

0.5kg~1kg Payload Compact Robotic Hand Changer

Model SWR0010



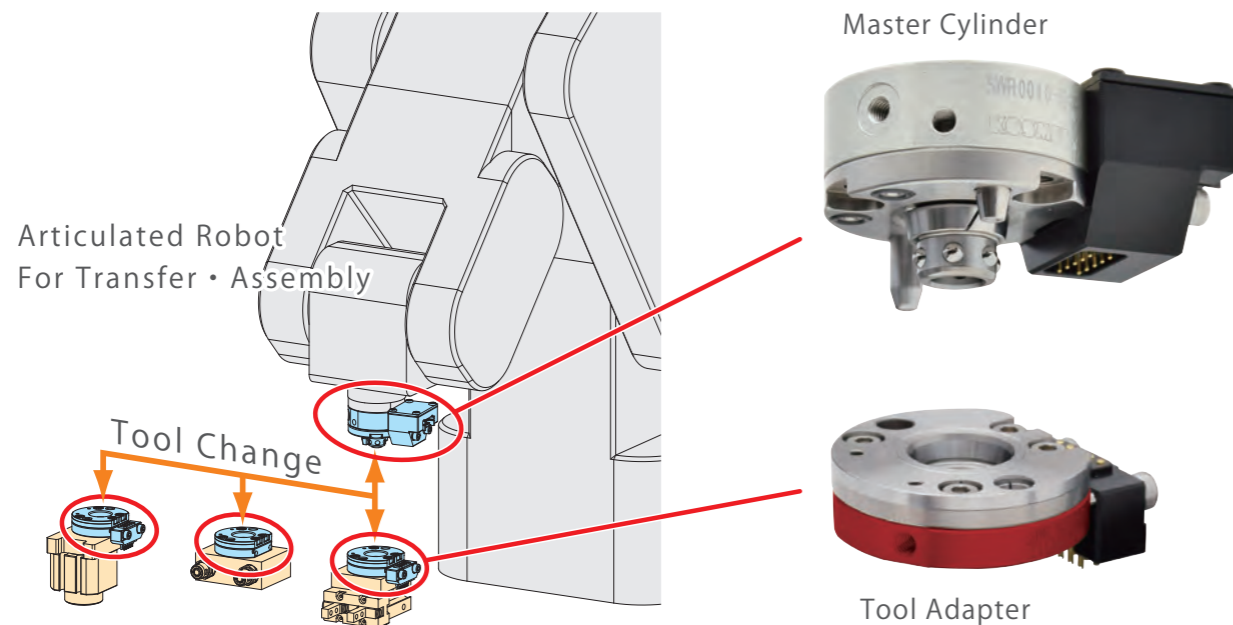
The Best Tool Changer for 0.5kg-Payload Robots

Repeatability : 5 μm

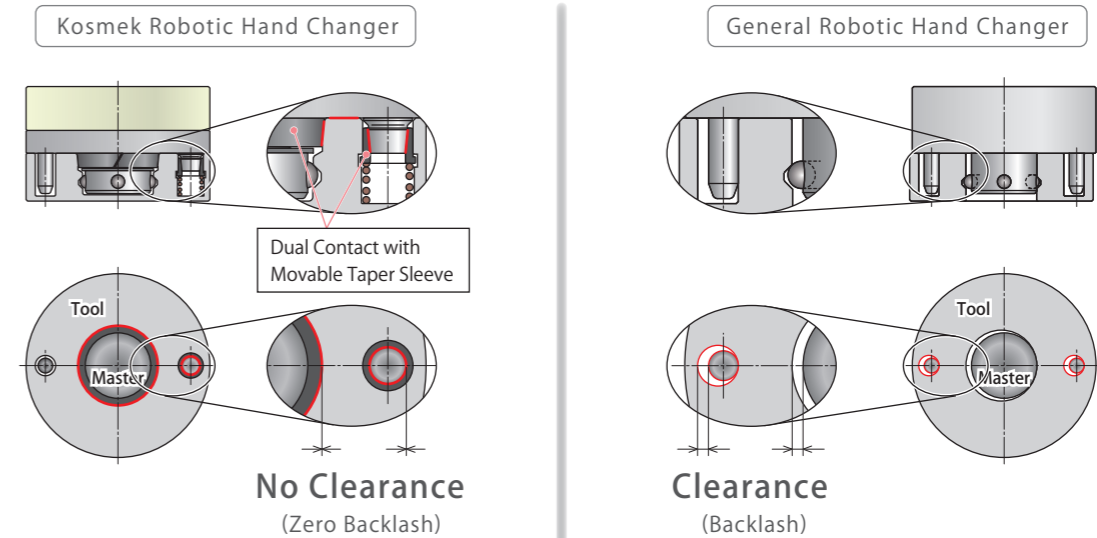
PAT.

High accuracy Robotic Hand Changer enables multiple functions of robots and setup time reduction.

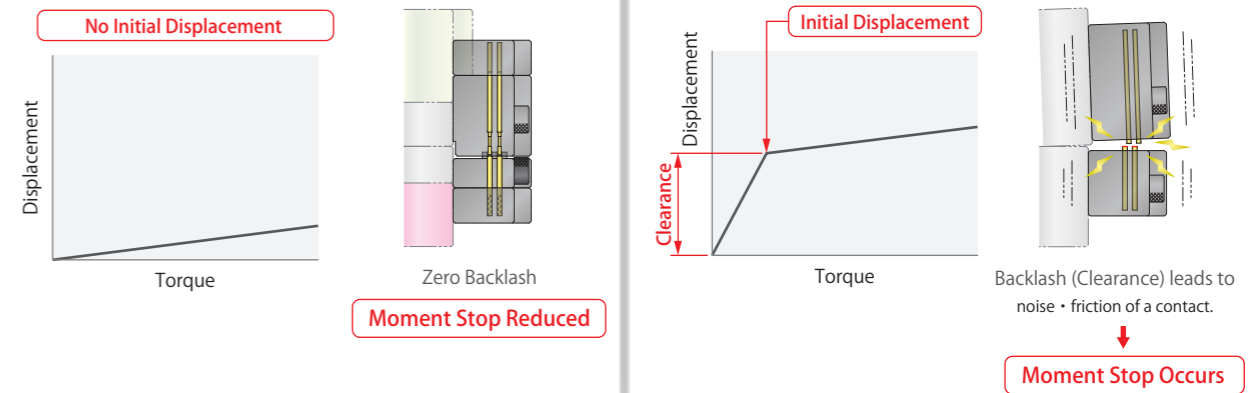
It enhances the productivity of automated production line.



The World's Only Zero-Backlash Robotic Hand Changer

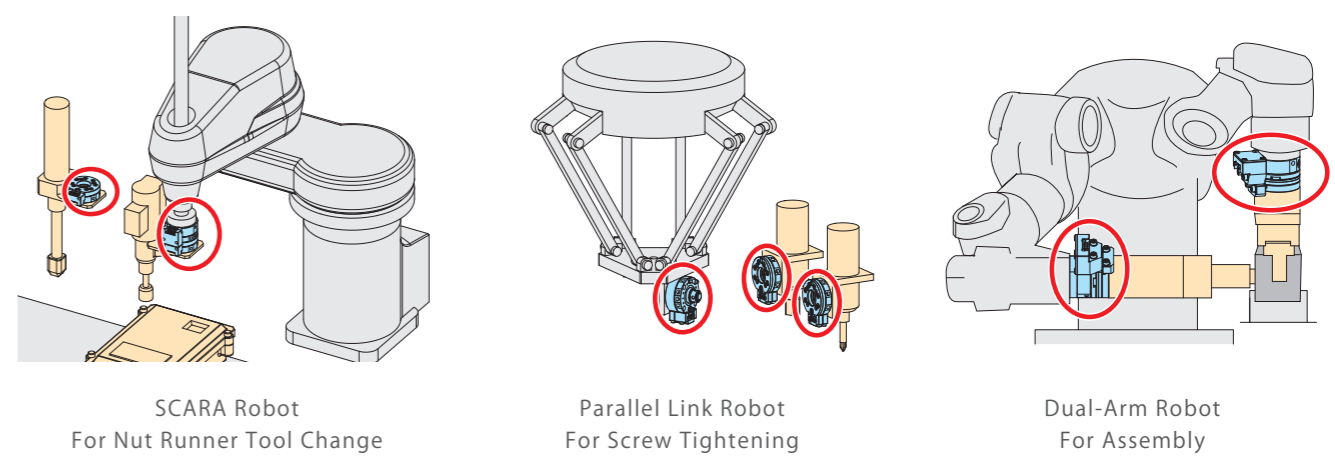


When torque acts in twisting direction,



Application Examples

One robot performs multiple operations.

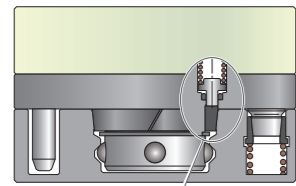


- Locating + Clamp
- Locating
- Hand • Clamp
- Support
- Valve • Coupler
- Cautions • Others
- Robotic Hand Changer
 - SWR Payload 3kg ~ 360kg
 - SWR0010 Payload 0.5kg ~ 1kg
- Manual Robotic Hand Changer
 - SXR
- Pneumatic Location Clamp
 - SWT
- Compact Pneumatic Location Clamp
 - SWQ
- High-Power Pneumatic Pallet Clamp
 - WVS

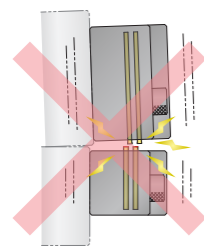
● Features

Light • Compact

Kosmek Tool Changer is light and compact, yet highly rigid when connected. Its weight of the body part is only 63g, suitable for compact robots.
(Master side : 40g, Tool side : 23g)

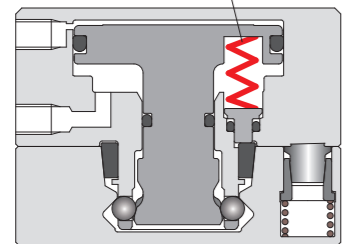


Close Contact

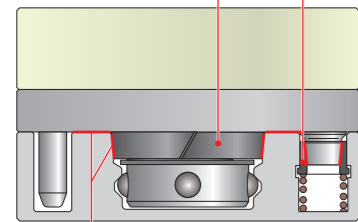


Prevents Errors

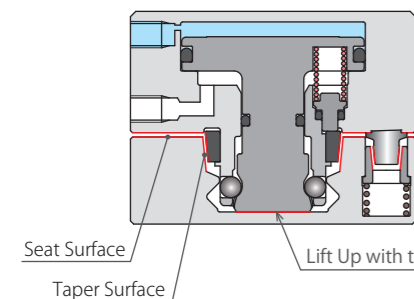
Internal Spring



Movable Taper Sleeve



Dual Contact



Lift Up with the End of Piston Rod (Detaching)

High Durability and Rigidity

Zero backlash when connecting and the durability is 1 million cycles. Even after 1 million cycles, repeatability 5 μm is maintained.

Zero backlash prevents core deflection and chattering.

No clearance or backlash with dual contact by the taper sleeve. It prevents core deflection and chattering due to the work load, and enhances productivity.

Prevents moment stops caused by electrode error.

"Zero" backlash of robotic hand changer minimizes the vibration of electrode and prevents noise and friction. Highly reliable electrode prevents moment stops caused by communication error.

Self-Locking prevents tools from falling.

Even when pressure is at zero, self-locking function prevents tools from falling.
※ Usually it should be connected with spring force and air pressure.

High Accuracy with Repeatability 0.005mm

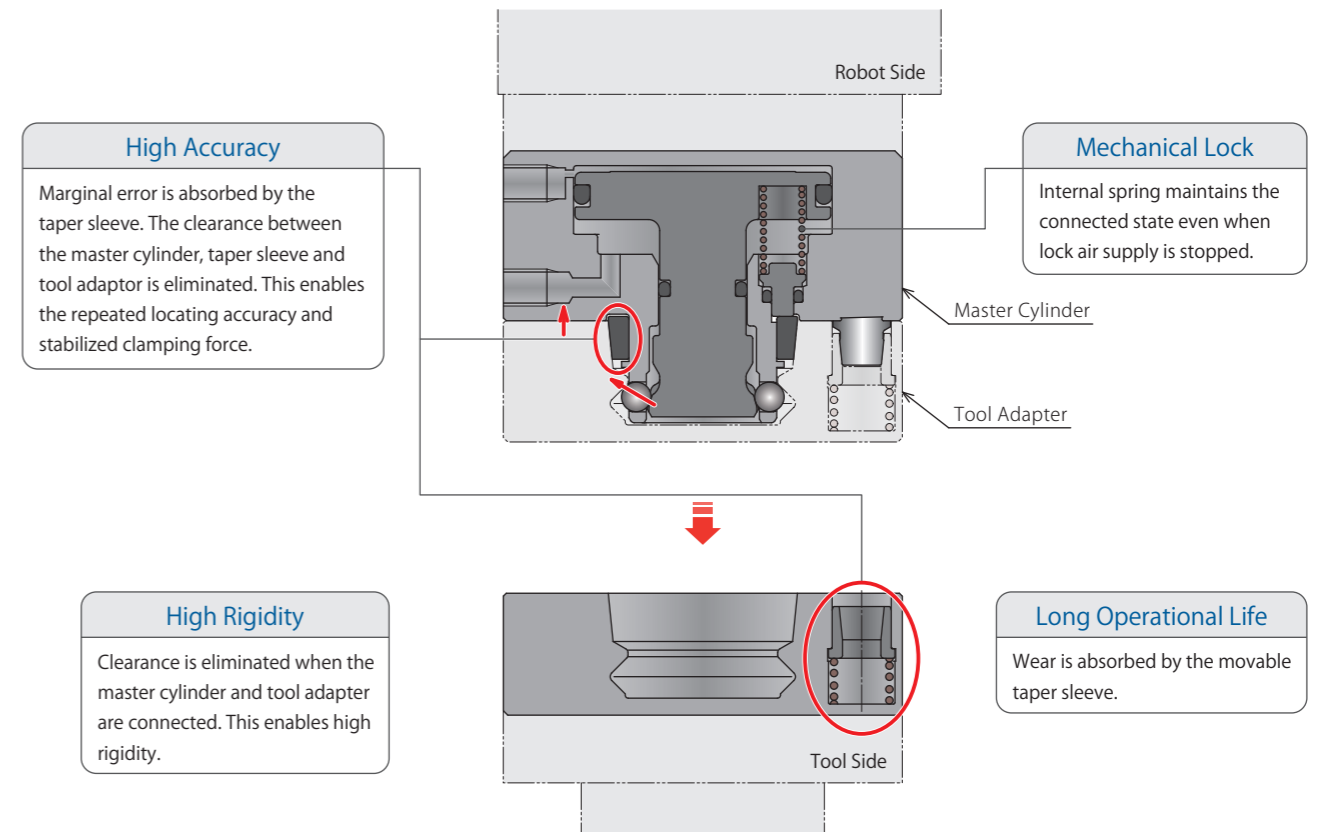
Repeatability is 5 μm.
Dual contact with movable taper sleeve enables high accuracy locating. Only slight fluctuation at the end of tool allowing for precise operation.

Lift up (Detaching) function protects locating part.

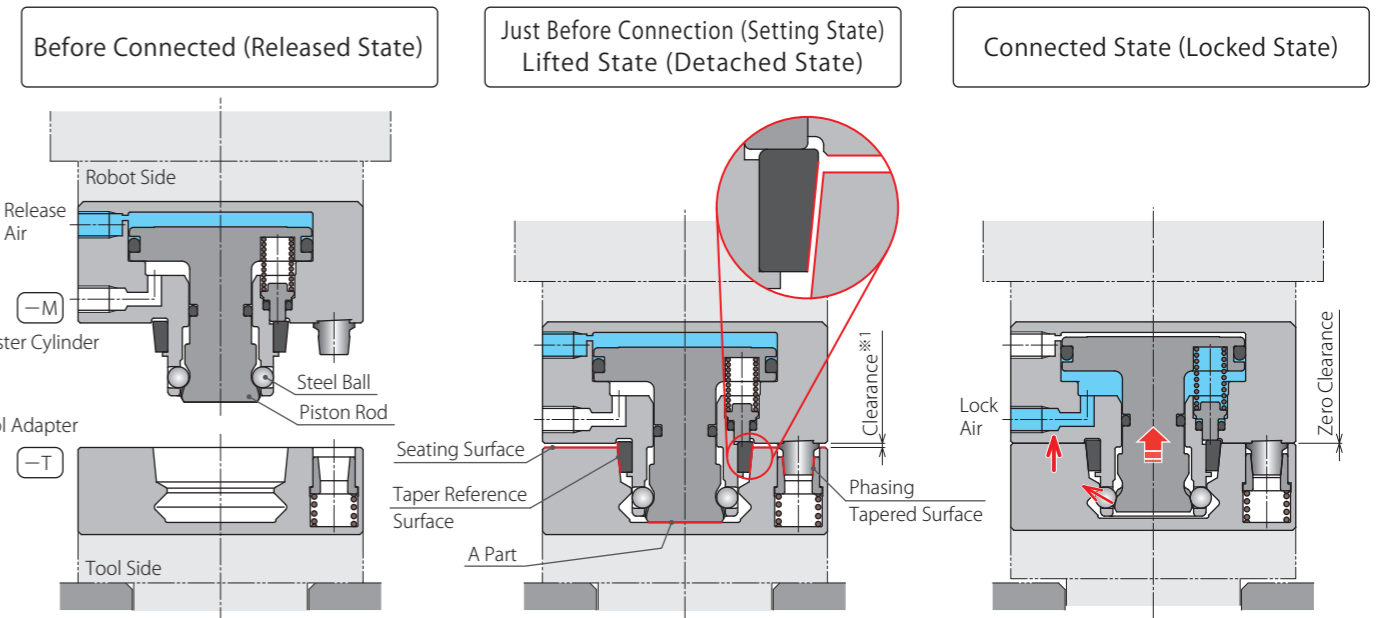
When connecting, lift up function prevents damage of the locating function part (seat surface and taper surface). When disconnecting, the piston rod detaches tool adaptor preventing moment stop caused by adhesion and seizure.

● Cross Section

High Accuracy / High Rigidity / Long Operational Life



● Action Description



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).

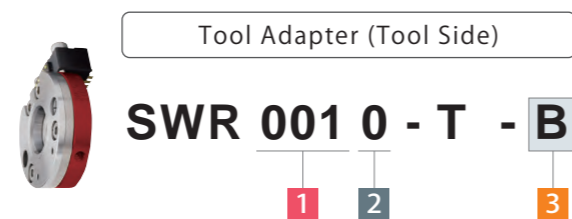
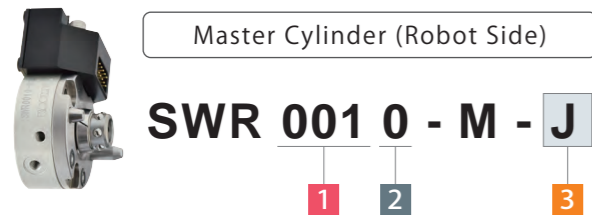
When the master cylinder is lowered and stopped at the amount of lift ~+0.5mm, it is in setting state. At this time there is a moderate gap at taper reference surface and seating surface. It prevents locating mechanism part from damage. When detached, the piston pushes out A part to prevent moment stop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

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.

※ 1. Refer to the caution "Most Suitable Gap b/w Master Cylinder and Tool Adapter Just Before Connection (When Setting)" on P.95.

Locating + Clamp
Locating
Hand • Clamp
Support
Valve • Coupler
Cautions • Others
Robotic Hand Changer
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SWR0010 Payload 0.5kg ~ 1kg
Manual Robotic Hand Changer
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High-Power Pneumatic Pallet Clamp
WVS

Model No. Indication



1 Payload ※Payload at Supply Air Pressure 0.5MPa

001 : 0.5 ~ 1 kg

2 Design No.

0 : Revision Number

3 External Option Symbol (Electrode)

Blank : Standard:No External Option
J^{※1} : Resin Connector (DC24V 10 Poles)



Note:
※1. External electrodes are used as the combination of Resin Connector on the master cylinder and Solder Terminal on the tool adapter.

1 Payload ※Payload at Supply Air Pressure 0.5MPa

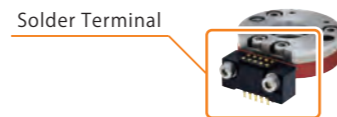
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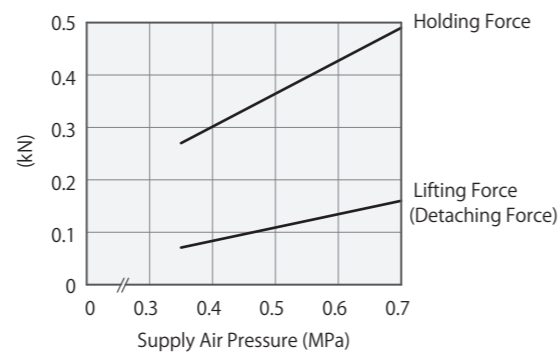


Specifications

Model No.	SWR0010	
Payload ^{※2} at 0.5MPa	kg	0.5 ~ 1
Repeatability	mm	0.005
Lift Stroke (Detaching Stroke)	mm	0.5
Cylinder Capacity	Lock	cm ³ 0.45
	Release	cm ³ 0.51
Operating Air Pressure	Max. Pressure	MPa 0.7
	Min. Pressure	MPa 0.35
	Withstanding Pressure	MPa 1.0
Holding Force	Refer to the graph.	
Lifting Force (Detaching Force)	Refer to the graph.	
Allowable ^{※2}	Bending (at 0.5MPa)	N·m 3.0
	Static Moment Twisting	N·m 6.0
Max. Load ^{※3}	Bending (at 0.5MPa)	N·m 6.0
	Moment Twisting	N·m 12.0
Operating Temperature	°C	0 ~ 70
Usable Fluid	Dry Air	
Weight ^{※4}	Master Cylinder	g 40
	Tool Adapter	g 23
Number of Air Ports ^{※5}	M3×0.5×2 Ports	
Thread Size×Number of Ports	M3×0.5×2 Ports	
Air Port Minimum Passage Area	mm ²	1.1 (Equal to φ1.2)
Electrode Option	Refer to P.89	
Allowable Offset while Teaching	Refer to P.94	

Holding Force · Lifting Force (Detaching Force)

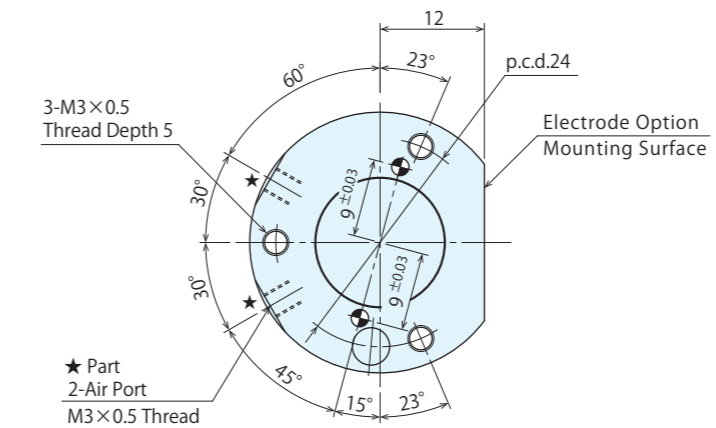
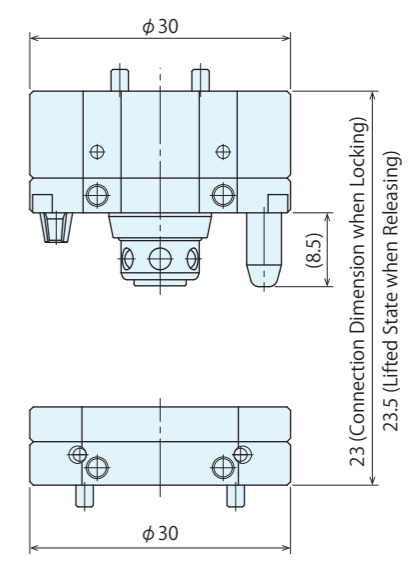
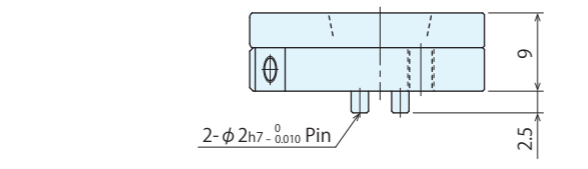
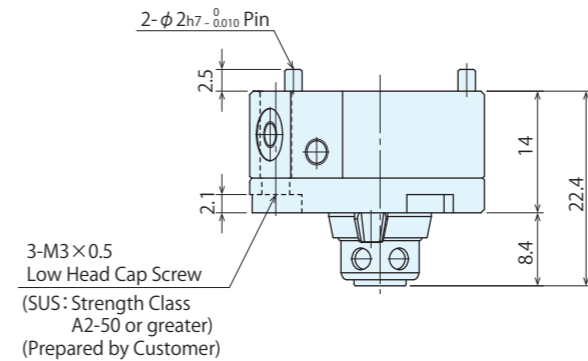
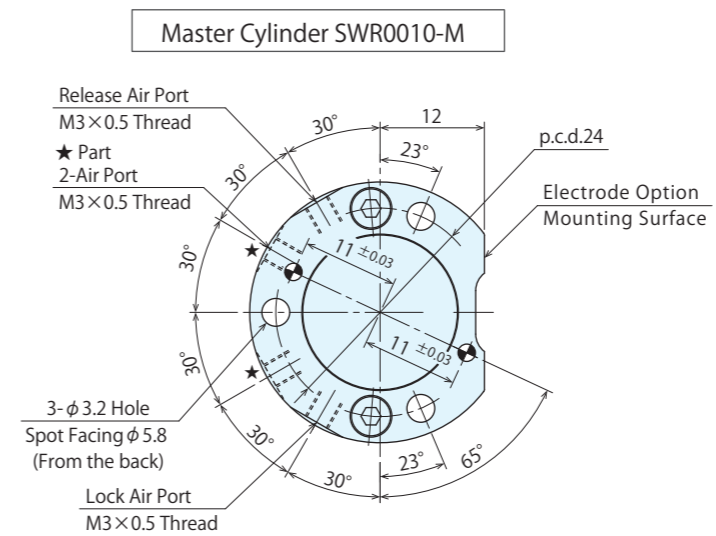
Model No.	SWR0010	
Holding Force	at 0MPa ^{※6}	kN 0.05
	at 0.35MPa	kN 0.27
	at 0.4MPa	kN 0.30
Lifting Force (Detaching Force)	at 0.5MPa	kN 0.37
	at 0.7MPa	kN 0.49
	at 0.35MPa	kN 0.07
	at 0.5MPa	kN 0.11
	at 0.7MPa	kN 0.16



Notes:
 ※2. Please consider both the payload and the allowable static moment when selecting a product.
 ※3. This product must be used within the allowable static moment (※1). Using with Max. Load Moment will not fill the specifications.
 ※4. Weight of the body without external options.
 ※5. Refer to P.92 for air port use.
 ※6. It indicates holding force when air pressure is at 0MPa after connecting and may not fill the specification.
 1. Tables and graphs show the relationship between supply air pressure (MPa) and holding force or lifting force (kN).

External Dimensions

※ This drawing shows the released state of SWR0010.



Tool Adapter SWR0010-T

Locating + Clamp
 Locating
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 Support
 Valve · Coupler
 Cautions · Others

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 WVS

External Option : Electrode

External Option Symbol : J

Master Cylinder
model SWR0010-M-J



External Option Symbol : B

Tool Adapter
model SWR0010-T-B



Specifications

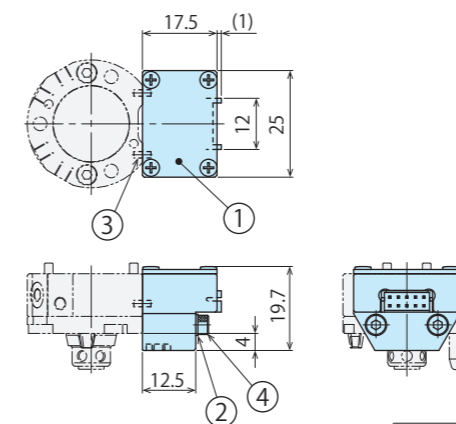
Rated Value (per contact)	DC 24V 2A : Pin 1,3,5,7,9 1A : Pin 2,4,6,8,10
Resin Connector (Master Cylinder Side)	DF11-10DP-2DS(24) (HIROSE ELECTRIC)
Contact Resistance (Initial Value)	30mΩ or less
Total Current Capacity	7.5A
Number of Poles (per electrode)	10
Weight ※1	Master Cylinder Side Electrode 10g Tool Adapter Side Electrode 3g
Cable with Applicable Connector (Sold Separately)	SEZ0J0-CL□ (Refer to P.91)

※1. Weight per electrode.

External Dimensions

Master Cylinder Side

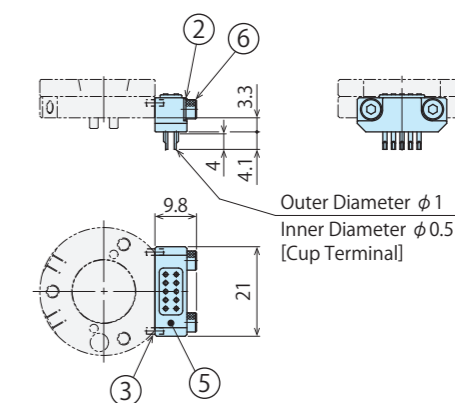
SWR0010-M-J



Model No.	No.	Name	Quantity
SWRZ5J0-M	①	Electrode (Master Side)	1
	②	Circular Washer ISO Small for M2.5	2
	③	Parallel Pin φ 1.5×4 B Type (SUS)	2
	④	Hexagon Socket Bolt M2.5×0.45×16 (SUS)	2

Tool Adapter Side

SWR0010-T-B



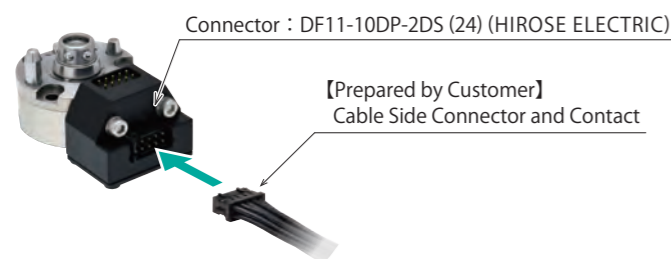
Model No.	No.	Name	Quantity
SWRZ5B0-T	⑤	Electrode (Tool Side)	1
	②	Circular Washer ISO Small for M2.5	2
	③	Parallel Pin φ 1.5×4 B Type (SUS)	2
	⑥	Hexagon Socket Bolt M2.5×0.45×10 (SUS)	2

Note :

1. Inform us with the model number shown above if you require an electrode only. (SWRZ5J0-M, SWRZ5B0-T : one set is one electrode.)

Connecting Cable

Master Cylinder Side



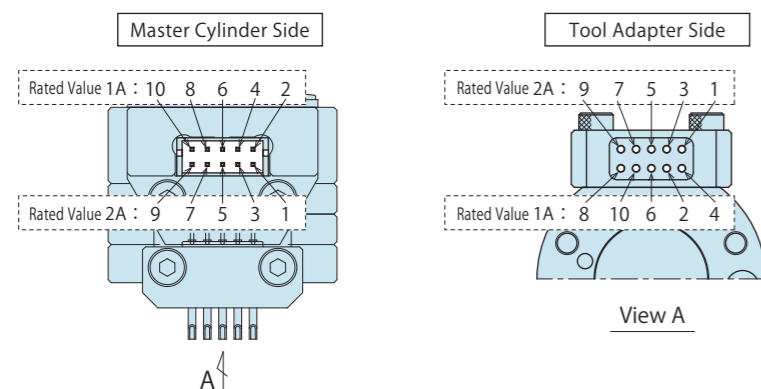
The cable side (connector, contact, cable) is not included.

Please prepare the cable with applicable connector (SEZ0J0-CL□) on P.91, or design them yourself referring to the following list.

Cable Side Connector Model No.	Cable Side Contact Model No.	Recommended Wire Size	Protective Tool		Maker
			Manual Crimping Tool	Contact Removal Tool	
DF11-10DS-2C	DF11-225C	AWG22	DF11-TA22HC	DF-C-PO(B)	HIROSE ELECTRIC
	DF11-2428SC	AWG24 ~ 28	DF11-TA2428HC		

Note : 1. Refer to HIROSE ELECTRIC catalogs for the detailed specifications and the rated current based on wire size.

Pin Number



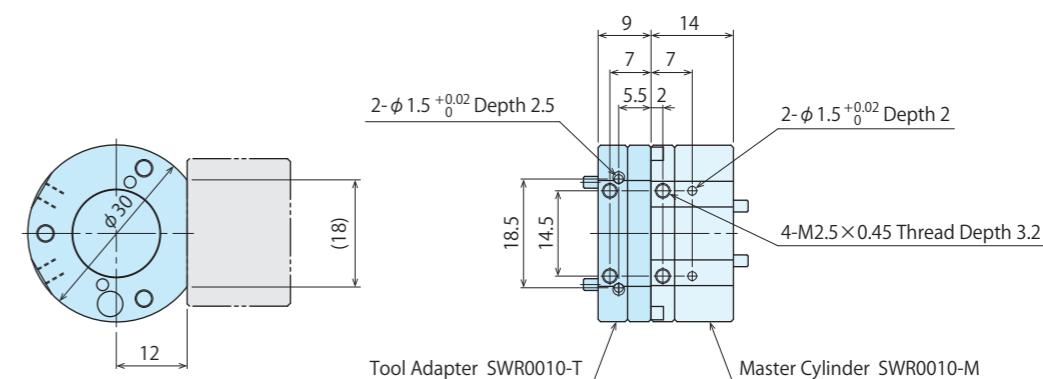
Note :

1. Please note that the pin number layouts of the master cylinder and the tool adapter are different.

Option Mounting Dimensions

Electrodes and fixtures provided by other than Kosmek, can be mounted with option mounting bolts.

This drawing shows the connected state of the master side and the tool side.



- Locating + Clamp
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- Support
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- Cautions • Others
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External Option : Cable with Connector for Resin Connector

This cable is an optional cable applicable to the Resin Connector Electrode (SWR External Option Symbol : J).

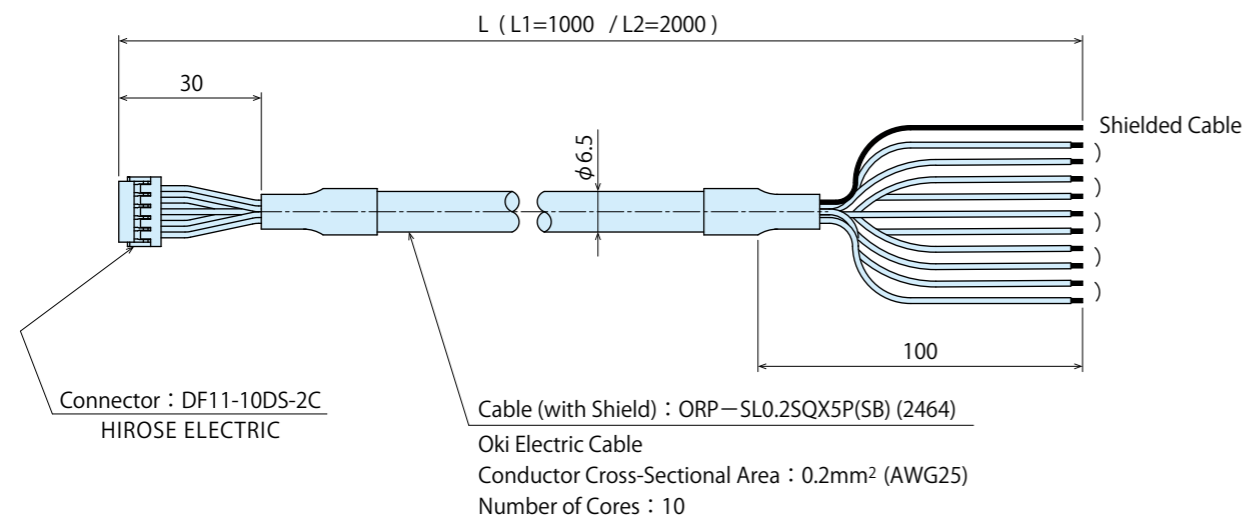
Model No. Indication

SEZ0J0-C

L1
L2

Cable Length
L1 : 1m
L2 : 2m

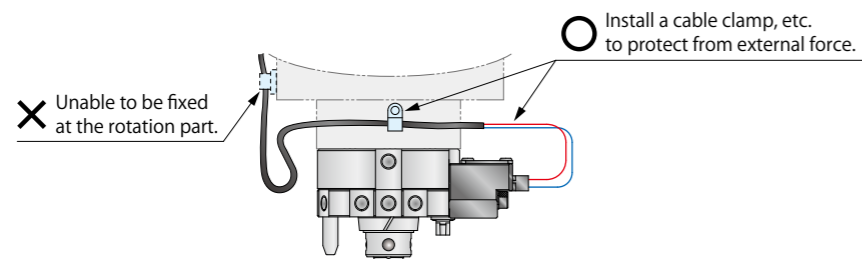
Design No.
(Revision Number)



Rated Current	2A					1A				
Pin Number	1	3	7	9	5	6	2	4	8	10
Wire Color	Blue	White	Red	Gray	Green	Black	Yellow	Brown	Violet	Orange
	Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair	

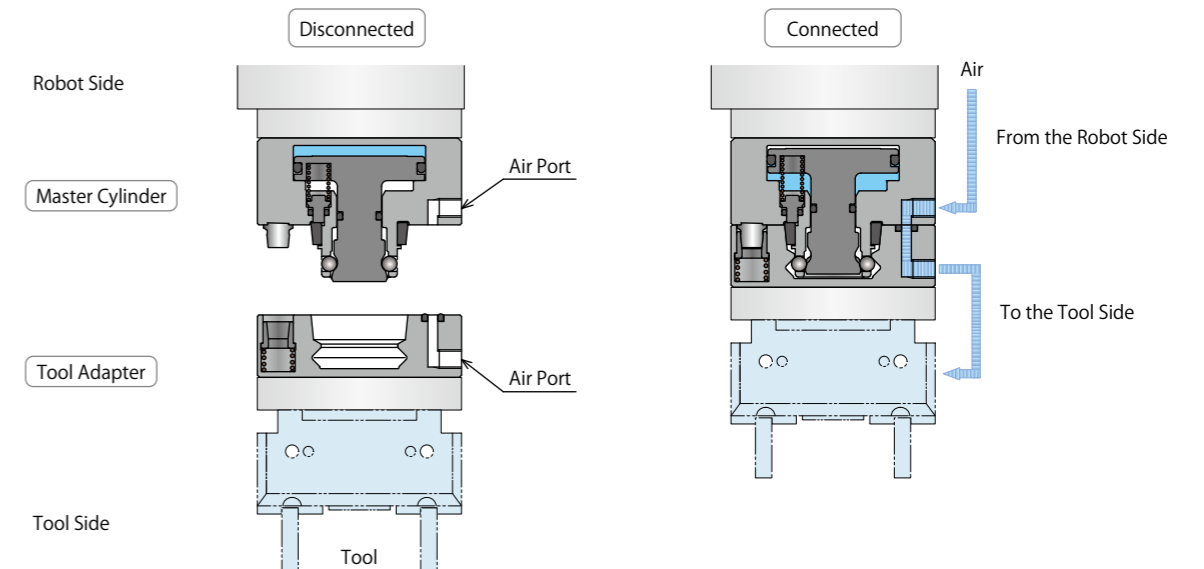
【Notes on Wire/Cable Procedure and Wiring】

- Make sure to fix the wire and cable so that they are not pulled while a robot is moving or turning around. External force should not be applied on the connector part since it leads to breaking of wire, detaching of connector and contact failure.



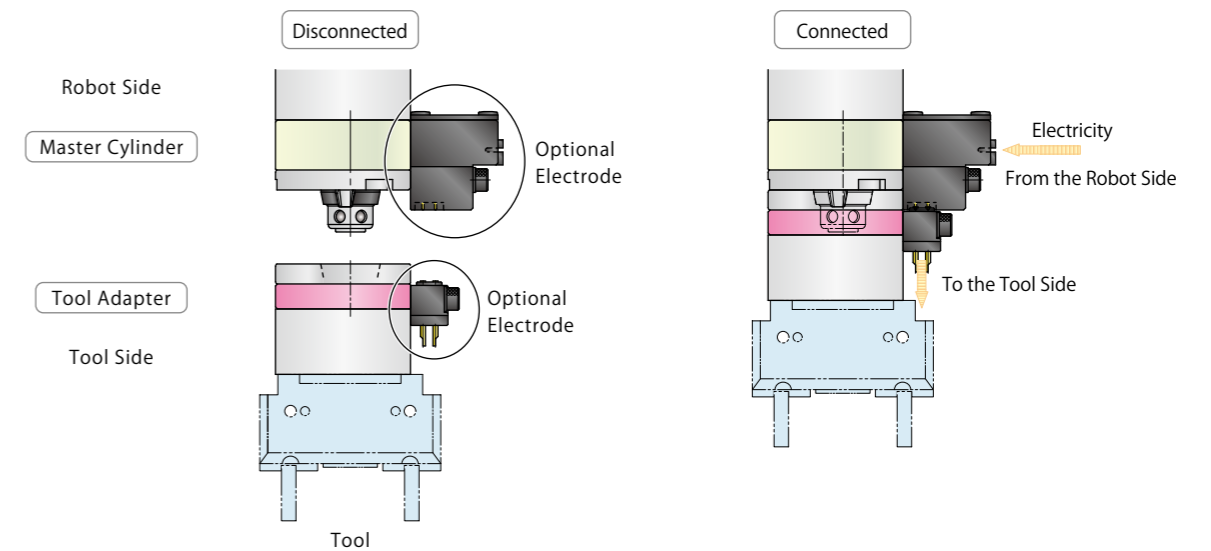
Description of Air Port

When the master cylinder and tool adapter are connected, the air port is at the connected state. At this time, it is able to supply air from the robot side to the tool side. Air port can be used for the operation of the actuator (positive pressure) and the suction pad (negative pressure). The number of air ports : 2 (M3×0.5 Thread)



Electrode Option

When the master cylinder and tool adapter are connected, the electrode (option) is in the connected state. At this time, it is able to transmit electrical signal and supply electricity between the robot and tool.



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Locating

Hand • Clamp

Support

Valve • Coupler

Cautions • Others

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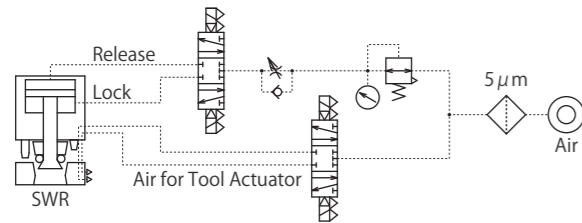
Cautions

Notes for Design

- 1) Check Specifications
 - Please use each product according to the specifications.
 - Maximum Air Pressure : 0.7MPa, Minimum Air Pressure : 0.35MPa

2) Air Pressure Circuit Reference

- SWR remains locked (keeps holding a tool) with mechanical lock (spring for maintain). However, for safety, when using a 2-position solenoid valve, make sure to select the solenoid valve for operating SWR that supplies air pressure to the lock port side when it is not magnetized. If air is supplied to the release port when the switch of solenoid valve is turned off, it is very dangerous since SWR may drop the tool (hand).



3) Operating Environment (External Option (Electrode))

- Do not use the product in the environment with water · vapor · liquid · scattering of chemicals · explosion · gas with causticity. Also, using in the environment with cutting chips · cutting fluid · dust · spatter scattering may lead to continuity error of electrode.

4) Electrification of Electrodes while Connecting/Disconnecting (External Option (Electrode))

- If connecting/disconnecting robotic hand changer while energized (hot swapping), there will be a discharge phenomenon (spark phenomenon) between the electrodes opposing each other. The tips of contact probes and electrode bars will be severely worn down due to the phenomenon, and the basis metal might be melted due to oxidation or abrasion of gold-plating leading to conduction failure. Electricity should be shut off while connecting/disconnecting the robotic hand changer. In case of continuous electrification with more than 40 ~ 60% of rated current, it is recommended to use multiple electrodes in a line. (In order to improve durability of contact probes.)

5) Note for Single Use of SWR Robotic Hand Changer

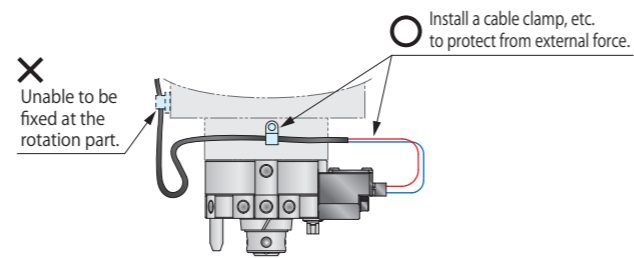
- Applying withstanding pressure without mounting on a robot or a plate leads to damage on the product. Make sure to supply air after setting SWR on a robot or a plate.

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

- When connecting/disconnecting the Robotic Hand Changer in a horizontal position, make sure not to apply excessive moment on master cylinder. Please select an appropriate size of model considering robot payload with allowance fully taken into consideration. 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 locating 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) Notes on Wire/Cable Procedure and Wiring (External Options (Electrode))
 - Make sure to fix the wire and cable so that they are not pulled while a robot is moving or turning around. External force should not be applied on the connector part since it leads to breaking of wire, detaching of connector and contact failure.



- When allocating each electric signal, imperceptible signal and power signal should be apart. Otherwise noise will be propagated from power signal to imperceptible signal. Also it is the same for wire and cable of external options (electrode). Make sure to keep imperceptible signal from power signal.

- 4) Installation/Removal of Master Cylinder/Tool Adapter
 - Please follow the tightening torque below. When mounting, use the attached pins and tighten them with bolts evenly not to incline the master cylinder and tool adapter. Recommended Low Head Cap Screw (SUS) : Strength Class A2-50 or greater (Prepared by customer)

[Master Cylinder / Tool Adapter]

Model No.	Thread Size	No. of Bolts	Tightening Torque (N·m)
SWR0010	M3 × 0.5	3	1.3

Do not lose attached pins for installation/removal of the master cylinder/tool adapter. If not using attached pins, moment quality may not be secured.

5) Installation of Optional Electrode

For electrode installation, apply screw lock glue (equivalent to 1401 made by ThreeBond) on the tip of the mounting bolt and tighten it with the tightening torque shown below.
 · M2.5 Hexagonal Socket Bolt : 0.5N · m

6) Test Run Method

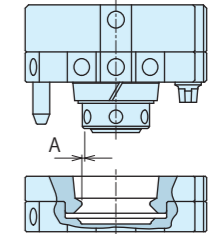
- If supplying a large amount of air just after installation, action time will be extremely fast leading to severe damage on robotic hand changer. Set the speed controller (Meter-in) and gradually supply air pressure.

7) 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

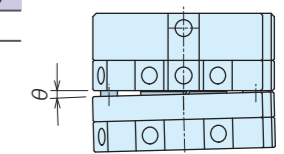
Model No.	Allowable Offset Amm
SWR0010	±0.8 mm



① Horizontal Position Offset

② Allowable Position Offset in Tilt Direction

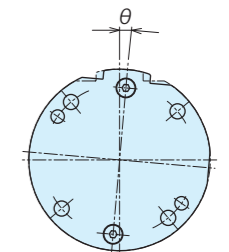
Model No.	Allowable Offset θ
SWR0010	θ = 1.5 deg




② Tilt Position Offset

③ Allowable Position Offset in Rotation Direction

Model No.	Allowable Offset θ
SWR0010	θ = ±3 deg



③ Rotation Position Offset

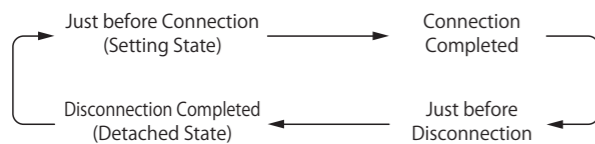
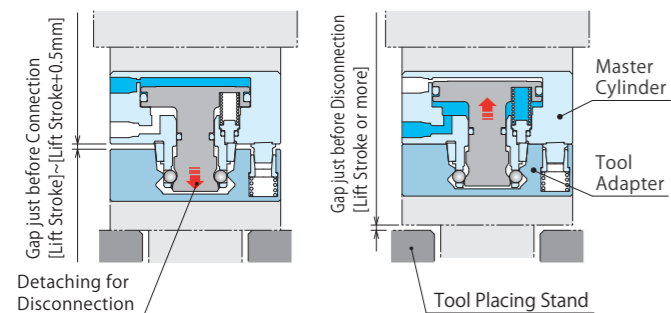
Continuing "Installation Notes" on the Next Page 

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WVS

Cautions

● Installation Notes (Continued)

- 8) 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.87.
It may not be able to connect with more than the lift stroke + 0.5mm.
- 9) Most Suitable Gap between Tool Adapter and Tool Placing Stand Just Before Disconnection
 - The gap between the tool adapter and the tool stand when detaching should be more than [Lift Stroke] shown on P.87. 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 the tool stand.



10) Connection Method for -B : Solder Terminal (External Option (Electrode))

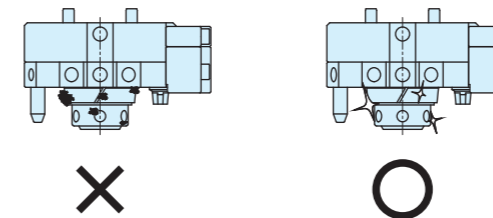
- Soldering condition should be : 280°C, within 3 seconds.
【Recommended Wire Diameter】
Use wires with AWG26 size or smaller diameter. If you need electric current more than allowable flowing current of AWG26, use wires within the rated value of electrode. At this time, soldering hole and attached continuity prevention cover cannot be used. If required, insulate them with a thermal contraction tube etc.

11) Connection Method for -J : Connector (External Option (Electrode))

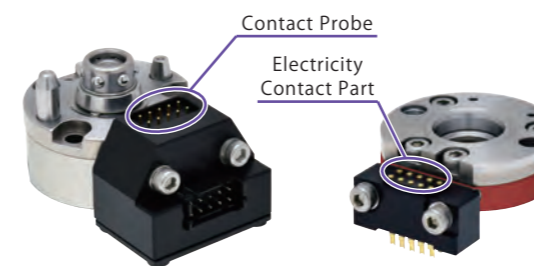
- Connector must be fully inserted into the electrode.

● Maintenance • Inspection

- 1) Removal of the Machine 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 and hydraulic circuits.
 - Make sure there is no trouble/issue in the bolts and respective parts before restarting.
- 2) Cleaning of Master Cylinder • Tool Adapter
 - If using the product when the taper reference surface or seat check surface of master cylinder/tool adapter are contaminated with dirt, it may lead to locating accuracy failure, malfunction or air leakage. (Do not apply grease on the taper reference surface.)



- 3) Regularly examine and retighten piping, mounting bolts and wires to ensure proper use.
- 4) Make an inspection before use and regularly.
 - If there is dirt or dust on the electric contact part, electric signal is hard to conduct. Wipe it out with a cloth soaked in an organic solvent such as IPA.
 - If there is a contact failure while in use, make an inspection mainly of the electricity connection part and clean it out.



- 5) Make sure to supply filtered clean dry air.
- 6) Make sure there is smooth action and no air leakage.
 - 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.

※ Please refer to P.715 for common cautions. • Notes on Handling • Maintenance/Inspection • Warranty

Locating + Clamp
Locating
Hand • Clamp
Support
Valve • Coupler
Cautions • Others

Robotic Hand Changer
SWR Payload 3kg ~ 360kg
SWR0010 Payload 0.5kg ~ 1kg
Manual Robotic Hand Changer
SXR
Pneumatic Location Clamp
SWT
Compact Pneumatic Location Clamp
SWQ
High-Power Pneumatic Pallet Clamp
WVS

Cautions

● Notes on Handling

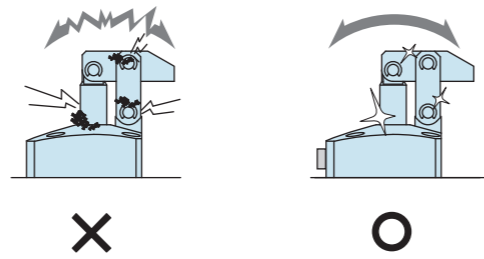
- 1) It should be operated by qualified personnel.
 - The hydraulic machine and air compressor should be operated and maintained by qualified personnel.
- 2) Do not operate or remove the product unless the safety protocols are ensured.
 - ① The machine and equipment can only be inspected or prepared 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 the machine or equipment.
- 3) Do not touch a clamp (cylinder) while it is working. Otherwise, your hands may be injured.



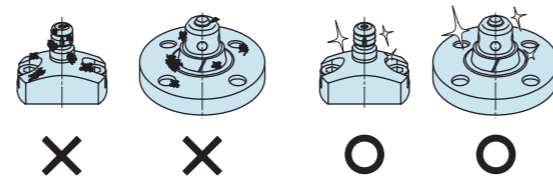
- 4) Do not disassemble or modify.
 - If the equipment is taken apart or modified, the warranty will be voided even within the warranty period.

● Maintenance and Inspection

- 1) Removal of the Machine and Shut-off of Pressure Source
 - Before 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 and hydraulic circuits.
 - Make sure there is no trouble/issue 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.



- 3) Regularly clean the reference surfaces (taper reference surface and seating surface) of locating products (SWT/SWQ/SWP/VRA/VRC/VX/VXE/VXF/WVS/VWH/VWM/VWK).
 - Locating products (except VRA/VRC/VX/VXE/VXF and SWR without air blow port) can remove contaminants with the cleaning function. When installing a workpiece or a pallet, make sure there are no contaminants such as thick sludge.
 - Continuous use with dirt on components will lead to locating failure, fluid leakage and malfunction.



- 4) Regularly tighten pipe, mounting bolt, nut, snap ring, cylinder and others to ensure proper use.
- 5) Make sure the hydraulic fluid has not deteriorated.
- 6) Make sure there is a smooth action without an irregular noise.
 - Especially when it is restarted after left unused for a long period, make sure it can be operated correctly.
- 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 Failure caused by the use of the non-confirming state at the user's discretion.
 - ③ If it is used or operated in an inappropriate way by the operator. (Including damage caused by the misconduct of the third party.)
 - ④ If the defect is caused by reasons other than our responsibility.
 - ⑤ If repair or modifications are carried out by anyone other than Kosmek, or without our approval and confirmation, it will void warranty.
 - ⑥ Other caused by natural disasters or calamities not attributable to our company.
 - ⑦ Parts or replacement expenses due to parts consumption and deterioration. (Such as rubber, plastic, seal material and some electric components.)

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

- Locating + Clamp
- Locating
- Hand · Clamp
- Support
- Valve · Coupler
- Cautions · Others**

- Cautions**
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