

Hydraulic Hole Clamp

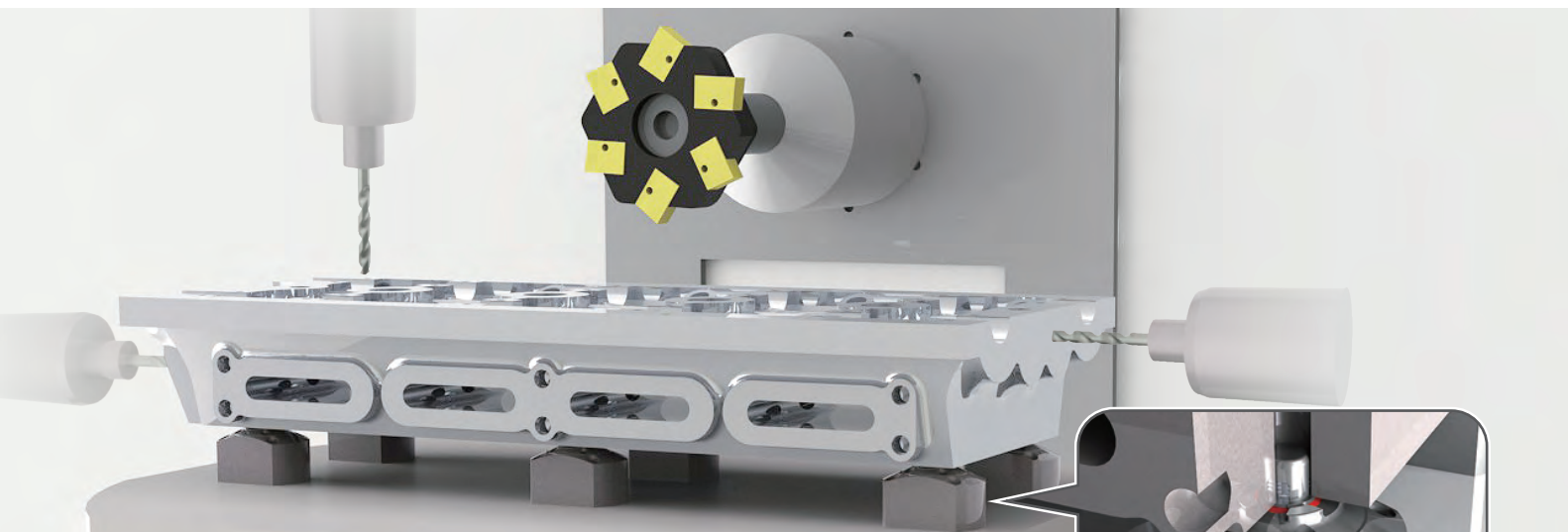
Model SFA

Model SFC

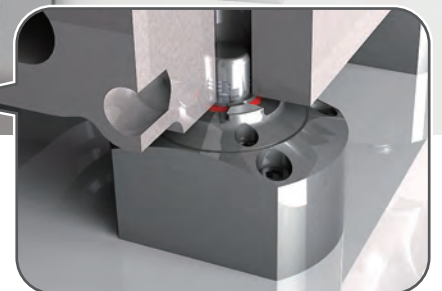


Gripper expands and pulls workpiece down.

PAT.



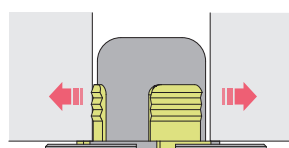
Gripper expands and pulls workpiece down.



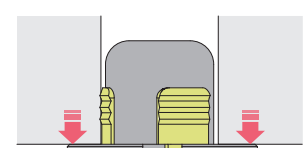
Application Example



< Released State >
Load/Unload Workpiece



< Clamping State >
Gripper expands to hold workpiece hole.

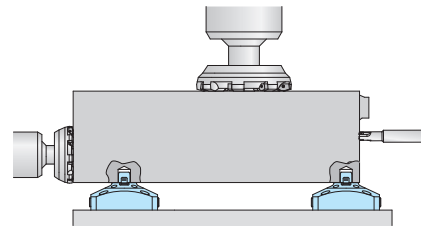


< Clamping Completed >
Pulls down onto resting surface.

Advantages

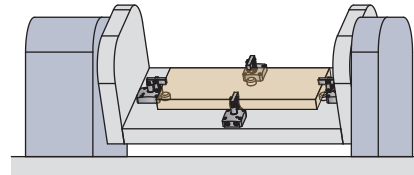
● To Workpiece

- Zero interference with 5 faces except clamping face.
- Possible to use standard length tool which provides better precision.
- Possible to enhance cutting parameters which leads to shorter cycle times.
- Elimination of multiple setups provides better machining process and zero setup time.

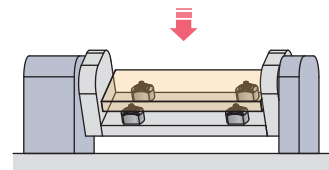


● To Processing Facility

- Fixture could be extremely downsized.
- Turn-table could be downsized.
- The movement of tool could be shorten.
- For saving weight of fixture.
- Processing facility could be more simple.
- Good design for efficient swarf management and reduction in coolant usage.



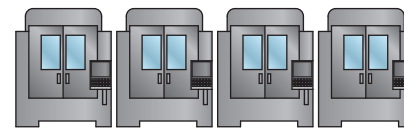
<Before> Clamping the outer side of the workpiece.



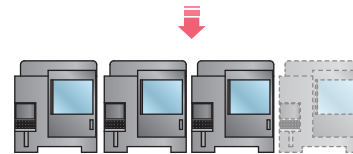
<After> Using the hole clamps.

● To Processing Line



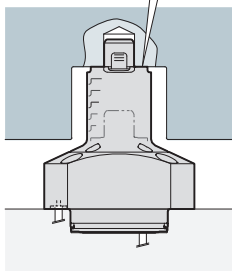
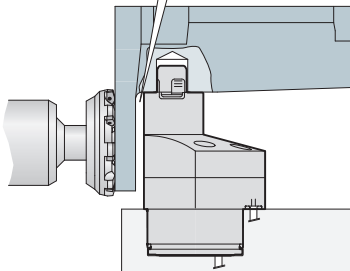
- 5 faces processing makes it possible to put process together.
- Processing line is kept small and simple.
- Possible to enhance cutting parameters which leads to shorter cycle times.



<Before> Big machining centers and long machining lines.



<After> Smaller machining centers and shorter machining lines.

	 Model SFA → P.245	 Model SFC → P.263
Classification	Double Action Standard Model	Double Action Offset Model
Features	Increments of 5mm seating heights available 	Avoids interference with workpiece. 

- High-Power Series
- Pneumatic Series
- Hydraulic Series**
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others

- Hole Clamp**
- SFA
- SFC

- Swing Clamp
- LHA
- LHC
- LHS
- LHW
- LT/LG
- TLA-2
- TLB-2
- TLA-1

- Link Clamp
- LKA
- LKC
- LKW
- LM/LJ
- TMA-2
- TMA-1

- Work Support
- LD
- LC
- TNC
- TC

- Air Sensing Lift Cylinder
- LLW

- Compact Cylinder
- LL
- LLR
- LLU
- DP
- DR
- DS
- DT

- Block Cylinder
- DBA
- DBC

- Control Valve
- BZL
- BZT
- BZX/JZG

- Pallet Clamp
- VS
- VT

- Expansion Locating Pin
- VL
- VM
- VJ
- VK

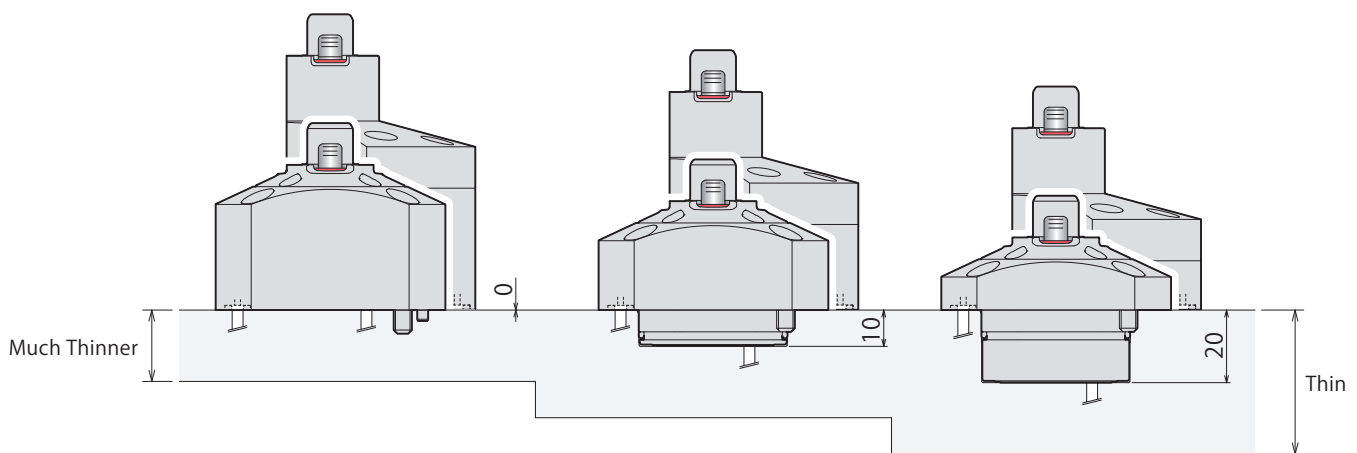
- Pull Stud Clamp
- FP
- FQ

- Customized Spring Cylinder
- DWA/DWB

Get more safety using New KOSMEK Hole Clamp

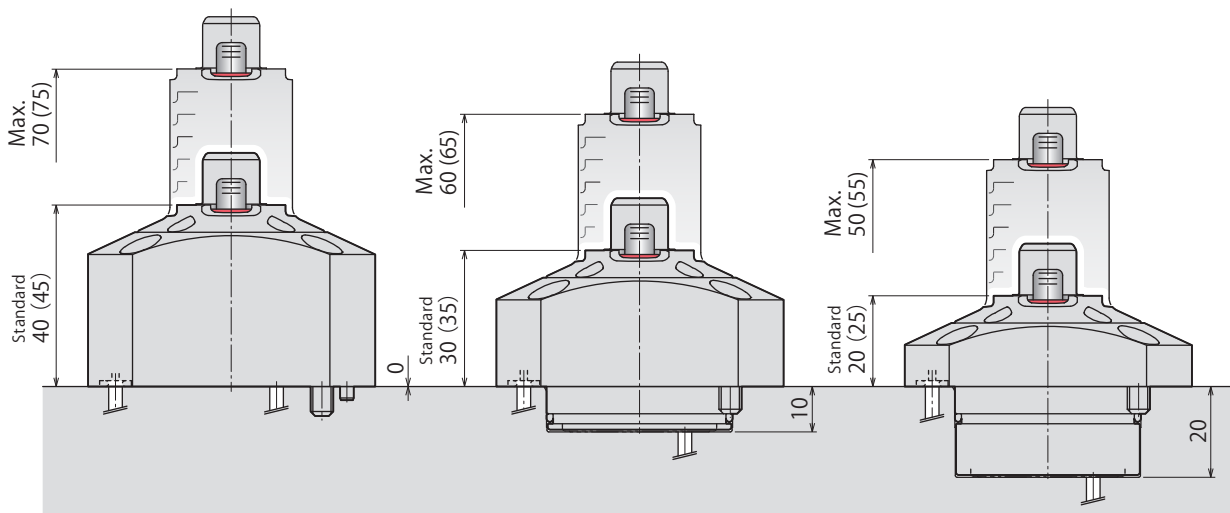
- Variable Mounting Dimensions to Suit the Process

Select appropriate mounting dimension according to the plate thickness.



- Seating Surface Height to Suit Variety of Work

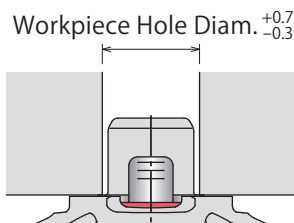
Level the height by 5mm according to the phase of workpiece seating surface.



※ The number of () is referred to SFA3000.

• Hole Diameter to Suit Variety of Work

To suit to different hole diameter and tolerances, hole diameter can be chosen in increment of every 0.5mm.

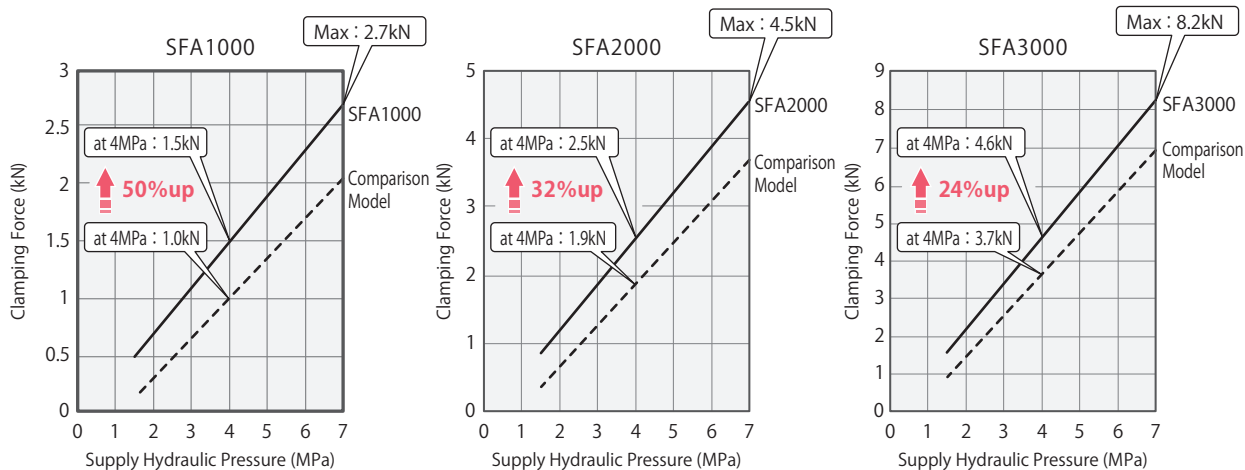


Model	Workpiece Hole Diameter (mm)																						
	6	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15	15.5	16		
SFA/SFC1000	Body Size-1 Type																						
SFA/SFC2000							Body Size-2 Type																
SFA/SFC3000																		Body Size-3 Type					

※ Max. operating pressure is 4MPa or 6MPa regarding to some of workpiece hole diameter.

• More Powerful Clamping Force

The range of hydraulic supply expands by having more powerful clamping force.

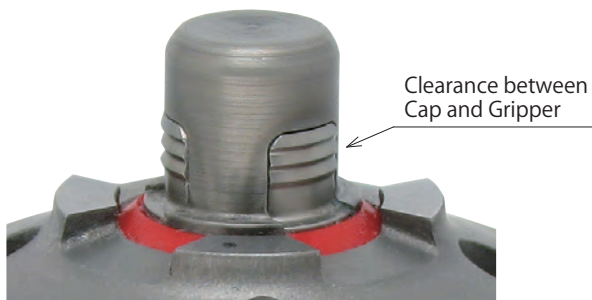


※ Max. operating pressure is 4MPa or 6MPa regarding to some of workpiece hole diameter.

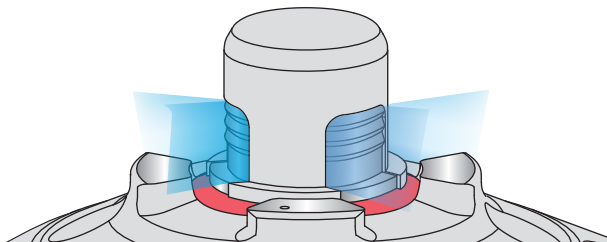
Get more safety using New KOSMEK Hole Clamp

● Cap Structure Available in Any Condition

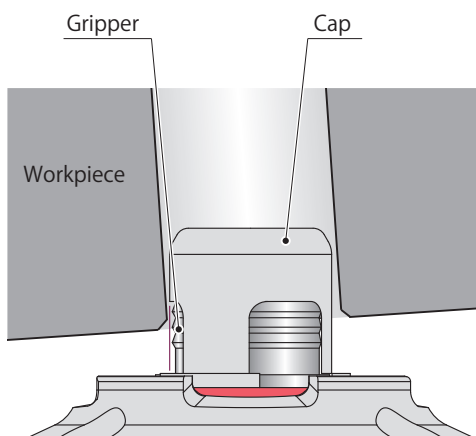
※ SFA/SFC1000 does not have cap.



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



- Small clearance leads to effective purging effect.
Even using a little air flow prevent coolant from coming in.



- Workpiece does not have contact with gripper. It makes loading-unloading smoothly.
- Not necessary for having rough guide on fixture.

※ It differs according to the loading speed.

High-Power
Series

Pneumatic Series

Hydraulic Series

Valve / Coupler
Hydraulic UnitManual Operation
Accessories

Cautions / Others

Hole Clamp

SFA

SFC

Swing Clamp

LHA

LHC

LHS

LHW

LT/LG

TLA-2

TLB-2

TLA-1

Link Clamp

LKA

LKC

LKW

LM/LJ

TMA-2

TMA-1

Work Support

LD

LC

TNC

TC

Air Sensing
Lift Cylinder

LLW

Compact Cylinder

LL

LLR

LLU

DP

DR

DS

DT

Block Cylinder

DBA

DBC

Control Valve

BZL

BZT

BZX/JZG

Pallet Clamp

VS

VT

Expansion
Locating Pin

VL

VM

VJ

VK

Pull Stud Clamp

FP

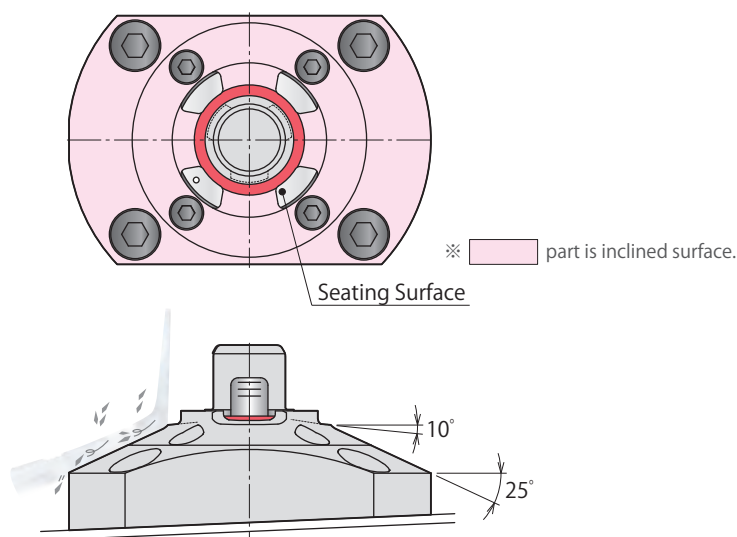
FQ

Customized
Spring Cylinder

DWA/DWB

● Pursuing Good Design for Cutting Chips

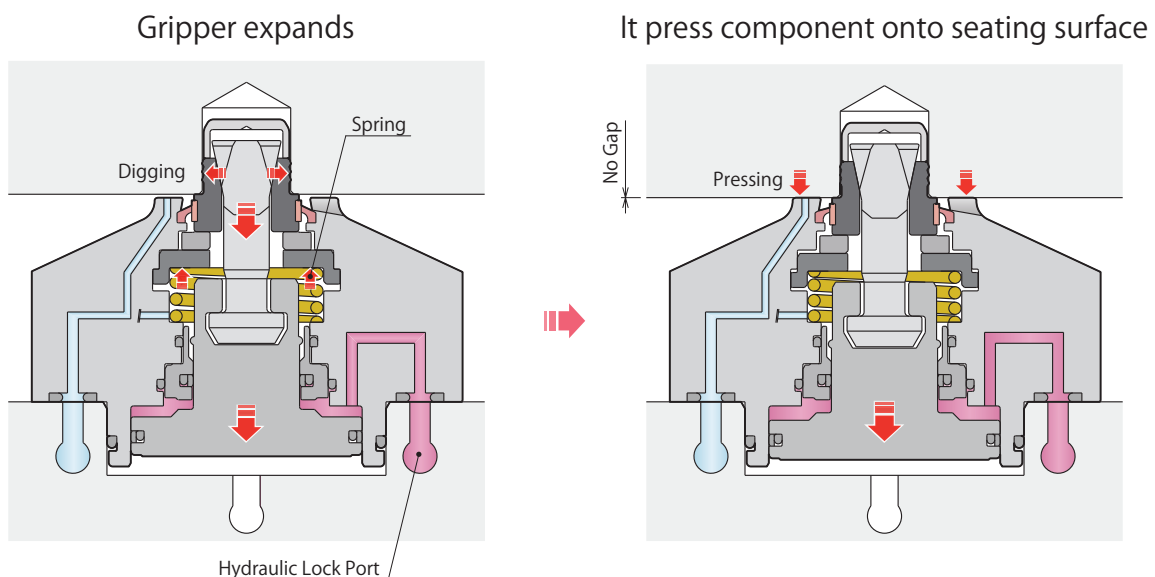
Having smaller seating surface & wide sweep area on the flange enables easy flow of chips & reduction in coolant usage.



● Secure Clamp Action Out of Sight

Built-in spring grip workpiece strongly and pull it.

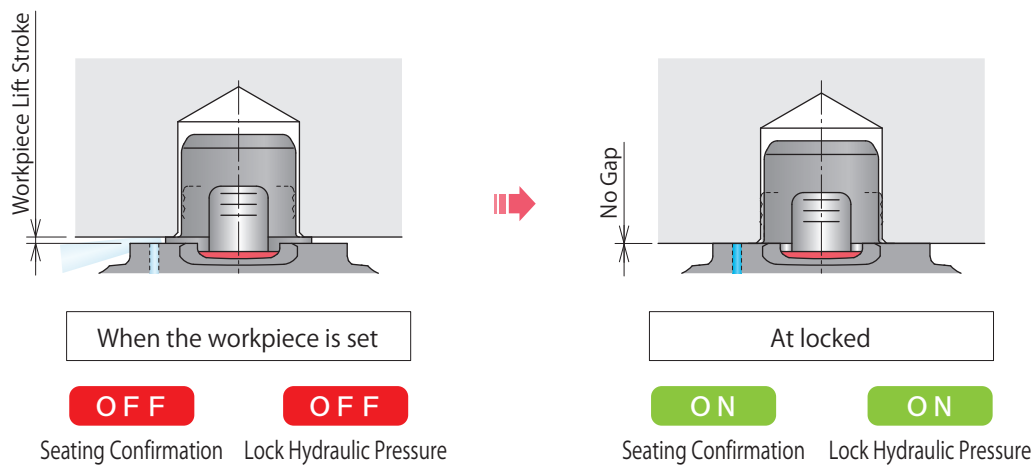
Oil temperature and oil quantity does not make a effect on it.



Get more safety using New KOSMEK Hole Clamp

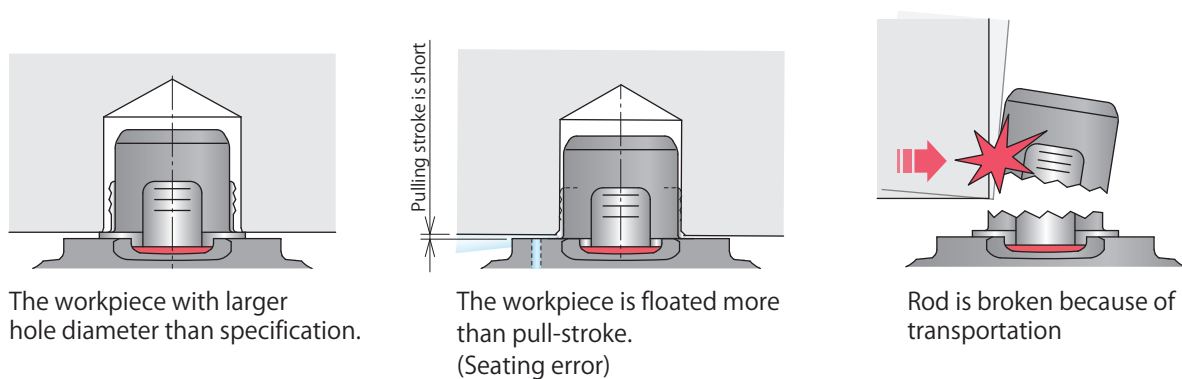
- Available for the Detection of Clamp Action

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



- Abnormality Detection for Unpredictable Troubles

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



High-Power
 Series

Pneumatic Series

Hydraulic Series

 Valve / Coupler
 Hydraulic Unit

 Manual Operation
 Accessories

Cautions / Others

Hole Clamp
SFA
SFC

Swing Clamp

LHA

LHC

LHS

LHW

LT/LG

TLA-2

TLB-2

TLA-1

Link Clamp

LKA

LKC

LKW

LM/LJ

TMA-2

TMA-1

Work Support

LD

LC

TNC

TC

Air Sensing
Lift Cylinder

LLW

Compact Cylinder

LL

LLR

LLU

DP

DR

DS

DT

Block Cylinder

DBA

DBC

Control Valve

BZL

BZT

BZX/JZG

Pallet Clamp

VS

VT

Expansion
Locating Pin

VL

VM

VJ

VK

Pull Stud Clamp

FP

FQ

Customized
Spring Cylinder

DWA/DWB

New Product



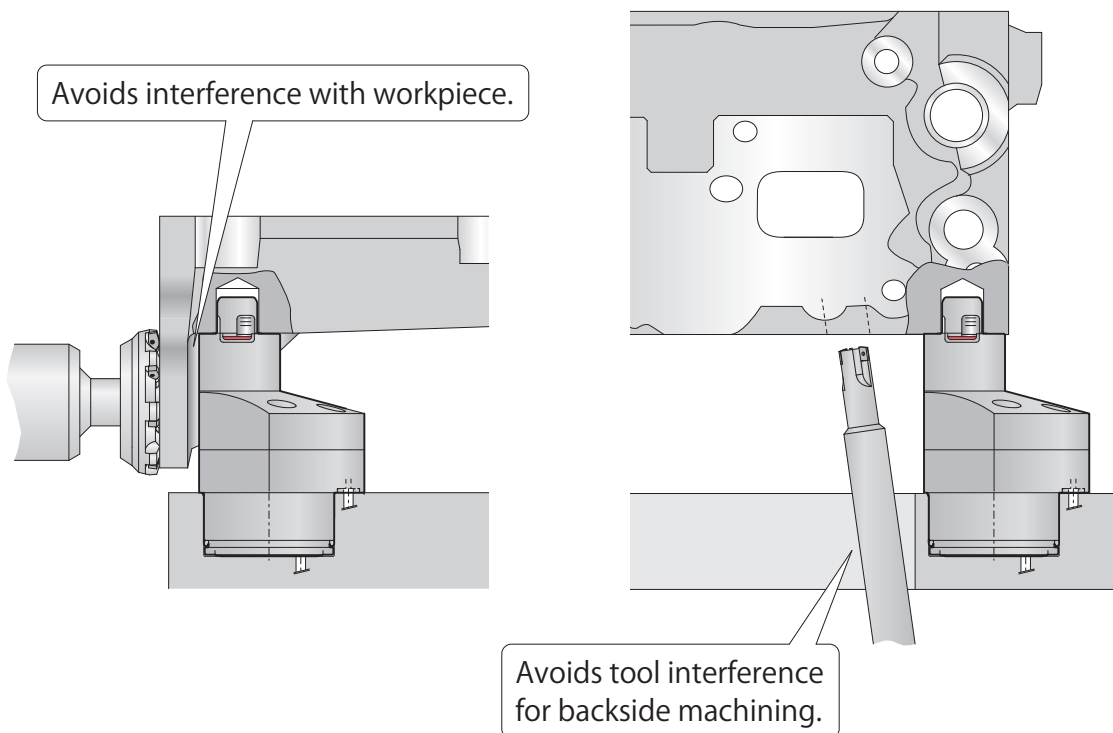
Hydraulic Hole Clamp Offset Model

Model SFC

Offset model is newly added to the line-up.

By using with the standard SFA model, there is no interference with workpieces, fixtures and tools.

Offset hole clamp is newly added.



PAT. Hydraulic Hole Clamp

Model SFA

Low Pressure (1.5~7MPa)

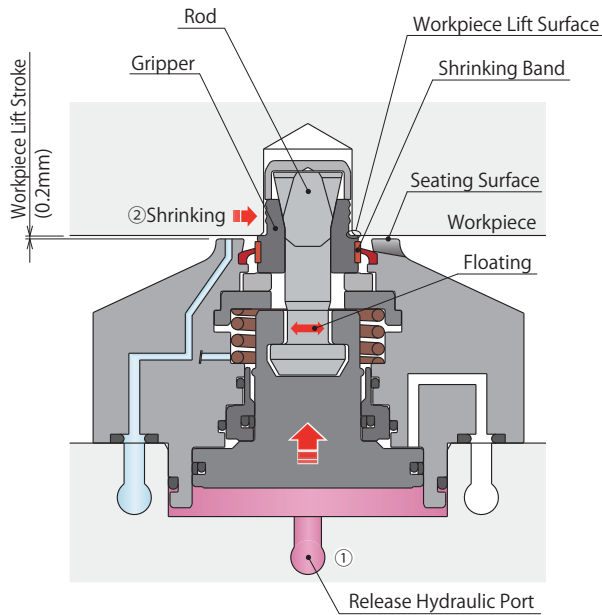
Many Varieties



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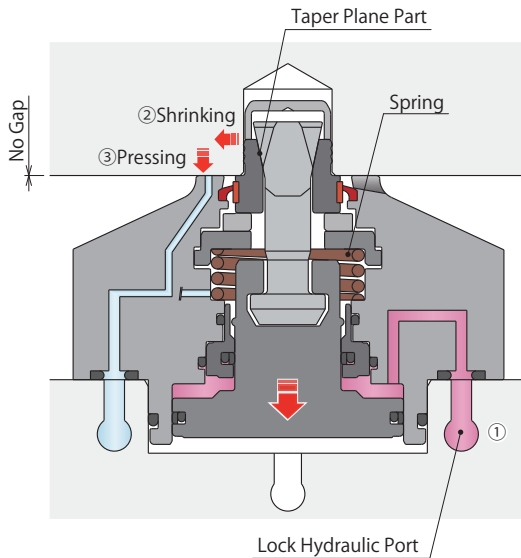
Action Description



Released State

- ① Hydraulic pressure is supplied to the release port.
- ↓
- ② The rod is lifted up and the gripper shrinks.
(Workpiece lift option : Gap is generated between workpiece bottom surface and seating surface.)

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

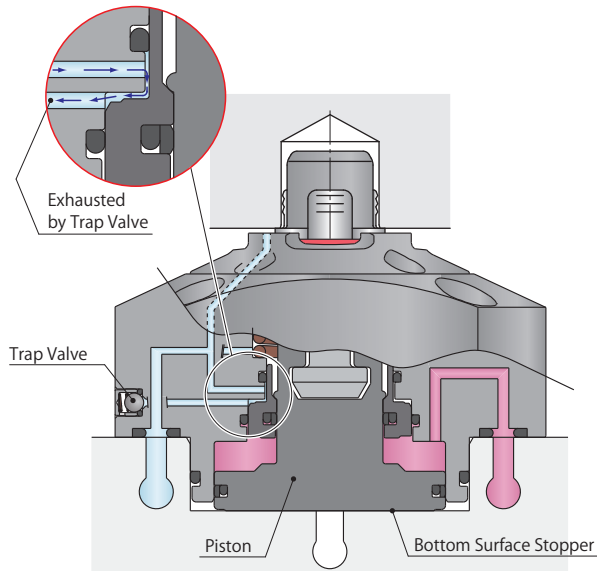


Locked State

- ① Hydraulic pressure is supplied to the lock port.
- ↓
- ② The rod descends and the gripper expands along the taper plane. (At this moment, because dish-spring is lifting the gripper, the gripper does not do pulling down action.)
- ↓
- ③ When pulling force exceeds the internal spring force, pulling down force works after the gripper digs into workpiece. Then, it presses workpiece onto seating surface. (Clamping force = Pressing force onto seating surface.)

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

Valve for Incomplete-Clamping Detection



Abnormality Detected State

In the event of the following condition, the built-in check valve allows the detection of incomplete clamping because the seat check air.

- When the gripper does not dig into workpiece enough, and it slips. (Condition without workpiece)
- In the case that rod or gripper are broken.
- Full stroke when the piston has to stop at the bottom.
- When loaded workpiece, more than 1mm is floated.

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

High-Power Series

Pneumatic Series

Hydraulic Series

Valve / Coupler Hydraulic Unit

Manual Operation Accessories

Cautions / Others

Hole Clamp

SFA

SFC

Swing Clamp

LHA

LHC

LHS

LHW

LT/LG

TLA-2

TLB-2

TLA-1

Link Clamp

LKA

LKC

LKW

LM/LJ

TMA-2

TMA-1

Work Support

LD

LC

TNC

TC

Air Sensing Lift Cylinder

LLW

Compact Cylinder

LL

LLR

LLU

DP

DR

DS

DT

Block Cylinder

DBA

DBC

Control Valve

BZL

BZT

BZX/JZG

Pallet Clamp

VS

VT

Expansion Locating Pin

VL

VM

VJ

VK

Pull Stud Clamp

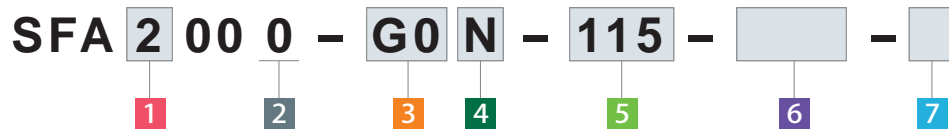
FP

FQ

Customized Spring Cylinder

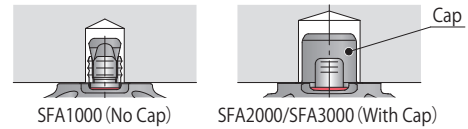
DWA/DWB

Model No. Indication



1 Body Size ※ Please refer to specification, performance graph and outline dimension detail.

- 1 : Available in Diameters between $\phi 6$ and $\phi 9$ mm (No Cap)
- 2 : Available in Diameters between $\phi 9$ and $\phi 13$ mm (With Cap)
- 3 : Available in Diameters between $\phi 13$ and $\phi 16$ mm (With Cap)

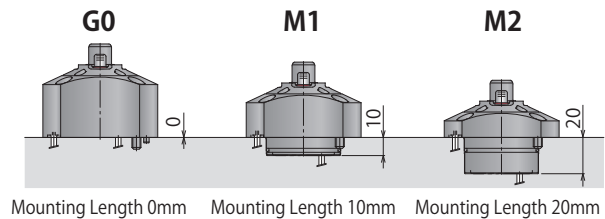


2 Design No.

0 : Revision Number

3 Mounting Methods

- G0 : Mounting Length 0mm
- M1 : Mounting Length 10mm
- M2 : Mounting Length 20mm

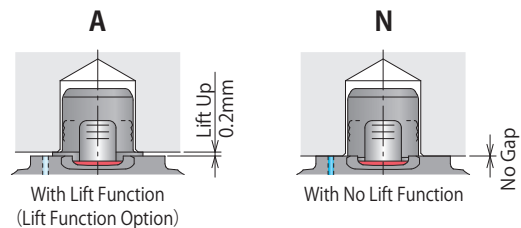


4 Workpiece Lifting Option

- A : With Lift Function (Lift Function Option)
- N : With No Lift Function

Notes

1. When using locating cylinders (model VL, VM, VJ, VK, WM, WK, VX) please choose with out lift function model.

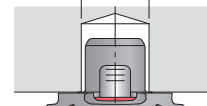


5 Workpiece Hole Diameter (Workpiece Hole Code)

Workpiece Hole Code : Workpiece Hole Diameter $\phi d \begin{smallmatrix} +0.7 \\ -0.3 \end{smallmatrix}$

※ Workpiece hole diameter should be specified in incremental of every 0.5mm from the allowable range in the list below.

Workpiece Hole Diameter $\phi d \begin{smallmatrix} +0.7 \\ -0.3 \end{smallmatrix}$



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. $\phi d \begin{smallmatrix} +0.7 \\ -0.3 \end{smallmatrix}$ (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		
SFA1000 No Cap	▲ ▲ Allowable Range																						
SFA2000 With Cap							▲	▲	■	■	Allowable Range												
SFA3000 With Cap																							Allowable Range

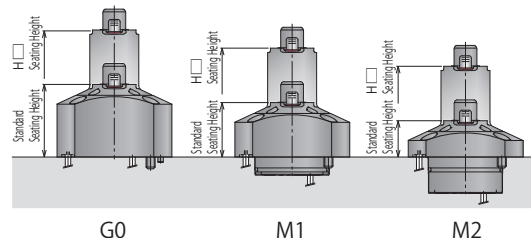
※ Max. operating pressure is 4.0MPa regarding to ▲ workpiece hole diameter. Max. operating pressure is 6.0MPa regarding to ■ workpiece hole diameter.

6 Seating Height Dimension

Blank : Standard Height

H [Seating Height] : Specifying Seating Height (by 5mm)

Model	3 Mounting Methods	Standard Height	Seating Height H (mm)																				
			20	25	30	35	40	45	50	55	60	65	70	75									
SFA1000	G0	40																					
	M1	30																					
SFA2000	M2	20																					
	G0	45																					
SFA3000	M1	35																					
	M2	25																					

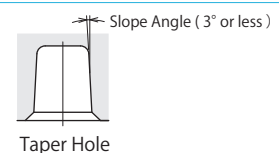
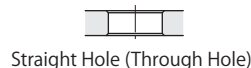
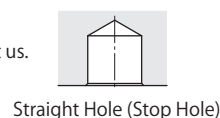


※ ★ is standard height and seating height dimension code is [Blank].
 ※ Entry example when specifying non-standard seating height.
 Seating Height 50mm : **H50**

7 Shape of Workpiece Hole

Blank : Straight Hole

T : Taper Hole ※ Contact us.



Specifications

Model No.	SFA1000								SFA2000							SFA3000								
	5 Workpiece Hole Code	060	065	070	075	080	085	090	090	095	100	105	110	115	120	125	130	130	135	140	145	150	155	160
Machine	Workpiece Hole Diam. ϕd $^{+0.7}_{-0.3}$ mm	6	6.5	7	7.5	8	8.5	9	9	9.5	10	10.5	11	11.5	12	12.5	13	13	13.5	14	14.5	15	15.5	16
Part	Hardness	HB250 or less																						
Offset Tolerance $\ast 1$ (Floating Clearance of Expanding Area)	mm	± 0.5																						
Full Stroke	mm	4.2																						
Pulling Stroke of Machine Part	mm	1.0																						
Lifting Stroke of Machine Part $\ast 2$	mm	0.2																						
Lifting Force of Machine Part $\ast 2$	kN	0.09							0.15							0.23								
Cylinder Capacity (Empty Action)	Release	2.4								3.8							6.7							
	Lock	1.8								3.0							5.4							
Max. Operating Pressure	MPa	4.0	7.0						4.0	6.0	7.0					7.0								
Min. Operating Pressure	MPa	1.5	1.5						1.5	1.5	1.5					1.5								
Withstanding Pressure	MPa	6.0	10.5						6.0	9.0	10.5					10.5								
Recommended Air Blow Pressure	MPa	0.4 ~ 0.5							0.2 ~ 0.3							0.2 ~ 0.3								
Operating Temperature	$^{\circ}\text{C}$	0 ~ 70																						
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32																						

Notes

$\ast 1$. The clamping part is an adjusting structure and the clamping operation is done by locating the work hole.

The numerical value in the table shows the amount of tolerance of one clamp.

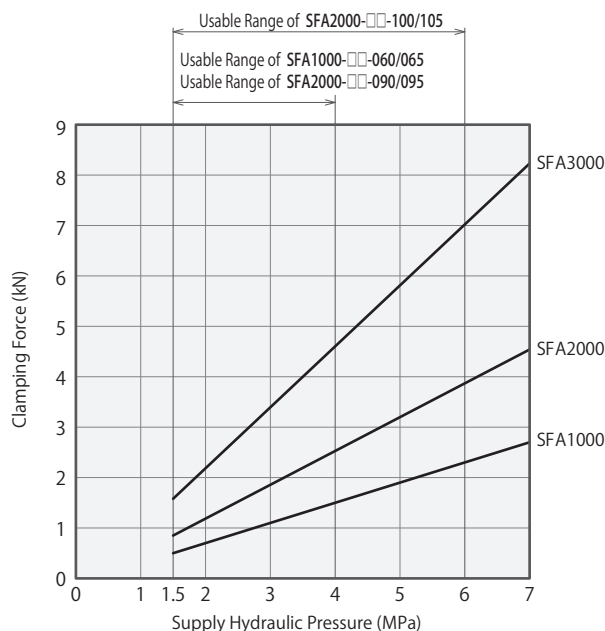
Please consider the clamp installation distance accuracy and the work piece hole distance accuracy when using with another locating clamp / locating cylinder, or using more than two of these products.

$\ast 2$. Work lift stroke and work lift force in the table is only for work lifting model.

1. Please see the external dimension if you need the information of mass.

Clamping Force Curve

Model	SFA1000								SFA2000							SFA3000														
	5 Workpiece Hole Code	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	Supply Hydraulic Pressure 7 MPa	-							2.7	-							4.5							8.2						
	Supply Hydraulic Pressure 6 MPa	-							2.3	3.9							3.9							7.0						
	Supply Hydraulic Pressure 5 MPa	-							1.9	3.2							3.2							5.8						
	Supply Hydraulic Pressure 4 MPa	1.5							2.5							4.6														
	Supply Hydraulic Pressure 3 MPa	1.1							1.9							3.4														
	Supply Hydraulic Pressure 2 MPa	0.7							1.2							2.2														
	Supply Hydraulic Pressure 1.5 MPa	0.5							0.9							1.6														
Clamping Force Calculation Formula $\ast 3$	kN	$F = 0.4 \times P - 0.1$								$F = 0.67 \times P - 0.15$							$F = 1.21 \times P - 0.24$													
Max. Operating Pressure	MPa	4.0	7.0						4.0	6.0	7.0					7.0														



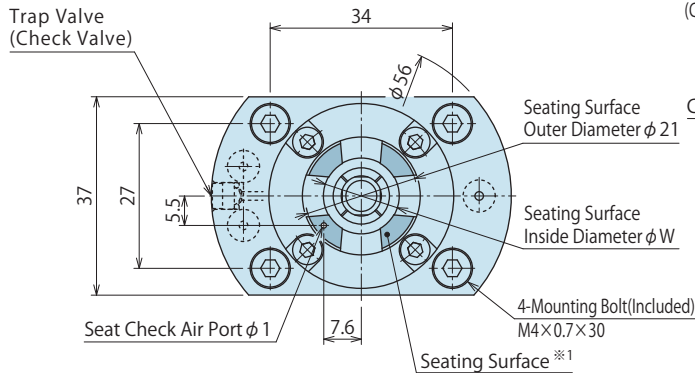
Notes

- This graph shows the relationship between clamping force (kN) and supply hydraulic pressure (MPa).
 - Clamping force shows power of pressing force against the seating surface.
 - When there is a thin wall around the work piece hole, the work hole could be deformed by the clamping operation. The clamping force does not fill the specification value.
- $\ast 3$. F: Clamping Force (kN), P: Supply Hydraulic Pressure (MPa).

- High-Power Series
- Pneumatic Series
- Hydraulic Series
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others
- Hole Clamp
 - SFA
 - SFC
- Swing Clamp
 - LHA
 - LHC
 - LHS
 - LHW
 - LT/LG
 - TLA-2
 - TLB-2
 - TLA-1
- Link Clamp
 - LKA
 - LKC
 - LKW
 - LM/LJ
 - TMA-2
 - TMA-1
- Work Support
 - LD
 - LC
 - TNC
 - TC
- Air Sensing Lift Cylinder
 - LLW
- Compact Cylinder
 - LL
 - LLR
 - LLU
 - DP
 - DR
 - DS
 - DT
- Block Cylinder
 - DBA
 - DBC
- Control Valve
 - BZL
 - BZT
 - BZX/JZG
- Pallet Clamp
 - VS
 - VT
- Expansion Locating Pin
 - VL
 - VM
 - VJ
 - VK
- Pull Stud Clamp
 - FP
 - FQ
- Customized Spring Cylinder
 - DWA/DWB

External Dimensions

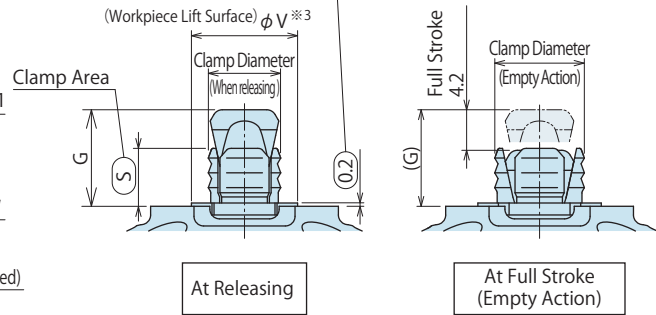
※The drawing shows the released state of SFA1000-G0A-□.



Expanding Area Detail

Workpiece Lift Stroke ※3

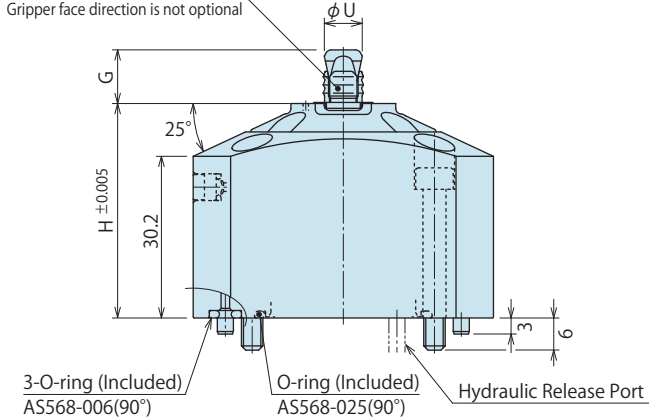
(Clearance from Seating Surface when Releasing)



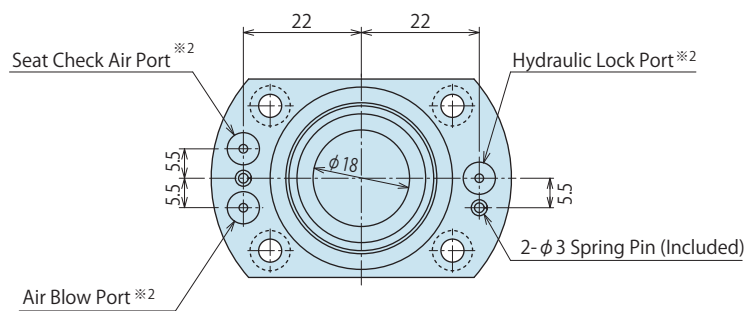
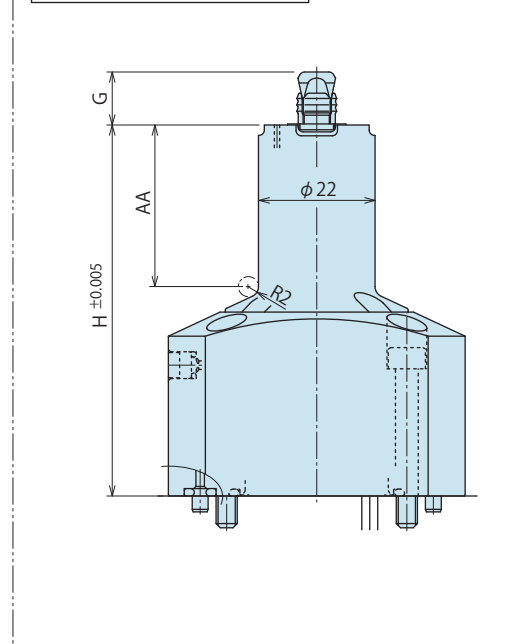
Seating Height: Standard

Gripper (4 Grippers)
(90 Degree Distance)

Gripper face direction is not optional



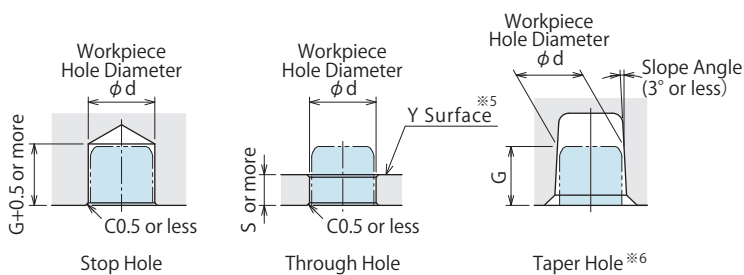
Specifying Seating Height ※4



Notes

- ※1. The workpiece must be resting on all seating surfaces when clamping. If this is not done the workpiece can become deformed by the clamping force.
- ※2. The name of each port is marked in the flange surface. (HYD: Hydraulic Lock Port, FC: Seating Check Port, BLOW: Air Blow Port)
Air is always recommended to be supplied to the air blow port and seating check port.
- ※3. The numerical value is only for the workpiece lift option.
- ※4. Please refer to the seating height:standard for the seating height that is not shown.

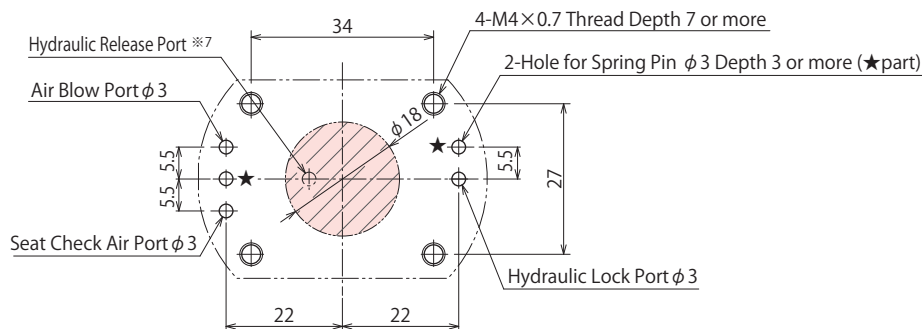
Workpiece (Pallet) Hole Dimension



Notes

- 1. When there is a thin wall around the workpiece hole, the work hole could be deformed by the clamping operation. The clamping force does not fill the specification value. Please make sure to test the clamping function before using and adjust to the appropriate supply of pressure.
- ※5. When the clamp head is sticking above the Y surface of the workpiece, please make sure there is no interference with the clamp cylinders during machining.
- ※6. In the case using taper hole for holding, please use -T:workpiece hole shaped taper hole specification.

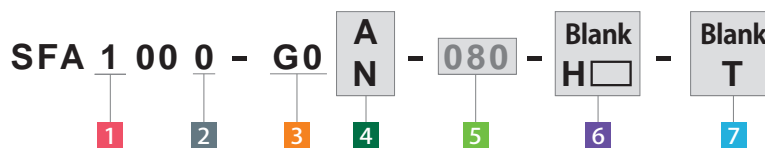
Machining Dimensions of Mounting Area



Notes

- There should be no Burrs at the hole contact surface.
 ※7. Please make a hydraulic release port in the range of .

Model No. Indication



- Body Size (When 1 is chosen)
- Design No.
- Mounting Methods (When G0 is chosen)
- Lifting Methods
- Workpiece Hole Diameter (Workpiece Hole Code)
- Seating Height Dimension
- Shape of Workpiece Hole

External Dimensions and Machining Dimensions for Mounting (mm)

Model No.	SFA1000-G0□							
5 Workpiece Hole Code	060	065	070	075	080	085	090	
Workpiece Hole Diameter ϕd	$6^{+0.7}_{-0.3}$	$6.5^{+0.7}_{-0.3}$	$7^{+0.7}_{-0.3}$	$7.5^{+0.7}_{-0.3}$	$8^{+0.7}_{-0.3}$	$8.5^{+0.7}_{-0.3}$	$9^{+0.7}_{-0.3}$	
Clamp Diameter	Release Condition	5.5	6	6.5	7	7.5	8	8.5
	Empty Action	7.2	7.7	8.2	8.7	9.2	9.7	10.2
Offset Tolerance (Floating Clearance of Expanding Area) ※8				±0.5				
Full Stroke				4.2				
Pulling Stroke of Workpiece				1.0				
Workpiece Lift Stroke ※9				0.2				
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	
V	8.5	9	9.5	10	10.5	11	11.5	
W	12	13	13	14	14	15	15	

- Notes
- ※8. The clamping part is an adjusting structure, and the clamping operation is done following the workpiece locating. The numerical value in the table shows the amount of tolerance value of one clamp. When using two or more location clamps, location cylinders, etc., please consider the accuracy between clamping installation distance accuracy of the holes.
 - ※9. Workpiece lift stroke is only for lift function option.

6 Seating Height Dimension	Standard Height	Specifying Seating Height (mm)						
		Blank	H45	H50	H55	H60	H65	H70
3 Mounting Method	H	40	45	50	55	60	65	70
	AA	—	5.5	10.5	15.5	20.5	25.5	30.5
	Mass kg	0.6	0.6	0.6	0.6	0.6	0.7	0.7

High-Power Series

Pneumatic Series

Hydraulic Series

Valve / Coupler Hydraulic Unit

Manual Operation Accessories

Cautions / Others

Hole Clamp

SFA

SFC

Swing Clamp

LHA

LHC

LHS

LHW

LT/LG

TLA-2

TLB-2

TLA-1

Link Clamp

LKA

LKC

LKW

LM/LJ

TMA-2

TMA-1

Work Support

LD

LC

TNC

TC

Air Sensing Lift Cylinder

LLW

Compact Cylinder

LL

LLR

LLU

DP

DR

DS

DT

Block Cylinder

DBA

DBC

Control Valve

BZL

BZT

BZX/JZG

Pallet Clamp

VS

VT

Expansion Locating Pin

VL

VM

VJ

VK

Pull Stud Clamp

FP

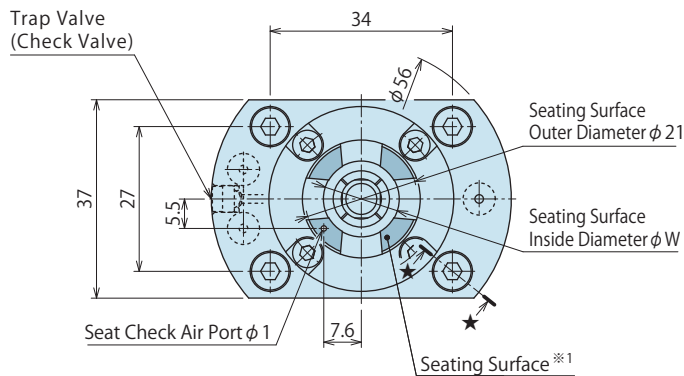
FQ

Customized Spring Cylinder

DWA/DWB

External Dimensions

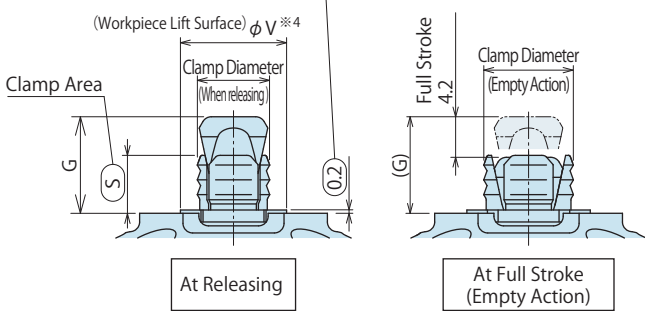
※The drawing shows the released state of SFA1000-M1A-□.



Expanding Area Detail

Workpiece Lift Stroke ※4

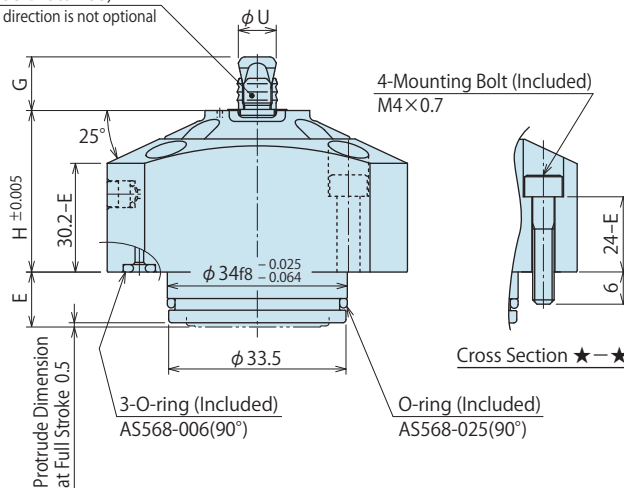
(Clearance from seating surface when releasing)



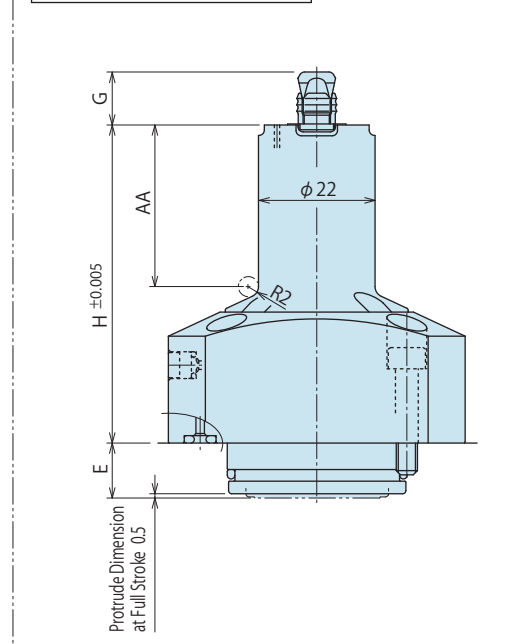
Seating Height: Standard

Gripper (4 Grippers)
(90 Degree Distance)

Gripper face direction is not optional



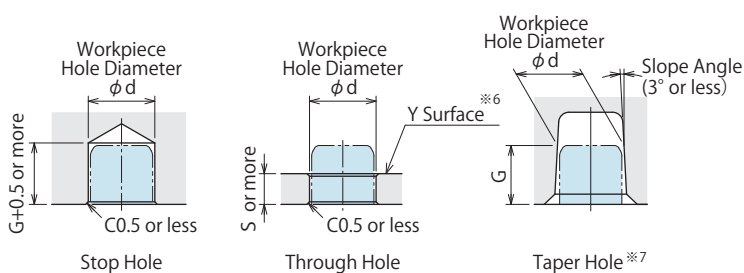
Specifying Seating Height ※5



Notes

- ※1. The workpiece must be resting on all seating surfaces when clamping. If this is not done the workpiece can become deformed by the clamping force.
- ※2. Screw jack is used when removing hole clamp. Remove with torque wrench in a parallel fashion when detaching.
- ※3. The name of each port is marked in the flange surface. (HYD: Hydraulic Lock Port, FC: Seating Check Port, BLOW: Air Blow Port)
Air is always recommended to be supplied to the air blow port and seating check port.
- ※4. The numerical value is only for the workpiece lift option.
- ※5. Please refer to the standard for the seating height that is not shown.

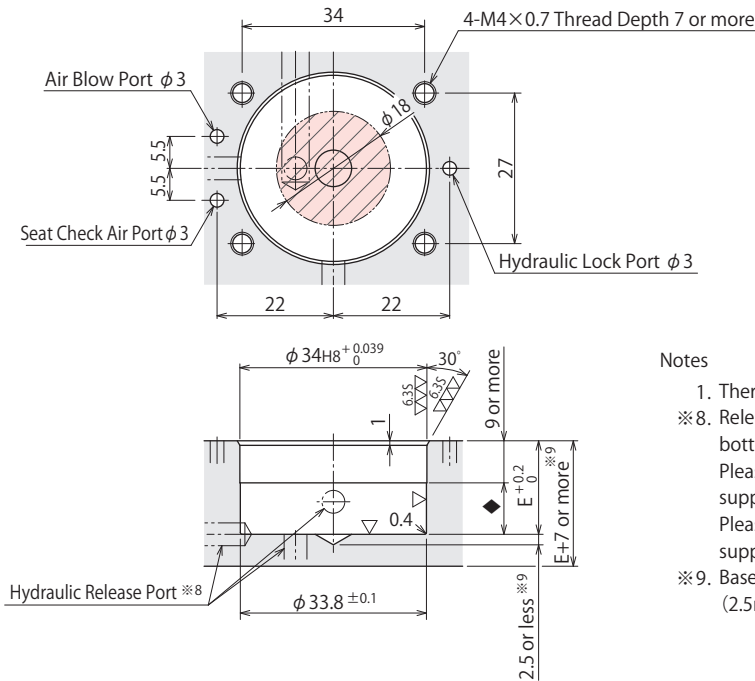
Workpiece (Pallet) Hole Dimension



Notes

- 1. When there is a thin wall around the workpiece hole, the work hole could be deformed by the clamping operation. The clamping force does not fill the specification value. 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 Y surface of the workpiece, please make sure there is no interference with the clamp cylinders during machining.
- ※7. In the case using taper hole for holding, please use -T: workpiece hole shaped taper hole specification.

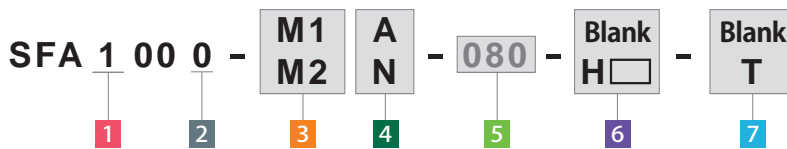
Machining Dimensions of Mounting Area



Notes

- 1. There should be no burrs at the hole contact surface.
- ※8. Release hydraulic pressure can be supplied from the side or bottom surface.
Please make a hydraulic release port within \blacklozenge area in the case supplied from the side.
Please make a hydraulic release port within hatched area in the case supplied from the bottom.
- ※9. Base thickness and remaining depth of the lower hole processing (2.5mm) is for when the material is S50C.

Model No. Indication



- 1 Body Size (When 1 is chosen)
- 2 Design No.
- 3 Mounting Methods (When M1/M2 is chosen)
- 4 Lifting Methods
- 5 Workpiece Hole Diameter (Workpiece Hole Code)
- 6 Seating Height Dimension
- 7 Shape of Workpiece Hole

External Dimensions and Machining Dimensions for Mounting (mm)

Model No.	SFA1000-M□□							
	5 Workpiece Hole Code	060	065	070	075	080	085	090
Workpiece Hole Diameter ϕd		$6^{+0.7}_{-0.3}$	$6.5^{+0.7}_{-0.3}$	$7^{+0.7}_{-0.3}$	$7.5^{+0.7}_{-0.3}$	$8^{+0.7}_{-0.3}$	$8.5^{+0.7}_{-0.3}$	$9^{+0.7}_{-0.3}$
Clamp Diameter	Release Condition	5.5	6	6.5	7	7.5	8	8.5
	Empty Action	7.2	7.7	8.2	8.7	9.2	9.7	10.2
Offset Tolerance (Floating Clearance of Expanding Area) ※10		± 0.5						
Full Stroke		4.2						
Pulling Stroke of Workpiece		1.0						
Workpiece Lift Stroke ※11		0.2						
	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
	V	8.5	9	9.5	10	10.5	11	11.5
	W	12	13	13	14	14	15	15

- Notes
- ※10. The clamping part is an adjusting structure, and the clamping operation is done following the workpiece locating. The numerical value in the table shows the amount of tolerance value of one clamp. When using two or more location clamps, location cylinders, etc., please consider the accuracy between clamping installation distance accuracy of the holes.
 - ※11. Workpiece lift stroke is only for lift function option.

6 Seating Height Dimension		(mm)								
3 Mounting Method		Standard Height		Specifying Seating Height						
		Blank	H25	H30	H35	H40	H45	H50	H55	H60
When M1 is chosen (Mounting Length 10mm)	H	30	-	-	35	40	45	50	55	60
	E	10	-	-	10	10	10	10	10	10
	AA	-	-	-	5.5	10.5	15.5	20.5	25.5	30.5
	Mass kg	0.5	-	-	0.5	0.6	0.6	0.6	0.6	0.6
When M2 is chosen (Mounting Length 20mm)	H	20	25	30	35	40	45	50	-	-
	E	20	20	20	20	20	20	20	-	-
	AA	-	5.5	10.5	15.5	20.5	25.5	30.5	-	-
	Mass kg	0.5	0.5	0.5	0.5	0.5	0.5	0.6	-	-

- High-Power Series
- Pneumatic Series
- Hydraulic Series**
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others

Hole Clamp

- SFA
- SFC

Swing Clamp

- LHA
- LHC
- LHS
- LHW
- LT/LG
- TLA-2
- TLB-2
- TLA-1

Link Clamp

- LKA
- LKC
- LKW
- LM/LJ
- TMA-2
- TMA-1

Work Support

- LD
- LC
- TNC
- TC

Air Sensing Lift Cylinder

- LLW

Compact Cylinder

- LL
- LLR
- LLU
- DP
- DR
- DS
- DT

Block Cylinder

- DBA
- DBC

Control Valve

- BZL
- BZT
- BZX/JZG

Pallet Clamp

- VS
- VT

Expansion Locating Pin

- VL
- VM
- VJ
- VK

Pull Stud Clamp

- FP
- FQ

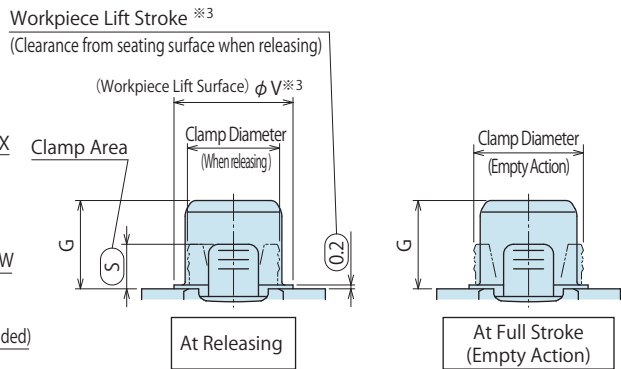
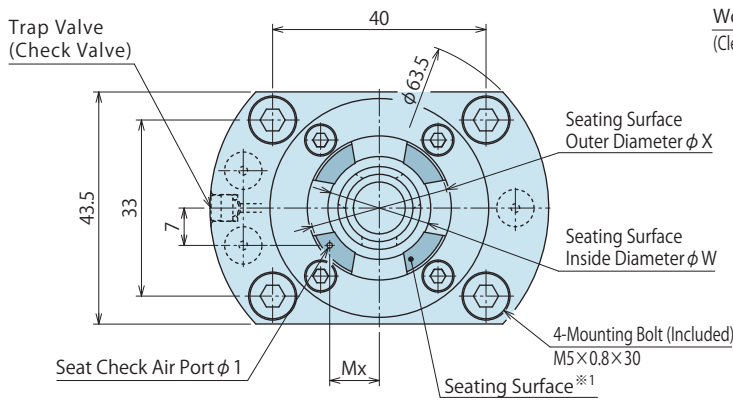
Customized Spring Cylinder

- DWA/DWB

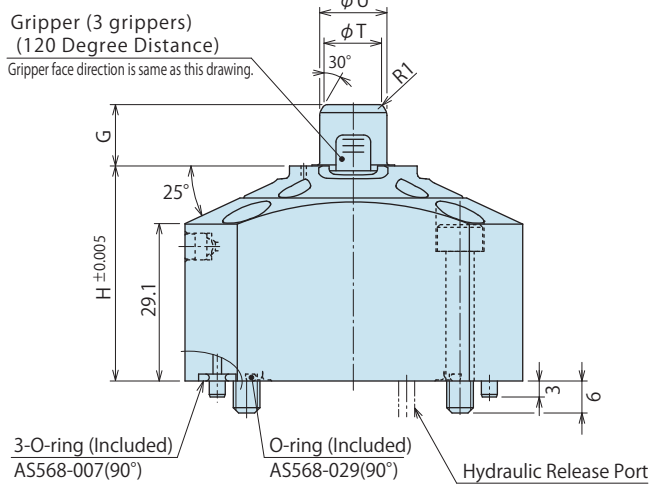
External Dimensions

※The drawing shows the released state of SFA2000-G0A-□.

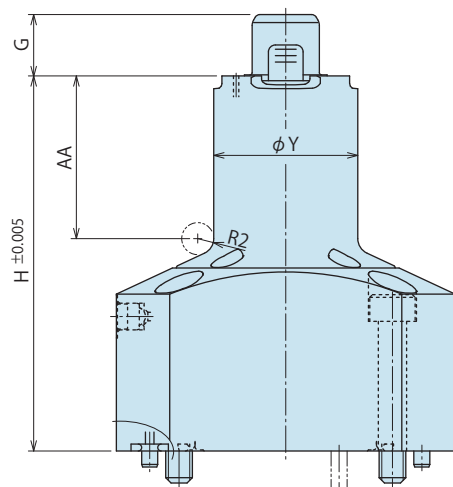
※ Expanding Area Detail



Seating Height: Standard

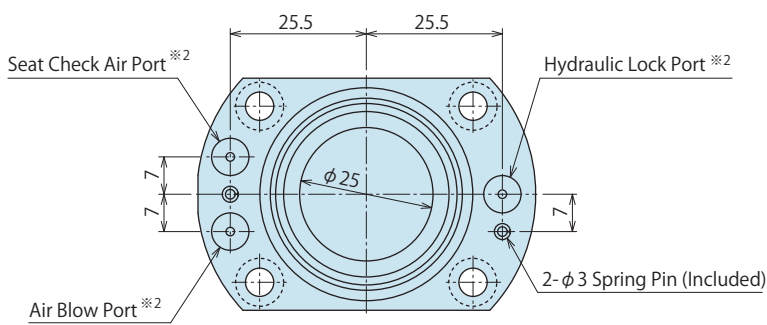


Specifying Seating Height ※4



Notes

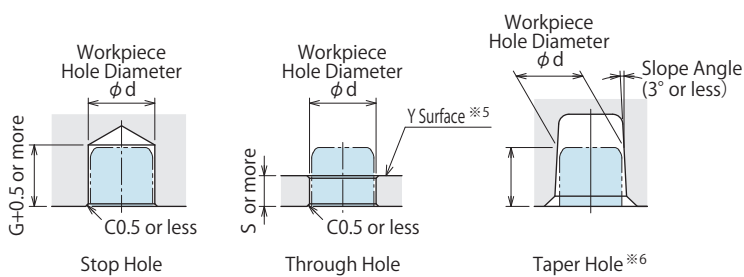
- ※1. The workpiece must be resting on all seating surfaces when clamping. If this is not done the workpiece can become deformed by the clamping force.
- ※2. The name of each port is marked in the flange surface. (HYD: Hydraulic Lock Port, FC: Seating Check Port, BLOW: Air Blow Port)
Air is always recommended to be supplied to the air blow port and seating check port.
- ※3. The numerical value is only for the workpiece lift option.
- ※4. Please refer to the standard for the seating height that is not shown.



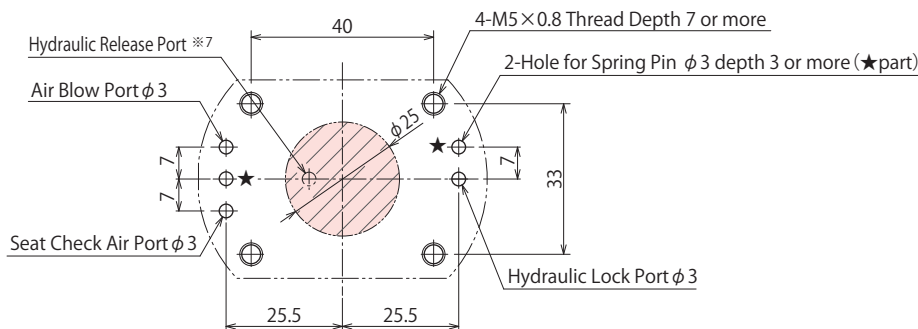
Notes

- 1. When there is a thin wall around the workpiece hole, the work hole could be deformed by the clamping operation. The clamping force does not fill the specification value. Please make sure to test the clamping function before using and adjust to the appropriate supply of pressure.
- ※5. When the clamp head is sticking above the Y surface of the workpiece, please make sure there is no interference with the clamp cylinders during machining.
- ※6. In the case using taper hole for holding, please use -T: workpiece hole shaped taper hole specification.

Workpiece (Pallet) Hole Dimension



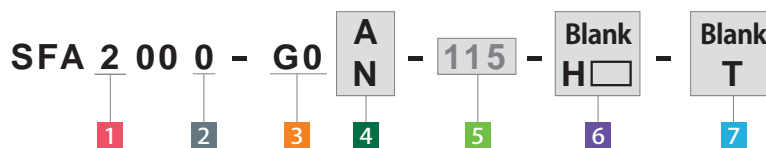
Machining Dimensions of Mounting Area



Notes

- There should be no burrs at the hole contact surface.
- ※7. Please make a hydraulic release port in the range of .

Model No. Indication



- Body Size (When 2 is chosen)
- Design No.
- Mounting Methods (When G0 is chosen)
- Lifting Methods
- Workpiece Hole Diameter (Workpiece Hole Code)
- Seating Height Dimension
- Shape of Workpiece Hole

External Dimensions and Machining Dimensions for Mounting

Model No.	SFA2000-G0□								
5 Workpiece Hole Code	090	095	100	105	110	115	120	125	130
Workpiece Hole Diameter φd	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}
Clamp Diameter	Release Condition	8.5	9	9.5	10	10.5	11	11.5	12
	Empty Action	10.2	10.7	11.2	11.7	12.2	12.7	13.2	13.7
Offset Tolerance (Floating Clearance of Expanding Area)※8	±0.5								
Full Stroke	4.2								
Pulling Stroke of Workpiece	1.0								
Workpiece Lift Stroke※9	0.2								
	G	10	10	10	11.5	11.5	11.5	11.5	11.5
Mx	8	8	8	8	8	8.6	8.6	9.3	9.3
S	4.3	4.3	4.3	5.8	5.8	5.8	5.8	5.8	5.8
T	5.7	6.2	6.7	7.2	7.7	8.2	8.7	9.2	9.7
U	8.6	9.1	9.6	10.1	10.6	11.1	11.6	12.1	12.6
V	11.5	12	12.5	13	13.5	14	14.5	15	15.5
W	15	16	16	17	17	18	18	19	19
X	24	24	24	24	24	25	25	26	26
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 following the workpiece locating. The numerical value in the table shows the amount of tolerance value of one clamp. When using two or more location clamps, location cylinders, etc., please consider the accuracy between clamping installation distance accuracy of the holes.
 - ※9. Workpiece lift stroke is only for lift function option.

6 Seating Height Dimension	3 Mounting Method	Standard Height	Specifying Seating Height					
		Blank	H45	H50	H55	H60	H65	H70
When G0 is chosen (Mounting Length 0mm)	H	40	45	50	55	60	65	70
	AA	-	5.5	10.5	15.5	20.5	25.5	30.5
	Mass kg	0.8	0.8	0.8	0.8	0.9	0.9	0.9

- High-Power Series
- Pneumatic Series
- Hydraulic Series**
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others

- Hole Clamp**
- SFA
- SFC

- Swing Clamp
- LHA
- LHC
- LHS
- LHW
- LT/LG
- TLA-2
- TLB-2
- TLA-1

- Link Clamp
- LKA
- LKC
- LKW
- LM/LJ
- TMA-2
- TMA-1

- Work Support
- LD
- LC
- TNC
- TC

- Air Sensing Lift Cylinder
- LLW

- Compact Cylinder
- LL
- LLR
- LLU
- DP
- DR
- DS
- DT

- Block Cylinder
- DBA
- DBC

- Control Valve
- BZL
- BZT
- BZX/JZG

- Pallet Clamp
- VS
- VT

- Expansion Locating Pin
- VL
- VM
- VJ
- VK

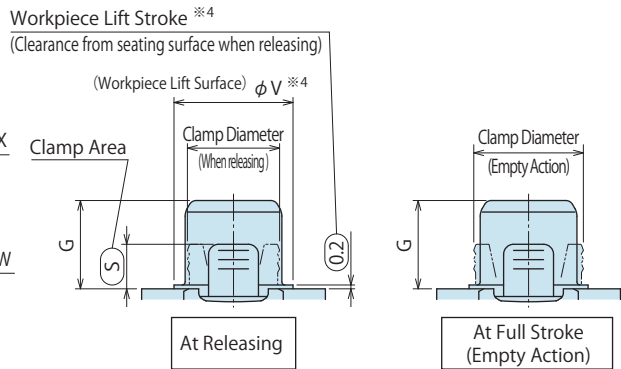
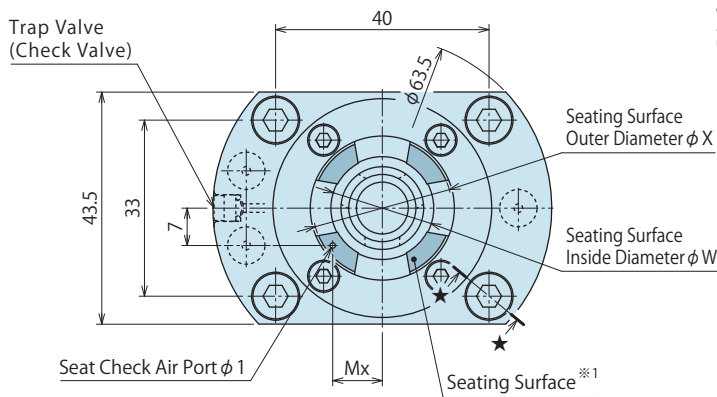
- Pull Stud Clamp
- FP
- FQ

- Customized Spring Cylinder
- DWA/DWB

External Dimensions

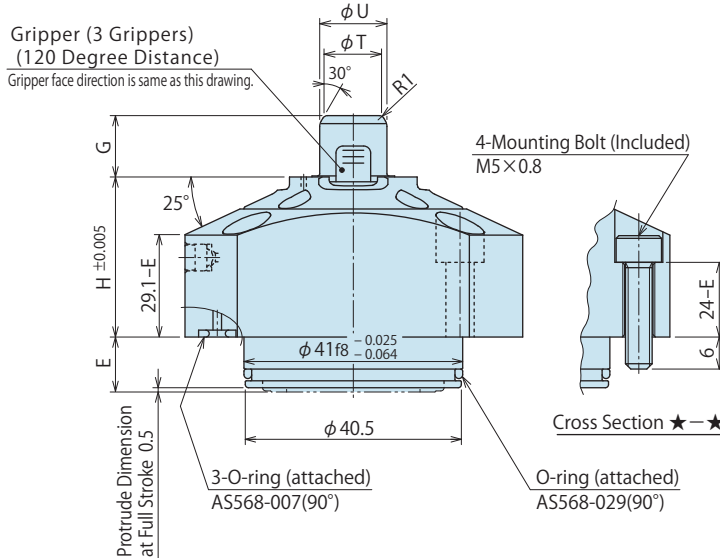
※The drawing shows the released state of SFA2000-M1A-□.

※ Expanding Area Detail

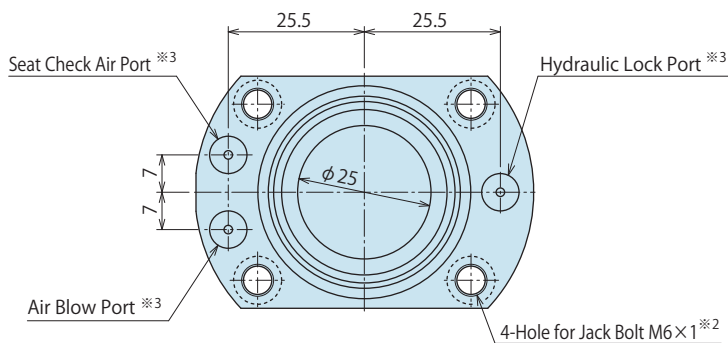
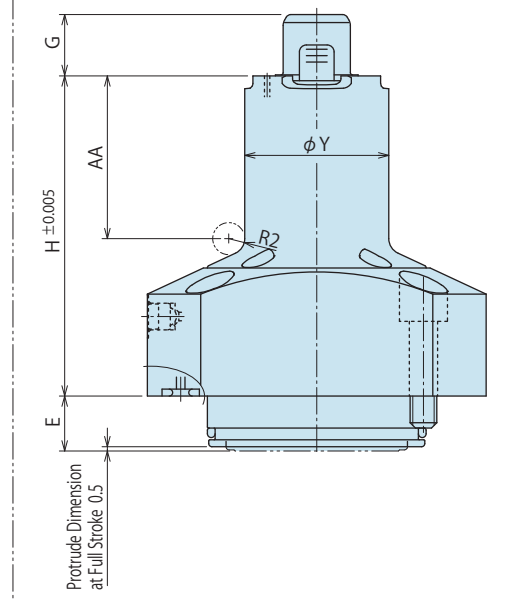


Seating Height: Standard

Gripper (3 Grippers)
(120 Degree Distance)
Gripper face direction is same as this drawing.



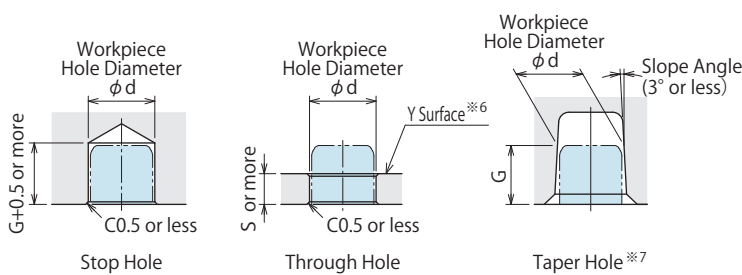
Specifying Seating Height ※5



Notes

- ※1. The workpiece must be resting on all seating surfaces when clamping. If this is not done the workpiece can become deformed by the clamping force.
- ※2. Screw jack is used when removing hole clamp. Remove with torque wrench in a parallel fashion when detaching.
- ※3. The name of each port is marked in the flange surface. (HYD : Hydraulic Lock Port, FC : Seating Check Port, BLOW: Air Blow Port)
Air is always recommended to be supplied to the air blow port and seating check port.
- ※4. The numerical value is only for the workpiece lift option.
- ※5. Please refer to the standard for the seating height that is not shown.

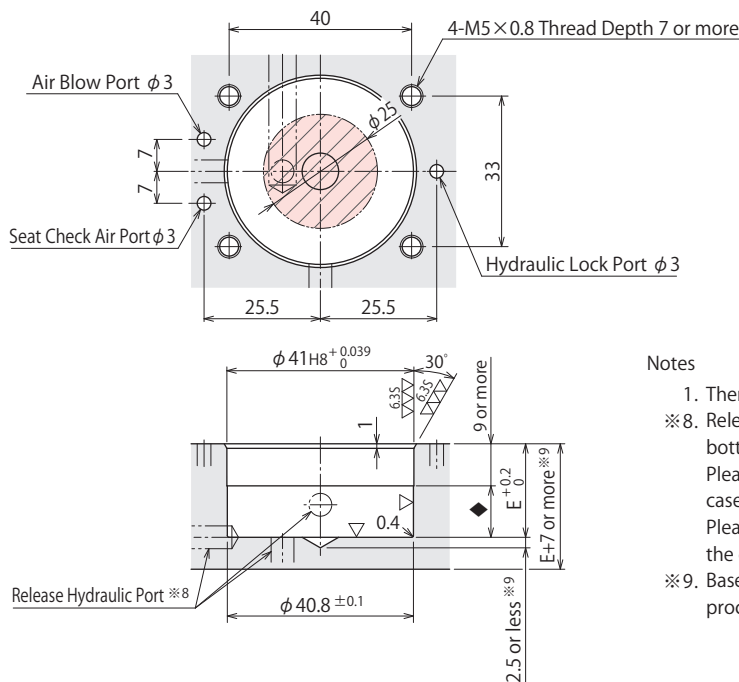
Workpiece (Pallet) Hole Dimension



Notes

- 1. When there is a thin wall around the workpiece hole, the work hole could be deformed by the clamping operation. The clamping force does not fill the specification value. 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 Y surface of the workpiece, please make sure there is no interference with the clamp cylinders during machining.
- ※7. In the case using taper hole for holding, please use -T: workpiece hole shaped taper hole specification.

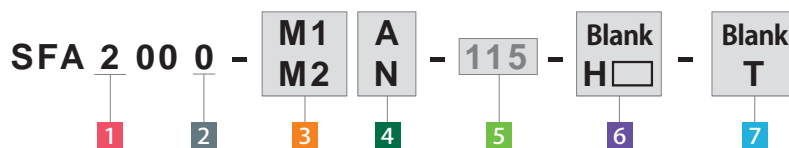
Machining Dimensions of Mounting Area



Notes

- 1. There should be no burrs at the hole contact surface.
- ※8. Release hydraulic pressure can be supplied from the side or bottom surface.
Please make a hydraulic release port within \blacklozenge area in the case supplied from the side.
Please make a hydraulic release port within \square area in the case supplied from the bottom.
- ※9. Base thickness and remaining depth of the lower hole processing (2.5mm) is for when the material is S50C.

Model No. Indication



- 1** Body Size (When 2 is chosen)
- 2** Design No.
- 3** Mounting Methods (When M1/M2 is chosen)
- 4** Lifting Methods
- 5** Workpiece Hole Diameter (Workpiece Hole Code)
- 6** Seating Height Dimension
- 7** Shape of Workpiece Hole

External Dimensions and Machining Dimensions for Mounting

Model No.	SFA2000-M□□ (mm)								
5 Workpiece Hole Code	090	095	100	105	110	115	120	125	130
Workpiece Hole Diameter ϕd	$9^{+0.7}_{-0.3}$	$9.5^{+0.7}_{-0.3}$	$10^{+0.7}_{-0.3}$	$10.5^{+0.7}_{-0.3}$	$11^{+0.7}_{-0.3}$	$11.5^{+0.7}_{-0.3}$	$12^{+0.7}_{-0.3}$	$12.5^{+0.7}_{-0.3}$	$13^{+0.7}_{-0.3}$
Clamp Diameter	Release Condition	8.5	9	9.5	10	10.5	11	11.5	12
	Empty Action	10.2	10.7	11.2	11.7	12.2	12.7	13.2	13.7
Offset Tolerance (Floating Clearance of Expanding Area) ※10									
Full Stroke	±0.5								
Pulling Stroke of Workpiece	4.2								
Workpiece Lift Stroke ※11	1.0								
G	10	10	10	11.5	11.5	11.5	11.5	11.5	11.5
Mx	8	8	8	8	8	8.6	8.6	9.3	9.3
S	4.3	4.3	4.3	5.8	5.8	5.8	5.8	5.8	5.8
T	5.7	6.2	6.7	7.2	7.7	8.2	8.7	9.2	9.7
U	8.6	9.1	9.6	10.1	10.6	11.1	11.6	12.1	12.6
V	11.5	12	12.5	13	13.5	14	14.5	15	15.5
W	15	16	16	17	17	18	18	19	19
X	24	24	24	24	24	25	25	26	26
Y	25	25	25	25	25	26	26	27	27

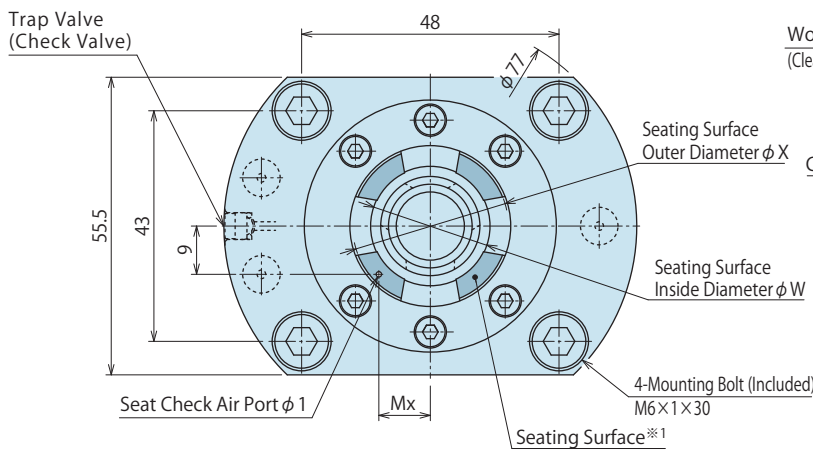
Notes ※10. The clamping part is an adjusting structure, and the clamping operation is done following the workpiece locating. The numerical value in the table shows the amount of tolerance value of one clamp. When using two or more location clamps, location cylinders, etc., please consider the accuracy between clamping installation distance accuracy of the holes.

※11. Workpiece lift stroke is only for lift function option.

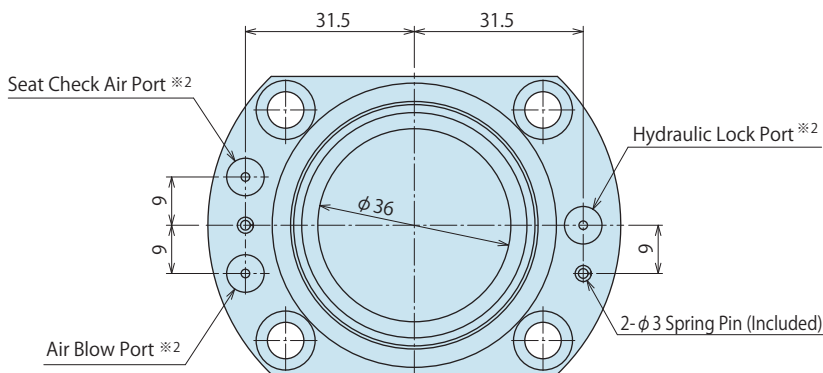
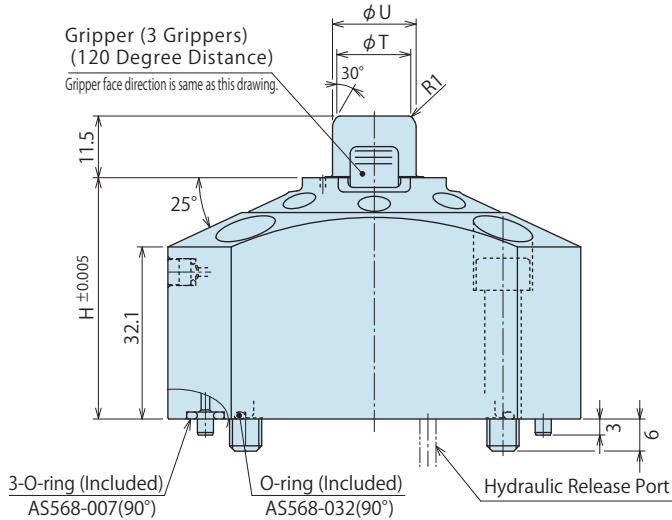
6 Seating Height Dimension	Standard Height	Specifying Seating Height (mm)								
		Blank	H25	H30	H35	H40	H45	H50	H55	H60
3 Mounting Method	H	30	-	-	35	40	45	50	55	60
	E	10	-	-	10	10	10	10	10	10
	AA	-	-	-	5.5	10.5	15.5	20.5	25.5	30.5
	Mass kg	0.7	-	-	0.7	0.7	0.8	0.8	0.8	0.8
When M1 is chosen (Mounting Length 10mm)	H	20	25	30	35	40	45	50	-	-
	E	20	20	20	20	20	20	20	-	-
	AA	-	5.5	10.5	15.5	20.5	25.5	30.5	-	-
	Mass kg	0.6	0.7	0.7	0.7	0.7	0.7	0.8	-	-

External Dimensions

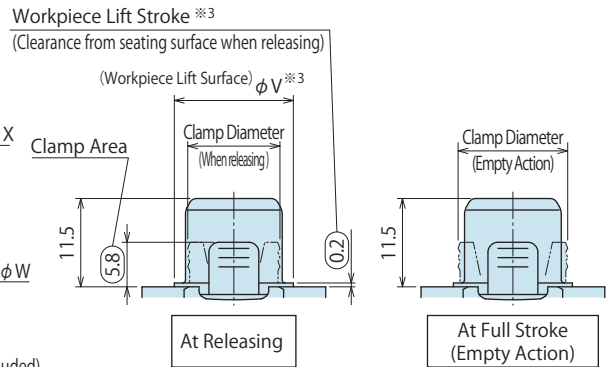
※The drawing shows the released state of SFA3000-G0A-□.



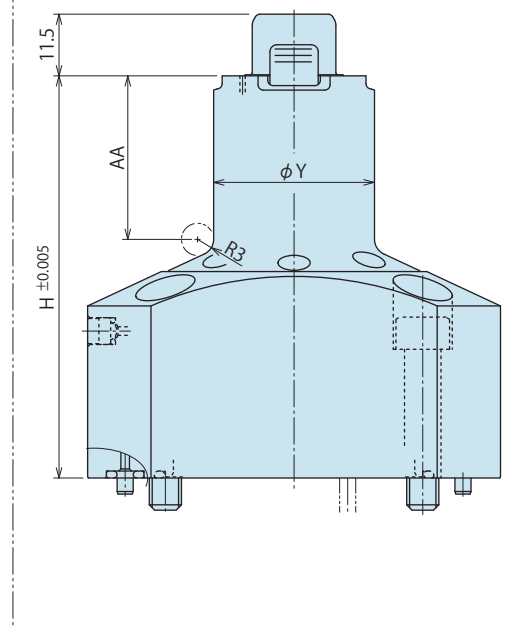
Seating Height: Standard



Expanding Area Detail



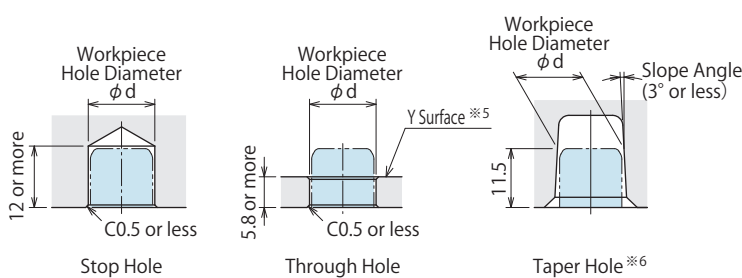
Specifying Seating Height^{※4}



Notes

- ※1. The workpiece must be resting on all seating surfaces when clamping. If this is not done the workpiece can become deformed by the clamping force.
- ※2. The name of each port is marked in the flange surface. (HYD: Hydraulic Lock Port, FC: Seating Check Port, BLOW: Air Blow Port)
Air is always recommended to be supplied to the air blow port and seating check port.
- ※3. The numerical value is only for the workpiece lift option.
- ※4. Please refer to the standard for the seating height that is not shown.

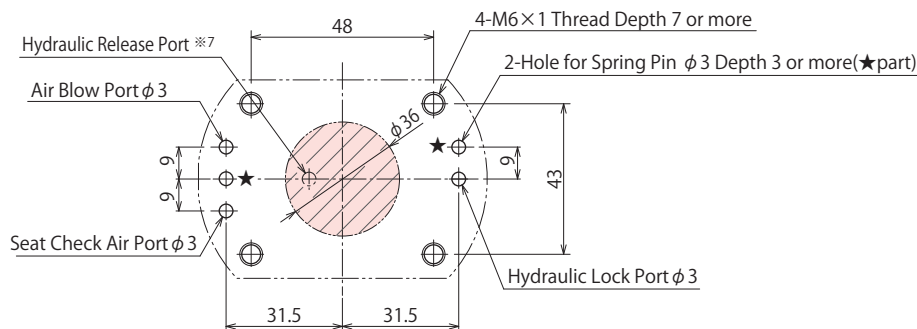
Workpiece (Pallet) Hole Dimension




Notes

- 1. When there is a thin wall around the workpiece hole, the work hole could be deformed by the clamping operation. The clamping force does not fill the specification value. Please make sure to test the clamping function before using and adjust to the appropriate supply of pressure.
- ※5. When the clamp head is sticking above the Y surface of the workpiece, please make sure there is no interference with the clamp cylinders during machining.
- ※6. In the case using taper hole for holding, please use -T: workpiece hole shaped taper hole specification.

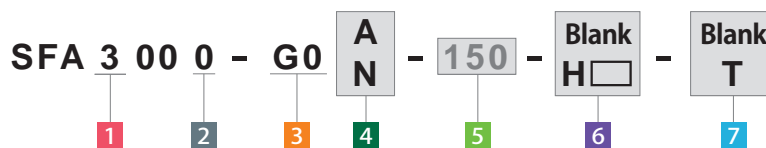
Machining Dimensions of Mounting Area



Notes

- There should be no burrs at the hole contact surface.
- ※7. Please make a hydraulic release port in the range of .

Model No. Indication



- Body Size (When 3 is chosen)
- Design No.
- Mounting Methods (When G0 is chosen)
- Lifting Methods
- Workpiece Hole Diameter (Workpiece Hole Code)
- Seating Height Dimension
- Shape of Workpiece Hole

External Dimensions and Machining Dimensions for Mounting (mm)

Model No.	SFA3000-G0□						
5 Workpiece Hole Code	130	135	140	145	150	155	160
Workpiece Hole Diameter φ d	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}
Clamp Diameter	Release Condition	12.5	13	13.5	14	14.5	15.5
	Empty Action	14.2	14.7	15.2	15.7	16.2	17.2
Offset Tolerance (Floating Clearance of Expanding Area) ※8	±0.5						
Full Stroke	4.2						
Pulling Stroke of Workpiece	1.0						
Workpiece Lift Stroke ※9	0.2						
Mx	8.8	8.8	8.8	8.8	8.8	9.6	9.6
T	9.7	10.2	10.7	11.2	11.7	12.2	12.7
U	12.6	13.1	13.6	14.1	14.6	15.1	15.6
V	15.5	16	16.5	17	17.5	18	18.5
W	19	20	20	21	21	22	22
X	28	28	28	28	28	29	29
Y	29	29	29	29	29	30	30

- Notes
- ※8. The clamping part is an adjusting structure, and the clamping operation is done following the workpiece locating. The numerical value in the table shows the amount of tolerance value of one clamp. When using two or more location clamps, location cylinders, etc., please consider the accuracy between clamping installation distance accuracy of the holes.
 - ※9. Work piece lift stroke is only for lift function option.

6 Seating Height Dimension	3 Mounting Method	Standard Height						
		Blank	H50	H55	H60	H65	H70	H75
When G0 is chosen (Mounting Length Omm)	H	45	50	55	60	65	70	75
	AA	—	5.5	10.5	15.5	20.5	25.5	30.5
	Mass kg	1.3	1.3	1.4	1.4	1.4	1.4	1.5

High-Power Series

Pneumatic Series

Hydraulic Series

Valve / Coupler Hydraulic Unit

Manual Operation Accessories

Cautions / Others

Hole Clamp

SFA

SFC

Swing Clamp

LHA

LHC

LHS

LHW

LT/LG

TLA-2

TLB-2

TLA-1

Link Clamp

LKA

LKC

LKW

LM/LJ

TMA-2

TMA-1

Work Support

LD

LC

TNC

TC

Air Sensing Lift Cylinder

LLW

Compact Cylinder

LL

LLR

LLU

DP

DR

DS

DT

Block Cylinder

DBA

DBC

Control Valve

BZL

BZT

BZX/JZG

Pallet Clamp

VS

VT

Expansion Locating Pin

VL

VM

VJ

VK

Pull Stud Clamp

FP

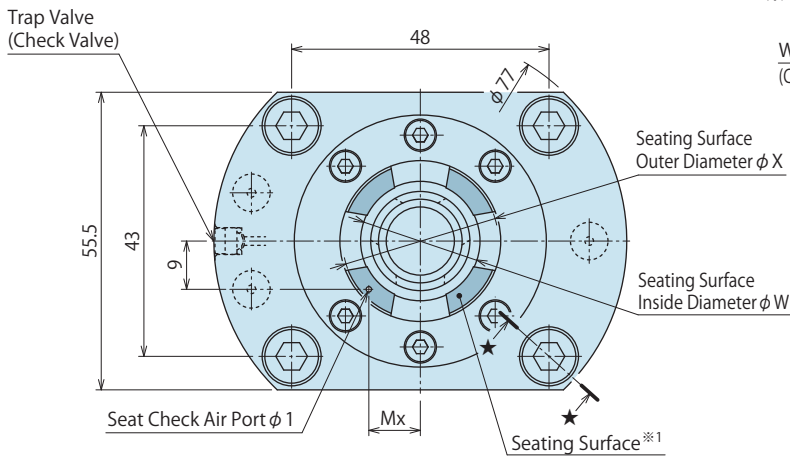
FQ

Customized Spring Cylinder

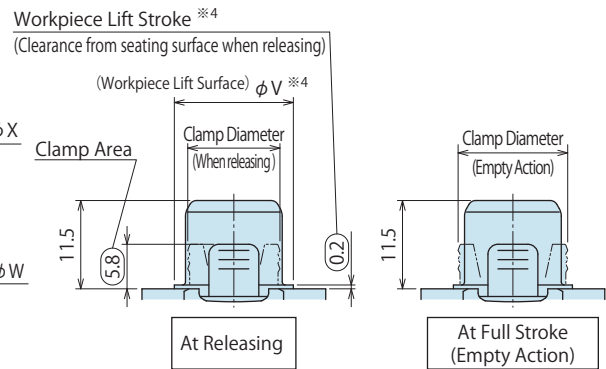
DWA/DWB

External Dimensions

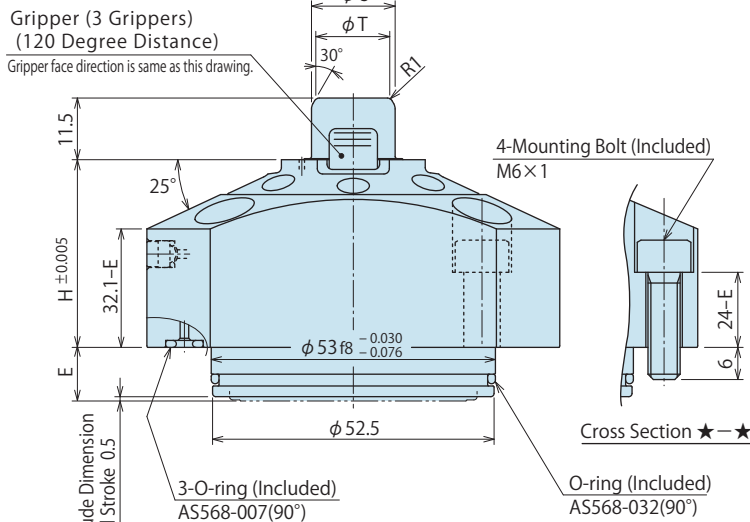
※The drawing shows the released state of SFA3000-M1A-□.



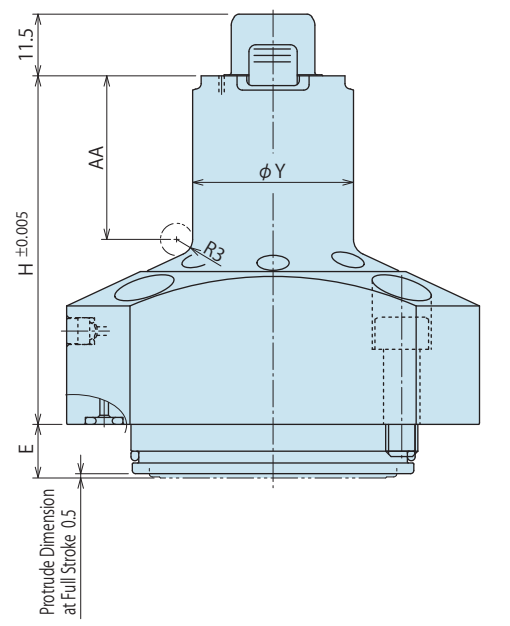
Expanding Area Detail



Seating Height: Standard

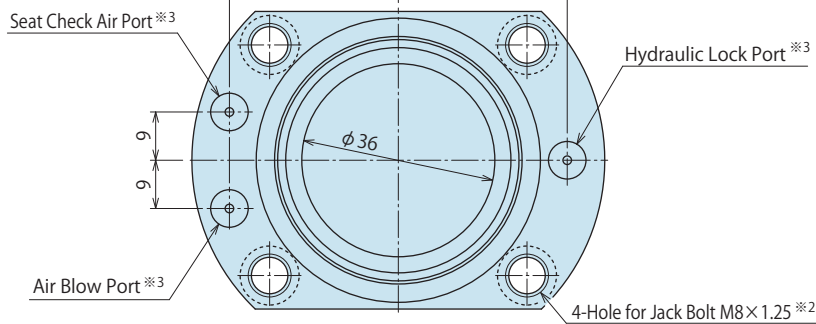


Specifying Seating Height

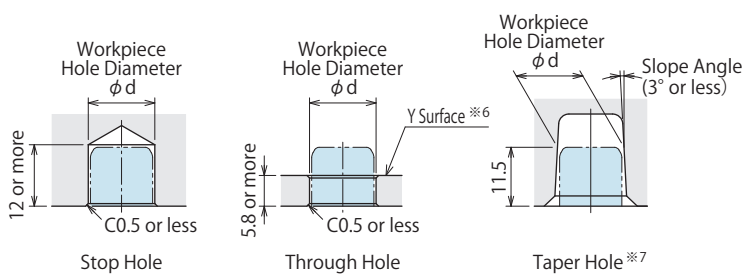


Notes

- ※1. The workpiece must be resting on all seating surfaces when clamping. If this is not done the work piece can become deformed by the clamping force.
- ※2. Screw jack is used when removing hole clamp. Remove with torque wrench in a parallel fashion when detaching.
- ※3. The name of each port is marked in the flange surface. (HYD : Hydraulic Lock Port, FC : Seating Check Port, BLOW: Air Blow Port)
Air is always recommended to be supplied to the air blow port and seating check port.
- ※4. The numerical value is only for the workpiece lift option.
- ※5. Please refer to the standard for the seating height that is not shown.



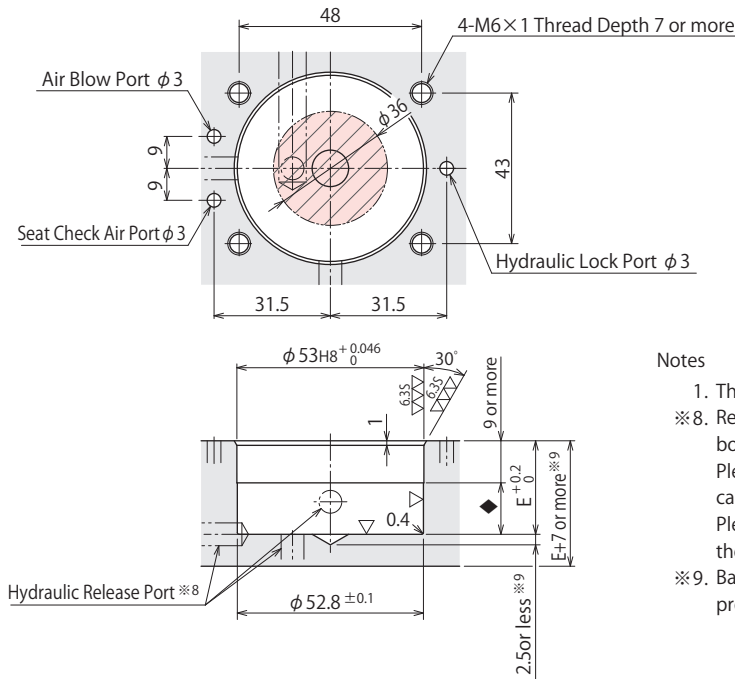
Workpiece (Pallet) Hole Dimension



Notes

- 1. When there is a thin wall around the workpiece hole, the work hole could be deformed by the clamping operation. The clamping force does not fill the specification value. 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 Y surface of the workpiece, please make sure there is no interference with the clamp cylinders during machining.
- ※7. In the case using taper hole for holding, please use -T: workpiece hole shaped taper hole specification.

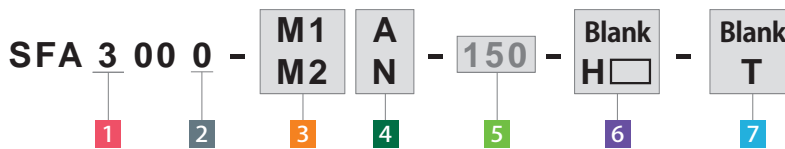
Machining Dimensions of Mounting Area



Notes

- 1. There should be no burrs at the hole contact surface.
- ※8. Release hydraulic pressure can be supplied from the side or bottom surface.
Please make a hydraulic release port within area in the case supplied from the side.
Please make a hydraulic release port within area in the case supplied from the bottom.
- ※9. Base thickness and remaining depth of the lower hole processing (2.5mm) is for when the material is S50C.

Model No. Indication



- 1** Body Size (When 3 is chosen)
- 2** Design No.
- 3** Mounting Methods (When M1/M2 is chosen)
- 4** Lifting Methods
- 5** Workpiece Hole Diameter (Workpiece Hole Code)
- 6** Seating Height Dimension
- 7** Shape of Workpiece Hole

External Dimensions and Machining Dimensions for Mounting (mm)

Model No.	SFA3000-M□□							
5 Workpiece Hole Code	130	135	140	145	150	155	160	
Workpiece Hole Diameter φ d	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}	
Clamp Diameter	Release Condition	12.5	13	13.5	14	14.5	15	15.5
	Empty Action	14.2	14.7	15.2	15.7	16.2	16.7	17.2
Offset Tolerance (Floating Clearance of Expanding Area) ※10				±0.5				
Full Stroke				4.2				
Pulling Stroke of Workpiece				1.0				
Workpiece Lift Stroke ※11				0.2				
Mx	8.8	8.8	8.8	8.8	8.8	9.6	9.6	
T	9.7	10.2	10.7	11.2	11.7	12.2	12.7	
U	12.6	13.1	13.6	14.1	14.6	15.1	15.6	
V	15.5	16	16.5	17	17.5	18	18.5	
W	19	20	20	21	21	22	22	
X	28	28	28	28	28	29	29	
Y	29	29	29	29	29	30	30	

- Notes ※10. The clamping part is an adjusting structure, and the clamping operation is done following the workpiece locating. The numerical value in the table shows the amount of tolerance value of one clamp. When using two or more location clamps, location cylinders, etc., please consider the accuracy between clamping installation distance accuracy of the holes.
- ※11. Workpiece lift stroke is only for lift function option.

6 Seating Height Dimension		(mm)								
3 Mounting Method		Standard Height		Specifying Seating Height						
		Blank	H30	H35	H40	H45	H50	H55	H60	H65
When M1 is chosen (Mounting length 10mm)	H	35	-	-	40	45	50	55	60	65
	E	10	-	-	10	10	10	10	10	10
	AA	-	-	-	5.5	10.5	15.5	20.5	25.5	30.5
	Mass kg	1.2	-	-	1.2	1.3	1.3	1.3	1.3	1.4
When M2 is chosen (Mounting length 20mm)	H	25	30	35	40	45	50	55	-	-
	E	20	20	20	20	20	20	20	-	-
	AA	-	5.5	10.5	15.5	20.5	25.5	30.5	-	-
	Mass kg	1.1	1.2	1.2	1.2	1.2	1.3	1.3	-	-

- High-Power Series
- Pneumatic Series
- Hydraulic Series**
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others

Hole Clamp

- SFA
- SFC

Swing Clamp

- LHA
- LHC
- LHS
- LHW
- LT/LG
- TLA-2
- TLB-2
- TLA-1

Link Clamp

- LKA
- LKC
- LKW
- LM/LJ
- TMA-2
- TMA-1

Work Support

- LD
- LC
- TNC
- TC

Air Sensing Lift Cylinder

- LLW

Compact Cylinder

- LL
- LLR
- LLU
- DP
- DR
- DS
- DT

Block Cylinder

- DBA
- DBC

Control Valve

- BZL
- BZT
- BZX/JZG

Pallet Clamp

- VS
- VT

Expansion Locating Pin

- VL
- VM
- VJ
- VK

Pull Stud Clamp

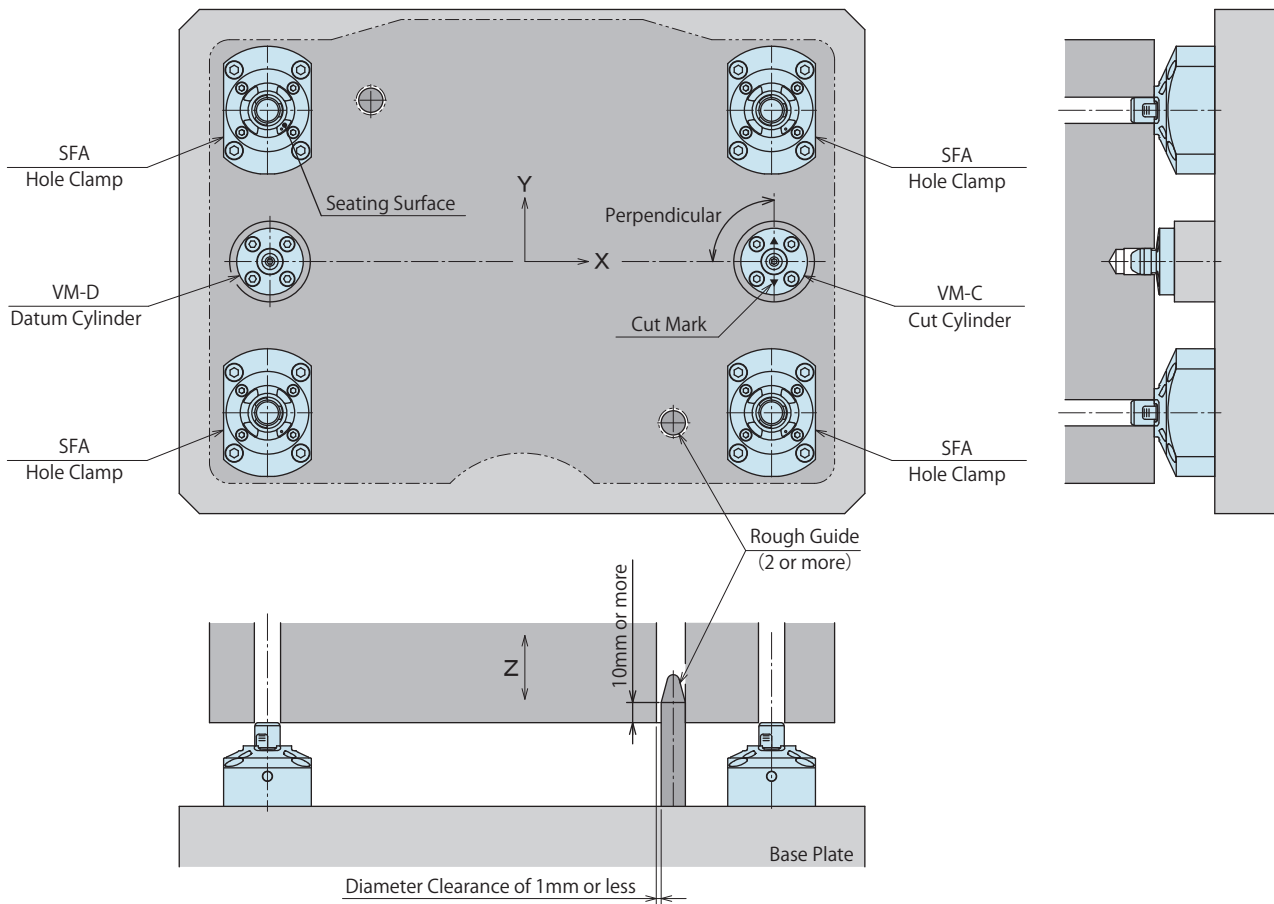
- FP
- FQ

Customized Spring Cylinder

- DWA/DWB

● Mounting Layout Sample

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



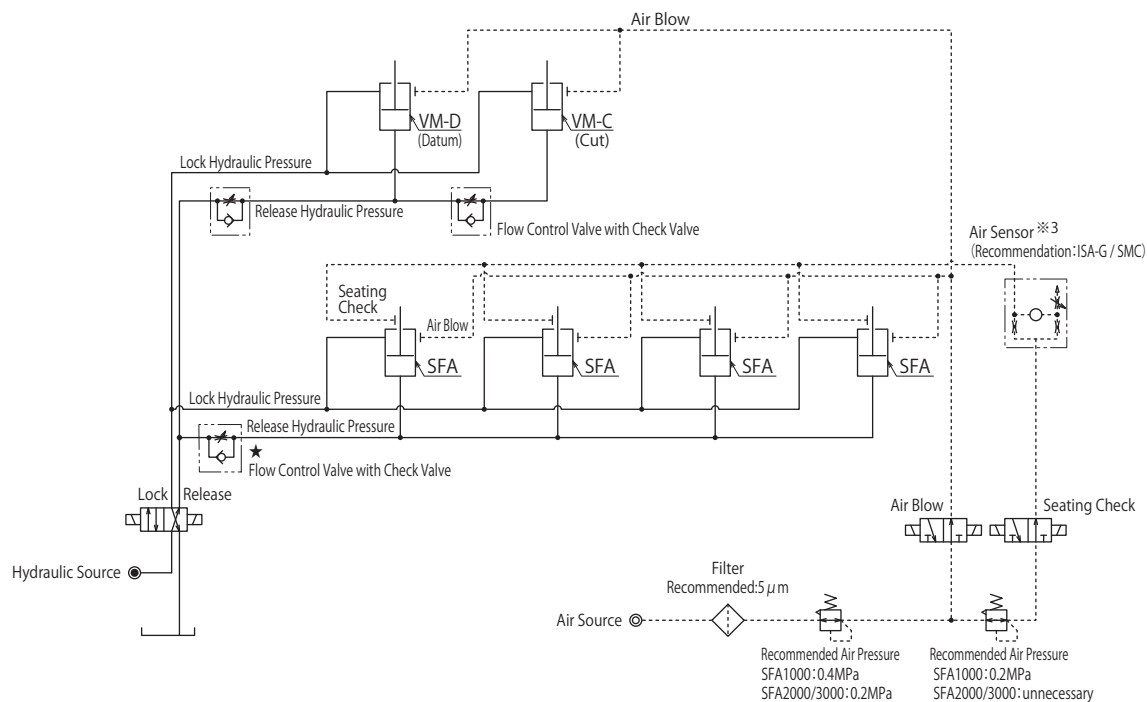
Notes

1. When detaching a workpiece, in order to prevent the clamping part from damage, please set up rough guide of 2 or more. Please refer to the above drawing about 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 VM datum cylinder and SFA hole clamp please choose non-lift function.

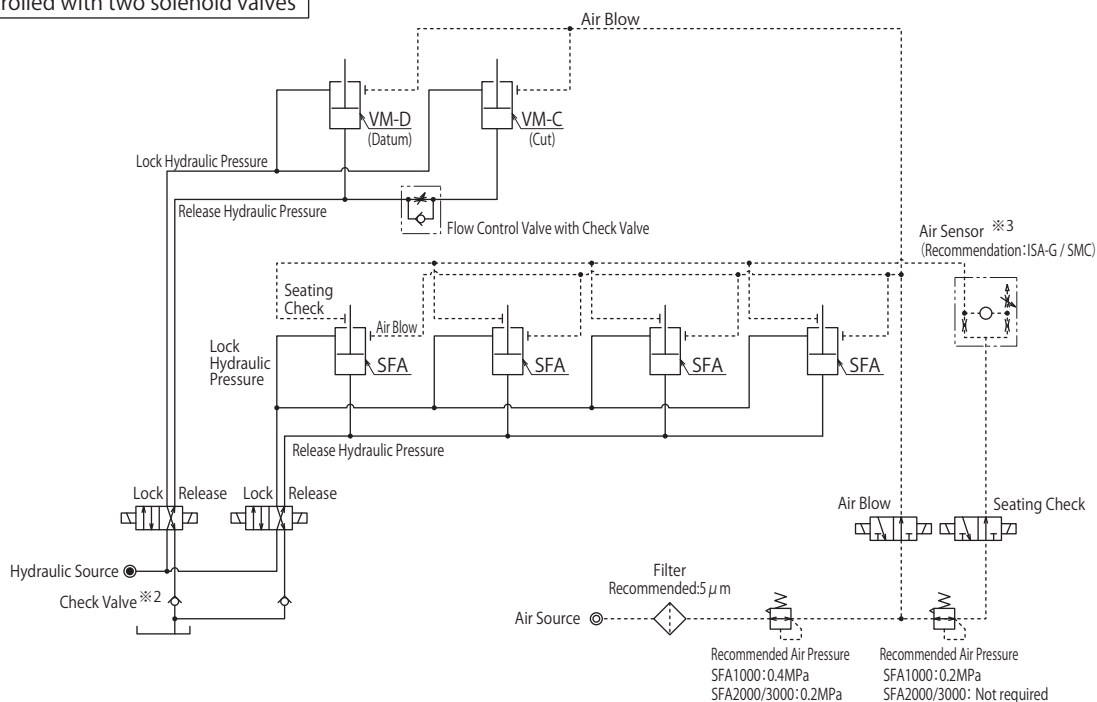
Hydraulic and Pneumatic Circuit Reference

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

When controlled with one solenoid valve



When controlled with two solenoid valves



Notes

- ※1. Make sure to activate VM (Expansion Locating Pin) first. Then activate SFA (Hole Clamp) by using solenoid valve etc.
When unable to use solenoid valve, please prepare flow control valve with check valve at ★(1 piece) to adjust sequencing speed.
If this product operates before locating there is a possibility for the equipment to be damaged.
- ※2. Expanded VM cylinder sometimes releases (unclamps) due to a back pressure of tank-port.
Please prepare check valve (recommend cracking pressure: less than 0.04MPa).
- ※3. To reach required accuracy in setting air sensor, please install air sensor for each individual clamp.
1. Movement of VM-C (cut) should be approximately simultaneous or earlier than the VM-D (datum).

High-Power Series

Pneumatic Series

Hydraulic Series

Valve / Coupler Hydraulic Unit

Manual Operation Accessories

Cautions / Others

Hole Clamp

SFA

SFC

Swing Clamp

LHA

LHC

LHS

LHW

LT/LG

TLA-2

TLB-2

TLA-1

Link Clamp

LKA

LKC

LKW

LM/LJ

TMA-2

TMA-1

Work Support

LD

LC

TNC

TC

Air Sensing Lift Cylinder

LLW

Compact Cylinder

LL

LLR

LLU

DP

DR

DS

DT

Block Cylinder

DBA

DBC

Control Valve

BZL

BZT

BZX/JZG

Pallet Clamp

VS

VT

Expansion Locating Pin

VL

VM

VJ

VK

Pull Stud Clamp

FP

FQ

Customized Spring Cylinder

DWA/DWB

Cautions

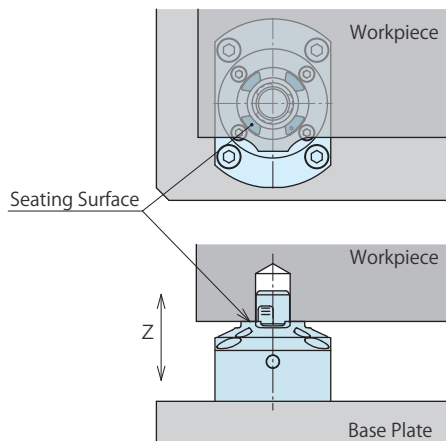
Notes for Design

1) Check Specifications

- Please use each product according to the specifications.
- This equipment is clamped by the hydraulic pressure and released by the hydraulic pressure.

2) Working reference plate (seating surface) Z axis.

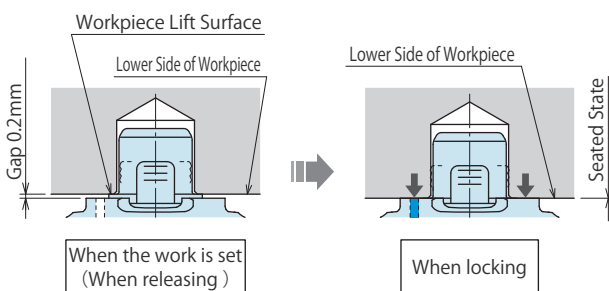
- The upper surface of the flange of this equipment is the seating surface of the workpiece and locates in the Z direction.



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

3) The seating check mechanism

- Workpiece is pressed against the seating surface by lock (clamp) operation and the seating check is detected.



In case of using lift-up function option, when work is set (before supplying the lock hydraulic pressure), the workpiece is lifted up by a built-in spring. There will be a gap of 0.2mm between the workpiece bottom surface and the seating surface.

4) Clamp Installation

- The clamping part of this equipment has the adjusting mechanism ($\pm 0.5\text{mm}$). When using two or more location clamps, location cylinders, etc., please consider the accuracy between clamping installation distance accuracy of the holes.

5) Clamping Force

- Clamping force shows power of pressing force against the seating surface. Please do trial testing and adjust to proper hydraulic pressure. When using in a state that the clamping force is insufficient, the workpiece may fallout.

6) Please use work hole size and work space hardness within the range of the specification.

When the work hole diameter is larger than specification.	The amount of the diameter expansion is insufficient and the clamping force does not satisfy the specification.
When using insufficient clamping force.	Leads to fallout of the workpiece.
When the work hole diameter is smaller than specification.	Detaching of the workpiece becomes difficult and could lead to damage.
When the work hole depth is shallow.	Could lead to abnormal seating and damage.
When the workpiece hole taper is larger than standard.	The load concentrates on the gripper point when clamping and could lead to damage.
When the workpiece is harder than specified.	Gripper does not dig into work enough reliable clamping cannot be achieved.

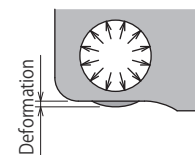
7) Regarding work piece hole material thickness.

- When there is a thin wall around the workpiece hole, the work hole could be deformed by the clamping operation.

The clamping force does not fill the specification.

Please do trial testing and adjust to proper hydraulic pressure.

When using in a state that the clamping force is insufficient, the workpiece may fallout.

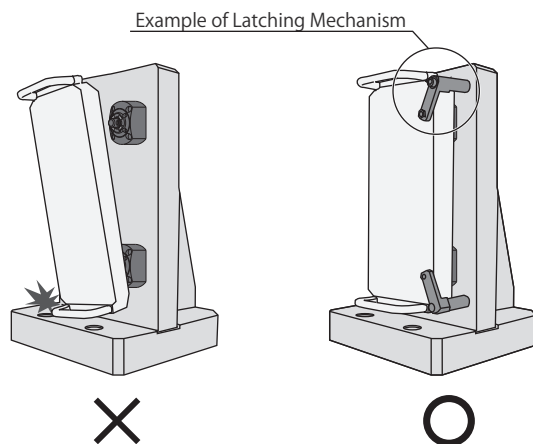


8) Air blow port and seating check port.

- Air is always recommended to be supplied to the air blow port and the seating check port. Using the product without air supply, this will lead to contaminants entering and leading to malfunction.

9) Release Condition

- When releasing, it lifts up the workpiece which is normal. When using in a horizontal application, it is recommended to install work fallout preventions and other temporary stop mechanisms.



10) Horizontal Locating

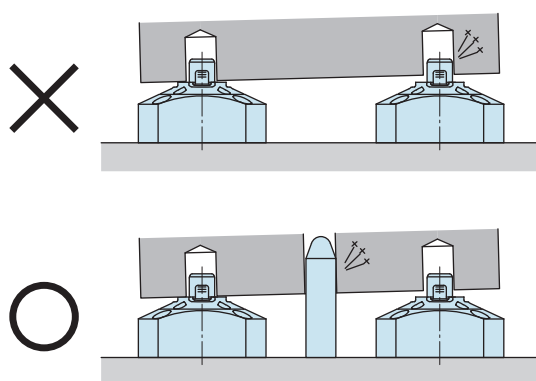
- When the workpiece is set, please make sure that there is no lifting or slope of the workpiece. If the clamping operation is done with lifting or slope of the workpiece, it will lead to possible damage of the work hole.

11) Please detach workpiece with all clamps released completely.

- When detachment of the workpiece during lock operation or release operation, it will lead to deformation and clamping damage of the workpiece hole.

12) Please set up rough guides.

- When detachment of the workpiece with slope it may will lead workpiece or clamping damage and workpiece fallout.



Please prepare rough guides when using with the other location clamps and location cylinders. Please consider the distance between hole clamps installation tolerance and workpiece hole distance tolerance.

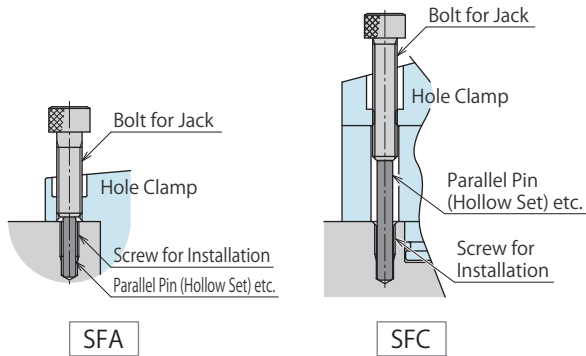
Cautions

Installation Notes

- 1) Check the Usable Fluid
 - Please use the appropriate fluid by referring to the Hydraulic Fluid List (P. 1043).
- 2) Mounting / Removing Hole Clamp
 - Use four bolts with hex holes (grade 12.9) and tighten the body with a torque wrench as shown in the table below. Tighten them evenly to prevent twisting or jamming.

Model No.	Thread Size	Tightening Torque (N·m)
SFA/SFC1000	M4×0.7	3.2
SFA/SFC2000	M5×0.8	6.3
SFA/SFC3000	M6×1	10.0

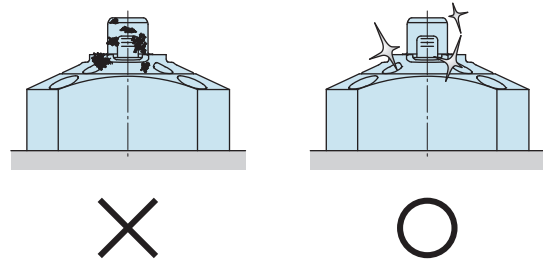
- When removing hole clamp with mounting length 10mm/20mm option, use screw for jack (SFA: 4 mounting bolt holes, SFC: 2 mounting bolt holes), and remove without damage to the screw. The right drawing shows the case in which the parallel pin (hollow set) is put in the screw hole without damage to the screw.



- 3) Port Position of the Hole Clamp
 - The name of each port is marked on the flange surface of the equipment. Be careful of installation direction. (HYD : Hydraulic Lock Port, FC : Seating Check Port, BLOW: Air Blow Port) Release pressure is supplied from the bottom of cylinder.
- 4) Please use air blow circuit with outside diameter $\phi 6$ (inside diameter $\phi 4$) or larger.
 - To do an effective air blow, it is recommended to use air piping with outside diameter $\phi 6$ (inside diameter $\phi 4$) or larger.

Maintenance and Inspection SFA Model

- 1) Please refer to P.1045 for general maintenance.
- 2) Please clean the clamping part regularly.
 - There is an air blow mechanism in this equipment and cutting chips and coolant can be removed. However, as it may be hard to remove clinging cutting chip and sludge, etc., please confirm there is no foreign body when workpiece is set. If operating with dirt adhering to the clamping part, it will lead to work fallout due to clamping force shortage, 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 repair is needed please call us. If repair or modifications are carried out by anyone other than Kosmek, or without our approval and confirmation, it will void warranty.

- 3) Continuous use will result in wear of the gripper and creating less clamping force. Whenever the wear is found replacement of the gripper is needed. Depending on operating pressure, work piece material and hole shape etc., the timing of replacement will differ due to those dependent conditions. Please contact us.

※ Please refer to P.1043 for common cautions. • Installation Notes • Hydraulic Fluid List • Notes on Hydraulic Cylinder Speed Control Circuit • Notes on Handling • Maintenance/Inspection • Warranty

 **MEMO**High-Power
Series

Pneumatic Series

Hydraulic SeriesValve / Coupler
Hydraulic UnitManual Operation
Accessories

Cautions / Others

Hole Clamp**SFA****SFC**

Swing Clamp

LHA

LHC

LHS

LHW

LT/LG

TLA-2

TLB-2

TLA-1

Link Clamp

LKA

LKC

LKW

LM/LJ

TMA-2

TMA-1

Work Support

LD

LC

TNC

TC

Air Sensing
Lift Cylinder

LLW

Compact Cylinder

LL

LLR

LLU

DP

DR

DS

DT

Block Cylinder

DBA

DBC

Control Valve

BZL

BZT

BZX/JZG

Pallet Clamp

VS

VT

Expansion
Locating Pin

VL

VM

VJ

VK

Pull Stud Clamp

FP

FQ

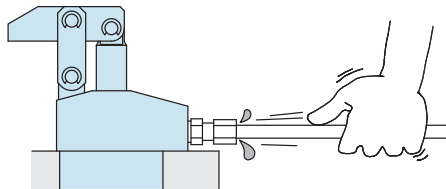
Customized
Spring Cylinder

DWA/DWB

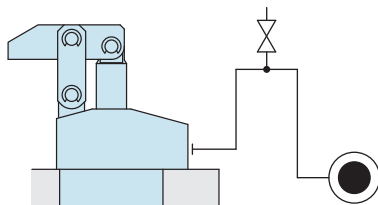
● Cautions

● Installation Notes (For Hydraulic Series)

- 1) Check the Usable Fluid
 - Please use the appropriate fluid by referring to the Hydraulic Fluid List.
- 2) Procedure before Piping
 - The pipeline, piping connector and fixture circuits should be cleaned by thorough flushing.
 - The dust and cutting chips in the circuit may lead to fluid leakage and malfunction.
 - There is no filter provided with Kosmek' s product except for a part of valves which prevents foreign materials and contaminants from getting into the circuit.
- 3) 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.
 - In order to prevent a foreign substance from going into the product during the piping work, it should be carefully cleaned before working.
- 4) 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 the following steps.
 - ① Reduce hydraulic pressure to less than 2MPa.
 - ② Loosen the cap nut of pipe fitting closest to the clamp by one full turn.
 - ③ Wiggle the pipeline to loosen the outlet of pipe fitting.
Hydraulic fluid mixed with air comes out.



- ④ Tighten the cap nut after bleeding.
- ⑤ It is more effective to bleed air at the highest point inside the circuit or at the end of the circuit.
(Set an air bleeding valve at the highest point inside the circuit.)



5) Checking Looseness and Retightening

- At the beginning of the machine installation, the bolt and nut may be tightened lightly. Check the looseness and re-tighten as required.

● Hydraulic Fluid List

Maker	ISO Viscosity Grade ISO-VG-32	
	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 As it may be difficult to purchase the products as shown in the table from overseas, please contact the respective manufacturer.

- High-Power Series
- Pneumatic Series
- Hydraulic Series
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others

Cautions

- Installation Notes (For Hydraulic Series)
- Hydraulic Fluid List
- Notes on Hydraulic Cylinder Speed Control Circuit
- Notes on Handling
- Maintenance/Inspection
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Sales Offices

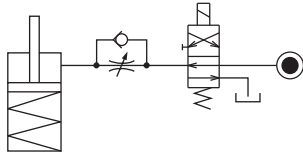
● Notes on Hydraulic Cylinder Speed Control Unit



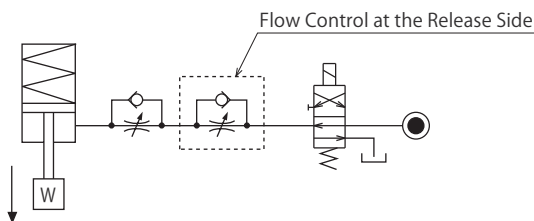
Please pay attention to the cautions below. Design the hydraulic circuit for controlling the action speed of hydraulic cylinder. Improper circuit design may lead to malfunctions and damages. Please review the circuit design in advance.

● Flow Control Circuit for Single Acting Cylinder

For spring return single acting cylinders, restricting flow during release can extremely slow down or disrupt release action. The preferred method is to control the flow during the lock action using a valve that has free-flow in the release direction. It is also preferred to provide a flow control valve at each actuator.



Accelerated clamping speed by excessive hydraulic flow to the cylinder may sustain damage. In this case add flow control to regulate flow. (Please add flow control to release flow if the lever weight is put on at the time of release action when using swing clamps.)



● Flow Control Circuit for Double Acting Cylinder

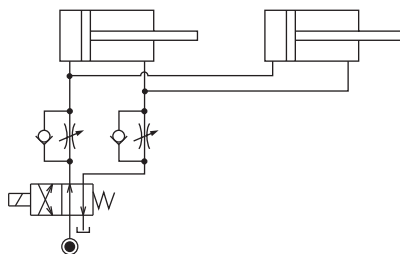
Flow control circuit for double acting cylinder should have meter-out circuits for both the lock and release sides. Meter-in control can have adverse effect by presence of air in the system.

However, in the case of controlling LKE, TMA, TLA, both lock side and release side should be meter-in circuit.

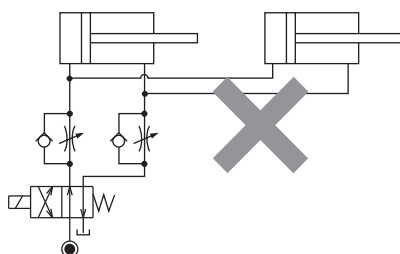
Refer to P.47 for speed adjustment of LKE.

For TMA and TLA, if meter-out circuit is used, abnormal high pressure is created, which causes oil leakage and damage.

【Meter-out Circuit】 (Except LKE/TMA/TLA)

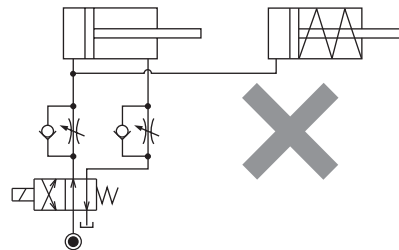


【Meter-in Circuit】 (LKE/TMA/TLA must be controlled with meter-in.)



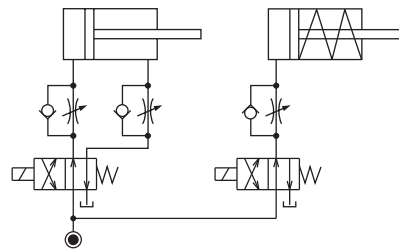
In the case of meter-out circuit, the hydraulic circuit should be designed with the following points.

- ① Single acting components should not be used in the same flow control circuit as the double acting components. The release action of the single acting cylinders may become erratic or very slow.

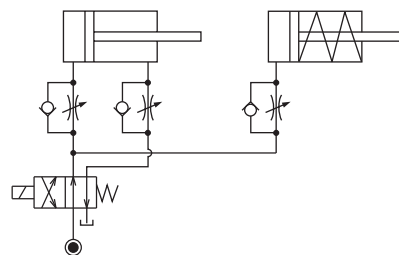


Refer to the following circuit when both the single acting cylinder and double acting cylinder are used together.

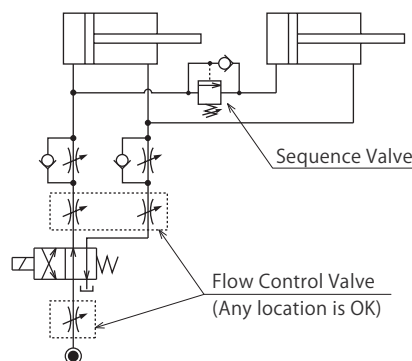
- Separate the control circuit.



- Reduce the influence of double acting cylinder control unit. However, due to the back pressure in tank line, single action cylinder is activated after double action cylinder works.



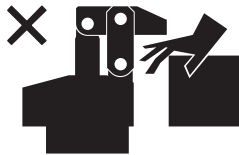
- ② In the case of meter-out circuit, the inner circuit pressure may increase during the cylinder action because of the fluid supply. The increase of the inner circuit pressure can be prevented by reducing the supplied fluid beforehand via the flow control valve. Especially when using sequence valve or pressure switches for clamping detection. If the back pressure is more than the set pressure then the system will not work as it is designed to.



● Cautions

● Notes on Handling

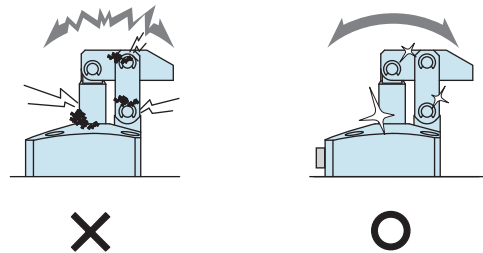
- 1) It should be handled by qualified personnel.
 - The hydraulic machine and air compressor should be handled and maintained by qualified personnel.
- 2) Do not handle or remove the machine unless the safety protocols are ensured.
 - ① The machine and equipment can only be inspected or prepared when it is confirmed that the preventive devices are in place.
 - ② Before the machine is removed, make sure that the above-mentioned safety measures are in place. Shut off the air of hydraulic source and make sure no pressure exists in the hydraulic and air circuit.
 - ③ After stopping the machine, do not remove until the temperature cools down.
 - ④ Make sure there is no abnormality in the bolts and respective parts before restarting the machine or equipment.
- 3) Do not touch clamps (cylinder) while clamps (cylinder) is working. Otherwise, your hands may be injured due to clinching.



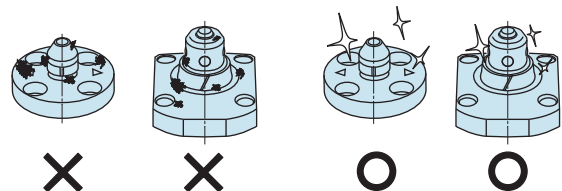
- 4) Do not disassemble or modify.
 - If the equipment is taken apart or modified, the warranty will be voided even within the warranty period.

● Maintenance and Inspection

- 1) Removal of the Machine and Shut-off of Pressure Source
 - Before the machine is removed, make sure that the above-mentioned safety measures are in place. Shut off the air of hydraulic source and make sure no pressure exists in the hydraulic and air circuit.
 - Make sure there is no abnormality in the bolts and respective parts before restarting.
- 2) Regularly clean the area around the piston rod and plunger.
 - If it is used when the surface is contaminated with dirt, it may lead to packing seal damage, malfunctioning, fluid leakage and air leaks.



- 3) Please clean out the reference surface regularly (taper reference surface and seating surface) of locating machine. (VS/VT/VL/VM/VJ/VK/WVS/WM/WK/VX/VXF)
 - Location products, except VX/VXF model, can remove contaminants with cleaning functions. When installing pallets make sure there is no thick sludge like substances on pallets.
 - Continuous use with dirt on components will lead to locating functions not work properly, leaking and malfunction.



- 4) If disconnecting by couplers on a regular basis, air bleeding should be carried out daily to avoid air mixed in the circuit.
- 5) Regularly tighten nuts, bolts, pins, cylinders and pipe line to ensure proper use.
- 6) Make sure the hydraulic fluid has not deteriorated.
- 7) Make sure there is smooth action and no abnormal 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.

Cautions

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\(For Hydraulic Series\)](#)
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[Notes on Hydraulic Cylinder
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Sales Offices

● 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 If the product is used while it is not suitable for use based on the operator's judgment, resulting in defect.
- ③ If it is used or handled in 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.

Sales Offices

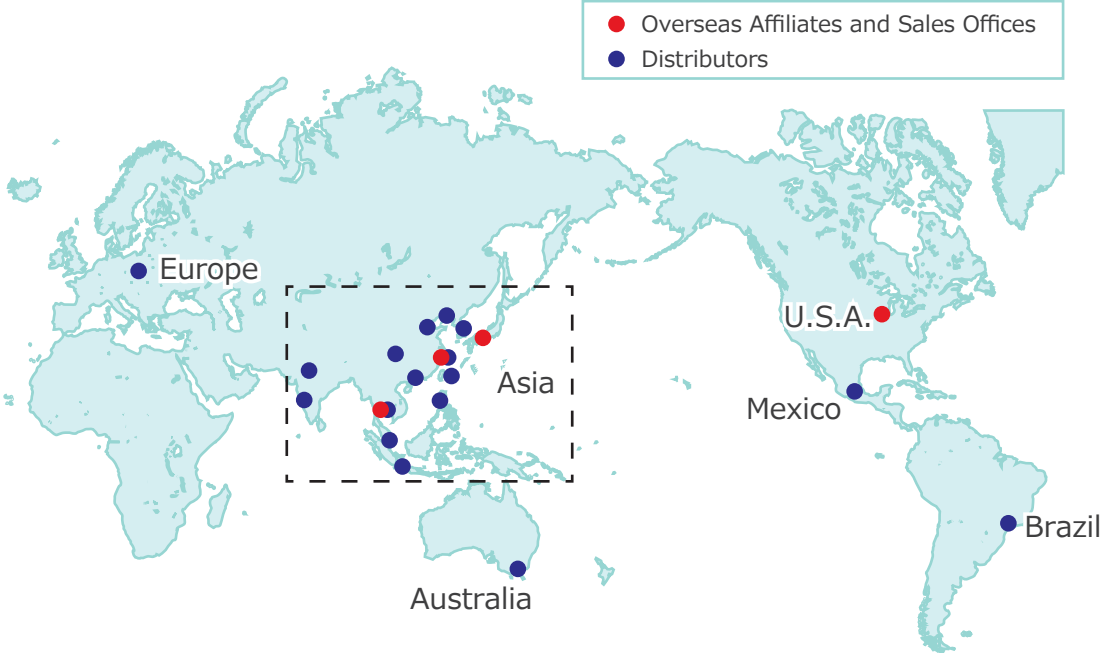
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KOSMEK (USA) LTD.	1441 Branding Avenue, Suite 110, Downers Grove, IL 60515 USA	
China	TEL.+86-21-54253000	FAX.+86-21-54253709
KOSMEK (CHINA) LTD. 考世美(上海)貿易有限公司	21/F, Orient International Technology Building, No.58, Xiangchen Rd, Pudong Shanghai 200122., P.R.China 中国上海市浦东新区向城路58号东方国际科技大厦21F室 200122	
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G.E.T. Inc, Phil.	Victoria Wave Special Economic Zone Mt. Apo Building, Brgy. 186, North Caloocan City, Metro Manila, Philippines 1427	
Europe (Europe Exclusive Distributor)	TEL. +43-463-287587-10	FAX. +43-463-287587-20
KOS-MECH GmbH	Schleppeplatz 2 9020 Klagenfurt Austria	
Indonesia (Indonesia Exclusive Distributor)	TEL. +62-21-5818632	FAX. +62-21-5814857
P.T PANDU HYDRO PNEUMATICS	Ruko Green Garden Blok Z- II No.51 Rt.005 Rw.008 Kedoya Utara-Kebon Jeruk Jakarta Barat 11520 Indonesia	

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Tokyo Sales Office	TEL.048-652-8839	FAX.048-652-8828
	〒331-0815 埼玉県さいたま市北区大成町4丁目81番地	
Nagoya Sales Office	TEL.0566-74-8778	FAX.0566-74-8808
	〒446-0076 愛知県安城市美園町2丁目10番地1	
Fukuoka Sales Office	TEL.092-433-0424	FAX.092-433-0426
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Global Network



Asia Detailed Map



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