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# KOGANEI

## ACTUATORS GENERAL CATALOG

SLIM CYLINDERS

# SLIM CYLINDERS CONTENTS

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**Caution** Before use, be sure to read the "Safety Precautions" on p. 57.

High-quality stainless steel cylinders ahead of all others

# SLIM CYLINDERS

## Use durable piston seals.

The two piston seals are the durable PPY type. This prevents inner air leakage, and achieves smooth operation from low-speed to high-speed ranges.

## Sensor switches can be installed anytime after cylinder installation.

Magnets as standard equipment across the entire series allow sensor switches to be installed anytime after the cylinder has been installed.

## High installation accuracy and simple mounting operations.

A centering location on the rod cover improves mounting precision. Moreover, the mounting nut's improved thread precision means that holding the cylinder body in place by hand is sufficient for mounting nut tightening operations. Mounting in hard-to-reach places is easy.

## Criteria for Selection: Slim Cylinder Allowable Kinetic Energy

Slim cylinders (with the exception of heat resistant specifications) include a cushioning mechanism.

This mechanism is intended to reduce as much as possible the impact of pistons with high kinetic energy when they stop at the end of the stroke. There are two types of cushions, as shown below.

### ● Rubber bumpers (Standard equipment)

Rubber bumpers installed on both sides of the piston soften the impact at the end of the stroke, and absorb the impact noise during stopping, in response to high-frequency and high-speed operations. They are standard equipment across the whole series, with the exception of heat resistant specifications.

Note that a certain amount of rebound will occur at the end of the stroke on the cylinder with the rubber bumpers.

### ● Variable cushions

Use variable cushions for large load or high-speed operations that rubber bumpers cannot adequately absorb. The impact is absorbed by compressing air, when the piston stops at the end of the stroke.

Since the cushioning stroke is included within the cylinder stroke, be careful to ensure that the cushion is not excessively performed during cylinder applications of 25mm strokes or less. An excessively performed cushion can result in too much time for each stroke, reducing efficiency. When operated at or below the absorbable kinetic energy shown in the table below, the cushion seal life is 1 million operations or more.

The load kinetic energy can be obtained through the formulas shown below.

$$E_x = \frac{m}{2} v^2$$

Ex: Kinetic energy (J)  
m: Load mass (kg)  
v: Piston speed (m/s)

$$E'x = \frac{W}{2g} v'^2$$

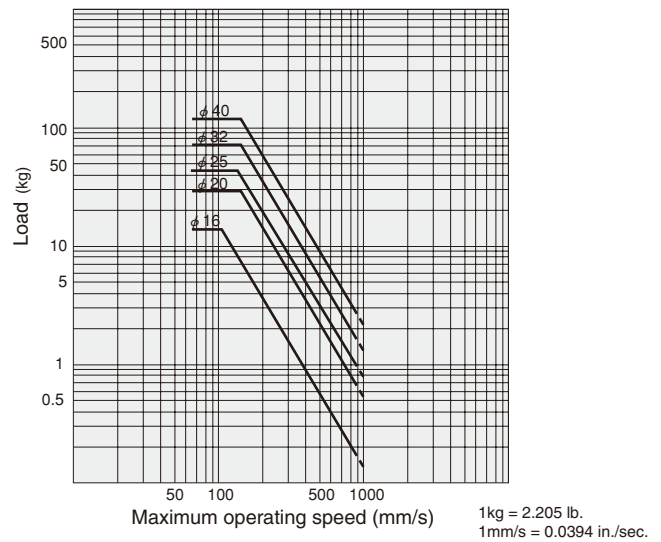
E'x: Kinetic energy [ft·lbf]  
W: Load [lbf.]  
v': Piston speed [ft./sec.]  
g: Acceleration of gravity 32.2 [ft./sec.<sup>2</sup>]

### Operating speed range

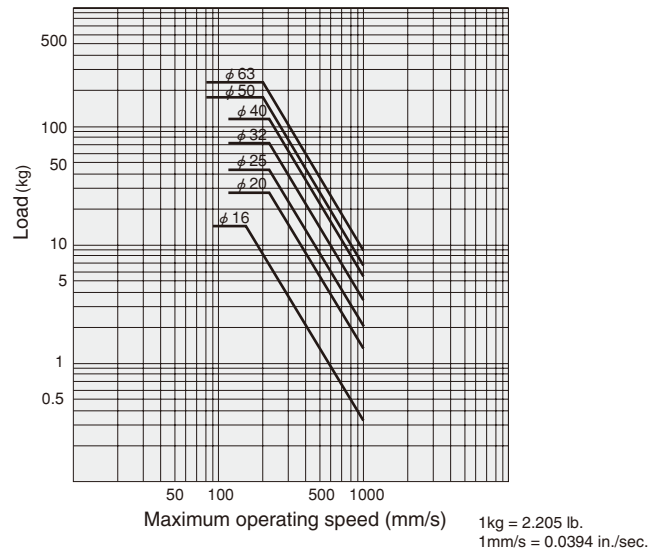
- Rubber bumper ..... 30~800mm/s [1.2~31.5in./sec.]
- Variable cushion ..... 30~1000mm/s [1.2~39.4in./sec.]

| Bore size<br>mm [in.] | Allowable kinetic energy<br>J [ft·lbf] |                       |
|-----------------------|--|-----------------------|
|                       | With rubber bumpers                    | With variable cushion |
| 16 [0.630]            | 0.07 [0.052]                           | 0.18 [0.13]           |
| 20 [0.787]            | 0.27 [0.20]                            | 0.7 [0.52]            |
| 25 [0.984]            | 0.40 [0.30]                            | 1.05 [0.77]           |
| 32 [1.260]            | 0.65 [0.48]                            | 1.8 [1.33]            |
| 40 [1.575]            | 1.2 [0.89]                             | 2.8 [2.07]            |
| 50 [1.969]            | —                                      | 3.5 [2.58]            |
| 63 [2.480]            | —                                      | 4.5 [3.32]            |

Rubber bumper (Graph 1)



Variable cushion (Graph 2)



### How to read the graphs

From Graph 1, the capacity of the rubber bumpers limits the maximum speed to 500mm/s [19.7in./sec.] or less when a φ32 Slim Cylinder is used to carry a load of 5kg [11.0lb.].

From Graph 2, a φ32 cylinder with variable cushion can be selected to carry a load of 8kg [17.6lb.] at a maximum speed of 600mm/s [23.6in./sec.].

# SLIM CYLINDERS

## Double Acting Type



### Symbols

- Without variable cushion
- With variable cushion



### Specifications

| Item                                   |                                | Bore size mm [in.]  | 20, 25 [0.787, 0.984] | 32, 40 [1.260, 1.575] | 50, 63 [1.969, 2.480]                                 |
|--|--------------------------------|---|-----------------------|-----------------------|---|
| Operation type                         |                                | Double acting type  |                       |                       |   |
| Media                                  |                                | Air   |                       |                       |   |
| Mounting type                          |                                | Basic type, Foot type, Flange type, Pivot type, Head trunnion type, Rod trunnion type |                       |                       | Basic type, Foot type, Flange type, Pivot type        |
| Operating pressure range<br>MPa [psi.] | Standard cylinder              | 0.04~0.9 [6~131]  |                       |                       | 0.04~0.7<br>[6~102]                                   |
|  | Cylinder with variable cushion | 0.15~0.9 [22~131]   | 0.1~0.9 [15~131]      |                       |   |
| Proof pressure                         | MPa [psi.]                     | 1.32 [191]  |                       |                       | 1.03 [149]  |
| Operating temperature range            |                                | °C [°F] 0~70 [32~158]   |                       |                       |   |
| Operating speed range                  |                                | mm/s [in./sec.] 30~800 [1.2~31.5] (With variable cushion is 30~1000 [1.2~39.4])       |                       |                       |   |
| Cushion                                | Standard cylinder              | Fixed type (Rubber bumper)  |                       |                       | Variable type as standard<br>(Stroke 12mm [0.472in.]) |
|  | Cylinder with variable cushion | Variable type (12mm [0.472in.] stroke)  |                       |                       |   |
| Lubrication                            |                                | Not required  |                       |                       |   |
| Port size                              |                                | Rc  | 1/8                   |                       | 1/4   |

### Bore Size and Stroke

| Bore size | Standard strokes                           | Maximum stroke |              | Maximum available stroke |              |
|-----------|--|----------------|--------------|--------------------------|--------------|
|           |  | No bellows     | With bellows | No bellows               | With bellows |
| 20        | 25 50 75 100 125 150                       | 200            |              | 1050                     | 740          |
| 25        | 25 50 75 100 125 150 200                   | 250            |              |                          |              |
| 32        | 25 50 75 100 125 150 200                   | 300            |              |                          |              |
| 40        | 25 50 75 100 125 150 200 250 300           | 400            | 300          | 900                      | 740          |
| 50        | 25 50 75 100 150 200 [250 300 350 400]     | 300[500]       | 300          |                          |              |
| 63        | 25 50 75 100 150 200 [250 300 350 400 500] | 300[600]       | 300          |                          |              |

- Remarks: 1. Stroke tolerance  $^{+1}_{0} [^{+0.039}_{0}\text{in.}]$   
 2. For non-standard strokes, consult us.  
 3. Items in parentheses [ ] are for cases when foot mounting brackets are used for mounting.  
 4. The minimum operating pressure when the stroke is over the maximum stroke at bore sizes of  $\phi 20 \sim \phi 40$  is 0.2MPa [29psi.].

### Order Codes

**DA** [ ] [ ] **20×50** - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

**Bore size × Stroke**  
**20×50**

**Non-ion specification**  
 Blank — Standard  
 NCU — Non-ion specification

**Bellows or scraper**  
 Blank — No bellows  
 J — With bellows (Made to order)  
 Y — With scraper (Made to order; available at  $\phi 50$  and  $\phi 63$  only)

**With or without variable cushion**  
 Blank — Standard cylinder  
 C — Cylinder with variable cushion (Available at  $\phi 20 \sim \phi 40$  only) (Standard equipment for  $\phi 50$  and  $\phi 63$ )

**Mounting type**  
 Blank — Basic type  
 1 — Double foot mounting type  
 3 — Flange mounting type  
 8B — Pivot mounting type with bushing ( $\phi 50$  and  $\phi 63$  only)  
 8E — Pivot mounting type with supporting bracket (with pin) ( $\phi 20 \sim \phi 40$  only)  
 8B-8E — Pivot mounting type with bushing and supporting bracket ( $\phi 50$  and  $\phi 63$  only)  
 11 — Head trunnion type\*  
 12 — Rod trunnion type\*  
 11-11T — Head trunnion type, with supporting bracket\*  
 12-12T — Rod trunnion type, with supporting bracket\*  
 ● For the pivot mounting type with bushing at  $\phi 20 \sim \phi 40$ , see made to order specifications on p.414.  
 ● Trunnion type is available at  $\phi 20 \sim \phi 40$  only. Moreover, it is not available for the variable cushion type.  
 ● Mounting brackets are included at shipping. (Except pivot type and pivot type with bushing)  
 ※ A head cover for the standard is a short head. Order code "A" is not required.

**Rod end accessory**  
 Blank — No rod end accessory  
 I — I type knuckle  
 Y — Y type knuckle (with pin)  
 ● For the cylinder joint and cylinder rod end, see p.1568.

**Number of sensor switches**  
 1 — With 1 sensor switch  
 2 — With 2 sensor switches  
 3 — With 3 sensor switches  
 : — :  
 :

**Lead wire length**  
 (Applies to all except CS□F)  
 A — 1000mm [39in.]  
 B — 3000mm [118in.]

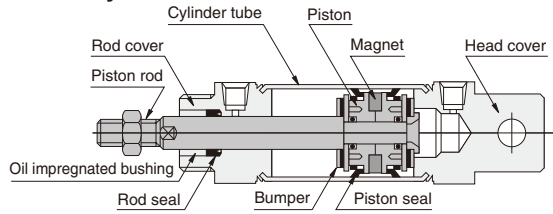
**Sensor switch (for cylinders with sensor switches)**  
 Blank — No sensor switch  
 ZG530 — 2-lead wire Solid state type with indicator lamp DC10~28V  
 ZG553 — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
 CS3M — Reed switch type with indicator lamp AC85~230V  
 CS4M — Reed switch type with indicator lamp DC10~30V  
 CS5M — Reed switch type without indicator lamp AC85~115V  
 CS2F — Reed switch type with indicator lamp AC85~230V  
 CS3F — Reed switch type with indicator lamp DC10~30V  
 CS4F — Reed switch type with indicator lamp DC10~30V  
 CS5F — Reed switch type without indicator lamp DC3~30V  
 ● For details of sensor switches, see p.1544.  
 ● CS□F comes with DIN connector. All others are grommet type.

**Head cover specification**  
 Blank — Standard head  
 A — Short head (For the basic type and flange mounting type only)

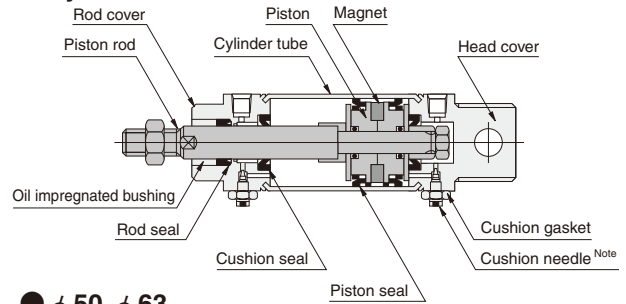
**Slim double acting cylinder**

# Inner Construction and Major Parts (cannot be disassembled)

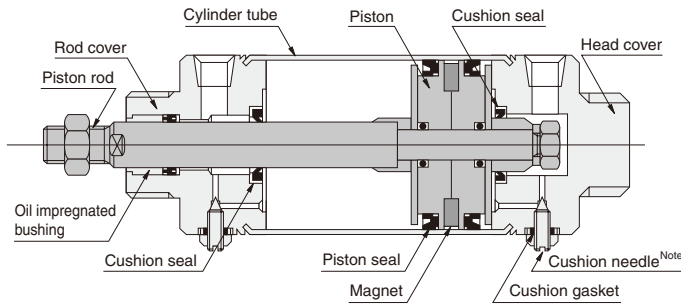
## ● $\phi 20 \sim \phi 40$ Standard cylinder



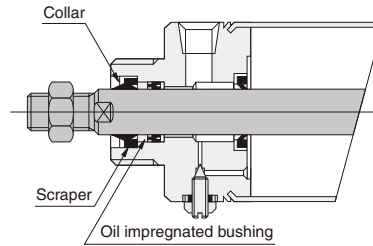
## ● $\phi 20 \sim \phi 40$ Cylinder with variable cushion



## ● $\phi 50, \phi 63$ Standard cylinder



## ● $\phi 50, \phi 63$ With scraper



Note: Set the cushion needle tightening torque to 1.0N·m [8.85in·lbf] or less.

## Major Parts and Materials

| Parts  | Bore size | 20  | 25~40 | 50, 63                 |
|--|-----------|---|-------|------------------------|
| Cylinder tube  |           | Stainless steel   |       |                        |
| Piston   |           | Plastic   |       |                        |
| Piston rod   |           | Steel (hard chrome plated)                                |       |                        |
| Rod cover  |           | Aluminum alloy (anodized)                                 |       |                        |
| Head cover   |           |   |       |                        |
| Seal   |           | Synthetic rubber (NBR)                                    |       |                        |
| Bumper   |           | Synthetic rubber (NBR)                                    | —     |                        |
| Scraper  |           | —   |       | Synthetic rubber (NBR) |
| Collar   |           | —   |       | Aluminum (anodized)    |
| Magnet   |           | Plastic magnet  |       |                        |
| Bellows  |           | Nylon tarpaulin (heat resistant temperature 70°C [158°F]) |       |                        |
| Y type knuckle, I type knuckle<br>Pivot mounting with supporting bracket |           | Mild steel (zinc plated)                                  |       |                        |

## Seals

Note: Seals cannot be replaced.

| Parts             | Rod seal     | Piston seal | Cushion seal | Cushion gasket | Scraper |
|-------------------|--------------|-------------|--------------|----------------|---------|
| Quantity          | 1            | 2           | 2            | 2              | 1       |
| <b>20 [0.787]</b> | NY-12×8×3.5  | PPY-20      | GYH-9        | DT-1-4         | —       |
| <b>25 [0.984]</b> | NY-14×10×3.5 | PPY-25      | GYH-11       | DT-1-4         | —       |
| <b>32 [1.260]</b> | NY-17×12×4   | PPY-32      | PCS-14       | DT-1-4         | —       |
| <b>40 [1.575]</b> | NY-22×16×5   | PPY-40      | PCS-18       | DT-1-4         | —       |
| <b>50 [1.969]</b> | NY-22×16×5   | PGY-50      | PCS-20       | DT-1-5         | SCB-16  |
| <b>63 [2.480]</b> | NY-22×16×5   | PGY-63      | PCS-20       | DT-1-5         | SCB-16  |

## Mass

| Bore size<br>mm [in.] | Zero stroke mass          |                           |                     |               | Additional mass<br>for each 1mm<br>[0.0394in.] stroke | Mass of mounting bracket |                |               |                |                |
|-----------------------|---------------------------|---------------------------|---------------------|---------------|---|--------------------------|----------------|---------------|----------------|----------------|
|                       | Standard head type        | Short head type           | Pivot mounting type | Trunnion type |   | Foot bracket             | Flange bracket | Pivot bracket | Y type knuckle | I type knuckle |
| <b>20 [0.787]</b>     | 0.16 [0.35] (0.14 [0.31]) | 0.15 [0.33] (0.13 [0.29]) | —                   | 0.35 [0.77]   | 0.0008 [0.0018]                                       | 0.14 [0.31]              | 0.08 [0.18]    | 0.06 [0.13]   | 0.041 [0.090]  | 0.036 [0.079]  |
| <b>25 [0.984]</b>     | 0.21 [0.46] (0.18 [0.40]) | 0.20 [0.44] (0.17 [0.37]) | —                   | 0.39 [0.86]   | 0.0011 [0.0024]                                       | 0.16 [0.35]              | 0.08 [0.18]    | 0.06 [0.13]   | 0.075 [0.165]  | 0.070 [0.154]  |
| <b>32 [1.260]</b>     | 0.33 [0.73] (0.30 [0.66]) | 0.31 [0.68] (0.28 [0.62]) | —                   | 0.50 [1.10]   | 0.0015 [0.0033]                                       | 0.19 [0.42]              | 0.10 [0.22]    | 0.14 [0.31]   | 0.075 [0.165]  | 0.070 [0.154]  |
| <b>40 [1.575]</b>     | 0.49 [1.08] (0.43 [0.95]) | 0.45 [0.99] (0.39 [0.86]) | —                   | 0.65 [1.43]   | 0.0024 [0.0053]                                       | 0.29 [0.64]              | 0.13 [0.29]    | 0.14 [0.31]   | 0.120 [0.265]  | 0.132 [0.291]  |
| <b>50 [1.969]</b>     | 0.91 [2.01]               | 0.86 [1.90]               | 0.83 [1.83]         | —             | 0.0028 [0.0062]                                       | 0.55 [1.21]              | 0.28 [0.62]    | 0.24 [0.53]   | 0.120 [0.265]  | 0.132 [0.291]  |
| <b>63 [2.480]</b>     | 1.24 [2.73]               | 1.20 [2.65]               | 1.17 [2.58]         | —             | 0.0033 [0.0073]                                       | 0.73 [1.61]              | 0.37 [0.82]    | 0.24 [0.53]   | 0.120 [0.265]  | 0.132 [0.291]  |

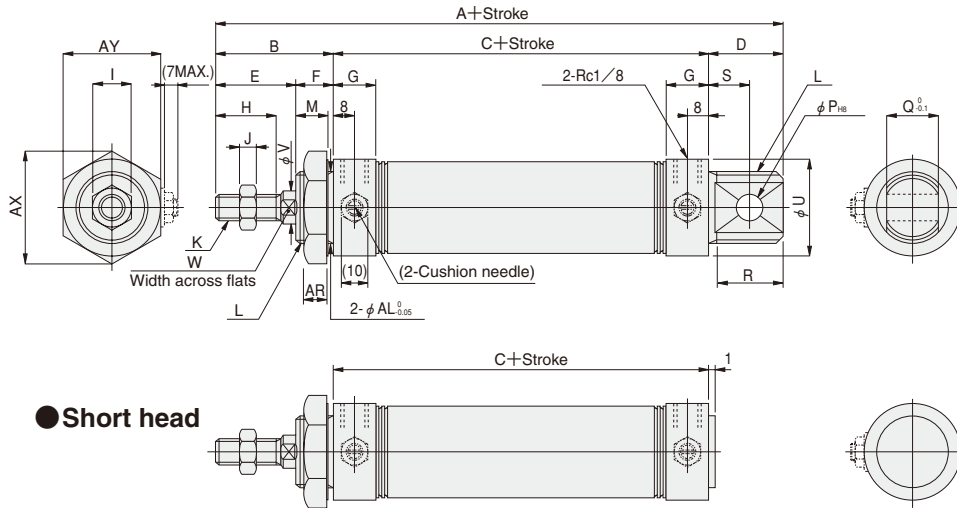
Note: Figures in parentheses ( ) are for cylinders with variable cushions of bore sizes  $\phi 20 \sim \phi 40$ .  
 Calculation example: For foot mounting type of 32mm bore size and 100mm stroke  
 $0.33 + 0.19 + (0.0015 \times 100) = 0.67\text{kg}$  [1.48lb.]

# Dimensions of Basic Type (mm)

●  $\phi 20 \sim \phi 40$  DA  Bore size  Stroke

● Figures in parentheses ( ) are for type with variable cushion.

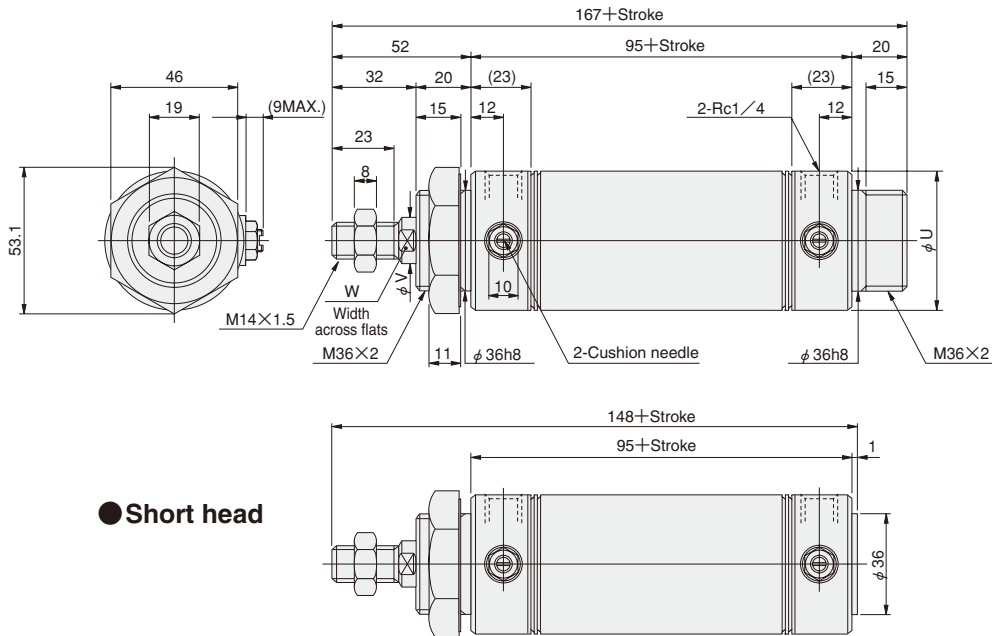
CAD DA-  Bore size SLIM-A



| Code       | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | L       | M  | P  | Q  | R  | S  | U    | V  | W  | AR  | AX   | AY | AL |
|------------|-----|----|----|----|----|----|--------|----|----|---|----------|---------|----|----|----|----|----|------|----|----|-----|------|----|----|
| 20 [0.787] | 132 | 35 | 76 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M 8×1    | M20×1.5 | 10 | 8  | 12 | 19 | 12 | 27   | 8  | 6  | 7.5 | 31.2 | 27 | 20 |
| 25 [0.984] | 137 | 40 | 76 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 8  | 12 | 19 | 12 | 29   | 10 | 8  | 9.5 | 34.6 | 30 | 22 |
| 32 [1.260] | 148 | 45 | 76 | 27 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 10 | 20 | 25 | 15 | 35   | 12 | 10 | 9.5 | 41.6 | 36 | 27 |
| 40 [1.575] | 148 | 45 | 76 | 27 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 10 | 20 | 25 | 15 | 41.6 | 16 | 14 | 9.5 | 47.3 | 41 | 33 |

●  $\phi 50, \phi 63$  DA  Bore size  Stroke

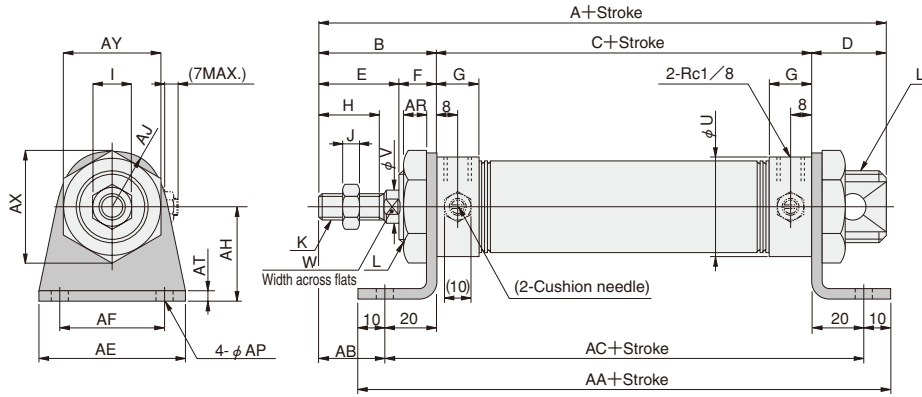
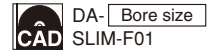
CAD DA-  Bore size SLIM-A



| Code       | U    | V  | W  |
|------------|------|----|----|
| 50 [1.969] | 52   | 16 | 14 |
| 63 [2.480] | 65.4 | 16 | 14 |

# Dimensions of Foot Mounting Type (mm)

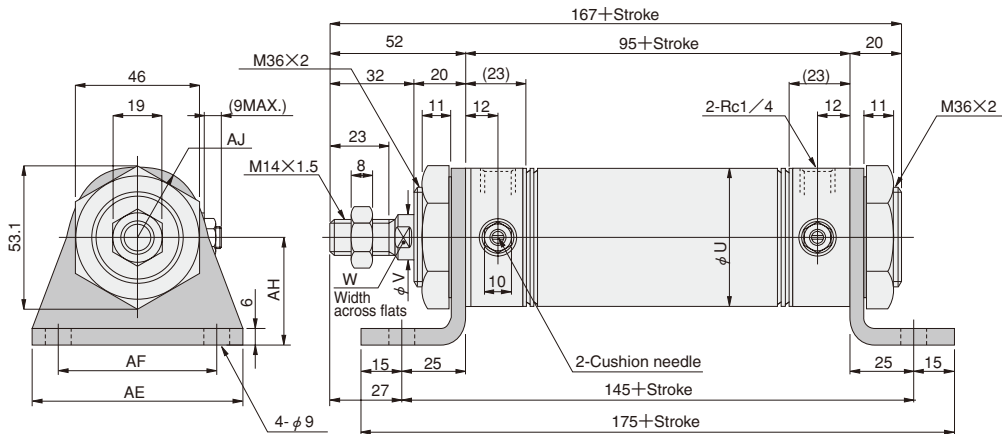
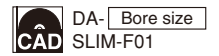
●  $\phi 20 \sim \phi 40$  DA  Bore size  $\times$   Stroke -1 ● Figures in parentheses ( ) are for type with variable cushion.



| Bore mm [in.] | Code | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | L       | U    | V  | W  |
|---------------|------|-----|----|----|----|----|----|--------|----|----|---|----------|---------|------|----|----|
| 20 [0.787]    |      | 132 | 35 | 76 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M 8×1    | M20×1.5 | 27   | 8  | 6  |
| 25 [0.984]    |      | 137 | 40 | 76 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 29   | 10 | 8  |
| 32 [1.260]    |      | 148 | 45 | 76 | 27 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 35   | 12 | 10 |
| 40 [1.575]    |      | 148 | 45 | 76 | 27 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 41.6 | 16 | 14 |

| Bore mm [in.] | Code | AA  | AB | AC  | AE | AF | AH | AJ   | AP  | AR  | AT  | AX   | AY |
|---------------|------|-----|----|-----|----|----|----|------|-----|-----|-----|------|----|
| 20 [0.787]    |      | 136 | 15 | 116 | 55 | 40 | 25 | 15.5 | 6.8 | 7.5 | 3.2 | 31.2 | 27 |
| 25 [0.984]    |      | 136 | 20 | 116 | 55 | 40 | 30 | 17   | 6.8 | 9.5 | 3.2 | 34.6 | 30 |
| 32 [1.260]    |      | 136 | 25 | 116 | 55 | 40 | 35 | 20   | 6.8 | 9.5 | 3.2 | 41.6 | 36 |
| 40 [1.575]    |      | 136 | 25 | 116 | 75 | 55 | 40 | 23.5 | 9   | 9.5 | 4   | 47.3 | 41 |

●  $\phi 50, \phi 63$  DA  Bore size  $\times$   Stroke -1



| Bore mm [in.] | Code | U    | V  | W  | AE | AF | AH | AJ |
|---------------|------|------|----|----|----|----|----|----|
| 50 [1.969]    |      | 52   | 16 | 14 | 80 | 60 | 40 | 26 |
| 63 [2.480]    |      | 65.4 | 16 | 14 | 95 | 74 | 45 | 32 |

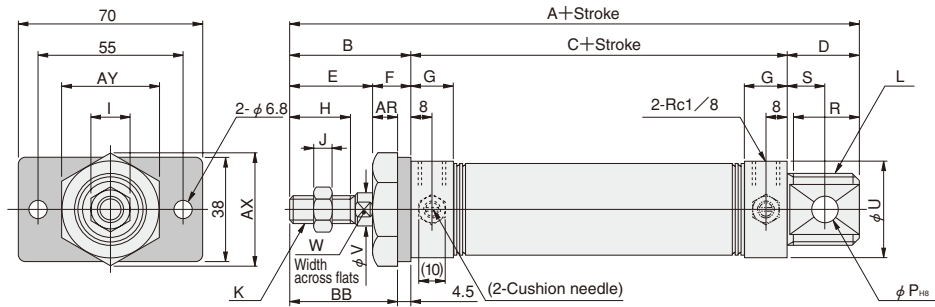
# Dimensions of Flange Mounting Type (mm)

●  $\phi 20 \sim \phi 40$  DA  Bore size  Stroke  -3

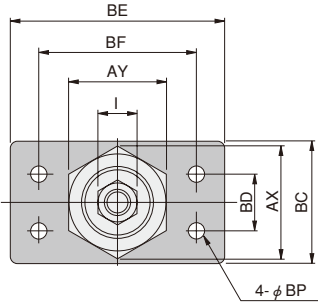
● Figures in parentheses ( ) are for type with variable cushion.

 DA-  Bore size  
SLIM-FL3

●  $\phi 20, \phi 25$




●  $\phi 32, \phi 40$

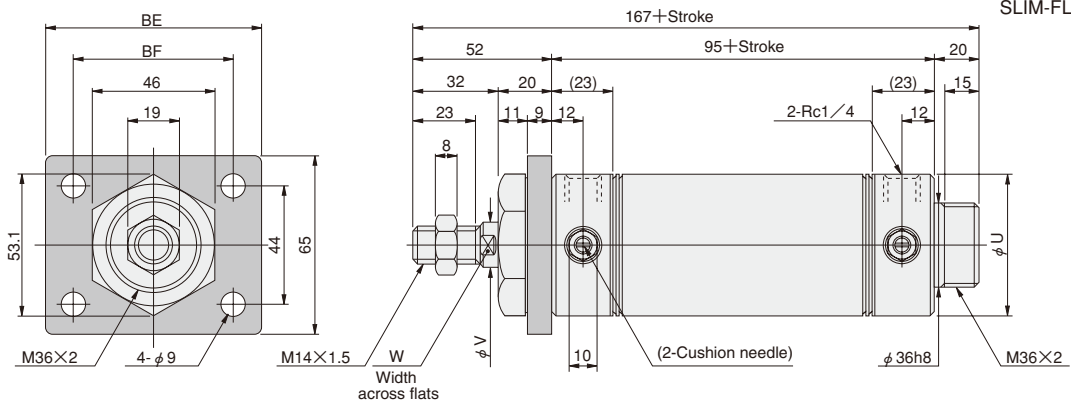


| Bore<br>mm [in.] | Code | A  | B  | C  | D  | E  | F      | G  | H  | I | J        | K       | L  | P  | R  | S    | U  | V  | W |
|------------------|------|----|----|----|----|----|--------|----|----|---|----------|---------|----|----|----|------|----|----|---|
| 20 [0.787]       | 132  | 35 | 76 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M 8×1    | M20×1.5 | 8  | 19 | 12 | 27   | 8  | 6  |   |
| 25 [0.984]       | 137  | 40 | 76 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 8  | 19 | 12 | 29   | 10 | 8  |   |
| 32 [1.260]       | 148  | 45 | 76 | 27 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 10 | 25 | 15 | 35   | 12 | 10 |   |
| 40 [1.575]       | 148  | 45 | 76 | 27 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 10 | 25 | 15 | 41.6 | 16 | 14 |   |

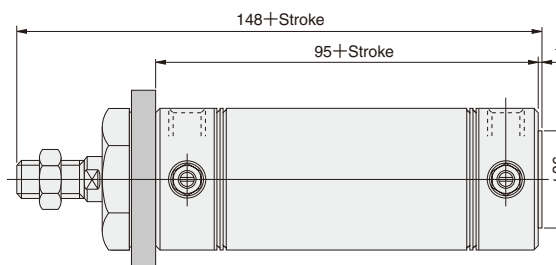
| Bore<br>mm [in.] | Code | AR  | AX   | AY | BB   | BC | BD | BE  | BF | BP  |
|------------------|------|-----|------|----|------|----|----|-----|----|-----|
| 20 [0.787]       |      | 7.5 | 31.2 | 27 | 30.5 | —  | —  | —   | —  | —   |
| 25 [0.984]       |      | 9.5 | 34.6 | 30 | 35.5 | —  | —  | —   | —  | —   |
| 32 [1.260]       |      | 9.5 | 41.6 | 36 | 40.5 | 45 | 20 | 80  | 60 | 6.8 |
| 40 [1.575]       |      | 9.5 | 47.3 | 41 | 40.5 | 50 | 30 | 100 | 80 | 9   |

●  $\phi 50, \phi 63$  DA  Bore size  Stroke  -3

 DA-  Bore size  
SLIM-A  
SLIM-FL3



● Short head



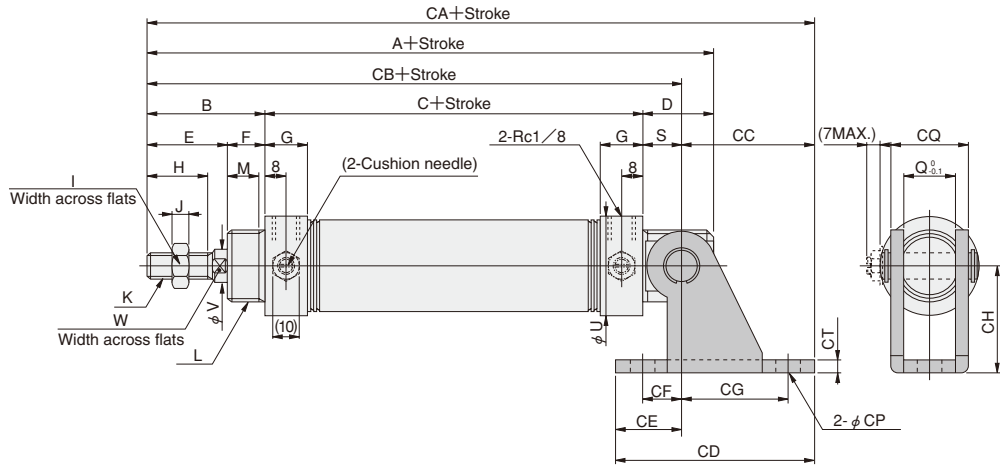
| Bore<br>mm [in.] | Code | U    | V  | W  | BE  | BF |
|------------------|------|------|----|----|-----|----|
| 50 [1.969]       |      | 52   | 16 | 14 | 80  | 60 |
| 63 [2.480]       |      | 65.4 | 16 | 14 | 100 | 80 |



# Dimensions of Pivot Mounting Type (mm)

●  $\phi 20 \sim \phi 40$  DA  Bore size   $\times$   Stroke **-8E** ● Figures in parentheses ( ) are for type with variable cushion.

CAD DA-  Bore size SLIM-CL7

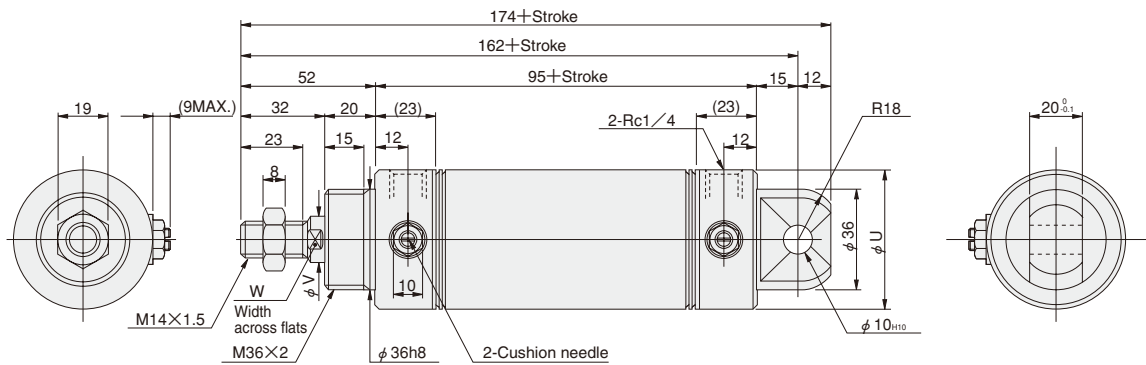


| Bore mm [in.] | Code | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | L       | M  | Q  | S  | U    | V  | W  |
|---------------|------|-----|----|----|----|----|----|--------|----|----|---|----------|---------|----|----|----|------|----|----|
| 20 [0.787]    |      | 132 | 35 | 76 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M 8×1    | M20×1.5 | 10 | 12 | 12 | 27   | 8  | 6  |
| 25 [0.984]    |      | 137 | 40 | 76 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 12 | 12 | 29   | 10 | 8  |
| 32 [1.260]    |      | 148 | 45 | 76 | 27 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 20 | 15 | 35   | 12 | 10 |
| 40 [1.575]    |      | 148 | 45 | 76 | 27 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 20 | 15 | 41.6 | 16 | 14 |

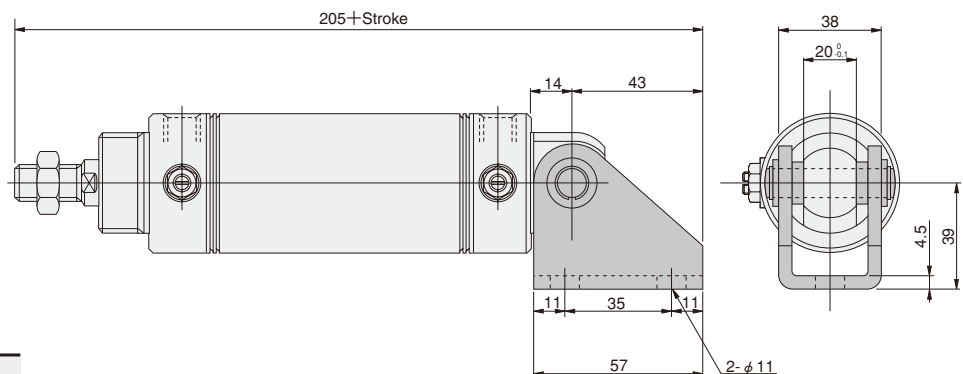
| Bore mm [in.] | Code | CA  | CB  | CC | CD | CE | CF | CG | CH | CP  | CQ   | CT  |
|---------------|------|-----|-----|----|----|----|----|----|----|-----|------|-----|
| 20 [0.787]    |      | 160 | 123 | 37 | 59 | 22 | 15 | 30 | 30 | 6.8 | 18.4 | 3.2 |
| 25 [0.984]    |      | 165 | 128 | 37 | 59 | 22 | 15 | 30 | 30 | 6.8 | 18.4 | 3.2 |
| 32 [1.260]    |      | 186 | 136 | 50 | 75 | 25 | 15 | 40 | 40 | 9   | 28   | 4   |
| 40 [1.575]    |      | 186 | 136 | 50 | 75 | 25 | 15 | 40 | 40 | 9   | 28   | 4   |

●  $\phi 50, \phi 63$

● Pivot mounting type with bushing DA  Bore size   $\times$   Stroke **-8B**



● Pivot mounting type with bushing DA  Bore size   $\times$   Stroke **-8B-8E**  
(With supporting bracket)



| Bore mm [in.] | Code | U    | V  | W  |
|---------------|------|------|----|----|
| 50 [1.969]    |      | 52   | 16 | 14 |
| 63 [2.480]    |      | 65.4 | 16 | 14 |

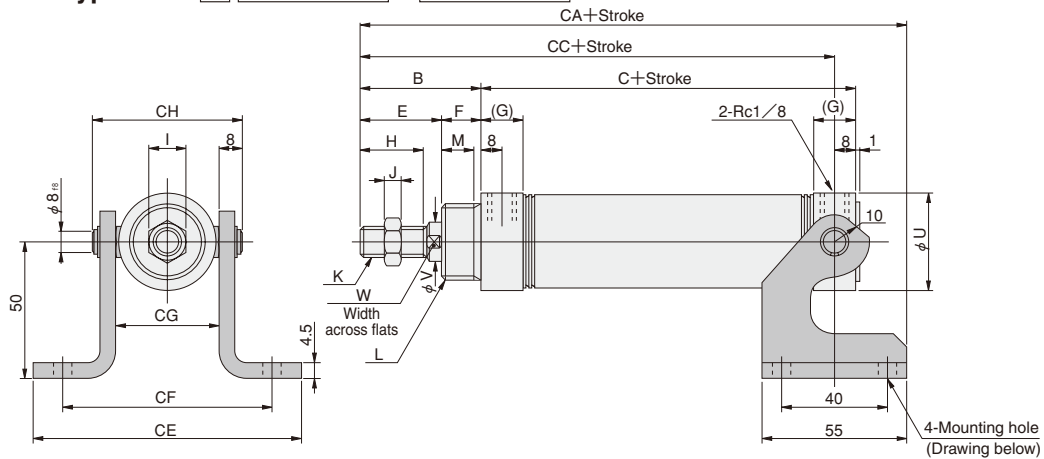


# Dimensions of Trunnion Type (mm)

●  $\phi 20 \sim \phi 40$

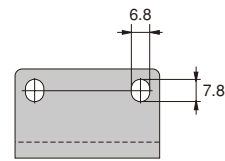
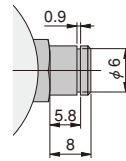
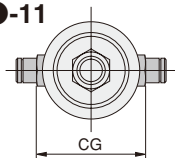
● Head trunnion type DA  Bore size  Stroke  -11-11T

CAD DA-  Bore size SLIM-TR



● -11

● Trunnion pin dimensions



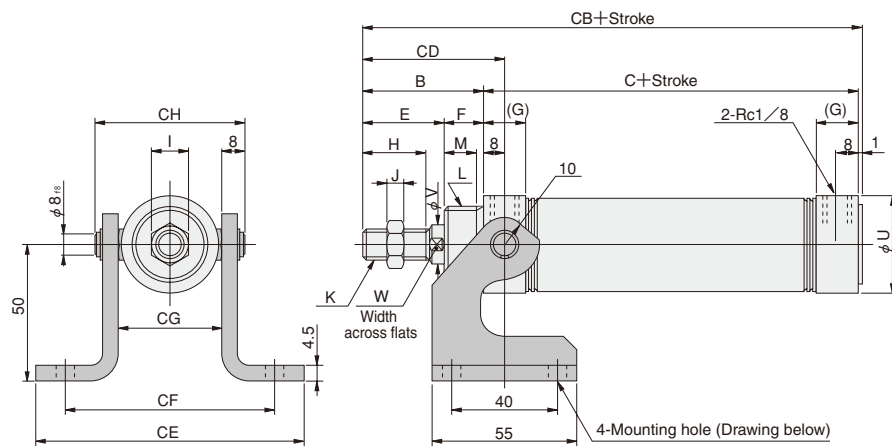
| Bore mm [in.] | Code    | B  | C  | E  | F  | G    | H  | I  | J | K        | L       | M  | U    | V  | W  | CA    | CE  | CF | CG | CH | CC  |
|---------------|---------|----|----|----|----|------|----|----|---|----------|---------|----|------|----|----|-------|-----|----|----|----|-----|
| 20            | [0.787] | 35 | 76 | 23 | 12 | 16   | 15 | 12 | 5 | M 8×1    | M20×1.5 | 10 | 27   | 8  | 6  | 130.5 | 92  | 72 | 32 | 48 | 103 |
| 25            | [0.984] | 40 | 76 | 26 | 14 | 16   | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 29   | 10 | 8  | 135.5 | 94  | 74 | 34 | 50 | 108 |
| 32            | [1.260] | 45 | 76 | 31 | 14 | 16   | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 35   | 12 | 10 | 140.5 | 100 | 80 | 40 | 56 | 113 |
| 40            | [1.575] | 45 | 76 | 31 | 14 | 14.5 | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 41.6 | 16 | 14 | 140.5 | 107 | 87 | 47 | 63 | 113 |

Remark : Head cover specification for the head trunnion type comes with a short head. Order code -A is not required.

●  $\phi 20 \sim \phi 40$

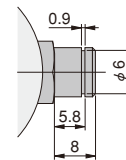
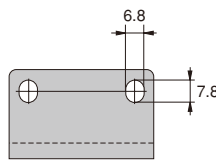
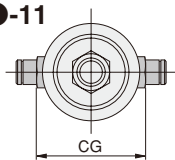
● Rod trunnion type DA  Bore size  Stroke  -12-12T

CAD DA-  Bore size SLIM-TR



● -11

● Trunnion pin dimensions

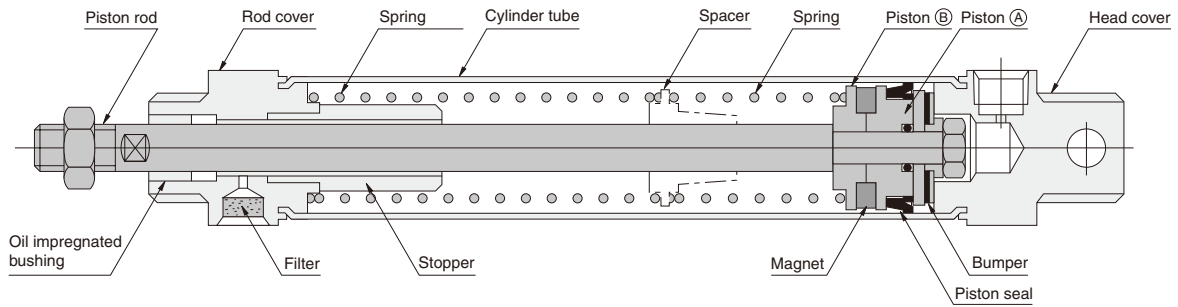


| Bore mm [in.] | Code    | B  | C  | E  | F  | G    | H  | I  | J | K        | L       | M  | U    | V  | W  | CB  | CE  | CF | CG | CH | CD |
|---------------|---------|----|----|----|----|------|----|----|---|----------|---------|----|------|----|----|-----|-----|----|----|----|----|
| 20            | [0.787] | 35 | 76 | 23 | 12 | 16   | 15 | 12 | 5 | M 8×1    | M20×1.5 | 10 | 27   | 8  | 6  | 112 | 92  | 72 | 32 | 48 | 43 |
| 25            | [0.984] | 40 | 76 | 26 | 14 | 16   | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 29   | 10 | 8  | 117 | 94  | 74 | 34 | 50 | 48 |
| 32            | [1.260] | 45 | 76 | 31 | 14 | 16   | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 35   | 12 | 10 | 122 | 100 | 80 | 40 | 56 | 53 |
| 40            | [1.575] | 45 | 76 | 31 | 14 | 14.5 | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 41.6 | 16 | 14 | 122 | 107 | 87 | 47 | 63 | 53 |

Remark : Head cover specification for the rod trunnion type comes with a short head. Order code -A is not required.



## Inner Construction and Major Parts (cannot be disassembled)



SLIM CYLINDERS

## Major Parts and Materials

| Parts   | Bore size | 20, 32  |
|---|-----------|---|
| Cylinder tube   |           | Stainless steel   |
| Piston (A)  |           | Plastic   |
| Piston (B)  |           | Stainless steel   |
| Piston rod  |           | Steel (hard chrome plated)                                |
| Rod cover   |           | Aluminum alloy (anodized)                                 |
| Head cover  |           |   |
| Seal  |           | Synthetic rubber (NBR)                                    |
| Bumper  |           |   |
| Stopper   |           | Steel pipe  |
| Spacer  |           | Steel   |
| Spring  |           | Piano wire  |
| Filter  |           | Foamed metal  |
| Magnet  |           | Plastic magnet  |
| Bellows   |           | Nylon tarpaulin (heat resistant temperature 70°C [158°F]) |
| Y type knuckle, I type knuckle<br>Pivot mounting with<br>supporting bracket |           | Mild steel (zinc plated)                                  |

## Air Consumption

● Air consumption for every 100mm stroke in single acting cylinder per 1 reciprocation

ℓ [ft.<sup>3</sup>] (ANR)

| Bore size<br>mm [in.] | Air pressure MPa [psi.] |                  |                  |                  |                  |                  |                  |                  |
|-----------------------|-------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|                       | 0.2 [29]                | 0.3 [44]         | 0.4 [58]         | 0.5 [73]         | 0.6 [87]         | 0.7 [102]        | 0.8 [116]        | 0.9 [131]        |
| <b>20 [0.787]</b>     | 0.1<br>[0.0035]         | 0.13<br>[0.0046] | 0.16<br>[0.0056] | 0.19<br>[0.0067] | 0.22<br>[0.0078] | 0.25<br>[0.0088] | 0.28<br>[0.0099] | 0.31<br>[0.0109] |
| <b>32 [1.260]</b>     | 0.24<br>[0.0085]        | 0.32<br>[0.0113] | 0.40<br>[0.0141] | 0.48<br>[0.0169] | 0.56<br>[0.0198] | 0.64<br>[0.0226] | 0.76<br>[0.0268] | 0.80<br>[0.0282] |

## Seals

Note: Seals cannot be replaced.

| Parts        | Quantity | Piston seal |
|--------------|----------|-------------|
| Bore size mm |          | 1           |
| <b>20</b>    |          | PPY-20      |
| <b>32</b>    |          | PPY-32      |

## Mass

kg [lb.]

| Bore size<br>mm [in.] | Mass of basic type        |                           |                           |                           | Mass of mounting bracket |                   |               |                |                |
|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|-------------------|---------------|----------------|----------------|
|                       | Stroke mm                 |                           |                           |                           | Foot bracket             | Flange<br>bracket | Pivot bracket | Y type knuckle | I type knuckle |
|                       | 25                        | 50                        | 75                        | 100                       |                          |                   |               |                |                |
| <b>20 [0.787]</b>     | 0.22 [0.49] (0.21 [0.46]) | 0.27 [0.60] (0.26 [0.57]) | 0.32 [0.71] (0.31 [0.68]) | —                         | 0.14 [0.31]              | 0.08 [0.18]       | 0.06 [0.13]   | 0.041 [0.090]  | 0.036 [0.079]  |
| <b>32 [1.260]</b>     | 0.37 [0.82] (0.35 [0.77]) | 0.56 [1.23] (0.54 [1.19]) | 0.71 [1.57] (0.69 [1.52]) | 0.80 [1.76] (0.78 [1.72]) | 0.19 [0.42]              | 0.10 [0.22]       | 0.14 [0.31]   | 0.075 [0.165]  | 0.070 [0.154]  |

Note: Figures in parentheses ( ) are for short head type.

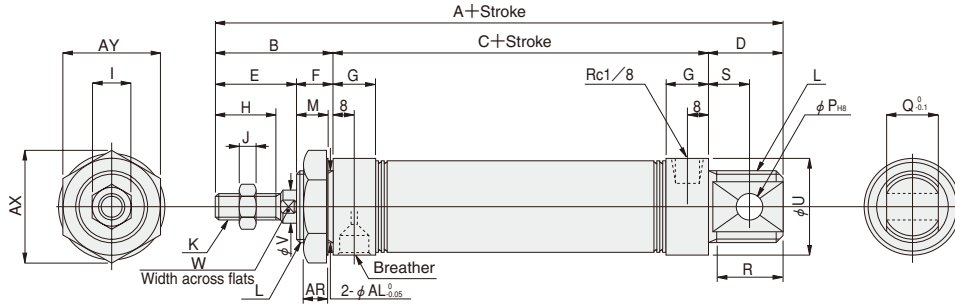
Calculation example: For foot mounting type of 32mm bore size and 75mm stroke

$$0.71 + 0.19 = 0.90\text{kg [1.98lb.]}$$

# Dimensions of Single Acting Push Type (mm)

● Basic type SA Bore size × Stroke

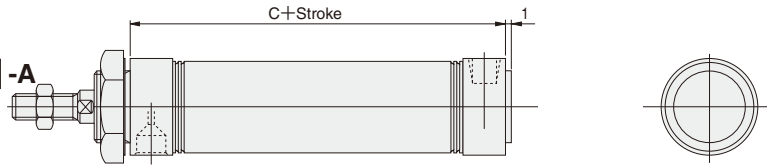
CAD SA- Bore size



● Short head

SA Bore size × Stroke

CAD SLIM-A

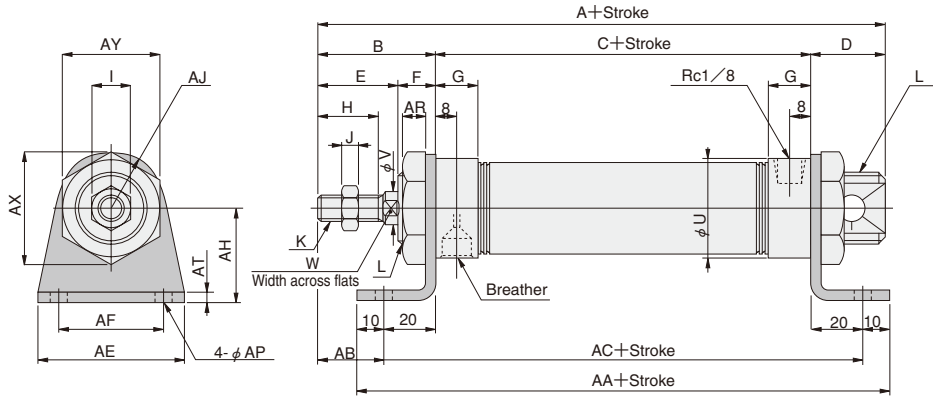


| Code<br>Stroke | A    |       |       |        |         |         | B  | C    |       |       |        |         |         | D  | E  | F  | G  | H  |
|----------------|------|-------|-------|--------|---------|---------|----|------|-------|-------|--------|---------|---------|----|----|----|----|----|
|                | 0~25 | 26~50 | 51~75 | 76~100 | 101~125 | 126~150 |    | 0~25 | 26~50 | 51~75 | 76~100 | 101~125 | 126~150 |    |    |    |    |    |
| 20 [0.787]     | 140  | 157   | 177   | —      | —       | —       | 35 | 84   | 101   | 121   | —      | —       | —       | 21 | 23 | 12 | 16 | 15 |
| 32 [1.260]     | 156  | 170   | 193   | 207    | —       | —       | 45 | 84   | 98    | 121   | 135    | —       | —       | 27 | 31 | 14 | 16 | 23 |

| Code       | I  | J | K        | L       | M  | P  | Q  | R  | S  | U  | V  | W  | AR  | AX   | AY | AL |
|------------|----|---|----------|---------|----|----|----|----|----|----|----|----|-----|------|----|----|
| 20 [0.787] | 12 | 5 | M 8×1    | M20×1.5 | 10 | 8  | 12 | 19 | 12 | 27 | 8  | 6  | 7.5 | 31.2 | 27 | 20 |
| 32 [1.260] | 14 | 6 | M10×1.25 | M27×2   | 12 | 10 | 20 | 25 | 15 | 35 | 12 | 10 | 9.5 | 41.6 | 36 | 27 |

● Foot mounting type SA Bore size × Stroke -1

CAD SA- Bore size SLIM-F01



| Code<br>Stroke | A    |       |       |        |         |         | B  | C    |       |       |        |         |         | D  | E  | F  | G  | H  |
|----------------|------|-------|-------|--------|---------|---------|----|------|-------|-------|--------|---------|---------|----|----|----|----|----|
|                | 0~25 | 26~50 | 51~75 | 76~100 | 101~125 | 126~150 |    | 0~25 | 26~50 | 51~75 | 76~100 | 101~125 | 126~150 |    |    |    |    |    |
| 20 [0.787]     | 140  | 157   | 177   | —      | —       | —       | 35 | 84   | 101   | 121   | —      | —       | —       | 21 | 23 | 12 | 16 | 15 |
| 32 [1.260]     | 156  | 170   | 193   | 207    | —       | —       | 45 | 84   | 98    | 121   | 135    | —       | —       | 27 | 31 | 14 | 16 | 23 |

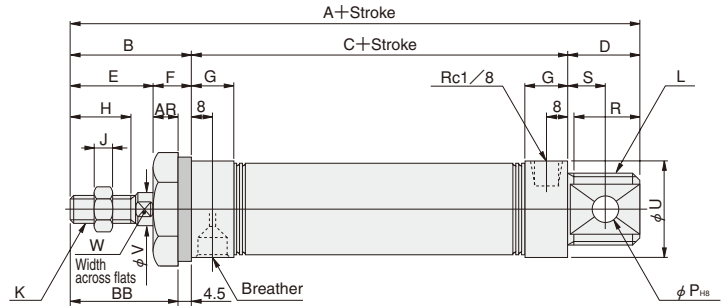
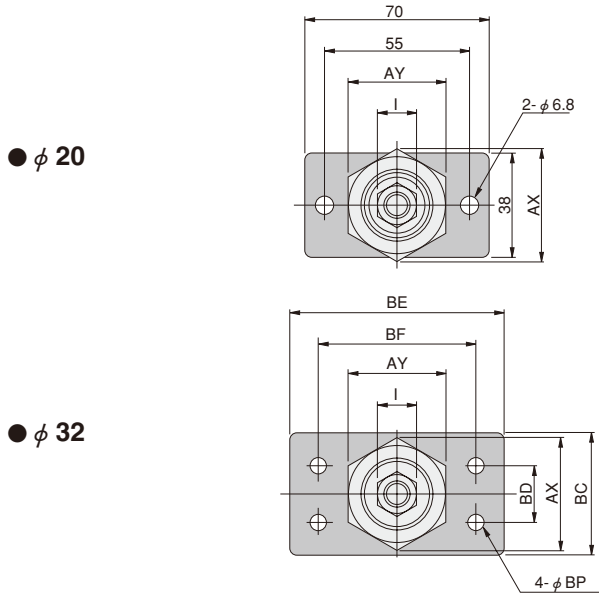
| Code       | I  | J | K        | L       | U  | V  | W  |
|------------|----|---|----------|---------|----|----|----|
| 20 [0.787] | 12 | 5 | M 8×1    | M20×1.5 | 27 | 8  | 6  |
| 32 [1.260] | 14 | 6 | M10×1.25 | M27×2   | 35 | 12 | 10 |

| Code<br>Stroke | AA   |       |       |        |         |         | AB | AC   |       |       |        |         |         | AE | AF | AH | AJ   | AP  | AR  | AT  | AX   | AY |
|----------------|------|-------|-------|--------|---------|---------|----|------|-------|-------|--------|---------|---------|----|----|----|------|-----|-----|-----|------|----|
|                | 0~25 | 26~50 | 51~75 | 76~100 | 101~125 | 126~150 |    | 0~25 | 26~50 | 51~75 | 76~100 | 101~125 | 126~150 |    |    |    |      |     |     |     |      |    |
| 20 [0.787]     | 144  | 161   | 181   | —      | —       | —       | 15 | 124  | 141   | 161   | —      | —       | —       | 55 | 40 | 25 | 15.5 | 6.8 | 7.5 | 3.2 | 31.2 | 27 |
| 32 [1.260]     | 144  | 158   | 181   | 195    | —       | —       | 25 | 124  | 138   | 161   | 175    | —       | —       | 55 | 40 | 35 | 20   | 6.8 | 9.5 | 3.2 | 41.6 | 36 |

# Dimensions of Single Acting Push Type (mm)

● Flange mounting type SA Bore size × Stroke -3

CAD SA- Bore size SLIM-FL3



● φ 20

● φ 32

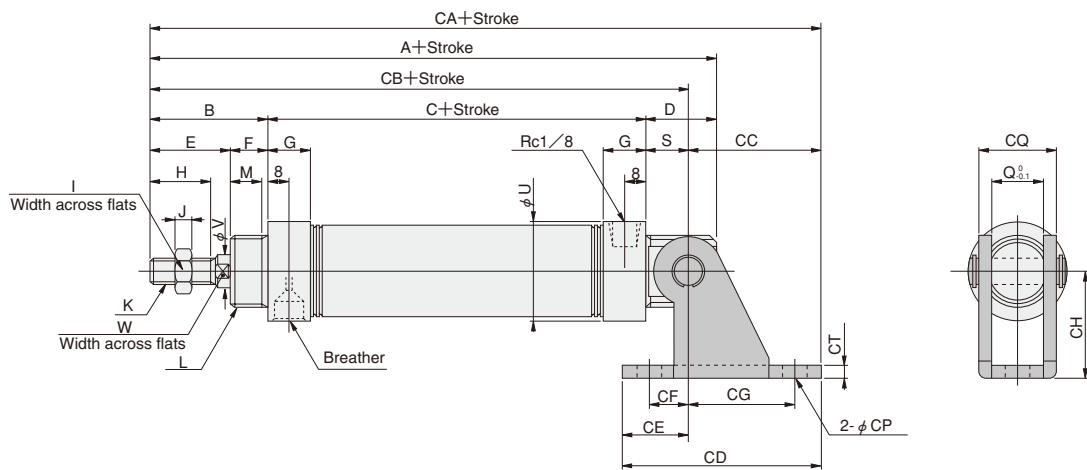
SLIM CYLINDERS

| Code<br>Stroke | A    |       |       |        |         |         | B  | C    |       |       |        |         |         | D  | E  | F  | G  | H  |
|----------------|------|-------|-------|--------|---------|---------|----|------|-------|-------|--------|---------|---------|----|----|----|----|----|
|                | 0~25 | 26~50 | 51~75 | 76~100 | 101~125 | 126~150 |    | 0~25 | 26~50 | 51~75 | 76~100 | 101~125 | 126~150 |    |    |    |    |    |
| 20 [0.787]     | 140  | 157   | 177   | —      | —       | —       | 35 | 84   | 101   | 121   | —      | —       | —       | 21 | 23 | 12 | 16 | 15 |
| 32 [1.260]     | 156  | 170   | 193   | 207    | —       | —       | 45 | 84   | 98    | 121   | 135    | —       | —       | 27 | 31 | 14 | 16 | 23 |

| Code       | I  | J | K        | L       | P  | R  | S  | U  | V  | W  | AR  | AX   | AY | BB   | BC | BD | BE | BF | BP  |
|------------|----|---|----------|---------|----|----|----|----|----|----|-----|------|----|------|----|----|----|----|-----|
| 20 [0.787] | 12 | 5 | M8×1     | M20×1.5 | 8  | 19 | 12 | 27 | 8  | 6  | 7.5 | 31.2 | 27 | 30.5 | —  | —  | —  | —  | —   |
| 32 [1.260] | 14 | 6 | M10×1.25 | M27×2   | 10 | 25 | 15 | 35 | 12 | 10 | 9.5 | 41.6 | 36 | 40.5 | 45 | 20 | 80 | 60 | 6.8 |

● Pivot mounting type with supporting bracket SA Bore size × Stroke -8E

CAD SA- Bore size SLIM-CL7



| Code<br>Stroke | A    |       |       |        |         |         | B  | C    |       |       |        |         |         | D  | E  | F  | G  | H  | I  | J | K        | L       | M  |
|----------------|------|-------|-------|--------|---------|---------|----|------|-------|-------|--------|---------|---------|----|----|----|----|----|----|---|----------|---------|----|
|                | 0~25 | 26~50 | 51~75 | 76~100 | 101~125 | 126~150 |    | 0~25 | 26~50 | 51~75 | 76~100 | 101~125 | 126~150 |    |    |    |    |    |    |   |          |         |    |
| 20 [0.787]     | 140  | 157   | 177   | —      | —       | —       | 35 | 84   | 101   | 121   | —      | —       | —       | 21 | 23 | 12 | 16 | 15 | 12 | 5 | M 8×1    | M20×1.5 | 10 |
| 32 [1.260]     | 156  | 170   | 193   | 207    | —       | —       | 45 | 84   | 98    | 121   | 135    | —       | —       | 27 | 31 | 14 | 16 | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 |

| Code<br>Stroke | Q  | S  | U  | V  | W  | CA   |       |       |        |         |         | CB   |       |       |        |         |         | CC | CD | CE | CF | CG | CH | CP  | CQ   | CT  |
|----------------|----|----|----|----|----|------|-------|-------|--------|---------|---------|------|-------|-------|--------|---------|---------|----|----|----|----|----|----|-----|------|-----|
|                |    |    |    |    |    | 0~25 | 26~50 | 51~75 | 76~100 | 101~125 | 126~150 | 0~25 | 26~50 | 51~75 | 76~100 | 101~125 | 126~150 |    |    |    |    |    |    |     |      |     |
| 20 [0.787]     | 12 | 12 | 27 | 8  | 6  | 168  | 185   | 205   | —      | —       | —       | 131  | 148   | 168   | —      | —       | —       | 37 | 59 | 22 | 15 | 30 | 30 | 6.8 | 18.4 | 3.2 |
| 32 [1.260]     | 20 | 15 | 35 | 12 | 10 | 194  | 208   | 231   | 245    | —       | —       | 144  | 158   | 181   | 195    | —       | —       | 50 | 75 | 25 | 15 | 40 | 40 | 9   | 28   | 4   |

# SLIM SQUARE ROD CYLINDERS



## Symbol



## Specifications

| Item                                  | Bore size mm [in.]                             |                       |                                      |
|---------------------------------------|--|-----------------------|--------------------------------------|
|                                       | 20, 25 [0.787, 0.984]                          | 32, 40 [1.260, 1.575] | 50, 63 [1.969, 2.480]                |
| Operation type                        | Double acting type                             |                       |                                      |
| Media                                 | Air  |                       |                                      |
| Mounting type                         | Basic type, Foot type, Flange type, Pivot type |                       |                                      |
| Operating pressure range MPa [psi.]   | 0.1~0.9 [15~131]                               |                       | 0.05~0.7 [7~102]                     |
| Proof pressure MPa [psi.]             | 1.32 [191]                                     |                       | 1.03 [149]                           |
| Operating temperature range °C [°F]   | 0~70 [32~158]                                  |                       |                                      |
| Operating speed range mm/s [in./sec.] | 50~700 [2.0~27.6]                              |                       | 50~500 [2.0~19.7]                    |
| Cushion                               | Fixed type (Rubber bumper)                     |                       | Variable type (Stroke15mm [0.59in.]) |
| Lubrication                           | Not required                                   |                       |                                      |
| Non-rotating accuracy                 | ±1.5°  |                       | ±1°                                  |
| Port size                             | Rc   | 1/8                   | 1/4                                  |

## Bore Size and Stroke

| Bore size | Standard strokes     | mm             |                          |
|-----------|----------------------|----------------|--------------------------|
|           |                      | Maximum stroke | Maximum available stroke |
| 20        | 25 50 75 100 125 150 | 150            | 500                      |
| 25        |                      |                |                          |
| 32        |                      |                |                          |
| 40        |                      |                |                          |
| 50        | 25 50 75 100 150     |                |                          |
| 63        |                      |                |                          |

- Remarks: 1. Stroke tolerance  $+0.039\text{in.}$   
 2. For non-standard strokes, consult us.  
 3. The minimum operating pressure when the stroke is over the maximum stroke is 0.2MPa [29psi.].

## Order Codes

**DA** **L** **□** **20×50** - **□** - **□** - **□** - **□** **□** **□**

**Square rod cylinder**  
**Slim double acting cylinder**

**Bore size × Stroke**

**Bellows**  
**Blank** — No bellows  
**J** — With bellows  
 ● (Made to order, available at φ 25 and φ 40 only.)

**Rod end accessory**  
**Blank** — No rod end accessory  
**I** — I type knuckle  
**Y** — Y type knuckle (with pin)  
 ● For the cylinder joint and cylinder rod end, see p.1568.

**Mounting type**  
**Blank** — Basic type  
**1** — Double foot mounting type  
**3** — Flange mounting type  
**8B** — Pivot mounting type with bushing (Available at φ 50 and φ 63 only)  
**8E** — Pivot mounting type with supporting bracket (with pin) (Available at φ 20~40 only)  
**8B-8E** — Pivot mounting type with bushing and supporting bracket (Available at φ 50 and φ 63 only)  
 ● Mounting brackets are included at shipping. (Except pivot mounting type and pivot mounting type with bushing)

**Head cover specification**  
**Blank** — Standard head  
**A** — Short head

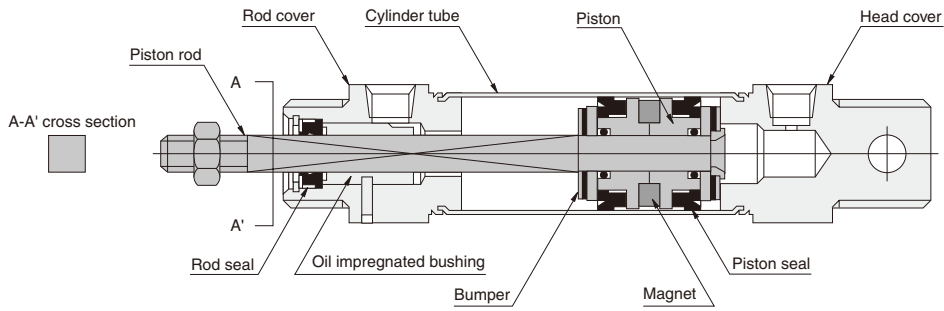
**Number of sensor switches**  
**1** — With 1 sensor switch  
**2** — With 2 sensor switches  
**3** — With 3 sensor switches  
 ⋮

**Lead wire length**  
 (Applies to all except **CS□F**)  
**A** — 1000mm  
**B** — 3000mm

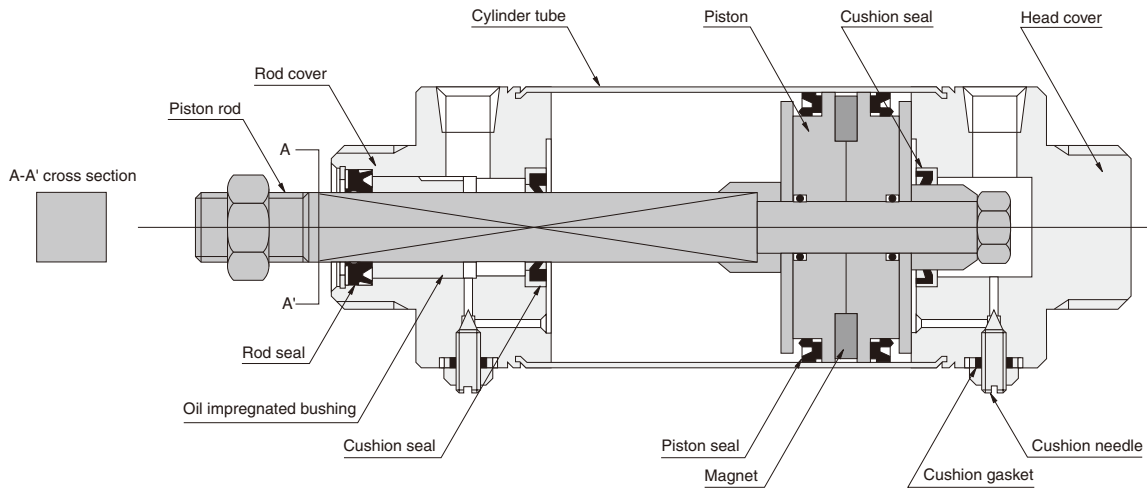
**Sensor switch (for cylinders with sensor switches)**  
**Blank** — No sensor switch  
**ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
**ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
**CS3M** — Reed switch type with indicator lamp DC10~30V  
 AC85~230V  
**CS4M** — Reed switch type with indicator lamp DC10~30V  
 AC85~115V  
**CS5M** — Reed switch type without indicator lamp DC3~30V  
 AC85~115V  
**CS2F** — Reed switch type with indicator lamp AC85~230V  
**CS3F** — Reed switch type with indicator lamp DC10~30V  
**CS4F** — Reed switch type with indicator lamp DC10~30V  
**CS5F** — Reed switch type without indicator lamp DC3~30V  
 ● For details of sensor switches, see p.1544.  
 ● **CS□F** comes with DIN connector. All others are grommet type.

# Inner Construction and Major Parts (cannot be disassembled)

●  $\phi 20 \sim \phi 40$



●  $\phi 50, \phi 63$



## Major Parts and Materials

| Parts  | Bore size | 20~40   | 50, 63 |
|--|-----------|---|--------|
| Cylinder tube  |           | Stainless steel   |        |
| Piston   |           | Plastic   |        |
| Piston rod   |           | Steel (hard chrome plated)                                |        |
| Rod cover  |           | Aluminum alloy (anodized)                                 |        |
| Head cover   |           |   |        |
| Seal   |           | Synthetic rubber (NBR)                                    |        |
| Bumper   |           | Synthetic rubber (NBR)                                    | —      |
| Magnet   |           | Plastic magnet  |        |
| Bellows  |           | Nylon tarpaulin (heat resistant temperature 70°C [158°F]) |        |
| Y type knuckle, I type knuckle<br>Pivot mounting with supporting bracket |           | Mild steel (zinc plated)                                  |        |

## Seals Note: Seals cannot be replaced.

| Parts   | Rod seal | Piston seal | Cushion seal | Cushion gasket |
|---------|----------|-------------|--------------|----------------|
| Bore mm | Quantity | 1           | 2            | 2              |
| 20      |          | KC-7.4      | PPY-20       | —              |
| 25      |          | KC-7.4      | PPY-25       | —              |
| 32      |          | KC-10       | PPY-32       | —              |
| 40      |          | KC-13       | PPY-40       | —              |
| 50      |          | KC-13       | PGY-50       | PCS-20         |
| 63      |          | KC-13       | PGY-63       | PCS-20         |

## Mass

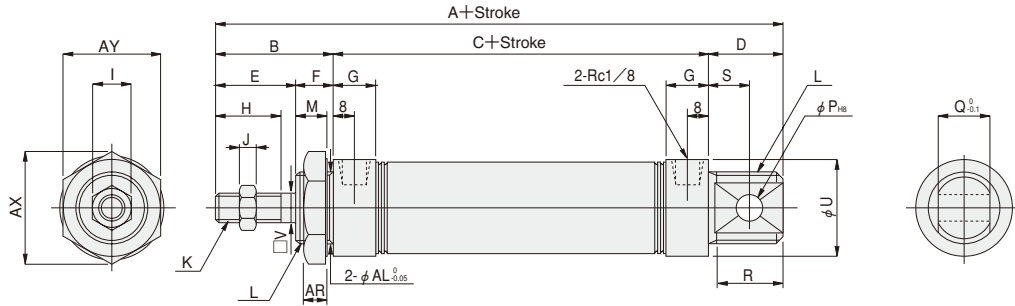
| Bore size<br>mm [in.] | Zero stroke mass   |                 |                     | Additional mass<br>for each 1mm<br>[0.0394in.] stroke | Mass of mounting bracket |                |               |                |                |
|-----------------------|--------------------|-----------------|---------------------|---|--------------------------|----------------|---------------|----------------|----------------|
|                       | Standard head type | Short head type | Pivot mounting type |   | Foot bracket             | Flange bracket | Pivot bracket | Y type knuckle | I type knuckle |
| 20 [0.787]            | 0.16 [0.35]        | 0.15 [0.33]     | —                   | 0.0008 [0.0018]                                       | 0.14 [0.31]              | 0.08 [0.18]    | 0.06 [0.13]   | 0.041 [0.090]  | 0.036 [0.079]  |
| 25 [0.984]            | 0.20 [0.44]        | 0.19 [0.42]     | —                   | 0.0009 [0.0020]                                       | 0.16 [0.35]              | 0.08 [0.18]    | 0.06 [0.13]   | 0.075 [0.165]  | 0.070 [0.154]  |
| 32 [1.260]            | 0.34 [0.75]        | 0.32 [0.71]     | —                   | 0.0014 [0.0031]                                       | 0.19 [0.42]              | 0.10 [0.22]    | 0.14 [0.31]   | 0.075 [0.165]  | 0.070 [0.154]  |
| 40 [1.575]            | 0.50 [1.10]        | 0.46 [1.01]     | —                   | 0.0021 [0.0046]                                       | 0.29 [0.64]              | 0.13 [0.29]    | 0.14 [0.31]   | 0.120 [0.265]  | 0.132 [0.291]  |
| 50 [1.969]            | 0.90 [1.98]        | 0.85 [1.87]     | 0.82 [1.81]         | 0.0027 [0.0060]                                       | 0.55 [1.21]              | 0.28 [0.62]    | 0.24 [0.53]   | 0.120 [0.265]  | 0.132 [0.291]  |
| 63 [2.480]            | 1.24 [2.73]        | 1.20 [2.65]     | 1.17 [2.58]         | 0.0032 [0.0071]                                       | 0.73 [1.61]              | 0.37 [0.82]    | 0.24 [0.53]   | 0.120 [0.265]  | 0.132 [0.291]  |

Calculation example: For short head type of 50mm bore size and 100mm stroke with flange mounting bracket  
 $0.85 + (0.0026 \times 100) + 0.28 = 1.39\text{kg} [3.06\text{lb.}]$

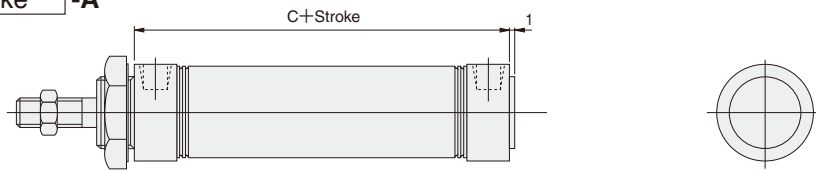


# Dimensions of Square Rod Basic Type (mm)

●  $\phi 20 \sim \phi 40$  DAL Bore size   $\times$  Stroke

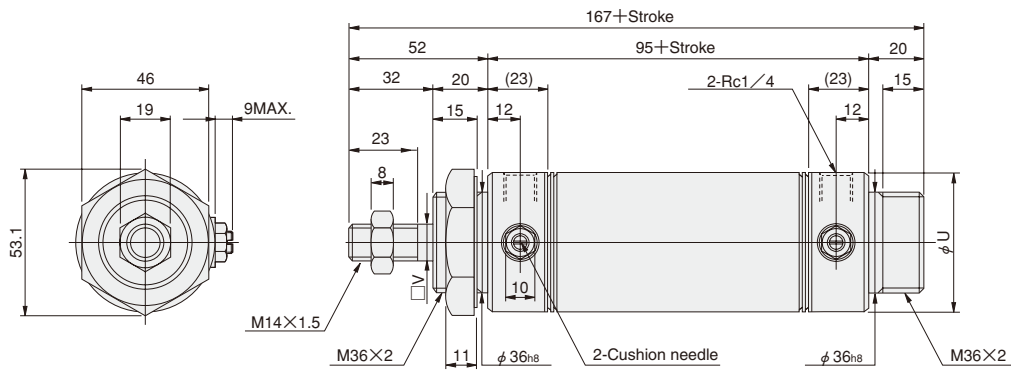


● Short head DAL Bore size   $\times$  Stroke  -A

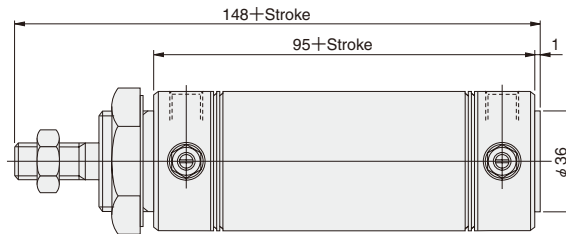


| Bore mm [in.] | Code    | A   | B  | C  | D  | E  | F  | G    | H  | I  | J | K        | L       | M  | P  | Q  | R  | S  | U    | V   | AR  | AX   | AY | AL |
|---------------|---------|-----|----|----|----|----|----|------|----|----|---|----------|---------|----|----|----|----|----|------|-----|-----|------|----|----|
| 20            | [0.787] | 132 | 35 | 76 | 21 | 23 | 12 | 16   | 15 | 12 | 5 | M 8×1    | M20×1.5 | 10 | 8  | 12 | 19 | 12 | 27   | 7.4 | 7.5 | 31.2 | 27 | 20 |
| 25            | [0.984] | 137 | 40 | 76 | 21 | 26 | 14 | 16   | 18 | 12 | 5 | M 8×1    | M22×1.5 | 12 | 8  | 12 | 19 | 12 | 29   | 7.4 | 9.5 | 34.6 | 30 | 22 |
| 32            | [1.260] | 148 | 45 | 76 | 27 | 31 | 14 | 16   | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 10 | 20 | 25 | 15 | 35   | 10  | 9.5 | 41.6 | 36 | 27 |
| 40            | [1.575] | 148 | 45 | 76 | 27 | 31 | 14 | (15) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 10 | 20 | 25 | 15 | 41.6 | 13  | 9.5 | 47.3 | 41 | 33 |

●  $\phi 50, \phi 63$  DAL Bore size   $\times$  Stroke



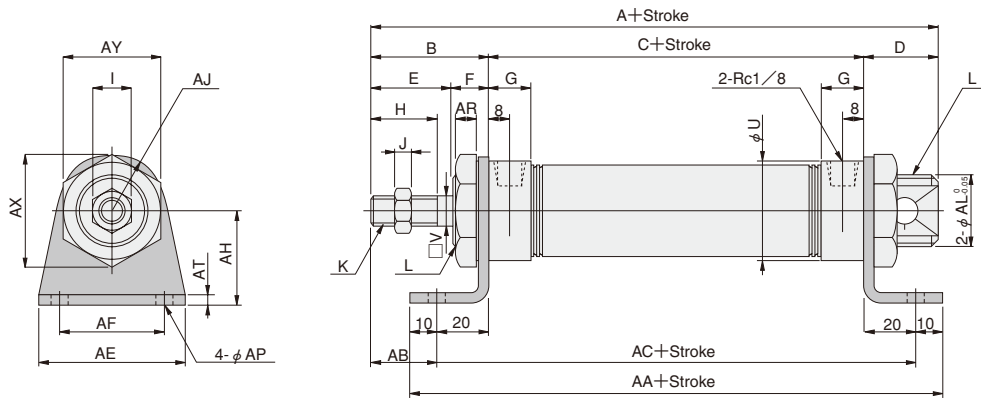
● Short head DAL Bore size   $\times$  Stroke  -A



| Bore mm [in.] | Code    | U    | V  |
|---------------|---------|------|----|
| 50            | [1.969] | 52   | 13 |
| 63            | [2.480] | 65.4 | 13 |

# Dimensions of Square Rod Foot Mounting Type (mm)

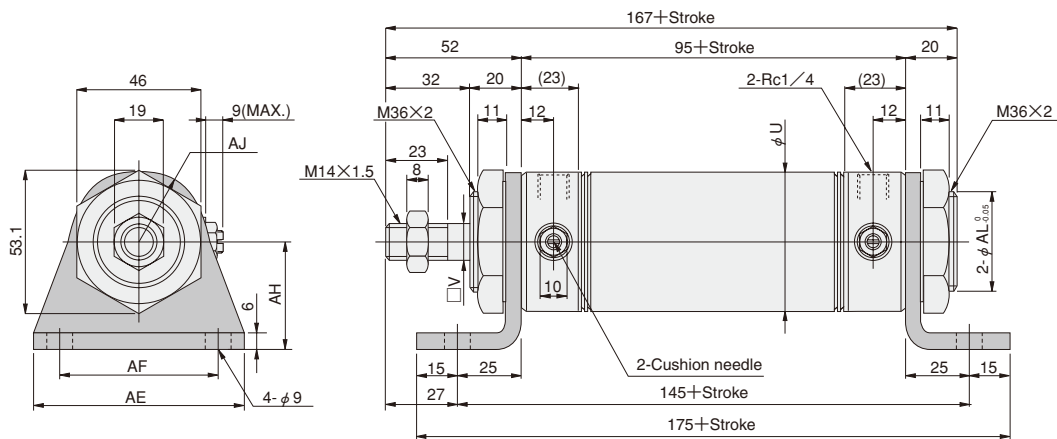
●  $\phi 20 \sim \phi 40$  DAL Bore size   $\times$  Stroke  -1



| Bore mm [in.] | Code | A   | B  | C  | D  | E  | F  | G  | H  | I  | J | K        | L       | U    | V   |
|---------------|------|-----|----|----|----|----|----|----|----|----|---|----------|---------|------|-----|
| 20 [0.787]    |      | 132 | 35 | 76 | 21 | 23 | 12 | 16 | 15 | 12 | 5 | M 8×1    | M20×1.5 | 27   | 7.4 |
| 25 [0.984]    |      | 137 | 40 | 76 | 21 | 26 | 14 | 16 | 18 | 12 | 5 | M 8×1    | M22×1.5 | 29   | 7.4 |
| 32 [1.260]    |      | 148 | 45 | 76 | 27 | 31 | 14 | 16 | 23 | 14 | 6 | M10×1.25 | M27×2   | 35   | 10  |
| 40 [1.575]    |      | 148 | 45 | 76 | 27 | 31 | 14 | 15 | 23 | 19 | 8 | M14×1.5  | M33×2   | 41.6 | 13  |

| Bore mm [in.] | Code | AA  | AB | AC  | AE | AF | AH | AJ   | AP  | AR  | AT  | AX   | AY |
|---------------|------|-----|----|-----|----|----|----|------|-----|-----|-----|------|----|
| 20 [0.787]    |      | 136 | 15 | 116 | 55 | 40 | 25 | 15.5 | 6.8 | 7.5 | 3.2 | 31.2 | 27 |
| 25 [0.984]    |      | 136 | 20 | 116 | 55 | 40 | 30 | 17   | 6.8 | 9.5 | 3.2 | 34.6 | 30 |
| 32 [1.260]    |      | 136 | 25 | 116 | 55 | 40 | 35 | 20   | 6.8 | 9.5 | 3.2 | 41.6 | 36 |
| 40 [1.575]    |      | 136 | 25 | 116 | 75 | 55 | 40 | 23.5 | 9   | 9.5 | 4   | 47.3 | 41 |

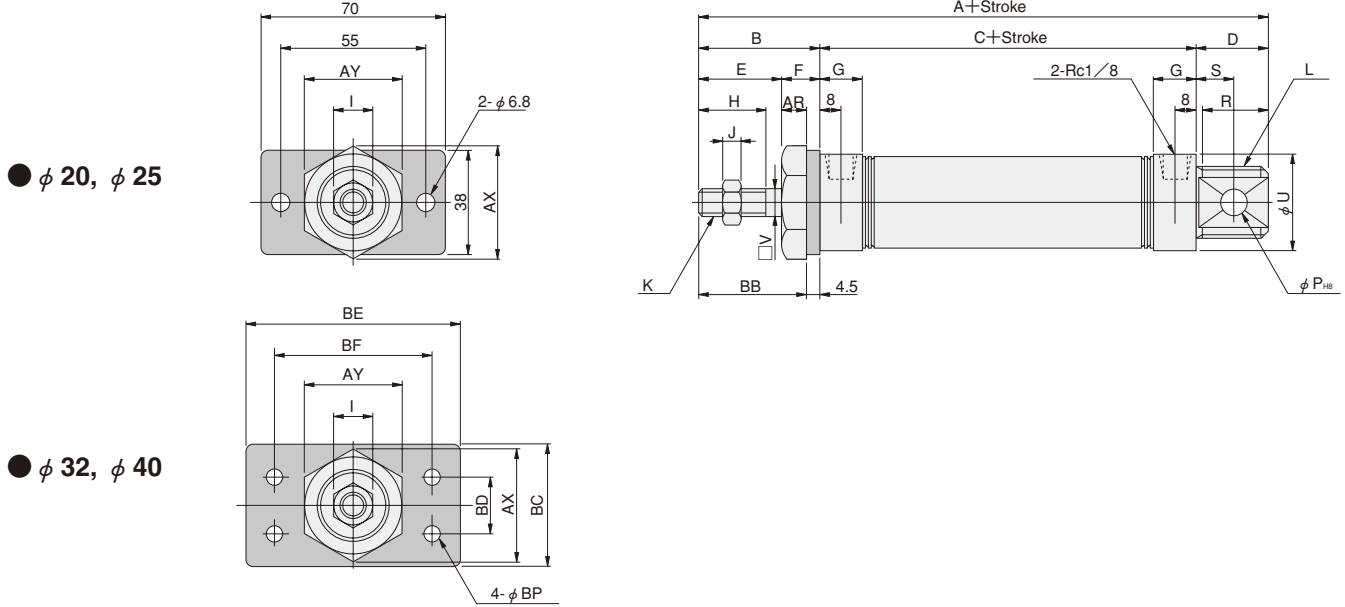
●  $\phi 50, \phi 63$  DAL Bore size   $\times$  Stroke  -1



| Bore mm [in.] | Code | U    | V  | AE | AF | AH | AJ |
|---------------|------|------|----|----|----|----|----|
| 50 [1.969]    |      | 52   | 13 | 80 | 60 | 40 | 26 |
| 63 [2.480]    |      | 65.4 | 13 | 95 | 74 | 45 | 32 |

# Dimensions of Square Rod Flange Mounting Type (mm)

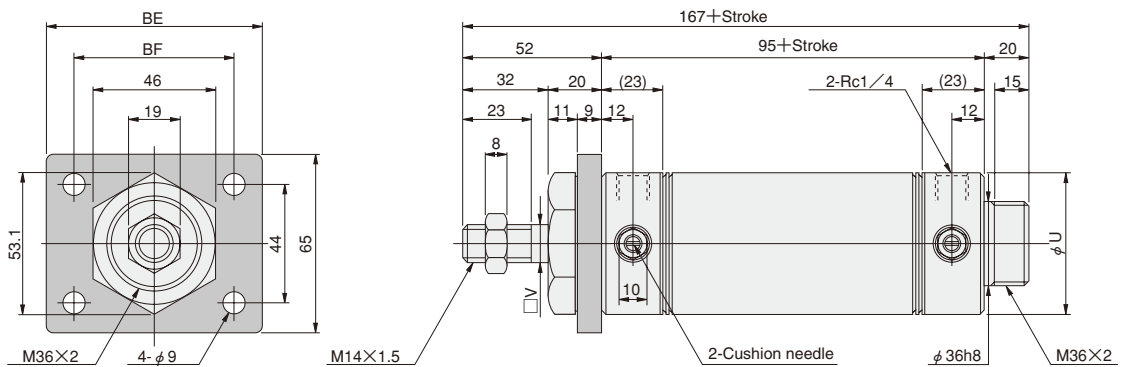
●  $\phi 20 \sim \phi 40$  DAL Bore size   $\times$  Stroke  -3



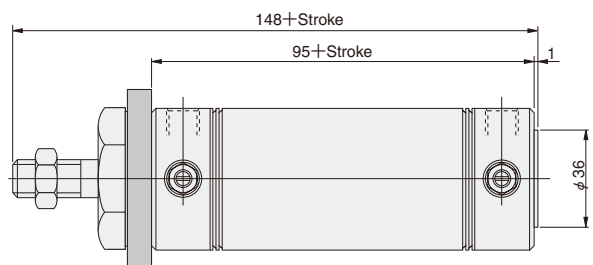
| Bore<br>mm [in.] | Code    | A   | B  | C  | D  | E  | F  | G  | H  | I  | J | K        | L       | P  | R  | S  | U    | V   |
|------------------|---------|-----|----|----|----|----|----|----|----|----|---|----------|---------|----|----|----|------|-----|
| 20               | [0.787] | 132 | 35 | 76 | 21 | 23 | 12 | 16 | 15 | 12 | 5 | M 8×1    | M20×1.5 | 8  | 19 | 12 | 27   | 7.4 |
| 25               | [0.984] | 137 | 40 | 76 | 21 | 26 | 14 | 16 | 18 | 12 | 5 | M 8×1    | M22×1.5 | 8  | 19 | 12 | 29   | 7.4 |
| 32               | [1.260] | 148 | 45 | 76 | 27 | 31 | 14 | 16 | 23 | 14 | 6 | M10×1.25 | M27×2   | 10 | 25 | 15 | 35   | 10  |
| 40               | [1.575] | 148 | 45 | 76 | 27 | 31 | 14 | 15 | 23 | 19 | 8 | M14×1.5  | M33×2   | 10 | 25 | 15 | 41.6 | 13  |

| Bore<br>mm [in.] | Code    | AR  | AX   | AY | BB   | BC | BD | BE  | BF | BP  |
|------------------|---------|-----|------|----|------|----|----|-----|----|-----|
| 20               | [0.787] | 7.5 | 31.2 | 27 | 30.5 | —  | —  | —   | —  | —   |
| 25               | [0.984] | 9.5 | 34.6 | 30 | 35.5 | —  | —  | —   | —  | —   |
| 32               | [1.260] | 9.5 | 41.6 | 36 | 40.5 | 45 | 20 | 80  | 60 | 6.8 |
| 40               | [1.575] | 9.5 | 47.3 | 41 | 40.5 | 50 | 30 | 100 | 80 | 9   |

●  $\phi 50, \phi 63$  DAL Bore size   $\times$  Stroke  -3



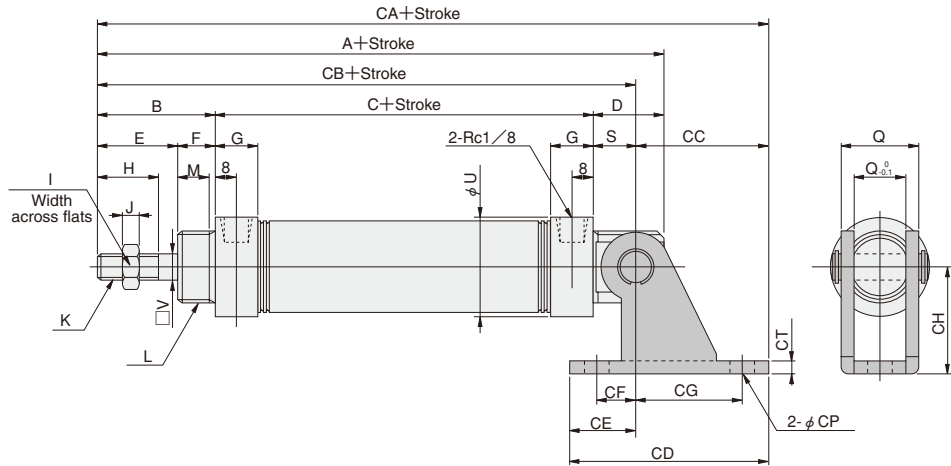
● Short head DAL Bore size   $\times$  Stroke  -A



| Bore<br>mm [in.] | Code    | U    | V  | BE  | BF |
|------------------|---------|------|----|-----|----|
| 50               | [1.969] | 52   | 13 | 80  | 60 |
| 63               | [2.480] | 65.4 | 13 | 100 | 80 |

# Dimensions of Square Rod Pivot Mounting Type (mm)

●  $\phi 20 \sim \phi 40$  DAL Bore size  $\times$  Stroke -8E

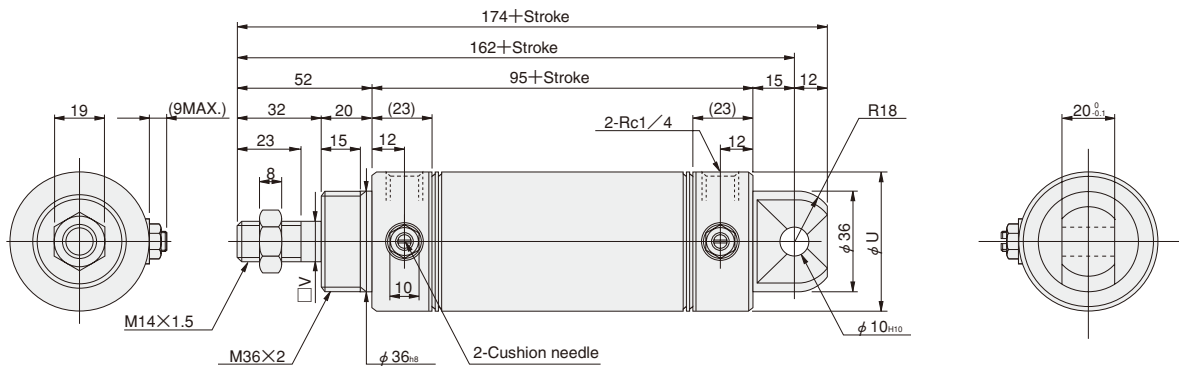


| Bore mm [in.] | Code | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | L       | M  | Q  | S  | U    | V   |
|---------------|------|-----|----|----|----|----|----|--------|----|----|---|----------|---------|----|----|----|------|-----|
| 20 [0.787]    |      | 132 | 35 | 76 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M 8×1    | M20×1.5 | 10 | 12 | 12 | 27   | 7.4 |
| 25 [0.984]    |      | 137 | 40 | 76 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M 8×1    | M22×1.5 | 12 | 12 | 12 | 29   | 7.4 |
| 32 [1.260]    |      | 148 | 45 | 76 | 27 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 20 | 15 | 35   | 10  |
| 40 [1.575]    |      | 148 | 45 | 76 | 27 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 20 | 15 | 41.6 | 13  |

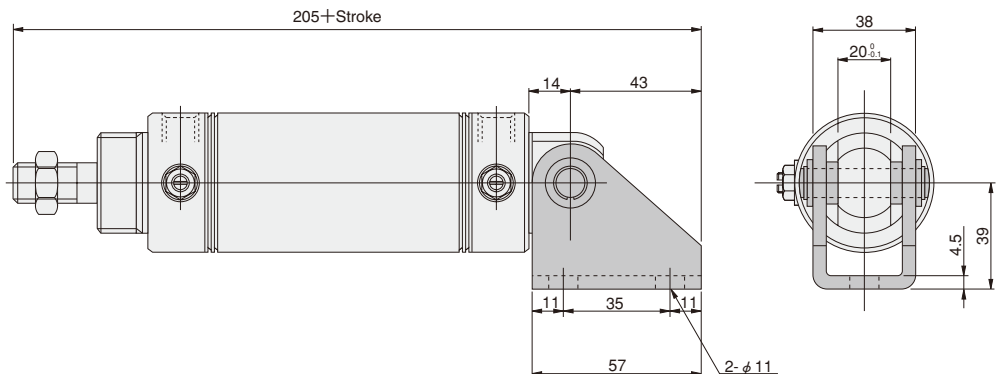
| Bore mm [in.] | Code | CA  | CB  | CC | CD | CE | CF | CG | CH | CP  | CQ   | CT  |
|---------------|------|-----|-----|----|----|----|----|----|----|-----|------|-----|
| 20 [0.787]    |      | 160 | 123 | 37 | 59 | 22 | 15 | 30 | 30 | 6.8 | 18.4 | 3.2 |
| 25 [0.984]    |      | 165 | 128 | 37 | 59 | 22 | 15 | 30 | 30 | 6.8 | 18.4 | 3.2 |
| 32 [1.260]    |      | 186 | 136 | 50 | 75 | 25 | 15 | 40 | 40 | 9   | 28   | 4   |
| 40 [1.575]    |      | 186 | 136 | 50 | 75 | 25 | 15 | 40 | 40 | 9   | 28   | 4   |

●  $\phi 50, \phi 63$

● Pivot mounting type with bushing DAL Bore size  $\times$  Stroke -8B



● Pivot mounting type with bushing DAL Bore size  $\times$  Stroke -8B-8E (With supporting bracket)



| Bore mm [in.] | Code | U    | V  |
|---------------|------|------|----|
| 50 [1.969]    |      | 52   | 13 |
| 63 [2.480]    |      | 65.4 | 13 |

# SLIM DOUBLE ROD CYLINDERS



## Symbol



## Specifications

| Item                                  | Bore size mm [in.]                 |                                       |
|---------------------------------------|------------------------------------|---------------------------------------|
|                                       | 20~40 [0.787~1.575]                | 50, 63 [1.969, 2.480]                 |
| Operation type                        | Double acting type                 |                                       |
| Media                                 | Air                                |                                       |
| Mounting type                         | Basic type, Foot type, Flange type |                                       |
| Operating pressure range MPa [psi.]   | 0.06~0.9 [9~131]                   | 0.05~0.7 [7~102]                      |
| Proof pressure MPa [psi.]             | 1.32 [191]                         |                                       |
| Operating temperature range °C [°F]   | 0~70 [32~158]                      |                                       |
| Operating speed range mm/s [in./sec.] | 50~800 [2.0~31.5]                  | 50~500 [2.0~19.7]                     |
| Cushion                               | Fixed type (Rubber bumper)         | Variable type (Stroke 15mm [0.59in.]) |
| Lubrication                           | Not required                       |                                       |
| Port size                             | Rc 1/8                             | 1/4                                   |

## Bore Size and Stroke

| Bore size | Standard strokes                 | mm             |                          |
|-----------|----------------------------------|----------------|--------------------------|
|           |                                  | Maximum stroke | Maximum available stroke |
| 20        | 25 50 75 100 125 150             | 200            | 400                      |
| 25        | 25 50 75 100 125 150 200         | 250            |                          |
| 32        | 25 50 75 100 125 150 200         | 300            | 500                      |
| 40        | 25 50 75 100 125 150 200 250 300 | 400<br>(300)   |                          |
| 50        | 25 50 75 100 150 200 250 300     |                |                          |
| 63        | 25 50 75 100 150 200 250 300     |                |                          |

- Remarks: 1. Stroke tolerance  $+ \frac{1}{0} [ +0.039in.]$   
 2. For non-standard strokes, consult us.  
 3. Figures in parentheses ( ) are for cylinders with bellows.  
 4. The minimum operating pressure when the stroke is over the maximum stroke at bore size of  $\phi 20 \sim \phi 40$  is 0.2MPa [29psi].

## Order Codes

**DA** **D** 20×50 -   -   -   -   -   -   -  

**Double rod cylinder**

**Slim double acting cylinder**

**Bore size × Stroke**

**Non-ion specification**  
 Blank — Standard  
 NCU — Non-ion specification

**Bellows or scraper**  
 Blank — No bellows  
 J — With bellows (Made to order, installed on one side only)  
 Y — With scraper (Made to order, available at  $\phi 50$  and  $\phi 63$  only. Mounted on both sides.)

**Mounting type**  
 Blank — Basic type  
 1 — Foot mounting type  
 3 — Flange mounting type  
 ● Mounting brackets are included at shipping.

**Rod end accessory**  
 Blank — No rod end accessory  
 I — I type knuckle  
 Y — Y type knuckle (with pin)  
 ● Rod end accessories mount to one side only.  
 ● For the cylinder joint and cylinder rod end, see p.1568.

**Number of sensor switches**  
 1 — With 1 sensor switch  
 2 — With 2 sensor switches  
 3 — With 3 sensor switches  
 ⋮

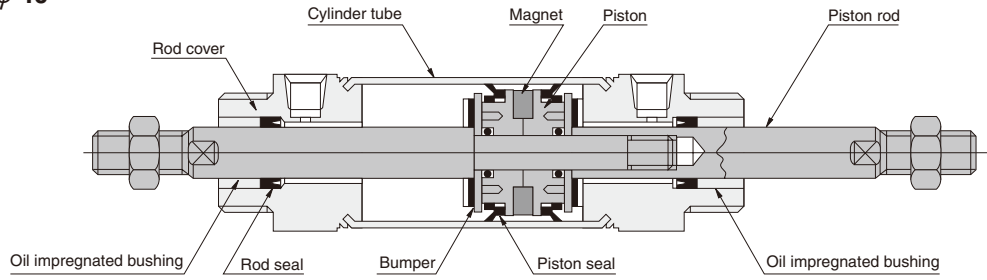
**Lead wire length**  
 (Applies to all except CS□F)  
 A — 1000mm [39in.]  
 B — 3000mm [118in.]

**Sensor switch (for cylinders with sensor switches)**  
 Blank — No sensor switch  
**ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
**ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
**CS3M** — Reed switch type with indicator lamp DC10~30V  
 AC85~230V  
**CS4M** — Reed switch type with indicator lamp DC10~30V  
 AC85~115V  
**CS5M** — Reed switch type without indicator lamp DC3~30V  
 AC85~115V  
**CS2F** — Reed switch type with indicator lamp AC85~230V  
**CS3F** — Reed switch type with indicator lamp DC10~30V  
**CS4F** — Reed switch type with indicator lamp DC10~30V  
**CS5F** — Reed switch type without indicator lamp DC3~30V

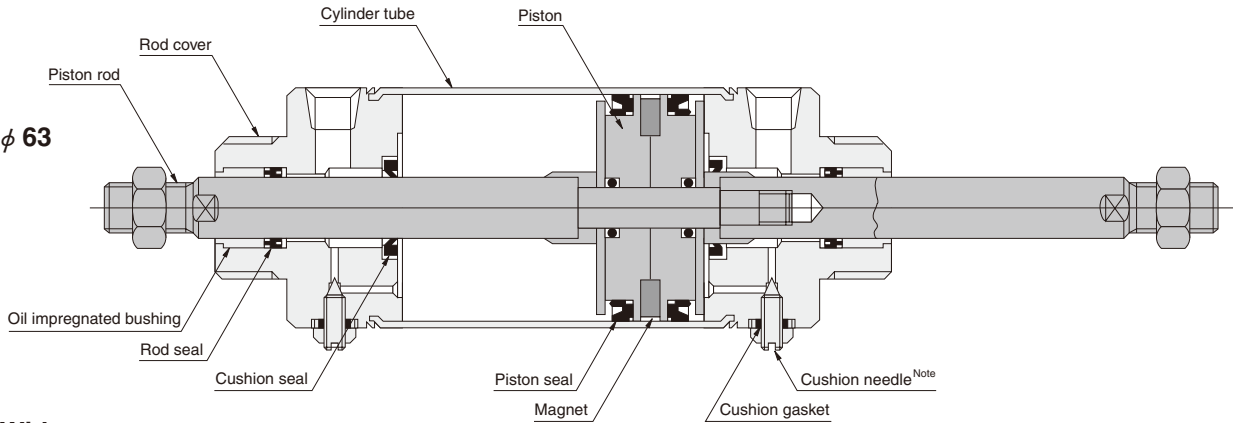
● For details of sensor switches, see p.1544.  
 ● CS□F comes with DIN connector. All others are grommet type.

# Inner Construction and Major Parts (cannot be disassembled)

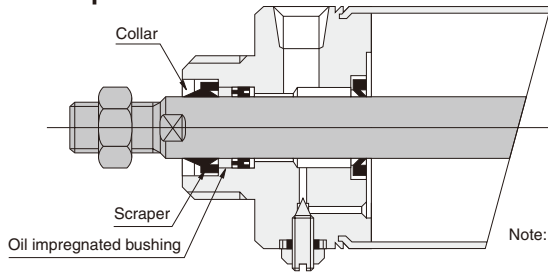
●  $\phi 20 \sim \phi 40$



●  $\phi 50, \phi 63$



● With scraper



Note: Set the cushion needle tightening torque to 1.0N·m [8.85in·lbf] or less.

## Major Parts and Materials

| Parts                          | Bore size | 20~40   | 50, 63                 |
|--------------------------------|-----------|---|------------------------|
| Cylinder tube                  |           | Stainless steel   |                        |
| Piston                         |           | Plastic   |                        |
| Piston rod                     |           | Steel (hard chrome plated)                                |                        |
| Rod cover                      |           | Aluminum alloy (anodized)                                 |                        |
| Seal                           |           | Synthetic rubber (NBR)                                    |                        |
| Bumper                         |           | Synthetic rubber (NBR)                                    | —                      |
| Scraper                        |           | —   | Synthetic rubber (NBR) |
| Collar                         |           | —   | Aluminum (anodized)    |
| Magnet                         |           | Plastic magnet  |                        |
| Bellows                        |           | Nylon tarpaulin (heat resistant temperature 70°C [158°F]) |                        |
| Y type knuckle, I type knuckle |           | Mild steel (zinc plated)                                  |                        |

## Seals Note: Seals cannot be replaced.

| Parts    | Rod seal     | Piston seal | Cushion seal | Cushion gasket | Scraper |
|----------|--------------|-------------|--------------|----------------|---------|
| Quantity | 2            | 2           | 2            | 2              | 2       |
| Bore mm  |              |             |              |                |         |
| 20       | NY-12X8X3.5  | PPY-20      | —            | —              | —       |
| 25       | NY-14X10X3.5 | PPY-25      | —            | —              | —       |
| 32       | NY-17X12X4   | PPY-32      | —            | —              | —       |
| 40       | NY-22X16X5   | PPY-40      | —            | —              | —       |
| 50       | NY-22X16X5   | PGY-50      | PCS-20       | DT-1-5         | SCB-16  |
| 63       | NY-22X16X5   | PGY-63      | PCS-20       | DT-1-5         | SCB-16  |

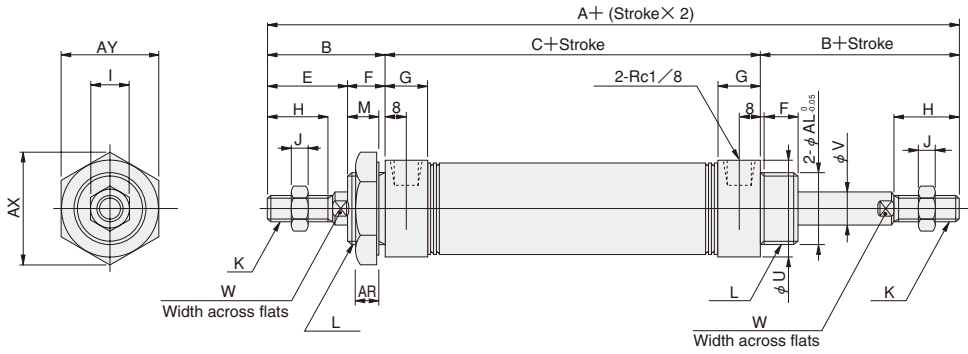
## Mass

| Bore size<br>mm [in.] | Zero stroke mass |                    |                      | Additional mass for each<br>1mm [0.0394in.] stroke | Mass of knuckle |                |
|-----------------------|------------------|--------------------|----------------------|--|-----------------|----------------|
|                       | Basic type       | Foot mounting type | Flange mounting type |  | Y type knuckle  | I type knuckle |
| 20 [0.787]            | 0.18 [0.40]      | 0.32 [0.71]        | 0.26 [0.57]          | 0.0012 [0.0026]                                    | 0.041 [0.090]   | 0.036 [0.079]  |
| 25 [0.984]            | 0.25 [0.55]      | 0.41 [0.90]        | 0.33 [0.73]          | 0.0016 [0.0035]                                    | 0.075 [0.165]   | 0.070 [0.154]  |
| 32 [1.260]            | 0.38 [0.84]      | 0.57 [1.26]        | 0.48 [1.06]          | 0.0025 [0.0055]                                    | 0.075 [0.165]   | 0.070 [0.154]  |
| 40 [1.575]            | 0.58 [1.28]      | 0.87 [1.92]        | 0.71 [1.57]          | 0.0039 [0.0086]                                    | 0.120 [0.265]   | 0.132 [0.291]  |
| 50 [1.969]            | 0.91 [2.01]      | 1.63 [3.59]        | 1.25 [2.76]          | 0.0044 [0.0097]                                    | 0.120 [0.265]   | 0.132 [0.291]  |
| 63 [2.480]            | 1.23 [2.71]      | 2.03 [4.48]        | 1.67 [3.68]          | 0.0052 [0.0115]                                    | 0.120 [0.265]   | 0.132 [0.291]  |

Calculation example: For basic type of 50mm bore size and 100mm stroke  
 $0.91 + (0.0044 \times 100) = 1.35\text{kg} [2.98\text{lb.}]$

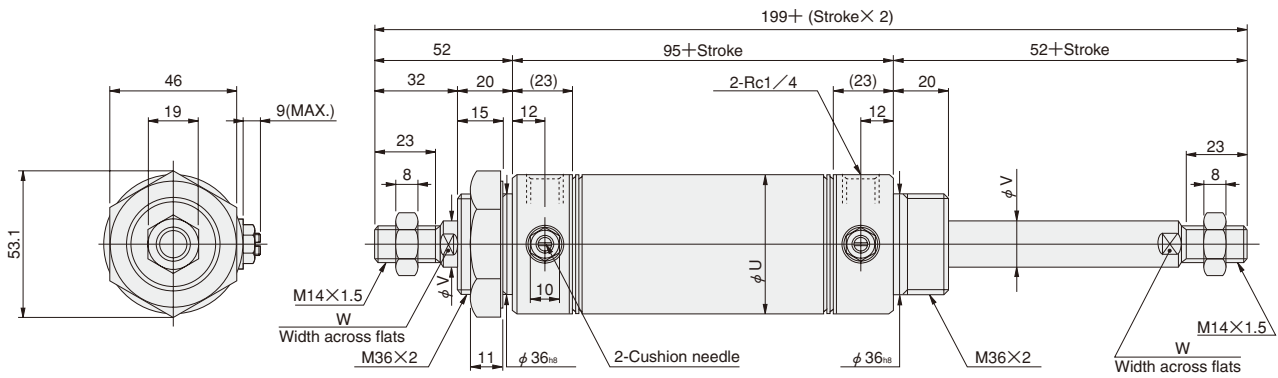
## Dimensions of Double Rod Basic Type (mm)

●  $\phi 20 \sim \phi 40$  DAD   $\times$



| Code       | A   | B  | C  | E  | F  | G      | H  | I  | J | K        | L       | M  | U    | V  | W  | AR  | AX   | AY | AL |
|------------|-----|----|----|----|----|--------|----|----|---|----------|---------|----|------|----|----|-----|------|----|----|
| 20 [0.787] | 146 | 35 | 76 | 23 | 12 | 16     | 15 | 12 | 5 | M 8×1    | M20×1.5 | 10 | 27   | 8  | 6  | 7.5 | 31.2 | 27 | 20 |
| 25 [0.984] | 156 | 40 | 76 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 29   | 10 | 8  | 9.5 | 34.6 | 30 | 22 |
| 32 [1.260] | 166 | 45 | 76 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 35   | 12 | 10 | 9.5 | 41.6 | 36 | 27 |
| 40 [1.575] | 166 | 45 | 76 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 41.6 | 16 | 14 | 9.5 | 47.3 | 41 | 33 |

●  $\phi 50, \phi 63$  DAD   $\times$

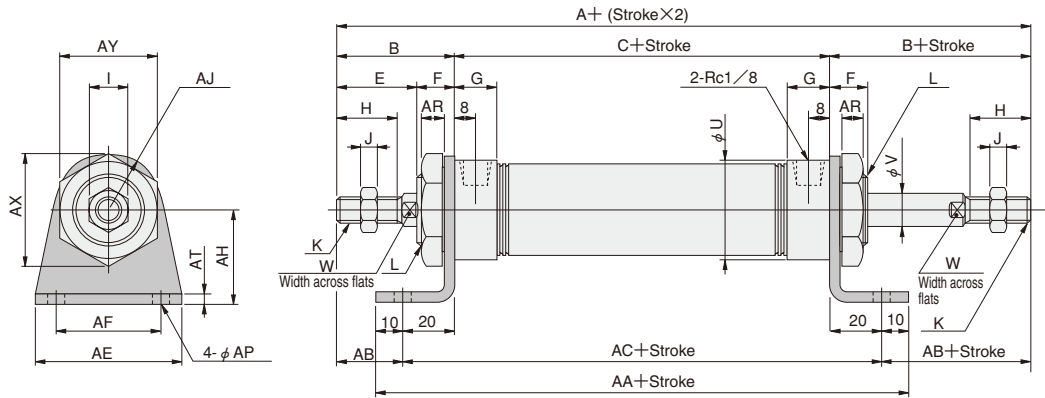


| Code       | U    | V  | W  |
|------------|------|----|----|
| 50 [1.969] | 52   | 16 | 14 |
| 63 [2.480] | 65.4 | 16 | 14 |



# Dimensions of Double Rod Foot Mounting Type (mm)

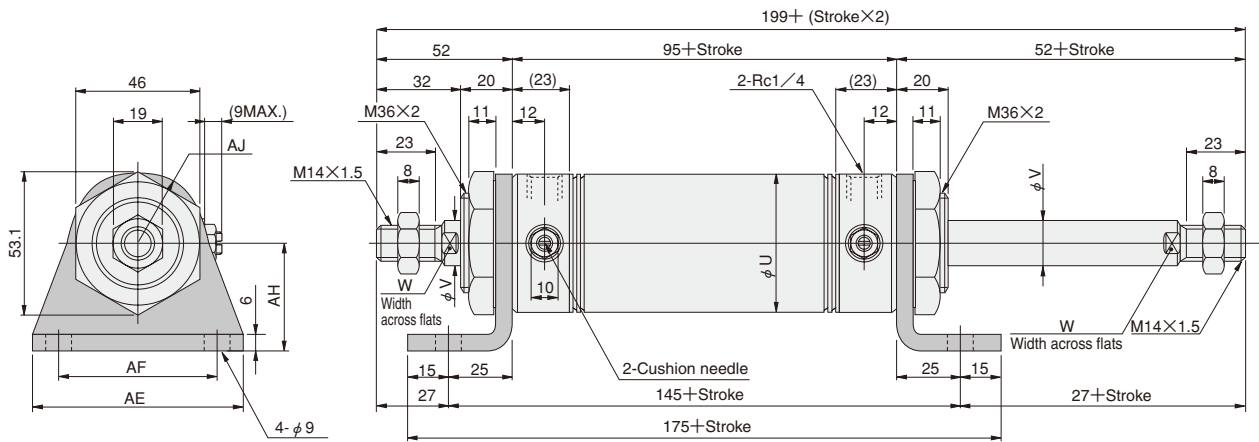
●  $\phi 20 \sim \phi 40$  DAD   $\times$   -1



| Bore mm [in.] | Code    | A   | B  | C  | E  | F  | G    | H  | I  | J | K        | L       | U    | V  | W  |
|---------------|---------|-----|----|----|----|----|------|----|----|---|----------|---------|------|----|----|
| 20            | [0.787] | 146 | 35 | 76 | 23 | 12 | 16   | 15 | 12 | 5 | M 8×1    | M20×1.5 | 27   | 8  | 6  |
| 25            | [0.984] | 156 | 40 | 76 | 26 | 14 | 16   | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 29   | 10 | 8  |
| 32            | [1.260] | 166 | 45 | 76 | 31 | 14 | 16   | 23 | 14 | 6 | M10×1.25 | M27×2   | 35   | 12 | 10 |
| 40            | [1.575] | 166 | 45 | 76 | 31 | 14 | (15) | 23 | 19 | 8 | M14×1.5  | M33×2   | 41.6 | 16 | 14 |

| Bore mm [in.] | Code    | AA  | AB | AC  | AE | AF | AH | AJ   | AP  | AR  | AT  | AX   | AY |
|---------------|---------|-----|----|-----|----|----|----|------|-----|-----|-----|------|----|
| 20            | [0.787] | 136 | 15 | 116 | 55 | 40 | 25 | 15.5 | 6.8 | 7.5 | 3.2 | 31.2 | 27 |
| 25            | [0.984] | 136 | 20 | 116 | 55 | 40 | 30 | 17   | 6.8 | 9.5 | 3.2 | 34.6 | 30 |
| 32            | [1.260] | 136 | 25 | 116 | 55 | 40 | 35 | 20   | 6.8 | 9.5 | 3.2 | 41.6 | 36 |
| 40            | [1.575] | 136 | 25 | 116 | 75 | 55 | 40 | 23.5 | 9   | 9.5 | 4   | 47.3 | 41 |

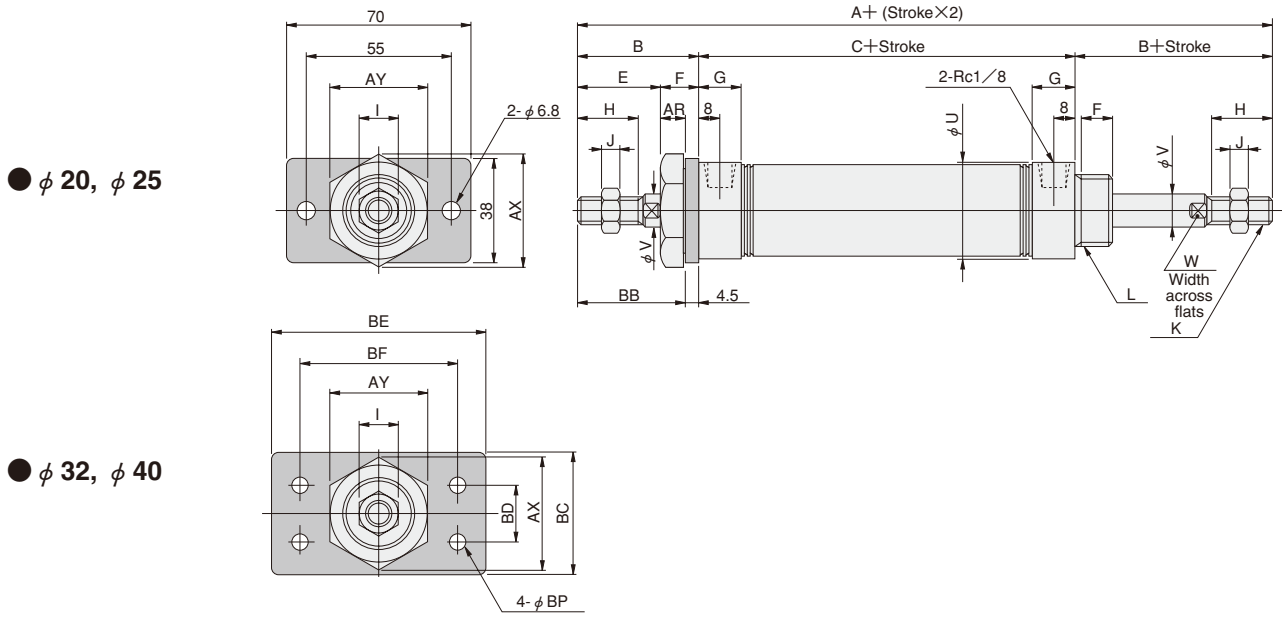
●  $\phi 50, \phi 63$  DAD   $\times$   -1



| Bore mm [in.] | Code    | U    | V  | W  | AE | AF | AH | AJ |
|---------------|---------|------|----|----|----|----|----|----|
| 50            | [1.969] | 52   | 16 | 14 | 80 | 60 | 40 | 26 |
| 63            | [2.480] | 65.4 | 16 | 14 | 95 | 74 | 45 | 32 |

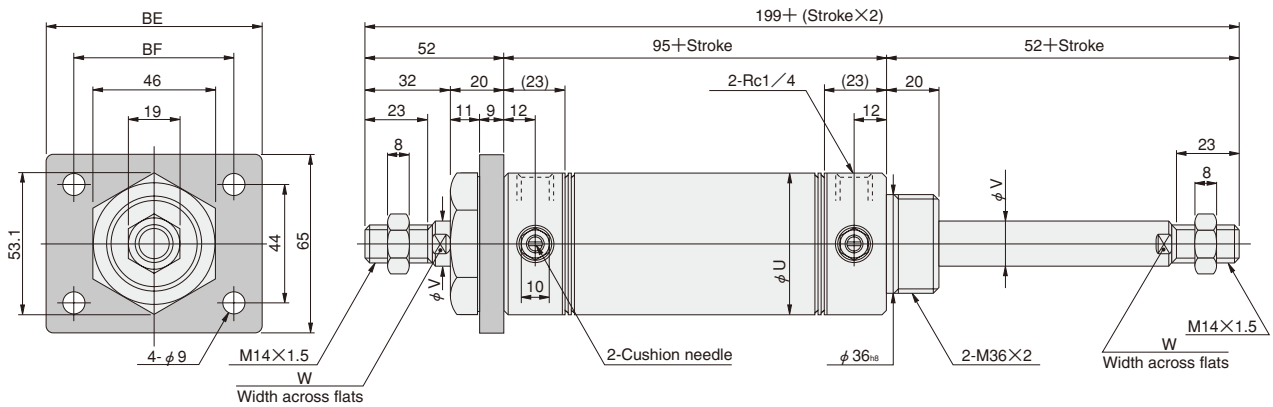
# Dimensions of Double Rod Flange Mounting Type (mm)

●  $\phi 20 \sim \phi 40$  DAD   $\times$   -3



| Bore<br>mm [in.] | Code    | A   | B  | C  | E  | F  | G    | H  | I  | J | K        | L       | U    | V  | W  | AR  | AX   | AY | BB   | BC | BD | BE  | BF | BP  |
|------------------|---------|-----|----|----|----|----|------|----|----|---|----------|---------|------|----|----|-----|------|----|------|----|----|-----|----|-----|
| 20               | [0.787] | 146 | 35 | 76 | 23 | 12 | 16   | 15 | 12 | 5 | M 8×1    | M20×1.5 | 27   | 8  | 6  | 7.5 | 31.2 | 27 | 30.5 | —  | —  | —   | —  | —   |
| 25               | [0.984] | 156 | 40 | 76 | 26 | 14 | 16   | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 29   | 10 | 8  | 9.5 | 34.6 | 30 | 35.5 | —  | —  | —   | —  | —   |
| 32               | [1.260] | 166 | 45 | 76 | 31 | 14 | 16   | 23 | 14 | 6 | M10×1.25 | M27×2   | 35   | 12 | 10 | 9.5 | 41.6 | 36 | 40.5 | 45 | 20 | 80  | 60 | 6.8 |
| 40               | [1.575] | 166 | 45 | 76 | 31 | 14 | (15) | 23 | 19 | 8 | M14×1.5  | M33×2   | 41.6 | 16 | 14 | 9.5 | 47.3 | 41 | 40.5 | 50 | 30 | 100 | 80 | 9   |

●  $\phi 50, \phi 63$  DAD   $\times$   -3

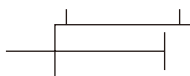


| Bore<br>mm [in.] | Code    | U    | V  | W  | BE  | BF |
|------------------|---------|------|----|----|-----|----|
| 50               | [1.969] | 52   | 16 | 14 | 80  | 60 |
| 63               | [2.480] | 65.4 | 16 | 14 | 100 | 80 |

# SLIM LOW HYDRAULIC CYLINDERS



## Symbol



## Specifications

| Item                        | Bore size mm [in.]                             | 20~40 [0.787~1.575]  | 50 [1.969]          | 63 [2.480]          |
|-----------------------------|--|--|---------------------|---------------------|
| Operation type              |  | Double acting type   |                     |                     |
| Media                       |  | Turbine oil with defoaming agent (ISO VG22~100 or equivalent) or petroleum-based hydraulic oil |                     |                     |
| Mounting type               |  | Basic type, Foot type, Flange type, Pivot type   |                     |                     |
| Operating pressure range    | MPa [psi.]                                     | 0.2~0.9 [29~131]   | 0.2~0.7 [29~102]    |                     |
| Proof pressure              | MPa [psi.]                                     | 1.32 [191]   | 1.03 [149]          |                     |
| Operating temperature range | °C [°F]  | 0~70 [32~158]  |                     |                     |
| Operating speed range       | When one side is air and the other side is oil | 1~100 [0.04~3.94]  | 0.5~150 [0.02~5.91] | 0.5~100 [0.02~3.94] |
|                             | When both sides are oil                        | 1~60 [0.04~2.36]   | 0.5~100 [0.02~3.94] | 0.5~50 [0.02~1.97]  |
| Cushion                     |  | Fixed type (Rubber bumper)   | None                |                     |
| Port size                   | Rc   | 1/8  | 1/4                 |                     |

Notes: 1. The low hydraulic cylinder is recommended to be used with oil on both sides. The use of oil on one side and air on the other side could result in imprecise speed control, and oil could leak across to the air side. In addition, use meter-out control for the speed control.  
2. Bore sizes  $\phi$  50 and  $\phi$  63 have air bleed ports. Loosen the plugs to bleed air of the cylinder inside.

3. When using the reed switch type sensor, maintain a minimum speed of 30mm/s [1.2in./sec.] or more.  
4. Do not use nonflammable hydraulic fluid, machine oil, or spindle oil.  
5. Be aware that changes in oil temperature can alter the speed.

## Bore Size and Stroke

| Bore size | Standard strokes                           | Maximum stroke |              | Maximum available stroke |              |
|-----------|--|----------------|--------------|--------------------------|--------------|
|           |  | No bellows     | With bellows | No bellows               | With bellows |
| 20        | 25 50 75 100 125 150                       | 200            |              | 1050                     | 740          |
| 25        | 25 50 75 100 125 150 200                   | 250            |              |                          |              |
| 32        | 25 50 75 100 125 150 200                   | 300            |              |                          |              |
| 40        | 25 50 75 100 125 150 200 250 300           | 400            | 300          | 900                      | 740          |
| 50        | 25 50 75 100 150 200 [250 300 350 400]     | 300[500]       | 300          |                          |              |
| 63        | 25 50 75 100 150 200 [250 300 350 400 500] | 300[600]       | 300          |                          |              |

Remarks: 1. Stroke tolerance  $^{+1}_{0}$  [+0.039in.]  
2. For non-standard strokes, consult us.

3. Figures in square brackets [ ] are for cases when foot mounting brackets are used for mounting.

## Order Codes

**DA** **H** 20×50 -   -   -   -   -   -  

**Low hydraulic cylinders**  
Slim double acting cylinder

**Bore size × Stroke**  
20×50

**Bellows**  
Blank — No bellows  
J — With bellows (Made to order)

**Rod end accessory**  
Blank — No rod end accessory  
I — I type knuckle  
Y — Y type knuckle (with pin)  
● For the cylinder joint and cylinder rod end, see p.1568.

**Mounting type**  
Blank — Basic type  
1 — Double foot mounting type  
3 — Flange mounting type  
8B — Pivot mounting type with bushing (Available at  $\phi$  50 and  $\phi$  63 only)  
8E — Pivot mounting type with supporting bracket (with pin) (Available at  $\phi$  20~40 only)  
8B-8E — Pivot mounting type with bushing and supporting bracket (Available at  $\phi$  50 and  $\phi$  63 only)  
● Mounting brackets are included at shipping.

**Head cover specification**  
Blank — Standard head  
A — Short head

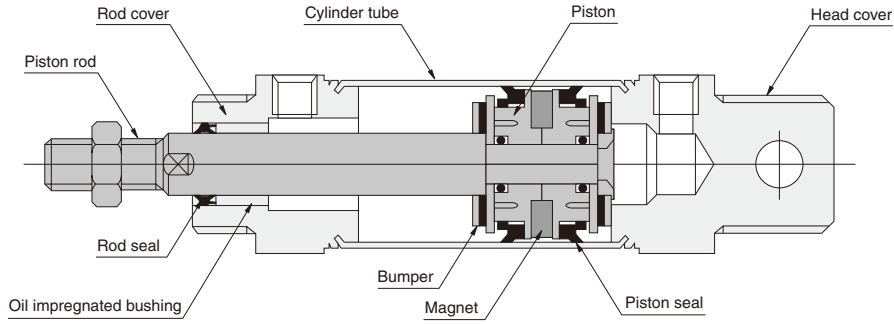
**Number of sensor switches**  
1 — With 1 sensor switch  
2 — With 2 sensor switches  
3 — With 3 sensor switches  
: — :  
: — :

**Lead wire length (Applies to all except CS□F)**  
A — 1000mm [39in.]  
B — 3000mm [118in.]

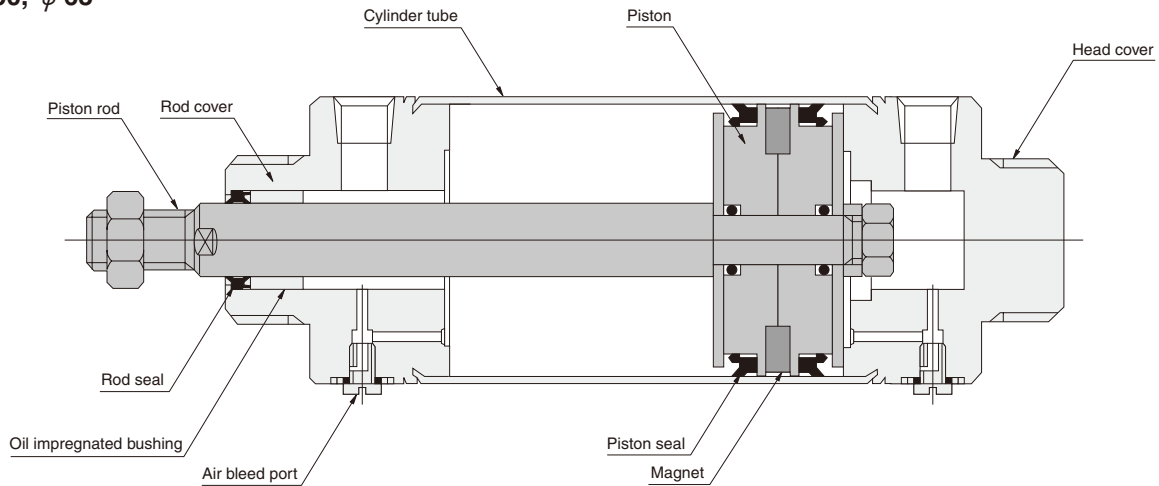
**Sensor switch (for cylinders with sensor switches)**  
Blank — No sensor switch  
ZG530 — 2-lead wire Solid state type with indicator lamp DC10~28V  
ZG553 — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
CS3M — Reed switch type with indicator lamp DC10~30V AC85~230V  
CS4M — Reed switch type with indicator lamp DC10~30V AC85~115V  
CS5M — Reed switch type without indicator lamp DC3~30V AC85~115V  
CS2F — Reed switch type with indicator lamp AC85~230V  
CS3F — Reed switch type with indicator lamp DC10~30V  
CS4F — Reed switch type with indicator lamp DC10~30V  
CS5F — Reed switch type without indicator lamp DC3~30V  
● For details of sensor switches, see p.1544.  
● CS□F comes with DIN connector. All others are grommet type.

# Inner Construction and Major Parts (cannot be disassembled)

●  $\phi 20 \sim \phi 40$



●  $\phi 50, \phi 63$



Note: Bore sizes  $\phi 50$  and  $\phi 63$  have air bleed ports.  
Loosen the plugs to bleed air of the cylinder inside.

## Major Parts and Materials

| Parts  | Bore size | 20~40   | 50, 63 |
|--|-----------|---|--------|
| Cylinder tube  |           | Stainless steel   |        |
| Piston   |           | Plastic   |        |
| Piston rod   |           | Steel (hard chrome plated)                                |        |
| Rod cover  |           | Aluminum alloy (anodized)                                 |        |
| Head cover   |           |   |        |
| Seal   |           | Synthetic rubber (NBR)                                    |        |
| Bumper   |           | Synthetic rubber (NBR)                                    | —      |
| Magnet   |           | Plastic magnet  |        |
| Bellows  |           | Nylon tarpaulin (heat resistant temperature 70°C [158°F]) |        |
| Y type knuckle, I type knuckle<br>Pivot mounting with supporting bracket |           | Mild steel (zinc plated)                                  |        |

## Seals

Note: Seals cannot be replaced.

| Parts | Quantity | Rod seal | Piston seal      |
|-------|----------|----------|------------------|
|       |          | 1        | 2                |
| 20    |          | NHU- 8   | PPY-20           |
| 25    |          | NHU-10   | PPY-25           |
| 32    |          | NHU-12   | PPY-32 (special) |
| 40    |          | NHU-16   | PPY-40 (special) |
| 50    |          | NHU-16   | SKY-40           |
| 63    |          | NHU-16   | SKY-53           |

## Mass

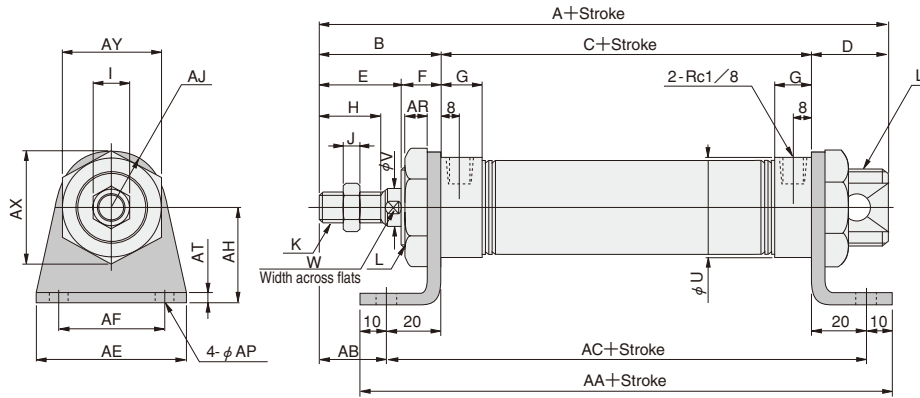
| Bore size<br>mm [in.] | Zero stroke mass   |                 |                     | Additional mass<br>for each 1mm<br>[0.0394in.] stroke | Mass of mounting bracket |                |               |                |                | kg [lb.] |
|-----------------------|--------------------|-----------------|---------------------|---|--------------------------|----------------|---------------|----------------|----------------|----------|
|                       | Standard head type | Short head type | Pivot mounting type |   | Foot bracket             | Flange bracket | Pivot bracket | Y type knuckle | I type knuckle |          |
| 20 [0.787]            | 0.14 [0.31]        | 0.15 [0.33]     | —                   | 0.0008 [0.0018]                                       | 0.14 [0.31]              | 0.08 [0.18]    | 0.06 [0.13]   | 0.041 [0.090]  | 0.036 [0.079]  |          |
| 25 [0.984]            | 0.21 [0.46]        | 0.20 [0.44]     | —                   | 0.0011 [0.0024]                                       | 0.16 [0.35]              | 0.08 [0.18]    | 0.06 [0.13]   | 0.075 [0.165]  | 0.070 [0.154]  |          |
| 32 [1.260]            | 0.33 [0.73]        | 0.31 [0.68]     | —                   | 0.0015 [0.0033]                                       | 0.19 [0.42]              | 0.10 [0.22]    | 0.14 [0.31]   | 0.075 [0.165]  | 0.070 [0.154]  |          |
| 40 [1.575]            | 0.49 [1.08]        | 0.45 [0.99]     | —                   | 0.0024 [0.0053]                                       | 0.29 [0.64]              | 0.13 [0.29]    | 0.14 [0.31]   | 0.120 [0.265]  | 0.132 [0.291]  |          |
| 50 [1.969]            | 0.83 [1.83]        | 0.78 [1.72]     | 0.75 [1.65]         | 0.0028 [0.0062]                                       | 0.55 [1.21]              | 0.28 [0.62]    | 0.24 [0.53]   | 0.120 [0.265]  | 0.132 [0.291]  |          |
| 63 [2.480]            | 1.17 [2.58]        | 1.13 [2.49]     | 1.10 [2.43]         | 0.0033 [0.0073]                                       | 0.73 [1.61]              | 0.37 [0.82]    | 0.24 [0.53]   | 0.120 [0.265]  | 0.132 [0.291]  |          |

Calculation example: For short head type of 50mm bore size and 100mm stroke with flange mounting bracket  
 $0.78 + (0.0028 \times 100) + 0.28 = 1.34\text{kg} [2.95\text{lb.}]$



# Dimensions of Low Hydraulic Foot Mounting Type (mm)

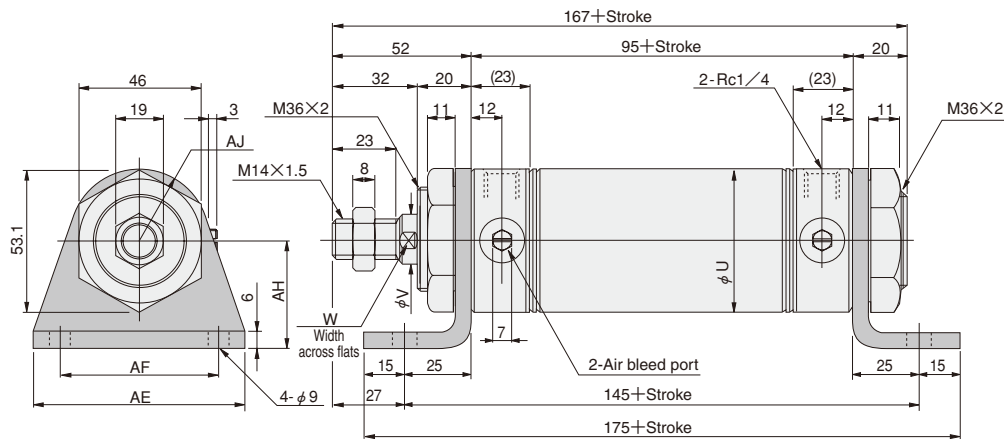
●  $\phi 20 \sim \phi 40$  DAH  ×  -1



| Bore<br>mm [in.] | Code | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | L       | U    | V  | W  |
|------------------|------|-----|----|----|----|----|----|--------|----|----|---|----------|---------|------|----|----|
| 20 [0.787]       |      | 132 | 35 | 76 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M 8×1    | M20×1.5 | 27   | 8  | 6  |
| 25 [0.984]       |      | 137 | 40 | 76 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 29   | 10 | 8  |
| 32 [1.260]       |      | 148 | 45 | 76 | 27 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 35   | 12 | 10 |
| 40 [1.575]       |      | 148 | 45 | 76 | 27 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 41.6 | 16 | 14 |

| Bore<br>mm [in.] | Code | AA  | AB | AC  | AE | AF | AH | AJ   | AP  | AR  | AT  | AX   | AY |
|------------------|------|-----|----|-----|----|----|----|------|-----|-----|-----|------|----|
| 20 [0.787]       |      | 136 | 15 | 116 | 55 | 40 | 25 | 15.5 | 6.8 | 7.5 | 3.2 | 31.2 | 27 |
| 25 [0.984]       |      | 136 | 20 | 116 | 55 | 40 | 30 | 17   | 6.8 | 9.5 | 3.2 | 34.6 | 30 |
| 32 [1.260]       |      | 136 | 25 | 116 | 55 | 40 | 35 | 20   | 6.8 | 9.5 | 3.2 | 41.6 | 36 |
| 40 [1.575]       |      | 136 | 25 | 116 | 75 | 55 | 40 | 23.5 | 9   | 9.5 | 4   | 47.3 | 41 |

●  $\phi 50, \phi 63$  DAH  ×  -1

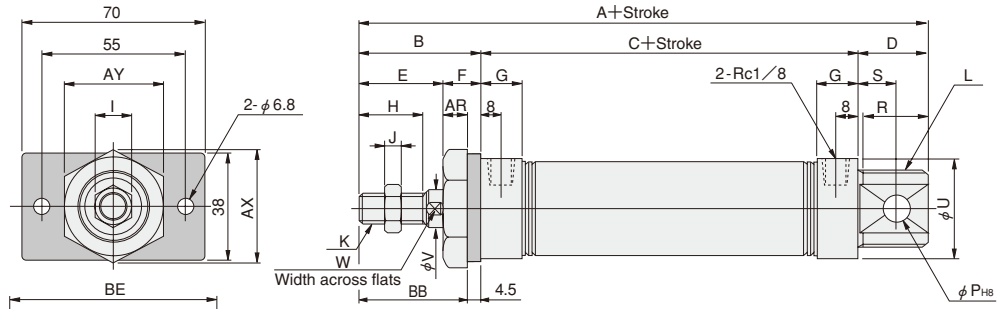


| Bore<br>mm [in.] | Code | U    | V  | W  | AE | AF | AH | AJ |
|------------------|------|------|----|----|----|----|----|----|
| 50 [1.969]       |      | 52   | 16 | 14 | 80 | 60 | 40 | 26 |
| 63 [2.480]       |      | 65.4 | 16 | 14 | 95 | 74 | 45 | 32 |

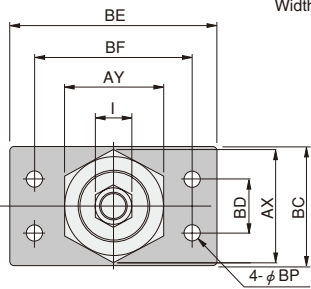
# Dimensions of Low Hydraulic Flange Mounting Type (mm)

●  $\phi 20 \sim \phi 40$  DAH Bore size   $\times$  Stroke  -3

●  $\phi 20, \phi 25$



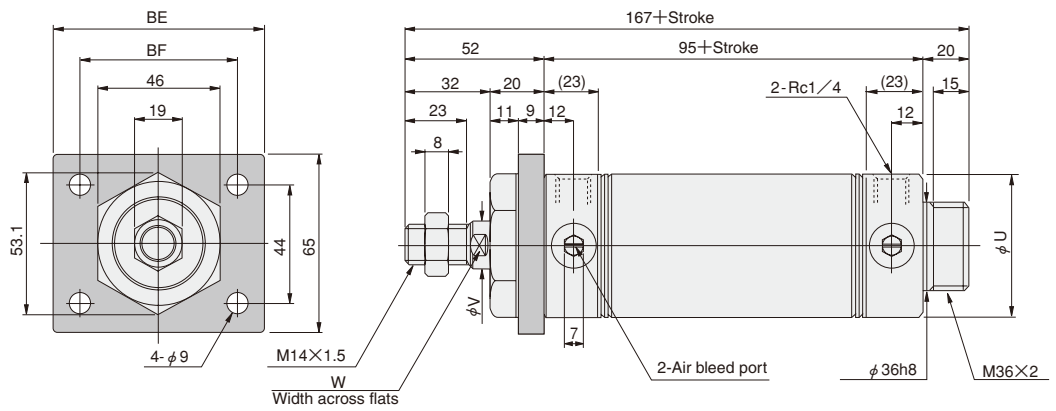
●  $\phi 32, \phi 40$



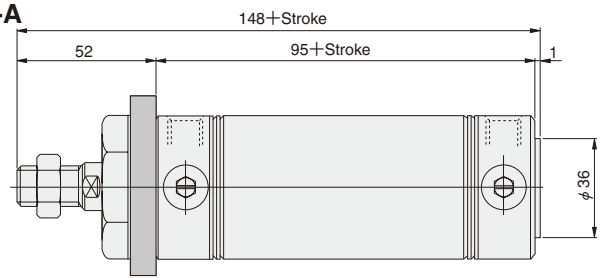
| Bore<br>mm [in.] | Code | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | L       | P  | R  | S  | U    | V  | W  |
|------------------|------|-----|----|----|----|----|----|--------|----|----|---|----------|---------|----|----|----|------|----|----|
| 20 [0.787]       |      | 132 | 35 | 76 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M 8×1    | M20×1.5 | 8  | 19 | 12 | 27   | 8  | 6  |
| 25 [0.984]       |      | 137 | 40 | 76 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 8  | 19 | 12 | 29   | 10 | 8  |
| 32 [1.260]       |      | 148 | 45 | 76 | 27 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 10 | 25 | 15 | 35   | 12 | 10 |
| 40 [1.575]       |      | 148 | 45 | 76 | 27 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 10 | 25 | 15 | 41.6 | 16 | 14 |

| Bore<br>mm [in.] | Code | AR  | AX   | AY | BB   | BC | BD | BE  | BF | BP  |
|------------------|------|-----|------|----|------|----|----|-----|----|-----|
| 20 [0.787]       |      | 7.5 | 31.2 | 27 | 30.5 | —  | —  | —   | —  | —   |
| 25 [0.984]       |      | 9.5 | 34.6 | 30 | 35.5 | —  | —  | —   | —  | —   |
| 32 [1.260]       |      | 9.5 | 41.6 | 36 | 40.5 | 45 | 20 | 80  | 60 | 6.8 |
| 40 [1.575]       |      | 9.5 | 47.3 | 41 | 40.5 | 50 | 30 | 100 | 80 | 9   |

●  $\phi 50, \phi 63$  DAH Bore size   $\times$  Stroke  -3



● Short head DAH Bore size   $\times$  Stroke  -A

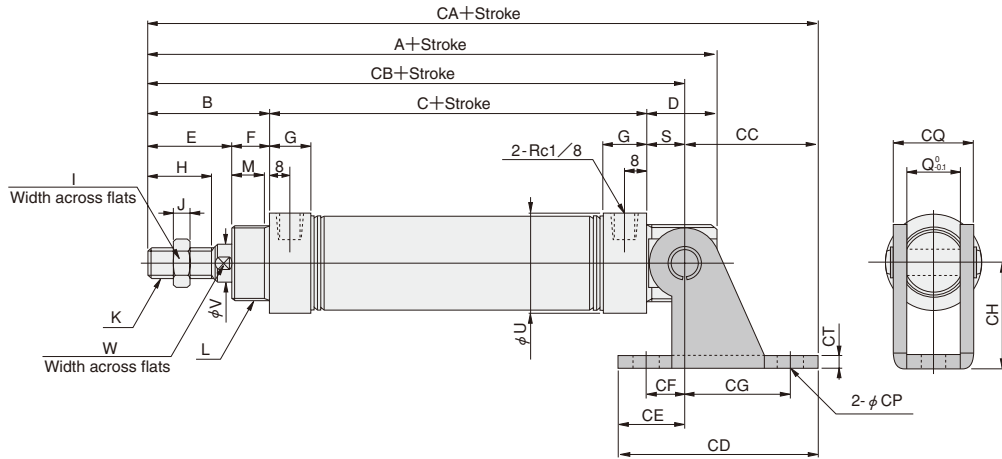


| Bore<br>mm [in.] | Code | U    | V  | W  | BE  | BF |
|------------------|------|------|----|----|-----|----|
| 50 [1.969]       |      | 52   | 16 | 14 | 80  | 60 |
| 63 [2.480]       |      | 65.4 | 16 | 14 | 100 | 80 |



# Dimensions of Low Hydraulic Pivot Mounting Type (mm)

●  $\phi 20 \sim \phi 40$  DAH Bore size  $\times$  Stroke -8E

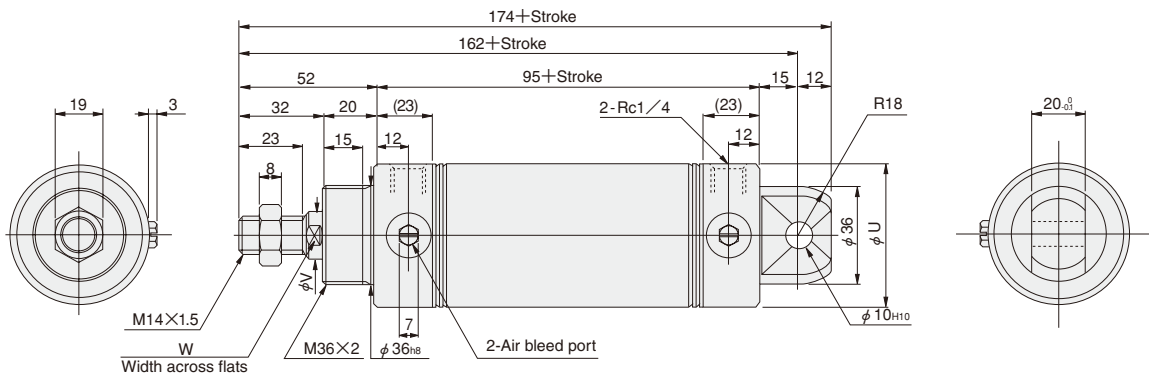


| Bore mm [in.] | Code | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | L       | M  | Q  | S  | U    | V  | W  |
|---------------|------|-----|----|----|----|----|----|--------|----|----|---|----------|---------|----|----|----|------|----|----|
| 20 [0.787]    |      | 132 | 35 | 76 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M 8×1    | M20×1.5 | 10 | 12 | 12 | 27   | 8  | 6  |
| 25 [0.984]    |      | 137 | 40 | 76 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 12 | 12 | 29   | 10 | 8  |
| 32 [1.260]    |      | 148 | 45 | 76 | 27 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 20 | 15 | 35   | 12 | 10 |
| 40 [1.575]    |      | 148 | 45 | 76 | 27 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 20 | 15 | 41.6 | 16 | 14 |

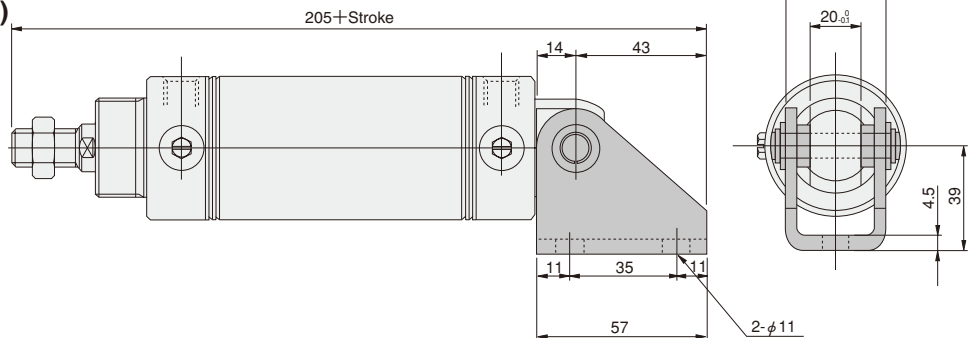
| Bore mm [in.] | Code | CA  | CB  | CC | CD | CE | CF | CG | CH | CP  | CQ   | CT  |
|---------------|------|-----|-----|----|----|----|----|----|----|-----|------|-----|
| 20 [0.787]    |      | 160 | 123 | 37 | 59 | 22 | 15 | 30 | 30 | 6.8 | 18.4 | 3.2 |
| 25 [0.984]    |      | 165 | 128 | 37 | 59 | 22 | 15 | 30 | 30 | 6.8 | 18.4 | 3.2 |
| 32 [1.260]    |      | 186 | 136 | 50 | 75 | 25 | 15 | 40 | 40 | 9   | 28   | 4   |
| 40 [1.575]    |      | 186 | 136 | 50 | 75 | 25 | 15 | 40 | 40 | 9   | 28   | 4   |

●  $\phi 50, \phi 63$

● Pivot mounting type with bushing DAH Bore size  $\times$  Stroke -8B



● Pivot mounting type with bushing DAH Bore size  $\times$  Stroke -8B-8E (With supporting bracket)

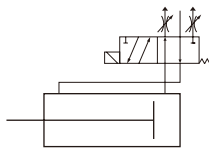


| Bore mm [in.] | Code | U    | V  | W  |
|---------------|------|------|----|----|
| 50 [1.969]    |      | 52   | 16 | 14 |
| 63 [2.480]    |      | 65.4 | 16 | 14 |

# SLIM VALPACK CYLINDERS

## Standard Rod Cylinders, Square Rod Cylinders

### Symbol



SLIM CYLINDERS

### Specifications

#### ● Valpack cylinders specifications

| Item                                  | Bore size mm [in.]  |                   |                   |                  |   |
|---------------------------------------|---|-------------------|-------------------|------------------|---|
|                                       | 20 [0.787]  | 25 [0.984]        | 32 [1.260]        | 40 [1.575]       | 40 [1.575]  |
| Solenoid valve series                 | 062 series  |                   |                   |                  | 125 series  |
| Operation type                        | Double acting type  |                   |                   |                  |   |
| Media                                 | Air   |                   |                   |                  |   |
| Mounting type                         | Basic type, Foot type, Flange type, Rod trunnion type, Head trunnion type           |                   |                   |                  |   |
| Operating pressure range MPa [psi.]   | Air cylinder  | 0.04~0.9 [6~131]  |                   |                  |   |
|                                       | Square rod cylinders (φ 25 and φ 40 only)   | 0.1~0.9 [15~131]  |                   |                  |   |
| Proof pressure MPa [psi.]             | 1.32 [191]  |                   |                   |                  |   |
| Operating temperature range °C [°F]   | 0~60 [32~140]   |                   |                   |                  |   |
| Operating speed range mm/s [in./sec.] | 30~800 [1.2~31.5]   | 30~500 [1.2~19.7] | 30~300 [1.2~11.8] | 30~210 [1.2~8.3] | 30~450 [1.2~17.7]                                       |
|                                       | Speed controller Exhaust throttle valve (in both directions) is standard equipment. |                   |                   |                  |   |
| Cushion                               | Fixed type (Rubber bumper)  |                   |                   |                  |   |
| Lubrication                           | Not required  |                   |                   |                  | Required (Turbine Oil Class 1 [ISO VG32] or equivalent) |
| Port size                             | Rc  | 1/4               |                   |                  |   |

Note: Solenoid valve 125 series is available (as an option) for bore size φ 40 only.

#### ● Solenoid valve specifications

| Item                                  | Series  | 062 series  | 125 series |
|---------------------------------------|---|---|------------|
|                                       | Solenoid specification                                | Single  | Single     |
| Model                                 | VPS062-4E1-70   | VPS125-4E1-70   |            |
| Operation type                        | Direct operation                                      |   |            |
| Number of positions and ports         | 2 positions, 5 ports                                  |   |            |
| Effective area mm <sup>2</sup> [Cv]   | 1.8 [0.1]   | 3.5 [0.19]  |            |
| Port size                             | Rc  | 1/4   |            |
| Lubrication                           | Not required  | Required (Turbine Oil Class 1 [ISO VG32] or equivalent) |            |
| Operating pressure range MPa [psi.]   | 0~0.9 [0~131] (For the solenoid valve alone, however) |   |            |
| Proof pressure MPa [psi.]             | 1.32 [191]  |   |            |
| Operating temperature range °C [°F]   | 0~60 [32~140]   |   |            |
| Shock resistance m/s <sup>2</sup> [G] | Lateral direction                                     | 980.7 [100]   |            |
|                                       | Axial direction                                       | 980.7 [100]   |            |
| Mounting direction                    | Any   |   |            |
| Maximum operation frequency Hz        | 5   |   |            |

#### ● Solenoid specifications

| Item                                  | Rated voltage                       | AC100V          | AC200V           | DC24V             |                    |
|---------------------------------------|-------------------------------------|-----------------|------------------|-------------------|--------------------|
|                                       | Operating voltage range V           |                 | 90~110 (100±10%) | 180~220 (200±10%) | 21.6~26.4 (24±10%) |
| Current value (Applied rated voltage) | Frequency Hz                        | 50              | 60               | 50                | 60                 |
|                                       | Current mA (r.m.s)                  | 140             | 130              | 70                | 65                 |
| Insulation resistance MΩ              | 100 or more                         |                 |                  |                   |                    |
| Wiring and lead wire length           | Grommet type: About 300mm [11.8in.] |                 |                  |                   |                    |
| Color of lead wire                    | Yellow and black                    | White and black | Red and black    |                   |                    |

- Notes: 1. While voltages other than those listed above can be manufactured, consult us about delivery for voltages other than AC100V and AC200V.
2. Since air pressure being used as a self-holding force could cause it to be unstable when using the VPS062-4E2 solenoid valve, always supply power with an electric circuit, to the solenoid valve, while the cylinder is in operation.
3. Consult us about surge suppression measures.

### Bore Size and Stroke

#### ● Standard rod cylinder

| Bore size | Standard strokes |    |    |     | Maximum stroke | Maximum available stroke |
|-----------|------------------|----|----|-----|----------------|--------------------------|
|           | 25               | 50 | 75 | 100 |                |                          |
| 20        | 25               | 50 | 75 | 100 | 200            | 1050 (740)               |
| 25        | 25               | 50 | 75 | 100 | 250            |                          |
| 32        | 25               | 50 | 75 | 100 | 300            |                          |
| 40        | 25               | 50 | 75 | 100 | 400 (300)      |                          |

#### ● Square rod cylinders

| Bore size | Standard strokes |    |    |     | Maximum stroke | Maximum available stroke |
|-----------|------------------|----|----|-----|----------------|--------------------------|
|           | 25               | 50 | 75 | 100 |                |                          |
| 20        | 25               | 50 | 75 | 100 | 150            | 500                      |
| 40        | 25               | 50 | 75 | 100 | 150            | 500                      |

- Remarks: 1. Stroke tolerance  $^{+1}_{0}$  [+0.039in.]
2. For non-standard strokes, consult us.
3. Figures in parentheses ( ) are for cylinders with bellows.
4. The minimum operating pressure when the stroke is over the maximum stroke is 0.2MPa [29psi].

### Mass

#### ● Standard rod cylinder

| Solenoid valve | Bore size mm | Zero stroke mass |             |             |               | Additional mass for each 1mm [0.0394in.] stroke |
|----------------|--------------|------------------|-------------|-------------|---------------|---|
|                |              | Basic type       | Foot type   | Flange type | Trunnion type |   |
| 062 series     | 20           | 0.49 [1.08]      | 0.62 [1.37] | 0.57 [1.26] | 0.69 [1.52]   | 0.0008 [0.0018]                                 |
|                | 25           | 0.54 [1.19]      | 0.68 [1.50] | 0.62 [1.37] | 0.73 [1.61]   | 0.0011 [0.0024]                                 |
|                | 32           | 0.64 [1.41]      | 0.79 [1.74] | 0.74 [1.63] | 0.82 [1.81]   | 0.0015 [0.0033]                                 |
|                | 40           | 0.80 [1.76]      | 1.01 [2.23] | 0.93 [2.05] | 0.97 [2.14]   | 0.0024 [0.0053]                                 |
| 125 series     | 40           | 0.86 [1.90]      | 1.08 [2.38] | 0.99 [2.18] | 1.04 [2.29]   | 0.0024 [0.0053]                                 |

Calculation example: For the mass of foot mounting type of 32mm bore size and 100mm stroke  
 $0.79 + (0.0015 \times 100) = 0.94\text{kg}$  [2.07lb.]

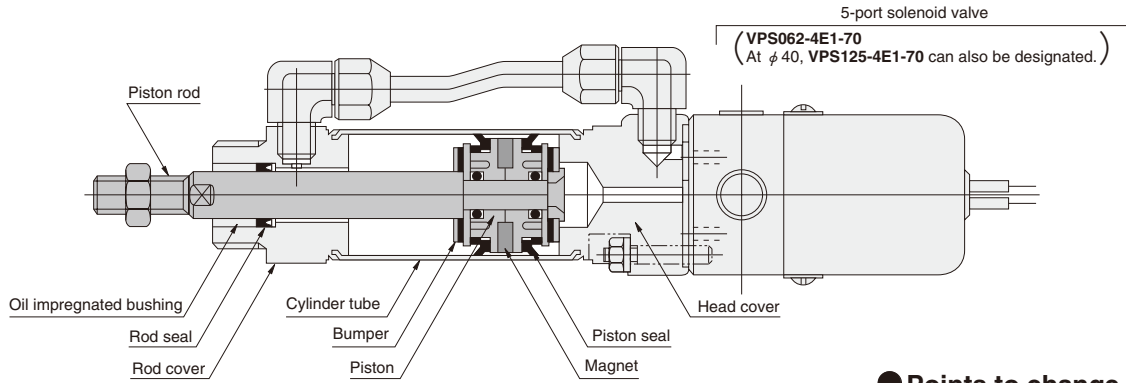
#### ● Square rod cylinder

| Solenoid valve | Bore size mm | Zero stroke mass |             |             |               | Additional mass for each 1mm [0.0394in.] stroke |
|----------------|--------------|------------------|-------------|-------------|---------------|---|
|                |              | Basic type       | Foot type   | Flange type | Trunnion type |   |
| 062 series     | 25           | 0.53 [1.17]      | 0.67 [1.48] | 0.61 [1.35] | 0.72 [1.59]   | 0.0009 [0.0020]                                 |
|                | 40           | 0.81 [1.79]      | 1.02 [2.25] | 0.94 [2.07] | 0.98 [2.16]   | 0.0021 [0.0046]                                 |
| 125 series     | 40           | 0.87 [1.92]      | 1.09 [2.40] | 1.00 [2.21] | 1.05 [2.32]   | 0.0021 [0.0046]                                 |

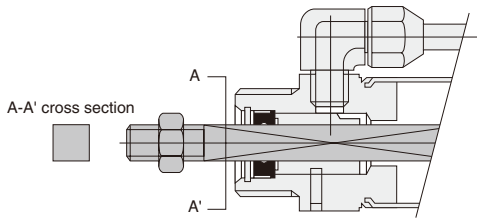
Calculation example: For the mass of foot mounting type of 25mm bore size and 100mm stroke  
 $0.67 + (0.0009 \times 100) = 0.76\text{kg}$  [1.68lb.]

- For the mass of the mounting bracket, see p.315.

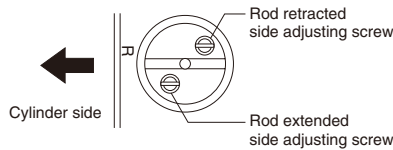
# Inner Construction and Major Parts (Cylinder body cannot be disassembled)



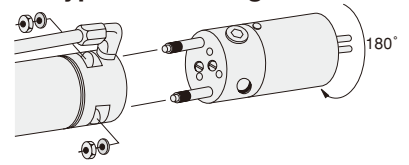
## ● Square rod cylinders



## ● Handling of speed controller



## ● Points to change for pull type when energized



Remove the nut and washer, pull the valve out from the cylinder, rotate it 180°, and assemble it as before.

Remark: Major parts and materials and seals are the same as for the standard cylinder.

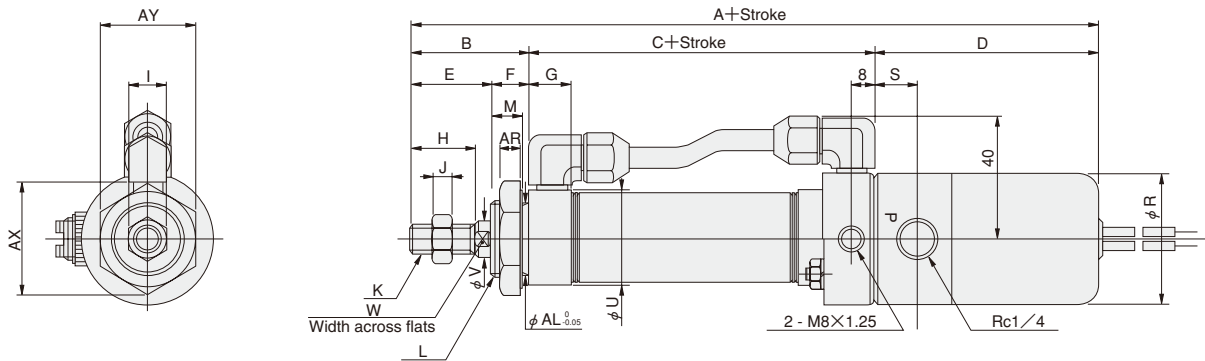
## Order Codes

|  |  |   |
|--|--|---|
| <p><b>DV</b> <span style="border: 1px solid black; padding: 2px;">20×50</span> —</p> <p><b>Bore size × Stroke</b></p> <p><b>Mounting type</b></p> <p><b>Blank</b> — Basic type</p> <p><b>1</b> — Foot mounting type</p> <p><b>3</b> — Flange mounting type</p> <p><b>11T</b> — With supporting bracket head side trunnion type</p> <p><b>12</b> — Rod side trunnion type</p> <p><b>12-12T</b> — With supporting bracket rod side trunnion type</p> <p>● Mounting brackets are included at shipping.</p> <p>● Rod trunnion type is not available for square rod cylinders.</p> <p><b>DV</b> — Double acting type cylinder with valve</p> <p><b>DVJ</b> — Cylinder with bellows and valve (Made to order)</p> <p><b>DVJL</b> — Square rod cylinder with valve and bellows (Made to order; available at φ 25 and φ 40 only)</p> <p><b>DVL</b> — Square rod cylinder with valve (Made to order; available at φ 25 and φ 40 only)</p> | <p><b>Mounting valve option</b></p> <p><b>Blank</b> — None</p> <p><b>37</b> — With conduit cover</p> <p><b>80</b> — With non-locking type manual override</p> <p><b>81</b> — With locking type manual override</p> <p><b>S</b> — Pull type when energized</p> <p><b>T</b> — With terminal box</p> <p><b>37-S</b></p> <p><b>80-S</b></p> <p><b>80-T</b></p> <p><b>81-S</b></p> <p><b>81-T</b></p> <p><b>S-T</b></p> <p><b>80-S-T</b></p> <p><b>81-S-T</b></p> <p>Combinations of the above options</p> <p><b>Mounting valve series</b></p> <p><b>Blank</b> — With VPS062-4E1-70</p> <p><b>Z</b> — With VPS125-4E1-70 (Available at φ 40 only)</p> <p><b>4E2</b> — With VPS062-4E2-70 (Double solenoid valve)</p> <p><b>4SE2</b> — With VPS062-4SE2-70 (Keep solenoid valve)</p> <p><b>Rod end accessory</b></p> <p><b>Blank</b> — No rod end accessory</p> <p><b>I</b> — I type knuckle</p> <p><b>Y</b> — Y type knuckle (with pin)</p> <p>● For the cylinder joint and cylinder rod end, see p.1568.</p> | <p><b>Solenoid valve voltage</b></p> <p><b>DC24V</b></p> <p><b>AC100V</b></p> <p><b>AC200V</b></p> <p><b>Number of sensor switches</b></p> <p><b>1</b> — With 1 sensor switch</p> <p><b>2</b> — With 2 sensor switches</p> <p><b>3</b> — With 3 sensor switches</p> <p>⋮</p> <p><b>Lead wire length (Applies to all except CS□F)</b></p> <p><b>A</b> — 1000mm [39in.]</p> <p><b>B</b> — 3000mm [118in.]</p> <p><b>Sensor switch (for cylinders with sensor switches)</b></p> <p><b>Blank</b> — No sensor switch</p> <p><b>ZG530</b> — 2-lead wire Solid state type with indicator lamp DC10~28V</p> <p><b>ZG553</b> — 3-lead wire Solid state type with indicator lamp DC4.5~28V</p> <p><b>CS3M</b> — Reed switch type with indicator lamp DC10~30V</p> <p><b>CS4M</b> — Reed switch type with indicator lamp AC85~230V</p> <p><b>CS5M</b> — Reed switch type without indicator lamp DC10~30V</p> <p><b>CS2F</b> — Reed switch type with indicator lamp AC85~115V</p> <p><b>CS3F</b> — Reed switch type with indicator lamp DC3~30V</p> <p><b>CS4F</b> — Reed switch type with indicator lamp AC85~230V</p> <p><b>CS5F</b> — Reed switch type without indicator lamp DC10~30V</p> <p>● For details of sensor switches, see p.1544.</p> <p>● CS□F comes with DIN connector. All others are grommet type.</p> |
|--|--|---|

Remarks: 1. Order code for the Valpack valve only is VPS062-4E1-70-voltage (or VPS125-4E1-70-voltage).  
 2. Can also be manufactured with keep solenoid type (momentarily energizing holding type) valve.

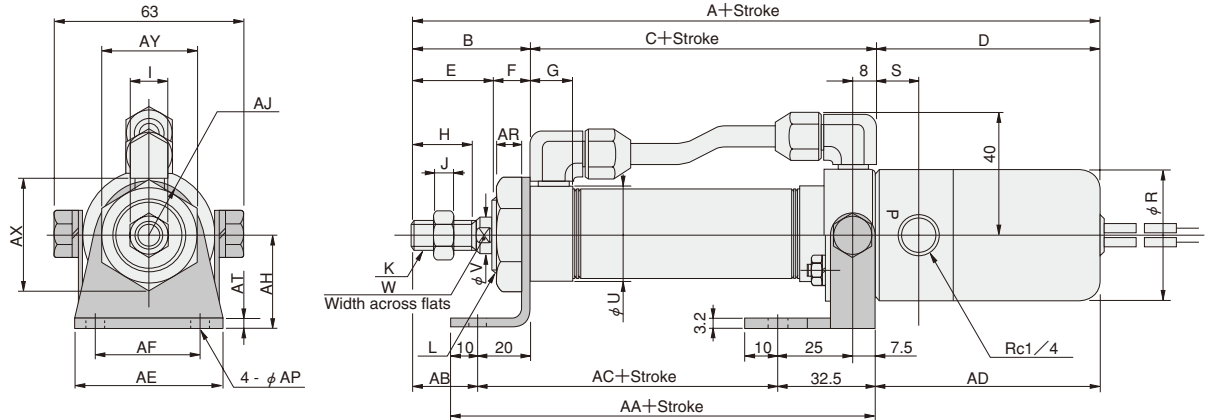
# Dimensions of Valpack Cylinder (mm)

● Basic type DV  ×



| Solenoid valve | Bore<br>mm [in.] | Code    | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | L       | M  | R  | S    | U    | V  | W  | AR  | AX   | AY | AL |
|----------------|------------------|---------|-----|----|----|----|----|----|--------|----|----|---|----------|---------|----|----|------|------|----|----|-----|------|----|----|
| 062 series     | 20               | [0.787] | 196 | 35 | 88 | 73 | 23 | 12 | 16     | 15 | 12 | 5 | M 8×1    | M20×1.5 | 10 | 42 | 14.5 | 27   | 8  | 6  | 7.5 | 31.2 | 27 | 20 |
|                | 25               | [0.984] | 201 | 40 | 88 | 73 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 42 | 14.5 | 29   | 10 | 8  | 9.5 | 34.6 | 30 | 22 |
|                | 32               | [1.260] | 206 | 45 | 88 | 73 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 42 | 14.5 | 35   | 12 | 10 | 9.5 | 41.6 | 36 | 27 |
|                | 40               | [1.575] | 211 | 45 | 93 | 73 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 42 | 14.5 | 41.6 | 16 | 14 | 9.5 | 47.3 | 41 | 33 |
| 125 series     | 40               | [1.575] | 221 | 45 | 93 | 83 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 46 | 16.5 | 41.6 | 16 | 14 | 9.5 | 47.3 | 41 | 33 |

● Foot mounting type DV  ×  -1

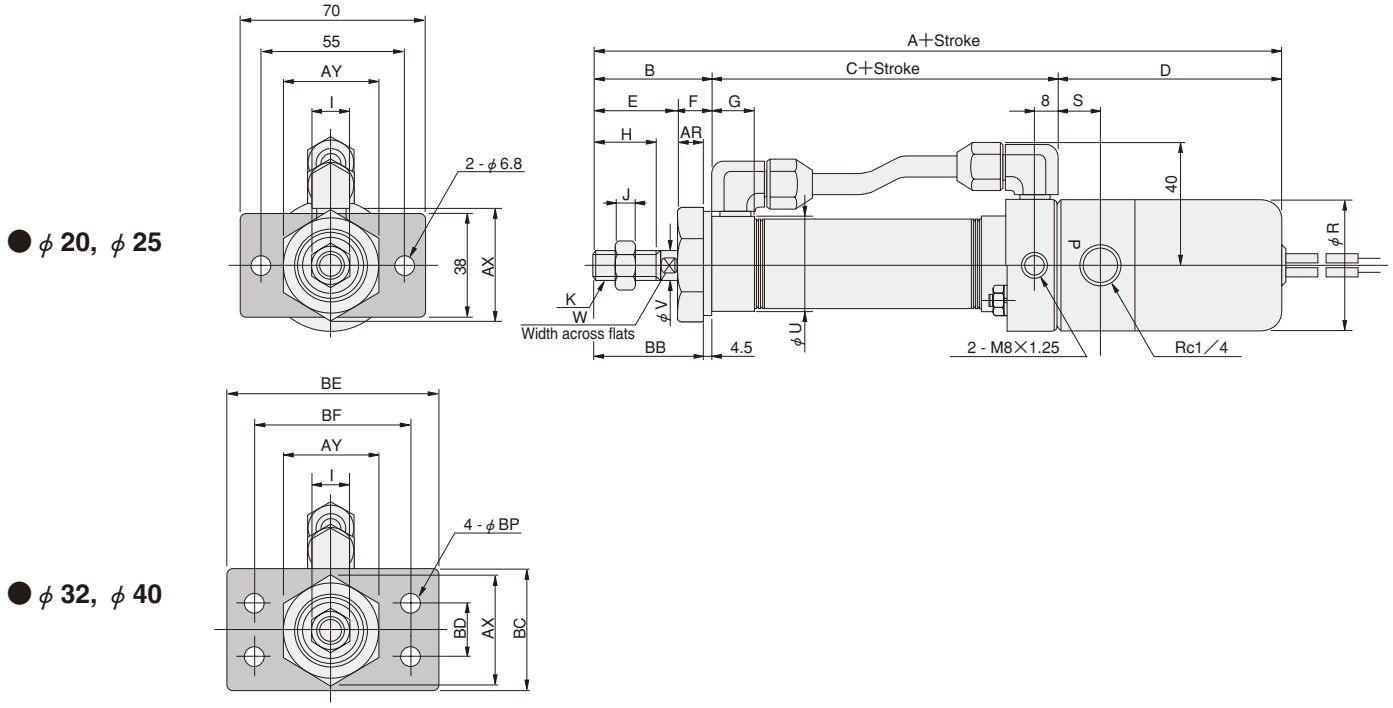


| Solenoid valve | Bore<br>mm [in.] | Code    | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | R  | S    | U    | V  | W  |
|----------------|------------------|---------|-----|----|----|----|----|----|--------|----|----|---|----------|----|------|------|----|----|
| 062 series     | 20               | [0.787] | 196 | 35 | 88 | 73 | 23 | 12 | 16     | 15 | 12 | 5 | M 8×1    | 42 | 14.5 | 27   | 8  | 6  |
|                | 25               | [0.984] | 201 | 40 | 88 | 73 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | 42 | 14.5 | 29   | 10 | 8  |
|                | 32               | [1.260] | 206 | 45 | 88 | 73 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | 42 | 14.5 | 35   | 12 | 10 |
|                | 40               | [1.575] | 211 | 45 | 93 | 73 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | 42 | 14.5 | 41.6 | 16 | 14 |
| 125 series     | 40               | [1.575] | 221 | 45 | 93 | 83 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | 46 | 16.5 | 41.6 | 16 | 14 |

| Solenoid valve | Bore<br>mm [in.] | Code    | AA    | AB | AC | AD   | AE | AF | AH | AJ   | AP  | AR  | AT  | AX   | AY |
|----------------|------------------|---------|-------|----|----|------|----|----|----|------|-----|-----|-----|------|----|
| 062 series     | 20               | [0.787] | 117.5 | 15 | 75 | 73.5 | 55 | 40 | 25 | 15.5 | 6.8 | 7.5 | 3.2 | 31.2 | 27 |
|                | 25               | [0.984] | 117.5 | 20 | 75 | 73.5 | 55 | 40 | 30 | 17   | 6.8 | 9.5 | 3.2 | 34.6 | 30 |
|                | 32               | [1.260] | 117.5 | 25 | 75 | 73.5 | 55 | 40 | 35 | 20   | 6.8 | 9.5 | 3.2 | 41.6 | 36 |
|                | 40               | [1.575] | 122.5 | 25 | 80 | 73.5 | 75 | 55 | 40 | 23.5 | 9   | 9.5 | 4   | 47.3 | 41 |
| 125 series     | 40               | [1.575] | 122.5 | 25 | 80 | 83.5 | 75 | 55 | 40 | 23.5 | 9   | 9.5 | 4   | 47.3 | 41 |

# Dimensions of Valpack Cylinder (mm)

● Flange mounting type DV  ×  -3



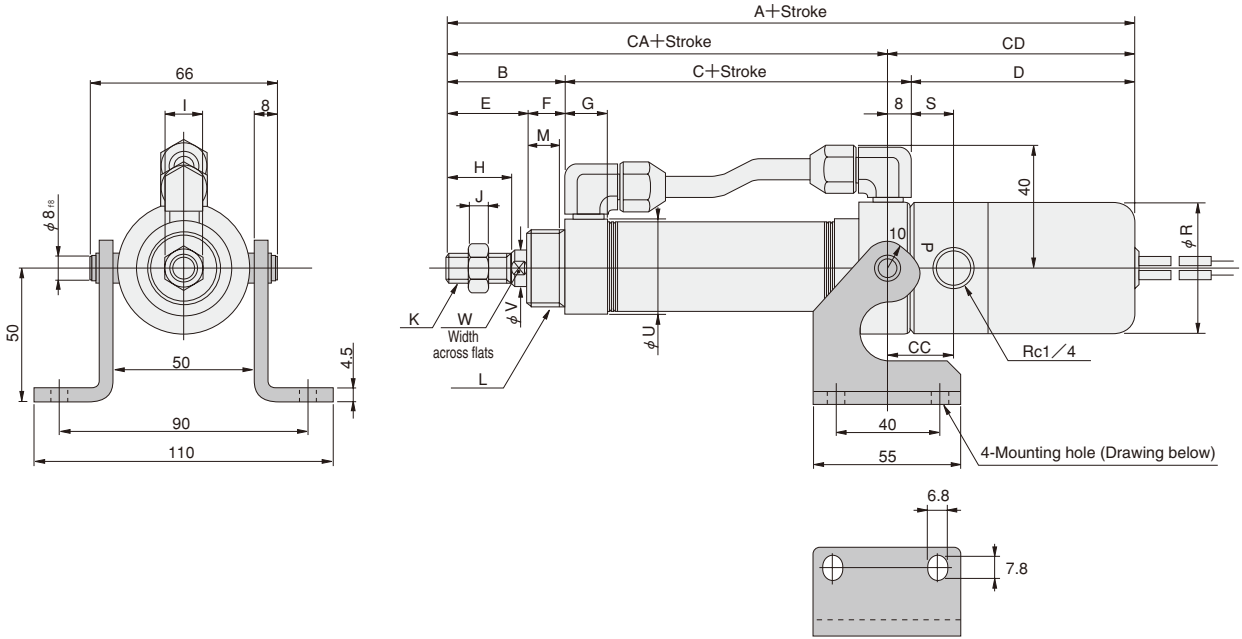
| Solenoid valve | Bore<br>mm [in.] | Code    | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | R  | S    | U    | V  | W  |
|----------------|------------------|---------|-----|----|----|----|----|----|--------|----|----|---|----------|----|------|------|----|----|
| 062 series     | 20               | [0.787] | 196 | 35 | 88 | 73 | 23 | 12 | 16     | 15 | 12 | 5 | M 8×1    | 42 | 14.5 | 27   | 8  | 6  |
|                | 25               | [0.984] | 201 | 40 | 88 | 73 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | 42 | 14.5 | 29   | 10 | 8  |
|                | 32               | [1.260] | 206 | 45 | 88 | 73 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | 42 | 14.5 | 35   | 12 | 10 |
| 125 series     | 40               | [1.575] | 211 | 45 | 93 | 73 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | 42 | 14.5 | 41.6 | 16 | 14 |
| 125 series     | 40               | [1.575] | 221 | 45 | 93 | 83 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | 46 | 16.5 | 41.6 | 16 | 14 |

| Solenoid valve | Bore<br>mm [in.] | Code    | AR  | AX   | AY | BB   | BC | BD | BE  | BF | BP  |
|----------------|------------------|---------|-----|------|----|------|----|----|-----|----|-----|
| 062 series     | 20               | [0.787] | 7.5 | 31.2 | 27 | 30.5 | —  | —  | —   | —  | —   |
|                | 25               | [0.984] | 9.5 | 34.6 | 30 | 35.5 | —  | —  | —   | —  | —   |
|                | 32               | [1.260] | 9.5 | 41.6 | 36 | 40.5 | 45 | 20 | 80  | 60 | 6.8 |
| 125 series     | 40               | [1.575] | 9.5 | 47.3 | 41 | 40.5 | 50 | 30 | 100 | 80 | 9   |
|                | 40               | [1.575] | 9.5 | 47.3 | 41 | 40.5 | 50 | 30 | 100 | 80 | 9   |

# Dimensions of Valpack Cylinder (mm)

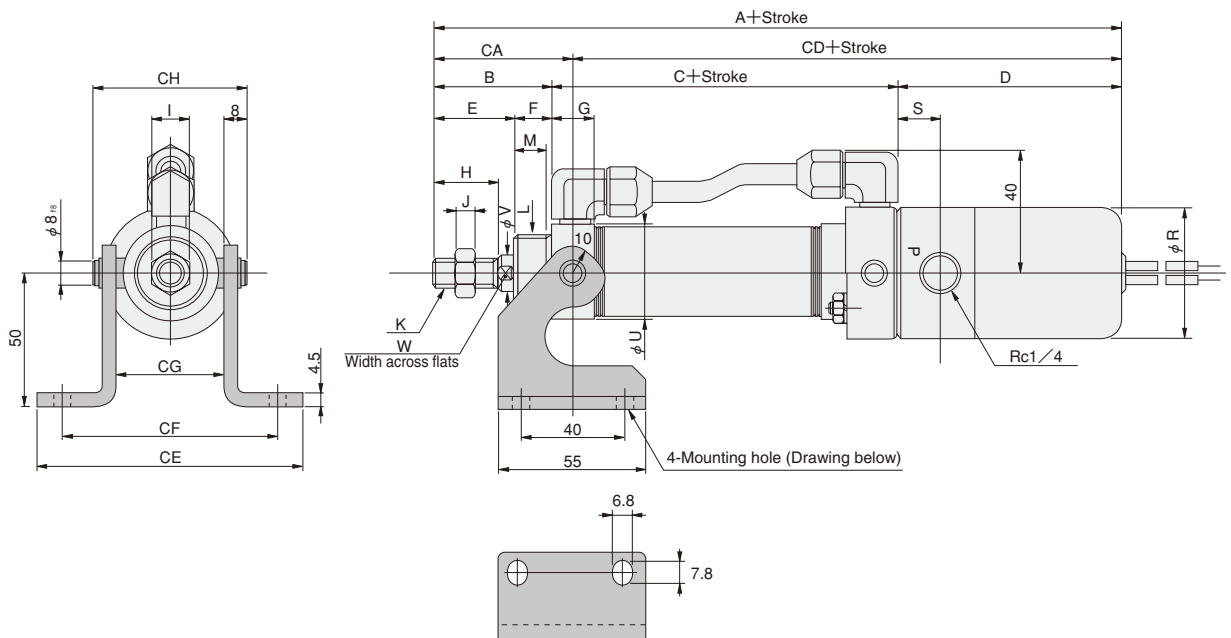
SLIM CYLINDERS

## ● Head side trunnion type DV Bore size × Stroke -11T



| Solenoid valve | Bore<br>mm [in.] | Code    | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | L       | M  | R  | S    | U    | V  | W  | CA  | CC   | CD |
|----------------|------------------|---------|-----|----|----|----|----|----|--------|----|----|---|----------|---------|----|----|------|------|----|----|-----|------|----|
| 062 series     | 20               | [0.787] | 196 | 35 | 88 | 73 | 23 | 12 | 16     | 15 | 12 | 5 | M8×1     | M20×1.5 | 10 | 42 | 14.5 | 27   | 8  | 6  | 115 | 22.5 | 81 |
|                | 25               | [0.984] | 201 | 40 | 88 | 73 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 42 | 14.5 | 29   | 10 | 8  | 120 | 22.5 | 81 |
|                | 32               | [1.260] | 206 | 45 | 88 | 73 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 42 | 14.5 | 35   | 12 | 10 | 125 | 22.5 | 81 |
|                | 40               | [1.575] | 211 | 45 | 93 | 73 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 42 | 14.5 | 41.6 | 16 | 14 | 130 | 22.5 | 81 |
| 125 series     | 40               | [1.575] | 221 | 45 | 93 | 83 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 46 | 16.5 | 41.6 | 16 | 14 | 130 | 24.5 | 91 |

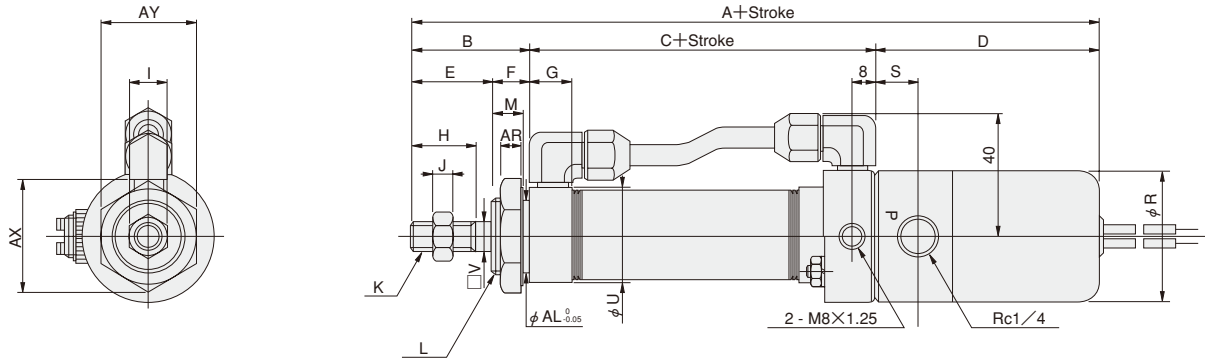
## ● Rod side trunnion type DV Bore size × Stroke -12



| Solenoid valve | Bore<br>mm [in.] | Code    | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | L       | M  | R  | S    | U    | V  | W  | CA | CD  | CE  | CF | CG | CH |
|----------------|------------------|---------|-----|----|----|----|----|----|--------|----|----|---|----------|---------|----|----|------|------|----|----|----|-----|-----|----|----|----|
| 062 series     | 20               | [0.787] | 196 | 35 | 88 | 73 | 23 | 12 | 16     | 15 | 12 | 5 | M8×1     | M20×1.5 | 10 | 42 | 14.5 | 27   | 8  | 6  | 43 | 153 | 92  | 72 | 32 | 48 |
|                | 25               | [0.984] | 201 | 40 | 88 | 73 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 42 | 14.5 | 29   | 10 | 8  | 48 | 153 | 94  | 74 | 34 | 50 |
|                | 32               | [1.260] | 206 | 45 | 88 | 73 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 42 | 14.5 | 35   | 12 | 10 | 53 | 153 | 100 | 80 | 40 | 56 |
|                | 40               | [1.575] | 211 | 45 | 93 | 73 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 42 | 14.5 | 41.6 | 16 | 14 | 53 | 158 | 107 | 87 | 47 | 63 |
| 125 series     | 40               | [1.575] | 221 | 45 | 93 | 83 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 46 | 16.5 | 41.6 | 16 | 14 | 53 | 168 | 107 | 87 | 47 | 63 |

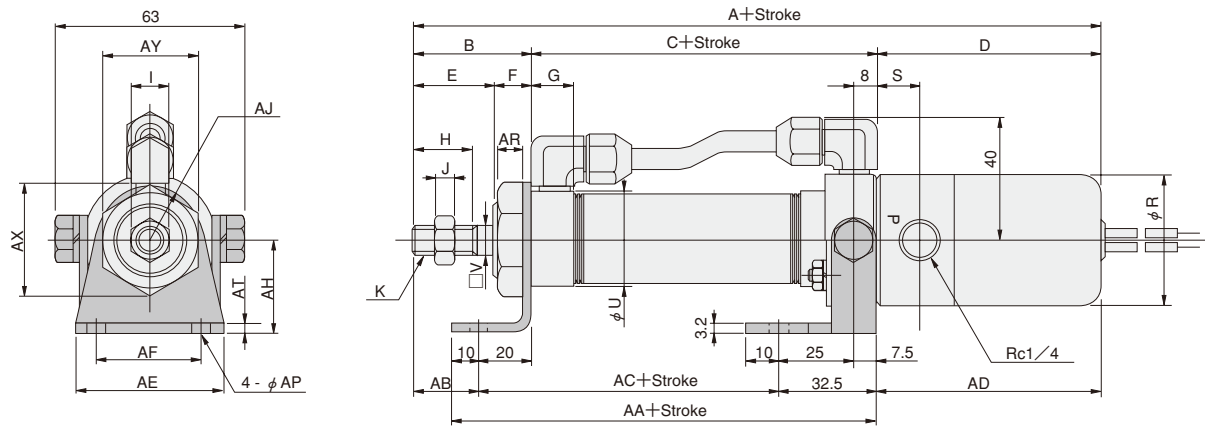
# Dimensions of Valpack Square Rod Cylinder (mm)

● Basic type DVL  ×



| Solenoid valve | Bore<br>mm [in.] | Code | A  | B  | C  | D  | E  | F      | G  | H  | I | J       | K       | L  | M  | R    | S    | U   | V   | AR   | AX | AY | AL |
|----------------|------------------|------|----|----|----|----|----|--------|----|----|---|---------|---------|----|----|------|------|-----|-----|------|----|----|----|
| 062 series     | 25 [0.984]       | 201  | 40 | 88 | 73 | 26 | 14 | 16     | 18 | 12 | 5 | M8×1    | M22×1.5 | 12 | 42 | 14.5 | 29   | 7.4 | 9.5 | 34.6 | 30 | 22 |    |
|                | 40 [1.575]       | 211  | 45 | 93 | 73 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5 | M33×2   | 12 | 42 | 14.5 | 41.6 | 13  | 9.5 | 47.3 | 41 | 33 |    |
| 125 series     | 40 [1.575]       | 221  | 45 | 93 | 83 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5 | M33×2   | 12 | 46 | 16.5 | 41.6 | 13  | 9.5 | 47.3 | 41 | 33 |    |

● Foot mounting type DVL  ×  -1



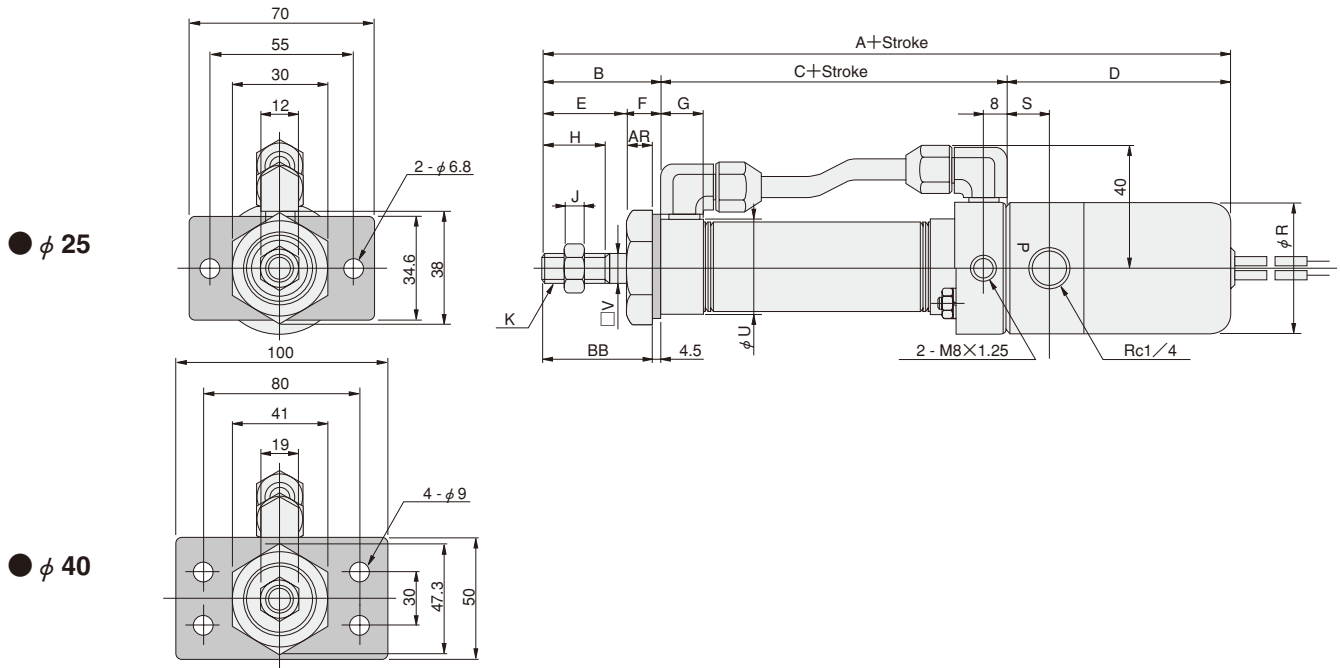
| Solenoid valve | Bore<br>mm [in.] | Code | A  | B  | C  | D  | E  | F      | G  | H  | I | J       | K  | R    | S    | U   | V |
|----------------|------------------|------|----|----|----|----|----|--------|----|----|---|---------|----|------|------|-----|---|
| 062 series     | 25 [0.984]       | 201  | 40 | 88 | 73 | 26 | 14 | 16     | 18 | 12 | 5 | M8×1    | 42 | 14.5 | 29   | 7.4 |   |
|                | 40 [1.575]       | 211  | 45 | 93 | 73 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5 | 42 | 14.5 | 41.6 | 13  |   |
| 125 series     | 40 [1.575]       | 221  | 45 | 93 | 83 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5 | 46 | 16.5 | 41.6 | 13  |   |

| Solenoid valve | Bore<br>mm [in.] | Code | AA    | AB | AC | AD   | AE | AF | AH | AJ   | AP  | AR  | AT  | AX   | AY |
|----------------|------------------|------|-------|----|----|------|----|----|----|------|-----|-----|-----|------|----|
| 062 series     | 25 [0.984]       | 201  | 117.5 | 20 | 75 | 73.5 | 55 | 40 | 30 | 17   | 6.8 | 9.5 | 3.2 | 34.6 | 30 |
|                | 40 [1.575]       | 211  | 122.5 | 25 | 80 | 73.5 | 75 | 55 | 40 | 23.5 | 9   | 9.5 | 4   | 47.3 | 41 |
| 125 series     | 40 [1.575]       | 221  | 122.5 | 25 | 80 | 83.5 | 75 | 55 | 40 | 23.5 | 9   | 9.5 | 4   | 47.3 | 41 |



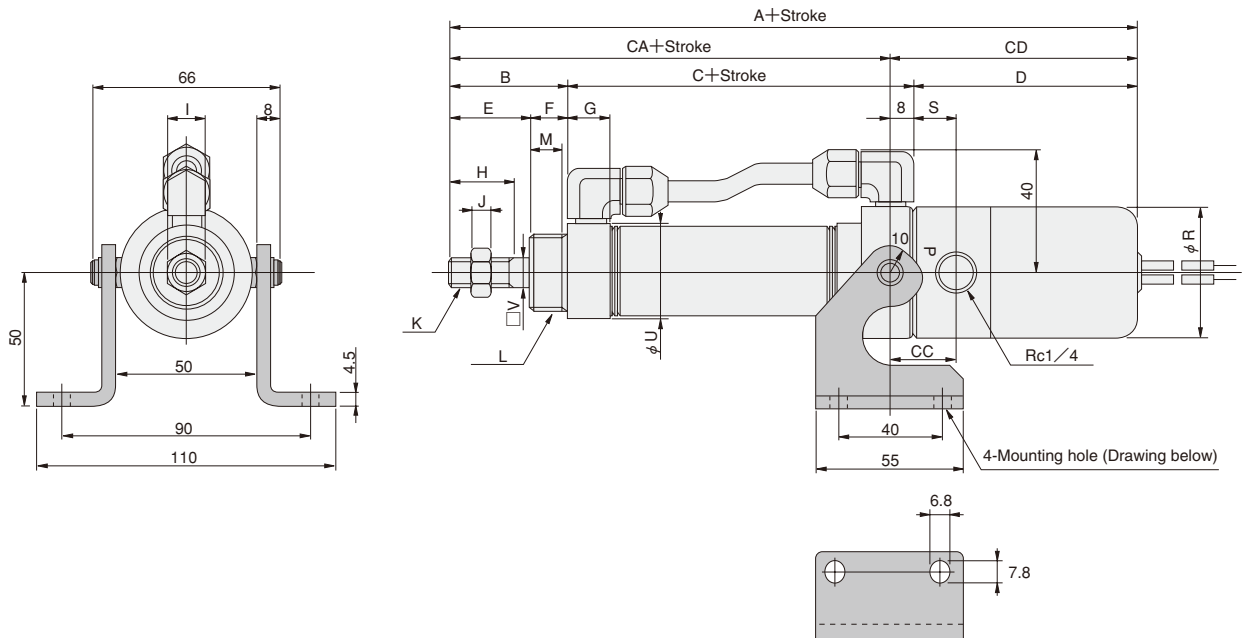
# Dimensions of Valpack Square Rod Cylinder (mm)

● Flange mounting type DVL Bore size × Stroke -3



| Solenoid valve | Bore mm [in.] | Code | A  | B  | C  | D  | E  | F      | G  | H | J       | K  | R    | S    | U   | V   | AR   | BB |
|----------------|---------------|------|----|----|----|----|----|--------|----|---|---------|----|------|------|-----|-----|------|----|
| 062 series     | 25 [0.984]    | 201  | 40 | 88 | 73 | 26 | 14 | 16     | 18 | 5 | M8×1    | 42 | 14.5 | 29   | 7.4 | 9.5 | 35.5 |    |
|                | 40 [1.575]    | 211  | 45 | 93 | 73 | 31 | 14 | (14.5) | 23 | 8 | M14×1.5 | 42 | 14.5 | 41.6 | 13  | 9.5 | 40.5 |    |
| 125 series     | 40 [1.575]    | 221  | 45 | 93 | 83 | 31 | 14 | (14.5) | 23 | 8 | M14×1.5 | 46 | 16.5 | 41.6 | 13  | 9.5 | 40.5 |    |

● Head side trunnion type DVL Bore size × Stroke -11T

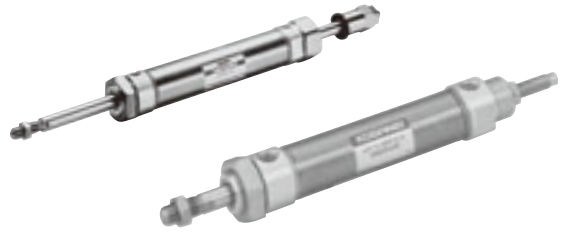


| Solenoid valve | Bore mm [in.] | Code | A  | B  | C  | D  | E  | F      | G  | H  | I | J       | K       | L  | M  | R    | S    | U   | V   | CA   | CC | CD |
|----------------|---------------|------|----|----|----|----|----|--------|----|----|---|---------|---------|----|----|------|------|-----|-----|------|----|----|
| 062 series     | 25 [0.984]    | 201  | 40 | 88 | 73 | 26 | 14 | 16     | 18 | 12 | 5 | M8×1    | M22×1.5 | 12 | 42 | 14.5 | 29   | 7.4 | 120 | 22.5 | 81 |    |
|                | 40 [1.575]    | 211  | 45 | 93 | 73 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5 | M33×2   | 12 | 42 | 14.5 | 41.6 | 13  | 130 | 22.5 | 81 |    |
| 125 series     | 40 [1.575]    | 221  | 45 | 93 | 83 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5 | M33×2   | 12 | 46 | 16.5 | 41.6 | 13  | 130 | 24.5 | 91 |    |

SLIM CYLINDERS

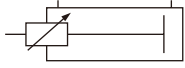
# SLIM STROKE ADJUSTING CYLINDERS

Push Side Stroke Adjusting Type,  
Pull Side Stroke Adjusting Type

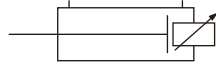


## Symbols

● Push side stroke adjusting type



● Pull side stroke adjusting type



## Specifications

| Item                        | Bore size mm [in.]                                 | 20, 25, 32, 40 [0.787, 0.984, 1.260, 1.575] <sup>Note1</sup> |
|-----------------------------|--|--|
| Operation type              | Double acting type with stroke adjusting mechanism |  |
| Media                       | Air  |  |
| Mounting type               | Basic type, Foot type, Flange type                 |  |
| Stroke adjusting range      | mm [in.]   | 0~25 [0~0.984] (To the specification stroke)                 |
| Operating pressure range    | MPa [psi.]   | 0.04~0.9 [6~131] (0.06~0.9 [9~131]) <sup>Note2</sup>         |
| Proof pressure              | MPa [psi.]   | 1.32 [191]   |
| Operating temperature range | °C [°F]  | 0~70 [32~158]  |
| Operating speed range       | mm/s [in./sec.]                                    | 30~800 [1.2~31.5] (50~800 [2.0~31.5]) <sup>Note2</sup>       |
| Cushion                     | Fixed type (Rubber bumper)                         |  |
| Lubrication                 | Not required                                       |  |
| Port size                   | Rc   | 1/8  |

Notes: 1. Square rod cylinders are available at  $\phi$  25 and  $\phi$  40 only.  
2. For push side stroke adjusting cylinders.

## Bore Size and Stroke

| Bore size <sup>Note</sup> | Standard strokes                    | Maximum stroke | Maximum available stroke        |                                 |
|---------------------------|-------------------------------------|----------------|---------------------------------|---------------------------------|
|                           |                                     |                | Push side stroke adjusting type | Pull side stroke adjusting type |
| 20                        | 20 50 75 100 125 150                | 200            | 400                             | 1000                            |
| 25                        | 25 50 75 100 125 150<br>200         | 250            |                                 |                                 |
| 32                        | 25 50 75 100 125 150<br>200         | 300            | 500                             |                                 |
| 40                        | 25 50 75 100 125 150<br>200 250 300 | 400<br>(300)   |                                 |                                 |

Note: Square rod cylinders are available at  $\phi$  25 and  $\phi$  40 only.

Remarks: 1. Stroke tolerance  $+1 \left[ +0.039 \text{in.} \right]$

2. For non-standard strokes, consult us.

3. Figures in parentheses ( ) are for cylinders with bellows.

4. The minimum operating pressure when the stroke is over the maximum stroke is 0.2MPa [29psi.].

## Order Codes

**DAE** **20×50** — [ ] — [ ] — [ ] — [ ] — [ ] — [ ]

**Bore size × Stroke**

**Non-ion specification**  
Blank — Standard  
NCU — Non-ion specification

**Rod end accessory**  
Blank — No rod end accessory  
I — I type knuckle  
Y — Y type knuckle (with pin)  
● For the cylinder joint and cylinder rod end, see p.1568.

**Mounting type**  
Blank — Basic type  
1 — Foot mounting type  
3 — Flange mounting type  
● Mounting brackets are included at shipping.

**Number of sensor switches**  
1 — With 1 sensor switch  
2 — With 2 sensor switches  
3 — With 3 sensor switches  
⋮

**Lead wire length**  
(Applies to all except CS□F)  
A — 1000mm [39in.]  
B — 3000mm [118in.]

**Sensor switch** (for cylinders with sensor switches)  
Blank — No sensor switch  
ZG530 — 2-lead wire Solid state type with indicator lamp DC10~28V  
ZG553 — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
CS3M — Reed switch type with indicator lamp DC10~30V  
CS4M — Reed switch type with indicator lamp AC85~230V  
CS5M — Reed switch type without indicator lamp DC10~30V  
CS2F — Reed switch type with indicator lamp AC85~115V  
CS3F — Reed switch type with indicator lamp DC3~30V  
CS4F — Reed switch type with indicator lamp AC85~115V  
CS5F — Reed switch type without indicator lamp DC85~230V  
DC10~30V  
DC10~30V  
DC10~30V  
DC3~30V  
AC85~115V  
DC10~30V  
DC10~30V  
DC3~30V

DAE — Pull side stroke adjusting type  
DAP — Push side stroke adjusting type

DAEJ — Pull side stroke adjusting type with bellows  
DAEJL<sup>Note</sup> — Pull side stroke adjusting type Square rod cylinder with bellows  
DAEL<sup>Note</sup> — Pull side stroke adjusting type Square rod cylinder  
DAJLP<sup>Note</sup> — Push side stroke adjusting type Square rod cylinder with bellows  
DAJP — Push side stroke adjusting type with bellows  
DALP — Push side stroke adjusting type Square rod cylinder

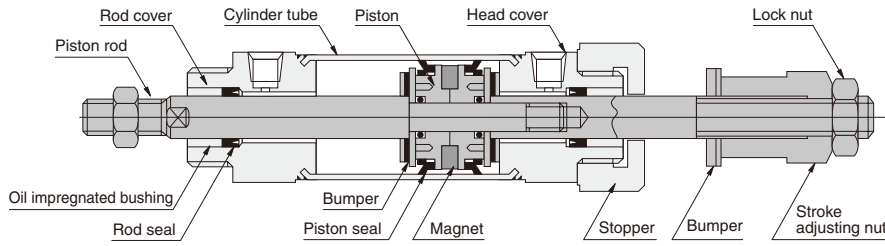
(Made to order)

Note: The available bore size is only  $\phi$  25, 40.

# Inner Construction and Major Parts (cannot be disassembled)

SLIM CYLINDERS

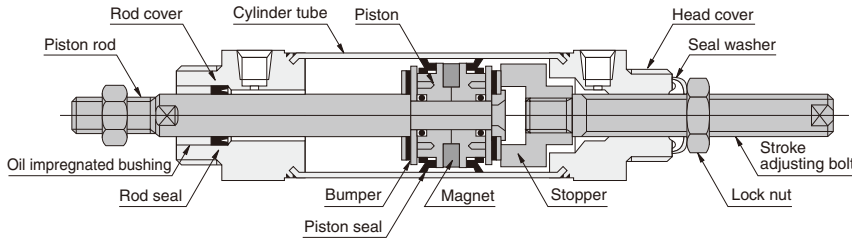
## ● Push side stroke adjusting type



● Instructions for stroke adjustment  
For stroke adjustment, turn the stroke adjusting nut. After completing stroke adjustment, secure the stroke adjusting nut in place with a lock nut. If mounting a sensor switch, move the mounting location of the sensor switch along the length of the adjusted stroke.

Note: When re-adjusting the stroke, always use a wrench to loosen the stroke adjusting nut and then complete the adjustment according to the above procedure. Do not use the method of securing the piston rod in place and then loosen the lock nut.

## ● Pull side stroke adjusting type



● Instructions for stroke adjustment  
For stroke adjustment, turn the stroke adjusting bolt. After completing stroke adjustment, secure the stroke adjusting bolt in place with a lock nut. If mounting a sensor switch, move the mounting location of the sensor switch along the length of the adjusted stroke.

## Major Parts and Materials

| Parts         | Bore size | 20, 25, 32, 40  |
|---------------|-----------|---|
| Cylinder tube |           | Stainless steel   |
| Piston        |           | Plastic   |
| Piston rod    |           | Steel (hard chrome plated)                                |
| Rod cover     |           | Aluminum alloy (anodized)                                 |
| Head cover    |           |   |
| Seal          |           | Synthetic rubber (NBR)                                    |
| Bumper        |           |   |
| Magnet        |           | Plastic magnet  |
| Bellows       |           | Nylon tarpaulin (heat resistant temperature 70°C [158°F]) |

## Seals Note: Seals cannot be replaced.

| Parts   | Rod seal     | Piston seal |
|---------|--------------|-------------|
| Bore mm | Quantity     |             |
| 20      | 2(1)         | 2           |
| 25      | NY-14×10×3.5 | PPY-25      |
| 32      | NY-17×12×4   | PPY-32      |
| 40      | NY-22×16×5   | PPY-40      |

Note: Figures in parentheses ( ) are for pull side stroke adjusting cylinder.

## Mass

### ● Push side stroke adjusting type

| Bore size<br>mm [in.] | Zero stroke mass |                    |                      | Additional mass for<br>each 1mm<br>[0.0394in.] stroke | Mass of mounting bracket |                |                |                |
|-----------------------|------------------|--------------------|----------------------|---|--------------------------|----------------|----------------|----------------|
|                       | Basic type       | Foot mounting type | Flange mounting type |   | Foot bracket             | Flange bracket | Y type knuckle | I type knuckle |
| 20 [0.787]            | 0.29 [0.64]      | 0.43 [0.95]        | 0.37 [0.82]          | 0.0012 [0.0026]                                       | 0.14 [0.31]              | 0.08 [0.18]    | 0.041 [0.090]  | 0.036 [0.079]  |
| 25 [0.984]            | 0.41 [0.90]      | 0.57 [1.26]        | 0.49 [1.08]          | 0.0016 [0.0035]                                       | 0.16 [0.35]              | 0.08 [0.18]    | 0.075 [0.165]  | 0.070 [0.154]  |
| 32 [1.260]            | 0.57 [1.26]      | 0.76 [1.68]        | 0.67 [1.48]          | 0.0025 [0.0055]                                       | 0.19 [0.42]              | 0.10 [0.22]    | 0.075 [0.165]  | 0.070 [0.154]  |
| 40 [1.575]            | 0.85 [1.87]      | 1.14 [2.51]        | 0.98 [2.16]          | 0.0039 [0.0086]                                       | 0.29 [0.64]              | 0.13 [0.29]    | 0.120 [0.265]  | 0.132 [0.291]  |

Calculation example: For foot mounting type of 32mm bore size and 100mm stroke,  $0.76 + (0.0025 \times 100) = 1.01\text{kg}$  [2.23lb.]

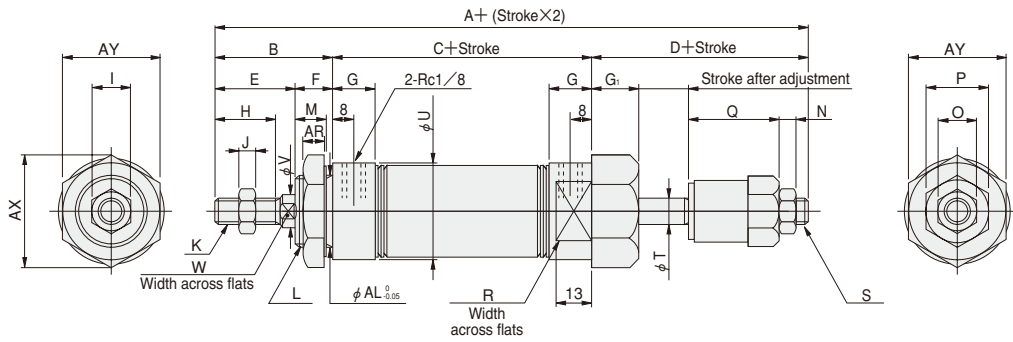
### ● Pull side stroke adjusting type

| Bore size<br>mm [in.] | Zero stroke mass |                    |                      | Additional mass for<br>each 1mm<br>[0.0394in.] stroke | Mass of mounting bracket |                |                |                |
|-----------------------|------------------|--------------------|----------------------|---|--------------------------|----------------|----------------|----------------|
|                       | Basic type       | Foot mounting type | Flange mounting type |   | Foot bracket             | Flange bracket | Y type knuckle | I type knuckle |
| 20 [0.787]            | 0.19 [0.42]      | 0.33 [0.73]        | 0.27 [0.60]          | 0.0008 [0.0018]                                       | 0.14 [0.31]              | 0.08 [0.18]    | 0.041 [0.090]  | 0.036 [0.079]  |
| 25 [0.984]            | 0.27 [0.60]      | 0.43 [0.95]        | 0.35 [0.77]          | 0.0011 [0.0024]                                       | 0.16 [0.35]              | 0.08 [0.18]    | 0.075 [0.165]  | 0.070 [0.154]  |
| 32 [1.260]            | 0.43 [0.95]      | 0.62 [1.37]        | 0.53 [1.17]          | 0.0015 [0.0033]                                       | 0.19 [0.42]              | 0.10 [0.22]    | 0.075 [0.165]  | 0.070 [0.154]  |
| 40 [1.575]            | 0.66 [1.46]      | 0.95 [2.09]        | 0.79 [1.74]          | 0.0024 [0.0053]                                       | 0.29 [0.64]              | 0.13 [0.29]    | 0.120 [0.265]  | 0.132 [0.291]  |

Calculation example: For foot mounting type of 32mm bore size and 100mm stroke,  $0.62 + (0.0015 \times 100) = 0.77\text{kg}$  [1.70lb.]

# Dimensions of Push Side Stroke Adjusting Cylinder (mm)

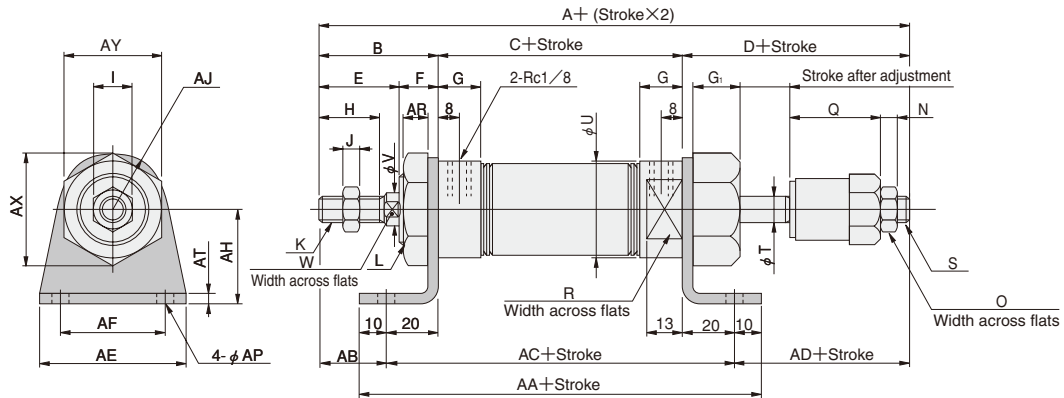
● Basic type DAP  ×



| Bore<br>mm [in.] | Code    | A   | B  | C  | D  | E  | F  | G      | G <sub>1</sub> | H  | I  | J | K        | L       | M  | N  | O  | P  | Q    | R  | S        | T  | U    | V  | W  |
|------------------|---------|-----|----|----|----|----|----|--------|----------------|----|----|---|----------|---------|----|----|----|----|------|----|----------|----|------|----|----|
| 20               | [0.787] | 171 | 35 | 76 | 60 | 23 | 12 | 16     | 15             | 15 | 12 | 5 | M 8×1    | M20×1.5 | 10 | 5  | 12 | 19 | 36   | 22 | M 8×1    | 8  | 27   | 8  | 6  |
| 25               | [0.984] | 179 | 40 | 76 | 63 | 26 | 14 | 16     | 17             | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 6  | 14 | 22 | 36   | 24 | M10×1.25 | 10 | 29   | 10 | 8  |
| 32               | [1.260] | 187 | 45 | 76 | 66 | 31 | 14 | 16     | 18             | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 7  | 19 | 22 | 36.5 | 30 | M12×1.25 | 12 | 35   | 12 | 10 |
| 40               | [1.575] | 191 | 45 | 76 | 70 | 31 | 14 | (14.5) | 18             | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 10 | 24 | 27 | 36.5 | 36 | M16×1.5  | 16 | 41.6 | 16 | 14 |

| Bore<br>mm [in.] | Code    | AR  | AX   | AY | AL |
|------------------|---------|-----|------|----|----|
| 20               | [0.787] | 7.5 | 31.2 | 27 | 20 |
| 25               | [0.984] | 9.5 | 34.6 | 30 | 22 |
| 32               | [1.260] | 9.5 | 41.6 | 36 | 27 |
| 40               | [1.575] | 9.5 | 47.3 | 41 | 33 |

● Foot mounting type DAP  ×  -1



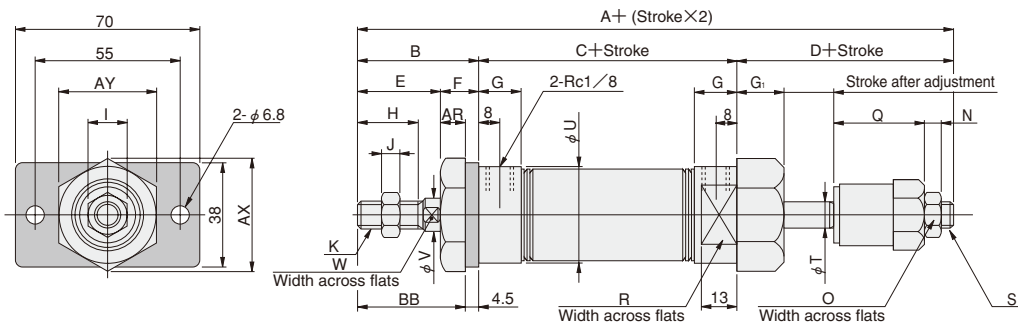
| Bore<br>mm [in.] | Code    | A   | B  | C  | D  | E  | F  | G      | G <sub>1</sub> | H  | I  | J | K        | L       | N  | O  | Q    | R  | S        | T  | U    | V  | W  |
|------------------|---------|-----|----|----|----|----|----|--------|----------------|----|----|---|----------|---------|----|----|------|----|----------|----|------|----|----|
| 20               | [0.787] | 171 | 35 | 76 | 60 | 23 | 12 | 16     | 15             | 15 | 12 | 5 | M 8×1    | M20×1.5 | 5  | 12 | 36   | 22 | M 8×1    | 8  | 27   | 8  | 6  |
| 25               | [0.984] | 179 | 40 | 76 | 63 | 26 | 14 | 16     | 17             | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 6  | 14 | 36   | 24 | M10×1.25 | 10 | 29   | 10 | 8  |
| 32               | [1.260] | 187 | 45 | 76 | 66 | 31 | 14 | 16     | 18             | 23 | 14 | 6 | M10×1.25 | M27×2   | 7  | 19 | 36.5 | 30 | M12×1.25 | 12 | 35   | 12 | 10 |
| 40               | [1.575] | 191 | 45 | 76 | 70 | 31 | 14 | (14.5) | 18             | 23 | 19 | 8 | M14×1.5  | M33×2   | 10 | 24 | 36.5 | 36 | M16×1.5  | 16 | 41.6 | 16 | 14 |

| Bore<br>mm [in.] | Code    | AA  | AB | AC  | AD | AE | AF | AH | AJ   | AP  | AR  | AT  | AX   | AY |
|------------------|---------|-----|----|-----|----|----|----|----|------|-----|-----|-----|------|----|
| 20               | [0.787] | 136 | 15 | 116 | 40 | 55 | 40 | 25 | 15.5 | 6.8 | 7.5 | 3.2 | 31.2 | 27 |
| 25               | [0.984] | 136 | 20 | 116 | 43 | 55 | 40 | 30 | 17   | 6.8 | 9.5 | 3.2 | 34.6 | 30 |
| 32               | [1.260] | 136 | 25 | 116 | 46 | 55 | 40 | 35 | 20   | 6.8 | 9.5 | 3.2 | 41.6 | 36 |
| 40               | [1.575] | 136 | 25 | 116 | 50 | 75 | 55 | 40 | 23.5 | 9   | 9.5 | 4   | 47.3 | 41 |

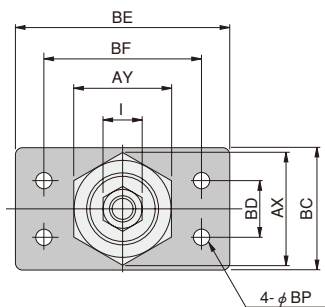
# Dimensions of Push Side Stroke Adjusting Cylinder (mm)

● Flange mounting type DAP  ×  -3

●  $\phi 20, \phi 25$



●  $\phi 32, \phi 40$

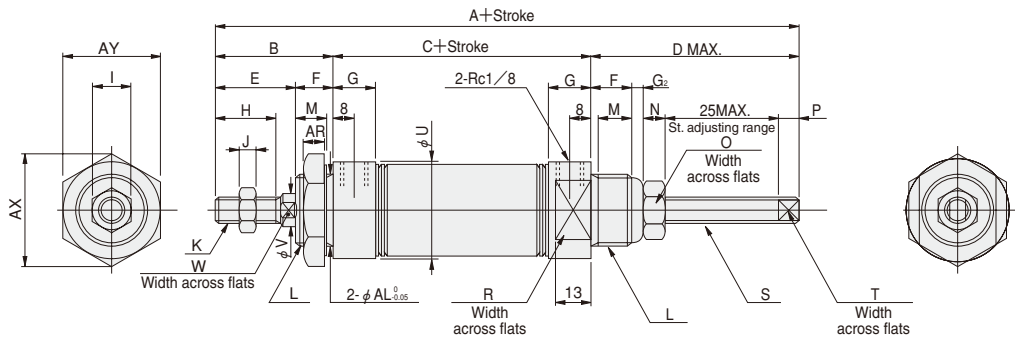


| Bore<br>mm [in.] | Code | A   | B  | C  | D  | E  | F  | G      | G <sub>1</sub> | H  | I  | J | K        | L       | N  | O  | Q    | R  | S        | T  | U    | V  | W  |
|------------------|------|-----|----|----|----|----|----|--------|----------------|----|----|---|----------|---------|----|----|------|----|----------|----|------|----|----|
| 20 [0.787]       |      | 171 | 35 | 76 | 60 | 23 | 12 | 16     | 15             | 15 | 12 | 5 | M 8×1    | M20×1.5 | 5  | 12 | 36   | 22 | M 8×1    | 8  | 27   | 8  | 6  |
| 25 [0.984]       |      | 179 | 40 | 76 | 63 | 26 | 14 | 16     | 17             | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 6  | 14 | 36   | 24 | M10×1.25 | 10 | 29   | 10 | 8  |
| 32 [1.260]       |      | 187 | 45 | 76 | 66 | 31 | 14 | 16     | 18             | 23 | 14 | 6 | M10×1.25 | M27×2   | 7  | 19 | 36.5 | 30 | M12×1.25 | 12 | 35   | 12 | 10 |
| 40 [1.575]       |      | 191 | 45 | 76 | 70 | 31 | 14 | (14.5) | 18             | 23 | 19 | 8 | M14×1.5  | M33×2   | 10 | 24 | 36.5 | 36 | M16×1.5  | 16 | 41.6 | 16 | 14 |

| Bore<br>mm [in.] | Code | AR  | AX   | AY | BB   | BC | BD | BE  | BF | BP  |
|------------------|------|-----|------|----|------|----|----|-----|----|-----|
| 20 [0.787]       |      | 7.5 | 31.2 | 27 | 30.5 | —  | —  | —   | —  | —   |
| 25 [0.984]       |      | 9.5 | 34.6 | 30 | 35.5 | —  | —  | —   | —  | —   |
| 32 [1.260]       |      | 9.5 | 41.6 | 36 | 40.5 | 45 | 20 | 80  | 60 | 6.8 |
| 40 [1.575]       |      | 9.5 | 47.3 | 41 | 40.5 | 50 | 30 | 100 | 80 | 9   |

# Dimensions of Pull Side Stroke Adjusting Cylinder (mm)

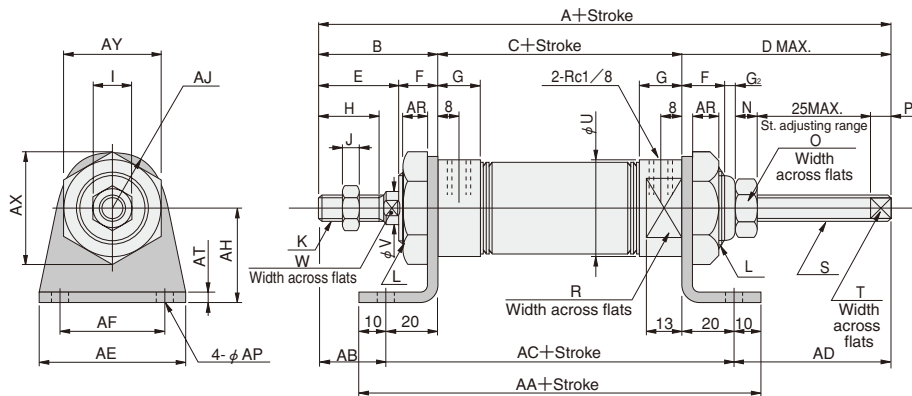
● Basic type DAE  ×



| Code       | A   | B  | C  | D  | E  | F  | G      | G <sub>2</sub> | H  | I  | J | K        | L       | M  | N | O  | P | R  | S     | T | U    | V  | W  |
|------------|-----|----|----|----|----|----|--------|----------------|----|----|---|----------|---------|----|---|----|---|----|-------|---|------|----|----|
| 20 [0.787] | 175 | 35 | 86 | 54 | 23 | 12 | 16     | 2              | 15 | 12 | 5 | M 8×1    | M20×1.5 | 10 | 5 | 12 | 5 | 22 | M 8×1 | 6 | 27   | 8  | 6  |
| 25 [0.984] | 183 | 40 | 86 | 57 | 26 | 14 | 16     | 2              | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 5 | 12 | 5 | 24 | M 8×1 | 6 | 29   | 10 | 8  |
| 32 [1.260] | 196 | 45 | 91 | 60 | 31 | 14 | 16     | 3.5            | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 7 | 19 | 5 | 30 | M12×1 | 9 | 35   | 12 | 10 |
| 40 [1.575] | 198 | 45 | 91 | 62 | 31 | 14 | (14.5) | 3.5            | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 7 | 19 | 5 | 36 | M12×1 | 9 | 41.6 | 16 | 14 |

| Code       | AR  | AX   | AY | AL |
|------------|-----|------|----|----|
| 20 [0.787] | 7.5 | 31.2 | 27 | 20 |
| 25 [0.984] | 9.5 | 34.6 | 30 | 22 |
| 32 [1.260] | 9.5 | 41.6 | 36 | 27 |
| 40 [1.575] | 9.5 | 47.3 | 41 | 33 |

● Foot mounting type DAE  ×  -1

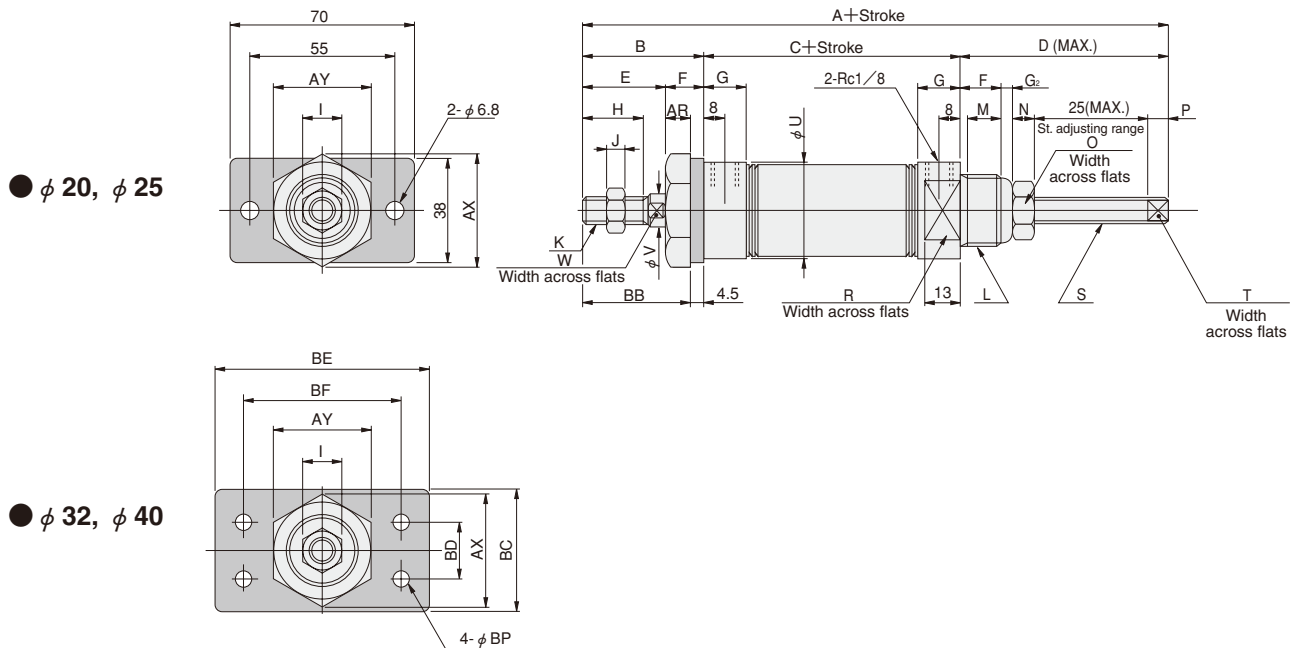


| Code       | A   | B  | C  | D  | E  | F  | G      | G <sub>2</sub> | H  | I  | J | K        | L       | N | O  | P | R  | S     | T | U    | V  | W  |
|------------|-----|----|----|----|----|----|--------|----------------|----|----|---|----------|---------|---|----|---|----|-------|---|------|----|----|
| 20 [0.787] | 175 | 35 | 86 | 54 | 23 | 12 | 16     | 2              | 15 | 12 | 5 | M 8×1    | M20×1.5 | 5 | 12 | 5 | 22 | M 8×1 | 6 | 27   | 8  | 6  |
| 25 [0.984] | 183 | 40 | 86 | 57 | 26 | 14 | 16     | 2              | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 5 | 12 | 5 | 24 | M 8×1 | 6 | 29   | 10 | 8  |
| 32 [1.260] | 196 | 45 | 91 | 60 | 31 | 14 | 16     | 3.5            | 23 | 14 | 6 | M10×1.25 | M27×2   | 7 | 19 | 5 | 30 | M12×1 | 9 | 35   | 12 | 10 |
| 40 [1.575] | 198 | 45 | 91 | 62 | 31 | 14 | (14.5) | 3.5            | 23 | 19 | 8 | M14×1.5  | M33×2   | 7 | 19 | 5 | 36 | M12×1 | 9 | 41.6 | 16 | 14 |

| Code       | AA  | AB | AC  | AD | AE | AF | AH | AJ   | AP  | AR  | AT  | AX   | AY |
|------------|-----|----|-----|----|----|----|----|------|-----|-----|-----|------|----|
| 20 [0.787] | 146 | 15 | 126 | 34 | 55 | 40 | 25 | 15.5 | 6.8 | 7.5 | 3.2 | 31.2 | 27 |
| 25 [0.984] | 146 | 20 | 126 | 37 | 55 | 40 | 30 | 17   | 6.8 | 9.5 | 3.2 | 34.6 | 30 |
| 32 [1.260] | 151 | 25 | 131 | 40 | 55 | 40 | 35 | 20   | 6.8 | 9.5 | 3.2 | 41.6 | 36 |
| 40 [1.575] | 151 | 25 | 131 | 42 | 75 | 55 | 40 | 23.5 | 9   | 9.5 | 4   | 47.3 | 41 |

# Dimensions of Pull Side Stroke Adjusting Cylinder (mm)

● Flange mounting type DAE  ×  -3

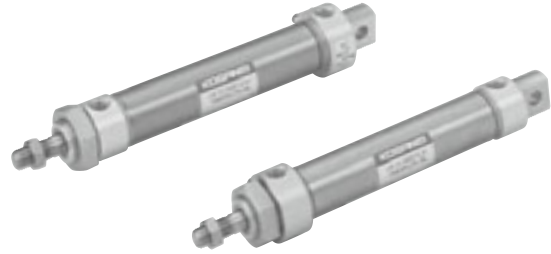


| Bore<br>mm [in.] | Code    | A   | B  | C  | D  | E  | F  | G      | G <sub>2</sub> | H  | I  | J | K        | L       | M  | N | O  | P | R  | S     | T | U    | V  | W  |
|------------------|---------|-----|----|----|----|----|----|--------|----------------|----|----|---|----------|---------|----|---|----|---|----|-------|---|------|----|----|
| 20               | [0.787] | 175 | 35 | 86 | 54 | 23 | 12 | 16     | 2              | 15 | 12 | 5 | M 8×1    | M20×1.5 | 10 | 5 | 12 | 5 | 22 | M 8×1 | 6 | 27   | 8  | 6  |
| 25               | [0.984] | 183 | 40 | 86 | 57 | 26 | 14 | 16     | 2              | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 5 | 12 | 5 | 24 | M 8×1 | 6 | 29   | 10 | 8  |
| 32               | [1.260] | 196 | 45 | 91 | 60 | 31 | 14 | 16     | 3.5            | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 7 | 19 | 5 | 30 | M12×1 | 9 | 35   | 12 | 10 |
| 40               | [1.575] | 198 | 45 | 91 | 62 | 31 | 14 | (14.5) | 3.5            | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 7 | 19 | 5 | 36 | M12×1 | 9 | 41.6 | 16 | 14 |

| Bore<br>mm [in.] | Code    | AR  | AX   | AY | BB   | BC | BD | BE  | BF | BP  |
|------------------|---------|-----|------|----|------|----|----|-----|----|-----|
| 20               | [0.787] | 7.5 | 31.2 | 27 | 30.5 | —  | —  | —   | —  | —   |
| 25               | [0.984] | 9.5 | 34.6 | 30 | 35.5 | —  | —  | —   | —  | —   |
| 32               | [1.260] | 9.5 | 41.6 | 36 | 40.5 | 45 | 20 | 80  | 60 | 6.8 |
| 40               | [1.575] | 9.5 | 47.3 | 41 | 40.5 | 50 | 30 | 100 | 80 | 9   |

# SLIM END KEEP CYLINDERS

Head Side End Keep,  
Rod Side End Keep



## Symbols

- Head side end keep
- Rod side end keep



## Specifications

| Item                                | Bore size mm [in.] | 20 [0.787]  | 25 [0.984] | 32 [1.260]    | 40 [1.575]       | 50 [1.969]                             | 63 [2.480]   |
|-------------------------------------|--------------------|---|------------|---------------|------------------|--|--------------|
| Operation type                      |                    | Double acting type, with head side or rod side end keep mechanism |            |               |                  |  |              |
| Media                               |                    | Air   |            |               |                  |  |              |
| Mounting type                       |                    | Basic type, Foot type, Flange type, Pivot type                    |            |               |                  |  |              |
| Operating pressure range            | MPa [psi.]         | 0.1~0.9 [15~131]  |            |               |                  | 0.1~0.7 [15~102]                       |              |
| Proof pressure                      | MPa [psi.]         | 1.32 [191]  |            |               |                  | 1.03 [149]                             |              |
| Operating temperature range         | °C [°F]            | 0~70 [32~158]   |            |               |                  |  |              |
| Operating speed range               | mm/s [in./sec.]    | 50~700 [2.0~27.6]   |            |               |                  | 50~500 [2.0~19.7]                      |              |
| Cushion                             |                    | Fixed type (Rubber bumper)  |            |               |                  | Variable type (Stroke 15mm [0.591in.]) |              |
| Lubrication                         |                    | Not required  |            |               |                  |  |              |
| Maximum holding force (at end keep) | N [lbf.]           | 194.2 [43.7]  | 303 [68.1] | 496.2 [111.5] | 775.7 [174.4]    | 943.4 [212.1]                          | 1497 [336.5] |
| Backlash (at end keep)              | mm [in.]           | 1.4 [0.055] MAX.  |            |               | 1.6 [0.063] MAX. |  |              |
| Port size                           | Rc                 | 1/8   |            |               |                  | 1/4                                    |              |

## Bore Size and Stroke

| Bore size | Standard strokes                           | Maximum stroke |              | Maximum available stroke |              |
|-----------|--|----------------|--------------|--------------------------|--------------|
|           |  | No bellows     | With bellows | No bellows               | With bellows |
| 20        | 25 50 75 100 125 150                       | 200            |              | 1050                     | 740          |
| 25        | 25 50 75 100 125 150 200                   | 250            |              |                          |              |
| 32        | 25 50 75 100 125 150 200                   | 300            |              |                          |              |
| 40        | 25 50 75 100 125 150 200 250 300           | 400            | 300          | 900                      |              |
| 50        | 25 50 75 100 150 200 [250 300 350 400]     | 300[500]       | 300          |                          |              |
| 63        | 25 50 75 100 150 200 [250 300 350 400 500] | 300[600]       | 300          |                          |              |

- Remarks: 1. Stroke tolerance  ${}_{0}^{+1} [{}_{0}^{+0.039in.}]$   
 2. For non-standard strokes, consult us.  
 3. Figures in parentheses [ ] are for cases when foot mounting brackets are used for mounting.  
 4. The minimum operating pressure when the stroke is over the maximum stroke at bore size of  $\phi 20 \sim \phi 40$  is 0.2MPa [29psi].

## Order Codes

**DA**  **K**  **20×50** —  —  —  —  —  —  —  —  —  —

**End keep cylinder**  
**Bore size × Stroke**  
**End keep position**  
**HL** — Head side end keep  
**RL** — Rod side end keep

**Slender cylinder**  
**Scraper**  
**Blank** — No scraper  
**Y** — With scraper (Made to order; available at  $\phi 50$  and  $\phi 63$  only)

**Head cover specification**  
**Blank** — Standard head  
**A** — Short head

**Bellows**  
**Blank** — No bellows  
**J** — With bellows (Made to order)

**Non-ion specification**  
**Blank** — Standard specification  
**NCU** — Non-ion specification

**Mounting type**  
**Blank** — Basic type  
**1** — Double foot mounting type  
**3** — Flange mounting type  
**8B** — Pivot mounting type with bushing (Available at  $\phi 50$  and  $\phi 63$  only)  
**8E** — Pivot mounting type with supporting bracket (with pin) (Available at  $\phi 20 \sim 40$  only)  
**8B-8E** — Pivot mounting type with bushing and supporting bracket (Available at  $\phi 50$  and  $\phi 63$  only)  
 ● Mounting brackets are included at shipping. (Except for pivot mounting type and pivot mounting type with bushing)

**Rod end accessory**  
**Blank** — No rod end accessory  
**I** — I type knuckle  
**Y** — Y type knuckle (with pin)  
 ● For the cylinder joint and cylinder rod end, see p.1568.

**Sensor switch (for cylinders with sensor switches)**  
**Blank** — No sensor switch  
**ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
**ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
**CS3M** — Reed switch type with indicator lamp DC10~30V AC85~230V  
**CS4M** — Reed switch type with indicator lamp DC10~30V AC85~115V  
**CS5M** — Reed switch type without indicator lamp DC3~30V AC85~115V  
**CS2F** — Reed switch type with indicator lamp AC85~230V  
**CS3F** — Reed switch type with indicator lamp DC10~30V  
**CS4F** — Reed switch type with indicator lamp DC10~30V  
**CS5F** — Reed switch type without indicator lamp DC3~30V  
 ● For details of sensor switches, see p.1544.  
 ● **CS□F** comes with DIN connector. All others are grommet type.

**Number of sensor switches**  
**1** — With 1 sensor switch  
**2** — With 2 sensor switches  
**3** — With 3 sensor switches  
 : :

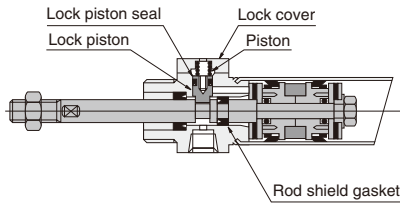
**Lead wire length**  
 (Applies to all except **CS□F**)  
**A** — 1000mm [39in.]  
**B** — 3000mm [118in.]



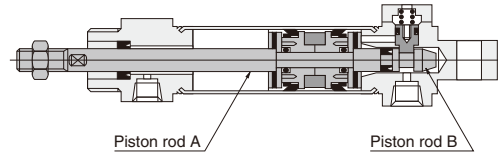
# Inner Construction and Major Parts (cannot be disassembled)

●  $\phi 20, \phi 25$

● Rod side end keep

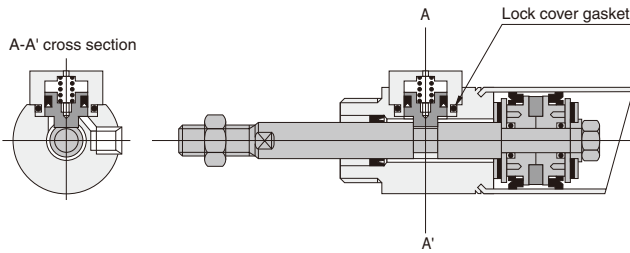


● Head side end keep

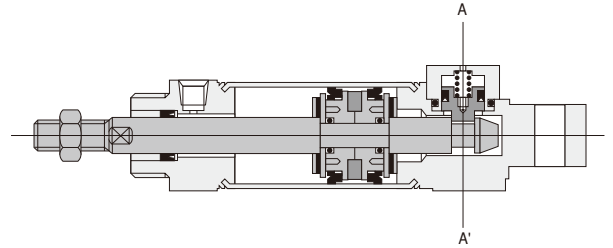


●  $\phi 32, \phi 40$

● Rod side end keep

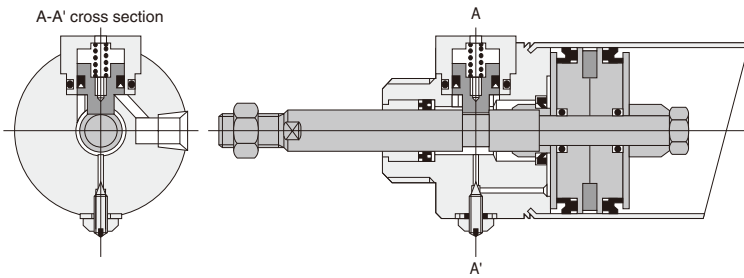


● Head side end keep

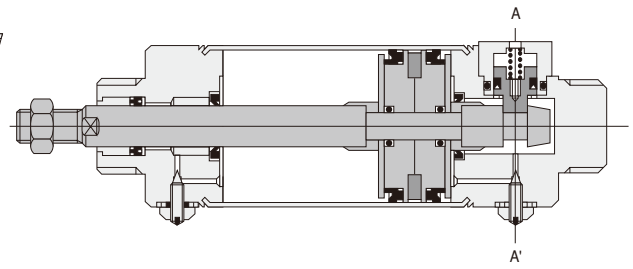


●  $\phi 50, \phi 63$

● Rod side end keep



● Head side end keep



## Major Parts and Materials

| Parts  | 20, 25                     | 32, 40, 50, 63 |
|--|----------------------------|----------------|
| Piston rod A   | Steel (hard chrome plated) |                |
| Piston rod B   | Steel (zinc plated)        |                |
| Spring   | Stainless steel            | Piano wire     |
| Lock piston  | Stainless steel            |                |
| Rod cover  | Aluminum alloy (anodized)  |                |
| Y type knuckle, I type knuckle<br>Pivot mounting with supporting bracket | Mild steel (zinc plated)   |                |

Other than the items listed above, they are the same as for the standard Slim Cylinder.

## Seals

Note: Seals cannot be replaced.

| Parts   | Rod seal | Lock piston seal | Lock cover gasket |
|---------|----------|------------------|-------------------|
| Bore mm | Quantity | 1                | 1                 |
| 20      | 1        | 1                | 1                 |
| 25      | 1        | 1                | 1                 |
| 32      | —        | 1                | 1                 |
| 40      | —        | 1                | 1                 |
| 50      | —        | 1                | 1                 |
| 63      | —        | 1                | 1                 |

Other than the items listed above, they are the same as for the standard Slim Cylinder.

## Mass

| Bore size mm [in.] | Zero stroke mass        |                 |                     |                        |                 |                     |                 | Additional mass for each 1mm [0.0394in.] stroke | Mass of mounting bracket |                |               |                |                |
|--------------------|-------------------------|-----------------|---------------------|------------------------|-----------------|---------------------|-----------------|---|--------------------------|----------------|---------------|----------------|----------------|
|                    | -HL: Head side end keep |                 |                     | -RL: Rod side end keep |                 |                     |                 |   | Foot bracket             | Flange bracket | Pivot bracket | Y type knuckle | I type knuckle |
|                    | Basic type              | Short head type | Pivot mounting type | Basic type             | Short head type | Pivot mounting type |                 |   |                          |                |               |                |                |
| 20 [0.787]         | 0.16 [0.35]             | 0.15 [0.33]     | —                   | 0.15 [0.33]            | 0.14 [0.31]     | —                   | 0.008 [0.0018]  | 0.14 [0.31]                                     | 0.08 [0.18]              | 0.06 [0.13]    | 0.042 [0.093] | 0.035 [0.077]  |                |
| 25 [0.984]         | 0.21 [0.46]             | 0.20 [0.44]     | —                   | 1.20 [2.65]            | 0.19 [0.42]     | —                   | 0.011 [0.0024]  | 0.16 [0.35]                                     | 0.08 [0.18]              | 0.06 [0.13]    | 0.075 [0.165] | 0.070 [0.154]  |                |
| 32 [1.260]         | 0.35 [0.77]             | 0.33 [0.73]     | —                   | 0.34 [0.75]            | 0.32 [0.71]     | —                   | 0.0015 [0.0033] | 0.19 [0.42]                                     | 0.10 [0.22]              | 0.14 [0.31]    | —             | —              |                |
| 40 [1.575]         | 0.53 [1.17]             | 0.51 [1.12]     | —                   | 0.52 [1.15]            | 0.50 [1.10]     | —                   | 0.0024 [0.0053] | 0.29 [0.64]                                     | 0.13 [0.29]              | 0.14 [0.31]    | —             | —              |                |
| 50 [1.969]         | 0.99 [2.18]             | 0.91 [2.01]     | 0.94 [2.07]         | 0.96 [2.12]            | 0.88 [1.94]     | 0.91 [2.01]         | 0.0028 [0.0062] | 0.55 [1.21]                                     | 0.28 [0.62]              | 0.24 [0.53]    | 0.122 [0.269] | 0.132 [0.291]  |                |
| 63 [2.480]         | 1.32 [2.91]             | 1.26 [2.78]     | 1.28 [2.82]         | 1.29 [2.84]            | 1.22 [2.69]     | 1.25 [2.76]         | 0.0035 [0.0077] | 0.73 [1.61]                                     | 0.37 [0.82]              | 0.24 [0.53]    | —             | —              |                |

Calculation example: For head side end keep foot mounting type of 32mm bore size and 100mm stroke  
 $0.35 + 0.19 + (0.0015 \times 100) = 0.69\text{kg} [1.52\text{lb.}]$

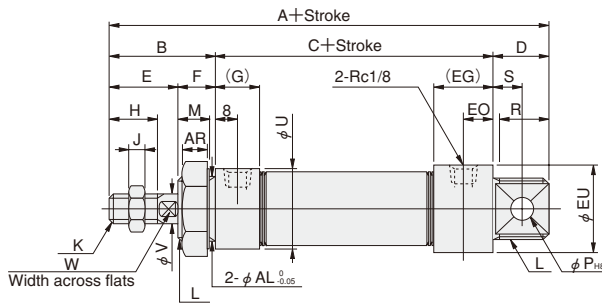
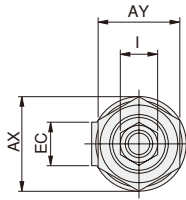
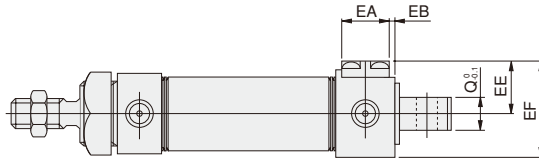
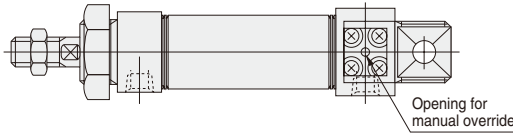
# -HL Dimensions of Head Side End Keep Basic Type (mm)

●  $\phi 20 \sim \phi 40$

DAK Bore size  $\times$  Stroke -HL



DAK Bore size -HL

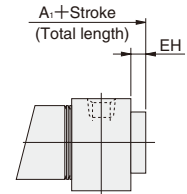


● Short head

DAK Bore size  $\times$  Stroke -A-HL



SLIM-A



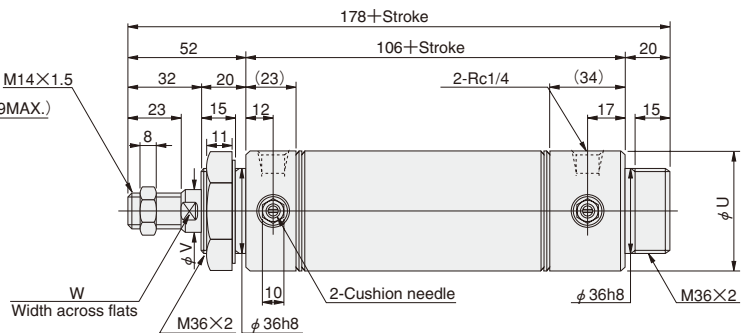
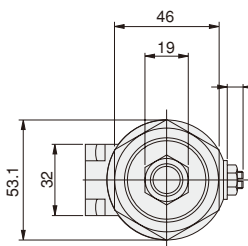
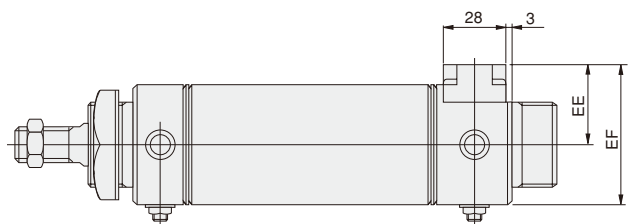
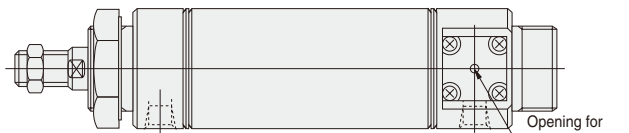
| Bore mm [in.] | Code | A   | A <sub>1</sub> | B  | C  | D  | E  | F  | G  | H  | I  | J | K        | L       | M  | P  | Q  | R  | S  | U    | V  | W  |
|---------------|------|-----|----------------|----|----|----|----|----|----|----|----|---|----------|---------|----|----|----|----|----|------|----|----|
| 20 [0.787]    |      | 132 | 117            | 35 | 76 | 21 | 23 | 12 | 16 | 15 | 12 | 5 | M8×1     | M20×1.5 | 10 | 8  | 12 | 19 | 12 | 27   | 8  | 6  |
| 25 [0.984]    |      | 137 | 122            | 40 | 76 | 21 | 26 | 14 | 16 | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 8  | 12 | 19 | 12 | 29   | 10 | 8  |
| 32 [1.260]    |      | 160 | 134            | 45 | 88 | 27 | 31 | 14 | 16 | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 10 | 20 | 25 | 15 | 35   | 12 | 10 |
| 40 [1.575]    |      | 165 | 139            | 45 | 93 | 27 | 31 | 14 | 15 | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 10 | 20 | 25 | 15 | 41.6 | 16 | 14 |

| Bore mm [in.] | Code | AR  | AX   | AY | AL | EA | EB | EC | EE   | EF   | EG | EH | EO | EU   |
|---------------|------|-----|------|----|----|----|----|----|------|------|----|----|----|------|
| 20 [0.787]    |      | 7.5 | 31.2 | 27 | 20 | 16 | —  | 16 | 17.5 | 32   | 16 | 6  | 8  | 29   |
| 25 [0.984]    |      | 9.5 | 34.6 | 30 | 22 | 16 | —  | 16 | 18.5 | 36   | 16 | 6  | 8  | 35   |
| 32 [1.260]    |      | 9.5 | 41.6 | 36 | 27 | 24 | 2  | 25 | 22.5 | 40.5 | 26 | 1  | 14 | 35   |
| 40 [1.575]    |      | 9.5 | 47.3 | 41 | 33 | 24 | 4  | 25 | 25.5 | 46   | 31 | 1  | 16 | 41.6 |

●  $\phi 50, \phi 63$  DAK Bore size  $\times$  Stroke -HL



DAK Bore size -HL

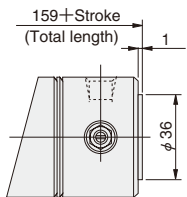


● Short head

DAK Bore size  $\times$  Stroke -A-HL

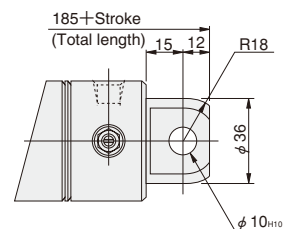
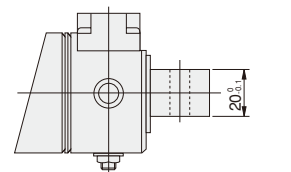


SLIM-A



● Pivot mounting type head

DAK Bore size  $\times$  Stroke -HL-8B



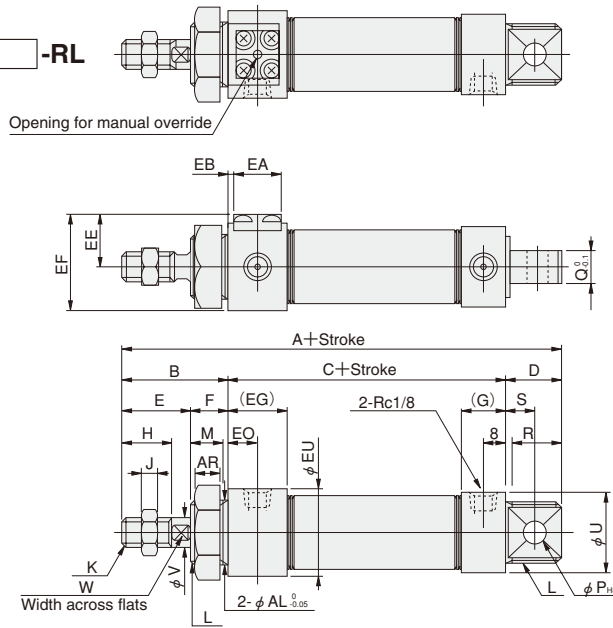
| Bore mm [in.] | Code | U    | V  | W  | EE   | EF   |
|---------------|------|------|----|----|------|------|
| 50 [1.969]    |      | 52   | 16 | 14 | 35.5 | 61.5 |
| 63 [2.480]    |      | 65.4 | 16 | 14 | 35.5 | 68.5 |

# -RL Dimensions of Rod Side End Keep Basic Type (mm)

●  $\phi 20 \sim \phi 40$

DAK Bore size  $\times$  Stroke -RL

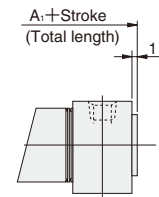
DAK Bore size -RL



● Short head

DAK Bore size  $\times$  Stroke -A-RL

SLIM-A

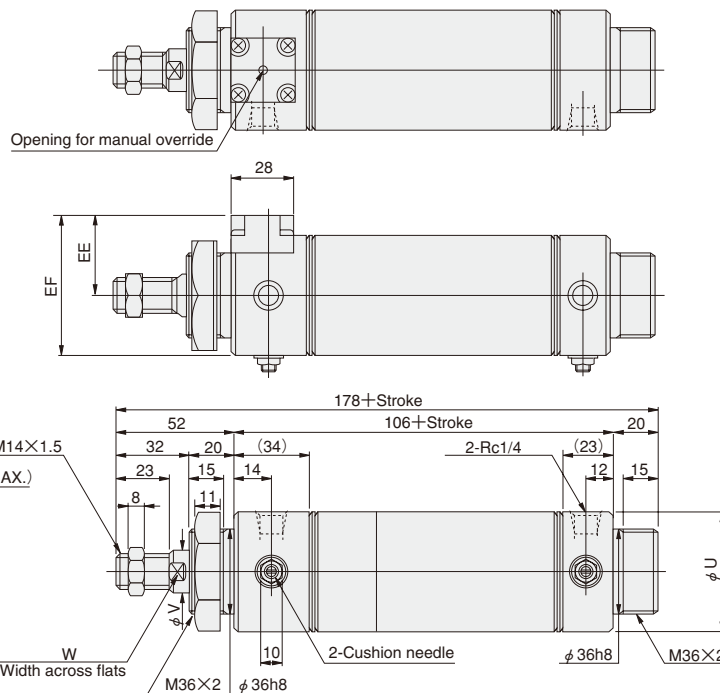


| Bore mm [in.] | Code | A   | A <sub>1</sub> | B  | C  | D  | E  | F  | G  | H  | I  | J | K        | L       | M  | P  | Q  | R  | S  | U    | V  | W  |
|---------------|------|-----|----------------|----|----|----|----|----|----|----|----|---|----------|---------|----|----|----|----|----|------|----|----|
| 20 [0.787]    |      | 132 | 112            | 35 | 76 | 21 | 23 | 12 | 16 | 15 | 12 | 5 | M8×1     | M20×1.5 | 10 | 8  | 12 | 19 | 12 | 27   | 8  | 6  |
| 25 [0.984]    |      | 137 | 117            | 40 | 76 | 21 | 26 | 14 | 16 | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 8  | 12 | 19 | 12 | 29   | 10 | 8  |
| 32 [1.260]    |      | 160 | 134            | 45 | 88 | 27 | 31 | 14 | 16 | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 10 | 20 | 25 | 15 | 35   | 12 | 10 |
| 40 [1.575]    |      | 165 | 139            | 45 | 93 | 27 | 31 | 14 | 15 | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 10 | 20 | 25 | 15 | 41.6 | 16 | 14 |

| Bore mm [in.] | Code | AR  | AX   | AY | AL | EA | EB | EC | EE   | EF   | EG | EO | EU   |
|---------------|------|-----|------|----|----|----|----|----|------|------|----|----|------|
| 20 [0.787]    |      | 7.5 | 31.2 | 27 | 20 | 16 | —  | 16 | 17.5 | 32   | 16 | 8  | 29   |
| 25 [0.984]    |      | 9.5 | 34.6 | 30 | 22 | 16 | —  | 16 | 18.5 | 36   | 16 | 8  | 35   |
| 32 [1.260]    |      | 9.5 | 41.6 | 36 | 27 | 24 | 2  | 25 | 22.5 | 40.5 | 26 | 14 | 35   |
| 40 [1.575]    |      | 9.5 | 47.3 | 41 | 33 | 24 | 4  | 25 | 25.5 | 46   | 31 | 16 | 41.6 |

●  $\phi 50, \phi 63$  DAK Bore size  $\times$  Stroke -RL

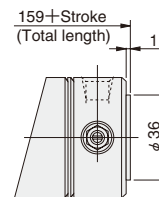
DAK Bore size -RL



● Short head

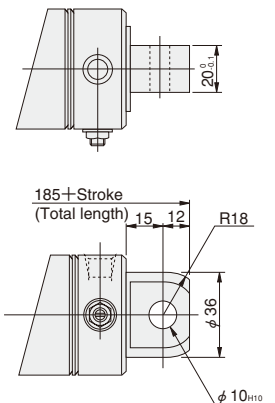
DAK Bore size  $\times$  Stroke -A-RL

SLIM-A



● Pivot mounting type head

DAK Bore size  $\times$  Stroke -RL-8B

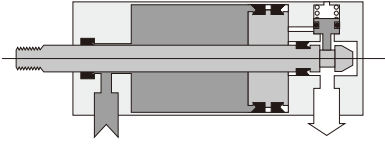


| Bore mm [in.] | Code | U    | V  | W  | EE   | EF   |
|---------------|------|------|----|----|------|------|
| 50 [1.969]    |      | 52   | 16 | 14 | 35.5 | 61.5 |
| 63 [2.480]    |      | 65.4 | 16 | 14 | 35.5 | 68.5 |

# Operating Principle

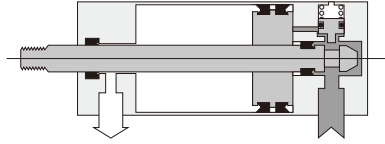
## Keep

When the piston reaches the end of the stroke, and the head side is completely exhausted, spring force causes the lock piston to engage, and automatically keep the end of stroke position.



## Release

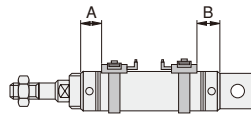
Supplying compressed air to the port on the locking mechanism side pushes up the lock piston and releases the lock. When the lock is released, the by-pass air passage opens to supply compressed air to the piston side.



# Mounting Location of Sensor Switch

When the sensor switch is mounted in the location shown in the diagram (figures in the table are reference values), the magnet comes to the sensor switch's maximum sensing location at the end of the stroke.

● Air cylinder



## ●-HL: Head side end keep

mm [in.]

| Sensor switch model | Bore size<br>Code | Air cylinder  |               |               |               |               |               |
|---------------------|-------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                     |                   | 20<br>[0.787] | 25<br>[0.984] | 32<br>[1.260] | 40<br>[1.575] | 50<br>[1.969] | 63<br>[2.480] |
| ZG530 □             | A                 | 27 [1.063]    | 27 [1.063]    | 27 [1.063]    | 27 [1.063]    | 36 [1.417]    | 36 [1.417]    |
| ZG553 □             | B                 | 27 [1.063]    | 27 [1.063]    | 39 [1.535]    | 44 [1.732]    | 47 [1.850]    | 47 [1.850]    |
| CS □ M              | A                 | 27 [1.063]    | 27 [1.063]    | 27 [1.063]    | 27 [1.063]    | 36 [1.417]    | 36 [1.417]    |
|                     | B                 | 27 [1.063]    | 27 [1.063]    | 39 [1.535]    | 44 [1.732]    | 47 [1.850]    | 47 [1.850]    |
| CS □ F              | A                 | 24 [0.945]    | 24 [0.945]    | 24 [0.945]    | 24 [0.945]    | 34 [1.339]    | 34 [1.339]    |
|                     | B                 | 24 [0.945]    | 24 [0.945]    | 38 [1.496]    | 41 [1.614]    | 46 [1.811]    | 46 [1.811]    |

## ●-RL: Rod side end keep

mm [in.]

| Sensor switch model | Bore size<br>Code | Air cylinder  |               |               |               |               |               |
|---------------------|-------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                     |                   | 20<br>[0.787] | 25<br>[0.984] | 32<br>[1.260] | 40<br>[1.575] | 50<br>[1.969] | 63<br>[2.480] |
| ZG530 □             | A                 | 27 [1.063]    | 27 [1.063]    | 39 [1.535]    | 44 [1.732]    | 47 [1.850]    | 47 [1.850]    |
| ZG553 □             | B                 | 27 [1.063]    | 27 [1.063]    | 27 [1.063]    | 27 [1.063]    | 36 [1.417]    | 36 [1.417]    |
| CS □ M              | A                 | 27 [1.063]    | 27 [1.063]    | 39 [1.535]    | 44 [1.732]    | 47 [1.850]    | 47 [1.850]    |
|                     | B                 | 27 [1.063]    | 27 [1.063]    | 27 [1.063]    | 27 [1.063]    | 36 [1.417]    | 36 [1.417]    |
| CS □ F              | A                 | 24 [0.945]    | 24 [0.945]    | 38 [1.496]    | 41 [1.614]    | 46 [1.811]    | 46 [1.811]    |
|                     | B                 | 24 [0.945]    | 24 [0.945]    | 24 [0.945]    | 24 [0.945]    | 34 [1.339]    | 34 [1.339]    |



## Control circuit

For control of Slim End Keep Cylinders, we recommend the use of 2-position, 4-, 5-port valves. Avoid the use of a control circuit of exhaust centers with 3-position valves or other control circuits that exhaust air from 2 delivery ports.

- Notes:
1. It is dangerous to supply air to a connection port on a side with a locking mechanism while already exhausted, because the piston rod could suddenly extend (or retract). In addition, since it could also cause galling of the lock piston and piston rod, resulting in defective operation. Always supply air to the connection port on the opposite side to ensure that back pressure is applied.
  2. When restarting operations after air has been exhausted from the cylinder due to completion of operations or to an emergency stop, always start by supplying air to the connection port on the opposite side of the locking mechanism.



## Manual operation

While the locking mechanism is normally released automatically through cylinder operations, it can also be released manually. For manual release, insert an M3 × 0.5 (M2.5×0.45 for  $\phi 16$ ) screw that has 30mm [1.18in.] below head length into the opening for manual override, thread it in about 3 turns into the internal lock piston, and then pull up the screw. To maintain the manual override for adjustment, etc., thread the locknut onto the screw and, with the locking mechanism in a released state, tighten the locknut against the cylinder.

- Notes:
1. It is dangerous to release the lock when a load (weight) is present on the piston rod, because it may cause a sudden fall or cause the unintended piston rod's extension (or retraction). In this case, always supply air to the connection port opposite the one adjacent to the locking mechanism before releasing the locking mechanism.
  2. If the locking mechanism cannot easily be released even with manual override, it could be the result of galling of the lock piston and piston rod. In this case, supply air to the connection port opposite the one adjacent to the locking mechanism before releasing the locking mechanism.



## General precautions

### Media

1. Use air for the media. For the use of any other media, consult us.
2. Air used for the cylinder should be clean air that contains no deteriorated compressor oil, etc. Install an air filter (filtration of a minimum 40  $\mu\text{m}$ ) near the cylinder or valve to remove collected liquid or dust. In addition, drain the air filter periodically.  
Collected liquid or dust entering the cylinder may cause improper operation.

### Lubrication

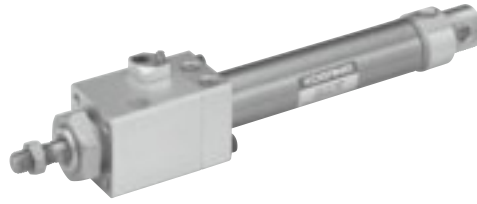
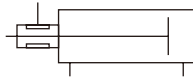
The product can be used without lubrication, if lubrication is required, use Turbine Oil Class 1 (ISO VG32) or equivalent. Avoid using spindle oil or machine oil.

### Atmosphere

1. Because water, oil, dust, etc., entering the opening for manual override may cause defective locks or other erratic operation. If using in locations subject to dripping water, dripping oil etc., or to large amounts of dust, use a cover to protect the unit.
2. The product cannot be used when the media or ambient atmosphere contains any of the substances listed below.  
Organic solvents, phosphate ester type hydraulic oil, sulphur dioxide, chlorine gas, or acids, etc.

# SLIM BRAKE CYLINDERS

## Symbol



## Specifications

| Item                        | Bore size mm [in.]   | 20 [0.787]   | 25 [0.984]                                 | 32 [1.260]                    | 40 [1.575]                    |                               |
|-----------------------------|--|--|--|-------------------------------|-------------------------------|-------------------------------|
| Media                       |  | Air  |  |                               |                               |                               |
| Proof pressure              | MPa [psi.]   | 1.32 [191]   |  |                               |                               |                               |
| Operating temperature range | °C [°F]  | 5~60 [41~140]  |  |                               |                               |                               |
| Operating speed range       | mm/s [in./sec.]  | 50~500 [2.0~19.7]  |  |                               |                               |                               |
| Cylinder section            | Operation type   | Double acting type   |  |                               |                               |                               |
|                             | Mounting type  | Basic type, Foot type, Flange type, Pivot type, Head trunnion type |  |                               |                               |                               |
|                             | Operating pressure range   | MPa [psi.]   | 0.08~0.9 [12~131]                          |                               |                               |                               |
|                             | Cushion  | Fixed type (Rubber bumper)   |  |                               |                               |                               |
|                             | Lubrication  | Not required   |  |                               |                               |                               |
|                             | Port size  | Rc   | 1/8  |                               |                               |                               |
| Brake section               | Operation type   | Spring, spring assisted air pressure type <sup>Note1</sup>         |  |                               |                               |                               |
|                             | Operating pressure range (When air is applied to brake port)             | MPa [psi.]   | 0.3~0.9 [44~131] (0.34~0.5 [49~73])        |                               |                               |                               |
|                             | Lubrication  | Prohibited <sup>Note2</sup>  |  |                               |                               |                               |
|                             | Retaining force (When pneumatic lock is pressurized to 0.4Mpa. [58psi.]) | N [lbf.]   | 156.9 [35.27] (245.2 [55.12])              | 245.2 [55.12] (392.3 [88.19]) | 392.3 [88.19] (617.8 [138.9]) | 617.8 [138.9] (980.7 [220.5]) |
|                             | Allowable kinetic energy of lock   | J [ft-lbf]   | 0.265 [0.195]                              | 0.422 [0.311]                 | 0.696 [0.513]                 | 1.187 [0.875]                 |
|                             | Repeatability (When air is applied to brake port)                        | mm [in.]   | ±1 [0.039] (±0.5 [0.020]) <sup>Note3</sup> |                               |                               |                               |
| Port size                   | Rc   | 1/8  |  |                               |                               |                               |

Notes: 1. The body is for common use. For details, see the Handling Instructions and Precautions on p.369.

2. Do not use lubrication.

3. For the case where cylinder speed is 300mm [11.8in./sec.], pressure is 0.5MPa [73psi.], and the load ratio is 25%. For details, see the Handling Instructions and Precautions on p.369.

## Bore Size and Strokes

| Bore size | Standard strokes                 | Maximum stroke |                      | Maximum available stroke |              |
|-----------|----------------------------------|----------------|----------------------|--------------------------|--------------|
|           |                                  | No bellows     | With bellows         | No bellows               | With bellows |
|           |                                  | 20             | 25 50 75 100 125 150 | 200                      |              |
| 25        | 25 50 75 100 125 150 200         | 250            |                      |                          |              |
| 32        | 25 50 75 100 125 150 200         | 300            |                      |                          |              |
| 40        | 25 50 75 100 125 150 200 250 300 | 400            | 300                  |                          |              |

Remarks: 1. Stroke tolerance  $+1 \begin{smallmatrix} +0.039in. \\ 0 \end{smallmatrix}$

2. For non-standard strokes, consult us.

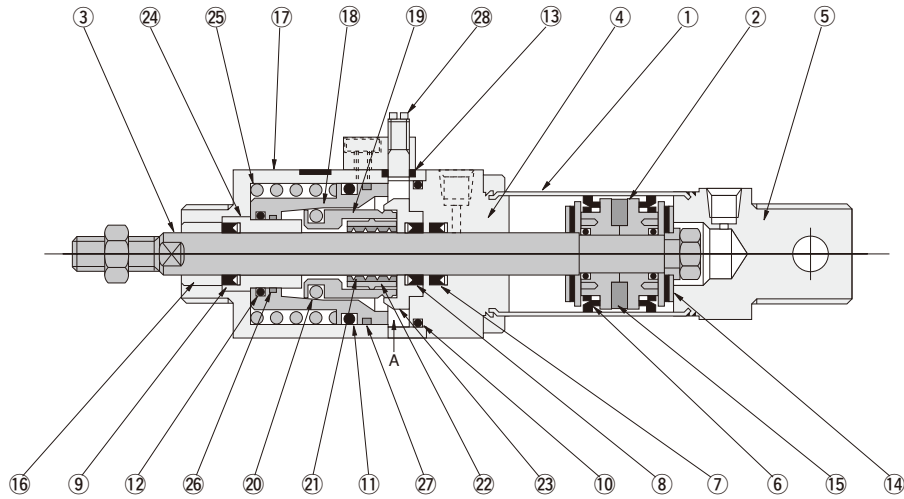
3. The minimum operating pressure when the stroke is over the maximum stroke is 0.2MPa [29psi.].

## Order Codes

**DA** R 20×50 -   -   -   -   -   -   -   -  

**DA** — Slim double acting cylinder  
**R** — Brake cylinder  
20×50 — Bore size × Stroke  
  — Bellows  
**Blank** — No bellows  
**J** — With bellows (Made to order)  
**Blank** — No rod end accessory  
**I** — I type knuckle  
**Y** — Y type knuckle (with pin)  
**●** For the cylinder joint and cylinder rod end, see p.1568.  
**Blank** — Basic type  
**1** — Foot mounting type  
**3** — Flange mounting type  
**8E** — Pivot mounting type with supporting bracket (with pin)  
**11** — Head trunnion type  
**11-11T** — Head trunnion type with supporting bracket  
**●** Mounting brackets are included at shipping.  
**Blank** — Standard head  
**A** — Short head  
**1** — With 1 sensor switch  
**2** — With 2 sensor switches  
**3** — With 3 sensor switches  
**⋮** —   
**A** — 1000mm [39in.]  
**B** — 3000mm [118in.]  
**Blank** — No sensor switch  
**ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
**ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
**CS3M** — Reed switch type with indicator lamp DC10~30V  
**CS4M** — Reed switch type with indicator lamp AC85~230V  
**CS5M** — Reed switch type without indicator lamp DC10~30V  
**CS2F** — Reed switch type with indicator lamp AC85~115V  
**CS3F** — Reed switch type with indicator lamp DC3~30V  
**CS4F** — Reed switch type with indicator lamp AC85~115V  
**CS5F** — Reed switch type without indicator lamp AC85~230V  
**●** For details of sensor switches, see p.1544.  
**● CS□F** comes with DIN connector. All others are grommet type.

# Inner Construction (cannot be disassembled)



The diagram shows the brake release state.

## Major Parts and Materials

| No. | Parts               | Materials   |
|-----|---------------------|---|
| ①   | Cylinder tube       | Stainless steel                                   |
| ②   | Piston              | Plastic   |
| ③   | Piston rod          | Steel (hard chrome plated)                        |
| ④   | Rod cover           | Aluminum (anodized)                               |
| ⑤   | Head cover          |   |
| ⑥   | Piston seal         | Synthetic rubber (NBR)                            |
| ⑦~⑨ | Rod seal            |   |
| ⑩~⑬ | O-ring              |   |
| ⑭   | Bumper              |   |
| ⑮   | Magnet              | Plastic magnet                                    |
| ⑯   | Rod bushing         | Oil impregnated bronze sintered alloy             |
| ⑰   | Brake head          | Aluminum (anodized)                               |
| ⑱   | Brake piston        | Special steel (heat-treated)                      |
| ⑲   | Collet              |   |
| ⑳   | Steel ball          | High carbon steel                                 |
| ㉑   | Brake shoe          | Special brake lining (copper sintered material)   |
| ㉒   | Brake shoe holder   | Special steel (heat-treated)                      |
| ㉓   | Holder              |   |
| ㉔   | Guide               | Aluminum alloy                                    |
| ㉕   | Spring              | Piano wire (zinc plated)                          |
| ㉖~㉗ | Wear ring           | Plastic   |
| ㉘   | Brake release screw | Mild steel (zinc plated)                          |
|     | Bellows             | Nylon tarpaulin (heat resistant temperature 60°C) |

## Operating Principle

### Brake operation

When air is exhausted from chamber A, brake piston ⑱ is moved by spring ㉕ to the right, steel ball ⑳ in contact with the tapered section inside of brake piston ⑱ is pushed to the inner side, and collet ⑲ works as a lever with holder ㉓ and brake shoe holder ㉒ as a pivot point. This action presses brake shoe ㉑ to tighten the piston rod and activate the brake.

### Brake release

When air is supplied to chamber A, brake piston ⑱ moves to the left against spring ㉕, steel ball ⑳ is separated from the tapered section inside of brake piston ⑱, and collet ⑲ expands and brake shoe ㉑ spreads to release the piston rod and disengage the brake.

## Seals

Note: Seals cannot be replaced.

| Parts     | Rod seal ⑦~⑨ | Piston seal ⑥ | O-ring ⑩ | O-ring ⑪ | O-ring ⑫ | O-ring ⑬ |
|-----------|--------------|---------------|----------|----------|----------|----------|
| Quantity  | 3            | 2             | 1        | 1        | 1        | 1        |
| <b>20</b> | NY-12×8×3.5  | PPY-20        | L090102  | P21      | P12      | P5       |
| <b>25</b> | NY-14×10×3.5 | PPY-25        | S26      | P24      | P14      | P5       |
| <b>32</b> | NY-17×12×4   | PPY-32        | S34      | P32      | P18      | P6       |
| <b>40</b> | NY-22×16×5   | PPY-40        | S42      | P40      | P22      | P6       |

## Mass

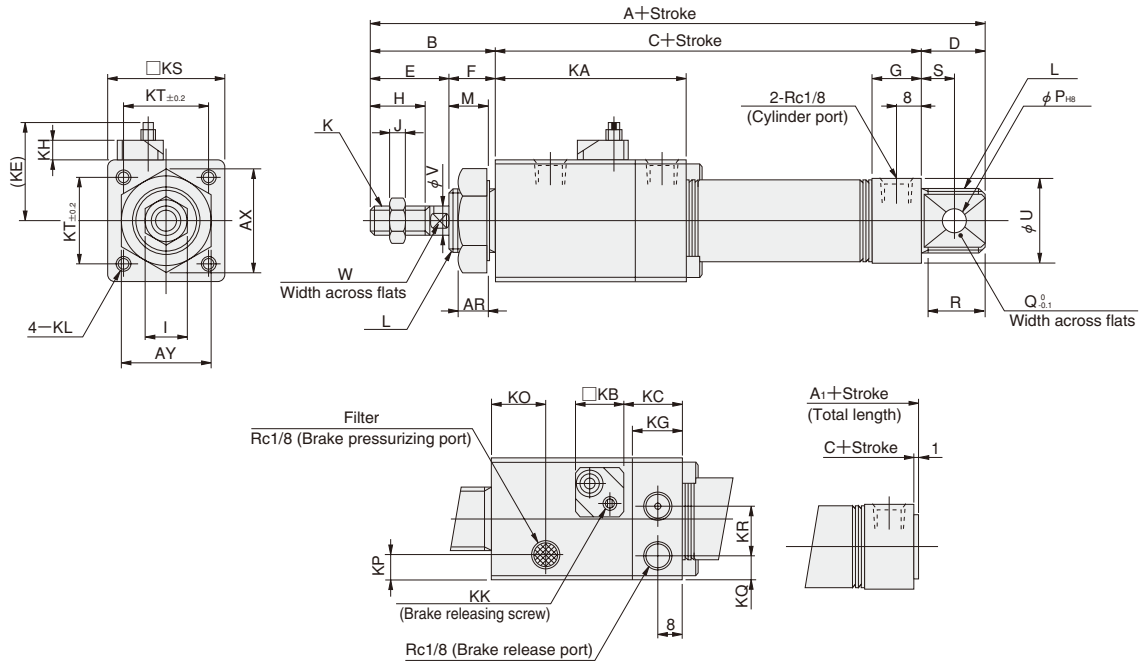
| Bore size mm [in.] | Zero stroke mass   |                 |               | Additional mass for each 1mm [0.0394in.] stroke | Mass of mounting bracket |                      |                      |
|--------------------|--------------------|-----------------|---------------|---|--------------------------|----------------------|----------------------|
|                    | Standard head type | Short head type | Trunnion type |   | Foot mounting type       | Flange mounting type | Clevis mounting type |
| <b>20 [0.787]</b>  | 0.37 [0.82]        | 0.36 [0.79]     | 0.56 [1.23]   | 0.0008 [0.0018]                                 | 0.14 [0.31]              | 0.08 [0.18]          | 0.06 [0.13]          |
| <b>25 [0.984]</b>  | 0.54 [1.19]        | 0.53 [1.17]     | 0.72 [1.59]   | 0.0011 [0.0024]                                 | 0.16 [0.35]              | 0.08 [0.18]          | 0.06 [0.13]          |
| <b>32 [1.260]</b>  | 0.84 [1.85]        | 0.82 [1.81]     | 1.01 [2.23]   | 0.0015 [0.0033]                                 | 0.19 [0.42]              | 0.10 [0.22]          | 0.14 [0.31]          |
| <b>40 [1.575]</b>  | 1.30 [2.87]        | 1.28 [2.82]     | 1.48 [3.26]   | 0.0024 [0.0053]                                 | 0.29 [0.64]              | 0.13 [0.29]          | 0.14 [0.31]          |

kg [lb.]

# Dimensions of Brake Cylinder Basic Type (mm)

DAR Bore size × Stroke

CAD DAR- Bore size



Brake head section

● Short head

DAR Bore size × Stroke -A

CAD SLIM-A

| Bore<br>mm [in.] | Code    | A   | A <sub>1</sub> | B  | C   | D  | E  | F  | G      | H  | I  | J | K        | L       | M  | P  | Q  | R  | S  | U    | V  | W  | AR  | AX   | AY |
|------------------|---------|-----|----------------|----|-----|----|----|----|--------|----|----|---|----------|---------|----|----|----|----|----|------|----|----|-----|------|----|
| 20               | [0.787] | 175 | 155            | 35 | 119 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M8×1     | M20×1.5 | 10 | 8  | 12 | 19 | 12 | 27   | 8  | 6  | 7.5 | 31.2 | 27 |
| 25               | [0.984] | 184 | 164            | 40 | 123 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 8  | 12 | 19 | 12 | 29   | 10 | 8  | 9.5 | 34.6 | 30 |
| 32               | [1.260] | 202 | 176            | 45 | 130 | 27 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 10 | 20 | 25 | 15 | 35   | 12 | 10 | 9.5 | 41.6 | 36 |
| 40               | [1.575] | 217 | 191            | 45 | 145 | 27 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 10 | 20 | 25 | 15 | 41.6 | 16 | 14 | 9.5 | 47.3 | 41 |

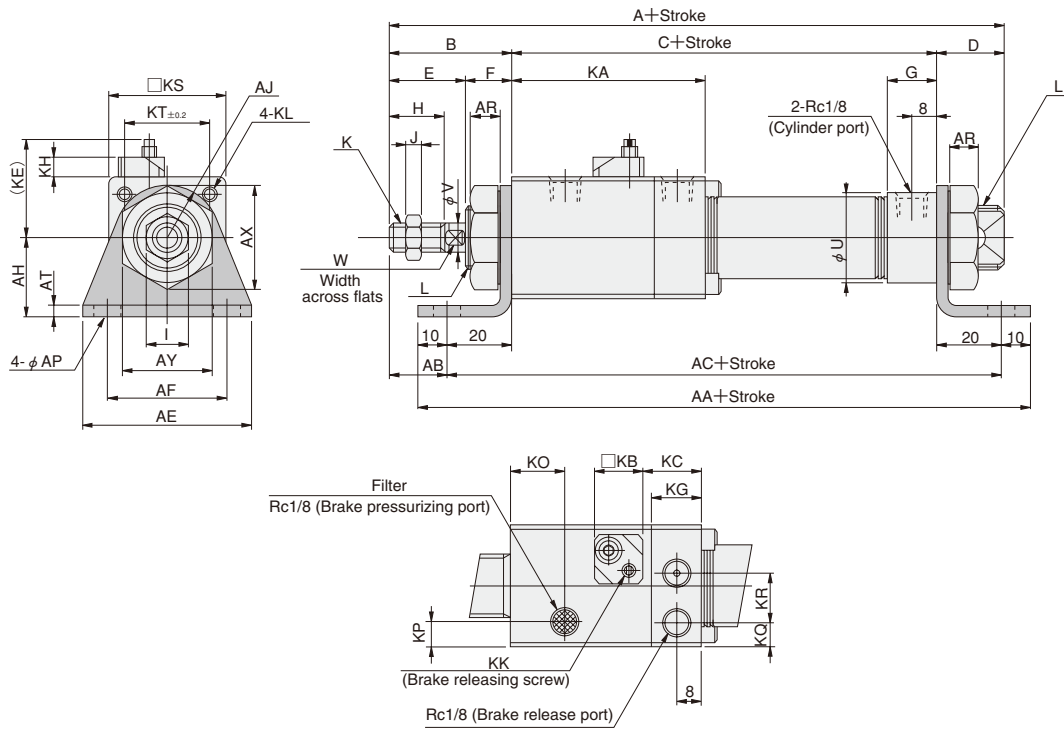
| Bore<br>mm [in.] | Code    | KA | KB | KC   | KE | KG | KH  | (KK)   | KL            | KO   | KP | KQ   | KR   | KS | KT |
|------------------|---------|----|----|------|----|----|-----|--------|---------------|------|----|------|------|----|----|
| 20               | [0.787] | 59 | 16 | 19   | 29 | 16 | 6.5 | M5×0.8 | M5×0.8 Depth7 | 16.5 | 7  | 7    | 14.5 | 35 | 26 |
| 25               | [0.984] | 63 | 16 | 19.5 | 32 | 16 | 6.5 | M5×0.8 | M5×0.8 Depth9 | 18   | 8  | 8    | 16   | 40 | 28 |
| 32               | [1.260] | 70 | 20 | 19   | 38 | 16 | 9   | M6×1   | M5×0.8 Depth9 | 23   | 8  | 14.5 | 16   | 45 | 34 |
| 40               | [1.575] | 83 | 20 | 20   | 40 | 16 | 9   | M6×1   | M6×1 Depth10  | 27   | 9  | 18   | 16   | 52 | 40 |



# Dimensions of Brake Cylinder Foot Mounting Type (mm)

DAR Bore size × Stroke -1

CAD DAR- Bore size SLIM-F01



Brake head section

SLIM CYLINDERS

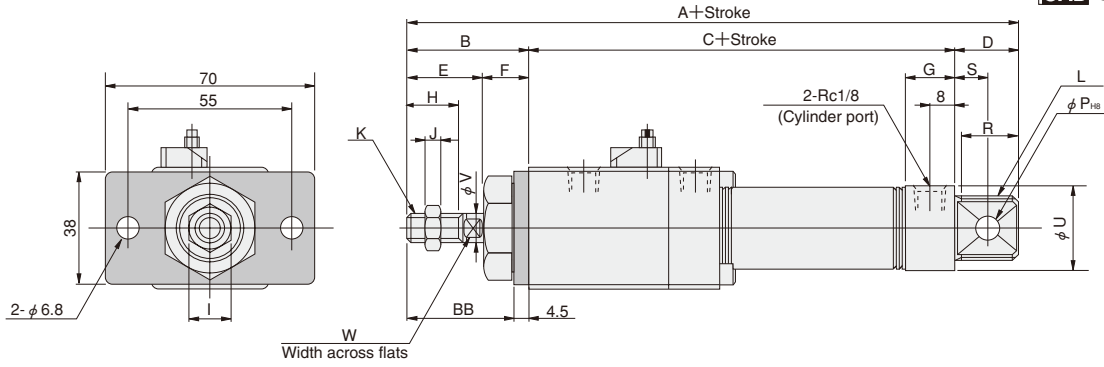
| Bore mm [in.] | Code    | A   | B  | C   | D  | E  | F  | G      | H  | I  | J | K        | L       | U    | V  | W  |
|---------------|---------|-----|----|-----|----|----|----|--------|----|----|---|----------|---------|------|----|----|
| 20            | [0.787] | 175 | 35 | 119 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M8×1     | M20×1.5 | 27   | 8  | 6  |
| 25            | [0.984] | 184 | 40 | 123 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 29   | 10 | 8  |
| 32            | [1.260] | 202 | 45 | 130 | 27 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 35   | 12 | 10 |
| 40            | [1.575] | 217 | 45 | 145 | 27 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 41.6 | 16 | 14 |

| Bore mm [in.] | Code    | KA | KB | KC   | KE | KG | KH  | (KK)   | KL            | KO   | KP | KQ   | KR   | KS | KT |
|---------------|---------|----|----|------|----|----|-----|--------|---------------|------|----|------|------|----|----|
| 20            | [0.787] | 59 | 16 | 19   | 29 | 16 | 6.5 | M5×0.8 | M5×0.8 Depth7 | 16.5 | 7  | 7    | 14.5 | 35 | 26 |
| 25            | [0.984] | 63 | 16 | 19.5 | 32 | 16 | 6.5 | M5×0.8 | M5×0.8 Depth9 | 18   | 8  | 8    | 16   | 40 | 28 |
| 32            | [1.260] | 70 | 20 | 19   | 38 | 16 | 9   | M6×1   | M5×0.8 Depth9 | 23   | 8  | 14.5 | 16   | 45 | 34 |
| 40            | [1.575] | 83 | 20 | 20   | 40 | 16 | 9   | M6×1   | M6×1 Depth10  | 27   | 9  | 18   | 16   | 52 | 40 |

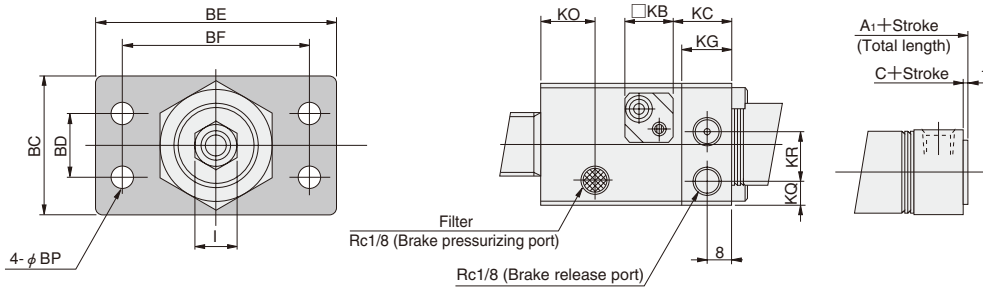
| Bore mm [in.] | Code    | AA  | AB | AC  | AE | AF | AH | AJ   | AP  | AR  | AT  | AX   | AY |
|---------------|---------|-----|----|-----|----|----|----|------|-----|-----|-----|------|----|
| 20            | [0.787] | 179 | 15 | 159 | 55 | 40 | 25 | 15.5 | 6.8 | 7.5 | 3.2 | 31.2 | 27 |
| 25            | [0.984] | 183 | 20 | 163 | 55 | 40 | 30 | 17   | 6.8 | 9.5 | 3.2 | 34.6 | 30 |
| 32            | [1.260] | 190 | 25 | 170 | 55 | 40 | 35 | 20   | 6.8 | 9.5 | 3.2 | 41.6 | 36 |
| 40            | [1.575] | 205 | 25 | 185 | 75 | 55 | 40 | 23.5 | 9   | 9.5 | 4   | 47.3 | 41 |

# Dimensions of Brake Cylinder Flange Mounting Type (mm)

●  $\phi 20 \sim \phi 25$  DAR Bore size  $\times$  Stroke -3



●  $\phi 32 \sim \phi 40$



Brake head section ● Short head

DAR Bore size  $\times$  Stroke -A-3



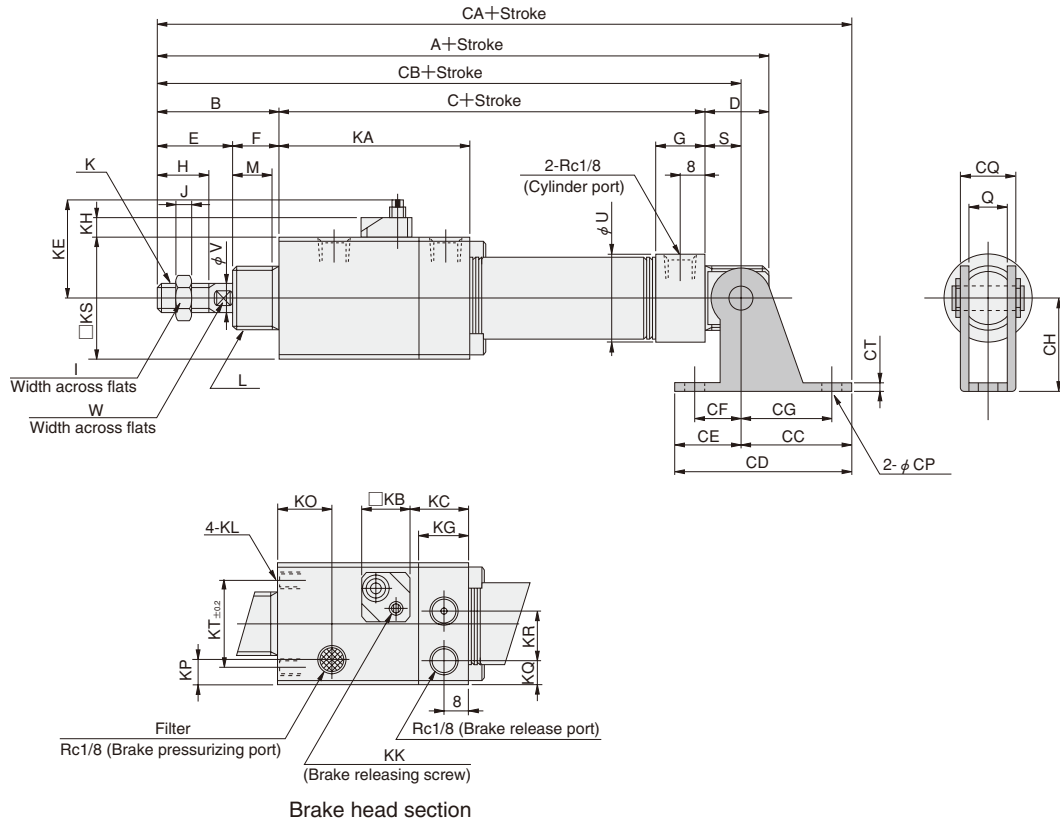
| Bore<br>mm [in.] | Code    | A   | A <sub>1</sub> | B  | C   | D  | E  | F  | G      | H  | I  | J | K        | L       | P  | R  | S  | U    | V  | W  |
|------------------|---------|-----|----------------|----|-----|----|----|----|--------|----|----|---|----------|---------|----|----|----|------|----|----|
| 20               | [0.787] | 175 | 155            | 35 | 119 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M8×1     | M20×1.5 | 8  | 19 | 12 | 27   | 8  | 6  |
| 25               | [0.984] | 184 | 164            | 40 | 123 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 8  | 19 | 12 | 29   | 10 | 8  |
| 32               | [1.260] | 202 | 176            | 45 | 130 | 27 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 10 | 25 | 15 | 35   | 12 | 10 |
| 40               | [1.575] | 217 | 191            | 45 | 145 | 27 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 10 | 25 | 15 | 41.6 | 16 | 14 |

| Bore<br>mm [in.] | Code    | BB   | BC | BD | BE  | BF | BP  | KQ   | KR   | KO   | KB | KC   | KG |
|------------------|---------|------|----|----|-----|----|-----|------|------|------|----|------|----|
| 20               | [0.787] | 30.5 | —  | —  | —   | —  | —   | 7    | 14.5 | 16.5 | 16 | 19   | 16 |
| 25               | [0.984] | 35.5 | —  | —  | —   | —  | —   | 8    | 16   | 18   | 16 | 19.5 | 16 |
| 32               | [1.260] | 40.5 | 45 | 20 | 80  | 60 | 6.8 | 14.5 | 16   | 23   | 20 | 19   | 16 |
| 40               | [1.575] | 40.5 | 50 | 30 | 100 | 80 | 9   | 18   | 16   | 27   | 20 | 20   | 16 |

# Dimensions of Brake Cylinder Pivot Mounting Type (mm)

DAR Bore size  $\times$  Stroke -8E

CAD DAR- Bore size SLIM-CL7



| Bore mm [in.] | Code    | A   | B  | C   | D  | E  | F  | G      | H  | I  | J | K        | L       | M  | Q  | S  | U    | V  | W  |
|---------------|---------|-----|----|-----|----|----|----|--------|----|----|---|----------|---------|----|----|----|------|----|----|
| 20            | [0.787] | 175 | 35 | 119 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M8×1     | M20×1.5 | 10 | 12 | 12 | 27   | 8  | 6  |
| 25            | [0.984] | 184 | 40 | 123 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 12 | 12 | 29   | 10 | 8  |
| 32            | [1.260] | 202 | 45 | 130 | 27 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 20 | 15 | 35   | 12 | 10 |
| 40            | [1.575] | 217 | 45 | 145 | 27 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 20 | 15 | 41.6 | 16 | 14 |

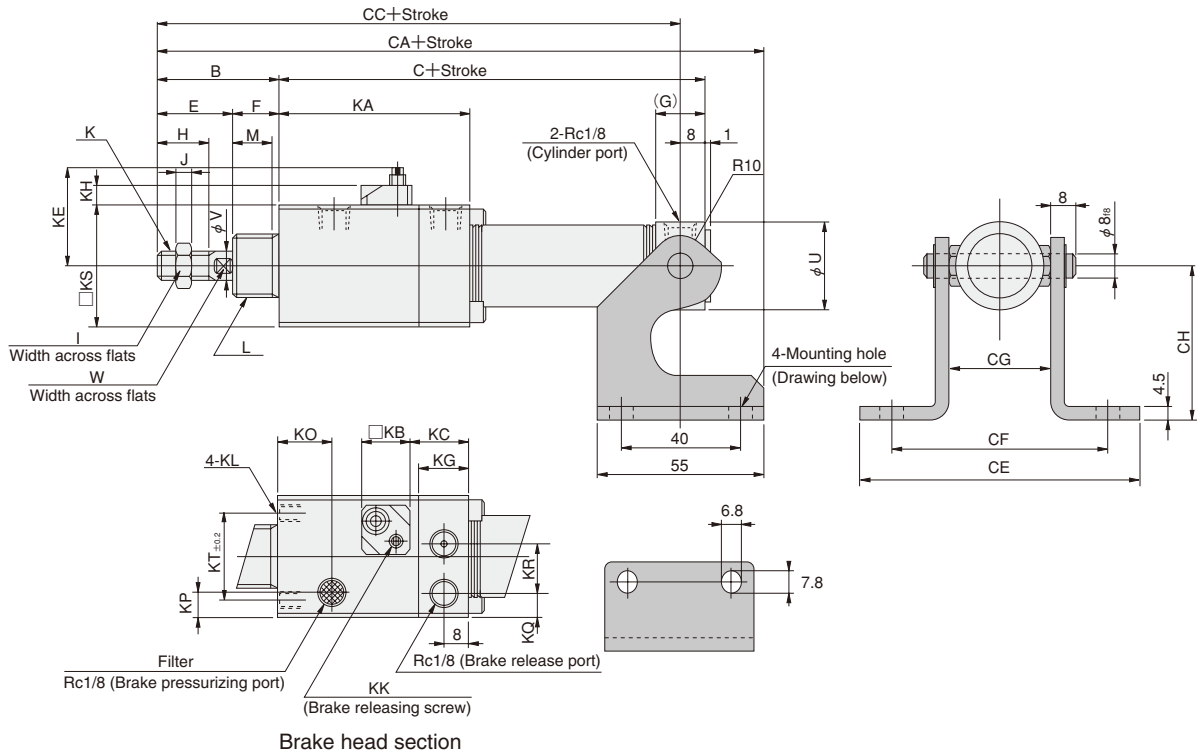
| Bore mm [in.] | Code    | KA | KB | KC   | KE | KG | KH  | (KK)   | KL            | KO   | KP | KQ   | KR   | KS | KT |
|---------------|---------|----|----|------|----|----|-----|--------|---------------|------|----|------|------|----|----|
| 20            | [0.787] | 59 | 16 | 19   | 29 | 16 | 6.5 | M5×0.8 | M5×0.8 Depth7 | 16.5 | 7  | 7    | 14.5 | 35 | 26 |
| 25            | [0.984] | 63 | 16 | 19.5 | 32 | 16 | 6.5 | M5×0.8 | M5×0.8 Depth9 | 18   | 8  | 8    | 16   | 40 | 28 |
| 32            | [1.260] | 70 | 20 | 19   | 38 | 16 | 9   | M6×1   | M5×0.8 Depth9 | 23   | 8  | 14.5 | 16   | 45 | 34 |
| 40            | [1.575] | 83 | 20 | 20   | 40 | 16 | 9   | M6×1   | M6×1 Depth10  | 27   | 9  | 18   | 16   | 52 | 40 |

| Bore mm [in.] | Code    | CA  | CB  | CC | CD | CE | CF | CG | CH | CP  | CQ   | CT  |
|---------------|---------|-----|-----|----|----|----|----|----|----|-----|------|-----|
| 20            | [0.787] | 203 | 166 | 37 | 59 | 22 | 15 | 30 | 30 | 6.8 | 18.4 | 3.2 |
| 25            | [0.984] | 212 | 175 | 37 | 59 | 22 | 15 | 30 | 30 | 6.8 | 18.4 | 3.2 |
| 32            | [1.260] | 240 | 190 | 50 | 75 | 25 | 15 | 40 | 40 | 9   | 28   | 4   |
| 40            | [1.575] | 255 | 205 | 50 | 75 | 25 | 15 | 40 | 40 | 9   | 28   | 4   |

SLIM CYLINDERS

# Dimensions of Brake Cylinder Head Trunnion Type (mm)

DAR Bore size × Stroke -11-11T



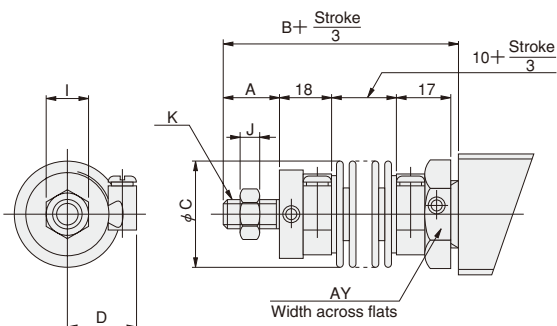
Brake head section

| Bore mm [in.] | Code    | B  | C   | E  | F  | G      | H  | I  | J | K        | L       | M  | U    | V  | W  |
|---------------|---------|----|-----|----|----|--------|----|----|---|----------|---------|----|------|----|----|
| 20            | [0.787] | 35 | 119 | 23 | 12 | 16     | 15 | 12 | 5 | M8×1     | M20×1.5 | 10 | 27   | 8  | 6  |
| 25            | [0.984] | 40 | 123 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 29   | 10 | 8  |
| 32            | [1.260] | 45 | 130 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 35   | 12 | 10 |
| 40            | [1.575] | 45 | 145 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 41.6 | 16 | 14 |

| Bore mm [in.] | Code    | KA | KB | KC   | KE | KG | KH  | (KK)   | KL            | KO   | KP | KQ   | KR   | KS | KT |
|---------------|---------|----|----|------|----|----|-----|--------|---------------|------|----|------|------|----|----|
| 20            | [0.787] | 59 | 16 | 19   | 29 | 16 | 6.5 | M5×0.8 | M5×0.8 Depth7 | 16.5 | 7  | 7    | 14.5 | 35 | 26 |
| 25            | [0.984] | 63 | 16 | 19.5 | 32 | 16 | 6.5 | M5×0.8 | M5×0.8 Depth9 | 18   | 8  | 8    | 16   | 40 | 28 |
| 32            | [1.260] | 70 | 20 | 19   | 38 | 16 | 9   | M6×1   | M5×0.8 Depth9 | 23   | 8  | 14.5 | 16   | 45 | 34 |
| 40            | [1.575] | 83 | 20 | 20   | 40 | 16 | 9   | M6×1   | M6×1 Depth10  | 27   | 9  | 18   | 16   | 52 | 40 |

| Bore mm [in.] | Code    | CA    | CE  | CF | CG | CH | CC  |
|---------------|---------|-------|-----|----|----|----|-----|
| 20            | [0.787] | 173.5 | 92  | 72 | 32 | 50 | 146 |
| 25            | [0.984] | 182.5 | 94  | 74 | 34 | 50 | 155 |
| 32            | [1.260] | 194.5 | 100 | 80 | 40 | 50 | 167 |
| 40            | [1.575] | 209.5 | 107 | 87 | 47 | 50 | 182 |

# Dimensions of Brake Cylinder with Bellows (mm)



| Bore mm [in.] | Code    | A  | B  | C  | D  | AY | I  | J | K        |
|---------------|---------|----|----|----|----|----|----|---|----------|
| 20            | [0.787] | 15 | 63 | 35 | 23 | 27 | 12 | 5 | M8×1     |
| 25            | [0.984] | 18 | 66 | 35 | 23 | 30 | 14 | 6 | M10×1.25 |
| 32            | [1.260] | 23 | 71 | 40 | 26 | 36 | 14 | 6 | M10×1.25 |
| 40            | [1.575] | 23 | 71 | 48 | 29 | 41 | 19 | 8 | M14×1.5  |



## Mounting and piping

### Control circuit

#### Electric control

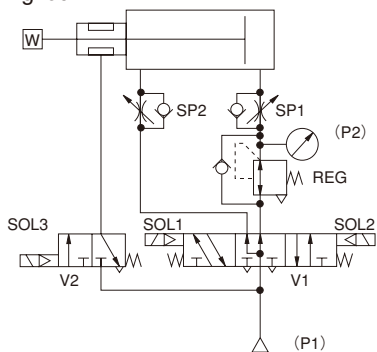
When using a sequencer for control, the scanning time of the sequencer will affect the stopping position error. To improve the stopping position accuracy, use a TTL circuit, etc., to directly control the signal from the cylinder's sensor switch, and operate the valve.

#### Pneumatic circuit

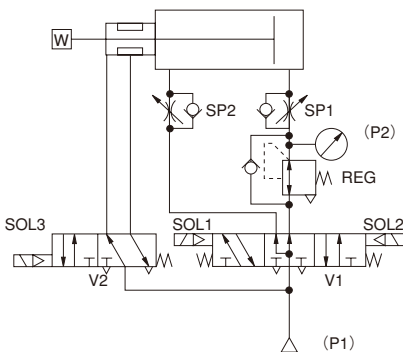
- To achieve a balance with the load, and a balance of differences in rod diameter area, always use a regulator with check valve. Regulators we recommend include the F.R.L. multi series **R152**, the manifold regulator **MR102**, or the solenoid valve 180 series sub-base regulator -54 (for single unit order code: **M020014**).
- For the cylinder control solenoid valve (V1), use a pressure center type 3-position solenoid valve (**113-4E2-14**, **183-4E2-14**), etc.
- Install the solenoid valve for brake (V2) as close to the cylinder as possible. Moreover, using a DC current solenoid valve will improve response (repeatability).

#### Standard circuit

##### ● Horizontal mounting Spring lock



##### Spring assisted air pressure lock



#### Regulator pressure setting

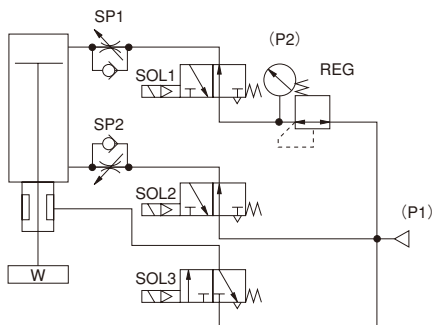
$$P2 = \frac{D^2 - d^2}{D^2} \cdot P1$$

D : Cylinder bore (mm)  
d : Rod diameter (mm)  
P1 : Supply pressure (MPa)

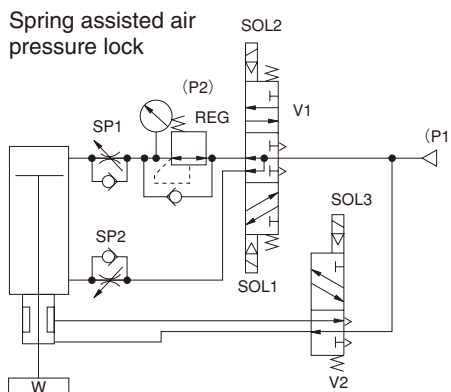
$$P2' = \frac{D'^2 - d'^2}{D'^2} \cdot P1'$$

D' : Cylinder bore [in.]  
d' : Rod diameter [in.]  
P1' : Supply pressure [psi.]

##### ● Vertical mounting Spring lock



##### Spring assisted air pressure lock



#### Regulator pressure setting

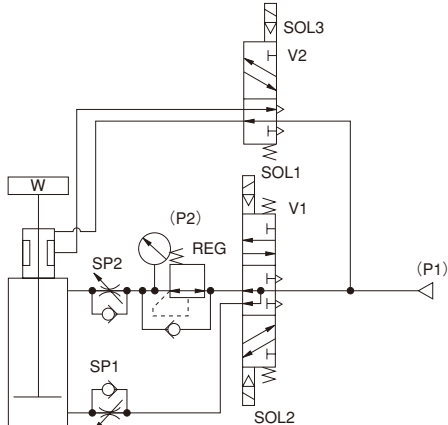
$$P2 = \frac{\pi (D^2 - d^2) P1 - 4W}{\pi \cdot D^2}$$

D : Cylinder bore (mm)  
d : Rod diameter (mm)  
P1 : Supply pressure (MPa)  
W : Load (N)

$$P2' = \frac{\pi (D'^2 - d'^2) P1' - 4W'}{\pi \cdot D'^2}$$

D' : Cylinder bore [in.]  
d' : Rod diameter [in.]  
P1' : Supply pressure [psi.]  
W' : Load [lbf]

##### ● Vertical mounting (push up) spring assisted air pressure lock



#### Regulator pressure setting

$$P2 = \frac{\pi \cdot D^2 \cdot P1 - 4W}{\pi (D^2 - d^2)}$$

D : Cylinder bore (mm)  
d : Rod diameter (mm)  
P : Supply pressure (MPa)  
W : Load (N)

$$P2' = \frac{\pi \cdot D'^2 \cdot P1' - 4W'}{\pi (D'^2 - d'^2)}$$

D' : Cylinder bore [in.]  
d' : Rod diameter [in.]  
P' : Supply pressure [psi.]  
W' : Load [lbf]

Solenoid ON, OFF switching sequence  
(same for all applications)

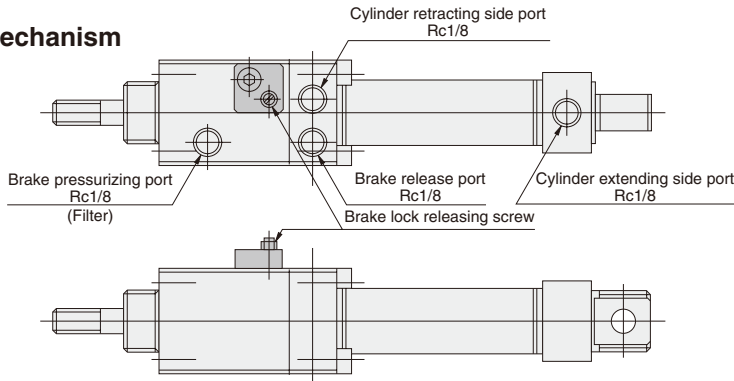
| Valve<br>Operating status | V1   |      |      | V2 |
|---------------------------|------|------|------|----|
|                           | SOL1 | SOL2 | SOL3 |    |
| Intermediate stop         | OFF  | OFF  | OFF  |    |
| Extend                    | OFF  | ON   | ON   |    |
| Retract                   | ON   | OFF  | ON   |    |

# Handling Instructions and Precautions



## Mounting and piping

### Brake mechanism



### Manual operation

- **Brake release**  
Apply 0.3~0.9MPa [44~131psi.] air pressure to the brake release port, then use a small screwdriver, etc., to thread the brake lock releasing screw in the clockwise direction until the screw thread disappears.
- **Brake operation**  
To again operate the brake, apply 0.3~0.9MPa [44~131psi.] air pressure to the brake release port, then use a small screwdriver, etc., to return the brake lock releasing screw in the counterclockwise direction until the screw comes to a stop.
- **Brake release**  
For safety, the brake lock releasing screw is designed to be immovable if no air has been applied to the brake release port.

### Spring assisted air pressure lock

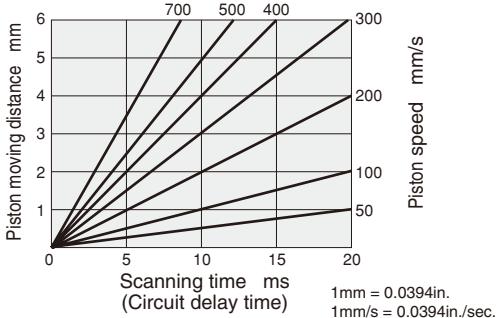
- To increase the holding force, use a screwdriver, etc., to remove the filter on the brake pressurizing port and use it as a connection port for spring assisted air pressure type brake.
- While using a spring assisted air pressure brake will approximately double the holding force, too much pressure on the brake pressurizing port could reduce the durability of the brake mechanism. For this reason, always maintain air pressure in the pressurizing port within a range of 0.34~0.50MPa [49~73psi.] when using a 4 way valve to switch between the brake release port and the pressurizing port.

### Stopping position accuracy

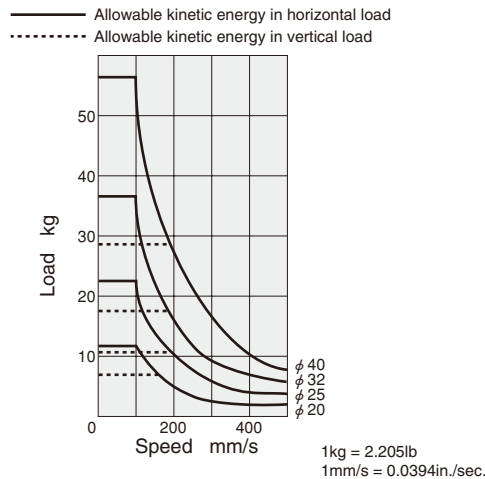
1. Stopping position accuracy (repeatability) shown in the specifications table is for initial conditions. This can change over time as the piston rod grease deteriorates, and as wear on the brake shoe and piston rod progresses.
2. The stopping position accuracy can vary in accordance with cylinder speed, control circuit delay time (sequencer scanning time, etc.), fluctuation in brake valve (V2) operating time, piping length, and piping diameter, etc.
3. To improve the stopping position accuracy, install a pressure reducing valve to ensure there are no pressure fluctuations in the media.
4. Use the brake cylinder within the allowable kinetic energy range.

● Fluctuations in cylinder stopping time arising during the sequencer's scanning time (or circuit operating time).

● Allowable kinetic energy when locked



- Examples: 1. A brake cylinder operated at a scanning time of 10ms (which will vary according to the sequencer and the number of program steps) and a cylinder speed of 300mm/s [11.8in./sec.] will cause a fluctuation of 3mm [0.118in.].
2. When 10ms is required for the response time of relays, etc., at least 3mm [0.118in.] of operating distance is required for the sensor. (When the cylinder speed is 300mm/s [11.8 in./sec.]



Note: Use the brake cylinder within the allowable kinetic energy range.

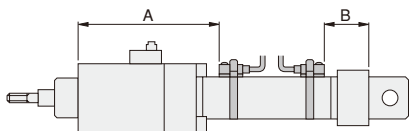
## Handling Instructions and Precautions



### Sensor switch mounting location

For moving sensor switch, see p.419.

Since dimensions for the mounting location will vary, see the table below.



#### ● Mounting location of end of stroke detection sensor switch

| Sensor switch model | Bore size mm [in.] | 20         | 25         | 32         | 40         |
|---------------------|--------------------|------------|------------|------------|------------|
|                     |                    | [0.787]    | [0.984]    | [1.260]    | [1.575]    |
| ZG530□              | A                  | 70 [2.756] | 74 [2.913] | 81 [3.189] | 95 [3.740] |
|                     | B                  | 27 [1.063] | 27 [1.063] | 27 [1.063] | 27 [1.063] |
| ZG553□              | A                  | 70 [2.756] | 74 [2.913] | 81 [3.189] | 95 [3.740] |
|                     | B                  | 27 [1.063] | 27 [1.063] | 27 [1.063] | 27 [1.063] |
| CS□M                | A                  | 70 [2.756] | 74 [2.913] | 81 [3.189] | 95 [3.740] |
|                     | B                  | 27 [1.063] | 27 [1.063] | 27 [1.063] | 27 [1.063] |
| CS□F                | A                  | 65 [2.559] | 69 [2.717] | 76 [2.992] | 90 [3.543] |
|                     | B                  | 22 [0.866] | 22 [0.866] | 22 [0.866] | 22 [0.866] |



### General precautions

#### Media

1. Air used in the brake cylinder should be clean air that contains no lubrication. Use of lubrication or humidified air could cause the grease inside the braking mechanism to wash out, which could later result in rapid wear on the braking mechanism caused by the consequent shortage of lubrication, etc.
2. Air used for the cylinder should be clean air that contains no deteriorated compressor oil, etc. Install an air filter (filtration of a minimum 40 μm) near the cylinder or valve to remove collected liquid or dust. In addition, drain the air filter periodically. Collected liquid or dust entering the cylinder may cause improper operation.

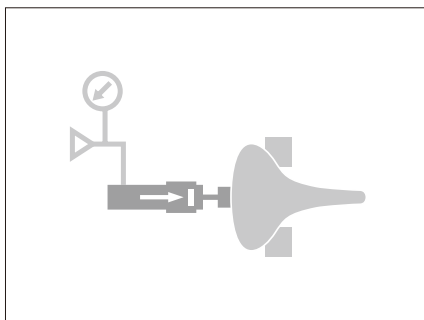
#### Maintenance

If the above basic precautions are observed, the brake cylinder can be used maintenance-free for a long period of time.

#### Atmosphere

1. If using in locations subject to dripping water, dripping oil, etc., or to large amounts of dust, use a cover to protect the unit.
2. The product cannot be used when the media or ambient atmosphere contains any of the substances listed below.  
Organic solvents, phosphate ester type hydraulic oil, sulphur dioxide, chlorine gas, or acids, etc.

## Application Examples

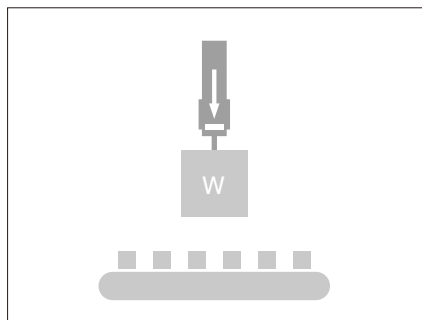


#### The piston rod locking

Use low pressure to press down cathode-ray tubes, etc., and then lock.

[To hold in place glass products, plastic, and other easily deformable items.]

- Cathode-ray tube manufacturing line
- Injection machine peripheral devices
- Tire production line

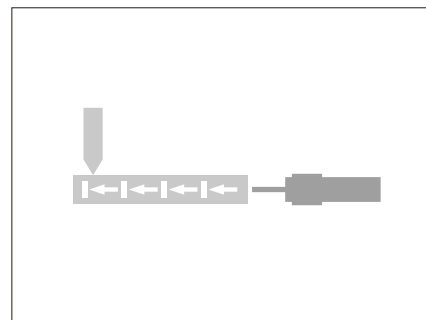


#### Prevention of falls in intermediate positions

The load is locked in place to prevent damage to work, etc., even when air pressure drops suddenly due to power failures, etc.

[Used for working operations which are set in intermediate positions.]

- Pick and place
- FMS (multi-item, small-lot production) conveyor line
- Automatic packaging machine



#### Multi-point operations

Spot welding at multiple points.

#### Workpiece switching

Select the products, and classify into several categories.

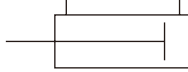
#### Fixture replacement

Move fixture to desired device.

- Spot welding machine
- Metal mold exchange
- Automatic chuck exchange

# SLIM BLOCK CYLINDERS

## Symbol



## Specifications

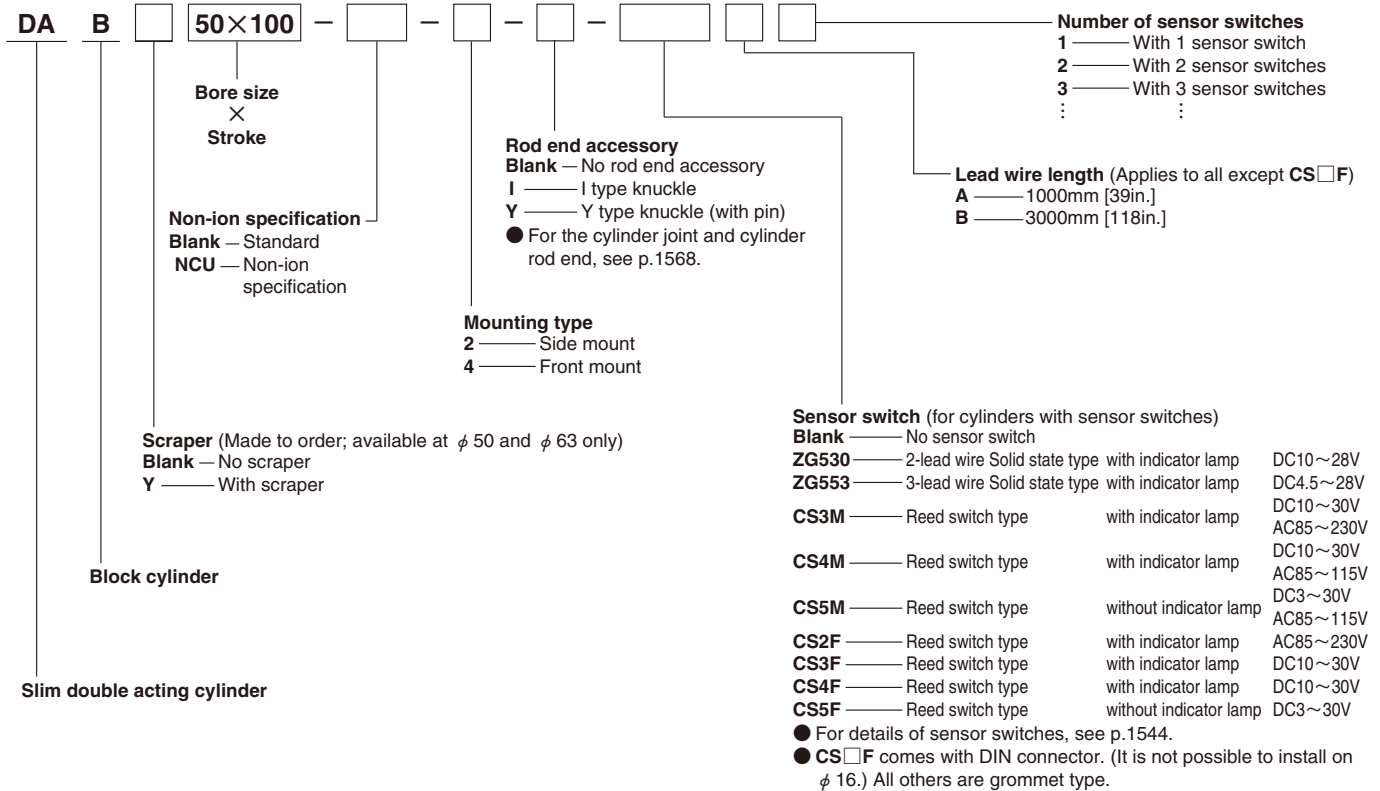
| Item                                  | Bore size mm [in.] | 16 [0.630]                 | 20~40 [0.787~1.575]                   | 50, 63 [1.969, 2.480] |
|---------------------------------------|--------------------|----------------------------|---------------------------------------|-----------------------|
| Operation type                        |                    | Double acting type         |                                       |                       |
| Media                                 |                    | Air                        |                                       |                       |
| Mounting type                         |                    | Side mount, Front mount    |                                       |                       |
| Operating pressure range MPa [psi.]   |                    | 0.04~0.9 [6~131]           | 0.04~0.7 [6~102]                      |                       |
| Proof pressure MPa [psi.]             |                    | 1.32 [191]                 | 1.03 [149]                            |                       |
| Operating temperature range °C [°F]   |                    | 0~70 [32~158]              |                                       |                       |
| Operating speed range mm/s [in./sec.] |                    | 30~700 [1.2~27.6]          | 30~500 [1.2~19.7]                     |                       |
| Cushion                               |                    | Fixed type (Rubber bumper) | Variable type (Stroke 15mm [0.59in.]) |                       |
| Lubrication                           |                    | Not required               |                                       |                       |
| Port size                             | Rc                 | 1/8                        | 1/4                                   |                       |

## Bore Size and Stroke

| Bore size | Standard strokes                 | Maximum stroke | mm                       |  |
|-----------|----------------------------------|----------------|--------------------------|--|
|           |                                  |                | Maximum available stroke |  |
| 16        | 15 25 50 75 100                  | 100            | 300                      |  |
| 20        | 25 50 75 100 125 150             | 150            | 500                      |  |
| 25        | 25 50 75 100 125 150 200         | 200            |                          |  |
| 32        | 25 50 75 100 125 150 200         | 200            |                          |  |
| 40        | 25 50 75 100 125 150 200 250 300 | 300            |                          |  |
| 50        | 25 50 75 100 150 200 250 300     | 300            |                          |  |
| 63        | 25 50 75 100 150 200 250 300     | 300            |                          |  |

Remarks: 1. Stroke tolerance  $^{+1}_{0} [^{+0.039}_{0} \text{in.}]$   
 2. For non-standard strokes, consult us.

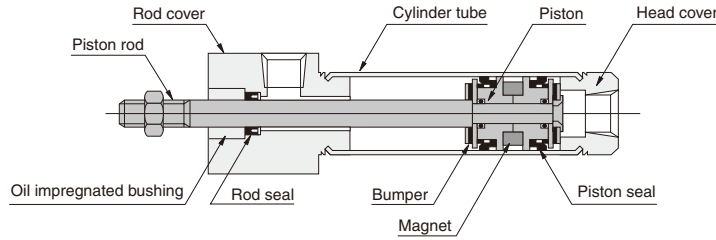
## Order Codes



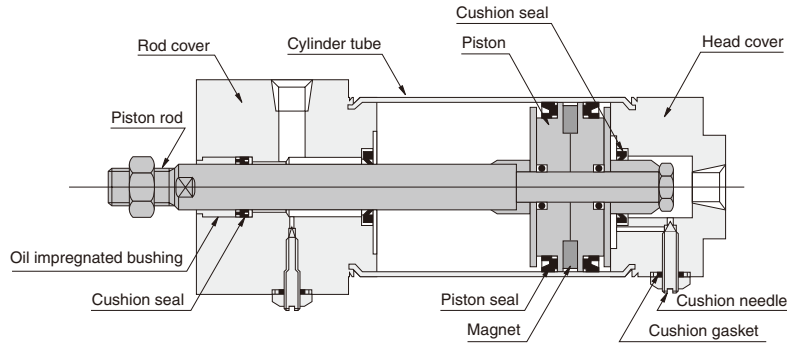


# Inner Construction and Major Parts (cannot be disassembled)

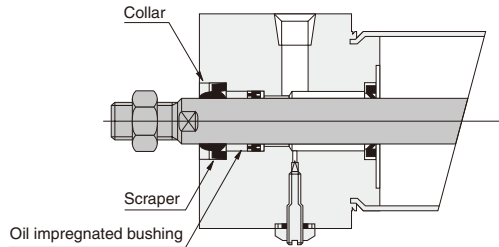
●  $\phi 16 \sim \phi 40$



●  $\phi 50, \phi 63$



● With scraper



## Major Parts and Materials

| Parts          | Bore size | 16                                   | 20~40                      | 50, 63 |
|----------------|-----------|--------------------------------------|----------------------------|--------|
| Cylinder tube  |           | Stainless steel                      |                            |        |
| Piston         |           | Plastic                              |                            |        |
| Piston rod     |           | Stainless steel (hard chrome plated) | Steel (hard chrome plated) |        |
| Rod cover      |           | Aluminum (anodized)                  |                            |        |
| Head cover     |           | Aluminum (anodized)                  |                            |        |
| Seal           |           | Synthetic rubber (NBR)               |                            |        |
| Bumper         |           | Synthetic rubber (NBR)               | —                          |        |
| Scraper        |           | —                                    | Synthetic rubber (NBR)     |        |
| Collar         |           | —                                    | Aluminum (anodized)        |        |
| Magnet         |           | Plastic magnet                       |                            |        |
| I type knuckle |           | Mild steel (nickel plated)           | Mild steel (zinc plated)   |        |
| Y type knuckle |           | Mild steel (zinc plated)             |                            |        |

## Seals

Note: Seals cannot be replaced.

| Parts    | Rod seal     | Piston seal | Cushion seal | Cushion gasket | Scraper |
|----------|--------------|-------------|--------------|----------------|---------|
| Quantity | 1            | 2           | 2            | 2              | 1       |
| Bore mm  |              |             |              |                |         |
| 16       | NY-3-6       | PPY-16      | —            | —              | —       |
| 20       | NY-12X8X3.5  | PPY-20      | —            | —              | —       |
| 25       | NY-14X10X3.5 | PPY-25      | —            | —              | —       |
| 32       | NY-17X12X4   | PPY-32      | —            | —              | —       |
| 40       | NY-22X16X5   | PPY-40      | —            | —              | —       |
| 50       | NY-22X16X5   | PGY-50      | PCS-20       | DT-1-5         | SCB-16  |
| 63       | NY-22X16X5   | PGY-63      | PCS-20       | DT-1-5         | SCB-16  |

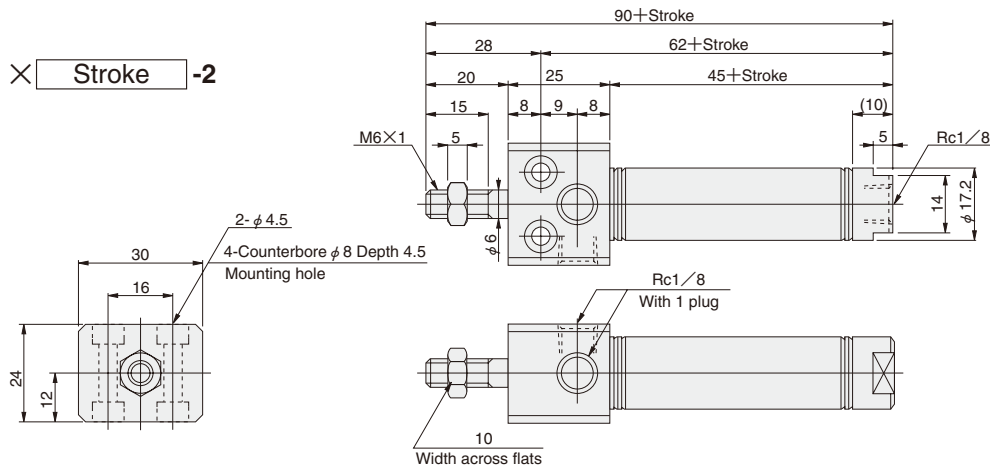
## Mass

| Bore size mm [in.] | Zero stroke mass |             | Additional mass for each 1mm [0.0394in.] stroke | Mass of knuckle |                |
|--------------------|------------------|-------------|---|-----------------|----------------|
|                    | Side mount       | Front mount |   | Y type knuckle  | I type knuckle |
| 16 [0.630]         | 0.09 [0.20]      | 0.08 [0.18] | 0.0005 [0.0011]                                 | 0.017 [0.037]   | 0.020 [0.044]  |
| 20 [0.787]         | 0.15 [0.33]      | 0.14 [0.31] | 0.0008 [0.0018]                                 | 0.041 [0.090]   | 0.036 [0.079]  |
| 25 [0.984]         | 0.22 [0.49]      | 0.19 [0.42] | 0.0011 [0.0024]                                 | 0.075 [0.165]   | 0.070 [0.154]  |
| 32 [1.260]         | 0.37 [0.82]      | 0.30 [0.66] | 0.0015 [0.0033]                                 | 0.075 [0.165]   | 0.070 [0.154]  |
| 40 [1.575]         | 0.66 [1.46]      | 0.49 [1.08] | 0.0024 [0.0053]                                 | 0.120 [0.265]   | 0.132 [0.291]  |
| 50 [1.969]         | 1.15 [2.54]      | 0.90 [1.98] | 0.0028 [0.0062]                                 | 0.120 [0.265]   | 0.132 [0.291]  |
| 63 [2.480]         | 1.62 [3.57]      | 1.26 [2.78] | 0.0033 [0.0073]                                 | 0.120 [0.265]   | 0.132 [0.291]  |

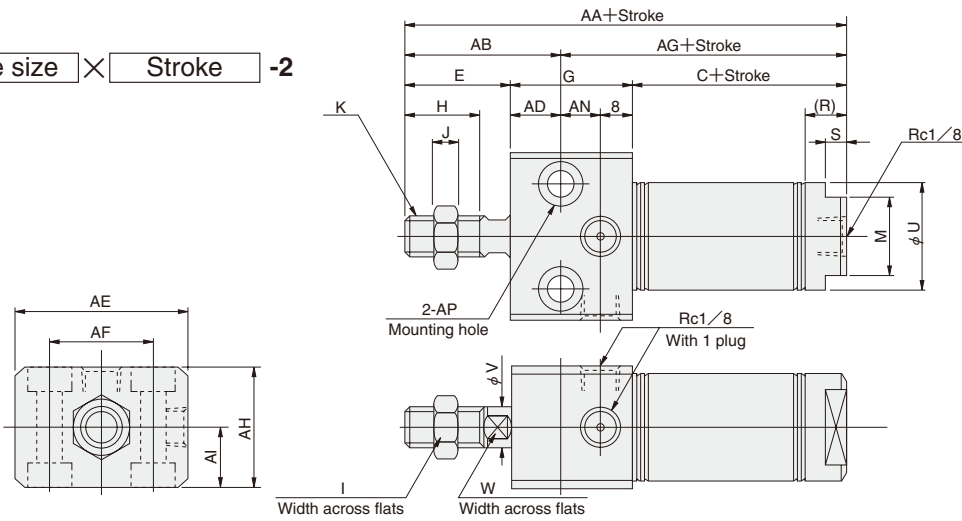
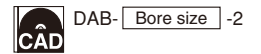
Calculation example: For the mass of side mount type of 32mm bore size and 100mm stroke  
 $0.037 + (0.0015 \times 100) = 0.52\text{kg} [1.15\text{lb.}]$

# Dimensions of Block Cylinder Side Mounting Type (mm)

●  $\phi 16$   
**DAB 16**  $\times$   -2

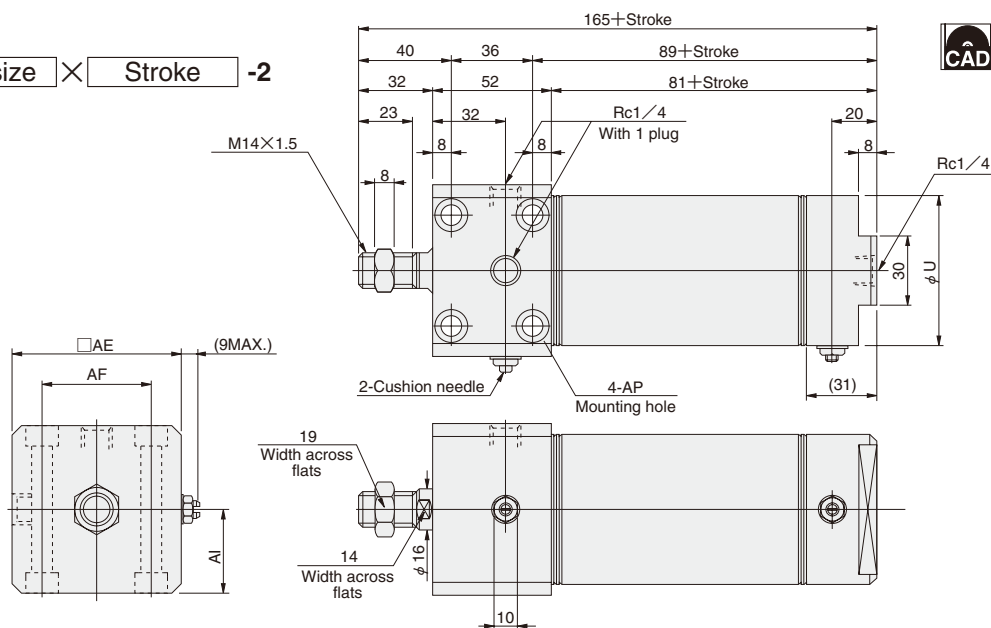


●  $\phi 20 \sim \phi 40$   
**DAB**   $\times$   -2



| Bore mm [in.] | Code | C  | E  | G  | H  | I | J | K        | M  | R  | S | U    | V  | W  | AA  | AB | AD | AE | AF | AG | AH | AI | AN | AP                                      |
|---------------|------|----|----|----|----|---|---|----------|----|----|---|------|----|----|-----|----|----|----|----|----|----|----|----|---|
| 20 [0.787]    | 53   | 23 | 28 | 15 | 12 | 5 |   | M8×1     | 17 | 10 | 5 | 21.4 | 8  | 6  | 104 | 34 | 11 | 38 | 22 | 70 | 28 | 14 | 9  | phi 6.6 2-Counterbore phi 11 Depth6.5   |
| 25 [0.984]    | 53   | 26 | 30 | 18 | 14 | 6 |   | M10×1.25 | 19 | 10 | 5 | 26.4 | 10 | 8  | 109 | 38 | 12 | 42 | 26 | 71 | 30 | 15 | 10 | phi 6.6 2-Counterbore phi 11 Depth6.5   |
| 32 [1.260]    | 54   | 31 | 36 | 23 | 14 | 6 |   | M10×1.25 | 22 | 11 | 6 | 33.6 | 12 | 10 | 121 | 45 | 14 | 54 | 34 | 76 | 36 | 18 | 14 | phi 9 2-Counterbore phi 14 Depth8.6     |
| 40 [1.575]    | 60   | 31 | 44 | 23 | 19 | 8 |   | M14×1.5  | 22 | 13 | 6 | 41.6 | 16 | 14 | 135 | 48 | 17 | 68 | 46 | 87 | 44 | 22 | 19 | phi 11 2-Counterbore phi 17.5 Depth10.8 |

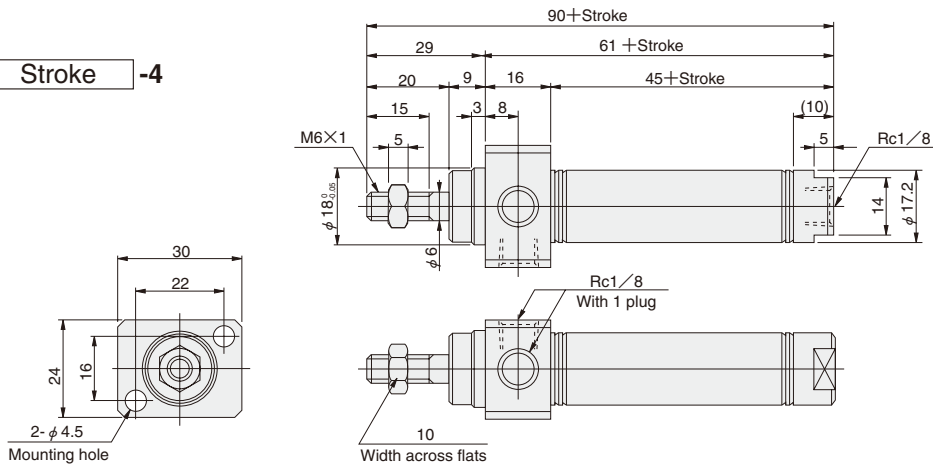
●  $\phi 50, \phi 63$   
**DAB**   $\times$   -2



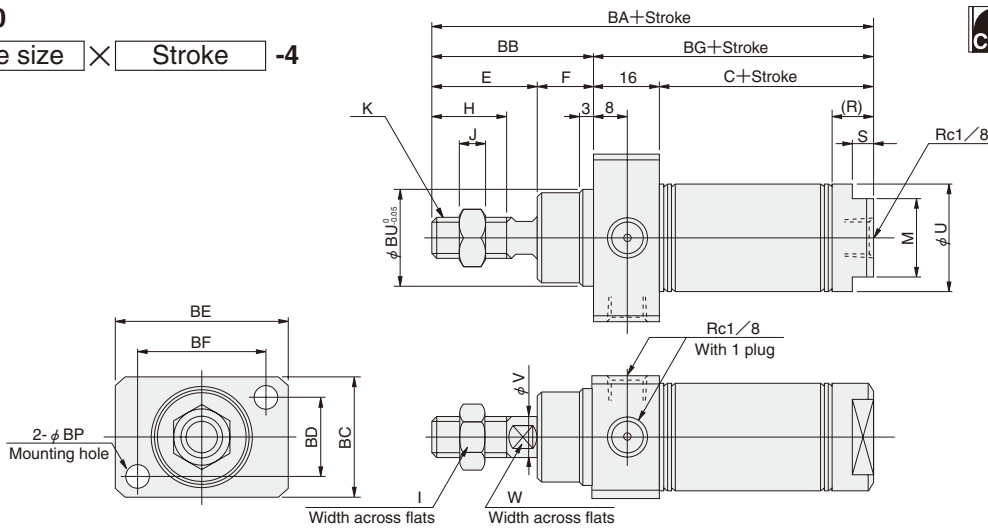
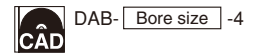
| Bore mm [in.] | Code | U  | AE | AF | AI | AP                                    |
|---------------|------|----|----|----|----|---------------------------------------|
| 50 [1.969]    | 52   | 62 | 44 | 31 |    | phi 6.6 2-Counterbore phi 11 Depth6.5 |
| 63 [2.480]    | 65.4 | 74 | 48 | 37 |    | phi 9 2-Counterbore phi 14 Depth8.6   |

# Dimensions of Block Cylinder Front Mounting Type (mm)

●  $\phi 16$   
**DAB 16**  $\times$   -4

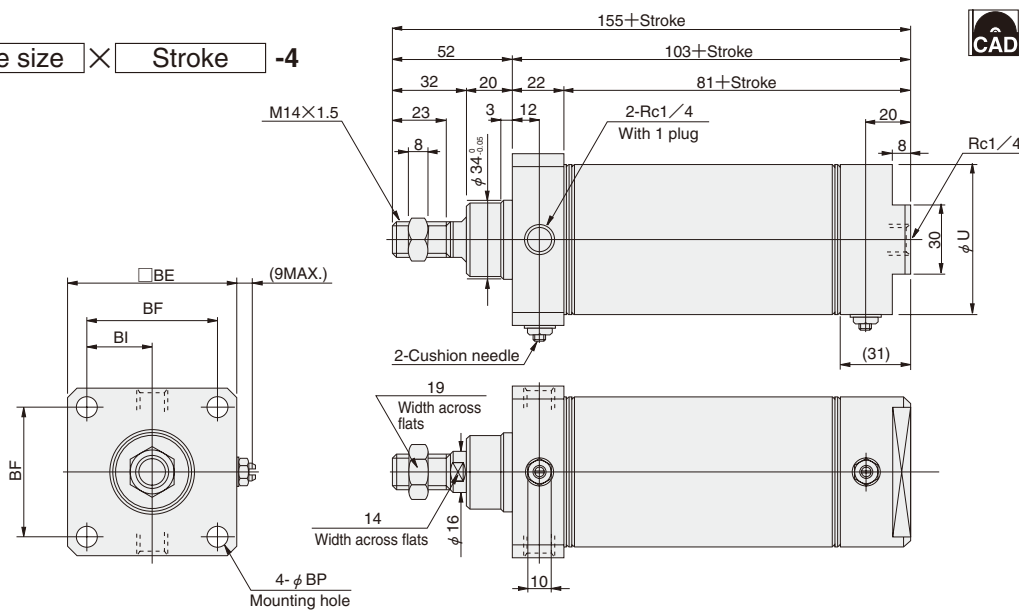
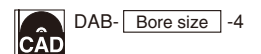


●  $\phi 20 \sim \phi 40$   
**DAB**   $\times$   -4



| Bore mm (in.) | Code              | C  | E  | F  | H  | I  | J | K        | M  | R  | S | U    | V  | W  | BA  | BB | BC | BD | BE | BF | BG | BP  | BU |
|---------------|-------------------|----|----|----|----|----|---|----------|----|----|---|------|----|----|-----|----|----|----|----|----|----|-----|----|
|               | <b>20 [0.787]</b> | 53 | 23 | 12 | 15 | 12 | 5 | M8×1     | 17 | 10 | 5 | 21.4 | 8  | 6  | 104 | 35 | 28 | 18 | 38 | 28 | 69 | 5.5 | 22 |
|               | <b>25 [0.984]</b> | 53 | 26 | 14 | 18 | 14 | 6 | M10×1.25 | 19 | 10 | 5 | 26.4 | 10 | 8  | 109 | 40 | 30 | 20 | 42 | 32 | 69 | 5.5 | 24 |
|               | <b>32 [1.260]</b> | 54 | 31 | 14 | 23 | 14 | 6 | M10×1.25 | 22 | 11 | 6 | 33.6 | 12 | 10 | 115 | 45 | 36 | 24 | 54 | 42 | 70 | 6.6 | 28 |
|               | <b>40 [1.575]</b> | 60 | 31 | 14 | 23 | 19 | 8 | M14×1.5  | 22 | 13 | 6 | 41.6 | 16 | 14 | 121 | 45 | 44 | 28 | 68 | 52 | 76 | 9   | 34 |

●  $\phi 50, \phi 63$   
**DAB**   $\times$   -4



| Bore mm (in.) | Code              | U    | BE | BF | BI | BP  |
|---------------|-------------------|------|----|----|----|-----|
|               | <b>50 [1.969]</b> | 52   | 62 | 48 | 24 | 6.6 |
|               | <b>63 [2.480]</b> | 65.4 | 74 | 58 | 29 | 9   |

# SLIM BLOCK SQUARE ROD CYLINDERS

## Symbol



## Specifications

| Item                                  | Bore size mm [in.]         | 20, 25 [0.787, 0.984] | 32, 40 [1.260, 1.575]                | 50, 63 [1.969, 2.480] |
|---------------------------------------|----------------------------|-----------------------|--------------------------------------|-----------------------|
| Operation type                        | Double acting type         |                       |                                      |                       |
| Media                                 | Air                        |                       |                                      |                       |
| Mounting type                         | Side mount, Front mount    |                       |                                      |                       |
| Operating pressure range MPa [psi.]   | 0.1~0.9 [15~131]           |                       | 0.05~0.7 [7~102]                     |                       |
| Proof pressure MPa [psi.]             | 1.32 [191]                 |                       | 1.03 [149]                           |                       |
| Operating temperature range °C [°F]   | 0~70 [32~158]              |                       |                                      |                       |
| Operating speed range mm/s [in./sec.] | 50~700 [2.0~27.6]          |                       | 50~500 [2.0~19.7]                    |                       |
| Cushion                               | Fixed type (Rubber bumper) |                       | Variable type (Stroke15mm [0.59in.]) |                       |
| Lubrication                           | Not required               |                       |                                      |                       |
| Non-rotating accuracy                 | ±1.5°                      |                       | ±1°                                  |                       |
| Port size                             | Rc                         | 1/8                   | 1/4                                  |                       |

## Bore Size and Stroke

| Bore size | Standard strokes     | Maximum stroke | Maximum available stroke |
|-----------|----------------------|----------------|--------------------------|
| 20        | 25 50 75 100 125 150 | 150            | 500                      |
| 25        |                      |                |                          |
| 32        |                      |                |                          |
| 40        | 25 50 75 100 150     | 150            | 500                      |
| 50        |                      |                |                          |
| 63        |                      |                |                          |

Remarks: 1. Stroke tolerance  $^{+1}_{0}$  [ $^{+0.039}_{0}$ in.]  
 2. For non-standard strokes, consult us.

## Order Codes

**DA** **BL** **50×100** - [ ] - [ ] - [ ] [ ] [ ]

**Bore size × Stroke**

**Block square rod cylinder**

**Rod end accessory**  
**Blank** — No rod end accessory  
**I** — I type knuckle  
**Y** — Y type knuckle (with pin)  
 ● For the cylinder joint and cylinder rod end, see p.1568.

**Mounting type**  
**2** — Side mount  
**4** — Front mount

**Number of sensor switches**  
**1** — With 1 sensor switch  
**2** — With 2 sensor switches  
**3** — With 3 sensor switches  
 ⋮

**Lead wire length**  
 (Applies to all except **CS□F**)  
**A** — 1000mm [39in.]  
**B** — 3000mm [118in.]

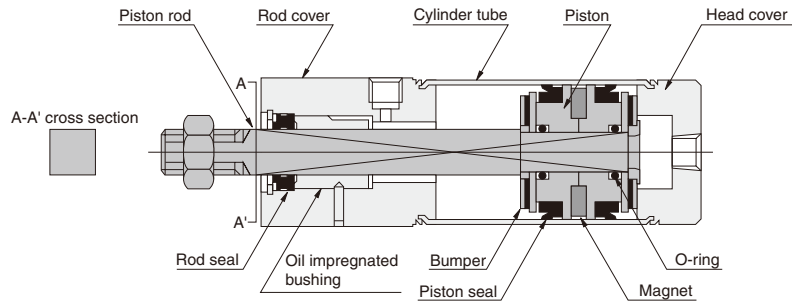
**Sensor switch** (for cylinders with sensor switches)  
**Blank** — No sensor switch  
**ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
**ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
**CS3M** — Reed switch type with indicator lamp DC10~30V  
**CS4M** — Reed switch type with indicator lamp AC85~230V  
**CS5M** — Reed switch type without indicator lamp DC10~30V  
**CS2F** — Reed switch type with indicator lamp AC85~115V  
**CS3F** — Reed switch type with indicator lamp DC3~30V  
**CS4F** — Reed switch type with indicator lamp AC85~230V  
**CS5F** — Reed switch type without indicator lamp DC10~30V  
 DC3~30V

● For details of sensor switches, see p.1544.  
 ● **CS□F** comes with DIN connector.  
 All others are grommet type.

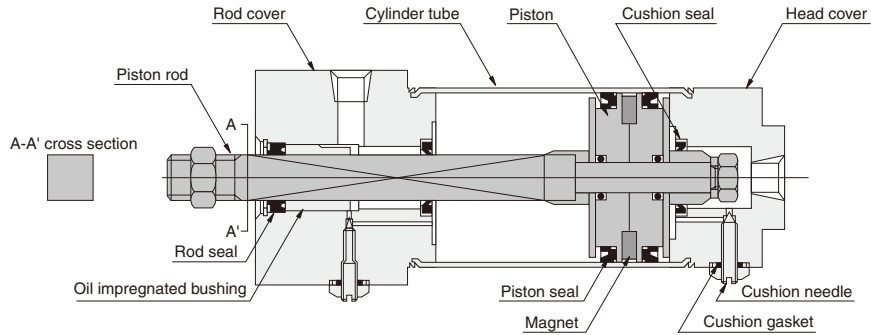
**Slim double acting cylinder**

# Inner Construction and Major Parts (cannot be disassembled)

●  $\phi 20 \sim \phi 40$



●  $\phi 50, \phi 63$



## Major parts and Materials

| Parts          | Bore size | 20~40                      | 50, 63 |
|----------------|-----------|----------------------------|--------|
| Cylinder tube  |           | Stainless steel            |        |
| Piston         |           | Plastic                    |        |
| Piston rod     |           | Steel (hard chrome plated) |        |
| Rod cover      |           | Aluminum (anodized)        |        |
| Head cover     |           | Aluminum (anodized)        |        |
| Seal           |           | Synthetic rubber (NBR)     |        |
| Bumper         |           | Synthetic rubber (NBR)     | —      |
| Magnet         |           | Plastic magnet             |        |
| I type knuckle |           | Mild steel (zinc plated)   |        |
| Y type knuckle |           | Mild steel (zinc plated)   |        |

## Mass

| Bore size<br>mm [in.] | Zero stroke mass |             | Additional mass for each<br>1mm [0.0394in.] stroke |
|-----------------------|------------------|-------------|--|
|                       | Side mount       | Front mount |  |
| 20 [0.787]            | 0.15 [0.33]      | 0.14 [0.31] | 0.0008 [0.0018]                                    |
| 25 [0.984]            | 0.21 [0.46]      | 0.18 [0.40] | 0.0009 [0.0020]                                    |
| 32 [1.260]            | 0.40 [0.88]      | 0.33 [0.73] | 0.0014 [0.0031]                                    |
| 40 [1.575]            | 0.66 [1.46]      | 0.49 [1.08] | 0.0021 [0.0046]                                    |
| 50 [1.969]            | 1.15 [2.54]      | 0.90 [1.98] | 0.0027 [0.0060]                                    |
| 63 [2.480]            | 1.62 [3.57]      | 1.26 [2.78] | 0.0032 [0.0071]                                    |

Calculation example: For the mass of side mount type of 40mm bore size and 100mm stroke  
 $0.066 + (0.0021 \times 100) = 0.87\text{kg} [1.92\text{lb.}]$

## Seals

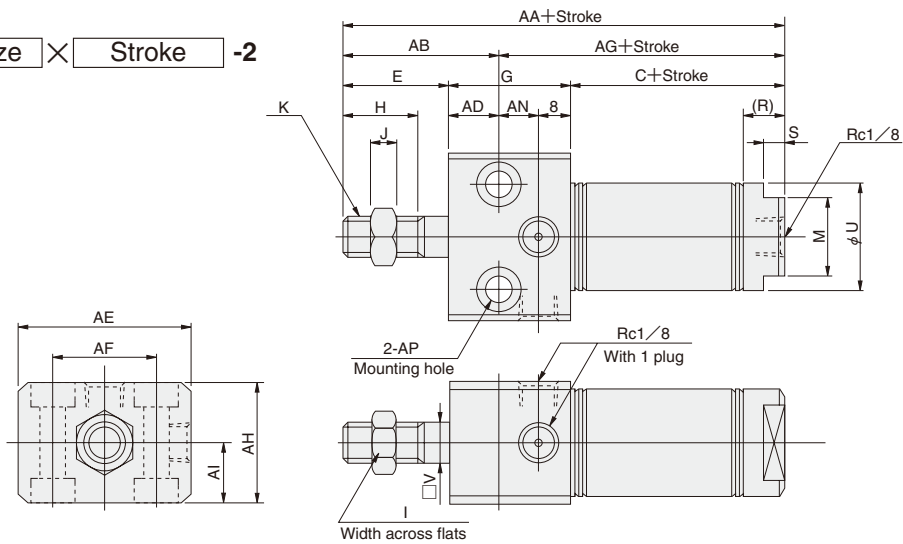
Note: Seals cannot be replaced.

| Parts   | Rod seal | Piston seal | Cushion seal | Cushion gasket |        |
|---------|----------|-------------|--------------|----------------|--------|
| Bore mm | Quantity | 1           | 2            | 2              | 2      |
| 20      |          | KC-7.4      | PPY-20       | —              | —      |
| 25      |          | KC-7.4      | PPY-25       | —              | —      |
| 32      |          | KC-10       | PPY-32       | —              | —      |
| 40      |          | KC-13       | PPY-40       | —              | —      |
| 50      |          | KC-13       | PGY-50       | PCS-20         | DT-1-5 |
| 63      |          | KC-13       | PGY-63       | PCS-20         | DT-1-5 |

## Dimensions of Block Square Rod, Side Mounting Type (mm)

●  $\phi 20 \sim \phi 40$

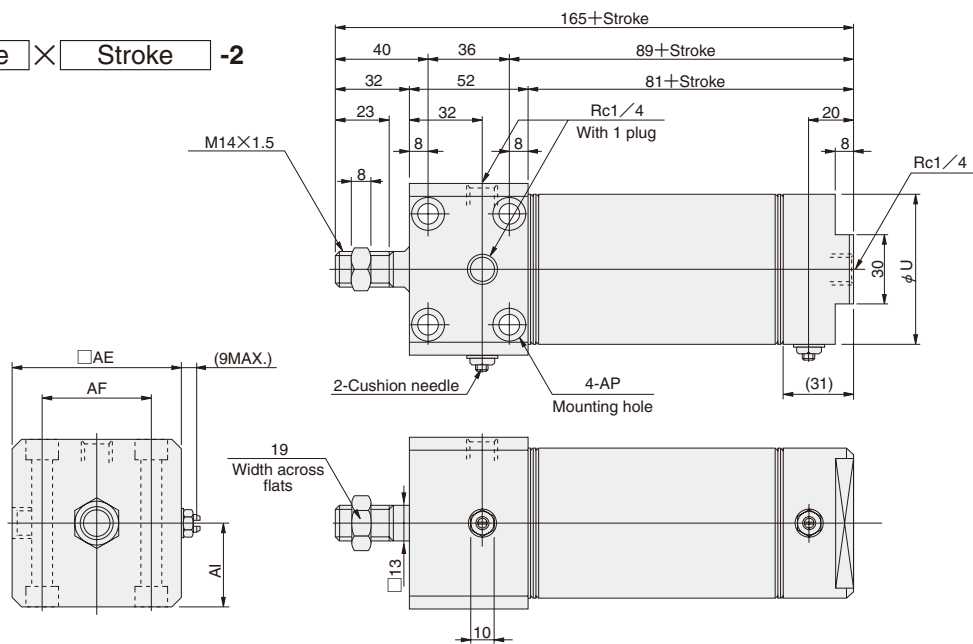
DABL Bore size  $\times$  Stroke -2



| Bore<br>mm [in.] | Code    | C  | E  | G  | H  | I  | J | K                 | M  | R  | S | U    | V   | AA  | AB | AD | AE | AF | AG | AH | AI | AN | AP  |
|------------------|---------|----|----|----|----|----|---|-------------------|----|----|---|------|-----|-----|----|----|----|----|----|----|----|----|---|
| 20               | [0.787] | 53 | 23 | 28 | 15 | 12 | 5 | M8 $\times$ 1     | 17 | 10 | 5 | 21.4 | 7.4 | 104 | 34 | 11 | 38 | 22 | 70 | 28 | 14 | 9  | $\phi 6.6$ 2-Counterbore $\phi 11$ Depth6.5   |
| 25               | [0.984] | 53 | 26 | 30 | 18 | 14 | 6 | M8 $\times$ 1     | 19 | 10 | 5 | 26.4 | 7.4 | 109 | 38 | 12 | 42 | 26 | 71 | 30 | 15 | 10 | $\phi 6.6$ 2-Counterbore $\phi 11$ Depth6.5   |
| 32               | [1.260] | 54 | 31 | 36 | 23 | 14 | 6 | M10 $\times$ 1.25 | 22 | 11 | 6 | 33.6 | 10  | 121 | 45 | 14 | 54 | 34 | 76 | 36 | 18 | 14 | $\phi 9$ 2-Counterbore $\phi 14$ Depth8.6     |
| 40               | [1.575] | 60 | 31 | 44 | 23 | 19 | 8 | M14 $\times$ 1.5  | 22 | 13 | 6 | 41.6 | 13  | 135 | 48 | 17 | 68 | 46 | 87 | 44 | 22 | 19 | $\phi 11$ 2-Counterbore $\phi 17.5$ Depth10.8 |

●  $\phi 50, \phi 63$

DABL Bore size  $\times$  Stroke -2

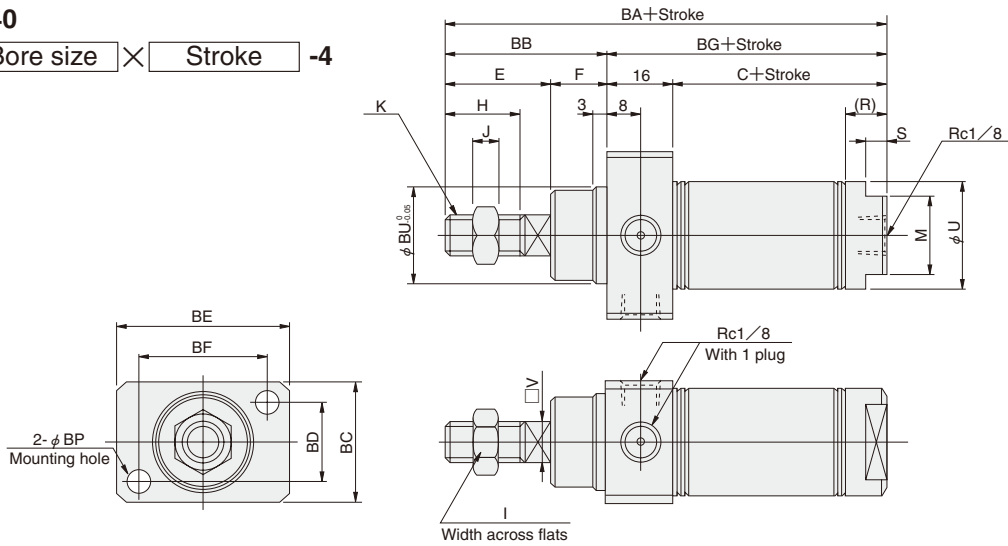


| Bore<br>mm [in.] | Code    | U    | AE | AF | AI | AP  |
|------------------|---------|------|----|----|----|---|
| 50               | [1.969] | 52   | 62 | 44 | 31 | $\phi 6.6$ 2-Counterbore $\phi 11$ Depth6.5 |
| 63               | [2.480] | 65.4 | 74 | 48 | 37 | $\phi 9$ 2-Counterbore $\phi 14$ Depth8.6   |

# Dimensions of Block Square Rod, Front Mounting Type (mm)

●  $\phi 20 \sim \phi 40$

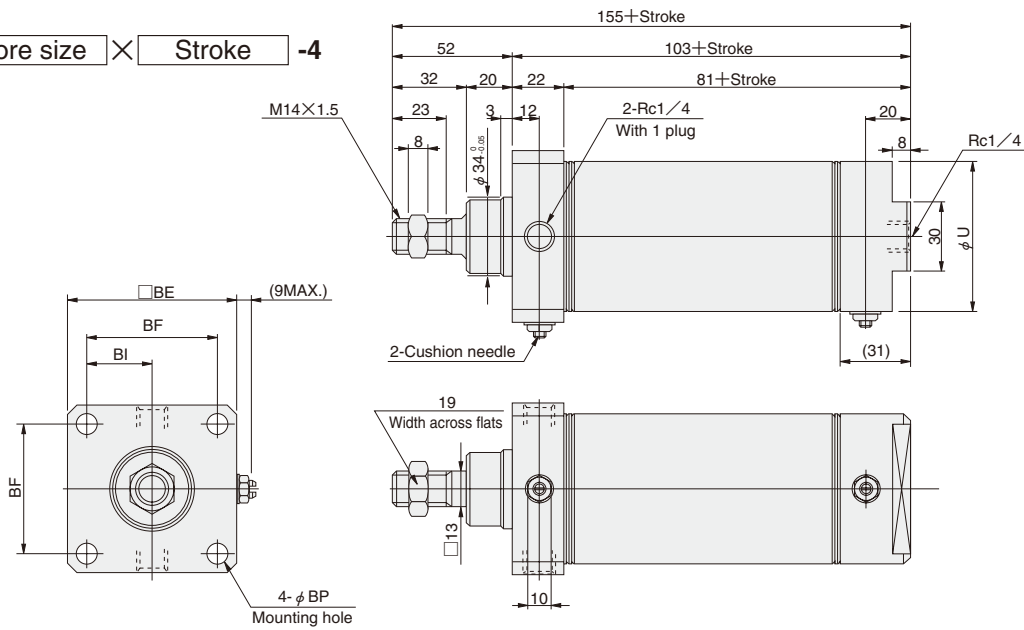
DABL Bore size  $\times$  Stroke -4



| Code       | C  | E  | F  | H  | I  | J | K        | M  | R  | S | U    | V   | BA  | BB | BC | BD | BE | BF | BG | BP  | BU |
|------------|----|----|----|----|----|---|----------|----|----|---|------|-----|-----|----|----|----|----|----|----|-----|----|
| 20 [0.787] | 53 | 23 | 12 | 15 | 12 | 5 | M8×1     | 17 | 10 | 5 | 21.4 | 7.4 | 104 | 35 | 28 | 18 | 38 | 28 | 69 | 5.5 | 22 |
| 25 [0.984] | 54 | 26 | 14 | 18 | 14 | 6 | M8×1     | 19 | 10 | 5 | 26.4 | 7.4 | 109 | 40 | 30 | 20 | 42 | 32 | 69 | 5.5 | 24 |
| 32 [1.260] | 54 | 31 | 14 | 23 | 14 | 6 | M10×1.25 | 22 | 11 | 6 | 33.6 | 10  | 115 | 45 | 36 | 24 | 54 | 42 | 70 | 6.6 | 28 |
| 40 [1.575] | 60 | 31 | 14 | 23 | 19 | 8 | M14×1.5  | 22 | 13 | 6 | 41.6 | 13  | 121 | 45 | 44 | 28 | 68 | 52 | 76 | 9   | 34 |

●  $\phi 50, \phi 63$

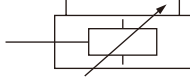
DABL Bore size  $\times$  Stroke -4



| Code       | U    | BE | BF | BI | BP  |
|------------|------|----|----|----|-----|
| 50 [1.969] | 52   | 62 | 48 | 24 | 6.6 |
| 63 [2.480] | 65.4 | 74 | 58 | 29 | 9   |

# SLIM BLOCK CYLINDERS WITH VARIABLE CUSHION

## Symbol



## Specifications

| Item                                  | Bore size mm [in.] | 16 [0.630]              | 20, 25 [0.787, 0.984] | 32, 40 [1.260, 1.575] |
|---------------------------------------|--------------------|-------------------------|-----------------------|-----------------------|
| Operation type                        |                    | Double acting type      |                       |                       |
| Media                                 |                    | Air                     |                       |                       |
| Mounting type                         |                    | Side mount, Front mount |                       |                       |
| Operating pressure range MPa [psi.]   |                    | 0.15~0.9 [22~131]       | 0.1~0.9 [15~131]      |                       |
| Proof pressure MPa [psi.]             |                    | 1.32 [191]              |                       |                       |
| Operating temperature range °C [°F]   |                    | 0~70 [32~158]           |                       |                       |
| Operating speed range mm/s [in./sec.] |                    | 30~1000 [1.2~39.4]      |                       |                       |
| Cushion stroke mm [in.]               |                    | 9 [0.35]                | 12 [0.47]             |                       |
| Lubrication                           |                    | Not required            |                       |                       |
| Port size                             | Rc                 | 1/8                     |                       |                       |

## Bore Size and Stroke

| Bore size | Standard strokes                 |     | Maximum available stroke |
|-----------|----------------------------------|-----|--------------------------|
|           | mm                               |     |                          |
| 16        | 25 50 75 100                     | 200 |                          |
| 20        | 25 50 75 100 125 150             | 500 |                          |
| 25        | 25 50 75 100 125 150 200         |     |                          |
| 32        | 25 50 75 100 125 150 200 250 300 |     |                          |
| 40        | 25 50 75 100 125 150 200 250 300 |     |                          |

Remarks: 1. Stroke tolerance  $^{+1}_{0} [^{+0.039}_{0}\text{in.}]$   
 2. For non-standard strokes, consult us.

## Order Codes

**DA** **BC** **20×100** — [ ] — [ ] — [ ] [ ] [ ]

**Block cylinder with variable cushion**

**Bore size × Stroke**

**Rod end accessory**  
**Blank** — No rod end accessory  
**I** — I type knuckle  
**Y** — Y type knuckle (with pin)  
 ● For the cylinder joint and cylinder rod end, see p.1568.

**Mounting type**  
**2** — Side mount  
**4** — Front mount

**Number of sensor switches**  
**1** — With 1 sensor switch  
**2** — With 2 sensor switches  
**3** — With 3 sensor switches  
 ⋮

**Lead wire length**  
 (Applies to all except **CS□F**)  
**A** — 1000mm [39in.]  
**B** — 3000mm [118in.]

**Sensor switch** (for cylinders with sensor switches)  
**Blank** — No sensor switch  
**ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
**ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
**CS3M** — Reed switch type with indicator lamp DC10~30V  
**CS4M** — Reed switch type with indicator lamp AC85~230V  
**CS5M** — Reed switch type without indicator lamp DC10~30V  
**CS2F** — Reed switch type with indicator lamp AC85~115V  
**CS3F** — Reed switch type with indicator lamp DC3~30V  
**CS4F** — Reed switch type with indicator lamp AC85~230V  
**CS5F** — Reed switch type without indicator lamp DC10~30V  
 DC3~30V

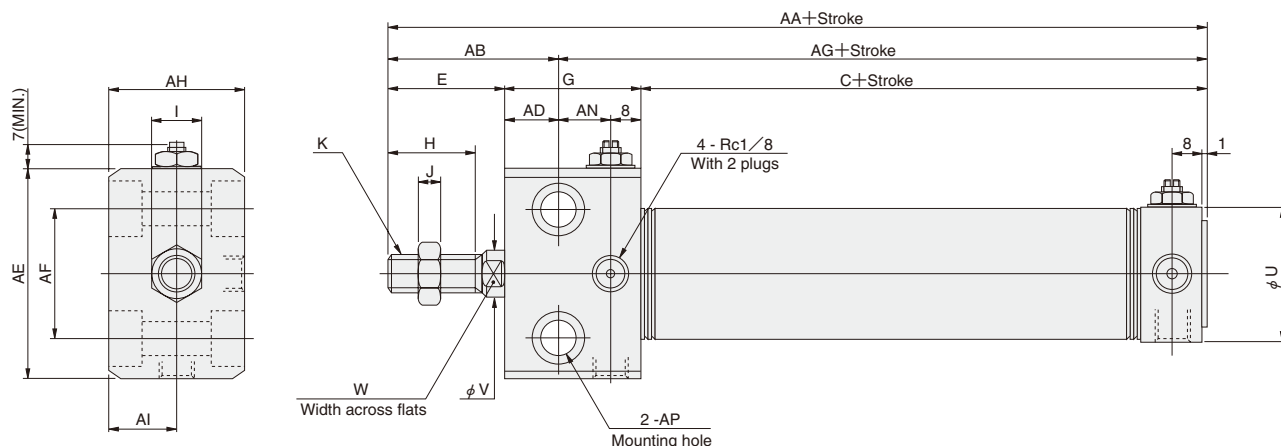
● For details of sensor switches, see p.1544.  
 ● **CS□F** comes with DIN connector. (It is not possible to install on φ 16.) All others are grommet type.

**Slim double acting cylinder**



## Dimensions of Block Cylinder with Variable Cushion, Side Mounting Type (mm)

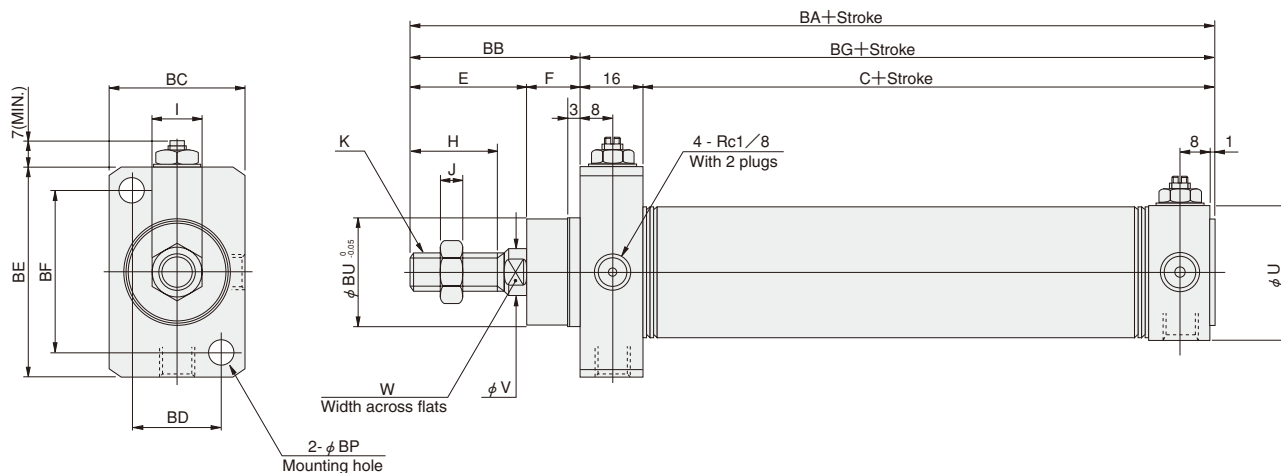
●  $\phi 16 \sim \phi 40$  DABC Bore size   $\times$  Stroke  -2



| Bore<br>mm (in.) | Code | C  | E  | G  | H  | I | J        | K    | U  | V  | W   | AA | AB | AD | AE | AF | AG | AH | AI                                | AP        |    | AN |
|------------------|------|----|----|----|----|---|----------|------|----|----|-----|----|----|----|----|----|----|----|-----------------------------------|-----------|----|----|
| 16 [0.630]       | 53   | 20 | 25 | 15 | 10 | 5 | M6×1     | 22   | 6  | —  | 98  | 28 | 8  | 30 | 16 | 70 | 24 | 12 | $\phi 4.5$ Counterbore $\phi 8$   | Depth4.5  | 9  |    |
| 20 [0.787]       | 61   | 23 | 28 | 15 | 12 | 5 | M8×1     | 27   | 8  | 6  | 112 | 34 | 11 | 38 | 22 | 78 | 28 | 14 | $\phi 6.6$ Counterbore $\phi 11$  | Depth6.5  | 9  |    |
| 25 [0.984]       | 61   | 26 | 30 | 18 | 14 | 6 | M10×1.25 | 29   | 10 | 8  | 117 | 38 | 12 | 42 | 26 | 79 | 30 | 15 | $\phi 6.6$ Counterbore $\phi 11$  | Depth6.5  | 10 |    |
| 32 [1.260]       | 61   | 31 | 36 | 23 | 14 | 6 | M10×1.25 | 35   | 12 | 10 | 128 | 45 | 14 | 54 | 34 | 83 | 36 | 18 | $\phi 9$ Counterbore $\phi 14$    | Depth8.6  | 14 |    |
| 40 [1.575]       | 63   | 31 | 44 | 23 | 19 | 8 | M14×1.5  | 41.6 | 16 | 14 | 138 | 48 | 17 | 68 | 46 | 90 | 44 | 22 | $\phi 11$ Counterbore $\phi 17.5$ | Depth10.8 | 19 |    |

## Dimensions of Block Cylinder with Variable Cushion, Front Mounting Type (mm)

●  $\phi 16 \sim \phi 40$  DABC Bore size   $\times$  Stroke  -4



| Bore<br>mm (in.) | Code | C  | E  | F  | H  | I | J        | K    | U  | V  | W   | BA | BB | BC | BD | BE | BF | BG  | BP | BU |
|------------------|------|----|----|----|----|---|----------|------|----|----|-----|----|----|----|----|----|----|-----|----|----|
| 16 [0.630]       | 53   | 20 | 9  | 15 | 10 | 5 | M6×1     | 22   | 6  | —  | 98  | 29 | 24 | 16 | 30 | 22 | 69 | 4.5 | 18 |    |
| 20 [0.787]       | 61   | 23 | 12 | 15 | 12 | 5 | M8×1     | 27   | 8  | 6  | 112 | 35 | 28 | 18 | 38 | 28 | 77 | 5.5 | 22 |    |
| 25 [0.984]       | 61   | 26 | 14 | 18 | 14 | 6 | M10×1.25 | 29   | 10 | 8  | 117 | 40 | 30 | 20 | 42 | 32 | 77 | 5.5 | 24 |    |
| 32 [1.260]       | 61   | 31 | 14 | 23 | 14 | 6 | M10×1.25 | 35   | 12 | 10 | 122 | 45 | 36 | 24 | 54 | 42 | 77 | 6.6 | 28 |    |
| 40 [1.575]       | 63   | 31 | 14 | 23 | 19 | 8 | M14×1.5  | 41.6 | 16 | 14 | 124 | 45 | 44 | 28 | 68 | 52 | 79 | 9   | 34 |    |

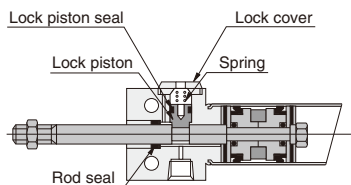


# Inner Construction and Major Parts (cannot be disassembled)

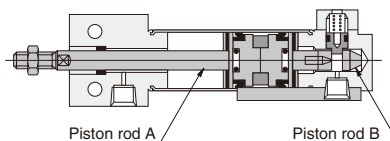
SLIM CYLINDERS

●  $\phi$  16

● Rod side end keep

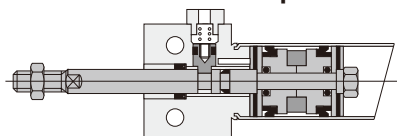


● Head side end keep

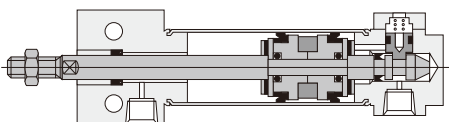


●  $\phi$  20,  $\phi$  25

● Rod side end keep

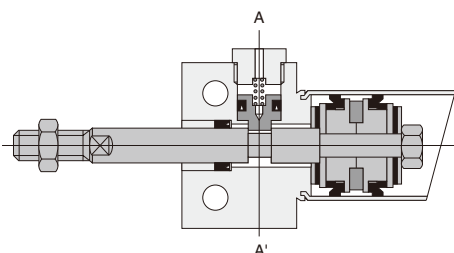
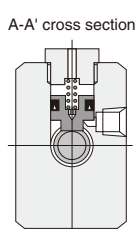


● Head side end keep

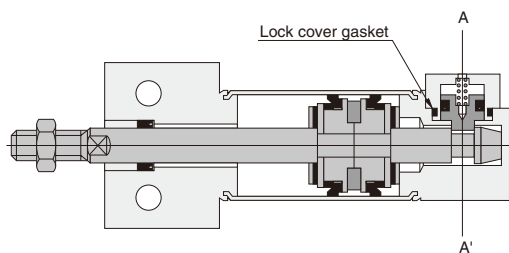


●  $\phi$  32,  $\phi$  40

● Rod side end keep

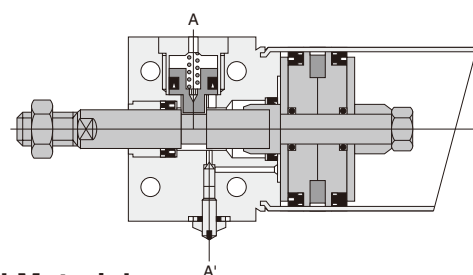
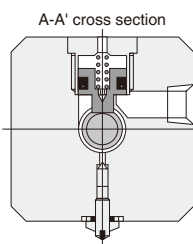


● Head side end keep

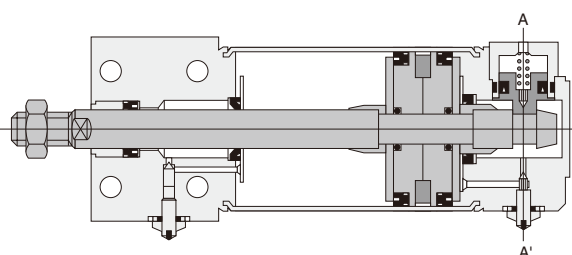


●  $\phi$  50,  $\phi$  63

● Rod side end keep



● Head side end keep



## Major Parts and Materials

| Parts                          | Bore size                            |                            |                |
|--------------------------------|--------------------------------------|----------------------------|----------------|
|                                | 16                                   | 20, 25                     | 32, 40, 50, 63 |
| Piston rod A                   | Stainless steel (hard chrome plated) | Steel (hard chrome plated) |                |
| Piston rod B                   | Stainless steel                      | Steel (zinc plated)        |                |
| Spring                         | Stainless steel                      |                            | Piano wire     |
| Lock piston                    | Stainless steel                      |                            |                |
| Lock cover                     | Stainless steel                      | Aluminum (anodized)        |                |
| Y type knuckle, I type knuckle | Mild steel (zinc plated)             |                            |                |

Other than the items listed above, it is the same as for the standard Slim Cylinder.

## Seals

Note: Seals cannot be replaced.

| Parts    | Rod seal | Lock piston seal | Lock cover gasket           |
|----------|----------|------------------|-----------------------------|
| Quantity | 1        | 1                | 1                           |
| Bore mm  |          |                  |                             |
| 16       | —        | MYN-5            | O-ring (Special dimensions) |
| 20       | GYH-9    | MYN-5            | —                           |
| 25       | GYH-11   | MYN-5            | —                           |
| 32       | —        | MYN-10A          | S18                         |
| 40       | —        | MYN-10A          | S18                         |
| 50       | —        | MYN-16           | S22.4                       |
| 63       | —        | MYN-16           | S22.4                       |

Other than the items listed above, it is the same as for the standard Slim Cylinder.

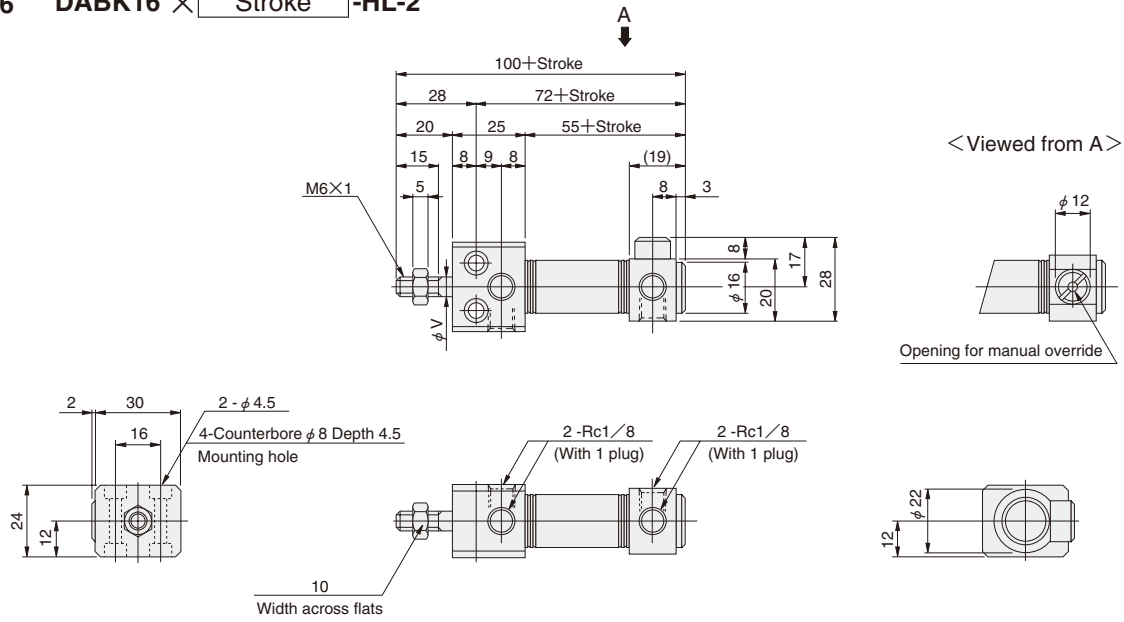
## Mass

| Bore size<br>mm [in.] | Zero stroke mass         |             |                         |             | Additional mass for<br>each 1mm<br>[0.0394in.] stroke | Mass of knuckle |                |
|-----------------------|--------------------------|-------------|-------------------------|-------------|---|-----------------|----------------|
|                       | -HL : Head side end keep |             | -RL : Rod side end keep |             |   | Y type knuckle  | I type knuckle |
|                       | Side mount               | Front mount | Side mount              | Front mount |   |                 |                |
| 16 [0.630]            | 0.11 [0.24]              | 0.10 [0.22] | 0.10 [0.22]             | 0.09 [0.20] | 0.0005 [0.0011]                                       | 0.017 [0.037]   | 0.020 [0.044]  |
| 20 [0.787]            | 0.18 [0.40]              | 0.17 [0.37] | 0.17 [0.37]             | 0.16 [0.35] | 0.0008 [0.0018]                                       | 0.042 [0.093]   | 0.035 [0.077]  |
| 25 [0.984]            | 0.25 [0.55]              | 0.23 [0.51] | 0.24 [0.53]             | 0.22 [0.49] | 0.0011 [0.0024]                                       | 0.075 [0.165]   | 0.070 [0.154]  |
| 32 [1.260]            | 0.39 [0.86]              | 0.36 [0.79] | 0.38 [0.84]             | 0.35 [0.77] | 0.0015 [0.0033]                                       |                 |                |
| 40 [1.575]            | 0.70 [1.54]              | 0.67 [1.48] | 0.68 [1.50]             | 0.65 [1.43] | 0.0024 [0.0053]                                       | 0.122 [0.269]   | 0.132 [0.291]  |
| 50 [1.969]            | 1.22 [2.69]              | 1.17 [2.58] | 1.20 [2.65]             | 1.14 [2.51] | 0.0029 [0.0064]                                       |                 |                |
| 63 [2.480]            | 1.69 [3.73]              | 1.30 [2.87] | 1.67 [3.68]             | 1.28 [2.82] | 0.0035 [0.0077]                                       |                 |                |

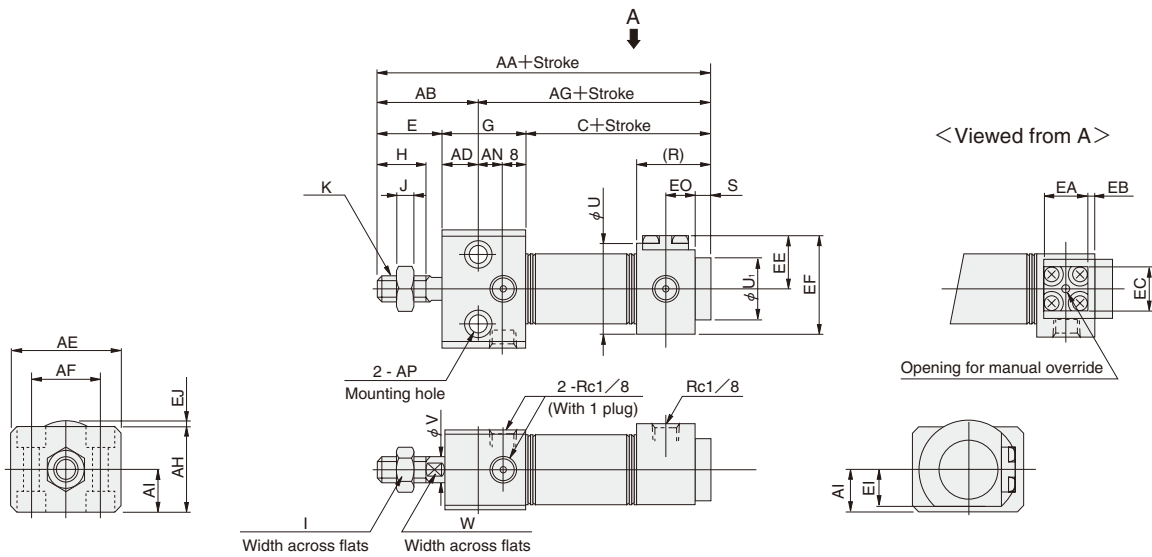
Calculation example: For head side end keep side mount type of 32mm bore size and 100mm stroke,  $0.39 + (0.0015 \times 100) = 0.54\text{kg}$  [1.19lb.]

# -HL Dimensions of Head Side End Keep, Side Mounting Type (mm)

## ● $\phi 16$ DABK16 $\times$ -HL-2



## ● $\phi 20 \sim \phi 40$ DABK $\times$ -HL-2



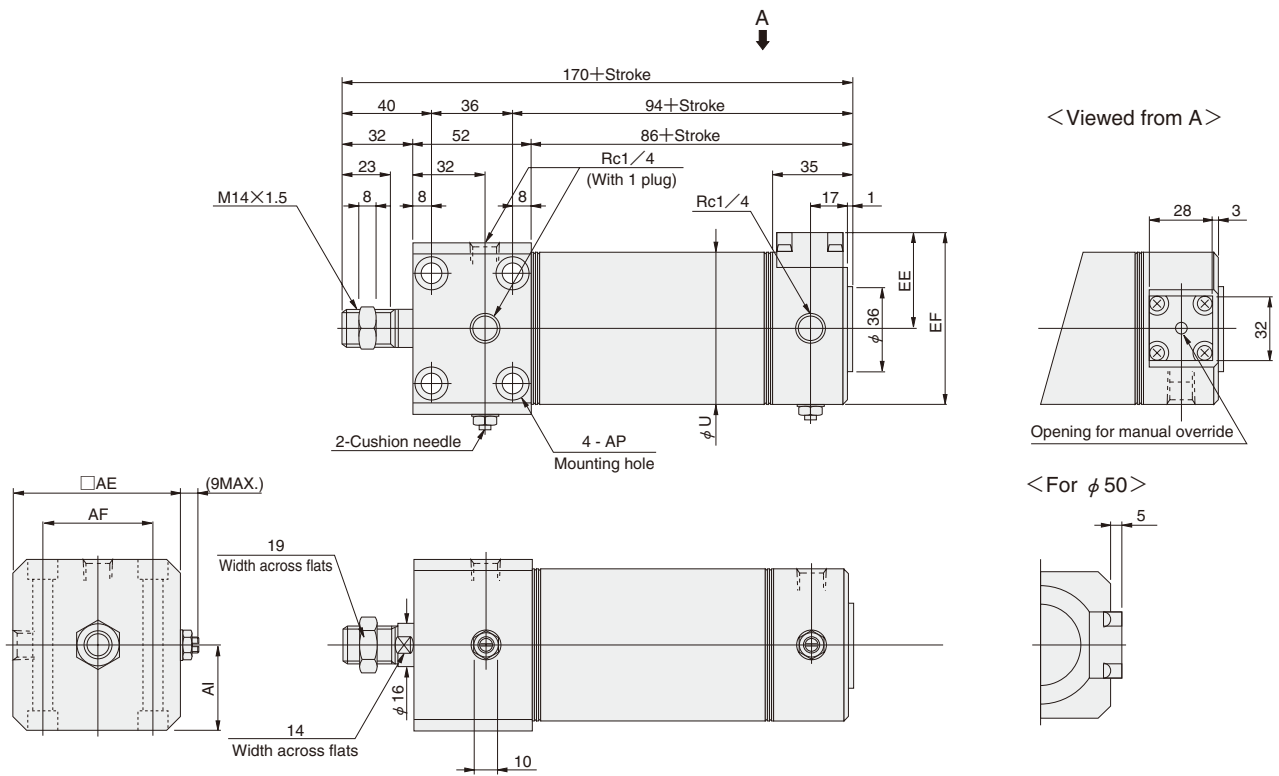
● The drawing is for the  $\phi 20$  and  $\phi 25$ . (Contour dimensions of the  $\phi 32$  and  $\phi 40$  head covers are smaller than the block portion.)

| Code       | C  | E  | G  | H  | I  | J | K        | R  | S | U  | U <sub>1</sub> | V  | W  |
|------------|----|----|----|----|----|---|----------|----|---|----|----------------|----|----|
| 20 [0.787] | 66 | 23 | 28 | 15 | 12 | 5 | M8×1     | 22 | 6 |    | 20             | 8  | 6  |
| 25 [0.984] | 66 | 26 | 30 | 18 | 14 | 6 | M10×1.25 | 22 | 6 | 29 | 22             | 10 | 8  |
| 32 [1.260] | 73 | 31 | 36 | 23 | 14 | 6 | M10×1.25 | 27 | 1 |    | 27             | 12 | 10 |
| 40 [1.575] | 80 | 31 | 44 | 23 | 19 | 8 | M14×1.5  | 32 | 1 | 35 | 33             | 16 | 14 |

| Code       | AA  | AB | AD | AE | AF | AG  | AH | AI | AN | AP   | EA | EB | EC | EE   | EF   | EI   | EJ  | EO |
|------------|-----|----|----|----|----|-----|----|----|----|--|----|----|----|------|------|------|-----|----|
| 20 [0.787] | 117 | 34 | 11 | 38 | 22 | 83  | 28 | 14 | 9  | $\phi 6.6$ Counterbore $\phi 11$ Depth 6.5   | 16 | —  | 16 | 17.5 | 32   | 12.5 | 0.5 | 8  |
| 25 [0.984] | 122 | 38 | 12 | 42 | 26 | 84  | 30 | 15 | 10 | $\phi 6.6$ Counterbore $\phi 11$ Depth 6.5   | 16 | —  | 16 | 18.5 | 36   | 13.5 | 2.5 | 8  |
| 32 [1.260] | 140 | 45 | 14 | 54 | 34 | 95  | 36 | 18 | 14 | $\phi 9$ Counterbore $\phi 14$ Depth 8.6     | 24 | 2  | 25 | 22.5 | 40.5 | 17.5 | —   | 14 |
| 40 [1.575] | 155 | 48 | 17 | 68 | 46 | 107 | 44 | 22 | 19 | $\phi 11$ Counterbore $\phi 17.5$ Depth 10.8 | 24 | 4  | 25 | 25.5 | 46   | 21   | —   | 16 |

# -HL Dimensions of Head Side End Keep, Side Mounting Type (mm)

●  $\phi 50$ ,  $\phi 63$  DABK  ×  -HL-2

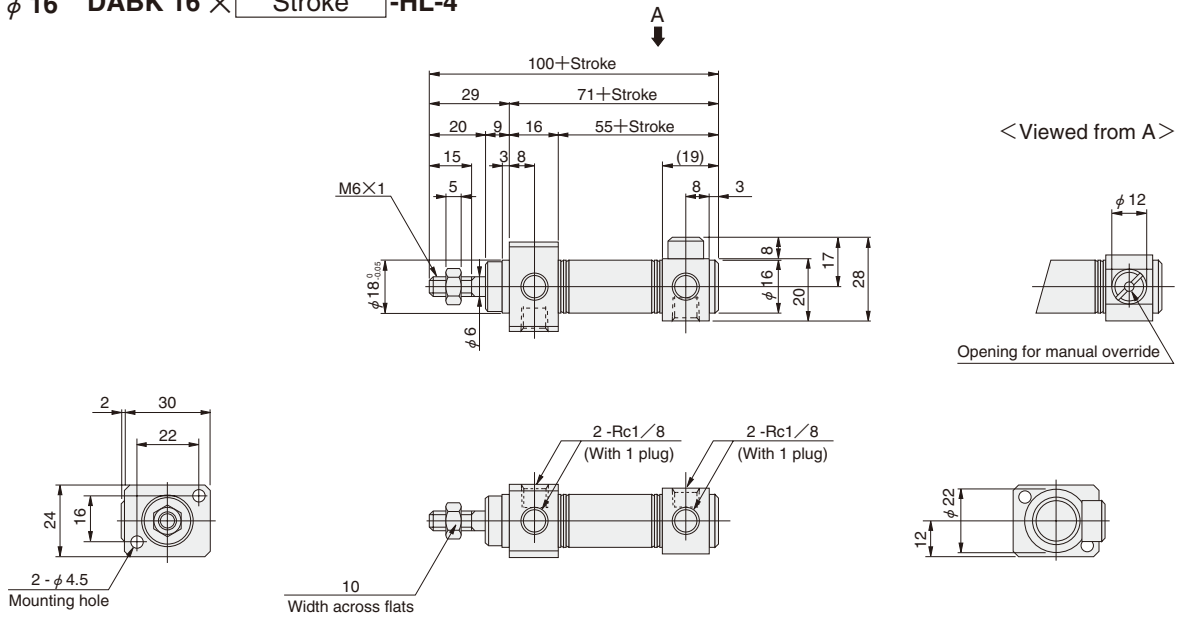


| Bore<br>mm [in.] | Code | U    | AE | AF | AI | AP   | EE   | EF   |
|------------------|------|------|----|----|----|--|------|------|
| 50 [1.969]       |      | 52   | 62 | 44 | 31 | $\phi 6.6$ Counterbore $\phi 11$ Depth 6.5 | 35.5 | 61.5 |
| 63 [2.480]       |      | 65.4 | 74 | 48 | 37 | $\phi 9$ Counterbore $\phi 14$ Depth 8.6   | 35.5 | 68.5 |

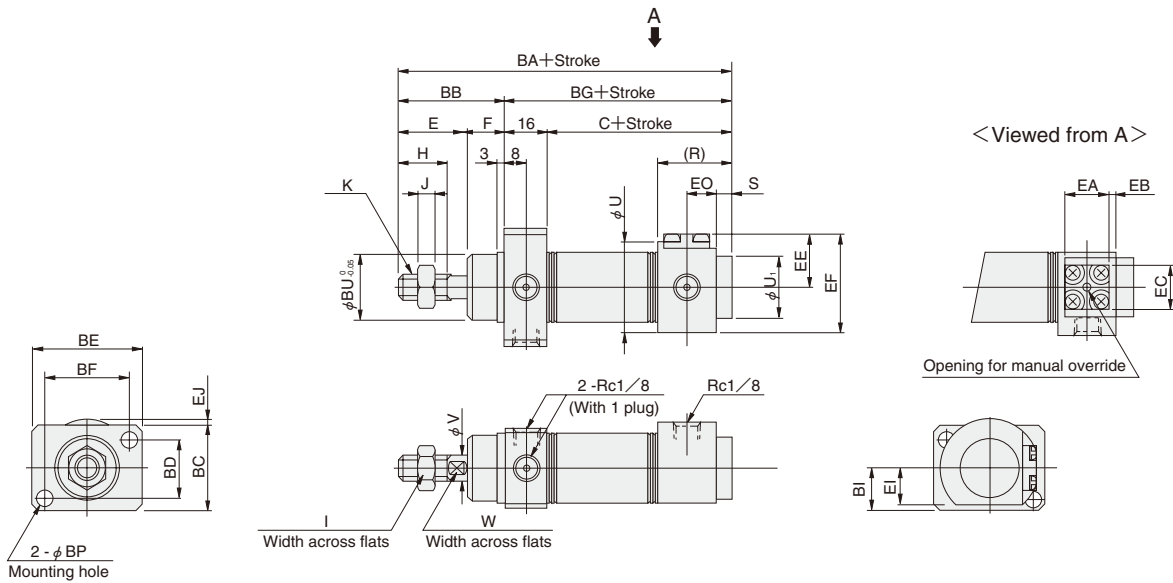
SLIM CYLINDERS

# -HL Dimensions of Head Side End Keep, Front Mounting Type (mm)

## ● $\phi 16$ DABK 16 $\times$ -HL-4



## ● $\phi 20 \sim \phi 40$ DABK $\times$ -HL-4



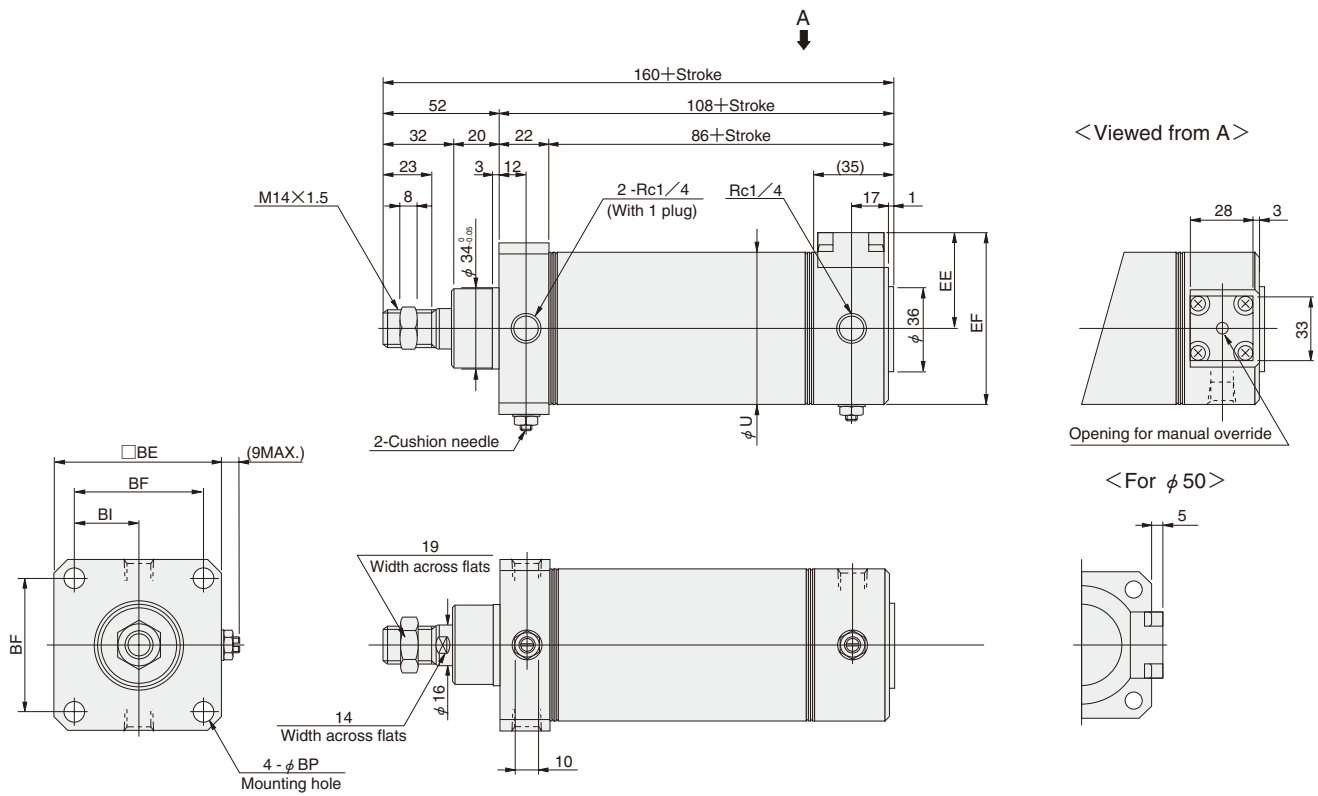
● The drawing is for the  $\phi 20$  and  $\phi 25$ . (Contour dimensions of the  $\phi 32$  and  $\phi 40$  head covers are smaller than the block portion.)

| Code       | C  | E  | F  | H  | I  | J | K        | R  | S | U  | U <sub>1</sub> | V  | W  |
|------------|----|----|----|----|----|---|----------|----|---|----|----------------|----|----|
| 20 [0.787] | 66 | 23 | 12 | 15 | 12 | 5 | M8×1     | 22 | 6 |    | 20             | 8  | 6  |
| 25 [0.984] | 66 | 26 | 14 | 18 | 14 | 6 | M10×1.25 | 22 | 6 | 29 | 22             | 10 | 8  |
| 32 [1.260] | 73 | 31 | 14 | 23 | 14 | 6 | M10×1.25 | 27 | 1 |    | 27             | 12 | 10 |
| 40 [1.575] | 80 | 31 | 14 | 23 | 19 | 8 | M14×1.5  | 32 | 1 | 35 | 33             | 16 | 14 |

| Code       | BA  | BB | BC | BD | BE | BF | BG | BI | BP  | BU | EA | EB | EC | EE   | EF   | EI   | EJ  | EO |
|------------|-----|----|----|----|----|----|----|----|-----|----|----|----|----|------|------|------|-----|----|
| 20 [0.787] | 117 | 35 | 28 | 18 | 38 | 28 | 82 | 14 | 5.5 | 22 | 16 | —  | 16 | 17.5 | 32   | 12.5 | 0.5 | 8  |
| 25 [0.984] | 122 | 40 | 30 | 20 | 42 | 32 | 82 | 15 | 5.5 | 24 | 16 | —  | 16 | 18.5 | 36   | 13.5 | 2.5 | 8  |
| 32 [1.260] | 134 | 45 | 36 | 24 | 54 | 42 | 89 | 18 | 6.6 | 28 | 24 | 2  | 25 | 22.5 | 40.5 | 17.5 | —   | 14 |
| 40 [1.575] | 141 | 45 | 44 | 28 | 68 | 52 | 96 | 22 | 9   | 34 | 24 | 4  | 25 | 25.5 | 46   | 21   | —   | 16 |

# -HL Dimensions of Head Side End Keep, Front Mounting Type (mm)

●  $\phi 50$ ,  $\phi 63$  DABK Bore size  $\times$  Stroke -HL-4

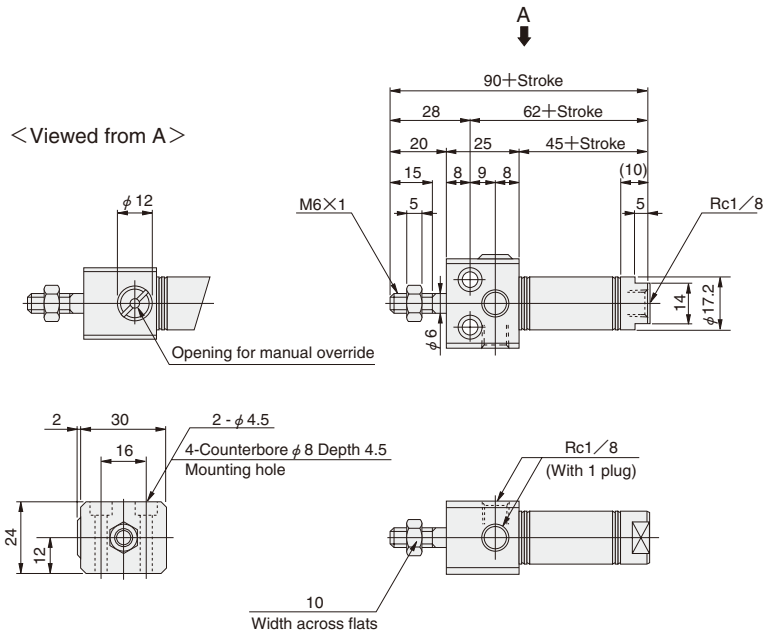


SLIM CYLINDERS

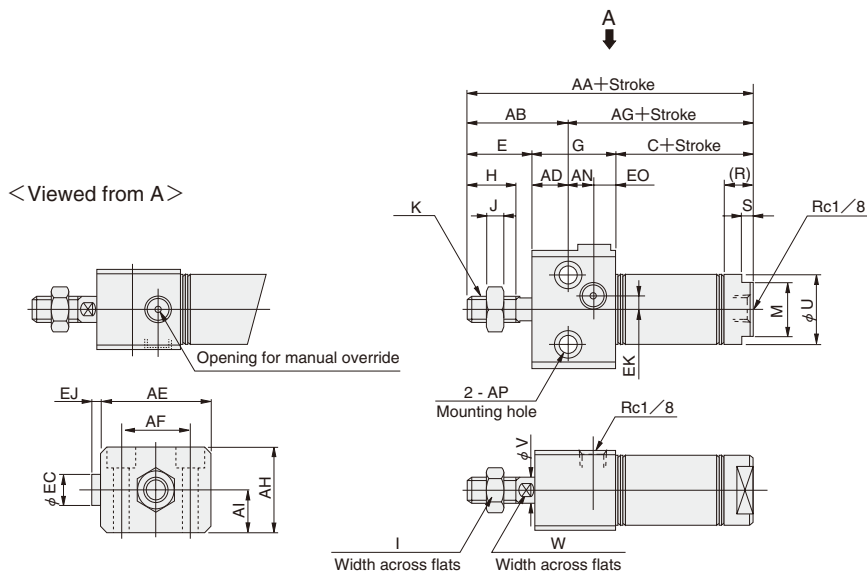
| Bore<br>mm [in.] | Code | U    | BE | BF | BI | BP  | EE   | EF   |
|------------------|------|------|----|----|----|-----|------|------|
| 50 [1.969]       |      | 52   | 62 | 48 | 24 | 6.6 | 35.5 | 61.5 |
| 63 [2.480]       |      | 65.4 | 74 | 58 | 29 | 9   | 35.5 | 68.5 |

# -RL Dimensions of Rod Side End Keep, Side Mounting Type (mm)

●  $\phi 16$  DABK16  $\times$  Stroke -RL-2



●  $\phi 20 \sim \phi 40$  DABK Bore size  $\times$  Stroke -RL-2



● The drawing is for the  $\phi 20$  and  $\phi 25$ . (Contour dimensions of the  $\phi 32$  and  $\phi 40$  head covers are smaller than the block portion.)

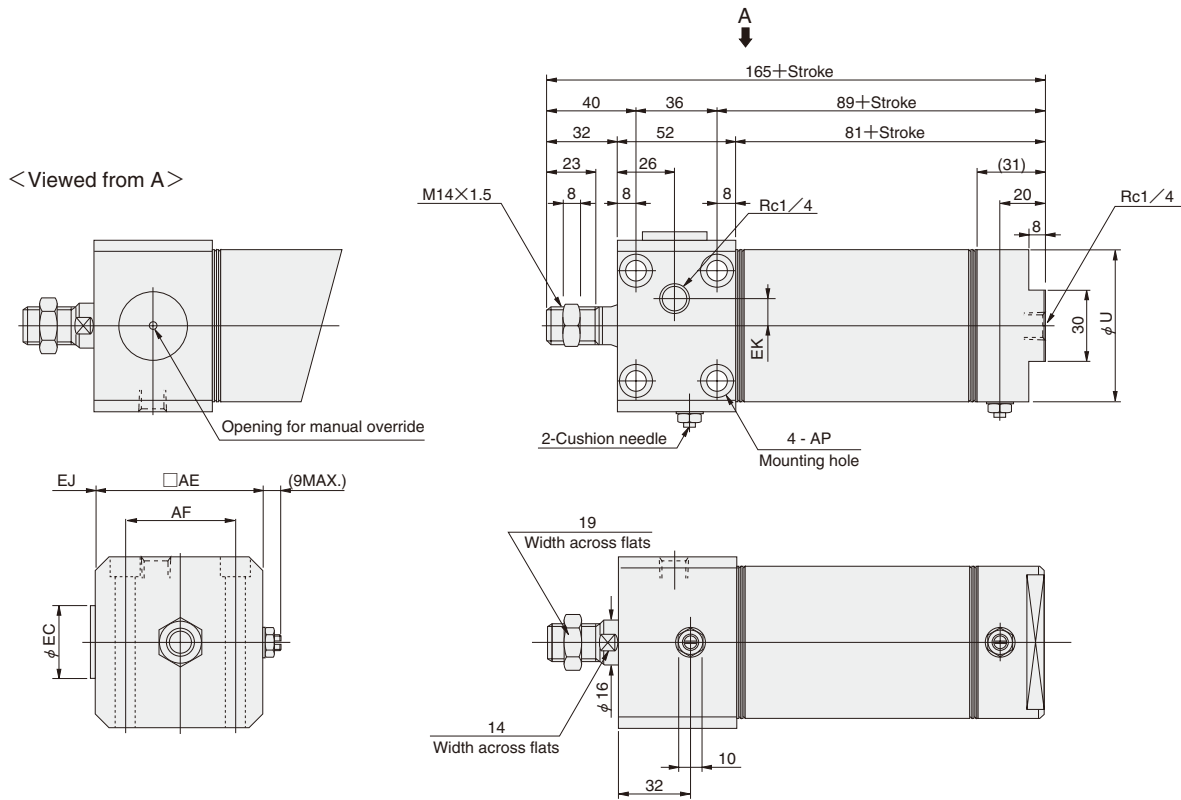
| Bore<br>mm [in.] | Code | C  | E  | G  | H  | I  | J | K        | M  | R  | S | U    | V  | W  |
|------------------|------|----|----|----|----|----|---|----------|----|----|---|------|----|----|
| 20 [0.787]       |      | 53 | 23 | 28 | 15 | 12 | 5 | M8×1     | 17 | 10 | 5 | 21.4 | 8  | 6  |
| 25 [0.984]       |      | 53 | 26 | 30 | 18 | 14 | 6 | M10×1.25 | 19 | 10 | 5 | 26.4 | 10 | 8  |
| 32 [1.260]       |      | 54 | 31 | 36 | 23 | 14 | 6 | M10×1.25 | 22 | 11 | 6 | 33.6 | 12 | 10 |
| 40 [1.575]       |      | 60 | 31 | 50 | 23 | 19 | 8 | M14×1.5  | 22 | 13 | 6 | 41.6 | 16 | 14 |

| Bore<br>mm [in.] | Code | AA  | AB | AD | AE | AF | AG | AH | AI | AN | AP  | EC   | EJ | EK  | EO |
|------------------|------|-----|----|----|----|----|----|----|----|----|---|------|----|-----|----|
| 20 [0.787]       |      | 104 | 34 | 11 | 38 | 22 | 70 | 28 | 14 | 9  | $\phi 6.6$ Counterbore $\phi 11$ Depth6.5   | 12   | 4  | 0   | 8  |
| 25 [0.984]       |      | 109 | 38 | 12 | 42 | 26 | 71 | 30 | 15 | 10 | $\phi 6.6$ Counterbore $\phi 11$ Depth6.5   | 12   | 3  | 0   | 8  |
| 32 [1.260]       |      | 121 | 42 | 11 | 54 | 34 | 79 | 36 | 18 | 14 | $\phi 9$ Counterbore $\phi 14$ Depth8.6     | 17.5 | 5  | 7.5 | 11 |
| 40 [1.575]       |      | 141 | 48 | 17 | 68 | 46 | 93 | 44 | 22 | 19 | $\phi 11$ Counterbore $\phi 17.5$ Depth10.8 | —    | 0  | 10  | 14 |



# -RL Dimensions of Rod Side End Keep, Side Mounting Type (mm)

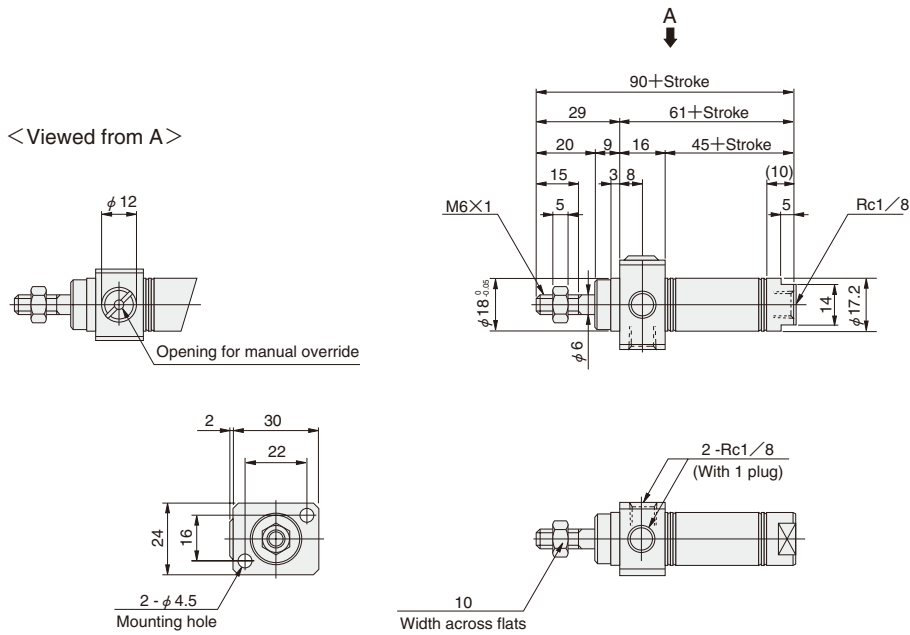
●  $\phi$  50,  $\phi$  63 DABK Bore size  $\times$  Stroke -RL-2



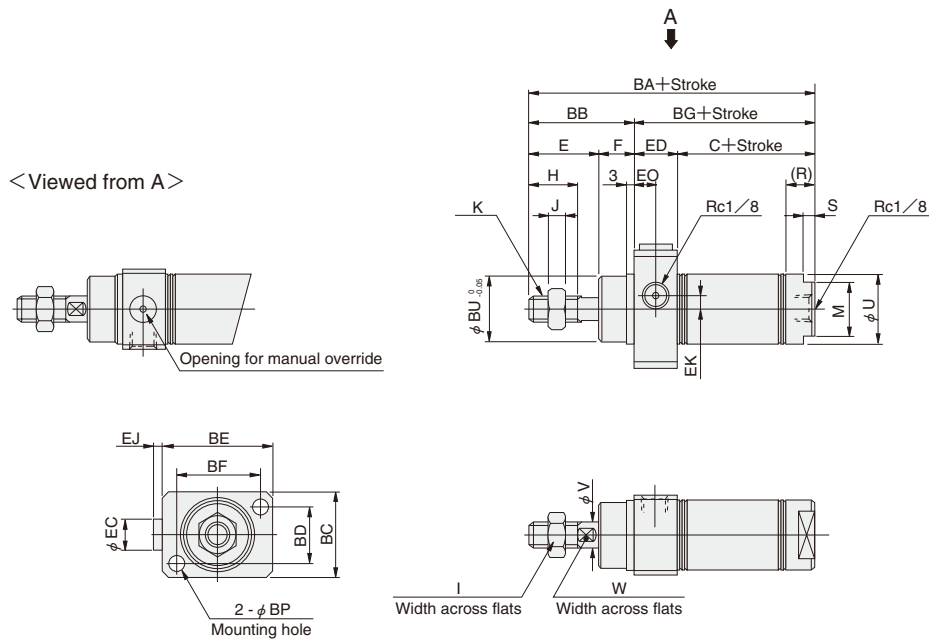
| Bore<br>mm [in.] | Code | U    | AE | AF | AP   | EC | EJ | EK |
|------------------|------|------|----|----|--|----|----|----|
| 50 [1.969]       |      | 52   | 62 | 44 | $\phi$ 6.6 Counterbore $\phi$ 11 Depth 6.5 | 30 | 6  | 10 |
| 63 [2.480]       |      | 65.4 | 74 | 48 | $\phi$ 6.6 Counterbore $\phi$ 11 Depth 6.5 | —  | 0  | 10 |

# -RL Dimensions of Rod Side End Keep, Front Mounting Type (mm)

●  $\phi 16$  DABK16  $\times$  Stroke -RL-4



●  $\phi 20 \sim \phi 40$  DABK Bore size  $\times$  Stroke -RL-4



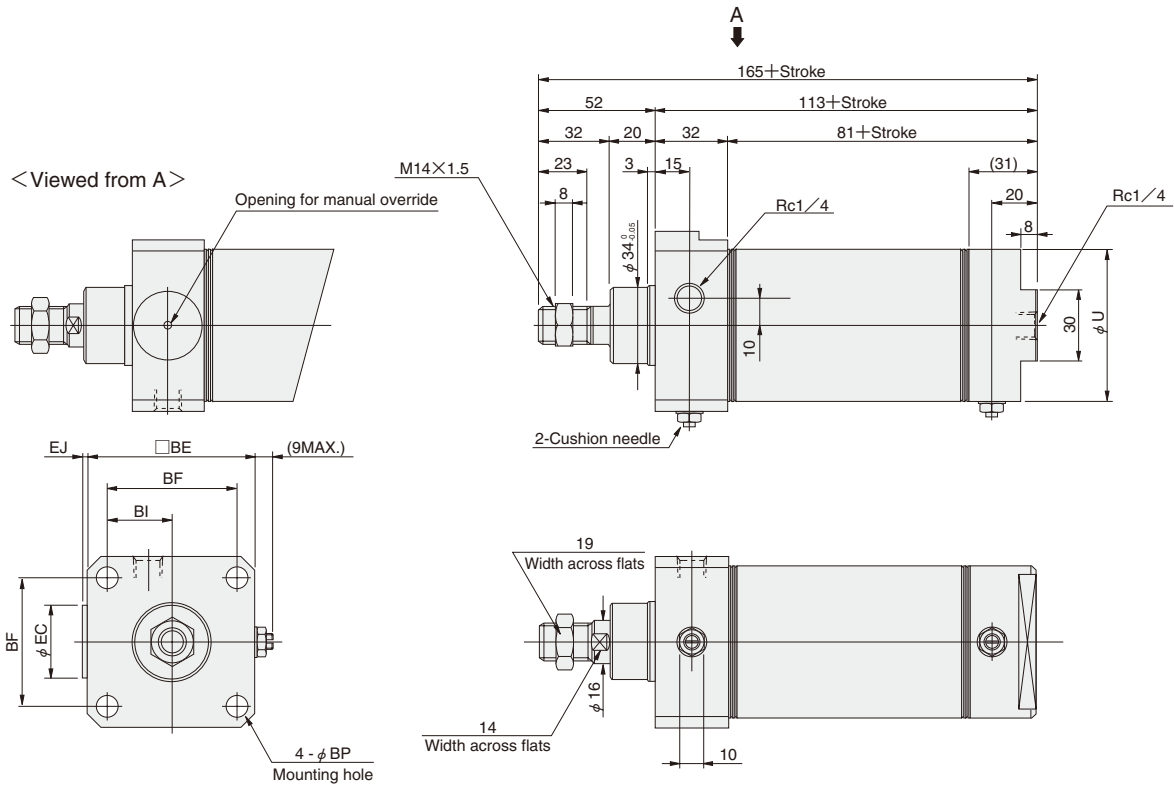
● The drawing is for the  $\phi 20$  and  $\phi 25$ . (Contour dimensions of the  $\phi 32$  and  $\phi 40$  head covers are smaller than the block portion.)

| Bore<br>mm [in.] | Code | C  | E  | F  | H  | I  | J | K        | M  | R  | S | U    | V  | W  |
|------------------|------|----|----|----|----|----|---|----------|----|----|---|------|----|----|
| 20 [0.787]       |      | 53 | 23 | 12 | 15 | 12 | 5 | M8×1     | 17 | 10 | 5 | 21.4 | 8  | 6  |
| 25 [0.984]       |      | 53 | 26 | 14 | 18 | 14 | 6 | M10×1.25 | 19 | 10 | 5 | 26.4 | 10 | 8  |
| 32 [1.260]       |      | 54 | 31 | 14 | 23 | 14 | 6 | M10×1.25 | 22 | 11 | 6 | 33.6 | 12 | 10 |
| 40 [1.575]       |      | 60 | 31 | 14 | 23 | 19 | 8 | M14×1.5  | 22 | 13 | 6 | 41.6 | 16 | 14 |

| Bore<br>mm [in.] | Code | BA  | BB | BC | BD | BE | BF | BG | BP  | BU | EC | ED | EJ | EK  | EO |
|------------------|------|-----|----|----|----|----|----|----|-----|----|----|----|----|-----|----|
| 20 [0.787]       |      | 104 | 35 | 28 | 18 | 38 | 28 | 69 | 5.5 | 22 |    | 16 | 4  | 0   | 8  |
| 25 [0.984]       |      | 109 | 40 | 30 | 20 | 42 | 32 | 69 | 5.5 | 24 | 12 | 16 | 3  | 0   | 8  |
| 32 [1.260]       |      | 124 | 45 | 36 | 24 | 54 | 42 | 79 | 6.6 | 28 |    | 25 | 5  | 7.5 | 11 |
| 40 [1.575]       |      | 131 | 45 | 44 | 28 | 68 | 52 | 86 | 9   | 34 | 12 | 26 | 0  | 10  | 14 |

# -RL Dimensions of Rod Side End Keep, Front Mounting Type (mm)

●  $\phi 50$ ,  $\phi 63$  DABK  ×  -RL-4



SLIM CYLINDERS

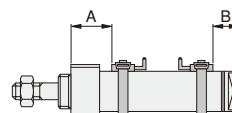
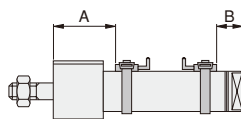
| Bore<br>mm [in.] | Code | U    | BE | BF | BI | BP  | EC | EJ |
|------------------|------|------|----|----|----|-----|----|----|
| 50 [1.969]       |      | 52   | 62 | 48 | 24 | 6.6 | 30 | 6  |
| 63 [2.480]       |      | 65.4 | 74 | 58 | 29 | 9   | —  | 0  |

## Mounting Location of Sensor Switch

When the sensor switch is mounted in the location shown in the diagram (figures in the tables are reference values), the magnet comes to the sensor switch's maximum sensing location at the end of the stroke.

● Block cylinder, side mount

● Block cylinder, front mount



### ●-HL : Head side end keep

mm [in.]

| Sensor switch model | Bore size<br>Code | Block cylinder |            |            |            |            |            |             |            |            |            |            |            |            |            |
|---------------------|-------------------|----------------|------------|------------|------------|------------|------------|-------------|------------|------------|------------|------------|------------|------------|------------|
|                     |                   | Side mount     |            |            |            |            |            | Front mount |            |            |            |            |            |            |            |
|                     |                   | 16 [0.630]     | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480]  | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480] |
| ZG530 □             | A                 | 32 [1.260]     | 39 [1.535] | 41 [1.614] | 47 [1.850] | 57 [2.244] | 66 [2.598] | 66 [2.598]  | 23 [0.906] | 27 [1.063] | 27 [1.063] | 27 [1.063] | 29 [1.142] | 36 [1.417] | 36 [1.417] |
|                     | B                 | 26 [1.024]     | 27 [1.063] | 27 [1.063] | 39 [1.535] | 44 [1.732] | 47 [1.850] | 47 [1.850]  | 26 [1.024] | 27 [1.063] | 39 [1.535] | 39 [1.535] | 44 [1.732] | 47 [1.850] | 47 [1.850] |
| CS □ M              | A                 | 32 [1.260]     | 39 [1.535] | 41 [1.614] | 47 [1.850] | 57 [2.244] | 66 [2.598] | 66 [2.598]  | 23 [0.906] | 27 [1.063] | 27 [1.063] | 27 [1.063] | 29 [1.142] | 36 [1.417] | 36 [1.417] |
|                     | B                 | 26 [1.024]     | 27 [1.063] | 27 [1.063] | 39 [1.535] | 44 [1.732] | 47 [1.850] | 47 [1.850]  | 26 [1.024] | 27 [1.063] | 39 [1.535] | 39 [1.535] | 44 [1.732] | 47 [1.850] | 47 [1.850] |
| CS □ F              | A                 | —              | 36 [1.417] | 38 [1.496] | 44 [1.732] | 54 [2.126] | 64 [2.520] | 64 [2.520]  | —          | 24 [0.945] | 24 [0.945] | 24 [0.945] | 26 [1.024] | 34 [1.339] | 34 [1.339] |
|                     | B                 | —              | 24 [0.945] | 24 [0.945] | 38 [1.496] | 41 [1.614] | 46 [1.811] | 46 [1.811]  | —          | 24 [0.945] | 38 [1.496] | 38 [1.496] | 41 [1.614] | 46 [1.811] | 46 [1.811] |

### ●-RL : Rod side end keep

mm [in.]

| Sensor switch model | Bore size<br>Code | Block cylinder |            |            |            |            |            |             |            |            |            |            |            |            |            |
|---------------------|-------------------|----------------|------------|------------|------------|------------|------------|-------------|------------|------------|------------|------------|------------|------------|------------|
|                     |                   | Side mount     |            |            |            |            |            | Front mount |            |            |            |            |            |            |            |
|                     |                   | 16 [0.630]     | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480]  | 16 [0.630] | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] | 50 [1.969] | 63 [2.480] |
| ZG530 □             | A                 | 32 [1.260]     | 39 [1.535] | 41 [1.614] | 47 [1.850] | 63 [2.480] | 66 [2.598] | 66 [2.598]  | 23 [0.906] | 27 [1.063] | 27 [1.063] | 36 [1.417] | 39 [1.535] | 46 [1.811] | 46 [1.811] |
|                     | B                 | 16 [0.630]     | 20 [0.787] | 20 [0.787] | 21 [0.827] | 25 [0.984] | 44 [1.732] | 44 [1.732]  | 16 [0.630] | 20 [0.787] | 20 [0.787] | 21 [0.827] | 25 [0.984] | 44 [1.732] | 44 [1.732] |
| CS □ M              | A                 | 32 [1.260]     | 39 [1.535] | 41 [1.614] | 47 [1.850] | 63 [2.480] | 66 [2.598] | 66 [2.598]  | 23 [0.906] | 27 [1.063] | 27 [1.063] | 36 [1.417] | 39 [1.535] | 46 [1.811] | 46 [1.811] |
|                     | B                 | 16 [0.630]     | 20 [0.787] | 20 [0.787] | 21 [0.827] | 25 [0.984] | 44 [1.732] | 44 [1.732]  | 16 [0.630] | 20 [0.787] | 20 [0.787] | 21 [0.827] | 25 [0.984] | 44 [1.732] | 44 [1.732] |
| CS □ F              | A                 | —              | 36 [1.417] | 38 [1.496] | 44 [1.732] | 60 [2.362] | 64 [2.520] | 64 [2.520]  | —          | 24 [0.945] | 24 [0.945] | 27 [1.063] | 36 [1.417] | 44 [1.732] | 44 [1.732] |
|                     | B                 | —              | 17 [0.669] | 17 [0.669] | 18 [0.709] | 20 [0.787] | 42 [1.654] | 42 [1.654]  | —          | 17 [0.669] | 17 [0.669] | 18 [0.709] | 20 [0.787] | 42 [1.654] | 42 [1.654] |

## Handling Instructions and Precautions



### Control circuit

For control of Slim End Keep Cylinders, we recommend the use of 2-position, 4-, 5-port valves. Avoid the use of a control circuit of exhaust centers with 3-position valves or other control circuits that exhaust air from 2 delivery ports.

- Notes: 1. It is dangerous to supply air to a connection port on a side with a locking mechanism while already exhausted, because the piston rod could suddenly extend (or retract). In addition, since it could also cause galling of the lock piston and piston rod, resulting in defective operation. Always supply air to the connection port on the opposite side to ensure that back pressure is applied.
2. When restarting operations after air has been exhausted from the cylinder due to completion of operations or to an emergency stop, always start by supplying air to the connection port on the opposite side of the locking mechanism.



### Manual operation

While the locking mechanism is normally released automatically through cylinder operations, it can also be released manually. For manual release, insert an M3 × 0.5 (M2.5 × 0.45 for φ16) screw that has 30mm [1.18in.] below head length into the opening for manual override, thread it in about 3 turns into the internal lock piston, and then pull up the screw. To maintain the manual override for adjustment, etc., thread the locknut onto the screw and, with the locking mechanism in a released state, tighten the locknut against the cylinder.

- Notes: 1. It is dangerous to release the lock when a load (weight) is present on the piston rod, because it may cause a sudden fall or cause the unintended piston rod's extension (or retraction). In this case, always supply air to the connection port opposite the one adjacent to the locking mechanism before releasing the locking mechanism.
2. If the locking mechanism cannot easily be released even with manual override, it could be the result of galling of the lock piston and piston rod. In this case, supply air to the connection port opposite the one adjacent to the locking mechanism before releasing the locking mechanism.



### General precautions

#### Media

1. Use air for the media. For the use of any other media, consult us.
2. Air used for the cylinder should be clean air that contains no deteriorated compressor oil, etc. Install an air filter (filtration of a minimum 40 μm) near the cylinder or valve to remove collected liquid or dust. In addition, drain the air filter periodically.  
Collected liquid or dust entering the cylinder may cause improper operation.

#### Lubrication

The product can be used without lubrication, if lubrication is required, use Turbine Oil Class 1 (ISO VG32) or equivalent. Avoid using spindle oil or machine oil.

#### Atmosphere

1. Because water, oil, dust, etc., entering the opening for manual override may cause defective locks or other erratic operation. If using in locations subject to dripping water, dripping oil etc., or to large amounts of dust, use a cover to protect the unit.
2. The product cannot be used when the media or ambient atmosphere contains any of the substances listed below.  
Organic solvents, phosphate ester type hydraulic oil, sulphur dioxide, chlorine gas, or acids, etc.

# SLIM TANDEM CYLINDERS

## Symbol



## Specifications

| Item                                  | Bore size mm [in.]                             | 20, 25, 32, 40 [0.787, 0.984, 1.260, 1.575] |
|---------------------------------------|--|---|
| Operation type                        | Double acting type                             |   |
| Media                                 | Air  |   |
| Mounting type                         | Basic type, Foot type, Flange type, Pivot type |   |
| Operating pressure range MPa [psi.]   | 0.08~0.9 [12~131]                              |   |
| Proof pressure MPa [psi.]             | 1.32 [191]                                     |   |
| Operating temperature range °C [°F]   | 0~70 [32~158]                                  |   |
| Operating speed range mm/s [in./sec.] | 50~800 [2.0~31.5]                              |   |
| Cushion                               | Fixed type (Rubber bumper)                     |   |
| Lubrication                           | Not required                                   |   |
| Port size                             | Rc   | 1/8   |

## Bore Size and Stroke

| Bore size | Stroke1 (Standard) |    |    |     |     |     | Maximum available stroke |     |
|-----------|--------------------|----|----|-----|-----|-----|--------------------------|-----|
|           | 25                 | 50 | 75 | 100 | 150 |     |                          |     |
| 20        | 0                  | 25 | 50 | 75  | 100 | 150 | 200                      | 650 |
| 25        | 0                  | 25 | 50 | 75  | 100 | 150 | 200                      |     |
| 32        | 0                  | 25 | 50 | 75  | 100 | 150 | 200                      |     |
| 40        | 0                  | 25 | 50 | 75  | 100 | 150 | 200                      |     |

Note: Figures in the table are combination of stroke 1 (standard) and its corresponding stroke 2 (standard).  
Stroke 1 is available up to 150 strokes.

## Order Codes

**DA T 20×50×50** - [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

**DA** — Slim double acting cylinder

**T** — Tandem cylinder

**20×50×50** — Bore size × Stroke1 × Stroke2

**Head cover specification**  
Blank — Standard head  
A — Short head

**Mounting type**  
Blank — Basic type  
1 — Foot mounting type  
3 — Flange mounting type  
8E — Pivot mounting type with supporting bracket (with pin)  
● Mounting brackets are included at shipping.

**Rod end accessory**  
Blank — No rod end accessory  
I — I type knuckle  
Y — Y type knuckle (with pin)  
● For the cylinder joint and cylinder rod end, see p.1568.

**Number of sensor switches**  
1 — With 1 sensor switch  
2 — With 2 sensor switches  
3 — With 3 sensor switches  
⋮

**Lead wire length**  
(Applies to all except CS□F)  
A — 1000mm [39in.]  
B — 3000mm [118in.]

**Sensor switch (for cylinders with sensor switches)**  
Blank — No sensor switch  
ZG530 — 2-lead wire Solid state type with indicator lamp DC10~28V  
ZG553 — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
CS3M — Reed switch type with indicator lamp DC10~30V  
CS4M — Reed switch type with indicator lamp AC85~230V  
CS5M — Reed switch type without indicator lamp DC10~30V  
CS2F — Reed switch type with indicator lamp AC85~115V  
CS3F — Reed switch type with indicator lamp AC85~115V  
CS4F — Reed switch type with indicator lamp DC3~30V  
CS5F — Reed switch type without indicator lamp DC3~30V

● For details of sensor switches, see p.1544.  
● CS□F comes with DIN connector.  
All others are grommet type.

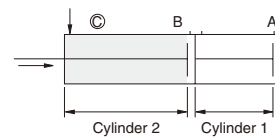
● About stroke 1 and stroke 2

Stroke 1 is the stroke of cylinder 1.  
Stroke 2 is obtained by subtracting stroke 1 from the stroke of cylinder 2.

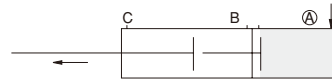


## Operation of Tandem Cylinders

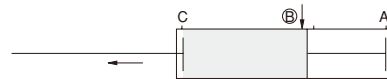
Tandem Cylinders are a set of 2 cylinders joined end to end. It can be used as a 2-stage stroke cylinder by supplying air to either Port A or Port B. It can also obtain twice the thrust within the "stroke 1" range.



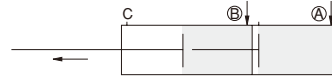
The rod retracts stroke 2 and stroke 1 when air is supplied from Port C.



The rod moves stroke 1 when air is supplied from Port A.

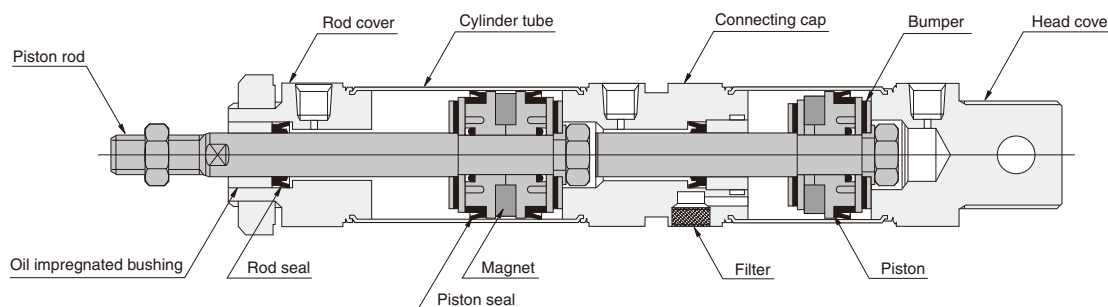


The rod moves stroke 2 when air is supplied from Port B.



Twice the thrust is obtained within the stroke 1 range when air is supplied from Ports A and B.

## Inner Construction and Major Parts (cannot be disassembled)



## Major Parts and Materials

| Parts          | Bore size | 20~40                      |
|----------------|-----------|----------------------------|
| Cylinder tube  |           | Stainless steel tube       |
| Piston         |           | Plastic                    |
| Piston rod     |           | Steel (hard chrome plated) |
| Rod cover      |           | Aluminum (anodized)        |
| Head cover     |           |                            |
| Connecting cap |           |                            |
| Seal           |           | Synthetic rubber (NBR)     |
| Bumper         |           |                            |
| Magnet         |           | Plastic magnet             |
| Filter         |           | Foamed metal               |

## Seals

Note: Seals cannot be replaced.

| mm        |              |             |
|-----------|--------------|-------------|
| Parts     | Rod seal     | Piston seal |
| Bore size | Quantity     |             |
| 20        | 2            | 3           |
| 25        | NY-12×8×3.5  | PPY-20      |
| 32        | NY-14×10×3.5 | PPY-25      |
| 40        | NY-17×12×4   | PPY-32      |
|           | NY-22×16×5   | PPY-40      |

## Mass

| kg [lb.]              |                  |             |   |                 |                          |                |               |                |                |
|-----------------------|------------------|-------------|---|-----------------|--------------------------|----------------|---------------|----------------|----------------|
| Bore size<br>mm [in.] | Zero stroke mass |             | Additional mass for each 1mm [0.0394in.] stroke |                 | Mass of mounting bracket |                |               |                |                |
|                       | Standard head    | Short head  | Stroke 1  | Stroke 2        | Foot bracket             | Flange bracket | Pivot bracket | Y type knuckle | I type knuckle |
| 20 [0.787]            | 0.30 [0.66]      | 0.26 [0.57] | 0.0016 [0.0035]                                 | 0.0008 [0.0018] | 0.14 [0.31]              | 0.08 [0.18]    | 0.06 [0.13]   | 0.041 [0.090]  | 0.036 [0.079]  |
| 25 [0.984]            | 0.35 [0.77]      | 0.34 [0.75] | 0.0022 [0.0049]                                 | 0.0011 [0.0024] | 0.16 [0.35]              | 0.08 [0.18]    | 0.06 [0.13]   | 0.075 [0.165]  | 0.070 [0.154]  |
| 32 [1.260]            | 0.45 [0.99]      | 0.43 [0.95] | 0.003 [0.0066]                                  | 0.0015 [0.0033] | 0.19 [0.42]              | 0.10 [0.22]    | 0.14 [0.31]   | 0.075 [0.165]  | 0.070 [0.154]  |
| 40 [1.575]            | 0.6 [1.32]       | 0.56 [1.23] | 0.0048 [0.0106]                                 | 0.0024 [0.0053] | 0.29 [0.64]              | 0.13 [0.29]    | 0.14 [0.31]   | 0.120 [0.265]  | 0.132 [0.291]  |

Calculation example: For tandem cylinder of 25mm bore size and stroke 1 of 50mm and stroke 2 of 100mm  
 $0.35 + (0.0022 \times 50) + (0.0011 \times 100) = 0.57\text{kg} [1.26\text{lb.}]$

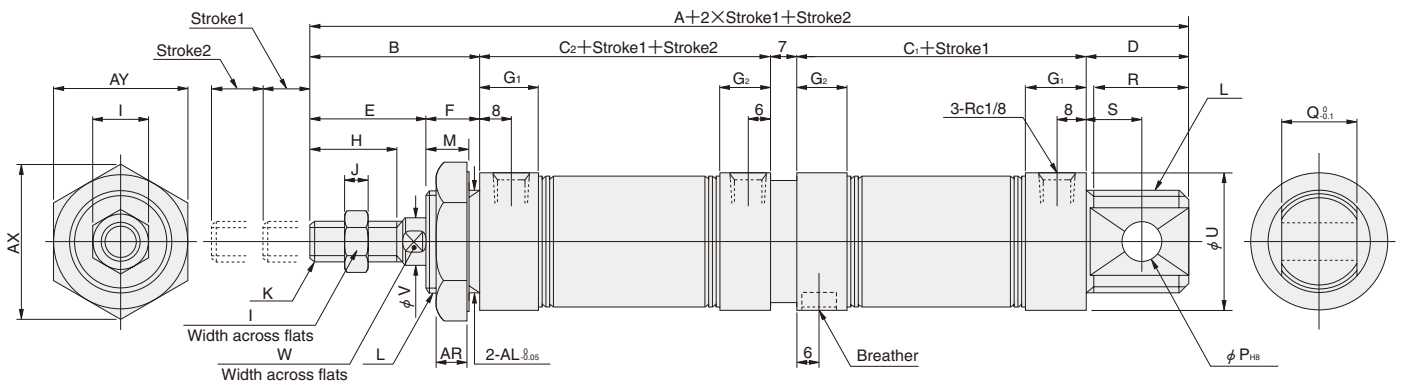
## Mounting Location of Sensor Switch



|                          |           | mm [in.]     |              |            |              |
|--------------------------|-----------|--------------|--------------|------------|--------------|
| Sensor switch model      | Bore size | 20 [0.787]   | 25 [0.984]   | 32 [1.260] | 40 [1.575]   |
|                          | Code      |              |              |            |              |
| ZG530□<br>ZG553□<br>CS□M | A         | 27 [1.063]   | 27 [1.063]   | 27 [1.063] | 27 [1.063]   |
|                          | B         | 16.5 [0.650] | 16.5 [0.650] | 17 [0.669] | 15.5 [0.610] |
|                          | C         | 25 [0.984]   | 25 [0.984]   | 25 [0.984] | 25 [0.984]   |
|                          | D         | 27 [1.063]   | 27 [1.063]   | 27 [1.063] | 27 [1.063]   |
| CS□F                     | A         | 22 [0.866]   | 22 [0.866]   | 22 [0.866] | 22 [0.866]   |
|                          | B         | 11.5 [0.453] | 11.5 [0.453] | 12 [0.472] | 10.5 [0.413] |
|                          | C         | 20 [0.787]   | 20 [0.787]   | 20 [0.787] | 20 [0.787]   |
|                          | D         | 22 [0.866]   | 22 [0.866]   | 22 [0.866] | 22 [0.866]   |

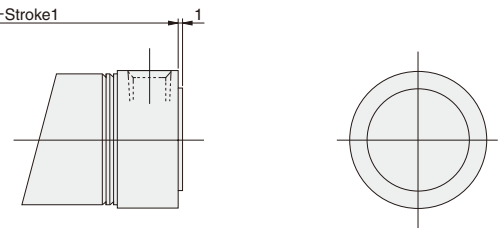
# Dimensions of Tandem Cylinder Basic Type (mm)

●  $\phi 20 \sim \phi 40$  DAT  ×  ×



SLIM CYLINDERS

● Short head  
DAT  ×  ×  -A

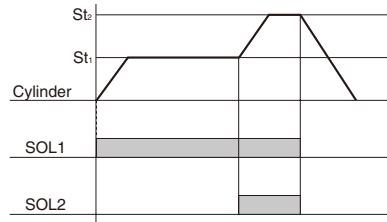
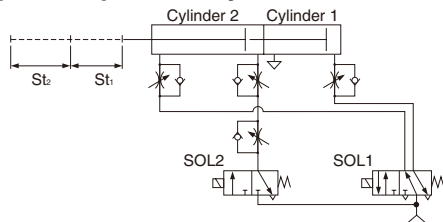


| Code       | A     | B  | C <sub>1</sub> | C <sub>2</sub> | D  | E  | F  | G <sub>1</sub> | G <sub>2</sub> | H  | I  | J | K        | L       | M  | P  | Q  | R  | S  | AL | U    | V  | W  | AR  | AX   | AY |
|------------|-------|----|----------------|----------------|----|----|----|----------------|----------------|----|----|---|----------|---------|----|----|----|----|----|----|------|----|----|-----|------|----|
| 20 [0.787] | 203.5 | 35 | 66.5           | 74             | 21 | 23 | 12 | 16             | 14             | 15 | 12 | 5 | M8×1     | M20×1.5 | 10 | 8  | 12 | 19 | 12 | 20 | 27   | 8  | 6  | 7.5 | 31.2 | 27 |
| 25 [0.984] | 208.5 | 40 | 66.5           | 74             | 21 | 26 | 14 | 16             | 14             | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 8  | 12 | 19 | 12 | 22 | 29   | 10 | 8  | 9.5 | 34.6 | 30 |
| 32 [1.260] | 220   | 45 | 67             | 74             | 27 | 31 | 14 | 16             | 14             | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 10 | 20 | 25 | 15 | 27 | 35   | 12 | 10 | 9.5 | 41.6 | 36 |
| 40 [1.575] | 218.5 | 45 | 65.5           | 74             | 27 | 31 | 14 | 14.5           | 12.5           | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 10 | 20 | 25 | 15 | 33 | 41.6 | 16 | 14 | 9.5 | 47.3 | 41 |

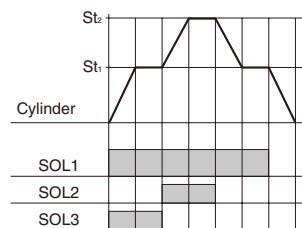
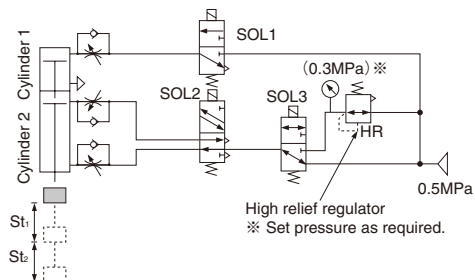
## Example of Air Circuit for Tandem Cylinders

See the following air circuit when using the tandem cylinder as a 2-staged stroke cylinder. Consult us for air circuits not shown below.

### ● For upward-operation cylinder



### ● For downward- or horizontal-operation cylinder



# SLIM DUAL STROKE CYLINDERS



## Symbol



## Specifications

| Item                                  | Bore size mm [in.] | 20, 25, 32, 40 [0.787, 0.984, 1.260, 1.575] |
|---------------------------------------|--------------------|---|
| Operation type                        |                    | Double acting type                          |
| Media                                 |                    | Air   |
| Mounting type                         |                    | Basic type, Foot type, Flange type          |
| Operating pressure range MPa [psi.]   |                    | 0.04~0.9 [6~131]                            |
| Proof pressure MPa [psi.]             |                    | 1.32 [191]                                  |
| Operating temperature range °C [°F]   |                    | 0~70 [32~158]                               |
| Operating speed range mm/s [in./sec.] |                    | 30~800 [1.2~31.5]                           |
| Cushion                               |                    | Fixed type (Rubber bumper)                  |
| Lubrication                           |                    | Not required                                |
| Port size                             | Rc                 | 1/8   |

## Bore Size and Stroke

|           |                 | mm |    |    |     |     |                          |     |
|-----------|-----------------|----|----|----|-----|-----|--------------------------|-----|
| Bore size | Stroke 1 (Std.) | 25 | 50 | 75 | 100 | 150 | Maximum available stroke |     |
|           | 20              |    | 0  | 25 | 50  | 75  | 100                      | 650 |
| 25        |                 | 0  | 25 | 50 | 75  | 100 |                          |     |
| 32        |                 | 0  | 25 | 50 | 75  | 100 |                          |     |
| 40        |                 | 0  | 25 | 50 | 75  | 100 |                          |     |

Note: Figures in the table are a combination of stroke 1 (standard) and the corresponding stroke 2 (standard).  
Stroke 1 is available up to 150 strokes.

## Order Codes

**DA** **W** **20×50×50** - [ ] - [ ] - [ ] [ ] [ ]

**Dual stroke cylinder**

**Bore size**  
× Stroke1  
× Stroke2

**Rod end accessory**  
Blank — No rod end accessory  
I — I type knuckle  
Y — Y type knuckle (with pin)  
● For the cylinder joint and cylinder rod end, see p.1568.

**Mounting type**  
Blank — Basic type  
1 — Foot mounting type  
3 — Flange mounting type  
● Mounting brackets are included at shipping.

**Number of sensor switches**  
1 — With 1 sensor switch  
2 — With 2 sensor switches  
3 — With 3 sensor switches  
: : :

**Lead wire length**  
(Applies to all except CS□F)  
A — 1000mm [39in.]  
B — 3000mm [118in.]

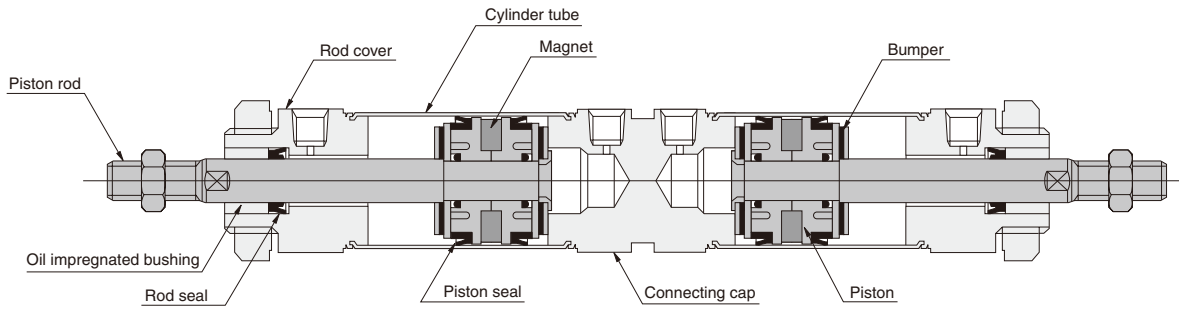
**Sensor switch** (for cylinders with sensor switches)  
Blank — No sensor switch  
ZG530 — 2-lead wire Solid state type with indicator lamp DC10~28V  
ZG553 — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
CS3M — Reed switch type with indicator lamp DC10~30V  
CS4M — Reed switch type with indicator lamp AC85~230V  
CS5M — Reed switch type without indicator lamp DC10~30V  
CS2F — Reed switch type with indicator lamp AC85~115V  
CS3F — Reed switch type with indicator lamp DC3~30V  
CS4F — Reed switch type with indicator lamp AC85~115V  
CS5F — Reed switch type without indicator lamp DC3~30V

● For details of sensor switches, see p.1544.  
● CS□F comes with DIN connector.  
All others are grommet type.

**Slim double acting cylinder**



# Inner Construction and Major Parts (cannot be disassembled)



## Major Parts and Materials

| Parts         | Bore size | 20~40                      |
|---------------|-----------|----------------------------|
| Cylinder tube |           | Stainless steel            |
| Piston        |           | Plastic                    |
| Piston rod    |           | Steel (hard chrome plated) |
| Rod cover     |           | Aluminum (anodized)        |
| Head cover    |           |                            |
| Seal          |           | Synthetic rubber (NBR)     |
| Bumper        |           |                            |
| Magnet        |           | Plastic magnet             |

## Seals

Note: Seals cannot be replaced.

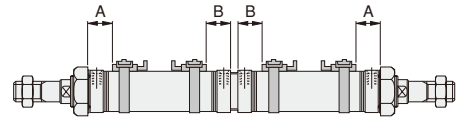
|           |          |              | mm          |  |
|-----------|----------|--------------|-------------|--|
| Parts     | Quantity | Rod seal     | Piston seal |  |
| Bore size |          | 2            | 4           |  |
| 20        |          | NY-12×8×3.5  | PPY-20      |  |
| 25        |          | NY-14×10×3.5 | PPY-25      |  |
| 32        |          | NY-17×12×4   | PPY-32      |  |
| 40        |          | NY-22×16×5   | PPY-40      |  |

## Mass

| Bore size<br>mm [in.] | Zero stroke mass | Additional mass for each 1mm [0.0394in.] stroke |                 | Mass of mounting bracket |                |                |                |
|-----------------------|------------------|---|-----------------|--------------------------|----------------|----------------|----------------|
|                       |                  | Stroke 1  | Stroke 2        | kg [lb.]                 |                |                |                |
|                       |                  |   |                 | Foot bracket             | Flange bracket | Y type knuckle | I type knuckle |
| 20 [0.787]            | 0.30 [0.66]      | 0.0008 [0.0018]                                 | 0.0008 [0.0018] | 0.14 [0.31]              | 0.08 [0.18]    | 0.041 [0.090]  | 0.036 [0.079]  |
| 25 [0.984]            | 0.39 [0.86]      | 0.0011 [0.0024]                                 | 0.0011 [0.0024] | 0.16 [0.35]              | 0.08 [0.18]    | 0.075 [0.165]  | 0.070 [0.154]  |
| 32 [1.260]            | 0.60 [1.32]      | 0.0015 [0.0033]                                 | 0.0015 [0.0033] | 0.19 [0.42]              | 0.10 [0.22]    | 0.075 [0.165]  | 0.070 [0.154]  |
| 40 [1.575]            | 0.90 [1.98]      | 0.0024 [0.0053]                                 | 0.0024 [0.0053] | 0.29 [0.64]              | 0.13 [0.29]    | 0.120 [0.265]  | 0.132 [0.291]  |

Calculation example: For dual stroke cylinder of 25mm bore size and stroke 1 of 50mm and stroke 2 of 100mm  
 $0.39 + (0.0011 \times 50 + 0.0011 \times 100) = 0.555\text{kg} [1.224\text{lb.}]$

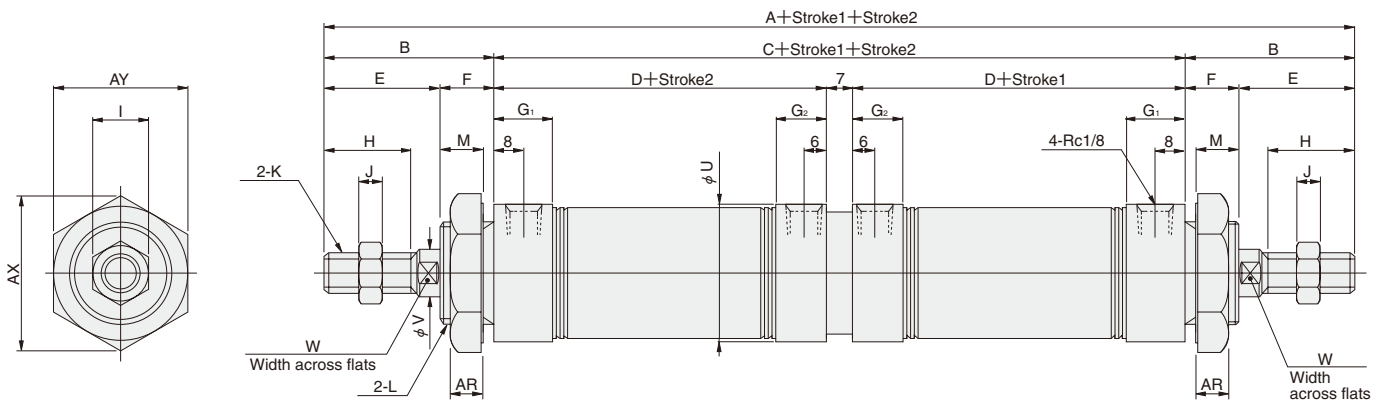
## Mounting Location of Sensor Switch



|                                |           | mm [in.]   |            |            |            |
|--------------------------------|-----------|------------|------------|------------|------------|
| Sensor switch model            | Bore size | 20 [0.787] | 25 [0.984] | 32 [1.260] | 40 [1.575] |
|                                | Code      |            |            |            |            |
| ZG530 <input type="checkbox"/> | A         | 27 [1.063] | 27 [1.063] | 27 [1.063] | 27 [1.063] |
| ZG553 <input type="checkbox"/> | B         | 25 [0.984] | 25 [0.984] | 25 [0.984] | 25 [0.984] |
| CS <input type="checkbox"/> M  | A         | 22 [0.866] | 22 [0.866] | 22 [0.866] | 22 [0.866] |
| CS <input type="checkbox"/> F  | B         | 20 [0.787] | 20 [0.787] | 20 [0.787] | 20 [0.787] |

# Dimensions of Dual Stroke Basic Type (mm)

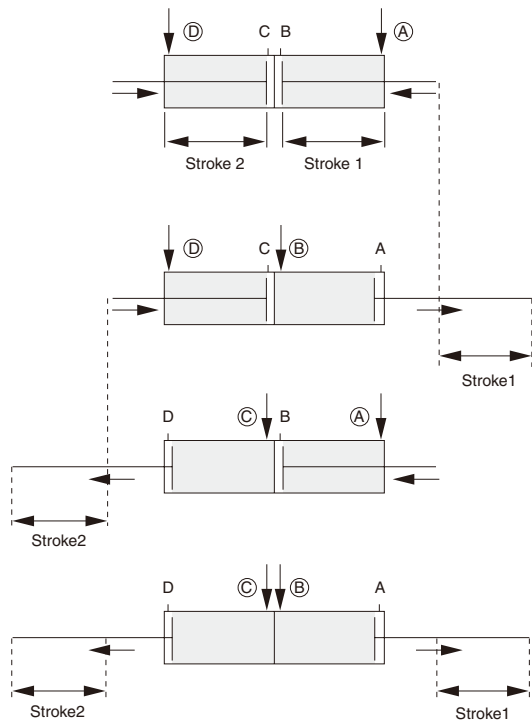
●  $\phi 20 \sim \phi 40$  DAW  ×  ×



| Code<br>Bore<br>mm [in.] | A   | B  | C   | D  | E  | F  | G <sub>1</sub> | G <sub>2</sub> | H  | I  | J | K        | L       | M  | U    | V  | W  | AR  | AX   | AY |
|--------------------------|-----|----|-----|----|----|----|----------------|----------------|----|----|---|----------|---------|----|------|----|----|-----|------|----|
| 20 [0.787]               | 225 | 35 | 155 | 74 | 23 | 12 | 16             | 14             | 15 | 12 | 5 | M8×1     | M20×1.5 | 10 | 27   | 8  | 6  | 7.5 | 31.2 | 27 |
| 25 [0.984]               | 235 | 40 | 155 | 74 | 26 | 14 | 16             | 14             | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 29   | 10 | 8  | 9.5 | 34.6 | 30 |
| 32 [1.260]               | 245 | 45 | 155 | 74 | 31 | 14 | 16             | 14             | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 35   | 12 | 10 | 9.5 | 41.6 | 36 |
| 40 [1.575]               | 245 | 45 | 155 | 74 | 31 | 14 | 14.5           | 12.5           | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 41.6 | 16 | 14 | 9.5 | 47.3 | 41 |

## Operation of Dual Stroke Cylinders

Dual Stroke Cylinders are a set of 2 cylinders connected back to back. The cylinder body can be secured in place and each stroke can be controlled separately. It can also be used to obtain 2-stage or 3-stage strokes by securing the piston rod on one side in place.



The rods retract stroke 2 and stroke 1 when air is supplied from Ports (A) and (D).

The rod moves stroke 1 when air is supplied from Ports (B) and (D).

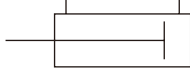
The rod moves stroke 2 when air is supplied from Ports (A) and (C).

The rod moves stroke 1 and stroke 2 when air is supplied from Ports (B) and (C).

# SLIM HEAT RESISTANT SPECIFICATION CYLINDERS



## Symbol



## Specifications

| Item                                  | Bore size mm [in.] | 20, 25, 32, 40 [0.787, 0.984, 1.260, 1.575]    |
|---------------------------------------|--------------------|--|
| Operation type                        |                    | Double acting type                             |
| Media                                 |                    | Air  |
| Mounting type                         |                    | Basic type, Foot type, Flange type, Pivot type |
| Operating pressure range MPa [psi.]   |                    | 0.1~0.9 [15~131]                               |
| Proof pressure MPa [psi.]             |                    | 1.32 [191]                                     |
| Operating temperature range °C [°F]   |                    | 0~130 [32~266]                                 |
| Operating speed range mm/s [in./sec.] |                    | 100~700 [3.9~27.6]                             |
| Cushion                               |                    | Fixed type (Rubber bumper)                     |
| Lubrication                           |                    | Not required                                   |
| Port size                             | Rc                 | 1/8  |

## Cylinder Bore Size and Stroke

| Bore size | Standard strokes |    |    |     |     |     |     | Maximum stroke | Maximum available stroke |
|-----------|------------------|----|----|-----|-----|-----|-----|----------------|--------------------------|
|           | 25               | 50 | 75 | 100 | 125 | 150 | 200 |                |                          |
| 20        |                  |    |    |     |     |     |     | 200            | 500                      |
| 25        |                  |    |    |     |     |     |     | 250            |                          |
| 32        |                  |    |    |     |     |     |     | 300            |                          |
| 40        |                  |    |    |     |     |     |     | 400            |                          |

Remarks 1: Stroke tolerance  ${}^+_1 \begin{matrix} +0.039in. \\ 0 \end{matrix}$

2: For non-standard strokes, consult us.

3: The minimum operating pressure when the stroke is over the maximum stroke at bore size of  $\phi 20$ - $\phi 40$  is 0.2MPa [29psi.].

## Order Codes

**DA** **F** **20×50** -  -  -

**Heat resistant specification**  
**Slim double acting cylinder**

**Bore size × Stroke**

**Rod end accessory**  
**Blank** — No rod end accessory  
**I** — I type knuckle  
**Y** — Y type knuckle (with pin)

**Mounting type**  
**Blank** — Basic type  
**1** — Foot mounting type  
**3** — Flange mounting type  
**8E** — Pivot mounting type with supporting bracket (with pin)  
 ● Mounting brackets are included at shipping.

**Head cover specification**  
**Blank** — Standard head  
**A** — Short head

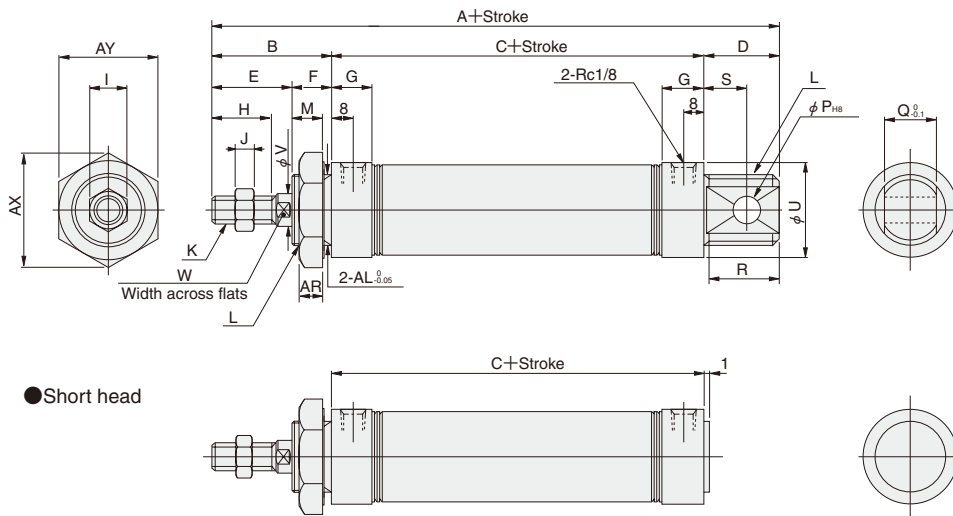
**Caution** Since a magnet for sensor switch is not built into the heat resistant specification cylinder, sensor switches will not be functional.

## Major Parts and Materials

| Parts         | Bore size | 20, 25, 32, 40             |
|---------------|-----------|----------------------------|
| Cylinder tube |           | Stainless steel            |
| Piston        |           | Aluminum (anodized)        |
| Piston rod    |           | Steel (hard chrome plated) |
| Rod cover     |           | Aluminum (anodized)        |
| Head cover    |           |                            |
| Seal          |           | Fluoro rubber (FKM)        |
| Bumper        |           |                            |

## Dimensions of Heat Resistant Specification Cylinder Basic Type (mm)

●  $\phi 20 \sim \phi 40$  DAF  ×

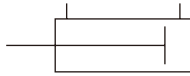


| Bore<br>mm [in.] | Code    | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | L       | M  | P  | Q  | R  | S  | U    | V  | W  |
|------------------|---------|-----|----|----|----|----|----|--------|----|----|---|----------|---------|----|----|----|----|----|------|----|----|
| 20               | [0.787] | 132 | 35 | 76 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M8×1     | M20×1.5 | 10 | 8  | 12 | 19 | 12 | 27   | 8  | 6  |
| 25               | [0.984] | 137 | 40 | 76 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 8  | 12 | 19 | 12 | 29   | 10 | 8  |
| 32               | [1.260] | 148 | 45 | 76 | 27 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 10 | 20 | 25 | 15 | 35   | 12 | 10 |
| 40               | [1.575] | 148 | 45 | 76 | 27 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 10 | 20 | 25 | 15 | 41.6 | 16 | 14 |

| Bore<br>mm [in.] | Code    | AR  | AX   | AY | AL |
|------------------|---------|-----|------|----|----|
| 20               | [0.787] | 7.5 | 31.2 | 27 | 20 |
| 25               | [0.984] | 9.5 | 34.6 | 30 | 22 |
| 32               | [1.260] | 9.5 | 41.6 | 36 | 27 |
| 40               | [1.575] | 9.5 | 47.3 | 41 | 33 |

# SLIM LOW SPEED CYLINDERS

## Symbol



## Specifications

| Item  | Bore size<br>mm [in.]                          |   |
|---|--|---|
|   | 20, 25, 32, 40<br>[0.787, 0.984, 1.260, 1.575] | 50, 63 [1.969, 2.480]   |
| Operation type  | Double acting type                             |   |
| Media   | Air  |   |
| Mounting type   | Basic type, Foot type, Flange type, Pivot type |   |
| Operating pressure range MPa [psi.]                   | 0.06~0.9 [9~131]                               | 0.05~0.7 [7~102]  |
| Proof pressure MPa [psi.]                             | 1.32 [191]                                     | 1.03 [149]  |
| Operating temperature range °C [°F]                   | 0~60 [32~140]                                  |   |
| Operating speed range <sup>1)2)</sup> mm/s [in./sec.] | 10~500 [0.4~19.7]                              | 10~300 [0.4~11.8]   |
| Cushion   | Fixed type (Rubber bumper)                     | Variable type is standard equipment.<br>(Stroke 15mm [0.59in.]) |
| Lubrication   | Not required                                   |   |
| Port size   | Rc 1/8   | 1/4   |

Note: When mounting and using sensor switches other than ZG530 and ZG553, maintain the minimum speed at 30mm/s [1.2in./sec.] or more.

## Bore Size and Stroke

| Bore size | Standard strokes                 |     | Maximum stroke | Maximum available stroke |
|-----------|----------------------------------|-----|----------------|--------------------------|
|           | mm                               |     |                |                          |
| 20        | 25 50 75 100 125 150             | 200 | 500            |                          |
| 25        | 25 50 75 100 125 150 200         | 250 |                |                          |
| 32        | 25 50 75 100 125 150 200         | 300 |                |                          |
| 40        | 25 50 75 100 125 150 200 250 300 | 400 |                |                          |
| 50        | 25 50 75 100 150 200             | 300 |                |                          |
| 63        | 25 50 75 100 150 200             | 300 |                |                          |

Remarks: 1. Stroke tolerance  ${}^{+1}_{0} [{}^{+0.039}_{0}\text{in.}]$

2. For non-standard strokes, consult us.

3. The minimum operating pressure when the stroke is over the maximum stroke at bore size of  $\phi 20 \sim \phi 40$  is 0.2MPa [29psi.].

## Order Codes

**DA** **N** **20×50** - [ ] - [ ] - [ ] - [ ] [ ] [ ]

**Low speed cylinder**

**Slime double acting cylinder**

**Bore size × Stroke**

**Mounting type**  
**Blank** — Basic type  
**1** — Foot mounting type  
**3** — Flange mounting type  
**8B** — Pivot mounting type with bushing (Available at  $\phi 50$  and  $\phi 63$  only)  
**8E** — Pivot mounting type with supporting bracket (with pin) (Available at  $\phi 20 \sim 40$  only)  
**8B-8E** — Pivot mounting type with bushing and supporting bracket (with pin) (Available at  $\phi 50$  and  $\phi 63$  only)  
 ● Mounting brackets are included at shipping.

**Head cover specification**  
**Blank** — Standard head  
**A** — Short head

**Rod end accessory**  
**Blank** — No rod end accessory  
**I** — I type knuckle  
**Y** — Y type knuckle (with pin)  
 ● For the cylinder joint and cylinder rod end, see p.1568.

**Number of sensor switches**  
**1** — With 1 sensor switch  
**2** — With 2 sensor switches  
**3** — With 3 sensor switches  
 ⋮

**Lead wire length**  
 (Applies to all except CS□F)  
**A** — 1000mm [39in.]  
**B** — 3000mm [118in.]

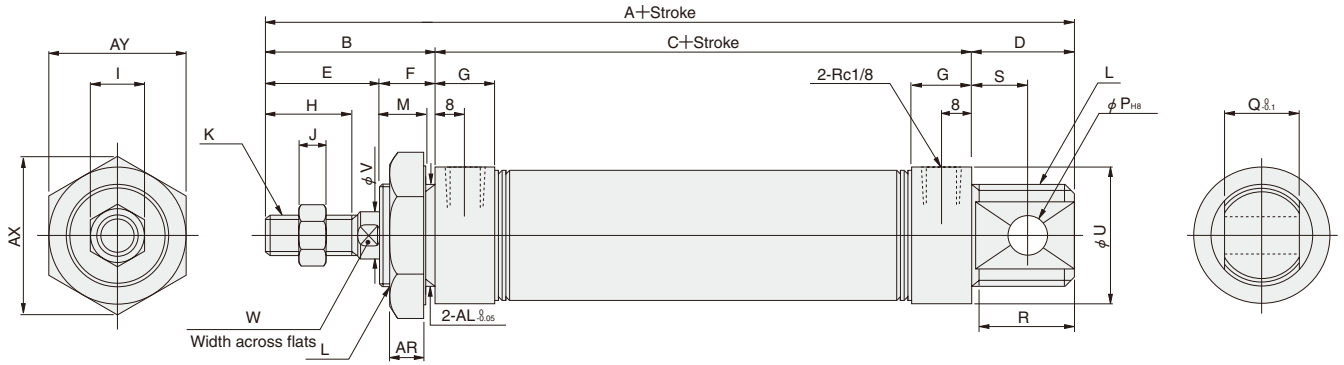
**Sensor switch (for cylinders with sensor switches)**  
**Blank** — No sensor switch  
**ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
**ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
**CS3M** — Reed switch type with indicator lamp DC10~30V  
**CS4M** — Reed switch type with indicator lamp AC85~115V  
**CS5M** — Reed switch type without indicator lamp DC3~30V  
**CS2F** — Reed switch type with indicator lamp AC85~230V  
**CS3F** — Reed switch type with indicator lamp DC10~30V  
**CS4F** — Reed switch type with indicator lamp DC10~30V  
**CS5F** — Reed switch type without indicator lamp DC3~30V

● For details of sensor switches, see p.1544.  
 ● CS□F comes with DIN connector. All others are grommet type.

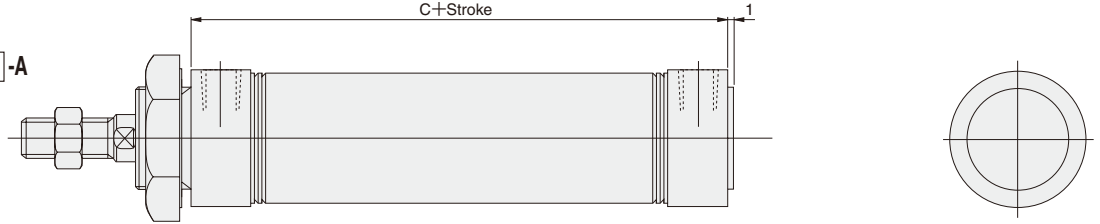
Note: When mounting and using sensor switches other than ZG530 and ZG553, maintain the minimum speed at 30mm/s [1.2in./sec.] or more.

# Dimensions of Low Speed Cylinder Basic Type (mm)

●  $\phi 20 \sim \phi 40$  DAN Bore size  $\times$  Stroke



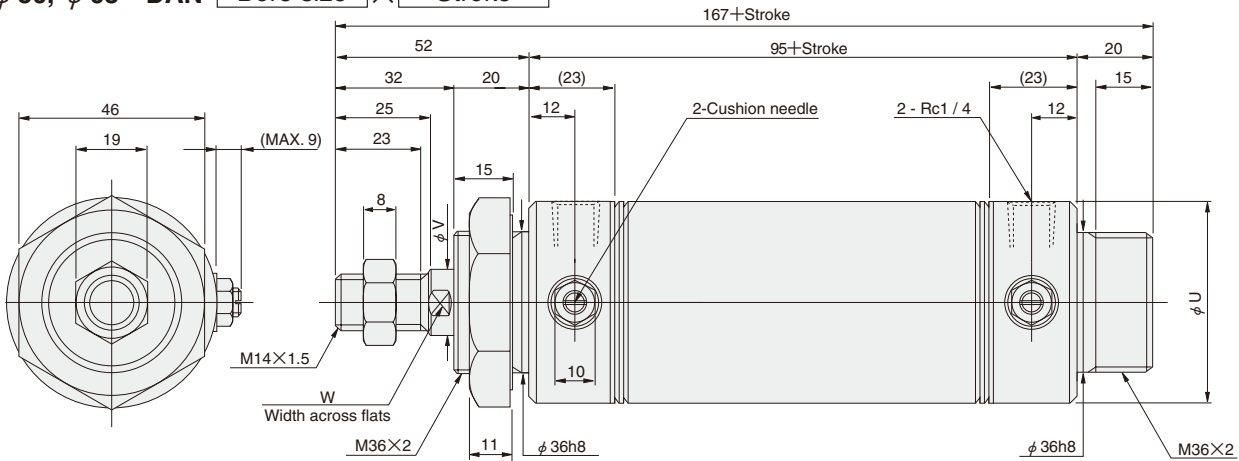
● Short head DAN Bore size  $\times$  Stroke -A



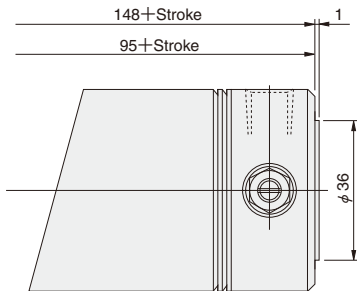
| Bore mm [in.] | Code | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | L       | M  | P  | Q  | R  | S  | U    | V  | W  |
|---------------|------|-----|----|----|----|----|----|--------|----|----|---|----------|---------|----|----|----|----|----|------|----|----|
| 20 [0.787]    |      | 132 | 35 | 76 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M8×1     | M20×1.5 | 10 | 8  | 12 | 19 | 12 | 27   | 8  | 6  |
| 25 [0.984]    |      | 137 | 40 | 76 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 8  | 12 | 19 | 12 | 29   | 10 | 8  |
| 32 [1.260]    |      | 148 | 45 | 76 | 27 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 10 | 20 | 25 | 15 | 35   | 12 | 10 |
| 40 [1.575]    |      | 148 | 45 | 76 | 27 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 10 | 20 | 25 | 15 | 41.6 | 16 | 14 |

| Bore mm [in.] | Code | AR  | AX   | AY | AL |
|---------------|------|-----|------|----|----|
| 20 [0.787]    |      | 7.5 | 31.2 | 27 | 20 |
| 25 [0.984]    |      | 9.5 | 34.6 | 30 | 22 |
| 32 [1.260]    |      | 9.5 | 41.6 | 36 | 27 |
| 40 [1.575]    |      | 9.5 | 47.3 | 41 | 33 |

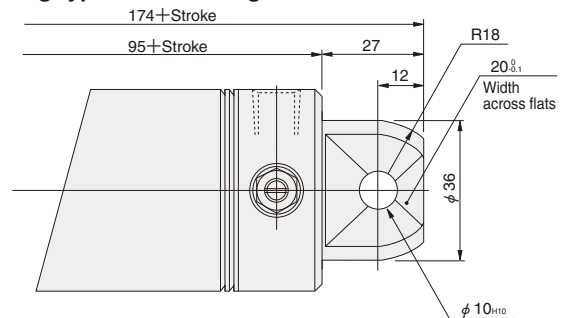
●  $\phi 50, \phi 63$  DAN Bore size  $\times$  Stroke



● Short head DAN Bore size  $\times$  Stroke -A



● Pivot mounting type with bushing DAN Bore size  $\times$  Stroke -8B



| Bore mm [in.] | Code | U    | V  | W  |
|---------------|------|------|----|----|
| 50 [1.969]    |      | 52   | 16 | 14 |
| 63 [2.480]    |      | 65.4 | 16 | 14 |

# MADE TO ORDER PRODUCT

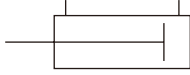
● For delivery, consult us.

## Cylinders with Scrapers



SLIM CYLINDERS

### Symbol



### Specifications

| Item                                  | Bore size mm [in.] | 20, 25, 32, 40 [0.787, 0.984, 1.260, 1.575]    |
|---------------------------------------|--------------------|--|
| Operation type                        |                    | Double acting type                             |
| Media                                 |                    | Air  |
| Mounting type                         |                    | Basic type, Foot type, Flange type, Pivot type |
| Operating pressure range MPa [psi.]   |                    | 0.1~0.9 [15~131]                               |
| Proof pressure MPa [psi.]             |                    | 1.32 [191]                                     |
| Operating temperature range °C [°F]   |                    | 0~70 [32~158]                                  |
| Operating speed range mm/s [in./sec.] |                    | 30~800 [1.2~31.5]                              |
| Cushion                               |                    | Fixed type (Rubber bumper)                     |
| Lubrication                           |                    | Not required                                   |
| Port size                             | Rc                 | 1/8  |

### Bore Size and Stroke

| Bore size | Standard strokes |    |    |     |     |     |     | Maximum stroke | Maximum available stroke |
|-----------|------------------|----|----|-----|-----|-----|-----|----------------|--------------------------|
|           | 25               | 50 | 75 | 100 | 125 | 150 | 200 |                |                          |
| 20        | 25               | 50 | 75 | 100 | 125 | 150 |     | 200            | 1050                     |
| 25        | 25               | 50 | 75 | 100 | 125 | 150 | 200 | 250            |                          |
| 32        | 25               | 50 | 75 | 100 | 125 | 150 | 200 | 300            |                          |
| 40        | 25               | 50 | 75 | 100 | 125 | 150 | 200 | 250            |                          |

Remarks: 1. Stroke tolerance  ${}^+_1\left[{}^{+0.039}_{0}\text{in.}\right]$

2. For non-standard strokes, consult us.

3. The minimum operating pressure when the stroke is over the maximum stroke at bore size of  $\phi 20 \sim \phi 40$  is 0.2MPa [29psi.].

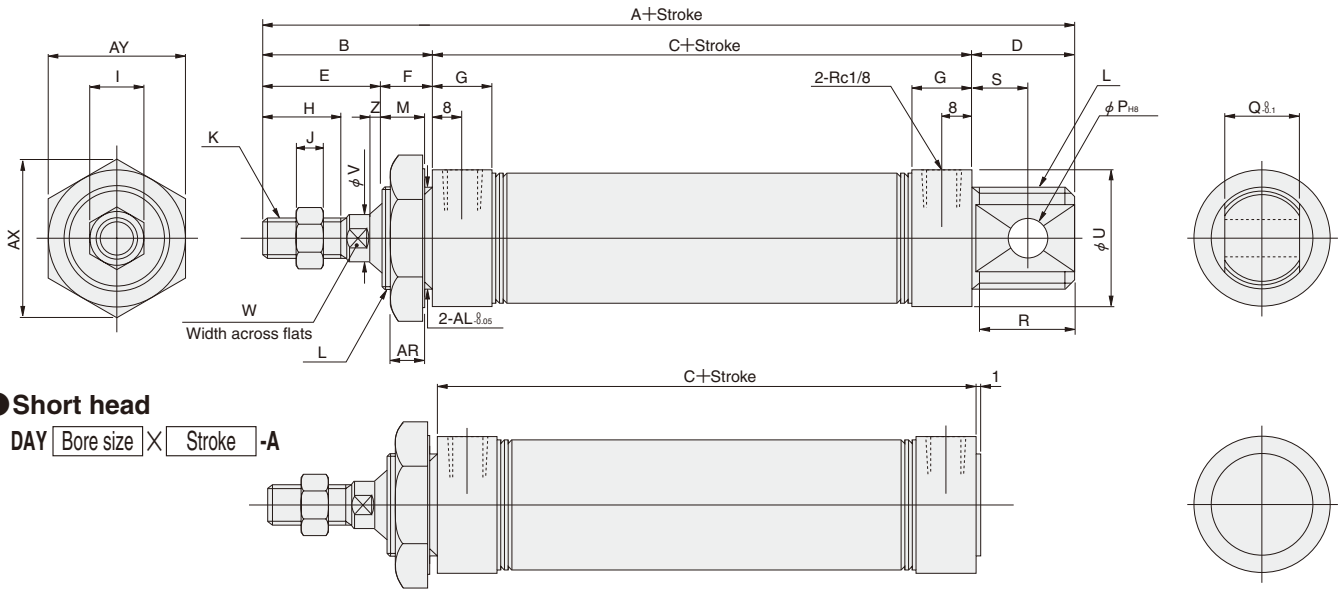
### Order Codes

**DA** **Y** **20×50** - [ ] - [ ] - [ ] - [ ] [ ] [ ]

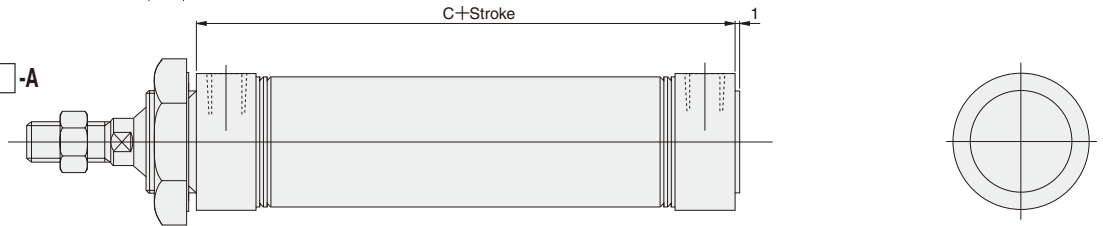
**DA** — Slim double acting cylinder  
**Y** — With scraper  
**20×50** — Bore size × Stroke  
 [ ] — Head cover specification  
     Blank — Standard head  
     **A** — Short head  
 [ ] — Mounting type  
     Blank — Basic type  
     **1** — Foot mounting type  
     **3** — Flange mounting type  
     **8E** — Pivot mounting type with supporting bracket (with pin)  
     ● Mounting brackets are included at shipping.  
 [ ] — Rod end accessory  
     Blank — No rod end accessory  
     **I** — I type knuckle  
     **Y** — Y type knuckle (with pin)  
     ● Mounting brackets are included at shipping.  
     ● For the cylinder joint and cylinder rod end, see p.1568.  
 [ ] [ ] [ ] — Number of sensor switches  
     **1** — With 1 sensor switch  
     **2** — With 2 sensor switches  
     **3** — With 3 sensor switches  
     : — :  
 [ ] — Lead wire length (Applies to all except **CS□F**)  
     **A** — 1000mm [39in.]  
     **B** — 3000mm [118in.]  
 [ ] — Sensor switch (for cylinders with sensor switches)  
     Blank — No sensor switch  
     **ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
     **ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
     **CS3M** — Reed switch type with indicator lamp DC10~30V  
     **CS4M** — Reed switch type with indicator lamp AC85~230V  
     **CS5M** — Reed switch type without indicator lamp DC10~30V  
     **CS2F** — Reed switch type with indicator lamp AC85~115V  
     **CS3F** — Reed switch type with indicator lamp AC85~230V  
     **CS4F** — Reed switch type with indicator lamp DC10~30V  
     **CS5F** — Reed switch type without indicator lamp DC10~30V  
     ● For details of sensor switches, see p.1544.  
     ● **CS□F** comes with DIN connector. All others are grommet type.

# Dimensions of Cylinder with Scraper Basic Type (mm)

●  $\phi 20 \sim \phi 40$  DAY Bore size   $\times$  Stroke



● Short head  
DAY Bore size   $\times$  Stroke  -A



| Bore<br>mm [in.] | Code    | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | L       | M  | P  | Q  | R  | S  | U    | V  | W  | Z   |
|------------------|---------|-----|----|----|----|----|----|--------|----|----|---|----------|---------|----|----|----|----|----|------|----|----|-----|
| 20               | [0.787] | 132 | 35 | 76 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M8×1     | M20×1.5 | 10 | 8  | 12 | 19 | 12 | 27   | 8  | 6  | (2) |
| 25               | [0.984] | 137 | 40 | 76 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 8  | 12 | 19 | 12 | 29   | 10 | 8  | (2) |
| 32               | [1.260] | 148 | 45 | 76 | 27 | 31 | 14 | 16     | 20 | 14 | 6 | M10×1.25 | M27×2   | 12 | 10 | 20 | 25 | 15 | 35   | 12 | 10 | (3) |
| 40               | [1.575] | 148 | 45 | 76 | 27 | 31 | 14 | (14.5) | 20 | 19 | 8 | M14×1.5  | M33×2   | 12 | 10 | 20 | 25 | 15 | 41.6 | 16 | 14 | (3) |

| Bore<br>mm [in.] | Code    | AR  | AX   | AY | AL |
|------------------|---------|-----|------|----|----|
| 20               | [0.787] | 7.5 | 31.2 | 27 | 20 |
| 25               | [0.984] | 9.5 | 34.6 | 30 | 22 |
| 32               | [1.260] | 9.5 | 41.6 | 36 | 27 |
| 40               | [1.575] | 9.5 | 47.3 | 41 | 33 |



# MADE TO ORDER PRODUCT

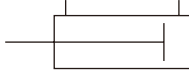
## Block Heat Resistant Specification Cylinders

● For delivery, consult us.



SLIM CYLINDERS

### Symbol



### Specifications

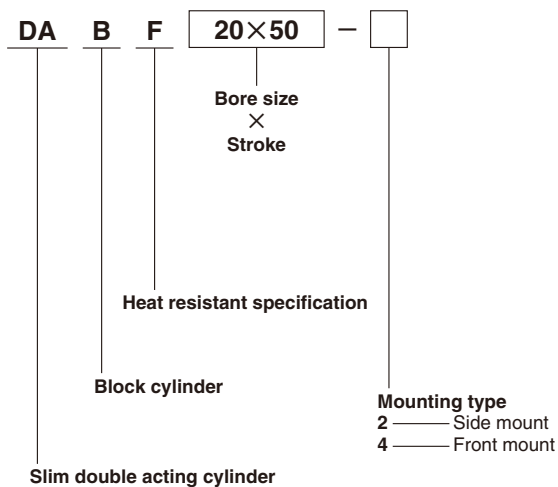
| Item                                  | Bore size mm [in.] | 16, 20, 25, 32, 40 [0.630, 0.787, 0.984, 1.260, 1.575] |
|---------------------------------------|--------------------|--|
| Operation type                        |                    | Double acting type                                     |
| Media                                 |                    | Air  |
| Mounting type                         |                    | Side mount, Front mount                                |
| Operating pressure range MPa [psi.]   |                    | 0.1~0.9 [15~131]                                       |
| Proof pressure MPa [psi.]             |                    | 1.32 [191]   |
| Operating temperature range °C [°F]   |                    | 0~130 [32~266]   |
| Operating speed range mm/s [in./sec.] |                    | 100~700 [3.9~27.6]                                     |
| Cushion                               |                    | Fixed type (Rubber bumper)                             |
| Lubrication                           |                    | Not required   |
| Port size                             | Rc                 | 1/8  |

### Bore Size and Stroke

| Bore size | Standard strokes                 |  | Maximum stroke | Maximum available stroke |
|-----------|----------------------------------|--|----------------|--------------------------|
|           | mm                               |  |                |                          |
| 16        | 15 25 50 75 100                  |  | 100            | 300                      |
| 20        | 25 50 75 100 125 150             |  | 150            | 500                      |
| 25        | 25 50 75 100 125 150 200         |  | 200            |                          |
| 32        | 25 50 75 100 125 150 200         |  | 200            |                          |
| 40        | 25 50 75 100 125 150 200 250 300 |  | 300            |                          |

- Remarks: 1. Stroke tolerance  ${}^+_1 \begin{matrix} +0.039in. \\ 0 \end{matrix}$   
 2. For non-standard strokes, consult us.  
 3. The minimum operating pressure when the stroke is over the maximum stroke at bore size of  $\phi 20 \sim \phi 40$  is 0.2MPa [29psi.].

### Order Codes



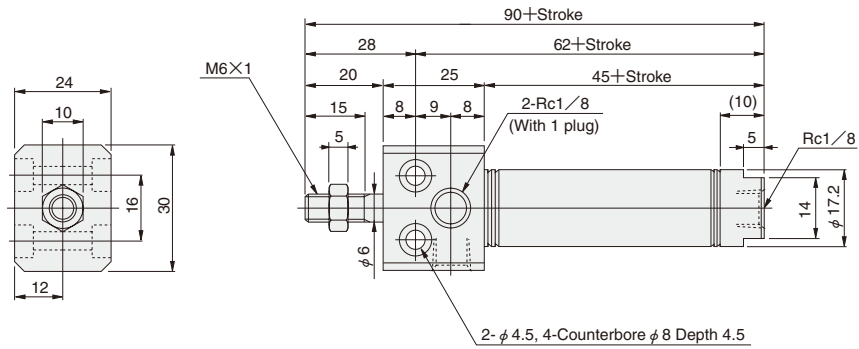
### Major Parts and Materials

| Parts         | Bore size | 16                                   | 20~40                      |
|---------------|-----------|--------------------------------------|----------------------------|
| Cylinder tube |           | Stainless steel                      |                            |
| Piston        |           | Aluminum (anodized)                  |                            |
| Piston rod    |           | Stainless steel (hard chrome plated) | Steel (hard chrome plated) |
| Rod cover     |           | Aluminum (anodized)                  |                            |
| Head cover    |           | Aluminum (anodized)                  |                            |
| Seal          |           | Fluoro rubber (FKM)                  |                            |
| Bumper        |           | Fluoro rubber (FKM)                  |                            |

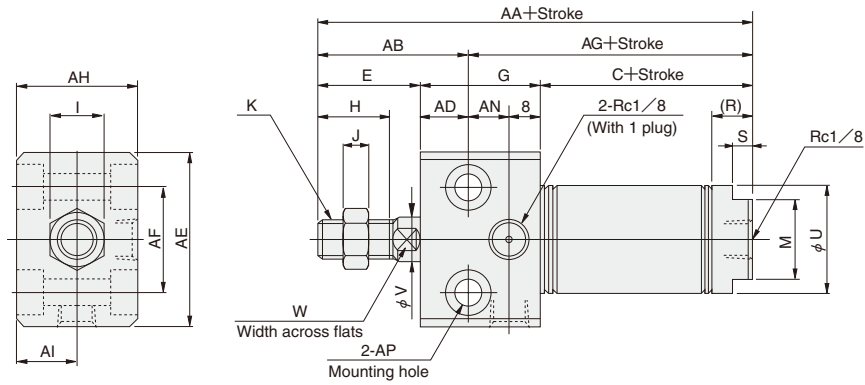
**Caution** Since a magnet for sensor switch is not built into the heat resistant specification cylinder, sensor switches will not be functional.

# Dimensions of Block Heat Resistant Specification Cylinder Side Mounting Type (mm)

●  $\phi 16$  DABF16  $\times$   -2



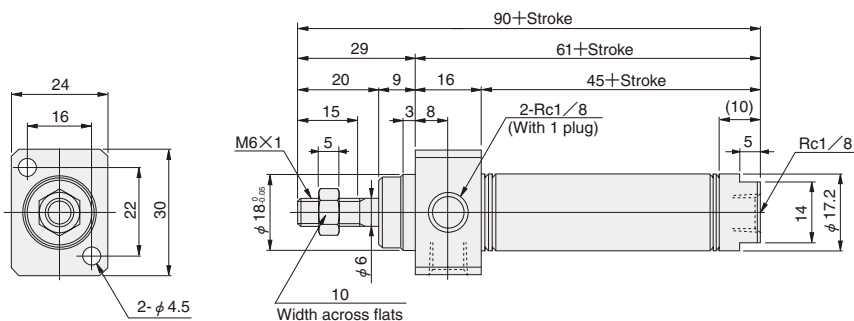
●  $\phi 20 \sim \phi 40$  DABF   $\times$   -2



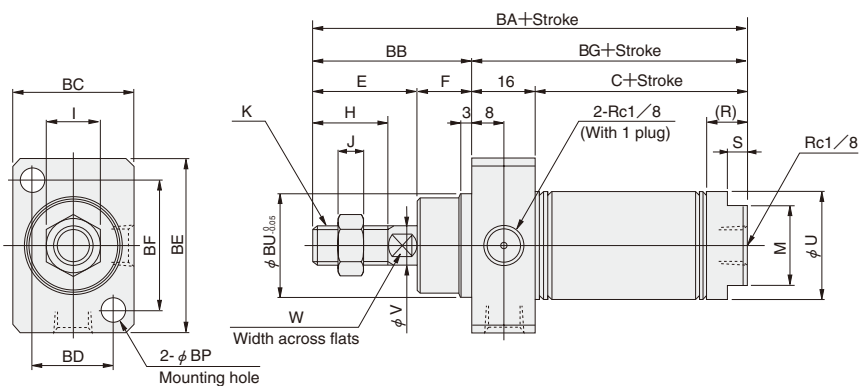
| Bore<br>mm [in.] | Code | C  | E  | G  | H  | I  | J | K        | M  | R  | S | U    | V         | W  | AA  | AB | AD | AE | AF | AG | AH | AI | AN | AP  |
|------------------|------|----|----|----|----|----|---|----------|----|----|---|------|-----------|----|-----|----|----|----|----|----|----|----|----|---|
| 20 [0.787]       |      | 53 | 23 | 28 | 15 | 12 | 5 | M8×1     | 17 | 10 | 5 | 21.4 | $\phi 8$  | 6  | 104 | 34 | 11 | 38 | 22 | 70 | 28 | 14 | 9  | $\phi 6.6$ 2-Counterbore $\phi 11$ Depth6.5   |
| 25 [0.984]       |      | 53 | 26 | 30 | 18 | 14 | 6 | M10×1.25 | 19 | 10 | 5 | 26.4 | $\phi 10$ | 8  | 109 | 38 | 12 | 42 | 26 | 71 | 30 | 15 | 10 | $\phi 6.6$ 2-Counterbore $\phi 11$ Depth6.5   |
| 32 [1.260]       |      | 54 | 31 | 36 | 23 | 14 | 6 | M10×1.25 | 22 | 11 | 6 | 33.6 | $\phi 12$ | 10 | 121 | 45 | 14 | 54 | 34 | 76 | 36 | 18 | 14 | $\phi 9$ 2-Counterbore $\phi 14$ Depth8.6     |
| 40 [1.575]       |      | 60 | 31 | 44 | 23 | 19 | 8 | M14×1.5  | 22 | 13 | 6 | 41.6 | $\phi 16$ | 14 | 135 | 48 | 17 | 68 | 46 | 87 | 44 | 22 | 19 | $\phi 11$ 2-Counterbore $\phi 17.5$ Depth10.8 |

# Dimensions of Block Heat Resistant Specification Cylinder Front Mounting Type (mm)

●  $\phi 16$  DABF16  $\times$   -4



●  $\phi 20 \sim \phi 40$  DABF   $\times$   -4



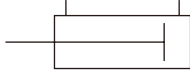
| Bore<br>mm [in.] | Code | C  | E  | F  | H  | I  | J | K        | M  | R  | S | U    | V         | W  | BA  | BB | BC | BD | BE | BF | BG | BP  | BU |
|------------------|------|----|----|----|----|----|---|----------|----|----|---|------|-----------|----|-----|----|----|----|----|----|----|-----|----|
| 20 [0.787]       |      | 53 | 23 | 12 | 15 | 12 | 5 | M8×1     | 17 | 10 | 5 | 21.4 | $\phi 8$  | 6  | 104 | 35 | 28 | 18 | 38 | 28 | 69 | 5.5 | 22 |
| 25 [0.984]       |      | 53 | 26 | 14 | 18 | 14 | 6 | M10×1.25 | 19 | 10 | 5 | 26.4 | $\phi 10$ | 8  | 109 | 40 | 30 | 20 | 42 | 32 | 69 | 5.5 | 24 |
| 32 [1.260]       |      | 54 | 31 | 14 | 23 | 14 | 6 | M10×1.25 | 22 | 11 | 6 | 33.6 | $\phi 12$ | 10 | 115 | 45 | 36 | 24 | 54 | 42 | 70 | 6.6 | 28 |
| 40 [1.575]       |      | 60 | 31 | 14 | 23 | 19 | 8 | M14×1.5  | 22 | 13 | 6 | 41.6 | $\phi 16$ | 14 | 121 | 45 | 44 | 28 | 68 | 52 | 76 | 9   | 34 |

# MADE TO ORDER PRODUCT

## Block Low Speed Cylinders



### Symbol



### Specifications

| Item  | Bore size mm [in.]         |                                       |
|---|----------------------------|---------------------------------------|
|   | 20~40 [0.787~1.575]        | 50, 63 [1.969, 2.480]                 |
| Operation type  | Double acting type         |                                       |
| Media   | Air                        |                                       |
| Mounting type   | Side mount, Front mount    |                                       |
| Operating pressure range MPa [psi.]                   | 0.06~0.9 [9~131]           | 0.05~0.7 [7~102]                      |
| Proof pressure MPa [psi.]                             | 1.32 [191]                 | 1.03 [149]                            |
| Operating temperature range °C [°F]                   | 0~60 [32~140]              |                                       |
| Operating speed range <sup>Note</sup> mm/s [in./sec.] | 10~500 [0.4~19.7]          | 10~300 [0.4~11.8]                     |
| Cushion   | Fixed type (Rubber bumper) | Variable type (Stroke 15mm [0.59in.]) |
| Lubrication   | Not required               |                                       |
| Port size   | Rc 1/8                     | 1/4                                   |

Note: When mounting and using sensor switches other than ZG530 and ZG553, maintain the minimum speed at 30mm/s [1.2in./sec.] or more.

### Bore Size and Stroke

| Bore size | Standard strokes                 | Maximum stroke | mm                       |
|-----------|----------------------------------|----------------|--------------------------|
|           |                                  |                | Maximum available stroke |
| 20        | 25 50 75 100 125 150             | 150            | 500                      |
| 25        | 25 50 75 100 125 150 200         | 200            |                          |
| 32        | 25 50 75 100 125 150 200         | 200            |                          |
| 40        | 25 50 75 100 125 150 200 250 300 | 300            |                          |
| 50        | 25 50 75 100 150 200 250 300     | 300            |                          |
| 63        | 25 50 75 100 150 200 250 300     | 300            |                          |

- Remarks: 1. Stroke tolerance  ${}^+1_0$  [  ${}^{+0.039}_{0}$ in.]  
 2. For non-standard strokes, consult us.  
 3. The minimum operating pressure when the stroke is over the maximum stroke at bore size of  $\phi 20 \sim \phi 40$  is 0.2MPa [29psi.].

### Order Codes

Order code structure: **DA** **B** **N** **50×100** - [ ] - [ ] - [ ] [ ] [ ]

- DA**: Slim double acting cylinder
- B**: Block cylinder
- N**: Low speed cylinder
- 50×100**: Bore size × Stroke
- [ ]: Mounting type (2: Side mount, 4: Front mount)
- [ ]: Rod end accessory (Blank: No rod end accessory, I: I type knuckle, Y: Y type knuckle (with pin))
- [ ] [ ] [ ]: Number of sensor switches (1: With 1 sensor switch, 2: With 2 sensor switches, 3: With 3 sensor switches, ...)
- [ ]: Lead wire length (A: 1000mm [39in.], B: 3000mm [118in.])

**Sensor switch (for cylinders with sensor switches)**

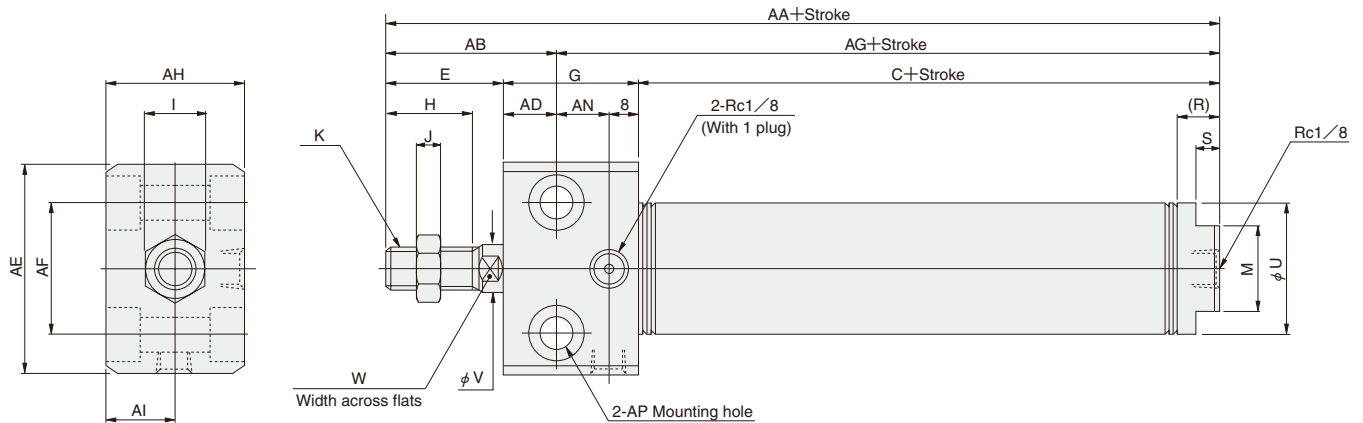
- Blank**: No sensor switch
- ZG530**: 2-lead wire Solid state type with indicator lamp DC10~28V
- ZG553**: 3-lead wire Solid state type with indicator lamp DC4.5~28V
- CS3M**: Reed switch type with indicator lamp DC10~30V AC85~230V
- CS4M**: Reed switch type with indicator lamp DC10~30V AC85~115V
- CS5M**: Reed switch type without indicator lamp DC3~30V AC85~115V
- CS2F**: Reed switch type with indicator lamp AC85~230V
- CS3F**: Reed switch type with indicator lamp DC10~30V
- CS4F**: Reed switch type with indicator lamp DC10~30V
- CS5F**: Reed switch type without indicator lamp DC3~30V

● For details of sensor switches, see p.1544.  
 ● **CS□F** comes with DIN connector. All others are grommet type.

Note: When mounting and using sensor switches other than ZG530 and ZG553, maintain the minimum speed at 30mm/s [1.2in./sec.] or more.

# Dimensions of Block Low Speed Cylinder Side Mounting Type (mm)

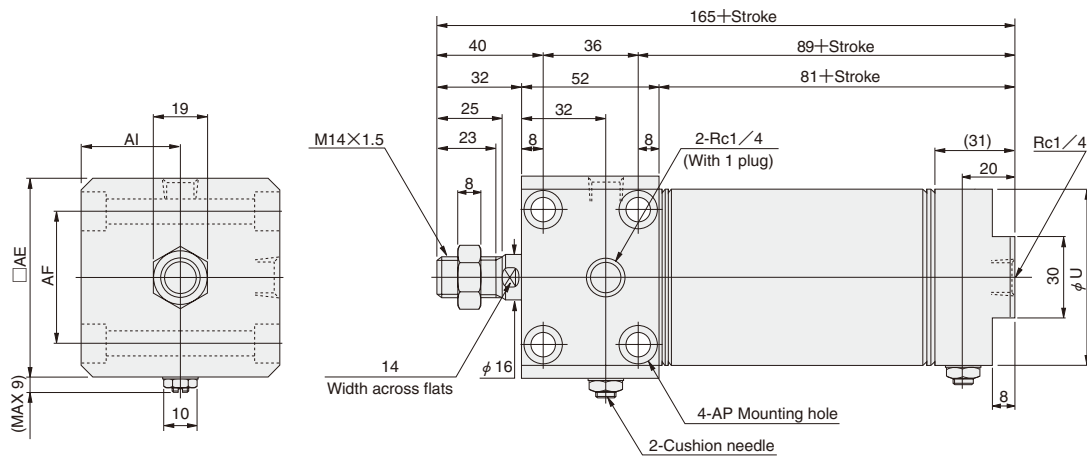
●  $\phi 20 \sim \phi 40$  DABN  ×  -2



| Bore mm [in.] | Code | C  | E  | G  | H  | I  | J | K        | M  | R  | S | U    | V  | W  |
|---------------|------|----|----|----|----|----|---|----------|----|----|---|------|----|----|
| 20 [0.787]    |      | 53 | 23 | 28 | 15 | 12 | 5 | M8×1     | 17 | 10 | 5 | 21.4 | 8  | 6  |
| 25 [0.984]    |      | 53 | 26 | 30 | 18 | 14 | 6 | M10×1.25 | 19 | 10 | 5 | 26.4 | 10 | 8  |
| 32 [1.260]    |      | 54 | 31 | 36 | 23 | 14 | 6 | M10×1.25 | 22 | 11 | 6 | 33.6 | 12 | 10 |
| 40 [1.575]    |      | 60 | 31 | 44 | 23 | 19 | 8 | M14×1.5  | 22 | 13 | 6 | 41.6 | 16 | 14 |

| Bore mm [in.] | Code | AA  | AB | AD | AE | AF | AG | AH | AI | AN | AP                                  |           |
|---------------|------|-----|----|----|----|----|----|----|----|----|-------------------------------------|-----------|
| 20 [0.787]    |      | 104 | 34 | 11 | 38 | 22 | 70 | 28 | 14 | 9  | $\phi 6.6$ 2-Counterbore $\phi 11$  | Depth6.5  |
| 25 [0.984]    |      | 109 | 38 | 12 | 42 | 26 | 71 | 30 | 15 | 10 | $\phi 6.6$ 2-Counterbore $\phi 11$  | Depth6.5  |
| 32 [1.260]    |      | 121 | 45 | 14 | 54 | 34 | 76 | 36 | 18 | 14 | $\phi 9$ 2-Counterbore $\phi 14$    | Depth8.6  |
| 40 [1.575]    |      | 135 | 48 | 17 | 68 | 46 | 87 | 44 | 22 | 19 | $\phi 11$ 2-Counterbore $\phi 17.5$ | Depth10.8 |

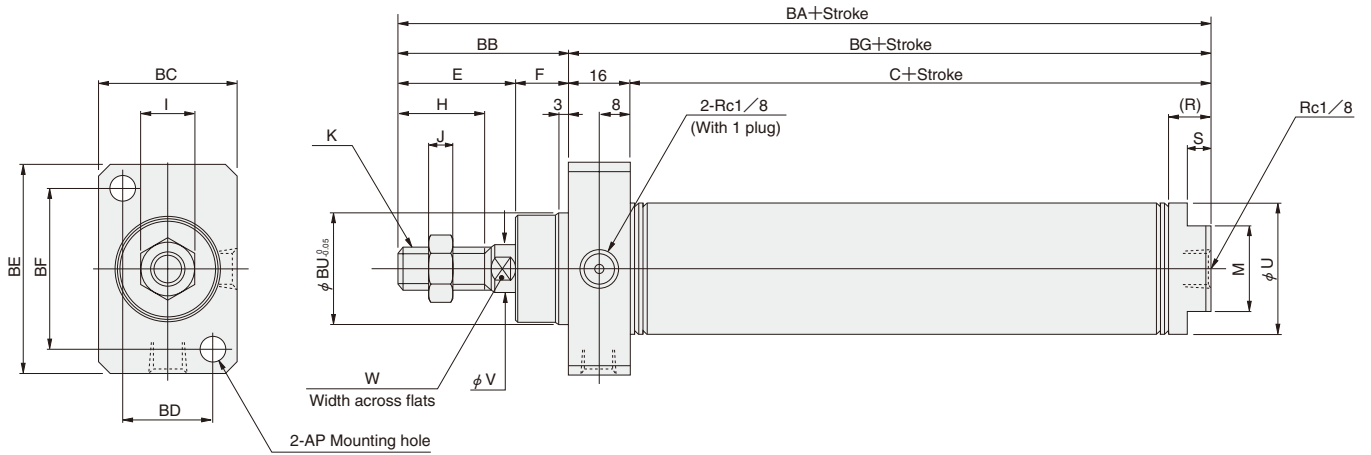
●  $\phi 50, \phi 63$  DABN  ×  -2



| Bore mm [in.] | Code | U    | AE | AF | AI | AP  |
|---------------|------|------|----|----|----|---|
| 50 [1.969]    |      | 52   | 62 | 44 | 31 | $\phi 6.6$ 2-Counterbore $\phi 11$ Depth6.5 |
| 63 [2.480]    |      | 65.4 | 74 | 48 | 37 | $\phi 9$ 2-Counterbore $\phi 14$ Depth8.6   |

# Dimensions of Block Low Speed Cylinder Front Mounting Type (mm)

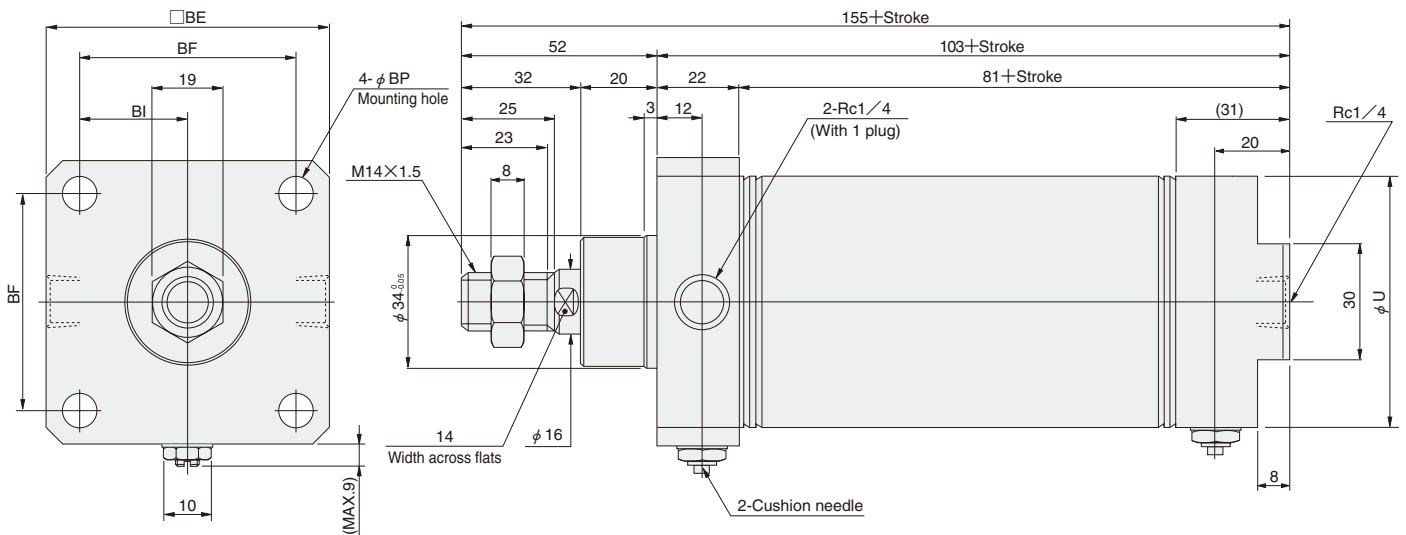
●  $\phi 20 \sim \phi 40$  DABN   $\times$   -4



| Bore mm [in.] | Code | C  | E  | F  | H  | I  | J | K        | M  | R  | S | U    | V  | W  |
|---------------|------|----|----|----|----|----|---|----------|----|----|---|------|----|----|
| 20 [0.787]    |      | 53 | 23 | 12 | 15 | 12 | 5 | M8×1     | 17 | 10 | 5 | 21.4 | 8  | 6  |
| 25 [0.984]    |      | 53 | 26 | 14 | 18 | 14 | 6 | M10×1.25 | 19 | 10 | 5 | 26.4 | 10 | 8  |
| 32 [1.260]    |      | 54 | 31 | 14 | 23 | 14 | 6 | M10×1.25 | 22 | 11 | 6 | 33.6 | 12 | 10 |
| 40 [1.575]    |      | 60 | 31 | 14 | 23 | 19 | 8 | M14×1.5  | 22 | 13 | 6 | 41.6 | 16 | 14 |

| Bore mm [in.] | Code | BA  | BB | BC | BD | BE | BF | BG | BP  | BU |
|---------------|------|-----|----|----|----|----|----|----|-----|----|
| 20 [0.787]    |      | 104 | 35 | 28 | 18 | 38 | 28 | 69 | 5.5 | 22 |
| 25 [0.984]    |      | 109 | 40 | 30 | 20 | 42 | 32 | 69 | 5.5 | 24 |
| 32 [1.260]    |      | 115 | 45 | 36 | 24 | 54 | 42 | 70 | 6.6 | 28 |
| 40 [1.575]    |      | 121 | 45 | 44 | 28 | 68 | 52 | 76 | 9   | 34 |

●  $\phi 50, \phi 63$  DABN   $\times$   -4

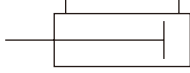


| Bore mm [in.] | Code | U    | BE | BF | BI | BP  |
|---------------|------|------|----|----|----|-----|
| 50 [1.969]    |      | 52   | 62 | 48 | 24 | 6.6 |
| 63 [2.480]    |      | 65.4 | 74 | 58 | 29 | 9   |

# MADE TO ORDER PRODUCT

## Cylinders with Wrench Flats

### Symbol



SLIM CYLINDERS

### Specifications

| Item                        | Bore size mm [in.] | 20, 25, 32, 40 [0.787, 0.984, 1.260, 1.575]    |
|-----------------------------|--------------------|--|
| Operation type              |                    | Double acting type                             |
| Media                       |                    | Air  |
| Mounting type               |                    | Basic type, Foot type, Flange type, Pivot type |
| Operating pressure range    | MPa [psi.]         | 0.04~0.9 [6~131]                               |
| Proof pressure              | MPa [psi.]         | 1.32 [191]                                     |
| Operating temperature range | °C [°F]            | 0~70 [32~158]                                  |
| Operating speed range       | mm/s [in./sec.]    | 30~800 [1.2~31.5]                              |
| Cushion                     |                    | Fixed type (Rubber bumper)                     |
| Lubrication                 |                    | Not required                                   |
| Port size                   | Rc                 | 1/8  |

### Bore Size and Stroke

| Bore size | Standard strokes |    |    |     |     |     |     |     | Maximum stroke | Maximum available stroke |
|-----------|------------------|----|----|-----|-----|-----|-----|-----|----------------|--------------------------|
|           | 25               | 50 | 75 | 100 | 125 | 150 | 200 | 250 |                |                          |
| 20        | 25               | 50 | 75 | 100 | 125 | 150 |     |     | 200            | 1050                     |
| 25        | 25               | 50 | 75 | 100 | 125 | 150 | 200 |     | 250            |                          |
| 32        | 25               | 50 | 75 | 100 | 125 | 150 | 200 |     | 300            |                          |
| 40        | 25               | 50 | 75 | 100 | 125 | 150 | 200 | 250 | 300            |                          |

Remarks: 1. Stroke tolerance  ${}^+1_0 [{}^{+0.039}_{0}\text{in.}]$

2. For non-standard strokes, consult us.

3. The minimum operating pressure when the stroke is over the maximum stroke at bore size of  $\phi 20 \sim \phi 40$  is 0.2MPa [29psi.].

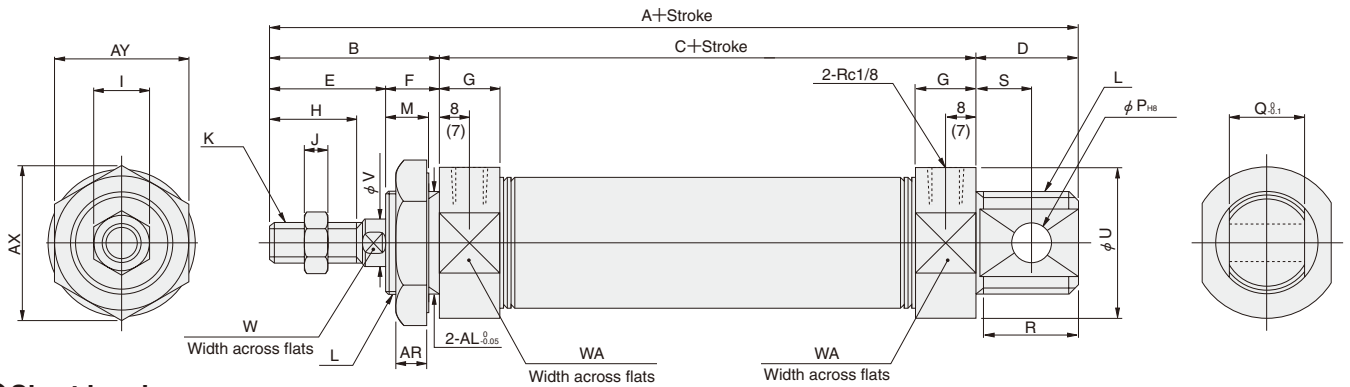
### Order Codes

**DA** — Slim double acting cylinder  
**20×50** — Bore size × Stroke  
**H** — With wrench flats specification  
**Head cover specification**  
 Blank — Standard head  
**A** — Short head  
**Rod end accessory**  
 Blank — No rod end accessory  
**I** — I type knuckle  
**Y** — Y type knuckle (with pin)  
 ● Mounting brackets are included at shipping.  
 ● For the cylinder joint and cylinder rod end, see p.1568.  
**Mounting type**  
 Blank — Basic type  
**1** — Foot mounting type  
**3** — Flange mounting type  
**8E** — Pivot mounting type with supporting bracket (with pin)  
 ● Mounting brackets are included at shipping.  
**Number of sensor switches**  
**1** — With 1 sensor switch  
**2** — With 2 sensor switches  
**3** — With 3 sensor switches  
 : :  
**Lead wire length**  
 (Applies to all except **CS□F**)  
**A** — 1000mm [39in.]  
**B** — 3000mm [118in.]  
**Sensor switch (for cylinders with sensor switches)**  
**Blank** — No sensor switch  
**ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
**ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
**CS3M** — Reed switch type with indicator lamp DC10~30V  
 AC85~230V  
**CS4M** — Reed switch type with indicator lamp DC10~30V  
 AC85~115V  
**CS5M** — Reed switch type without indicator lamp DC3~30V  
 AC85~115V  
**CS2F** — Reed switch type with indicator lamp AC85~230V  
**CS3F** — Reed switch type with indicator lamp DC10~30V  
**CS4F** — Reed switch type with indicator lamp DC10~30V  
**CS5F** — Reed switch type without indicator lamp DC3~30V  
 ● For details of sensor switches, see p.1544.  
 ● **CS□F** comes with DIN connector. All others are grommet type.

# Dimensions of Cylinder with Wrench Flats Basic Type (mm)

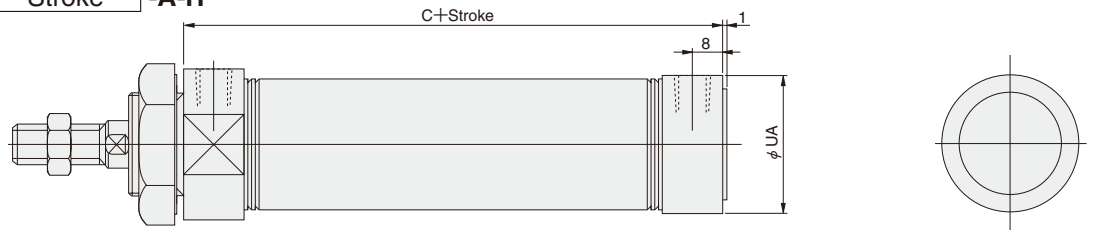
●  $\phi 20 \sim \phi 40$  DA  ×  -H

( ) shows for  $\phi 40$ .



## ● Short head

DA  ×  -A-H



| Bore<br>mm [in.] | Code    | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | L       | M  | P  | Q  | R  | S  | U    | UA   | V  | W  | WA |
|------------------|---------|-----|----|----|----|----|----|--------|----|----|---|----------|---------|----|----|----|----|----|------|------|----|----|----|
| 20               | [0.787] | 132 | 35 | 76 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M8×1     | M20×1.5 | 10 | 8  | 12 | 19 | 12 | 27   | 27   | 8  | 6  | 24 |
| 25               | [0.984] | 137 | 40 | 76 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 8  | 12 | 19 | 12 | 29   | 29   | 10 | 8  | 27 |
| 32               | [1.260] | 148 | 45 | 76 | 27 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 10 | 20 | 25 | 15 | 38   | 35   | 12 | 10 | 35 |
| 40               | [1.575] | 148 | 45 | 76 | 27 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 10 | 20 | 25 | 15 | 44.6 | 41.6 | 16 | 14 | 42 |

| Bore<br>mm [in.] | Code    | AR  | AX   | AY | AL |
|------------------|---------|-----|------|----|----|
| 20               | [0.787] | 7.5 | 31.2 | 27 | 20 |
| 25               | [0.984] | 9.5 | 34.6 | 30 | 22 |
| 32               | [1.260] | 9.5 | 41.6 | 36 | 27 |
| 40               | [1.575] | 9.5 | 47.3 | 41 | 33 |



# MADE TO ORDER PRODUCT

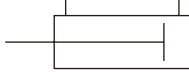
## All SUS Type Cylinders

● For delivery, consult us.



SLIM CYLINDERS

### Symbol



### Specifications

| Item                        | Bore size mm [in.] | 20, 25, 32, 40 [0.787, 0.984, 1.260, 1.575] |
|-----------------------------|--------------------|---|
| Operation type              |                    | Double acting type                          |
| Media                       |                    | Air   |
| Mounting type               |                    | Basic type                                  |
| Operating pressure range    | MPa [psi.]         | 0.04~0.9 [6~131]                            |
| Proof pressure              | MPa [psi.]         | 1.32 [191]                                  |
| Operating temperature range | °C [°F]            | 0~70 [32~158]                               |
| Operating speed range       | mm/s [in./sec.]    | 30~700 [1.2~27.6]                           |
| Cushion                     |                    | Fixed type (Rubber bumper)                  |
| Lubrication                 |                    | Not required                                |
| Port size                   | Rc                 | 1/8   |

### Bore Size and Stroke

| Bore size | Standard strokes |    |    |     |     |     |     | Maximum stroke | Maximum available stroke |
|-----------|------------------|----|----|-----|-----|-----|-----|----------------|--------------------------|
|           | 25               | 50 | 75 | 100 | 125 | 150 | 200 |                |                          |
| 20        | 25               | 50 | 75 | 100 | 125 | 150 |     | 200            | 1050                     |
| 25        | 25               | 50 | 75 | 100 | 125 | 150 | 200 | 250            |                          |
| 32        | 25               | 50 | 75 | 100 | 125 | 150 | 200 | 300            |                          |
| 40        | 25               | 50 | 75 | 100 | 125 | 150 | 200 | 250            |                          |

Remarks: 1. Stroke tolerance  ${}^+1_0 \left[ \begin{smallmatrix} +0.039in. \\ 0 \end{smallmatrix} \right]$

2. For non-standard strokes, consult us.

3. The minimum operating pressure when the stroke is over the maximum stroke at bore size of  $\phi 20 \sim \phi 40$  is 0.2MPa [29psi.].

### Order Codes

**SUS** — **DA** **20×50** — [ ] — [ ] [ ] [ ]

**SUS specification**

**DA** — Slim double acting cylinder

**20×50** — Bore size × Stroke

**[ ]** — Head cover specification  
Blank — Standard head  
A — Short head

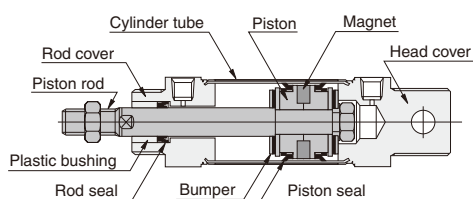
**Number of sensor switches**  
1 — With 1 sensor switch  
2 — With 2 sensor switches  
3 — With 3 sensor switches  
⋮

**Lead wire length** (Applies to all except CS□F)  
A — 1000mm [39in.]  
B — 3000mm [118in.]

**Sensor switch** (for cylinders with sensor switches)  
Blank — No sensor switch  
ZG530 — 2-lead wire Solid state type with indicator lamp DC10~28V  
ZG553 — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
CS3M — Reed switch type with indicator lamp DC10~30V  
CS4M — Reed switch type with indicator lamp AC85~230V  
CS5M — Reed switch type without indicator lamp DC10~30V  
CS2F — Reed switch type with indicator lamp AC85~115V  
CS3F — Reed switch type with indicator lamp DC3~30V  
CS4F — Reed switch type with indicator lamp AC85~115V  
CS5F — Reed switch type without indicator lamp DC3~30V

● For details of sensor switches, see p.1544.  
● CS□F comes with DIN connector. All others are grommet type.

## Inner Construction and Major Parts

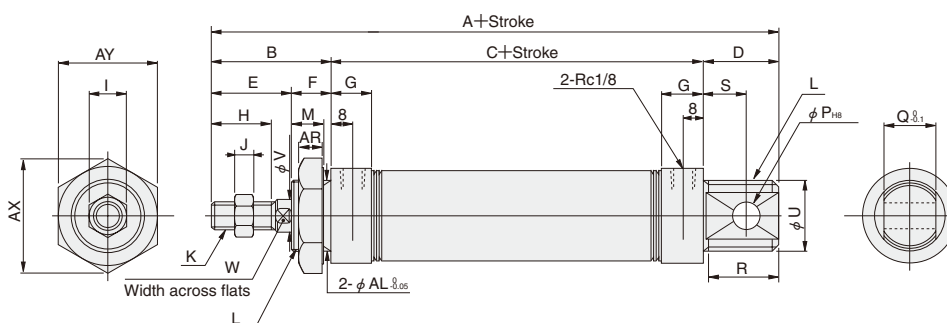


## Major Parts and Materials

| Parts         | Bore size | 20~40                                |
|---------------|-----------|--------------------------------------|
| Cylinder tube |           | Stainless steel                      |
| Piston        |           | Plastic                              |
| Piston rod    |           | Stainless steel (hard chrome plated) |
| Rod cover     |           | Stainless steel                      |
| Head cover    |           |                                      |
| Seal          |           | Synthetic rubber (NBR)               |
| Bumper        |           | Synthetic rubber (NBR)               |
| Magnet        |           | Plastic magnet                       |

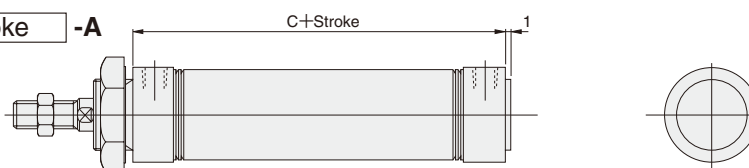
## Dimensions of All SUS Type Cylinder Basic Type (mm)

● Basic type SUS-DA  ×



● Short head

SUS-DA  ×  -A



| Code       | A   | B  | C  | D  | E  | F  | G      | H  | I  | J | K        | L       | M  | P  | Q  | R  | S  | U    | V  | W  |
|------------|-----|----|----|----|----|----|--------|----|----|---|----------|---------|----|----|----|----|----|------|----|----|
| 20 [0.787] | 132 | 35 | 76 | 21 | 23 | 12 | 16     | 15 | 12 | 5 | M8×1     | M20×1.5 | 10 | 8  | 12 | 19 | 12 | 27   | 8  | 6  |
| 25 [0.984] | 137 | 40 | 76 | 21 | 26 | 14 | 16     | 18 | 14 | 6 | M10×1.25 | M22×1.5 | 12 | 8  | 12 | 19 | 12 | 29   | 10 | 8  |
| 32 [1.260] | 148 | 45 | 76 | 27 | 31 | 14 | 16     | 23 | 14 | 6 | M10×1.25 | M27×2   | 12 | 10 | 20 | 25 | 15 | 35   | 12 | 10 |
| 40 [1.575] | 148 | 45 | 76 | 27 | 31 | 14 | (14.5) | 23 | 19 | 8 | M14×1.5  | M33×2   | 12 | 10 | 20 | 25 | 15 | 41.6 | 16 | 14 |

| Code       | AR  | AX   | AY | AL |
|------------|-----|------|----|----|
| 20 [0.787] | 7.5 | 31.2 | 27 | 20 |
| 25 [0.984] | 9.5 | 34.6 | 30 | 22 |
| 32 [1.260] | 9.5 | 41.6 | 36 | 27 |
| 40 [1.575] | 9.5 | 47.3 | 41 | 33 |

# MADE TO ORDER PRODUCT

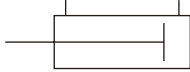
## Pivot Mounting Type Cylinders with Bushing

● For delivery, consult us.



SLIM CYLINDERS

### Symbol



### Specifications

Same as for standard items. See p.314.  
 Available at bore sizes  $\phi 20$ ,  $\phi 25$ ,  $\phi 32$ , and  $\phi 40$  [ $\phi 0.787$ in.,  $\phi 0.984$ in.,  $\phi 1.260$ in.,  $\phi 1.575$ in.] only.  
 However, bore sizes  $\phi 50$  and  $\phi 63$  [ $\phi 1.969$ in.,  $\phi 2.480$ in.] are standard with bushing.

### Bore Size and Stroke

Same as for standard items. See p.314.

### Order Codes

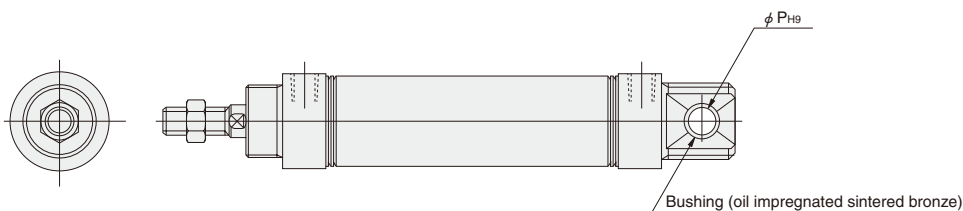
|  |  |   |   |   |   |  |
|--|--|---|---|---|---|--|
| <p><b>DA</b></p> <p><b>20×50</b></p> <p>Bore size<br/>×<br/>Stroke</p> | <p><b>8B</b></p> <p>Pivot mounting type<br/>with bushing</p> | <p><b>Rod end accessory</b></p> <p><b>Blank</b> — No rod end accessory<br/> <b>I</b> — I type knuckle<br/> <b>Y</b> — Y type knuckle (with pin)<br/>                 ● For the cylinder joint and cylinder rod end, see p.1568.</p> | <p><b>Supporting bracket</b></p> <p><b>Blank</b> — Not required<br/> <b>8E</b> — Pivot mounting type with supporting bracket (with pin)</p> | <p><b>Number of sensor switches</b></p> <p><b>1</b> — With 1 sensor switch<br/> <b>2</b> — With 2 sensor switches<br/> <b>3</b> — With 3 sensor switches<br/>                 ⋮</p> | <p><b>Lead wire length</b> (Applies to all except <b>CS□F</b>)</p> <p><b>A</b> — 1000mm [39in.]<br/> <b>B</b> — 3000mm [118in.]</p> | <p><b>Sensor switch</b> (for cylinders with sensor switches)</p> <p><b>Blank</b> — No sensor switch<br/> <b>ZG530</b> — 2-lead wire Solid state type with indicator lamp DC10~28V<br/> <b>ZG553</b> — 3-lead wire Solid state type with indicator lamp DC4.5~28V<br/> <b>CS3M</b> — Reed switch type with indicator lamp DC10~30V<br/> <b>CS4M</b> — Reed switch type with indicator lamp AC85~230V<br/> <b>CS5M</b> — Reed switch type without indicator lamp DC10~30V<br/> <b>CS2F</b> — Reed switch type with indicator lamp DC3~30V<br/> <b>CS3F</b> — Reed switch type with indicator lamp AC85~115V<br/> <b>CS4F</b> — Reed switch type with indicator lamp AC85~115V<br/> <b>CS5F</b> — Reed switch type without indicator lamp AC85~230V<br/>                 DC10~30V<br/>                 DC3~30V</p> <p>● For details of sensor switches, see p.1544.<br/>                 ● <b>CS□F</b> comes with DIN connector. All others are grommet type.</p> |
|--|--|---|---|---|---|--|

Slim double acting cylinder

### Dimensions of Pivot Mounting Type Cylinder with Bushing Basic Type

Other than the dimension and note shown below, all are the same as the standard items. See the basic type on p.316.

DA [Bore size] × [Stroke] -8B

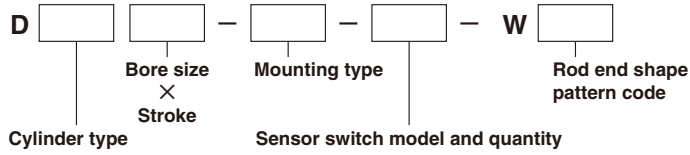


# OPTIONAL ROD END SHAPE PATTERNS

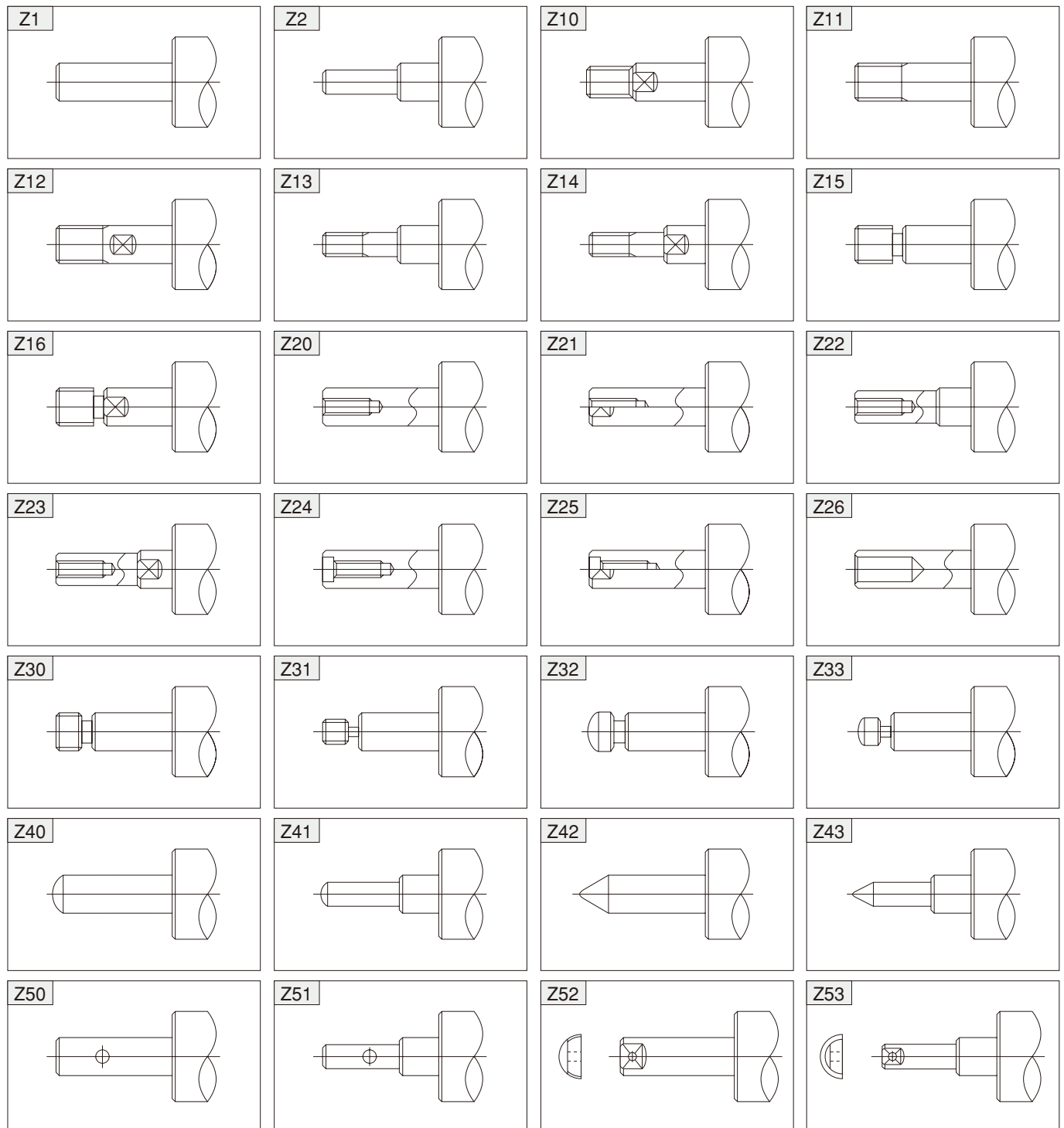
Use an order form of rod end pattern and fill the items on the selected one from among 28 types of optional patterned shapes to obtain made-to-order cylinders of non-standard rod end shapes.

The shapes can be applied to the entire Slim cylinders series with the exception of square rod cylinders and cylinders with bellows. For the order form containing the optional patterned shapes, consult us.

## Order Codes



## Piston Rod End Shape Pattern Diagram (28 Types)



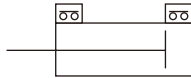
# SENSOR SWITCHES

## Solid State Type, Reed Switch Type

- Since a magnet is already standard on the Slim cylinders series<sup>Note</sup>, mounting a sensor switch will enable use in sensor switch applications.

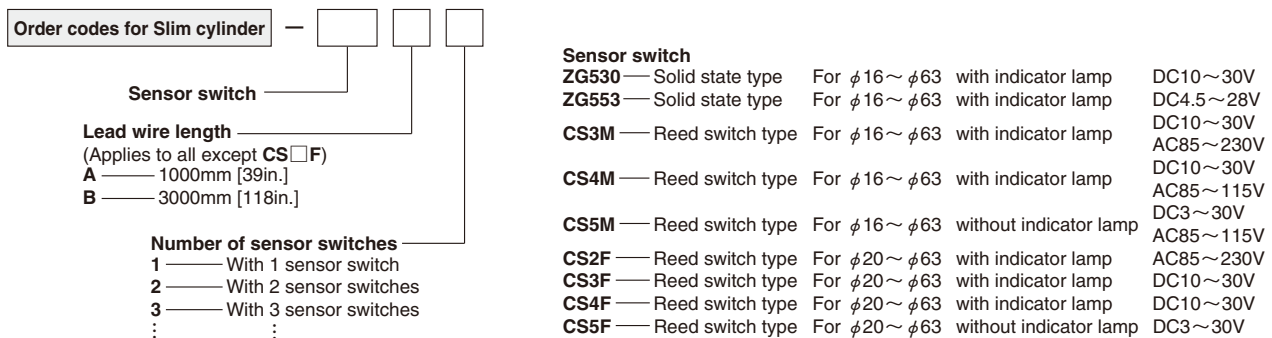
Note: Except the heat resistant specification cylinder.

### Symbol

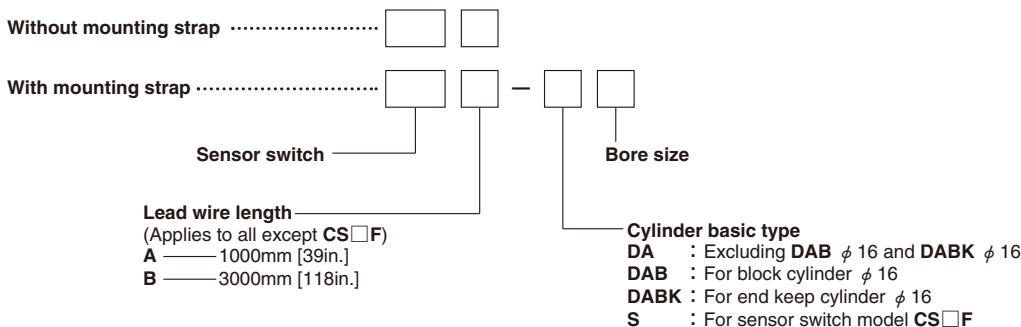


### Order Codes

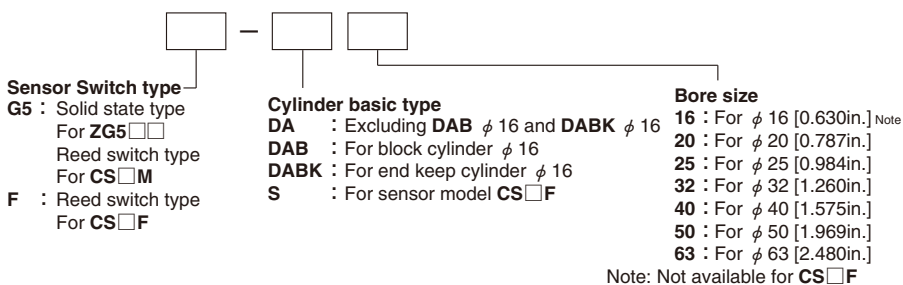
- Order codes for sensor switches mounted on the Slim cylinders



- Order codes for sensor switch only



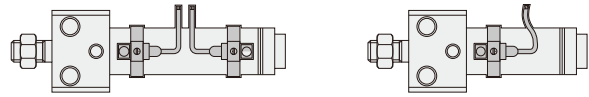
- Order codes for mounting strap only



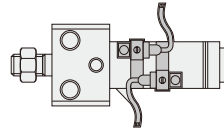
# Minimum Cylinder Strokes When Using Sensor Switches

| Sensor switch model | Bore size | mm                    |                        |                |
|---------------------|-----------|-----------------------|------------------------|----------------|
|                     |           | 2 pcs. mounting       |                        | 1 pc. mounting |
|                     |           | Along a straight line | In staggered positions |                |
| ZG530               | 16        | 20                    | 10                     | 10             |
| ZG553               | 20~63     | 20                    | 10                     | 10             |
| CS□M                | 16~63     | 20                    | 15                     | 15             |
| CS□F                | 20~63     | 40                    | 21                     | 15             |

- Two pieces mounting ● One piece mounting
- When mounted in-line

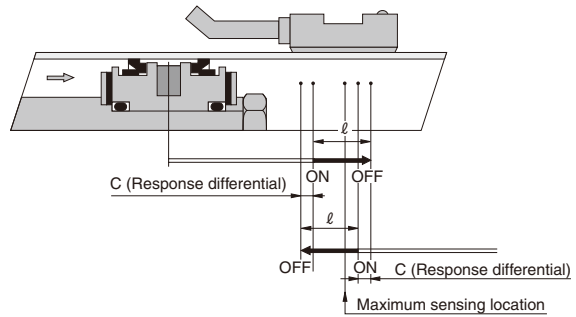


- When mounted in staggered positions



## Sensor Switch Operating Range, Response Differential, and Maximum Sensing Location

- Operating range :  $\ell$   
The distance the piston travels in one direction, while the switch is in the ON position.
- Response differential : C  
The distance between the point where the piston turns the switch ON and the point where the switch is turned OFF as the piston travels in the opposite direction.



| Item                      | Bore size                      | mm [in.]                 |                          |                          |                          |                          |                          |                          |
|---------------------------|--------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|                           |                                | 16 [0.630]               | 20 [0.787]               | 25 [0.984]               | 32 [1.260]               | 40 [1.575]               | 50 [1.969]               | 63 [2.480]               |
| Operating range : $\ell$  | ZG530□                         | 2.5~4.1<br>[0.098~0.161] | 2.5~4.2<br>[0.098~0.165] | 2.6~4.3<br>[0.102~0.169] | 3.0~4.8<br>[0.118~0.189] | 3.1~5.0<br>[0.122~0.197] | 3.3~5.4<br>[0.130~0.213] | 3.5~5.7<br>[0.138~0.224] |
|                           | ZG533□                         | —                        | —                        | —                        | —                        | —                        | —                        | —                        |
|                           | CS□M                           | 6.7~7 [0.264~0.276]      | 7~8.5 [0.276~0.335]      | 7~8.5 [0.276~0.335]      | 8~9 [0.315~0.354]        | 9~10.5 [0.354~0.413]     | 7~8 [0.276~0.315]        | 8~9.5 [0.315~0.374]      |
|                           | CS□F                           | —                        | 7~8.5 [0.276~0.335]      | 8.5~10 [0.335~0.394]     | 9~10.5 [0.354~0.413]     | 10.5~12 [0.413~0.472]    | 9~10 [0.354~0.394]       | 9~10.5 [0.354~0.413]     |
| Response differential : C | ZG530                          | 0.7 [0.028] or less      | 0.7 [0.028] or less      | 0.8 [0.031] or less      | 0.7 [0.028] or less      | 0.8 [0.031] or less      | 0.8 [0.031] or less      | 0.8 [0.031] or less      |
|                           | ZG533                          | 0.7 [0.028] or less      | 0.7 [0.028] or less      | 0.8 [0.031] or less      | 0.7 [0.028] or less      | 0.8 [0.031] or less      | 0.8 [0.031] or less      | 0.8 [0.031] or less      |
|                           | CS□M                           | 1 [0.039] or less        | 1 [0.039] or less        | 1 [0.039] or less        | 1 [0.039] or less        | 1 [0.039] or less        | 1.2 [0.047] or less      | 1.2 [0.047] or less      |
|                           | CS□F                           | —                        | 1.5 [0.059] or less      | 1.5 [0.059] or less      | 1.5 [0.059] or less      | 1.5 [0.059] or less      | 2 [0.079] or less        | 1.5 [0.059] or less      |
| Maximum sensing location  | ZG530, ZG533 <sup>Note 1</sup> | 11 [0.433]               | 11 [0.433]               | 11 [0.433]               | 11 [0.433]               | 11 [0.433]               | 11 [0.433]               | 11 [0.433]               |
|                           | CS□M <sup>Note 1</sup>         | 11 [0.433]               | 11 [0.433]               | 11 [0.433]               | 11 [0.433]               | 11 [0.433]               | 11 [0.433]               | 11 [0.433]               |
|                           | CS□F <sup>Note 2</sup>         | —                        | 16 [0.630]               | 16 [0.630]               | 16 [0.630]               | 16 [0.630]               | 16 [0.630]               | 16 [0.630]               |

Remark: Figures in the table above are reference values.

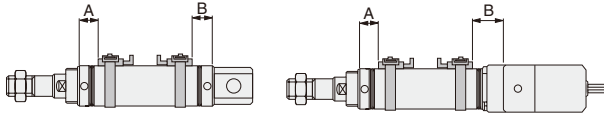
- Notes: 1. Figures are lengths measured from the switch's opposite end side to the lead wire.  
2. Figures are lengths measured from the connector side's end surface to the lead wire.

# Mounting Location of End of Stroke Detection Sensor Switch

When the sensor switch is mounted in the location shown in the diagram (figures in the table are reference values), the magnet comes to the sensor switch's maximum sensing location at the end of the stroke.

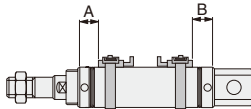
## ● Air cylinder, Low hydraulic cylinder, Valpack cylinder

● Air cylinder, Low hydraulic cylinder ● Valpack cylinder



| Sensor switch model |   | Bore size |        | Air cylinder, Low hydraulic cylinder |    |    |    |    |    | Valpack cylinder |    |    |    |
|---------------------|---|-----------|--------|--------------------------------------|----|----|----|----|----|------------------|----|----|----|
|                     |   | Code      | Stroke | 20                                   | 25 | 32 | 40 | 50 | 63 | 20               | 25 | 32 | 40 |
| ZG530 □<br>ZG553 □  | A | 27        | 27     | 27                                   | 27 | 36 | 36 | 27 | 27 | 27               | 27 | 27 | 27 |
|                     | B | 27        | 27     | 27                                   | 27 | 36 | 36 | 39 | 39 | 39               | 39 | 44 | 44 |
| CS □ M              | A | 27        | 27     | 27                                   | 27 | 36 | 36 | 27 | 27 | 27               | 27 | 27 | 27 |
|                     | B | 27        | 27     | 27                                   | 27 | 36 | 36 | 39 | 39 | 39               | 39 | 44 | 44 |
| CS □ F              | A | 22        | 22     | 22                                   | 22 | 32 | 32 | 22 | 22 | 22               | 22 | 22 | 22 |
|                     | B | 22        | 22     | 22                                   | 22 | 32 | 32 | 34 | 34 | 34               | 34 | 39 | 39 |

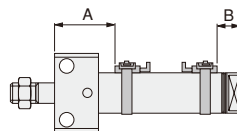
## ● Single acting cylinder



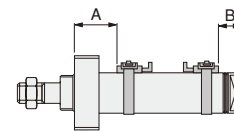
| Sensor switch model          |   | Bore size |        | Stroke |    |     |    |
|------------------------------|---|-----------|--------|--------|----|-----|----|
|                              |   | Code      | Stroke | 20     | 25 | 32  | 40 |
| ZG530 □<br>ZG553 □<br>CS □ M | A | 0~25      | 35     | 36     | 35 | 37  |    |
|                              |   | 26~50     | 52     | 49     | 49 | 53  |    |
|                              |   | 51~75     | 72     | 71     | 72 | 68  |    |
|                              |   | 76~100    | —      | 84     | 86 | 95  |    |
|                              |   | 101~125   | —      | —      | —  | 110 |    |
|                              |   | 126~150   | —      | —      | —  | 125 |    |
|                              | B | —         | 27     | 27     | 27 | 27  |    |
| CS □ F                       | A | 0~25      | 30     | 31     | 30 | 32  |    |
|                              |   | 26~50     | 47     | 44     | 44 | 48  |    |
|                              |   | 51~75     | 67     | 66     | 67 | 63  |    |
|                              |   | 76~100    | —      | 79     | 81 | 90  |    |
|                              |   | 101~125   | —      | —      | —  | 105 |    |
|                              |   | 126~150   | —      | —      | —  | 120 |    |
|                              | B | —         | 22     | 22     | 22 | 22  |    |

## ● Block cylinder

● Side mount

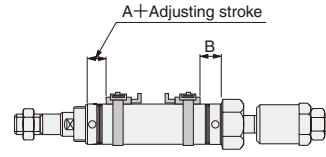


● Front mount



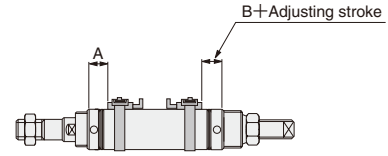
| Mounting type |            | Side mount |    |    |    |    |    |    | Front mount |    |    |    |    |    |    |
|---------------|------------|------------|----|----|----|----|----|----|-------------|----|----|----|----|----|----|
|               |            | Bore size  |    | 16 | 20 | 25 | 32 | 40 | 50          | 63 | 16 | 20 | 25 | 32 | 40 |
| ZG530 □       | A Rod side | 32         | 39 | 41 | 47 | 57 | 67 | 67 | 23          | 27 | 27 | 27 | 29 | 37 | 37 |
| ZG553 □       | B Rod side | 16         | 20 | 20 | 21 | 25 | 45 | 45 | 16          | 20 | 20 | 21 | 25 | 45 | 45 |
| CS □ M        | A Rod side | 32         | 39 | 41 | 47 | 57 | 66 | 66 | 23          | 27 | 27 | 27 | 29 | 36 | 36 |
|               | B Rod side | 16         | 20 | 20 | 21 | 25 | 44 | 44 | 16          | 20 | 20 | 21 | 25 | 44 | 44 |
| CS □ F        | A Rod side | —          | 36 | 38 | 44 | 52 | 64 | 64 | —           | 24 | 24 | 24 | 24 | 34 | 34 |
|               | B Rod side | —          | 17 | 17 | 18 | 20 | 42 | 42 | —           | 17 | 17 | 18 | 22 | 42 | 42 |

## ● Push side stroke adjusting cylinder



| Sensor switch model          |   | Bore size |        | Stroke |    |    |    |
|------------------------------|---|-----------|--------|--------|----|----|----|
|                              |   | Code      | Stroke | 20     | 25 | 32 | 40 |
| ZG530 □<br>ZG553 □<br>CS □ M | A | 27        | 27     | 27     | 27 | 27 | 27 |
|                              | B | 27        | 27     | 27     | 27 | 27 | 27 |
| CS □ F                       | A | 22        | 22     | 22     | 22 | 22 | 22 |
|                              | B | 22        | 22     | 22     | 22 | 22 | 22 |

## ● Pull side stroke adjusting cylinder

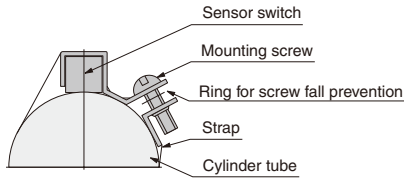


| Sensor switch model          |   | Bore size |        | Stroke |    |    |    |
|------------------------------|---|-----------|--------|--------|----|----|----|
|                              |   | Code      | Stroke | 20     | 25 | 32 | 40 |
| ZG530 □<br>ZG553 □<br>CS □ M | A | 27        | 27     | 27     | 27 | 27 | 27 |
|                              | B | 37        | 37     | 42     | 42 | 42 | 42 |
| CS □ F                       | A | 22        | 22     | 22     | 22 | 22 | 22 |
|                              | B | 32        | 32     | 37     | 37 | 37 | 37 |

SLIM CYLINDERS

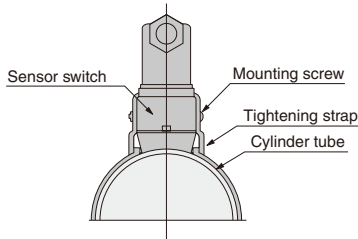
## Moving Sensor Switch

- ZG530
- ZG553
- CS  M



- Loosening the mounting screw allows the sensor switch to be moved freely along with the strap in the axial and circumferential direction. The sensor switch alone cannot be moved.
- To remove the sensor switch from the strap, first detach the strap from the cylinder tube and then remove the sensor switch from the strap.
- Tighten the mounting screw with a tightening torque of 49N·cm [4.3in·lbf].

- CS  F

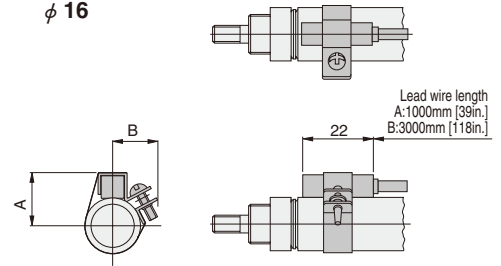


- Loosening the mounting screw allows the sensor switch to be moved freely in the axial and circumferential direction.
- Slightly loosening the mounting screw allows fine adjustment of the lead switch only, up to 5mm [0.2in.] in the axial direction. Tighten the mounting screw with a tightening torque of 68.6N·cm [6.1in·lbf].

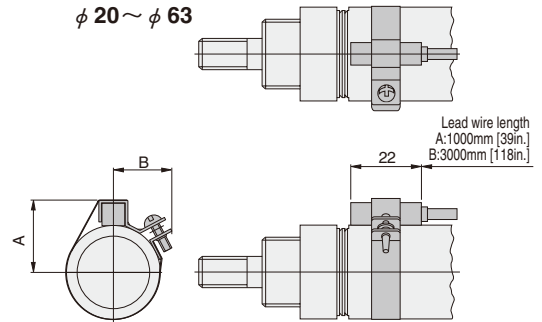
## Dimensions of Sensor Switch (mm)

- ZG530
- ZG553
- CS  M

φ 16



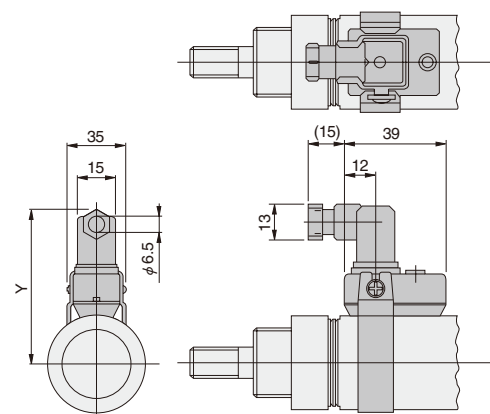
φ 20 ~ φ 63



|      |         | mm [in.] |         |
|------|---------|----------|---------|
| Bore | Code    | A        | B       |
| 16   | 16      | 15       | 15      |
|      | [0.630] | [0.630]  | [0.591] |
| 20   | 19      | 17       | 17      |
|      | [0.787] | [0.748]  | [0.669] |
| 25   | 20.5    | 17.5     | 17.5    |
|      | [0.984] | [0.807]  | [0.689] |
| 32   | 25      | 19       | 19      |
|      | [1.260] | [0.984]  | [0.748] |
| 40   | 29      | —*       | —*      |
|      | [1.575] | [1.142]  |         |
| 50   | 34      | —*       | —*      |
|      | [1.969] | [1.339]  |         |
| 63   | 41      | —*       | —*      |
|      | [2.480] | [1.614]  |         |

\* At φ 40 or larger, dimension B is the radius of the cylinder tube. Therefore, the protrusion in the B direction of the mounting section disappears.

- CS  F



|      |         | mm [in.] |
|------|---------|----------|
| Bore | Code    | Y        |
| 20   | 59      | 59       |
|      | [0.787] | [2.323]  |
| 25   | 61.5    | 61.5     |
|      | [0.984] | [2.421]  |
| 32   | 65      | 65       |
|      | [1.260] | [2.559]  |
| 40   | 69      | 69       |
|      | [1.575] | [2.717]  |
| 50   | 76      | 76       |
|      | [1.969] | [2.992]  |
| 63   | 83      | 83       |
|      | [2.480] | [3.268]  |



# ROD END ACCESSORIES

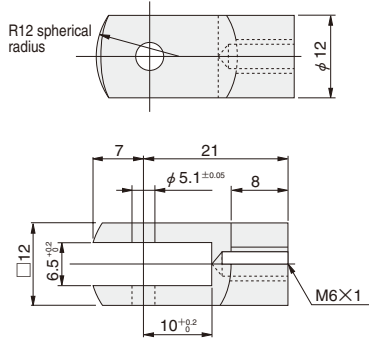
## Option

### Dimensions

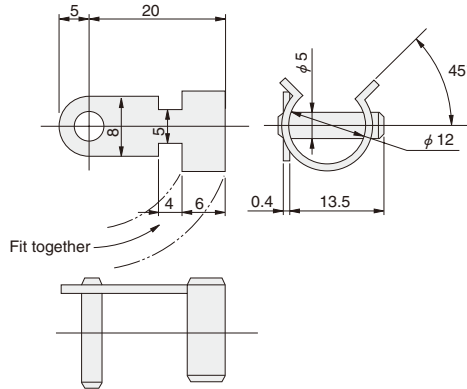
●  $\phi 16$

● Y type

 SLIM-Y

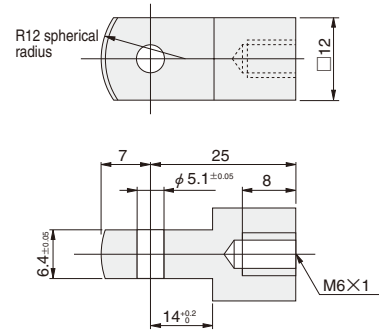


Pin for Y type knuckle



● I type

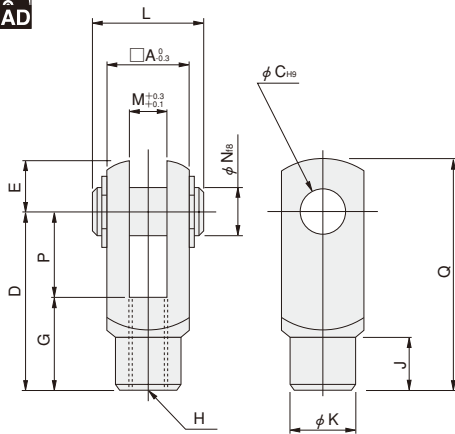
 SLIM-I



●  $\phi 20 \sim \phi 63$

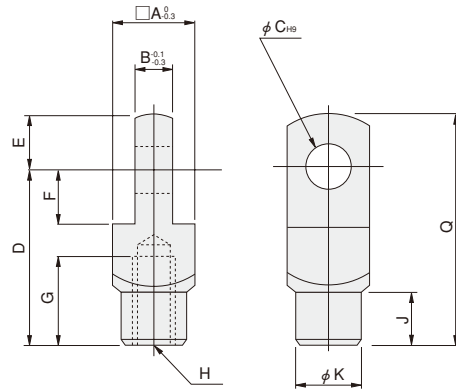
● Y type

 SLIM-Y



● I type

 SLIM-I



|                                    |      | mm [in.] |    |    |    |    |    |    |          |    |    |    |    |    |    |    |
|------------------------------------|------|----------|----|----|----|----|----|----|----------|----|----|----|----|----|----|----|
| Bore                               | Code | A        | B  | C  | D  | E  | F  | G  | H        | J  | K  | L  | M  | N  | P  | Q  |
| 20 [0.787], 25 [0.984]※            |      | 16       | 8  | 8  | 30 | 10 | 11 | 15 | M8×1     | 10 | 14 | 21 | 8  | 8  | 15 | 40 |
| 25 [0.984], 32 [1.260]             |      | 19       | 10 | 10 | 40 | 12 | 13 | 20 | M10×1.25 | 12 | 16 | 25 | 10 | 10 | 20 | 52 |
| 40 [1.575], 50 [1.969], 63 [2.480] |      | 24       | 14 | 10 | 45 | 12 | 13 | 25 | M14×1.5  | 15 | 22 | 30 | 14 | 10 | 20 | 57 |

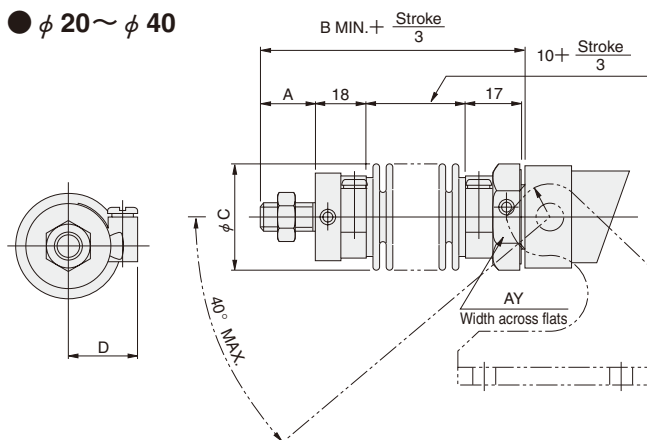
Note: Items marked with ※ are for the square rod cylinders.

# BELLOWS, MOUNTING BRACKETS



## Dimensions (For brake cylinders with bellows, see p.367.)

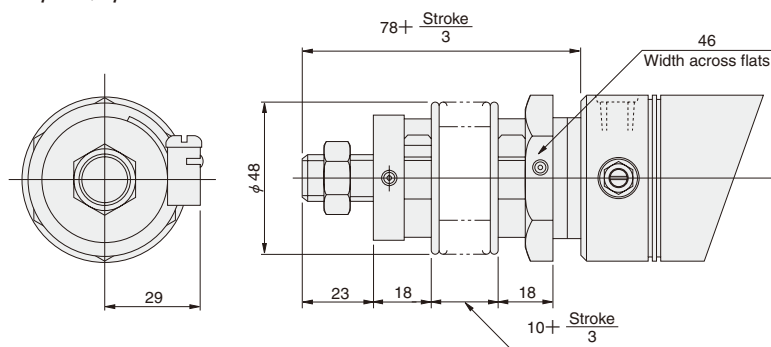
### ● $\phi 20 \sim \phi 40$



| Bore | Code    | A          | B          | C          | D          | AY         |
|------|---------|------------|------------|------------|------------|------------|
| 20   | [0.787] | 15 [0.591] | 63 [2.480] | 35 [1.378] | 23 [0.906] | 27 [1.063] |
| 25   | [0.984] | 18 [0.709] | 66 [2.598] | 35 [1.378] | 23 [0.906] | 30 [1.181] |
| 32   | [1.260] | 23 [0.906] | 71 [2.795] | 40 [1.575] | 26 [1.024] | 36 [1.417] |
| 40   | [1.575] | 23 [0.906] | 71 [2.795] | 48 [1.890] | 29 [1.142] | 41 [1.614] |

Note: Supporting brackets for the rod trunnion type with bellows should be mounted in the direction opposite to the case of no bellows shown in the diagram.

### ● $\phi 50, \phi 63$



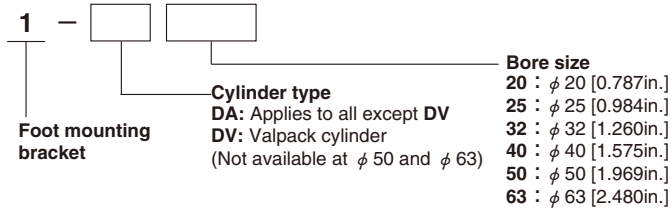
## Mass of Slim Cylinder with Bellows

| Bore size<br>mm [in.] | Zero stroke mass          |                           |                     |               | Additional mass for each<br>1mm [0.0394in.] stroke |
|-----------------------|---------------------------|---------------------------|---------------------|---------------|--|
|                       | Standard head             | Short head                | Pivot mounting type | Trunnion type |  |
| 20 [0.787]            | 0.25 [0.55] (0.23 [0.51]) | 0.24 [0.53] (0.22 [0.49]) | —                   | 0.44 [0.97]   | 0.0009 [0.0020]                                    |
| 25 [0.984]            | 0.29 [0.64] (0.27 [0.60]) | 0.28 [0.62] (0.26 [0.57]) | —                   | 0.47 [1.04]   | 0.0013 [0.0029]                                    |
| 32 [1.260]            | 0.43 [0.95] (0.40 [0.88]) | 0.41 [0.90] (0.38 [0.84]) | —                   | 0.60 [1.32]   | 0.0018 [0.0040]                                    |
| 40 [1.575]            | 0.62 [1.37] (0.56 [1.23]) | 0.58 [1.28] (0.52 [1.15]) | —                   | 0.78 [1.72]   | 0.0029 [0.0064]                                    |
| 50 [1.969]            | 1.03 [2.27]               | 0.98 [2.16]               | 0.95 [2.09]         | —             | 0.0033 [0.0073]                                    |
| 63 [2.480]            | 1.36 [3.00]               | 1.32 [2.91]               | 1.29 [2.84]         | —             | 0.0038 [0.0084]                                    |

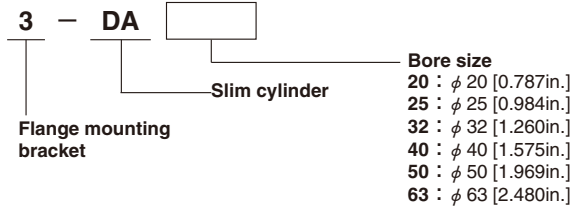
Note: Figures in parentheses ( ) are for the cylinder with variable cushion.

# Order Codes for Mounting Bracket

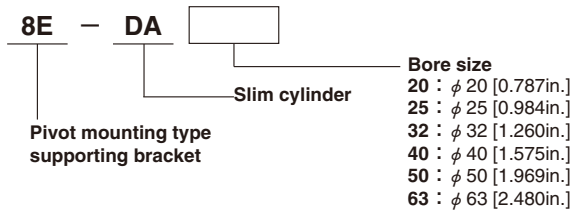
## (1) Foot mounting bracket



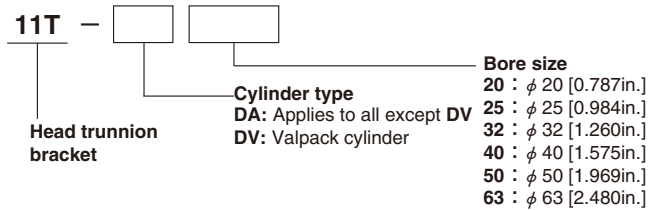
## (2) Flange mounting bracket



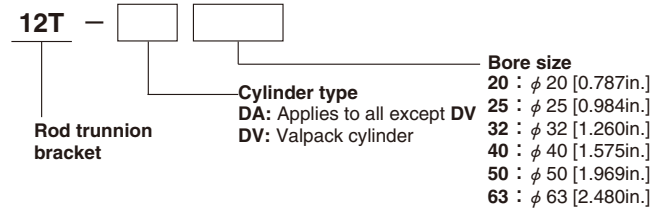
## (3) Pivot mounting type supporting bracket



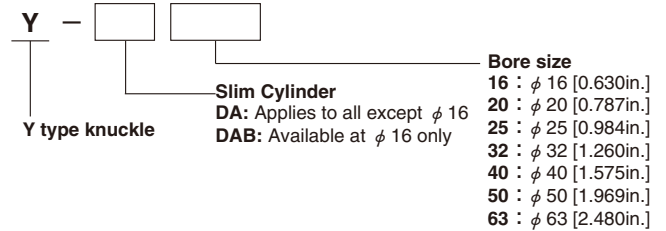
## (4) Head trunnion bracket



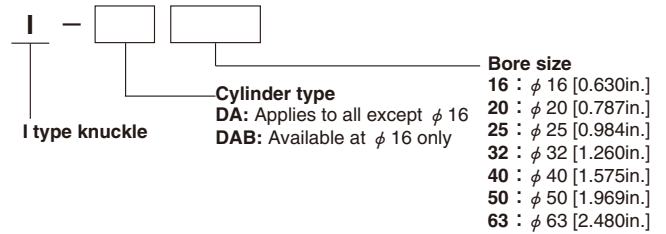
## (5) Rod trunnion bracket



## (6) Y type knuckle



## (7) I type knuckle



SLIM CYLINDERS