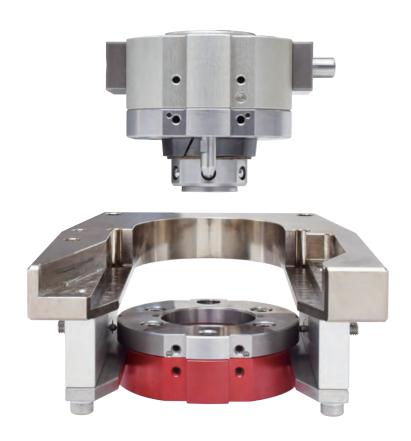
**New** Additional Line-up: 25kg Payload Model (SMR0250)

# Mechanical Robotic Hand Changer



Model SMR



# Mechanical Robotic Hand Changer

Additional Line-up: 25kg Payload Model Model SMR0250

Model SMR



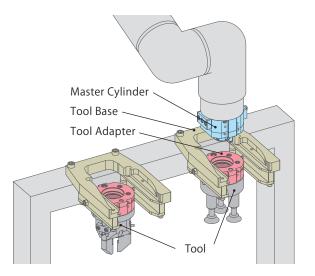
# Mechanical robotic hand changer that uses robot's power.

No power source required. Zero backlash when connected. High accuracy and high rigidity (Repeatability: 3  $\mu$  m)

PAT. P.

# No Power Source Required Repeatability : 3 $\mu$ m





High-precision robotic hand changer enables a robot to perform multiple operations.

Reduce tool change time, Increase productivity.

1

External Options for SMR

SWLZ

# Action Description



**Before Connection** 

Move the robot vertically to the setting position

Move the robot horizontally and connection is completed\*

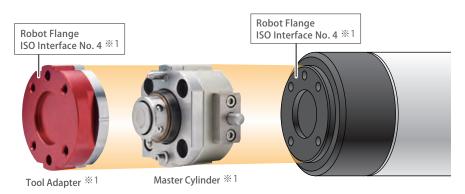
\*During horizontal movement, the cam button moves in contact with the tool base. At this time, a load is applied to the robot.

### Features

# • Able to mount directly to the robot flange corresponding to ISO Interface.

Able to mount directly to the robots corresponding to Interface No.4 (based on ISO9409-1).

\*1. Bolts and pins are not included. Please check the external dimensions before use.



# External option electrode and air joints are available.

A wide variety of electrodes can connect various signals such as control signals and power signals. Additional air joints are also available for extra air ports.

% For external options, please refer to P.21 and after.





# Enables forced connection/disconnection by hand.

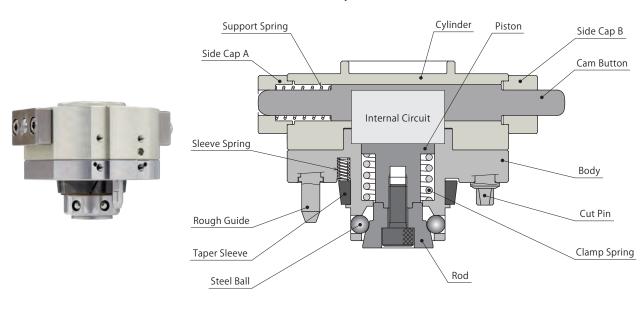
When you want to connect or disconnect the hand outside the tool base, manually push in the cam button.

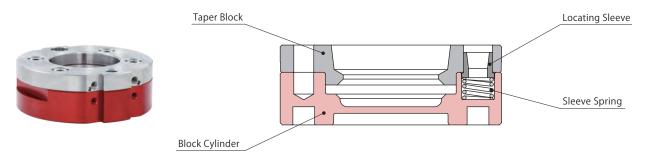
- \* For manual hand change, we recommend another model : Manual Robotic Hand Changer, Model SXR.
- \* SMR0250 is not easily operated by hand. Manual operation should only be used in emergency situations.



Cross Section

# Master Cylinder (SMR \_\_\_\_\_-M)

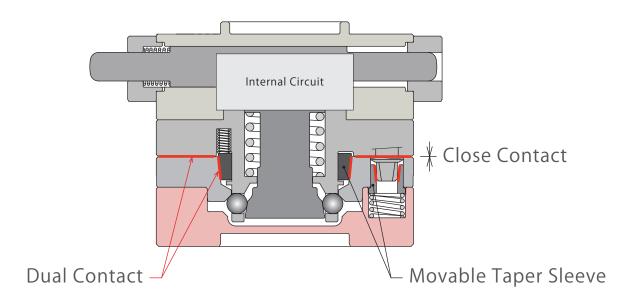




Tool Adapter (SMR \_\_\_\_\_-T)

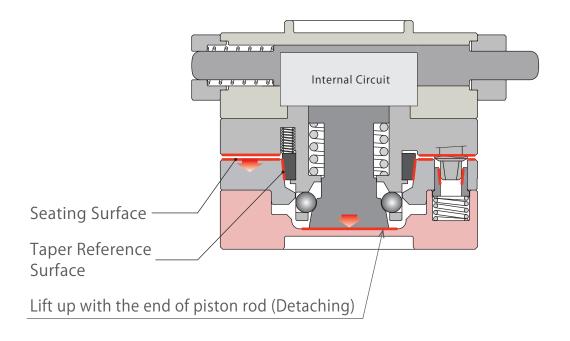
# High Accuracy Repeatability $3 \mu$ m. Zero Backlash prevents core deflection and chattering.

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.

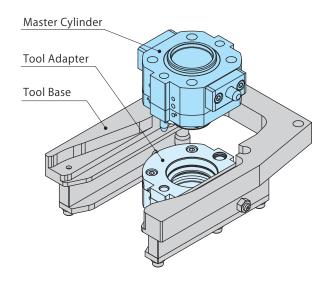
When connecting, lift up function prevents damage of the locating function part (seating surface and taper reference surface). When disconnecting, the piston rod detaches tool adapter preventing moment stop caused by adhesion and galling.

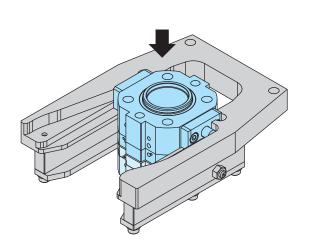


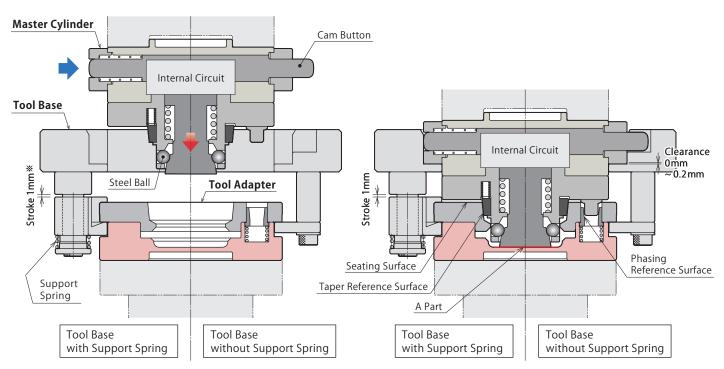
### Action Description

### Before Connected (Released State)

### Lifted State (Detached State)





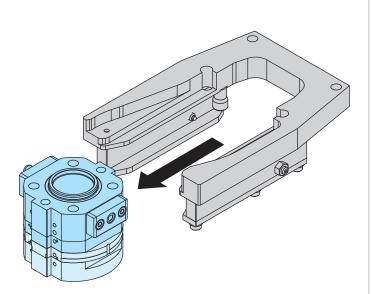


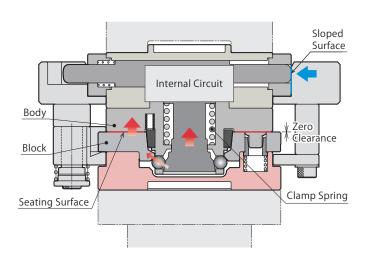
- When the cam button is pushed in the direction of the arrow shown above, the piston rod is pushed down by the internal circuit. At this time, the steel balls are free to move (set inside).
- In case of Tool Base with Support Spring The tool base strokes 1mm.
   When the support spring force is large, the \*\* part is closely contacted.
- The setting state is where the master cylinder is lowered and the clearance with the tool base is 0 to 0.2 mm.
   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 rod pushes out A part to prevent moment stop caused by adhesion or galling.
- In case of Tool Base with Support Spring
  If the hand weight is small, the tool adapter is pushed by
  A part.

### Note:

1. The above shows the operation procedure from the disconnected state to the connected state. To change from the connected state to the disconnected state, reverse the above procedure.

# Connected State (Locked State)





• When the master cylinder is moved along the tool base, the cam button contacts the sloped surface and moves in the direction of the arrow shown above.

The piston rod is pulled up by the clamp spring and presses the block on the tool adapter side against the seating surface via the steel balls.

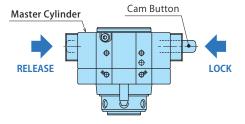
- \* Locking operation should be performed at a constant speed.
- When the block on the tool adapter side is pressed, the taper reference surface and phasing taper sleeve are centered in a reference axis (body), and locating is completed.

# Reference

# **Connecting Operation** without Using a Tool Base

Lock / release operation can be performed by pushing the cam button of the master cylinder with external force.

\* Refer to the specifications on P.8 for the cam button pressing force.



### Reference Case:

Pushing the cam button of the master cylinder using the air cylinder.



External Options for SMR

> SWLZ SMRZ

### Model No. Indication

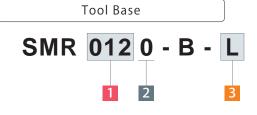












### Payload

**012** : 7 ~ 12 kg **025** : 12 ~ 25 kg

# 2 Design No.

0 : Revision Number

# **3 Support Spring Option** \*\* Please refer to "Support Spring Chart" on P.9 for further information.

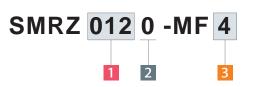
**Blank**: without Support Spring

※ Only L and H can be selected in case of 1 Payload : 025.

L : with Support Spring (for light-weight tools)
M : with Support Spring (for medium-weight tools)
H : with Support Spring (for heavy-weight tools)

### Model No. Indication (Spacer Plate)

lpha Use when the joints or wiring interfere with the robot body when external options (P.21 $\sim$ ) are mounted.



### 1 Applicable Robotic Hand Changer (SMR) Model No.

**012** : SMR0120-M

# 2 Design No.

**0** : Revision Number

# 3 Applicable Mounting Pattern No.

4 : ISO Mounting Pattern Number 4



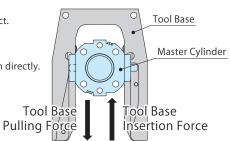
External Options for SMR SWLZ

# Specifications

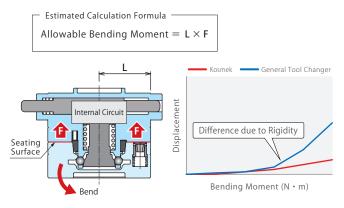
Model No.			SMR0120	SMR0250
Payload <sup>*1</sup>		kg	7 ~ 12	12 ~ 25
Repeatability		mm	0.003	
Lifting Stroke (Detac	:hing Stroke)	mm	1	0.8
Holding Force		N	600	1500
Allowable	Bending	N∙m	16	50
Static Moment **1	Twisting	N∙m	25	45
	Master Cylinder	g	Approx. 450	Approx. 770
	Tool Adapter	g	Approx. 200	Approx. 270
Weight <sup>**2</sup>	Tool Base In case of 3	<b>Blank</b> g	Approx. 1000	-
	Tool Base In case of 3	<b>L/M/H</b> g	Approx. 1200	Approx. 2000
Tool Base Insertion F	Force/Pulling Force **3	N	Approx. 75 or less	Approx. 90 or less
Cam Button Pressing	Force <sup>※3</sup>	N	Approx. 125 or less	Approx. 200 or less
Operating Temperature °C		0 ~ 70		
Number of Electrode Mounting Surfaces		2		
Applicable Mounting Pattern Number **4		4		
Allowable Offset while Teaching		Refer	to P.19	

### Notes:

- %1. Please consider both the payload and allowable static moment when selecting the product.
- ※2. Weight of the body without external options.
- $\divideontimes 3$ . Value at the time of shipment.
- ※4. ISO Interface Number indicates the robot mounting surface that is allowed to mounted on directly. Refer to P.10 for Standard ISO Mounting Pattern.

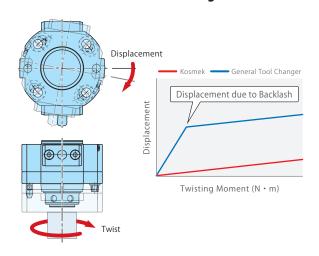


# Point The whole surface is a seating surface High Rigidity Possible!!



# Point Kosmek Exclusive Mechanism

### Zero Backlash!! Strong to Twist

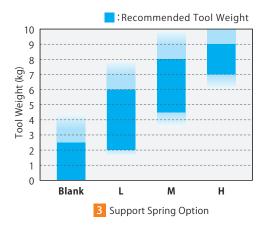


### Support Spring Chart

When selecting Option 3, refer to recommended tool weight charts for proper support spring options.

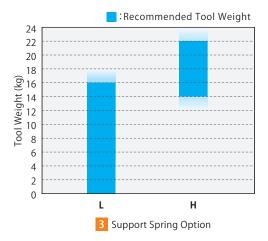
### SMR0120

Model No.	SMR0120-B	SMR0120-B-L	SMR0120-B-M	SMR0120-B-H
Recommended Tool Weight **1 kg	2.5 or less	2 ~ 6	4.5 ~ 8	7 ~ 9



### SMR0250

Model No.		SMR0250-B-L	SMR0250-B-H
Recommended Tool Weight **1	kg	16 or less	14 ~ 22



### Notes:

- $\textcolor{red}{\%1.} \label{prop:section} \textbf{The recommended tool weight includes the weight of tool adapter (SMR0120:about 0.2kg, SMR0250:about 0.3kg,).}$ 
  - In case an external air joint and electrode are overlapping:
     Please select M if 3 Support Spring Option in the recommended range is Blank, and H if it is L or M.
  - 2. Please make sure that the center of gravity of the tool is within the outer diameter range of the tool adapter. Inclination of the tool may cause contact failure.

# Mounting Pattern (Based on ISO9409-1) and SMR Combination

		SMR Combination		
		Master Cylinder	Tool Adapter	Tool Base
M .: D N	4	SMR0120-M	SMR0120-T	SMR0120-B-□
Mounting Pattern No.	4	SMR0250-M	SMR0250-T	SMR0250-B-□

### Mechanical Robotic Hand Changer

CMD

External Options for SMR

SWLZ SMR7

### Collaborative Robot Installation Examples







UNIVERSAL ROBOTS



**DENSO WAVE INCORPORATED** 



YASKAWA ELECTRIC CORPORATION

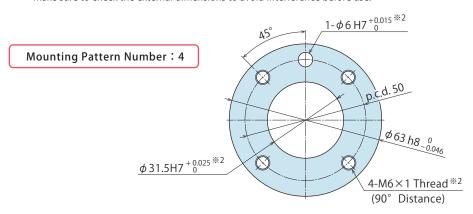
Cameras and other end effectors may interfere with the body or tool base of the SMR hand changer.

If there is interference, please make a spacer or adjust the mounting position of the end effector before use.

### © Standard Shape of Mounting Pattern

### Notes:

- 1. Please refer to the following drawing and the external dimensions of SMR when designing an adapter plate.
- 2. The drawing is for reference. Please design an adapter plate considering plate thickness, mounting direction, robot environment and others according to specifications and dimensions of each robot.
- ※2. There are various hole depths and thread depths for robots and tool adapter side devices. Make sure to check the external dimensions to avoid interference before use.



52 (Connecting Dimension when Locked)

robots and tool adapter side devices. Make sure to check

the external dimensions to avoid interference before use.

53 (Lifted State when Released)

### External Dimensions

\* This drawing shows the released state.

Master Cylinder

### SMR0120-M External Option \*1 $2-\phi 6^{+0.03}_{0}$ Depth 5 \*\*3 Mounting Surface 1 (8) (12.5)68 Cam Button \*\*2 27 Release \*\*2 ☐ Lock<sup>※2</sup> ±0.03 27 4-φ6.8 Hole <sup>※</sup>3 Counterbore $\phi$ 11 (From the back) External Option \*1 2-M3×0.5 Cap Screw \*1 Mounting Surface 2 Maintainance Oil Port $\phi$ 31.5 $_{-0.05}^{0}$ 6 Φ Φ 30 Ф 48 ₩ Ф Rough Guide 18 0 $\phi$ 63 $\phi$ 63 Ф Ф 22 Φ Φ 3.2 \*\*3 $\phi$ 31.5 $^{+}$ $^{0.05}$ 54 External Option \*1 Mounting Surface 2 %1. This product can mount various accessories (SWLZ) on the external option mounting surfaces. Refer to P.21 and after for details. When they are mounted, there is P.C. 4.50 $25 \pm 0.03$ no interference with the maintainance oil port. $\otimes$ \*2. Move the cam button in the direction of the arrow to 27 switch between locked and released states. \*3. There are various hole depths and thread depths for

27

3.8

 $2-\phi\,6\,_{0}^{+0.03}$  Depth 5  $^{*3}$ 

14

 $25 \pm 0.03$ 

4-Mounting Bolt \*\*3

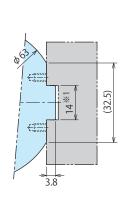
External Option \*1 Mounting Surface 1

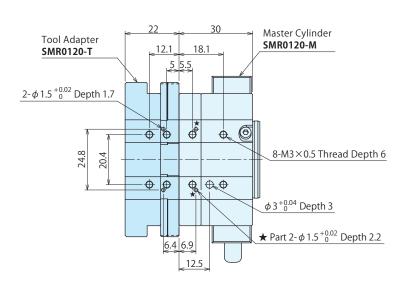
M6×1 Thread Depth 11

# External 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 tool side.

# SMR0120-M / SMR0120-T





### Notes:

- %1. Recommended width of option side is 14 $^{+0.15}_{+0.05}$ .
- 1. Mounting surface dimensions are the same for both areas.

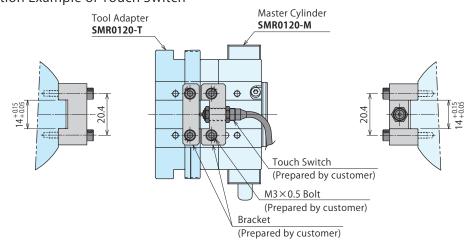
### Contact Check when Connected

This product does not have seat check detection by such as air ports.

If necessary, please consider the following methods.

- Contact check by continuity of an external option (electrode).
- Contact check by installing a touch switch or similar device using female thread holes on external option mounting surface. (The drawing below shows an installation example when using a touch switch.)

### Installation Example of Touch Switch



Mechanical Robotic Hand Changer

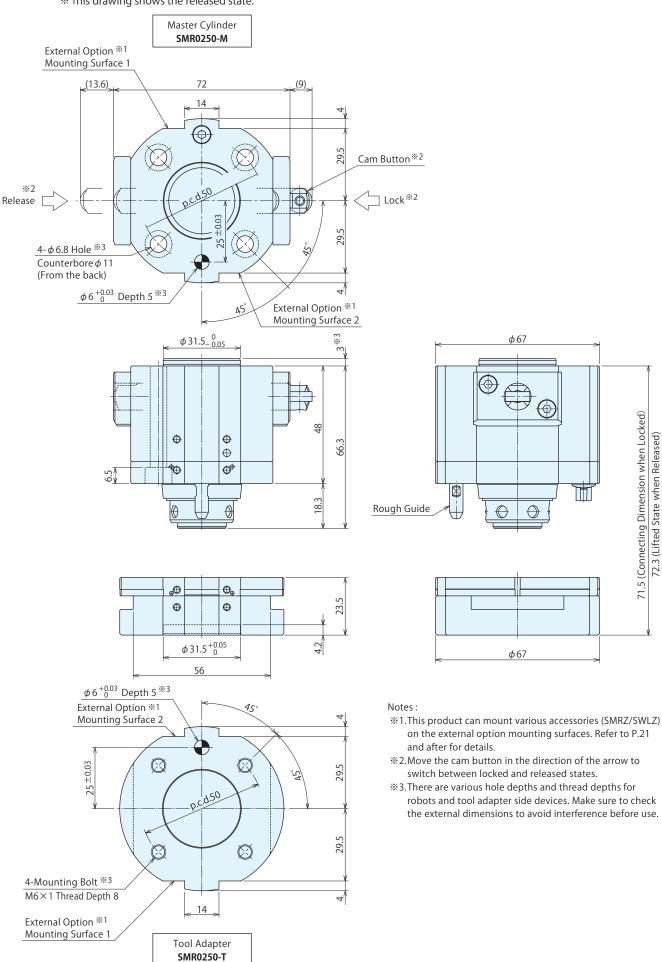
SMR

External Options for SMR

SWLZ

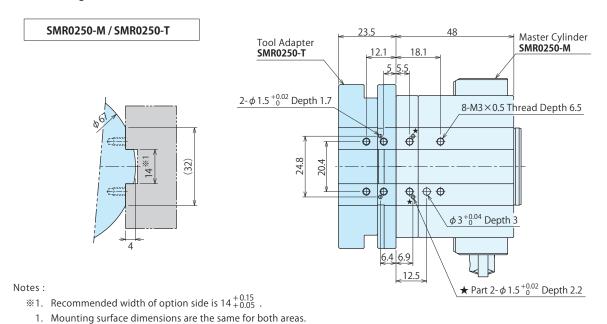
### External Dimensions

\* This drawing shows the released state.



# External 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 tool side.



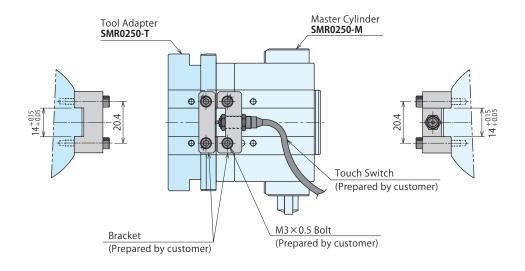
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### Installation Example of Touch Switch



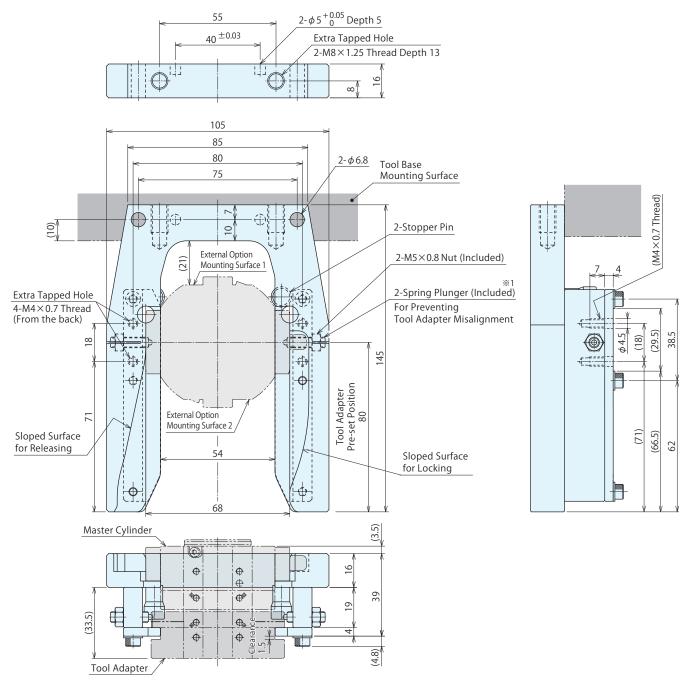
Mechanical Robotic Hand Changer

SMR

External Options for SMR

SWLZ SMRZ

### Tool Base External Dimensions: SMR0120-B (without Support Spring)

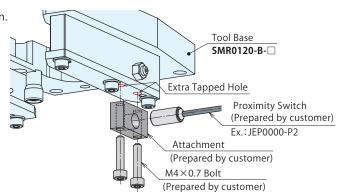


### Note:

\*\*1.The spring plunger is used as a temporary stopper for the tool. Adjust it within the range that does not affect the operation of the robot.

### Tool Detection -

This product does not have a tool (hand) detection function. If necessary, use extra tapped holes on the tool base to mount equipment such as proximity switch.



# $lue{f o}$ Tool Base External Dimensions: SMR0120-B- $\Box$ (with Support Spring)

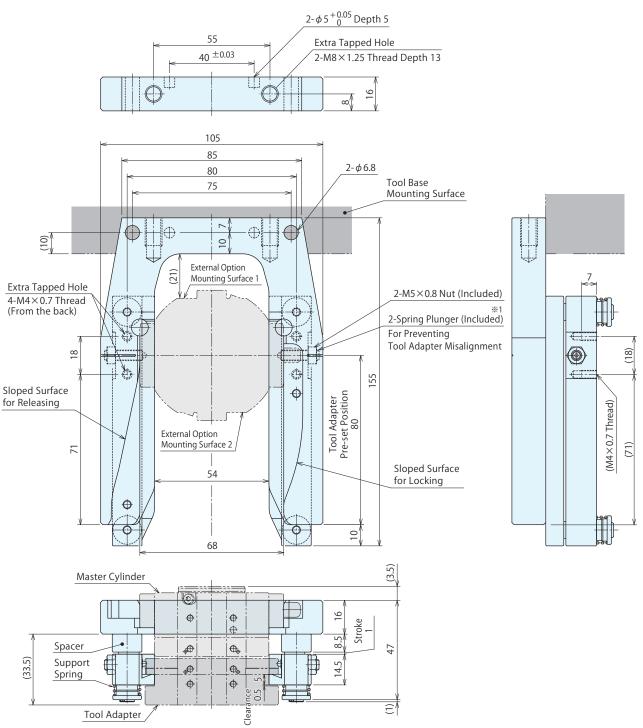
Harmony in Innovation

and Changer

SMR

External Options for SMR

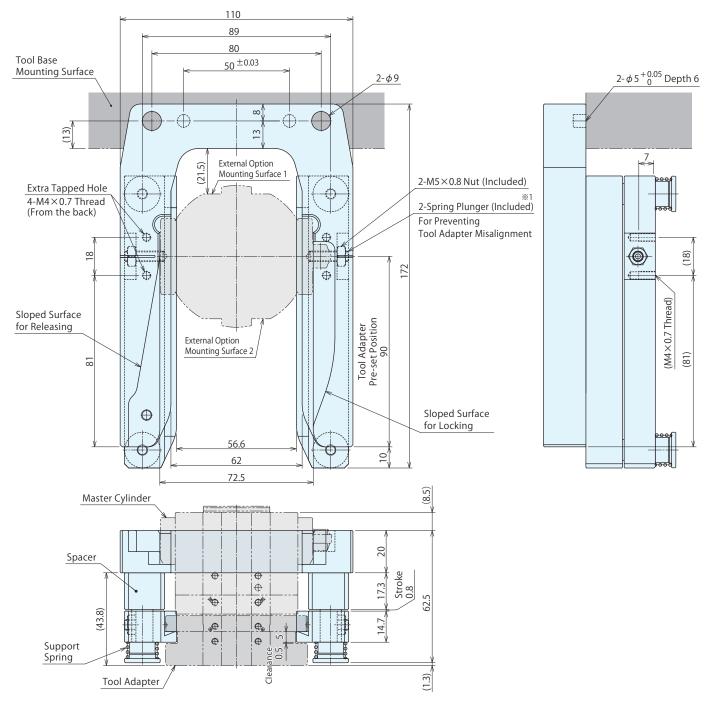
SWLZ SMRZ



### Note:

\*1. The spring plunger is used as a temporary stopper for the tool. Adjust it within the range that does not affect the operation of the robot.

### ◆ Tool Base External Dimensions: SMR0250-B-□ (with Support Spring)

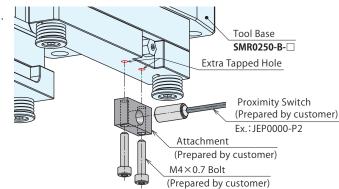


### Note:

₹1. The spring plunger is used as a temporary stopper for the tool. Adjust it within the range that does not affect the operation of the robot.

### Tool Detection -

This product does not have a tool (hand) detection function. If necessary, use extra tapped holes on the tool base to mount equipment such as proximity switch.



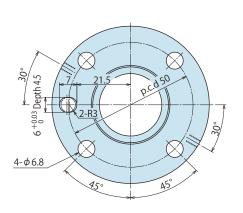
# Spacer Plate External Dimensions: SMRZ0120-MF4

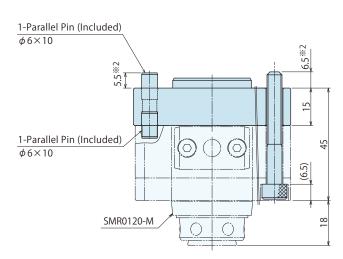
### Mechanical Robotic Hand Changer

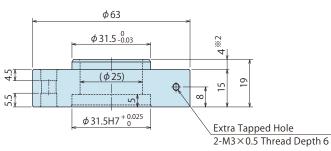
SMR

External Options for SMR

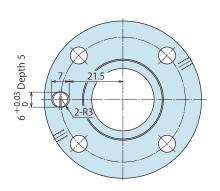
SWLZ







# pth 6 Mounting Procedure



	Robot Flange
① Mount Spacer Plate	
② Mount SMR0120-M	
4-Mounting Bolt (Included) M6×1×45	

Spacer Plate Model No.	SMRZ0120-MF4
Weight	105g <sup>※1</sup>
Applicable Mounting Pattern No.	4
Applicable Robotic Hand Changer Model No.	SMR0120-M

### Notes:

- 1. Material: A2017BE-T4
- 2. Please refer to the above drawings when designing a spacer plate.
- \*1. Weight of a spacer plate body only. Bolts and pins not included.
- \*\*2. There are various hole depths and thread depths for robots and tool adapter side devices. Make sure to check the external dimensions to avoid interference before use.

### Cautions

### Notes for Design

- 1) Check Specifications
- Please use each product according to the specifications.
- 2) Combination of Master Cylinder, Tool Adapter and Tool Base
- The combination of master cylinder, tool adapter and tool base should be as follows.

Ī	Master Cylinder	Tool Adapter	Tool Base
	SMR0120-M	SMR0120-T	SMR0120-B-□
Ī	SMR0250-M	SMR0250-T	SMR0250-B-□

Please select a tool base referring to P.9 "Support Spring Chart". In case an external air joint and electrode are overlapping, it is recommended to select M if the support spring option in the recommended range is Blank, and H if it is L or M.

### 3) Allowable Static Moment

 The allowable static moment should be within the range of the bending moment and the twisting moment.

Model No.	Bending Moment	Twisting Moment
SMR0120	16 N • m	25 N • m
SMR0250	50 N • m	45 N • m

### 4) Operating Environment

 Do not use the product in the environment with water, vapor, liquid, scattering of chemicals, explosion, gas with causticity, cutting chips, cutting fluid, dust or spatter scattering.

### 5) Insertion Force of Robot

When using with a robot designed to work with humans, the robot may stop by exceeding the upper limit of the load depending on its specifications and posture.

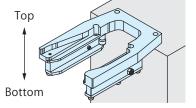
Make sure that it can operate within the range of tool base insertion force/pulling force before use.

### 6) The Gravity Center of Tool (Hand)

- If the gravity center of the tool (hand) is out of the range of the tool adapter, the tool (hand) may tilt and interfere with the surroundings.
   Overhaul is recommended when the tilt becomes large due to product use.
- If the center of gravity of a tool is offset, please check (test) with an actual machine.

### 7) External Options

- SMR can be equipped with external options. Please refer to P.21 or after for external options.
- When installing an external option(s) to this product, please check (test) with an actual machine before use.
- 8) Top and bottom directions when mounting the tool base
- When mounting the tool base, follow the top and bottom directions shown below.



### Installation Notes

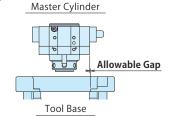
- 1) Installation and Removal of Master Cylinder/Tool Adapter/Tool Base
- Tighten the mounting bolt with the following torque. When mounting, tighten the bolts evenly not to incline the master cylinder, tool adapter and tool base.

Model No.		Bolt Size	Bolt Qty.	Tightning Torque
				(N • m)
Master Cylinder	SMR0120-M	M6×1	4	10
Tool Adapter	SMR0120-T	M6×1	4	10
Tool Base	SMR0120-B-□	M6×1	2	10
Master Cylinder	SMR0250-M	M6×1	4	10
Tool Adapter	SMR0250-T	M6×1	4	10
Tool Base	SMR0250-B-□	M8×1.25	2	25

### 2) Allowable Offset while Teaching

• When teaching, ensure the master cylinder and tool base have the following allowable gap. If the allowable gap is exceeded, the master cylinder and the tool base will interfere with each other and the robot may stop.

Model No.	Allowable Gap
SMR0120	0.2 mm or less
SMR0250	0.5 mm or less



- When the tool base is not being used, the master cylinder and the tool adapter can be connected within the range of the following allowable offset.
  - Allowable Position Offset in Horizontal Direction

Model No.	Allowable Offset A mm
SMR0120	±1.0 mm
SMR0250	±1.0 mm



① Horizontal Position Offset

② Allowable Position Offset in Tilt Direction

Model No.	Allowable Offset $ heta$
SMR0120	$\theta$ = 1.0 deg
SMR0250	$\theta$ = 1.0 deg



② Tilt Position Offset

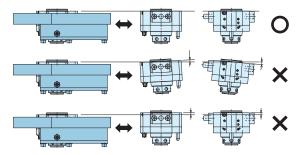
3 Allowable Position Offset in Rotation Direction

Model No.	Allowable Offset $ heta$
SMR0120	$\theta = \pm 1.5 \deg$
SMR0250	$\theta = \pm 1.5 \text{ deg}$



- Most Suitable Gap between Master Cylinder and Tool Base When Connecting
- The gap between master cylinder and tool base when connecting should be within the range of 0mm ~ 0.2mm.
   It may not be able to connect with the gap more than 0.2mm.
   Please refer to "Lifted State (Detached State)" on P.5 for details.

- 4) Teaching for Connecting and Disconnecting Operation
- Teaching of connecting/disconnecting operation should be moved parallel to the tool base so that there is no difference in height or tilt before and after the connecting/disconnecting operation.



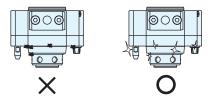
- Operating speed should be 150 mm/sec or less.
   Excessive operating speed may burn out internal components leading to malfunction.
- Locking operation should be performed at a constant speed.
   Stopping SMR in the middle of locking operation may cause contact failure. Also, be careful not to apply impact force.

### Notes on Handling

 Be careful not to drop a tool when changing (attaching/ detaching) the hand. Ensure that a fall prevention measure of a tool is in place before releasing the mechanical robotic hand changer by hand. Otherwise it may cause damage to the tool or an accident.

### Maintenance • Inspection

- 1) Removal of the Product
- Before removing the product, make sure that safety devices and preventive devices are in place.
- Make sure there is no trouble/issue in the bolts and respective parts before restarting.
- 2) Cleaning of Master Cylinder and Tool Adapter
- Use of the master cylinder/tool adapter when they are contaminated with dirt or viscous substances will cause locating accuracy failure and malfunction.

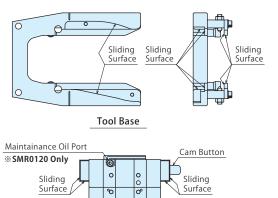


- 3) Regularly tighten mounting bolts to ensure proper use.
- 4) Make sure there is smooth action without an irregular noise.
- Especially when it is restarted after left unused for a long period, make sure it can be operated properly.
- 5) The product should be stored in the cool and dark place without direct sunshine or moisture.
- 6) Please contact us for overhaul and repair.
- Regularly supply lubricating oil and grease.
   Internal Lubrication (Master Cylinder) \*\*SMR0120 only
   Supply lubricating oil from the maintenance oil port of the master cylinder (Recommended: Once/100,000 operations).
   It is more effective to supply oil while operating the cam button.
   Apply on Sliding Surface (Master Cylinder / Tool Base)
  - Apply grease to the sliding surfaces shown below.

    (Recommended: Once/30,000 operations).

    Please use barium soap base mineral oil grease.

    (Grease applied at shipment: NBU8EP made by NOK)



Master Cylinder

External Options

Accessories Sold Separately

# External Options for SMR Electrical Connection / Air Ports

Able to connect control signals, power signals and air with a wide variety of electrodes and air joints.



Electrical connectors are sold separately. Please mount on applicable mounting surfaces shown below.

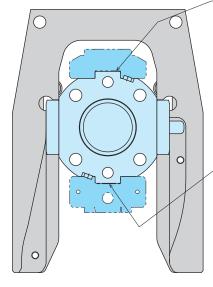
# Option Mounting Surface: 2 Parts

Applicable options differ depending on the mounting surface.

### Option Mounting Surface 1 (Unable to mount 2 options)



Option Mounting Surface



### Option Mounting Surface 2 (Able to mount 2 options)

Applicable External Options	SMR0120	SMR0250
SWLZ0B0: Solder Terminal	0	0
SWLZ0C0: Solder Terminal	0	0
SMRZ0D0: D-sub Connector	-	0
SMRZ0G0: Circular Connector	-	0
SWLZ0J0: Resin Connector	0	0
<b>SWLZ0K0</b> : Compact Electric Power Transmission	0	0
SMRZ0E0: Electric Power Transmission	-	0
<b>SWLZ0U0</b> : Simple Waterproof Electrode	0	0
<b>SWLZOWO</b> : Noncontact Waterproof Electrode Compact Model	0	0
SMRZ0L0: Ethernet Electrode	-	0
SWLZ0R0: Air Joint 3 Ports	0	0
SWLZ0PZ90: Air Joint 4 Ports	0	0

Mechanical Robotic Hand Changer

SMR

xternal Options



This mark means: Able to mount two options together. \*\*Refer to P.47 for details.



DC24V -















Solder Terminal

Solder Terminal
with Cable

Simple Waterproof Electrode
Only when connected: IP54







**D-sub Connector** 

Resin Connector

Circular Connector

AC / DC200V







Compact Electric Power

Transmission Option

5A 4 Poles

(Total Current Capacity 12A)

Power Transmission Option

5A 8 Poles
(Total Current Capacity 24A)

Noncontact Waterproof Electrode (IP67) —





Ethernet Electrode -





Ethernet Electrode
Transmission Speed: 100Mbps
Connector: M12 D-code 4 Poles

Air Joint (For Extra Air Ports)









3 Ports Equal to  $\phi$  6 × 1 Port Equal to  $\phi$  2 × 2 Ports

4 Ports Equal to  $\phi$  2 × 4 Ports

# **Option Mounting Surface**

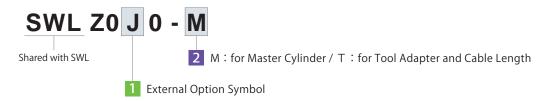
Master Cylinder



Tool Adapter



### Model No. Indication



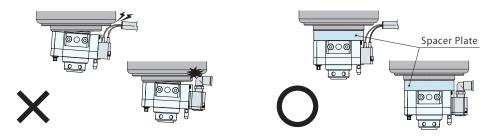
• El	ectr	ode	Model No.					
Rated Voltage	Rated Current External Options (Detail Page)  Number of Poles		Master Cylinder	Tool Adapter				
	*1 2A/1A	Resin Connector P.25	65	16 Poles		SWLZ0J0-M	SWLZ0J0-T	
DC24V		Solder Terminal P.29	6	15 Poles		SWLZ0B0-M	SWLZ0B0-T	
DC24V	24.91	Solder Terminal with Cable		15 Poles	Cable 1m	SWLZ0C0-M01 <sup>*2</sup>	SWLZ0C0-T01	
	3A *1	P.31			Cable 2m	SWLZ0C0-M02 <sup>*2</sup>	SWLZ0C0-T02	
		Simple Waterproof Electrode		460	Cable 1m	SWLZ0U0-M01 **2	SWLZ0U0-T01	
		Only when Connected IP54 P.33		16 Poles	Cable 2m	SWLZ0U0-M02*2	SWLZ0U0-T02	
AC200V DC200V	5A **1	Compact Electric Power Transmission Option P.37				SWLZ0K0-M <sup>**2</sup>	SWLZ0K0-T	
	ntact Wate	rproof Electrode Compact Model		Number of	NPN	SWLZ0W0-M	SWLZ0W0-T	
IP67 P.41				Signals : 4	PNP	SWLZ0WX0-M	For both NPN and PNP	

• Air Joi	nt	Model No.			
Number of Ports (Min. Passage Area)	External Options (Detail Page)		Master Cylinder	Tool Adapter	
3 Ports  (Equal to $\phi 6 \times 1$ Port)  (Equal to $\phi 2 \times 2$ Ports)	Air Joint P.45		SWLZORO-M*2	SWLZ0R0-T	
4 Ports (Equal to $\phi$ 2)	Air Joint P.46		SWLZ0PZ90-M	SWLZ0PZ90-T	

### Notes:

- \$1. For the electrode options, check the total current capacity and contact resistance shown in the specifications of each option.
- \*2. When using external options, the joints and cables may interfere with the robot body depending on the robot type.

  Use a spacer plate (SMRZ0120-MF4) or design a plate referring to the external dimensions on P.18.



# Model No. Indication



SMR

xternal Options
or SMR

SWLZ

SMRZ

Mechanical Robotic Hand Changer

• EI	ectr	ode		Mode	el No.		
Rated Voltage	Rated Current	External Options (Detail Page)	Number of Poles	Master Cylinder	Tool Adapter		
			SMRZ0D0-T				
DC24V	3A **1	Circular Connector (Connector Based on JIS C 5432) P.36	15 Poles	SMRZ0G0-M	SMRZ0G0-T		
AC200V DC200V	5A *1	Power Transmission Option (Connector Based on MIL-DTL-5015) P.39	8 Poles	SMRZ0E0-M	SMRZ0E0-T		
Ether P.43	rnet Elect	rode	4 Poles	SMRZ0L0-M SMRZ0L0-T			

### Note:

<sup>\*1.</sup> For the electrode options, check the total current capacity and contact resistance shown in the specifications of each option.

Able to add an external option.

Refer to P.47 for details.

### External Option: Resin Connector

# External Option Symbol: J

Model No. for Master Cylinder Side model **SWLZ0J0-M** 



Model No. for Tool Adapter Side model **SWLZ0J0-T** 

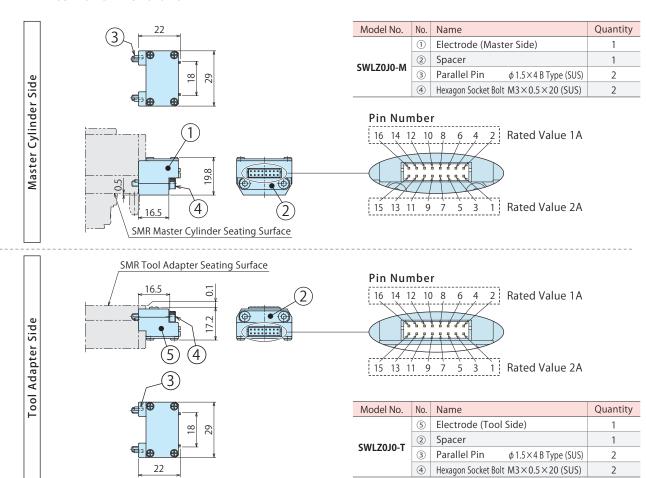


# Specifications

Specii	• Specifications								
Rated Value (per contact)	2	DC 24V 2A:1,3,5,7,9,11,13,15 1A:2,4,6,8,10,12,14,16							
Resin Conn	actor								
Resin Conn	ector	DF11-16DP-2DS(24) (HIROSE ELECTRIC)							
Contact Resi	stance (Initial Value)	$30 m\Omega$ or less							
Total Currer	nt Capacity	10A							
Number of F	Poles (per electrode)	16							
Connector	Pin Coating	Gold Coating							
\A/-:	Master Cylinder Side	13g							
Weight <sup>※1</sup>	Tool Adapter Side	11g							
Cable with Ap	plicable Connector	SWZ0J0-CL□ (Refer to P.26)							
(Sold Separate	elv)	SWZ0J0-M8□-CL□ (Refer to P.27)							

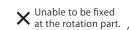
%1. Weight per kit.

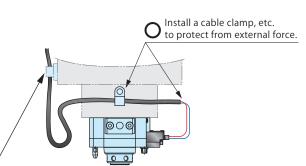
### External Dimensions



### Notes on Wire/Cable Procedure and Wiring

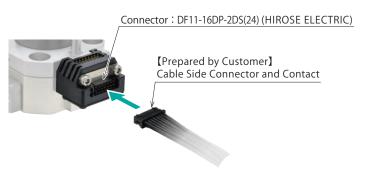
• Make sure to fix the wire and cable so that they are not pulled while a robot is moving or turning around. External force should not be applied on the connector part since it leads to breaking of wire, detaching of connector and contact failure.







# Connecting Cable



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

Please prepare the cable with applicable connector (SWZ0J0-CL ), or design them yourself referring to the following list.

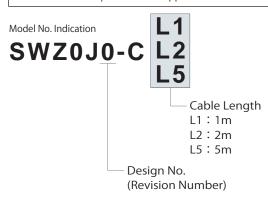
Cable Side Connector Model No.	Cable Side Contact Model No.	Recommended Wire Size	Protecti Manual Crimping Tool	Maker	
DE11 16D6 26	DF11-22SC	AWG22	DF11-TA22HC	DE C DO(D)	LUDOCE ELECTRIC
DF11-16DS-2C	DF11-2428SC	AWG24 ∼ 28	DF11-TA2428HC	DF-C-PO(B)	HIROSE ELECTRIC

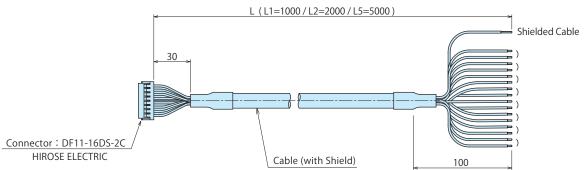
Notes: 1. Refer to HIROSE ELECTRIC catalogs for the detailed specifications and the rated current based on wire size.

2. The model number of connector required for the master cylinder and the tool adapter is the same.

### © External Option: Cable with Connector for Resin Connector

This cable is an optional cable applicable to the Resin Connector Electrode (SWLZ0J0-M/T External Option Symbol: J).





### Pin Numbers and Wire Colors

HIFLON SD-SB/20276 Black AWG24X8P (with Shield)

NISSEI ELECTRIC

Conductor Cross-Sectional Area: 0.2mm<sup>2</sup> (AWG24)

Number of Cores: 16

Weight: 76g /m (Weight per meter)

Outer Diameter  $\phi$  7.1

Rated Current	2A								1A							
Pin Number	1	3	5	7	9	11	13	15	2	4	6	8	10	12	14	16
Wire Color	Black	White	Red	Green	Yellow	Brown	Blue	Orange	Gray	Violet	Light Blue	Pink	White/ Black	White/ Red	White/ Blue	Yellow/ Black
	L	ed Pair	L	ed Pair	L	ed Pair	L Twist	ed Pair	L	ed Pair	L	ed Pair	Twist	ed Pair	L	ed Pair

Mechanical Robotic Hand Changer

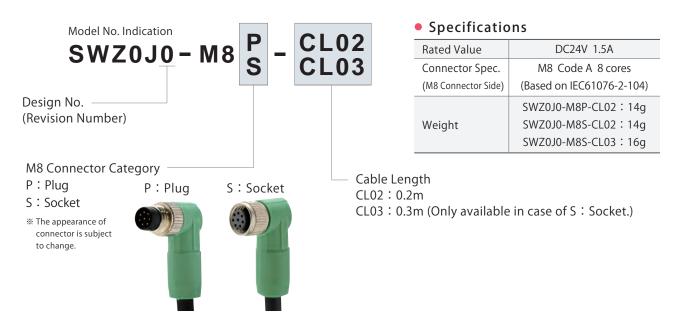
SMR

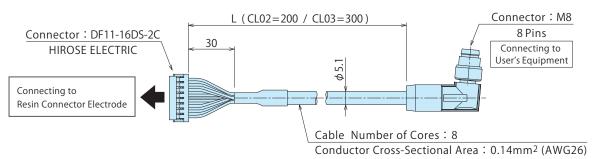
External Options for SMR

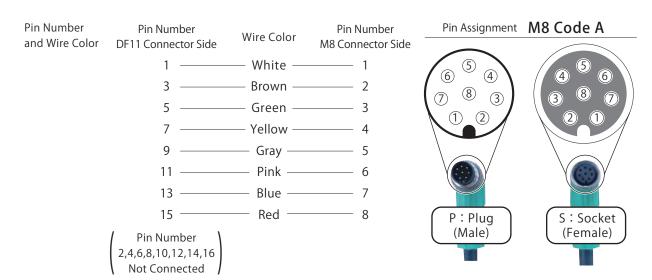
SMRZ

### External Option: Cable with M8 Connector for Resin Connector

This cable is an optional cable applicable to the Resin Connector Electrode (SWLZ0J0).

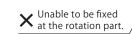


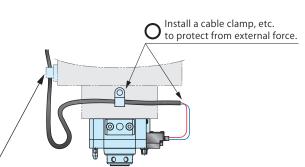




### Notes on Wire/Cable Procedure and Wiring

• 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.





Option List Mounting Surface Model No. Indication Mounting Dimension of Two Options Electrode Air Joint Cautions

MEMO

Mechanical Robotic Hand Changer

SMR

SWLZ

SMRZ

### External Option: Solder Terminal

### External Option Symbol: **B**

Model No. for Master Cylinder Side model **SWLZ0B0-M** 

Model No. for Tool Adapter Side model **SWLZ0B0-T** 





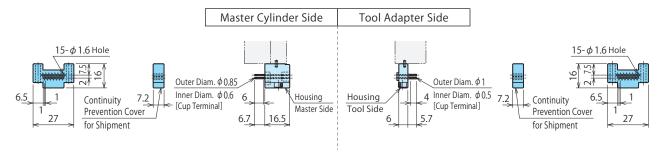
### Able to add an external option. Refer to P.47 for details.

### Specifications

Rated Valu	~	DC 24V 3A		
Contact Resi	stance (Initial Value)	100m $\Omega$ or less		
Total Currer	nt Capacity	10A		
Number of I	Poles (per electrode)	15		
Weight **1	Master Cylinder Side	19g		
weight **	Tool Adapter Side	15g		

**%**1. Weight per kit

### • External Dimensions : Electrode



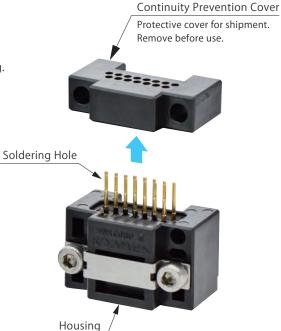
### Connection Method for Solder Terminal

For solder terminal option, the electric signal pin, wire and cable of both master cylinder and tool adapter are connected with soldering. If required, insulate them with a thermal contraction tube etc. (Remove the continuity prevention cover before soldering.)

Soldering condition should be : 280°C, within 3 seconds. Make sure the outer diameter is  $\phi$  1.6mm after soldering.

### [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 cannot be used.



ф Ф

Protective cover for shipment. Remove before use.

### External Dimensions



Continuity Prevention Cover

Housing (Electrode Master Side)

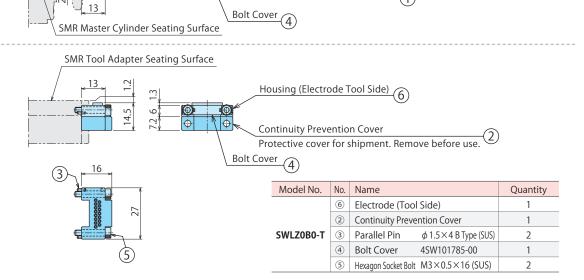


Mechanical Robotic

Hand Changer

Tool Adapter Side

Master Cylinder Side



Able to add an external option.

Refer to P.47 for details.

### External Option: Solder Terminal with Cable



 $\begin{array}{c} \mathsf{Model\ No.\ for\ Master\ Cylinder\ Side} \\ \mathsf{model\ SWLZ0C0-} \\ \mathbf{M01} \\ \mathbf{M02} \\ \mathbf{M05} \end{array}$ 

Model No. for Tool Adapter Side model SWLZ0C0- T01 T02

T05



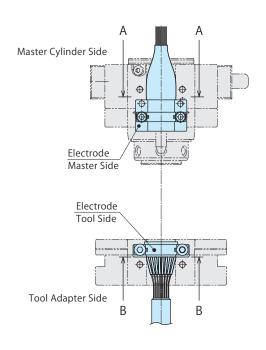


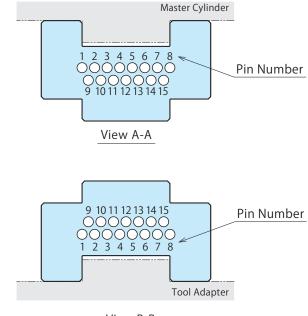
### Specifications

Rated Valu			DC 24V 3A		
Contact Res	istance (Initial	Value)	100mΩ or less		
Total Curre	ent Capacity		10A		
Number of	Poles (per ele	ctrode)	15		
Lead Wire	Size		Refer to the table below		
	-M01/T01		1m		
Lead Wire Length	-M02/T02	)	2m		
Length	-M05/T05	,	5m		
		-M01	Electrode 20g + Cable 80g		
	Master Cylinder Side	-M02	Electrode 20g + Cable 160g		
%1	Cyllilaci Siac	-M05	Electrode 20g + Cable 400g		
Weight		-T01	Electrode 15g + Cable 80g		
	Tool Adapter Side	-T02	Electrode 15g + Cable 160g		
	/ dupter side	-T05	Electrode 15g + Cable 400g		

%1. Weight per kit.

### Pin Numbers and Wire Colors





View B-B

### Cable

HIFLON SD-SB/20276 Black AWG24X8P (with Shield)

NISSEI ELECTRIC Weight: 76g /m (Weight per meter)

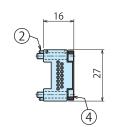
Conductor Cross-Sectional Area: 0.2mm<sup>2</sup> (AWG24)

Number of Cores: 16



Pin Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Not Used
Wire Color	Black	White	Red	Green	Yellow	Brown	Blue	Orange	Gray	Violet	Light Blue	Pink	White/ Black	White/ Red	White/ Blue	Yellow/ Black
	Twist	ed Pair	Twist	ed Pair	Twist	ed Pair	Twist	ed Pair	Twist	ed Pair	Twiste	ed Pair	Twist	ed Pair	Twist	ed Pair

### External Dimensions



Model No.	No.	Name	Quantity
	1	Electrode (Mass	1
SWLZ0C0	2	Parallel Pin	2
-M01/M02/M05	3	Bolt Cover	1
	4	Hexagon Socket Bolt	2

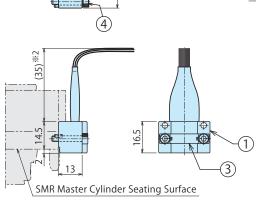
Mechanical Robotic Hand Changer

SMR

External Options for SMR

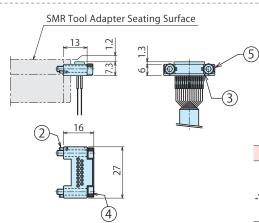
SWLZ

SMRZ



Tool Adapter Side

Master Cylinder Side

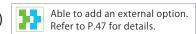


Model No.	No.	Name	Quantity
	(5)	Electrode (Tool Side)	1
SWLZ0C0	2	Parallel Pin $\phi$ 1.5 × 4 B Type (SUS)	2
-T01/T02/T05	3	Bolt Cover 4SW101785-00	1
	4	Hexagon Socket Bolt $M3 \times 0.5 \times 16$ (SUS)	2

### Notes:

- \*2. Depending on the type of robot, the cable may interfere with the robot body. Use a spacer plate (SMRZ0120-MF4) or design a plate referring to the external dimensions on P.18.
  - 1. The connected part of the solder terminal and lead wire is isolated with a thermal contraction tube.
  - 2. For SWLZ0C0-\\_01/02/05, the lead wire length is different from its shown in the specifications. (SWLZ0C0-\\_01: Lead Wire Length 1m, SWLZ0C0-\\_02: Lead Wire Length 2m, SWLZ0C0-\\_05: Lead Wire Length 5m)

# External Option : Waterproof Electrode (Simple Waterproof Option)



External Option Symbol: **U** 

 $\begin{array}{c} \mathsf{Model\ No.\ for\ Master\ Cylinder\ Side} \\ \mathsf{model\ SWLZ0U0-} \\ \hline \mathbf{M01} \\ \mathbf{M02} \\ \mathbf{M05} \\ \end{array}$ 

Model No. for Tool Adapter Side

 $\mathsf{model}\, \mathbf{SWLZ0U0} \text{-} \begin{array}{c} \mathbf{T01} \\ \mathbf{T02} \\ \mathbf{T05} \end{array}$ 



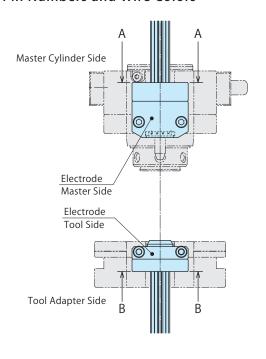


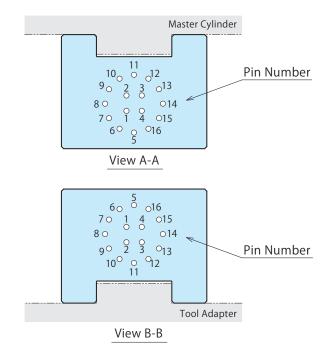
### Specifications

Rated Val		DC 24V 3A			
Contact Re	esistance (Initial '	100mΩ or less			
Total Curre	ent Capacity		10A		
Number o	f Poles (per electr	ode)	16		
Lead Wire	Size		Refer to the table below		
	-M01/-T01		1m		
Lead Wire Length	-M02/-T02		2m		
9	-M05/-T05		5m		
		-M01	Electrode 35g + Cable 80g		
	Master Cylinder Side	-M02	Electrode 35g + Cable 160g		
%1 Waight		-M05	Electrode 35g + Cable 400g		
Weight		-T01	Electrode 35g + Cable 80g		
	Tool Adapter Side	-T02	Electrode 35g + Cable 160g		
	Side	-T05	Electrode 35g + Cable 400g		
Protection	n Grade <sup>*2</sup>		Equivalent to IP54		

- ※ 1. Weight per kit.
- ※2. The protection grade is equivalent to IP54 at connected state (fit state) of the master cylinder and tool adapter.

### Pin Numbers and Wire Colors





### Cable

HIFLON SD-SB/20276 Black AWG24X8P (with Shield)

NISSEI ELECTRIC Weight: 76g /m (Weight per meter)

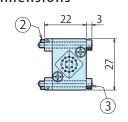
Conductor Cross-Sectional Area: 0.2mm<sup>2</sup> (AWG24)

Number of Cores: 16



Pin Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Wire Color	Black	White	Red	Green	Yellow	Brown	Blue	Orange	Gray	Violet	Light Blue	Pink	White/ Black	White/ Red	White/ Blue	Yellow/ Black
	L	ed Pair	L	ed Pair	L	ed Pair	L	ted Pair	L	ed Pair	L	ed Pair	L	ed Pair	L	ed Pair

### External Dimensions

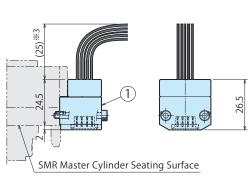


Model No.	No.	Name	Quantity
SWL ZOUO	1	Electrode (Master Side)	1
-M01/M02/M05	2	Parallel Pin $\phi$ 1.5×4 B Type (SUS)	2
-1010 1/10102/10103	3	Hexagon Socket Bolt M3×0.5×25 (SUS)	2

Mechanical Robotic Hand Changer

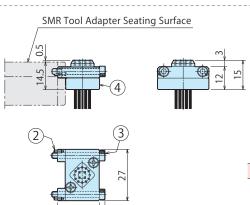
SMR

External Options for SMR



Tool Adapter Side

Master Cylinder Side



Model No.	No.	Name	Quantity
CM/1 70110	4	Electrode (Tool Side)	1
SWLZ0U0	2	Parallel Pin $\phi$ 1.5×4 B Type (SUS)	2
-T01/T02/T05	3	Hexagon Socket Bolt M3×0.5×25 (SUS)	2

### Notes:

- \*3. Depending on the type of robot, the cable may interfere with the robot body. Use a spacer plate (SMRZ0120-MF4) or design a plate referring to the external dimensions on P.18.
  - 1. For SWLZ0U0- $\square$ 01/02/05, the lead wire length is different from its shown in the specifications. (SWLZ0U0- $\square$ 01: Lead Wire Length 1m, SWLZ0U0- $\square$ 02: Lead Wire Length 2m, SWLZ0U0- $\square$ 05: Lead Wire Length 5m)

### External Option : D-SUB Connector

### External Option Symbol: **D**





 $\begin{array}{ll} \mathsf{Model} \ \mathsf{No.} \ \mathsf{for} \ \mathsf{Tool} \ \mathsf{Adapter} \ \mathsf{Side} \\ \mathsf{model} \ \ \boldsymbol{\mathsf{SMRZ0D0-T}} \end{array}$ 

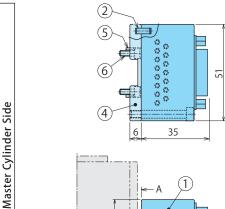


### Specifications

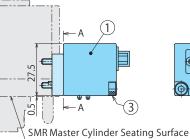
Rated Value (per contact)	-	DC 24V 3A		
Contact Resis	tance (Initial Value)	$100 m\Omega$ or less		
Total Currer	nt Capacity	10A		
Number of Po	oles (per electrode)	15		
Weight <sup>%1</sup>	Master Cylinder Side	100g		
	Tool Adapter Side	90g		

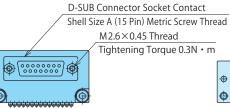
※1. Weight per kit.

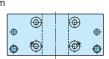
### External Dimensions



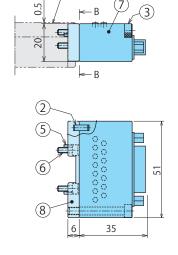
All-inclusive Model No.	Part No.	No.	Name	Quantity
		1	Electrode (Master Side)	1
	SWRZ0D0-M	2	Parallel Pin $\phi 3 \times 8$ B Type (SUS)	2
CMDZODO M		3	Hexagon Socket Bolt M4×0.7×30 (SUS)	2
SMRZ0D0-M		4	Bracket (Master Side)	1
	SMRZ0Z0 -MB	(5)	Parallel Pin φ1.5×4 B Type (SUS)	2
	-IVID	6	Hexagon Socket Bolt M3×0.5×8 (SUS)	4

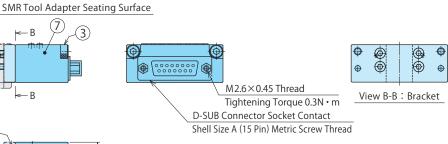






View A-A: Bracket





All-inclusive Model No.	Part No.	No.	Name	Quantity
		7	Electrode (Tool Side)	1
	SWRZ0D0-T	2	Parallel Pin $\phi$ 3×8 B Type (SUS)	2
CMDZODO T		3	Hexagon Socket Bolt M4×0.7×30 (SUS)	2
SMRZ0D0-T	SMRZ0Z0 -TB	8	Bracket (Tool Side)	1
		(5)	Parallel Pin $\phi$ 1.5×4 B Type (SUS)	2
		6	Hexagon Socket Bolt M3×0.5×8 (SUS)	4

**Tool Adapter Side** 

# External Option: Circular Connector (Connector Based on JIS C 5432)

## External Option Symbol: **G**

Model No. for Master Cylinder Side  $\mathsf{model}~\mathbf{SMRZ0G0\text{-}M}$ 



Model No. for Tool Adapter Side

model SMRZ0G0-T



# Specifications

Rated Value (per contact)	-	DC 24V 3A	
Contact Resis	tance (Initial Value)	100m or less	
Total Currer	nt Capacity	17A	
Number of Pol	es (per electrode)	15*2	
Weight <sup>*1</sup>	Master Cylinder Side	125g	
	Tool Adapter Side	145g	

※1. Weight per kit.

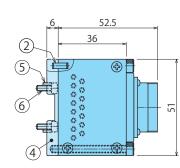
Compatible with

 $\ \%2$ . Connector pin #16 is not used.

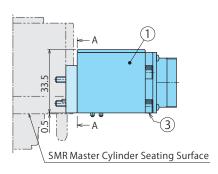
#### External Dimensions

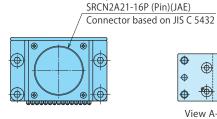
Master Cylinder Side

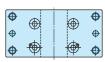
**Tool Adapter Side** 



All-inclusive Model No.	Part No.	No.	Name	Quantity
		1	Electrode (Master Side)	1
	SWRZ0G0-M	2	Parallel Pin $\phi 3 \times 8$ B Type (SUS)	2
C14D70C0 14		3	Hexagon Socket Bolt M4×0.7×40 (SUS)	4
SMRZ0G0-M	SMRZ0E0 -MB	4	Bracket (Master Side)	1
		(5)	Parallel Pin $\phi$ 1.5 × 4 B Type (SUS)	2
		6	Hexagon Socket Bolt M3×0.5×8 (SUS)	4







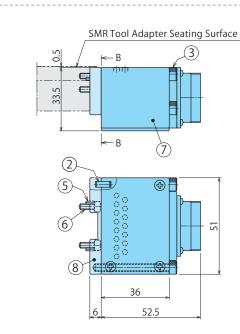
View A-A: Bracket

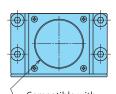
(1)

View B-B: Bracket

Ф **@**  $\Phi$ 

 $\oplus$ 





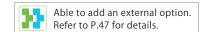


All-inclusive Model No.	Part No.	No.	Name	Quantity
	SWRZ0G0-T	7	Electrode (Tool Side)	1
		2	Parallel Pin $\phi 3 \times 8$ B Type (SUS)	2
CMD70C0 T		3	Hexagon Socket Bolt M4×0.7×40 (SUS)	4
SMRZ0G0-T	SMRZ0E0 -TB	8	Bracket (Tool Side)	1
		(5)	Parallel Pin $\phi$ 1.5×4 B Type (SUS)	2
		6	Hexagon Socket Bolt M3×0.5×8 (SUS)	4

SMR

 $\mathsf{SWLZ}$ 

## External Option: Compact Electric Power Transmission



#### External Option Symbol: **K**

Model No. for Master Cylinder Side model **SWLZ0K0-M** 

Model No. for Tool Adapter Side model **SWLZOKO-T** 





# Specifications

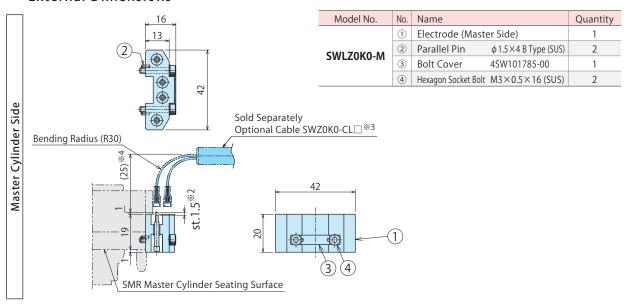
Rated Value (per contact)	-	AC/DC 200V 5A
Total Currer	nt Capacity	12A
Number of P	oles (per electrode)	4
Weight*1	Master Cylinder Side	21g
weight	Tool Adapter Side	17g
Cable with Ap (Sold Separat	oplicable Terminal ely)	SWZ0K0-CL□ (Refer to P.38)

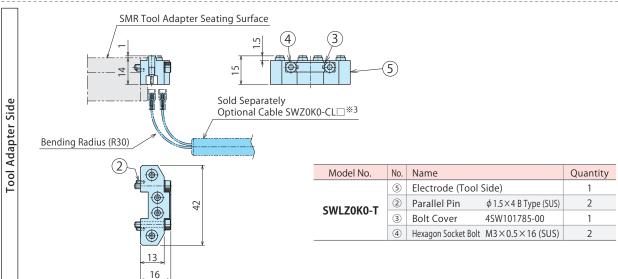
%1. Weight per kit.

## Applicable Cable

The cable with applicable terminal and applicable terminal are not included. Please prepare the cable with applicable terminal (SWZ0K0-CL $\square$ ) on P.38 or design it yourself referring to the applicable terminal on P.38.

#### External Dimensions



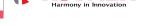


#### Notes:

- \*\*2. The electrode probe on master side strokes 1.5mm (\*\*2) when connecting with SMR. When fixing the cable, make sure there is enough space for the probe operation.
- \*3. The optional cable and terminal are not included in the electrode. Please prepare them separately.
- \*4. Depending on the type of robot, the cable may interfere with the robot body. Use a spacer plate (SMRZ0120-MF4) or design a plate referring to the external dimensions on P.18.

# 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. However, the electrode probe on master side strokes 1.5mm when connecting with SMR. When fixing the cable, make sure there is enough space for the probe to stroke.

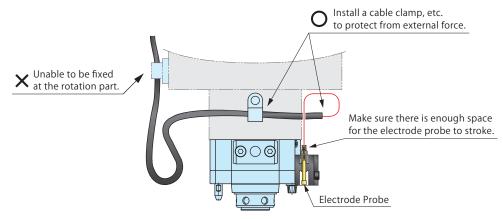


SMR

Mechanical Robotic

Hand Changer

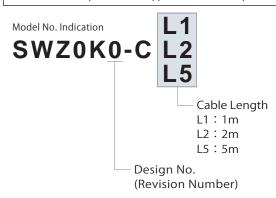
SWLZ SMRZ

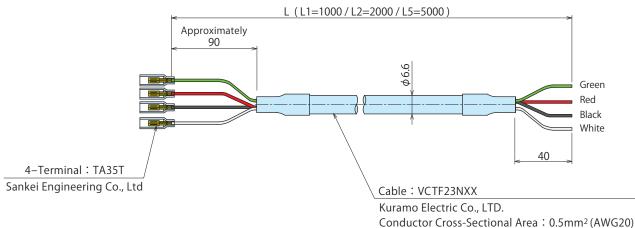


 As for Compact Electric Power Transmission option, the electrode probes on both master cylinder and tool adapter are exchangeable. The electrode probes will be fallen out if pushed from the cable connecting side with power stronger than a certain level. In case the electrode probes are pushed out after connecting the cable, make sure to push them back from the seating surface side before use.

# External Option: Cable with Terminal for Compact Electric Power Transmission

This cable is an optional cable applicable to the Compact Electric Power Transmission SWLZ0K0-M/T (External Option Symbol: K).





Number of Cores: 4

Weight: 65g/m (Weight per meter)

# © External Option: Power Transmission Option (Connector Based on MIL-DTL-5015)

## External Option Symbol: **E**









# Specifications

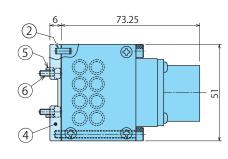
Rated Value (per contact)	2	AC/DC 200V 5A
Total Currer	nt Capacity	24A
Number of Po	oles (per electrode)	8
Weight*1	Master Cylinder Side	165g
weight	Tool Adapter Side	175g

%1. Weight per kit.

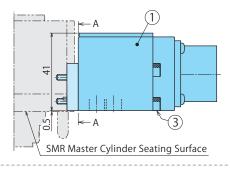
## External Dimensions

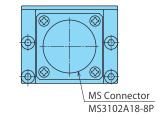
Master Cylinder Side

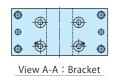
**Tool Adapter Side** 

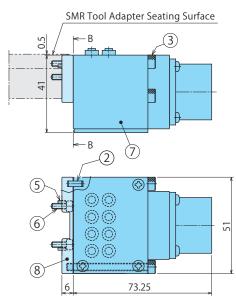


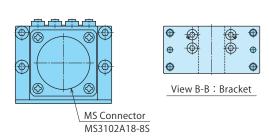
All-inclusive Model No.	Part No.	No.	Name	Quantity
	SWRZ0E0-M	1	Electrode (Master Side)	1
		2	Parallel Pin $\phi 3 \times 8$ B Type (SUS)	2
CMDZOFO M		3	Hexagon Socket Bolt M4 $\times$ 0.7 $\times$ 45 (SUS)	4
SMRZ0E0-M	SMRZ0E0 -MB	4	Bracket (Master Side)	1
		(5)	Parallel Pin $\phi$ 1.5×4 B Type (SUS)	2
		6	Hexagon Socket Bolt M3×0.5×8 (SUS)	4











All-inclusive Model No.	Part No.	No.	Name	Quantity
	SWRZ0E0-T	7	Electrode (Tool Side)	1
		2	Parallel Pin $\phi 3 \times 8$ B Type (SUS)	2
SMRZ0E0-T		3	Hexagon Socket Bolt M4 $\times$ 0.7 $\times$ 45 (SUS)	4
	SMRZ0E0 -TB	8	Bracket (Tool Side)	1
		(5)	Parallel Pin $\phi$ 1.5 × 4 B Type (SUS)	2
		6	Hexagon Socket Bolt M3 $ imes$ 0.5 $ imes$ 8 (SUS)	4

Option List
Mounting Surface

Model No. Indication

Electrode

Air Joint

Mounting Dimension of Two Options

Cautions

MEMO

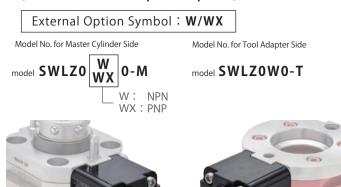
Mechanical Robotic Hand Changer SMR

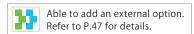
External Options for SMR

SWLZ

SMRZ

# © External Option: Compact Waterproof Electrode (Noncontact Waterproof Option) IP67



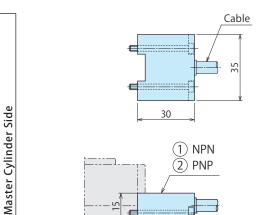


# Specifications

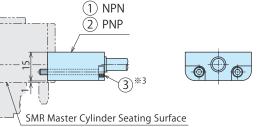
Number of S	ignals (per electrode)	4	
Protection	Grade **1	IP67	
Cable		PUR <b>ø</b> 6.3	
Cable		7×0.259mm <sup>2</sup>	
Cable	Master Cylinder Side	2m	
Length	Tool Adapter Side	1m	
*2 Weight	Master Cylinder Side	Electrode 20g + Cable 120g	
weight	Tool Adapter Side	Electrode 20g + Cable 60g	

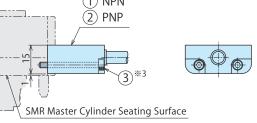
- \*1. Protection grade of the electrode part.
- %2. Weight per kit.

## External Dimensions



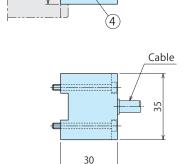
Model No.	No.	Name	Quantity
SWLZ0W0-M		Electrode (Master Side) NPN (B & Plus)	1
SWLZUWU-W	3	Hexagon Socket Bolt M3×0.5×30 (SUS)*3	2
Model No.	No.	Name	Quantity
SWLZ0WX0-M ② 3		Electrode (Master Side) PNP (B & Plus)	1
		Hexagon Socket Bolt M3×0.5×30 (SUS)**3	2





SMR Tool Adapter Seating Surface

**Tool Adapter Side** 



Model No.	No.	Name	Quantity
CWI 70W0 T	4	Electrode (Tool Side) (B & Plus)	1
SWLZ0W0-T	(3)	Hexagon Socket Bolt M3×0.5×30 (SUS) *3	2

Note:  $\mbox{\%}3$ . The tightening torque for M3 mounting bolts marked with 3 should be 0.63 N · m.

Mechanical Robotic

SWLZ SMRZ

Hand Changer SMR

# 💿 Details and Notes on External Option:Compact Noncontact Waterproof Electrode

#### Applicable Sensor

Supply Voltage	12V DC
Total Current Consumption	≦60mA
Residual Voltage	≦3.5V

\*Total current consumption of sensors must not exceed the total rated output current.

#### **Electrode Specifications** (Tool Adapter Side)

SWLZ0W0-T		
DC 3-Wire Sensor		
12V ±1.5	5V DC	
4		
≦ 30mA	≦ 60mA	
0~3mm	0~2mm	
0 ~ 50℃		
IP67		
ABS		
PUR $\phi$ 6.3 / 7×0.259mm <sup>2</sup> Hitachi Metals, Ltd. RBT-VUCTF		
	DC 3-Wir $12V \pm 1.9$ 4 $\leq 30\text{mA}$ $0\sim3\text{mm}$ $0\sim50^{\circ}\text{C}$ IP67 ABS PUR $\phi$ 6.3/7 Hitachi Me	

#### **Electrode Specifications** (Master Cylinder Side)

Model	NPN	SWLZ0W0-M
No.	PNP	SWLZ0WX0-M
Supply Voltag	ge (Input Voltage)	24V DC ±10% (Including Ripple)
Current C	onsumption	≦ 200mA
No. of Ou	tput Signals	4 + 1 (Inzone)
Load Current		≦ 50mA / 1 Output
Operating Temperature		0 ~ 50℃
Protection Grade		IP67
Materia	l	ABS
Cable		PUR \$\phi\$ 6.3 / 7 \times 0.259 mm <sup>2</sup>
		Hitachi Metals, Ltd.
		RBT-VUCTF

■ LED Indication Status LED: Green

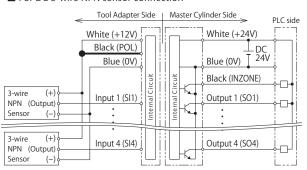
LED	Meaning
ON O	The power is supplied.
OFF	The power is not supplied.
Blink ∹ <b>Ç</b> -	Blinks in case of abnormality.

■ LED Indication Inzone LED: Orange The master cylinder and tool adapter are opposed, LED is lit when you can communicate.

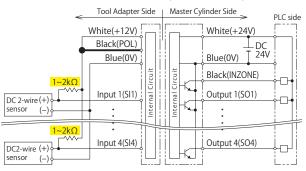
## Wiring Diagram

#### SWLZ0W0-M (NPN)

■ For DC 3-wire NPN sensor connection



■ For DC 2-wire sensor connection (when NPN is set)



- When connecting a DC 2-wire sensor, ensure to wire a resistor of about 1 to 2 k  $\Omega$ .
- POL is wiring for switching the polarity (NPN/PNP) of the sensor.

#### Wiring Color

- Electrode for Tool Adapter side Output + 12V White Output 0V Blue Black Polarity Switching POL Input 1 (SI1) Brown Input 2 (SI2) Red Input 3 (SI3) Yellow Input 4 (SI4) Green
- Electrode for Master Cylinder side Input +24V White Input 0V Blue INZONE Black Output 1 (SO1) Brown Output 2 (SO2) Red Output 3 (SO3) Yellow Output 4 (SO4) Green

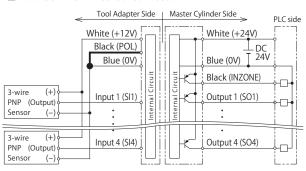
## Bending Radius of Cable

The minimum bending radius for the sensors are 50mm. \* Do not pull the cable with excessive force.

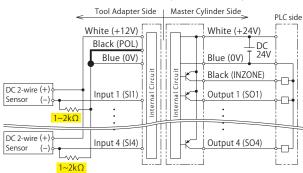


## SWLZ0WX0-M (PNP)

■ For DC 3-wire PNP sensor connection



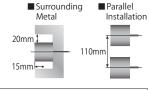
■ For DC 2-wire sensor connection (when PNP is set)



## Attention for Installation

(Read this section thoroughly before installation.)

- ♦ Ensure the power is switched off during installation or maintenance
- Use a regulated power supply, e.g. switch-model type. Simpler power supplies, such as a full-wave rectification type, will cause the permissible ripple rating to be exceeded and may cause malfunction.
- ◆ Do not put metal objects between electrodes during operation. Failure to do so may cause heat generation, ignition, or malfunction.
- ◆ Ensure correct connections by referencing the wiring diagram.
- To avoid malfunction caused by induction noise, cable should be kept apart from motor or other power cable.
- The control communication device in the product may affect electronic devices and medical devices. Persons wearing pacemakers should stay away from this product.
- ♦ In order to avoid influence of surrounding metal, or to avoid mutual influence between parallel-mounted sensors, keep the minimum free zone as described on the right.



The information above is quoted from B & Plus K.K. Remote System User's Guide (No.T315201G).

Please contact B & Plus K.K. (TEL 81(0)-493-71-5160) for further information about electrodes (Model No. SWRZ0W0-M-/ SWRZ0W0-T-

# External Option: Ethernet Electrode

## External Option Symbol: L

Model No. for Master Cylinder Side

 $\mathsf{model}~\mathbf{SMRZ0L0-M}$ 



Model No. for Tool Adapter Side model **SMRZ0L0-T** 

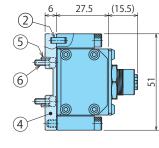


# Specifications

Rated Valu	-	DC 30V 0.5A	
Number of P	oles (per electrode)	4	
Connector		M12 D-code 4 poles (Female) (based on IEC61076-2-101)	
Ethernet App	olicable Standard	100BASE-TX <sup>※3</sup>	
Transmissi	on Speed	100Mbps <sup>※3</sup>	
Category		CAT5	
		EtherNet/IP	
		EtherCAT	
Applicable	Fieldbus	PROFINET	
	Modbus TCP		
		CC-Link IE Field Network Basic **2	
Wai-lat **1	Master Cylinder Side	130 g	
Weight <sup>※1</sup>	Tool Adapter Side	120 g	

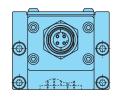
- ※1. Weight per kit.
- \*\*2. Cannot be used with a fieldbus that requires a communication speed of 1Gbps such as CC-Link IE.
- ※3. In the case transmission speed of Ethernet applicable standard 1000BASE-T (transmission speed: 1 Gbps) is required, please contact us.

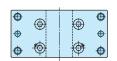
# External Dimensions



A	1
SMR Master C	ylinder Seating Surface

	All-inclusive Model No.	Part No.	No.	Name		Quantity
			1	Electrode (Master	Side)	1
	SMRZ0L0-M	SWRZ0L0-M	2	Parallel Pin	$\phi$ 3×8 B Type (SUS)	2
			3	Hexagonal Socket Bolt	M4×0.7×25 (SUS)	4
		SMRZ0E0 -MB	4	Bracket (Master Si	de)	1
			(5)	Parallel Pin	$\phi$ 1.5×4 B Type (SUS)	2
_			6	Hexagonal Socket Bolt	M3×0.5×8 (SUS)	4

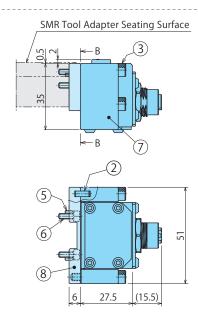


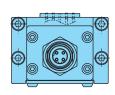


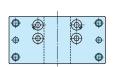
View A-A: Bracket



Master Cylinder Side







View B-B: Bracket

All-inclusive Model No.	Part No.	No.	Name	Quantity
SMRZ0L0-T	SWRZ0L0-T	7	Electrode (Tool Side)	1
		2	Parallel Pin $\phi 3 \times 8$ B Type (SUS)	2
		3	Hexagonal Socket Bolt M4×0.7×25 (SUS)	4
	SMRZ0E0 -TB	8	Bracket (Tool Side)	1
		(5)	Parallel Pin $\phi$ 1.5×4 B Type (SUS)	2
		6	Hexagonal Socket Bolt M3×0.5×8 (SUS)	4

Option List
Mounting Surface

Model No. Indication

Electrode

Air Joint

Mounting Dimension of Two Options

Cautions

MEMO

Mechanical Robotic Hand Changer

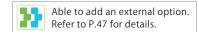
SMR

External Options for SMR

SWLZ

SMRZ

## External Option : Air Joint 3-Port Option (1 Port Rc1/8)



## External Option Symbol: R

Model No. for Master Cylinder Side model SWLZ0R0-M

Model No. for Tool Adapter Side model SWLZ0R0-T



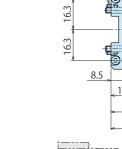


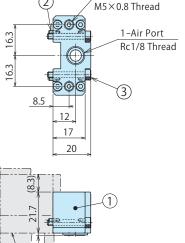
## Specifications

Port Size		Rc1/8	M5	
Number of	Ports	1	2	
Operating F	Pressure	max. 0.7MPa (Va	cuum Available)	
Withstandi	ng Pressure	1.11	MРа	
Min. Passag	ge Area	28.3mm <sup>2</sup> 3.1mm <sup>2</sup> (Equal to $\phi$ 6) (Equal to $\phi$ 2		
Operating 1	Гетрегаture	0 ~ 70℃		
Usable Flui	d	Dry Air		
Reaction Force	Pressure at 0.7 MPa	0.13 kN	0.04kN	
(per port)	Pressure at 0.5 MPa	0.10 kN	0.03kN	
	Pressure at P MPa	0.154×P+0.019 kN	0.047×P+0.008 kN	
Weight **1	Master Cylinder Side	54 g		
weight ***	Tool Adapter Side	28 g		

%1. Weight per kit.

#### External Dimensions





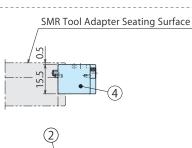
2-Air Port

Model No.	No.	Name	Quantity
	1	Joint (Master Side)	1
SWLZ0R0-M	2	Parallel Pin $\phi$ 1.5 × 4 B Type (SUS)	2
	3	Hexagon Socket Bolt M3×0.5×20 (SUS)	2

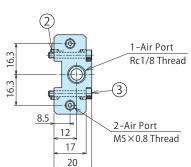


**Tool Adapter Side** 

Master Cylinder Side



SMR Master Cylinder Seating Surface



<b>(</b>			<b>@</b>	
	4	2		

Model No.	No.	Name	Quantity
	4	Joint (Tool Side)	1
SWLZ0R0-T	2	Parallel Pin $\phi$ 1.5 × 4 B Type (SUS)	2
	3	Hexagon Socket Bolt M3×0.5×20 (SUS)	2

1. Depending on the type of joints and robot, the joints may interfere with the robot body. Use a spacer plate (SMRZ0120-MF4) or design a plate referring to the external dimensions on P.18.



# External Option : Air Joint 4-Port Option

External Option Symbol: PZ9

Model No. for Master Cylinder Side model SWLZ0PZ90-M Model No. for Tool Adapter Side model SWLZ0PZ90-T





Air Port Position: 4 ports on the bottom

#### Able to add an external option. Refer to P.47 for details.

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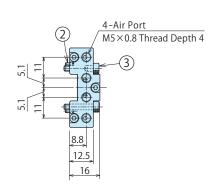
# Specifications

Number of	Ports	4	
Operating I	Pressure	max. 1.0MPa (Vacuum Available)	
Withstandi	ng Pressure	1.5MPa	
Min. Passag	je Area	3.1mm <sup>2</sup> (Equal to $\phi$ 2)	
Operating <sup>-</sup>	Temperature	0 ~ 70℃	
Usable Flui	d	Dry Air	
	Pressure at 1 MPa	0.03 kN	
Reaction Force (per port)	Pressure at 0.5 MPa	0.02 kN	
(per port)	Pressure at P MPa	0.027×P +0.004 kN	
Waight %1	Master Cylinder Side	74 g	
Weight <sup>※1</sup>	Tool Adapter Side	64 g	

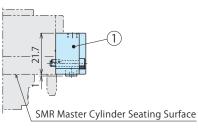
<sup>%1.</sup> Weight per kit.

# External Dimensions

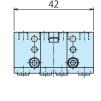
Master Cylinder Side



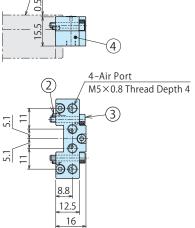
Model No.	No.	Name	Quantity
	1	Joint (Master Side)	1
SWLZ0PZ90-M	2	Parallel Pin $\phi$ 1.5 × 4 B Type (SUS	2
	3	Hexagon Socket Bolt M3×0.5×16 (SUS)	2



SMR Tool Adapter Seating Surface







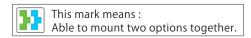
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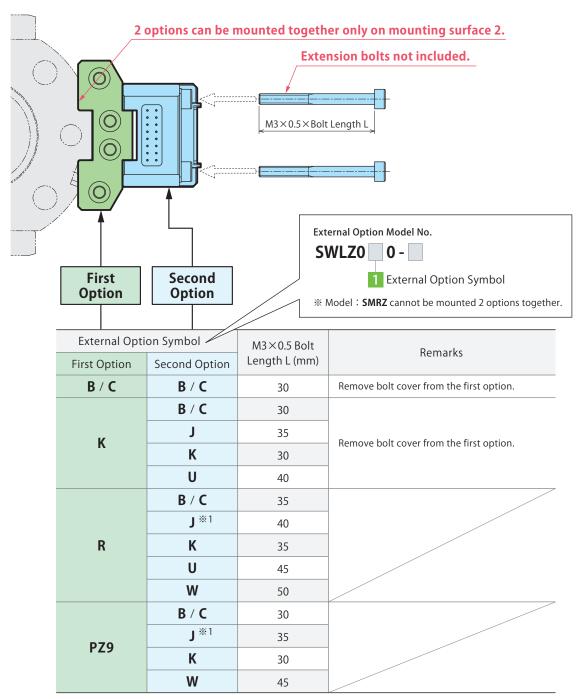
Model No.	No.	Name	Quantity
	4	Joint (Tool Side)	1
SWLZ0PZ90-T	2	Parallel Pin $\phi$ 1.5 × 4 B Type (SUS)	2
	3	Hexagon Socket Bolt M3×0.5×16 (SUS)	2

<sup>1.</sup> Depending on the type of joints and robot, the joints may interfere with the robot body. Use a spacer plate (SMRZ0120-MF4) or design a plate referring to the external dimensions on P.18.

## Mounting Dimension of Two Options

This table shows bolt length and combination of option symbols when mounting two external options together.





#### Notes:

- \*1. JIS Spring Lock Washer (for M3) is required. Please prepare it separately.
- 1. In case an external air joint and electrode are overlapping, please select a tool base referring to P.9 "Support Spring Chart". It is recommended to select M if 3 support spring option in the recommended range is Blank, and H if it is L or M.

# Cautions for External Options

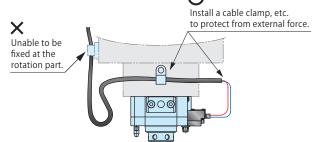
- Notes for Design
- 1) Check Specifications
- Please use each product according to the specifications.
- 2) Operating Environment (Electrode)
- Do not use the product in the environment with water vapor liquid scattering of chemicals explosion gas with causticity. Also, using in the environment with cutting chips cutting fluid dust spatter scattering may lead to continuity error of electrode. We offer IP67-Compatible Noncontact Waterproof Electrode for the environment with water vapor liquid cutting chips.
- 3) Electrification of Electrodes while Connecting/Disconnecting (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  $40 \sim 60\%$  of rated current, it is recommended to use multiple electrodes in a line. (In order to improve durability of contact probes.)

#### Installation Notes

- 1) Please supply filtered clean dry air to air joint options.
- 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) Notes on Wire/Cable Procedure and Wiring (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.
- 5) Connection Method for -D/E/G/J/L: Connector
- A Connector must be fully inserted into the electrode.
   If a connector is not fully inserted, it will cause contact failure.
   As for -D/E/G/L options, make sure to screw up the connector.
   If a connector is not fully inserted or screwed up, it will cause contact failure.
  - Tightening Torque for -D: D-SUB Connector M2.6 Thread: 0.3N m
- 6) Notes for using -K: Compact Electric Power Transmission
- As for Compact Electric Power Transmission option, the electrode probes on both master cylinder and tool adapter are exchangeable. The electrode probes will be fallen out if pushed from the cable connecting side with power stronger than a certain level. In case the electrode probes are pushed out after connecting the cable, make sure to push them back from the seating surface side before use.

Mechanical Robotic Hand Changer

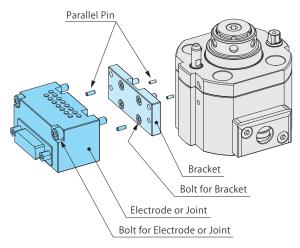
SMR

external Options

SWLZ SMRZ

## Cautions for External Options

- Installation Notes (Continued)
- 7) Installation of External Option
- For bolt for electrode or joint, 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 in Table A.
- For bolt for bracket, apply screw lock glue (equivalent to 1344 made by ThreeBond) on the tip of the mounting bolt and tighten it with the tightening torque shown in Table B.
- When mounting, use the attached pins and tighten them with bolts evenly not to incline the master cylinder and tool adapter.
- When mounting two external options together, tighten them with the tightening torque of the second option (installed on the outside).



【Table A: Tightening Torque of Bolt for Electrode or Joint】

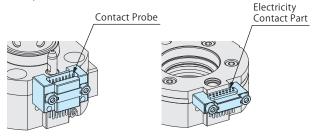
Trable A . Tigritering rorque or boil for Electrode of Joint				
External Option		Bolt Size / Tightening Torque		
Symbol	Model No.	Boit Size / Fightering Forque		
J	SWLZ0J0-M/T			
В	SWLZ0B0-M/T			
C	SWLZ0C0-M□/T□	M3×0.5 Bolt: 0.5 N • m		
U	SWLZ0U0-M□/T□			
K	SWLZ0K0-M/T			
W	SWLZ0W0-M/T	M3×0.5 Bolt: 0.63 N • m		
WX	SWLZ0WX0-M	M3 × 0.5 BOIL : 0.05 N · III		
D	SMRZ0D0-M/T	M4×0.7 Bolt: 1.5 N • m		
G	SMRZ0G0-M/T			
E	SMRZ0E0-M/T			
L	SMRZ0L0-M/T			
R	SWLZ0R0-M/T	M2 V 0 E Bolt * 1 2 N - m		
PZ9	SWLZ0PZ90-M/T	M3×0.5 Bolt ∶ 1.3 N • m		

【Table B: Tightening Torque of Bolt for Bracket】

External Symbol	Option Model No.	Bolt Size / Tightening Torque
D G	SMRZ0D0-M/T SMRZ0G0-M/T	Bolt for Bracket
E L	SMRZ0E0-M/T SMRZ0L0-M/T	M3×0.5 Bolt: 1.3 N⋅m

#### Maintenance • Inspection

- 1) Removal of the Product and Shut-off of Pressure Source
- Before the product is removed, make sure that safety devices and preventive devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air circuits.
- Make sure there is no trouble/issue in the bolts and respective parts before restarting.
- 2) Regularly examine and retighten piping, mounting bolts and wires to ensure proper use.
- 3) 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.
   If the contact probe of master cylinder has abnormality, it has to
  be replaced.



- 4) Make sure to supply filtered clean dry air.
- 5) 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.
- 6) The products should be stored in the cool and dark place without direct sunshine or moisture.
- 7) Please contact us for overhaul and repair.

## Common Cautions

#### 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 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
- Make sure there is no trouble/issue in the bolts and respective parts
   before restarting a machine or device.
- Do not touch a master cylinder, a tool adapter, a tool base or an external option while it is working. Otherwise, your hands may be injured.



- 4) Do not disassemble or modify.
- If the product is taken apart or modified, the warranty will be voided even within the warranty period.
- 5) When the robot is in operation, make sure the safety of environment in case of a tool/workpiece detachment.

#### 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.
- 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.

Hand Changer

SMR

External Options

SMRZ



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