New

Single Action Hole Clamp

Gripper expands and pulls workpiece down.

Model SFG

KOSMEK
Harmony in Innovation

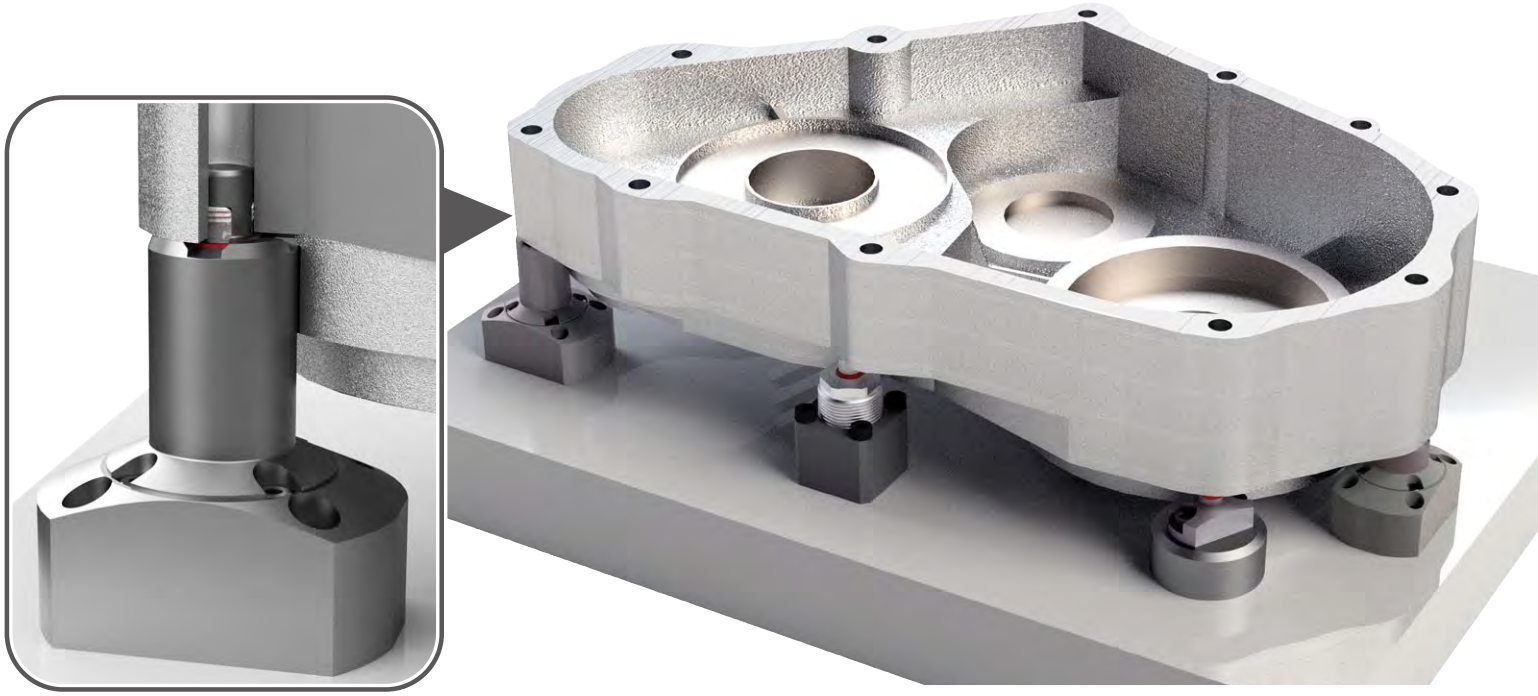
Single Action Hole Clamp

Model **SFG**

HYD. LOCK / SPRING RELEASE

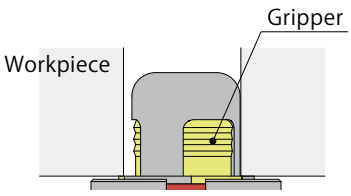
Gripper expands and pulls workpiece down.

PAT.

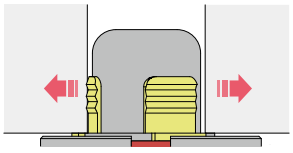


Gripper expands and pulls workpiece down.

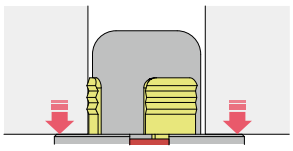
Action Description



< Released State >
Load/Unload Workpiece



< Clamping State >
Gripper expands to hold workpiece hole.

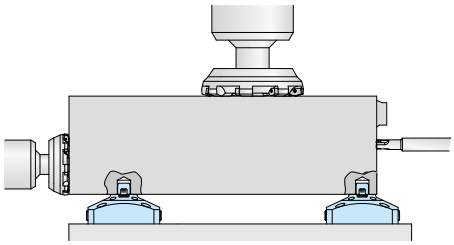


< Clamping Completed >
Pulls and clamps in workpiece hole.

Advantages

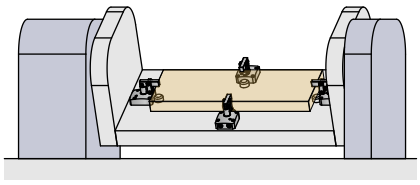
To Workpiece

- 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.

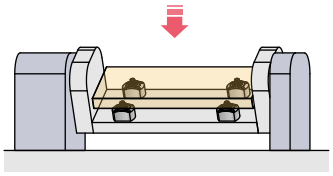


To Machining Equipment

- 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.



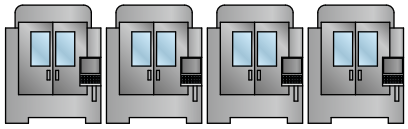
< Before > Perimeter Clamping



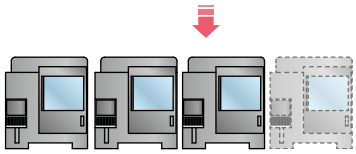
< After > Hole Clamps

To Machining Line

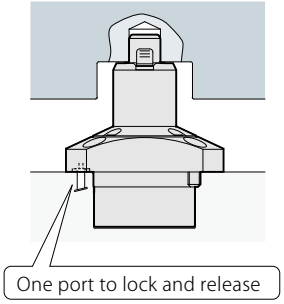
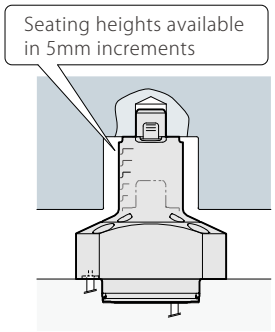
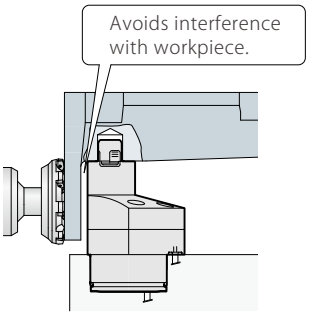
- 5-face machining makes it possible to put process together.
- Machining line is kept small and simple.
- Possible to enhance cutting parameters which allows for shorter cycle times.



< Before > Large Machining Centers and Long Machining Lines



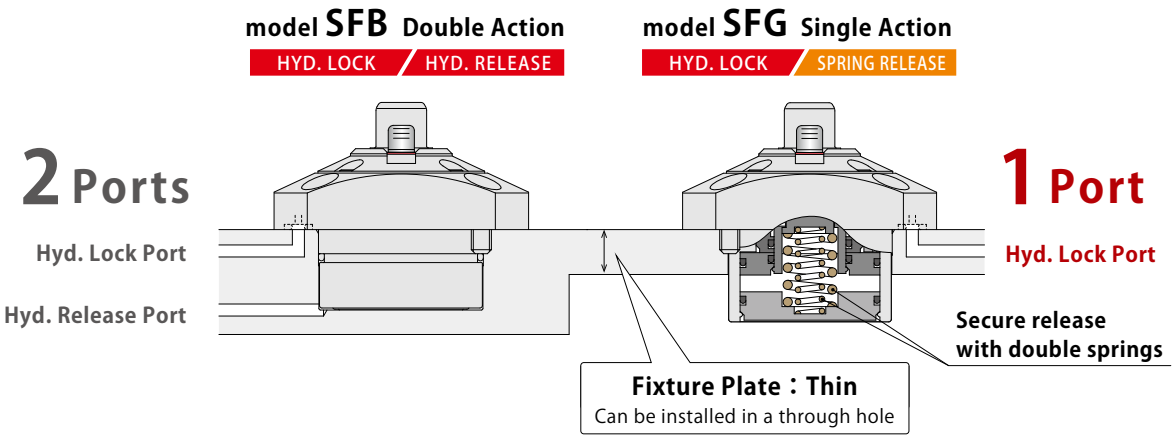
< After > Smaller Machining Centers and Shorter Machining Lines

	NEW  Model SFG	 Model SFB	 Model SFC
Classification	HYD. LOCK / SPRING RELEASE Single Action / Standard Model	HYD. LOCK / HYD. RELEASE Double Action / Standard Model	HYD. LOCK / HYD. RELEASE Double Action / Offset Model
Features			

More Flexible Fixture Design with KOSMEK Hole Clamp

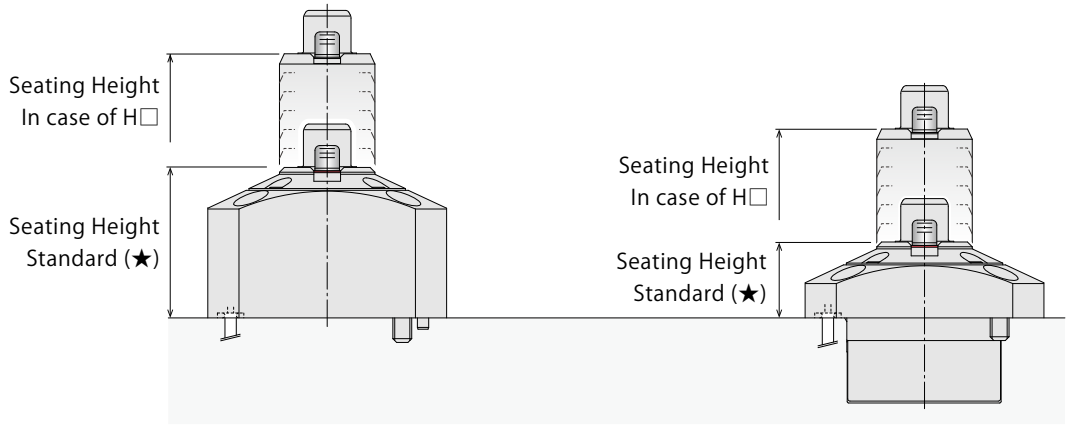
● Spring Release to Reduce the Number of Ports Needed

SFG can be operated by one port. This minimizes fluid passage machining, resulting in fixture weight reduction and cost savings. No energy consumption during release operation.



● Seating Surface Height to Suit Variety of Workpieces

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

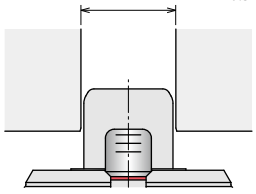


Non-Embedded Method　　Embedded Method

Model No.	Mounting Method	Seating Height H (mm)													
		Standard	20	25	30	35	40	45	50	55	60	65	70	75	80	85
SFG0600	Non-Embedded	45						★	H□ Range							
SFG1000	Embedded	20	★	H□ Range												
SFG2000	Non-Embedded	50							★	H□ Range						
	Embedded	20	★	H□ Range												
SFG3000	Non-Embedded	55								★	H□ Range					
	Embedded	25		★	H□ Range											

Hole Diameter to Suit Variety of Workpieces

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

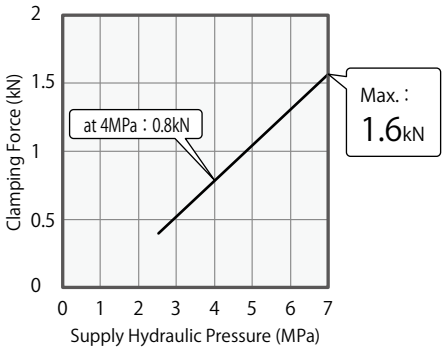


Model	Cap	Workpiece Hole Diameter (mm)
		6 6.5 7 7.5 8 8.5 9 9.5 10 10.5 11 11.5 12 12.5 13 13.5 14 14.5 15 15.5 16
SFG0600	With Cap	Allowable Range
SFG1000	No Cap	Allowable Range
SFG2000	With Cap	Allowable Range
SFG3000		Allowable Range

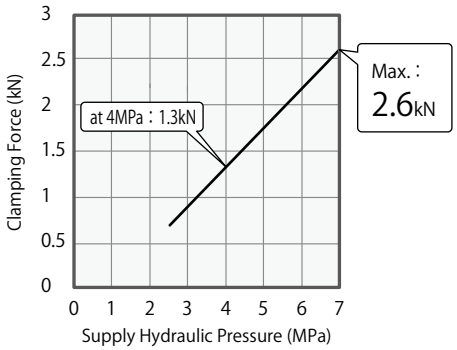
Powerful and Stable Clamping Force

The secure sequential operating structure provides reliable clamping force with a simple circuit structure.

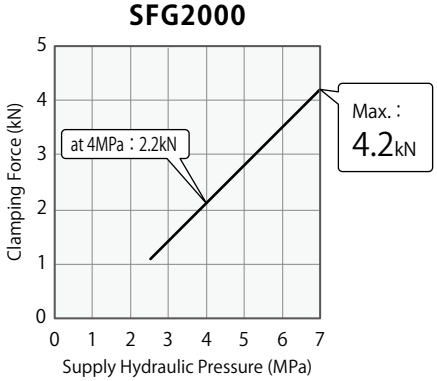
SFG0600



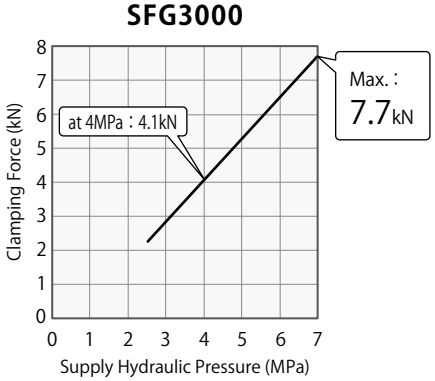
SFG1000



SFG2000



SFG3000

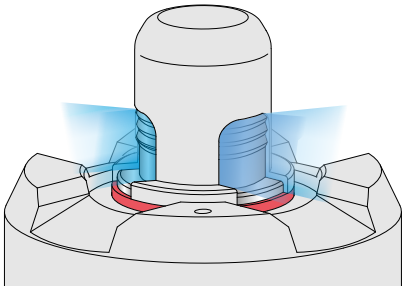


※ Max. operating pressure is 4.5MPa, 5MPa or 6MPa regarding to some of workpiece hole diameter.

More Safe Operation and Long Operating Life with KOSMEK Hole Clamp

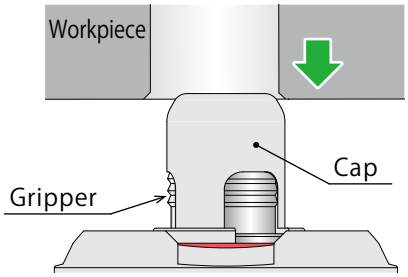
Cap Structure Available in Any Condition

※ SFG1000 does not have the cap.



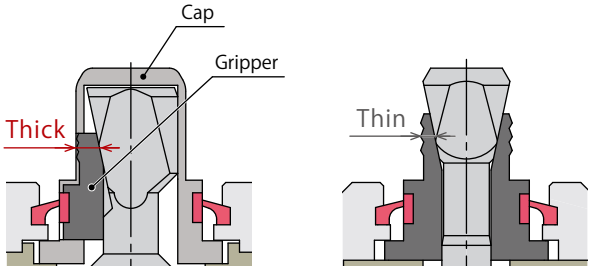
Effective air purging

Small clearance leads to effective air purging. It prevents cutting chips and coolant from entering inside the hole clamp.
50% of air flow consumption compared to our non-cap model.



Protects gripper when loading workpiece

Cap protects gripper.
Workpiece does not hit gripper when loading and unloading.



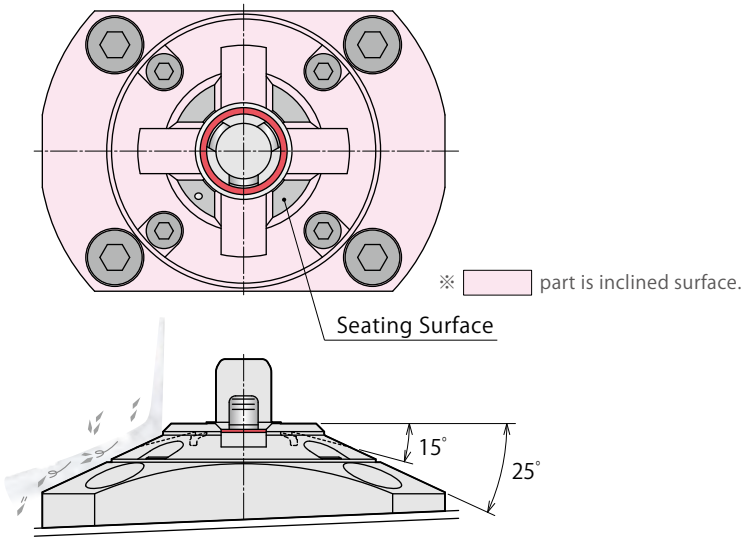
Thicker Gripper, Longer Life

No degradation in performance even after **1 million cycles**※ internal tests on A2017 aluminum workpieces.

(※ 500,000 cycles test on SCM435 thermal refined steel)

Pursuing Good Design for Cutting Chips

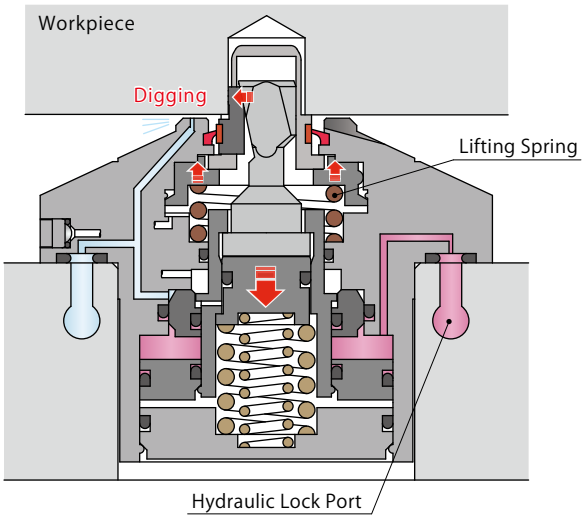
Having smaller seating surface and wide sweep area on the flange enables easy flow of cutting chips and reduction in coolant usage.



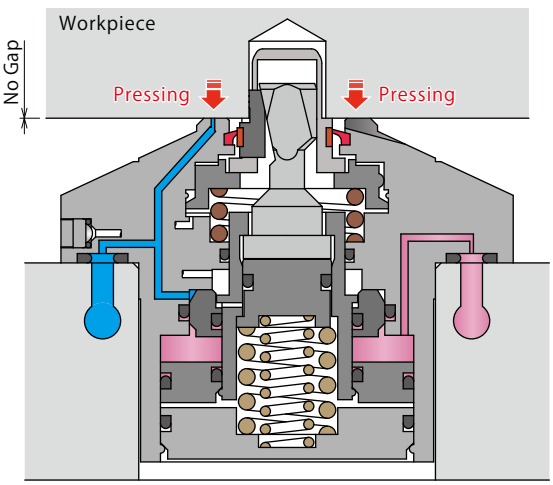
Secure Clamp Action Out of Sight

Built-in spring grips workpiece strongly and pulls it in.
There is no effect by the temperature and/or amount of oil.

Gripper expands.



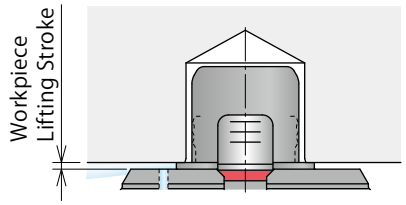
Pulls on to seating surface.



More Safe Operation and Long Operating Life with KOSMEK Hole Clamp

● Clamp action detecting function is in standard

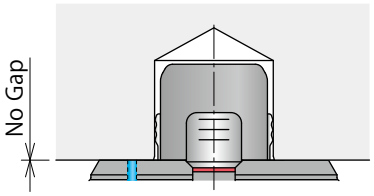
Lift-up function allows to check the movement of pulling and lifting off the workpiece.
Suitable for automated production line.



OFF ※ Seating Confirmation

OFF Lock Hyd. Pressure

When loading the workpiece



ON Seating Confirmation

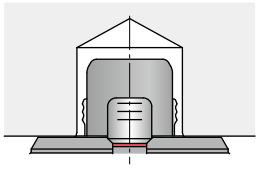
ON Lock Hyd. Pressure

When the workpiece is locked

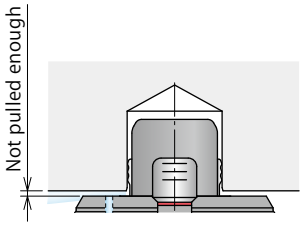
※ In case of 'with lifting function (workpiece lifting option)' .

● Abnormality Detection for Unpredictable Troubles

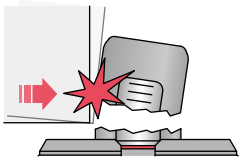
Anomaly detection for unpredictable trouble. It can be used in automated line.



The workpiece with larger hole diameter than specification.



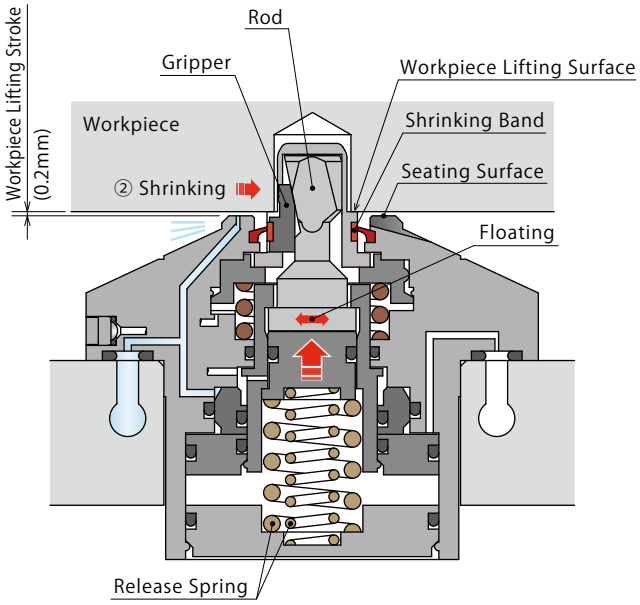
The workpiece is floated more than pulling stroke. (Seating Error)



Rod breakage due to transportation.

Action Description

※This is a simplified drawing in case of 'with lifting function (workpiece lifting option)' .

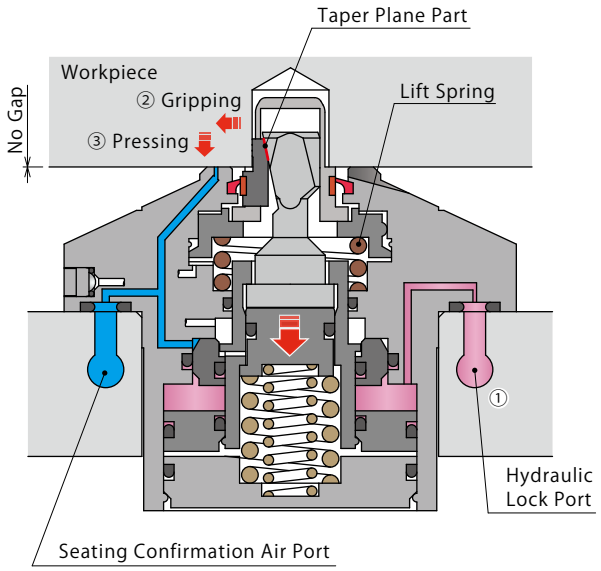


■ Released State

The rod is lifted up by the release spring and the gripper retracts. (For workpiece lifting option, there is a gap between workpiece bottom surface and seating surface.)

Pressure Switch (Lock Hydraulic Pressure)	Seating Confirmation (Air Sensor)
OFF	OFF ※

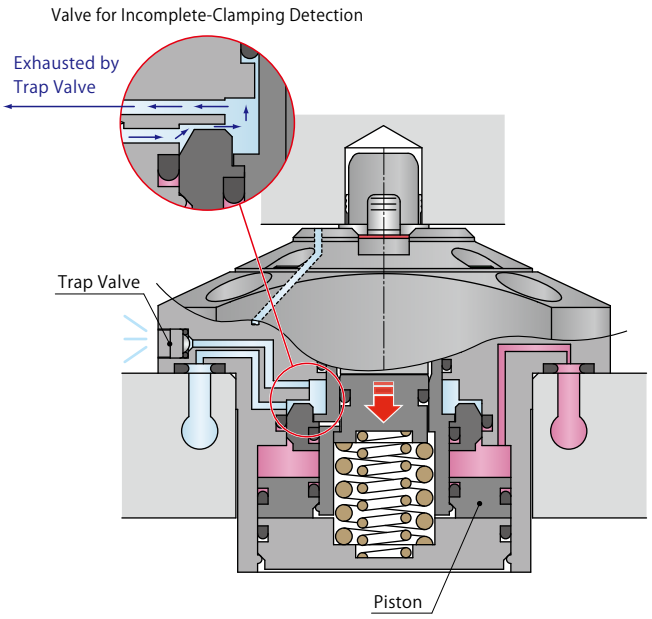
※ In case of 'with lifting function (workpiece lifting option)' .



■ Locked State

① Hydraulic 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 of the lift spring, pulling force works after the gripper digs into workpiece. Then, it presses workpiece onto seating surface. (Clamping force = Pressing force onto seating surface.)

Pressure Switch (Lock Hydraulic Pressure)	Seating Confirmation (Air Sensor)
ON	ON



■ Abnormality Detected State

(Clamping without Workpiece)

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

- When clamping a 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 the rod or the 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.

Pressure Switch (Lock Hydraulic Pressure)	Seating Confirmation (Air Sensor)
ON	OFF

Model No. Indication (Workpiece Hole Shape：Straight)

SFG | 20 | 0 | 0 | – | G0 | N | – | 115 | – | | – | Blank / F

1 2 3 4 5 6 7

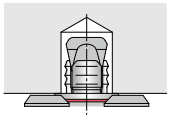
1 Body Size ※ Please refer to the specifications, the performance curve and the external dimensions for details.

06 ： Available in workpiece hole diameters between ϕ6 and ϕ9 (With Cap)

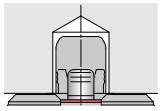
10 ： Available in workpiece hole diameters between ϕ6 and ϕ9 (No Cap)

20 ： Available in workpiece hole diameters between ϕ9 and ϕ13 (With Cap)

30 ： Available in workpiece hole diameters between ϕ13 and ϕ16 (With Cap)



SFG1000
(No Cap)



SFG0600/SFG2000/SFG3000
(With Cap)

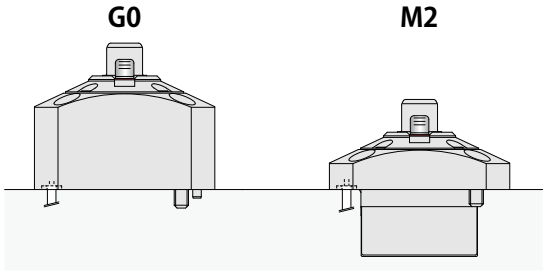
2 Design No.

0 ：Revision Number

3 Mounting Method

G0 ： Non-Embedded

M2 ： Embedded



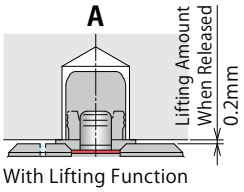
Non-Embedded　　Embedded

4 Workpiece Lifting Option

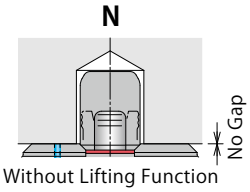
A ： With Lifting Function (Workpiece Lifting Option)

N ： Without Lifting Function

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



With Lifting Function
(Workpiece Lifting Option)



Without Lifting Function

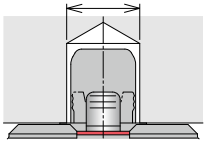
Note :
When using SFG with expansion locating pin(s)
(model VFH, VFL, VFM, VFJ, VFK, VWH, VWM, VWK, VX, VFP, SWG),
please choose **N**：Without Lifting Function.

5 Workpiece Hole Code

Workpiece Hole Code : Workpiece Hole Diameter $\phi d^{+0.7}_{-0.3}$

※ Workpiece hole diameter should be specified in 0.5mm increments from the allowable range in the table below.

Workpiece Hole Diameter $\phi d^{+0.7}_{-0.3}$



Workpiece Hole Code		060	065	070	075	080	085	090	095	100	105	110	115	120	125	130	135	140	145	150	155	160
Workpiece Hole Diam. $\phi d^{+0.7}_{-0.3}$ (mm)		6	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15	15.5	16
SFG0600	With Cap	▲	▲	▲	▲	▲	▲	Allowable Range														
SFG1000	No Cap	▲	▲	Allowable Range																		
SFG2000	With Cap							♦	♦	■	■	Allowable Range										
SFG3000	With Cap															Allowable Range						

※ Max. operating pressure : 4.5MPa in case of ▲, 5.0MPa in case of ♦ and 6.0MPa in case of ■ workpiece hole diameter.

6 Seating Height Dimension

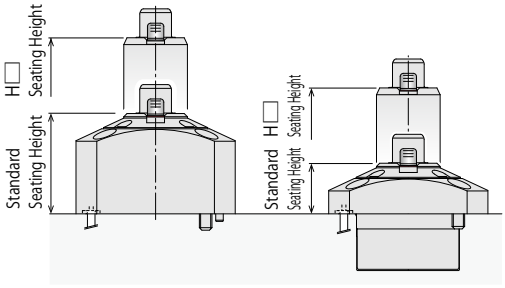
Blank : Standard Height (★ part in the following table.)

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

Model	3 Mounting Method	Seating Height H (mm)														
		Standard Height	20	25	30	35	40	45	50	55	60	65	70	75	80	85
SFG0600 **SFG1000**	G0	45						★	H□ Range							
	M2	20	★	H□ Range												
SFG2000	G0	50							★	H□ Range						
	M2	20	★	H□ Range												
SFG3000	G0	55								★	H□ Range					
	M2	25		★	H□ Range											

※ ★ is standard height and seating height dimension code is [**Blank**].

※ Entry example when specifying non-standard seating height. Seating Height 50mm : **H50**



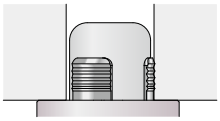
G0 M2

7 Gripper (Workpiece Hole) Shape

Blank : With Serration (Workpiece Hole Shape : Straight)

F : Without Serration (Workpiece Hole Shape : Straight)

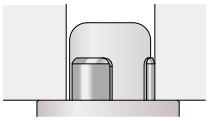
Blank



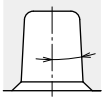
With Serration

Standard (Digs into and powerfully clamps a workpiece.)

F



Without Serration



Slope Angle Less than 3°

Taper Hole

Refer to P.11 ~ P.12 for the taper workpiece hole.

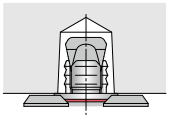
Model No. Indication (Workpiece Hole Shape：Tapered)

SFG **20** **0** **0** – **G0** **N** – **115** – **[ ]** – **T**

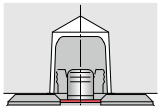
1 2 3 4 5 6 7

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

06 ： Available in workpiece hole mouth diameters between ϕ6.5 and ϕ9 (With Cap)
10 ： Available in workpiece hole mouth diameters between ϕ6.5 and ϕ9 (No Cap)
20 ： Available in workpiece hole mouth diameters between ϕ9 and ϕ13 (With Cap)
30 ： Available in workpiece hole mouth diameters between ϕ13 and ϕ16 (With Cap)



SFG1000 (No Cap)



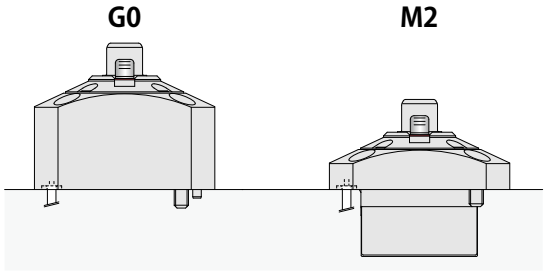
SFG0600/SFG2000/SFG3000 (With Cap)

2 Design No.

0 ：Revision Number

3 Mounting Method

G0 ： Non-Embedded
M2 ： Embedded

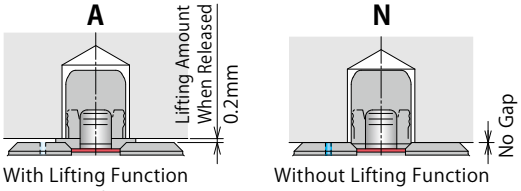


Non-Embedded Embedded

4 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.



With Lifting Function (Workpiece Lifting Option)

Without Lifting Function

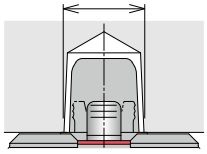
Note :
When using SFG with expansion locating pin(s) (model VFH, VFL, VFM, VFJ, VFK, VWH, VWM, VWK, VX, VFP, SWG), please choose **N**：Without Lifting Function.

5 Workpiece Hole Code (Workpiece Hole Mouth Diameter)

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 Mouth Diameter ϕd

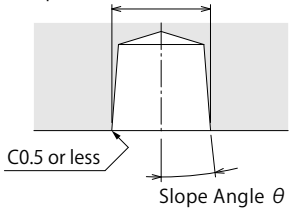


Workpiece Hole Code		060	065	070	075	080	085	090	095	100	105	110	115	120	125	130	135	140	145	150	155	160
Workpiece Hole Mouth Diam. ϕd (mm)		-	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15	15.5	16
SFG0600	With Cap		▲	▲	▲	▲	▲	Allowable Range														
SFG1000	No Cap		▲	▲	Allowable Range																	
SFG2000	With Cap							♦	♦	♦	♦	■	■	Allowable Range								
SFG3000	With Cap															■	Allowable Range					

※ Max. operating pressure : 4.5MPa in case of ▲, 5.0MPa in case of ♦ and 6.0MPa in case of ■ workpiece hole diameter.
※ Taper hole model is not available for Workpiece Hole Code : **060**.

Workpiece Hole Slope Angle and Allowable Tolerance of Hole Mouth Diameter

Workpiece Hole Mouth Diameter ϕd



Model No.	Workpiece Hole Code	Slope Angle θ	Allowable Tolerance of Hole Mouth Diam.
SFG0600	065 ~ 085	$1 \leqq \theta^\circ \leqq 2.5$	$\phi d^{\pm 0.3}$
		$2.5 < \theta^\circ \leqq 3$	$\phi d^{+0.3}_{-0.15}$
	090	$1 \leqq \theta^\circ \leqq 2$	$\phi d^{\pm 0.3}$
		$2 < \theta^\circ \leqq 2.5$	$\phi d^{+0.3}_{-0.15}$
		$2.5 < \theta^\circ \leqq 3$	$\phi d^{+0.3}_{0}$
SFG1000	065 ~ 090	$1 \leqq \theta^\circ \leqq 2.5$	$\phi d^{\pm 0.3}$
		$2.5 < \theta^\circ \leqq 3$	$\phi d^{+0.3}_{-0.15}$
SFG2000	090	$1 \leqq \theta^\circ \leqq 2$	$\phi d^{\pm 0.3}$
		$2 < \theta^\circ \leqq 2.5$	$\phi d^{+0.3}_{-0.15}$
		$2.5 < \theta^\circ \leqq 3$	$\phi d^{+0.3}_{0}$
	095 ~ 130	$1 \leqq \theta^\circ \leqq 2.5$	$\phi d^{\pm 0.3}$
		$2.5 < \theta^\circ \leqq 3$	$\phi d^{+0.3}_{-0.15}$
SFG3000	130 ~ 160	$1 \leqq \theta^\circ \leqq 2.5$	$\phi d^{\pm 0.3}$
		$2.5 < \theta^\circ \leqq 3$	$\phi d^{+0.3}_{-0.15}$

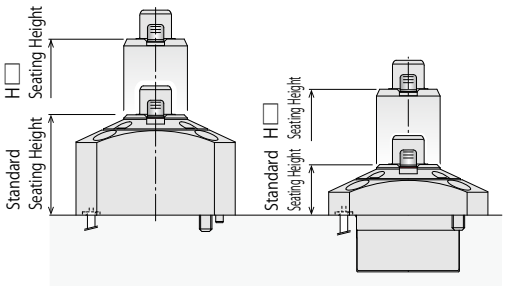
※ Please contact us when the slope angle is less than 1°.

6 Seating Height Dimension

Blank : Standard Height (★ part in the following table.)
H Seating Height : Specifying Seating Height (In 5mm increments)

Model	3 Mounting Method	Seating Height H (mm)														
		Standard Height	20	25	30	35	40	45	50	55	60	65	70	75	80	85
SFG0600	G0	45						★	H□ Range							
SFG1000	M2	20	★	H□ Range												
SFG2000	G0	50							★	H□ Range						
	M2	20	★	H□ Range												
SFG3000	G0	55								★	H□ Range					
	M2	25		★	H□ Range											

※ ★ is standard height and seating height dimension code is [**Blank**].
※ Entry example when specifying non-standard seating height. Seating Height 50mm : **H50**

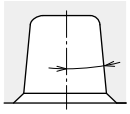


G0 M2

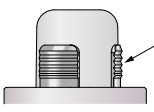
7 Workpiece Hole (Gripper) Shape

T : Taper Hole (with Serration)

T

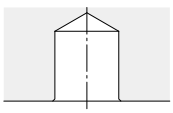


Slope Angle Less than 3°



With Serration
Standard (Digs into and powerfully clamps a workpiece.)

Workpiece Hole Shape : Taper Hole (with Serration)
('No Serration' is not available.)

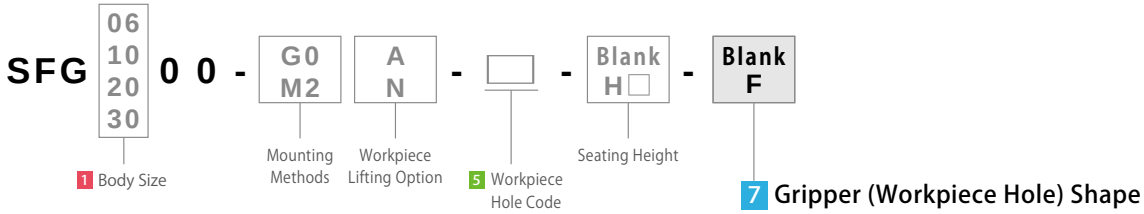


Hole Shape : Straight

Refer to P.9 ~ P.10 for the straight workpiece hole.

Specifications (Workpiece Hole Shape : Straight)

Applicable Model No.



Model No.		SFG0600-□□-□-□ SFG0600-□□-□-□-F							SFG1000-□□-□-□ SFG1000-□□-□-□-F							SFG2000-□□-□-□ SFG2000-□□-□-□-F								
	5 Workpiece Hole Code	060	065	070	075	080	085	090	060	065	070	075	080	085	090	090	095	100	105	110	115	120	125	130
Workpiece	Hole Diam. ϕd $^{+0.7}_{-0.3}$ mm	6	6.5	7	7.5	8	8.5	9	6	6.5	7	7.5	8	8.5	9	9	9.5	10	10.5	11	11.5	12	12.5	13
	Hardness	HB250 or less																						
Allowable Offset (Floating Clearance of Expanding Area)※1	mm	±0.5																						
Full Stroke	mm	4.2																						
Workpiece Pulling Stroke	mm	1.0																						
Workpiece Lifting Stroke ※2	mm	0.2																						
Workpiece Lifting Force ※2	kN	0.09							0.09							0.15								
Cylinder Capacity (Empty Action)	cm^3	1.2							1.8							3.0								
Cylinder Inner Diameter ※3	mm	24							28							35								
Rod Diameter ※3	mm	15							15							18								
Max. Operating Pressure	MPa	4.5						7.0	4.5			7.0				5.0		6.0				7.0		
Min. Operating Pressure	MPa	2.5						2.5	2.5			2.5				2.5		2.5				2.5		
Withstanding Pressure	MPa	6.7						10.5	6.7			10.5				7.5		9.0				10.5		
Recommended Air Blow Pressure	MPa	0.2 ~ 0.3 (About 10L/min)							0.4 ~ 0.5 (About 20L/min)							0.2 ~ 0.3 (About 10L/min)								
Operating Temperature	℃	0 ~ 70																						
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32																						
Weight		Refer to the External Dimensions pages.																						

Model No.		SFG3000-□□-□-□ SFG3000-□□-□-□-F						
	5 Workpiece Hole Code	130	135	140	145	150	155	160
Workpiece	Hole Diam. ϕd $^{+0.7}_{-0.3}$ mm	13	13.5	14	14.5	15	15.5	16
	Hardness	HB250 or less						
Allowable Offset (Floating Clearance of Expanding Area)※1	mm	±0.5						
Full Stroke	mm	4.2						
Workpiece Pulling Stroke	mm	1.0						
Workpiece Lifting Stroke※2	mm	0.2						
Workpiece Lifting Force ※2	kN	0.23						
Cylinder Capacity (Empty Action)	cm^3	5.4						
Cylinder Inner Diameter ※3	mm	46						
Rod Diameter ※3	mm	22						
Max. Operating Pressure	MPa	7.0						
Min. Operating Pressure	MPa	2.5						
Withstanding Pressure	MPa	10.5						
Recommended Air Blow Pressure	MPa	0.2 ~ 0.3 (About 10L/min)						
Operating Temperature	℃	0 ~ 70						
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32						
Weight		Refer to the External Dimensions pages.						

Notes :

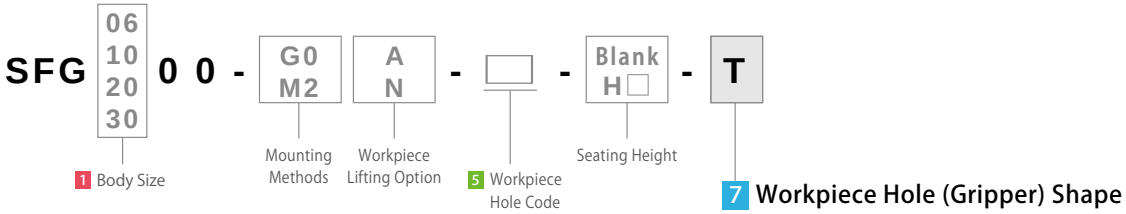
※1. The clamping part is an adjusting structure and the clamping operation is done by locating the workpiece hole. The numerical value in the table shows the amount of tolerance value of single clamp. Please consider the center distance accuracy of each clamping installation part and each workpiece hole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

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

※3. Clamping force cannot be calculated from the cylinder inner diameter and the rod diameter. Please refer to the clamping force curve (P.15).

Specifications (Workpiece Hole Shape : Tapered)

Applicable Model No.



Model No.			SFG0600-□□-□-□-T							SFG1000-□□-□-□-T							SFG2000-□□-□-□-T									
	5 Workpiece Hole Code		060	065	070	075	080	085	090	060	065	070	075	080	085	090	090	095	100	105	110	115	120	125	130
Workpiece	Hole Mouth Diam. ϕd	mm	–	6.5	7	7.5	8	8.5	9	–	6.5	7	7.5	8	8.5	9	9	9.5	10	10.5	11	11.5	12	12.5	13
	Allowable Tolerance of Hole Mouth Diam.		–	Refer to 5 Workpiece Hole Code on P.12.						–	Refer to 5 Workpiece Hole Code on P.12.														
	Hole Slope Angle		–	3° or less						–	3° or less														
	Hardness		–	HB250 or less						–	HB250 or less														
Allowable Offset (Floating Clearance of Expanding Area) ※4		mm	–	±0.5						–	±0.5														
Full Stroke		mm	–	4.2						–	4.2														
Workpiece Pulling Stroke		mm	–	1.0						–	1.0														
Workpiece Lifting Stroke ※5		mm	–	0.2						–	0.2														
Workpiece Lifting Force ※5		kN	–	0.09						–	0.09						0.15								
Cylinder Capacity (Empty Action)		cm^3	–	1.2						–	1.8						3.0								
Cylinder Inner Diameter ※6		mm	–	24						–	28						35								
Rod Diameter ※6		mm	–	15						–	15						18								
Max. Operating Pressure		MPa	–	4.5					7.0	–	4.5					7.0	5.0				6.0				7.0
Min. Operating Pressure		MPa	–	2.5					2.5	–	2.5					2.5	2.5				2.5				2.5
Withstanding Pressure		MPa	–	6.7					10.5	–	6.7					10.5	7.5				9.0				10.5
Recommended Air Blow Pressure		MPa	–	0.2 ~ 0.3 (About 10L/min)						–	0.4 ~ 0.5 (About 20L/min)						0.2 ~ 0.3 (About 10L/min)								
Operating Temperature		℃	–	0 ~ 70						–	0 ~ 70														
Usable Fluid			–	General Hydraulic Oil Equivalent to ISO-VG-32						–	General Hydraulic Oil Equivalent to ISO-VG-32														
Weight			–	Refer to the External Dimensions pages.						–	Refer to the External Dimensions pages.														

Model No.			SFG3000-□□-□-□-T						
	5 Workpiece Hole Code		130	135	140	145	150	155	160
Workpiece	Hole Mouth Diam. ϕd	mm	13	13.5	14	14.5	15	15.5	16
	Allowable Tolerance of Hole Mouth Diam.		Refer to 5 Workpiece Hole Code on P.12.						
	Hole Slope Angle		3° or less						
	Hardness		HB250 or less						
Allowable Offset (Floating Clearance of Expanding Area) ※4		mm	±0.5						
Full Stroke		mm	4.2						
Workpiece Pulling Stroke		mm	1.0						
Workpiece Lifting Stroke ※5		mm	0.2						
Workpiece Lifting Force ※5		kN	0.23						
Cylinder Capacity (Empty Action)		cm^3	5.4						
Cylinder Inner Diameter ※6		mm	46						
Rod Diameter ※6		mm	22						
Max. Operating Pressure		MPa	6.0	7.0					
Min. Operating Pressure		MPa	2.5	2.5					
Withstanding Pressure		MPa	9.0	10.5					
Recommended Air Blow Pressure		MPa	0.2 ~ 0.3 (About 10L/min)						
Operating Temperature		℃	0 ~ 70						
Usable Fluid			General Hydraulic Oil Equivalent to ISO-VG-32						
Weight			Refer to the External Dimensions pages.						

※ 7 **T** : Taper hole option is not available for Workpiece Hole Code : **060**.

Notes :

※4. 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 locating clamps or locating devices, or when using more than two of these products.

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

※6. Clamping force cannot be calculated from the cylinder inner diameter and the rod diameter. Please refer to the clamping force curve (P.16).

Clamping Force Curve (Workpiece Hole Shape：Straight)

Applicable Model No.

SFG [06 10 20 30] 0 0 - [G0 M2] [A N] - [□] - [Blank H□] - [Blank F]

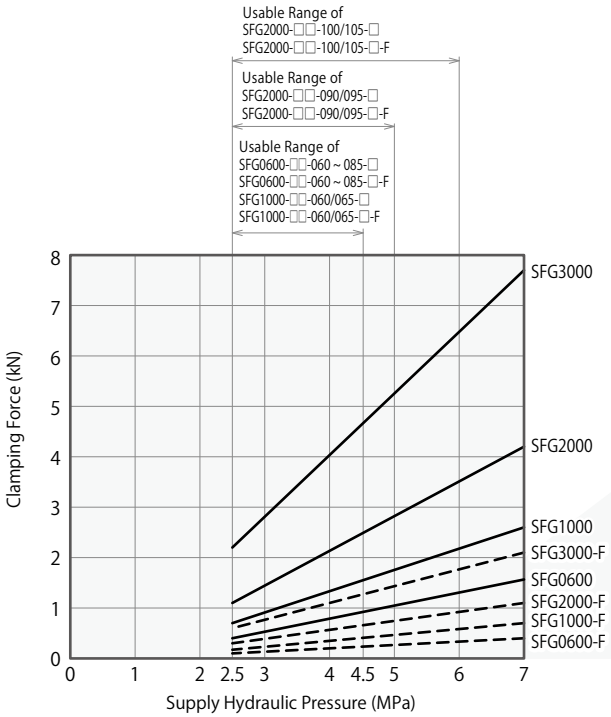
- [06 10 20 30] → 1 Body Size
- [G0 M2] → Mounting Methods
- [A N] → Workpiece Lifting Option
- [□] → 5 Workpiece Hole Code
- [Blank H□] → Seating Height
- [Blank F] → 7 Gripper (Workpiece Hole) Shape

7 Gripper (Workpiece Hole) Shape：**Blank** (With Serration)

Model No.		SFG0600-□□-□-□			SFG1000-□□-□-□							SFG2000-□□-□-□									SFG3000-□□-□-□						
5 Workpiece Hole Code		060	065	070	075	080	085	090	060	065	070	075	080	085	090	090	095	100	105	110	115	120	125	130	130	135	140	145	150	155	160
Clamping Force kN	Hyd. Pressure 7 MPa	–						1.57	–			2.6				–	–			4.2					7.7						
	Hyd. Pressure 6 MPa	–						1.31	–			2.2				–				3.5					6.5						
	Hyd. Pressure 5 MPa	–						1.05	–			1.7								2.8					5.3						
	Hyd. Pressure 4.5 MPa	0.92							1.5											2.5					4.7						
	Hyd. Pressure 4 MPa	0.79							1.3											2.2					4.1						
	Hyd. Pressure 3 MPa	0.53							0.9											1.5					2.8						
	Hyd. Pressure 2.5 MPa	0.40							0.7											1.1					2.2						
Clamping Force Calculation Formula※1 kN		F = 0.26 × P – 0.25							F = 0.42 × P – 0.39							F = 0.68 × P – 0.56									F = 1.22 × P – 0.84						
Max. Operating Pressure MPa		4.5						7.0	4.5			7.0				5.0		6.0		7.0					7.0						

7 Gripper (Workpiece Hole) Shape：**F** (Without Serration)

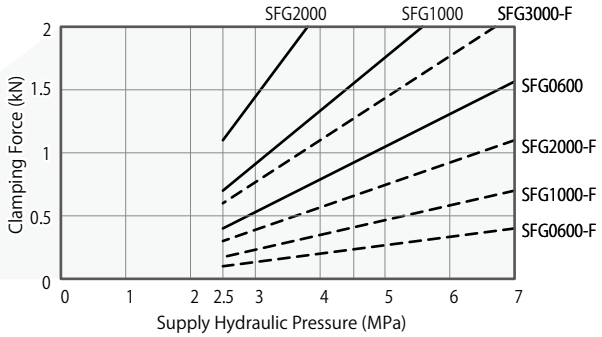
Model No.		SFG0600-□□-□-□-F			SFG1000-□□-□-□-F							SFG2000-□□-□-□-F									SFG3000-□□-□-□-F						
5 Workpiece Hole Code		060	065	070	075	080	085	090	060	065	070	075	080	085	090	090	095	100	105	110	115	120	125	130	130	135	140	145	150	155	160
Clamping Force kN	Hyd. Pressure 7 MPa	–						0.40	–			0.70				–	–			1.10					2.10						
	Hyd. Pressure 6 MPa	–						0.34	–			0.59				–				0.95					1.80						
	Hyd. Pressure 5 MPa	–						0.26	–			0.47								0.75					1.45						
	Hyd. Pressure 4.5 MPa	0.23							0.42											0.65					1.30						
	Hyd. Pressure 4 MPa	0.19							0.36											0.55					1.10						
	Hyd. Pressure 3 MPa	0.13							0.24											0.40					0.75						
	Hyd. Pressure 2.5 MPa	0.09							0.18											0.30					0.60						
Clamping Force Calculation Formula※1 kN		F = 0.07 × P – 0.08							F = 0.12 × P – 0.11							F = 0.18 × P – 0.15									F = 0.34 × P – 0.25						
Max. Operating Pressure MPa		4.5						7.0	4.5			7.0				5.0		6.0		7.0					7.0						



Notes：

1. The table and graph show the relationship between clamping force (kN) and supply hydraulic pressure (MPa).
2. Clamping force shows a pressing force against the seating surface.
3. Thin wall around the workpiece hole can be deformed by clamping action, and the clamping force will not fill the specification.
4. Clamping force of **F**：Without Serration shows the calculated value when the friction coefficient of workpiece and gripper is μ0.1.

※1. F：Clamping Force (kN), P：Supply Hydraulic Pressure (MPa)



Clamping Force Curve (Workpiece Hole Shape : Tapered)

Applicable Model No.

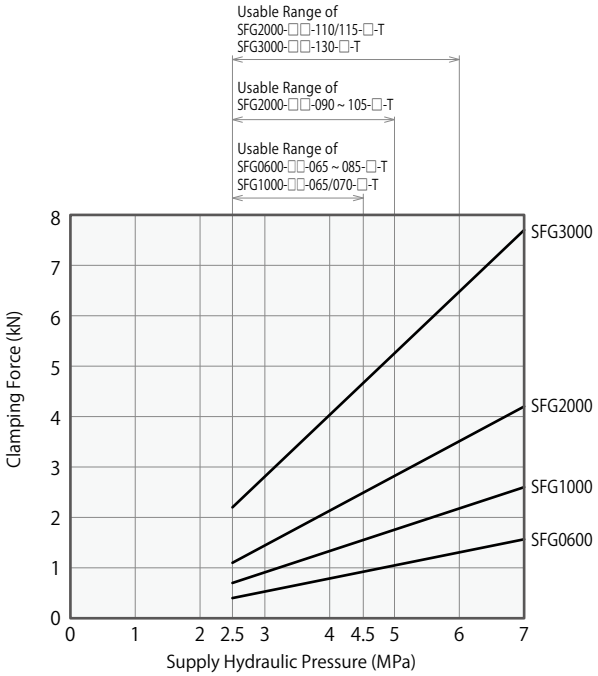
SFG 06 10 20 30 0 0 - G0 M2 - A N - □ - Blank H□ - T

- 1 Body Size
- Mounting Methods
- Workpiece Lifting Option
- 5 Workpiece Hole Code
- Seating Height
- 7 Workpiece Hole (Gripper) Shape

7 Workpiece Hole (Gripper) Shape : T Taper Hole (With Serration)

Model No.		SFG0600-□□-□-□-T						SFG1000-□□-□-□-T							SFG2000-□□-□-□-T								SFG3000-□□-□-□-T						
5 Workpiece Hole Code		060	065	070	075	080	085	090	060	065	070	075	080	085	090	090	095	100	105	110	115	120	125	130	130	135	140	145	150	155	160
Clamping Force kN	Hyd. Pressure 7 MPa	–	–				1.57	–	–			2.6			–	–					4.2				–	7.7					
	Hyd. Pressure 6 MPa	–	–				1.31	–	–			2.2			–	–				3.5					6.5					
	Hyd. Pressure 5 MPa	–	–				1.05	–	–			1.7			2.8									5.3						
	Hyd. Pressure 4.5 MPa	–	0.92					–	1.5						2.5									4.7						
	Hyd. Pressure 4 MPa	–	0.79					–	1.3						2.2									4.1						
	Hyd. Pressure 3 MPa	–	0.53					–	0.9						1.5									2.8						
	Hyd. Pressure 2.5 MPa	–	0.40					–	0.7						1.1									2.2						
Clamping Force Calculation Formula ※2 kN		–	F = 0.26 × P – 0.25					–	F = 0.42 × P – 0.39						F = 0.68 × P – 0.56									F = 1.22 × P – 0.84						
Max. Operating Pressure MPa		–	4.5				7.0	–	4.5			7.0			5.0				6.0			7.0		6.0	7.0					

※ 7 T : Taper hole option is not available for Workpiece Hole Code : **060**.



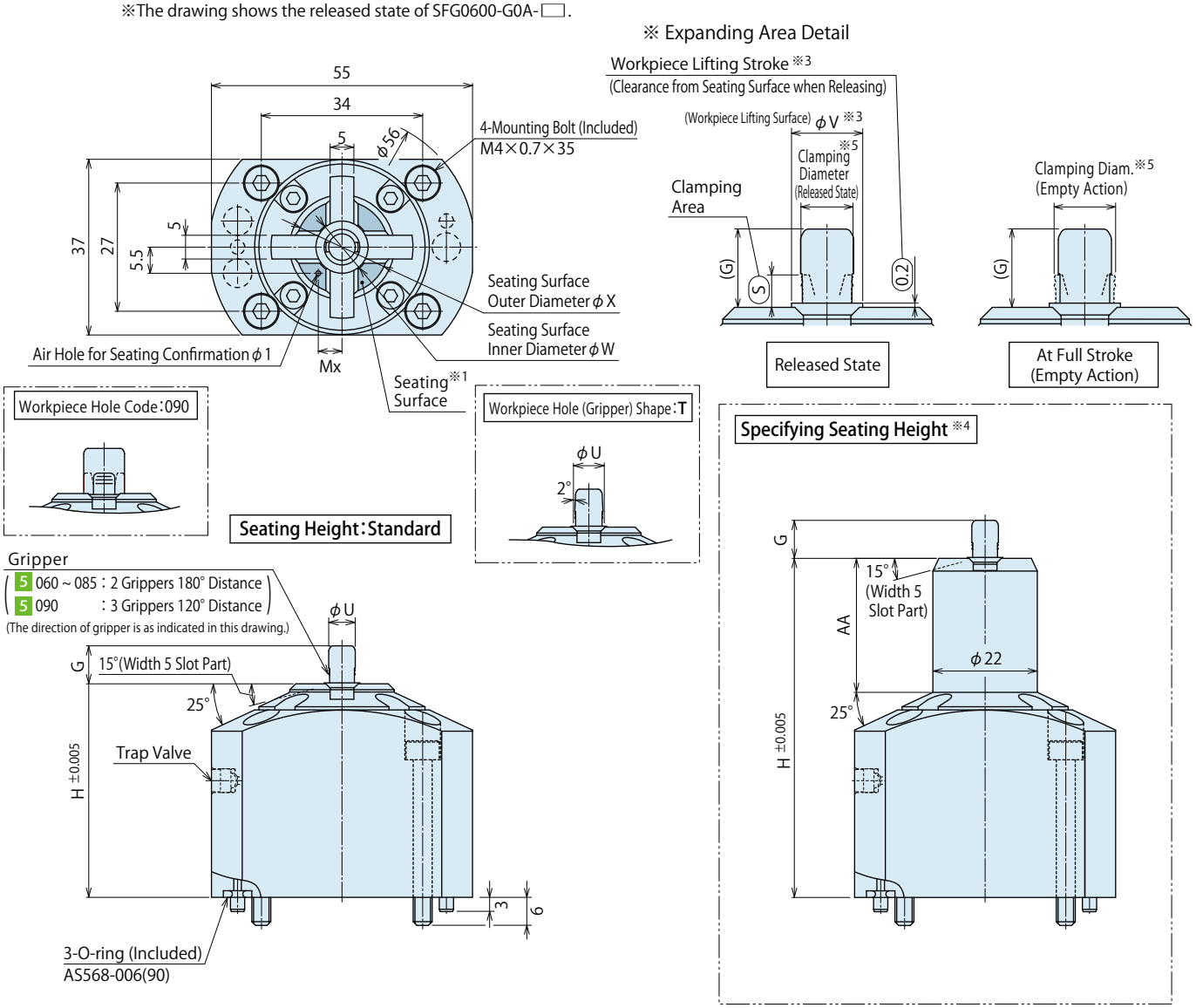
Notes :

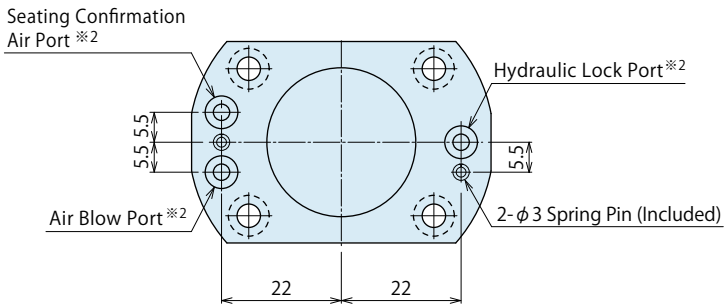
1. The table and graph show the relationship between clamping force (kN) and supply hydraulic pressure (MPa).
2. Clamping force shows a pressing force against the seating surface.
3. Thin wall around the workpiece hole can be deformed by clamping action, and the clamping force will not fill the specification.

※2. F : Clamping Force (kN), P : Supply Hydraulic Pressure (MPa)

External Dimensions

※The drawing shows the released state of SFG0600-G0A-□.





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.

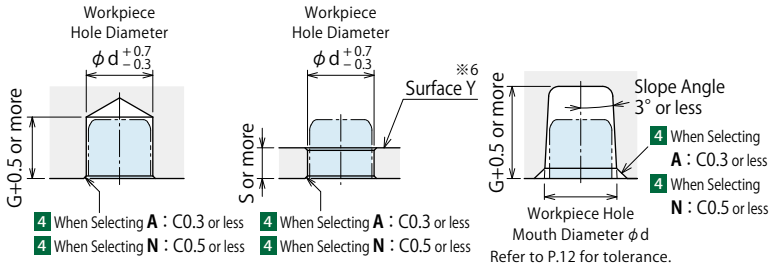
※2. The port names are marked on the product surface. (HYD:Hydraulic Lock Port, FC:Seating Confirmation Air Port, BLOW:Air Blow Port)
Continuously supply air pressure to the air blow port and the seating confirmation air port.

※3. The numerical value is only for the workpiece lifting option.

※4. 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

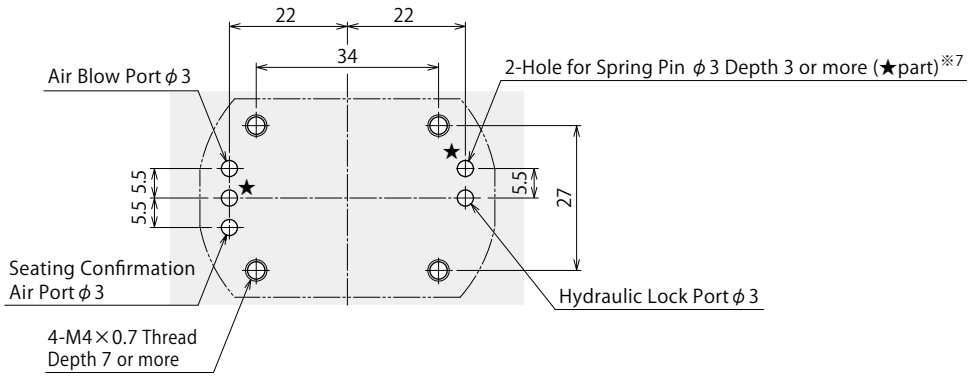


Notes:

1. Thin wall around the workpiece hole could be deformed by clamping action, and clamping force will not fill the specification. Please make sure to test the clamping function before use.

※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 Hole

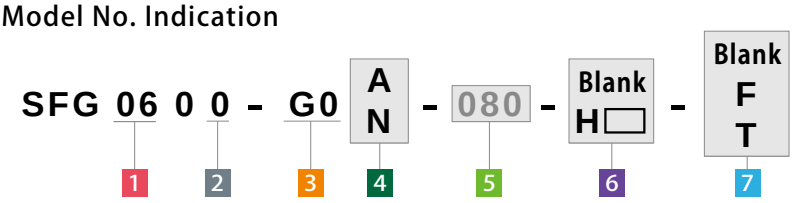


Notes :

1. There should be no burrs at the hole contact surface.
2. The mounting surface should be machined with a surface roughness of Rz6.3 or better.

※7. The distance accuracy for machining the holes for spring pins (2 parts marked with ★) should be within ±0.1mm.

Model No. Indication



1 Body Size (When selecting 06)
2 Design No.
3 Mounting Methods (When selecting G0)
4 Workpiece Lifting Option
5 Workpiece Hole Code
6 Seating Height Dimension
7 Shape of Gripper (Workpiece Hole)

External Dimensions and Machining Dimensions for Mounting

(mm)

Model No.		SFG0600-G0□-□-□-□						
5 Workpiece Hole Code		060	065	070	075	080	085	090
Workpiece Hole Diam. φd	7 Blank, F ※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	at Released	5.5	6	6.5	7	7.5	8	8.5
7 Blank, F	Empty Action	7.2	7.7	8.2	8.7	9.2	9.7	10.2
Clamping Diameter	at Released	–	5.7	6.2	6.7	7.2	7.7	8.2
7 T	Empty Action	–	7.4	7.9	8.4	8.9	9.4	9.9
Allowable Offset (Floating Clearance of Expanding Area) ※8		±0.5						
Full Stroke		4.2						
Workpiece Pulling Stroke		1.0						
Workpiece Lifting Stroke ※9		0.2						
7 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
7 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		5	5.6	5.6	5.6	5.6	6.4	7
V		7.5	8	8.5	9	9.5	10	11.5
W		11.5	12.5	12.5	13.5	13.5	14.5	15.5
X		19.5	19.5	19.5	19.5	19.5	19.5	20.5

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 locating clamps or locating devices, or when using more than two of these products.

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

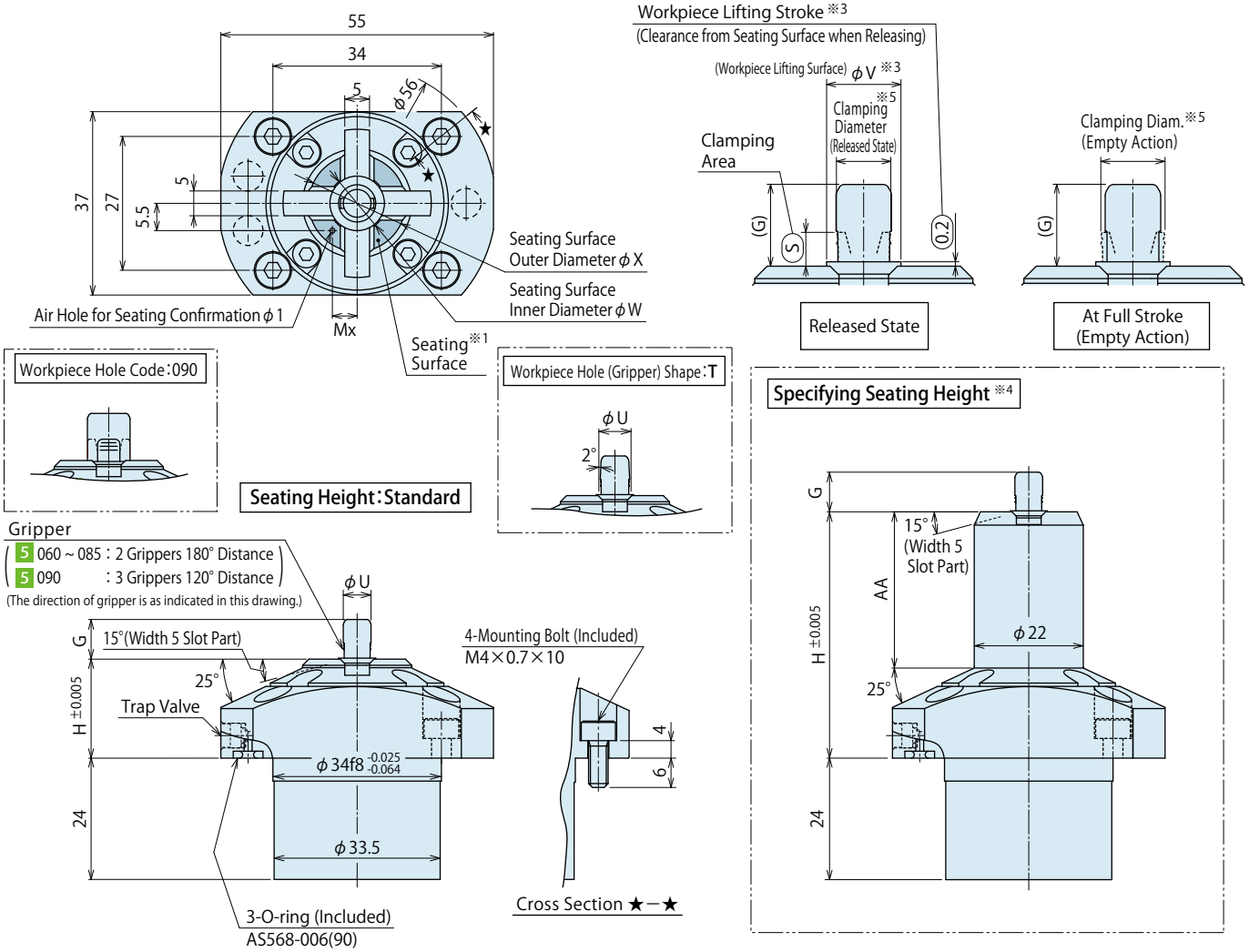
※ 10. For **-T**:Taper Hole option, the allowable tolerance of the hole mouth diameter differs depending on the slope angle. (Refer to P.12.)

(mm)

6 Seating Height Dimension		Standard Height	Specifying Seating Height					
3 Mounting Method		Blank	H50	H55	H60	H65	H70	H75
In case of G0 (Non-Embedded)	H	45	50	55	60	65	70	75
	AA	–	6.8	11.8	16.8	21.8	26.8	31.8
	Weight kg	0.5	0.5	0.6	0.6	0.6	0.6	0.6

External Dimensions

※The drawing shows the released state of SFG0600-M2A-□.



Notes:

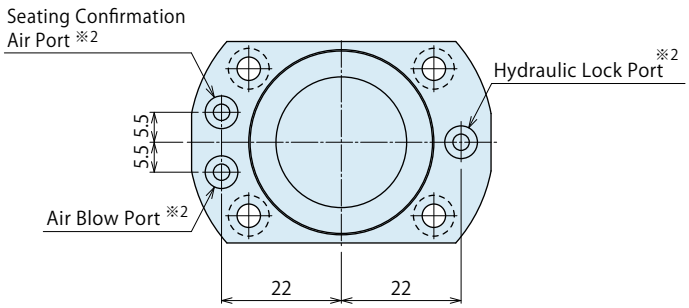
※1. The workpiece must be resting on all seating surfaces when clamping. If this is not done the workpiece can be deformed by the clamping force.

※2. The port names are marked on the product surface. (HYD:Hydraulic Lock Port, FC:Seating Confirmation Air Port, BLOW:Air Blow Port) Continuously supply air pressure to the air blow port and the seating confirmation air port.

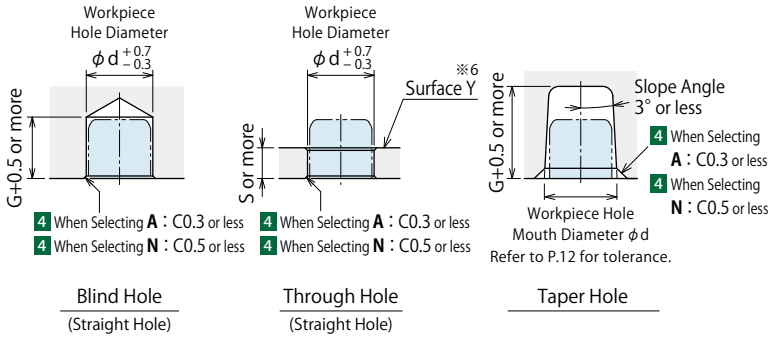
※3. The numerical value is only for the workpiece lifting option.

※4. 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

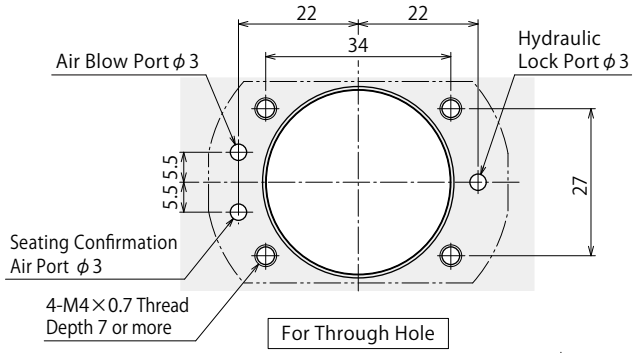


Notes:

1. Thin wall around the workpiece hole could be deformed by clamping action, and clamping force will not fill the specification. Please make sure to test the clamping function before use.

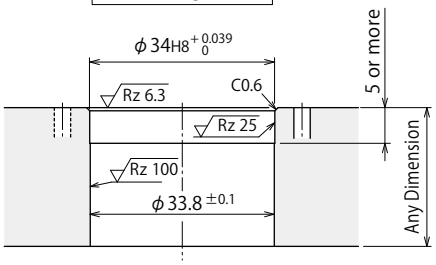
※6. When the clamp head is sticking above the surface Y of the workpiece, please make sure there is no interference with the clamp cylinders during machining.

Machining Dimensions of Mounting Hole

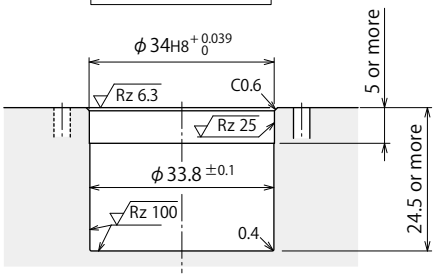


Notes :
1. There should be no burrs at the hole contact surface.
2. Please contact us when adding a spacer.

For Through Hole



For Blind Hole



Model No. Indication

SFG 06 0 0 - M2 [A N] - 080 - [Blank H□] - [Blank F T]

1 Body Size (When selecting 06)
2 Design No.
3 Mounting Methods (When selecting M2)
4 Workpiece Lifting Option
5 Workpiece Hole Code
6 Seating Height Dimension
7 Shape of Gripper (Workpiece Hole)

External Dimensions and Machining Dimensions for Mounting

(mm)

Model No.		SFG0600-M2□-□-□-□						
5 Workpiece Hole Code		060	065	070	075	080	085	090
Workpiece Hole Diam. φd	7 Blank, F ※9	$6^{+0.7}_{-0.3}$	$6.5^{+0.7}_{-0.3}$	$7^{+0.7}_{-0.3}$	$7.5^{+0.7}_{-0.3}$	$8^{+0.7}_{-0.3}$	$8.5^{+0.7}_{-0.3}$	$9^{+0.7}_{-0.3}$
Clamping Diameter	at Released	5.5	6	6.5	7	7.5	8	8.5
7 Blank, F	Empty Action	7.2	7.7	8.2	8.7	9.2	9.7	10.2
Clamping Diameter	at Released	–	5.7	6.2	6.7	7.2	7.7	8.2
7 T	Empty Action	–	7.4	7.9	8.4	8.9	9.4	9.9
Allowable Offset (Floating Clearance of Expanding Area) ※7		±0.5						
Full Stroke		4.2						
Workpiece Pulling Stroke		1.0						
Workpiece Lifting Stroke ※8		0.2						
7 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
7 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		5	5.6	5.6	5.6	5.6	6.4	7
V		7.5	8	8.5	9	9.5	10	11.5
W		11.5	12.5	12.5	13.5	13.5	14.5	15.5
X		19.5	19.5	19.5	19.5	19.5	19.5	20.5

Notes : ※ 7. 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 locating clamps or locating devices, or when using more than two of these products.

※ 8. Workpiece lifting stroke is the function only for lifting option.

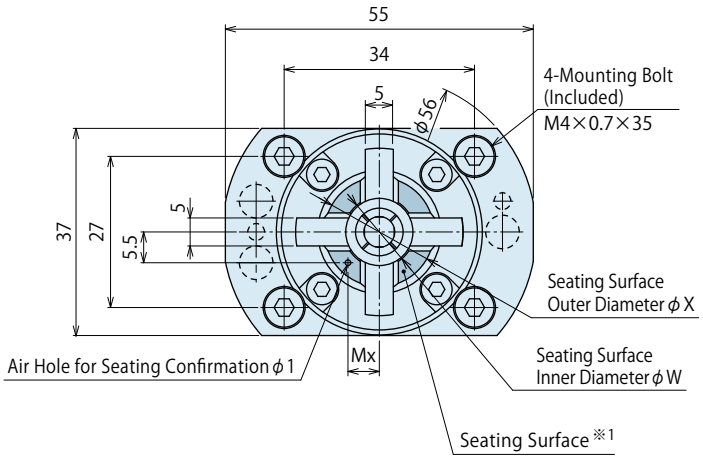
※ 9. For **-T**: Taper Hole option, the allowable tolerance of the hole mouth diameter differs depending on the slope angle. (Refer to P.12.)

(mm)

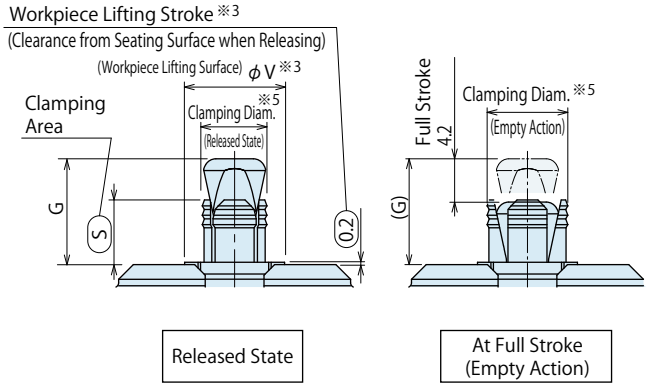
6 Seating Height Dimension		Standard Height	Specifying Seating Height					
3 Mounting Method		Blank	H25	H30	H35	H40	H45	H50
In case of M2 (Embedded)	H	20	25	30	35	40	45	50
	AA	–	6.8	11.8	16.8	21.8	26.8	31.8
	Weight kg	0.4	0.4	0.4	0.4	0.4	0.4	0.4

External Dimensions

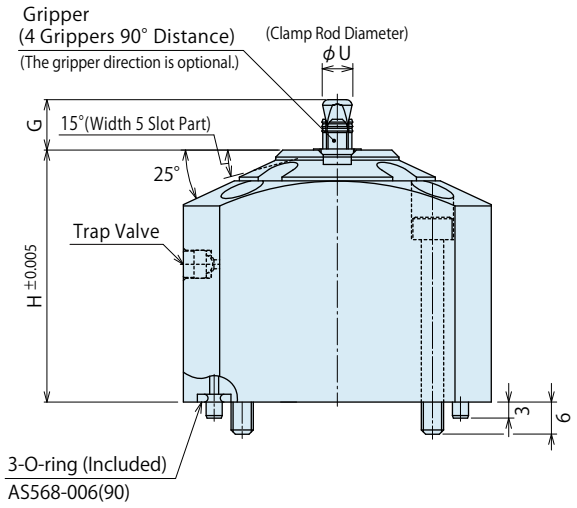
※The drawing shows the released state of SFG1000-G0A-□.



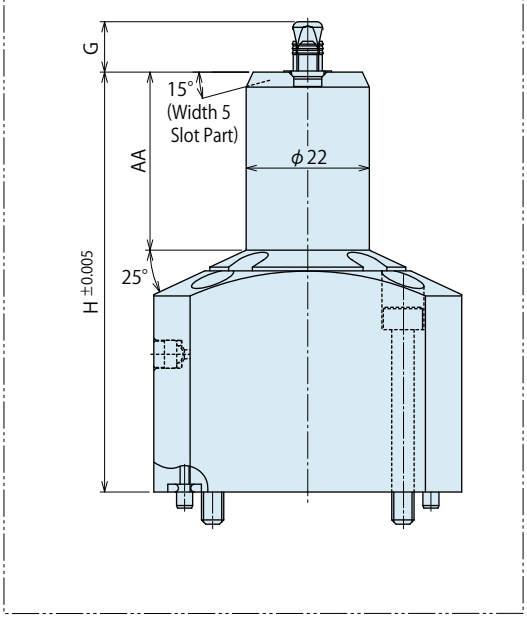
※ Expanding Area Detail

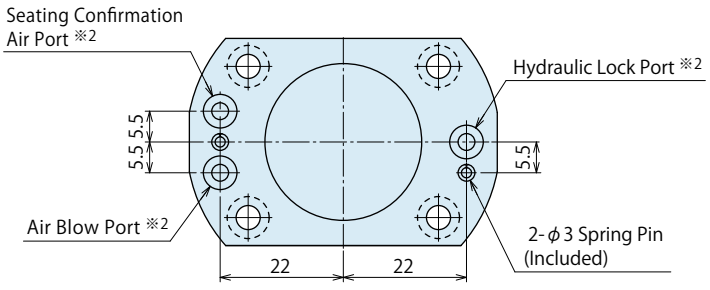


Seating Height：Standard



Specifying Seating Height ※4





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.

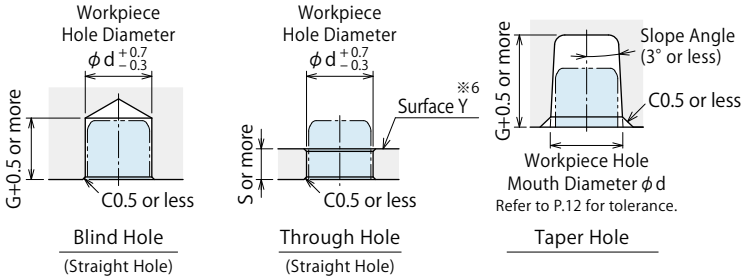
※2. The port names are marked on the product surface. (HYD：Hydraulic Lock Port, FC：Seating Confirmation Air Port, BLOW：Air Blow Port)
Continuously supply air pressure to the air blow port and the seating confirmation air port.

※3. The numerical value is only for the workpiece lifting option.

※4. 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

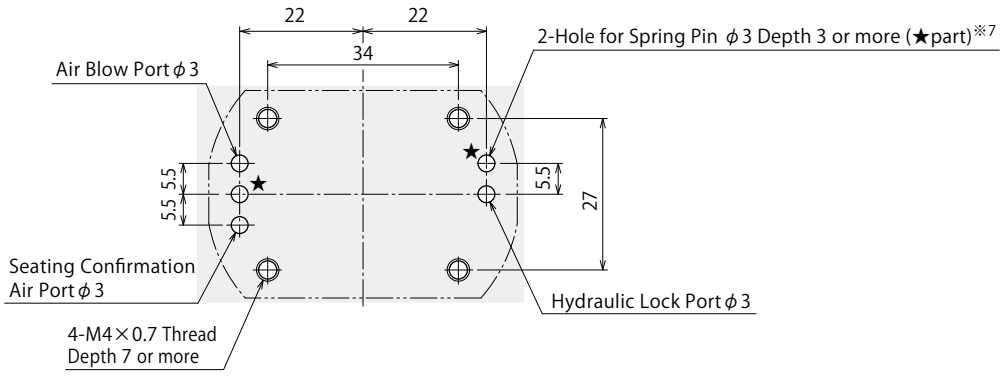


Notes：

1. Thin wall around the workpiece hole could be deformed by clamping action, and clamping force will not fill the specification. Please make sure to test the clamping function before use.

※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 Hole

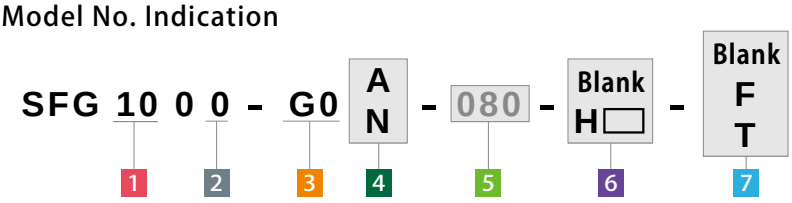


Notes :

1. There should be no burrs at the hole contact surface.
2. The mounting surface should be machined with a surface roughness of Rz6.3 or better.

※7. The distance accuracy for machining the holes for spring pins (2 parts marked with ★) should be within ±0.1mm.

Model No. Indication



1 Body Size (When selecting 10)
2 Design No.
3 Mounting Methods (When selecting G0)
4 Workpiece Lifting Option
5 Workpiece Hole Code
6 Seating Height Dimension
7 Shape of Gripper (Workpiece Hole)

External Dimensions and Machining Dimensions for Mounting

(mm)

Model No.		SFG1000-G0□-□-□-□						
5 Workpiece Hole Code		060	065	070	075	080	085	090
Workpiece Hole Diam. φd	7 Blank, F ※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	at Released	5.5	6	6.5	7	7.5	8	8.5
7 Blank, F	Empty Action	7.2	7.7	8.2	8.7	9.2	9.7	10.2
Clamping Diameter	at Released	–	5.4	5.9	6.4	6.85	7.35	7.85
7 T	Empty Action	–	7.1	7.6	8.1	8.55	9.05	9.55
Allowable Offset (Floating Clearance of Expanding Area) ※8		±0.5						
Full Stroke		4.2						
Workpiece Pulling Stroke		1.0						
Workpiece Lifting Stroke ※9		0.2						
7 Shape of Gripper Blank, F	G	9	9	9	10	10	10	10
	S	5.5	5.5	5.5	6	6	6	6
	U	5.55	6.05	6.55	7.05	7.55	8.05	8.55
7 Shape of Gripper T	G	–	9	9	9	10	10	10
	S	–	5.5	5.5	5.5	6	6	6
	U	–	5.45	5.95	6.45	6.9	7.4	7.9
Mx		5.6	5.6	5.6	6.4	6.4	7	7
V		8.5	9	9.5	10	10.5	11	11.5
W		12.5	13.5	13.5	14.5	14.5	15.5	15.5
X		19.5	19.5	19.5	19.5	19.5	20.5	20.5

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 locating clamps or locating devices, or when using more than two of these products.

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

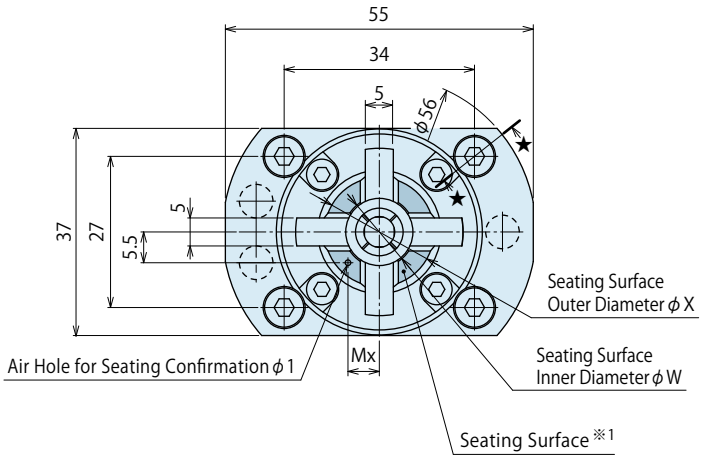
※ 10. For **-T**:Taper Hole option, the allowable tolerance of the hole mouth diameter differs depending on the slope angle. (Refer to P.12.)

(mm)

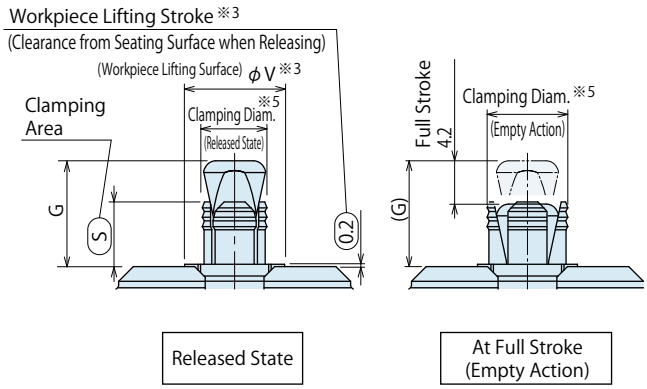
6 Seating Height Dimension		Standard Height	Specifying Seating Height					
3 Mounting Method		Blank	H50	H55	H60	H65	H70	H75
In case of G0 (Non-Embedded)	H	45	50	55	60	65	70	75
	AA	–	6.8	11.8	16.8	21.8	26.8	31.8
	Weight kg	0.5	0.5	0.6	0.6	0.6	0.6	0.6

External Dimensions

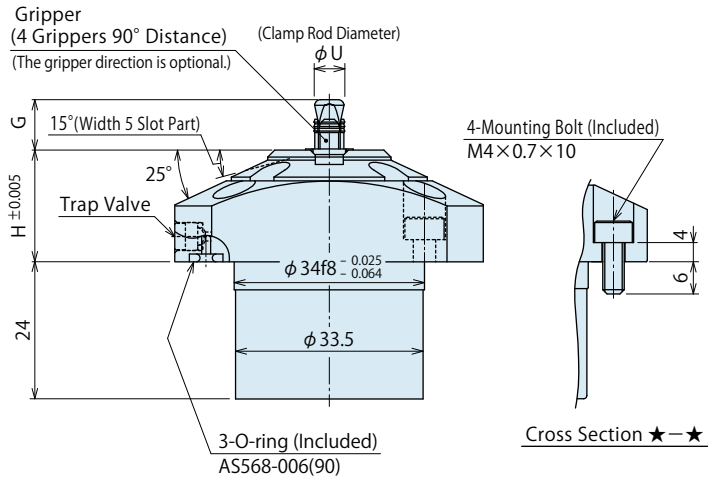
※The drawing shows the released state of SFG1000-M2A-□.



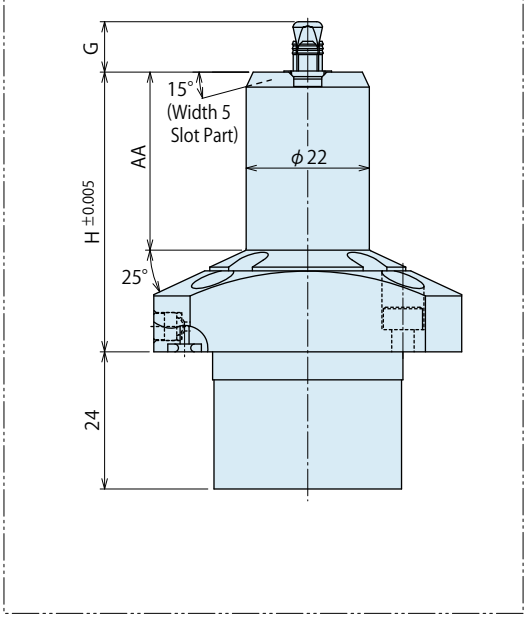
※ Expanding Area Detail

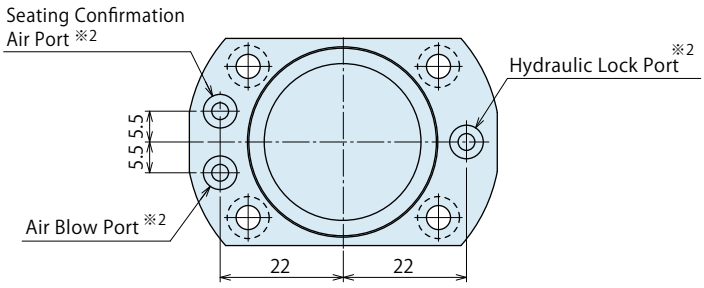


Seating Height：Standard



Specifying Seating Height ※4





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.

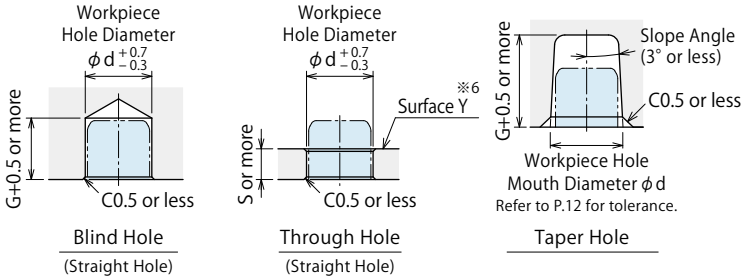
※2. The port names are marked on the product surface. (HYD：Hydraulic Lock Port, FC：Seating Confirmation Air Port, BLOW：Air Blow Port)
Continuously supply air pressure to the air blow port and the seating confirmation air port.

※3. The numerical value is only for the workpiece lifting option.

※4. 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

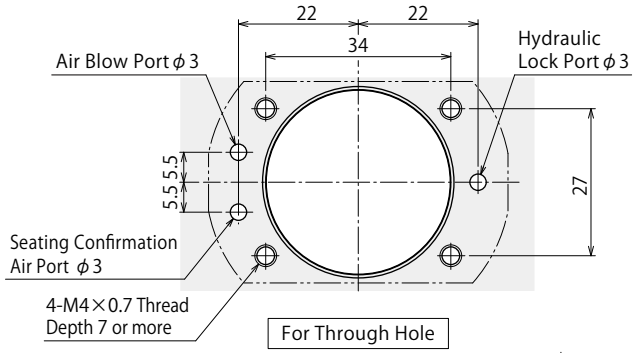


Notes：

1. Thin wall around the workpiece hole could be deformed by clamping action, and clamping force will not fill the specification. Please make sure to test the clamping function before use.

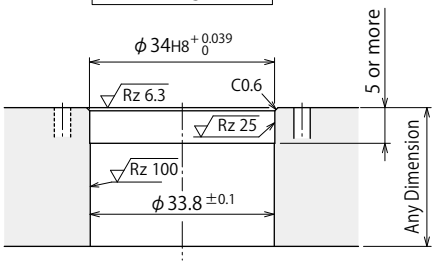
※6. When the clamp head is sticking above the surface Y of the workpiece, please make sure there is no interference with the clamp cylinders during machining.

Machining Dimensions of Mounting Hole

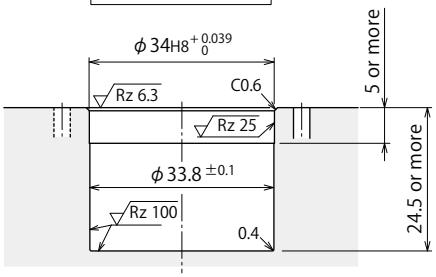


Notes :
1. There should be no burrs at the hole contact surface.
2. Please contact us when adding a spacer.

For Through Hole



For Blind Hole



Model No. Indication

SFG 10 0 0 - M2 A N - 080 - Blank H□ - Blank F T

1 Body Size (When selecting 10)
2 Design No.
3 Mounting Methods (When selecting M2)
4 Workpiece Lifting Option
5 Workpiece Hole Code
6 Seating Height Dimension
7 Shape of Gripper (Workpiece Hole)

External Dimensions and Machining Dimensions for Mounting (mm)

Model No.		SFG1000-M2□-□-□-□						
5 Workpiece Hole Code		060	065	070	075	080	085	090
Workpiece Hole Diam. φd	7 Blank, F ※9	$6^{+0.7}_{-0.3}$	$6.5^{+0.7}_{-0.3}$	$7^{+0.7}_{-0.3}$	$7.5^{+0.7}_{-0.3}$	$8^{+0.7}_{-0.3}$	$8.5^{+0.7}_{-0.3}$	$9^{+0.7}_{-0.3}$
Clamping Diameter	at Released	5.5	6	6.5	7	7.5	8	8.5
7 Blank, F	Empty Action	7.2	7.7	8.2	8.7	9.2	9.7	10.2
Clamping Diameter	at Released	–	5.4	5.9	6.4	6.85	7.35	7.85
7 T	Empty Action	–	7.1	7.6	8.1	8.55	9.05	9.55
Allowable Offset (Floating Clearance of Expanding Area) ※7		±0.5						
Full Stroke		4.2						
Workpiece Pulling Stroke		1.0						
Workpiece Lifting Stroke ※8		0.2						
7 Shape of Gripper Blank, F	G	9	9	9	10	10	10	10
	S	5.5	5.5	5.5	6	6	6	6
	U	5.55	6.05	6.55	7.05	7.55	8.05	8.55
7 Shape of Gripper T	G	–	9	9	9	10	10	10
	S	–	5.5	5.5	5.5	6	6	6
	U	–	5.45	5.95	6.45	6.9	7.4	7.9
Mx		5.6	5.6	5.6	6.4	6.4	7	7
V		8.5	9	9.5	10	10.5	11	11.5
W		12.5	13.5	13.5	14.5	14.5	15.5	15.5
X		19.5	19.5	19.5	19.5	19.5	20.5	20.5

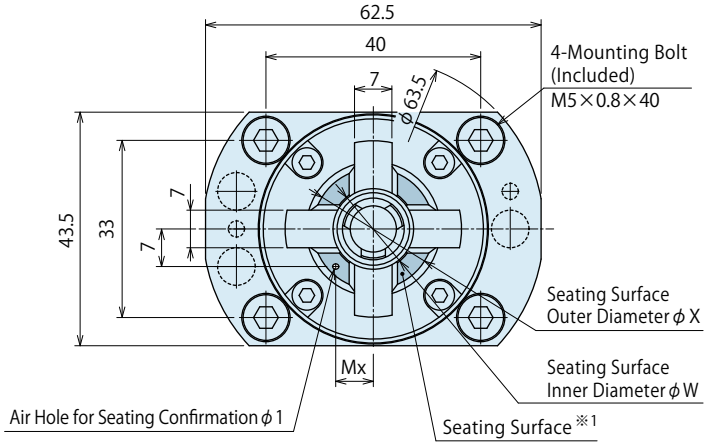
Notes : ※ 7. The clamping part is an adjusting structure and the clamping operation is done by locating the workpiece hole. The numerical value in the table shows the amount of tolerance value of single clamp. Please consider the center distance accuracy of each clamping installation part and each workpiece hole when used with other locating clamps or locating devices, or when using more than two of these products.
※ 8. Workpiece lifting stroke is the function only for lifting option.
※ 9. For **-T**:Taper Hole option, the allowable tolerance of the hole mouth diameter differs depending on the slope angle. (Refer to P.12.)

(mm)

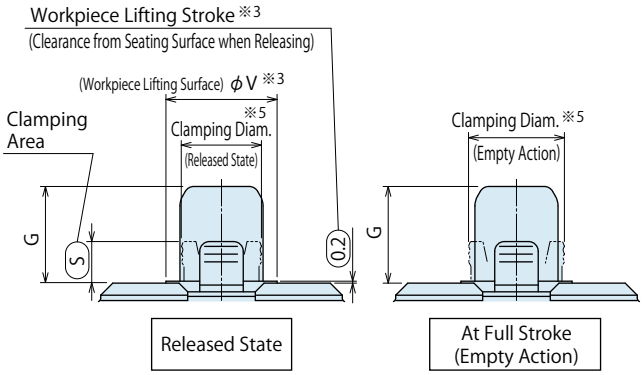
6 Seating Height Dimension		Standard Height	Specifying Seating Height					
3 Mounting Method		Blank	H25	H30	H35	H40	H45	H50
In case of M2 (Embedded)	H	20	25	30	35	40	45	50
	AA	–	6.8	11.8	16.8	21.8	26.8	31.8
	Weight kg	0.4	0.4	0.4	0.4	0.4	0.4	0.4

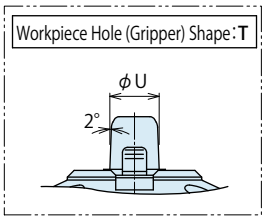
External Dimensions

※The drawing shows the released state of SFG2000-G0A-□.

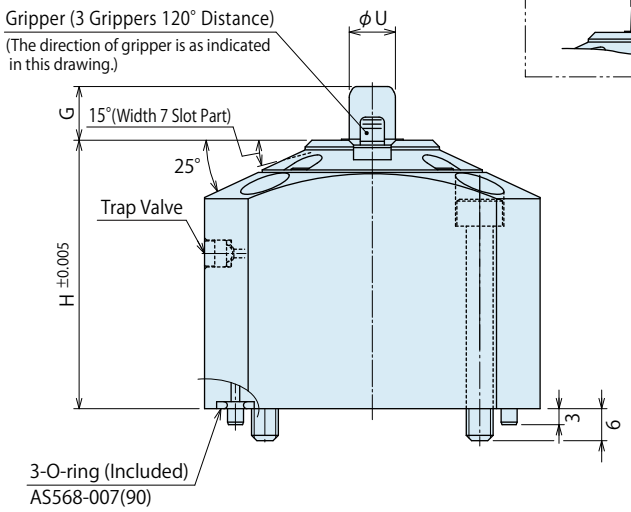


※ Expanding Area Detail

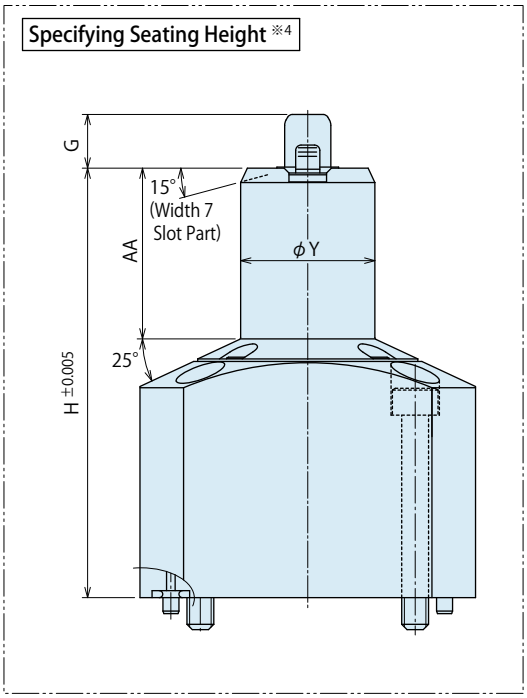


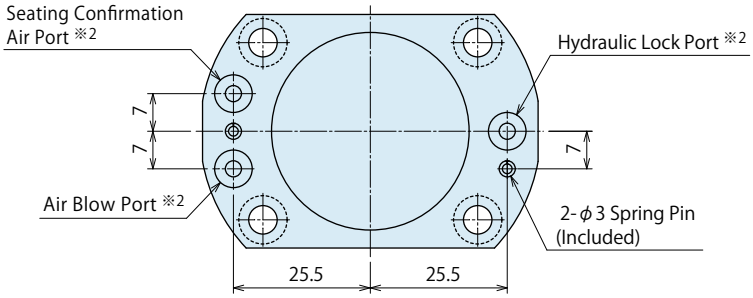


Seating Height:Standard



Specifying Seating Height ※4





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.

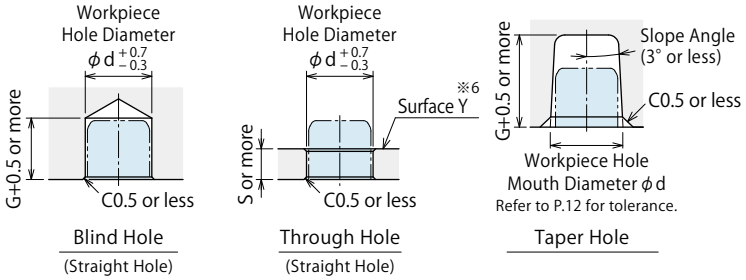
※2. The port names are marked on the product surface. (HYD:Hydraulic Lock Port, FC:Seating Confirmation Air Port, BLOW:Air Blow Port)
Continuously supply air pressure to the air blow port and the seating confirmation air port.

※3. The numerical value is only for the workpiece lifting option.

※4. 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

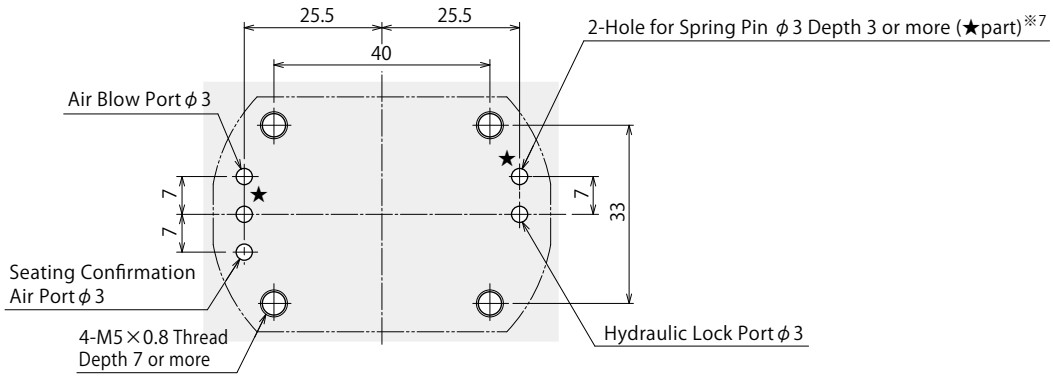


Notes:

1. Thin wall around the workpiece hole could be deformed by clamping action, and clamping force will not fill the specification.
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 Hole



Notes :
1. There should be no burrs at the hole contact surface.
2. The mounting surface should be machined with a surface roughness of Rz6.3 or better.

※7. The distance accuracy for machining the holes for spring pins (2 parts marked with ★) should be within ±0.1mm.

Model No. Indication

SFG 20 0 0 - G0 A N - 115 - Blank H□ - Blank F T

1 Body Size (When selecting 20)
2 Design No.
3 Mounting Methods (When selecting G0)
4 Workpiece Lifting Option
5 Workpiece Hole Code
6 Seating Height Dimension
7 Shape of Gripper (Workpiece Hole)

External Dimensions and Machining Dimensions for Mounting

(mm)

Model No.		SFG2000-G0□-□-□-□								
5 Workpiece Hole Code		090	095	100	105	110	115	120	125	130
Workpiece Hole Diam. ϕd	7 Blank, F ※10	$9^{+0.7}_{-0.3}$	$9.5^{+0.7}_{-0.3}$	$10^{+0.7}_{-0.3}$	$10.5^{+0.7}_{-0.3}$	$11^{+0.7}_{-0.3}$	$11.5^{+0.7}_{-0.3}$	$12^{+0.7}_{-0.3}$	$12.5^{+0.7}_{-0.3}$	$13^{+0.7}_{-0.3}$
Clamping Diameter	at Released	8.5	9	9.5	10	10.5	11	11.5	12	12.5
7 Blank, F	Empty Action	10.2	10.7	11.2	11.7	12.2	12.7	13.2	13.7	14.2
Clamping Diameter	at Released	8.2	8.5	9	9.5	9.95	10.45	10.95	11.45	11.95
7 T	Empty Action	9.9	10.2	10.7	11.2	11.65	12.15	12.65	13.15	13.65
Allowable Offset (Floating Clearance of Expanding Area) ※8		±0.5								
Full Stroke		4.2								
Workpiece Pulling Stroke		1.0								
Workpiece Lifting Stroke ※9		0.2								
7 Shape of Gripper Blank, F	G	10	10	10	11.5	11.5	11.5	11.5	11.5	11.5
	S	4.3	4.3	4.3	5.8	5.8	5.8	5.8	5.8	5.8
	U	8.6	9.1	9.6	10.1	10.6	11.1	11.6	12.1	12.6
7 Shape of Gripper T	G	10	10	10	10	11.5	11.5	11.5	11.5	11.5
	S	4.3	4.3	4.3	4.3	5.8	5.8	5.8	5.8	5.8
	U	8.6	9	9.5	10	10.4	10.9	11.4	11.9	12.4
Mx		7	7	7	7.1	7.1	7.8	7.8	9.0	9.0
V		11.5	12	12.5	13	13.5	14	14.5	15	15.5
W		15.5	16.5	16.5	17.5	17.5	18.5	18.5	19.5	19.5
X		22.5	22.5	22.5	23.5	23.5	23.5	23.5	25.5	25.5
Y		25	25	25	25	25	26	26	27	27

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 locating clamps or locating devices, or when using more than two of these products.

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

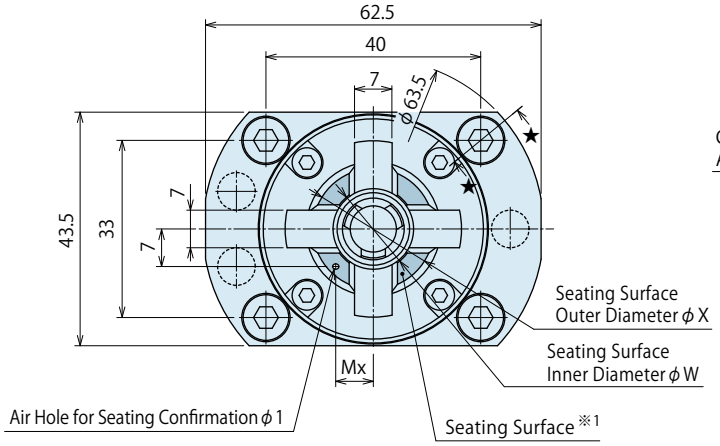
※ 10. For **-T**:Taper Hole option, the allowable tolerance of the hole mouth diameter differs depending on the slope angle. (Refer to P.12.)

(mm)

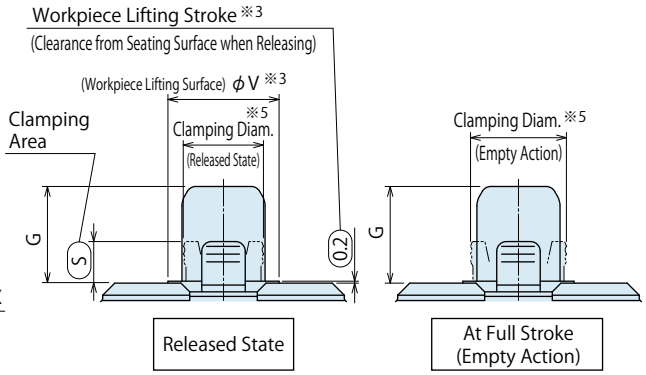
6 Seating Height Dimension			Standard Height	Specifying Seating Height					
3 Mounting Method			Blank	H55	H60	H65	H70	H75	H80
In case of G0 (Non-Embedded)	H		50	55	60	65	70	75	80
	AA	5 090 ~ 110	–	6.8	11.8	16.8	21.8	26.8	31.8
		5 115,120	–	7.0	12.0	17.0	22.0	27.0	32.0
		5 125,130	–	7.2	12.2	17.2	22.2	27.2	32.2
	Weight kg		0.8	0.8	0.8	0.8	0.8	0.9	0.9

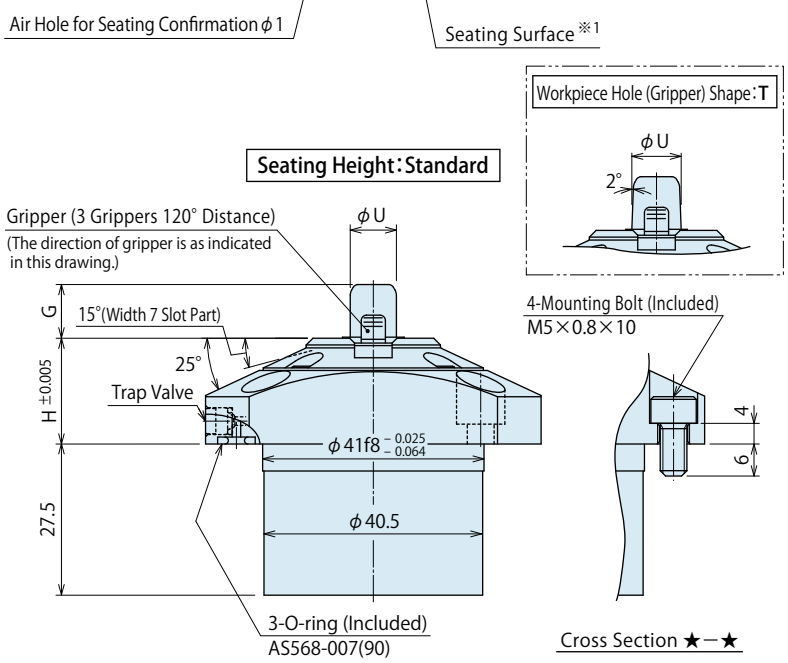
External Dimensions

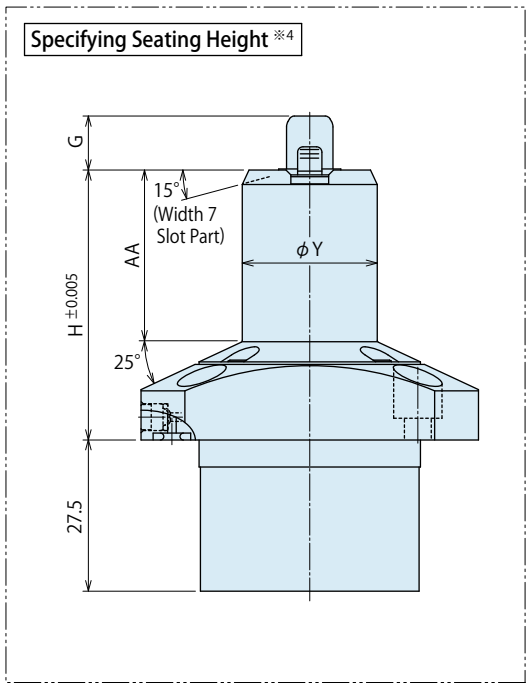
※The drawing shows the released state of SFG2000-M2A-□.

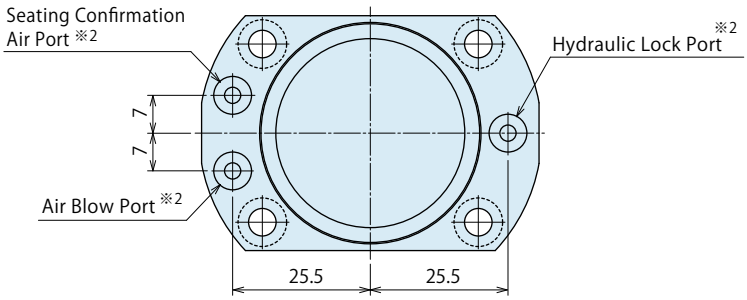


※ Expanding Area Detail









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.

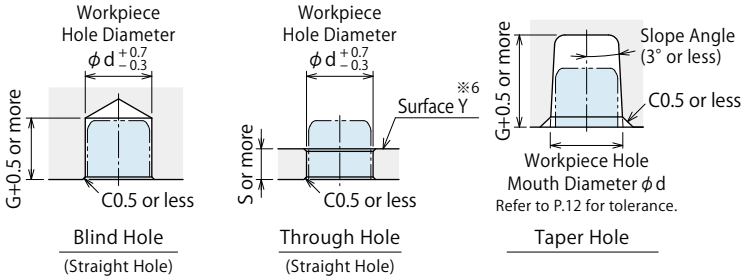
※2. The port names are marked on the product surface. (HYD:Hydraulic Lock Port, FC:Seating Confirmation Air Port, BLOW:Air Blow Port)
Continuously supply air pressure to the air blow port and the seating confirmation air port.

※3. The numerical value is only for the workpiece lifting option.

※4. 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

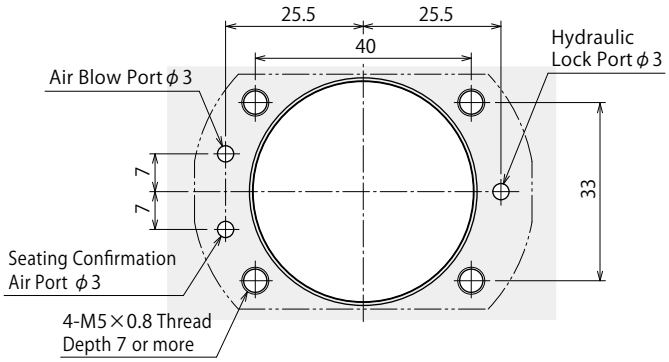


Notes:

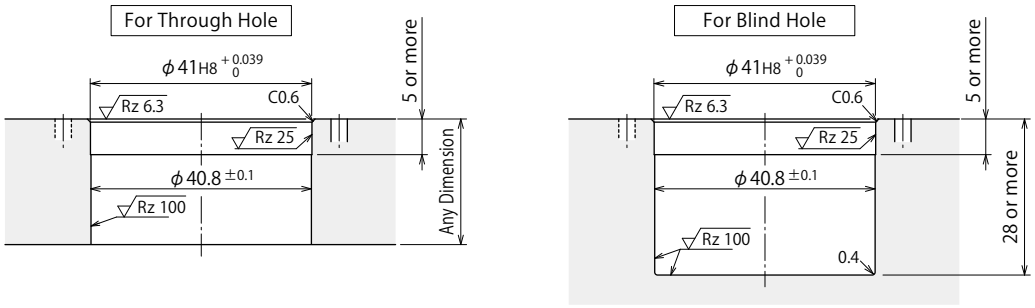
1. Thin wall around the workpiece hole could be deformed by clamping action, and clamping force will not fill the specification. Please make sure to test the clamping function before use.

※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 Hole



Notes :
1. There should be no burrs at the hole contact surface.
2. Please contact us when adding a spacer.



Model No. Indication

SFG 20 0 0 - M2 [A / N] - 115 - [Blank / H□] - [Blank / F / T]

1 Body Size (When selecting 20)
2 Design No.
3 Mounting Methods (When selecting M2)
4 Workpiece Lifting Option
5 Workpiece Hole Code
6 Seating Height Dimension
7 Shape of Gripper (Workpiece Hole)

External Dimensions and Machining Dimensions for Mounting

(mm)

Model No.		SFG2000-M2□-□-□-□								
5 Workpiece Hole Code		090	095	100	105	110	115	120	125	130
Workpiece Hole Diam. φd	7 Blank, F ※9	$9^{+0.7}_{-0.3}$	$9.5^{+0.7}_{-0.3}$	$10^{+0.7}_{-0.3}$	$10.5^{+0.7}_{-0.3}$	$11^{+0.7}_{-0.3}$	$11.5^{+0.7}_{-0.3}$	$12^{+0.7}_{-0.3}$	$12.5^{+0.7}_{-0.3}$	$13^{+0.7}_{-0.3}$
Clamping Diameter	at Released	8.5	9	9.5	10	10.5	11	11.5	12	12.5
7 Blank, F	Empty Action	10.2	10.7	11.2	11.7	12.2	12.7	13.2	13.7	14.2
Clamping Diameter	at Released	8.2	8.5	9	9.5	9.95	10.45	10.95	11.45	11.95
7 T	Empty Action	9.9	10.2	10.7	11.2	11.65	12.15	12.65	13.15	13.65
Allowable Offset (Floating Clearance of Expanding Area) ※7		±0.5								
Full Stroke		4.2								
Workpiece Pulling Stroke		1.0								
Workpiece Lifting Stroke ※8		0.2								
7 Shape of Gripper Blank, F	G	10	10	10	11.5	11.5	11.5	11.5	11.5	11.5
	S	4.3	4.3	4.3	5.8	5.8	5.8	5.8	5.8	5.8
	U	8.6	9.1	9.6	10.1	10.6	11.1	11.6	12.1	12.6
7 Shape of Gripper T	G	10	10	10	10	11.5	11.5	11.5	11.5	11.5
	S	4.3	4.3	4.3	4.3	5.8	5.8	5.8	5.8	5.8
	U	8.6	9	9.5	10	10.4	10.9	11.4	11.9	12.4
Mx		7	7	7	7.1	7.1	7.8	7.8	9.0	9.0
V		11.5	12	12.5	13	13.5	14	14.5	15	15.5
W		15.5	16.5	16.5	17.5	17.5	18.5	18.5	19.5	19.5
X		22.5	22.5	22.5	23.5	23.5	23.5	23.5	25.5	25.5
Y		25	25	25	25	25	26	26	27	27

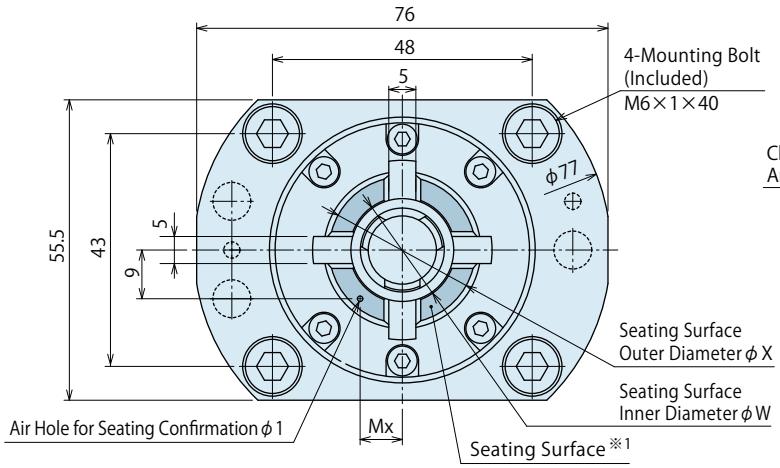
Notes : ※ 7. The clamping part is an adjusting structure and the clamping operation is done by locating the workpiece hole. The numerical value in the table shows the amount of tolerance value of single clamp. Please consider the center distance accuracy of each clamping installation part and each workpiece hole when used with other locating clamps or locating devices, or when using more than two of these products.
※ 8. Workpiece lifting stroke is the function only for lifting option.
※ 9. For **-T**: Taper Hole option, the allowable tolerance of the hole mouth diameter differs depending on the slope angle. (Refer to P.12.)

(mm)

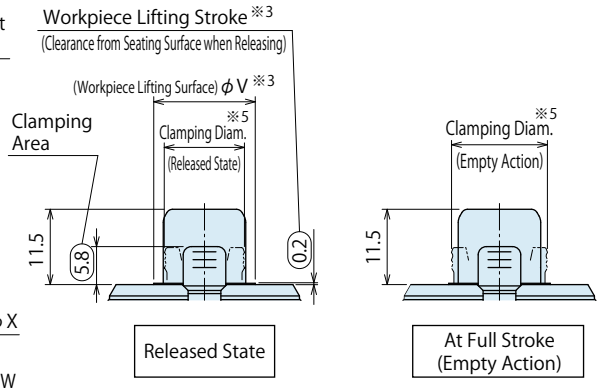
6 Seating Height Dimension			Standard Height	Specifying Seating Height					
3 Mounting Method			Blank	H25	H30	H35	H40	H45	H50
In case of M2 (Embedded)	H		20	25	30	35	40	45	50
	AA	5 090,095	–	6.8	11.8	16.8	21.8	26.8	31.8
		5 100,105	–	7.0	12.0	17.0	22.0	27.0	32.0
		5 110 ~ 130	–	7.2	12.2	17.2	22.2	27.2	32.2
	Weight kg		0.5	0.5	0.5	0.5	0.6	0.6	0.6

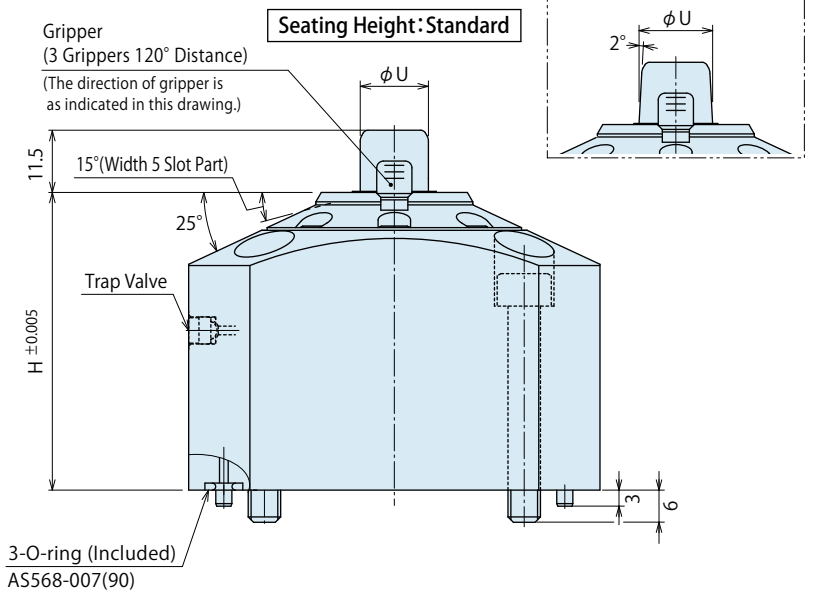
External Dimensions

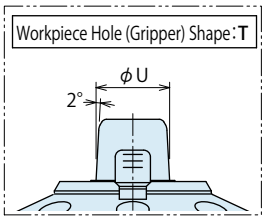
※The drawing shows the released state of SFG3000-G0A-□.

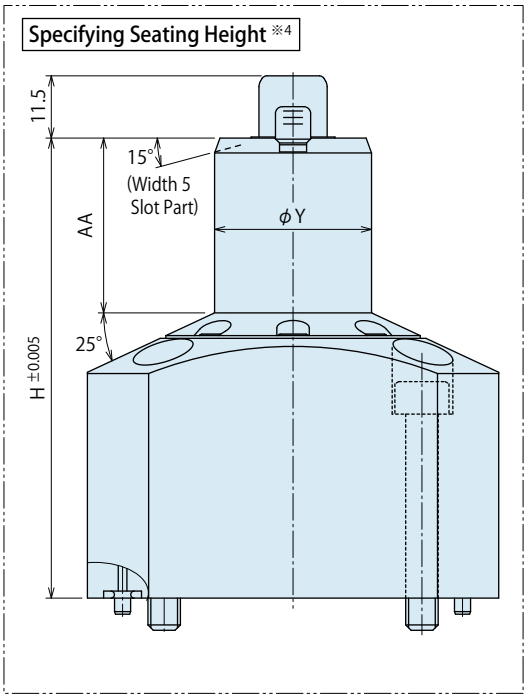


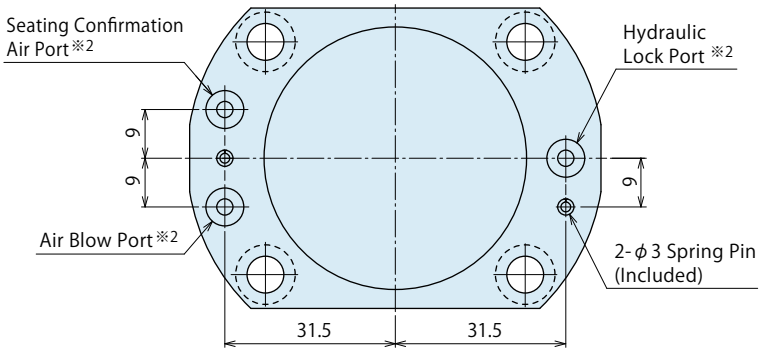
※ Expanding Area Detail











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.

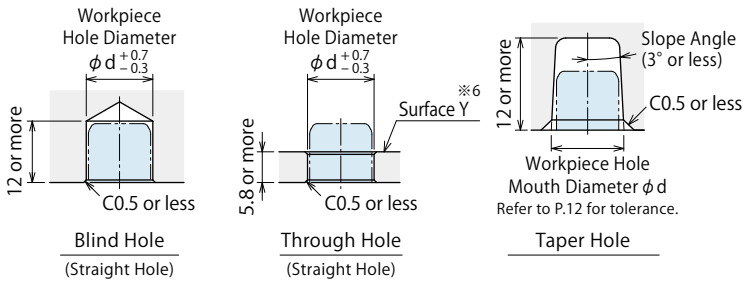
※2. The port names are marked on the product surface. (HYD:Hydraulic Lock Port, FC:Seating Confirmation Air Port, BLOW:Air Blow Port)
Continuously supply air pressure to the air blow port and the seating confirmation air port.

※3. The numerical value is only for the workpiece lifting option.

※4. 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

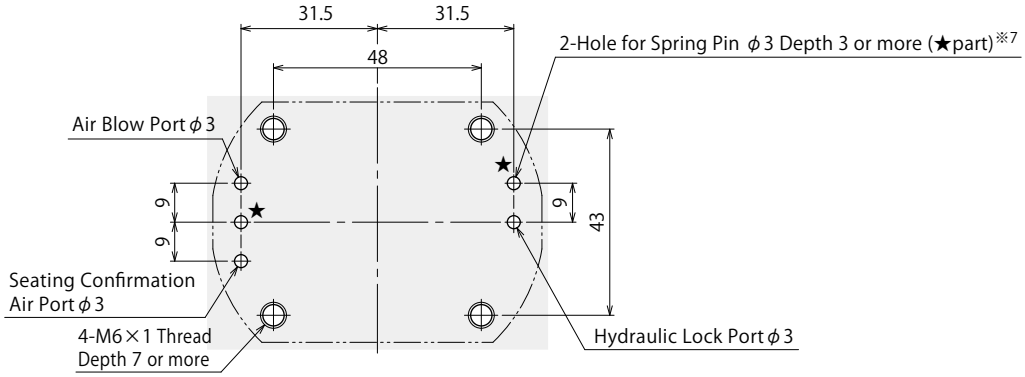


Notes:

1. Thin wall around the workpiece hole could be deformed by clamping action, and clamping force will not fill the specification.
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 Hole



Notes :

1. There should be no burrs at the hole contact surface.
2. The mounting surface should be machined with a surface roughness of Rz6.3 or better.

※7. The distance accuracy for machining the holes for spring pins (2 parts marked with ★) should be within ±0.1mm.

Model No. Indication

SFG 30 0 0 - G0 A N - 150 - Blank H□ - Blank F T

1 Body Size (When selecting 30)
2 Design No.
3 Mounting Methods (When selecting G0)
4 Workpiece Lifting Option
5 Workpiece Hole Code
6 Seating Height Dimension
7 Shape of Gripper (Workpiece Hole)

External Dimensions and Machining Dimensions for Mounting

(mm)

Model No.		SFG3000-G0□-□-□-□						
5 Workpiece Hole Code		130	135	140	145	150	155	160
Workpiece Hole Diam. ϕd	7 Blank, F※10	$13^{+0.7}_{-0.3}$	$13.5^{+0.7}_{-0.3}$	$14^{+0.7}_{-0.3}$	$14.5^{+0.7}_{-0.3}$	$15^{+0.7}_{-0.3}$	$15.5^{+0.7}_{-0.3}$	$16^{+0.7}_{-0.3}$
Clamping Diameter	at Released	12.5	13	13.5	14	14.5	15	15.5
7 Blank, F	Empty Action	14.2	14.7	15.2	15.7	16.2	16.7	17.2
Clamping Diameter	at Released	11.95	12.45	12.95	13.45	13.95	14.45	14.95
7 T	Empty Action	13.65	14.15	14.65	15.15	15.65	16.15	16.65
Allowable Offset (Floating Clearance of Expanding Area)※8		±0.5						
Full Stroke		4.2						
Workpiece Pulling Stroke		1.0						
Workpiece Lifting Stroke※9		0.2						
U	7 Blank, F	12.6	13.1	13.6	14.1	14.6	15.1	15.6
	7 T	12.4	12.9	13.4	13.9	14.4	14.9	15.4
Mx		7.8	7.8	7.8	7.8	7.8	8.8	8.8
V		15.5	16	16.5	17	17.5	18	18.5
W		19.5	20.5	20.5	21.5	21.5	22.5	22.5
X		27	27	27	27	27	28	28
Y		29	29	29	29	29	30	30

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 locating clamps or locating devices, or when using more than two of these products.

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

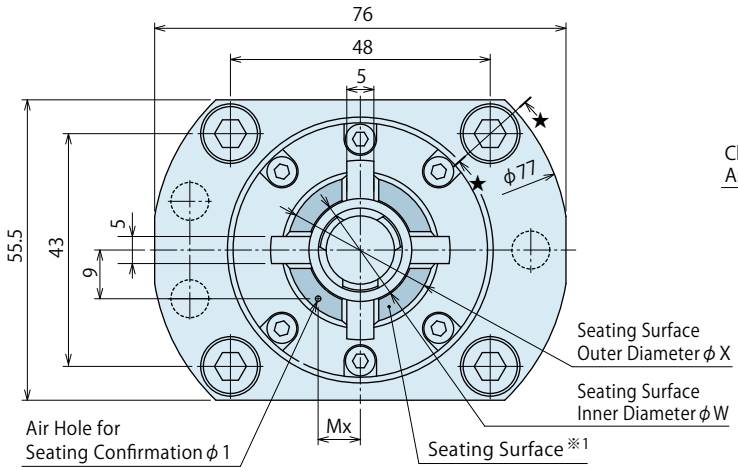
※ 10. For **-T**: Taper Hole option, the allowable tolerance of the hole mouth diameter differs depending on the slope angle. (Refer to P.12.)

(mm)

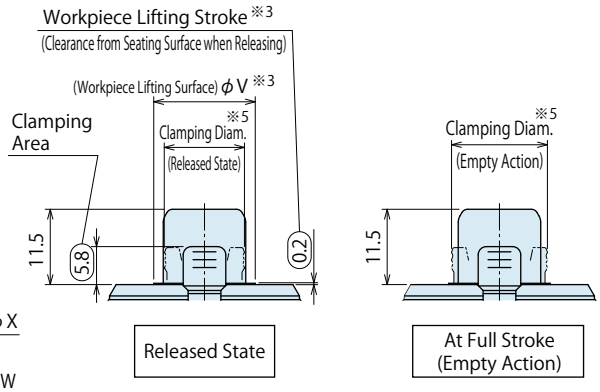
6 Seating Height Dimension		Standard Height	Specifying Seating Height					
3 Mounting Method		Blank	H60	H65	H70	H75	H80	H85
In case of G0 (Non-Embedded)	H	55	60	65	70	75	80	85
	AA	–	7.3	12.3	17.3	22.3	27.3	32.3
	Weight kg	1.3	1.3	1.3	1.3	1.4	1.4	1.4

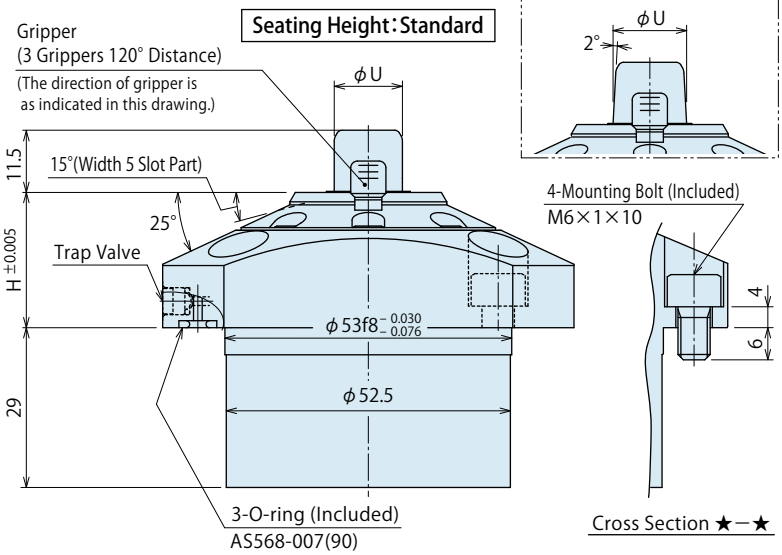
External Dimensions

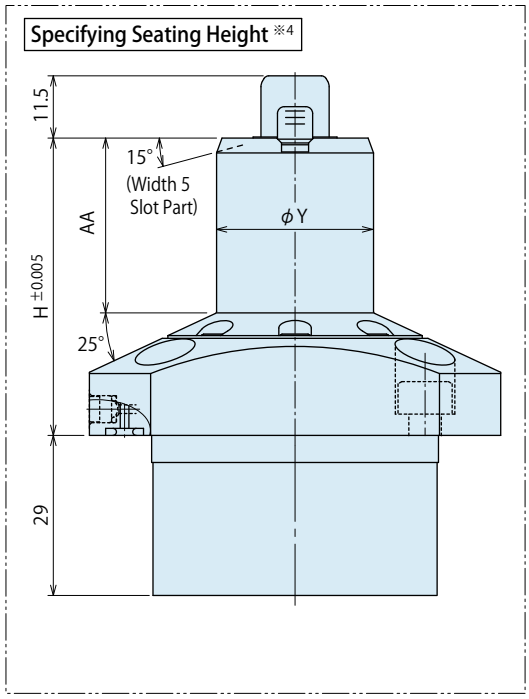
※The drawing shows the released state of SFG3000-M2A-□.

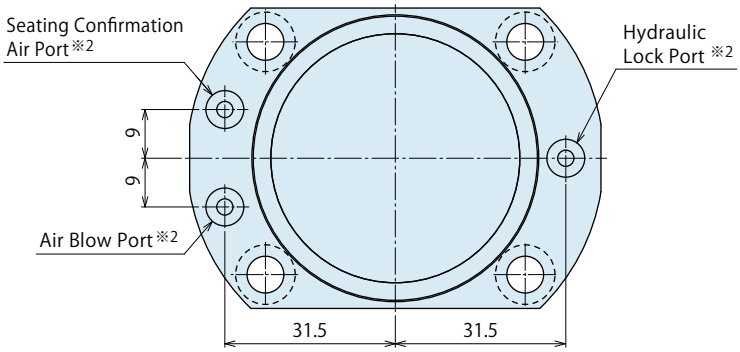


※ Expanding Area Detail









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.

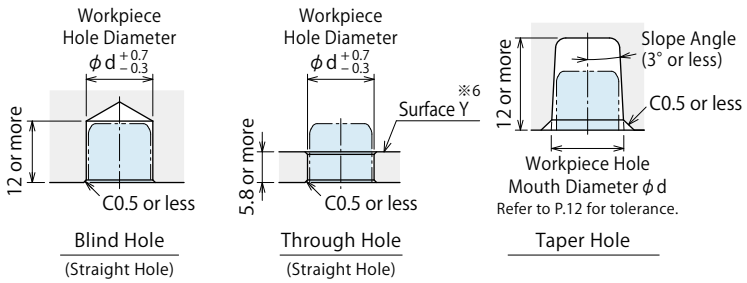
※2. The port names are marked on the product surface. (HYD:Hydraulic Lock Port, FC:Seating Confirmation Air Port, BLOW:Air Blow Port)
Continuously supply air pressure to the air blow port and the seating confirmation air port.

※3. The numerical value is only for the workpiece lifting option.

※4. 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

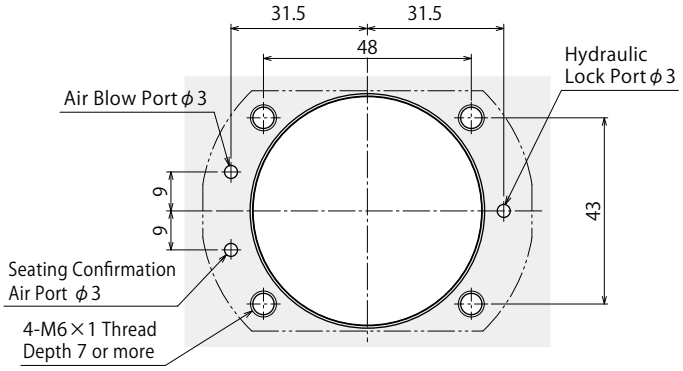


Notes:

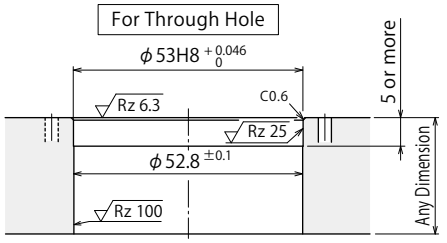
1. Thin wall around the workpiece hole could be deformed by clamping action, and clamping force will not fill the specification.
Please make sure to test the clamping function before using and adjust to the appropriate supply of pressure.

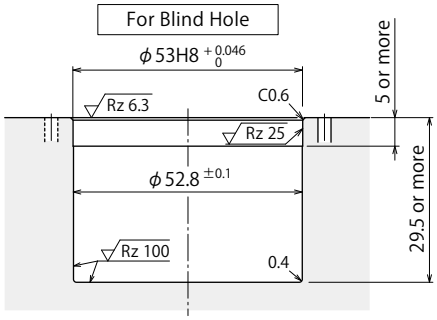
※6. When the clamp head is sticking above the surface Y of the workpiece, please make sure there is no interference with the clamp cylinders during machining.

Machining Dimensions of Mounting Hole



Notes :
1. There should be no burrs at the hole contact surface.
2. Please contact us when adding a spacer.





Model No. Indication

SFG 30 0 0 - M2 [A N] - 150 - [Blank H□] - [Blank F T]

1 Body Size (When selecting 30)
2 Design No.
3 Mounting Methods (When selecting M2)
4 Workpiece Lifting Option
5 Workpiece Hole Code
6 Seating Height Dimension
7 Shape of Gripper (Workpiece Hole)

External Dimensions and Machining Dimensions for Mounting

(mm)

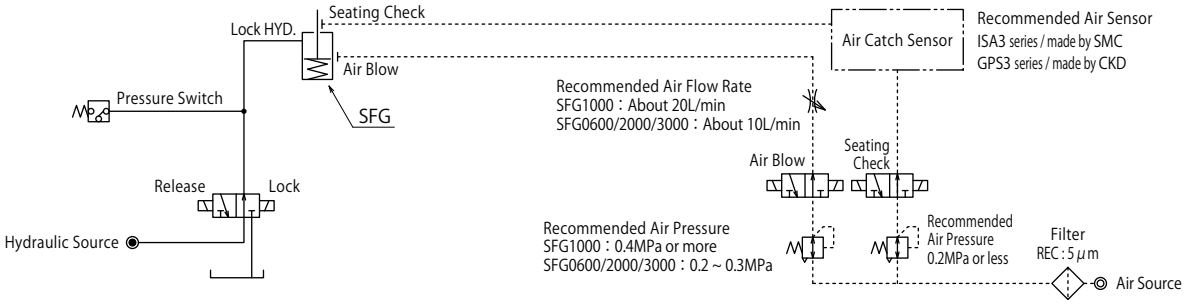
Model No.		SFG3000-M2□-□-□-□						
5 Workpiece Hole Code		130	135	140	145	150	155	160
Workpiece Hole Diam. φd	7 Blank, F ※9	$13^{+0.7}_{-0.3}$	$13.5^{+0.7}_{-0.3}$	$14^{+0.7}_{-0.3}$	$14.5^{+0.7}_{-0.3}$	$15^{+0.7}_{-0.3}$	$15.5^{+0.7}_{-0.3}$	$16^{+0.7}_{-0.3}$
Clamping Diameter	at Released	12.5	13	13.5	14	14.5	15	15.5
7 Blank, F	Empty Action	14.2	14.7	15.2	15.7	16.2	16.7	17.2
Clamping Diameter	at Released	11.95	12.45	12.95	13.45	13.95	14.45	14.95
7 T	Empty Action	13.65	14.15	14.65	15.15	15.65	16.15	16.65
Allowable Offset (Floating Clearance of Expanding Area) ※7		±0.5						
Full Stroke		4.2						
Workpiece Pulling Stroke		1.0						
Workpiece Lifting Stroke ※8		0.2						
U	7 Blank, F	12.6	13.1	13.6	14.1	14.6	15.1	15.6
	7 T	12.4	12.9	13.4	13.9	14.4	14.9	15.4
Mx		7.8	7.8	7.8	7.8	7.8	8.8	8.8
V		15.5	16	16.5	17	17.5	18	18.5
W		19.5	20.5	20.5	21.5	21.5	22.5	22.5
X		27	27	27	27	27	28	28
Y		29	29	29	29	29	30	30

Notes : ※ 7. 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 locating clamps or locating devices, or when using more than two of these products.
※ 8. Workpiece lifting stroke is the function only for lifting option.
※ 9. For **-T**: Taper Hole option, the allowable tolerance of the hole mouth diameter differs depending on the slope angle. (Refer to P.12.)

(mm)

6 Seating Height Dimension		Standard Height	Specifying Seating Height					
3 Mounting Method		Blank	H30	H35	H40	H45	H50	H55
In case of M2 (Embedded)	H	25	30	35	40	45	50	55
	AA	–	7.3	12.3	17.3	22.3	27.3	32.3
	Weight kg	0.9	0.9	1.0	1.0	1.0	1.0	1.0

Operation Control Cycle

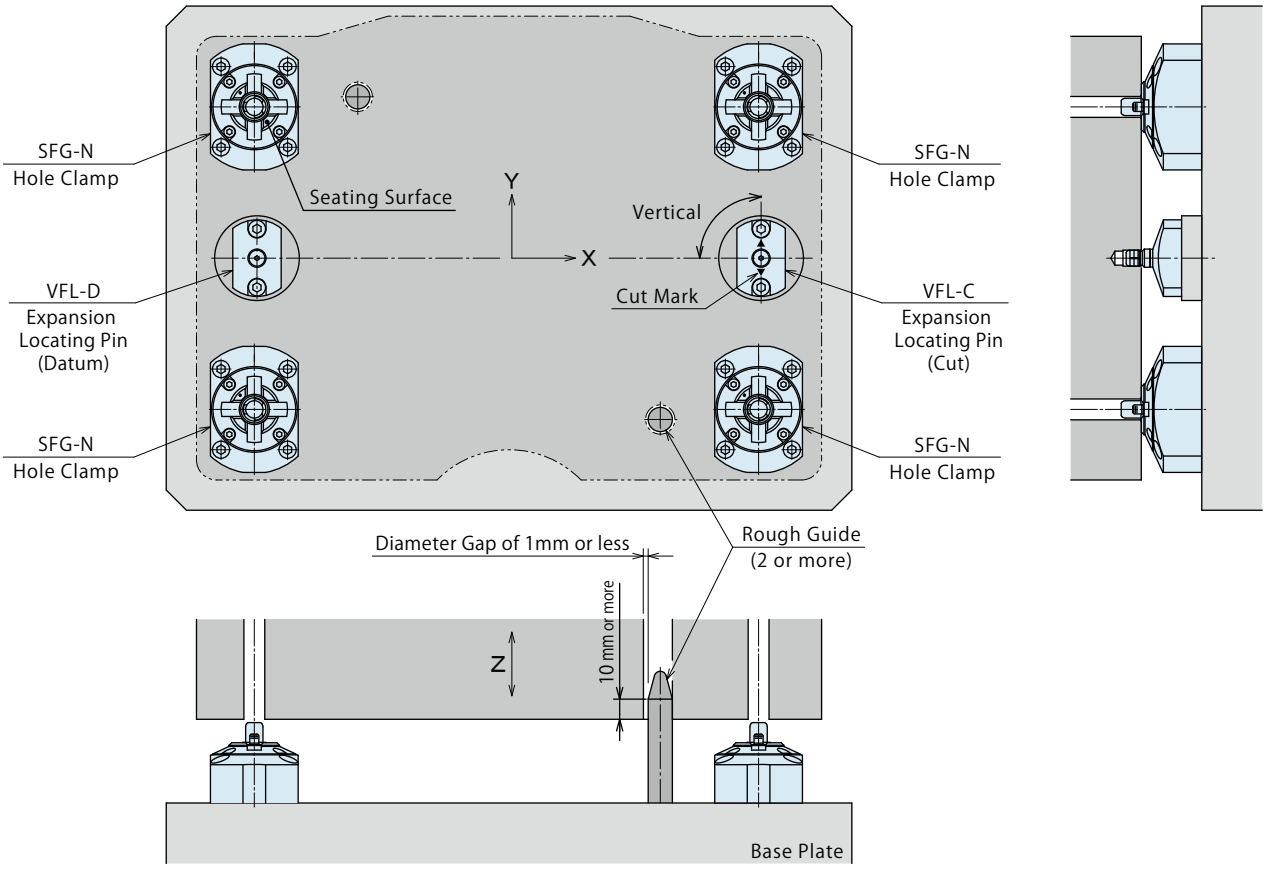


State			Workpiece Loading	Locking	Locking Completed	(Machining)	Releasing	Releasing Completed	Workpiece Unloading
Solenoid Valve	Lock Hyd. Pressure	ON (Lock)							
		OFF (Release)							
	Air Blow	Always ON							
	Seating Check Air	Always ON							
Hyd. Pressure SW Air Sensor Signal	Pressure SW for Lock Hyd. Pressure			OFF	ON			OFF	
	Air Sensor for Seating Check	with Lifting Function		OFF	ON or OFF ※1			OFF	
		w/o Lifting Function	OFF	ON				ON	OFF

Note: ※1. ON when a workpiece is locked properly. OFF when clamping without a workpiece or when clamping error is detected.

Layout Sample

※ This drawing shows a combination layout sample of SFG (Hole Clamp) and VFL (Expansion Locating Pin).



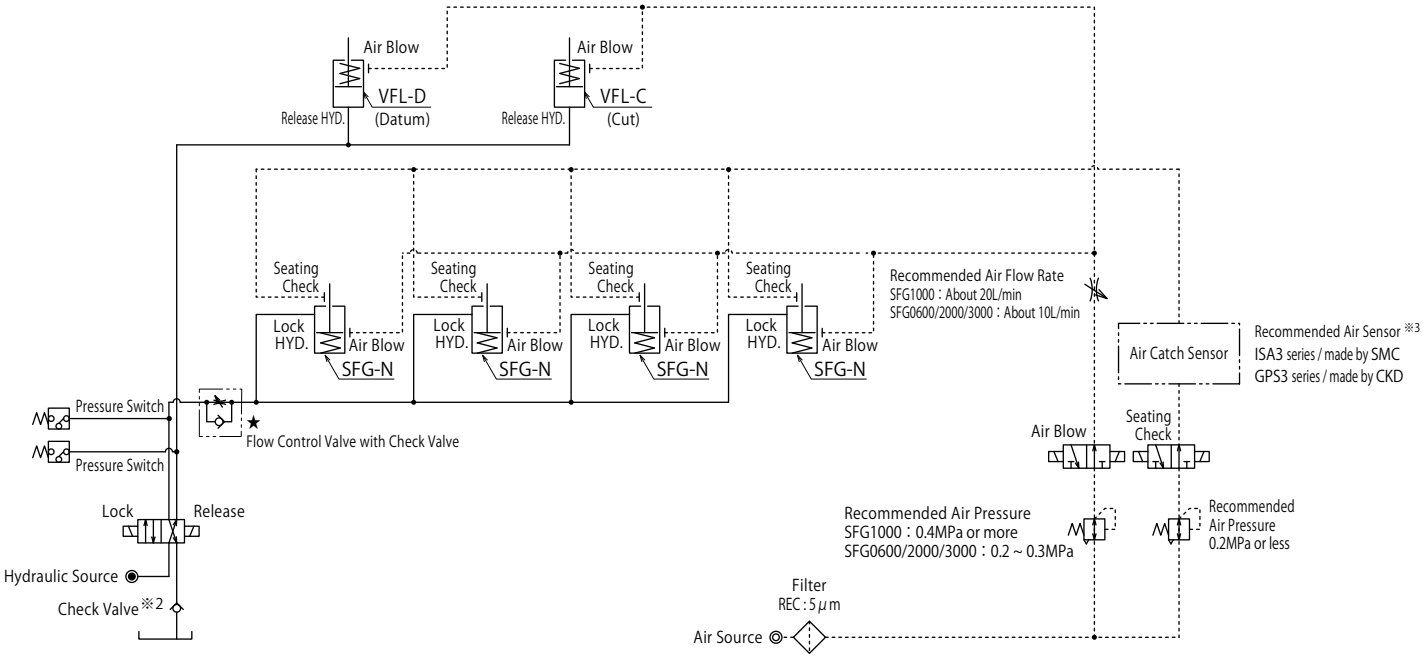
Notes :

1. In order to prevent the clamping part from damage, please set up rough guide of 2 or more when loading / unloading a workpiece. Please refer to the above drawing for the length of rough guide and the diameter gap. (Use of rough guides depends on the loading / unloading condition of the workpiece.)
2. When using a combination of VFL (Expansion Locating Pin) and SFG (Hole Clamp), please choose N：without lifting function.

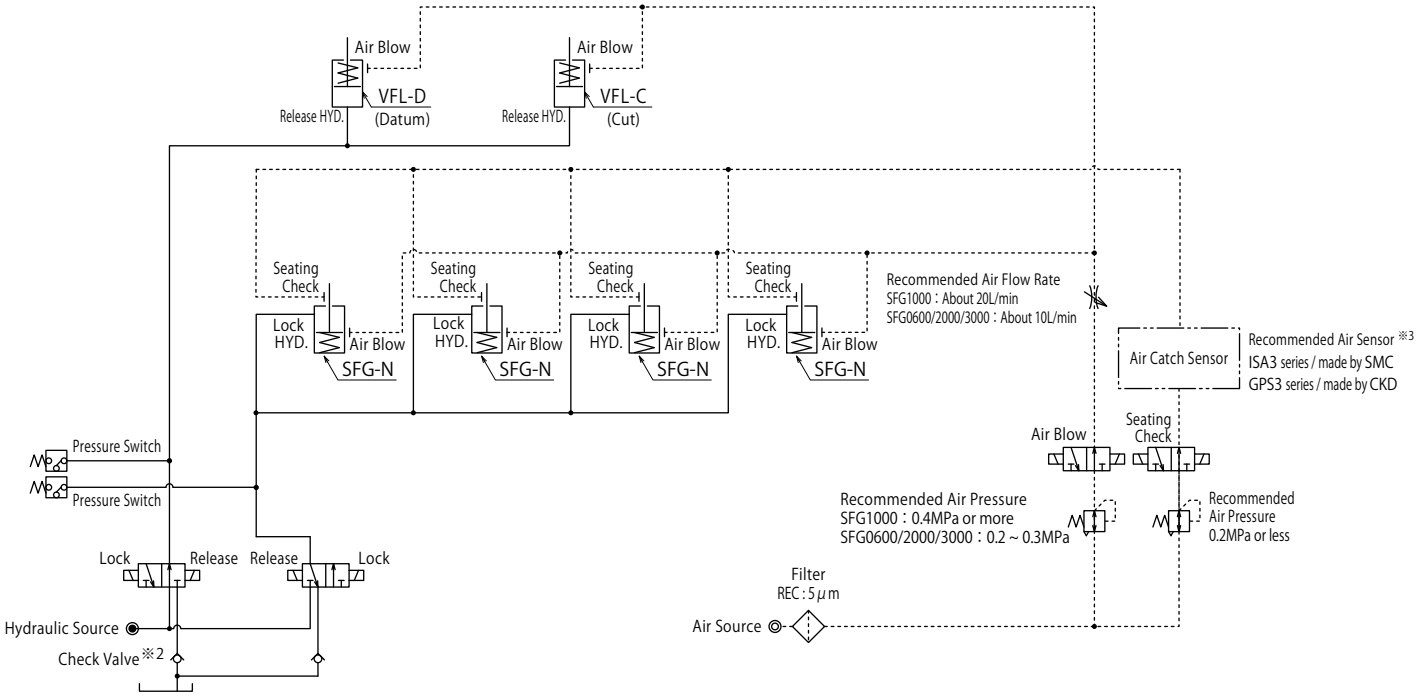
Hydraulic and Pneumatic Circuit Reference

※This drawing shows a combination circuit reference of SFG (Hole Clamp) and VFL (Expansion Locating Pin).

When controlled with one solenoid valve



When controlled with two solenoid valves



Notes:

1. Please use solenoid valve to make a sequence operation that SFG (Hole Clamp) starts working after VFL (Expansion Locating Pin) completes the movement. When unable to use solenoid valve, please prepare flow control valve with check valve at ★(1 piece) to adjust sequencing speed. If SFG operates before VFL, there is a possibility for the equipment to be damaged due to a thrust load on SFG.

※2. When there is back pressure in the tank port, please prepare check valve (recommend cracking pressure: less than 0.04MPa).

※3. In case high accuracy is required for air sensor setting, please install an air sensor for individual clamp.

Cautions

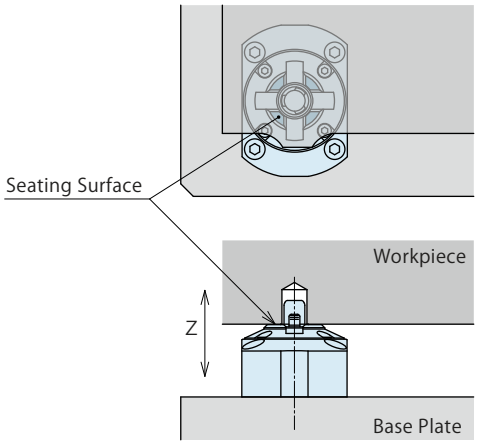
Notes for Design

1) Check Specifications

- Please use each product according to the specifications.
- This product is hydraulic single-acting model which locks with hydraulic pressure and releases with spring.

2) Working Reference Plate (Seating Surface) Z axis.

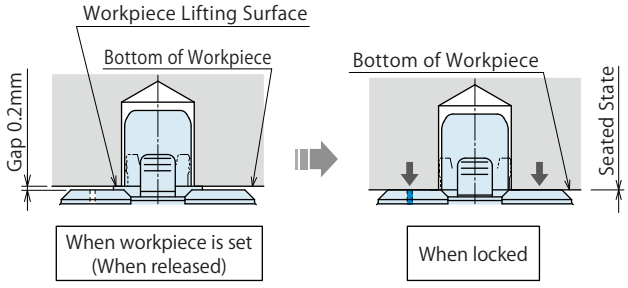
- The upper surface of the flange of this product is the seating surface of workpiece and locates in Z direction.



When clamping, make sure all seating surfaces touch a workpiece. When the workpiece is not touching the seating surface area, please refer to external dimension chart and calculate contacting pressure with clamping force and seating area not to deform the workpiece.

3) Seating Confirmation Mechanism

- It will be detected when a workpiece is pressed against the seating surface by locking (clamping) action.



With lifting function, when workpiece is set (before supplying lock hydraulic pressure), the workpiece is lifted up by built-in spring, and there will be a gap of 0.2mm between workpiece bottom surface and seating surface.

4) Clamp Installation

- The clamping part of this product has floating structure (±0.5mm). Please consider the center distance accuracy of each clamping installation part and each workpiece hole when used with other locating clamps or locating devices, or when using more than two of these products.

5) Clamping Force

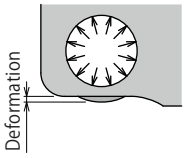
- Clamping force shows a pressing force against the seating surface.
  Make sure to conduct test clamping and adjust supply pressure accordingly. Insufficient clamping force leads to workpiece detachment.

6) Workpiece hole size, slope angle and workpiece hardness should be within the range of the specification.

When workpiece hole diameter is larger than specification.	Expansion stroke is insufficient and the clamping force will not fill the specifications.
When using it with insufficient clamping force.	Leads to falling of the workpiece.
When workpiece hole diameter is smaller than specification.	Difficult to attach/detach the workpiece leading to damage.
When workpiece hole depth is shallow.	May lead to abnormal seating and damage.
When workpiece hole taper slope angle is larger than specification.	The load concentrates on the gripper point when clamping and could lead to damage.
When workpiece hole is harder than specified.	Gripper does not dig into the workpiece enough and it cannot clamp securely.

7) Wall Thickness around Workpiece Hole

- Thin wall around the workpiece hole could be deformed by clamping action, and clamping force does not fill the specification. Make sure to conduct test clamping and adjust supply pressure accordingly. Insufficient clamping force leads to workpiece detachment.

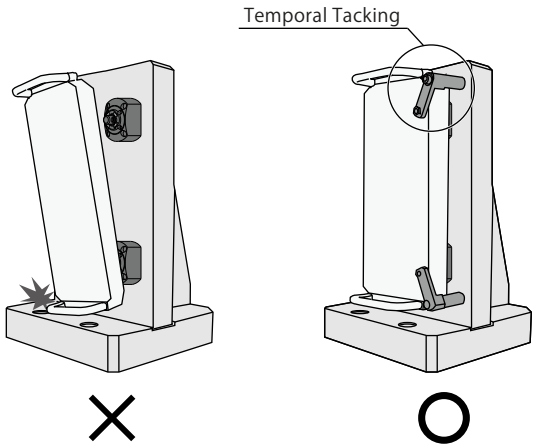


8) Air Blow Port and Seating Confirmation Port

- Continuously supply air pressure to the air blow port and the seating confirmation port. If air supply is shut off during operation, contaminants enter into the clamp leading to malfunctions.

9) Release Action

- When releasing, it lifts up a workpiece which is normal. When using in a horizontal application, it is recommended to install a fall prevention of workpiece for temporal tacking.



10) Horizontal Locating

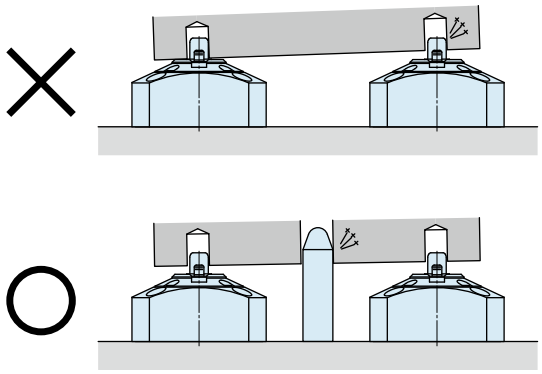
- When a workpiece is set, please make sure there is no lifting or slope of the workpiece. If the clamping operation is done with lifting or slope of the workpiece, it will lead to possible damage of a clamp and deformation of the workpiece hole.

11) Please detach a workpiece with all clamps fully released.

- When a workpiece is detached during lock or release operation, it will lead to damage of clamp or fall of workpiece.

12) Please set up rough guides.

- When detaching a workpiece with slope it may cause damage of clamp or fall of workpiece.



When using the product with other locating clamps or locating devices, please set rough guides considering the center distance accuracy of each mounting hole and workpiece hole of locating clamps or locating devices.

Cautions

Installation Notes

1) Check the Usable Fluid

- Please use the appropriate fluid by referring to the Hydraulic Fluid List.

2) Installation of Hole Clamp

- Use four hexagonal socket bolts for mounting (with tensile strength of 12.9) and tighten them with the torque shown in the table below. Tighten them evenly to prevent twisting or jamming.

Model No.	Mounting Bolt Size	Tightening Torque (N·m)
SFG0600	M4×0.7	3.2
SFG1000	M4×0.7	3.2
SFG2000	M5×0.8	6.3
SFG3000	M6×1	10.0

3) Port Position of the Hole Clamp

- The port names are marked on the product surface. Be careful of installation direction. (HYD：Hydraulic Lock Port, FC：Seating Confirmation Air Port, BLOW：Air Blow Port)

4) Preparation for Piping

- The pipeline, piping connector and fixture circuits should be cleaned by thorough flushing.
- Dust and cutting chips in circuits may lead to oil leakage and malfunction.
- This product is not provided with a filter which prevents contaminants from getting into the circuit.

5) Applying Sealing Tape

- Wrap with tape 1 to 2 times following the screw direction.
- Pieces of the sealing tape can lead to oil leakage and malfunction.
- Please implement piping construction in a clear environment to prevent anything getting in products.

6) Air Bleeding of the Hydraulic Circuit

- If the hydraulic circuit has excessive air, the action time may become very long. If air enters the circuit after connecting the hydraulic port or under the condition of no air in the oil tank, please perform air bleeding.

7) Use air piping with outer diameter ϕ6 (inner diameter ϕ4) or larger for air blow.

- In order to conduct an effective air blow, it is recommended to use air piping with outer diameter ϕ6 (inner diameter ϕ4) or larger.

Notes on Handling

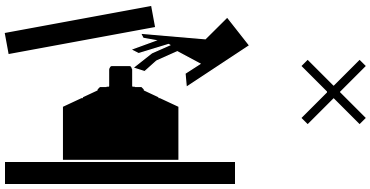
1) It should be operated by qualified personnel.

- Machines and devices with hydraulic and pneumatic products should be operated and maintained by qualified personnel.

2) Do not operate or remove the product unless the safety protocols are ensured.

① Machines and devices can only be inspected or prepared when it is confirmed that the safety devices are in place.
② Before the product is removed, make sure that the above-mentioned safety devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
③ After stopping the product, do not remove until the temperature cools down.
④ Make sure there is no trouble/issue in the bolts and respective parts before restarting the machine or equipment.

3) Do not touch the clamp while it is working. Otherwise, your hands may be injured.



4) Do not disassemble or modify.

- Contains a powerful spring which is dangerous. If the product is taken apart or modified, the warranty will be voided even within the warranty period.

Hydraulic Fluid List

ISO Viscosity Grade ISO-VG-32

Maker	Anti-Wear Hydraulic Oil	Multi-Purpose Hydraulic Oil
Showa Shell Sekiyu	Tellus S2 M 32	Morlina S2 B 32
Idemitsu Kosan	Daphne Hydraulic Fluid 32	Daphne Super Multi Oil 32
JX Nippon Oil & Energy	Super Hyrando 32	Super Mulpus DX 32
Cosmo Oil	Cosmo Hydro AW32	Cosmo New Mighty Super 32
ExxonMobil	Mobil DTE 24	Mobil DTE 24 Light
Matsumura Oil	Hydol AW-32	
Castrol	Hyspin AWS 32	

Note : Please contact manufacturers when customers require products in the list above.

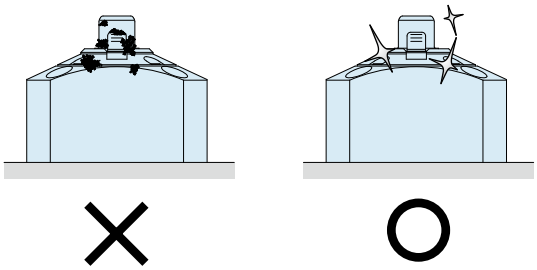
Maintenance and Inspection

1) Removal of the Product and Shut-off of Pressure Source

- Before removing the product, make sure that safety devices and preventive devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
- Make sure there is no trouble/issue in the bolts and respective parts before restarting.

2) Regularly clean the clamping part and the seating surface.

- There is an air blow mechanism in this product, and cutting chips and coolant can be removed. However, as it may be hard to remove clinging cutting chips, sludge, etc., please confirm there are no contaminants when a workpiece is set. If operating with dirt adhering to the clamping part, it will lead to a workpiece fall due to insufficient clamping force, defective operation, and oil leakage etc.



Even with general cleaning on exterior of hole clamp, there may be contaminants within internal parts of the component. If necessary, please call us for repair. If repair or modifications are carried out by anyone other than Kosmek, or without our approval or confirmation, it will void warranty.

3) Clamping force will be decreased by friction of a gripper surface due to repeated operation. Replacement period differs depending on operating pressure, workpiece material and shape of hole. When you find friction on gripper surface, the gripper needs to be replaced. Please contact us for overhaul.

Material of Clamping Hole	Gripper Replacement Frequency Guide
A2017 Aluminum	Locking operation 1 million cycles
SCM435 Thermal Refined Steel	Locking operation 500,000 cycles

※ It varies depending on the operating conditions. Please request an overhaul after confirming its suitability for the actual machine.

4) If disconnecting by couplers, air bleeding should be carried out on a regular basis to avoid air mixed in the circuit.

5) Regularly tighten the pipeline and mounting bolts to ensure proper use.

6) Make sure the hydraulic fluid has not deteriorated.

7) Make sure there is a smooth action without an irregular noise.

- Especially when it is restarted after left unused for a long period, make sure it can be operated correctly.

8) The products should be stored in the cool and dark place without direct sunshine or moisture.

9) Please contact us for overhaul and repair.

- Contains a powerful spring which is dangerous.

Warranty

1) Warranty Period

- The product warranty period is 18 months from shipment from our factory or 12 months from initial use, whichever is earlier.

2) Warranty Scope

- If the product is damaged or malfunctions during the warranty period due to faulty design, materials or workmanship, we will replace or repair the defective part at our expense.
  Defects or failures caused by the following are not covered.

① If the stipulated maintenance and inspection are not carried out.
② Failure caused by the use of the non-confirming state at the user's discretion.
③ If it is used or operated in an inappropriate way by the operator. (Including damage caused by the misconduct of the third party.)
④ If the defect is caused by reasons other than our responsibility.
⑤ If repair or modifications are carried out by anyone other than Kosmek, or without our approval and confirmation, it will void warranty.
⑥ Other caused by natural disasters or calamities not attributable to our company.
⑦ Parts or replacement expenses due to parts consumption and deterioration.
(Such as rubber, plastic, seal material and some electric components.)

Damages excluding from direct result of a product defect shall be excluded from the warranty.

KOSMEK
Harmony in Innovation

KOSMEK LTD.

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- For Further Information on Unlisted Specifications and Sizes, Please call us.
- Specifications in this Leaflet are Subject to Change without Notice.

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