

# Bernoulli Gripper

ø20, ø30, ø40, ø60, ø80

RoHS

**New Body size ø20 has been added.**



For the adsorption transfer of thin cloths, films, printed circuit boards, etc.

Energy saving

Max. 79% improvement\*1

\*1 Comparison of air consumption to lifting force

High lifting force

65 N

10.3 times that of the existing model

(Existing model: 6.3 N → ZNC80: 65 N)



ZNC40  
Body material: Resin  
30 g

[Click here for details](#)

## 3 types of body materials



## With stoppers

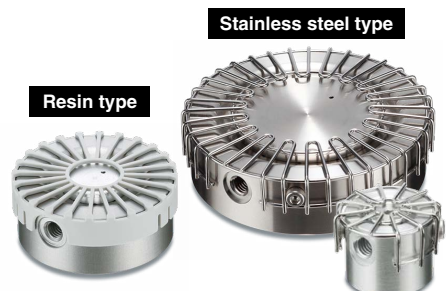
Prevents workpiece slippage



## With vibration suppression cover

Vibration noise:  
Max. 17 dB[A] reduction

Suppresses the vibration noise of thin workpieces



**ZNC Series**

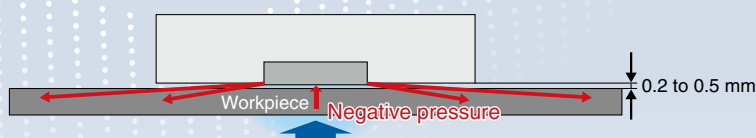


CAT.ES100-145B <sup>Ⓐ</sup>

## Basic type (Without vibration suppression cover/stoppers)

**When a flat, hard, non-breathable workpiece such as glass is adsorbed, it will be gripped without direct contact.**

As the gripper approaches the workpiece, the flow speed of the air flowing between the gripper and the workpiece increases, creating a vacuum and adsorbing the workpiece. In the case of a flat, hard, non-breathable workpiece such as glass, it will be in a non-contact state. The lifting force of the gripper and the weight of the workpiece is balanced around 0.2 to 0.5 mm.

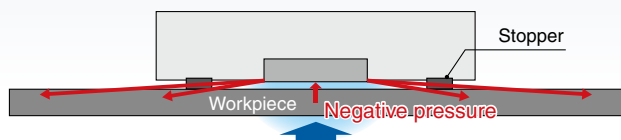


## With stoppers

**The rubber stoppers prevent the workpiece from slipping.**

By attaching stoppers, the gripping state changes from non-contact to contact. For flat and hard workpieces such as glass, stoppers are recommended to prevent slipping. When using a soft workpiece such as cloth or paper, it may come into contact with the gripper and generate a vibration noise. In this case, a vibration suppression cover is recommended.

- \* Only the rubber parts of the stoppers can be replaced.
- \* The stoppers reduce the lifting force.

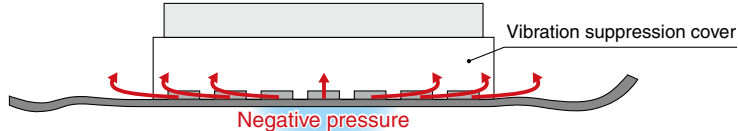


## With vibration suppression cover

**Suppresses the vibration that occurs when a soft workpiece such as cloth or paper is adsorbed**

The vibration suppression cover suppresses the vibration generated when a soft workpiece, such as cloth or paper, comes into contact with the gripper, and it reduces the generation of sound. Air flows at high speed in the gap between the vibration suppression cover and the workpiece, enabling stable suction transfer.

- \* With the vibration suppression cover, the gripping state changes from non-contact to contact.
- \* The vibration suppression cover reduces the lifting force.



### Application Examples

For the adsorption of printed circuit boards



For the adsorption of bubble wrap



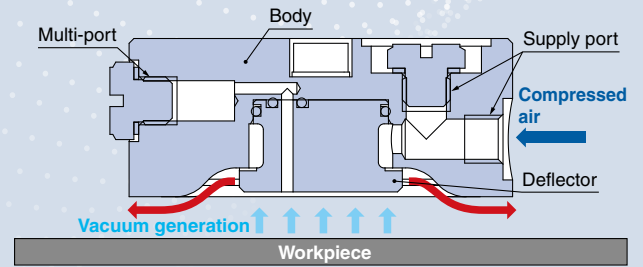
For the adsorption of paper



# Construction and working principle

By supplying clean air, the clogging of foreign matter can be prevented.

**Bernoulli gripper construction**



## Piping port

### Multiple ports

Can be used as a sensor port or release port

**Release port**

Workpieces can be removed easily.

Release air OUT



Release air IN



Body material: **Aluminum**

**A pressure sensor option can be selected.**

Detects the presence of a workpiece  
\* Connects to the multi-port



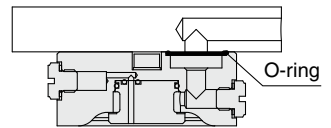
### Air supply port

Piping from 2 directions (top and side) is possible.

**Requires no piping**

Direct porting is possible.

\* The O-ring can be ordered separately or prepared by the customer. (For details, refer to page 16.)



Body material: **Stainless steel**

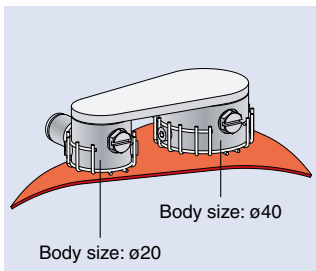
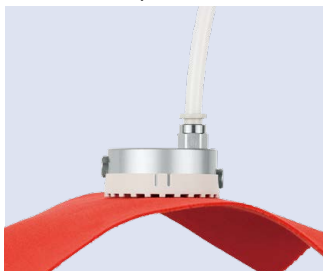
Anti-corrosive type



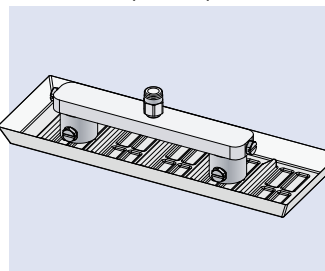
Body material: **Resin**

Lightweight type

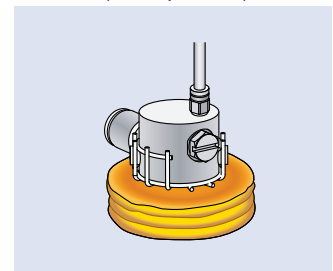
For the adsorption of thin cloths



For the adsorption of plastic cases




Cookies (Food product)



\* The body mounting adapter should be provided by the customer.

# Series Variations

| Material  | Size          | Weight [g] | Attachment  |                                  | Pressure sensor |                 |
|---|---------------|------------|---|----------------------------------|-----------------|-----------------|
|   |               |            | With stoppers   | With vibration suppression cover |                 |                 |
|   |               |            |   | Resin                            |                 | Stainless steel |
| <br>Aluminum         | <b>New</b> 20 | 12         | With stoppers<br><br>NBR<br>(Improved abrasion resistance)<br><br>Silicone rubber<br>(Heat/ozone resistant) | —                                | ●               | With or without |
|   | 30            | 27         |   | —                                | ●               |                 |
|   | 40            | 48         |   | ●                                | ●               |                 |
|   | 60            | 110        |   | —                                | ●               |                 |
|   | 80            | 193        |   | —                                | ●               |                 |
| <br>Resin            | <b>New</b> 20 | 7          |   | —                                | ●               |                 |
|   | 30            | 17         |   | —                                | ●               |                 |
|   | 40            | 30         |   | ●                                | —               |                 |
|   | 60            | 67         |   | —                                | ●               |                 |
|   | 80            | 119        |   | —                                | ●               |                 |
| <br>Stainless steel | <b>New</b> 20 | 34         |   | —                                | ●               |                 |
|   | 30            | 77         |   | —                                | ●               |                 |
|   | 40            | 139        |   | —                                | ●               |                 |
|   | 60            | 323        |   | —                                | ●               |                 |
|   | 80            | 568        |   | —                                | ●               |                 |

## CONTENTS



|  |       |
|--|-------|
| Model Selection .....  | p. 4  |
| How to Order .....   | p. 5  |
| Specifications .....   | p. 6  |
| Lifting Force .....  | p. 7  |
| Air Consumption.....   | p. 7  |
| Lifting Force–Distance from the Workpiece .....                    | p. 8  |
| Construction .....   | p. 9  |
| Dimensions: $\varnothing 20$ .....                                 | p. 11 |
| Dimensions: $\varnothing 30, \varnothing 40, \varnothing 60$ ..... | p. 13 |
| Dimensions: $\varnothing 80$ .....                                 | p. 14 |
| Specific Product Precautions .....                                 | p. 15 |

# ZNC Series Model Selection

## Selection Procedure

### [Basic type]

#### Step 1 Calculate the lifting force.

$$W = M \times g \times t \times \frac{1}{n}$$

**W**: Required lifting force [N]

**M**: Workpiece mass [kg]

**g**: Gravitational acceleration [= 9.8 m/s<sup>2</sup>]

**t**: Safety factor (Recommended value: 2 or more)

**n**: Number of Bernoulli grippers [pcs.]

#### Selection example

Workpiece mass: **M** = 0.7 kg

Safety factor: **t** = 2

Number of Bernoulli grippers: **n** = 2 pcs.

Required lifting force: **W** =  $0.7 \times 9.8 \times 2 \times \frac{1}{2} = 6.9 \text{ N}$

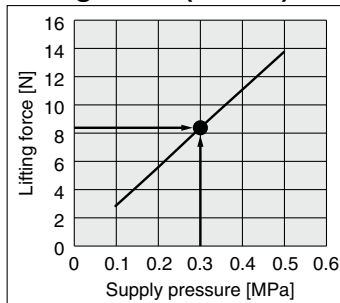
#### Basic type

Workpiece: Smooth and non-permeable

Operating pressure: 0.3 MPa

#### Step 2 Model selection

##### Lifting Force (ZNC40)



The lifting force in relation to the supply pressure for each size can be confirmed using the graph.

For the ZNC40, as the lifting force is 8.4 N when the supply pressure is 0.3 MPa, the lifting force is greater than the required lifting force. Therefore, the product can be used. If the lifting force is less than the required lifting force, considering rethinking the size, number of grippers to be used, or operating pressure.

The lifting force changes depending on the shape, size, surface unevenness, breathability, flexibility, etc., of the workpiece. Use the selection result as a reference value and perform verification and confirmation on the actual machine.

### [With stoppers/vibration suppression cover]

#### Step 1 Calculate the lifting force.

$$W = M \times g \times t \times \frac{1}{n}$$

**W**: Required lifting force [N]

**M**: Workpiece mass [kg]

**g**: Gravitational acceleration [= 9.8 m/s<sup>2</sup>]

**t**: Safety factor (Recommended value: 2 or more)

**n**: Number of Bernoulli grippers [pcs.]

#### Selection example

Workpiece mass: **M** = 0.25 kg

Safety factor: **t** = 2

Number of Bernoulli grippers: **n** = 1 pc.

Required lifting force: **W** =  $0.25 \times 9.8 \times 2 \times \frac{1}{1} = 4.9 \text{ N}$

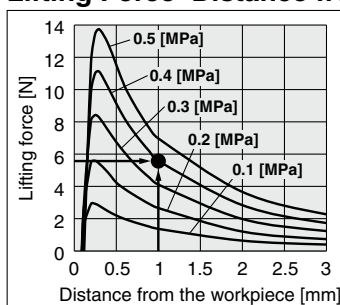
#### With stoppers

Workpiece: Smooth and non-permeable

Operating pressure: 0.4 MPa

#### Step 2 Model selection

##### Lifting Force–Distance from the Workpiece (ZNC40)



The lifting force in relation to the distance from the workpiece for each size can be confirmed using the graph.

In addition, for the type with stoppers, confirm the lifting force at 1 mm.

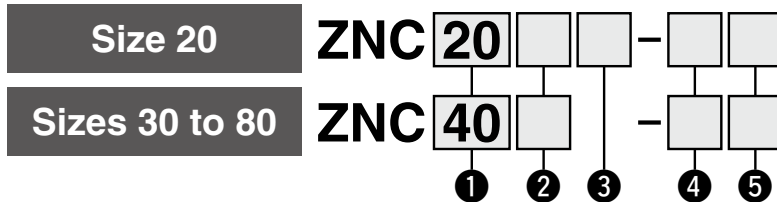
(For the type with a vibration suppression cover, confirm the lifting force at 1.5 mm.)

For the ZNC40, as the lifting force is 5.5 N when the supply pressure is 0.4 MPa, the lifting force is greater than the required lifting force. Therefore, the product can be used. If the lifting force is less than the required lifting force, considering rethinking the size, number of grippers to be used, or operating pressure.

The lifting force changes depending on the shape, size, surface unevenness, breathability, flexibility, etc., of the workpiece. Use the selection result as a reference value and perform verification and confirmation on the actual machine.

# Bernoulli Gripper ZNC Series

## How to Order



### 1 Body size

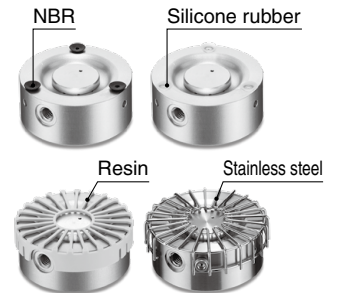
|    |        |
|----|--------|
| 20 | ø20 mm |
| 30 | ø30 mm |
| 40 | ø40 mm |
| 60 | ø60 mm |
| 80 | ø80 mm |

### 2 Body material

|     |                 |  |
|-----|-----------------|--|
| Nil | Aluminum        |  |
| P   | Resin           |  |
| S   | Stainless steel |  |

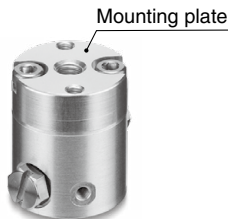
### 4 Attachment

|     |                                    |                         |
|-----|------------------------------------|-------------------------|
| Nil | Basic type (Without attachment)    |                         |
| PN  | With stoppers                      | NBR (Black)             |
| PS  |                                    | Silicone rubber (White) |
| VP  | With vibration suppression cover*1 | Resin                   |
| VS  |                                    | Stainless steel         |



### 3 Mounting plate (Size 20)

|     |                        |                 |
|-----|------------------------|-----------------|
| Nil | Without mounting plate |                 |
| T   | With mounting plate    | Aluminum        |
| TS  |                        | Stainless steel |



- \* The mounting plate is shipped together with the product but does not come assembled. Single unit part nos. ⇒ p. 16
- \* The piping methods for types with and without a mounting plate are shown in Table 2 below.

\*1 Refer to the Table 1. With Vibration Suppression Cover for the size and material.

- \* Stoppers cannot be retrofitted.
- \* Vibration suppression cover can be retrofitted to the basic type.
- \* The vibration suppression cover cannot be used with the type with stoppers.

### 5 Pressure sensor

|     |  |
|-----|--|
| Nil | None   |
| S   | With pressure sensor<br>Part no.: PSE541-M5-X2 |



- \* The pressure sensor is shipped together with the product but does not come assembled.

Table 1. With Vibration Suppression Cover

| Symbol | Material        | Body size symbol | Body material |       |                 |
|--------|-----------------|------------------|---------------|-------|-----------------|
|        |                 |                  | Aluminum      | Resin | Stainless steel |
| VP     | Resin           | 20               | —             | —     | —               |
|        |                 | 30               | —             | —     | —               |
|        |                 | 40               | ●             | ●     | —               |
|        |                 | 60               | —             | —     | —               |
|        |                 | 80               | —             | —     | —               |
| VS     | Stainless steel | 20               | ●             | ●     | ●               |
|        |                 | 30               | ●             | ●     | ●               |
|        |                 | 40               | ●             | —     | ●               |
|        |                 | 60               | ●             | ●     | ●               |
|        |                 | 80               | ●             | ●     | ●               |

Table 2. Size 20 Piping (Refer to page 16 for details on how to mount the product.)

|                     | Side ported            |  | Body ported (Requires no piping) |  |
|---------------------|------------------------|--|----------------------------------|--|
|                     | Without mounting plate |  |                                  |  |
| With mounting plate | Top ported             |  | Side ported                      |  |

- \* An O-ring (5.7 x 3.7 x 1) and a plug are shipped together with the product as accessories.

## Attachments/Part Nos.

Stopper ZNCM-PS 2

### Material

|    |                         |
|----|-------------------------|
| PN | NBR (Black)             |
| PS | Silicone rubber (White) |

### Stopper size

| Symbol | Body size  |
|--------|------------|
| 1      | 20, 30     |
| 2      | 40, 60, 80 |

- \* Stopper size 1: With 3 stoppers
- \* Stopper size 2: With 3 stoppers and 3 spring pins
- For replacement instructions ⇒ Refer to page 20.

Vibration suppression cover ZNCM-40 VP

### Body size

|    |        |    |        |
|----|--------|----|--------|
| 20 | ø20 mm | 60 | ø60 mm |
| 30 | ø30 mm | 80 | ø80 mm |
| 40 | ø40 mm |    |        |

### Material

|    |                 |
|----|-----------------|
| VP | Resin           |
| VS | Stainless steel |

- \* Material: Resin is only selectable for body size 40.

- \* For stainless steel:  
Body sizes ø20mm and ø30 mm: With 2 mounting screws  
Body sizes ø40 mm, ø60 mm, and ø80 mm: With 3 mounting screws



## Specifications

| Model  |                      | ZNC20   | ZNC30                  | ZNC40 | ZNC60 | ZNC80 |     |
|--|----------------------|---|------------------------|-------|-------|-------|-----|
| <b>Lifting force [N]</b> *1, *3              |                      | 5.2   | 10.7                   | 13.8  | 28.3  | 65    |     |
| <b>Air consumption [L/min] (ANR)</b> *2, *3  |                      | 131   | 138                    | 182   | 182   | 255   |     |
| <b>Type</b>                                  |                      | Bernoulli   |                        |       |       |       |     |
| <b>Fluid</b>                                 |                      | Air   |                        |       |       |       |     |
| <b>Operating pressure</b>                    |                      | 0.1 to 0.5 MPa  |                        |       |       |       |     |
| <b>Proof pressure</b>                        |                      | 0.75 MPa  |                        |       |       |       |     |
| <b>Ambient and operating temperatures</b> *4 | <b>Body material</b> | Aluminum  | -5 to 80°C (0 to 50°C) |       |       |       |     |
|  |                      | Resin   | -5 to 40°C (0 to 40°C) |       |       |       |     |
|  |                      | Stainless steel   | -5 to 80°C (0 to 50°C) |       |       |       |     |
| <b>Grease</b>                                |                      | Grease-free   |                        |       |       |       |     |
| <b>Weight [g]</b> *5                         | <b>Body material</b> | Aluminum  | 12                     | 27    | 48    | 110   | 193 |
|  |                      | Resin   | 7                      | 17    | 30    | 67    | 119 |
|  |                      | Stainless steel   | 34                     | 77    | 139   | 323   | 568 |
| <b>Pressure sensor</b> *6                    |                      | PSE541-M5-X2 (Grease-free)<br>Rated pressure range: 0 to -101 kPa |                        |       |       |       |     |

\*1 Lifting force of the basic type at the max. supply pressure

Values when a flat, non-breathable workpiece is adsorbed

\*2 Air consumption at the max. supply pressure

\*3 (For the ZNC20, 30, 40, and 60) The values are for when the connection is as follows: Fitting min. hole diameter:  $\phi 2.5$ , Tubing size:  $\phi 6 \times \phi 4$ , Length: 500 mm

(For the ZNC80) The values are for when the connection is as follows: Fitting min. hole diameter:  $\phi 4.5$ , Tubing size:  $\phi 6 \times \phi 4$ , Length: 500 mm

\*4 No freezing or condensation. The values in ( ) are for models with a pressure sensor.

\*5 **ZNC20**: The weight value is for the basic type without a mounting plate or plug. Add the mounting plate weight if needed. (Aluminum: 6.5 g, Stainless steel: 17.6 g)

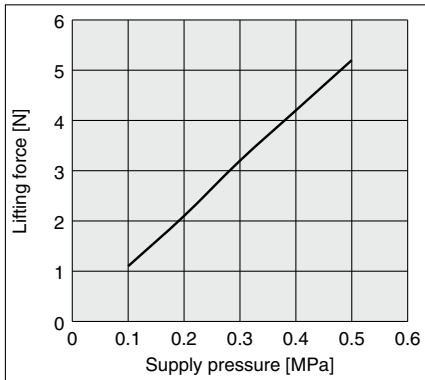
**ZNC30 to 80**: The weight value is for the basic type without a plug.

\*6 For pressure sensor details, refer to the PSE540 series in the **Web Catalog** and the Operation Manual.

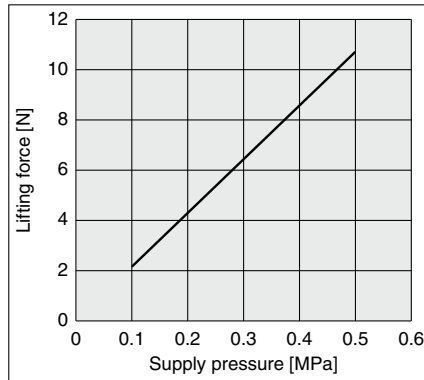
# ZNC Series

## Lifting Force

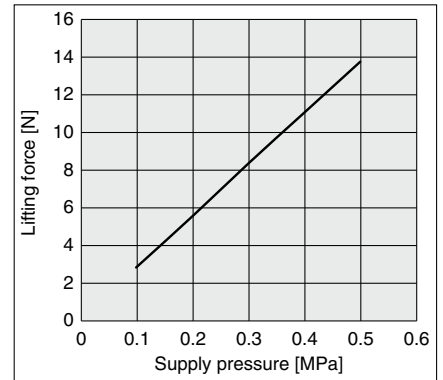
ZNC20□



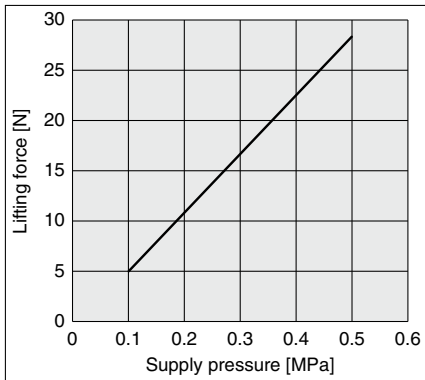
ZNC30□



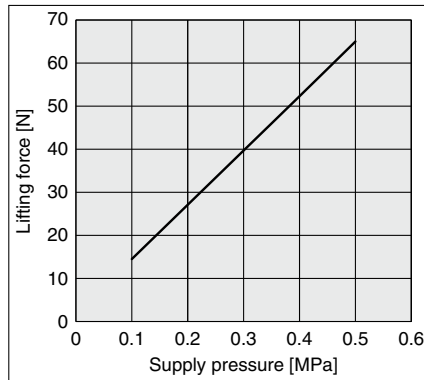
ZNC40□



ZNC60□

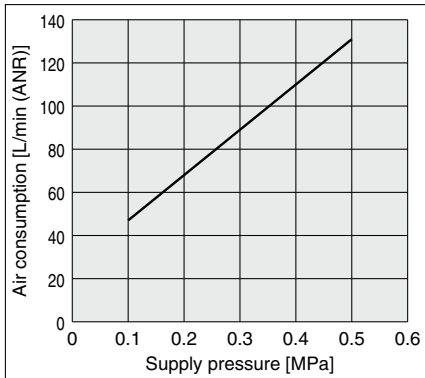


ZNC80□

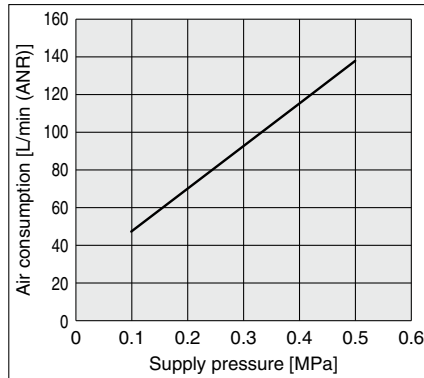


## Air Consumption

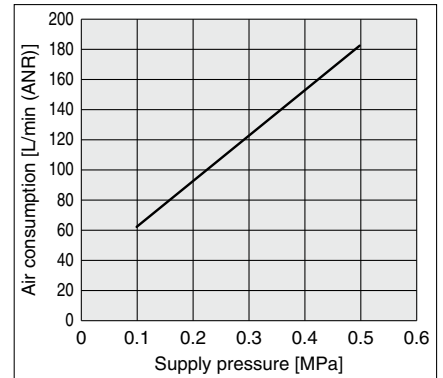
ZNC20□



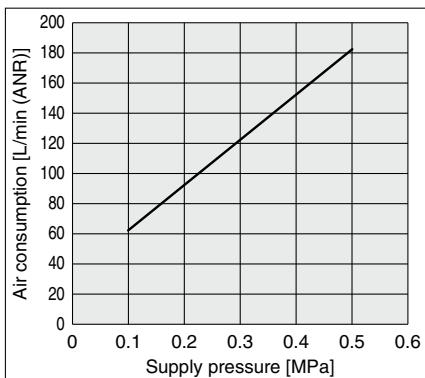
ZNC30□



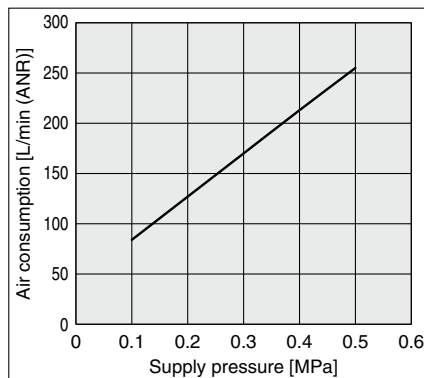
ZNC40□



ZNC60□



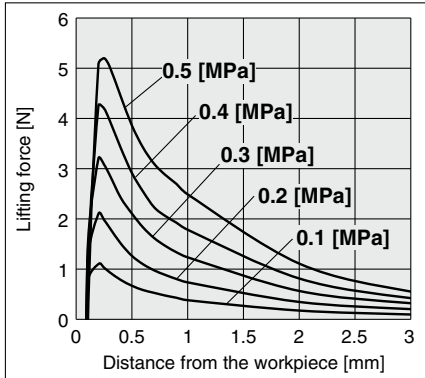
ZNC80□



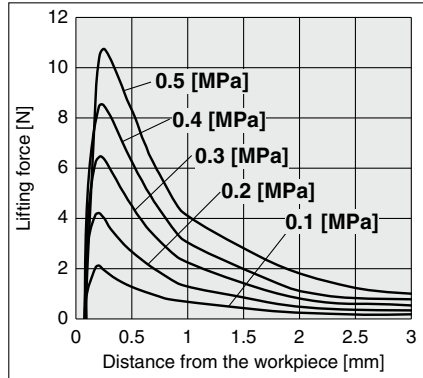


## Lifting Force–Distance from the Workpiece

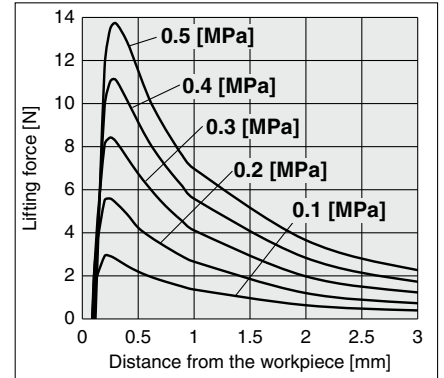
**ZNC20**



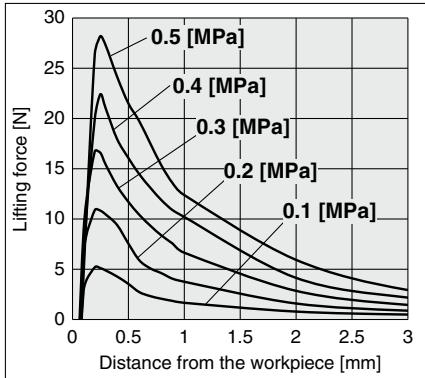
**ZNC30**



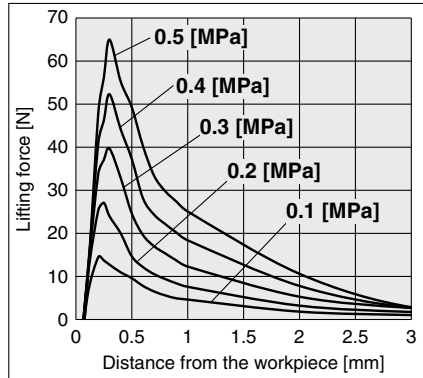
**ZNC40**



**ZNC60**



**ZNC80**



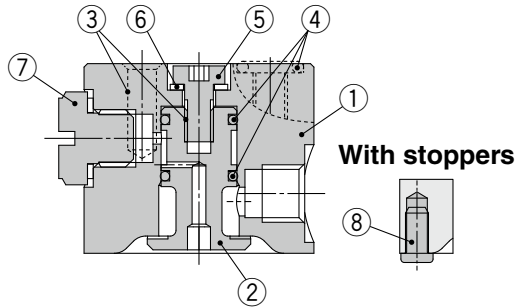
- \* The lifting force changes depending on the shape, size, surface unevenness, breathability, flexibility, etc., of the workpiece. Use the values shown in the graphs above as a reference, and confirm using the actual machine.
- \* For the lifting force when using stoppers or a vibration suppression cover, use the following values as a guide for the distance from the workpiece. With stoppers: 1 mm, With vibration suppression cover: 1.5 mm

# ZNC Series

## Construction

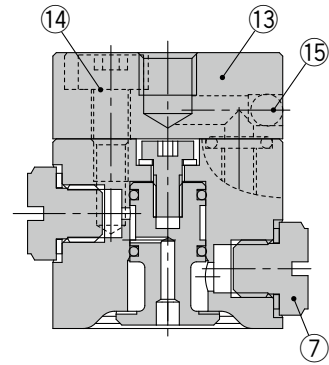
ø20

Basic type



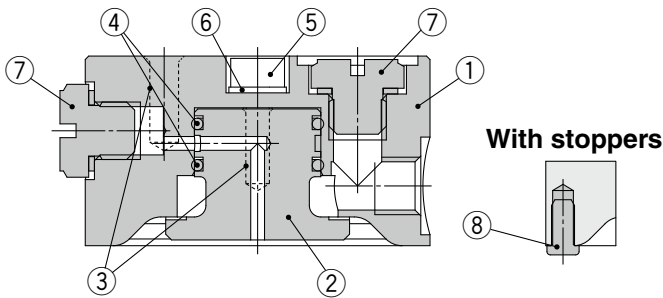
ø20

With mounting plate



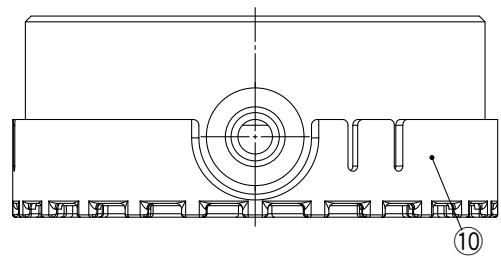
ø30

Basic type



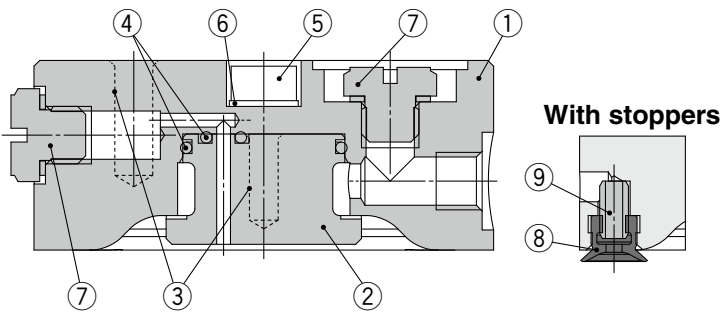
ø40

With vibration suppression cover: Resin



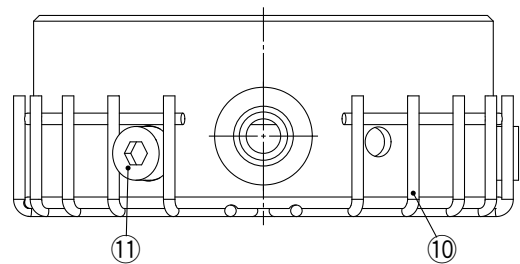
ø40, ø60

Basic type

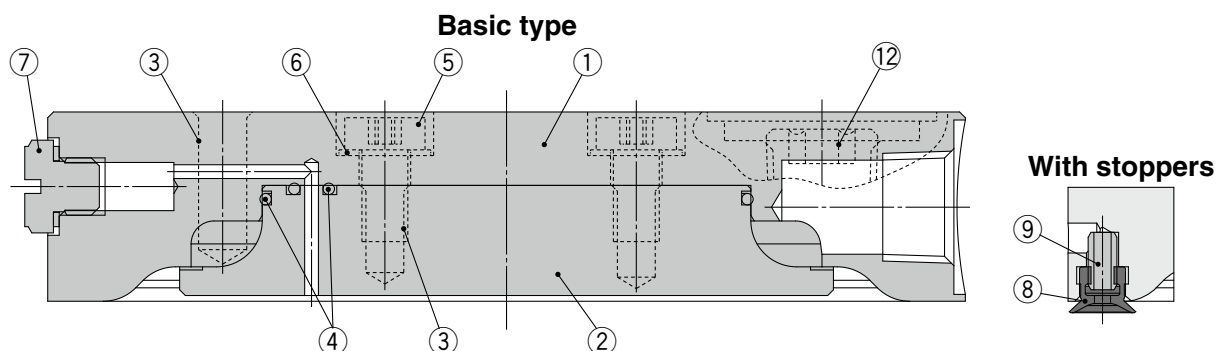


ø20, ø30, ø40, ø60, ø80

With vibration suppression cover: Stainless steel



ø80

**Component Parts**

| No. | Description                   | Material<br>(Surface treatment) | Note                                |                                      |
|-----|-------------------------------|---------------------------------|-------------------------------------|--------------------------------------|
| 1   | Body                          | Aluminum alloy<br>(Anodized)    | Body material                       | For aluminum                         |
|     |                               | Synthetic resin                 | Body material                       | For resin                            |
|     |                               | Stainless steel                 | Body material                       | For stainless steel                  |
| 2   | Deflector                     | Aluminum alloy<br>(Anodized)    | Body material                       | For aluminum                         |
|     |                               | Synthetic resin                 | Body material                       | For resin                            |
|     |                               | Stainless steel                 | Body material                       | For stainless steel                  |
| 3   | Helical insert                | Stainless steel                 | Body material                       | For resin                            |
| 4   | O-ring                        | FKM                             |                                     |                                      |
| 5   | Hexagon socket head cap screw | Stainless steel                 |                                     |                                      |
| 6   | Flat washer                   | Stainless steel                 |                                     |                                      |
| 7   | Plug                          | Stainless steel/FKM             |                                     |                                      |
| 8   | Stopper                       | NBR                             | With stoppers                       | Refer to page 5 for<br>part numbers. |
|     |                               | Silicone rubber*1, *2           |                                     |                                      |
| 9   | Spring pin                    | Stainless steel                 |                                     |                                      |
| 10  | Vibration suppression cover   | Synthetic resin                 | With vibration<br>suppression cover |                                      |
|     |                               | Stainless steel                 |                                     |                                      |
| 11  | Hexagon socket head cap screw | Stainless steel                 |                                     |                                      |
| 12  | Hexagon socket head plug      | Stainless steel                 |                                     |                                      |
| 13  | Mounting plate                | Aluminum alloy<br>(Anodized)    | Mounting plate<br>material          | For aluminum                         |
|     |                               | Stainless steel                 | Mounting plate material             | For stainless steel                  |
| 14  | Hexagon socket head cap screw | Stainless steel                 |                                     |                                      |
| 15  | Steel ball                    | Stainless steel                 |                                     |                                      |

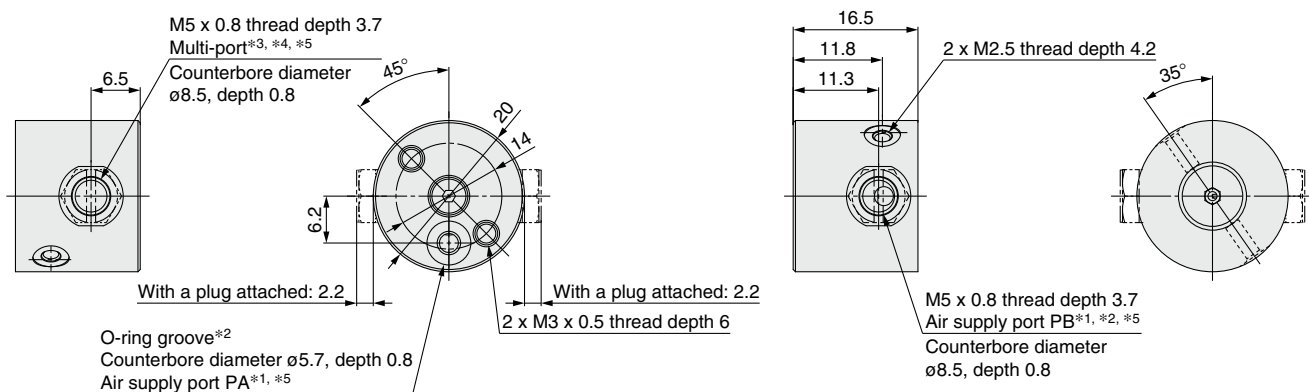
\*1 Uses a material compliant with a dissolution test of the FDA (U.S. Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use."

\*2 Uses a material compliant with the standards for "Rubber apparatus (excluding baby drinking apparatus) and containers/packaging" (D3) (Partial revision: Japanese Ministry of Health, Labour, and Welfare Notification No. 595, 2012) in Section 3 "Apparatus and Containers/Packaging" of the Japan Food Sanitation Act, Article 18 "Specifications and Standards for Food and Food Additives, etc." (Japanese Ministry of Health and Welfare Notification No. 370, 1959)

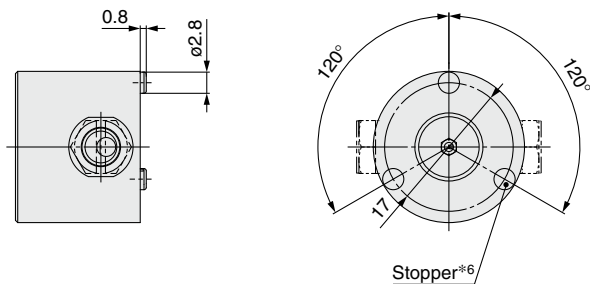
# ZNC Series

## Dimensions: $\varnothing 20$ (Without mounting plate)

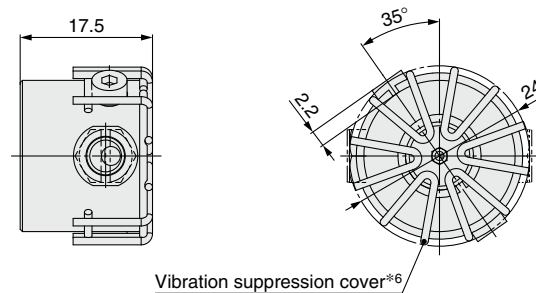
### Basic type



### With stoppers



### With vibration suppression cover

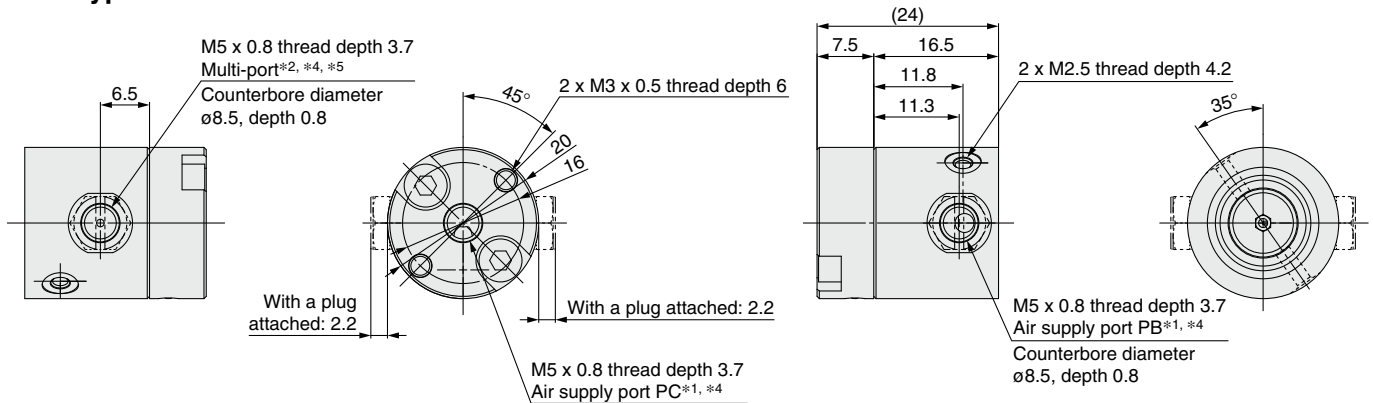


- \*1 Supply air to either air supply port PA or PB. Plug the unused air supply port.
- \*2 An O-ring (5.7 x 3.7 x 1) and a plug for the air supply port PB are included with the product. Be sure to attach the O-ring. For details on how to mount the product, refer to the "Specific Product Precautions."
- \*3 Use the multi-port as a sensor mounting or release port.
- \*4 Seal the multi-port with a plug when not in use.
- \*5 The product is shipped with a plug in the multi-port. After determining which port to use, it is recommended that adhesive be applied to the threads of the air supply port and the multi-port.

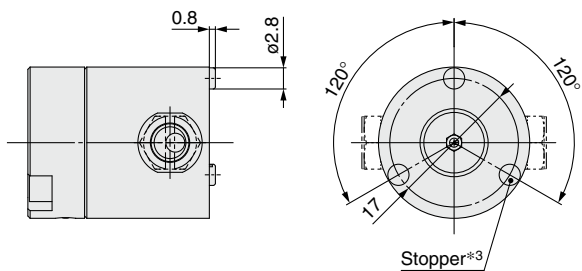
- \*6 The vibration suppression cover cannot be used with the type with stoppers.
- \* The pressure sensor is shipped together with the product but does not come assembled.
- \* For pressure sensor details, refer to the PSE540 series in the **Web Catalog** and the Operation Manual.

**Dimensions: Ø20 (With mounting plate)**

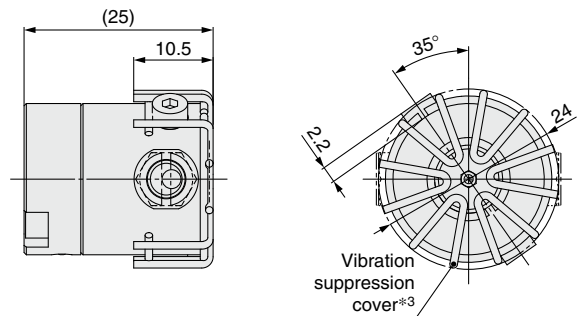
**Basic type**



**With stoppers**



**With vibration suppression cover**



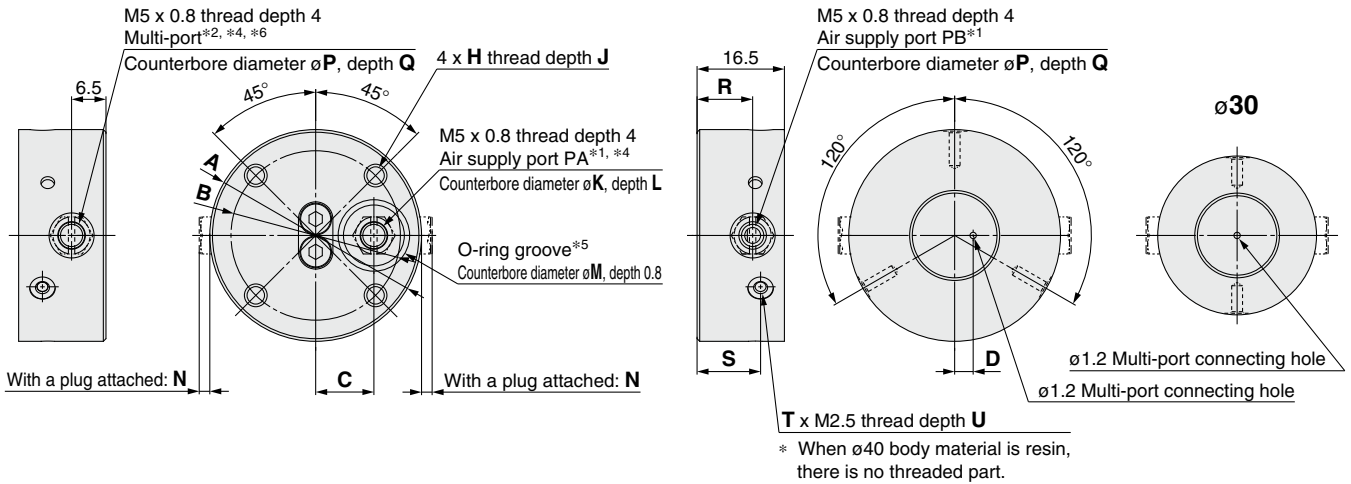
- \*1 Be sure to change the mounting plate direction in accordance with whether air supply port PB or PC is used. Also, be sure to mount the product in accordance with the mounting method described in the "Specific Product Precautions."
- \*2 Seal the multi-port with a plug when not in use.
- \*3 The vibration suppression cover cannot be used with the type with stoppers.
- \*4 The product is shipped with a plug in the multi-port. After determining which port to use, it is recommended that adhesive be applied to the threads of the air supply port and the multi-port.

- \*5 Use the multi-port as a sensor mounting or release port.
- \* The mounting plate comes with 1 O-ring (5.7 x 3.7 x 1), 1 plug for air supply port PB, and 2 mounting screws. The mounting plate does not come assembled.
- \* For pressure sensor details, refer to the PSE540 series in the **Web Catalog** and the Operation Manual.
- \* The pressure sensor is shipped together with the product but does not come assembled.

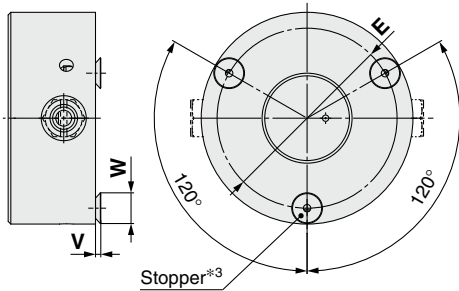
# ZNC Series

Dimensions:  $\varnothing 30$ ,  $\varnothing 40$ ,  $\varnothing 60$

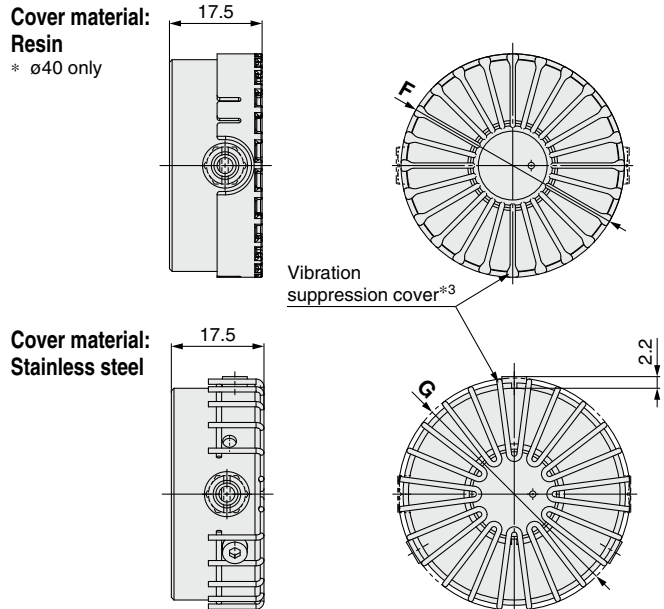
## Basic type



## With stoppers



## With vibration suppression cover



- \*1 Supply air to either air supply port PA or PB. Seal the unused ports with plugs.
- \*2 Seal the multi-port with a plug when not in use.
- \*3 The vibration suppression cover cannot be used with the type with stoppers.
- \*4 The product is shipped with plugs in the air supply port PA and multi-port. After determining which port to use, it is recommended to apply adhesive to the threads of the two air supply ports and the multi-port.

- \*5 The O-ring is not included. If needed, it can be ordered separately or prepared by the customer.
- \*6 Use the multi-port as a sensor mounting or release port.
- \* For pressure sensor details, refer to the PSE540 series in the **Web Catalog** and the Operation Manual.
- \* The pressure sensor is shipped together with the product but does not come assembled.

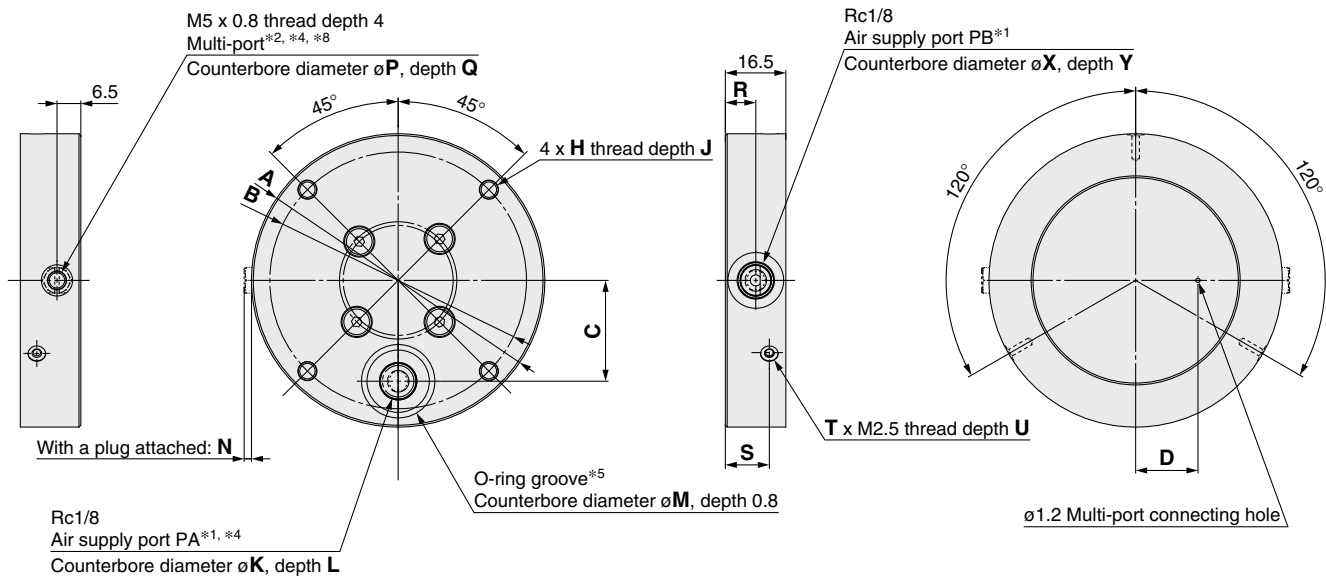
## Dimensions

| Model | Outer body dia. | Body material | [mm] |    |     |     |    |      |          |          |      |     |      |      |     |     |      |      |      |   |     | Weight [g] <sup>*1</sup> |     |     |
|-------|-----------------|---------------|------|----|-----|-----|----|------|----------|----------|------|-----|------|------|-----|-----|------|------|------|---|-----|--------------------------|-----|-----|
|       |                 |               | A    | B  | C   | D   | E  | F    | G        | H        | J    | K   | L    | M    | N   | P   | Q    | R    | S    | T | U   |                          | V   | W   |
| ZNC   | 30              | Nil           |      |    |     |     |    |      |          |          |      |     |      |      |     |     |      |      |      |   |     |                          | 27  |     |
|       |                 | P             | 30   | 23 | 8.7 | —   | 27 | —    | 34       | M3 x 0.5 | 6    | 8.5 | 3.3  | 10.5 | 2.2 | 8.5 | 0.8  | 11.3 | 11.8 | 2 | 4.2 | 0.8                      | 2.8 | 17  |
|       |                 | S             |      |    |     |     |    |      |          |          |      |     |      |      |     |     |      |      |      |   |     |                          |     | 77  |
|       | 40              | Nil           |      |    |     |     |    |      |          |          |      |     |      |      |     |     |      |      |      |   |     |                          |     | 48  |
|       |                 | P             | 40   | 32 | 11  | 3.5 | 34 | 42.2 | 44       |          |      |     |      |      |     |     |      |      |      |   |     |                          |     | 30  |
|       |                 | S             |      |    |     |     |    |      |          |          |      |     |      |      |     |     |      |      |      |   |     |                          |     | 139 |
| 60    | Nil             |               |      |    |     |     |    |      |          |          |      |     |      |      |     |     |      |      |      |   |     |                          | 110 |     |
|       | P               | 60            | 47   | 21 | 10  | 54  | —  | 64   | M4 x 0.7 | 8        | 11.5 | 3.6 | 13.5 | 2    | 8.5 | 1.0 | 10.5 | 12   | 3    | 5 | 1   | 5.8                      | 67  |     |
|       | S               |               |      |    |     |     |    |      |          |          |      |     |      |      |     |     |      |      |      |   |     |                          | 323 |     |

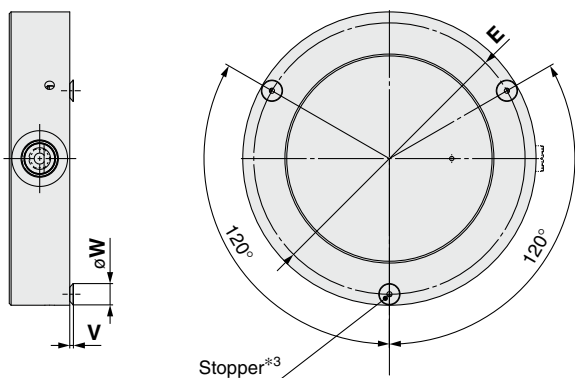
\*1 The stopper, vibration suppression cover, and plug weights are not included.

**Dimensions: Ø80**

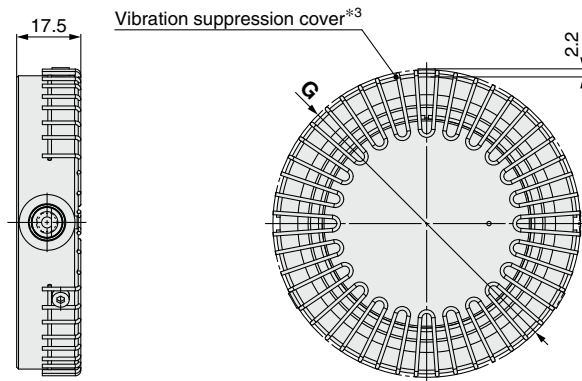
**Basic type**



**With stoppers**



**With vibration suppression cover**



- \*1 Supply air to either air supply port PA or PB. Seal the unused ports with plugs.
- \*2 Seal the multi-port with a plug when not in use.
- \*3 The vibration suppression cover cannot be used with the type with stoppers.
- \*4 The product is shipped with plugs in the air supply port PA and multi-port. After determining which port to use, it is recommended to apply adhesive to the threads of the two air supply ports and the multi-port.

- \*5 The O-ring is not included. If needed, it can be ordered separately or prepared by the customer.
- \*6 Use the multi-port as a sensor mounting or release port.
- \* For pressure sensor details, refer to the PSE540 series in the **Web Catalog** and the Operation Manual.
- \* The pressure sensor is shipped together with the product but does not come assembled.

**Dimensions**

| ZNC | Model           |               |    |    |      |    |    |   |    |          |    |    |     |    |   |     |     |     |    | Weight [g]*1 |   |   |     |      |     |     |
|-----|-----------------|---------------|----|----|------|----|----|---|----|----------|----|----|-----|----|---|-----|-----|-----|----|--------------|---|---|-----|------|-----|-----|
|     | Outer body dia. | Body material | A  | B  | C    | D  | E  | F | G  | H        | J  | K  | L   | M  | N | P   | Q   | R   | S  | T            | U | V | W   | X    | Y   |     |
|     | 80              | Nil           | 80 | 70 | 27.5 | 17 | 74 | — | 84 | M5 x 0.8 | 10 | 17 | 2.5 | 20 | 2 | 8.5 | 1.0 | 8.3 | 12 | 3            | 5 | 1 | 5.8 | 15.2 | 1.0 | 193 |
|     | P               |               |    |    |      |    |    |   |    |          |    |    |     |    |   |     |     |     |    |              |   |   |     |      |     | 119 |
|     | S               |               |    |    |      |    |    |   |    |          |    |    |     |    |   |     |     |     |    |              |   |   |     |      |     | 568 |

\*1 The stopper, vibration suppression cover, and plug weights are not included.



# ZNC Series

## Specific Product Precautions 1

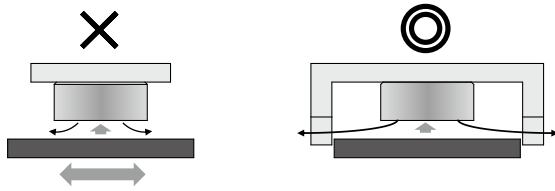
Be sure to read this before handling the products.

For safety instructions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <https://www.smcworld.com>

### Design / Selection

- In the Bernoulli gripper, air flows between the suction surface and the workpiece when the workpiece is adsorbed. The workpiece is then gripped without direct contact, making it easy to slide sideways. Consider an external guide, etc., for safety design.**

The workpiece may fall due to the influence of external force or inertial force during workpiece transportation. This can cause injury or damage the equipment.



No restraining force in the horizontal direction

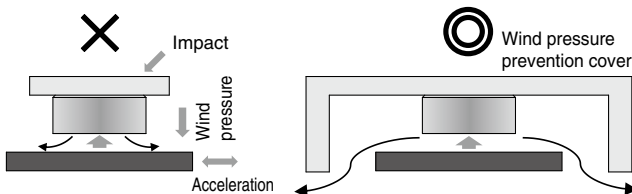
Restrain horizontal movement with a guide.

- The product performance of the Bernoulli gripper varies greatly depending on the type of workpiece. Please make your selection carefully.**

The lifting force changes depending on the shape, size, surface unevenness, breathability, flexibility, etc., of the workpiece.

- Select the Bernoulli gripper with sufficient margin for acceleration/deceleration, vibration, shock, and wind pressure during workpiece transportation.**

Ensure a safety factor for the allowable lifting force. The recommended value is 2 or more. If necessary, reduce external force and install a wind pressure prevention cover to design a safe application.



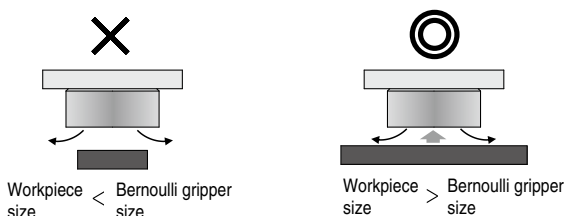
- When adjusting the distance between the Bernoulli gripper and the workpiece, design your application taking the performance characteristics for the distance into consideration.**

The lifting force changes depending on the distance from the workpiece.

- When adsorbing food, take sufficient safety measures. Additionally, please contact us in advance.**

- The product performance described in the catalog is based on the condition that the workpiece is larger than the product suction surface, and the workpiece is smooth and non-breathable.**

If the workpiece is smaller than the product suction surface, the lifting force may be reduced or it may not be possible to lift. Please check with customer's equipment before use.



Workpiece size < Bernoulli gripper size

Workpiece size > Bernoulli gripper size

### Mounting

- Be careful not to drop or hit the product to avoid scratches and dents.**

Even slight deformation of the suction surface can decrease product performance.

- When installing the product, tighten it with an appropriate tightening torque.**

If excessive or insufficient tightening torque is applied, sealing failure or loose screws may result. Adhesive is recommended for screws.

#### Body Mounting

| Model        | Body material   | Screw size | Max. screw-in depth [mm] | Tightening torque [N·m] |
|--------------|-----------------|------------|--------------------------|-------------------------|
| ZNC(20, 30)  | Aluminum        | M3 x 0.5   | 6                        | 0.63                    |
| ZNC(20, 30)P | Resin           |            |                          | 0.32                    |
| ZNC(20, 30)S | Stainless steel |            |                          | 0.63                    |
| ZNC(40, 60)  | Aluminum        | M4 x 0.7   | 8                        | 1.5                     |
| ZNC(40, 60)P | Resin           |            |                          | 0.76                    |
| ZNC(40, 60)S | Stainless steel |            |                          | 1.5                     |
| ZNC80        | Aluminum        | M5 x 0.8   | 10                       | 3                       |
| ZNC80P       | Resin           |            |                          | 1.5                     |
| ZNC80S       | Stainless steel |            |                          | 3                       |

- When installing the stainless steel vibration suppression cover, tighten it with the proper tightening torque.**

If excessive or insufficient tightening torque is applied, loose screws may result. Adhesive is recommended for screws.

#### Vibration Suppression Cover Mounting (Stainless steel type only)

| Model            | Body material   | Screw size  | Max. screw-in depth [mm] | Tightening torque [N·m] |
|------------------|-----------------|-------------|--------------------------|-------------------------|
| ZNC(20, 30)      | Aluminum        | M2.5 x 0.45 | 4.2                      | 0.36                    |
| ZNC(20, 30)P     | Resin           |             |                          | 0.18                    |
| ZNC(20, 30)S     | Stainless steel |             |                          | 0.36                    |
| ZNC(40, 60, 80)  | Aluminum        | M2.5 x 0.45 | 5                        | 0.36                    |
| ZNC(40, 60, 80)P | Resin           |             |                          | 0.18                    |
| ZNC(40, 60, 80)S | Stainless steel |             |                          | 0.36                    |

- When installing tube fitting (supply port), pressure sensor (multi-port), and plugs, tighten them with an appropriate tightening torque. Retighten all bolts regularly.**

If excessive or insufficient tightening torque is applied, loose screws may result. Loose bolts may cause air leakage or falling of parts. Retighten them regularly and apply adhesive.

#### Supply Port

| Model            | Body material   | Screw size | Max. screw-in depth [mm] | Tightening torque [N·m] |
|------------------|-----------------|------------|--------------------------|-------------------------|
| ZNC20            | Aluminum        | M5 x 0.8   | 3.7                      | 1 to 1.5                |
| ZNC20P           | Resin           |            |                          | 0.5 to 1                |
| ZNC20S           | Stainless steel |            |                          | 1 to 1.5                |
| ZNC(30, 40, 60)  | Aluminum        | M5 x 0.8   | 4                        | 1 to 1.5                |
| ZNC(30, 40, 60)P | Resin           |            |                          | 0.5 to 1                |
| ZNC(30, 40, 60)S | Stainless steel |            |                          | 1 to 1.5                |
| ZNC80            | Aluminum        | R1/8       | —                        | 7                       |
| ZNC80P           | Resin           |            |                          | 3                       |
| ZNC80S           | Stainless steel |            |                          | 7                       |





# ZNC Series Specific Product Precautions 2

Be sure to read this before handling the products.

For safety instructions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: <https://www.smcworld.com>

## Mounting

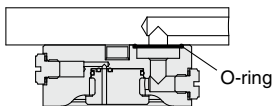
5. When mounting the product directly without piping, smooth the mounting surface (Recommended surface roughness: Rz 25 or less) and use an appropriate O-ring. (The O-ring can be ordered separately or prepared by the customer.)

Installation on a mounting surface with a rough surface, scratches or dents, or mounting an unsuitable O-ring may cause sealing failure.

### O-rings

| Model        | Single unit part no. | Size            |
|--------------|----------------------|-----------------|
| ZNC30□       | ZNCM-30DR            | 10.5 x 8.5 x 1  |
| ZNC(40, 60)□ | ZNCM-40DR            | 13.5 x 11.5 x 1 |
| ZNC80□       | ZNCM-80DR            | 20 x 18 x 1     |

\* Sales unit: 10 pcs.



## Mounting (ø20)

### <Without Mounting Plate>

When mounting the product, be sure to attach the O-ring included with the product. Also, the mounting surface should be smooth (Recommended surface roughness: Rz 25 or less).

When using the product without piping (body ported), seal the air supply port PB with the attached plug.

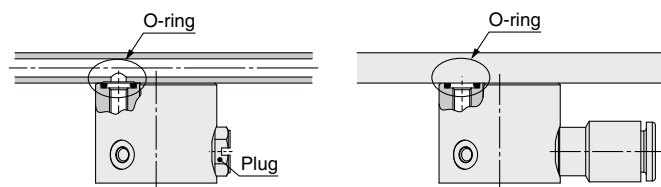
When piping from the side, cover the air supply port PA on the top of the product with the mounting surface.

Installation on a mounting surface with a rough surface, scratches or dents, or mounting an unsuitable O-ring may cause sealing failure.

### Attached O-ring

| Model  | Single unit part no. | Size          |
|--------|----------------------|---------------|
| ZNC20□ | ZNCM-20DR            | 5.7 x 3.7 x 1 |

\* Sales unit: 10 pcs.



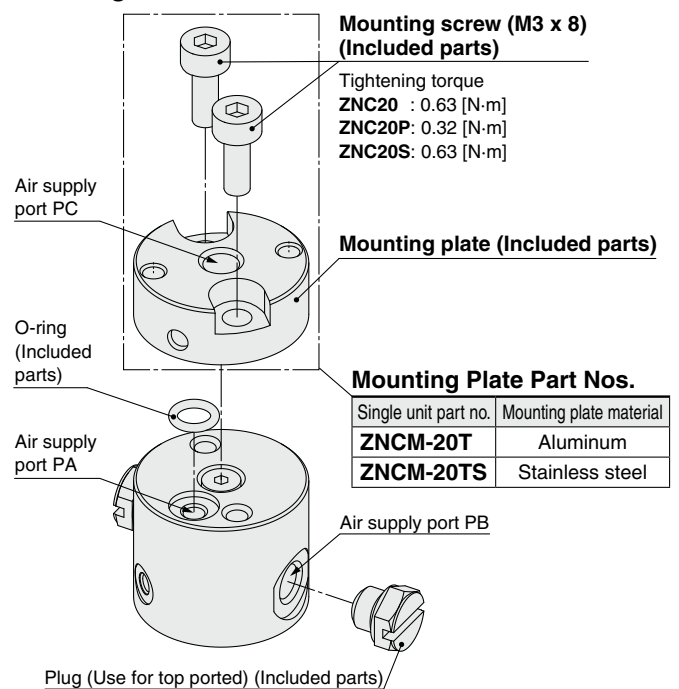
Requires no piping (Body ported)

Side ported

## Assembly (ø20)

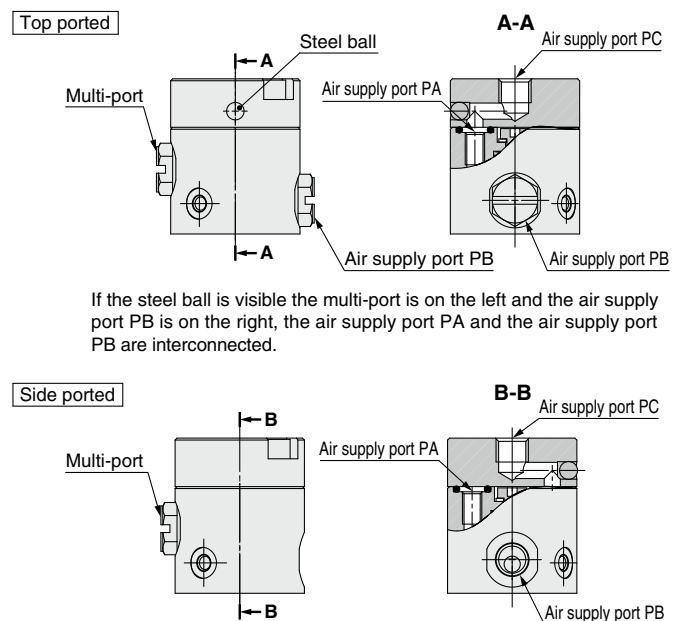
The mounting plate is shipped together with the product but does not come assembled. Please follow the assembly instructions below. In addition, be sure to change the mounting plate direction in accordance with the piping method.

### Mounting method



\* The drawing above shows the top ported type.

### Mounting direction



If the steel ball is visible the multi-port is on the left and the air supply port PB is on the right, the air supply port PA and the air supply port PB are interconnected.

If the steel ball is not visible the multi-port is on the left and the air supply port PB is on the right, the air supply port PA is plugged.



# ZNC Series

## Specific Product Precautions 3

Be sure to read this before handling the products.

For safety instructions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <https://www.smcworld.com>

### Air Supply

#### 1. Use compressed air and control the cleanliness.

Install an air filter, air dryer, or a mist separator. A system with a quality grade of No. C or higher in the air preparation equipment model selection guide of the **Web Catalog** is recommended.

### Handling

#### 1. Depending on the usage conditions, the workpiece may come into contact with the main body at the moment of suction even when using the basic type. If the product with stoppers or with a vibration suppression cover is used, it will come into contact with the workpiece.

#### 2. The NBR stoppers are not suitable for ozone environments, so select silicone rubber.

Deterioration is accelerated in ozone environments such as in clean rooms, around ionizers, or around motor equipment.

#### 3. The vibration suppression cover cannot be used with the type with stoppers.

#### 4. When a thin and soft workpiece is adsorbed, a high-frequency sound may be generated. This generation of sound is due to the vibration of the workpiece and is not a product abnormality.

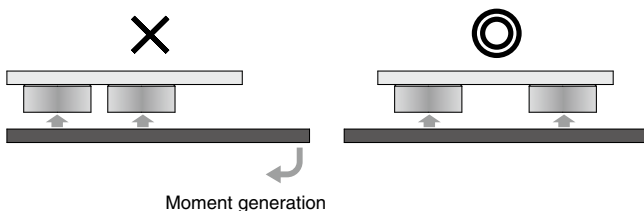
Sound generation may be reduced by reducing the supply pressure or using the vibration suppression cover.

#### 5. Depending on the type of workpiece and usage conditions, the pressure sensor may not be able to detect the workpiece or the sensor value may differ.

The vacuum pressure changes depending on the type of workpiece and the conditions of use. Be sure to conduct testing with the actual device and workpiece before operation.

#### 6. When arranging the Bernoulli grippers, consider the position of the center of gravity of the workpiece to maintain balance.

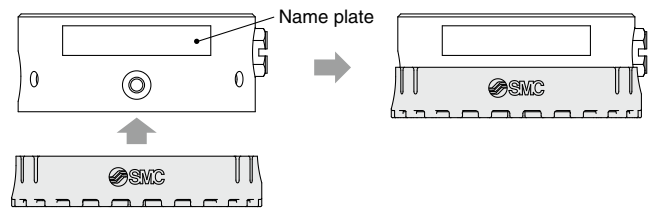
If the mounting position of the product and the position of the center of gravity of the workpiece are misaligned, moment may be generated due to the weight of the workpiece, which may cause it to fall.



### Handling

#### 7. When installing the vibration suppression cover (synthetic resin), align the center position of the product name plate with the SMC logo on the vibration suppression cover.

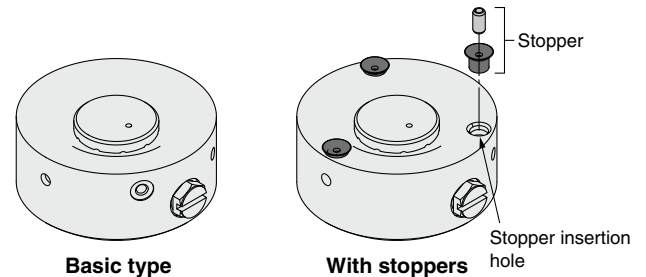
If the mounting position is not correct, the vibration suppression cover may interfere with the fittings, etc., resulting in the deterioration of product performance and damage to the cover.



#### 8. Stoppers cannot be retrofitted.

Since the body shape of the basic type and the type with stoppers are different, it is not possible to add stoppers to the basic type. If you order the type with stoppers and then remove the stoppers to use it as the basic type, the lifting force will be lower than the basic type.

However, the vibration suppression cover can be retrofitted to the basic type.



Example) For the ZNC40□/ZNC60□/ZNC80□



# ZNC Series

## Specific Product Precautions 4

Be sure to read this before handling the products.

For safety instructions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <https://www.smcworld.com>

### Handling

#### 9. Use fittings with the following specifications or use the recommended fittings on page 19.

If the fitting dimensions are not compatible with the product, it may interfere with the product body. Therefore, such fittings cannot be used. For example, if the external dimensions of the fitting are too large, the following types of interference may occur. (See the precautions for each type of piping below.)

And if the min. hole diameter of the air supply port fitting is too small, the product may fail to operate properly.

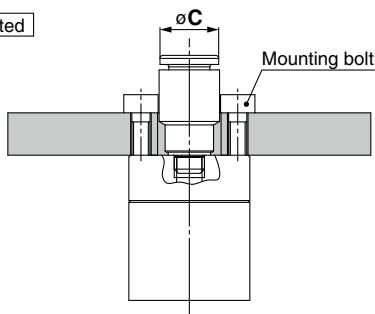
[Top ported] It may interfere with the product mounting bolt.

[Side ported] It may protrude from the product suction surface, interfering with the workpiece.

[Multi-port] It may protrude from the product mounting surface, interfering with the mounting portion.

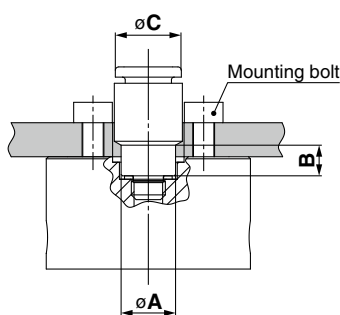
#### ø20 (With mounting plate)

Top ported

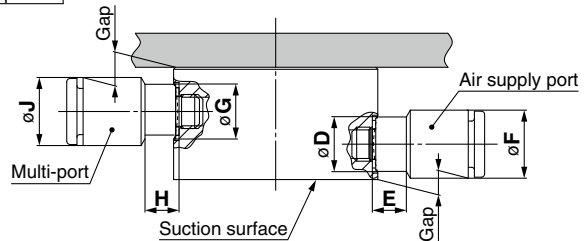


#### ø30, ø40

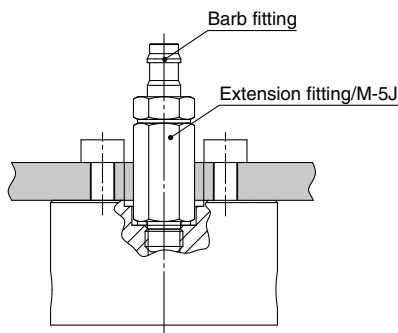
Top ported



Side ported



#### Extension fitting/M-5J usage example



#### Specifications

[mm]

| Model       | Top ported   |             |            | Side ported  |             |             | Multi-port  |             |            | Min. hole diameter |
|-------------|--------------|-------------|------------|--------------|-------------|-------------|-------------|-------------|------------|--------------------|
|             | A            | B           | C          | D            | E           | F           | G           | H           | J          |                    |
| ZNC20       | —            | —           | 10 or less | 8.3 or less  | 1 or more   | 10 or less  | 8.3 or less | 1 or more   | 10 or less | 2.5 or more        |
| ZNC30       | 8.3 or less  | 3.6 or more |            |              | 1.2 or more | 11 or less  |             | 1.2 or more | 11 or less |                    |
| ZNC(40, 60) | 11.3 or less | 3.9 or more | 15 or less | 16.2 or less |             | 4.5 or more |             |             |            |                    |
| ZNC80       | 16.8 or less | 2.7 or more | —          | —            | —           | —           | —           | —           | —          | —                  |



# ZNC Series

## Specific Product Precautions 5

Be sure to read this before handling the products.

For safety instructions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <https://www.smcworld.com>

### Handling

#### Recommended Fitting Part Numbers List

| Series   | Variations                         | Model        | Top ported |       |              |       | Side ported  |              |       | Multi-port   |                  |
|--|------------------------------------|--------------|------------|-------|--------------|-------|--------------|--------------|-------|--------------|------------------|
|  |                                    |              | ZNC20T     | ZNC30 | ZNC (40, 60) | ZNC80 | ZNC (20, 30) | ZNC (40, 60) | ZNC80 | ZNC (20, 30) | ZNC (40, 60, 80) |
| One-touch fittings                               | Male connector                     | KQ2H04-M5□   | ●          | ○     | ●            | —     | ●            | ●            | —     | ●            | ●                |
|  |                                    | KQ2H06-M5□   | —          | —     | ●            | —     | —            | ●            | —     | —            | ●                |
|  |                                    | KQ2H06-01□S  | —          | —     | —            | ●     | —            | —            | ●     | —            | —                |
|  |                                    | KQ2H08-01□S  | —          | —     | —            | ●     | —            | —            | ●     | —            | —                |
|  | Hexagon socket head male connector | KQ2S04-M5□   | ●          | ●     | ●            | —     | ●            | ●            | —     | ●            | ●                |
|  |                                    | KQ2S06-M5□   | ●          | ●     | ●            | —     | ●            | ●            | —     | ●            | ●                |
|  |                                    | KQ2S06-01□S  | —          | —     | —            | ●     | —            | —            | ●     | —            | —                |
|  |                                    | KQ2S08-01□S  | —          | —     | —            | ●     | —            | —            | ●     | —            | —                |
| Metric size/ Uni One-touch fittings/ Gasket seal | Male connector                     | KQ2H06-U01□  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
|  |                                    | KQ2H08-U01□  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
|  | Hexagon socket head male connector | KQ2S06-U01□  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
|  |                                    | KQ2S08-U01□  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
| Metric size/ One-touch fittings/ Face seal       | Male connector                     | KQ2H06-01□P  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
|  |                                    | KQ2H08-01□P  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
|  | Hexagon socket head male connector | KQ2S06-01□P  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
|  |                                    | KQ2S08-01□P  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
| Metal One-touch fittings                         | Male connector                     | KQB2H04-M5   | —          | —     | ●            | —     | —            | ●            | —     | —            |                  |
|  |                                    | KQB2H06-01S  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
|  |                                    | KQB2H08-01S  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
|  |                                    | KQB2S08-01S  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
|  | Hexagon socket head male connector | KQB2S04-M5   | ●          | ○     | ●            | —     | ●            | ●            | —     | ●            |                  |
|  |                                    | KQB2S06-01S  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
| Miniature fittings                               | Barb fitting for nylon tubing      | M-5AN-6      | ●          | ○     | ●            | —     | ●            | ●            | —     | ●            |                  |
|  | Barb fitting for soft tubing       | M-5AU-6      | ●          | ○     | ●            | —     | ●            | ●            | —     | ●            |                  |
|  | Hose nipple                        | M-5H-6       | ●          | ○     | ○            | —     | —            | —            | —     | —            |                  |
| Stainless steel One-touch fittings               | Male connector                     | KQ2H04-M5G1  | ●          | ○     | ●            | —     | ●            | ●            | —     | ●            |                  |
|  |                                    | KQ2H06-M5G1  | —          | —     | ●            | —     | —            | —            | —     | —            |                  |
|  |                                    | KQ2H06-01GS1 | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
|  |                                    | KQ2H08-01GS  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
|  | Hexagon socket head male connector | KQ2S04-M5G1  | ●          | ●     | ●            | —     | ●            | ●            | —     | ●            |                  |
|  |                                    | KQ2S06-M5G1  | ●          | ●     | ●            | —     | —            | —            | —     | —            |                  |
|  |                                    | KQ2S06-01GS1 | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
|  |                                    | KQ2S08-01GS  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
| One-touch fittings/ Stainless steel 316          | Male connector                     | KQG2H04-M5   | —          | —     | ●            | —     | —            | ●            | —     | —            |                  |
|  |                                    | KQG2H06-01S  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
|  |                                    | KQG2H08-01S  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
|  |                                    | KQG2S08-01S  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
|  | Hexagon socket head male connector | KQG2S04-M5   | ●          | ○     | ●            | —     | ●            | ●            | —     | ●            |                  |
|  |                                    | KQG2S06-01S  | —          | —     | —            | ●     | —            | —            | ●     | —            |                  |
| Miniature fittings/ Stainless steel 316          | Barb fitting for soft tubing       | MS-5AU-6     | ●          | ○     | ●            | —     | ●            | ●            | —     | ●            |                  |
|  | Hose nipple                        | MS-5H-6      | ●          | ○     | ○            | —     | —            | —            | —     | —            |                  |

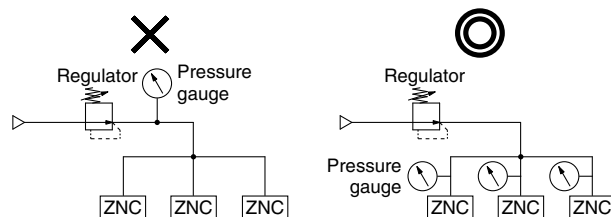
\* ●: Applicable, ○: Extension fitting/M-5J required separately

\* □: A (Brass), N (Brass + Electroless nickel plating)

### 10. When multiple Bernoulli grippers are to be operated simultaneously, adjust the individual piping pressure of each gripper to the set pressure.

When the pressure is set just before a piping branch, the piping pressure in each pipe will decline, resulting in the product failing to operate properly.

The catalog values are for when the connection between the pressure gauge and the Bernoulli gripper is as follows: Fitting min. hole diameter:  $\varnothing 2.5$  ( $\varnothing 20$ ,  $\varnothing 30$ ,  $\varnothing 40$ ,  $\varnothing 60$ ), Fitting min. hole diameter:  $\varnothing 4.5$  ( $\varnothing 80$ ), Tubing size:  $\varnothing 6 \times \varnothing 4$ , Length: 500 mm





# ZNC Series

## Specific Product Precautions 6

Be sure to read this before handling the products.

For safety instructions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <https://www.smcworld.com>

### Maintenance

#### 1. Do not disassemble or modify the body of the product.

If the disassembled and/or modified, the functions and performance may not be achieved and the product will not be warranted.

#### 2. In periodical inspections, check the following items and replace the parts if necessary.

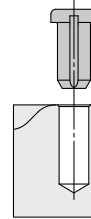
- Scratches, gouges, abrasion, corrosion
- Air leakage (Retighten the fitting and plugs.)
- Twisting, crushing, and turning of connected tubes
- Hardening, deterioration, and softening of connected tubes
- Cracks, wear, and deformation of the stopper

#### 3. Replacement of the stopper

If the stopper is not mounted correctly, the product performance may deteriorate and the stopper may be damaged.

#### ZNC20□/ZNC30□

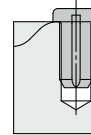
1



After removing the old stopper, insert the new stopper into the body.

\*1 Apply alcohol for easier insertion.

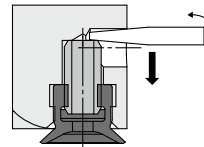
2



Push the stopper in until it reaches the position shown in the diagram.

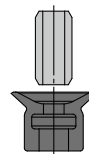
#### ZNC40□/ZNC60□/ZNC80□

1



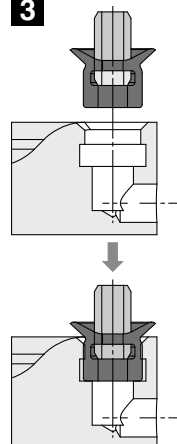
Use a precision screwdriver to push the spring pin out of the side hole in the body and remove the spring pin and stopper.

2



Insert the spring pin to a new stopper.

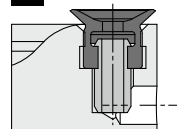
3



Insert the new stopper with a spring pin to the body.\*1

\*1 Apply alcohol for easier insertion.


4





Insert the spring pin to the end.

## Safety Instructions

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

 **Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

 **Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

 **Danger:** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

\*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.  
ISO 4413: Hydraulic fluid power – General rules relating to systems.  
IEC 60204-1: Safety of machinery – Electrical equipment of machines.  
(Part 1: General requirements)  
ISO 10218-1: Manipulating industrial robots – Safety.  
etc.

### Caution

We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing business.

**Use in non-manufacturing business is not covered.**

Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.

The new Measurement Act prohibits use of any unit other than SI units in Japan.

### Warning

#### 1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

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

#### 2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

#### 3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

### Warning

#### 4. Our products cannot be used beyond their specifications. Our products are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not covered.

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

## Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

### Limited warranty and Disclaimer

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

\*2) Vacuum pads are excluded from this 1 year warranty.

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


### Compliance Requirements

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

### Revision History

**Edition B** \* Body sizes have been added.  
\* The number of pages has been increased from 12 to 24.

BO

 **Safety Instructions** Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.

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