# Air Cylinder

## *CG3* Series

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

RoHS

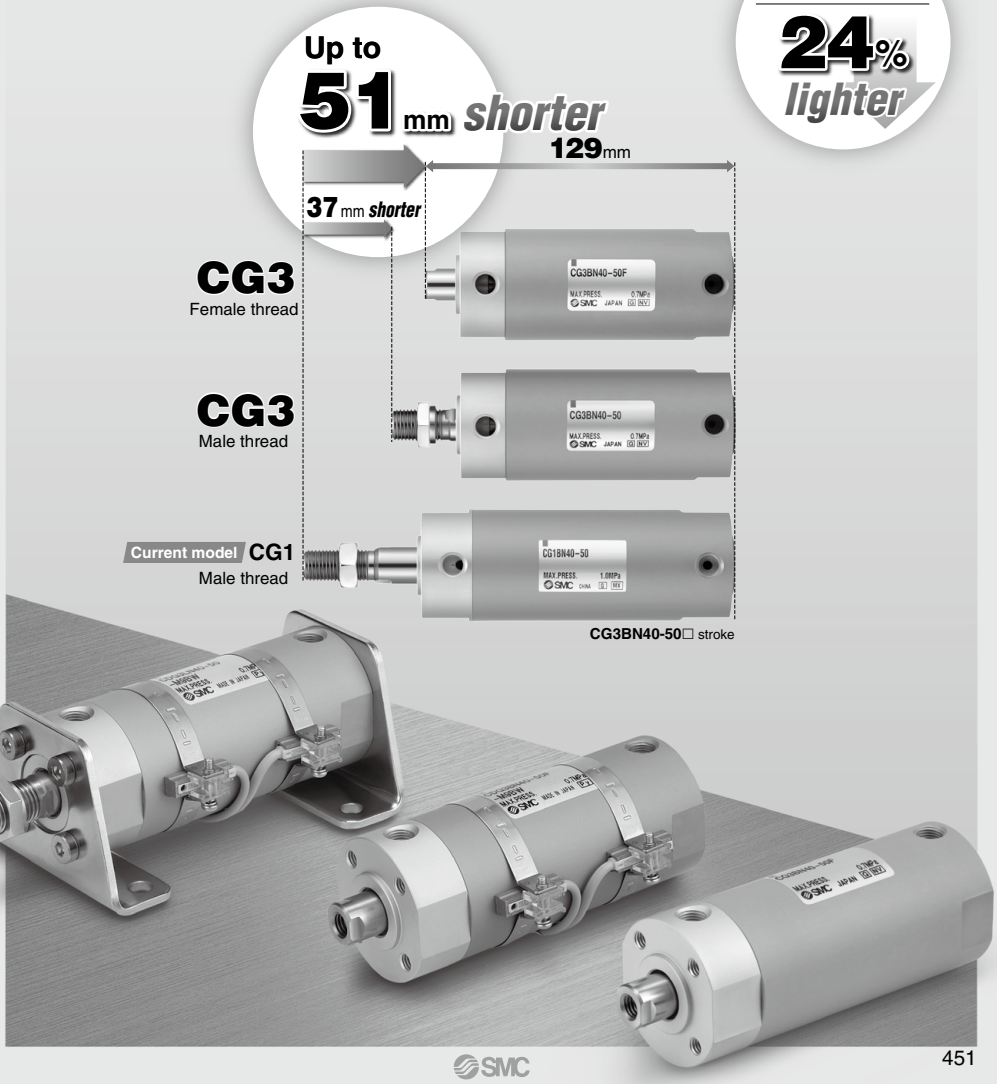
## Compact with a new construction!
## New release with full functions

## Minimized with shorter total length!

**Space saving; contributes to downsizing of equipment.**

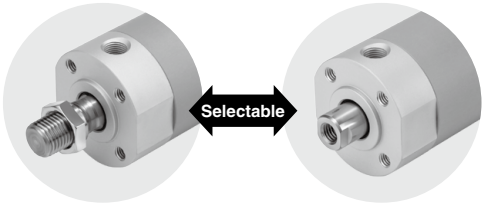
Up to **51** mm *shorter*

Up to **24**% *lighter*



## Female rod end available as standard

Applications expanded by making it possible to select either male or female thread within the standard model.

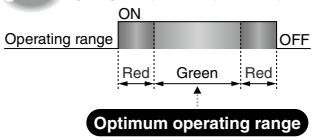



Male thread　　Female thread

## 2-color indicator solid state auto switch mountable

Possible to confirm whether the position is appropriate at a glance.
Increases effectiveness of adjustment time.

A green light lights up at the optimum operating range.




### Total length minimized

- The new structure has reduced the total length.
- Up to 37 mm shorter than CG1 series, making the product more compact.
- Integrated structure of head cover and tube

**Comparison of the total length with CG1 series**

| Bore size (mm) | Shortened by |
|---|---|
| 20 | 27 mm |
| 25 | 26 mm |
| 32 | 26 mm |
| 40 | 37 mm |
| 50 | 29 mm |
| 63 | 29 mm |
| 80 | 31 mm |
| 100 | 30 mm |


∗ Compared with the basic type with male thread



**Small auto switches are mountable.**
(ø20 to ø63)

### Series Variations

| Series | Bore size (mm) | Standard stroke (mm) | Action | Rod | Mounting | Built-in magnet for auto switch | Rubber bumper | Auto switch |
|---|---|---|---|---|---|---|---|---|
| CG3 | 20 | 25 to 200 | Double acting | Single rod | Basic, Foot, Flange, Clevis | ● | ● | D-M9□(W), D-A90 |
| | 25 to 63 | 25 to 300 | | | | | | |
| | 80, 100 | | | | | | | D-G5□(W), D-K59(W), D-B64 |

∗ For the trunnion type, please contact SMC sales representatives.

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

RoHS

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

## How to Order

**CG3 L N 25 – 100 – **

**With auto switch** **CDG3 L N 25 – 100 – M9BW – C – **

**With auto switch** (Built-in magnet)

**Mounting**

| | |
|---|---|
| B | Basic |
| L | Foot |
| F | Rod flange |
| G | Head flange |
| D | Clevis |

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

**Cushion**

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

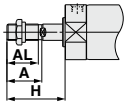
**Bore size**

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

**Rod end thread**

| | |
|---|---|
| Nil | Male thread |
| F | Female thread |
| G | Long male rod end* |

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




**Cylinder stroke (mm)**
Refer to the next page for standard strokes.

**Auto switch**

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

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

**Made to Order**
For details, refer to page 454.

**Auto switch mounting bracket** Note)
Note) This symbol is indicated when the D-A9□ or M9□ type auto switch is specified. This mounting bracket does not apply to other auto switches (D-C7□ and H7□, etc.) (Nil)

**Number of auto switches**

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

### Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CDG3FN32-100

### Applicable Auto Switches/Refer to pages 1271 to 1365 for further information on auto switches.

| Type | Special function | Electrical entry | Indicator light | Wiring (Output) | Load voltage DC | Load voltage AC | Auto switch model: Applicable bore size ø20 to ø63 Perpendicular | Auto switch model: Applicable bore size ø20 to ø63 In-line | Auto switch model: Applicable bore size ø80, ø100 In-line | Lead wire length (m) 0.5 (Nil) | 1 (M) | 3 (L) | 5 (Z) | None (N) | Pre-wired connector | Applicable load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Solid state auto switch | — | Grommet | Yes | 3-wire (NPN) | 5 V, 12 V | — | M9NV | M9N | — | ● | ● | ● | ○ | — | ○ | IC circuit | Relay, PLC |
| | | | | | | | — | — | G59 | ● | — | ● | ○ | — | ○ | | |
| | | | | 3-wire (PNP) | | | M9PV | M9P | — | ● | ● | ● | ○ | — | ○ | | |
| | | | | | | | — | — | G5P | ● | — | ● | ○ | — | ○ | | |
| | | | | 2-wire | 12 V | | M9BV | M9B | — | ● | ● | ● | ○ | — | ○ | — | |
| | | | | | | | — | — | K59 | ● | — | ● | ○ | — | ○ | | |
| | | Connector | | | | | — | H7C | — | ● | — | ● | ● | ● | — | | |
| | Diagnostic indication (2-color indicator) | Grommet | | 3-wire (NPN) | 5 V, 12 V | | M9NWV | M9NW | — | ● | ● | ● | ○ | — | ○ | IC circuit | |
| | | | | | | | — | — | G59W | ● | — | ● | ○ | — | ○ | | |
| | | | | 3-wire (PNP) | | | M9PWV | M9PW | — | ● | ● | ● | ○ | — | ○ | | |
| | | | | | | | — | — | G5PW | ● | — | ● | ○ | — | ○ | | |
| | | | | 2-wire | 12 V | | M9BWV | M9BW | — | ● | ● | ● | ○ | — | ○ | — | |
| | | | | | | | — | — | K59W | ● | — | ● | ○ | — | ○ | | |
| | Water resistant (2-color indicator) | | | 3-wire (NPN) | 5 V, 12 V | | M9NAV∗1 | M9NA∗1 | — | ○ | ○ | ● | ○ | — | ○ | IC circuit | |
| | | | | 3-wire (PNP) | | | M9PAV∗1 | M9PA∗1 | — | ○ | ○ | ● | ○ | — | ○ | | |
| | | | | 2-wire | 12 V | | M9BAV∗1 | M9BA∗1 | — | ○ | ○ | ● | ○ | — | ○ | — | |
| | | | | | | | — | — | G5BA∗1 | — | — | ● | ○ | — | ○ | | |
| | | | | 4-wire (NPN) | 5 V, 12 V | | — | H7NF | G59F | ● | — | ● | ○ | — | ○ | IC circuit | |
| | With diagnostic output (2-color indicator) | | | | | | | | | | | | | | | | |
| Reed auto switch | — | Grommet | Yes | 3-wire (NPN equivalent) | 5 V | — | A96V | A96 | — | ● | ● | ● | ● | — | ○ | IC circuit | — |
| | | | No | 2-wire | 12 V | 100 V | A93V | A93 | — | ● | ● | ● | ● | — | ○∗2 | — | Relay, PLC |
| | | | Yes | | | 100 V or less | A90V | A90 | — | ● | ● | ● | ● | — | ○∗2 | IC circuit | |
| | | | No | | | 100 V, 200 V | — | B54 | | ● | — | ● | ● | — | — | — | |
| | | | Yes | | | 200 V or less | — | B64 | | ● | — | ● | — | — | — | | |
| | | Connector | No | | | — | — | C73C | — | ● | — | ● | ● | ● | — | | |
| | | | Yes | | | 24 V or less | — | C80C | — | ● | — | ● | ● | ● | — | IC circuit | |
| | Diagnostic indication (2-color indicator) | Grommet | Yes | | — | — | — | B59W | | ● | — | ● | — | — | — | — | |

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

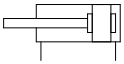
∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ
None ····· N (Example) H7CN

∗ Auto switches marked with "○" are produced upon receipt of order.
∗ The D-G5□/K5□/B5□/B6□ types cannot be mounted on the bore size ø40.

∗ Since there are other applicable auto switches than listed above, refer to page 464 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1340 and 1341.
∗ The D-A9□(V)/M9□(V)/M9□W(V)/M9□A(V) type auto switches are shipped together, (but not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

## Symbol

**Rubber bumper**



Refer to pages 461 to 464 for cylinders with auto switches.

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

**Made to Order**
Click here for details

| Symbol | Specification |
|---|---|
| -XA□ | Change of rod end shape |

## Specifications

| Bore size (mm) | | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|---|---|---|---|
| **Action** | | Double acting, Single rod | | | | | | | |
| **Lubrication** | | Not required (Non-lube) | | | | | | | |
| **Fluid** | | Air | | | | | | | |
| **Proof pressure** | | 1.0 MPa | | | | | | | |
| **Maximum operating pressure** | | 0.7 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 | | | | | | | 30 to 700 mm/s |
| **Stroke length tolerance** | | $^{+1.4}_{0}$ mm | | | | | | | |
| **Cushion** | | Rubber bumper | | | | | | | |
| **Mounting** | | Basic, Foot, Rod flange, Head flange, Clevis | | | | | | | |
| **Allowable kinetic energy** | **Male rod end** | 0.2 J | 0.29 J | 0.46 J | 0.84 J | 1.4 J | 2.38 J | 4.13 J | 6.93 J |
| | **Female rod end** | 0.11 J | 0.18 J | 0.29 J | 0.52 J | 0.91 J | 1.54 J | 2.71 J | 4.54 J |

∗ Operate the cylinder within the allowable kinetic energy. Refer to page 456 for details.

## Standard Strokes

| Bore size (mm) | Standard stroke (mm) Note) |
|---|---|
| **20** | 25, 50, 75, 100, 125, 150, 200 |
| **25** | 25, 50, 75, 100, 125, 150, 200, 250, 300 |
| **32** | |
| **40** | |
| **50** | |
| **63** | |
| **80** | |
| **100** | |

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

## Accessories

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

∗ A double knuckle joint pin and retaining rings are shipped together.
∗ For part numbers and dimensions, refer to page 460.

## Mounting Brackets/Part No.

| Mounting bracket | Order qty. | Bore size (mm) 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | Contents |
|---|---|---|---|---|---|---|---|---|---|---|
| Foot | Note) 2 | CG-L020 | CG-L025 | CG-L032 | CG3-L040 | CG-L050 | CG-L063 | CG-L080 | CG-L100 | 2 foots, 8 mounting bolts |
| Flange | 1 | CG3-F020 | CG3-F025 | CG-F032 | CG3-F040 | CG-F050 | CG-F063 | CG-F080 | CG-F100 | 1 flange, 4 mounting bolts |
| Clevis | 1 | CG-D020 | CG-D025 | CG-D032 | CG3-D040 | CG-D050 | CG-D063 | CG-D080 | CG-D100 | 1 clevis, 4 mounting bolts, 1 clevis pin, 2 retaining rings |
| Pivoting bracket | 1 | CG-020-24A | CG-025-24A | CG-032-24A | CG-040-24A | CG-050-24A | CG-063-24A | CG-080-24A | CG-100-24A | 1 pivoting bracket |

Note) Order 2 foots per cylinder.

## Theoretical Output

Unit: N

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

## Weights

(kg)

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

Calculation: (Example) **CDG3FN20-100** (Built-in magnet, Flange type, ø20, 100 mm stroke)

- Basic weight ····· 0.09 (Basic type, ø20)
- Additional weight for bracket ····· 0.08 (Flange)
- Additional weight for stroke ····· 0.05/50 mm
- Air cylinder stroke····· 100 mm
- Additional weight for switch magnet ···· 0.01

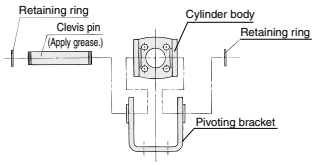
0.09 + 0.08 + 0.05 x (100/50) + 0.01 = 0.28 kg

## Mounting Procedure

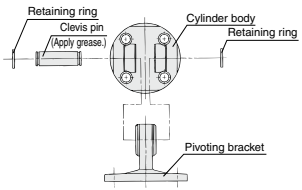
### Mounting procedure for clevis

Follow the procedures below when mounting a pivoting bracket on the clevis type.

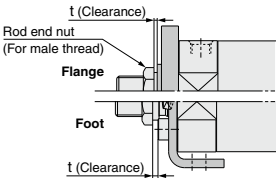
**ø20 to ø63**




**ø80, ø100**




### Mounting procedure for rod end nut




## ⚠Caution

1. **Tighten clevis bracket mounting bolts with the following proper tightening torque.**
   ø20: 1.5 N·m, ø25 to ø32: 2.9 N·m, ø40: 4.9 N·m
   ø50: 11.8 N·m, ø63 to ø80: 24.5 N·m, ø100: 42.2 N·m
2. **For the flange type and the foot type, mount the rod end nut so that distance t (clearance) will be 1 mm or more in order to prevent interference of the nut with the bracket when the rod is retracted.**
3. **The rod end nut (for male thread) should be mounted so that the hexagon part is on the rod end side. Apply the wrench to the hexagon part.**

## Allowable Kinetic Energy

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

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

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

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

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

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

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

### Table (3) Additional Mass [g]

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

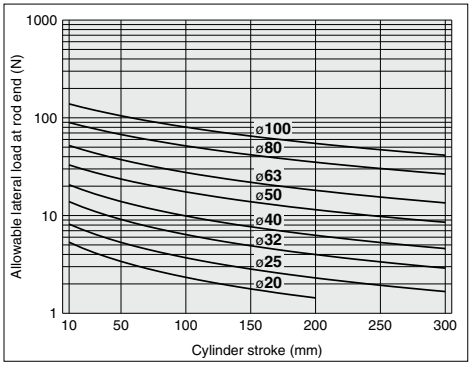
∗ Do not apply a lateral load over the allowable range to the rod end when it is mounted horizontally.

Calculation: (Example) **CDG3BN40-150**

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

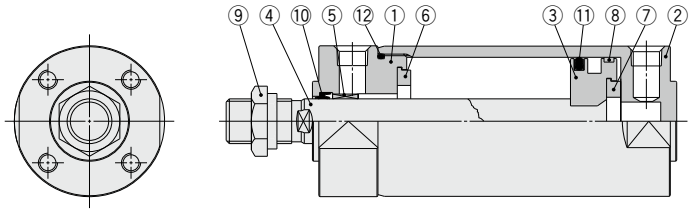
Total 317 g

## Allowable Lateral Load at Rod End




## Construction

### With rubber bumper




### Component Parts

| No. | Description | Material | Note |
|---|---|---|---|
| 1 | **Rod cover** | Aluminum alloy | Hard anodized |
| 2 | **Tube cover** | Aluminum alloy | Hard anodized |
| 3 | **Piston** | Aluminum alloy | Chromated |
| 4 | **Piston rod** | Carbon steel∗ | Hard chrome plated∗ |
| 5 | **Bushing** | Bearing alloy | |
| 6 | **Bumper A** | Resin | |
| 7 | **Bumper B** | Resin | |
| 8 | **Wear ring** | Resin | |
| 9 | **Rod end nut** | Carbon steel | Nickel plated |
| 10 | **Rod seal** | NBR | |
| 11 | **Piston seal** | NBR | |
| 12 | **Tube gasket** | NBR | |

Note) In the case of cylinders with auto switches, magnets are installed in the piston.
∗ The material for ø20 and ø25 cylinders with auto switches is made of stainless steel.

### Replacement Parts/Seal Kit

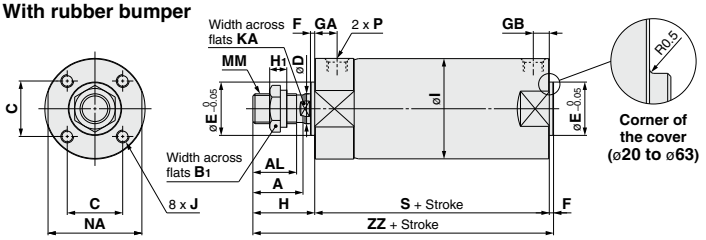
| Bore size (mm) | Kit no. | Contents |
|---|---|---|
| **20** | CG3N20-PS | Set of the nos. ⑩, ⑪, ⑫ |
| **25** | CG3N25-PS | |
| **32** | CG3N32-PS | |
| **40** | CG3N40-PS | |

Note) As sizes ø50 and larger cannot be disassembled, the seal cannot be replaced.
Note) Refer to the following 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)

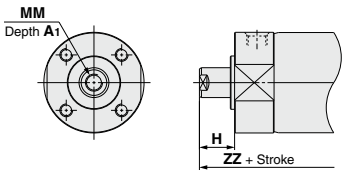
## Dimensions

### Basic: CG3BN **Bore size** – **Stroke**

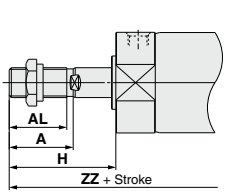
**With rubber bumper**




**Female rod end**




**Long male rod end**




**Female Rod End** (mm)

| Bore size (mm) | Standard stroke | A1 | H | MM | ZZ |
|---|---|---|---|---|---|
| 20 | Up to 200 | 8 | 13 | M4 x 0.7 | 72 |
| 25 | Up to 300 | 8 | 14 | M5 x 0.8 | 76 |
| 32 | Up to 300 | 12 | 14 | M6 x 1 | 78 |
| 40 | Up to 300 | 13 | 15 | M8 x 1.25 | 79 |
| 50 | Up to 300 | 18 | 16 | M10 x 1.5 | 102 |
| 63 | Up to 300 | 18 | 16 | M10 x 1.5 | 102 |
| 80 | Up to 300 | 21 | 19 | M14 x 1.5 | 126 |
| 100 | Up to 300 | 25 | 22 | M16 x 1.5 | 130 |

**Long Male Rod End** *2 (mm)

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

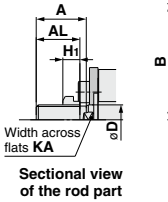
**Basic** (mm)

| Bore size (mm) | Standard stroke | A | AL | B1 | C | D | E | F | GA | GB | H | H1 | I | J | KA | MM | NA | P | S | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | Up to 200 | 14.5 | 12 | 13 | 14 | 8 | 12 | 2 | 12 | 6 | 20 | 5 | 26 | M4 x 0.7 depth 7 | Width across flats 6 length 3.5 | M8 x 1.25 | 24 | M5 x 0.8 | 57 | 79 |
| 25 | Up to 300 | 17.5 | 15 | 17 | 16.5 | 10 | 14 | 2 | 12.5 | 7 | 23 | 6 | 31 | M5 x 0.8 depth 7.5 | Width across flats 8 length 3.5 | M10 x 1.25 | 29 | M5 x 0.8 | 60 | 85 |
| 32 | Up to 300 | 17.5 | 15 | 17 | 20 | 12 | 18 | 2 | 11 | 7.5 | 23 | 6 | 38 | M5 x 0.8 depth 8 | Width across flats 10 length 3.5 | M10 x 1.25 | 35.5 | Rc1/8 | 62 | 87 |
| 40 | Up to 300 | 23.5 | 20.5 | 19 | 26 | 14 | 25 | 2 | 10.5 | 7.5 | 29 | 8 | 47 | M6 x 1 depth 10 | Width across flats 12 length 3.5 | M14 x 1.5 | 44 | Rc1/8 | 62 | 93 |
| 50 | Up to 300 | 29 | 26 | 27 | 32 | 18 | 30 | 2 | 15 | 12 | 35 | 11 | 58 | M8 x 1.25 depth 16 | Width across flats 16 length 4.5 | M18 x 1.5 | 55 | Rc1/4 | 84 | 121 |
| 63 | Up to 300 | 29 | 26 | 27 | 38 | 18 | 32 | 2 | 15 | 12 | 35 | 11 | 72 | M10 x 1.5 depth 16 | Width across flats 16 length 4.5 | M18 x 1.5 | 69 | Rc1/4 | 84 | 121 |
| 80 | Up to 300 | 35.5 | 32.5 | 32 | 50 | 22 | 40 | 3 | 17 | 16 | 44 | 13 | 89 | M10 x 1.5 depth 22 | Width across flats 19 length 4.5 | M22 x 1.5 | 80 | Rc1/4 | 104 | 151 |
| 100 | Up to 300 | 35.5 | 32.5 | 41 | 60 | 26 | 50 | 3 | 20 | 16 | 44 | 16 | 110 | M12 x 1.75 depth 22 | Width across flats 22 length 4.5 | M26 x 1.5 | 100 | Rc3/8 | 105 | 152 |

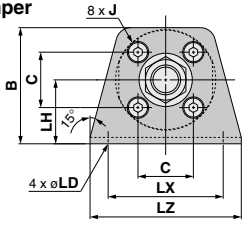
*1 Use a thin wrench when tightening the piston rod.
*2 Long male rod end type (G) is the same rod end dimensions (A, AL, H) as the CG1 series.
*3 When female thread is used, use a washer, etc. to prevent the contact part at the rod end from being deformed depending on the material of the work piece.

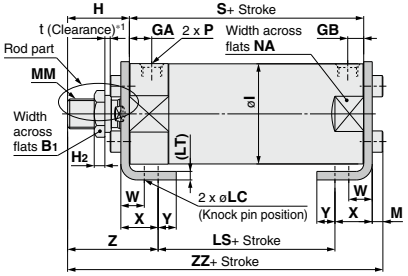
### Foot: CG3LN **Bore size** – **Stroke**

**With rubber bumper**




**Sectional view of the rod part**




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

**Foot** (mm)

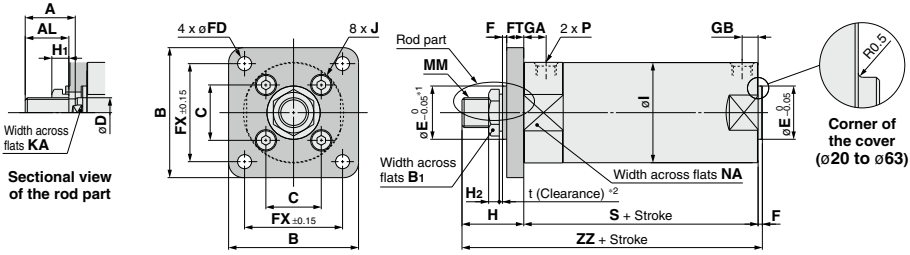
| Bore size (mm) \ Symbol | A | AL | B | B1 | C | D | GA | GB | H | H1 | H2 | I | J | KA | LC | LD | LH | LS | LT | LX | LZ | M | MM | NA | P | S | W | X | Y | Z | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 14.5 | 12 | 34 | 13 | 14 | 8 | 12 | 6 | 20 | 5 | 4 | 26 | M4 x 0.7 | Width across flats 6 length 3.5 | 4 | 6 | 20 | 33 | (3) | 32 | 44 | 3 | M8 x 1.25 | 24 | M5 x 0.8 | 57 | 10 | 15 | 7 | 32 | 83 |
| 25 | 17.5 | 15 | 38.5 | 17 | 16.5 | 10 | 12.5 | 7 | 23 | 6 | 4 | 31 | M5 x 0.8 | Width across flats 8 length 3.5 | 4 | 6 | 22 | 36 | (3) | 36 | 49 | 3.5 | M10 x 1.25 | 29 | M5 x 0.8 | 60 | 10 | 15 | 7 | 35 | 89.5 |
| 32 | 17.5 | 15 | 45 | 17 | 20 | 12 | 11 | 7.5 | 23 | 6 | 4 | 38 | M5 x 0.8 | Width across flats 10 length 3.5 | 4 | 7 | 25 | 36 | (3) | 44 | 58 | 3.5 | M10 x 1.25 | 35.5 | Rc1/8 | 62 | 10 | 16 | 8 | 36 | 91.5 |
| 40 | 23.5 | 20.5 | 54.5 | 19 | 26 | 14 | 10.5 | 7.5 | 29 | 8 | 5.5 | 47 | M6 x 1 | Width across flats 12 length 3.5 | 4 | 7 | 30 | 35 | (3) | 54 | 71 | 4 | M14 x 1.5 | 44 | Rc1/8 | 62 | 10 | 16.5 | 8.5 | 42.5 | 98 |
| 50 | 29 | 26 | 70.5 | 27 | 32 | 18 | 15 | 12 | 35 | 11 | 8 | 58 | M8 x 1.25 | Width across flats 16 length 4.5 | 5 | 10 | 40 | 49 | (4.5) | 66 | 86 | 5 | M18 x 1.5 | 55 | Rc1/4 | 84 | 17.5 | 22 | 11 | 52.5 | 128.5 |
| 63 | 29 | 26 | 82.5 | 27 | 38 | 18 | 15 | 12 | 35 | 11 | 8 | 72 | M10 x 1.5 | Width across flats 16 length 4.5 | 5 | 12 | 45 | 49 | (4.5) | 82 | 106 | 5 | M18 x 1.5 | 69 | Rc1/4 | 84 | 17.5 | 22 | 13 | 52.5 | 128.5 |
| 80 | 35.5 | 32.5 | 101 | 32 | 50 | 22 | 17 | 16 | 44 | 13 | 9.5 | 89 | M10 x 1.5 | Width across flats 19 length 4.5 | 6 | 11 | 55 | 56 | (4.5) | 100 | 125 | 5 | M22 x 1.5 | 80 | Rc1/4 | 104 | 20 | 28.5 | 14 | 68 | 157.5 |
| 100 | 35.5 | 32.5 | 121 | 41 | 60 | 26 | 20 | 16 | 44 | 16 | 9.5 | 110 | M12 x 1.75 | Width across flats 22 length 4.5 | 6 | 14 | 65 | 57 | (6) | 120 | 150 | 7 | M26 x 1.5 | 100 | Rc3/8 | 105 | 20 | 30 | 16 | 68 | 162 |

* Use a thin wrench when tightening the piston rod.
* Refer to the dimensions of the basic type for the female rod end type and the long male rod end type.

## Dimensions

### Rod Flange: CG3FN Bore size – Stroke

**With rubber bumper**




∗1 End boss is machined on the flange for øE.

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

### Rod Flange

(mm)

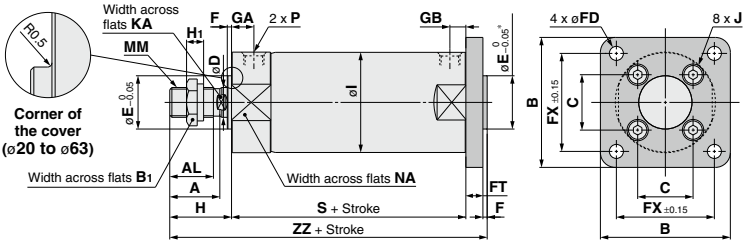
| Bore size (mm) \ Symbol | A | AL | B | B1 | C | D | E | F | FX | FD | FT | GA | GB | H | H1 | H2 | I | J | KA | MM | NA | P | S | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | 14.5 | 12 | 40 | 13 | 14 | 8 | 12 | 2 | 28 | 5.5 | 6 | 12 | 6 | 20 | 5 | 4 | 26 | M4 x 0.7 | Width across flats 6 length 3.5 | M8 x 1.25 | 24 | M5 x 0.8 | 57 | 79 |
| **25** | 17.5 | 15 | 44 | 17 | 16.5 | 10 | 14 | 2 | 32 | 5.5 | 7 | 12.5 | 7 | 23 | 6 | 4 | 31 | M5 x 0.8 | Width across flats 8 length 3.5 | M10 x 1.25 | 29 | M5 x 0.8 | 60 | 85 |
| **32** | 17.5 | 15 | 53 | 17 | 20 | 12 | 18 | 2 | 38 | 6.6 | 7 | 11 | 7.5 | 23 | 6 | 4 | 38 | M5 x 0.8 | Width across flats 10 length 3.5 | M10 x 1.25 | 35.5 | Rc1/8 | 62 | 87 |
| **40** | 23.5 | 20.5 | 61 | 19 | 26 | 14 | 25 | 2 | 46 | 6.6 | 8 | 10.5 | 7.5 | 29 | 8 | 5.5 | 47 | M6 x 1 | Width across flats 12 length 3.5 | M14 x 1.5 | 44 | Rc1/8 | 62 | 93 |
| **50** | 29 | 26 | 76 | 27 | 32 | 18 | 30 | 2 | 58 | 9 | 9 | 15 | 12 | 35 | 11 | 8 | 58 | M8 x 1.25 | Width across flats 16 length 4.5 | M18 x 1.5 | 55 | Rc1/4 | 84 | 121 |
| **63** | 29 | 26 | 92 | 27 | 38 | 18 | 32 | 2 | 70 | 11 | 9 | 15 | 12 | 35 | 11 | 8 | 72 | M10 x 1.5 | Width across flats 16 length 4.5 | M18 x 1.5 | 69 | Rc1/4 | 84 | 121 |
| **80** | 35.5 | 32.5 | 104 | 32 | 50 | 22 | 40 | 3 | 82 | 11 | 11 | 17 | 16 | 44 | 13 | 9.5 | 89 | M10 x 1.5 | Width across flats 19 length 4.5 | M22 x 1.5 | 80 | Rc1/4 | 104 | 151 |
| **100** | 35.5 | 32.5 | 128 | 41 | 60 | 26 | 50 | 3 | 100 | 14 | 14 | 20 | 16 | 44 | 16 | 9.5 | 110 | M12 x 1.75 | Width across flats 22 length 4.5 | M26 x 1.5 | 100 | Rc3/8 | 105 | 152 |

∗ Use a thin wrench when tightening the piston rod.

∗ Refer to the dimensions of the basic type for the female rod end type and the long male rod end type.

### Head Flange: CG3GN Bore size – Stroke

**With rubber bumper**




∗ End boss is machined on the flange for øE.

### Head Flange

(mm)

| Bore size (mm) | Standard stroke | A | AL | B | B1 | C | D | E | F | FX | FD | FT | GA | GB | H | H1 | I | J | KA | MM | NA | P | S | ZZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | Up to 200 | 14.5 | 12 | 40 | 13 | 14 | 8 | 12 | 2 | 28 | 5.5 | 6 | 12 | 6 | 20 | 5 | 26 | M4 x 0.7 | Width across flats 6 length 3.5 | M8 x 1.25 | 24 | M5 x 0.8 | 57 | 85 |
| **25** | Up to 300 | 17.5 | 15 | 44 | 17 | 16.5 | 10 | 14 | 2 | 32 | 5.5 | 7 | 12.5 | 7 | 23 | 6 | 31 | M5 x 0.8 | Width across flats 8 length 3.5 | M10 x 1.25 | 29 | M5 x 0.8 | 60 | 92 |
| **32** | Up to 300 | 17.5 | 15 | 53 | 17 | 20 | 12 | 18 | 2 | 38 | 6.6 | 7 | 11 | 7.5 | 23 | 6 | 38 | M5 x 0.8 | Width across flats 10 length 3.5 | M10 x 1.25 | 35.5 | Rc1/8 | 62 | 94 |
| **40** | Up to 300 | 23.5 | 20.5 | 61 | 19 | 26 | 14 | 25 | 2 | 46 | 6.6 | 8 | 10.5 | 7.5 | 29 | 8 | 47 | M6 x 1 | Width across flats 12 length 3.5 | M14 x 1.5 | 44 | Rc1/8 | 62 | 101 |
| **50** | Up to 300 | 29 | 26 | 76 | 27 | 32 | 18 | 30 | 2 | 58 | 9 | 9 | 15 | 12 | 35 | 11 | 58 | M8 x 1.25 | Width across flats 16 length 4.5 | M18 x 1.5 | 55 | Rc1/4 | 84 | 130 |
| **63** | Up to 300 | 29 | 26 | 92 | 27 | 38 | 18 | 32 | 2 | 70 | 11 | 9 | 15 | 12 | 35 | 11 | 72 | M10 x 1.5 | Width across flats 16 length 4.5 | M18 x 1.5 | 69 | Rc1/4 | 84 | 130 |
| **80** | Up to 300 | 35.5 | 32.5 | 104 | 32 | 50 | 22 | 40 | 3 | 82 | 11 | 11 | 17 | 16 | 44 | 13 | 89 | M10 x 1.5 | Width across flats 19 length 4.5 | M22 x 1.5 | 80 | Rc1/4 | 104 | 162 |
| **100** | Up to 300 | 35.5 | 32.5 | 128 | 41 | 60 | 26 | 50 | 3 | 100 | 14 | 14 | 20 | 16 | 44 | 16 | 110 | M12 x 1.75 | Width across flats 22 length 4.5 | M26 x 1.5 | 100 | Rc3/8 | 105 | 166 |

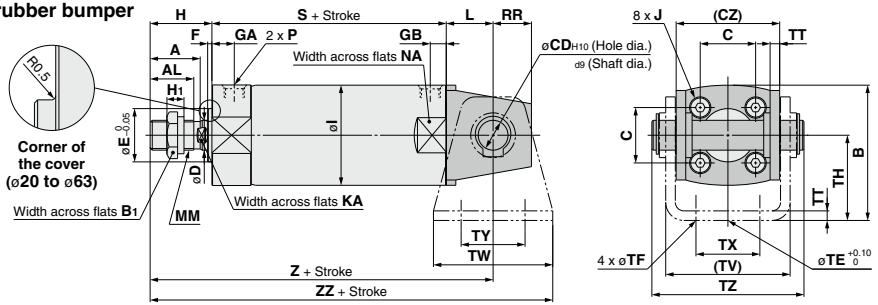
∗ Use a thin wrench when tightening the piston rod.

∗ Refer to the dimensions of the basic type for the female rod end type and the long male rod end type.

## Dimensions

### Clevis: CG3DN Bore size – Stroke (ø20 to ø63)

**With rubber bumper**




### Clevis (ø20 to ø63)

(mm)

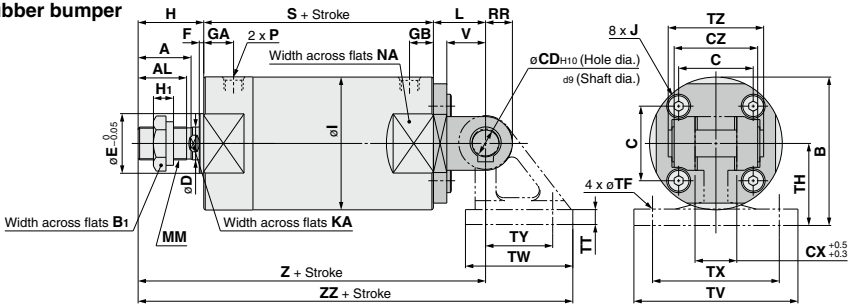
| Bore size (mm) | Standard stroke | A | AL | B | B1 | C | CD | CZ | D | E | F | GA | GB | H | H1 | I | J | KA | L | MM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | Up to 200 | 14.5 | 12 | 38 | 13 | 14 | 8 | (29) | 8 | 12 | 2 | 12 | 6 | 20 | 5 | 26 | M4 x 0.7 | Width across flats 6 length 3.5 | 14 | M8 x 1.25 |
| **25** | Up to 300 | 17.5 | 15 | 45.5 | 17 | 16.5 | 10 | (33) | 10 | 14 | 2 | 12.5 | 7 | 23 | 6 | 31 | M5 x 0.8 | Width across flats 8 length 3.5 | 16 | M10 x 1.25 |
| **32** | Up to 300 | 17.5 | 15 | 54 | 17 | 20 | 12 | (40) | 12 | 18 | 2 | 11 | 7.5 | 23 | 6 | 38 | M5 x 0.8 | Width across flats 10 length 3.5 | 20 | M10 x 1.25 |
| **40** | Up to 300 | 23.5 | 20.5 | 63.5 | 19 | 26 | 14 | (49) | 14 | 25 | 2 | 10.5 | 7.5 | 29 | 8 | 47 | M6 x 1 | Width across flats 12 length 3.5 | 22 | M14 x 1.5 |
| **50** | Up to 300 | 29 | 26 | 79 | 27 | 32 | 16 | (60) | 18 | 30 | 2 | 15 | 12 | 35 | 11 | 58 | M8 x 1.25 | Width across flats 16 length 4.5 | 25 | M18 x 1.5 |
| **63** | Up to 300 | 29 | 26 | 96 | 27 | 38 | 18 | (74) | 18 | 32 | 2 | 15 | 12 | 35 | 11 | 72 | M10 x 1.5 | Width across flats 16 length 4.5 | 30 | M18 x 1.5 |

| Bore size (mm) | Standard stroke | NA | P | RR | S | TE | TF | TH | TT | TV | TW | TX | TY | TZ | Z | ZZ | Applicable pin part no. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **20** | Up to 200 | 24 | M5 x 0.8 | 11 | 57 | 10 | 5.5 | 25 | 3.2 | (35.8) | 42 | 16 | 28 | 43.4 | 91 | 112 | CD-G02 |
| **25** | Up to 300 | 29 | M5 x 0.8 | 13 | 60 | 10 | 5.5 | 30 | 3.2 | (39.8) | 42 | 20 | 28 | 48 | 99 | 120 | CD-G25 |
| **32** | Up to 300 | 35.5 | Rc1/8 | 15 | 62 | 10 | 6.6 | 35 | 4.5 | (49.4) | 48 | 22 | 28 | 59.4 | 105 | 129 | CD-G03 |
| **40** | Up to 300 | 44 | Rc1/8 | 18 | 62 | 10 | 6.6 | 40 | 4.5 | (58.4) | 56 | 30 | 30 | 71.4 | 113 | 141 | CD-G04 |
| **50** | Up to 300 | 55 | Rc1/4 | 20 | 84 | 20 | 9 | 50 | 6 | (72.4) | 64 | 36 | 36 | 86 | 144 | 176 | CD-G05 |
| **63** | Up to 300 | 69 | Rc1/4 | 22 | 84 | 20 | 11 | 60 | 8 | (90.4) | 74 | 46 | 46 | 105.4 | 149 | 186 | CD-G06 |

∗ Use a thin wrench when tightening the piston rod. ∗ Refer to the dimensions of the basic type for the female rod end type and the long male rod end type.
∗ Refer to page 460 for pivoting bracket.

### Clevis: CG3DN Bore size – Stroke (ø80, ø100)

**With rubber bumper**




### Clevis (ø80, ø100)

(mm)

| Bore size (mm) | Standard stroke | A | AL | B | B1 | C | CD | CX | CZ | D | E | F | GA | GB | H | H1 | I | J | KA | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **80** | Up to 300 | 35.5 | 32.5 | 99.5 | 32 | 50 | 18 | 28 | 56 | 22 | 40 | 3 | 17 | 16 | 44 | 13 | 89 | M10 x 1.5 | Width across flats 19 length 4.5 | 35 |
| **100** | Up to 300 | 35.5 | 32.5 | 120 | 41 | 60 | 22 | 32 | 64 | 26 | 50 | 3 | 20 | 16 | 44 | 16 | 110 | M12 x 1.75 | Width across flats 22 length 4.5 | 43 |

| Bore size (mm) | Standard stroke | MM | NA | P | RR | S | TF | TH | TT | TV | TW | TX | TY | TZ | V | Z | ZZ | Applicable pin part no. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **80** | Up to 300 | M22 x 1.5 | 80 | Rc1/4 | 18 | 104 | 11 | 55 | 11 | 110 | 72 | 85 | 45 | 64 | 26 | 183 | 241.5 | IY-G08 |
| **100** | Up to 300 | M26 x 1.5 | 100 | Rc3/8 | 22 | 105 | 13.5 | 65 | 12 | 130 | 93 | 100 | 60 | 72 | 32 | 192 | 268.5 | IY-G10 |

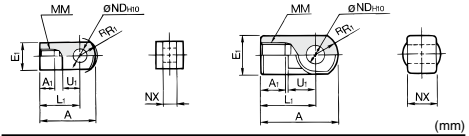
∗ Use a thin wrench when tightening the piston rod. ∗ Refer to the dimensions of the basic type for the female rod end type and the long male rod end type.
∗ Refer to page 460 for pivoting bracket.

# Dimensions of Accessories

## Single Knuckle Joint

**I-G02, I-G03**
Material: Carbon steel

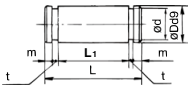
**I-G04, I-G05, I-G08, I-G10**
Material: Cast iron




(mm)

| Part no. | Applicable bore size (mm) | A | A1 | E1 | L1 | MM | R1 | U1 | 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 | ø22 | 30 | M14 x 1.5 | 12 | 14 | $10^{+0.058}_{0}$ | $18^{-0.3}_{-0.5}$ |
| I-G05 | 50, 63 | 56 | 18 | ø28 | 40 | M18 x 1.5 | 16 | 20 | $14^{+0.070}_{0}$ | $22^{-0.3}_{-0.5}$ |
| I-G08 | 80 | 71 | 21 | ø38 | 50 | M22 x 1.5 | 21 | 27 | $18^{+0.070}_{0}$ | $28^{-0.3}_{-0.5}$ |
| I-G10 | 100 | 79 | 21 | ø44 | 55 | M26 x 1.5 | 24 | 31 | $22^{+0.084}_{0}$ | $32^{-0.3}_{-0.5}$ |

## Knuckle Pin



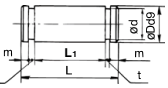

Material: Iron

(mm)

| Part no. | Applicable bore size (mm) | Dd9 | L | d | L1 | m | t | Included retaining ring |
|---|---|---|---|---|---|---|---|---|
| IY-G02 | 20 | $8^{-0.040}_{-0.076}$ | 21 | 7.6 | 16.2 | 1.5 | 0.9 | Type C8 for axis |
| IY-G03 | 25, 32 | $10^{-0.040}_{-0.076}$ | 25.6 | 9.6 | 20.2 | 1.55 | 1.15 | Type C10 for axis |
| IY-G04 | 40 | $10^{-0.040}_{-0.076}$ | 41.6 | 9.6 | 36.2 | 1.55 | 1.15 | Type C10 for axis |
| IY-G05 | 50, 63 | $14^{-0.050}_{-0.093}$ | 50.6 | 13.4 | 44.2 | 2.05 | 1.15 | Type C14 for axis |
| IY-G08 | 80 | $18^{-0.050}_{-0.093}$ | 64 | 17 | 56.2 | 2.55 | 1.35 | Type C18 for axis |
| IY-G10 | 100 | $22^{-0.065}_{-0.117}$ | 72 | 21 | 64.2 | 2.55 | 1.35 | Type C22 for axis |

∗ Retaining rings are included.

## Clevis Pin



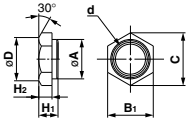

Material: Carbon steel

(mm)

| Part no. | Applicable bore size (mm) | Dd9 | L | d | L1 | m | t | Included retaining ring |
|---|---|---|---|---|---|---|---|---|
| CD-G02 | 20 | $8^{-0.040}_{-0.076}$ | 43.4 | 7.6 | 38.6 | 1.5 | 0.9 | Type C8 for axis |
| CD-G25 | 25 | $10^{-0.040}_{-0.076}$ | 48 | 9.6 | 42.6 | 1.55 | 1.15 | Type C10 for axis |
| CD-G03 | 32 | $12^{-0.050}_{-0.093}$ | 59.4 | 11.5 | 54 | 1.55 | 1.15 | Type C12 for axis |
| CD-G04 | 40 | $14^{-0.050}_{-0.093}$ | 71.4 | 13.4 | 65 | 2.05 | 1.15 | Type C14 for axis |
| CD-G05 | 50 | $16^{-0.050}_{-0.093}$ | 86 | 15.2 | 79.6 | 2.05 | 1.15 | Type C16 for axis |
| CD-G06 | 63 | $18^{-0.050}_{-0.093}$ | 105.4 | 17 | 97.8 | 2.45 | 1.35 | Type C18 for axis |

∗ Retaining rings are included.
∗ A clevis pin and a knuckle pin are common for the bore size ø80 and ø100.

## Rod End Nut (For Male Thread)




Material: Carbon steel

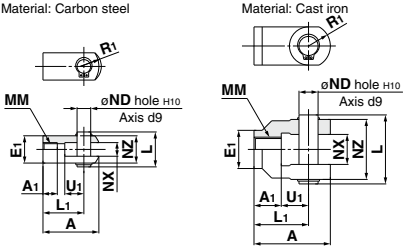
(mm)

| Part no. | Applicable bore size (mm) | d | H1 | H2 | B1 | C | øD | øA |
|---|---|---|---|---|---|---|---|---|
| NT-02G3 | 20 | M8 x 1.25 | 5 | 4 | 13 | (15) | 12.5 | 10 |
| NT-03G3 | 25, 32 | M10 x 1.25 | 6 | 4 | 17 | (19.6) | 16.5 | 12 |
| NT-04G3 | 40 | M14 x 1.5 | 8 | 5.5 | 19 | (21.9) | 18 | 16.4 |
| NT-05G3 | 50, 63 | M18 x 1.5 | 11 | 8 | 27 | (31.2) | 26 | 20.4 |
| NT-08G3 | 80 | M22 x 1.5 | 13 | 9.5 | 32 | (37) | 31 | 28 |
| NT-10G3 | 100 | M26 x 1.5 | 16 | 9.5 | 41 | (47.3) | 39 | 33 |

## Double Knuckle Joint

**Y-G02, Y-G03**
Material: Carbon steel

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



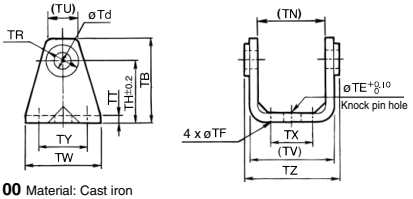

(mm)

| Part no. | Applicable bore size (mm) | A | A1 | E1 | L1 | MM | R1 | U1 | ND | NX | NZ | L | Included pin part no. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Y-G02 | 20 | 34 | 8.5 | □16 | 25 | M8 x 1.25 | 10.3 | 11.5 | 8 | $8^{+0.4}_{+0.2}$ | 16 | 21 | IY-G02 |
| Y-G03 | 25, 32 | 41 | 10.5 | □20 | 30 | M10 x 1.25 | 12.8 | 14 | 10 | $10^{+0.4}_{+0.2}$ | 20 | 25.6 | IY-G03 |
| Y-G04 | 40 | 42 | 16 | ø22 | 30 | M14 x 1.5 | 12 | 14 | 10 | $18^{+0.5}_{+0.3}$ | 36 | 41.6 | IY-G04 |
| Y-G05 | 50, 63 | 56 | 20 | ø28 | 40 | M18 x 1.5 | 16 | 20 | 14 | $22^{+0.5}_{+0.3}$ | 44 | 50.6 | IY-G05 |
| Y-G08 | 80 | 71 | 23 | ø38 | 50 | M22 x 1.5 | 21 | 27 | 18 | $28^{+0.3}_{+0.3}$ | 56 | 64 | IY-G08 |
| Y-G10 | 100 | 79 | 24 | ø44 | 55 | M26 x 1.5 | 24 | 31 | 22 | $32^{+0.5}_{+0.3}$ | 64 | 72 | IY-G10 |

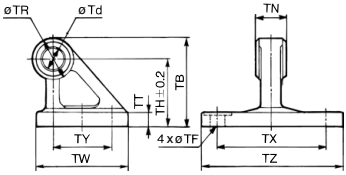
∗ A knuckle pin and retaining rings are included.

## Pivoting Bracket (Order separately)

**ø20 to ø63** Material: Carbon steel




**ø80, ø100** Material: Cast iron




(mm)

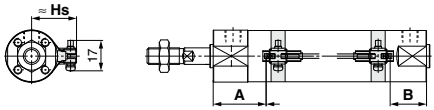
| Part no. | Applicable bore size (mm) | TB | Td | TE | TF | TH | TN | TR | TT |
|---|---|---|---|---|---|---|---|---|---|
| CG-020-24A | 20 | 36 | 8 | 10 | 5.5 | 25 | (29.3) | 13 | 3.2 |
| CG-025-24A | 25 | 43 | 10 | 10 | 5.5 | 30 | (33.1) | 15 | 3.2 |
| CG-032-24A | 32 | 50 | 12 | 10 | 6.6 | 35 | (40.4)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

| Part no. | Applicable bore size (mm) | TU | TV | TW | TX | TY | TZ | Applicable pin O.D |
|---|---|---|---|---|---|---|---|---|
| CG-020-24A | 20 | (18.1) | (35.8) | 42 | 16 | 28 | 38.3 | $8d_{9}^{-0.040}_{-0.076}$ |
| CG-025-24A | 25 | (20.7) | (39.8) | 42 | 20 | 28 | 42.1 | $10d_{9}^{-0.040}_{-0.076}$ |
| CG-032-24A | 32 | (23.6) | (49.4) | 48 | 22 | 28 | 53.8 | $12d_{9}^{-0.050}_{-0.093}$ |
| CG-040-24A | 40 | (27.3) | (58.4) | 56 | 30 | 30 | 64.6 | $14d_{9}^{-0.050}_{-0.093}$ |
| CG-050-24A | 50 | (29.7) | (72.4) | 64 | 36 | 36 | 79.2 | $16d_{9}^{-0.050}_{-0.093}$ |
| CG-063-24A | 63 | (34.3) | (90.4) | 74 | 46 | 46 | 97.2 | $18d_{9}^{-0.050}_{-0.093}$ |
| CG-080-24A | 80 | — | — | 72 | 85 | 45 | 110 | $18d_{9}^{-0.050}_{-0.093}$ |
| CG-100-24A | 100 | — | — | 93 | 100 | 60 | 130 | $22d_{9}^{-0.065}_{-0.117}$ |

# Auto Switch Mounting

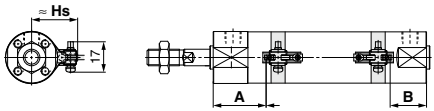
## Auto Switch Proper Mounting Position (Detection at stroke end) and Its Mounting Height

### Solid state auto switch
**D-M9□, M9□W/D-M9□A**
**ø20 to ø63**



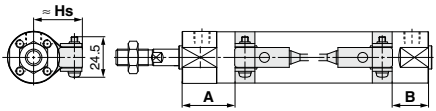

A and B are the dimensions from the end of the head cover/rod cover to the end of the auto switch.

**D-M9□V, M9□WV/D-M9□AV**
**ø20 to ø63**

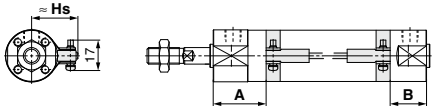



A and B are the dimensions from the end of the head cover/rod cover to the end of the auto switch.

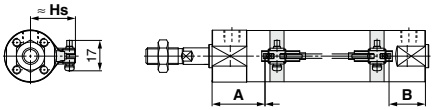
**D-G5, K5, G5□W, G5BA**
**D-K59W, D-G59F, D-G5NT**
**ø20 to ø100**




**D-H7□, H7□W**
**D-H7NF, H7BA, D-H7C**
**ø20 to ø63**

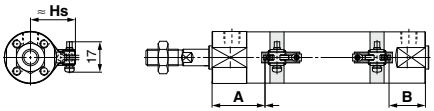



### Reed auto switch
**D-A9□**
**ø20 to ø63**



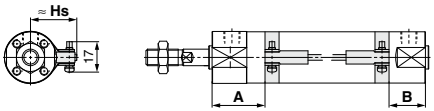

A and B are the dimensions from the end of the head cover/rod cover to the end of the auto switch.

**D-A9□V**
**ø20 to ø63**

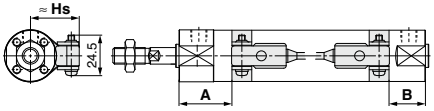



A and B are the dimensions from the end of the head cover/rod cover to the end of the auto switch.

**D-C7, C8/D-C73C, C80C**
**ø20 to ø63**




**D-B5, B6, B59W**
**ø20 to ø100**




### Auto Switch Proper Mounting Position

(mm)

| Auto switch model / Bore size | D-M9□(V) D-M9□W(V) D-M9□A(V) | | D-A9□(V) | | D-C7/C8 D-C73C D-C80C | | D-B5 D-B6 | | D-B59W | | D-H7□ D-H7C D-H7□W D-H7BA D-H7NF | | D-G5□W D-K59W D-G59F D-G5 D-K5 D-G5NT D-G5BA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| **20** | 28.5 | 16.5 | 24.5 | 12.5 | 25 | 13 | 19 | 8 | 22 | 10 | 24 | 12 | 20.5 | 8.5 |
| **25** | 29 | 19 | 25 | 15 | 25.5 | 15.5 | 19.5 | 9.5 | 22.5 | 12.5 | 24.5 | 14.5 | 21 | 11 |
| **32** | 30.5 | 19.5 | 26.5 | 15.5 | 27 | 16 | 21 | 10 | 24 | 13 | 26 | 15 | 22.5 | 11.5 |
| **40** | 31 | 19 | 27 | 15 | 27.5 | 15.5 | — | — | — | — | 26.5 | 14.5 | — | — |
| **50** | 42.5 | 29.5 | 38.5 | 25.5 | 39 | 26 | 33 | 20 | 36 | 23 | 38 | 25 | 34.5 | 21.5 |
| **63** | 42.5 | 29.5 | 38.5 | 25.5 | 39 | 26 | 33 | 20 | 36 | 23 | 38 | 25 | 34.5 | 21.5 |
| **80** | — | — | — | — | — | — | 44 | 29 | 47 | 31.5 | — | — | 45.5 | 30.5 |
| **100** | — | — | — | — | — | — | 44 | 30 | 47 | 32.5 | — | — | 45.5 | 31.5 |

### Auto Switch Mounting Height

(mm)

| Auto switch model / Bore size | D-M9□(V) D-M9□W(V) D-M9□A(V) D-A9□(V) D-H7□ D-H7□W D-H7NF D-H7BA D-C7/C8 | D-C73C D-C80C | D-G5/K5 D-G5□W D-K59W D-B5/B6 D-B59W D-G5NT D-G59F D-H7C D-G5BA |
|---|---|---|---|
| | Hs | Hs | Hs |
| **20** | 26.5 | 27 | 27.5 |
| **25** | 29 | 29.5 | 30 |
| **32** | 32.5 | 33 | 33.5 |
| **40** | 37 | 37.5 | 38 |
| **50** | 42.5 | 43 | 43.5 |
| **63** | 49.5 | 50 | 50.5 |
| **80** | — | — | 59 |
| **100** | — | — | 69.5 |

Note 1) Adjust the auto switch after confirming the operating condition in the actual setting.
Note 2) For the combination of the following auto switches, bore sizes and mounting positions, the auto switch cannot be mounted to the port side.
- D-H7□ type ··· On the head side of the bore size ø20, ø25, ø32, ø40, ø50, ø63
- D-A9□/C7□/C8 types ··· On the head side of the bore size ø20, ø32, ø40
- D-G5□/K5□/B59W types ··· On the head side of the bore size ø20, ø25, ø32, ø50, ø63
- D-B5□/B6□ types ··· On the head side of the bore size ø20, ø25, ø32, ø50, ø63, ø80, ø100 and the rod side of the bore size ø20, ø25, ø32

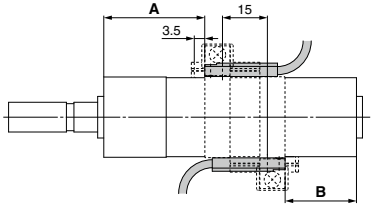
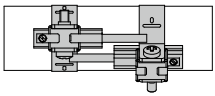
## Minimum Stroke for Auto Switch Mounting

n: Number of auto switches (mm)

| Auto switch model | Number of auto switches | | | | |
|---|---|---|---|---|---|
| | With 1 pc. | With 2 pcs. | | With n pcs. | |
| | | Different surfaces | Same surface | Different surfaces | Same surface |
| **D-M9□** | 5 | 15 Note 1) | 40 Note 1) | $20 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6···) Note 3) | 55 + 35 (n – 2) (n = 2, 3, 4, 5···) |
| **D-M9□W** | 10 | 15 Note 1) | 40 Note 1) | $20 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6···) Note 3) | 55 + 35 (n – 2) (n = 2, 3, 4, 5···) |
| **D-M9□A** | 10 | 25 | 40 Note 1) | $25 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6···) Note 3) | 60 + 35 (n – 2) (n = 2, 3, 4, 5···) |
| **D-A9□** | 5 | 15 | 30 Note 1) | $15 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6···) Note 3) | 50 + 35 (n – 2) (n = 2, 3, 4, 5···) |
| **D-M9□V** | 5 | 20 | 35 | $20 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6···) Note 3) | 35 + 35 (n – 2) (n = 2, 3, 4, 5···) |
| **D-A9□V** | 5 | 15 | 25 | $15 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6···) Note 3) | 25 + 35 (n – 2) (n = 2, 3, 4, 5···) |
| **D-M9□WV**<br>**D-M9□AV** | 10 | 20 | 35 | $20 + 35\frac{(n-2)}{2}$ (n = 2, 4, 6···) Note 3) | 35 + 35 (n – 2) (n = 2, 3, 4, 5···) |
| **D-C7□**<br>**D-C80** | 5 | 20 | 60 | $20 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6···) Note 3) | 60 + 45 (n – 2) (n = 2, 3, 4, 5···) |
| **D-H7□**<br>**D-H7□W**<br>**D-H7BA**<br>**D-H7NF** | 10 | 25 | 70 | $25 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6···) Note 3) | 70 + 45 (n – 2) (n = 2, 3, 4, 5···) |
| **D-C73C**<br>**D-C80C**<br>**D-H7C** | 5 | 30 | 80 | $30 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···) Note 3) | 80 + 50 (n – 2) (n = 2, 3, 4, 5···) |
| **D-B5□**<br>**D-B64**<br>**D-G5□**<br>**D-K59□** | 5 | 25 | 70 | $25 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···) Note 3) | 70 + 50 (n – 2) (n = 2, 3, 4, 5···) |
| **D-B59W** | 10 | 30 | 75 | $30 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···) Note 3) | 75 + 50 (n – 2) (n = 2, 3, 4, 5···) |

Note 3) When "n" is an odd number, an even number that is one larger than this odd number is used for the calculation.

Note 1) Auto switch mounting

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

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

## Auto Switch Mounting Brackets/Part No.

| Auto switch model | Bore size (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **20** | **25** | **32** | **40** | **50** | **63** | **80** | **100** |
| **D-M9□(V)**<br>**D-M9□W(V)**<br>**D-A9□(V)** | Note 1)<br>BMA3-020<br>(A set of a, b, c, d) | Note 1)<br>BMA3-025<br>(A set of a, b, c, d) | Note 1)<br>BMA3-032<br>(A set of a, b, c, d) | Note 1)<br>BMA3-040<br>(A set of a, b, c, d) | Note 1)<br>BMA3-050<br>(A set of a, b, c, d) | Note 1)<br>BMA3-063<br>(A set of a, b, c, d) | — | — |
| **D-M9□A(V)**Note 2) | BMA3-020S<br>(A set of b, c, e, f) | BMA3-025S<br>(A set of b, c, e, f) | BMA3-032S<br>(A set of b, c, e, f) | BMA3-040S<br>(A set of b, c, e, f) | BMA3-050S<br>(A set of b, c, e, f) | BMA3-063S<br>(A set of b, c, e, f) | — | — |
| **D-C7□**<br>**D-H7□W**<br>**D-H7NF**<br>**D-H7□/C80**<br>**D-C73C/C80C** | BMA2-020A<br>(A set of c and d) | BMA2-025A<br>(A set of c and d) | BMA2-032A<br>(A set of c and d) | BMA2-040A<br>(A set of c and d) | BMA2-050A<br>(A set of c and d) | BMA2-063A<br>(A set of c and d) | — | — |
| **D-H7BA** | BMA2-020AS<br>(A set of c and f) | BMA2-025AS<br>(A set of c and f) | BMA2-032AS<br>(A set of c and f) | BMA2-040AS<br>(A set of c and f) | BMA2-050AS<br>(A set of c and f) | BMA2-063AS<br>(A set of c and f) | — | — |
| **D-B5□/B64**<br>**D-B59W**<br>**D-G5□/K59**<br>**D-G5□W/K59W**<br>**D-G5BA/G59F**<br>**D-G5NT** | BA-01<br>(A set of c and d) | BA-02<br>(A set of c and d) | BA-32<br>(A set of c and d) | BA-04<br>(A set of c and d) | BA-05<br>(A set of c and d) | BA-06<br>(A set of c and d) | BA-08<br>(A set of c and d) | BA-10<br>(A set of c and d) |

Note 1) Since the switch bracket (made from nylon) are affected in an environment where alcohol, chloroform, methylamines, hydrochloric acid or sulfuric acid is splashed over, so it cannot be used. Please consult SMC regarding other chemicals.

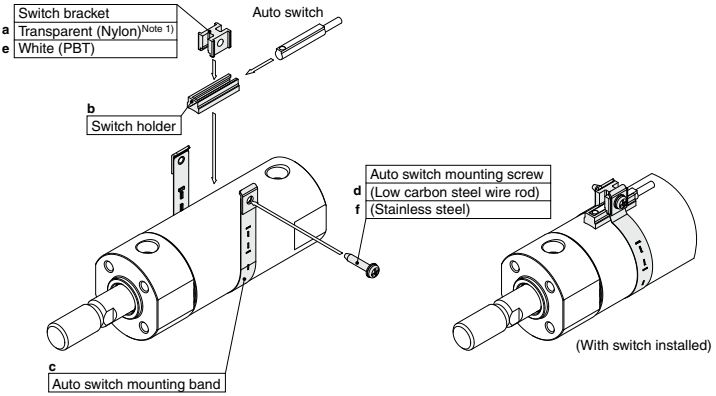
Note 2) When mounting a D-M9□A(V) type auto switch, if the switch bracket is mounted on the indicator light, it may damage the auto switch. Therefore, be sure to avoid mounting the switch bracket on the indicator light.

**[Stainless Steel Mounting Screw]**

The following stainless steel mounting screw kit is available. Use it in accordance with the operating environment.
(Since the auto switch mounting bracket is not included, order it separately.)

BBA3: D-B5,B6,G5,K5 types
BBA4: D-C7,C80,H7 types

Note) Refer to page 1369 for details on the BBA3.
The above stainless steel screws are used when a cylinder is shipped with the D-H7BA/G5BA auto switches.
When only an auto switch is shipped independently, the BBA3 or BBA4 is attached.




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

## Operating Range

(mm)

| Auto switch model | Bore size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
| **D-M9□(V)<br>D-M9□W(V)<br>D-M9□A(V)** | 4.5 | 5.0 | 4.5 | 5.5 | 5.0 | 5.5 | — | — |
| **D-A9□** | 7 | 6 | 8 | 8 | 8 | 9 | — | — |
| **D-C7/C80<br>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<br>D-H7NF/H7BA** | 4 | 4 | 4.5 | 5 | 6 | 6.5 | — | — |
| **D-H7C** | 7 | 8.5 | 9 | 10 | 9.5 | 10.5 | — | — |
| **D-G5□/G5□W/G59F<br>D-G5BA/K59/K59W** | 4 | 4 | 4.5 | 5 | 6 | 6.5 | 6.5 | 7 |
| **D-G5NT** | 4 | 4 | 4.5 | 5 | 6 | 6.5 | 6.5 | 7 |

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

## Cylinder Mounting Bracket, by Stroke/Auto Switch Mounting Surfaces

st: Stroke (mm)

| Auto switch model | Basic, Foot, Flange, Clevis | | |
|---|---|---|---|
| | With 1 pc. (Rod cover side) | With 2 pcs. (Different surfaces) | With 2 pcs. (Same surface) |
| Auto switch mounting surface / Auto switch model | Port side  | Port side  | Port side  |
| **D-M9□(V)<br>D-M9□W(V)<br>D-M9□A(V)<br>D-A9□** | 10 st or more | 15 to 44 st | 45 st or more |
| **D-C7/C8** | 10 st or more | 15 to 49 st | 50 st or more |
| **D-H7□/H7□W<br>D-H7BA/H7NF** | 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 |
| **D-B5/B6/G5/K5<br>D-G5□W/K59W/G5BA<br>D-G59F/G5NT** | 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 |

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

Refer to pages 1271 to 1365 for detailed specifications.

| Type | Model | Electrical entry | Features | Applicable bore size |
|---|---|---|---|---|
| **Solid state** | D-H7A1, H7A2, H7B | Grommet (In-line) | — | ø20 to ø63 |
| | D-H7NW, H7PW, H7BW | | Diagnostic indication (2-color indicator) | |
| | D-H7BA | | Water resistant (2-color) | |
| | D-G5NT | | With timer | ø20 to ø100 |
| **Reed** | D-C73, C76 | | — | ø20 to ø63 |
| | D-C80 | | Without indicator light | |
| | D-B53 | | — | ø20 to ø100 |

∗ With pre-wired connector is also available for solid state auto switches. For details, refer to pages 1340 and 1341.
∗ Normally closed (NC = b contact) solid state auto switches (D-M9□E(V)) are also available. For details, refer to page 1290.

# *CG3 Series*
# Specific Product Precautions 1

**Be sure to read this before handling the products. Refer to page 20 for safety instructions and pages 21 to 30 for actuator and auto switch precautions.**

## Handling

### ⚠Warning

**1. Operate the cylinder within the specified cylinder speed, kinetic energy and lateral load at the rod end.**

Otherwise, cylinder and seal damage may occur.

**2. The allowable kinetic energy is different between the cylinders with male rod end and with female rod end due to the different thread sizes. Refer to page 456.**

**3. When the cylinder is used as mounted with a single side fixed or free (basic type, flange type), be careful not to apply vibration or impact to the cylinder body. A bending moment will be applied to the cylinder due to the vibration generated at the stroke end, and the cylinder may be damaged. In such a case, mount a bracket to reduce the vibration of the cylinder or use the cylinder at a piston speed low enough to prevent the cylinder from vibrating at the stroke end. Furthermore, when the cylinder is moved or mounted horizontally and with a single side fixed, use a bracket to fix the cylinder.**

**4. When female rod end is used, use a washer, etc. to prevent the contact part at the rod end from being deformed depending on the material of the work piece.**

### ⚠Caution

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

This will result in oil leakage and damage the product.

**2. Use a thin wrench when tightening the piston rod.**

**3. Check the mounting direction of the rod end nut (for male thread). Refer to Mounting Procedure on page 455 for details.**

**4. There are some changes in the dimensions and the specifications of this model from the current model. Please check them when replacing from the current model. Check the operating conditions and interference with workpieces before use.**

## Disassembly/Replacement

### ⚠Warning

**1. Only people who have sufficient knowledge and experience are allowed to replace seals.**

The person who disassembles and reassembles the cylinder is responsible for the safety of the product. Repeatedly disassembling and reassembling the product may cause wearing or deformation of the screws as well as a decline in screw tightening strength. When reassembling the product, be sure to check the cover and tubing screws for wear, deformities, or any other abnormalities. Operating the product with damaged screws may result in the cover or tubing coming off during operation, which could lead to a serious accident. Caution must be taken to avoid such incidents.

### ⚠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. Cylinders with ø50 or larger bore sizes cannot be disassembled.**

When disassembling cylinders with bore sizes 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 retightening, 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. If disassembly is required, please contact SMC.)

**4. When replacing seals, take care not to hurt your hand or finger on the corners of parts.**