

For Semiconductor Manufacturing

# High-Accuracy Changeover

**of tools and nozzles  
at the equipment's end**



**NEW**

## Compact Hand Changer High-Accuracy Tool Change to Reduce Setup Time model SVS

- Using low-dust grease for clean environments
- With vacuum port to minimize particles
- Mechanical lock function to maintain the connected state even when air falls to 0MPa.

# Compact Hand Changer

Model SVS



Developed for Semiconductor Manufacturing Processes

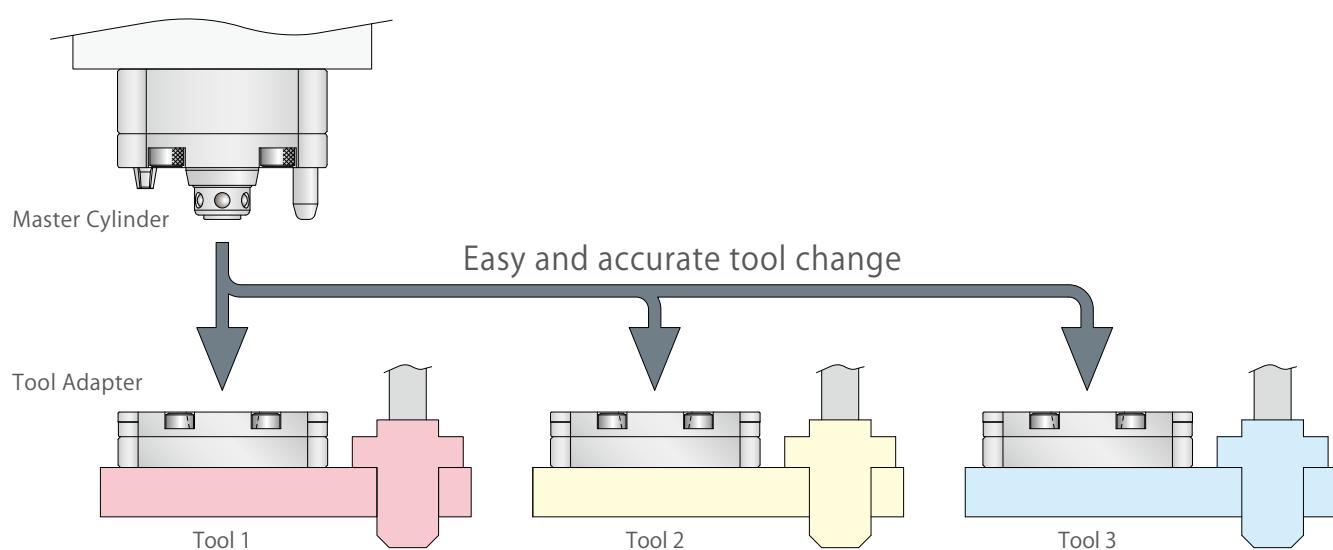
High-Accuracy Tool Change to Reduce Setup Time

**Payload : 1kg , 7kg   Repeatability : 5  $\mu$ m**

PAT.

Automates the replacement of chemical spray nozzles and small tools.

Equipped with low-dust grease and a vacuum port to minimize particles, this product is ideal for use in semiconductor manufacturing equipment and FA application.



For Tool Changes in Semiconductor Cleaning Processes

Allows for Compact Equipment and Multi-Functionality (Standardization)

# — for Semiconductor Manufacturing —

## • Materials Suitable for Semiconductor Manufacturing

Body Material : Stainless Steel, Aluminum

Packing Material : Fluor Rubber

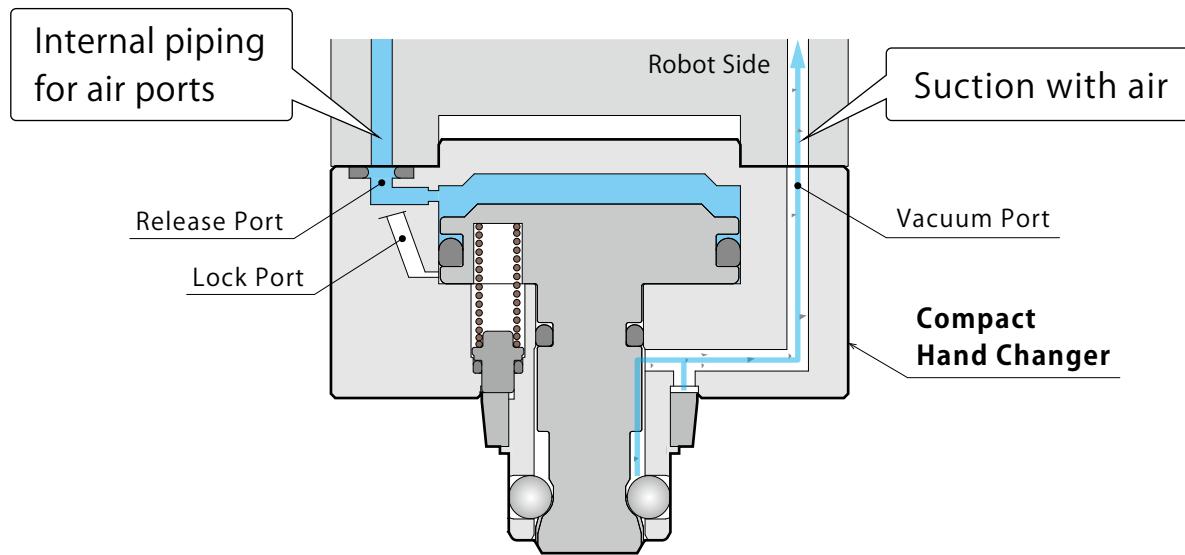
Internal Lubricant : Low-dust Grease for Clean Environments

## • Rear Gasket Design

Internal piping possible.

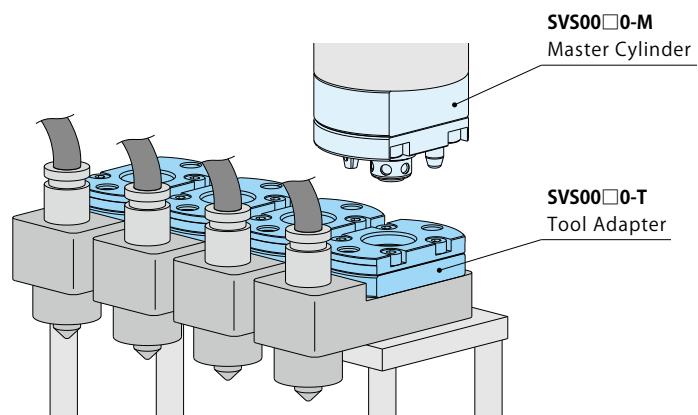
## • Equipped with Vacuum Port

Minimizes small debris and particles.



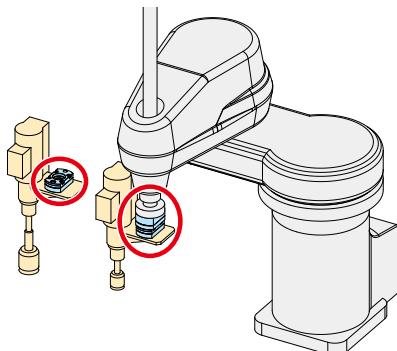
## ● Application Example

### For Replacing Nozzle Ends

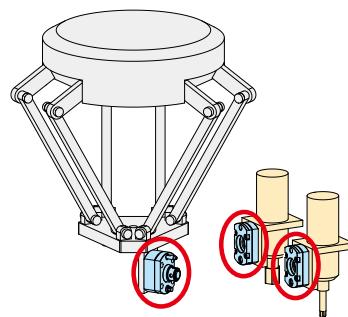


● Features

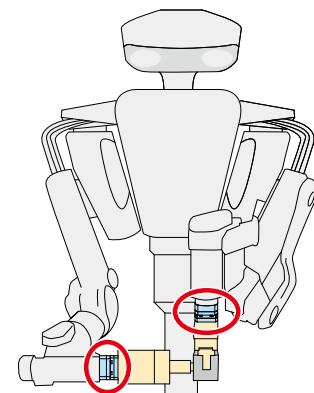
# — Instant Change of Robot Tools —



SCARA Robot



Parallel Link Robot



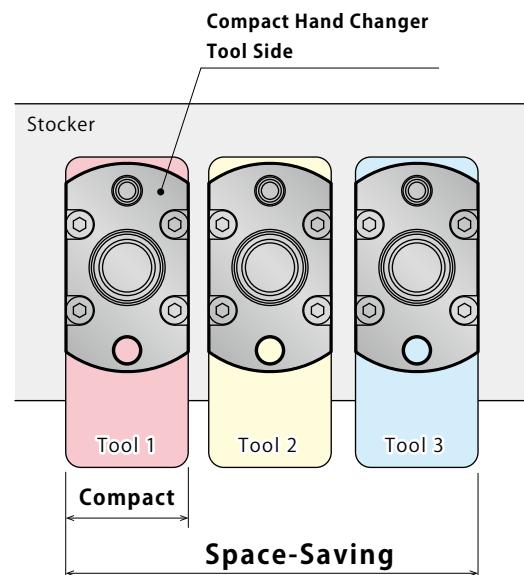
Humanoid Robot

## Light and Compact

Even more compact than our conventional SWR models. Space saving for tool stocker. Ideal for exchanging nozzles and small tools.

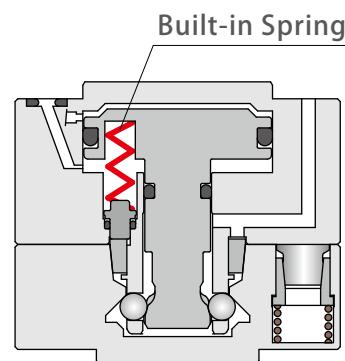
## High Durability and High Rigidity

Zero backlash when connected and mechanical durability exceeds 2 million cycles. Maintains repeatability of 0.005 mm even after 2 million cycles.



## Self-Locking Function to Prevent a Tool Fall

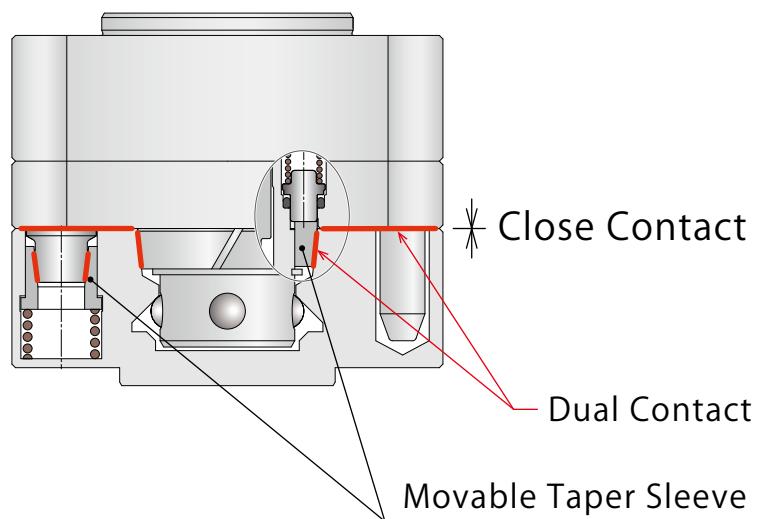
The built-in self-locking spring prevents tools from falling even when air pressure falls to 0 MPa.   
※ Usually it should be connected with spring force and air pressure.



# High-Accuracy Repeatability 0.005mm

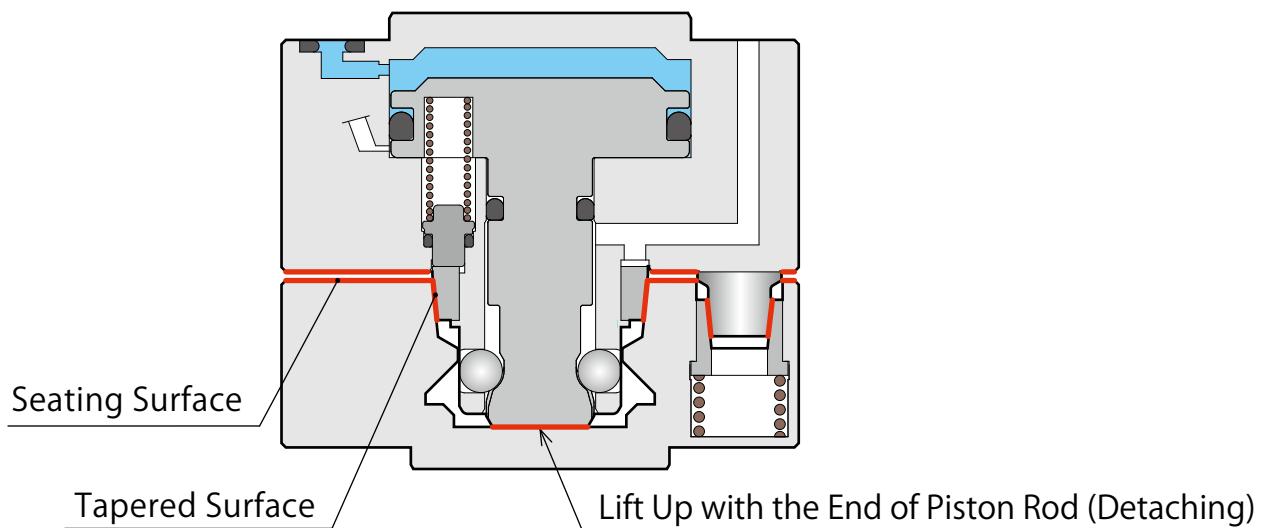
## Zero backlash to prevent deflection and chattering

Dual contact with movable taper sleeve enables high accuracy locating.  
Only slight fluctuation at the end of tool allowing for precise operation.

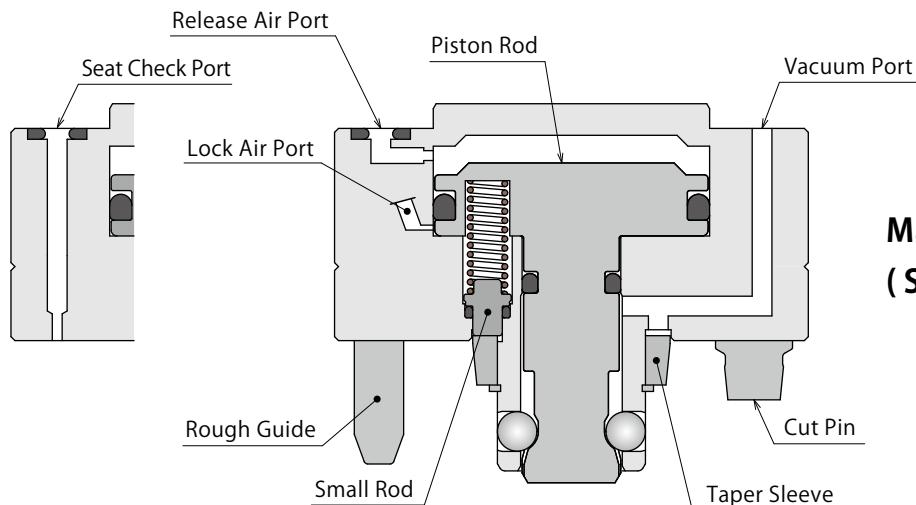


## Lift up (Detaching) function protects locating part.

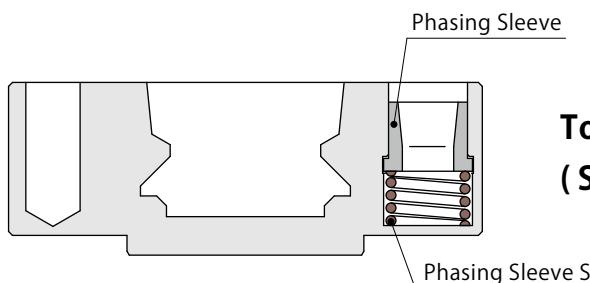
When connecting, lift up function prevents damage of the locating function part (seating surface and tapered surface). When disconnecting, the rod detaches the tool adaptor preventing moment stop caused by adhesion and galling.



### ● Cross Section

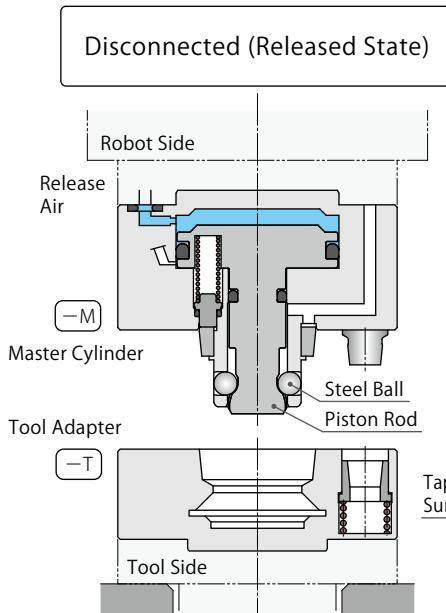


**Master Cylinder**  
( SVS□0-M )



**Tool Adapter**  
( SVS□0-T )

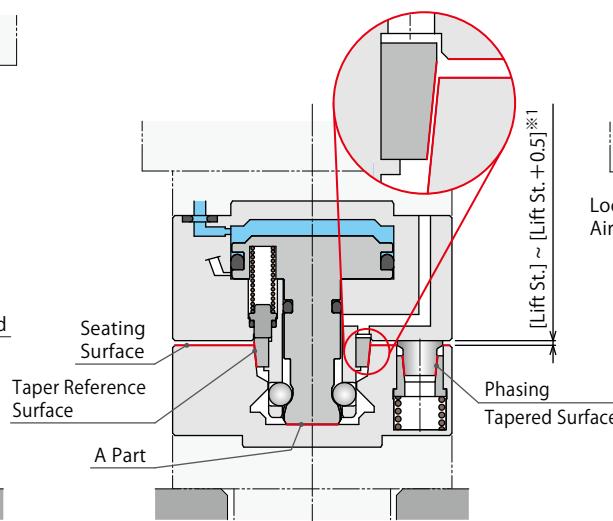
### ● Action Description



Disconnected (Released State)

Just before Connection (Setting State)  
Lifted State (Detached State)

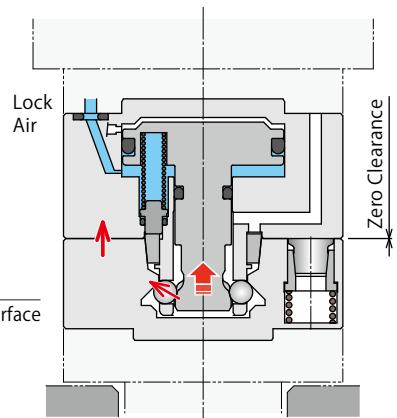
Connected State (Locked State)



Supply air to the release side.  
The piston rod is pushed down with thrust force caused by release air. At this time the steel balls are free to move (set inside).

When the master cylinder is lowered and stopped at the lift stroke  $\sim +0.5\text{mm}$ , it is in setting state.  
At this time there is a moderate gap at taper reference surface and seating surface. It prevents the locating mechanism part from damage.  
When detached, the piston pushes out A part to prevent moment stop caused by fixation or galling.

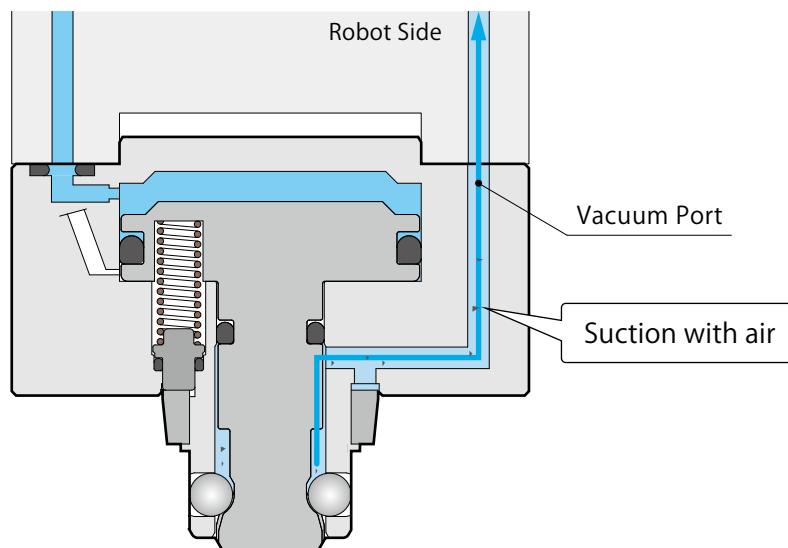
\*1. Refer to the specification on P.8 for the lift stroke.



Stop the release air pressure and supply air to the lock port. The piston rod will be pulled up with piston thrust and an internal spring, and the tool adapter will be pulled to the seating surface by the steel balls.  
When the tool adapter is pulled, the taper reference surface and phasing taper sleeve are centered in a reference axis (body), and locating is completed.

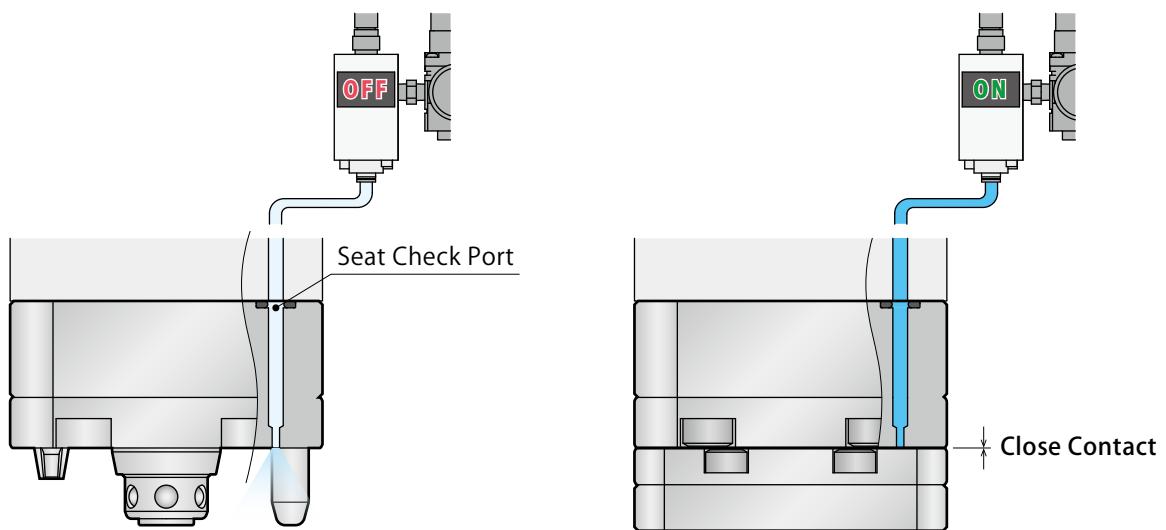
## ● Air Port Description : Vacuum Port

Air suction via the vacuum port effectively minimizes the presence of fine debris and particles.



## ● Air Port Description : Seat Check Port

Close contact of master cylinder and tool adapter is confirmed by installing an air sensor to the seat check port. If they are not in close contact and there is a gap on the seating surfaces (connection failure), air will leak. It detects the connected condition precisely since the air sensor turns on when they are connected properly. ※ Air sensor must be installed separately.



Before Connection : Air Sensor OFF

When Connected : Air Sensor ON

**Model No. Indication**

Master Cylinder (Robot Side)

**SVS** **001** **007** **0 - M**

1 2



Tool Adapter (Tool Side)

**SVS** **001** **007** **0 - T**

1 2

**1 Payload**

**001** : 1kg  
**007** : 7kg

**2 Design No.**

**0** : Revision Number

Features Application Ex.	Cross Section Action Description	Model No. Indication	Specifications Performance Curve	External Dimensions	Cautions
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## ● Specifications

Model No.		SVS0010	SVS0070
Payload	kg	1	7
Repeatability	mm	0.005	
Lift Stroke (Detaching Stroke)	mm	0.5	0.8
Cylinder Lock	cm <sup>3</sup>	0.45	1.50
Capacity Release	cm <sup>3</sup>	0.51	1.72
Operating Air Pressure	Max. Pressure	MPa	0.7
	Min. Pressure	MPa	0.35
	Withstanding Pressure	MPa	1.0
Holding Force	Refer to the performance curve below.		
Lifting Force (Detaching Force)	Refer to the performance curve below.		
Allowable <sup>※1</sup>	Bending Direction (at 0.5MPa)	N·m	2.5
Static Moment	Twisting Direction	N·m	6.0
Max. Load <sup>※2</sup>	Bending Direction (at 0.5MPa)	N·m	5.0
Moment	Twisting Direction	N·m	12.0
Operating Temperature	°C	0 ~ 70	
Usable Fluid	Dry Air		
Weight	Master Cylinder	g	About 54
	Tool Adapter	g	About 24
Allowable Offset while Teaching	Refer to P.12		

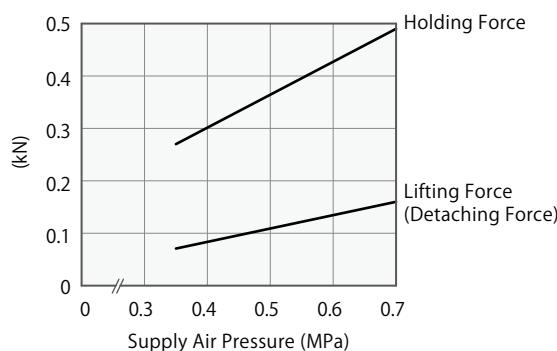
Notes :

- ※1. Please consider both the payload and allowable static moment when selecting the product.
- ※2. The product must be used within Allowable Static Moment (※1). Using within Max. Load Moment will not fill the specifications.
- 1. If the air pressure drops to 0 MPa after connection, the mechanical lock function will maintain the connected state; however, it will not maintain the performance specifications.

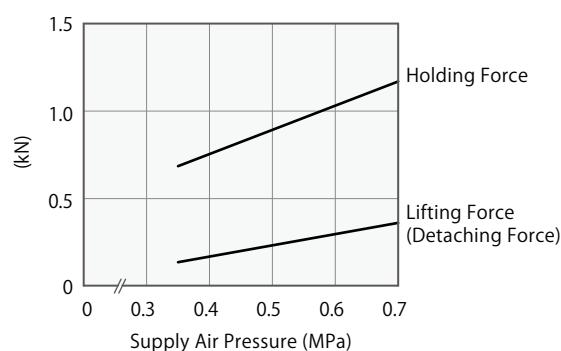
## ● Performance Curve : Holding Force and Lifting Force (Detaching Force)

Model No.		SVS0010	SVS0070
Holding Force	at 0MPa <sup>※3</sup>	kN	0.05
	at 0.35MPa	kN	0.27
	at 0.4MPa	kN	0.30
	at 0.5MPa	kN	0.37
	at 0.7MPa	kN	0.49
Lifting Force (Detaching Force)	at 0.35MPa	kN	0.07
	at 0.5MPa	kN	0.11
	at 0.7MPa	kN	0.16

**SVS0010**



**SVS0070**



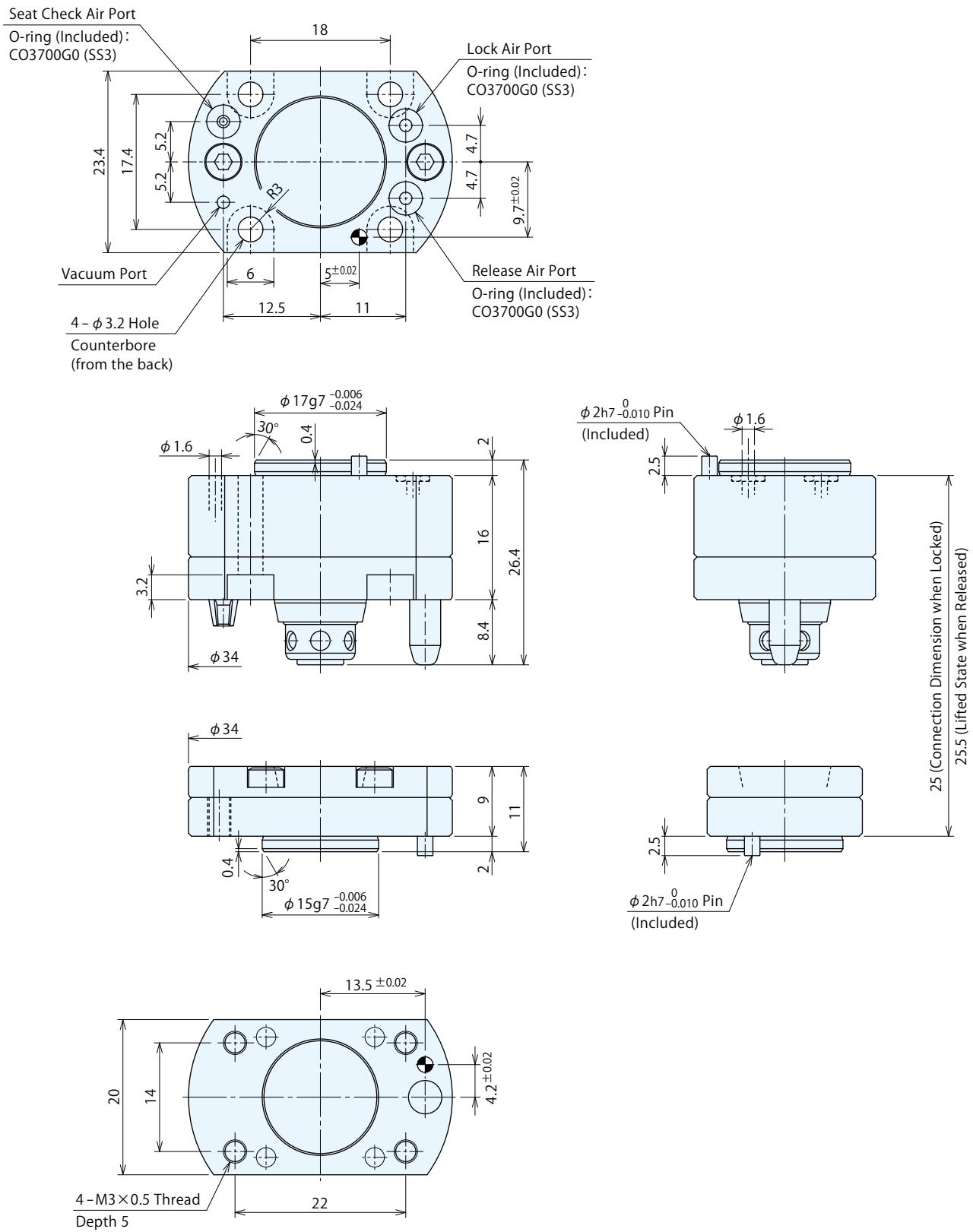
Notes :

- ※3. Holding force when air pressure drops to 0MPa after connection and it will not fill the specification.
- 1. The table and graphs shown are the relationship between supply air pressure (MPa) and holding force (kN) or lifting force (kN).

## External Dimensions (SVS0010)

※ This drawing shows the released state of SVS0010.

Master Cylinder **SVS0010-M**

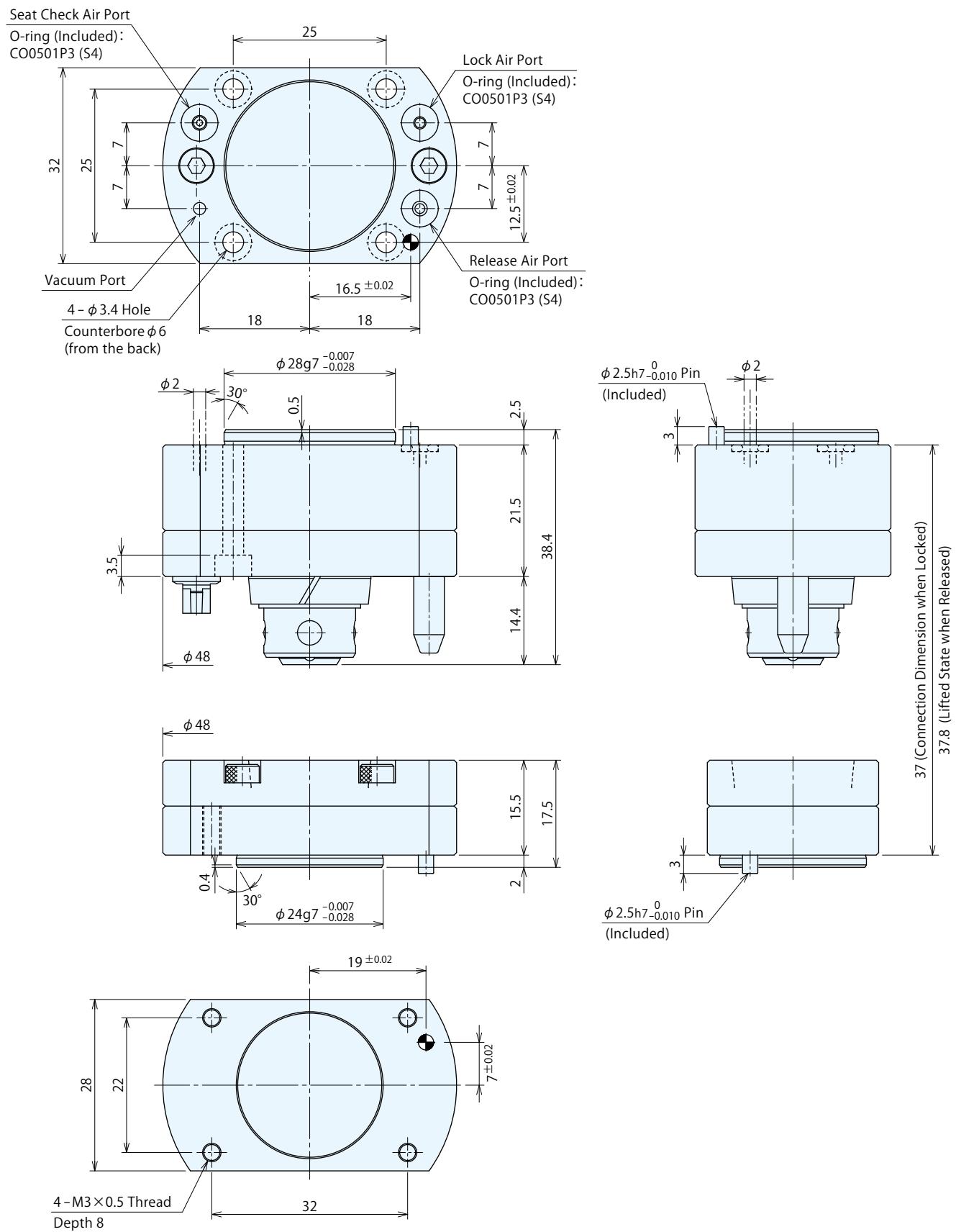


## Tool Adapter **SVS0010-T**

## External Dimensions (SVS0070)

※ This drawing shows the released state of SVS0070.

Master Cylinder **SVS0070-M**



Tool Adapter **SVS0070-T**

## ● Cautions

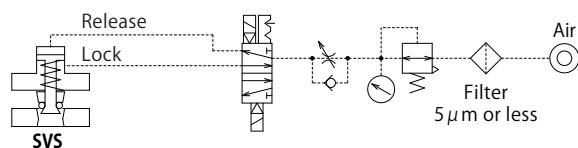
### ● Notes for Design

#### 1) Check Specifications

- Please use each product according to the specifications.
- Operating air pressure is Max. 0.7 MPa and Min. 0.35MPa.

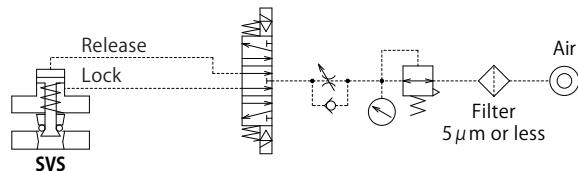
#### 2) Air Pressure Circuit Reference

- During normal use, make sure to supply air pressure to the lock circuit. Even if the air pressure becomes zero due to power failure, the self-lock function with a spring prevents the tool from falling.  
【When using a 2-Position Solenoid Valve】  
Please use a 2-position double solenoid valve. In case of using a 2-position single solenoid valve, for safety, connect the piping so that air is supplied to the lock side when the power is turned off. If air is supplied to the release side, it is dangerous as it may cause the tool (hand) to drop. Also, in the case of 2-position single, please note that if the power is turned off in the release state, it will lock.



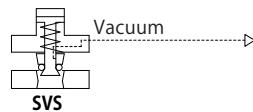
#### 【When Using a 3-Position Solenoid Valve】

Please use the valve with a 3-position exhaust center. When the power is turned off due to emergency stop, please be aware that the compact hand changer will perform locking operation even in the released state due to the fall prevention function.

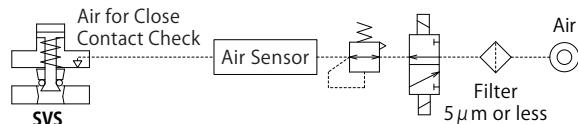


#### ● Circuit Reference for each port

##### ① Vacuum Port



##### ② Seat Check Port



#### 3) Combination of Master Cylinder and Tool Adapter

- Please refer to the below table for combination of Master Cylinder and Tool Adapter.

Master Cylinder	Tool Adapter
<b>SVS0010-M</b>	<b>SVS0010-T</b>
<b>SVS0070-M</b>	<b>SVS0070-T</b>

#### 4) Allowable Static Moment

- The allowable static moment should be within the respective range of the bending moment and the twisting moment.  
(Refer to P.8 for further information.)

#### 5) Operating Environment

- Do not use the product in the environment with water • vapor • liquid • scattering of chemicals • explosion • gas with causticity.

#### 6) Hand Changing (Attaching/Detaching) in a Horizontal Position

- When connecting/disconnecting the Compact Hand Changer in a horizontal position, make sure not to apply excessive moment on master cylinder. When selecting the compact hand changer, ensure a sufficient safety margin for the payload.

When connecting, make sure the tool side has no lifting or tilting that is larger than the allowable position offset range.

Also, do not fix it completely on the tool stand, and make a margin (clearance) within the allowable position offset range. Otherwise, this will affect repeatability.

## ● Installation Notes

- 1) Please supply filtered clean dry air.
- Make sure to supply filtered clean dry air.
- Oil supply with a lubricator etc. is unnecessary.
- 2) Preparation for Piping
  - The pipeline, piping connector and fixture circuits should be cleaned and flushed thoroughly. The dust and cutting chips in the circuit may lead to fluid leakage and malfunction.
  - There is no filter provided with this product for prevention of contaminants in the air circuit.

- 3) Applying Sealing Tape
  - When using sealing tape, wrap with it 1 to 2 times following the screwing direction. When piping, be careful that contaminant such as sealing tape does not enter in products. Pieces of the sealing tape can cause air leaks and malfunction.
- 4) Installation/Removal of Master Cylinder/Tool Adapter
  - Please follow the tightening torque below. When mounting, tighten with bolts evenly not to incline the master cylinder and tool adapter.

### [ Master Cylinder / Tool Adapter ]

Model No.	Bolt Size	No. of Bolts	Tightening Torque (N·m)
<b>SVS0010</b>	M3 × 0.5	4	1.3
<b>SVS0070</b>	M3 × 0.5	4	1.3

When installing and removing the master cylinder and tool adapter, be sure not to lose the attached pins.

Moment characteristics may not be guaranteed if installed without using the attached pins.

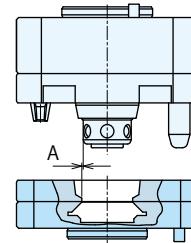
- 5) Test Run Method
  - If supplying a large amount of air just after installation, action time will be extremely fast leading to severe damage on compact hand changer. Set the speed controller (Meter-in) and gradually supply air pressure.

### 6) Allowable Offset while Teaching

- Allowable offset of the master cylinder and tool adapter while teaching should be within the range shown below. Tool adapter and tool placing stand should have space within the range of allowable offset.

#### ① Allowable Position Offset in Horizontal Direction

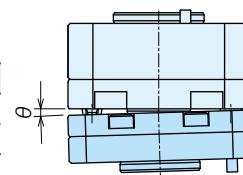
Model No.	Allowable Offset Amm
<b>SVS0010</b>	$\pm 0.8$ mm
<b>SVS0070</b>	$\pm 0.8$ mm



① Horizontal Position Offset

#### ② Allowable Position Offset in Tilt Direction

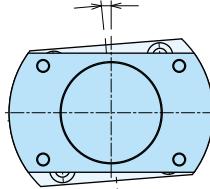
Model No.	Allowable Offset $\theta$
<b>SVS0010</b>	$\theta = \pm 1.5$ deg
<b>SVS0070</b>	$\theta = \pm 1.5$ deg



② Tilt Position Offset

#### ③ Allowable Position Offset in Rotation Direction

Model No.	Allowable Offset $\theta$
<b>SVS0010</b>	$\theta = \pm 3$ deg
<b>SVS0070</b>	$\theta = \pm 3$ deg



③ Rotation Position Offset

## ● Cautions

### ● Installation Notes

#### 7) Most Suitable Gap between Master Cylinder and Tool Adapter

Just Before Connection (When Setting)

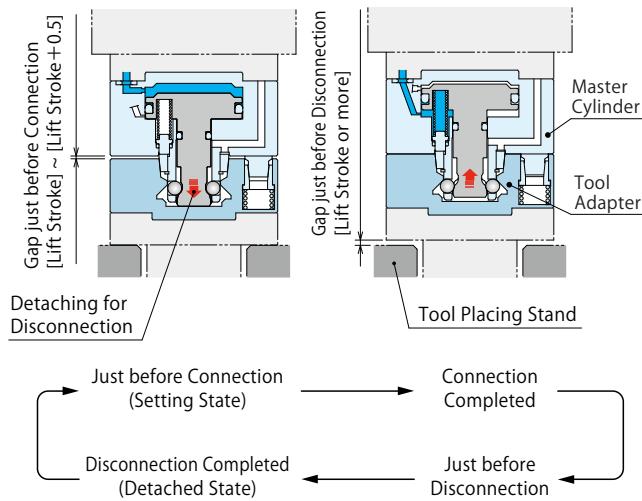
- The gap between master cylinder and tool adapter when connecting should be within the range of [Lift Stroke] ~ [Lift Stroke +0.5mm] shown on P.8. It may not be able to connect if the lift stroke is more than +0.5mm.

#### 8) Most Suitable Gap between Tool Adapter and Tool Placing Stand

Just Before Disconnection

- The gap between the tool adapter and tool placing stand just before disconnection should be more than the [Lift Stroke] shown on P.8. Tool adapter is forcibly detached with detaching (lifting) function of the master cylinder.

It is recommended to install cushioning mechanism between the tool adapter and tool stand.



### ● 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 drops.
- ④ Make sure there is no trouble/issue in the bolts and respective parts before restarting a machine or device.

- 3) Do not touch a master cylinder or a tool adapter while it is working. Otherwise, your hands may be injured.



- 4) During workpiece transport, make sure the safety of environment in case of a tool or workpiece detachment.

- 5) Do not disassemble or modify.

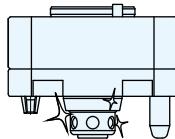
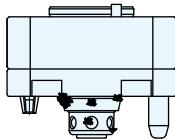
- If the equipment is taken apart or modified, the warranty will be voided even within the warranty period.

## ● Maintenance and Inspection

- 1) Removal of the Product and Shut-off of Pressure Source
- Before removing the product, make sure that the safety devices are in place. Shut off the pressure and power source and make sure no pressure exists in the air circuit.
- Make sure there is no trouble/issue in the bolts and respective parts before restarting.

### 2) Cleaning of Master Cylinder and Tool Adapter

- If tapered reference surfaces and seating surfaces of master cylinder and tool adapter are contaminated with dirt, it may lead to locating accuracy failure, malfunction or air leakage.  
(Please do not apply grease to the tapered reference surfaces.)



- 3) Regularly examine and retighten piping, mounting bolts and wires to ensure proper use.

- 4) Make an inspection before use and regularly.

- 5) Make sure to supply filtered clean dry air.

- 6) Make sure there is smooth action and no air leaks.

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

If there is air leak while connecting, please contact us for overhaul and repair.

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

- 8) Please contact us for overhaul and repair.

## ● 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 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.

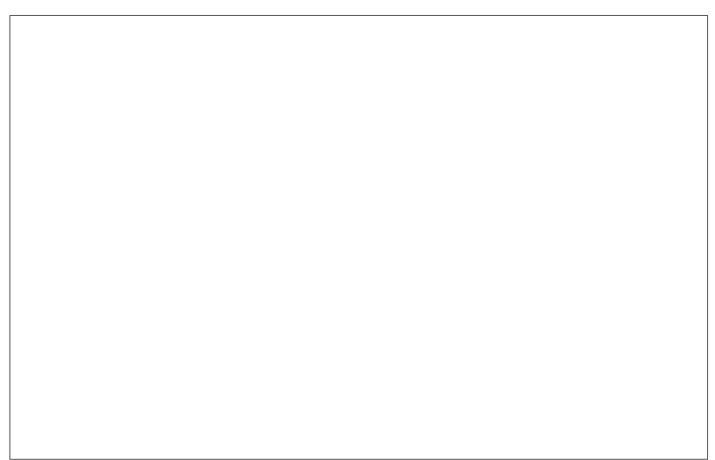


United States of America SUBSIDIARY	KOSMEK (USA) LTD. 650 Springer Drive, Lombard, IL 60148 USA TEL. +1-630-620-7650 FAX. +1-630-620-9015
MEXICO BRANCH OFFICE	KOSMEK USA MEXICO BRANCH OFFICE Av. Loma Pinal de Amoles 320-piso PH oficina 504 interior 13, Vista Dorada, 76060 Santiago de Querétaro, Qro. Mexico TEL. +52-442-851-1377
EUROPE SUBSIDIARY	KOSMEK EUROPE GmbH Schleppenplatz 2 9020 Klagenfurt am Wörthersee Austria TEL. +43-463-287587 FAX. +43-463-287587-20
CHINA SUBSIDIARY	KOSMEK (CHINA) LTD. Room601, RIVERSIDE PYRAMID No.55, Lane21, Pusan Rd, Pudong Shanghai 200125, China TEL. +86-21-54253000
INDIA BRANCH OFFICE	KOSMEK LTD. - INDIA 4A/Old No:649, Ground Floor, 4th D cross, MM Layout, Kavalbyrasandra, RT Nagar, Bangalore -560032 India TEL.+91-9880561695
THAILAND REPRESENTATIVE OFFICE	KOSMEK Thailand Representation Office 67 Soi 58, RAMA 9 Rd, Phatthanakan, Suanluang, Bangkok 10250, Thailand TEL. +66-2-300-5132 FAX. +66-2-300-5133

## KOSMEK LTD.

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HEAD OFFICE 1-5, 2-chome, Murotani, Nishi-ku, Kobe-city, Hyogo, Japan 651-2241  
TEL.+81-78-991-5162 FAX.+81-78-991-8787



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

