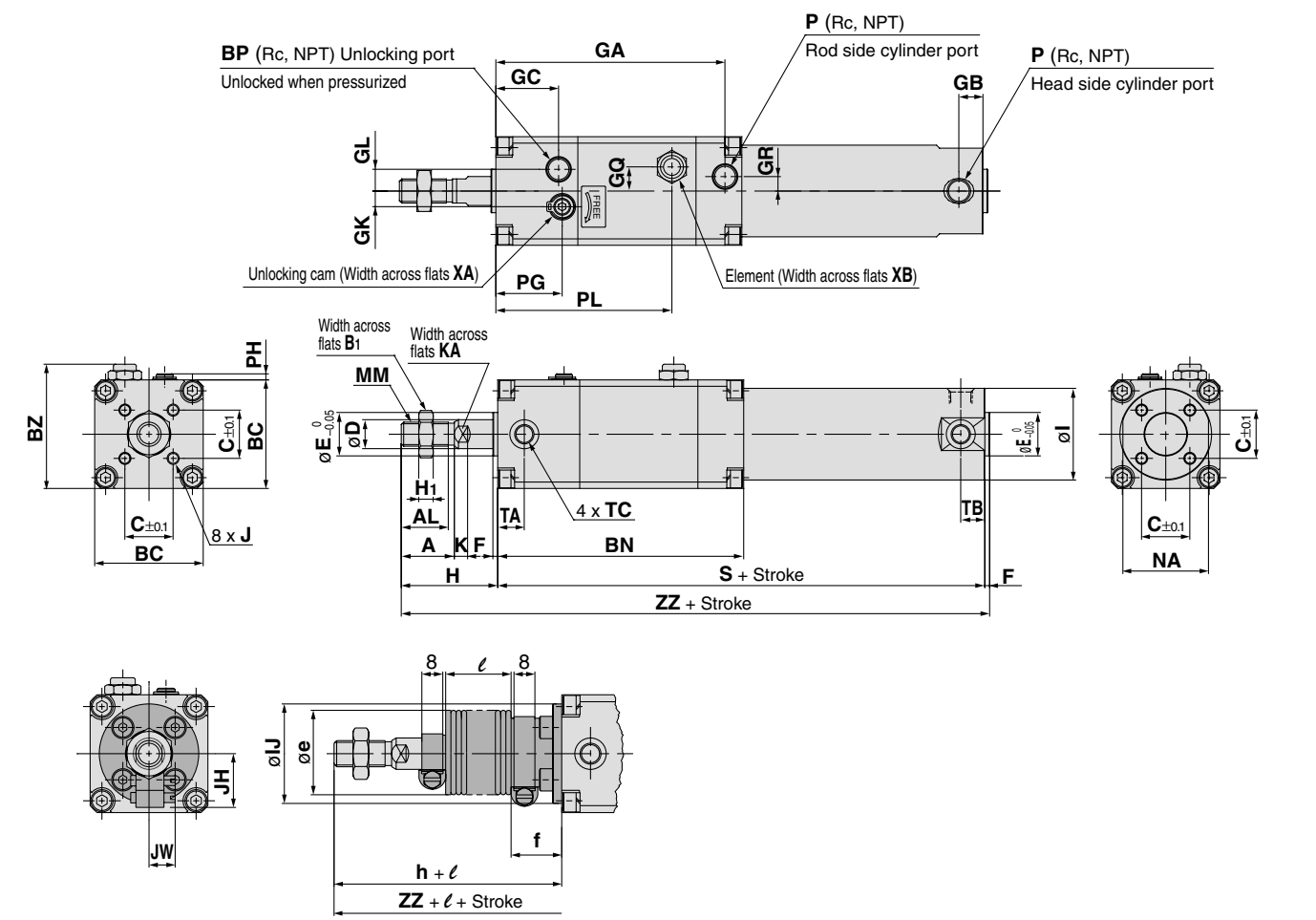
Bore size (mm)	Kit no.	Contents
20	CG1N20-PS	Set of above nos. 37, 39, 40
25	CG1N25-PS	
32	CG1N32-PS	
40	CG1N40-PS	

* Since the lock section for Series CNG 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 (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 style (B): With rubber bumper CNGBN



With rod boot

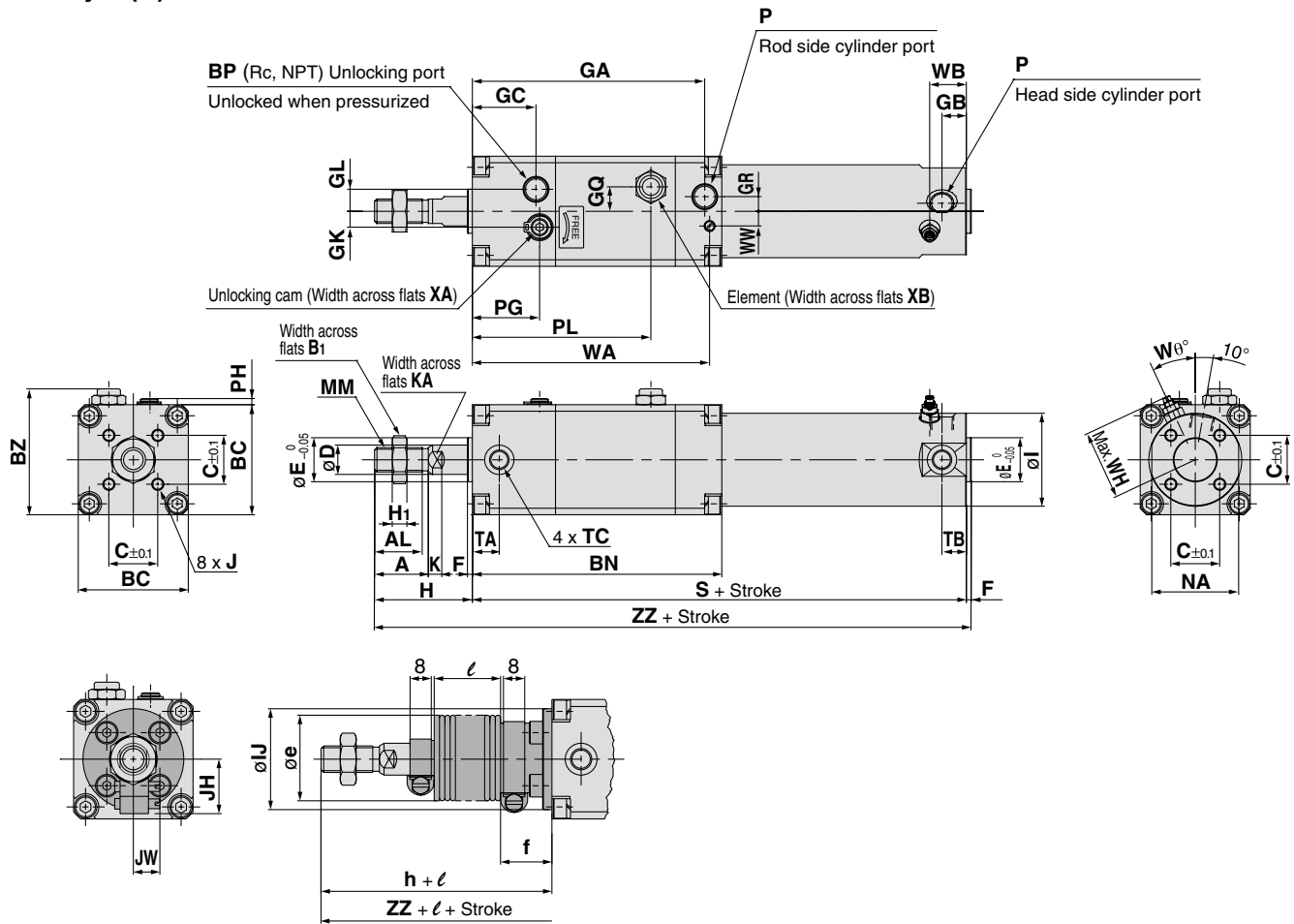
Bore size (mm)		Stroke range without rod boot		Stroke range with rod boot		A	AL	B ₁	BC	BN	BP	BZ	C	D	E	F	GA	GB	GC	GK	GL	GR	GQ	H ₁	I
		Standard	Long stroke	Standard	Long stroke																				
20		Up to 200	201 to 350	20 to 200	201 to 350	18	15.5	13	38	93	1/8	44.5	14	8	12	2	85	10 (12)	18	5.5	6	4	8	5	26
25		Up to 200	301 to 400	20 to 300	301 to 400	22	19.5	17	45	103	1/8	51.5	16.5	10	14	2	96	10 (12)	25	6.5	9	7	10	6	31
32		Up to 300	301 to 450	20 to 300	301 to 450	22	19.5	17	45	104	1/8	51.5	20	12	18	2	97	10 (12)	25	6.5	9	7	10	6	38
40		Up to 300	301 to 800	20 to 300	301 to 800	30	27	19	52	112	1/8	58.5	26	16	25	2	104	10 (13)	26	7	11	7	12	8	47

Bore size (mm)		J	K	KA	MM	NA	P	PG	PH	PL	S	TA	TB	TC	XA	XB	Without rod boot	
																	H	ZZ
20		M4 x 0.7 depth 7	5	6	M8 x 1.25	24	1/8	21.5	2	65	141 (149)	11	11	M5 x 0.8	3	12	35	178 (186)
25		M5 x 0.8 depth 7.5	5.5	8	M10 x 1.25	29	1/8	26.5	2.5	73	151 (159)	11	11	M6 x 0.75	3	12	40	193 (201)
32		M5 x 0.8 depth 8	5.5	10	M10 x 1.25	35.5	1/8	26.5	2.5	73	154 (162)	11	10 (11)	M8 x 1.0	3	12	40	196 (204)
40		M6 x 1 depth 12	6	14	M14 x 1.5	44	1/8	28	2.5	81	169 (178)	12	10 (12)	M10 x 1.25	4	12	50	221 (230)

Bore size (mm)	With rod boot								ZZ
	IJ	JH (Reference)	JW (Reference)	e	f	h	ℓ		
20	27	15.5	10.5	30	18	55	1/4 stroke		198 (206)
25	32	16.5	10.5	30	19	62			215 (223)
32	38	18.5	10.5	35	19	62			218 (226)
40	48	21.5	10.5	35	19	70			241 (250)

Note) (): Denotes the dimensions for long stroke.

Basic style (B): With air cushion CNGBA



With rod boot

(mm)																								
Bore size (mm)	Stroke range without rod boot		Stroke range with rod boot		A	AL	B ₁	BC	BN	BP	BZ	C	D	E	F	GA	GB	GC	GK	GL	GR	GQ	H ₁	I
	Standard	Long stroke	Standard	Long stroke																				
20	Up to 200	201 to 350	20 to 200	201 to 350	18	15.5	13	38	93	1/8	44.5	14	8	12	2	87	10 (12)	18	5.5	6	4	8	5	26
25	Up to 300	301 to 400	20 to 300	301 to 400	22	19.5	17	45	103	1/8	51.5	16.5	10	14	2	97	10 (12)	25	6.5	9	7	10	6	31
32	Up to 300	301 to 450	20 to 300	301 to 450	22	19.5	17	45	104	1/8	51.5	20	12	18	2	97	10 (12)	25	6.5	9	7	10	6	38
40	Up to 300	301 to 800	20 to 300	301 to 800	30	27	19	52	112	1/8	58.5	26	16	25	2	104	10 (13)	26	7	11	7	12	8	47

Bore size (mm)																												
	J	K	KA	MM	NA	P	PG	PH	PL	S	TA	TB	TC	WA	WB	WH	WW	W _θ	XA	XB								
20	M4 x 0.7 depth 7	5	6	M8 x 1.25	24	M5 x 0.8	21.5	2	65	141 (149)	11	11	M5 x 0.8	88	15 (16)	23	5.5	30°	3	12								
25	M5 x 0.8 depth 7.5	5.5	8	M10 x 1.25	29	M5 x 0.8	26.5	2.5	73	151 (159)	11	11	M6 x 0.75	98	15 (16)	25	6	30°	3	12								
32	M5 x 0.8 depth 8	5.5	10	M10 x 1.25	35.5	Rc 1/8	26.5	2.5	73	154 (162)	11	10 (11)	M8 x 1.0	99	15 (16)	28.5	6	25°	3	12								
40	M6 x 1 depth 12	6	14	M14 x 1.5	44	Rc 1/8	28	2.5	81	169 (178)	12	10 (12)	M10 x 1.25	107	15 (16)	33	8	20°	4	12								

Bore size (mm)	Without rod boot				With rod boot									
	H	ZZ	IJ	JH (Reference)	JW (Reference)	e	f	h	ℓ	ZZ				
20	35	178 (186)	27	15.5	10.5	30	18	55	1/4 stroke	198 (206)				
25	40	193 (201)	32	16.5	10.5	30	19	62		215 (223)				
32	40	196 (204)	38	18.5	10.5	35	19	62		218 (226)				
40	50	221 (230)	48	21.5	10.5	35	19	70		241 (250)				

Note) (): Denotes the dimensions for long stroke.

Dimensions with mounting bracket are the same as dimensions with rubber bumper.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

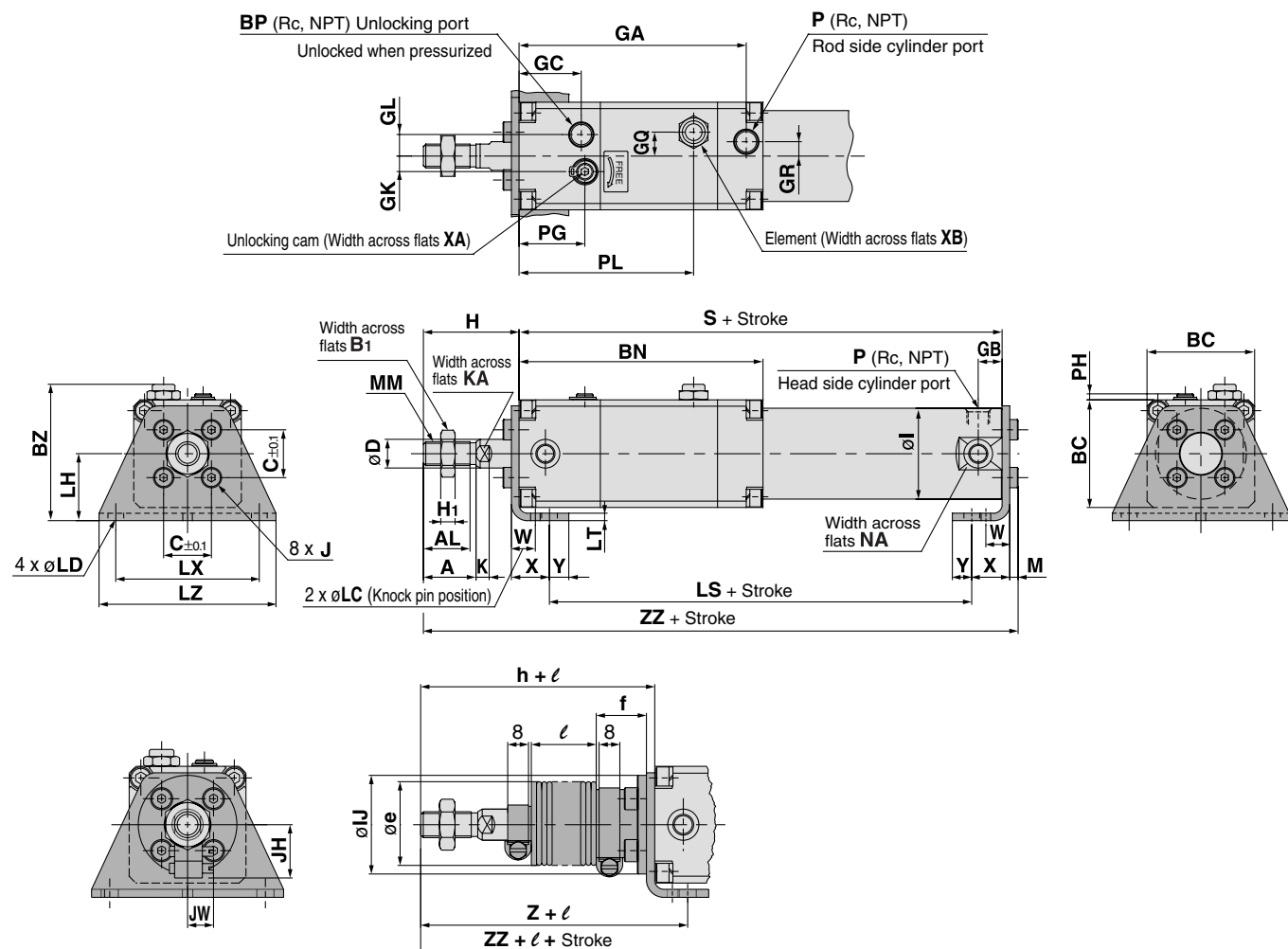
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Individual
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Series CNG

Dimensions

Axial foot style (L): With rubber bumper CNGLN



With rod boot

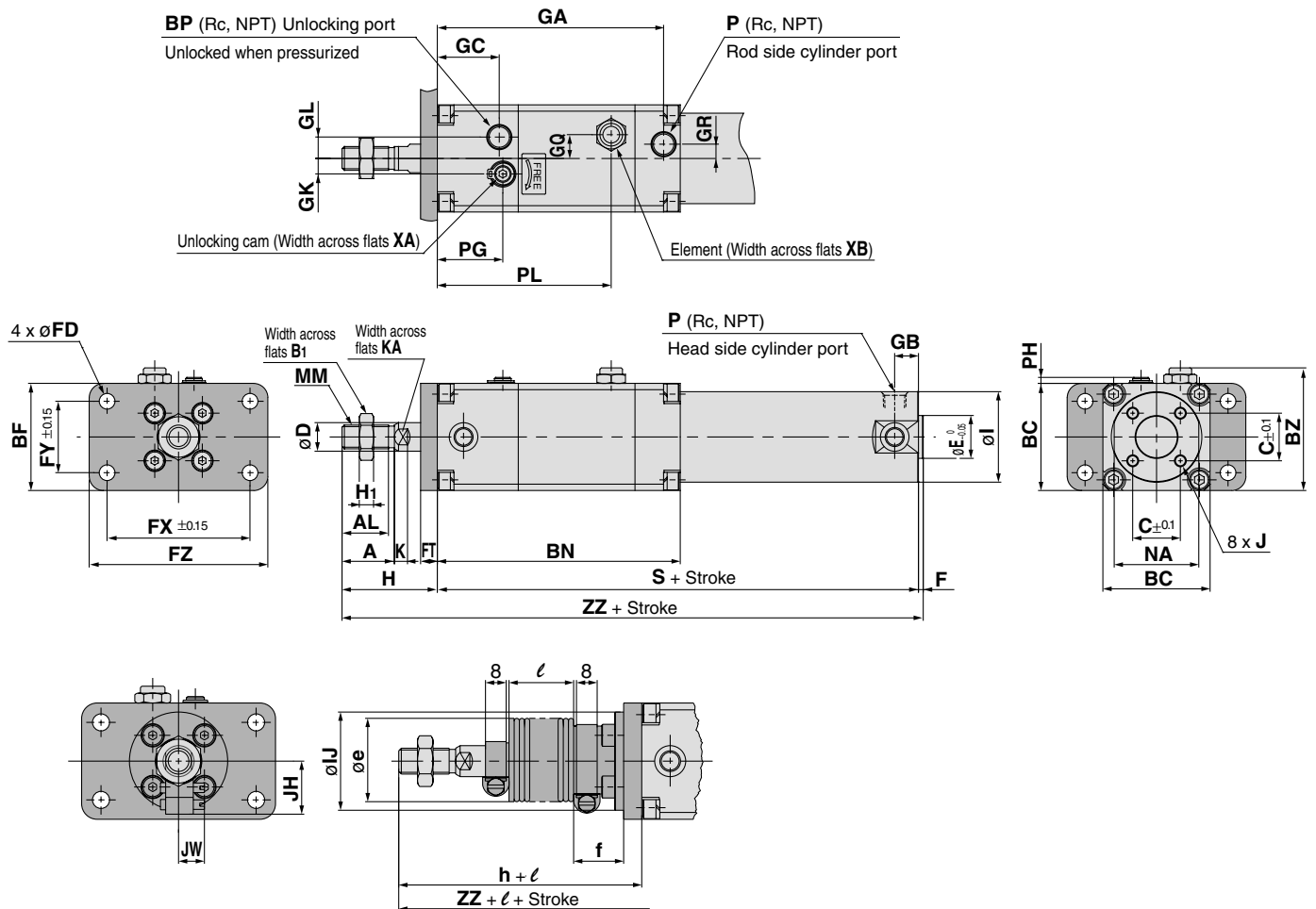
Bore size (mm)	Stroke range without rod boot		Stroke range with rod boot		A	AL	B ₁	BC	BN	BP	BZ	C	D	GA	GB	GC	GK	GL	GR	GQ	H ₁	I	J
	Standard	Long stroke	Standard	Long stroke																			
20	Up to 200	201 to 350	20 to 200	201 to 350	18	15.5	13	38	93	1/8	50.5	14	8	85	10 (12)	18	5.5	6	4	8	5	26	M4 x 0.7
25	Up to 300	301 to 400	20 to 300	301 to 400	22	19.5	17	45	103	1/8	57	16.5	10	96	10 (12)	25	6.5	9	7	10	6	31	M5 x 0.8
32	Up to 300	301 to 450	20 to 300	301 to 450	22	19.5	17	45	104	1/8	57	20	12	97	10 (12)	25	6.5	9	7	10	6	38	M5 x 0.8
40	Up to 300	301 to 800	20 to 300	301 to 800	30	27	19	52	112	1/8	65.5	26	16	104	10 (13)	26	7	11	7	12	8	47	M6 x 1

Bore size (mm)	K	KA	M	MM	NA	P	PG	PH	PL	S	LC	LD	LH	LS	LT	LX	LZ	X	Y	W	XA	XB
20	5	6	3	M8 x 1.25	24	1/8	21.5	2	65	141 (149)	4	6	25	117 (125)	3	50	62	15	7	10	3	12
25	5.5	8	3.5	M10 x 1.25	29	1/8	26.5	2.5	73	151 (159)	4	6	28	127 (135)	3	57	70	15	7	10	3	12
32	5.5	10	3.5	M10 x 1.25	35.5	1/8	26.5	2.5	73	154 (162)	4	6.6	28	128 (136)	3	60	74	16	8	10	3	12
40	6	14	4	M14 x 1.5	44	1/8	28	2.5	81	169 (178)	4	6.6	33	142 (151)	3	68	84	16.5	8.5	10	4	12

Bore size (mm)	Without rod boot			With rod boot									
	H	ZZ	IJ	JH (Reference)	JW (Reference)	e	f	h	l	Z	ZZ		
20	35	182 (190)	27	15.5	10.5	30	18	55	1/4 stroke	67	202 (210)		
25	40	197.5 (205.5)	32	16.5	10.5	30	19	62		74	219.5 (227.5)		
32	40	200.5 (208.5)	38	18.5	10.5	35	19	62		75	222.5 (230.5)		
40	50	226 (235)	48	21.5	10.5	35	19	70		83.5	246 (255)		

Note) (): Denotes the dimensions for long stroke.

Rod side flange style (F): With rubber bumper CNGFN



With rod boot

With rod boot																							(mm)	
Bore size (mm)	Stroke range without rod boot		Stroke range with rod boot		A	AL	B ₁	BC	BF	BN	BP	BZ	C	D	E	F	GA	GB	GC	GK	GL	GR	GQ	H ₁
	Standard	Long stroke	Standard	Long stroke																				
20	Up to 200	201 to 350	20 to 200	201 to 350	18	15.5	13	38	38	93	1/8	44.5	14	8	12	2	85	10 (12)	18	5.5	6	4	8	5
25	Up to 300	301 to 400	20 to 300	301 to 400	22	19.5	17	45	45	103	1/8	51.5	16.5	10	14	2	96	10 (12)	25	6.5	9	7	10	6
32	Up to 300	301 to 450	20 to 300	301 to 450	22	19.5	17	45	45	104	1/8	51.5	20	12	18	2	97	10 (12)	25	6.5	9	7	10	6
40	Up to 300	301 to 800	20 to 300	301 to 800	30	27	19	52	52	112	1/8	58.5	26	16	25	2	104	10 (13)	26	7	11	7	12	8

Bore size (mm)	I	J	K	KA	MM	NA	P	PG	PH	PL	S	FD	FT	FX	FY	FZ	XA	XB	Without rod boot	
																			H	ZZ
20	26	M4 x 0.7	5	6	M8 x 1.25	24	1/8	21.5	2	65	141 (149)	5.5	6	52	25	65	3	12	35	178 (186)
25	31	M5 x 0.8	5.5	8	M10 x 1.25	29	1/8	26.5	2.5	73	151 (159)	5.5	7	60	30	75	3	12	40	193 (201)
32	38	M5 x 0.8	5.5	10	M10 x 1.25	35.5	1/8	26.5	2.5	73	154 (162)	6.6	7	60	30	75	3	12	40	196 (204)
40	47	M6 x 1	6	14	M14 x 1.5	44	1/8	28	2.5	81	169 (178)	6.6	8	66	36	82	4	12	50	221 (230)

Bore size (mm)	With rod boot							ZZ
	IJ	JH (Reference)	JW (Reference)	e	f	h	ℓ	
20	27	15.5	10.5	30	18	55	1/4 stroke	198 (206)
25	32	16.5	10.5	30	19	62		215 (223)
32	38	18.5	10.5	35	19	62		218 (226)
40	48	21.5	10.5	35	19	70		241 (250)

Note) (): Denotes the dimensions for long stroke.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

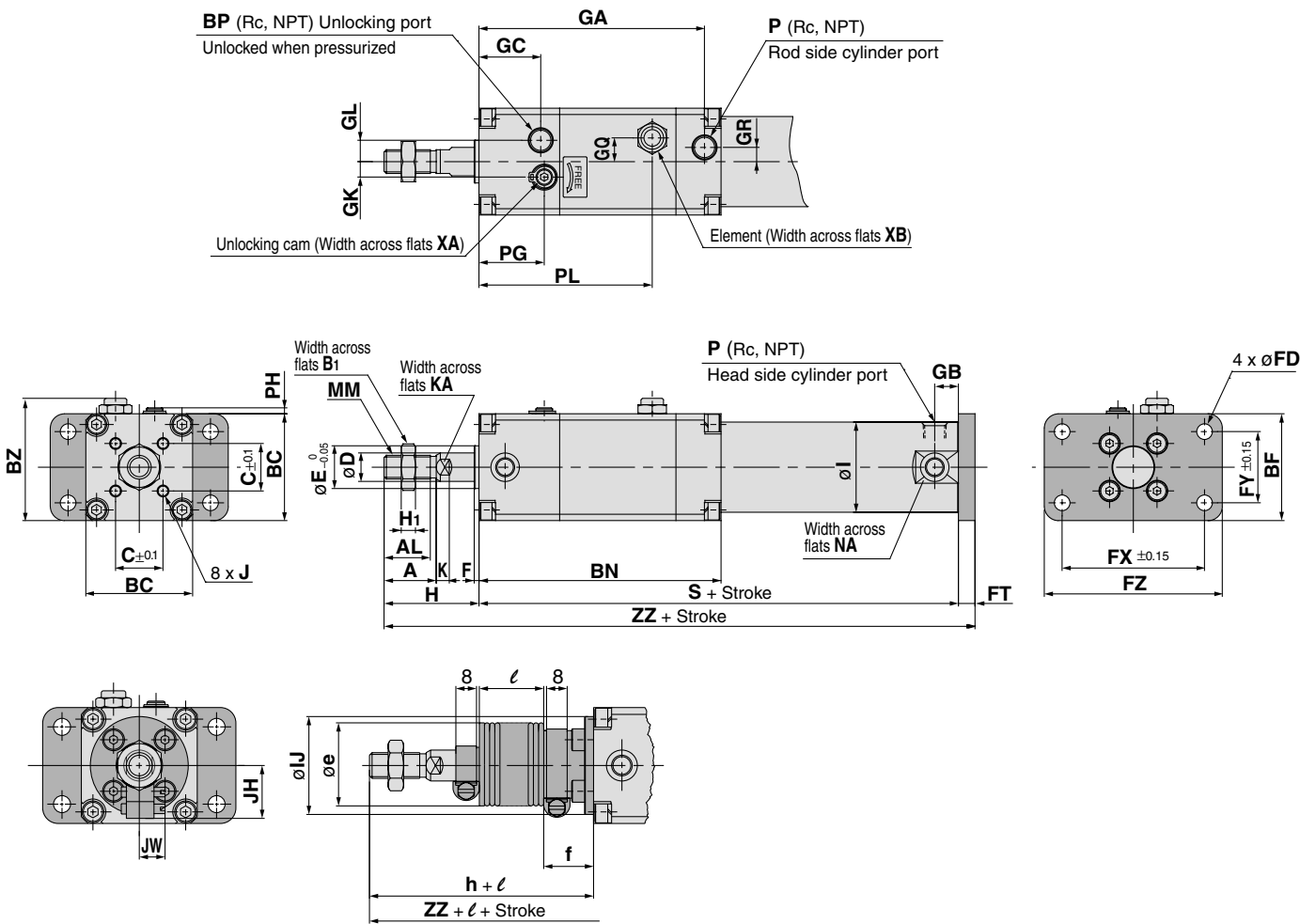
D-□

-X□

Individual
-X□

Dimensions

Head side flange style (G): With rubber bumper CNGGN

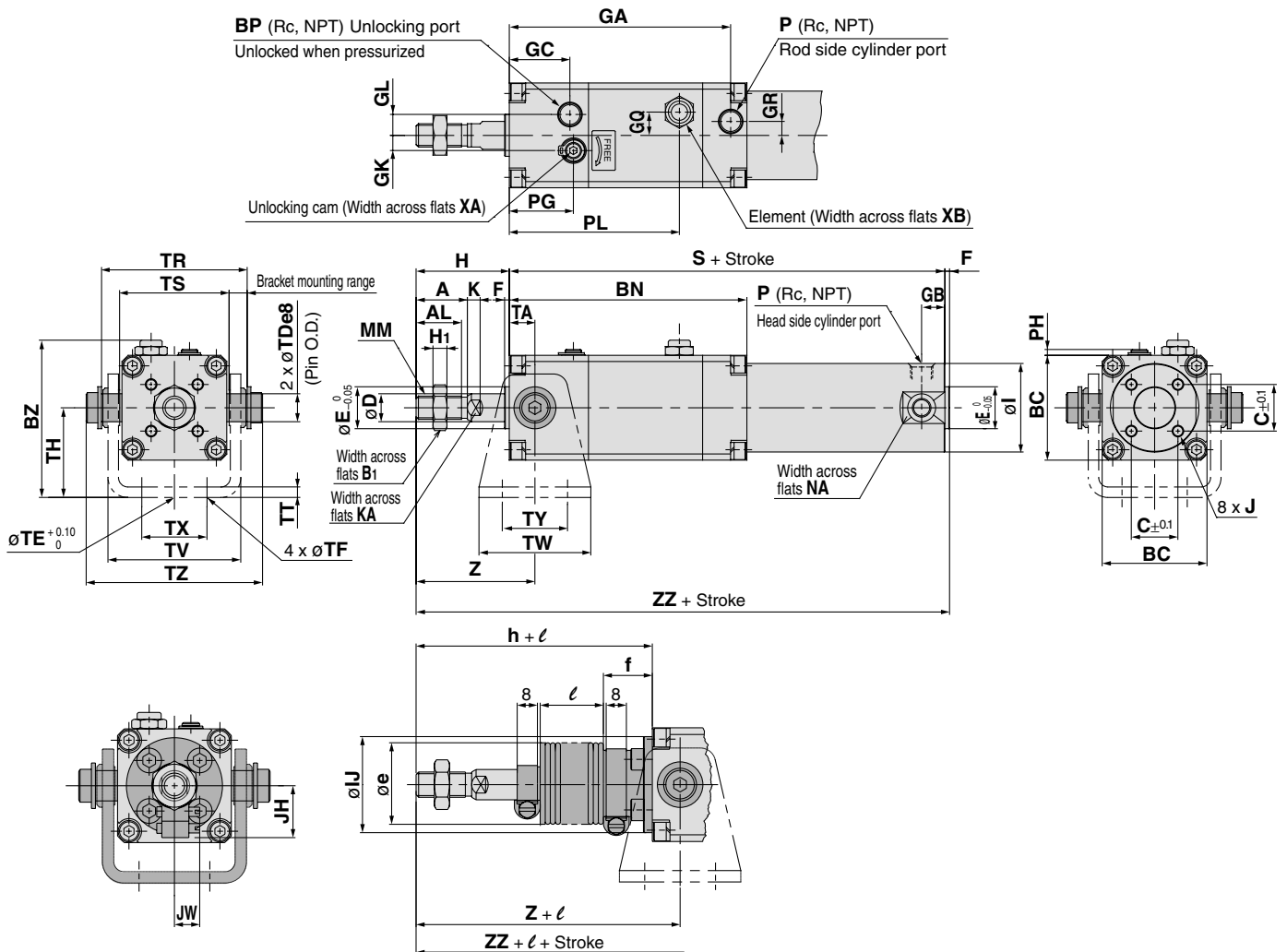


With rod boot

(mm)																									
Bore size (mm)	Stroke range without rod boot		Stroke range with rod boot		A	AL	B ₁	BC	BF	BN	BP	BZ	C	D	E	F	GA	GB	GC	GK	GL	GR	GQ	H ₁	I
	Standard	Long stroke	Standard	Long stroke																					
20	Up to 200	—	20 to 200	—	18	15.5	13	38	38	93	1/8	44.5	14	8	12	2	85	10	18	5.5	6	4	8	5	26
25	Up to 300	—	20 to 300	—	22	19.5	17	45	45	103	1/8	51.5	16.5	10	14	2	96	10	25	6.5	9	7	10	6	31
32	Up to 300	—	20 to 300	—	22	19.5	17	45	45	104	1/8	51.5	20	12	18	2	97	10	25	6.5	9	7	10	6	38
40	Up to 300	301 to 500	20 to 300	301 to 500	30	27	19	52	52	112	1/8	58.5	26	16	25	2	104	10 (13)	26	7	11	7	12	8	47
(mm)																									
Bore size (mm)	J	K	KA	MM	NA	P	PG	PH	PL	S	FD	FT	FX	FY	FZ	XA	XB	Without rod boot							
																		H	ZZ						
20	M4 x 0.7	5	6	M8 x 1.25	24	1/8	21.5	2	65	141	5.5	6	52	25	65	3	12	35	182						
25	M5 x 0.8	5.5	8	M10 x 1.25	29	1/8	26.5	2.5	73	151	5.5	7	60	30	75	3	12	40	198						
32	M5 x 0.8	5.5	10	M10 x 1.25	35.5	1/8	26.5	2.5	73	154	6.6	7	60	30	75	3	12	40	201						
40	M6 x 1	6	14	M14 x 1.5	44	1/8	28	2.5	81	169 (178)	6.6	8	66	36	82	4	12	50	227 (236)						
(mm)																									
Bore size (mm)	With rod boot																								
	IJ	JH (Reference)	JW (Reference)	e	f	h	ℓ	ZZ																	
20	27	15.5	10.5	30	18	55	1/4 stroke	198 (206)																	
25	32	16.5	10.5	30	19	62		215 (223)																	
32	38	18.5	10.5	35	19	62		218 (226)																	
40	48	21.5	10.5	35	19	70		241 (250)																	

Note) () : Denotes the dimensions for long stroke.

Rod side trunnion style (U): With rubber bumper CNGUN



With rod boot

Bore size (mm)	Stroke range without rod boot		Stroke range with rod boot		A	AL	B ₁	BC	BN	BP	BZ	C	D	E	F	GA	GB	GC	GK	GL	GR	GQ	H ₁	I
	Standard	Long stroke	Standard	Long stroke																				
20	Up to 200	—	20 to 200	—	18	15.5	13	38	93	1/8	56.5	14	8	12	2	85	10	18	5.5	6	4	8	5	26
25	Up to 300	—	20 to 300	—	22	19.5	17	45	103	1/8	66	16.5	10	14	2	96	10	25	6.5	9	7	10	6	31
32	Up to 300	—	20 to 300	—	22	19.5	17	45	104	1/8	67.5	20	12	18	2	97	10	25	6.5	9	7	10	6	38
40	Up to 300	301 to 500	20 to 300	301 to 500	30	27	19	52	112	1/8	75	26	16	25	2	104	10 (13)	26	7	11	7	12	8	47

Bore size (mm)	J	K	KA	MM	NA	P	PG	PH	PL	S	TA	TDe8	TE	TF	TH	TR	TS	TT	TV	TW	TX	TY	TZ	XA	XB
20	M4 x 0.7	5	6	M8 x 1.25	24	1/8	21.5	2	65	141	11	8 ^{-0.025} _{-0.047}	10	5.5	31	51	40	3.2	47.8	42	26	28	59.6	3	12
25	M5 x 0.8	5.5	8	M10 x 1.25	29	1/8	26.5	2.5	73	151	11	10 ^{-0.025} _{-0.047}	10	5.5	37	58	47	3.2	54.8	42	28	28	68	3	12
32	M5 x 0.8	5.5	10	M10 x 1.25	35.5	1/8	26.5	2.5	73	154	11	12 ^{-0.032} _{-0.059}	10	6.6	38.5	62.5	47	4.5	57.4	48	28	28	75.7	3	12
40	M6 x 1	6	14	M14 x 1.5	44	1/8	28	2.5	81	169 (178)	12	14 ^{-0.032} _{-0.059}	10	6.6	42.5	72.5	54	4.5	65.4	56	36	30	85.7	4	12

Bore size (mm)	Without rod boot			With rod boot									
	H	Z	ZZ	IJ	JH (Reference)	JW (Reference)	e	f	h	ℓ	Z	ZZ	
20	35	46	178	27	15.5	10.5	30	18	55	1/4 stroke	66	198	
25	40	51	193	32	16.5	10.5	30	19	62	1/4 stroke	73	215	
32	40	51	196	38	18.5	10.5	35	19	62	1/4 stroke	73	218	
40	50	62	221 (230)	48	21.5	10.5	35	19	70	1/4 stroke	82	241 (250)	

Note) (): Denotes the dimensions for long stroke.
For the pivot bracket, refer to page 684.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

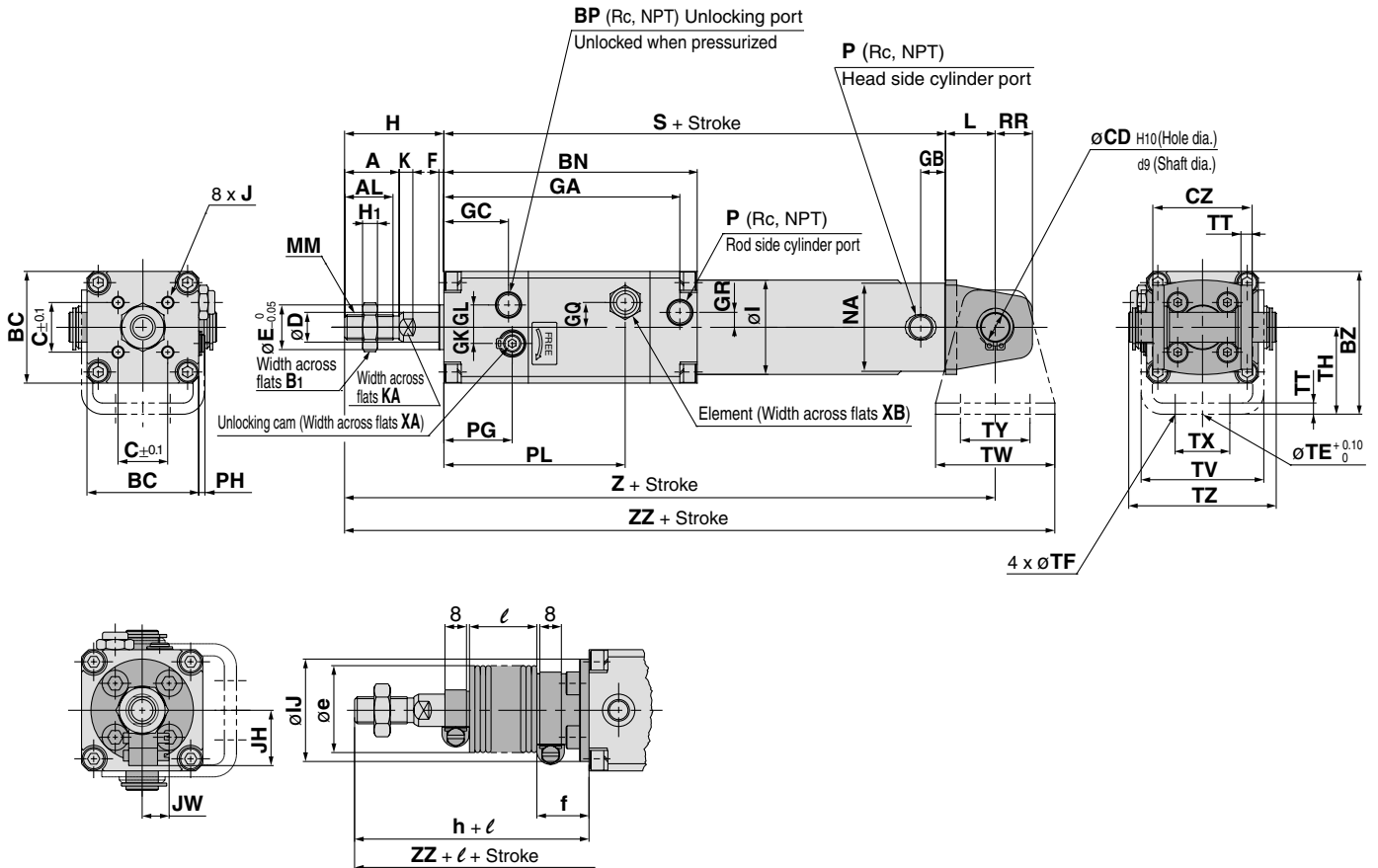
ML1C

D-□

-X□

Individual
-X□

Clevis style (D): With rubber bumper CNGDN



With rod boot

Bore size (mm)	Stroke range without rod boot		Stroke range with rod boot		A	AL	B ₁	BC	BN	BP	BZ	C	D	E	F	GA	GB	GC	GK	GL	GR	GQ	H ₁	I
	Standard	Long stroke	Standard	Long stroke																				
20	Up to 200	—	20 to 200	—	18	15.5	13	38	93	1/8	44	14	8	12	2	85	10	18	5.5	6	4	8	5	26
25	Up to 300	—	20 to 300	—	22	19.5	17	45	103	1/8	52.5	16.5	10	14	2	96	10	25	6.5	9	7	10	6	31
32	Up to 300	—	20 to 300	—	22	19.5	17	45	104	1/8	57.5	20	12	18	2	97	10	25	6.5	9	7	10	6	38
40	Up to 300	301 to 500	20 to 300	301 to 500	30	27	19	52	112	1/8	66	26	16	25	2	104	10 (13)	26	7	11	7	12	8	47

Bore size (mm)	J	K	KA	MM	NA	P	PG	PH	PL	S	CD	CZ	L	RR	TE	TF	TH	TT	TV	TW	TX	TY	TZ	XA	XB
20	M4 x 0.7	5	6	M8 x 1.25	24	1/8	21.5	2	65	141	8	29	14	11	10	5.5	25	3.2	35.8	42	16	28	43.4	3	12
25	M5 x 0.8	5.5	8	M10 x 1.25	29	1/8	26.5	2.5	73	151	10	33	16	13	10	5.5	30	3.2	39.8	42	20	28	48	3	12
32	M5 x 0.8	5.5	10	M10 x 1.25	35.5	1/8	26.5	2.5	73	154	12	40	20	15	10	6.6	35	4.5	49.4	48	22	28	59.4	3	12
40	M6 x 1	6	14	M14 x 1.5	44	1/8	28	2.5	81	169 (178)	14	49	22	18	10	6.6	40	4.5	58.4	56	30	30	71.4	4	12

													(mm)
Bore size (mm)	Without rod boot			With rod boot									
	H	Z	ZZ	IJ	JH (Reference)	JW (Reference)	e	f	h	ℓ	Z	ZZ	
20	35	190	211	27	15.5	10.5	30	18	55	1/4 stroke	210	231	
25	40	207	228	32	16.5	10.5	30	19	62		229	250	
32	40	214	238	38	18.5	10.5	35	19	62		236	260	
40	50	241 (250)	269 (278)	48	21.5	10.5	35	19	70		261 (270)	289 (298)	

Note () : Denotes the dimensions for long stroke.
Clevis pin and retaining ring are attached.
For the pivot bracket, refer to page 684.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual
-X□

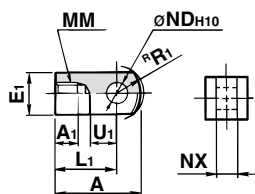
Series CNG

Accessory Bracket Dimensions

Single Knuckle Joint

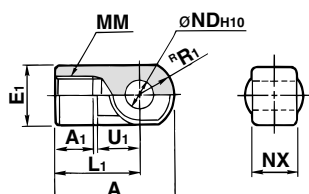
I-G02/G03

Material: Rolled steel



I-G04

Material: Cast iron



Part no.	Applicable bore size (mm)	A	A ₁	E ₁	L ₁	MM	R ₁	U ₁	NDH ₁₀	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	22	30	M14 x 1.5	12	14	10 ^{+0.058} ₀	18 ^{-0.3} _{-0.5}

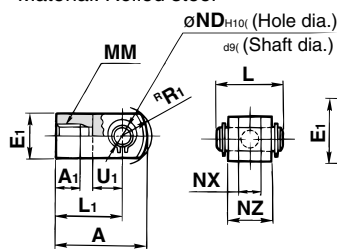
(mm)

Double Knuckle Joint

* Knuckle pin and retaining ring are attached.

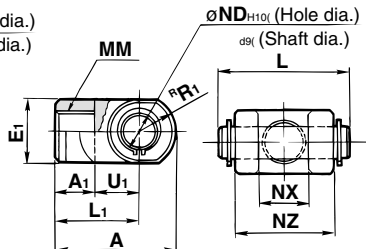
Y-G02/G03

Material: Rolled steel



Y-G04

Material: Cast iron



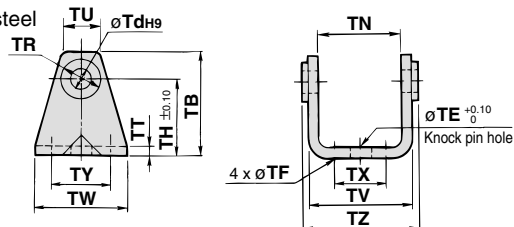
Part no.	Applicable bore size (mm)	A	A ₁	E ₁	L ₁	MM	R ₁	U ₁	ND	NX	NZ	L	Applicable pin part no.
Y-G02	20	34	8.5	16	25	M8 x 1.25	10.3	11.5	8	8 ^{+0.4} _{-0.2}	16	21	IY-G02
Y-G03	25, 32	41	10.5	20	30	M10 x 1.25	12.8	14	10	10 ^{+0.4} _{-0.2}	20	25.6	IY-G03
Y-G04	40	42	16	22	30	M14 x 1.5	12	14	10	18 ^{+0.5} _{-0.3}	36	41.6	IY-G04

(mm)

Rod Side Pivot Bracket

ø20 to ø40

Material: Rolled steel



(mm)

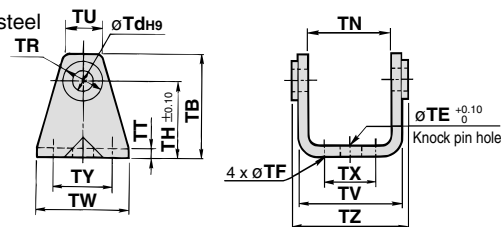
Part no.	Applicable bore size (mm)	TB	TdH ₉	TE	TF	TH	TN
CNG-020-24	20	42	8 ^{+0.036} ₀	10	5.5	31	(41.4)
CNG-025-24	25	48	10 ^{+0.036} ₀	10	5.5	37	(48.4)
CNG-032-24	32	53	12 ^{+0.043} ₀	10	6.6	38.5	(48.4)
CNG-040-24	40	60	14 ^{+0.043} ₀	10	6.6	42.5	(56.4)

Part no.	Applicable bore size (mm)	TR	TT	TU	TV	TW	TX	TY	TZ
CNG-020-24	20	13	3.2	21.2	47.8	42	26	28	50
CNG-025-24	25	15	3.2	21.3	54.8	42	28	28	57
CNG-032-24	32	17	4.5	25.6	57.4	48	28	28	61.4
CNG-040-24	40	21	4.5	26.3	65.4	56	36	30	71.4

Head Side Pivot Bracket

ø20 to ø40

Material: Rolled steel



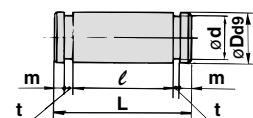
(mm)

Part no.	Applicable bore size (mm)	TB	TdH ₉	TE	TF	TH	TN
CG-020-24A	20	36	8 ^{+0.036} ₀	10	5.5	25	(29.3)
CG-025-24A	25	43	10 ^{+0.036} ₀	10	5.5	30	(33.1)
CG-032-24A	32	50	12 ^{+0.043} ₀	10	6.6	35	(40.4)
CG-040-24A	40	58	14 ^{+0.043} ₀	10	6.6	40	(49.2)

Part no.	Applicable bore size (mm)	TR	TT	TU	TV	TW	TX	TY	TZ
CG-020-24A	20	13	3.2	18.1	35.8	42	16	28	38.3
CG-025-24A	25	15	3.2	20.7	39.8	42	20	28	42.1
CG-032-24A	32	17	4.5	23.6	49.4	48	22	28	53.8
CG-040-24A	40	21	4.5	27.3	58.4	56	30	30	64.6

Knuckle Pin

Material: Carbon steel



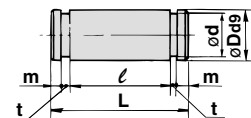
(mm)

Part no.	Applicable bore size (mm)	Dd ₉	L	d	ℓ	m	t	Applicable retaining ring
IY-G02	20	8 ^{-0.040} _{-0.076}	21	7.6	16.2	1.5	0.9	Type C 8 for axis
IY-G03	25, 32	10 ^{-0.040} _{-0.076}	25.6	9.6	20.2	1.55	1.15	Type C 10 for axis
IY-G04	40	10 ^{-0.040} _{-0.076}	41.6	9.6	36.2	1.55	1.15	Type C 10 for axis

* Retaining rings are included.

Clevis Pin

Material: Carbon steel



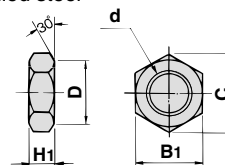
(mm)

Part no.	Applicable bore size (mm)	Dd ₉	L	d	ℓ	m	t	Applicable retaining ring
CD-G02	20	8 ^{-0.040} _{-0.076}	43.4	7.6	38.6	1.5	0.9	Type C 8 for axis
CD-G25	25	10 ^{-0.040} _{-0.076}	48	9.6	42.6	1.55	1.15	Type C 10 for axis
CD-G03	32	12 ^{-0.050} _{-0.093}	59.4	11.5	54	1.55	1.15	Type C 12 for axis
CD-G04	40	14 ^{-0.050} _{-0.093}	71.4	13.4	65	2.05	1.15	Type C 14 for axis

* Retaining rings are included.

Rod End Nut

Material: Rolled steel

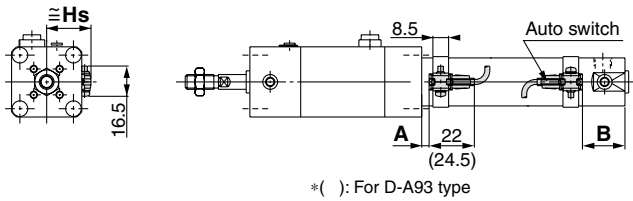


(mm)

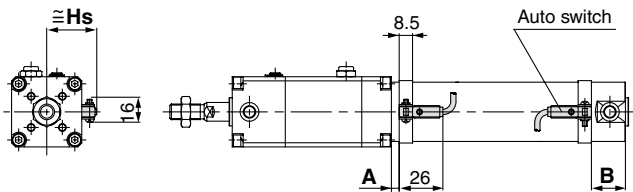
Part no.	Applicable bore size (mm)	B ₁	C	D	d	H ₁
NT-02	20	13	(15)	12.5	M8 x 1.25	5
NT-03	25, 32	17	(19.6)	16.5	M10 x 1.25	6
NT-G04	40	19	(21.9)	18	M14 x 1.5	8

Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

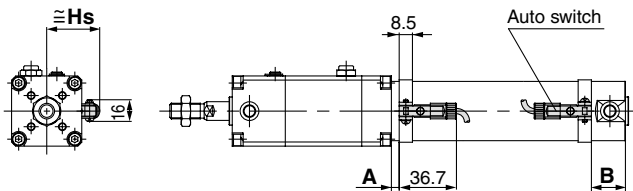
Reed auto switch D-A9□



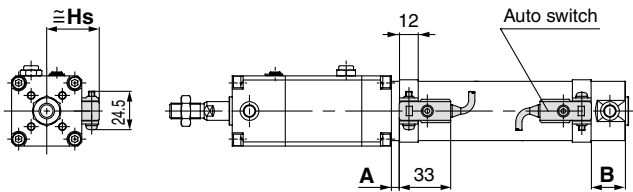
D-C7, C8



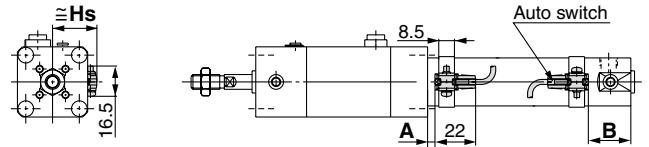
D-C73C, C80C



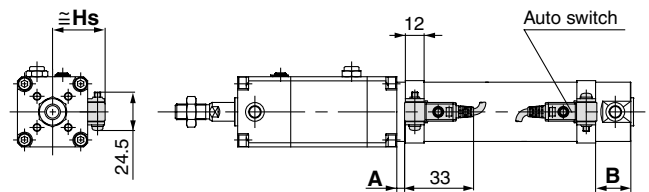
D-B5, B6, B59W



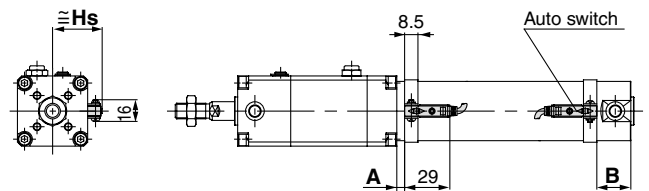
Solid state auto switch D-M9□ D-M9□W



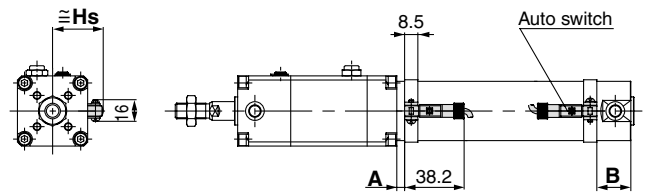
D-G5NTL



D-H7□, H7□W D-H7NF, H7BAL



D-H7C



Auto Switch Proper Mounting Position

Auto switch model	D-A9□		D-M9□ D-M9□W		D-C7□ D-C80 D-C73C D-C80C		D-B5□ D-B64		D-B59W		D-H7□ D-H7C D-H7□W D-H7BAL D-H7NF		D-G5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
20	8	20 (28)	12	24 (32)	8.5	20.5 (28.5)	2.5	14.5 (22.5)	5.5	17.5 (25.5)	7.5	19.5 (27.5)	4	16 (24)
25	8	20 (28)	12	24 (32)	8.5	20.5 (28.5)	2.5	14.5 (22.5)	5.5	17.5 (25.5)	7.5	19.5 (27.5)	4	16 (24)
32	9	21 (29)	13	25 (33)	9.5	21.5 (29.5)	3.5	15.5 (23.5)	6.5	18.5 (26.5)	8.5	20.5 (28.5)	5	17 (25)
40	14	23 (32)	18	27 (36)	14.5	23.5 (32.5)	8.5	17.5 (26.5)	11	20.5 (29.5)	13.5	22.5 (31.5)	10	19 (28)

*(): For the long stroke type

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

Auto Switch Mounting Height (mm)

Auto switch model	D-A9□ D-M9□ D-M9□W	D-C7□ D-C80 D-H7□ D-H7□W D-H7NF D-H7BAL	D-C73C D-C80C	D-B5□ D-B64 D-B59W D-H7C D-G5NTL
Bore size (mm)	Hs	Hs	Hs	Hs
20	24	24.5	27	27.5
25	26.5	27	29.5	30
32	30	30.5	33	33.5
40	34.5	35	37.5	38

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual
-X□

Minimum Auto Switch Mounting Stroke

n: No. of auto switches (mm)

Auto switch model	No. of auto switches mounted				
	1	2		n	
		Different surfaces	Same surface	Different surfaces	Same surface
D-A9□ D-M9□ D-M9□W	10	15 Note 1)	45 Note 1)	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	45 + 45 (n - 2)
D-C7□ D-C80	10	15	50	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	50 + 45 (n - 2)
D-H7□ D-H7□W D-H7BAL D-H7NF	10	15	60	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	60 + 45 (n - 2)
D-C73C D-C80C	10	15	65	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	65 + 50 (n - 2)
D-B5□ D-B64 D-G5□NTL	10	15	75	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	75 + 55 (n - 2)
D-B59W	15	20	75	$20 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	75 + 55 (n - 2)

Note 1) Auto switch mounting

Auto switch model	With 2 auto switches	
	Different surfaces Note 1)	Same surface Note 1)
	Auto switch D-M9□ D-M9□W The proper auto switch mounting position is 6 mm inward from the switch holder edge.	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-A93	—	Less than 50 strokes Note 2)
D-M9□ D-M9□W	Less than 20 strokes Note 2)	Less than 55 strokes Note 2)

Note 2) Minimum stroke for mounting auto switches in the other mounting styles mentioned in note 1.

Operating Range

(mm)

Auto switch model	Bore size (mm)			
	20	25	32	40
D-A9□	7	6	8	8
D-M9□ D-M9□W	4.5	5	4.5	5.5
D-C7□/C-80 D-C73C/C-80C	8	10	9	10
D-B5□/B64	8	10	9	10
D-B59W	13	13	14	14
D-H7□/H7□W D-H7BAL/H7NF	4	4	4.5	5
D-H7C	7	8.5	9	10
D-G5NTL	4	4	4.5	5
D-G5NBL	35	40	40	45

* Since the operating range is provided as a guideline including hysteresis, it cannot be guaranteed (assuming approximately ±30% dispersion). It may vary substantially depending on an ambient environment.

Auto Switch Mounting Bracket: Part No.

Auto switch model	Bore size (mm)			
	ø20	ø25	ø32	ø40
D-A9□ D-M9□ D-M9□W	note1) 1 BMA2-020 2 BJ3-1	note1) 1 BMA2-025 2 BJ3-1	note1) 1 BMA2-032 2 BJ3-1	note1) 1 BMA2-040 2 BJ3-1
D-C7□/C80 D-C73C/C80C D-H7□ D-H7□W D-H7BAL D-H7NF	BMA2-020	BMA2-025	BMA2-032	BMA2-040
D-B5□/B64 D-B59W D-G5NTL D-G5NBL	BA-01	BA-02	BA-32	BA-04

Note 1) Two kinds of auto switch mounting brackets are used as a set.

[Mounting screw set made of stainless steel]

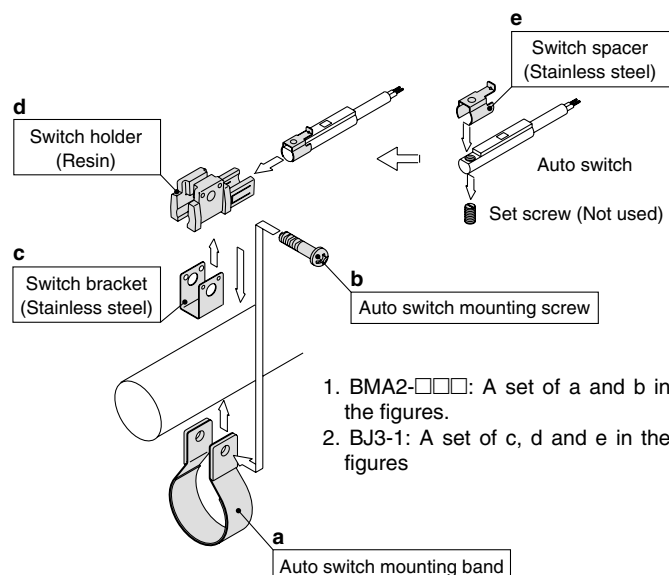
The following set of mounting screws made of stainless steel is available. Use it in accordance with the operating environment. (Please order the auto switch mounting bracket separately, since it is not included.)

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

BBA4: For D-C7/C8/H7 types

D-H7BAL/G5BAL auto switches are set on the cylinder with the stainless steel screws above when shipped. When an auto switch is shipped independently, BBA3 or BBA4 is attached.

Note 2) Refer to pages 1813 and 1814 for the details about BBA3 and BBA4.



1. BMA2-□□□: A set of a and b in the figures.
2. BJ3-1: A set of c, d and e in the figures

Cylinder Brackets by Stroke/Mounting Surfaces

Mounting bracket	Basic style, Foot style, Flange style, Clevis style			Trunnion style		
	1 (Rod cover side)	2 (Different surfaces)	2 (Mounted on the same surface)	1 (Rod cover side)	2 (Different surfaces)	2 (Mounted on the same surface)
No. of auto switches mounted						
Switch mounting surface	Port surface	Port surface	Port surface			
Switch model						
D-A9□ D-M9□ D-M9□W	10 st or more	15 to 44 st	45 st or more	10 st or more	15 to 44 st	45 st or more
D-C7□/C80	10 st or more	15 to 49 st	50 st or more	10 st or more	15 to 49 st	50 st or more
D-H7□/H7□W D-H7BAL/H7NF	10 st or more	15 to 59 st	60 st or more	10 st or more	15 to 59 st	60 st or more
D-C73C/C80C/H7C	10 st or more	15 to 64 st	65 st or more	10 st or more	15 to 64 st	65 st or more
D-B5□/B64/G5NTL	10 st or more	15 to 74 st	75 st or more	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	15 st or more	20 to 74 st	75 st or more

st: Stroke (mm)

Other than the applicable auto switches listed in "How to Order", the following auto switches can be mounted. For detailed specifications, refer to pages 1719 to 1827.

Auto switch type	Model	Electrical entry (Fetching direction)	Features
Reed	D-B53, C73, C76	Grommet (In-line)	—
	D-C80		Without indicator light
Solid state	D-H7A1, H7A2, H7B		—
	D-H7NW, H7PW, H7BW		Diagnostic indication (2-color)
	D-G5NTL		With timer

* For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 1784 and 1785 for details.

* Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H types) are also available. Refer to page 1746 for details.

* Wide range detection type, solid state auto switch (D-G5NBL type) is also available. For details, refer to page 1776.



Series CNG

Specific Product Precautions 1

Be sure to read before handling.

Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Design of Equipment and Machinery

⚠ Warning

1. **Construct so that the human body will not come into direct contact with driven objects or the moving parts of locking cylinders.**

Devise a safe structure by attaching protective covers that prevent direct contact with the human body, or in cases where there is a danger of contact, provide sensors or other devices to perform an emergency stop, etc., before contact occurs.

2. **Use a balance circuit, taking cylinder lurching into consideration.**

In cases such as an intermediate stop, where a lock is operated at a desired position within the stroke and air pressure is applied from only one side of the cylinder, the piston will lurch at high speed when the lock is released. In such situations, there is a danger of causing human injury by having hands or feet, etc. caught, and also a danger for causing damage to the equipment. In order to prevent this lurching, a balance circuit such as the recommended pneumatic circuits (pages 689 and 690) should be used.

Selection

⚠ Warning

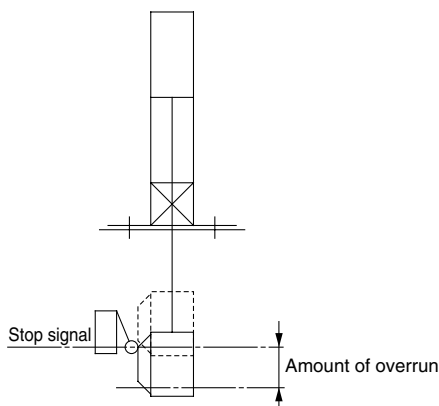
1. **When in the locked state, do not apply a load accompanied by an impact shock, strong vibration or turning force, etc.**

Use caution, because an external action such as an impacting load, strong vibration or turning force, may damage the locking mechanism or reduce its life.

2. **Consider stopping accuracy and the amount of overrun when an intermediate stop is performed.**

Due to the nature of a mechanical lock, there is a momentary lag with respect to the stop signal, and a time delay occurs before stopping. The cylinder stroke resulting from this delay is the overrun amount. The difference between the maximum and minimum overrun amounts is the stopping accuracy.

- Place a limit switch before the desired stopping position, at a distance equal to the overrun amount.
- The limit switch must have a detection length (dog length) of the overrun amount + ϕ .
- For SMC's auto switches, the operating range is between 8 and 14 mm. (It varies depending on a switch model.) When the overrun amount exceeds this range, selfholding of the contact should be performed at the switch load side.
* For stopping accuracy, refer to page 673.



Selection

⚠ Warning

3. **In order to further improve stopping accuracy, the time from the stop signal to the operation of the lock should be shortened as much as possible.**

To accomplish this, use a device such as a highly responsive electric control circuit or solenoid valve driven by direct current, and place the solenoid valve as close as possible to the cylinder.

4. **Note that the stopping accuracy will be influenced by changes in piston speed.**

When piston speed changes during the course of the cylinder stroke due to variations in the load or disturbances, etc., the dispersion of stopping positions will increase. Therefore, consideration should be given to establishing a standard speed for the piston just before it reaches the stopping position.

Moreover, the dispersion of stopping positions will increase during the cushioned portion of the stroke and during the accelerating portion of the stroke after the start of operation, due to the large changes in piston speed.

5. **The holding force (max. static load) indicates the maximum capability to hold a static load without loads, vibration and impact. This does not indicate a load that can be held in ordinary conditions.**

Select the most suitable bore sizes for the operating conditions in accordance with the selection procedures. The Model Selection (pages 670 and 671) is based on use at the intermediate stop (including emergency stops during operation). However, when the cylinder is in a locked state, kinetic energy does not act upon it. Under these conditions, use the load mass at the maximum speed (V) of 100 mm/s shown in graphs (5) to (7) on page 671 depending on the operating pressure and select models.

Mounting

⚠ Warning

1. **Be certain to connect the rod end to the load with the lock released.**

If connected in the locked state, a load greater than the turning force or holding force may operate on the piston rod and cause damage to the lock mechanism. Series CNG is equipped with an emergency unlocking mechanism, however, when connecting the rod end to the load this should be done with the lock released by simply connecting an air line to the unlocking port and supplying airpressure of 0.25 MPa or more.



Series CNG

Specific Product Precautions 2

Be sure to read before handling.

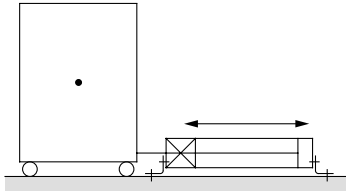
Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Mounting

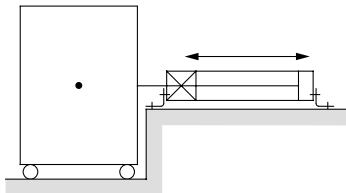
⚠ Caution

1. Do not apply offset loads to the piston rod.

Particular care should be taken to match the load's center of gravity with the center of the cylinder shaft. When there is a large discrepancy, the piston rod may be subjected to uneven wear or damage due to the inertial moment during locking stops.



X Load center of gravity and cylinder shaft center are not matched.



○ Load center of gravity and cylinder shaft center are matched.

Note) Can be used if all of the generated moment is absorbed by an effective guide.

Adjustment

⚠ Caution

1. Adjust the cylinder's air balance. Balance the load by adjusting the air pressure in the rod and head sides of the cylinder with the load connected to the cylinder and the lock released. Lurching of the cylinder when unlocked can be prevented by carefully adjusting this air balance.
2. Adjust mounting position for detection area of auto switch etc. When intermediate stop is done, adjust the mounting position for detection stop is done, adjust the mounting position for detection area of auto switch etc., with consideration of overrun distance to required stop position.

Pneumatic Circuit

⚠ Warning

1. Be certain to use an pneumatic circuit which will apply balancing pressure to both sides of the piston when in a locked stop.

In order to prevent cylinder lurching after a lock stop, when restarting or when manually unlocking, a circuit should be used to which will apply balancing pressure to both sides of the piston, thereby canceling the force generated by the load in the direction of piston movement.

2. Use a solenoid valve for unlocking which has a large effective area, as a rule 50% or more of the effective area of the cylinder drive solenoid valve.

The larger the effective area is, the shorter the locking time will be (the overrun amount will be shorter), and stopping accuracy will be improved.

3. Place the solenoid valve for unlocking close to the cylinder, and no farther than the cylinder drive solenoid valve.

The shorter the distance from the cylinder (the shorter the piping), the shorter the overrun amount will be, and stopping accuracy will be improved.

4. Allow at least 0.5 seconds from a locked stop (intermediate stop of the cylinder) until release of the lock.

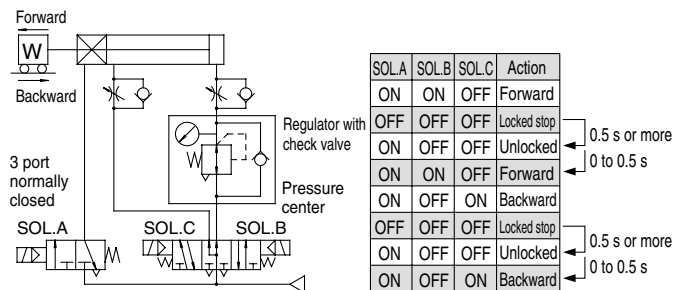
When the locked stop time is too short, the piston rod (and load) may lurch at a speed greater than the control speed of the speed controller.

5. When restarting, control the switching signal for the unlocking solenoid valve so that it acts before or at the same time as the cylinder drive solenoid valve.

If the signal is delayed, the piston rod (and load) may lurch at a speed greater than the control speed of the speed controller.

6. Basic circuit

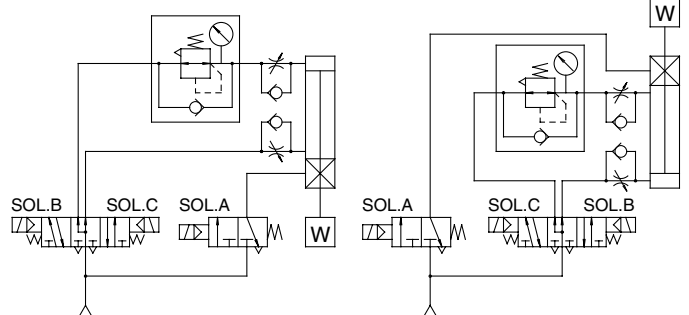
1) [Horizontal]



2) [Vertical]

[Load in the direction of rod extension]

[Load in the direction of rod retraction]



CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

Individual
-X□



Series CNG

Specific Product Precautions 3

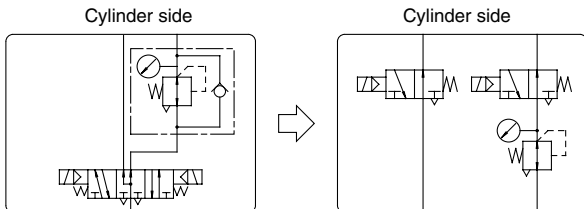
Be sure to read before handling.

Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Pneumatic Circuit

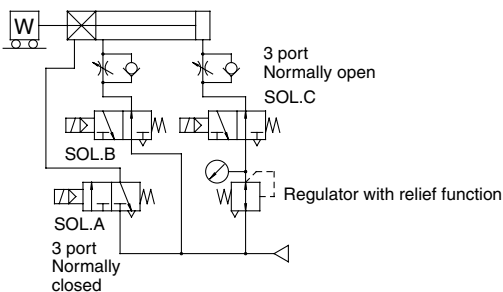
⚠ Caution

1. A 3 position pressure center solenoid valve and regulator with check valve can be replaced with two 3 port normally open valves and a regulator with relief function.



[Example]

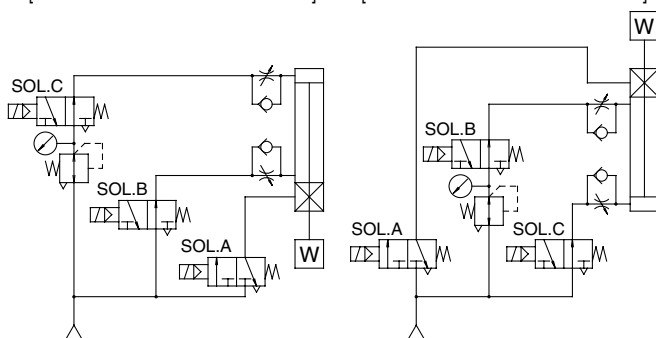
1. [Horizontal]



2. [Vertical]

[Load in the direction of rod extension]

[Load in the direction of rod retraction]



Manually Unlocking

⚠ Warning

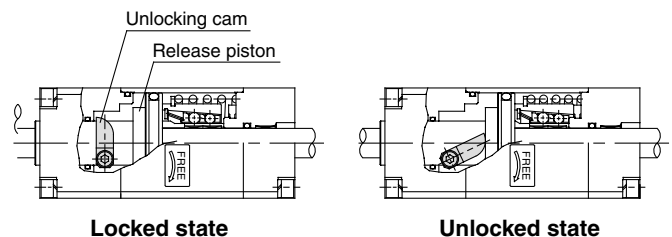
1. **Never operate the unlocking cam until safety has been confirmed. (Do not turn to the FREE side.)**
 - a) When unlocking is performed with air pressure applied to only one side of the cylinder, the moving parts of the cylinder will lurch at high speed causing a serious hazard.
 - b) When unlocking is performed, be sure to confirm that personnel are not within the load movement range and that no other problems will occur if the load moves.
2. **Before operating the unlocking cam, exhaust any residual pressure which is in the system.**
3. **Take measures to prevent the load from dropping when unlocking is performed.**
 - a) Perform work with the load in its lowest position.
 - b) Take measures for drop prevention by strut, etc.

⚠ Caution

1. **The unlocking cam is an emergency unlocking mechanism only.**
During an emergency when the air supply is stopped or cut off, this is used to alleviate a problem by forcibly pushing back the release piston and brake spring to release the lock.
2. **When installing the cylinder into equipment or performing adjustments, etc., be sure to apply air pressure of 0.25 MPa or more to the unlocking port, and do not perform work using the unlocking cam.**
3. **When releasing the lock with the unlocking cam, it must be noted that the internal resistance of the cylinder will be high, unlike normally unlocking with air pressure.**

Bore size (mm)	Cylinder internal resistance (N)	Cam operating torque (standard) (N·m)	Max. cam operating torque (N·m)	Applicable hex. wrench size
20	24.6	1.0	2.3	Size 3
25	38.2	2.5	4.7	Size 3
32	62.7	3.0	4.7	Size 3
40	98	4.0	8.2	Size 4

4. **Be sure to operate the unlocking cam on the FREE side (clockwise direction), and do not turn with a torque greater than the maximum cam operating torque. There is a danger of damaging the unlocking cam if it is turned excessively.**
5. **For safety reasons, the unlocking cam is constructed so that it cannot be fixed in the unlocked condition.**



[Principle]

If the unlocking cam is turned in a clockwise direction with a hexagon wrench, the release piston is pushed back and the lock is released. Further, if the unlocking cam is not held it will return to its original position and the unit will lock again. Therefore, the unlocking cam must be held in position for as long as unlocking is required.



Series CNG

Specific Product Precautions 4

Be sure to read before handling.

Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Maintenance

Caution

1. Series CNG lock units are replaceable.

(However, please note that lock units cannot be replaced in the case of long stroke specifications.)

To order replacement lock units for Series CNG, use the order numbers given in the table below.

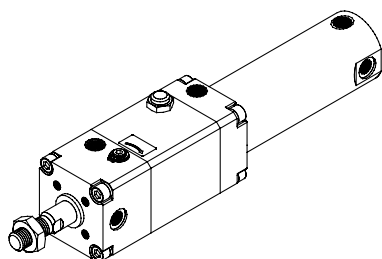
Bore size (mm)	Lock unit part no.	
	Rubber bumper type	Air cushion type
20	CNGN20D-UA	CNGA20D-UA
25	CNGN25D-UA	CNGA25D-UA
32	CNGN32D-UA	CNGA32D-UA
40	CNGN40D-UA	CNGA40D-UA

2. Replacement of lock units.

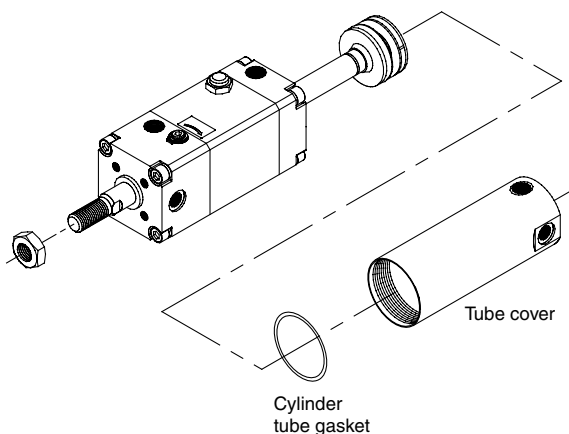
1) Remove the lock unit by securing the square section of the rod cover or the wrench flats of the tube cover in an apparatus such as a vice, and then loosening the other end with a spanner or adjustable angle wrench, etc.

For the dimensions of the square section and the wrench flats, refer to the table below.

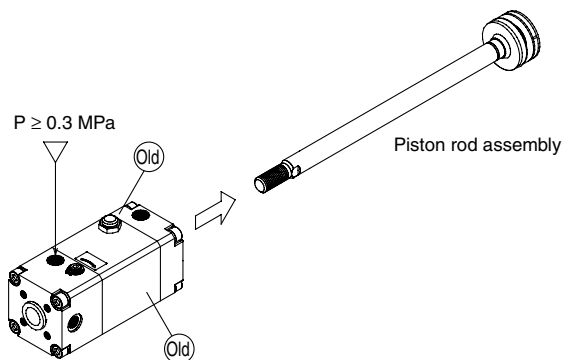
Bore size (mm)	Rod cover square section (mm)	Tube cover wrench flats (mm)
20	38	24
25	45	29
32	45	35.5
40	52	44



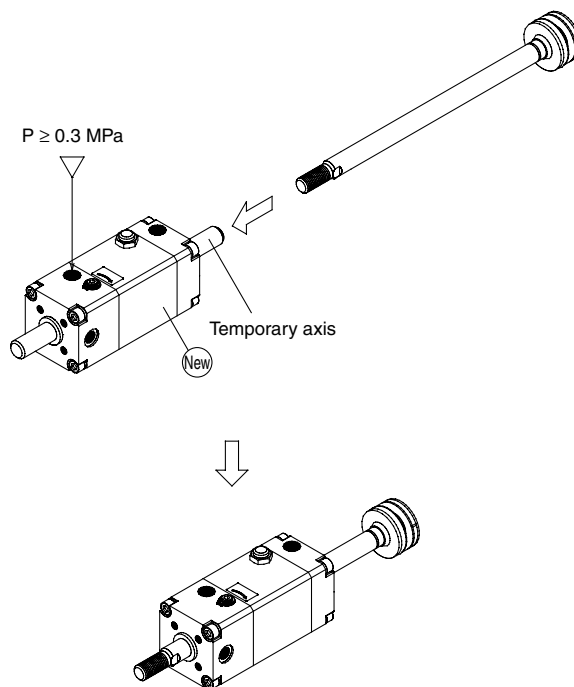
2) Remove the tube cover.



3) Apply 0.3 MPa or more of compressed air to the unlocking port, and pull out the piston rod assembly.



4) Similarly, apply 0.3 MPa or more of compressed air to the unlocking port of the new lock unit, and replace the new lock unit's temporary axis with the previous piston rod assembly.



5) Reassemble in reverse order from steps 2) and 1). When retightening the sections, turn approximately 2° past their position prior to disassembly.

CLJ2

CLM2

CLG1

CL1

MLGC

CNG

MNB

CNA

CNS

CLS

CLQ

RLQ

MLU

MLGP

ML1C

D-□

-X□

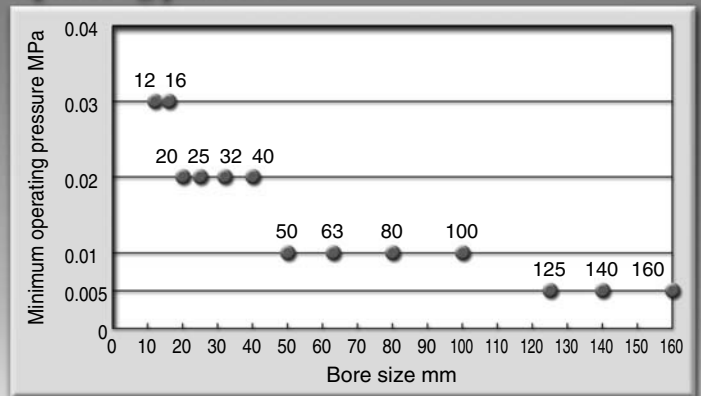
Individual
-X□

Smooth Cylinder

Series CQSY/CQ2Y/CM2Y/CG1Y/CA2Y/CS2Y
 ø12 to ø25 ø32 to ø100 ø20 to ø40 ø20 to ø100 ø40 to ø100 ø125 to ø160



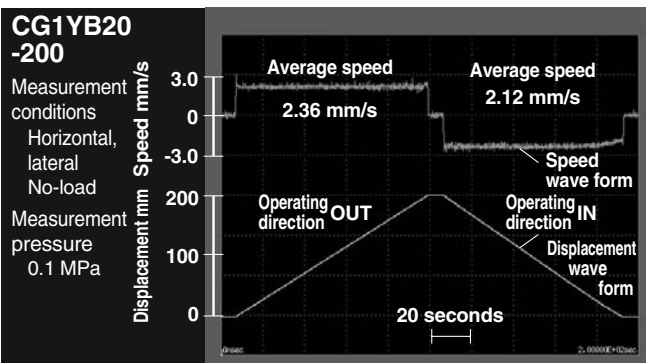
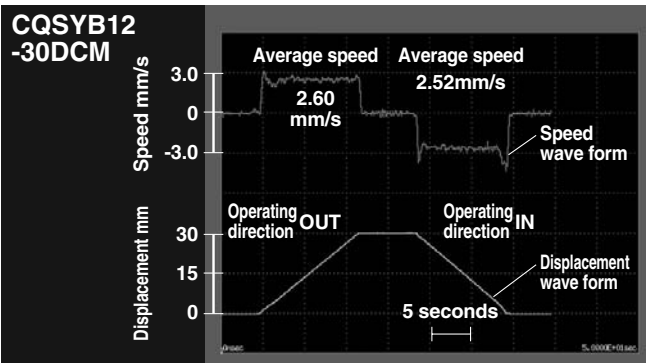
Minimum operating pressure 0.005 to 0.03 MPa



(Measurement based on JIS B8377)

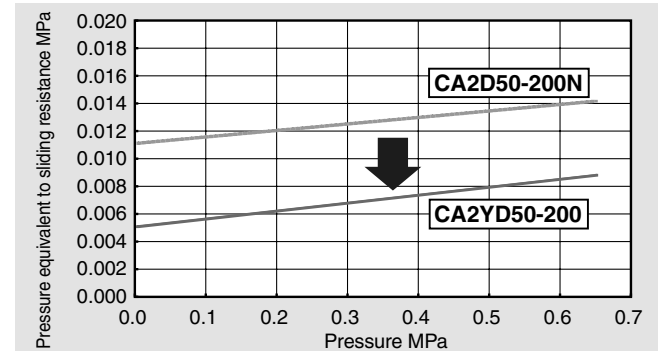
Stable operation possible even at a low speed of 5 mm/s
(Measurement based on JIS B 8377)

Smooth operation with less sticking and slipping



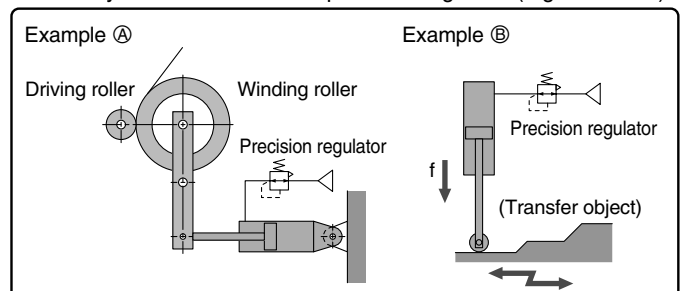
Sliding resistance

Bi-directional low-friction operation possible.
 Pressure can be controlled regardless of its direction.



Application Example

Smooth cylinder combined with precision regulator (e.g. Series IR)



REA

REB

REC

C□Y

C□X

MQ

RHC

RZQ

D-□

-X□

Individual

-X□

Smooth Cylinder

Series CG1Y

ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

CG1Y L 25 - 100 -

With auto switch **CDG1Y L 25 - 100 - M9BW**

With auto switch
(Built-in magnet)

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
U*	Rod side trunnion style
T*	Head side trunnion style
D	Clevis style

* Not available at ø80 and ø100.
Note) Mounting brackets are not mounted and are supplied loose at the time of shipment.

Bore size

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

Port thread type

Nil	Rc	ø20 to ø100
TN	NPT	ø20 to ø100
TF	M5 x 0.8	ø20, ø25
	G	ø32 to ø100

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

Made to Order
For details, refer to page 1084.

Number of auto switches

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

Cylinder stroke (mm)
Refer to "Standard Stroke" on next page.

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) CDG1YB32-150

Applicable Auto Switch/Refer to pages 1719 to 1827 for further information on auto switches.

Applicable state switch models are shown in this table. For further information, see data switches.																									
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire (m)					Pre-wired connector	Applicable load										
					DC	AC	Applicable bore size ø20 to ø63	ø80, ø100	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)												
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9N	—	●	●	●	○	—	○	IC circuit	Relay, PLC									
				3-wire (PNP)			M9P	—	●	●	●	○	—	○											
				2-wire	12 V		M9B	—	●	●	●	○	—	○	—										
		Connector		3-wire (NPN)	24 V		H7C	—	●	—	●	●	●	—			—	IC circuit							
				3-wire (PNP)	5 V, 12 V		M9NW	—	●	●	●	○	—	○											
				2-wire	12 V		M9PW	—	●	●	●	○	—	○											
	Diagnostic indication (2-color)	Grommet	Yes	4-wire(NPN)	5 V, 12 V		M9BW	—	●	●	●	○	—	○	—										
							—	K59W	●	—	●	○	—	○											
							Water resistant (2-color)	H7BA	G5BA	—	—	●	○	—	○		IC circuit								
							With diagnostic output (2-color)	H7NF	G59F	●	—	●	○	—	○										
							Reed switch	—	Grommet	Yes	3-wire (Equiv. NPN)	—	5 V	—	A96		—	●	—	●	—	—	—	IC circuit	Relay, PLC
											2-wire	24 V	12 V	100 V	A93		—	●	—	●	—	—	—	—	
100 V or less	A90	—	●	—	●	—								—	—										
100 V, 200 V	B54		●	—	●	●								—	—										
200 V or less	B64		●	—	●	—								—	—										
Connector	No	2-wire	24 V	12 V	—	C73C			—	●	—	●	●	●	—	—									
					—	C80C			—	●	—	●	●	●	—										
					24 V or less	B59W			●	—	●	—	—	—	—										
					Diagnostic indication (2-color)	Grommet			Yes	—	—	—		●	—	●	—	—	—	—					

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

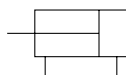
* ○: Manufactured upon receipt of order.
 * D-A9□V/M9□V/M9□WV/M9□A(V)L types cannot be mounted.

* In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 1093.
 * Refer to pages 1784 and 1785 for details of auto switches with a pre-wired connector.
 * D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled before shipped.)

Series CG1Y



JIS Symbol



Made to Order

(For details, refer to pages 1836, 1882 and 1917.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC6	Made of stainless steel
—XC20	Head cover axial port

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
20	CG1Y20-PS	Piston seal 1 pc.
25	CG1Y25-PS	Rod seal 1 pc.
32	CG1Y32-PS	Tube gasket 2 pcs.
40	CG1Y40-PS	Grease pack (10 g) 1 pc.

When only grease for maintenance is necessary, please order by the following part numbers.

Grease pack part no.: **GR-L-005** (5 g)
GR-L-010 (10 g)
GR-L-150 (150 g)

Specifications

Bore size (mm)	20	25	32	40	50	63	80	100
Action	Double acting, Single rod							
Type	Non-lube							
Fluid	Air							
Proof pressure	1.05 MPa							
Maximum operating pressure	0.7 MPa							
Ambient and fluid temperature	Without auto switch -10 to 70°C (with no freezing)							
	With auto switch -10 to 60°C (with no freezing)							
Operating piston speed	5 to 500 mm/s							
Stroke length tolerance	Up to 300 st + 1.4 ₀ mm							
Cushion	Rubber bumper							
Mounting	Basic, Axial foot, Rod side flange, Head side flange, Rod side trunnion, Head side trunnion, Clevis (in case of 90° change in port location)							
Allowable leakage rate	0.5 ℓ/min (ANR) or less							



* Rod side trunnion and head side trunnion styles are not available at ø80 and ø100.

Minimum Operating Pressure

Unit: MPa

Bore size (mm)	20	25	32	40	50	63	80	100
Minimum operating pressure	0.02				0.01			

Standard Stroke

Bore size (mm)	Standard stroke (mm) Note 1)
20	25, 50, 75, 100, 125, 150, 200
25, 32, 40, 50, 63, 80, 100	25, 50, 75, 100, 125, 150, 200, 250, 300



Note 1) Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Note 2) Please consult with SMC for strokes outside the above ranges.

Note 3) 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.

Mounting Bracket Part No.

Mounting bracket	Min. order	Bore size (mm)								Description
		20	25	32	40	50	63	80	100	
Foot	2 ^{Note)}	CG-L020	CG-L025	CG-L032	CG-L040	CG-L050	CG-L063	CG-L080	CG-L100	Foot x 2, Bracket mounting bolt x 8
Flange	1	CG-F020	CG-F025	CG-F032	CG-F040	CG-F050	CG-F063	CG-F080	CG-F100	Flange x 1, Bracket mounting bolt x 4
Trunnion pin	1	CG-T020	CG-T025	CG-T032	CG-T040	CG-T050	CG-T063	—	—	Trunnion pin x 2, Trunnion pivot bracket x 2, Flat washer x 2
Clevis	1	CG-D020	CG-D025	CG-D032	CG-D040	CG-D050	CG-D063	CG-D080	CG-D100	Clevis x 1, Bracket mounting bolt x 4, Clevis pin x 1, Retaining ring x 2
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	Pivot bracket x 1

Note) Order two foot brackets per cylinder.

Mass

Bore size (mm)		20	25	32	40	50	63	80	100	(mm)
Basic mass	Basic style	0.11	0.18	0.28	0.44	0.83	1.17	2.23	3.43	
	Axial foot style	0.22	0.31	0.44	0.66	1.31	1.89	3.19	5.18	
	Flange style	0.19	0.28	0.42	0.64	1.17	1.67	2.94	4.78	
	Trunnion style	0.12	0.20	0.31	0.49	0.97	1.31	—	—	
	Clevis style	0.16	0.26	0.43	0.67	1.23	1.85	2.94	4.71	
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 mass per each 50 mm of stroke		0.05	0.07	0.09	0.15	0.22	0.26	0.35	0.49	

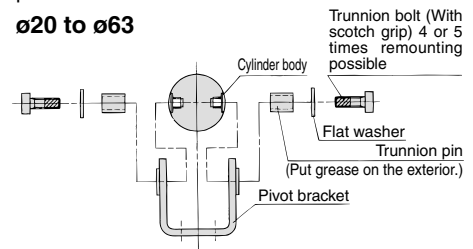
Calculation: (Example) **CG1YL20-100**
(Foot style, ø20, 100 st)

- Basic mass..... 0.22 (Foot, ø20)
- Additional mass..... 0.05/50 stroke
- Cylinder stroke..... 100 stroke
- $0.22 + 0.05 \times 100/50 = 0.32$ kg

Mounting Procedure**Mounting procedure for trunnion**

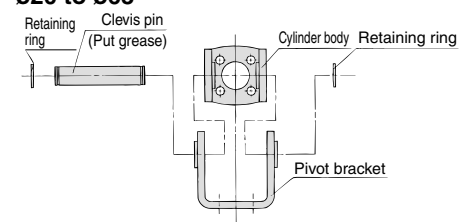
Follow the procedures below when mounting a pivot bracket on the trunnion.

ø20 to ø63

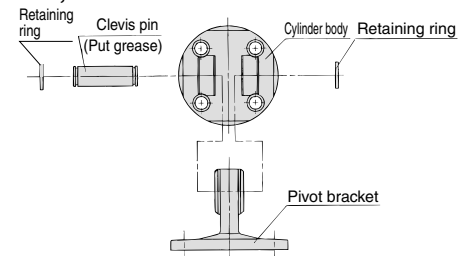
**Mounting procedure for clevis**

Follow the procedures below when mounting a pivot bracket on the clevis style.

ø20 to ø63



ø80, ø100

**⚠ Precautions**

- Be sure to read before handling.
- Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Operating Precautions**⚠ Warning**

1. Operate within the specified cylinder speed.
Otherwise, cylinder and seal damage may occur.
2. When operating a cylinder as a single side fixed (Basic/flange style), a bending moment generated at the stroke end due to vibration will be applied to the cylinder, which may damage it. In such cases, install a bracket to prevent vibration or lower the piston speed until the cylinder does not vibrate at the stroke end.

⚠ Caution

1. Tighten clevis bracket mounting bolts with the proper tightening torque shown listed below.
ø20: 1.5 N·m, ø25 to 32: 2.9 N·m, ø40: 4.9 N·m,
ø50: 11.8 N·m, ø63 to 80: 24.5 N·m, ø100: 42.2 N·m

Disassembly/Replacement**⚠ Caution**

1. Do not replace the bushings.
The bushings are press-fit. To replace them, they must be replaced together with the cover assembly.
2. To replace a seal, apply grease to the new seal before installing it.
If the cylinder is put into operation without applying grease to the seal, it could cause the seal to wear significantly, leading to premature air leakage.
3. Those with a bore of ø50 or more cannot be disassembled.
When disassembling cylinders with bore sizes of ø20 through ø40, grip the double flat part of either the head cover or the rod cover with a vise and loosen the other side with a wrench or a monkey wrench, etc., and then remove the cover. When re-tightening, tighten approximately 2 degrees more than the original position. (Cylinders with ø50 or larger bore sizes are tightened with a large tightening torque and cannot be disassembled. Please contact SMC when disassembly is required.)

REA

REB

REC

C□Y

C□X

MQ

RHC

RZQ

D-□

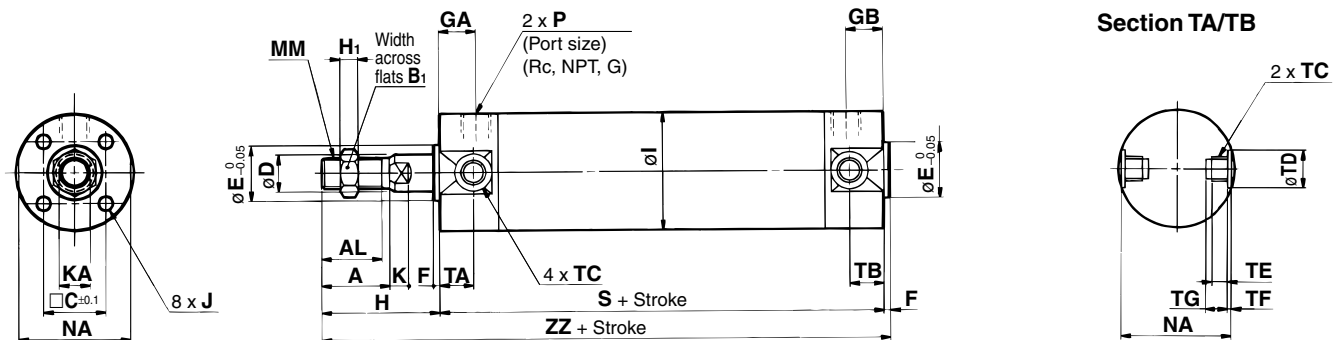
-X□

Individual
-X□

Series CG1Y

Dimensions: ø20 to ø100

Basic style: CG1YB



Section TA/TB

(mm)

Bore size (mm)	TC*	TDH9	TE	TF	TG
20	M5 x 0.8	8 ^{+0.08} ₀	4	0.5	5.5
25	M6 x 0.75	10 ^{+0.08} ₀	5	1	6.5
32	M8 x 1.0	12 ^{+0.08} ₀	5.5	1	7.5
40	M10 x 1.25	14 ^{+0.08} ₀	6	1.25	8.5
50	M12 x 1.25	16 ^{+0.08} ₀	7.5	2	10
63	M14 x 1.5	18 ^{+0.08} ₀	11.5	3	14.5

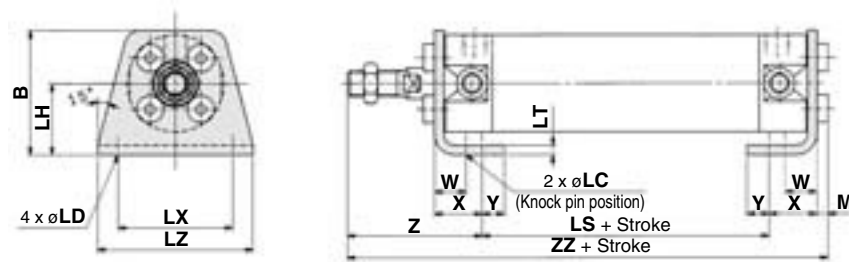
* Trunnion mounting taps for the width across flats NA are not attached to ø80 and ø100 types.

(mm)

Bore size (mm)	Stroke range (mm)	A	AL	B ₁	C	D	E	F	H	H ₁	I	J	K	KA	MM	NA
20	Up to 200	18	15.5	13	14	8	12	2	35	5	26	M4 x 0.7 depth 7	5	6	M8 x 1.25	24
25	Up to 300	22	19.5	17	16.5	10	14	2	40	6	31	M5 x 0.8 depth 7.5	5.5	8	M10 x 1.25	29
32	Up to 300	22	19.5	17	20	12	18	2	40	6	38	M5 x 0.8 depth 8	5.5	10	M10 x 1.25	35.5
40	Up to 300	30	27	19	26	16	25	2	50	8	47	M6 x 1 depth 12	6	14	M14 x 1.5	44
50	Up to 300	35	32	27	32	20	30	2	58	11	58	M8 x 1.25 depth 16	7	18	M18 x 1.5	55
63	Up to 300	35	32	27	38	20	32	2	58	11	72	M10 x 1.5 depth 16	7	18	M18 x 1.5	69
80	Up to 300	40	37	32	50	25	40	3	71	13	89	M10 x 1.5 depth 22	10	22	M22 x 1.5	80
100	Up to 300	40	37	41	60	30	50	3	71	16	110	M12 x 1.75 depth 22	10	26	M26 x 1.5	100

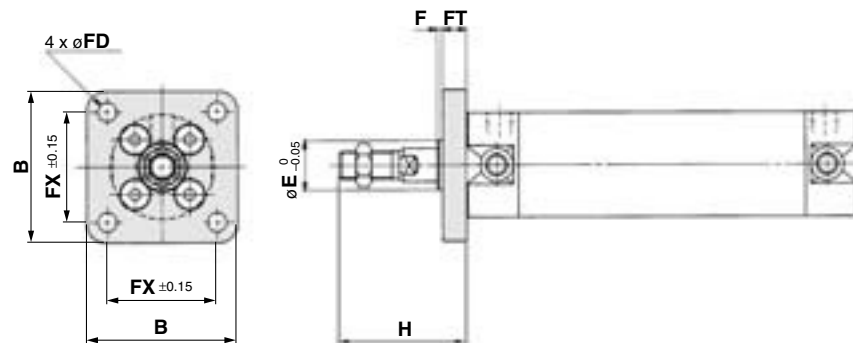
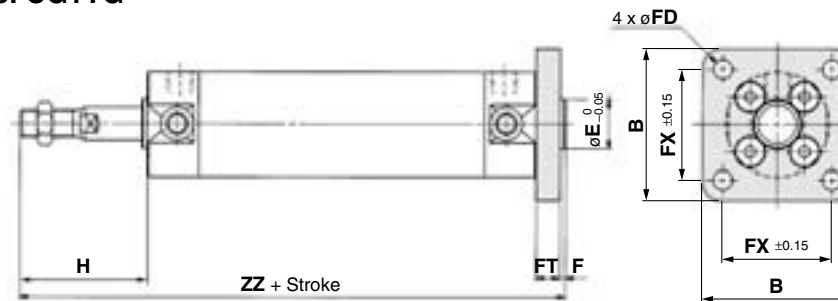
(mm)

Bore size (mm)	Stroke range (mm)	S	TA	TB	ZZ	Rc, NPT port			G port		
						GA	GB	P	GA	GB	P
20	Up to 200	77	11	11	114	12	12	1/8	12	12	M5 x 0.8
25	Up to 300	77	11	11	119	12	12	1/8	12	12	M5 x 0.8
32	Up to 300	79	11	11	121	12	12	1/8	10	10	1/8
40	Up to 300	87	12	12	139	13	13	1/8	10	10	1/8
50	Up to 300	102	13	13	162	14	14	1/4	12	12	1/4
63	Up to 300	102	13	13	162	14	14	1/4	12	12	1/4
80	Up to 300	122	—	—	196	20	20	3/8	17	17	3/8
100	Up to 300	122	—	—	196	20	20	1/2	17	17	1/2

With Mounting Bracket**Axial foot style: CG1YL****Axial Foot Style**

Bore size (mm)	B	LC	LD	LH	LS	LT	LX	LZ	M	W	X	Y	Z	ZZ	(mm)
20	34	4	6	20	53	3	32	44	3	10	15	7	47	118	
25	38.5	4	6	22	53	3	36	49	3.5	10	15	7	52	123.5	
32	45	4	7	25	53	3	44	58	3.5	10	16	8	53	125.5	
40	54.5	4	7	30	60	3	54	71	4	10	16.5	8.5	63.5	144	
50	70.5	5	10	40	67	4.5	66	86	5	17.5	22	11	75.5	169.5	
63	82.5	5	12	45	67	4.5	82	106	5	17.5	22	13	75.5	169.5	
80	101	6	11	55	74	4.5	100	125	5	20	28.5	14	95	202.5	
100	121	6	14	65	74	6	120	150	7	20	30	16	95	206	

* Other dimensions are the same as basic style.

Rod side flange style: CG1YF**Head side flange style: CG1YG****Flange Style**

Bore size (mm)	B	E	F	FX	FD	FT	H	Head side flange ZZ	(mm)
20	40	12	2	28	5.5	6	35	120	
25	44	14	2	32	5.5	7	40	126	
32	53	18	2	38	6.6	7	40	128	
40	61	25	2	46	6.6	8	50	147	
50	76	30	2	58	9	9	58	171	
63	92	32	2	70	11	9	58	171	
80	104	40	3	82	11	11	71	207	
100	128	50	3	100	14	14	71	210	

Note) End boss is machined on the flange for øE.

* Other dimensions are the same as basic style.

REA

REB

REC

C□Y

C□X

MQ

RHC

RZQ

D-□

-X□

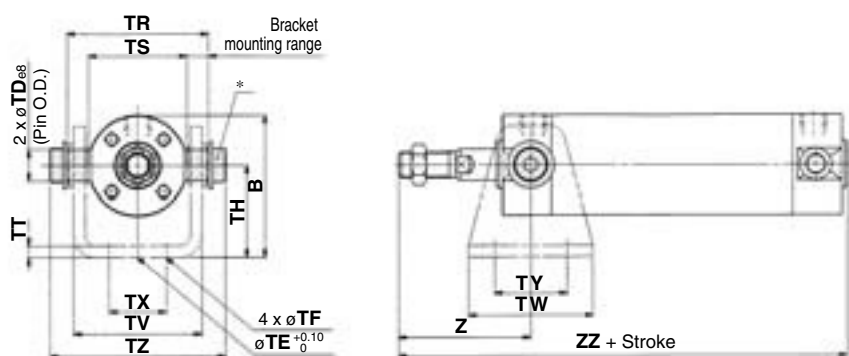
Individual

-X□

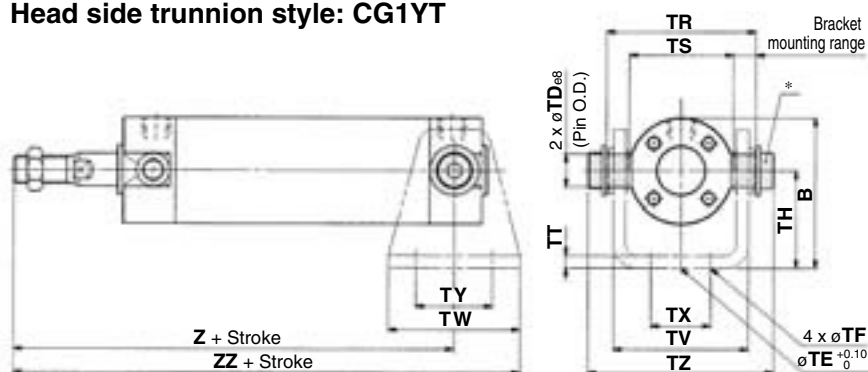
Series CG1Y

With Mounting Bracket

Rod side trunnion style: CG1YU



Head side trunnion style: CG1YT



Trunnion Style

(mm)

Bore size (mm)	B	TDe8	TE	TF	TH	TR	TS	TT	TV
20	38	8 ^{-0.025} _{-0.047}	10	5.5	25	39	28	3.2	(35.8)
25	45.5	10 ^{-0.025} _{-0.047}	10	5.5	30	43	33	3.2	(39.8)
32	54	12 ^{-0.032} _{-0.059}	10	6.6	35	54.5	40	4.5	(49.4)
40	63.5	14 ^{-0.032} _{-0.059}	10	6.6	40	65.5	49	4.5	(58.4)
50	79	16 ^{-0.032} _{-0.059}	20	9	50	80	60	6	(72.4)
63	96	18 ^{-0.032} _{-0.059}	20	11	60	9	74	8	(90.4)

Bore size (mm)	TW	TX	TY	TZ	Rod side		Head side	
					Z	Z	ZZ	ZZ
20	42	16	28	47.6	46	101	122	
25	42	20	28	53	51	106	127	
32	48	22	28	67.7	51	108	132	
40	56	30	30	78.7	62	125	153	
50	64	36	36	98.6	71	147	179	
63	74	46	46	119.2	71	147	184	

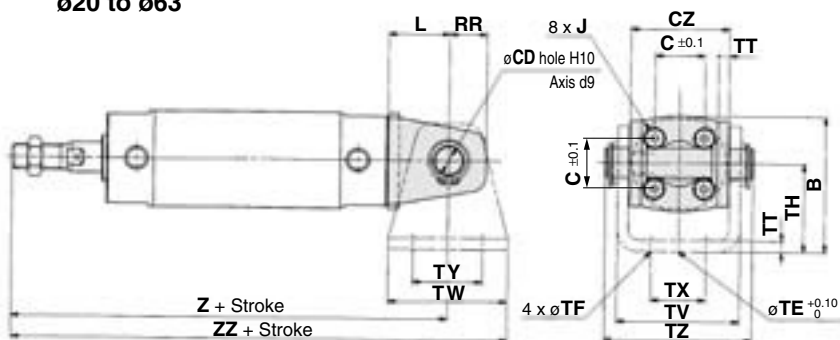
* Consists of pin, flat washer and hexagon socket head cap bolt.

Note) Refer to page 1089 for pivot bracket.

* Other dimensions are the same as basic style.

Clevis style: CG1YD

$\phi 20$ to $\phi 63$



(The above shows the case port location is changed by 90°.)

Clevis Style

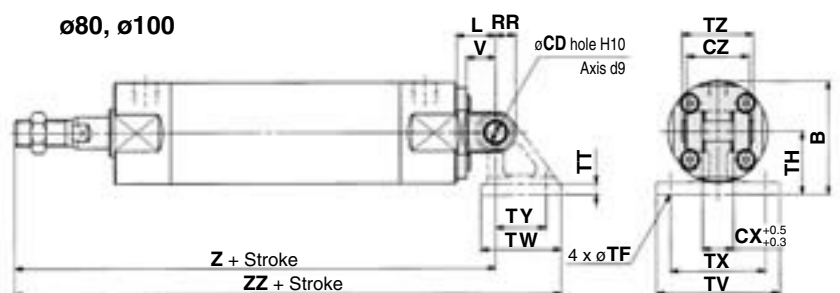
(mm)

Bore size (mm)	B	CD	CX	CZ	L	RR	V	TE	TF	TH
20	38	8	—	29	14	11	—	10	5.5	25
25	45.5	10	—	33	16	13	—	10	5.5	30
32	54	12	—	40	20	15	—	10	6.6	35
40	63.5	14	—	49	22	18	—	10	6.6	40
50	79	16	—	60	25	20	—	20	9	50
63	96	18	—	74	30	22	—	20	11	60
80	99.5	18	28	56	35	18	26	—	11	55
100	120	22	32	64	43	22	32	—	13.5	65

Bore size (mm)	TT	TV	TW	TX	TY	TZ	Z	ZZ	Applicable pin part no.
20	3.2	(35.8)	42	16	28	43.4	126	147	CD-G02
25	3.2	(39.8)	42	20	28	48	133	154	CD-G25
32	4.5	(49.4)	48	22	28	59.4	139	163	CD-G03
40	4.5	(58.4)	56	30	30	71.4	159	187	CD-G04
50	6	(72.4)	64	36	36	86	185	217	CD-G05
63	8	(90.4)	74	46	46	105.4	190	227	CD-G06
80	11	110	72	85	45	64	228	286.5	IY-G08
100	12	130	93	100	60	72	236	312.5	IY-G10

Note) Refer to page 1089 for pivot bracket.

* Other dimensions are the same as basic style.



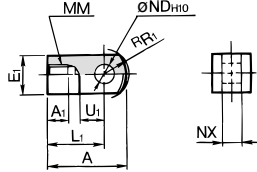
* Clevis pin and retaining ring are attached for the clevis style.

Accessory Bracket Dimensions

Single Knuckle Joint

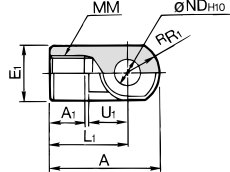
I-G02/G03

Material: Rolled steel



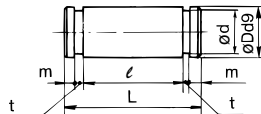
I-G04/G05/G08/G10

Material: Cast iron



Part no.	Applicable bore (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	□22	30	M14 x 1.5	12	14	10 ^{+0.058} ₀	18 ^{+0.3} _{-0.5}
I-G05	50, 63	56	18	□28	40	M18 x 1.5	16	20	14 ^{+0.070} ₀	22 ^{+0.3} _{-0.5}
I-G08	80	71	21	□38	50	M22 x 1.5	21	27	18 ^{+0.070} ₀	28 ^{+0.3} _{-0.5}
I-G10	100	79	21	□44	55	M26 x 1.5	24	31	22 ^{+0.084} ₀	32 ^{+0.3} _{-0.5}

Knuckle Pin

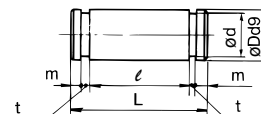


Material: Carbon steel

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

* Retaining rings are shipped together.

Clevis Pin



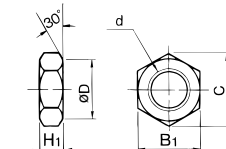
Material: Carbon steel

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

* Retaining rings are shipped together.

* Clevis pin and knuckle pin are common for bore size ø80 and ø100.

Rod End Nut



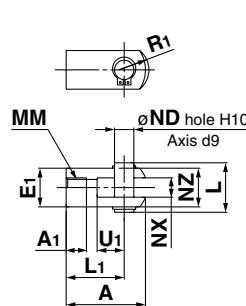
Material: Rolled steel

Part no.	Applicable bore (mm)	d	H ₁	B ₁	C	D
NT-02	20	M8 x 1.25	5	13	(15)	12.5
NT-03	25, 32	M10 x 1.25	6	17	(19.6)	16.5
NT-G04	40	M14 x 1.5	8	19	(21.9)	18
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

Double Knuckle Joint

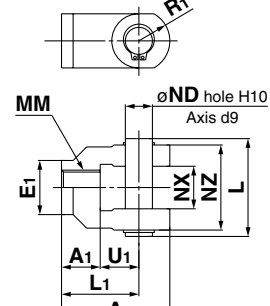
Y-G02/G03

Material: Rolled steel



Y-G04/G05/G08/G10

Material: Cast iron



Part no.	Applicable bore (mm)	A	A ₁	E ₁	L ₁	MM	R ₁	U ₁	ND	NX	NZ	L	Applicable 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	□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	□28	40	M18 x 1.5	16	20	14	22 ^{+0.5} _{-0.3}	44	50.6	IY-G05
Y-G08	80	71	23	□38	50	M22 x 1.5	21	27	18	28 ^{+0.5} _{-0.3}	56	64	IY-G08
Y-G10	100	79	24	□44	55	M26 x 1.5	24	31	22	32 ^{+0.5} _{-0.3}	64	72	IY-G10

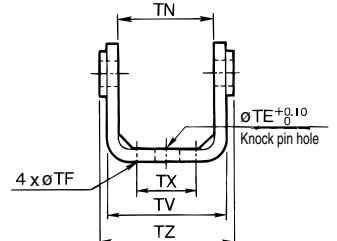
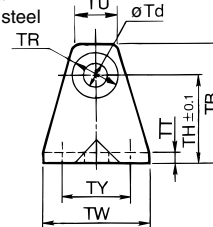
* Knuckle pin and retaining ring are shipped together.

Pivot Bracket (Order separately)

ø20 to ø63

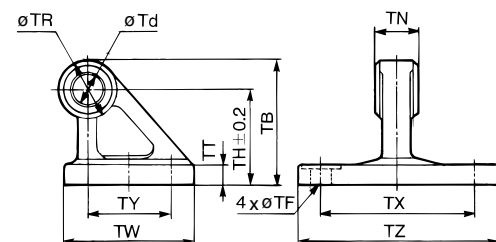
Material:

Rolled steel



ø80, ø100

Material: Cast iron



Part no.	Applicable bore (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 (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}

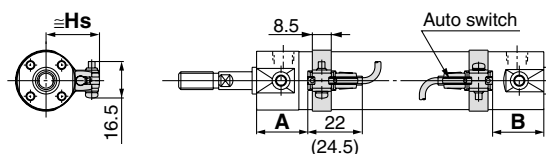
Series CG1Y

Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

Reed auto switch

D-A9□

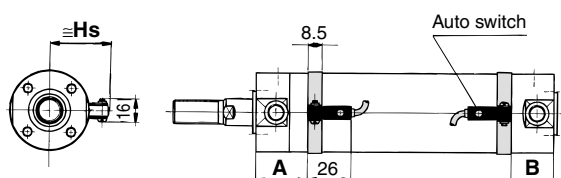
ø20 to ø63



(): For D-A93 type

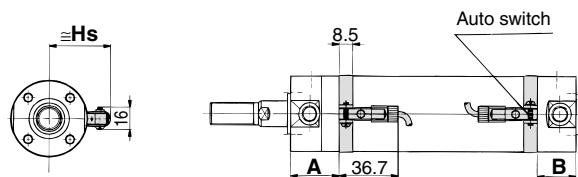
D-C7, C8

ø20 to ø63



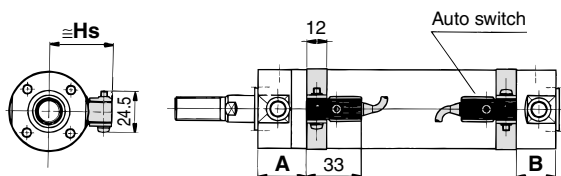
D-C73C, C80C

ø20 to ø63



D-B5, B6, B59W

ø20 to ø100

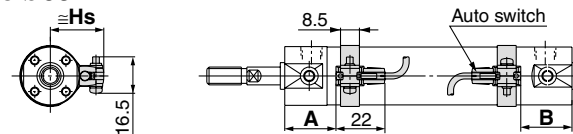


Solid state auto switch

D-M9□

D-M9□W

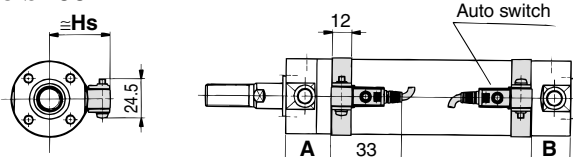
ø20 to ø63



D-G5, K5, G5□W

D-K59W, D-G59F, D-G5NTL

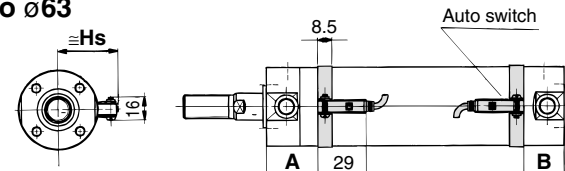
ø20 to ø100



D-H7□, H7□W

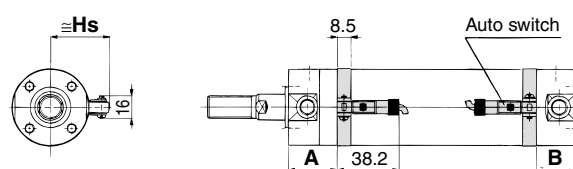
D-H7NF

ø20 to ø63



D-H7C

ø20 to ø63



Auto Switch Proper Mounting Position

(mm)

Auto switch model Bore size (mm)	D-A9□		D-M9□ D-M9□W		D-C7/C8 D-C73C D-C80C		D-B5 D-B6		D-B59W		D-H7□ D-H7C D-H7□W D-H7NF		D-G5□W D-K59W D-G59F D-G5 D-K5 D-G5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
20	29	28	33	32	29.5	28.5	23.5	22.5	26.5	25.5	28.5	27.5	25	24
25	29	28	33	32	29.5	28.5	23.5	22.5	26.5	25.5	28.5	27.5	25	24
32	30	29	34	33	30.5	29.5	24.5	23.5	27.5	26.5	29.5	28.5	26	25
40	35	32	39	36	35.5	32.5	29.5	26.5	32	29.5	34.5	31.5	31	28
50	42	40	46	44	42.5	40.5	36.5	34.5	39.5	37.5	41.5	39.5	38	36
63	42	40	46	44	42.5	40.5	36.5	34.5	39.5	37.5	41.5	39.5	38	36
80	—	—	—	—	—	—	46.5	44.5	49.5	47.5	—	—	48	46
100	—	—	—	—	—	—	46.5	44.5	49.5	47.5	—	—	48	46

Auto Switch Mounting Height

(mm)

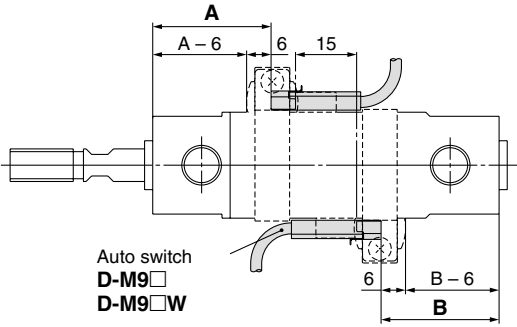
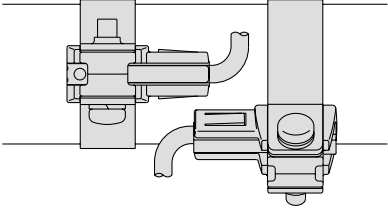
Auto switch model Bore size (mm)	D-A9□ D-M9□ D-M9□W	D-C7/C8 D-H7□ D-H7□W D-H7NF	D-C73C D-C80C	D-B5/B6 D-B59W D-K59W D-G5NTL D-G5/K5 D-G59F D-G5□W D-H7C
	Hs	Hs	Hs	Hs
20	24	24.5	27	27.5
25	26.5	27	29.5	30
32	30	30.5	33	33.5
40	34.5	35	37.5	38
50	40	40.5	43	43.5
63	47	47.5	50	50.5
80	—	—	—	59
100	—	—	—	69.5

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

Minimum Auto Switch Mounting Stroke

Auto switch model	No. of auto switch mounted				
	1 pc.	2 pcs.		n pcs.	
		Different surfaces	Same surface	Different surfaces	Same surface
D-A9 D-M9 D-M9W	10	15 Note 1)	45 Note 1)	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	45 + 45 (n-2)
D-C7 D-C80	10	15	50	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	50 + 45 (n-2)
D-H7 D-H7W D-H7NF	10	15	60	$15 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	60 + 45 (n-2)
D-C73C D-C80C	10	15	65	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	65 + 50 (n-2)
D-B5 D-B64 D-G5 D-K59	10	15	75	$15 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	75 + 55(n-2)
D-B59W	15	20	75	$20 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6...)	75 + 55(n-2)

Note 1) Auto switch mounting

Auto switch model	With 2 auto switches	
	Different surfaces Note 1)	Same surface Note 1)
	 Auto switch D-M9 D-M9W The proper auto switch mounting position is 6 mm inward from the switch holder edge.	 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-A93	—	Less than 50 strokes Note 2)
D-M9 D-M9W	Less than 20 strokes Note 2)	Less than 55 strokes Note 2)

Note 2) Minimum stroke for mounting auto switches in the other mounting styles mentioned in note 1.

REA**REB****REC****CY****CX****MQ****RHC****RZQ****D-****-X**Individual
-X

Series CG1Y

Operating Range

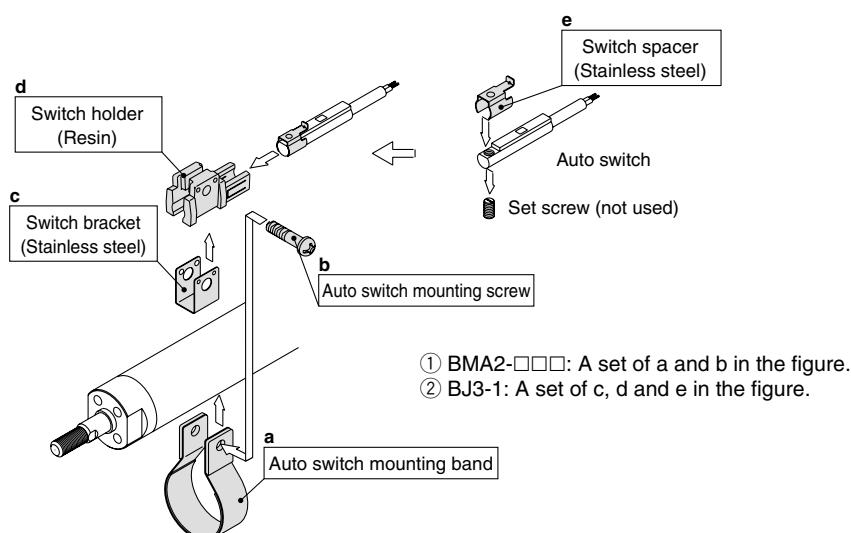
Auto switch model	Bore size (mm)							
	20	25	32	40	50	63	80	100
D-A9□	7	6	8	8	8	9	—	—
D-M9□ D-M9□W	4.5	5	4.5	5.5	5	5.5	—	—
D-C7/C80 D-C73C/C80C	8	10	9	10	10	11	—	—
D-B5□/B64	8	10	9	10	10	11	11	11
D-B59W	13	13	14	14	14	17	16	18
D-H7□/H7□W D-H7NF	4	4	4.5	5	6	6.5	—	—
D-H7C	7	8.5	9	10	9.5	10.5	—	—
D-G5□/G5□W/G59F D-G5BAL/K59/K59W	4	4	4.5	5	6	6.5	6.5	7
D-G5NTL	4	4	4.5	5	6	6.5	6.5	7
D-G5NBL	35	40	40	45	45	45	45	50

* Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately $\pm 30\%$ dispersion)
There may be the case it will vary substantially depending on an ambient environment.

Auto Switch Mounting Bracket Part No.

Auto switch model	Bore size (mm)							
	20	25	32	40	50	63	80	100
D-A9□ D-M9□ D-M9□W	Note) ① BMA2-020 ② BJ3-1	Note) ① BMA2-025 ② BJ3-1	Note) ① BMA2-032 ② BJ3-1	Note) ① BMA2-040 ② BJ3-1	Note) ① BMA2-050 ② BJ3-1	Note) ① BMA2-063 ② BJ3-1	—	—
D-C7□/C80 D-C73C D-C80C D-H7□ D-H7□W D-H7NF	BMA2-020	BMA2-025	BMA2-032	BMA2-040	BMA2-050	BMA2-063	—	—
D-B5□/B64 D-B59W D-G5□/K59 D-G5□W/K59W D-G59F D-G5NTL D-G5NBL	BA-01	BA-02	BA-32	BA-04	BA-05	BA-06	BA-08	BA-10

Note) Two kinds of auto switch mounting brackets are used as a set.



Cylinder Bracket by Stroke/Auto Switch Mounting Surface

Auto switch mounting surface varies depending on mounting brackets and cylinder strokes. Refer to the table below.

(mm)

No. of auto switches	Basic style, Foot style, Flange style, Clevis style			Trunnion style		
	1 (Rod cover side)	2 (Different surfaces)	2 (Same surface)	1 (Rod cover side)	2 (Different surfaces)	2 (Same surface)
Switch mounting surface	Port surface 	Port surface 	Port surface 			
Switch type						
D-A9 D-M9 D-M9W	10 st or more	15 to 44st	45 st or more	10 st or more	15 to 44 st	45 st or more
D-C7/C8	10 st or more	15 to 49st	50 st or more	10 st or more	15 to 49 st	50 st or more
D-H7 D-H7W D-H7NF	10 st or more	15 to 59st	60 st or more	10 st or more	15 to 59 st	60 st or more
D-C73C/C80C/H7C	10 st or more	15 to 64st	65 st or more	10 st or more	15 to 64 st	65 st or more
D-B5/B6/G5/K5 D-G5W/K59W D-G59F/G5NTL	10 st or more	15 to 74st	75 st or more	10 st or more	15 to 74 st	75 st or more
D-B59W	15 st or more	20 to 74st	75 st or more	15 st or more	20 to 74 st	75 st or more

* Trunnion style is not available for bore sizes ø80 and ø100.

Other than the applicable auto switches listed in "How to Order", the following auto switches can be mounted.
For detailed specifications, refer to pages 1719 to 1827.

Auto switch type	Model	Electrical entry (Direction)	Features	Applicable bore size
Reed	D-C73, C76	Grommet (In-line)	—	ø20 to ø63
	D-C80		Without indicator light	
	D-B53		—	ø20 to ø100
Solid state	D-H7A1, H7A2, H7B		—	ø20 to ø63
	D-H7NW, H7PW, H7BW		Diagnostic indication (2-color indication)	
	D-G5NTL		With timer	ø20 to ø100

* With pre-wired connector is available for solid state auto switches. For details, refer to pages 1784 to 1785.

* Normally closed (NC = b contact), solid state auto switches (D-F9G, F9H type) are also available. For details, refer to page 1746.

* Wide range detection type, solid state auto switches (D-G5NBL type) are also available. Refer to page 1776 for details.

REA**REB****REC****CY****CX****MQ****RHC****RZQ****D-□****-X□**Individual
-X□