

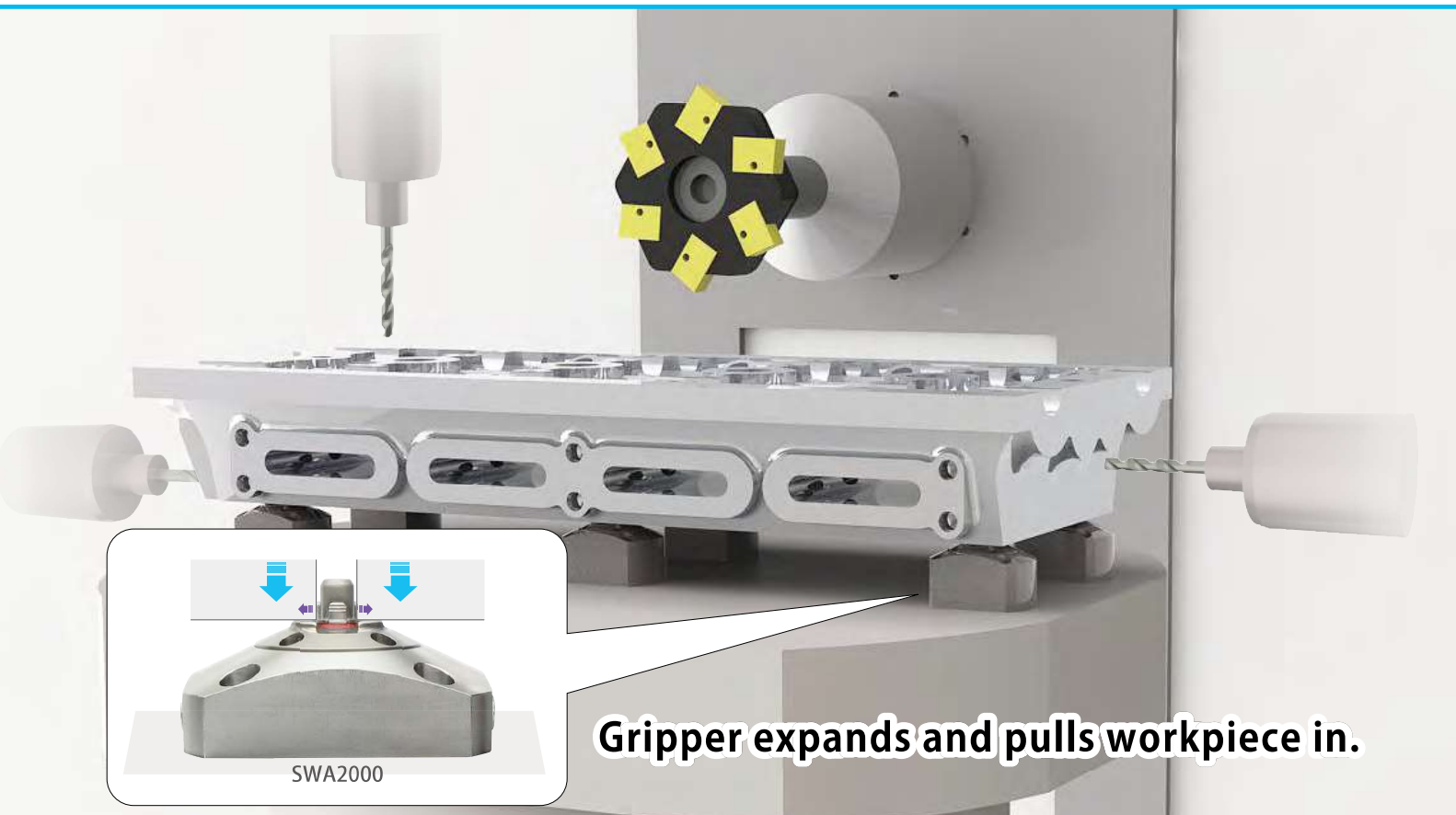
Pneumatic Hole Clamp

Model SWA

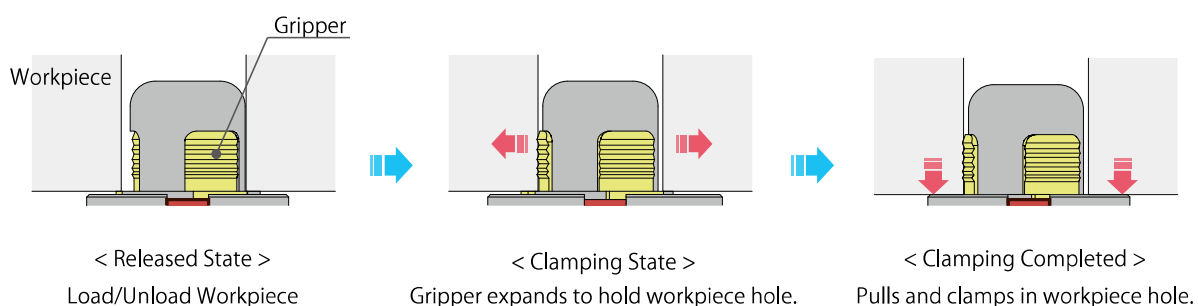


Gripper expands and pulls workpiece in.

PAT.



Action Description (The Tip of Hole Clamp)



Advantages

 High-Power
Series

Pneumatic Series

Hydraulic Series

 Valve / Coupler
Hydraulic Unit

 Manual Operation
Accessories

Cautions / Others

 Pneumatic
Hole Clamp

SWA

 Pneumatic
Swing Clamp

WHA

 Double Piston
Pneumatic Swing Clamp

WHD

 Pneumatic
Link Clamp

WCA

 Air Flow
Control Valve

BZW

 Pneumatic
Expansion Locating Pin

VWM

VWK

 Pneumatic
Sensor Pin

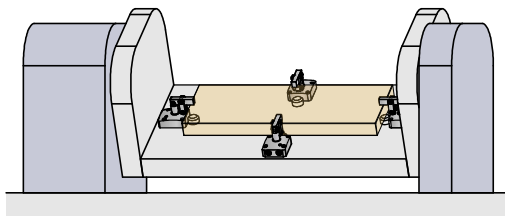
WWA

● To Workpiece

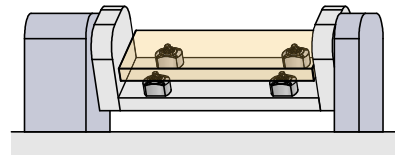
- Zero interference with 5 faces except clamping face.
- Possible to use standard length tool which provides for better machining accuracy.
- Possible to enhance cutting parameters which leads to shorter cycle times.

● To Machining Equipment

- Fixture could be extremely downsized.
- Turn-table could be downsized.
- The movement of tool could be shorten.
- For saving weight of fixture.
- Machining equipment could be more simple.
- Good design for easy flow of chips and reduction in coolant usage.



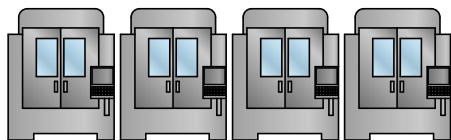
<Before> Clamping around the Workpiece



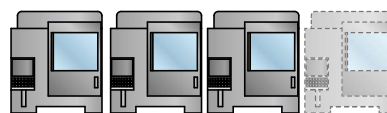
<After> Using the Hole Clamps

● To Machining Line

- 5-face machining makes it possible to put process together.
- Machining line is kept small and simple.
- Possible to enhance cutting parameters which leads to shorter cycle times.



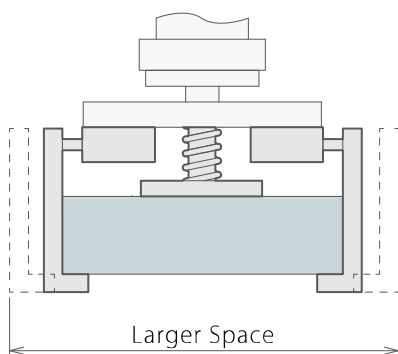
<Before> Large Machining Centers
and Long Machining Lines.



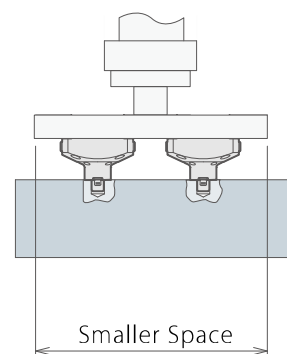
<After> Smaller Machining Centers
and Shorter Machining Lines.

● To Transfer Equipment

- Hand part can be compact and light.
- Transfer equipment can be compact.



<Before> Transfer Hand with Linear Cylinder



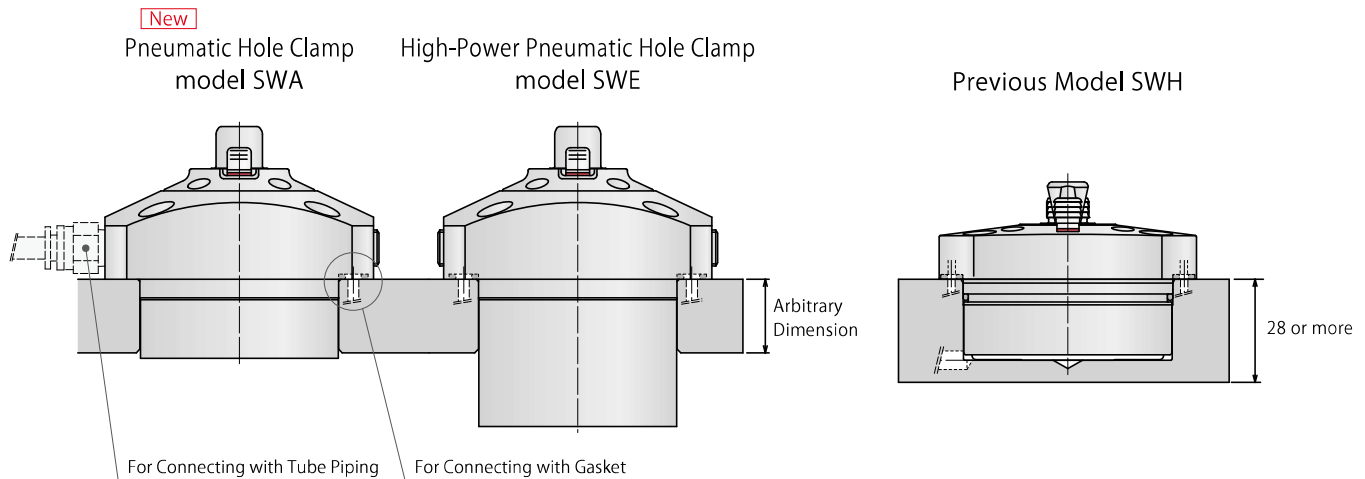
<After> Transfer Hand with Hole Clamp

● Features

● Variable Mounting Dimensions to Suit the Equipment

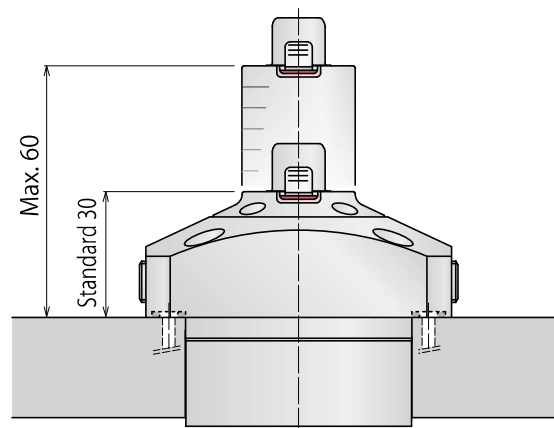
All pipes are set in flange so plate thickness would be much thinner.

The body below flange is shorter and lighter than high-power pneumatic hole clamp (model SWE).



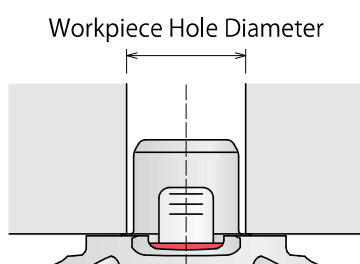
● Seating Surface Height Suitable to Workpiece

Level the height in 5mm increments according to the phase of workpiece seating surface.



● Hole Diameter to Suit a Variety of Workpieces

In order to suit different hole diameters and tolerances, hole diameters can be specified in 0.5mm increments.



| Model No. | Workpiece Hole Diameter (mm) | | | | | | | | | | | | | |
|-----------|------------------------------|-----|---|-----|---|-----|---|--------------------|----|------|----|------|----|------|
| | 6 | 6.5 | 7 | 7.5 | 8 | 8.5 | 9 | 9.5 | 10 | 10.5 | 11 | 11.5 | 12 | 12.5 |
| SWA1000 | Body Size – Type 1 | | | | | | | | | | | | | |
| SWA2000 | | | | | | | | Body Size – Type 2 | | | | | | |

※ Refer to the specifications for the tolerance of workpiece hole diameter.

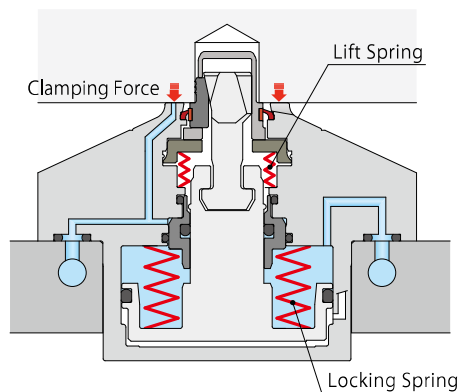
• Without Pulling Function (Option)

It has expanding force only, and minimizes deformation caused by clamping.

※ Workpiece pulling stroke per clamp is max. 0.1mm.

【Standard】

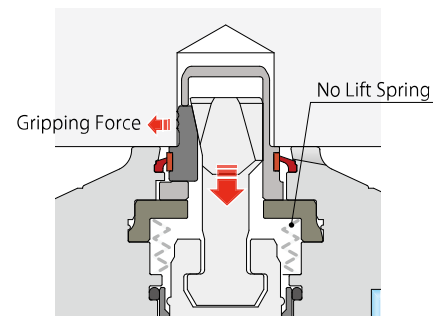
Built-in locking spring and lift spring enable secure clamping and self-locking at zero air pressure.



【Option : Without Pulling Function】

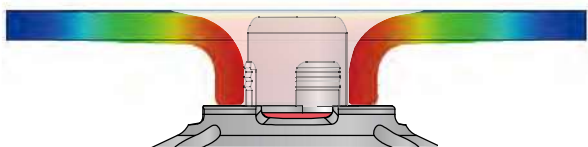
Not equipped with lift spring, and workpiece pulling stroke is minimum. It clamps a workpiece with expanding force only.

※ This option has no seating confirmation function, but clamp abnormality detection function.

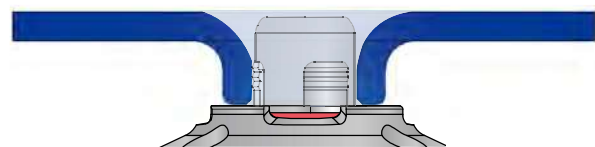


<Deformation Analysis> Color Indication : Less Deformation (Blue) (Red) Lager Deformation

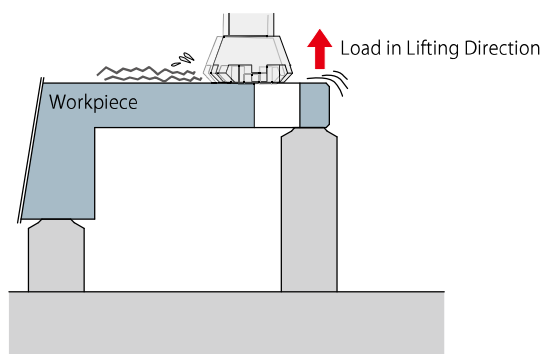
Since clamping force is applied toward the pulling direction, the workpiece hole might be deformed.



By clamping with expanding force only, there is no force applied or deformation occurred toward the pulling direction.

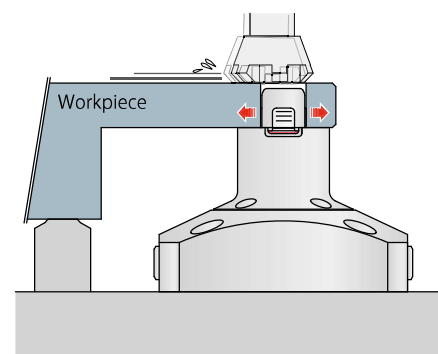


<Application Example of 'Without Pulling Function' Option : Supports the Displacement of Lifting Direction with Hole Clamp>



【Without Hole Clamp】

Due to the load in lifting direction, there is deflection when machining the workpiece.



【Support with Hole Clamp】

Grips the workpiece, prevents deflection in lifting direction and improves machining accuracy.

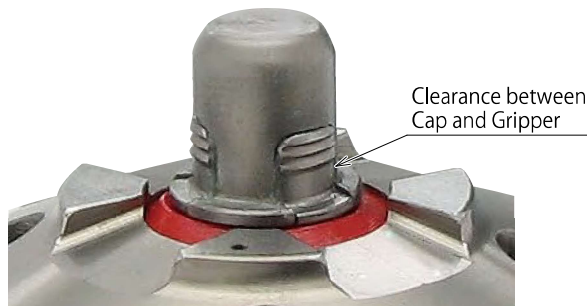
Note : In case there is thrust load (vertical load toward the hole clamp axis), 'without pulling function' has no clamping force, so the product will be damaged or broken when thrust load is applied to the hole clamp.

Make sure to use a support, etc. for thrust load.

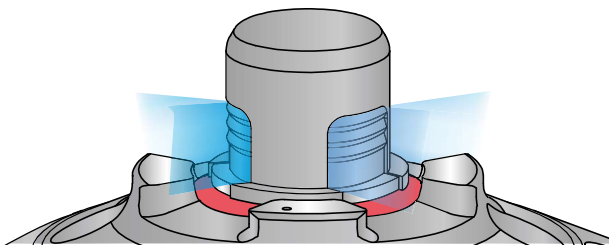
Features

• Various Kinds of Protection by Cap Structure

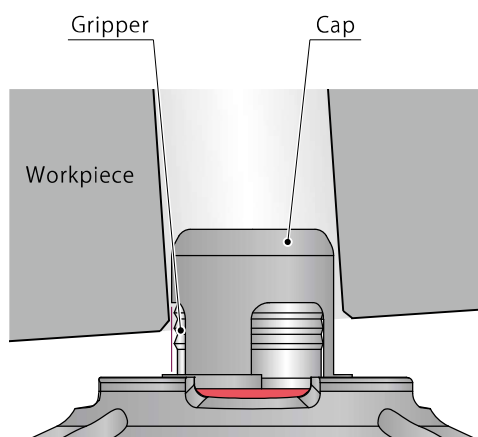
All sizes are equipped with the cap.



- Minimum clearance between cap and gripper prevents cutting chips from entering inside.



- Small clearance leads to effective purging. Even with a little air flow it prevents coolant from entering inside.

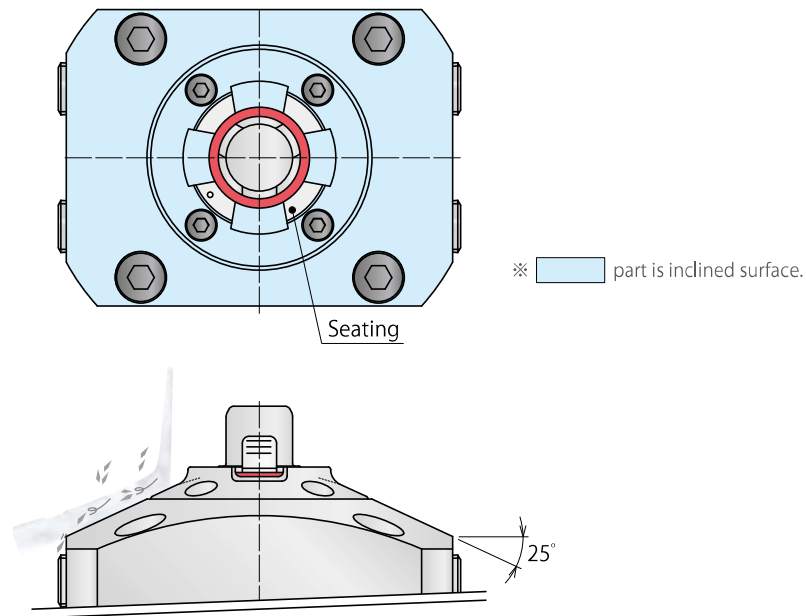


- Workpiece does not have contact with gripper. It makes loading-unloading smooth.
- Not necessary to have rough guide on fixture.

※ Depends on the condition of loading speed, etc.

• Pursuit of Good Design for Efficient Swarf Management

Having smaller seating surface and wide sweep area on the flange enables easy flow of chips and reduction in coolant usage.

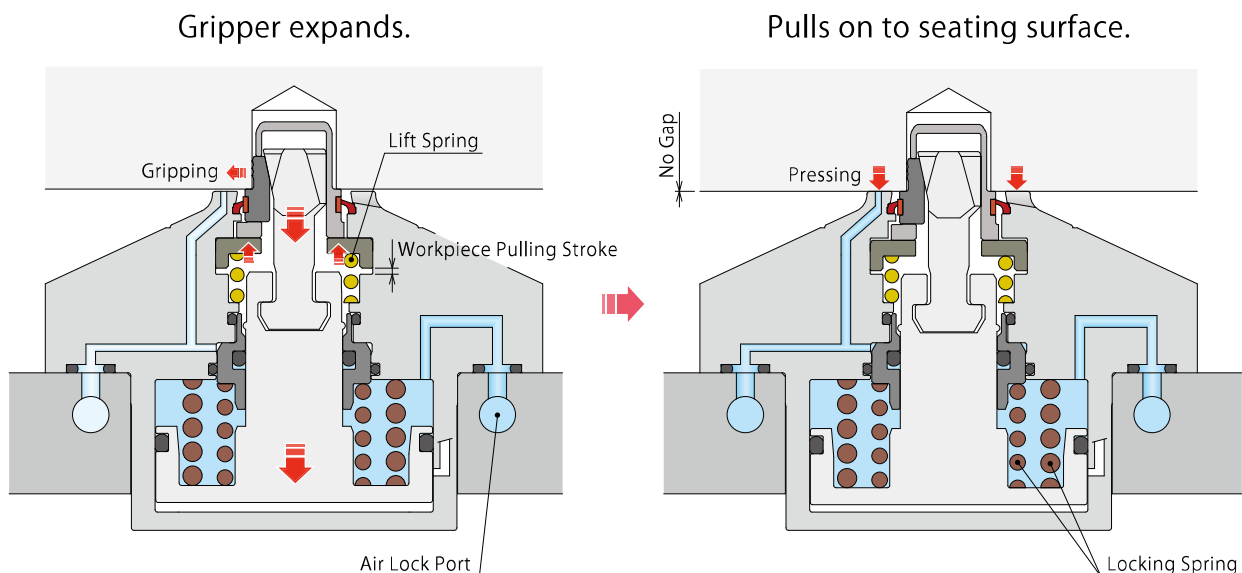


• Secure Clamp Action Out of Sight

Lift spring grips a workpiece strongly and pulls it in.^{※1}

Even when air pressure is at zero, self-lock function with locking spring ensures safety.

※1. 'Without pulling function' (option) does not pull down the workpiece to the seating surface.



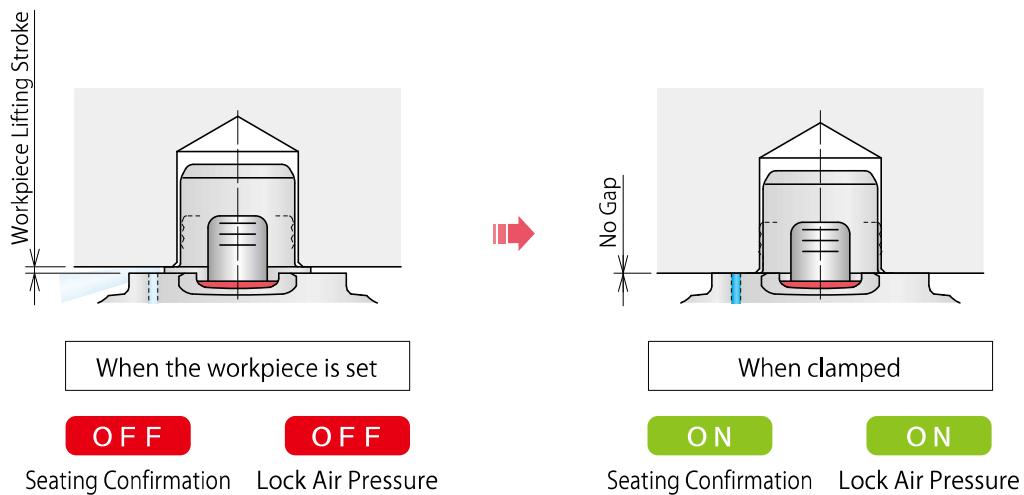
※This is a simplified drawing. Actual components are different.

● Features

● Action Confirmation of Clamping

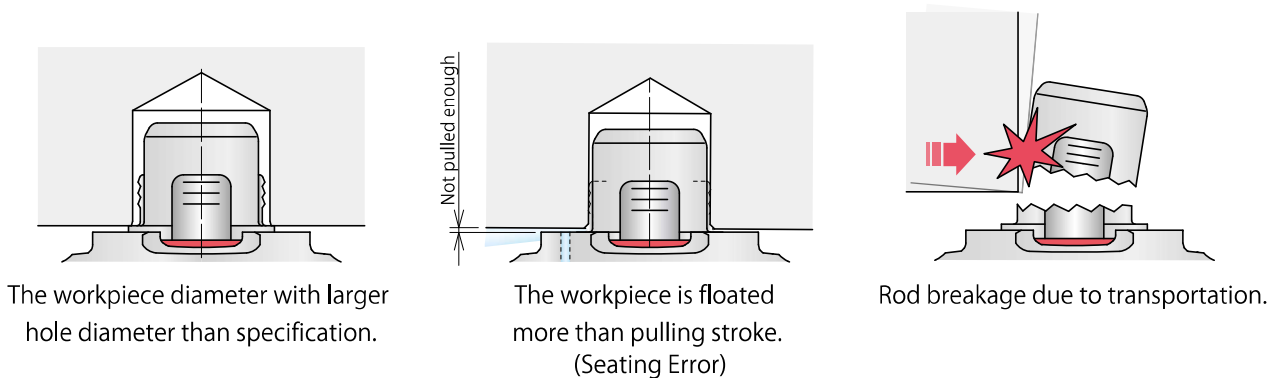
Lift-up function allows to check the movement of pulling and lifting off the workpiece. It can be used in automated line.

※ Lift-up function is the function of "workpiece lifting option: with lift option".



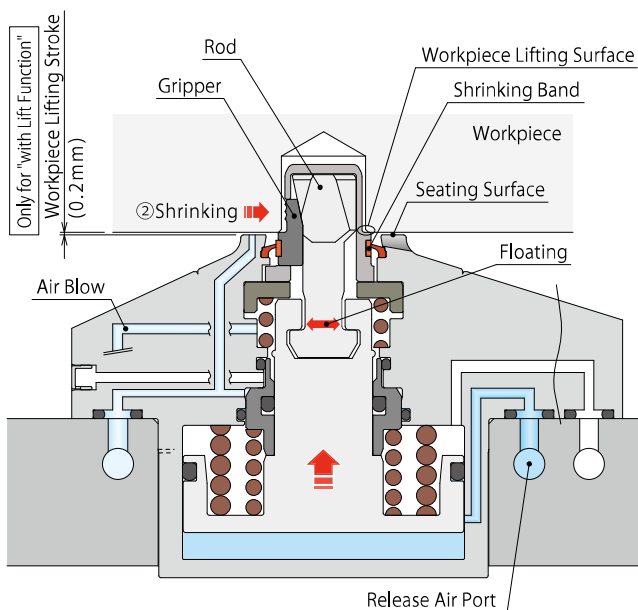
● Abnormality Detection for Unpredictable Troubles

Error detection for unpredictable troubles when machining or transferring. It can be used in automated line.



Action Description

※This is a simplified drawing. Actual components are different.



Released State

- ① Air pressure is supplied to the release port.
- ↓
- ② The rod is lifted up and the gripper retracts.
(For workpiece lifting option, there is a gap between workpiece bottom surface and seating surface.)

| Air Pressure Switch | | Seat Check Detection (Air Sensor) |
|----------------------|-------------------|--------------------------------------|
| Release Air Pressure | Lock Air Pressure | |
| ON | OFF | OFF |

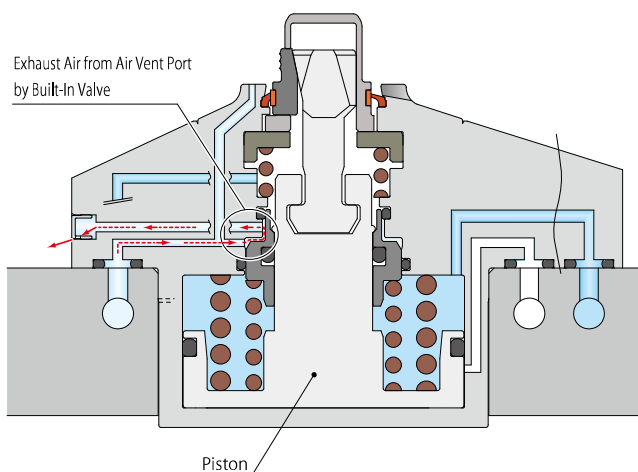
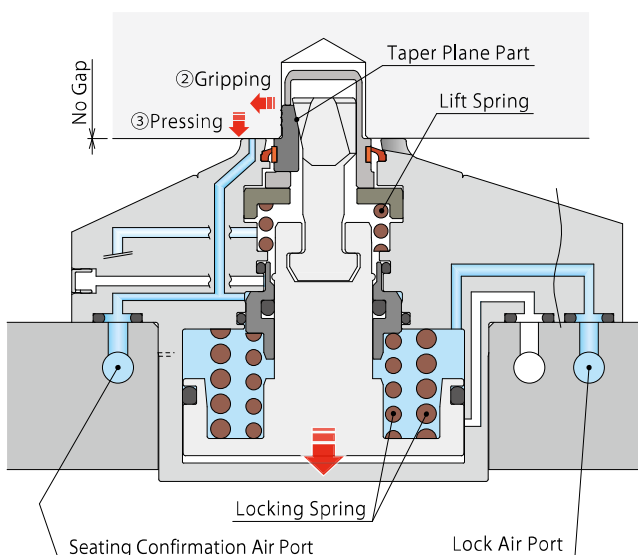
※ Continuously supply air pressure to the air blow port and seating confirmation port. If clamps are used without air supply, foreign substances enter into clamps resulting in clamping error.
Option : Without Pulling Function has no seating confirmation detection and only detects abnormality shown below.

Locked State

- ① Air pressure is supplied to the lock port.
- ↓
- ② The rod descends and the gripper expands along the taper plane. (Since the gripper is lifted by spring force, it does not pull down.)
- ↓
- ③ When pulling force exceeds the spring force for lift up, pulling force works after the gripper digs into workpiece. Then, it presses workpiece onto seating surface.
(Clamping force = Pressing force onto seating surface.)

| Air Pressure Switch | | Seat Check Detection (Air Sensor) |
|----------------------|-------------------|--------------------------------------|
| Release Air Pressure | Lock Air Pressure | |
| OFF | ON | ON |

(Without Pulling Function (Option) clamps a workpiece)
with expansion of grippers. There is no action of ③.



Abnormality Detected State (Clamping without Workpiece)

The built-in check valve function and seating confirmation air pressure detect abnormal condition as follows.

- When clamping workpiece which has larger workpiece hole diameter or clamping without workpiece (In this state the gripper expands but the lifting spring does not have pulling force so the workpiece lifting surface does not descend.)
- When rod or gripper is broken.
- If the piston is fully stroked when it has to stop at the bottom.
- In the case workpiece is floated more than 1mm when setting it.

| Air Pressure Switch | | Seat Check Detection (Air Sensor) |
|----------------------|-------------------|--------------------------------------|
| Release Air Pressure | Lock Air Pressure | |
| OFF | ON | OFF |

High-Power Series

Pneumatic Series

Hydraulic Series

Valve / Coupler Hydraulic Unit

Manual Operation Accessories

Cautions / Others

Pneumatic Hole Clamp

SWA

Pneumatic Swing Clamp

WHA

Double Piston Pneumatic Swing Clamp

WHD

Pneumatic Link Clamp

WCA

Air Flow Control Valve

BZW

Pneumatic Expansion Locating Pin

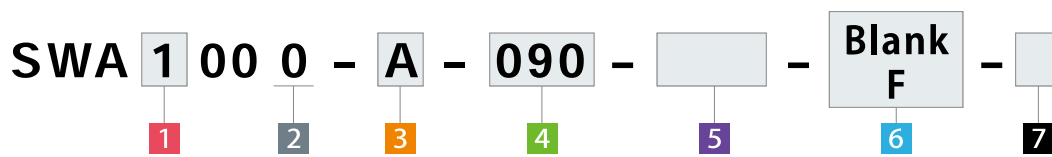
VWM

VWK

Pneumatic Sensor Pin

WWA

Model No. Indication (Workpiece Hole Shape : Straight)



1 Body Size ※ Please refer to specifications, performance curve and external dimensions for details.

- 1 : Available in diameters between $\phi 6$ and $\phi 9$ mm
- 2 : Available in diameters between $\phi 9$ and $\phi 13$ mm

2 Design No.

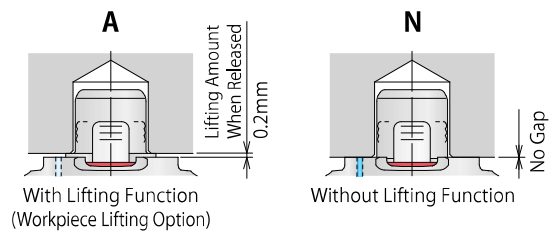
0 : Revision Number

3 Workpiece Lifting Option

- A : With Lifting Function (Workpiece Lifting Option)
- N : Without Lifting Function

The lifting function lifts the workpiece 0.2mm up from the seating surface when the clamp is released.

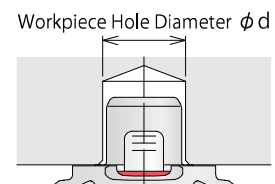
Note: When using SWA with expansion locating pin(s) (model VWH, VWM, VWK, VFH, VFL, VFM, VFJ, VFK, VX), please choose **N** : Without Lifting Function.



4 Workpiece Hole Diameter (Workpiece Hole Code)

Workpiece Hole Code : Workpiece Hole Diameter ϕd

- ※ Workpiece hole diameter should be specified in 0.5mm increments from the allowable range in the following table.
- ※ Refer to the specifications for the tolerance.



| Workpiece Hole Code | 060 | 065 | 070 | 075 | 080 | 085 | 090 | 095 | 100 | 105 | 110 | 115 | 120 | 125 | 130 | |
|---------------------------------------|-----|-----|-----------------|-----|-----|-----|-----|-----------------|-----|------|-----|------|-----|------|-----|--|
| Workpiece Hole Diameter ϕd (mm) | 6 | 6.5 | 7 | 7.5 | 8 | 8.5 | 9 | 9.5 | 10 | 10.5 | 11 | 11.5 | 12 | 12.5 | 13 | |
| SWA1000 | ▲ | ▲ | Allowable Range | | | | | | | | | | | | | |
| SWA2000 | | | | | | | | Allowable Range | | | | | | | | |

※ Maximum operating pressure for the workpiece hole diameters marked ▲ : 0.5MPa.

5 Seating Height Dimension

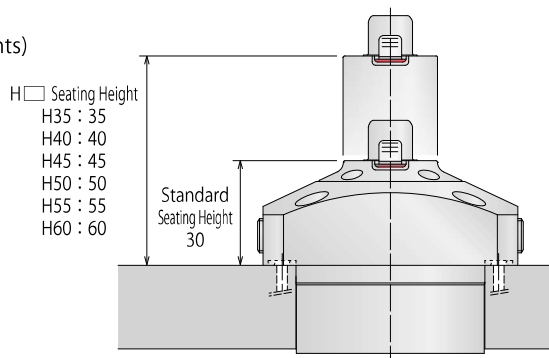
Blank : Standard Height (30mm)

H **Seating Height** : Specifying Seating Height (In 5mm increments)

| Model | Seating Height H (mm) | | | | | | | |
|----------------|-----------------------|----|---------|----|----|----|----|----|
| | Standard | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| SWA1000 | 30 | ★ | H□Range | | | | | |
| SWA2000 | 30 | ★ | H□Range | | | | | |

※ ★ part is standard height, and seating height dimension code is "Blank".

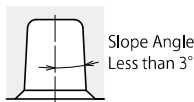
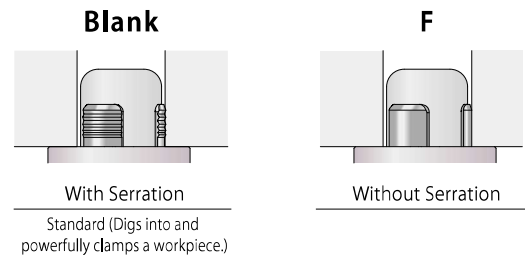
※ Entry example when specifying non-standard seating height.
In case of seating height 50mm : **H50**



6 Workpiece Hole (Gripper) Shape

Blank : With Serration (Workpiece Hole Shape: Straight)

F : Without Serration (Workpiece Hole Shape: Straight)



Taper Hole

Refer to P.239 ~ P.240 for the taper workpiece hole.

※ Contact us when ordering the taper hole model.

7 Option

Blank : Standard Model (With Pulling Function)

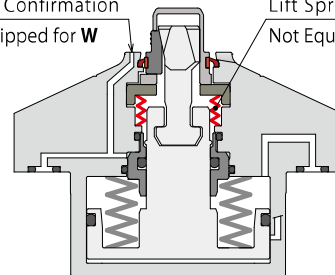
W : Without Pulling Function ※2 ※3

※2. It has no air blow-out hole for seating confirmation or its function.
With built-in valve it detects clamp abnormality except seating confirmation.

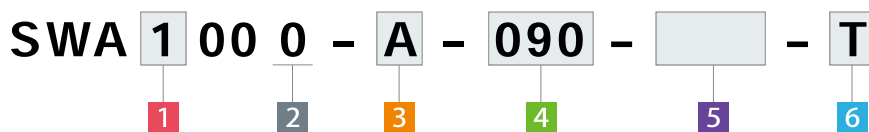
※3. **3** Workpiece lifting function is N.

Air Blow-out Hole for Seating Confirmation
Not Equipped for **W**

Lift Spring
Not Equipped for **W**



Model No. Indication (Workpiece Hole Shape : Tapered)



1 Body Size ※ Please refer to the specifications, the performance curve and the external dimensions for details.

- 1 : Available in workpiece hole mouth diameters between $\phi 6.5$ and $\phi 9$ (No cap)
- 2 : Available in workpiece hole mouth diameters between $\phi 9$ and $\phi 13$ (With cap)

2 Design No.

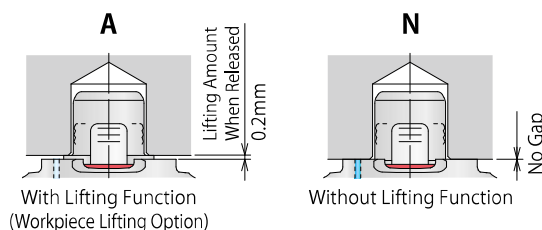
0 : Revision Number

3 Workpiece Lifting Option

- A : With Lifting Function (Workpiece Lifting Option)
- N : Without Lifting Function

The lifting function lifts the workpiece 0.2mm up from the seating surface when the clamp is released.

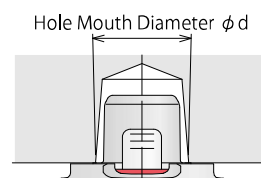
Note: When using SWA with expansion locating pin(s) (model VWH, VWM, VWK, VFH, VFL, VFM, VFJ, VFK, VX), please choose N : Without Lifting Function.



4 Workpiece Hole Mouth Diameter (Workpiece Hole Code)

Workpiece Hole Code : Workpiece Hole Mouth Diameter ϕd

- ※ Workpiece hole mouth diameter ϕd should be specified in 0.5mm increments from the allowable range in the following table.
- ※ The allowable tolerance of the hole mouth diameter ϕd differs depending on the slope angle. Refer to the table below.

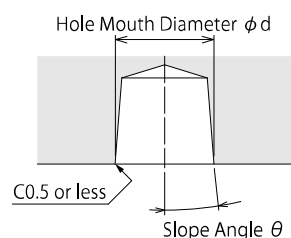


| Workpiece Hole Code | (060) | 065 | 070 | 075 | 080 | 085 | 090 | 095 | 100 | 105 | 110 | 115 | 120 | 125 | 130 |
|--------------------------------|-------|-----|-----|-----------------|-----|-----|-----------------|-----|-----|------|-----|------|-----|------|-----|
| Hole Mouth Diam. ϕd (mm) | - | 6.5 | 7 | 7.5 | 8 | 8.5 | 9 | 9.5 | 10 | 10.5 | 11 | 11.5 | 12 | 12.5 | 13 |
| SWA1000 | | ▲ | ▲ | Allowable Range | | | | | | | | | | | |
| SWA2000 | | | | | | | Allowable Range | | | | | | | | |

- ※ Maximum operating pressure for the workpiece hole diameters marked ▲ : 0.5MPa.
- ※ Taper hole model is not available for Workpiece Hole Code : 060.

Workpiece Hole Slope Angle and Allowable Tolerance of Hole Mouth Diameter

| Model No. | Workpiece Hole Code | Slope Angle θ | Allowable Tolerance of Hole Mouth Diam. |
|-----------|---------------------|--------------------------|--|
| SWA1000 | 065 ~ 085 | $1 \leq \theta \leq 2.5$ | $\phi d \pm 0.3$ |
| | | $2.5 < \theta \leq 3$ | $\phi d \begin{smallmatrix} +0.3 \\ -0.15 \end{smallmatrix}$ |
| | 090 | $1 \leq \theta \leq 2$ | $\phi d \pm 0.3$ |
| | | $2 < \theta \leq 2.5$ | $\phi d \begin{smallmatrix} +0.3 \\ -0.15 \end{smallmatrix}$ |
| SWA2000 | 090 | $2.5 < \theta \leq 3$ | $\phi d \begin{smallmatrix} +0.3 \\ 0 \end{smallmatrix}$ |
| | | $1 \leq \theta \leq 2$ | $\phi d \pm 0.3$ |
| | | $2 < \theta \leq 2.5$ | $\phi d \begin{smallmatrix} +0.3 \\ -0.15 \end{smallmatrix}$ |
| | 095 ~ 130 | $2.5 < \theta \leq 3$ | $\phi d \begin{smallmatrix} +0.3 \\ 0 \end{smallmatrix}$ |
| | | $1 \leq \theta \leq 2.5$ | $\phi d \pm 0.3$ |
| | | $2.5 < \theta \leq 3$ | $\phi d \begin{smallmatrix} +0.3 \\ -0.15 \end{smallmatrix}$ |



※ Please contact us when the slope angle is less than 1°.

5 Seating Height Dimension

Blank : Standard Height (30mm)

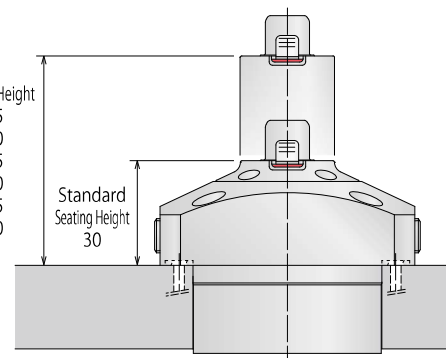
H **Seating Height** : Specifying Seating Height (In 5mm increments)

| Model | Seating Height H (mm) | | | | | | | |
|----------------|-----------------------|----|----|----|----|----|----|----|
| | Standard | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| SWA1000 | 30 | ★ | | | | | | |
| SWA2000 | 30 | ★ | | | | | | |

※ ★ part is standard height, and seating height dimension code is "**Blank**".

※ Entry example when specifying non-standard seating height.
In case of seating height 50mm : **H50**

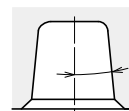
H □ Seating Height
H35 : 35
H40 : 40
H45 : 45
H50 : 50
H55 : 55
H60 : 60



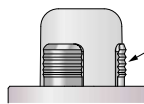
6 Workpiece Hole (Gripper) Shape

T : Taper Hole (with Serration)

When ordering this model, please inform us of the detailed dimensions of the workpiece hole.



Slope Angle
Less than 3°

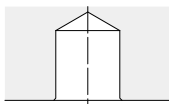


With Serration

Standard (Digs into and powerfully clamps a workpiece.)

Workpiece Hole Shape : Taper Hole (with Serration)

(*No Serration* is not available.)

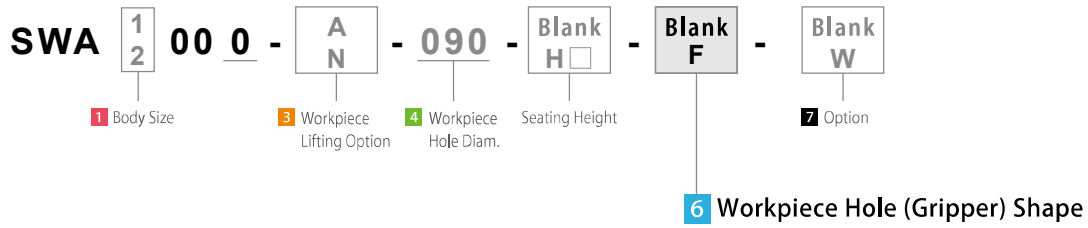


Hole Shape: Straight

Refer to P.237 ~ P.238 for the straight workpiece hole.

Specifications (Workpiece Hole Shape : Straight)

Applicable Model No.



| Model No. | SWA1000-□-□-□-□ SWA1000-□-□-□-□-□ | | | | | | | | SWA2000-□-□-□-□ SWA2000-□-□-□-□-□ | | | | | | | | | |
|---|--------------------------------------|---|------------------------|--------------------------|------------------------|--------------------------|------------------------|--------------------------|--------------------------------------|------------------------|--------------------------|-------------------------|---------------------------|-------------------------|---------------------------|-------------------------|---------------------------|-------------------------|
| | 4 Workpiece Hole Code | 060 | 065 | 070 | 075 | 080 | 085 | 090 | 090 | 095 | 100 | 105 | 110 | 115 | 120 | 125 | 130 | |
| Workpiece Hole | 3 Lifting Option A | mm | 6 ^{±0.3} | 6.5 ^{±0.3} | 7 ^{±0.3} | 7.5 ^{±0.3} | 8 ^{±0.3} | 8.5 ^{±0.3} | 9 ^{±0.3} | | | | | | | | | |
| Diam. φd | 3 Lifting Option N | mm | 6 ^{+0.7/-0.3} | 6.5 ^{+0.7/-0.3} | 7 ^{+0.7/-0.3} | 7.5 ^{+0.7/-0.3} | 8 ^{+0.7/-0.3} | 8.5 ^{+0.7/-0.3} | 9 ^{+0.7/-0.3} | 9 ^{+0.7/-0.3} | 9.5 ^{+0.7/-0.3} | 10 ^{+0.7/-0.3} | 10.5 ^{+0.7/-0.3} | 11 ^{+0.7/-0.3} | 11.5 ^{+0.7/-0.3} | 12 ^{+0.7/-0.3} | 12.5 ^{+0.7/-0.3} | 13 ^{+0.7/-0.3} |
| Workpiece Hardness | HB250 or less | | | | | | | | | | | | | | | | | |
| Allowable Offset (Floating Clearance of Expanding Area) ^{※1} | mm | ±0.3 | | | | | | | | ±0.5 | | | | | | | | |
| Full Stroke | mm | 4.2 | | | | | | | | | | | | | | | | |
| Workpiece | 7 Option Blank | mm | 1.0 | | | | | | | | | | | | | | | |
| Pulling Stroke | 7 Option W | mm | 0.1 or less | | | | | | | | | | | | | | | |
| Workpiece Lifting Stroke ^{※2} (Only for 3 A) | mm | 0.2 | | | | | | | | | | | | | | | | |
| Workpiece Lifting Force ^{※2} (Only for 3 A) | kN | 0.09 | | | | | | | | 0.15 | | | | | | | | |
| Cylinder Capacity (Empty Action) | Release | cm ³ | 4.8 | | | | | | | | 7 | | | | | | | |
| | Lock | cm ³ | 4.3 | | | | | | | | 6.1 | | | | | | | |
| Max. Operating Pressure | MPa | 0.5 | 0.7 | | | | | 1.0 | | | | | | | | | | |
| Min. Releasing Pressure | MPa | 0.25 | | | | | | | | | | | | | | | | |
| Withstanding Pressure | MPa | 0.75 | 1.0 | | | | | 1.0 | | | | | | | | | | |
| Recommended Air Blow Pressure | MPa | 0.2 ~ 0.3 | | | | | | | | | | | | | | | | |
| Operating Temperature | °C | 0 ~ 70 | | | | | | | | | | | | | | | | |
| Usable Fluid | | Dry Air | | | | | | | | | | | | | | | | |
| Weight | | Please refer to the external dimensions for the product weight. | | | | | | | | | | | | | | | | |

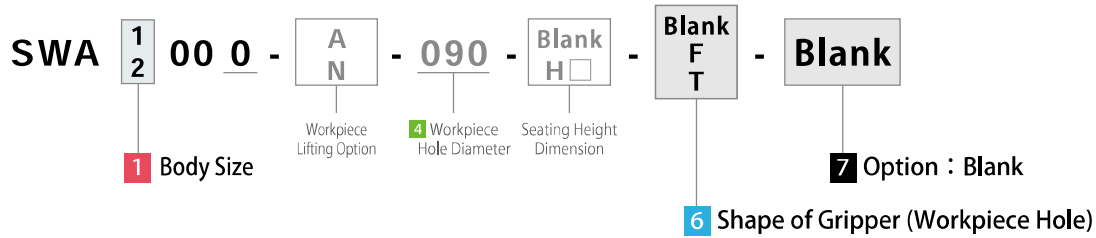
Notes:

※1. The clamping part is an adjusting structure and the clamping operation is done by locating the workpiece hole. The numerical value in the table shows the amount of tolerance value of single clamp. Please consider the center distance accuracy of each clamping installation part and each workpiece hole when used with another location clamp / location cylinder, or when using more than two of these products.

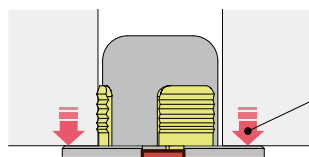
※2. Workpiece lifting stroke and workpiece lifting force are functions only for lifting option.

Performance Curve (Option **7** Blank : Standard)

Applicable Model No.



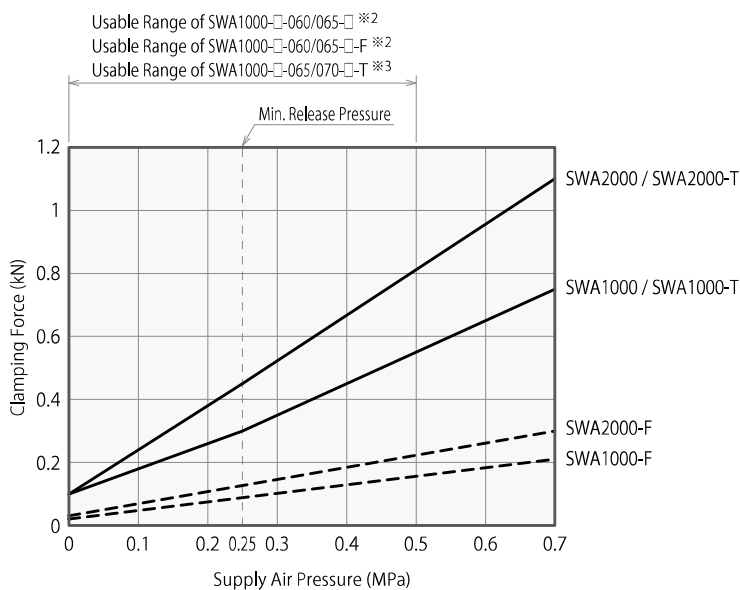
Clamping Force Curve



Clamping Force

It shows the pressing force against the seating surface.

| Model No. | Blank / T : With Serration | | | | | | F : Without Serration | | | | | |
|---|----------------------------|-----|-----------------|------------------|----------------------------------|------------------|-----------------------|-------------------|-----------------|-------------------|-----------|-----------|
| | SWA1000-□-□-□ | | SWA1000-□-□-□-T | | SWA2000-□-□-□ SWA2000-□-□-□-T | | SWA1000-□-□-□-F | | SWA2000-□-□-□-F | | | |
| 4 Workpiece Hole Code | 060 | 065 | 070 ~ 090 | 060 | 065 | 070 | 075 ~ 090 | 090 ~ 130 | 060 | 065 | 070 ~ 090 | 090 ~ 130 |
| Air Pressure 0.7 MPa | - | - | 0.75 | - | - | - | 0.75 | 1.1 | - | - | 0.21 | 0.30 |
| Air Pressure 0.6 MPa | - | - | 0.65 | - | - | - | 0.65 | 0.95 | - | - | 0.19 | 0.26 |
| Air Pressure 0.5 MPa | 0.55 | | - | 0.55 | | 0.80 | | 0.16 | | 0.22 | | |
| Air Pressure 0.4 MPa | 0.45 | | - | 0.45 | | 0.65 | | 0.13 | | 0.18 | | |
| Air Pressure 0.3 MPa | 0.35 | | - | 0.35 | | 0.50 | | 0.11 | | 0.14 | | |
| Air Pressure 0.25 MPa | 0.30 | | - | 0.30 | | 0.45 | | 0.10 | | 0.12 | | |
| Air Pressure 0 MPa | 0.10 | | - | 0.10 | | 0.10 | | 0.10 | | 0.02 | | 0.03 |
| Clamping Force Calculation Formula ^{※1} kN | Fc = 0.93P + 0.1 | | - | Fc = 0.93P + 0.1 | | Fc = 1.43P + 0.1 | | Fc = 0.27P + 0.02 | | Fc = 0.39P + 0.03 | | |



Notes:

- The table and graph show the relationship between clamping force (kN) and supply air pressure (MPa).
- Clamping force shows a pressing force against the seating surface.
- Thin wall around the workpiece hole can be deformed by clamping action, and the clamping force will not fill the specification.
- Clamping force of **F**: Without Serration shows the calculated value when the friction coefficient of workpiece and gripper is $\mu 0.1$.

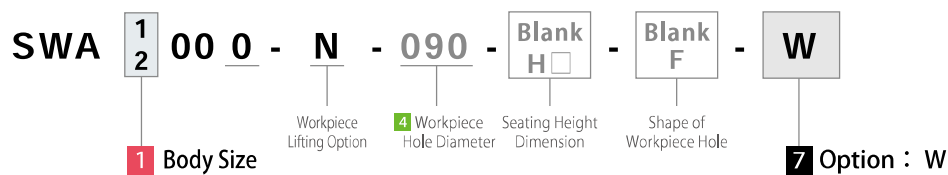
※1. Fc: Clamping Force (kN), P: Supply Air Pressure (MPa)

※2. When selecting SWA1000-□-□-□, SWA1000-□-□-□-F with workpiece hole code **060 / 065**, it cannot be used with 0.5MPa or more.

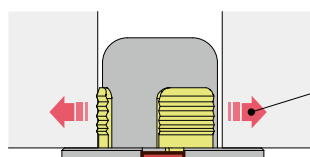
※3. When selecting SWA1000-□-□-□-T with workpiece hole code **065 / 070**, it cannot be used with 0.5MPa or more.

Performance Curve (Option **W** : Without Pulling Function)

Applicable Model No.



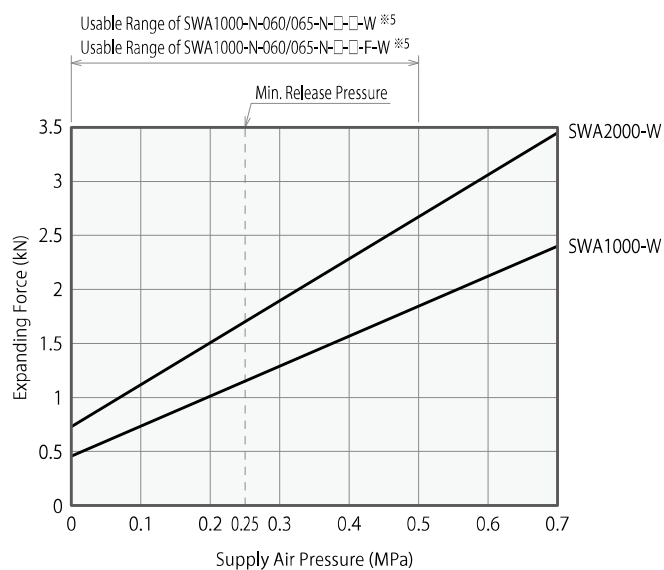
Expanding Force Curve



Expanding Force

It shows the gripping force generated inside workpiece hole.

| Model No. | Expanding Force (kN) | | | |
|--|----------------------|------------------|----------------------|-------------------|
| | SWA1000-N-□-□-W | SWA2000-N-□-□-W | SWA1000-N-□-□-F-W | SWA2000-N-□-□-F-W |
| 4 Workpiece Hole Code | 060 065 | 070 ~ 090 | 090 ~ 130 | |
| Air Pressure 0.7 MPa | — | 2.4 | 3.5 | |
| Air Pressure 0.6 MPa | — | 2.1 | 3.1 | |
| Air Pressure 0.5 MPa | 1.9 | | 2.7 | |
| Air Pressure 0.4 MPa | 1.6 | | 2.3 | |
| Air Pressure 0.3 MPa | 1.3 | | 1.9 | |
| Air Pressure 0.25 MPa | 1.1 | | 1.7 | |
| Air Pressure 0 MPa | 0.50 | | 0.75 | |
| Expanding Force Calculation Formula ^{※4} kN | $F_c = 2.71P + 0.5$ | | $F_c = 3.89P + 0.75$ | |



Notes:

- The table and graph show the relationship between expanding force (kN) and supply air pressure (MPa).
 - Expanding force shows the gripping force generated inside workpiece hole.
 - Expanding force shows the calculated value when the friction coefficient of expanding part is $\mu 0.15$.
 - Thin wall around the workpiece hole can be deformed by expanding action, and expanding force will not fill the specification.
 - 0.1mm or less pulling stroke can be generated by accumulated tolerance of internal parts.
- ※4. FH: Expanding Force (kN), P: Supply Air Pressure (MPa)
- ※5. When selecting SWA1000-N-□-□-W, SWA1000-N-□-□-F-W with workpiece hole code **060 / 065**, it cannot be used with 0.5MPa or more.

High-Power Series

Pneumatic Series

Hydraulic Series

Valve / Coupler Hydraulic Unit

Manual Operation Accessories

Cautions / Others

Pneumatic Hole Clamp

SWA

Pneumatic Swing Clamp

WHA

Double Piston Pneumatic Swing Clamp

WHD

Pneumatic Link Clamp

WCA

Air Flow Control Valve

BZW

Pneumatic Expansion Locating Pin

VWM

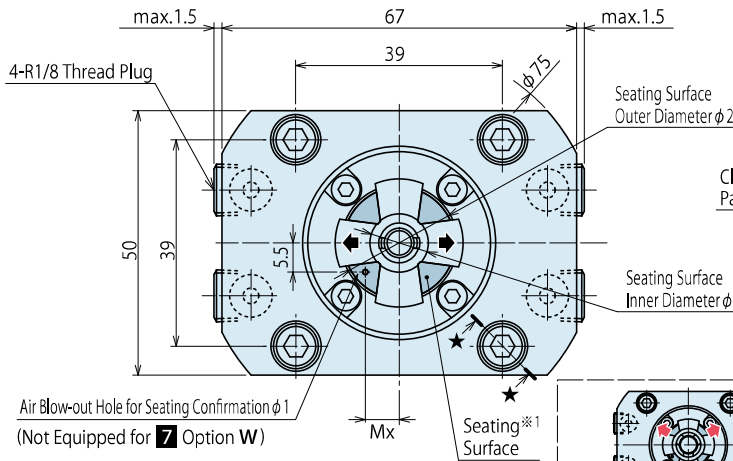
VWK

Pneumatic Sensor Pin

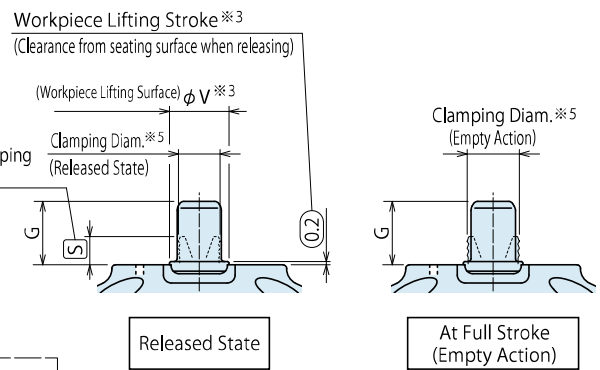
WWA

External Dimensions

※This drawing shows the released state of SWA1000-A-□.



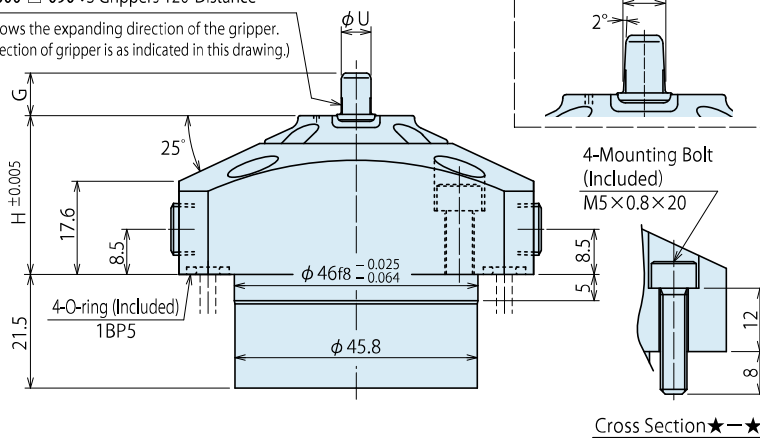
Expanding Area Detail



Seating Height: Standard

SWA1000-□-060 ~ 085 : 2 Grippers 180° Distance
 SWA1000-□-090 : 3 Grippers 120° Distance

◆ shows the expanding direction of the gripper. (The direction of gripper is as indicated in this drawing.)

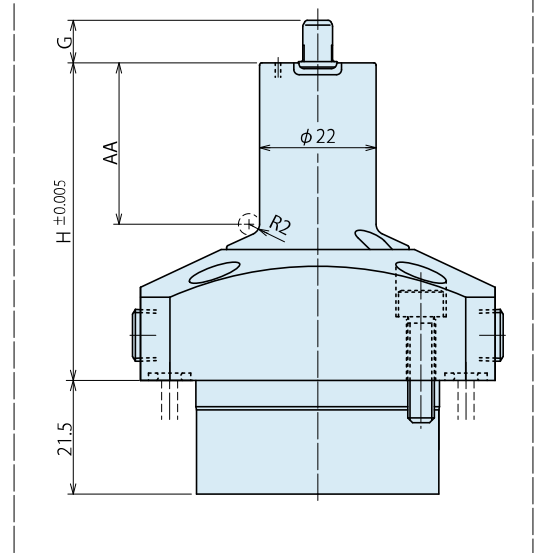


SWA1000-□-090: Gripper Expanding Direction
 ◆ shows the expanding direction of the gripper.

Workpiece Hole (Gripper Shape): T

4-Mounting Bolt (Included)
 M5 × 0.8 × 20

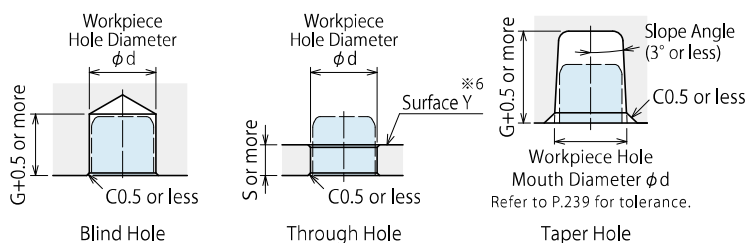
Specifying Seating Height



Notes:

- ※1. The workpiece must be resting on all seating surfaces when clamping. If this is not done the workpiece can be deformed by the clamping force.
- ※2. The port names are marked on the product surface. (LOCK: Air Lock Port, RELEASE: Air Release Port, BLOW: Air Blow Port, FC: Seating Confirmation Port, SENSOR: Clamp Abnormality Confirmation Port) Continuously supply air pressure to the air blow port, and the seating confirmation port or clamp abnormality confirmation port.
- ※3. The numerical value is only for the workpiece lifting option.
- ※4. Please refer to Seating Height: Standard for unlisted dimensions.
- ※5. For -T: Taper Hole model, the first gripper ridge is the reference diameter.

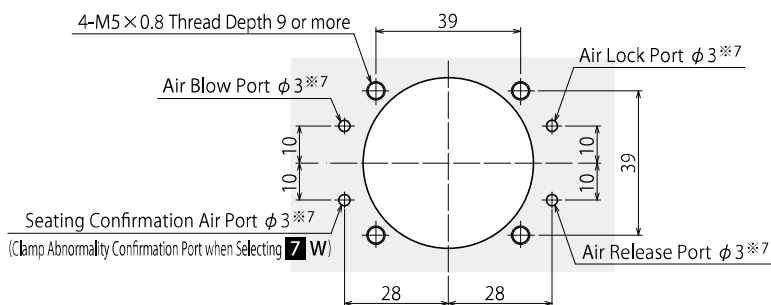
Workpiece (Pallet) Hole Dimensions



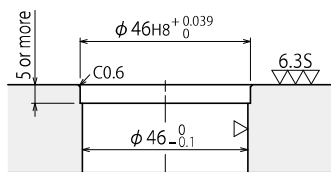
Notes:

- 1. Workpiece hole that is extremely thin can be deformed by clamping action and the specifications will not be fulfilled. Please make sure to test the clamping function before using and adjust to the appropriate supply of pressure.
- ※6. When the clamp head is sticking above the surface Y of the workpiece, please make sure there is no interference with the clamp cylinders during machining.

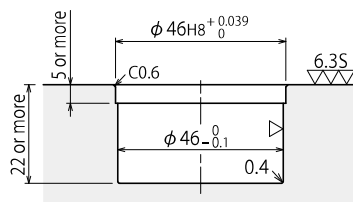
Machining Dimensions of Mounting Area



Through Hole



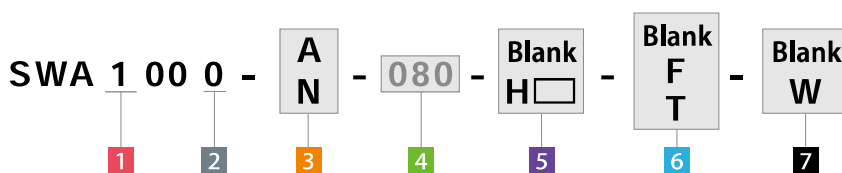
Blind Hole



Notes:

- There should be no burrs at the hole contact surface.
- It is not required to machine each port if removing SWA R1/8 thread plug (4 plugs) and setting air fitting and air hose directly.

Model No. Indication



- Body Size (When selecting 1)
- Design No.
- Workpiece Lifting Option
- Workpiece Hole Diameter (Workpiece Hole Code)
- Seating Height Dimension
- Shape of Gripper (Workpiece Hole)
- Option

External Dimensions and Machining Dimensions for Mounting (mm)

| Model No. | SWA1000-□-□-□-□ | | | | | | | | |
|---|-----------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|--|
| 4 Workpiece Hole Code | 060 | 065 | 070 | 075 | 080 | 085 | 090 | | |
| Workpiece Hole | 3 Lifting Option A ^{※10} | 6.5±0.3 | 7±0.3 | 7.5±0.3 | 8±0.3 | 8.5±0.3 | 9±0.3 | | |
| Diam. φ d ^{※10} | 3 Lifting Option N ^{※10} | 6 ^{+0.7} _{-0.3} | 6.5 ^{+0.7} _{-0.3} | 7 ^{+0.7} _{-0.3} | 7.5 ^{+0.7} _{-0.3} | 8 ^{+0.7} _{-0.3} | 8.5 ^{+0.7} _{-0.3} | 9 ^{+0.7} _{-0.3} | |
| Clamping Diameter | Released State | 5.5 | 6 | 6.5 | 7 | 7.5 | 8 | 8.5 | |
| | Empty Action | 7.2 | 7.7 | 8.2 | 8.7 | 9.2 | 9.7 | 10.2 | |
| Allowable Offset (Floating Clearance of Expanding Area) ^{※8} | ±0.3 | | | | | | | | |
| Full Stroke | 4.2 | | | | | | | | |
| Workpiece | 7 Option Blank | 1.0 | | | | | | | |
| Pulling Stroke | 7 Option W | 0.1 or less | | | | | | | |
| Workpiece Lifting Stroke ^{※9} (Only for 3 A) | 0.2 | | | | | | | | |
| 6 Shape of Gripper Blank, F | G | 8 | 8 | 8 | 8 | 8 | 8 | 9.5 | |
| | S | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 4.3 | |
| | U | 5.6 | 6.1 | 6.6 | 7.1 | 7.6 | 8.1 | 8.6 | |
| 6 Shape of Gripper T | G | - | 8 | 8 | 8 | 8 | 8 | 9.5 | |
| | S | - | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 4.3 | |
| | U | - | 6 | 6.5 | 7 | 7.5 | 8 | 8.6 | |
| Mx | | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 7 | 7.6 | |
| V | | 7.5 | 8 | 8.5 | 9 | 9.5 | 10 | 11.5 | |
| W | | 11 | 12 | 12 | 13 | 13 | 14 | 15 | |

Notes: ^{※8} The clamping part is an adjusting structure and the clamping operation is done by locating the workpiece hole. The numerical value in the table shows the amount of tolerance value of single clamp. Please consider the center distance accuracy of each clamping installation part and each workpiece hole when used with other location clamps / location cylinders, or when using more than two of these products.

^{※9} Workpiece lifting stroke is the function only for lifting option.

^{※10} For -T: Taper Hole model, the allowable tolerance of the hole mouth diameter differs depending on the slope angle. (Refer to P.239)

| 5 Seating Height Dimension | Standard Height | Specifying Seating Height | | | | | |
|----------------------------|-----------------|---------------------------|------|------|------|------|------|
| | Blank | H35 | H40 | H45 | H50 | H55 | H60 |
| H | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| AA | - | 5.5 | 10.5 | 15.5 | 20.5 | 25.5 | 30.5 |
| Weight kg | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.75 | 0.75 |

High-Power Series

Pneumatic Series

Hydraulic Series

Valve / Coupler Hydraulic Unit

Manual Operation Accessories

Cautions / Others

Pneumatic Hole Clamp

SWA

Pneumatic Swing Clamp

WHA

Double Piston Pneumatic Swing Clamp

WHD

Pneumatic Link Clamp

WCA

Air Flow Control Valve

BZW

Pneumatic Expansion Locating Pin

VWM

VWK

Pneumatic Sensor Pin

WWA