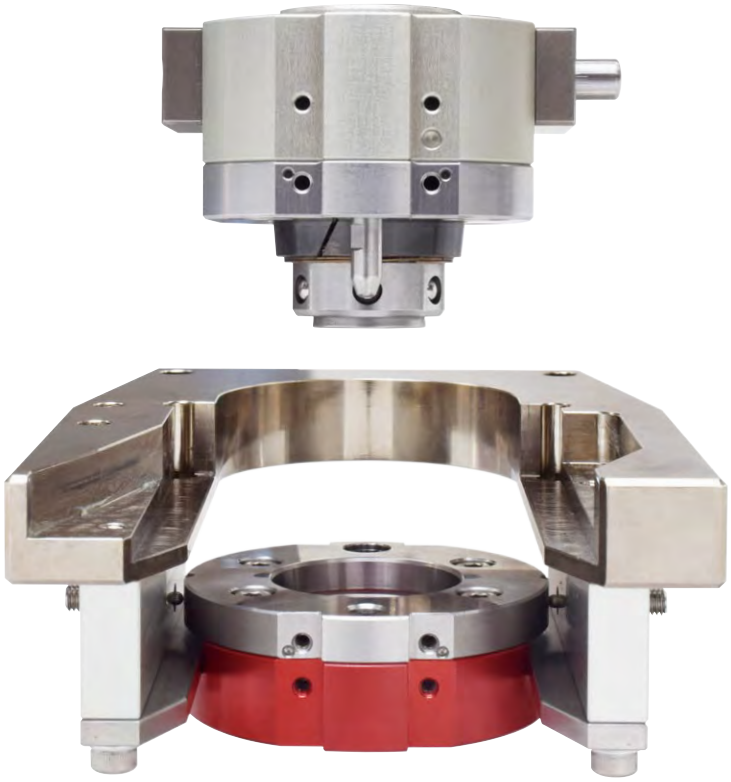
New Additional Line-up: 25kg Payload Model (SMR0250)

Mechanical Robotic Hand Changer



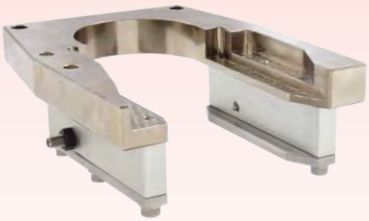
Model SMR

KOSMEK
Harmony in Innovation

Mechanical
Robotic Hand Changer

Additional Line-up : 25kg Payload Model Model SMR0250

Model SMR

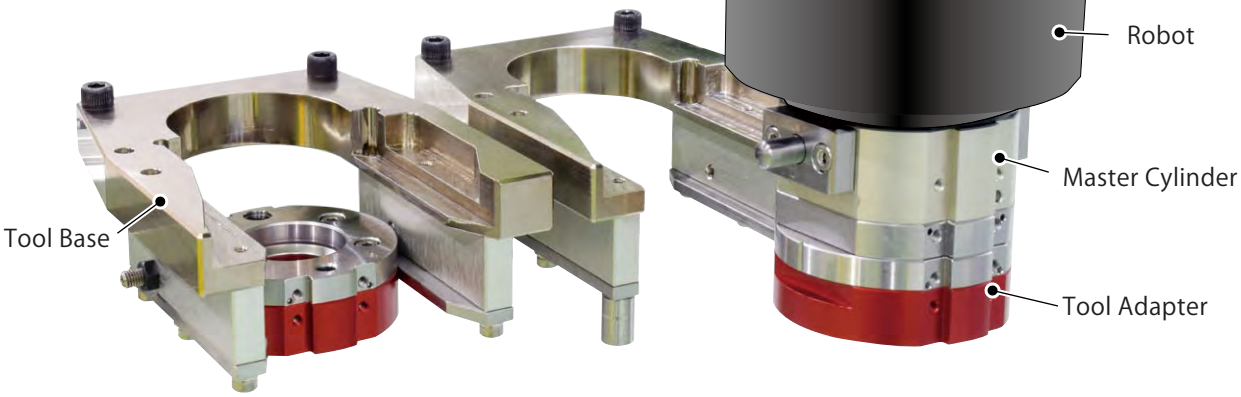


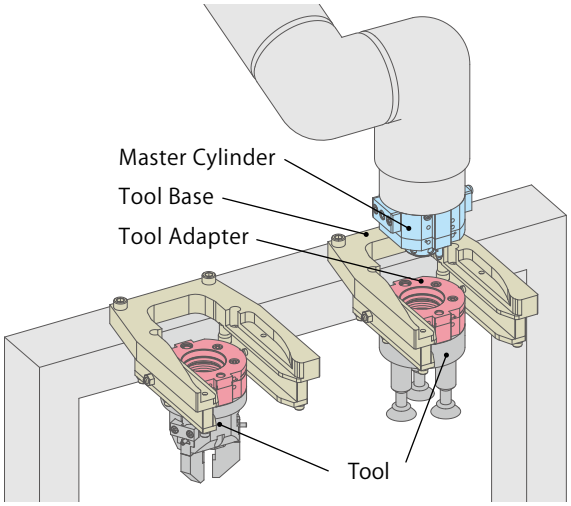
Mechanical robotic hand changer that uses robot's power.

No power source required. Zero backlash when connected.
High accuracy and high rigidity (Repeatability： 3 μm)

PAT. P.

No Power Source Required
Repeatability : 3 μm

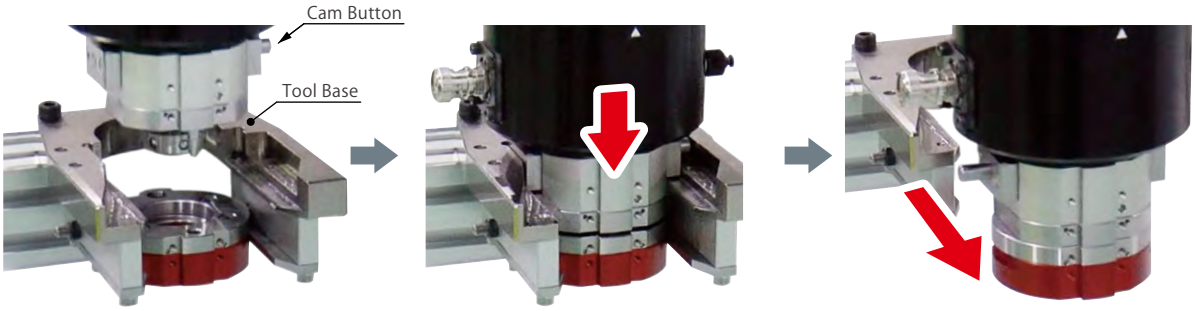




High-precision robotic hand changer enables a robot to perform multiple operations.

Reduce tool change time, Increase productivity.

Action Description



Before Connection

Move the robot vertically to the setting position

Move the robot horizontally and connection is completed※

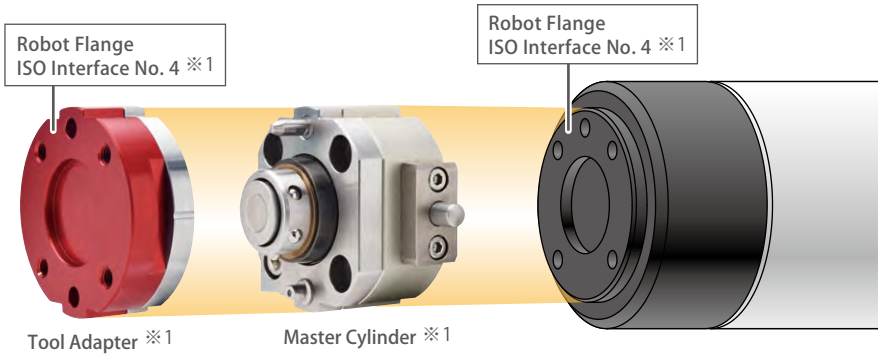
※During horizontal movement, the cam button moves in contact with the tool base. At this time, a load is applied to the robot.

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).

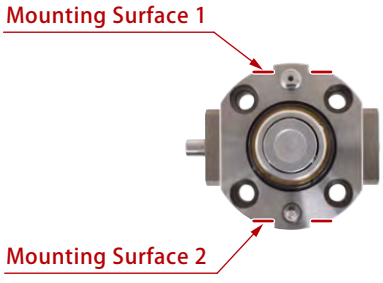
※1. Bolts and pins are not included. Please check the external dimensions before use.



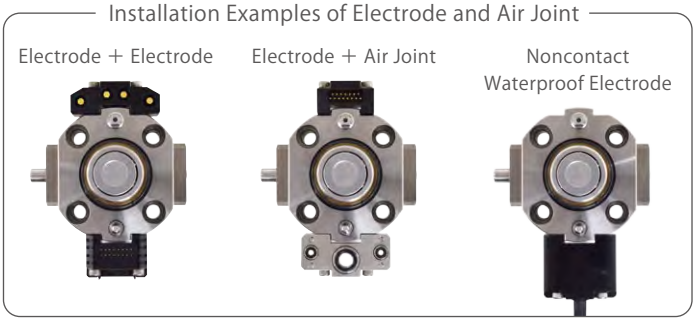
• External option electrode and air joints are available.

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.



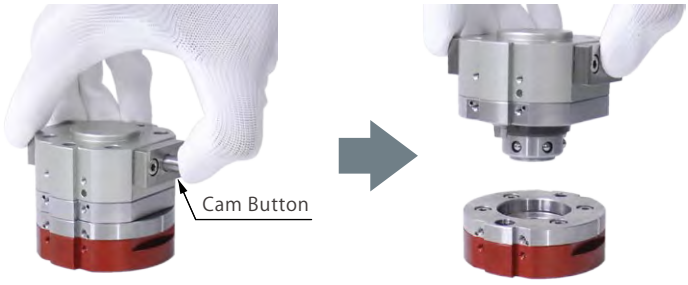
Installation Examples of Electrode and Air Joint



• Enables forced connection/disconnection by hand.

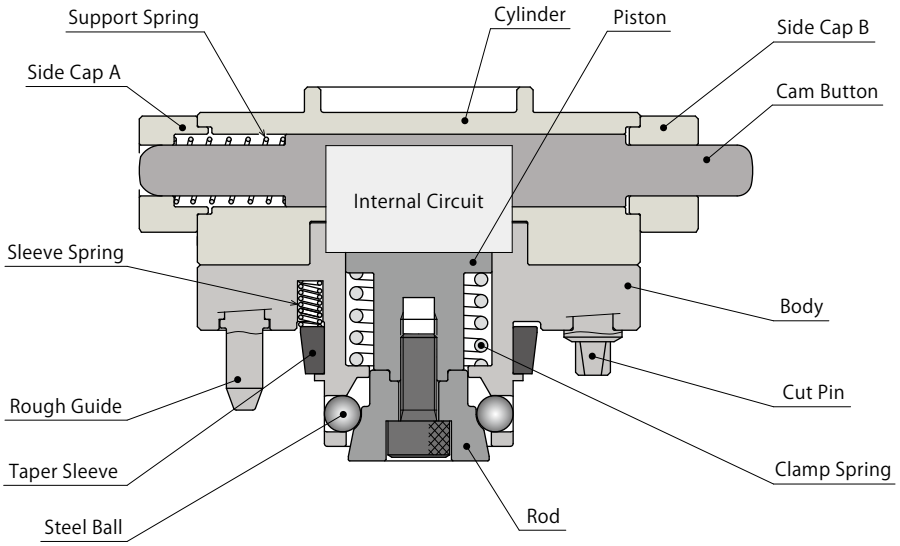
When you want to connect or disconnect the hand outside the tool base, manually push in the cam button.

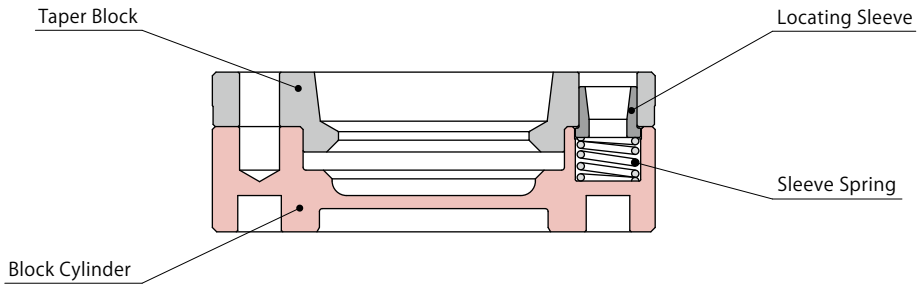
* For manual hand change, we recommend another model : Manual Robotic Hand Changer, Model SXR.
* SMR0250 is not easily operated by hand. Manual operation should only be used in emergency situations.



Cross Section

Master Cylinder (SMR□-M)

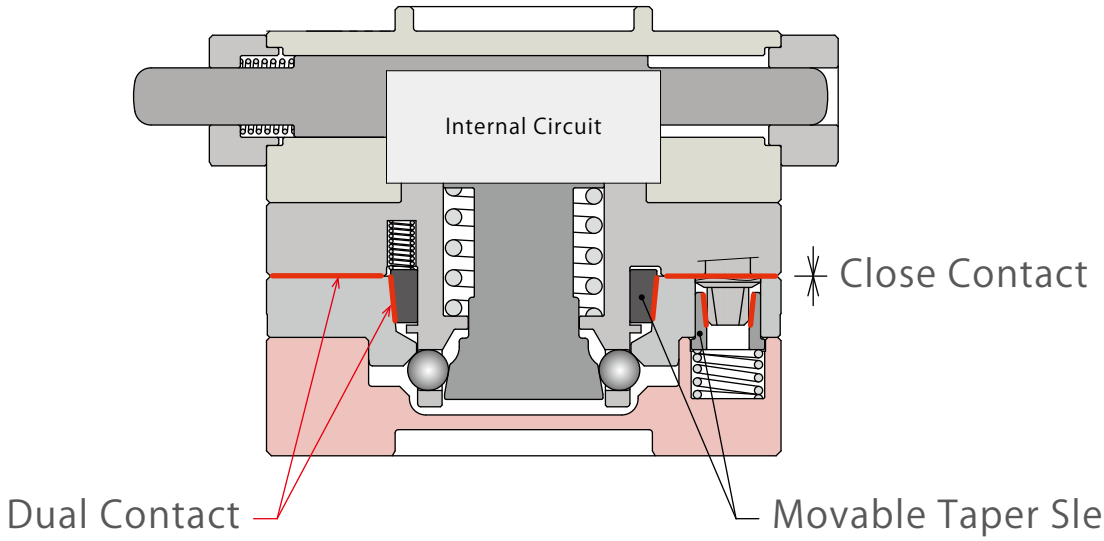




Tool Adapter (SMR□-T)

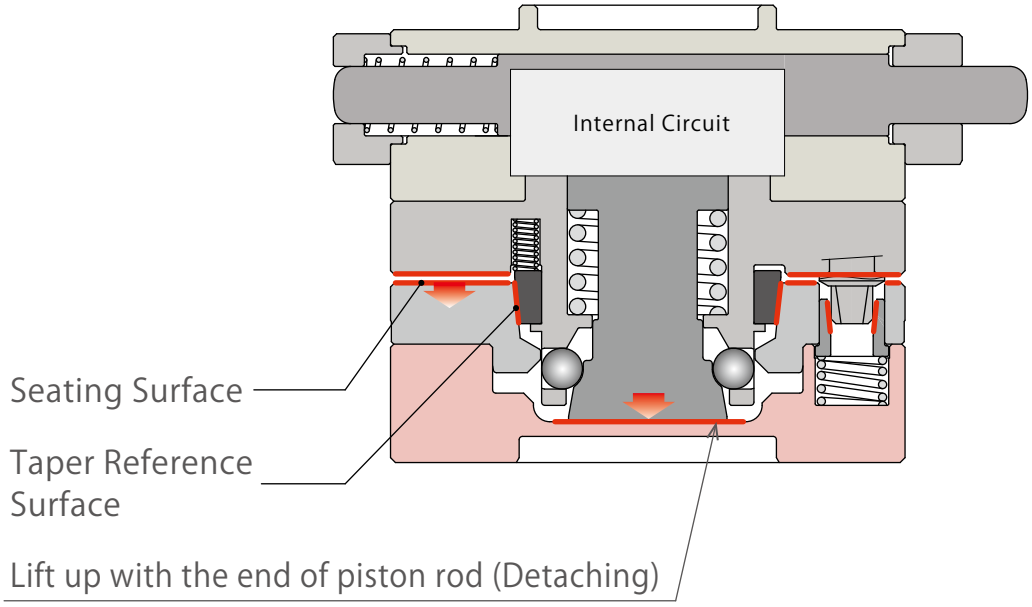
High Accuracy **Repeatability 3 μm**. Zero Backlash **prevents core deflection and chattering**.

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



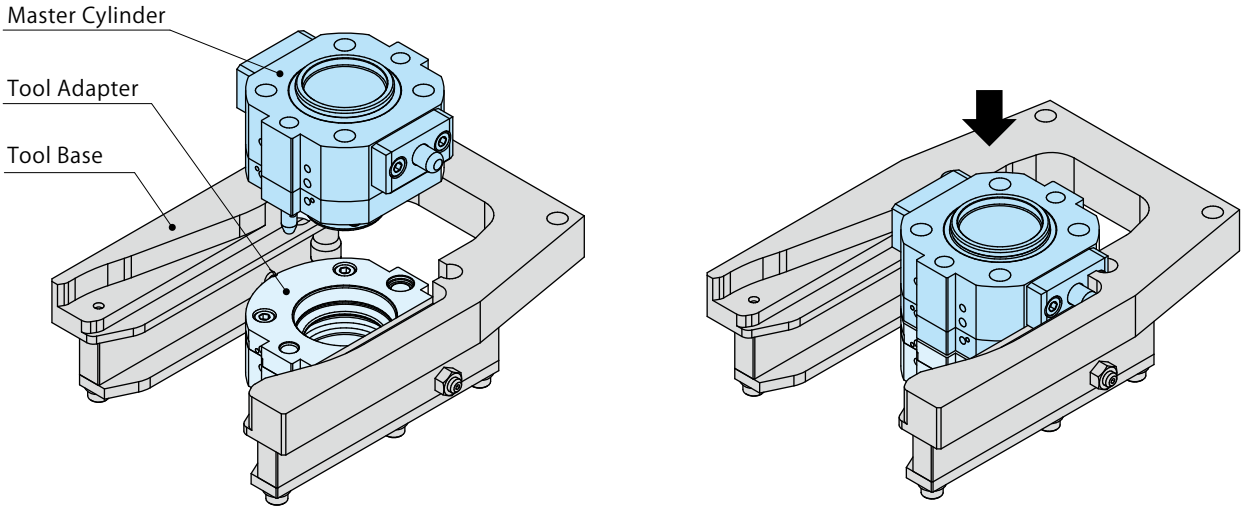
Lift up (Detaching) Function **protects locating part**.

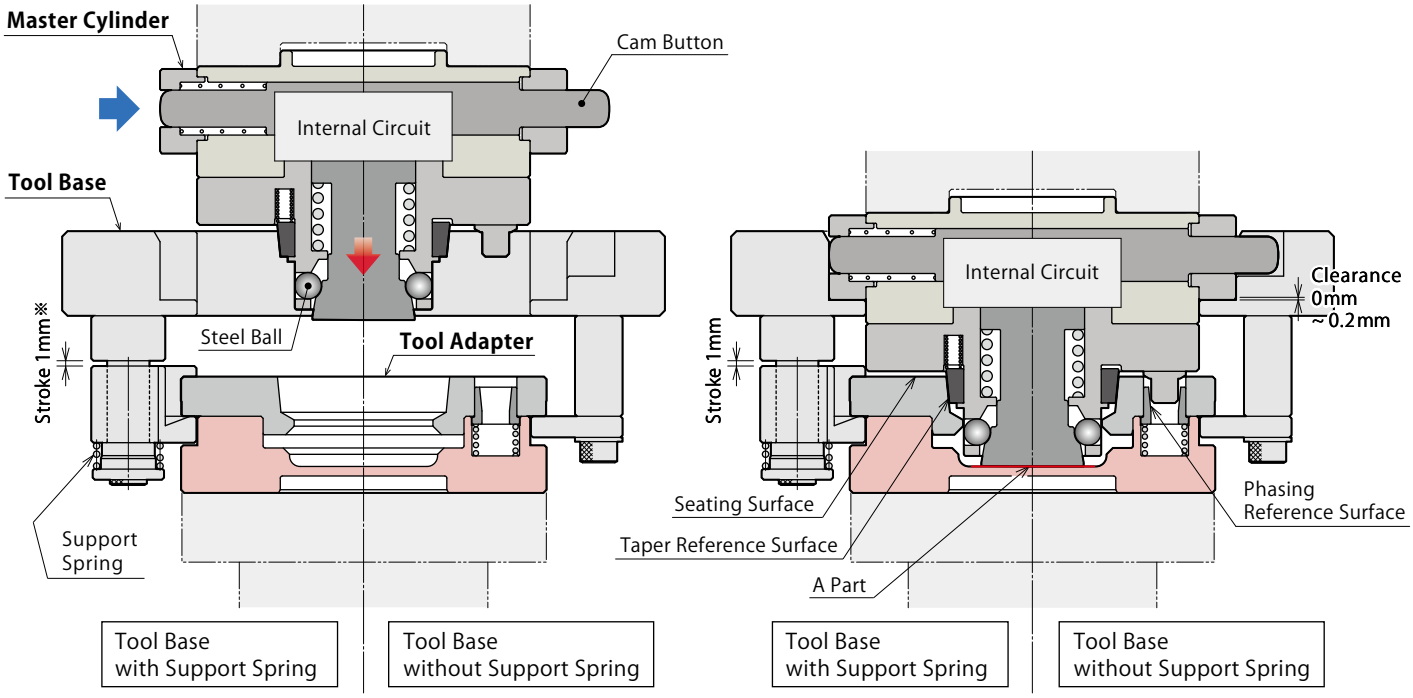
When connecting, lift up function prevents damage of the locating function part (seating surface and taper reference surface). When disconnecting, the piston rod detaches tool adapter preventing moment stop caused by adhesion and galling.



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.

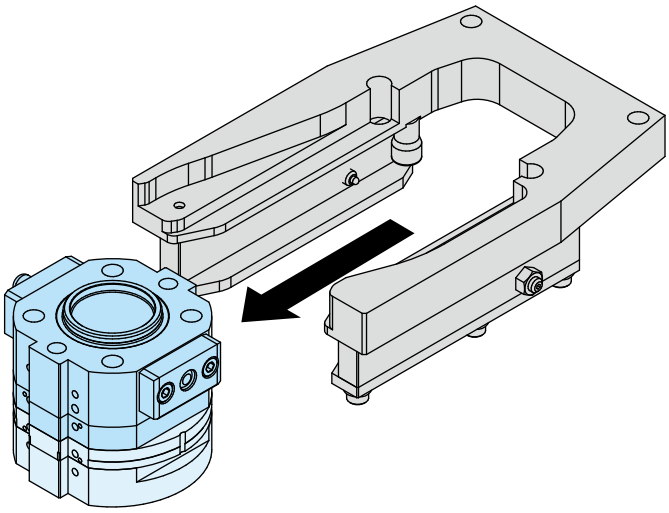
- The setting state is where the master cylinder is lowered and the clearance with the tool base is 0 to 0.2 mm.
  At this time, there is a moderate gap at taper reference surface and seating surface. It prevents locating mechanism part from damage. When detached, the piston rod pushes out A part to prevent moment stop caused by adhesion or galling.

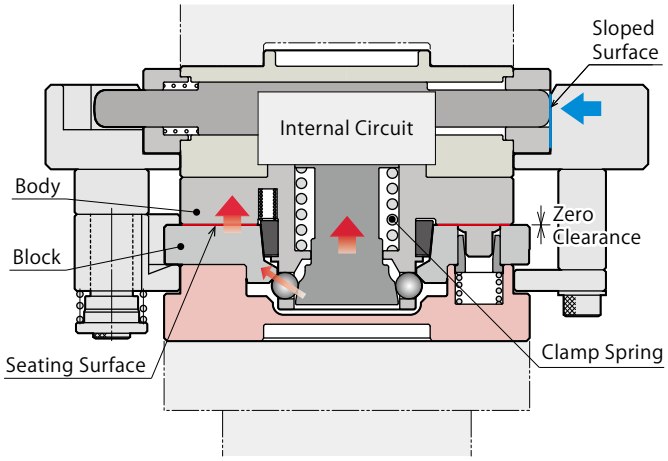
- In case of Tool Base with Support Spring
  If the hand weight is small, the tool adapter is pushed by A part.

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.

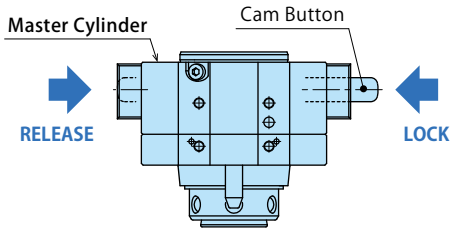
- When the block on the tool adapter side is pressed, the taper reference surface and phasing taper sleeve are centered in a reference axis (body), and locating is completed.

Reference

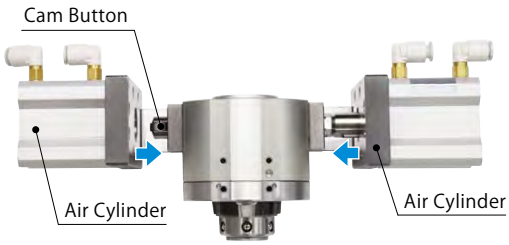
Connecting Operation without Using a Tool Base

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.



Model No. Indication

Master Cylinder (Robot Side)

SMR 012 0 - M

1 2

Tool Adapter (Tool Side)

SMR 012 0 - T

1 2

Tool Base

SMR 012 0 - B - L

1 2 3

1 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
L : with Support Spring (for light-weight tools)
M : with Support Spring (for medium-weight tools)
H : with Support Spring (for heavy-weight tools)

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

Model No. Indication (Spacer Plate)

※ Use when the joints or wiring interfere with the robot body when external options (P.21～) are mounted.

SMRZ 012 0 -MF 4

1 2 3

1 Applicable Robotic Hand Changer (SMR) Model No.

012 : SMR0120-M

2 Design No.

0 : Revision Number

3 Applicable Mounting Pattern No.

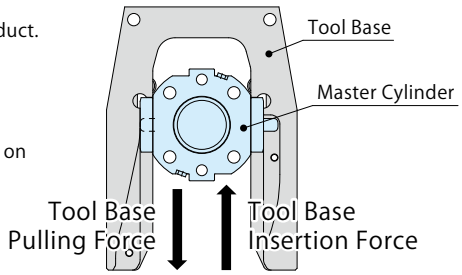
4 : ISO Mounting Pattern Number 4

Specifications

Model No.			SMR0120	SMR0250
Payload※1		kg	7 ~ 12	12 ~ 25
Repeatability		mm	0.003	
Lifting Stroke (Detaching Stroke)		mm	1	0.8
Holding Force		N	600	1500
Allowable Static Moment※1	Bending	N・m	16	50
	Twisting	N・m	25	45
Weight※2	Master Cylinder	g	Approx. 450	Approx. 770
	Tool Adapter	g	Approx. 200	Approx. 270
	Tool Base In case of 3 Blank	g	Approx. 1000	-
	Tool Base In case of 3 L/M/H	g	Approx. 1200	Approx. 2000
Tool Base Insertion Force/Pulling Force※3		N	Approx. 75 or less	Approx. 90 or less※4
Cam Button Pressing Force※3		N	Approx. 125 or less	Approx. 200 or less
Operating Temperature		℃	0 ~ 70	
Number of Electrode Mounting Surfaces			2	
Applicable Mounting Pattern Number※5			4	
Allowable Offset while Teaching			Refer to P.19	

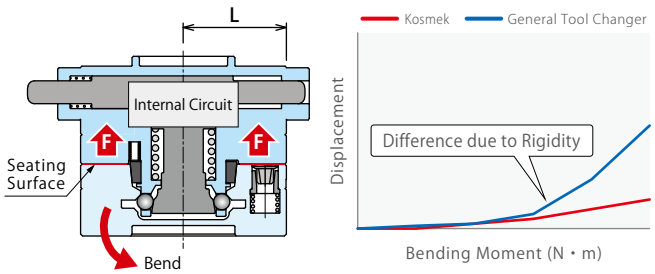
Notes :

※1. Please consider both the payload and allowable static moment when selecting the product.
※2. Weight of the body without external options.
※3. Value at the time of shipment.
※4. Tool base insertion force in the connected state.
※5. ISO Interface Number indicates the robot mounting surface that is allowed to mounted on directly. Refer to P.10 for Standard ISO Mounting Pattern.

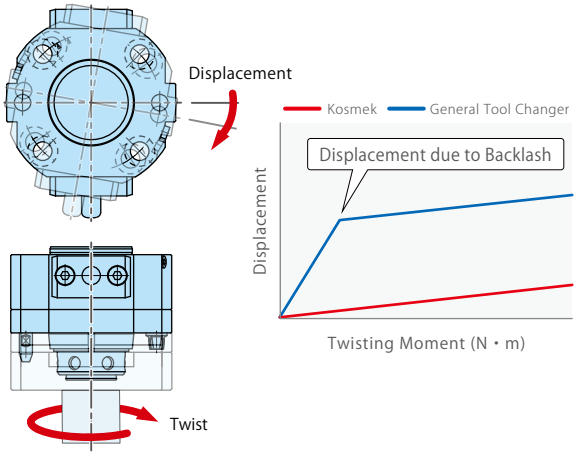


Point **The whole surface is a seating surface**
High Rigidity Possible !!

Estimated Calculation Formula
Allowable Bending Moment = L × F



Point **Kosmek Exclusive Mechanism**
Zero Backlash ! ! Strong to Twist

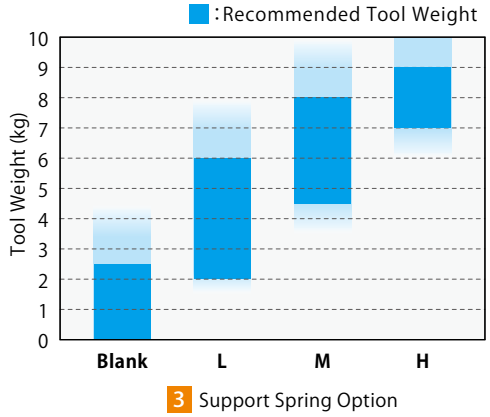


Support Spring Chart

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

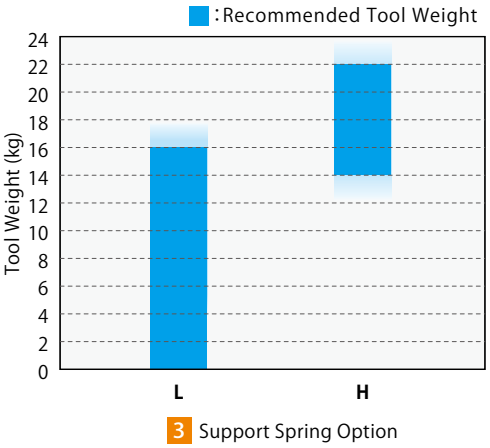
SMR0120

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 :

※1. The recommended tool weight includes the weight of tool adapter (SMR0120：about 0.2kg, SMR0250：about 0.3kg,).

1. 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
Mounting Pattern No.	**4**	**SMR0120-M**	**SMR0120-T**	**SMR0120-B-□**
		SMR0250-M	**SMR0250-T**	**SMR0250-B-□**

Collaborative Robot Installation Examples

FANUC CORPORATION

UNIVERSAL ROBOTS

DENSO WAVE INCORPORATED

YASKAWA ELECTRIC CORPORATION

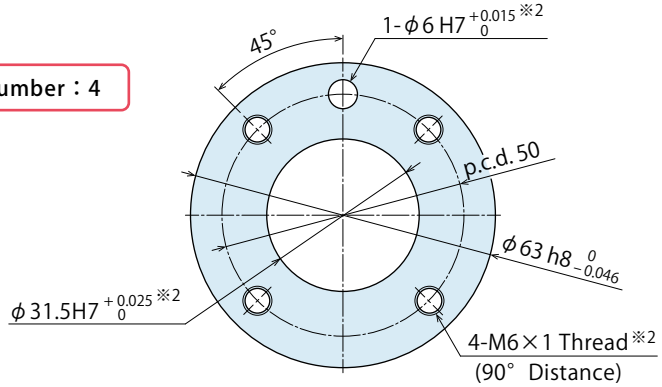
Cameras and other end effectors may interfere with the body or tool base of the SMR hand changer.
If there is interference, please make a spacer or adjust the mounting position of the end effector before use.

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.

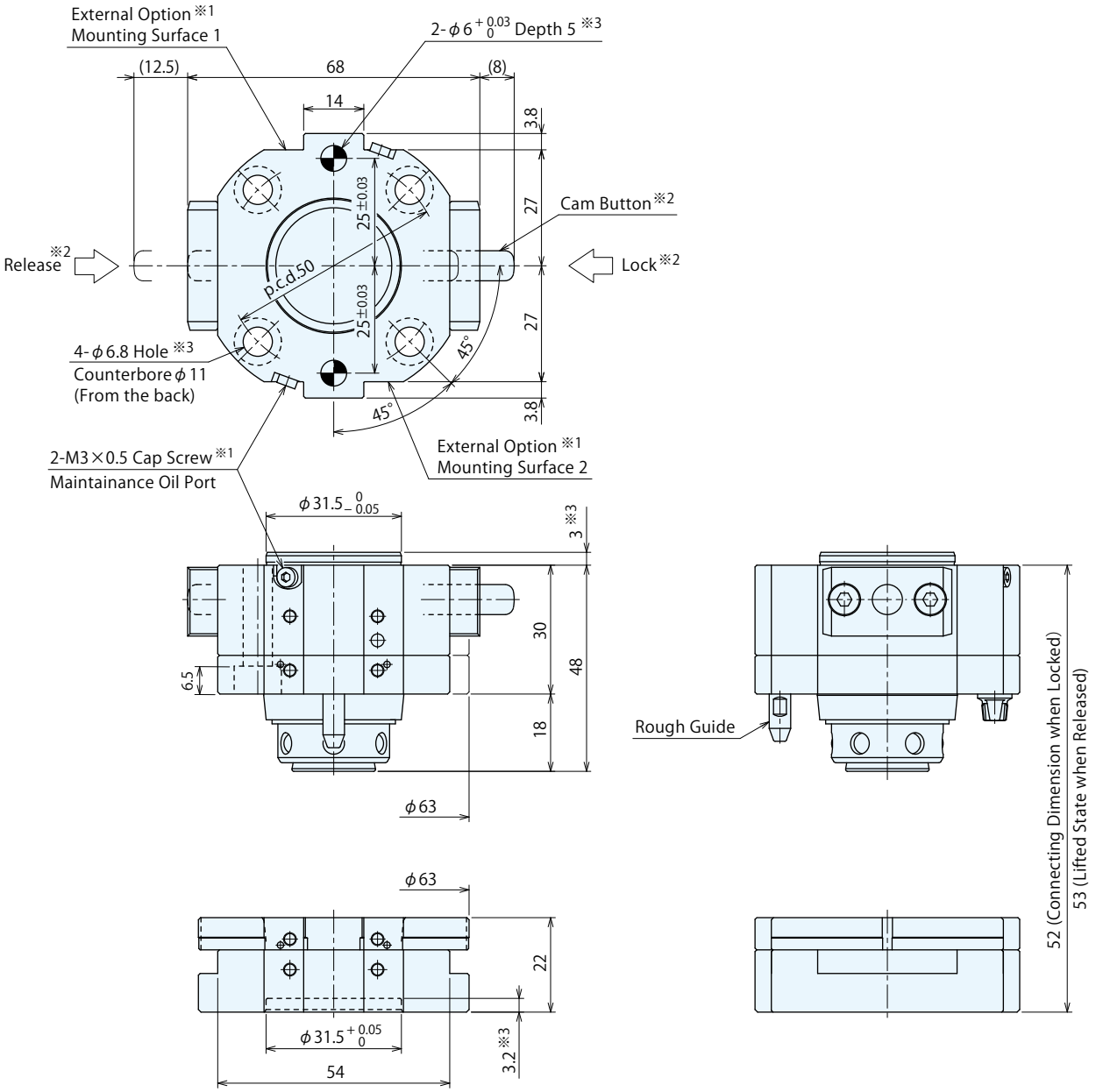
Mounting Pattern Number : 4

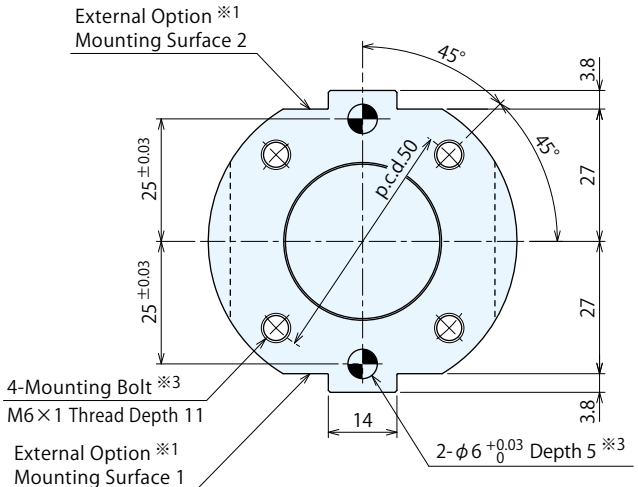


External Dimensions

※ This drawing shows the released state.

Master Cylinder
SMR0120-M





Tool Adapter
SMR0120-T

Notes :

※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 no interference with the maintainance oil port.

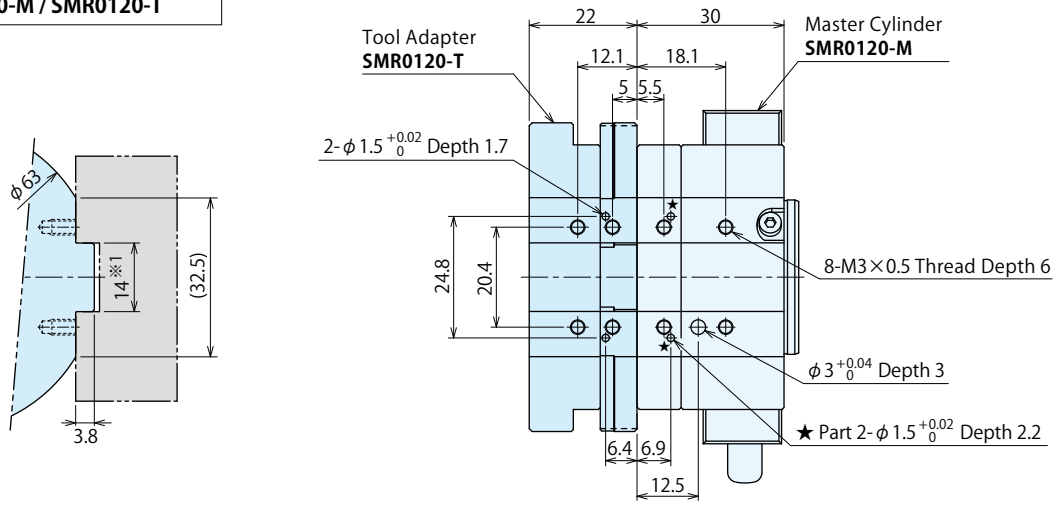
※2. Move the cam button in the direction of the arrow to switch between locked and released states.

※3. 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.

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 $14^{+0.15}_{+0.05}$.

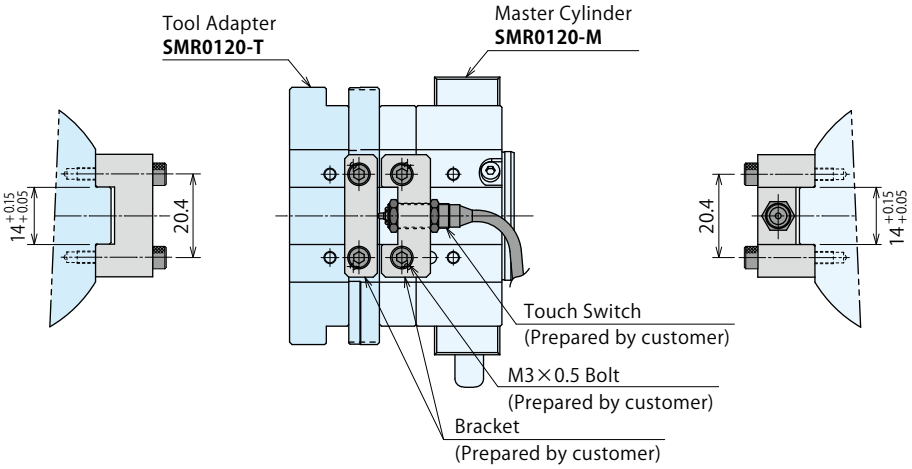
1. Mounting surface dimensions are the same for both areas.

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.)

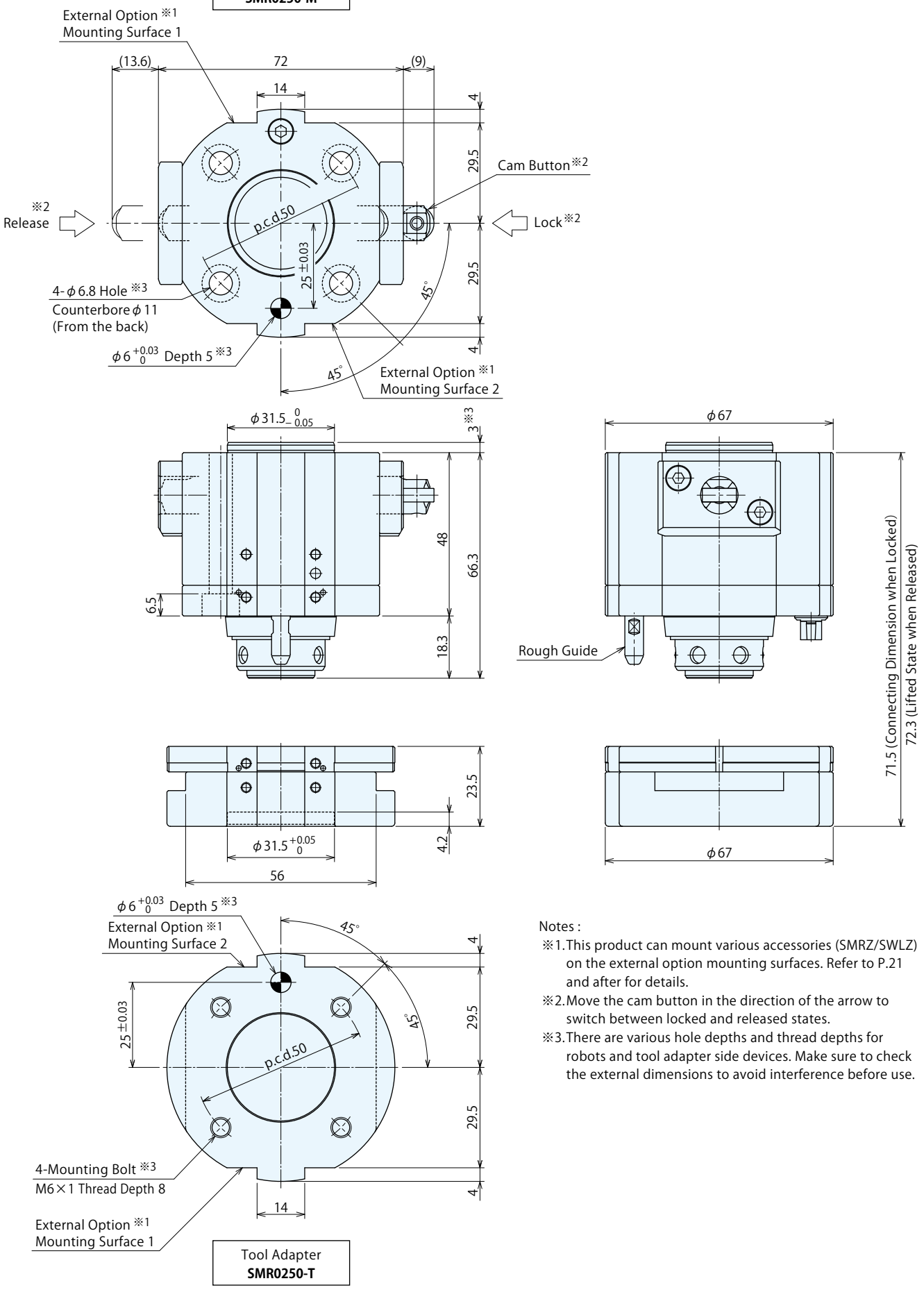
Installation Example of Touch Switch



External Dimensions

※ This drawing shows the released state.

Master Cylinder
SMR0250-M



Tool Adapter
SMR0250-T

Notes :

※1. This product can mount various accessories (SMRZ/SWLZ) on the external option mounting surfaces. Refer to P.21 and after for details.

※2. Move the cam button in the direction of the arrow to switch between locked and released states.

※3. 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.

External Option Mounting Dimensions

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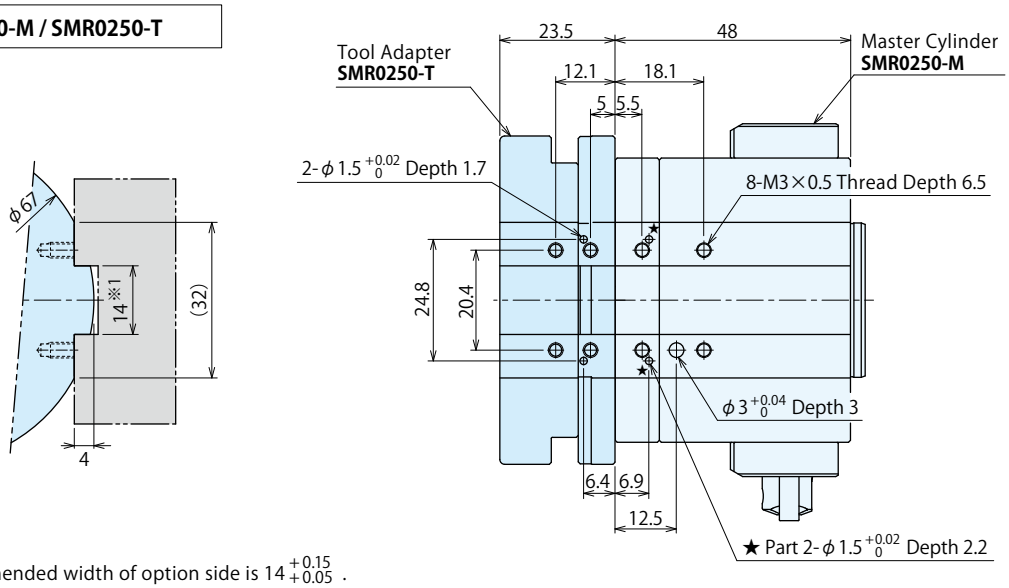
SMR0250-M / SMR0250-T



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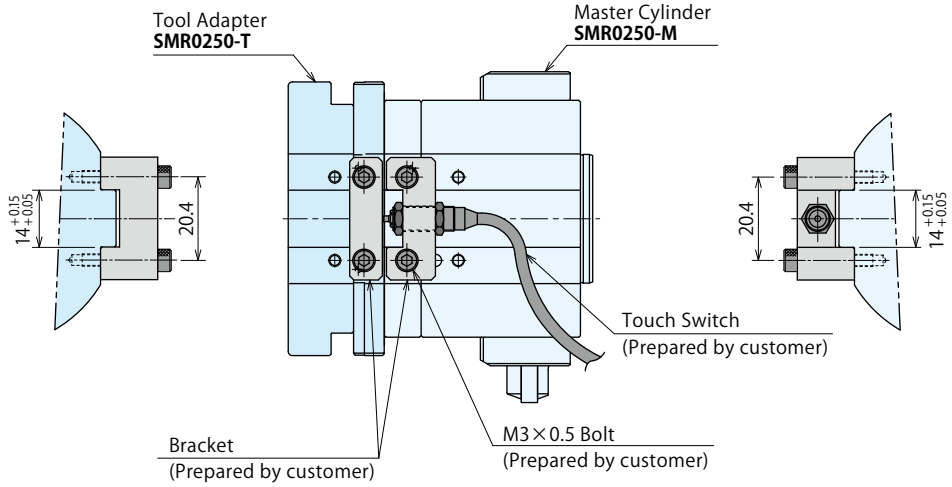
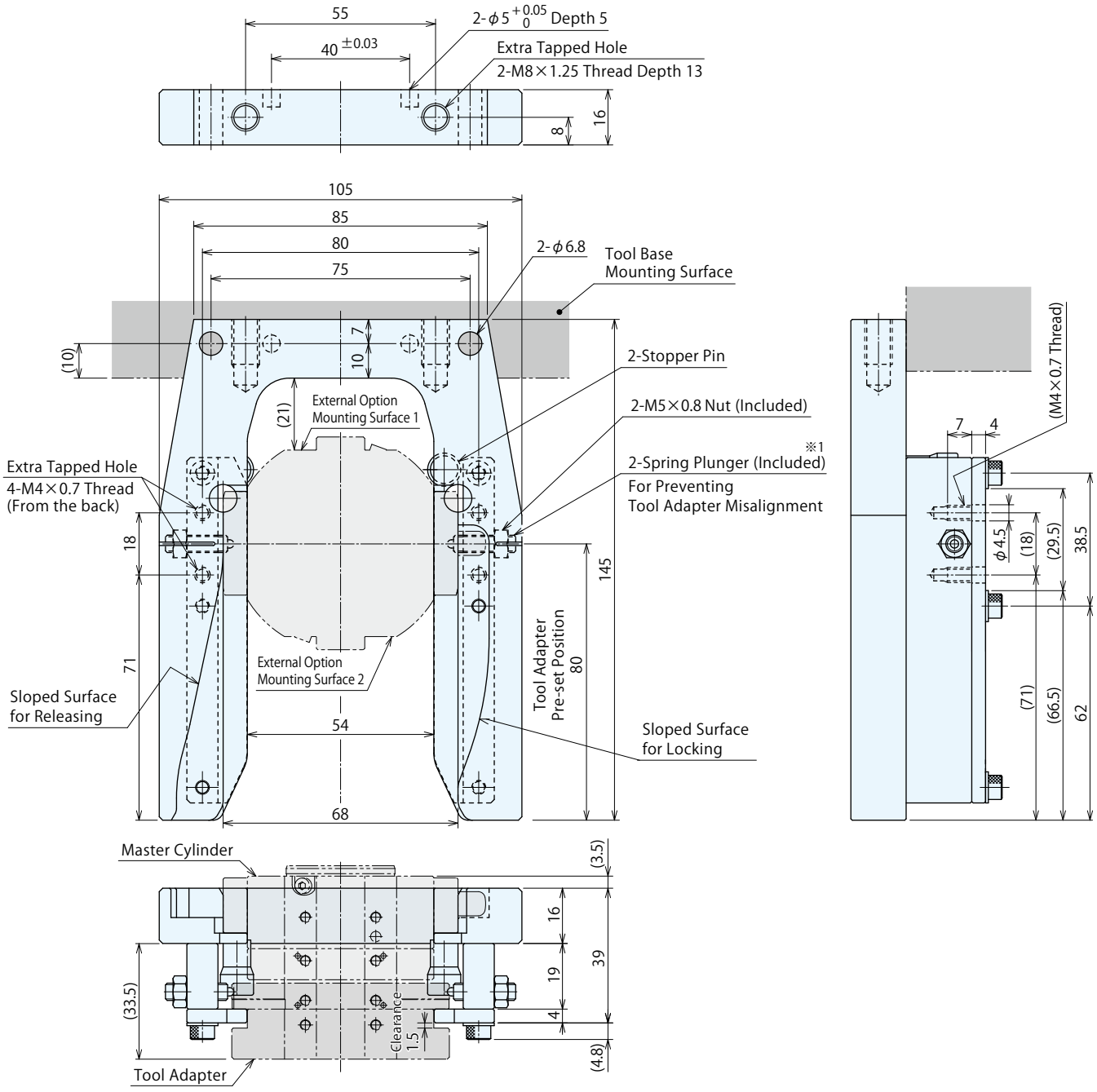
Installation Example of Touch Switch



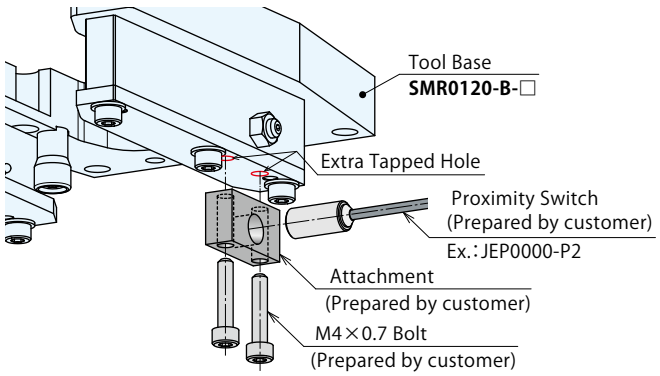
Tool Base External Dimensions：SMR0120-B (without Support Spring)



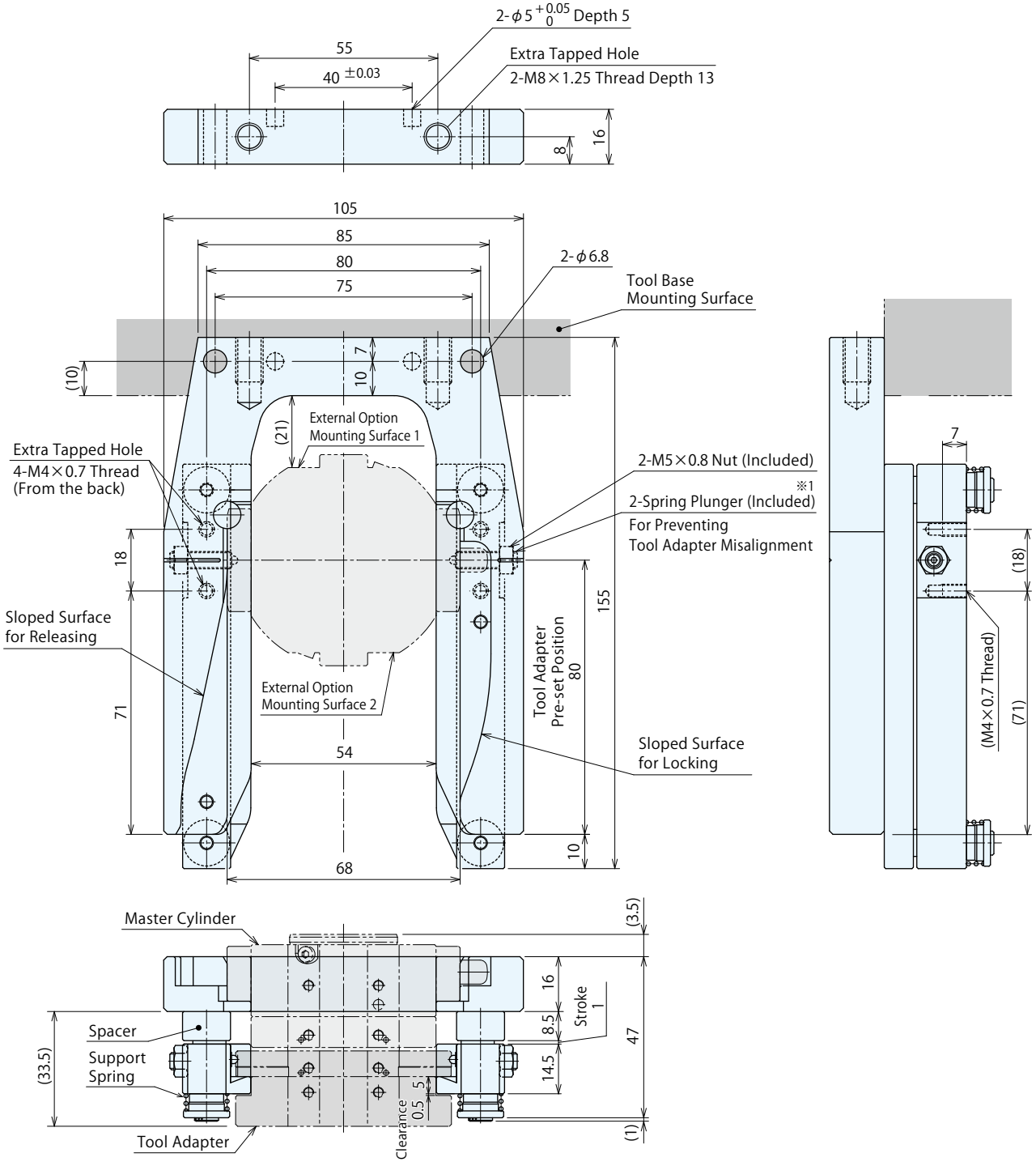
Note :
※1.The spring plunger is used as a temporary stopper for the tool. Adjust it within the range that does not affect the operation of the robot.

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.

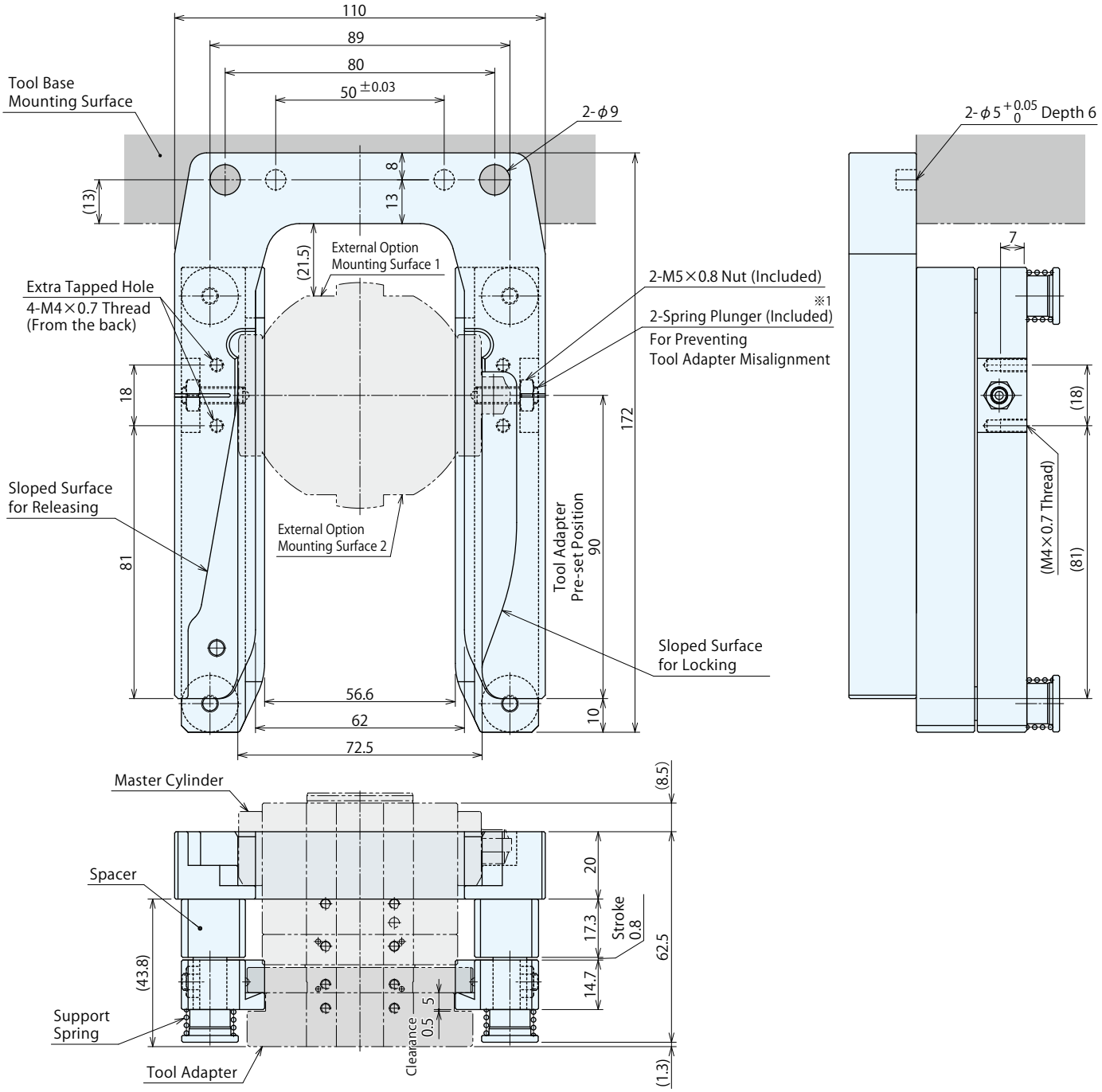


Tool Base External Dimensions : SMR0120-B-□ (with Support Spring)



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



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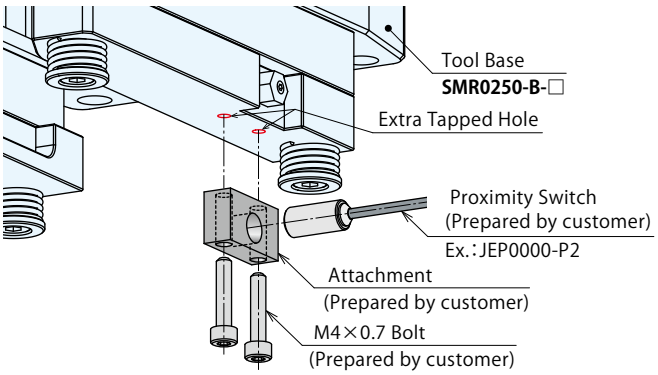
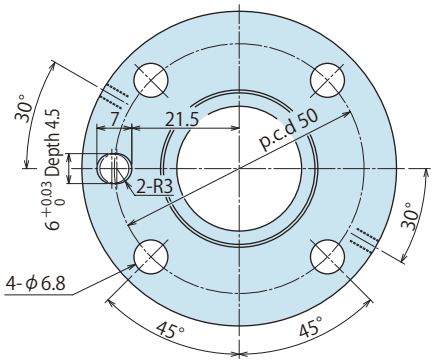
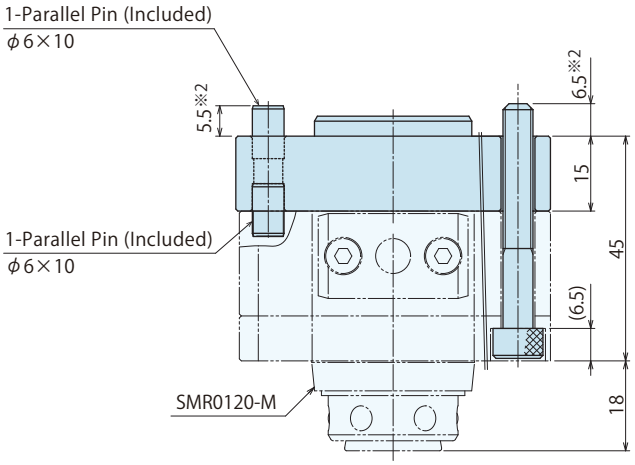
Tool Detection

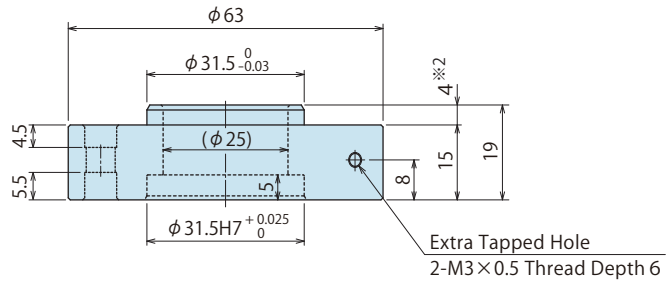
This product does not have a tool (hand) detection function. If necessary, use extra tapped holes on the tool base to mount equipment such as proximity switch.

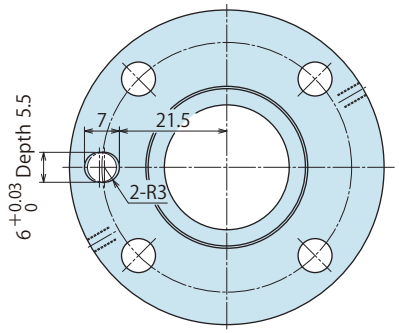


Spacer Plate External Dimensions : SMRZ0120-MF4

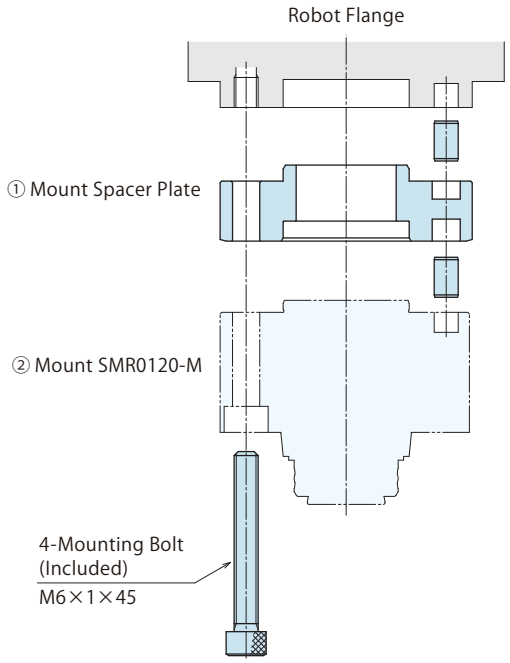








Mounting Procedure



Spacer Plate Model No.	**SMRZ0120-MF4**
Weight	105g ※1
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.

Master Cylinder	Tool Adapter	Tool Base
SMR0120-M	**SMR0120-T**	**SMR0120-B-□**
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.

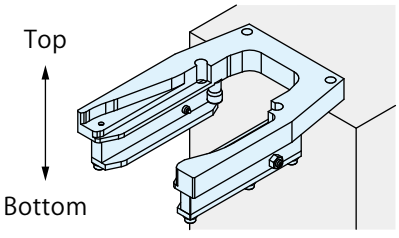
7) External Options

● 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

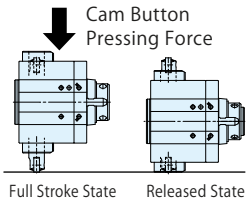
● Tighten the mounting bolt with the following torque.
When mounting, tighten the bolts evenly not to incline the master cylinder, tool adapter and tool base.

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) Condition of Master Cylinder (SMR-M) at Shipment

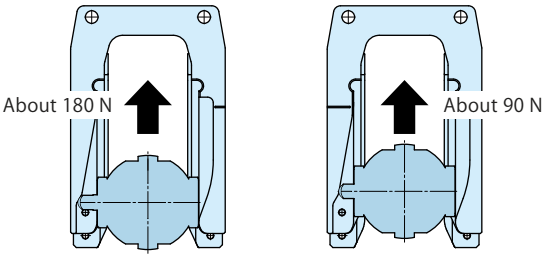
● Master cylinder (SMR-M) is in a released state at shipment. If an impact is applied to a cam button, the master cylinder may reach its full stroke position. Since the tool base insertion force increases in the full stroke state, please use it in the released state during initial teaching. To return to the released state from the full stroke state, press the cam button straight down on a flat surface.
The cam button pressing force is as specified below.
The cam button will be damaged if impacted with a hammer or other device.

Model No.	Cam Button Pressing Force
SMR0120	About 125 N or less
SMR0250	About 200 N or less



3) SMR0250 Tool Base Insertion Force

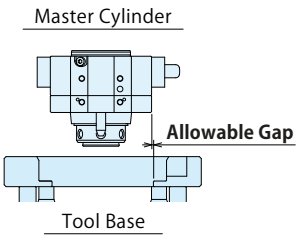
● The tool base insertion force for the SMR0250 is the value when SMR0250-T is connected. When SMR0250-M is inserted into the tool base alone (in the full stroke state) without connecting to SMR0250-T, the insertion force is about 180 N. Please ensure that it can operate within the range of the tool base insertion force before use.



4) 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.

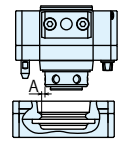
Model No.	Allowable Gap
SMR0120	0.2 mm or less
SMR0250	0.5 mm or less



● 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.

① Allowable Position Offset in Horizontal Direction

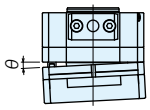
Model No.	Allowable Offset A mm
SMR0120	±1.0 mm
SMR0250	±1.0 mm



① Horizontal Position Offset

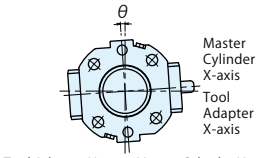
② Allowable Position Offset in Tilt Direction

Model No.	Allowable Offset θ
SMR0120	θ=1.0 deg
SMR0250	θ=1.0 deg


② Tilt Position Offset

③ Allowable Position Offset in Rotation Direction

Model No.	Allowable Offset θ
SMR0120	θ=±1.5 deg
SMR0250	θ=±1.5 deg



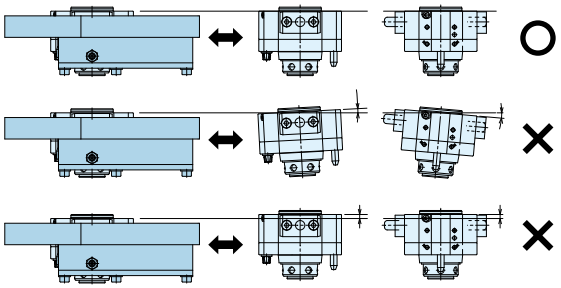
③ Rotation Position Offset

5) 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.

6) 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

1) 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

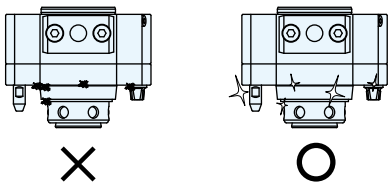
1) Removal of the Product

● 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.

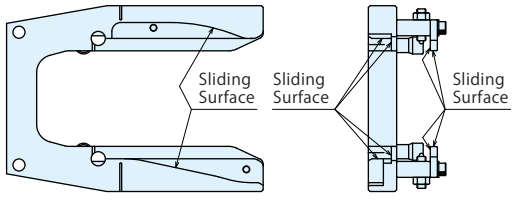
5) The product should be stored in the cool and dark place without direct sunshine or moisture.

6) Please contact us for overhaul and repair.

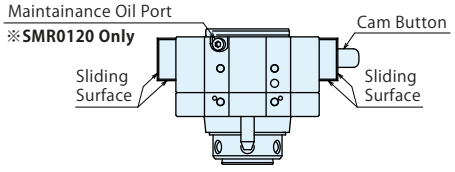
7) Regularly supply lubricating oil and grease.

① 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.

② 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)



Tool Base



Master Cylinder

※ Please refer to P.50 for common cautions. ・Notes on Handling ・Warranty

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.

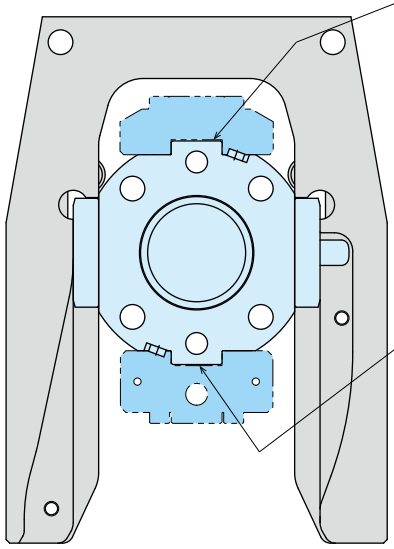
Installation Examples of Air Joint / Electrode

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

Option Mounting Surface

Option Mounting Surface：2 Parts

Applicable options differ depending on the mounting surface.



Option Mounting Surface 1 (Unable to mount 2 options)

Applicable External Options	SMR0120	SMR0250
SWLZ0B0：Solder Terminal	○	○
SWLZ0C0：Solder Terminal	○	○
SWLZ0K0：Compact Electric Power Transmission	○	○
SWLZ0PZ90：Air Joint 4 Ports	○	○

Option Mounting Surface 2 (Able to mount 2 options)

Applicable External Options	SMR0120	SMR0250
SWLZ0B0：Solder Terminal	○	○
SWLZ0C0：Solder Terminal	○	○
SMRZ0D0：D-sub Connector	-	○
SMRZ0G0：Circular Connector	-	○
SWLZ0J0：Resin Connector	○	○
SWLZ0K0：Compact Electric Power Transmission	○	○
SMRZ0E0：Electric Power Transmission	-	○
SWLZ0U0：Simple Waterproof Electrode	○	○
SWLZ0W0：Noncontact Waterproof Electrode Compact Model	○	○
SMRZ0L0：Ethernet Electrode	-	○
SWLZ0R0：Air Joint 3 Ports	○	○
SWLZ0PZ90：Air Joint 4 Ports	○	○

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

DC24V

Resin Connector

Solder Terminal

Solder Terminal
with Cable

Simple Waterproof Electrode
Only when connected : IP54

D-sub 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)

Noncontact Waterproof Electrode Compact Model
Number of Signals : 4

Ethernet Electrode

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

Air Joint (For Extra Air Ports)

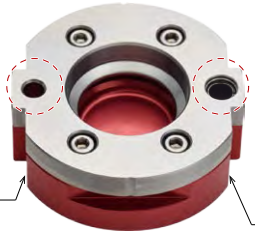
3 Ports
Equal to ϕ6 × 1 Port
Equal to ϕ2 × 2 Ports

4 Ports
Equal to ϕ2 × 4 Ports

Option Mounting Surface

● Master Cylinder

● Tool Adapter



Model No. Indication

SWL Z0 J 0 - M

- SWL: Shared with SWL
- J: 1 External Option Symbol
- M: 2 M：for Master Cylinder / T：for Tool Adapter and Cable Length

• Electrode

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

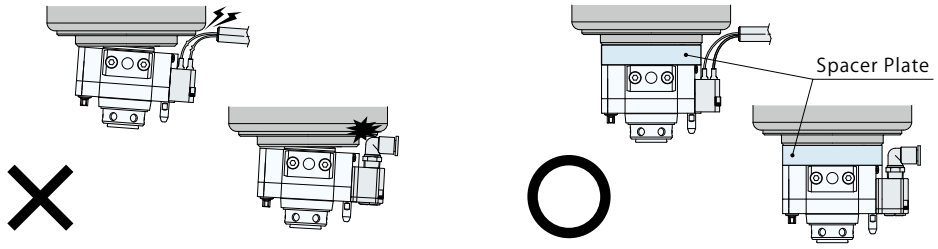
• Air Joint

Number of Ports (Min. Passage Area)	External Options (Detail Page)	Model No. Master Cylinder	Model No. Tool Adapter
3 Ports (Equal to φ6×1 Port / Equal to φ2×2 Ports)	Air Joint P.45 	SWLZ0R0-M ※2	SWLZ0R0-T
4 Ports (Equal to φ2)	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 Z0 D 0 - M

- SMR: with Exclusive Bracket for SMR
- D: 1 External Option Symbol
- M: 2 M：for Master Cylinder / T：for Tool Adapter and Cable Length

• Electrode

Rated Voltage	Rated Current	External Options (Detail Page)	Number of Poles	Model No. Master Cylinder	Model No. Tool Adapter
DC24V	3A ※1	D-sub Connector P.35 	15 Poles	SMRZ0D0-M	SMRZ0D0-T
		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
Ethernet Electrode P.43 			4 Poles	SMRZ0L0-M	SMRZ0L0-T

Note :

※1. For the electrode options, check the total current capacity and contact resistance shown in the specifications of each option.

External Option：Resin Connector

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

External Option Symbol：**J**

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

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

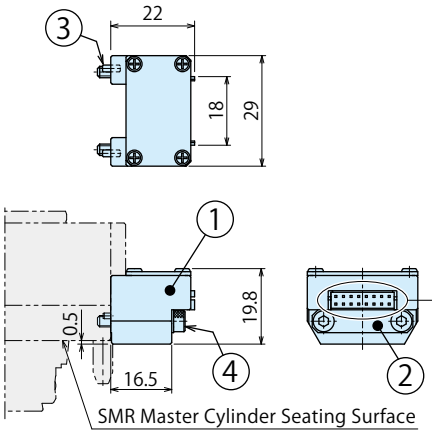
Specifications

Rated Value (per contact)		DC 24V 2A：1,3,5,7,9,11,13,15 1A：2,4,6,8,10,12,14,16
Resin Connector		DF11-16DP-2DS(24) (HIROSE ELECTRIC)
Contact Resistance (Initial Value)		30mΩ or less
Total Current Capacity		10A
Number of Poles (per electrode)		16
Connector Pin Coating		Gold Coating
Weight※1	Master Cylinder Side	13g
	Tool Adapter Side	11g
Cable with Applicable Connector (Sold Separately)		SWZ0J0-CL□ (Refer to P.26) SWZ0J0-M8□-CL□ (Refer to P.27)

※1. Weight per kit.

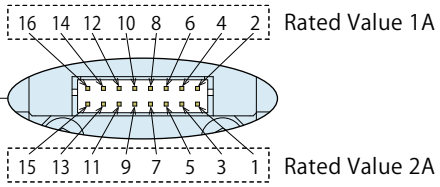
External Dimensions

Master Cylinder Side

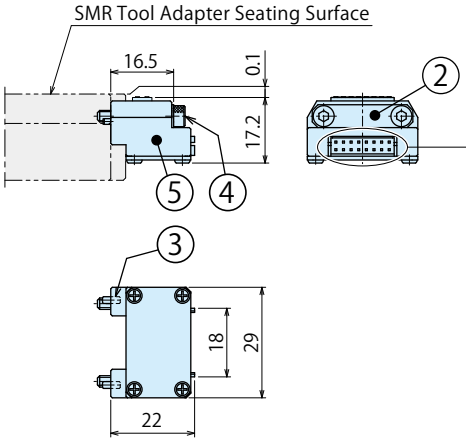


Model No.	No.	Name	Quantity
SWLZ0J0-M	①	Electrode (Master Side)	1
	②	Spacer	1
	③	Parallel Pin ϕ1.5×4 B Type (SUS)	2
	④	Hexagon Socket Bolt M3×0.5×20 (SUS)	2

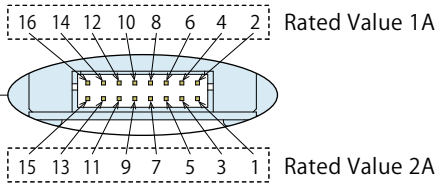
Pin Number



Tool Adapter Side



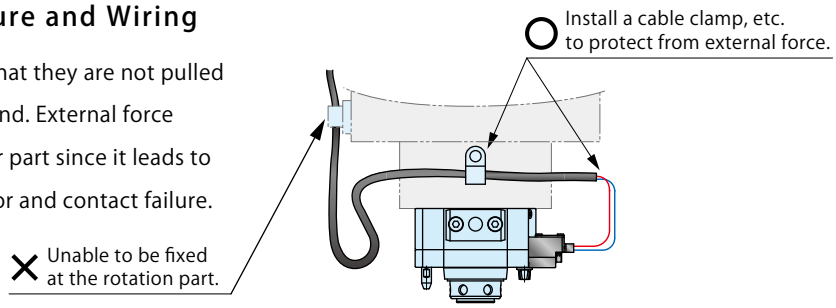
Pin Number



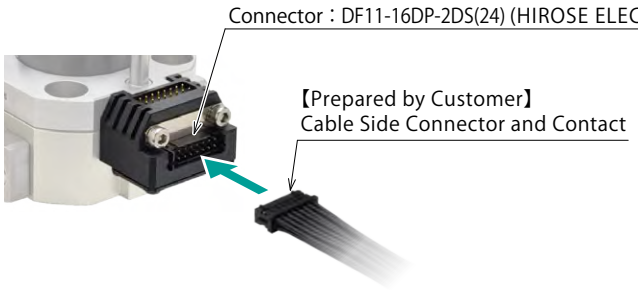
Model No.	No.	Name	Quantity
SWLZ0J0-T	⑤	Electrode (Tool Side)	1
	②	Spacer	1
	③	Parallel Pin ϕ1.5×4 B Type (SUS)	2
	④	Hexagon Socket Bolt M3×0.5×20 (SUS)	2

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	Protective Tool: Manual Crimping Tool	Protective Tool: Contact Removal Tool	Maker
DF11-16DS-2C	DF11-22SC	AWG22	DF11-TA22HC	DF-C-PO(B)	HIROSE ELECTRIC
	DF11-2428SC	AWG24 ～ 28	DF11-TA2428HC		

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

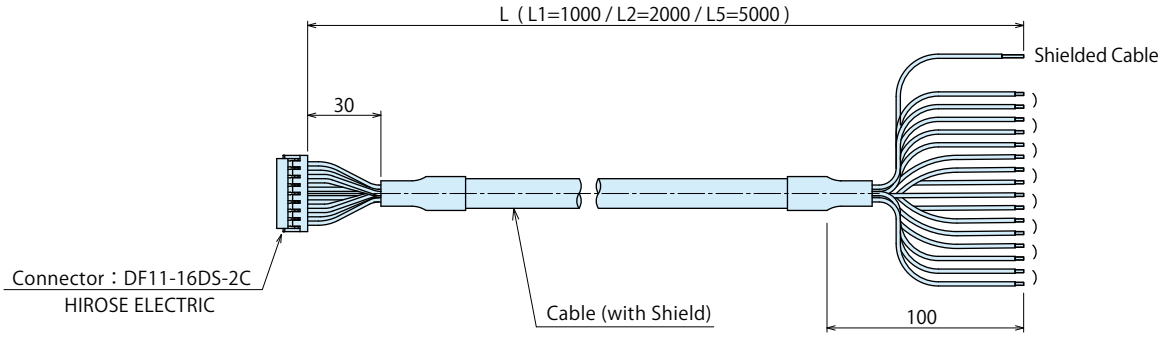
This cable is an optional cable applicable to the Resin Connector Electrode (SWLZ0J0-M/T External Option Symbol：**J**).

Model No. Indication

SWZ0J0-C **L1 L2 L5**

Cable Length
L1：1m
L2：2m
L5：5m

Design No.
(Revision Number)



Pin Numbers and Wire Colors

HIFLON SD-SB/20276 Black AWG24X8P (with Shield)
NISSEI ELECTRIC
Conductor Cross-Sectional Area：0.2mm² (AWG24)
Number of Cores：16
Weight：76g /m (Weight per meter)

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
	Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair	

External Option：Cable with M8 Connector for Resin Connector

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

Model No. Indication

SWZ0J0 – M8 P/S – CL02/CL03

Design No.
(Revision Number)

M8 Connector Category
P：Plug
S：Socket
※ The appearance of connector is subject to change.

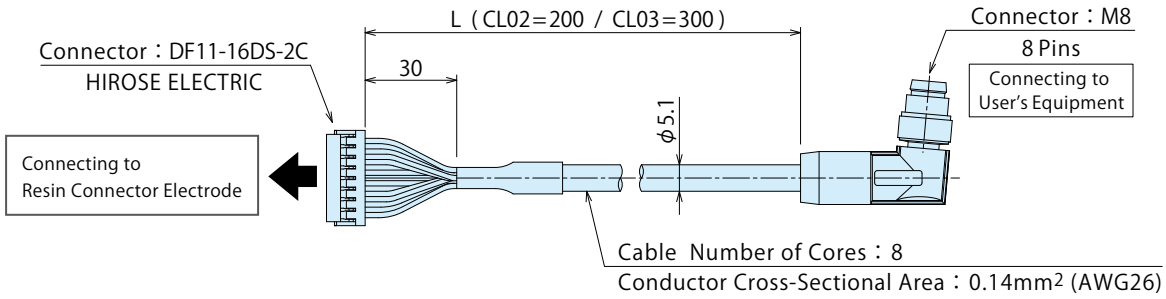
P：Plug

S：Socket

Cable Length
CL02：0.2m
CL03：0.3m (Only available in case of S：Socket.)

Specifications

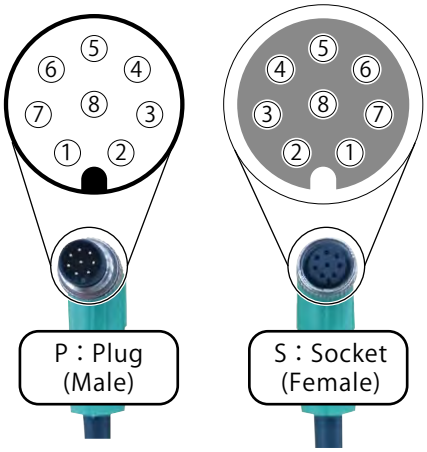
Rated Value	DC24V 1.5A
Connector Spec. (M8 Connector Side)	M8 Code A 8 cores (Based on IEC61076-2-104)
Weight	SWZ0J0-M8P-CL02：14g SWZ0J0-M8S-CL02：14g SWZ0J0-M8S-CL03：16g



Pin Number and Wire Color	Pin Number DF11 Connector Side	Wire Color	Pin Number M8 Connector Side
	1	White	1
	3	Brown	2
	5	Green	3
	7	Yellow	4
	9	Gray	5
	11	Pink	6
	13	Blue	7
	15	Red	8

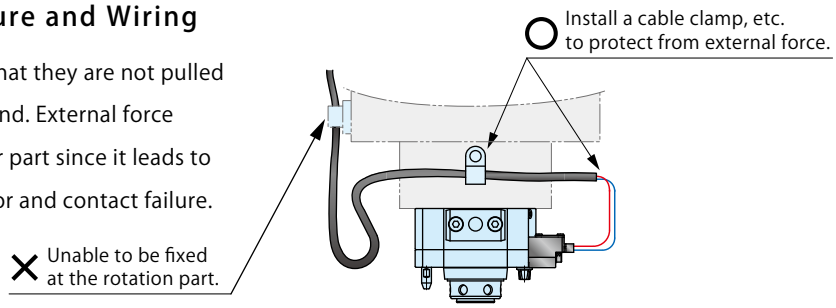
Pin Number
2,4,6,8,10,12,14,16
Not Connected

Pin Assignment **M8 Code A**



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.



MEMO

External Option：Solder Terminal

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

External Option Symbol：**B**

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

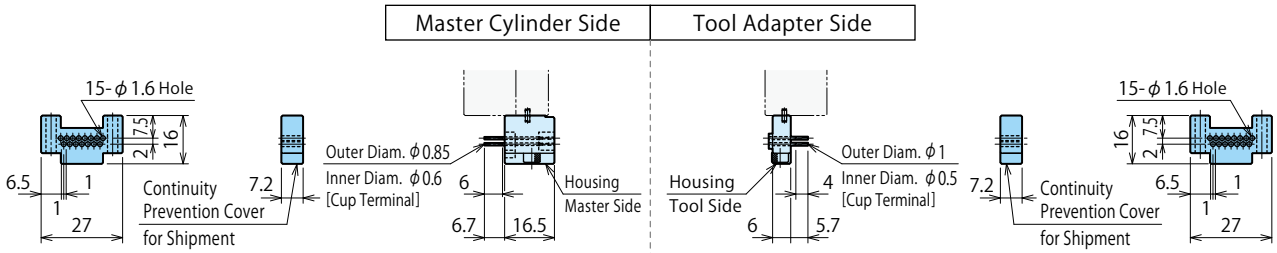
Model No. for Tool Adapter Side
model **SWLZ0B0-T**

Specifications

Rated Value (per contact)		DC 24V 3A
Contact Resistance (Initial Value)		100mΩ or less
Total Current Capacity		10A
Number of Poles (per electrode)		15
Weight ※1	Master Cylinder Side	19g
	Tool Adapter Side	15g

※1. Weight per kit

External Dimensions：Electrode

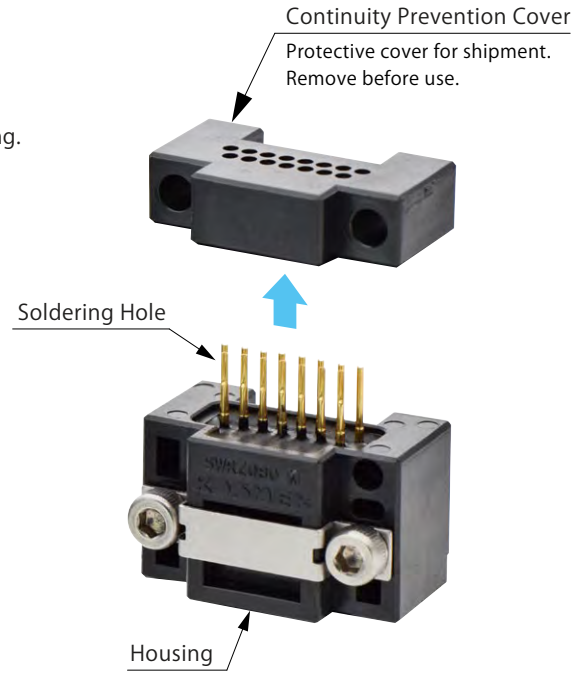


Connection Method for Solder Terminal

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.）

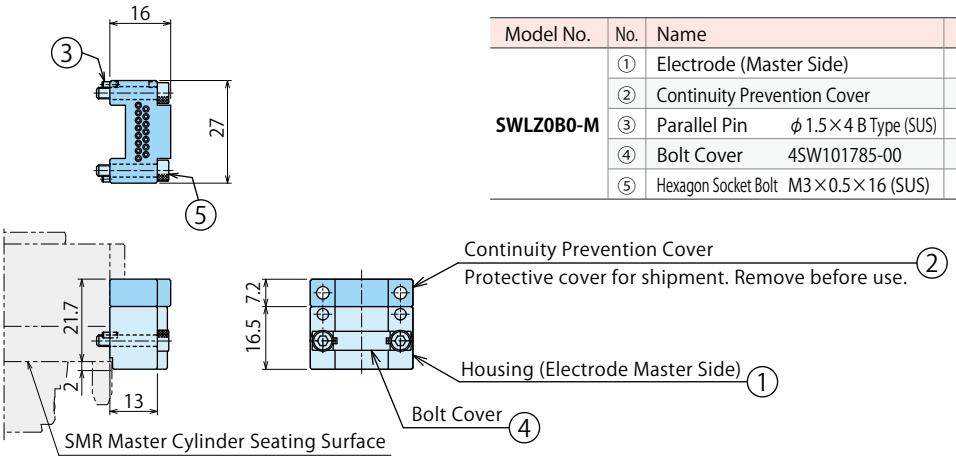
Soldering condition should be：280℃, within 3 seconds.
Make sure the outer diameter is φ1.6mm after soldering.

【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.



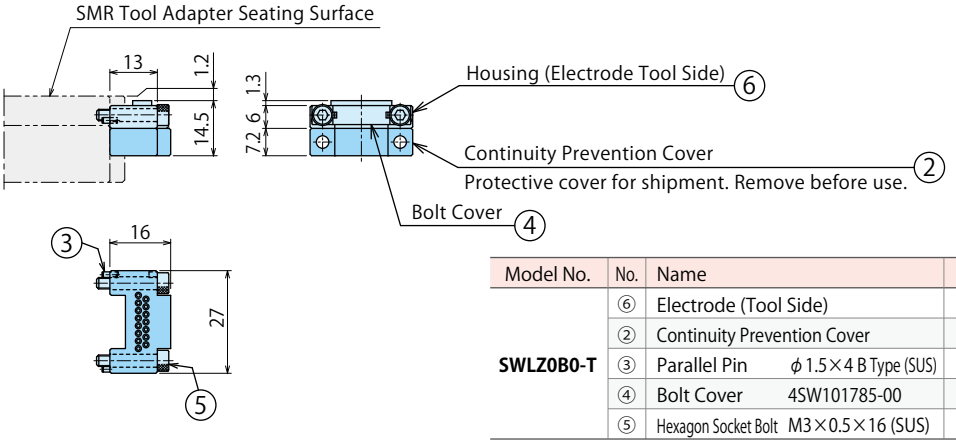
External Dimensions

Master Cylinder Side



Model No.	No.	Name	Quantity
SWLZ0B0-M	①	Electrode (Master Side)	1
	②	Continuity Prevention Cover	1
	③	Parallel Pin ϕ1.5×4 B Type (SUS)	2
	④	Bolt Cover 4SW101785-00	1
	⑤	Hexagon Socket Bolt M3×0.5×16 (SUS)	2

Tool Adapter Side



Model No.	No.	Name	Quantity
SWLZ0B0-T	⑥	Electrode (Tool Side)	1
	②	Continuity Prevention Cover	1
	③	Parallel Pin ϕ1.5×4 B Type (SUS)	2
	④	Bolt Cover 4SW101785-00	1
	⑤	Hexagon Socket Bolt M3×0.5×16 (SUS)	2

External Option：Solder Terminal with Cable

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

External Option Symbol：**C**

Model No. for Master Cylinder Side
model **SWLZ0C0-** **M01 M02 M05**

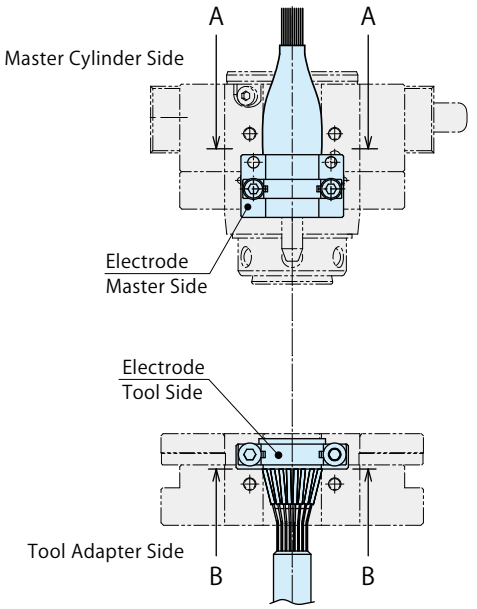
Model No. for Tool Adapter Side
model **SWLZ0C0-** **T01 T02 T05**

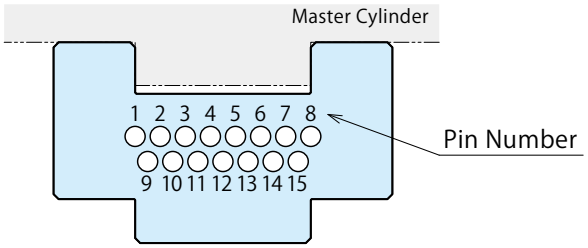
Specifications

Rated Value (per contact)			DC 24V 3A
Contact Resistance (Initial Value)			100mΩ or less
Total Current Capacity			10A
Number of Poles (per electrode)			15
Lead Wire Size			Refer to the table below
Lead Wire Length	−M01/T01		1m
	−M02/T02		2m
	−M05/T05		5m
Weight ※1	Master Cylinder Side	-M01	Electrode 20g + Cable 80g
		-M02	Electrode 20g + Cable 160g
		-M05	Electrode 20g + Cable 400g
	Tool Adapter Side	-T01	Electrode 15g + Cable 80g
		-T02	Electrode 15g + Cable 160g
		-T05	Electrode 15g + Cable 400g

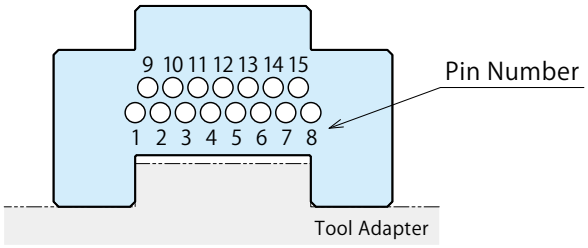
※1. Weight per kit.

Pin Numbers and Wire Colors





View A-A



View B-B

Cable

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

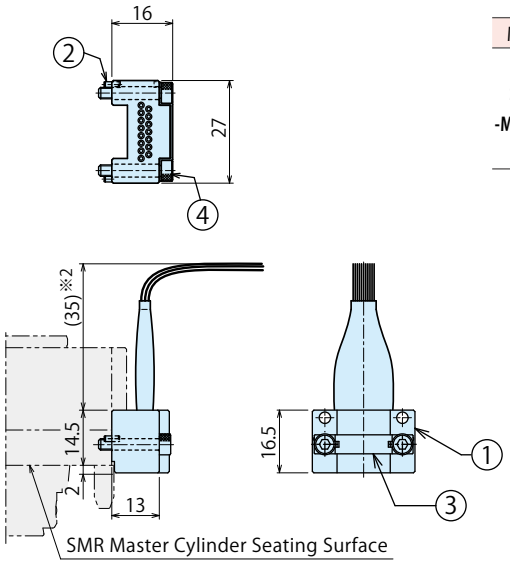
NISSEI ELECTRIC　　Weight：76g /m (Weight per meter)
Conductor Cross-Sectional Area：0.2mm² (AWG24)
Number of Cores：16

Outer Diameter ϕ7.1

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
	Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair	

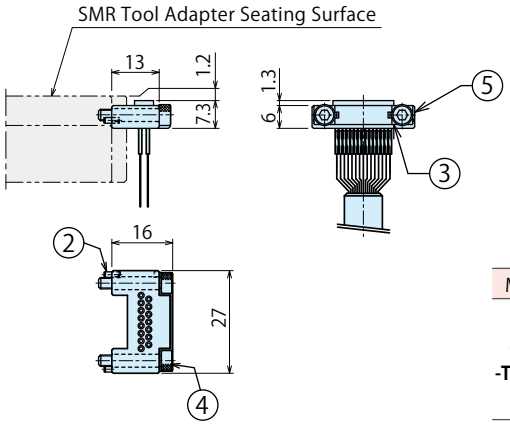
External Dimensions

Master Cylinder Side



Model No.	No.	Name	Quantity
SWLZ0C0 -M01/M02/M05	①	Electrode (Master Side)	1
	②	Parallel Pin φ1.5×4 B Type (SUS)	2
	③	Bolt Cover 4SW101785-00	1
	④	Hexagon Socket Bolt M3×0.5×16 (SUS)	2

Tool Adapter Side



Model No.	No.	Name	Quantity
SWLZ0C0 -T01/T02/T05	⑤	Electrode (Tool Side)	1
	②	Parallel Pin φ1.5×4 B Type (SUS)	2
	③	Bolt Cover 4SW101785-00	1
	④	Hexagon Socket Bolt M3×0.5×16 (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)

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

External Option Symbol：**U**

Model No. for Master Cylinder Side

model **SWLZ0U0-** **M01** **M02** **M05**

Model No. for Tool Adapter Side

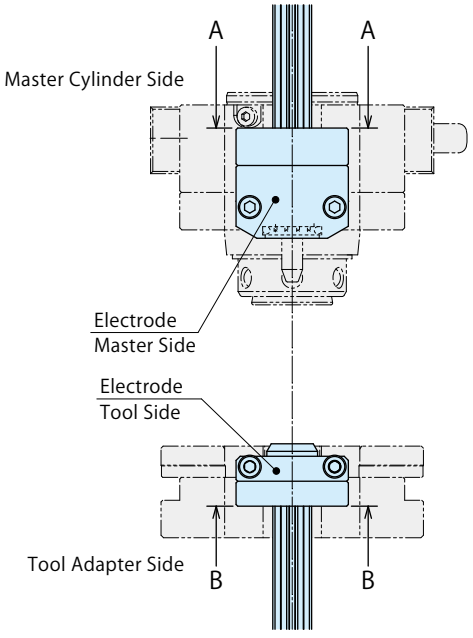
model **SWLZ0U0-** **T01** **T02** **T05**

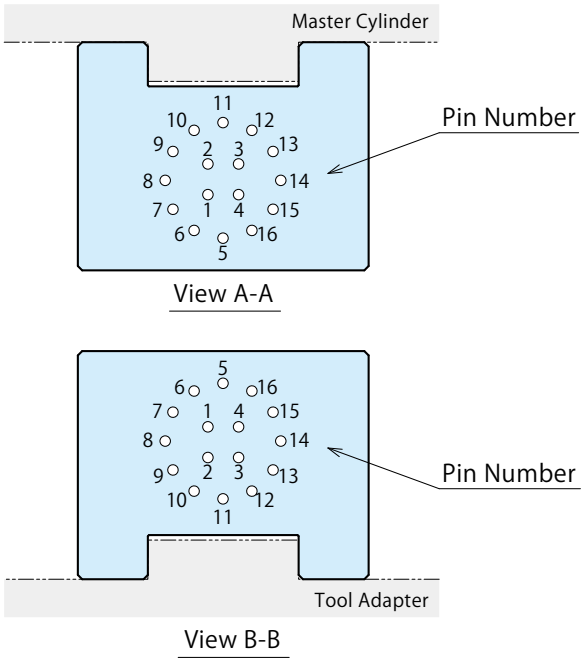
Specifications

Rated Value (per contact)			DC 24V 3A
Contact Resistance (Initial Value)			100mΩ or less
Total Current Capacity			10A
Number of Poles (per electrode)			16
Lead Wire Size			Refer to the table below
Lead Wire Length	−M01/-T01		1m
	−M02/-T02		2m
	−M05/-T05		5m
Weight ※1	Master Cylinder Side	-M01	Electrode 35g + Cable 80g
		-M02	Electrode 35g + Cable 160g
		-M05	Electrode 35g + Cable 400g
	Tool Adapter Side	-T01	Electrode 35g + Cable 80g
		-T02	Electrode 35g + Cable 160g
		-T05	Electrode 35g + Cable 400g
Protection Grade※2			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：0.2mm² (AWG24)

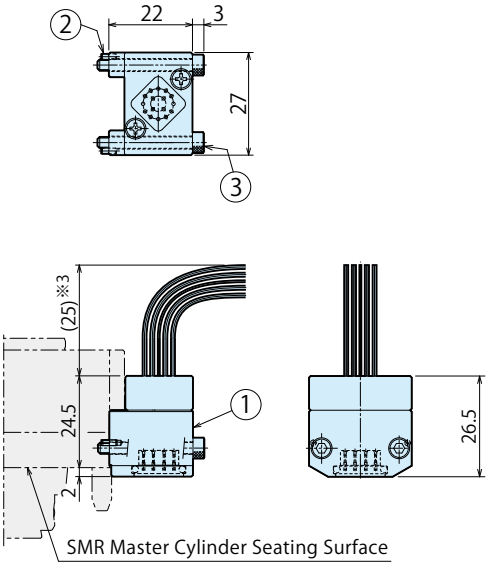
Number of Cores：16

Outer Diameter ϕ7.1

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
	Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair		Twisted Pair	

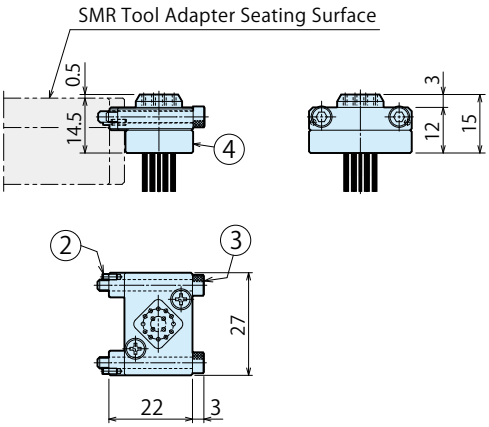
External Dimensions

Master Cylinder Side



Model No.	No.	Name	Quantity
SWLZ0U0 -M01/M02/M05	①	Electrode (Master Side)	1
	②	Parallel Pin φ1.5×4 B Type (SUS)	2
	③	Hexagon Socket Bolt M3×0.5×25 (SUS)	2

Tool Adapter Side



Model No.	No.	Name	Quantity
SWLZ0U0 -T01/T02/T05	④	Electrode (Tool Side)	1
	②	Parallel Pin φ1.5×4 B Type (SUS)	2
	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-□01/02/05, the lead wire length is different from its shown in the specifications.
(SWLZ0U0-□01：Lead Wire Length 1m, SWLZ0U0-□02：Lead Wire Length 2m, SWLZ0U0-□05：Lead Wire Length 5m)

External Option：D-SUB Connector

External Option Symbol：**D**

Model No. for Master Cylinder Side
model **SMRZ0D0-M**

Model No. for Tool Adapter Side
model **SMRZ0D0-T**

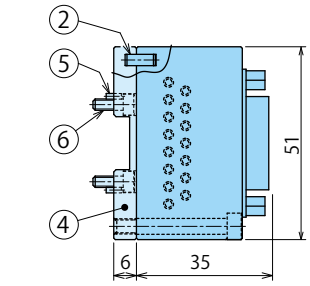
Specifications

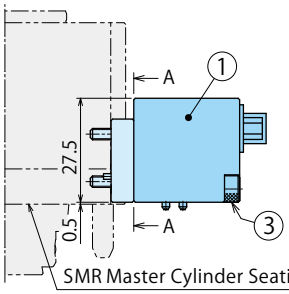
Rated Value (per contact)		DC 24V 3A
Contact Resistance (Initial Value)		100mΩ or less
Total Current Capacity		10A
Number of Poles (per electrode)		15
Weight※1	Master Cylinder Side	100g
	Tool Adapter Side	90g

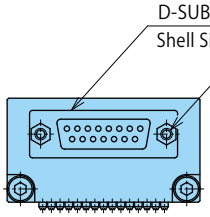
※1. Weight per kit.

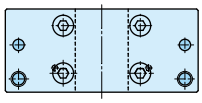
External Dimensions

Master Cylinder Side





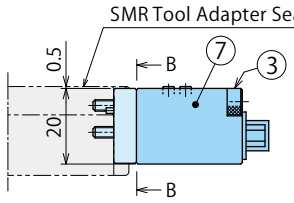


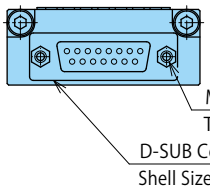


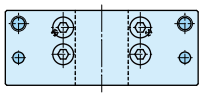
View A-A：Bracket

All-inclusive Model No.	Part No.	No.	Name	Quantity
SMRZ0D0-M	SWRZ0D0-M	①	Electrode (Master Side)	1
		②	Parallel Pin φ3×8 B Type (SUS)	2
		③	Hexagon Socket Bolt M4×0.7×30 (SUS)	2
	SMRZ0Z0 -MB	④	Bracket (Master Side)	1
		⑤	Parallel Pin φ1.5×4 B Type (SUS)	2
		⑥	Hexagon Socket Bolt M3×0.5×8 (SUS)	4

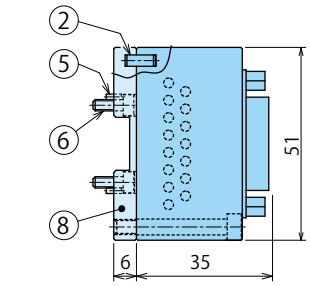
Tool Adapter Side







View B-B：Bracket



All-inclusive Model No.	Part No.	No.	Name	Quantity
SMRZ0D0-T	SWRZ0D0-T	⑦	Electrode (Tool Side)	1
		②	Parallel Pin φ3×8 B Type (SUS)	2
		③	Hexagon Socket Bolt M4×0.7×30 (SUS)	2
	SMRZ0Z0 -TB	⑧	Bracket (Tool Side)	1
		⑤	Parallel Pin φ1.5×4 B Type (SUS)	2
		⑥	Hexagon Socket Bolt M3×0.5×8 (SUS)	4

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

External Option Symbol：**G**

Model No. for Master Cylinder Side
model **SMRZ0G0-M**

Model No. for Tool Adapter Side
model **SMRZ0G0-T**

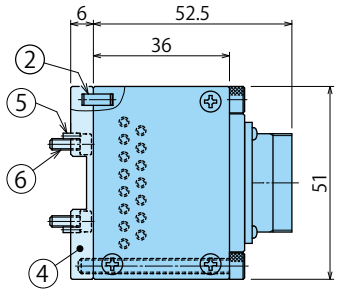
Specifications

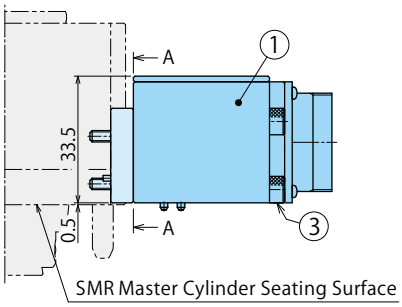
Rated Value (per contact)		DC 24V 3A
Contact Resistance (Initial Value)		100m or less
Total Current Capacity		17A
Number of Poles (per electrode)		15※2
Weight※1	Master Cylinder Side	125g
	Tool Adapter Side	145g

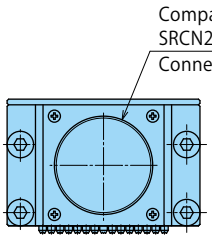
※1. Weight per kit.
※2. Connector pin #16 is not used.

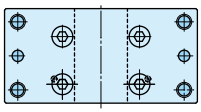
External Dimensions

Master Cylinder Side



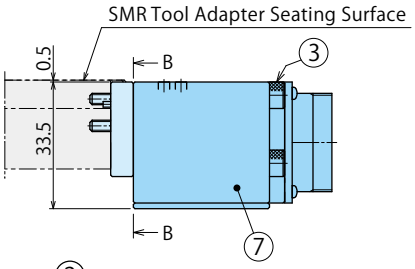


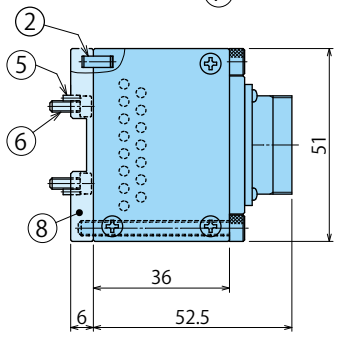


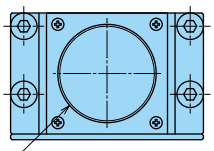


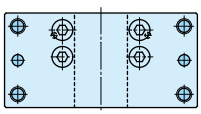
All-inclusive Model No.	Part No.	No.	Name	Quantity
SMRZ0G0-M	SWRZ0G0-M	①	Electrode (Master Side)	1
		②	Parallel Pin φ3×8 B Type (SUS)	2
		③	Hexagon Socket Bolt M4×0.7×40 (SUS)	4
	SMRZ0E0-MB	④	Bracket (Master Side)	1
		⑤	Parallel Pin φ1.5×4 B Type (SUS)	2
		⑥	Hexagon Socket Bolt M3×0.5×8 (SUS)	4

Tool Adapter Side









All-inclusive Model No.	Part No.	No.	Name	Quantity
SMRZ0G0-T	SWRZ0G0-T	⑦	Electrode (Tool Side)	1
		②	Parallel Pin φ3×8 B Type (SUS)	2
		③	Hexagon Socket Bolt M4×0.7×40 (SUS)	4
	SMRZ0E0-TB	⑧	Bracket (Tool Side)	1
		⑤	Parallel Pin φ1.5×4 B Type (SUS)	2
		⑥	Hexagon Socket Bolt M3×0.5×8 (SUS)	4

External Option：Compact Electric Power Transmission

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

External Option Symbol：**K**

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

Model No. for Tool Adapter Side
model **SWLZ0K0-T**

Specifications

Rated Value (per contact)		AC/DC 200V 5A
Total Current Capacity		12A
Number of Poles (per electrode)		4
Weight※1	Master Cylinder Side	21g
	Tool Adapter Side	17g
Cable with Applicable Terminal (Sold Separately)		SWZ0K0-CL□ (Refer to P.38)

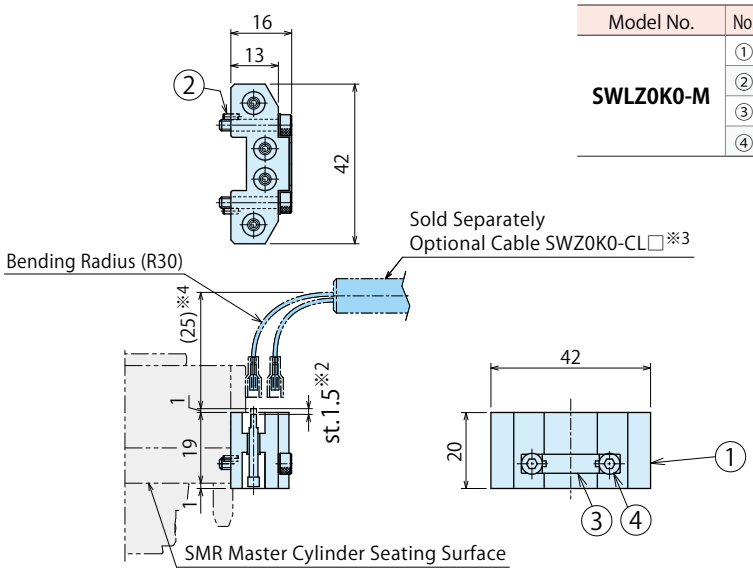
※1. Weight per kit.

Applicable Cable

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

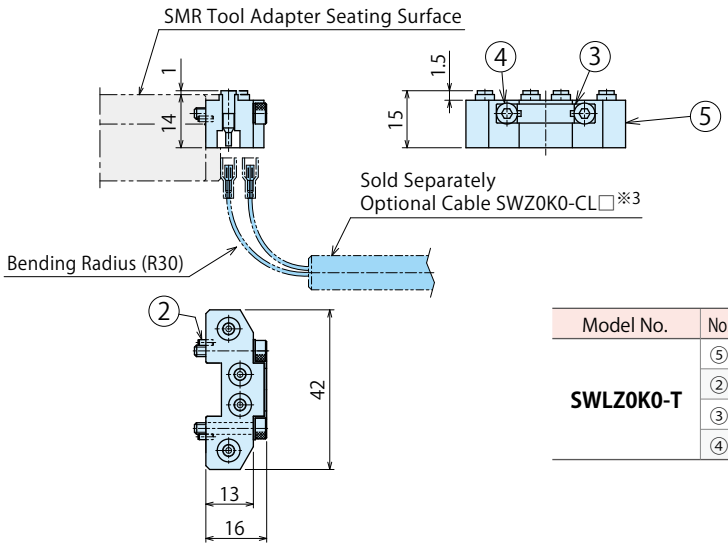
External Dimensions

Master Cylinder Side



Model No.	No.	Name	Quantity
SWLZ0K0-M	①	Electrode (Master Side)	1
	②	Parallel Pin ϕ1.5×4 B Type (SUS)	2
	③	Bolt Cover 4SW101785-00	1
	④	Hexagon Socket Bolt M3×0.5×16 (SUS)	2

Tool Adapter Side



Model No.	No.	Name	Quantity
SWLZ0K0-T	⑤	Electrode (Tool Side)	1
	②	Parallel Pin ϕ1.5×4 B Type (SUS)	2
	③	Bolt Cover 4SW101785-00	1
	④	Hexagon Socket Bolt M3×0.5×16 (SUS)	2

Notes :

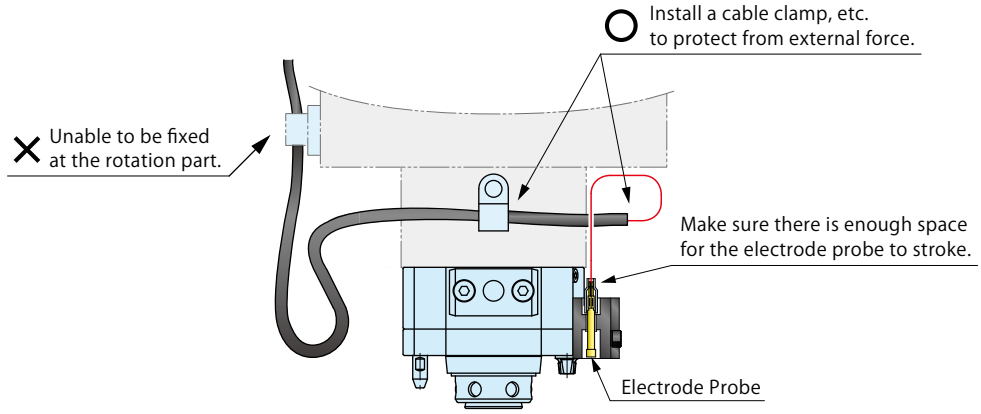
※2. The electrode probe on master side strokes 1.5mm (※2) when connecting with SMR.
When fixing the cable, make sure there is enough space for the probe operation.

※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.



- 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

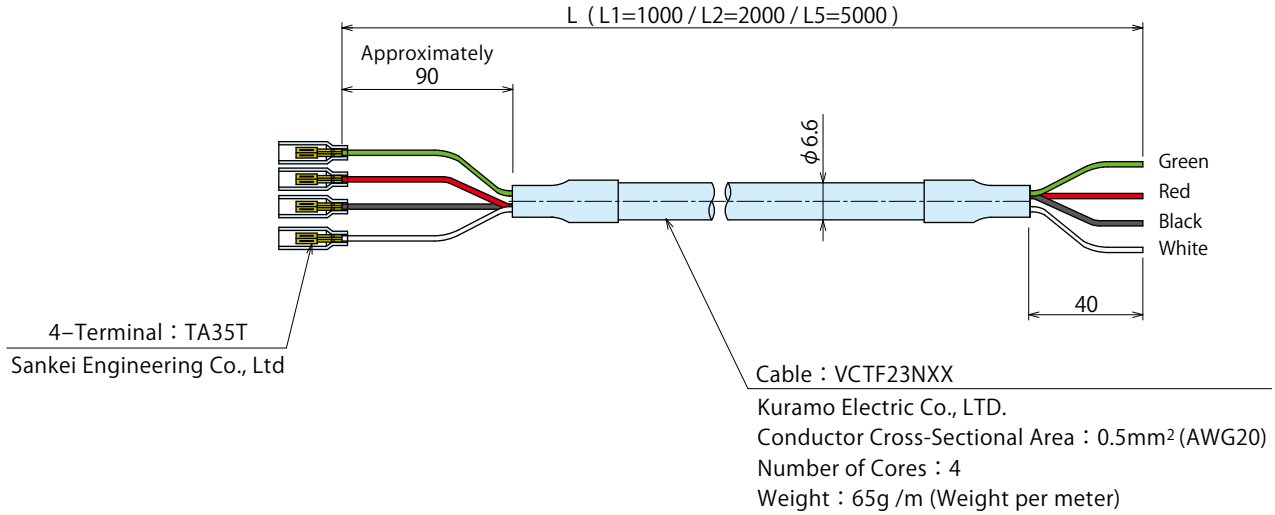
This cable is an optional cable applicable to the Compact Electric Power Transmission SWLZ0K0-M/T (External Option Symbol：**K**).

Model No. Indication

SWZ0K0-C **L1** **L2** **L5**

Cable Length
L1：1m
L2：2m
L5：5m

Design No.
(Revision Number)



※A crimp tool for crimping the applicable terminal (TA35T) is required when preparing a cable by yourself referring to this drawing.

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

External Option Symbol：**E**

Model No. for Master Cylinder Side
model **SMRZ0E0-M**

Model No. for Tool Adapter Side
model **SMRZ0E0-T**

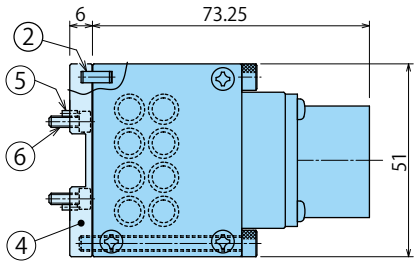
Specifications

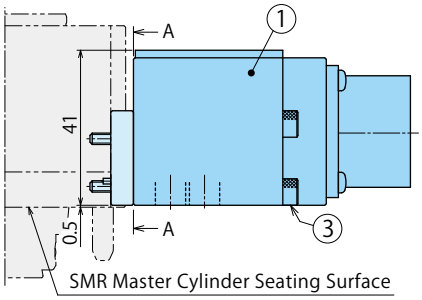
Rated Value (per contact)		AC/DC 200V 5A
Total Current Capacity		24A
Number of Poles (per electrode)		8
Weight※1	Master Cylinder Side	165g
	Tool Adapter Side	175g

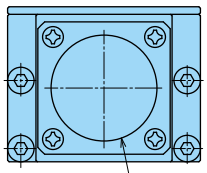
※1. Weight per kit.

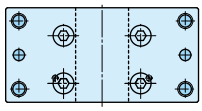
External Dimensions

Master Cylinder Side



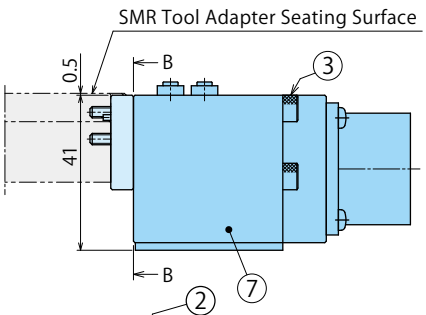


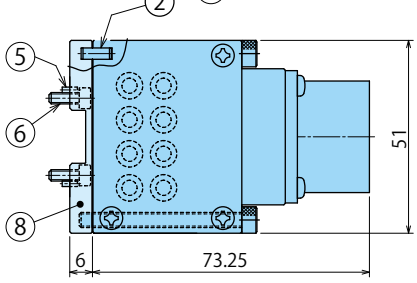


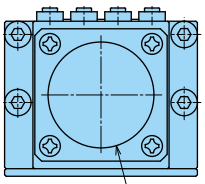


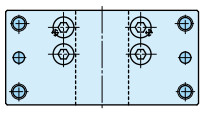
All-inclusive Model No.	Part No.	No.	Name	Quantity
SMRZ0E0-M	SWRZ0E0-M	①	Electrode (Master Side)	1
		②	Parallel Pin ϕ3×8 B Type (SUS)	2
		③	Hexagon Socket Bolt M4×0.7×45 (SUS)	4
	SMRZ0E0 -MB	④	Bracket (Master Side)	1
		⑤	Parallel Pin ϕ1.5×4 B Type (SUS)	2
		⑥	Hexagon Socket Bolt M3×0.5×8 (SUS)	4

Tool Adapter Side









All-inclusive Model No.	Part No.	No.	Name	Quantity
SMRZ0E0-T	SWRZ0E0-T	⑦	Electrode (Tool Side)	1
		②	Parallel Pin ϕ3×8 B Type (SUS)	2
		③	Hexagon Socket Bolt M4×0.7×45 (SUS)	4
	SMRZ0E0 -TB	⑧	Bracket (Tool Side)	1
		⑤	Parallel Pin ϕ1.5×4 B Type (SUS)	2
		⑥	Hexagon Socket Bolt M3×0.5×8 (SUS)	4

MEMO

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

External Option Symbol：**W/WX**

Model No. for Master Cylinder Side

model **SWLZ0** [**W** / **WX**] **0-M**

W： NPN
WX：PNP

Model No. for Tool Adapter Side

model **SWLZ0W0-T**

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

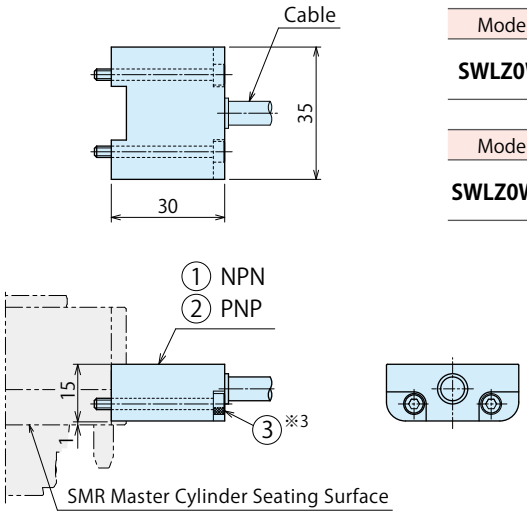
Specifications

Number of Signals (per electrode)		4
Protection Grade ※1		IP67
Cable		PUR φ6.3 7×0.259mm²
Cable Length	Master Cylinder Side	2m
	Tool Adapter Side	1m
Weight ※2	Master Cylinder Side	Electrode 20g + Cable 120g
	Tool Adapter Side	Electrode 20g + Cable 60g

※1. Protection grade of the electrode part.
※2. Weight per kit.

External Dimensions

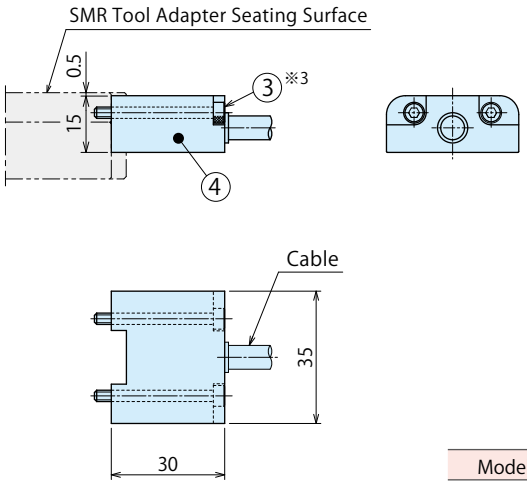
Master Cylinder Side



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

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

Tool Adapter Side



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

Note： ※3. The tightening torque for M3 mounting bolts marked with ※3 should be 0.63 N・m.

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)

Model No.	SWLZ0W0-T	
Applicable Sensor	DC 3-Wire Sensor	
Output Voltage	12V ±1.5V DC	
No. of Input Signals	4	
Total Output Current	≦ 30mA	≦ 60mA
Operating Distance	0~3mm	0~2mm
Operating Temperature	0 ~ 50℃	
Protection Grade	IP67	
Material	ABS	
Cable	PUR φ6.3 / 7×0.259mm² Hitachi Metals, Ltd. RBT-VUCTF	

Electrode Specifications (Master Cylinder Side)

Model No.	NPN	SWLZ0W0-M
	PNP	SWLZ0WX0-M
Supply Voltage (Input Voltage)	24V DC±10% (Including Ripple)	
Current Consumption	≦ 200mA	
No. of Output Signals	4 + 1 (Inzone)	
Load Current	≦ 50mA / 1 Output	
Operating Temperature	0 ~ 50℃	
Protection Grade	IP67	
Material	ABS	
Cable	PUR φ6.3 / 7×0.259mm² Hitachi Metals, Ltd. RBT-VUCTF	

■ LED Indication Status LED : Green

LED	Meaning
ON	The power is supplied.
OFF	The power is not supplied.
Blink	Blinks in case of abnormality.

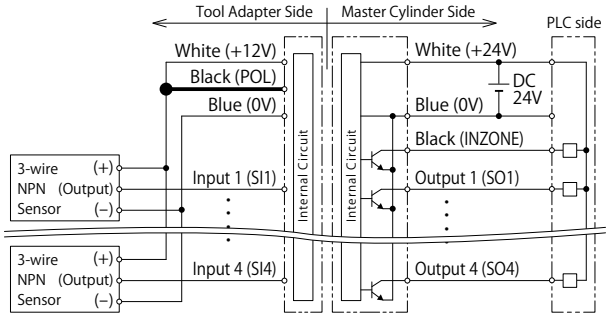
■ LED Indication Inzone LED : Orange

The master cylinder and tool adapter are opposed, LED is lit when you can communicate.

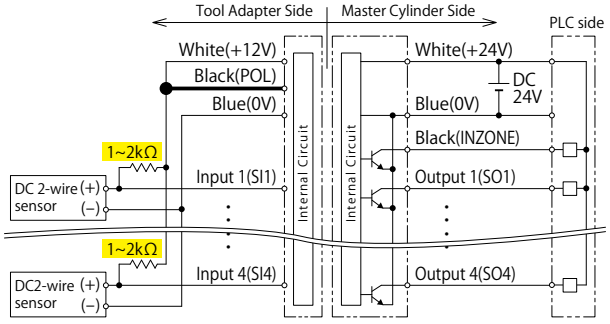
Wiring Diagram

SWLZ0W0-M (NPN)

■ For DC 3-wire NPN sensor connection

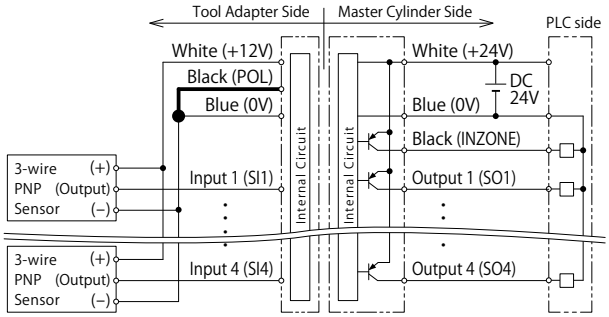


■ For DC 2-wire sensor connection (when NPN is set)

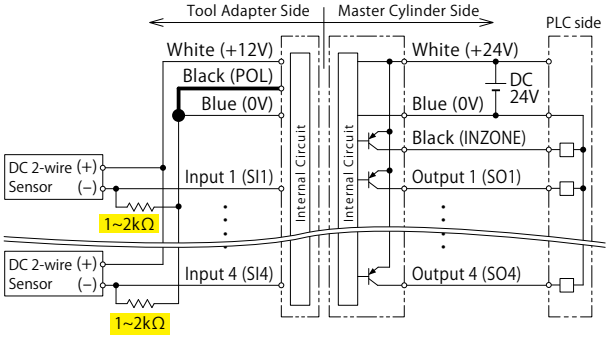


SWLZ0WX0-M (PNP)

■ For DC 3-wire PNP sensor connection



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



■ When connecting a DC 2-wire sensor, ensure to wire a resistor of about 1 to 2 k Ω.

■ POL is wiring for switching the polarity (NPN/PNP) of the sensor.

Wiring Color

■ Electrode for Tool Adapter side

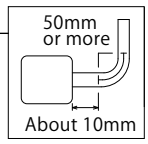
Output + 12V	White
Output 0V	Blue
Polarity Switching POL	Black
Input 1 (SI1)	Brown
Input 2 (SI2)	Red
Input 3 (SI3)	Yellow
Input 4 (SI4)	Green

■ 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.

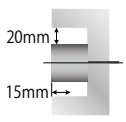


Attention for Installation

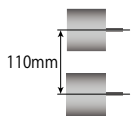
(Read this section thoroughly before installation.)

- Ensure the power is switched off during installation or maintenance operations.
- 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.

■ Surrounding Metal



■ Parallel Installation



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
model **SMRZ0L0-M**

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

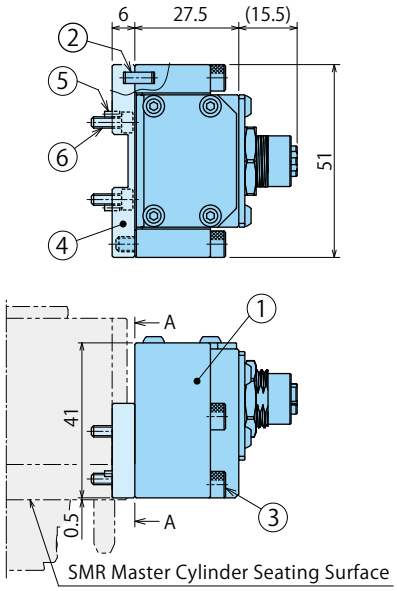
Specifications

Rated Value (per contact)		DC 30V 0.5A
Number of Poles (per electrode)		4
Connector		M12 D-code 4 poles (Female) (based on IEC61076-2-101)
Ethernet Applicable Standard		100BASE-TX※3
Transmission Speed		100Mbps※3
Category		CAT5
Applicable Fieldbus		EtherNet/IP EtherCAT PROFINET Modbus TCP CC-Link IE Field Network Basic※2
Weight※1	Master Cylinder Side	130 g
	Tool Adapter Side	120 g

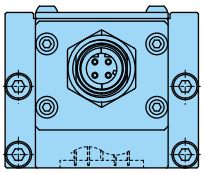
※1. Weight per kit.
※2. Cannot be used with a fieldbus that requires a communication speed of 1Gbps such as CC-Link IE.
※3. In the case transmission speed of Ethernet applicable standard 1000BASE-T (transmission speed : 1 Gbps) is required, please contact us.

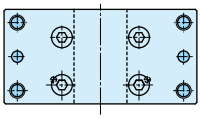
External Dimensions

Master Cylinder Side



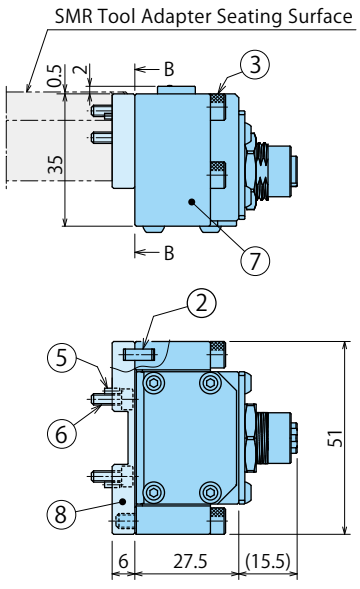
All-inclusive Model No.	Part No.	No.	Name	Quantity
SMRZ0L0-M	SWRZ0L0-M	①	Electrode (Master Side)	1
		②	Parallel Pin ϕ3×8 B Type (SUS)	2
		③	Hexagonal Socket Bolt M4×0.7×25 (SUS)	4
	SMRZ0E0-MB	④	Bracket (Master Side)	1
		⑤	Parallel Pin ϕ1.5×4 B Type (SUS)	2
		⑥	Hexagonal Socket Bolt M3×0.5×8 (SUS)	4

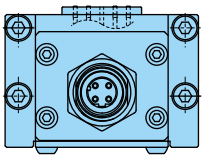


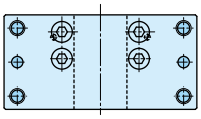


View A-A：Bracket

Tool Adapter 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 ϕ3×8 B Type (SUS)	2
		③	Hexagonal Socket Bolt M4×0.7×25 (SUS)	4
	SMRZ0E0-TB	⑧	Bracket (Tool Side)	1
		⑤	Parallel Pin ϕ1.5×4 B Type (SUS)	2
		⑥	Hexagonal Socket Bolt M3×0.5×8 (SUS)	4

MEMO

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

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

External Option Symbol：**R**

Model No. for Master Cylinder Side
model **SWLZ0R0-M**

Model No. for Tool Adapter Side
model **SWLZ0R0-T**

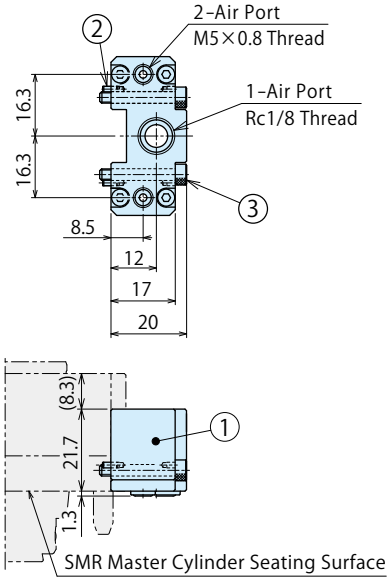
Specifications

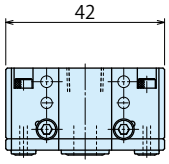
Port Size		Rc1/8	M5
Number of Ports		1	2
Operating Pressure		max. 0.7MPa (Vacuum Available)	
Withstanding Pressure		1.1MPa	
Min. Passage Area		28.3mm² (Equal to φ6)	3.1mm² (Equal to φ2)
Operating Temperature		0 ~ 70℃	
Usable Fluid		Dry Air	
Reaction Force (per port)	Pressure at 0.7 MPa	0.13 kN	0.04kN
	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	
	Tool Adapter Side	28 g	

※1. Weight per kit.

External Dimensions

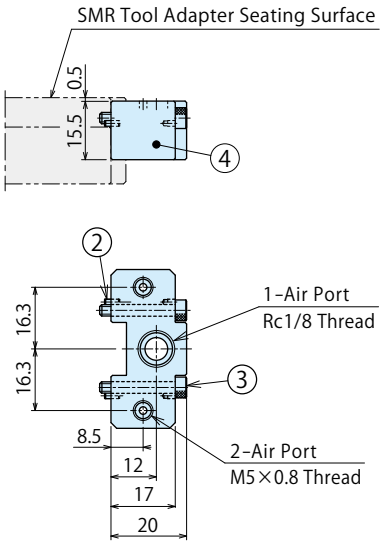
Master Cylinder Side

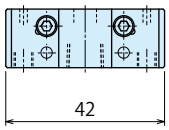




Model No.	No.	Name	Quantity
SWLZ0R0-M	①	Joint (Master Side)	1
	②	Parallel Pin φ1.5×4 B Type (SUS)	2
	③	Hexagon Socket Bolt M3×0.5×20 (SUS)	2

Tool Adapter Side





Model No.	No.	Name	Quantity
SWLZ0R0-T	④	Joint (Tool Side)	1
	②	Parallel Pin φ1.5×4 B Type (SUS)	2
	③	Hexagon Socket Bolt M3×0.5×20 (SUS)	2

Note :

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.

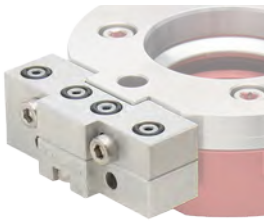
External Option : Air Joint 4-Port Option

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

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

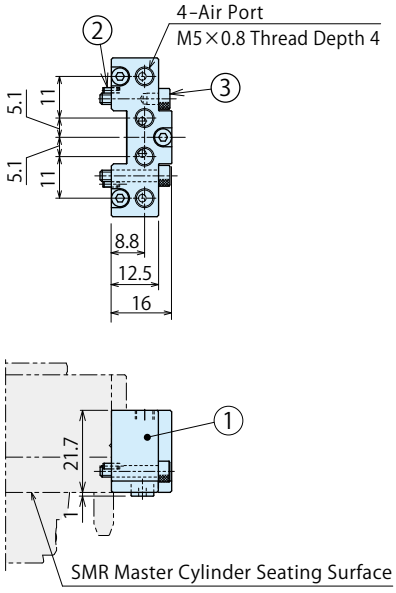
Specifications

Number of Ports		4
Operating Pressure		max. 1.0MPa (Vacuum Available)
Withstanding Pressure		1.5MPa
Min. Passage Area		3.1mm² (Equal to φ2)
Operating Temperature		0 ~ 70℃
Usable Fluid		Dry Air
Reaction Force (per port)	Pressure at 1 MPa	0.03 kN
	Pressure at 0.5 MPa	0.02 kN
	Pressure at P MPa	0.027×P +0.004 kN
Weight ※1	Master Cylinder Side	74 g
	Tool Adapter Side	64 g

※1. Weight per kit.

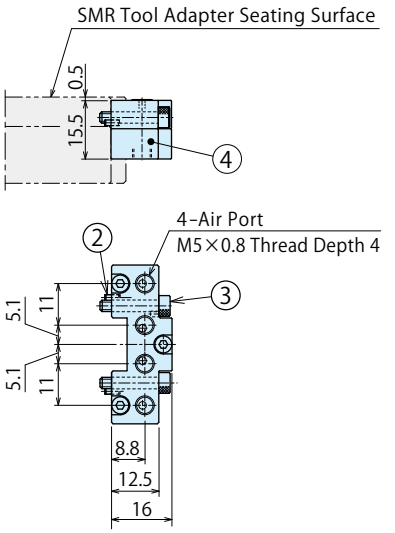
External Dimensions

Master Cylinder Side



Model No.	No.	Name	Quantity
SWLZ0PZ90-M	①	Joint (Master Side)	1
	②	Parallel Pin φ1.5×4 B Type (SUS)	2
	③	Hexagon Socket Bolt M3×0.5×16 (SUS)	2

Tool Adapter Side



Model No.	No.	Name	Quantity
SWLZ0PZ90-T	④	Joint (Tool Side)	1
	②	Parallel Pin φ1.5×4 B Type (SUS)	2
	③	Hexagon Socket Bolt M3×0.5×16 (SUS)	2

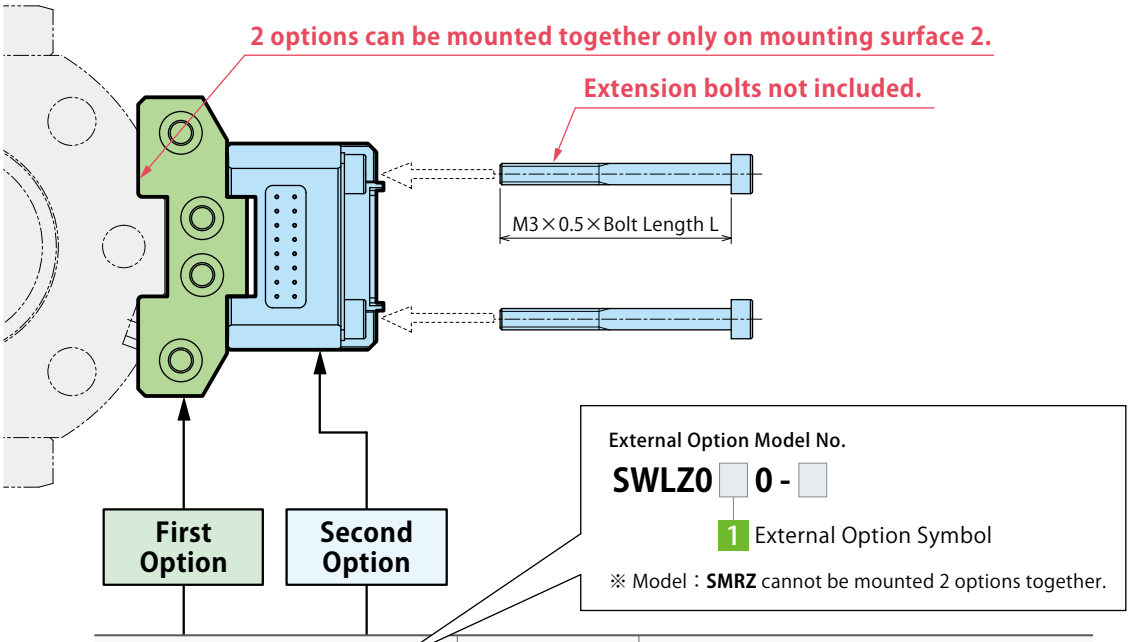
Note :

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.

Mounting Dimension of Two Options

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

This mark means :
Able to mount two options together.



External Option Model No.
SWLZ0 ☐ 0 - ☐
1 External Option Symbol
※ Model：**SMRZ** cannot be mounted 2 options together.

External Option Symbol		M3×0.5 Bolt Length L (mm)	Remarks
First Option	Second Option		
B / C	**B / C**	30	Remove bolt cover from the first option.
K	**B / C**	30	Remove bolt cover from the first option.
	J	35	
	K	30	
	U	40	
R	**B / C**	35	
	J ※1	40	
	K	35	
	U	45	
	W	50	
PZ9	**B / C**	30	
	J ※1	35	
	K	30	
	W	45	

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 ~ 60% of rated current, it is recommended to use multiple electrodes in a line. (In order to improve durability of contact probes.)

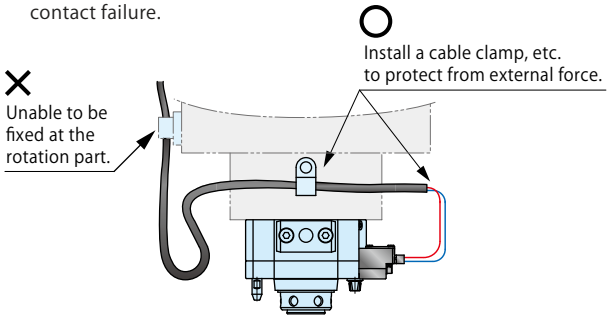
Installation Notes

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

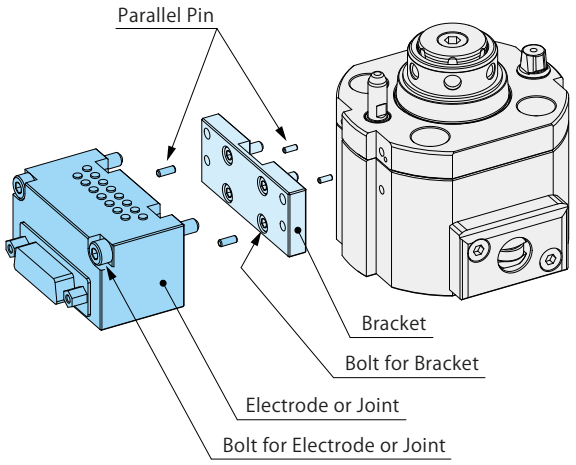
6) Notes for using -K：Compact Electric Power Transmission
- As for Compact Electric Power Transmission option, the electrode probes on both master cylinder and tool adapter are exchangeable. The electrode probes will be fallen out if pushed from the cable connecting side with power stronger than a certain 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.

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】

External Option Symbol	External Option Model No.	Bolt Size / Tightening Torque
J	SWLZ0J0-M/T	M3×0.5 Bolt：0.5 N・m
B	SWLZ0B0-M/T	
C	SWLZ0C0-M□/T□	
U	SWLZ0U0-M□/T□	
K	SWLZ0K0-M/T	
W	SWLZ0W0-M/T	M3×0.5 Bolt：0.63 N・m
WX	SWLZ0WX0-M	
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	M3×0.5 Bolt：1.3 N・m
PZ9	SWLZ0PZ90-M/T	

【Table B：Tightening Torque of Bolt for Bracket】

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

Maintenance・Inspection

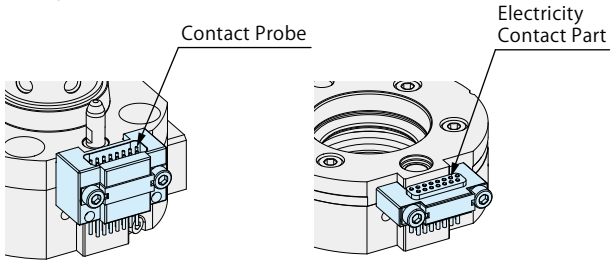
1) Removal of the Product and Shut-off of Pressure Source

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

3) Do not touch a master cylinder, 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.
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.

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

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