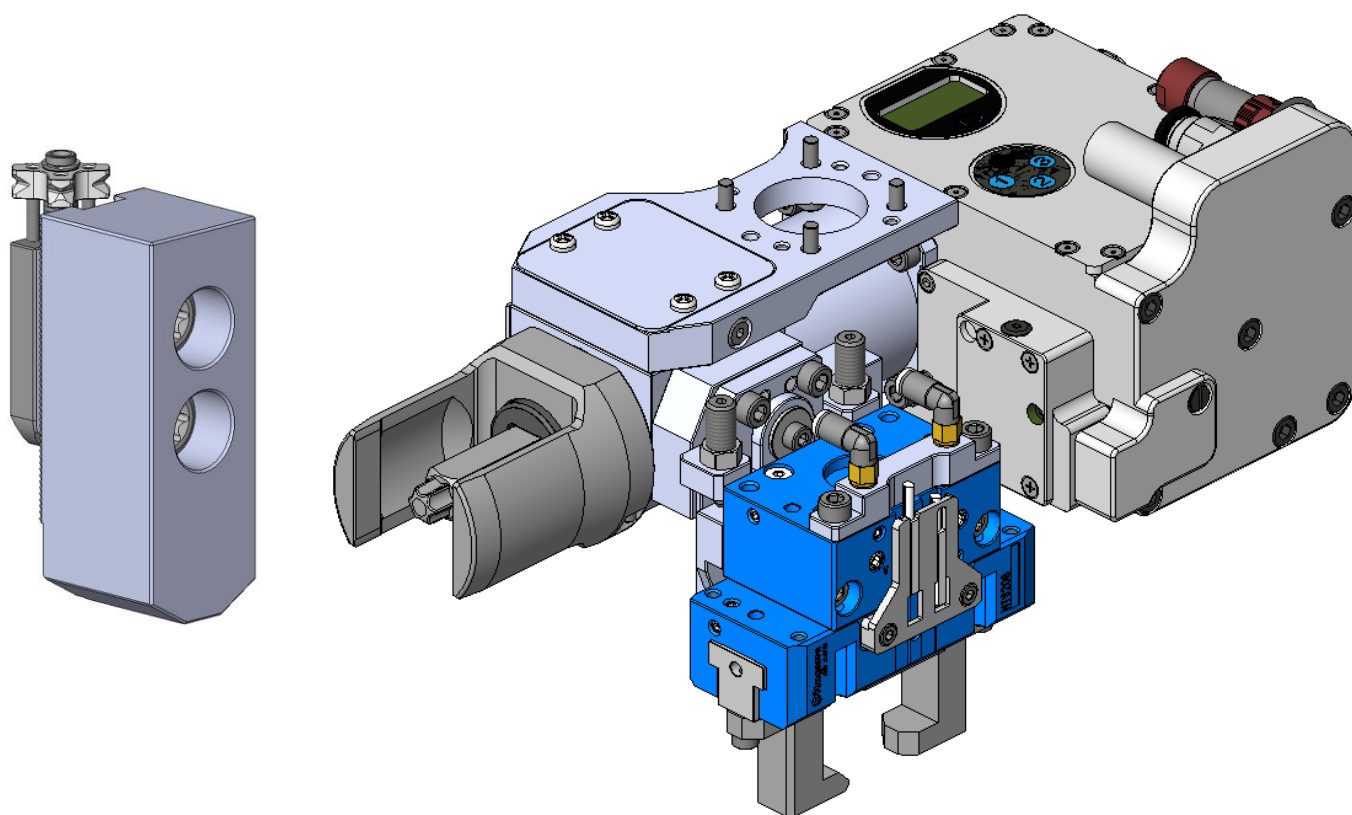


INSTRUCTION MANUAL

BR-AJC



Kitagawa Corporation

77-1, Motomachi, Fuchu-shi, Hiroshima, 726-8610, Japan

TEL +81-(0)847-40-0526

FAX +81-(0)847-45-8911

Before using this product, be sure to read this manual
carefully to understand how to use it correctly.

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1. Preface

1.1. How to Use This Manual

- This manual provides detailed information on this product so that you can understand its performance and functions and use it safely and correctly. Before using this product, be sure to read this manual carefully to understand how to use it correctly.
- Before using this product, be sure to read this instruction manual and the instruction manual for the power chuck (Standard Chuck BR type) to be used in combination with this product carefully to ensure that you correctly understand how to use the product.
- This manual has been prepared for intended use for persons in charge of installation, operation, inspection, and maintenance of this product. When the beginners use this product, be sure to receive the guidance from skilled persons, sales agents, or us in advance.
- Store this manual with care in the specified place at hand, and reread it as necessary for correct use of the product.
- This manual is a part of the product. Do not sell or transfer the product to a third party without attaching this manual.
- Read the section "Important Safety Precautions" at the beginning of this manual especially carefully, which summarizes precautions that particularly you should know or follow.
- Failure to follow the instructions and warnings in this manual could result in serious human accidents. Kitagawa shall not be held liable for human accidents, death, damage, or loss that occurred due to a failure to follow this manual.
- This manual does not predict all potential hazards in installation, operation, maintenance, and inspection under all environmental conditions. Therefore, the matters, unless otherwise mentioned clearly as "can be done" or "may be done" in this manual, should be considered as "cannot be done" or "must not be done".
- Please contact us or our agents if you have an uncertainty about safety when you try to perform installation, operation, inspection, or maintenance of the product.
- The information and product specifications described in this manual are subject to change without notice for the purpose of improvement.

1.2. Signal Word Definition

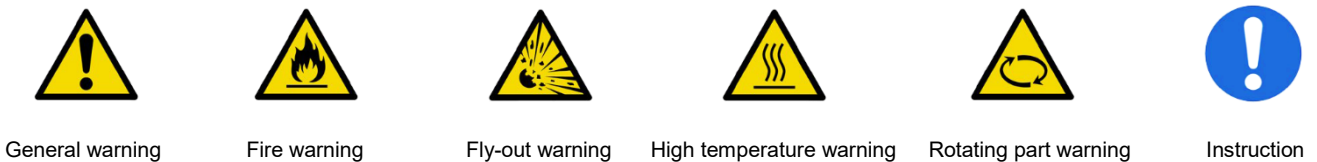


The triangle shown on the left indicates warning. The warning signs are used to alert you to potential safety hazards. To avoid death or injuries that could occur, follow all the instructions given with the warning signs.

Handling precautions that are considered especially important are classified and indicated as shown below according to the degree of risk that could result.

Danger	Failure to follow the safety precautions below will result in death or serious injuries.
Warning	Failure to follow the safety precautions below could result in death or serious injuries.
Caution	Failure to follow the safety precautions below may result in minor or moderate injuries.
Notice	Indicates instructions which, if you do not heed given instructions, could result in damage to the product or shortened service life, or damage to peripheral equipment.

The signs are classified and indicated as follows according to the type of risk.



1.3. Type Designation

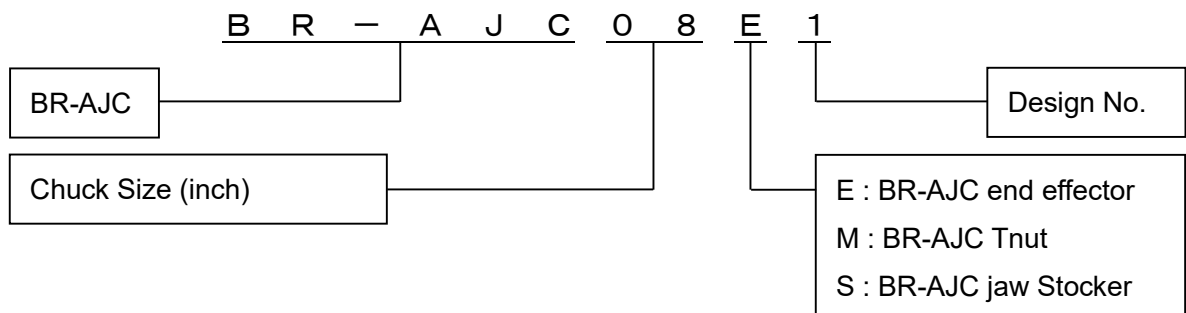


Figure 1 Type designation

1.4. Application Purpose of This Product

This product is suitable for automatic replacement of the jaws of power chucks mounted on machine tools such as NC lathes and machining centers. The BR-AJC end effector can be mounted on a robot or loader to mount and remove the BR-AJC Tnut from the power chuck. For any other applications, please contact us.

1.5. Outline of BR-AJC

1.5.1. System Image

The BR-AJC system consists of the following elements.

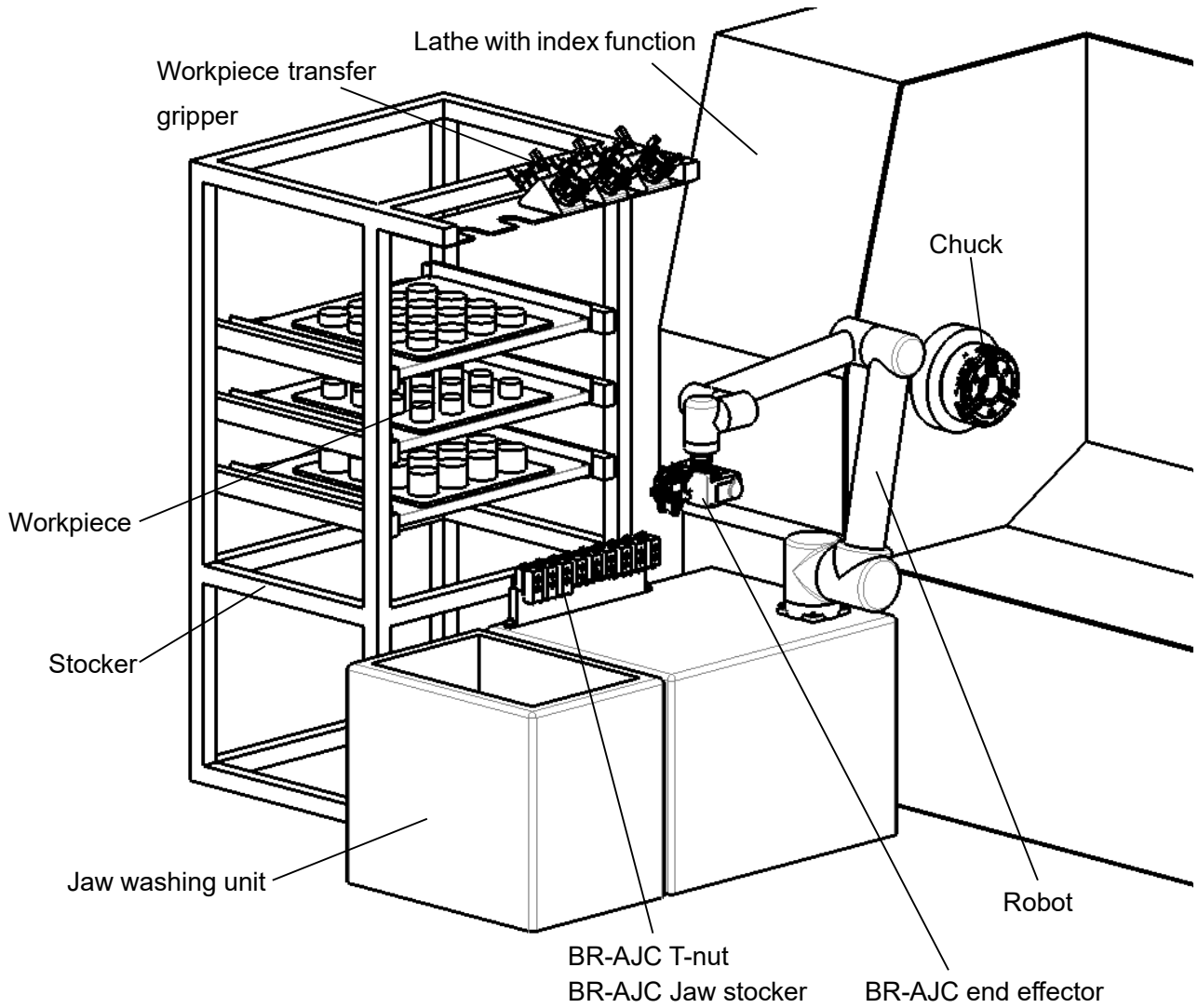
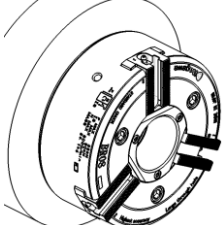
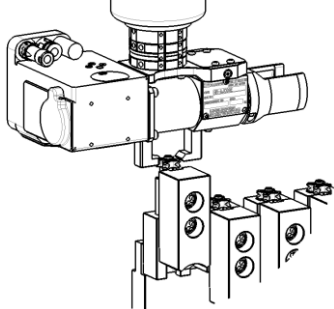
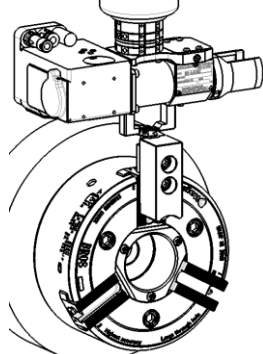
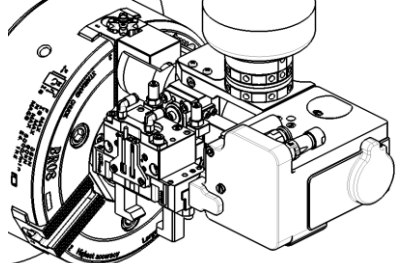


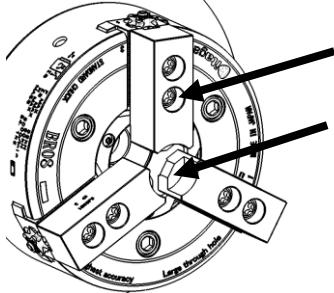
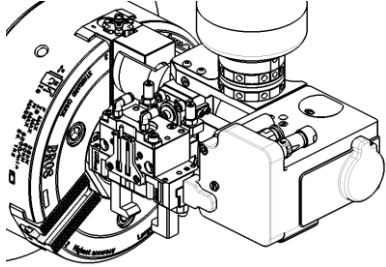
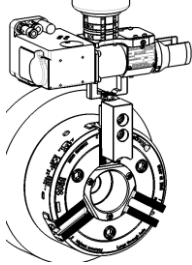
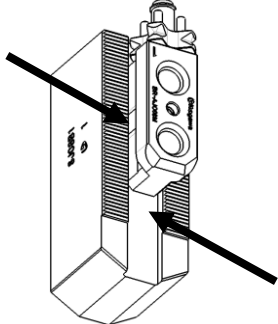
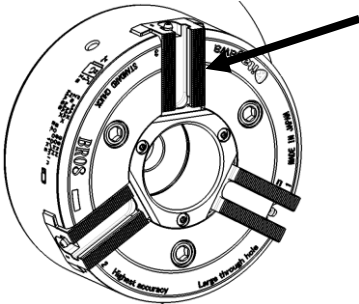
Figure 2 BR-AJC System image

1.5.2. Outline of Jaw Change Procedure

Jaws on the chuck are changed by indexing the chuck on the lathe, tightening/loosening the bolts using the jaw change end effector mounted on the robot, and transferring the jaws. The outline of the procedure is shown in Table 1.

Table 1 Jaw Change Procedure

①	Indexing the chuck	The chuck is indexed on the lathe so that the jaw mounting position comes directly above.	
②	Taking out jaws	Jaws are taken out of the stocker.	
③	Inserting the jaws	The jaws are inserted into the chuck.	
④	Jaw Mounting Bolt Tightening	The jaw mounting bolts are tightened.	
⑤	Machining the workpiece	A workpiece is mounted on the chuck, machined, and removed.	

⑥	Washing the chuck	<p>The chuck is washed using coolant or air blow.</p> <ul style="list-style-type: none"> ● Chips remaining on the mounting bolt holes and workpiece gripping surfaces of the soft jaws may cause jaw change failure or decrease in gripping accuracy.(Parts shown by the arrows) 	
⑦	Jaw Mounting Bolt Loosening	The jaw mounting bolts are loosened.	
⑧	Taking out jaws	The jaws are taken out of the chuck.	
⑨	Washing the jaws	<p>The jaw washing unit removes chips on the jaws.</p> <ul style="list-style-type: none"> ● Chips remaining on the serrations and T-nut of the soft jaws may cause jaw change failure or decrease in gripping accuracy. (Parts shown by the arrows) 	
⑩	Washing the chuck	<p>The chuck is washed using coolant or air blow.</p> <ul style="list-style-type: none"> ● Chips remaining on the serrations and groove of the master jaws may cause jaw change failure or decrease in gripping accuracy. (Parts shown by the arrows) 	

1.6. Scope of the Product

This is the instruction manual for the BR-AJC end effector, BR-AJC T-nut, and BR-AJC jaw stocker.

For other peripheral devices, such as work transfer gripper, workpiece stocker, washing tank, and control unit, refer to their respective instruction manuals.

1.6.1. Product and Function

1.6.1.1. BR-AJC End Effector

- The BR-AJC end effector rotates the pneumatic nutrunner by the START signal to tighten or loosen the jaw mounting bolts with the predetermined torque.
- When the set tightening torque is reached, the end effector stops automatically and outputs the status by the STOP signal.
- The reaction lever is applied to the side face of a soft jaw to receive the reaction force of the bolt tightening torque, reducing the load on the robot.
- The pneumatic gripper holds and transfers a jaw.

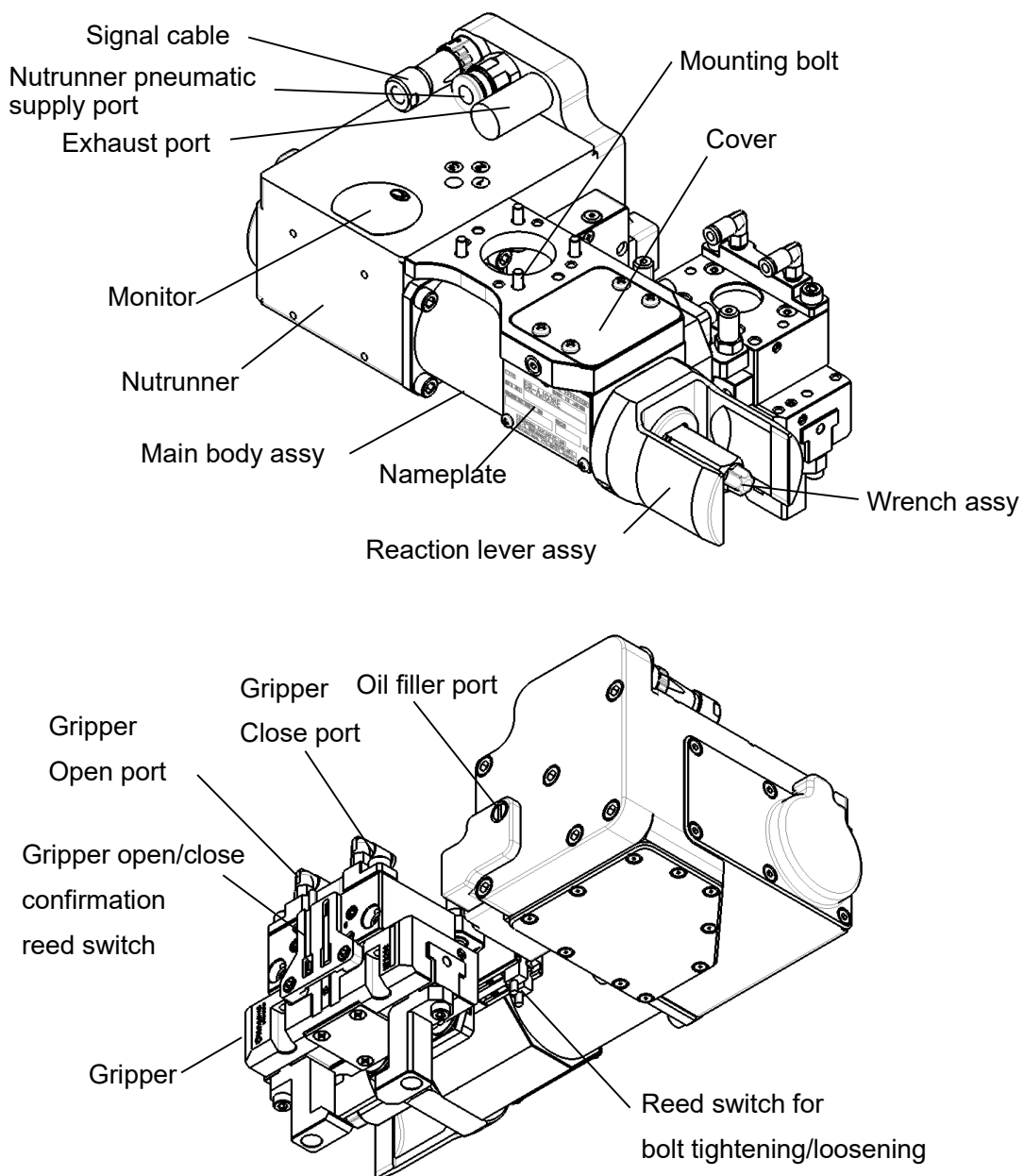


Figure 3 Appearance of BR-AJC end effector

1.6.1.2. BR-AJC T-nut

- The jaw mounting bolts of BR-AJC**M for mounting soft jaws to the power chuck are replaced with the dedicated jaw mounting bolts.
 - Also refer to the BR-AJC**M instruction manual.
- This T-nut is used to reproduce the serration position.
- Even when a jaw is once removed from the chuck, the T-nut allows maintaining the equivalent gripping accuracy as for the jaw just formed.

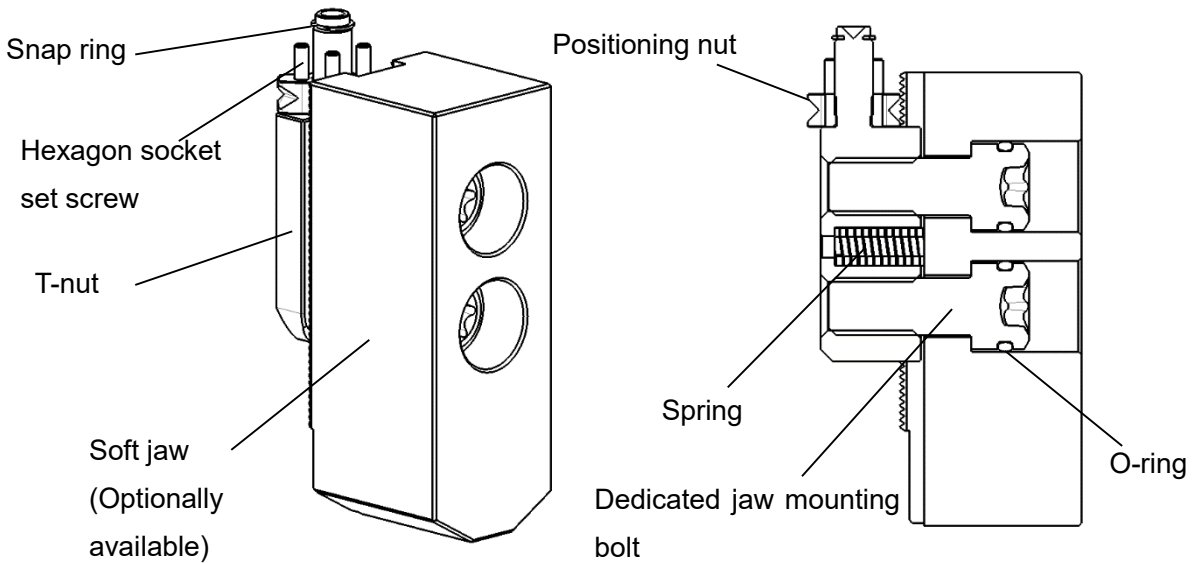


Figure 4 Appearance of BR-AJC T-nut

1.6.1.3. BR-AJC Jaw Stocker

- This is used to store the BR-AJC T-nuts.
- The mounting base is to be prepared by the customer.

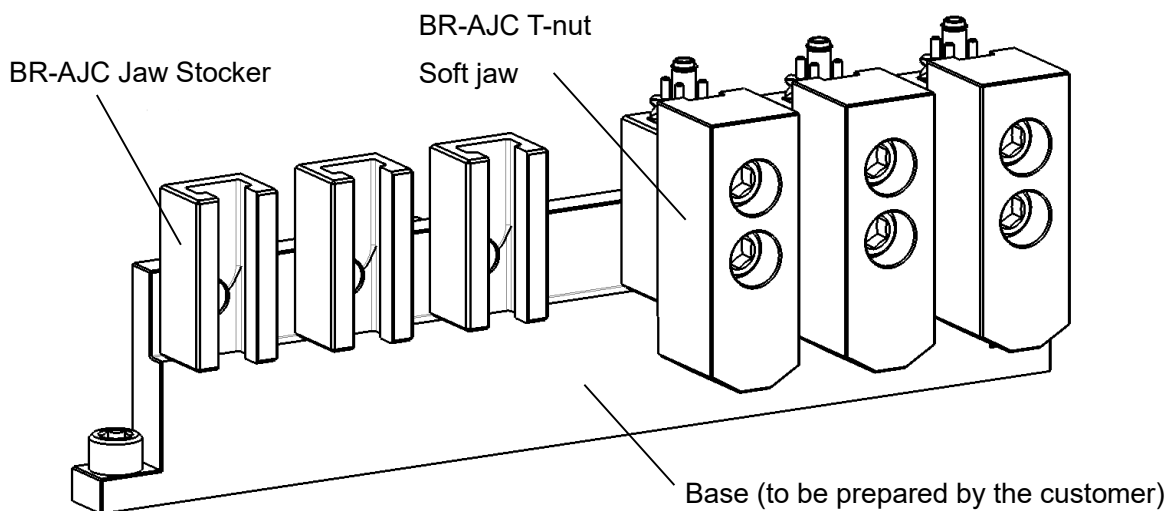


Figure 5 Appearance of BR-AJC jaw stocker

1.6.2. Outline of Product Range

The items described in Table 2 and Table 2 are to be prepared by the customer as they are out of the product range.

1.6.2.1. Items to be prepared by the customer

Table 2

Item	Contents
Lathe with index function	The chuck needs to be indexed to the jaw mounting position.
Robot	The BR-AJC end effector is to be mounted for jaw change.
Jaw washing unit	Necessary to wash off chips on the jaws.
Control unit/electric wiring	Necessary for controlling the BR-AJC end effector to tighten/loosen the jaw mounting bolts.
Pneumatic source/pneumatic piping	Necessary for driving the BR-AJC end effector.
Workpiece stocker	For storing workpieces.
Workpiece transfer gripper	For transferring workpieces. The BR-AJC end effector cannot be used for transferring workpieces.
Other equipment	Equipment as needed, such as safety fence, measurement device, reversing base, and loader.

1.6.2.2. Work to be done by the customer

Table 3

Item	Contents
Cleaning of chuck in machine	Remove chips on the chuck.
Creation of control program for BR-AJC end effector	Create the control program for tightening/loosening the jaw mounting bolts.
Noise countermeasures for BR-AJC end effector	Take countermeasures against noise to prevent malfunction. <ul style="list-style-type: none"> ➤ Be sure to use shielded cables. ➤ Install away from high voltage sources and high current sources. ➤ Ground each equipment.

Notice

Indicates instructions which, if you do not heed given instructions, could result in damage to the product or shortened service life, or damage to peripheral equipment.



When changing the jaws, clean the chuck inside the machine and the jaws outside the machine to sufficiently remove accumulating chips.

- Failure to do so will result in the failure of inserting/removing the jaws to/from the chuck.
- Failure to do so will result in the tightening/loosening failure of the jaw mounting bolts.

Be sure to use shielded cables when connecting the BR-AJC end effector and the host control unit.



Install the cables away from high voltage sources and high current sources.

Ground the BR-AJC end effector.

- Malfunction due to noise will result in the failure of jaw change, causing suspension of facilities or breakage of parts.

1.7. Warranty

The product is warranted for one year after the date of delivery. However, the following cases will void the warranty.

- When parts other than Kitagawa's genuine parts are used.
- When proper maintenance and inspection such as periodic greasing are not performed.
- Other than above, when the product is used in methods not following this manual.

1.8. Parts List

All parts used including consumables shall be genuine parts delivered by Kitagawa.

Kitagawa shall not be held liable for human accidents, death, damage, or loss that occurred due to the use of non-genuine parts.

1.8.1. BR-AJC End Effector

1.8.1.1. Wrench ASSY

Table 4 Delivery range

No.	Parts name	BRAJCWT10	BRAJCWT12	Qty.	Note
1	Wrench	61P865932	61P865914	1	
2	Spring	WL5-60		1	MISUMI
3	Hex. socket head cap screw	M3×12		2	
4	Washer	FWTAC-D7-M3-T9		2	MISUMI

1.8.1.2. Reaction lever ASSY

Table 5 Delivery range

No.	Parts name	BRAJCL06	BRAJCL08	BRAJCL10	Qty.	Note
5	Reaction lever	61P297145	61P297130	61P297141	1	
6	Screw	FMSSG5-24-14			2	MISUMI

1.8.1.3. Body ASSY

Table 6 Delivery range

No.	Parts name	BR-AJC-E	Qty.	Note
7	Adaptor plate	61P865910	1	
8	Hex. socket head cap screw	M5×15	4	
9	Cover	61Q494943	1	
10	cross-recessed head machine screw	M4×6	4	
11	Hex. socket head cap screw	M4×16	4	
12	Washer	4	4	
13	Fittings	KQ2L04-M5A	2	SMC
14	Plug	MS-5P	1	SMC
15	Hex. socket head cap screw	M3×6	2	
16	Reed switch bracket	-	1	
17	Reed switch	D-M9B	2	SMC
18	Signal cable	-	1	
19	Reed switch	D-M9BV	2	SMC

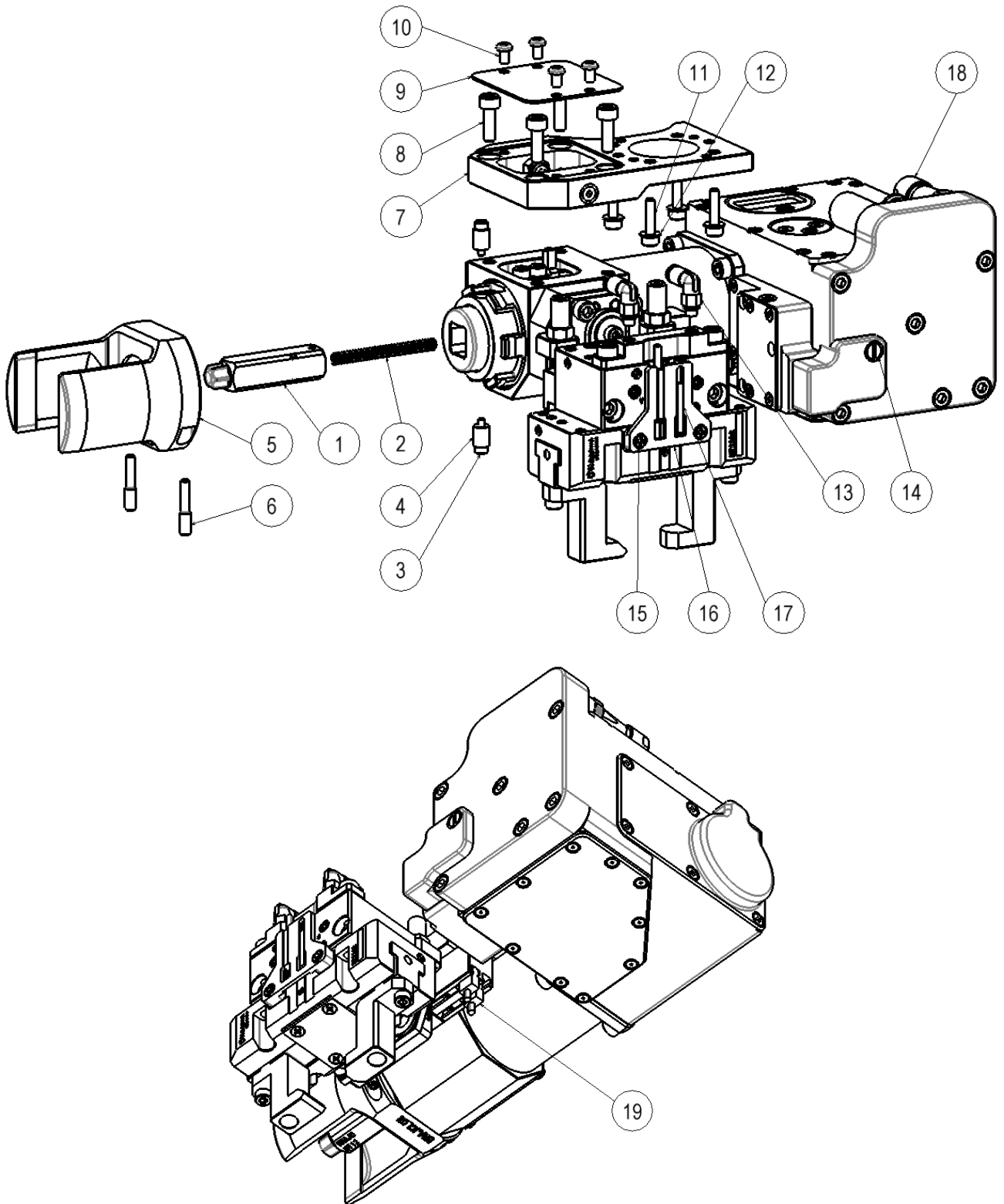


Figure 6 Parts

1.8.2. BR-AJC Tnut

Table 7 Delivery range

No.	Parts name	BR-AJC06M	BR-AJC08M	BR-AJC10M	Qty.
1	Jaw mounting bolt	61Q494598	61Q493434		6
2	O-ring	P12.5	P15		6

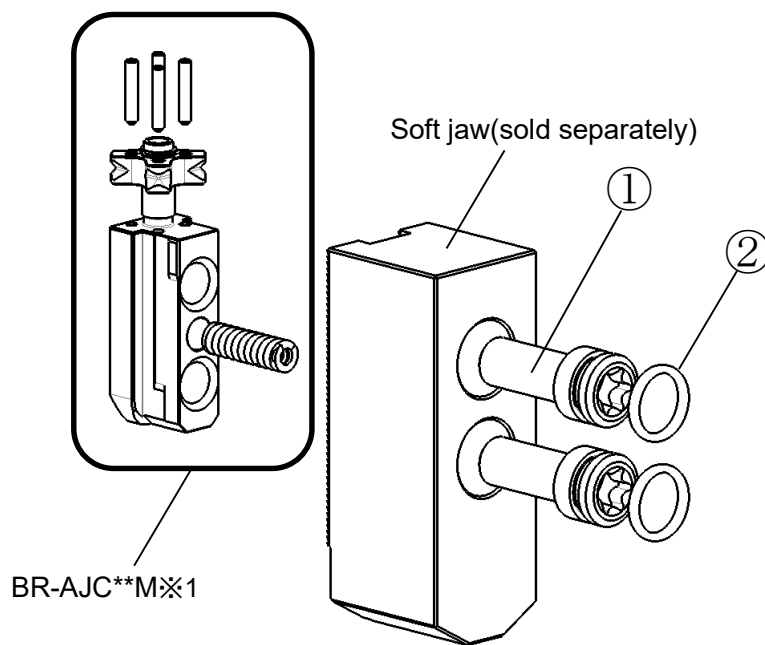


Figure 7 Parts

※1: Refer to BR-AJC**M instruction manual.

1.8.3. BR-AJC Jaw Stocker

Table 8 Delivery range

No.	Parts name	BR-AJC06S	BR-AJC08S	BR-AJC10S	Qty.
1	Jaw stocker	-	-	-	3

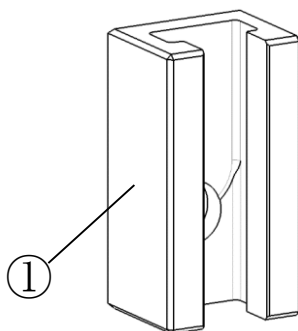


Figure 8 Parts

2. Important Safety Precautions

This chapter summarizes precautions that particularly you should know or follow.

Please read them before starting to use the product.

 **Danger** Failure to follow the safety precautions below will result in death or serious injuries.

The jaw mounting bolts must be replaced after a specified number of years or a specified number of times of use. (Refer to “6.2.1. Jaw Mounting Bolt”)



- The bolts may be damaged, causing the chuck and workpiece to fly out.
- Measures shall be taken to ensure that the bolt does not exceed the limit of use.
 - The number of times the upper controller or machine tool is used is controlled and the operator is notified.
 - Establish rules for replacement timing based on frequency of use. etc.

When installing, inspecting, lubricating, replacing BR-AJC End effector,

Be sure to turn off the main power supply,

Shut off all air pressure in the work area and relieve any remaining air pressure inside the end effector,



Post a sign or notice, or provide a fence, and so on to notify people around the machine that work is in progress.

- During work, the robot or end effector could move abruptly and collide with body.
- Unexpected machine operation by a third party may result in a collision with body.

Use the BR-AJC end effector in accordance with the legal safety standards.



- Comply with the safety standards of laws and regulations set forth in each country, including the installation of safety fences and safety covers.

Take safety measures so that the operator is not injured even if the conveyed workpiece flies out due to reduced air pressure.



- Workpiece may fly out and collide with body.

Be sure to tighten bolts to the specified torque.



Use a proper tool that can control torque such as a torque wrench.

- If insufficient bolts are mounted or tightening torque is improper, the bolts may be damaged, causing the end effector and workpiece to fly out.

If the BR-AJC end effector or BR-AJC Tnut is impacted due to malfunction or programming error, carefully examine each part for damaged or cracks, and repair or replace if necessary.



- The impact may cause damage or crack on the parts. Continuous use of faulty parts may damage the BR-AJC end effector/Chuck causing the workpiece to fly out.



Prevent your hands and fingers from being caught when gripping a workpiece with the BR-AJC end effector.

- Otherwise, your hands and fingers may be crushed or cut off.



Do not modify the product.

- Not only product is damaged but also the workpiece may fly out.



Warning

Failure to follow the safety precautions below could result in death or serious injuries.



Check jaw mounting bolts and wrenches daily for damage. (Refer to “6.1. Periodic Inspection”)

- If the jaws are not properly installed due to damaged parts, the workpiece may fly out.



BR-AJC end effector should be used at a pneumatic pressure of 0.5 to 0.7 MPa.

- Use of a value other than the specified value may cause the workpiece to fly out or damage the product.



Do not wear clothing or accessories such as gloves and necktie which are easy to be caught in.

- Otherwise, your body or clothing may be entangled.



Do not perform the work after drinking alcohol or taking medicine.

- Impaired judgment or operation mistake may cause serious hazards.

3. Specifications

3.1. BR-AJC End Effector

3.1.1. Basic Specifications

Table 9

Type		BR-AJC06E	BR-AJC08E	BR-AJC10E
Body ASSY type		BR-AJC-E	BR-AJC-E	BR-AJC-E
Wrench ASSY type		BRAJCWT10	BRAJCWT12	BRAJCWT12
Reaction lever ASSY type		BRAJCL06	BRAJCL08	BRAJCL10
Dimensions	Length	mm	265	265
	Height	mm	140	140
	Width	mm	139	139
Mass ※1	kg	5.5	5.5	5.5
Correct chuck type		BR06/BRT06	BR08/BRT08	BR10/BRT10
Correct BR-AJC Tnut type		BR-AJC06M	BR-AJC08M	BR-AJC10M
Correct soft jaw type		SJ06B1 SJ06A1T SJ06A1-066※2 SJ06A1T066※2	SJ08B1 SJ08A1 SJ08S1 SJ08A1-056 SJ08A1T056	SJ10B1 SJ10A1 SJ10A1-056
Max. soft jaw height	mm	56※2	56	56
Set torque	N·m	47	80	107
Tightening torque accuracy	%	±5		
Max. loosening torque	N·m	160		
Max. number of tightening count	times	16,777,215		
Wrench stroke	mm	13		
Gripper jaw stroke in dia.	mm	16		
Ambient temperature range ※3	°C	5~50		
Ambient humidity range ※3	%	30~95		
Noise level	dB	79		
Ingress Protection	Equivalent to IP53			
Lamp	Green: Lights up in sync with START signal Red: Lights up in sync with ERR signal Green lighting has priority when START signal = ON while ERR = ON			

※1 : Signal cables and pneumatic piping are not included.

※2 : Machining to a max. jaw height to 56mm or less.

※3 : No condensation or freezing.

3.1.2. Electrical specifications

Table 10

Type	BR-AJC06E / BR-AJC08E / BR-AJC10E		
Input signals	START	Pneumatic supply	OFF = Stop, ON = Rotation
		Load	Solenoid valve(DC24V/50mA or more)
	DIR	Switching direction of rotation	OFF = Right (Bolt Tightening) ON = Left (Bolt Loosening)
		Load	Solenoid valve(DC24V/50mA or more)
	LOW	Low speed reverse rotation instruction	OFF = Tightening/Loosening ON = Low speed reverse rotation
		Load	Photo coupler(DC24V/20mA or more)
Output signals	STOP	Auto stop	ON = stop
		Output	Open collector(DC24V/30mA or less)
	ERR	Error	ON = Error
		Output	Open Collector(DC24V/30mA or less)
Supply voltage	DC 24 V / 10 W or more		

3.1.2.1. Description of Input Signals

- START

This signal is directly connected to the integrated driving solenoid valve. Energizing the end effector supplies pneumatic pressure and the nutrunner starts.

- DIR

This signal is directly connected to the solenoid valve for changing the rotation direction. During energization, the rotation changes to left.

- LOW

This signal specifies low speed reverse rotation. During energization, the rotation changes to low speed reverse rotation.

Table 11 Signal, rotation direction, and mode

DIR signal	LOW signal	Rotation direction	Mode
OFF	OFF	Right	Tightening
OFF	ON	Left	Low speed
ON	OFF	Left	Loosening
ON	ON	Right	Low speed

3.1.2.2. Description of Output Signals

- STOP

The solenoid valve turns OFF when the set torque is reached or under the ERR conditions. It turns ON when the integrated motor is stopped (at N.O.)

When the solenoid valve turns OFF, the nutrunner rotates at a low speed to eliminate the remaining torque.

When the remaining torque is eliminated, STOP turns OFF (at N.O.)

- ERR

This signal turns ON under the following conditions (at N.O.)

- Insufficient torque

- During tightening, the set torque is not reached within the preset time of the insufficient torque timer.
- The default setting for the set torque is 10 seconds.
- During tightening, a torque of 1 N·m or more is detected and then rotation stops before the set torque is reached.

- Over torque

During tightening, the torque reaches set torque + 20 N·m.

- Loosening limit

The torque has reached the loosening limit torque of 160 N·m.

- Offset error

An internal error occurs.

3.1.3. Signal Cable Specifications

Table 12 Signal cable parts specifications

Name	Model	Manufacturer
Receptacle on nutrunner side	LF10WBRB-12S	HIROSE ELECTRIC
Plug on cable side	LF10WBP-12P	HIROSE ELECTRIC
Cable	SS300RSB-28-6P-10	MISUMI

Table 13 Signal cable Specifications

Signal name		Pin No.	Cable color (Sheath color/point color)
Start	START+	1	Black/None
	START-	2	Black/White
Rotation direction switching	DIR+	3	Red/None
	DIR-	4	Red/White
Low speed reverse rotation instruction	LOW+	5	Green/None
	COM	6	Green/White
Automatic stop output	STOP	7	Yellow/None
	COM	8	Yellow/White
Error output	ERR	9	Brown/None
	COM	10	Brown/White
Power supply	DCIN	11	Blue/None
	GND	12	Blue/White
Shielded earth	-	-	Green/Yellow

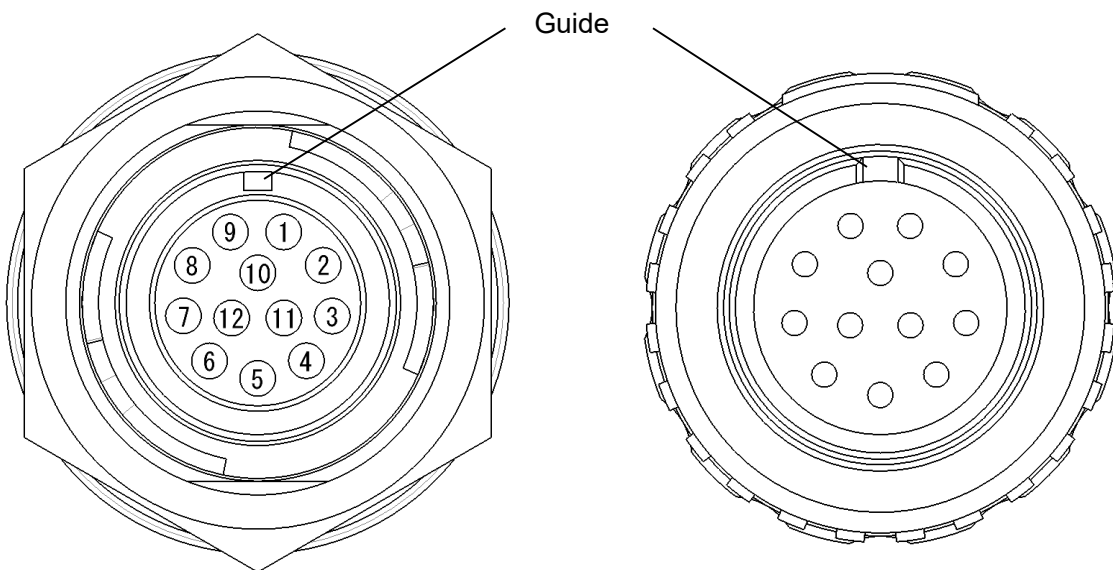
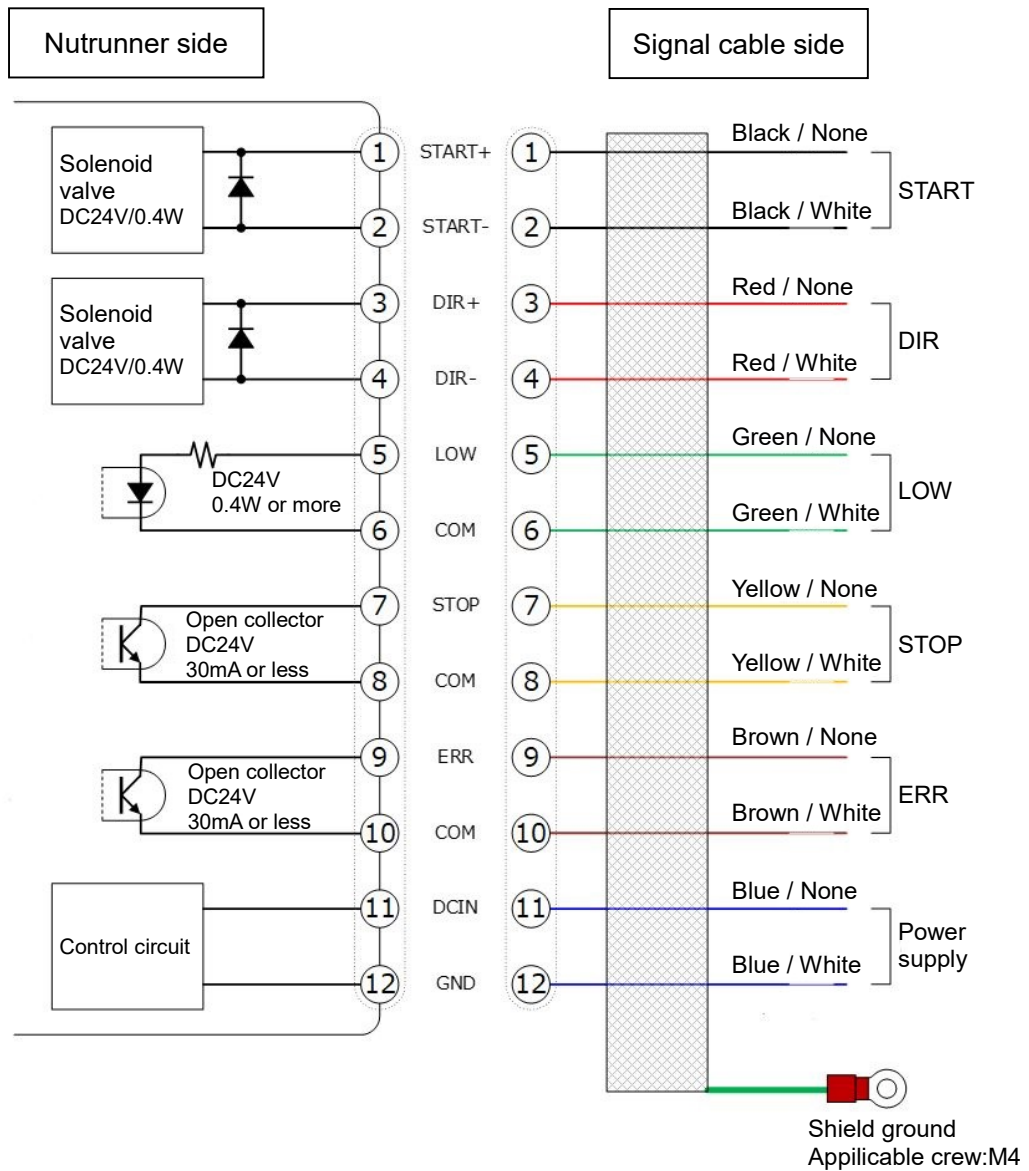


Figure 9 Signal cable specifications

3.1.4. Reed switch specifications

Table 14

Item	For bolt tightening /loosening PXS1	For bolt tightening /loosening PXS2	Confirm gripper opening PXS3	Confirm gripper closing PXS4
Type	D-M9BV		D-M9B	
Manufacturer	SMC			
Operating voltage	10~28 V			
Operating current	2.5~40 mA			
Lead wire length	500 mm			

3.1.5. Pneumatic specifications

Table 15

Item	Nutrunner	Gripper
Type	PTS-150EX-KAJC-3A	NTS208
Working air pressure	0.5~0.7 MPa	0.5~0.7 MPa
Air consumption	200 L/min(nor)	18.8 cm ³ (reciprocation)

3.2. BR-AJC Tnut

Table 16

Type		BR-AJC06M	BR-AJC08M	BR-AJC10M
Jaw mounting bolt	Head shape	Torx	Torx	Torx
	Drive size	T50	T55	T55
	Thread size	M10×25	M12×30	M12×30
O-ring		P12.5	P15	P15
Positioning nut adjustment range	mm	10.5	10.5	19.5
Tightening torque	N·m	47	80	107
Mass ※1	kg	0.12	0.19	0.23

※1: Per jaw. Soft jaws are not included.

3.3. BR-AJC Jaw stocker

Table 17

Type	BR-AJC06S	BR-AJC08S	BR-AJC10S
Correct BR-AJC Tnut	BR-AJC06M	BR-AJC08M	BR-AJC10M

3.4. Soft Jaw Machining Prohibition Area

The shaded area in Figure 10 is the machining prohibition area.

Leave the machining inhibition area without machining when forming soft jaws.

- The prohibition area will receive the reaction lever when the jaw mounting bolts are tightened using the BR-AJC end effector.

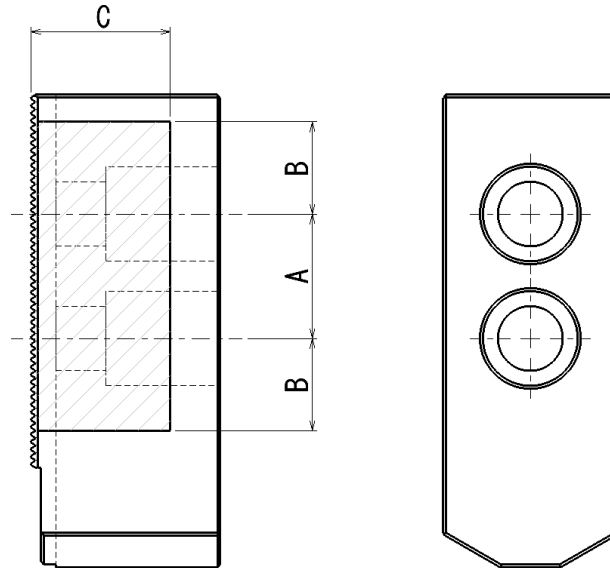


Figure 10 Machining prohibition area(shaded area)

Table 18 Dimension of soft jaw processing prohibition area

BR-AJC end effector type	BR-AJC06E	BR-AJC08E	BR-AJC10E
A	20	25	30
B	15	18.5	18.5
C	28	28	28

4. Assembly and Mounting

4.1. Assembling the BR-AJC End Effector

Mount the wrench assy and the reaction lever assy to the main body assy.

Refer to Figure 11, Figure 12, and Table 19.

- ① Insert the spring [2] and wrench [1] in the socket.
- ② Tighten the hex. socket head cap screw [3] to the washer [4], and then tighten to the screw hole of the wrench [1].
- ③ Mount the reaction lever [5] with the projection and depression aligned, and tighten the screw [6].
- ④ Expand and retract the wrench [1] to confirm that it satisfies the wrench stroke specified in 3.1.1. Basic Specifications Table 9.

Table 19 Tightening torque

No.	Parts name	Tightening torque
3	Hex. socket head cap screw	1.6 N·m
6	Screw	3.5 N·m

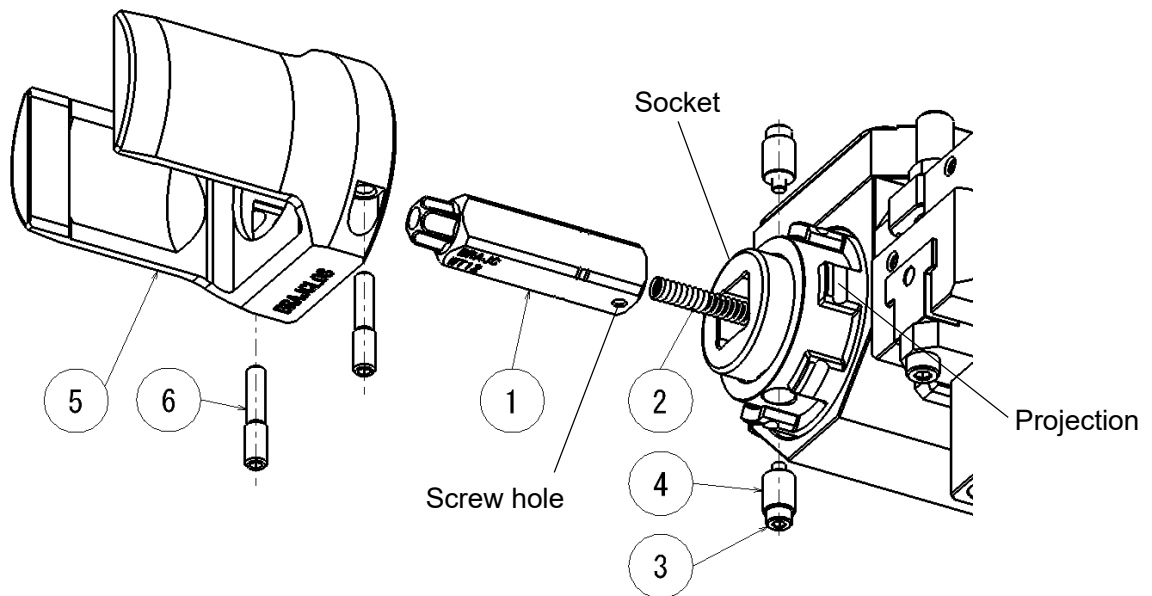


Figure 11

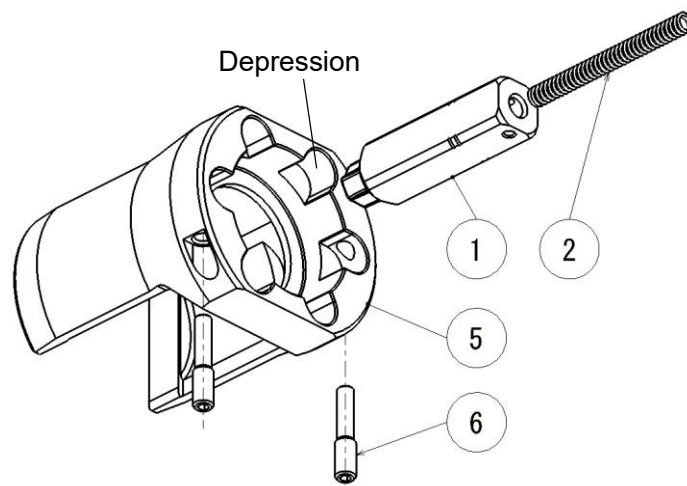


Figure 12

4.2. Mounting the BR-AJC End Effector

4.2.1. Assembling the BR-AJC End Effector

Two mounting methods are available. Select in accordance with the mounting target.

- When mounting from the bottom surface

Read the following procedure also referring to "1.8.1. BR-AJC End Effector".

- ① Before start of work, be sure to turn off the main power of the machine.
- ② Loosen the cross-recessed pan-head head machine screw [10] and remove the cover [9].
- ③ Loosen the hex. socket head cap screw [8] and remove the adapter plate [7].
- ④ Mount to the adapter using the hex. socket head cap screw [11] and the washer [12].
- ⑤ The adapter is to be prepared by the customer.
- ⑥ Assemble in the reverse order. For the tightening torque, refer to Table 20.

Table 20

No.	Parts name	Tightning torque
8	Hex. socket head cap screw	6.0 N·m
10	Cross-recessed head machine screw	1.1 N·m
11	Hex. socket head cap screw	3.0 N·m

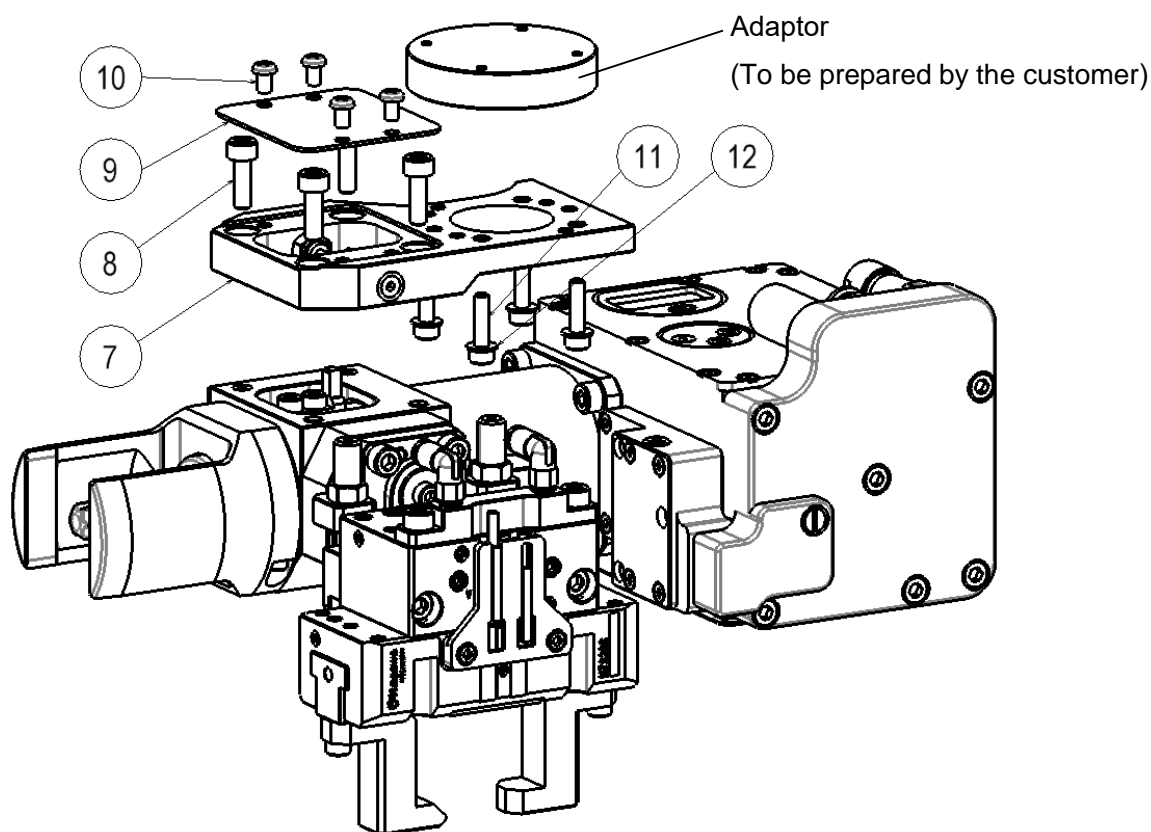


Figure 13 Adaptor mounting

- When mounting from the top surface
Use the screw holes on the adaptor plate for installation.
Adaptors and mounting bolts must be prepared by the customer.

Table 21

Mounting bolt	Tightening Torque
M4	3.0 N·m

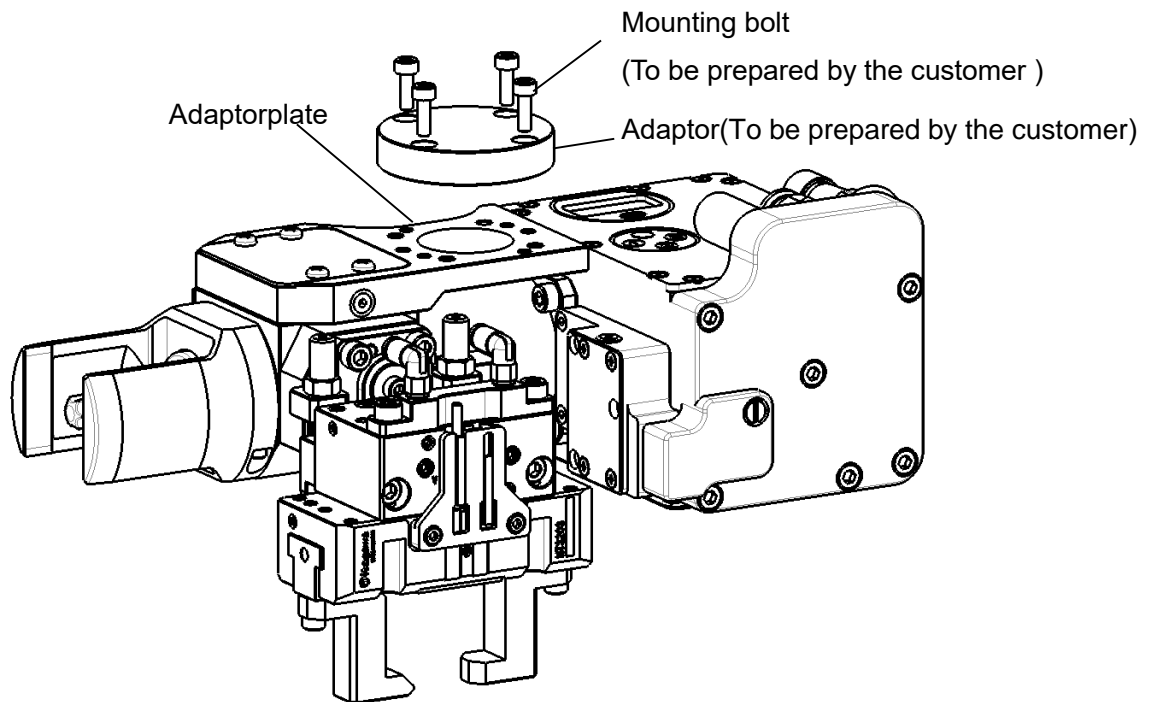


Figure 14 Adaptor mounting



Danger

Failure to follow the safety precautions below will result in death or serious injuries.



Be sure to tighten bolts to the specified torque.

Use a proper tool that can control torque such as a torque wrench.

- **If insufficient bolts are mounted or tightening torque is improper, the bolts may be damaged, causing the end effector and workpiece to fly out.**

4.2.2. Reed Switch Mounting Procedure

4.2.2.1. Mounting the Reed Switch for bolt tightening/loosening

Tighten and fix the setscrew provided on the reed switch into the groove in the switch bracket. For the position, see Figure 15.

For adjusting the mounting position, refer to "5.3.4. Adjusting the Reed Switch".

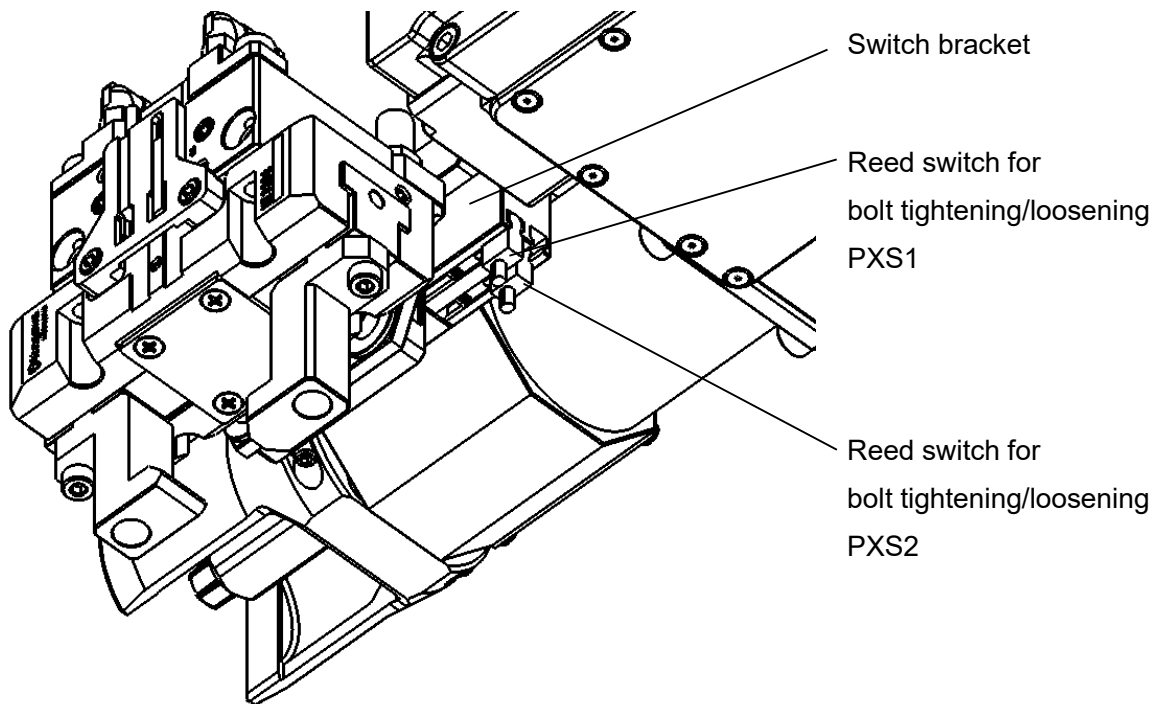


Figure 15 Reed switch mounting location

4.2.2.2. Mounting the Gripper Open/Close Confirmation Reed Switch

Mount the supplied reed switch using the reed switch bracket.

For the tightening torque, refer to Table 22.

Table 22

No.	Mounting bolt	Tightening Torque
15	Hex. socket head cap screw	1.3 N·m

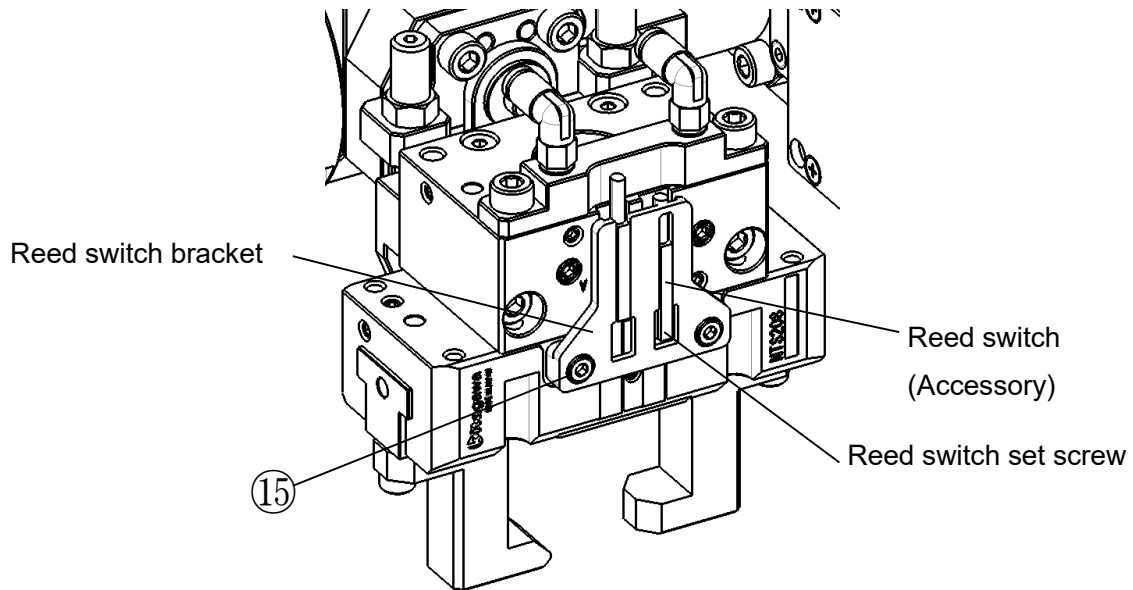


Figure 16 Mounting reed switch

- Mounting procedure for the close end side

- ① Close the gripper.
- ② Mount the reed switch using the reed switch bracket.
- ③ Move up and down the reed switch slowly.
- ④ Tighten and fix the setscrew provided on the reed switch at the position where the reed switch detected.
- ⑤ Repeat the opening/closing operation of the master jaws to confirm that the reed switch can detect.

- Mounting procedure for the open end side

- ① Open the gripper.
- ② Mount the reed switch using the reed switch bracket.
- ③ Move up and down the reed switch slowly.
- ④ Tighten and fix the setscrew provided on the reed switch at the position where the reed switch detected.
- ⑤ Repeat the opening/closing operation of the master jaws to confirm that the reed switch can detect.

4.2.3. 3.2.3. Pneumatic Piping Installation Procedure

Install a pneumatic piping tube to the pneumatic port for driving the nutrunner and opening/closing the gripper.

The pneumatic piping is to be prepared by the customer.

Table 23 Port specifications

	Applicable Tube Outer Diameter	Pipe Fitting Thread Size
Nutrunner pneumatic supply port	8 mm	-
Gripper opening port	4 mm	M5
Gripper closing port	4 mm	M5

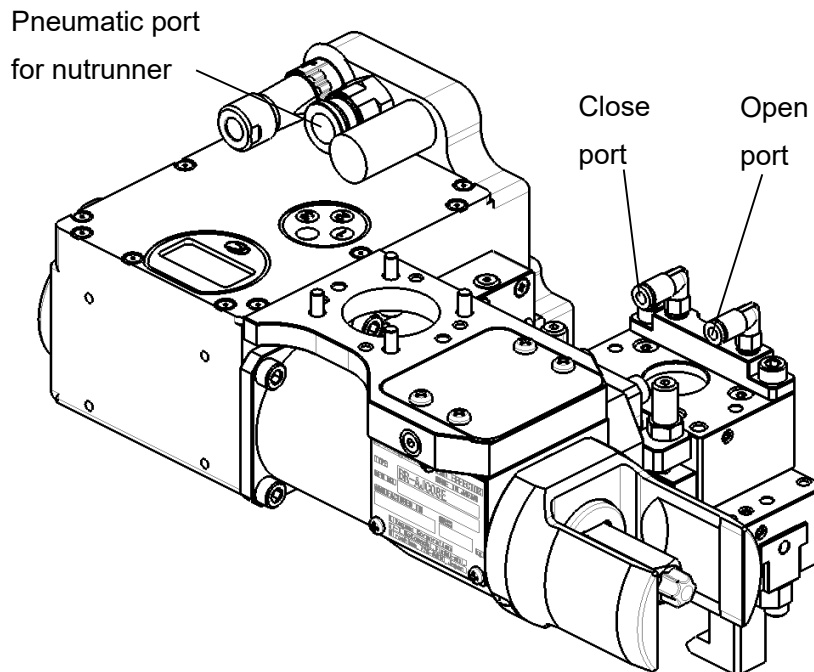


Figure 17

- Installing piping
 - ① Insert the tube gradually, and securely push it in to the tube end.
 - ② After inserting the tube to the end, pull it lightly to check that it is not pulled out.
 - ③ Check that the tube is not bent or crushed when installing it.

- Removing piping
- ① Push the release bushing of the piping joint evenly into the direction of arrow with your fingers.
- ② Pull out the tube while holding the release bushing to prevent it from being pushed back.

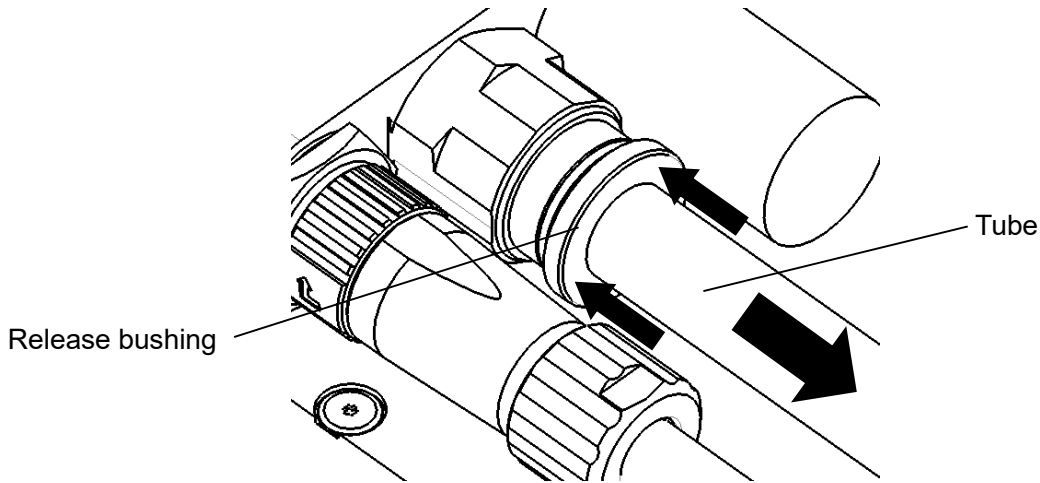


Figure 18 Remove piping



Danger

Failure to follow the safety precautions below will result in death or serious injuries.



Be sure to turn off the main power supply,

Shut off all air pressure in the work area and relieve any remaining air pressure inside the end effector,

Post a sign or notice, or provide a fence, and so on to notify people around the machine that work is in progress.

- During work, the robot or end effector could move abruptly and collide with body.
- Unexpected machine operation by a third party may result in a collision with body.



Warning

Failure to follow the safety precautions below could result in death or serious injuries.

Use compressed air as the fluid.

Do not use compressed air containing chemicals, synthetic oils containing organic solvents, or salt corrosive gases.

Use clean air that has passed through an air filter (filtration of 5 µm or less).

Keep the fluid temperature and ambient temperature within the range of 5 to 60°C.

Select an after cooler, air dryer, mist separator, etc., according to ISO 8573 1 Class 4, and take measures against drainage.

- Jaws are not installed properly or grippers are not gripped properly, causing workpieces to fly out.

4.2.4. Signal Cable Installation Procedure

Connect the supplied signal cable to the nutrunner.

- ① Confirm the projection/depression position of each connector.

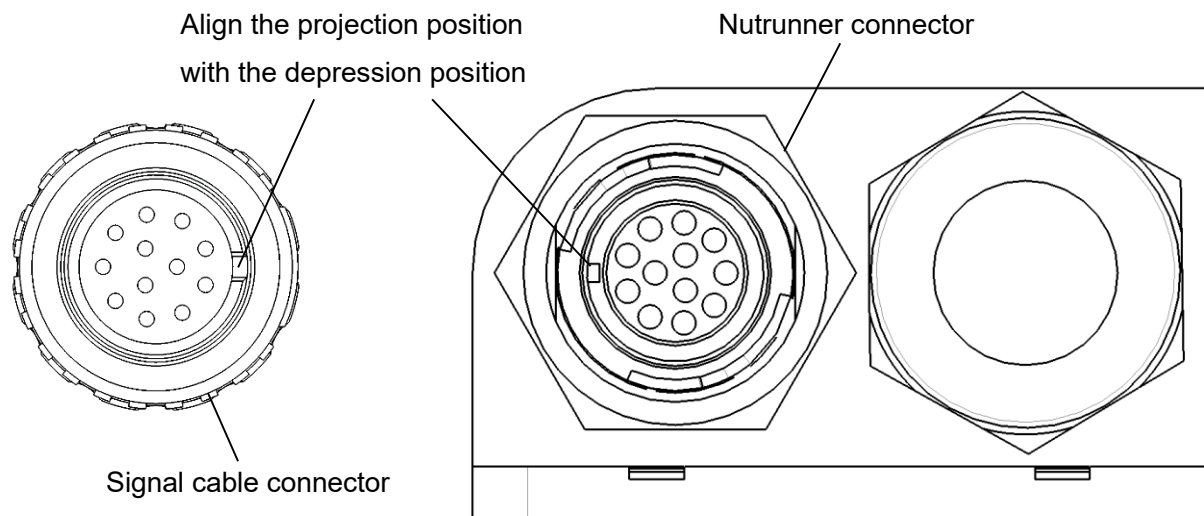


Figure 19 Connector projection/depression position

- ② After inserting the connector, rotate the sleeve until locked.

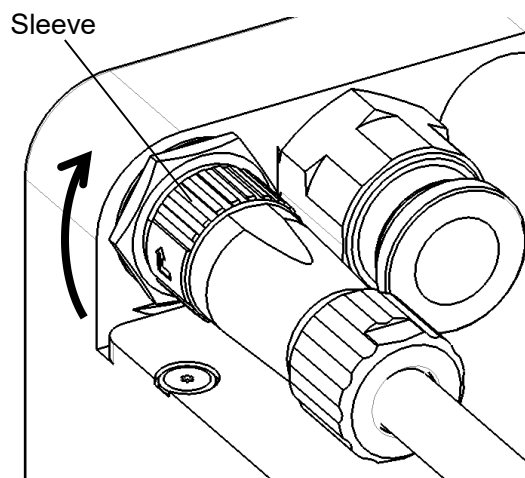


Figure 20 Locking the connector

Danger Failure to follow the safety precautions below will result in death or serious injuries.



**Be sure to turn off the main power supply,
Shut off all air pressure in the work area and relieve any remaining air pressure inside the end effector,**



Post a sign or notice, or provide a fence, and so on to notify people around the machine that work is in progress.

- During work, the robot or end effector could move abruptly and collide with body.
- Unexpected machine operation by a third party may result in a collision with body.

Notice

Indicates instructions which, if you do not heed given instructions, could result in damage to the product or shortened service life, or damage to peripheral equipment.

Be sure to use shielded cables when connecting the BR-AJC end effector and the host control unit.



Install the cables away from high voltage sources and high current sources.

Ground the BR-AJC end effector.

- Malfunction due to noise will result in the failure of jaw change, causing suspension of facilities or breakage of parts.

4.3. Mounting the BR-AJC T-nut

Read the following procedure also referring to "1.8.2. BR-AJC T-nut" and the BR-AJC**M instruction manual.

- ① Attach the O-ring [2] to the jaw mounting bolt [1].
- ② Mount soft jaws to BR-AJC**M with ①.
- ③ Mount them to the chuck and form the soft jaws.

4.4. Mounting the BR-AJC Jaw Stocker

Mount the jaw stocker to the base using any of the bolts in Table 24. For the detailed dimensions, see the external view.

The base is to be prepared by the customer.

Table 24 Mounting bolt specifications

Parts name	BR-AJC06S	BR-AJC08S	BR-AJC10S	Manufacturer
Low head hex. socket head cap screw	CBS6	CBS8	CBS8	MISUMI
Hex. socket head cap screw	M8	M10	M10	-

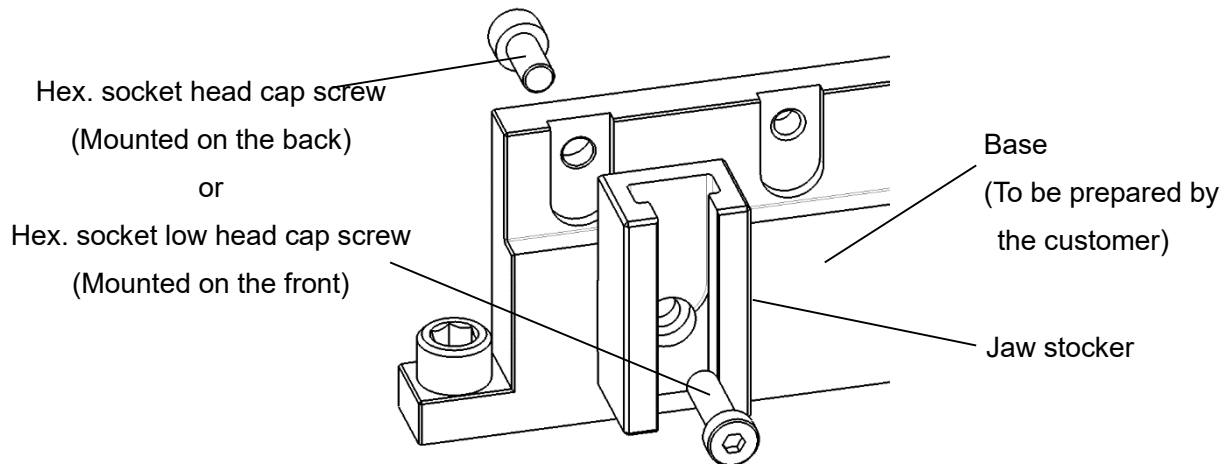


Figure 21 Mounting the BR-AJC Jaw stocker

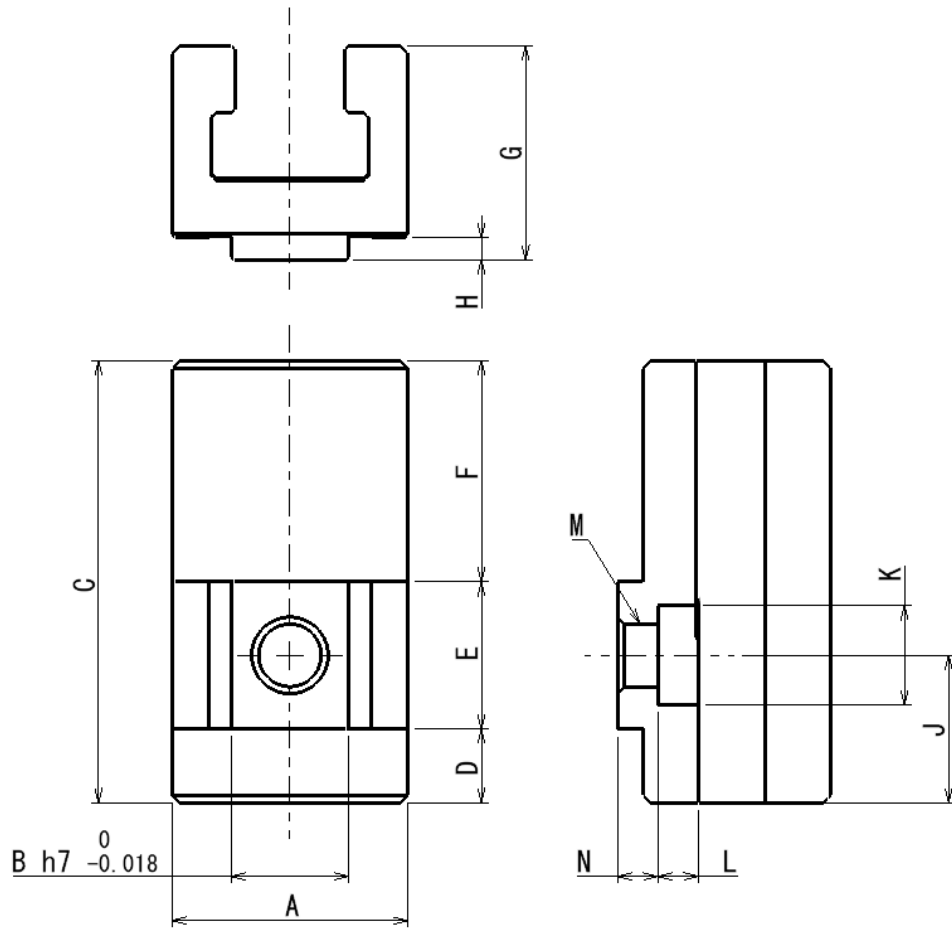


Figure 22 Dimensions of BR-AJC Jaw stocker

Table 25 BR-AJC Jaw stocker dimensions

Type	A	B	C	D	E	F	G	H	J	K	L	M	N
BR-AJC06S	29	16	47.5	10	20	17.5	27	3	20	10.5	4.5	M8	6.5
BR-AJC08S	32	16	60	10	20	30	29	3	20	13.5	5.5	M10	5.5
BR-AJC10S	34	16	72.5	10	20	42.5	30	3	20	13.5	5.5	M10	5.5

5. Control

5.1. Outline of Jaw Change Operation

For jaw change, the lathe, robot, and BR-AJC end effector must be controlled.

See Table 26 and create a program for each operation.

Table 26 Flow of jaw change operation

	Operation	Contents	Reference
①	Indexing the chuck	The chuck is indexed on the lathe so that the jaw mounting position comes directly above.	To be prepared by the customer.
②	Taking out jaws	Jaws to be mounted are taken out of the jaw stocker.	5.3.2. Teaching the Jaw Insertion/Removal Position
③	Inserting the jaws	The jaws are inserted into the chuck.	5.3.2. Teaching the Jaw Insertion/Removal Position
④	Jaw Mounting Bolt Tightening	The jaw mounting bolts are tightened.	5.3.3. Teaching the Bolt Tightening/Loosening Position 5.2.2. Bolt Tightening Operation
⑤	Repeat ① through ④ for the number of jaws to be mounted.		
⑥	Machining the workpiece	A workpiece is mounted on the chuck, machined, and removed.	To be prepared by the customer.
⑦	Washing the chuck	The chuck is washed using coolant or air blow.	To be prepared by the customer.
⑧	Indexing the chuck	The chuck is indexed on the lathe so that the jaw removing position comes directly above.	To be prepared by the customer.
⑨	Jaw Mounting Bolt Loosening	The jaw mounting bolts are loosened.	5.3.3. Teaching the Bolt Tightening/Loosening Position 5.2.3. Bolt Loosening Operation
⑩	Removing the jaws	The jaws are removed from the chuck.	5.3.2. Teaching the Jaw Insertion/Removal Position
⑪	Repeat ⑧ through ⑩ for the number of jaws to be removed.		
⑫	Washing the jaws (Outside the machine)	The jaw washing unit removes chips on the jaws.	To be prepared by the customer.
⑬	Storing the jaws	The washed jaws are stored in the stocker.	5.3.2. Teaching the Jaw Insertion/Removal Position
⑭	Washing the chuck (Inside the machine)	The chuck is washed using coolant or air blow.	To be prepared by the customer.

5.2. BR-AJC End Effector Control Program

Tightening and loosening the bolts requires operation programs using the nutrunner input/output signals and reed switch signals.

Use a robot controller, PLC, etc. as the host control unit.

5.2.1. Operation Outline

Tightening/loosening the jaw mounting bolts is performed in each mode shown in Table 27.

Table 27 Operation mode

Mode	Rotation direction	DIR signal	LOW signal
A	Tightening	Right	OFF
B	Loosening	Left	OFF
C	Inserting the wrench at tightening	Right	ON
D	Inserting the wrench at loosening	Left	ON

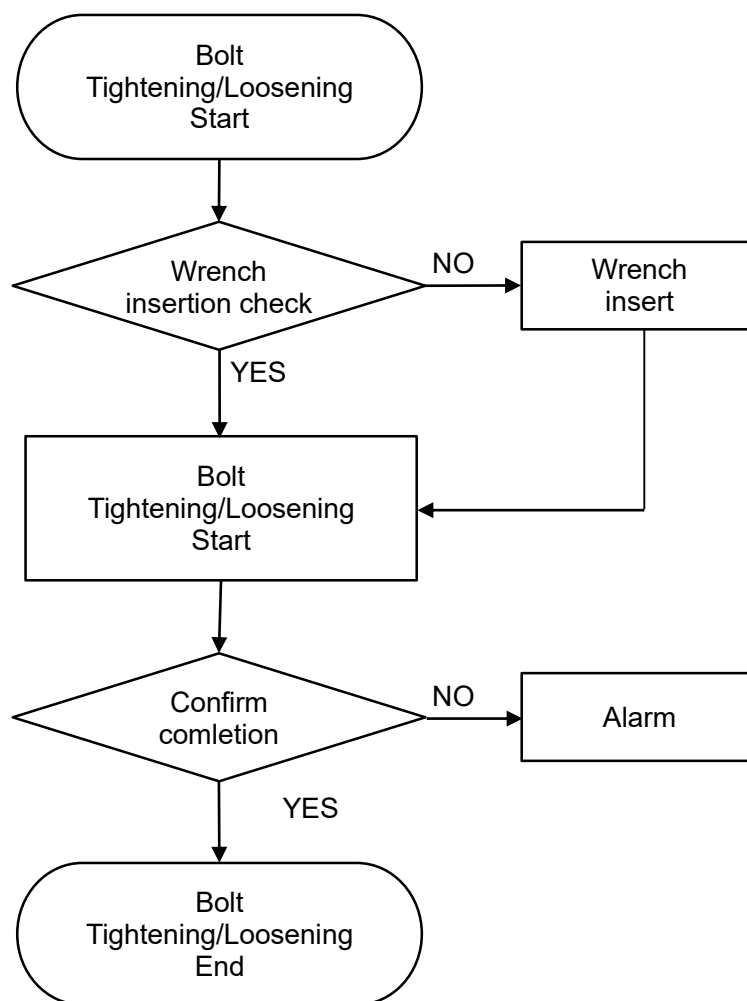


Figure 23 Flow chart of operation overview

5.2.2. Bolt Tightening Operation

- ① Move the robot to the "bolt tightening/loosening position" *1 and check the reed switch PXS1 signal.
When the signal is OFF : The wrench is inserted in the bolt hole. Go to ⑥.
When the signal is ON : The wrench not inserted in the bolt hole. Go to ②.
- ② Turn ON the START signal for 3 seconds in mode C (refer to Table 27 Operation mode in 5.2.1. Operation Outline).
- ③ During operation of ②, always check the PXS1 signal.
When the signal is OFF : Turn off the START signal and go to ⑥.
If still ON after 3 seconds : Turn off the START signal and go to ④.
- ④ ② Turn ON the START signal for 3 seconds in mode D (refer to Table 27 Operation mode in 5.2.1. Operation Outline).
- ⑤ During operation of ④, always check the PXS1 signal.
When the signal is OFF : Turn off the START signal and go to ⑥.
If still ON after 3 seconds : Some parts may be damaged. Stop operation of the system.
- ⑥ Activate mode A. (Refer to Table 27 Operation mode in 5.2.1. Operation Outline.)
- ⑦ Turn ON the START signal to start the tightening operation.
- ⑧ When the set torque is reached normally, the operation stops automatically and the STOP signal turns ON. Usually it takes about a few seconds. *2
- ⑨ The reaction lever rotates automatically in the reverse direction at a low speed. When the remaining torque caused by the reaction lever biting the soft jaw reduces, the STOP signal turns OFF.
- ⑩ The START signal turns OFF about 0 to 0.3 seconds after the STOP signal turns OFF.
Adjust time so that the reaction lever does not bite the soft jaw. *3

*1 For the bolt tightening/loosening position, refer to "5.3.2. Teaching the Bolt Tightening/Loosening Position".

*2 If the ERR signal turns ON when the START signal is ON, turn OFF the START signal to stop the operation. Bolt tightening may have failed. Parts may be broken if the operation continues.

*3 The appropriate time may vary depending on the pneumatic condition, communication speed of the control unit, etc.

Increase the time when the reaction lever still bites the soft jaw, and decrease the time when the reaction lever rotates excessively, biting the opposite side. We recommend that the adjustment be made in 0.1 second increments.

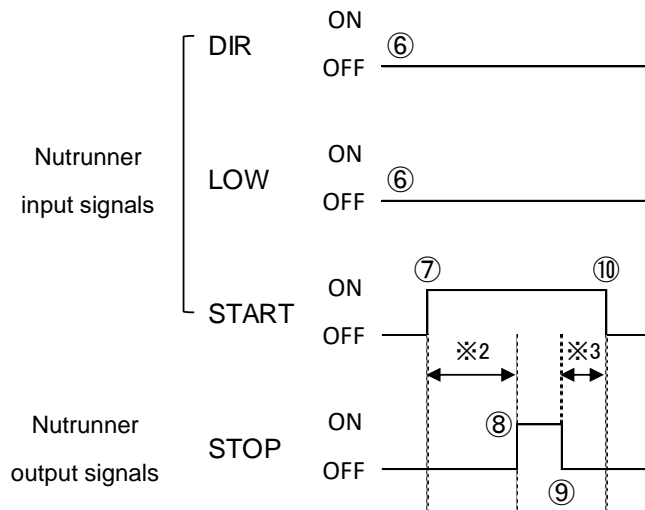


Figure 24 Bolt tightening timing chart



Danger

Failure to follow the safety precautions below will result in death or serious injuries.



When the nutrunner ERR signal is output during tightening of the jaw mounting bolts, do not perform gripping or machining of a workpiece using the chuck subsequently.

- If the jaw mounting bolts are not tightened properly, they may be broken, causing the workpiece to fly out.

5.2.3. Bolt Loosening Operation

- ① Move the robot to the "bolt tightening/loosening position" *1 and check the reed switch PXS1 and PXS2 signals.

When both signals is OFF : The wrench is inserted in the bolt hole. Go to ⑥.

When both of either signals are ON : The wrench not inserted in the bolt hole. Go to ②.

- ② Turn ON the START signal for 3 seconds in mode D (refer to Table 27 Operation mode in 5.2.1. Operation Outline).

- ③ During operation of ②, always check PXS1 and PXS2 signals.

When both signals are OFF : Turn off the START signal and go to ⑥.

If both or either are still ON after 3 seconds : Turn off the START signal and go to ④.

- ④ Turn ON the START signal for 3 seconds in mode C (refer to Table 27 Operation mode in 5.2.1. Operation Outline).

- ⑤ During operation of ④, always check PXS1 and PXS2 signals.

When both signals are OFF : Turn off the START signal and go to ⑥.

If both or either are still ON after 3 seconds : Some parts may be damaged. Stop operation of the system.

- ⑥ Activate mode B. (Refer to Table 27 Operation mode in 5.2.1. Operation Outline.)

- ⑦ Turn ON the START signal to start the loosening operation.

- ⑧ When the bolt is loosened to the detection position, the PXS2 signal turns ON. Usually it takes about three seconds. ※2
 - ⑨ After confirming that the PXS2 signal is ON, immediately turn OFF the START signal.
- *1 For the bolt tightening/loosening position, refer to "5.3.2. Teaching the Bolt Tightening/Loosening Position".
- *2 In the following cases, turn OFF the START signal to stop the operation. Bolt loosening may have failed. Parts may be broken if the operation continues.
- When the ERR signal turns ON while the START signal is ON
 - When the PXS2 signal does not turn ON even when five to ten seconds have elapsed after turning ON the START signal

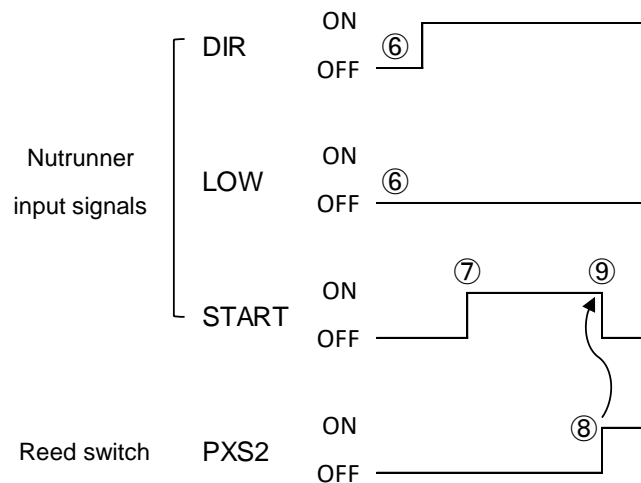


Figure 25 Bolt loosening timing chart

5.3. Robot Teaching

This section describes the method of robot teaching that is required for jaw change operation. For operation of the robot, refer to the instruction manual prepared by your robot manufacturer.

5.3.1. Creating the User Coordinates

For tightening/loosening the bolts correctly, and inserting/removing jaws to/from the chuck smoothly, we recommend creating user coordinates for the robot with reference to a jaw in the chuck.

- ① Mount a jaw to the chuck and index it to the jaw change position.
- ② Create user coordinates using the reference surface of the jaw shown in Figure 26.
 - x, y, and z are optional signals for the sake of convenience.
 - The x direction can be used for tightening/loosening the bolts. (5.3.2. Teaching the Bolt Tightening/Loosening Position)
 - The y direction can be used for inserting/removing jaws. (5.3.3. Teaching the Jaw Insertion/Removal Position)

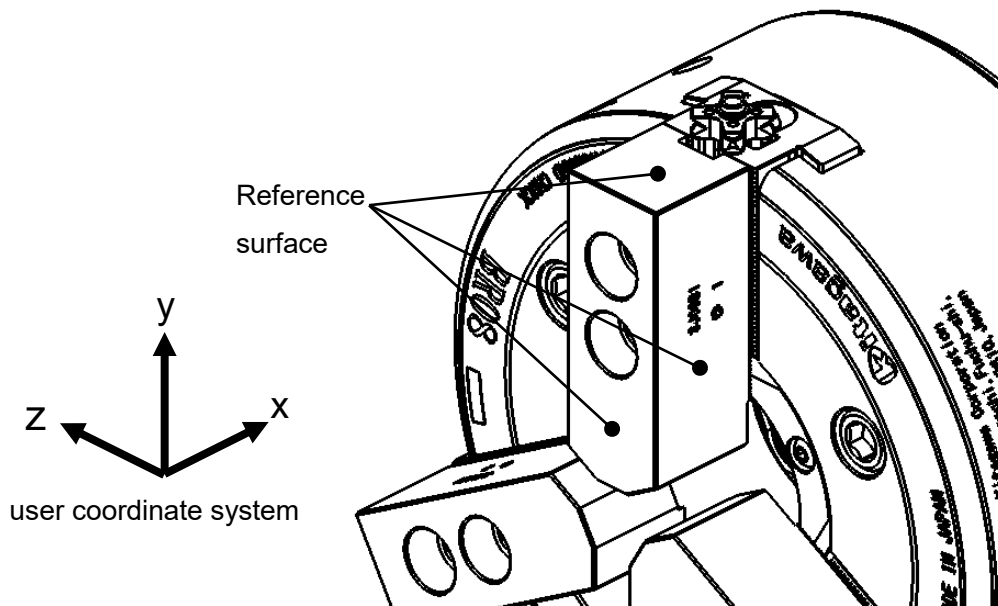


Figure 26

Notice

Indicates instructions which, if you do not heed given instructions, could result in damage to the product or shortened service life, or damage to peripheral equipment.



When changing jaws, index the chuck so that the jaw to be changed is positioned directly above.

- Otherwise, jaw change may fail, resulting in breakage of parts and suspension of facilities.

5.3.2. Teaching the bolt Tightening/Loosening Position

- ① Mount a jaw to the chuck and index it to the jaw change position.
- ② Adjust the posture of the BR-AJC end effector so that the rotation axis of the jaw mounting bolt and that of the BR-AJC end effector are coaxial. (Figure 27)
 - We recommend removing the reaction lever for good visibility. (Refer to up to ② in 6.3.1. Wrench Replacement Procedure.)
 - The adjustment can be made easily by creating user coordinates with reference to the jaw (refer to 5.3.1. Creating User Coordinates) and aligning the posture of the BR-AJC end effector with the user coordinates using the reference surface (Figure 28).

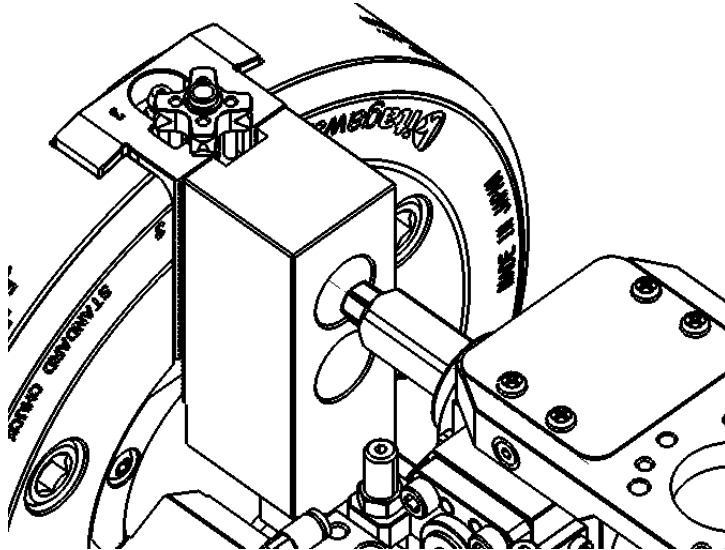


Figure 27

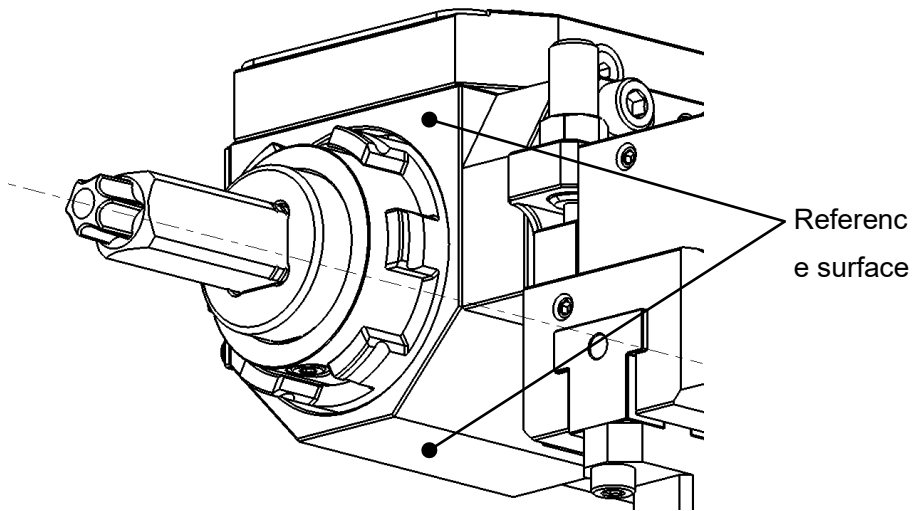


Figure 28

- ③ Insert the wrench in the mounting bolt hole (Figure 29).
 - It can be inserted easily by rotating the nutrunner at a low speed.

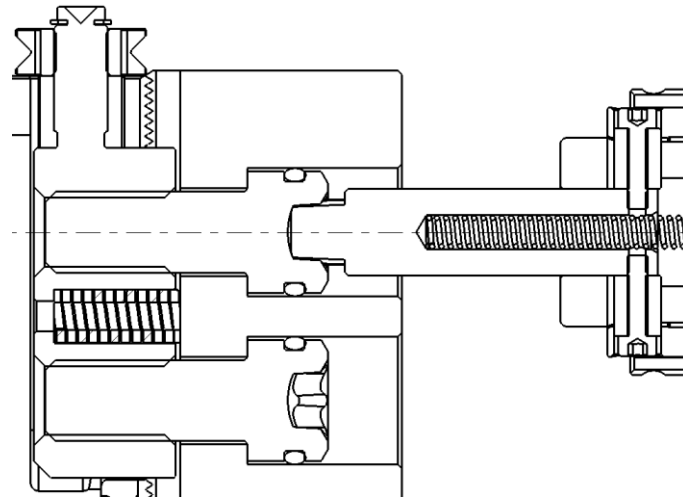


Figure 29

- ④ Move the BR-AJC end effector to the position where the notch closer to the socket, the one of the two notches on the socket (Figure 30) , is aligned with the socket end face (Figure 31).
- ⑤ Now teaching of the bolt tightening/loosening position is completed. Store the current position using functions such as the position register of the robot controller.
 - For the bolt tightening/loosening position of the other jaw mounting bolt, perform teaching by offsetting the robot in the X-axis direction of Figure 26 (refer to 5.3.1. Creating User Coordinates) by the distance of the jaw mounting bolt, or using steps ② through ⑤.

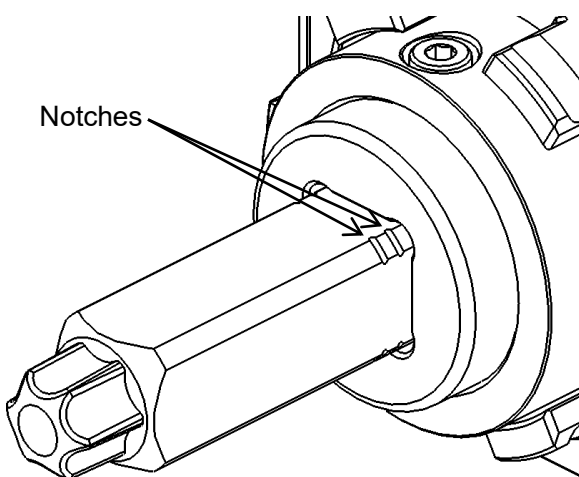


Figure 30

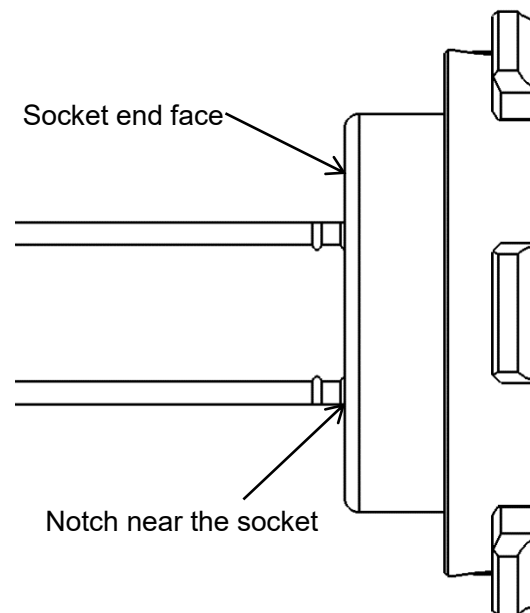


Figure 31

5.3.3. Teaching the Jaw Inserting/Removal Position

- ① Mount a jaw to the chuck and index it to the jaw change position.
- ② Move the BR-AJC end effector to the positioning nut holding position (Figure 32).
 - The adjustment can be made easily by rotating it 90° from the bolt tightening/loosening position. (Figure 33)
- ③ Open and close the gripper, and move the BR-AJC end effector to the position where the gripper does not deflect.
 - As the jaw on the gripper is unsymmetrical, perform positioning vertically and horizontally.
- ④ Loosen the jaw mounting bolt about one and a half to two turns.
- ⑤ Close the gripper and confirm that the jaw can be inserted/removed smoothly.
 - It can be inserted/removed smoothly by moving it straight up and down using the user coordinates (refer to 5.3.1. Creating User Coordinates).
- ⑥ If you feel resistance, make fine adjustment to the position of the BR-AJC end effector.

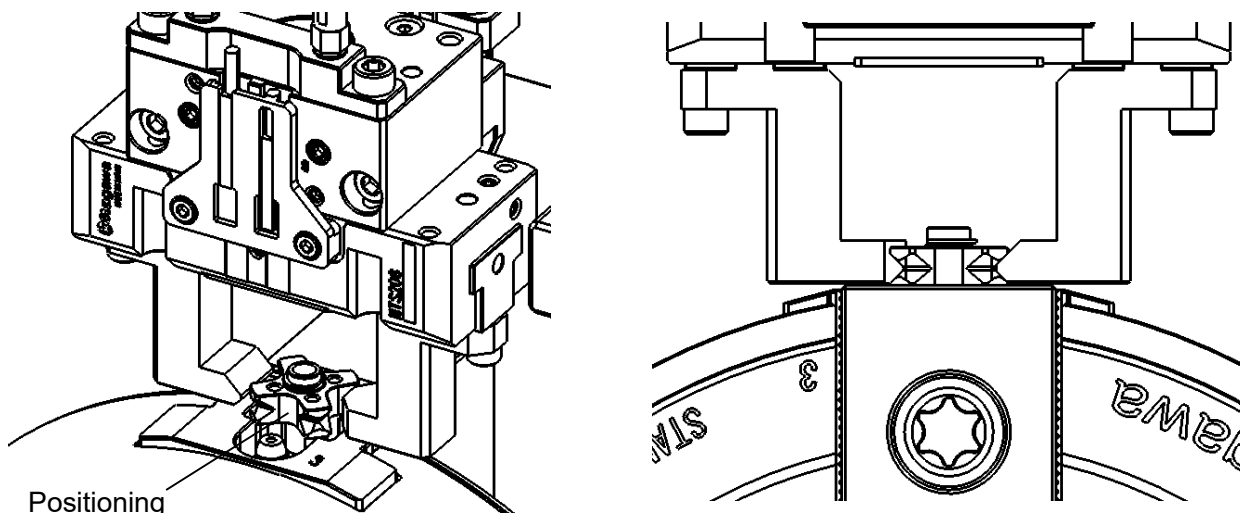


Figure 32 Holding Position

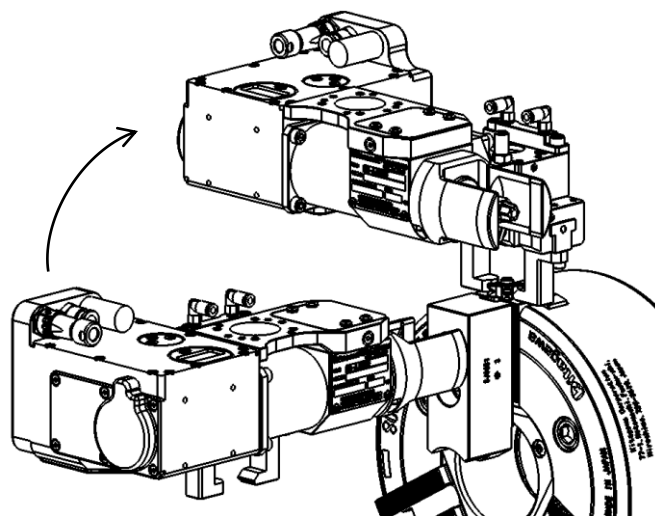


Figure 3330

5.3.4. Adjusting the Reed Switch

The reed switch responds when detecting the magnetic force of the magnet that moves in conjunction with the wrench stroke.

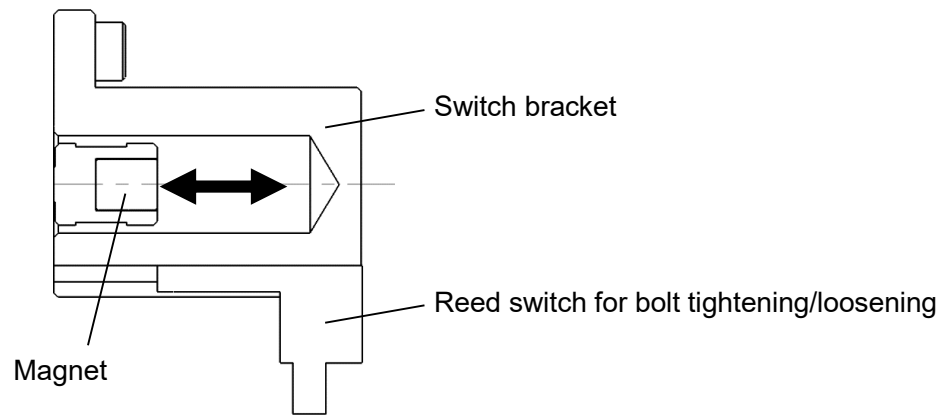


Figure 34 Reed Switch Detection Mechanism

Reed Switch Adjusting Procedure

- ① Mount a jaw to the chuck and index it to the jaw change position.
- ② Shift the phase of the wrench to prevent it from entering the bolt hole.
 - It can be shifted easily by rotating the nutrunner at a low speed.
- ③ Move the BR-AJC end effector to the bolt tightening/loosening position (refer to 5.3.2. Teaching the Bolt Tightening/Loosening Position).
- ④ Position it so that the reed switch PXS2 turns ON with the wrench being retracted and not inserted in the bolt hole. The position must be as close to OFF as possible.
- ⑤ Mount the reed switch PXS1 in the position about 2 mm behind PXS2. (Figure 35 Reed switch mounting position)
- ⑥ Insert the wrench in the jaw mounting bolt hole.
- ⑦ Drive the nutrunner to loosen the bolt to the position where PXS2 turns ON.
- ⑧ Confirm that the serrations are separated from each other and the jaw can be removed.
 - Approximate amount of loosening of the jaw mounting bolt: 1.5 to 2 turns
 - When the bolt loosening amount is excessive or insufficient, adjust the PXS2 position.
- ⑨ Confirm the bolt tightening operation and bolt loosening operation created in "5.2. BR-AJC End Effector Control Program". Also, adjust the reed switch position as necessary.
 - For the response of the reed switch for each state, refer to Table 28.

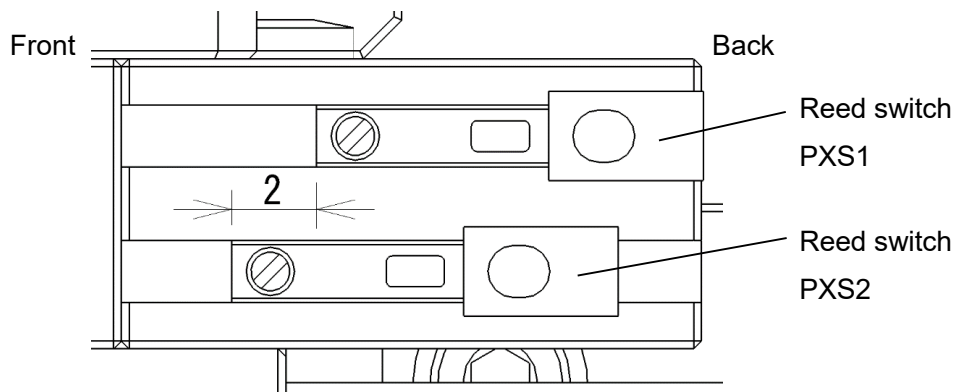


Figure 35 Reed switch mounting position

Table 28 Reed switch response according to wrench condition and bolt fastening condition

	Wrench condition	Bolt is Tightened	Bolt is loosened
Reed switch PXS1	Insertion	-	OFF
	Non-insertion	ON	ON
Reed switch PXS2	Insertion	OFF	ON
	Non-insertion	-	-

6. Maintenance and Inspection

6.1. Periodic Inspection

Table 29

Interval	Contents
Daily	<ul style="list-style-type: none"> ● Lubricate the nutrunner. ● Check the jaw mounting bolts and the wrench for damage. ● Open and close the gripper of the BR-AJC end effector to confirm that it satisfies the stroke in the specification table and swings. ● Confirm that the reaction lever of the BR-AJC end effector swings. ● Clean the BR-AJC end effector using an air gun, etc.
Every 3 months	<ul style="list-style-type: none"> ● Check the bolts of each part for looseness.
Every 6 months	<ul style="list-style-type: none"> ● Disassemble and clean the BR-AJC T-nut and check the thread of the jaw mounting bolts for damage.

6.1.1. Lubrication

- Supply the lubricant shown in Table 30 once a day.
- Remove the screw in the lubrication port when supplying the lubricant.

Table 30 Specified lubricant

Lubricant	Viscosity grade	Lubrication amount
Machine oil	ISO VG10	1 or 2 drops

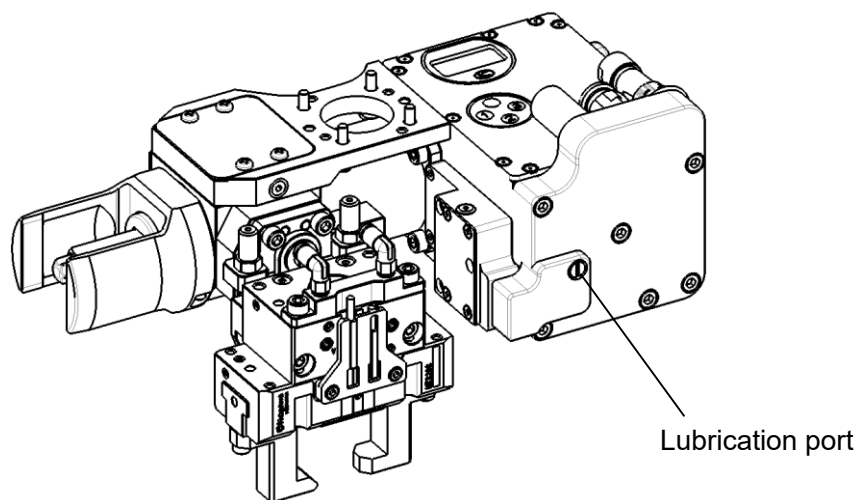


Figure 36 Lubrication port location

6.1.2. Inspecting the Jaw Mounting Bolt

Visually check the jaw mounting bolts once a day and replace them if damaged.



Warning

Failure to follow the safety precautions below could result in death or serious injuries.



Do not use damaged bolts.

- Failure to do so may result in further breakage of parts and suspension of facilities.
- If the jaws are not properly installed due to damaged parts, the workpiece may fly out.

6.1.3. Inspecting the Wrench

Visually check the wrench once a day and replace them if damaged.

Also confirm that the wrench satisfies the stroke specified in the specifications.



Warning

Failure to follow the safety precautions below could result in death or serious injuries.



Do not use the damaged wrench.

- Failure to do so may result in further breakage of parts and suspension of facilities.
- If the jaws are not properly installed due to damaged parts, the workpiece may fly out.

6.1.4. Inspecting the Gripper

Open and close the gripper once a day to confirm that it satisfies the stroke specified in Table 9 in 3.1.1. Basic Specifications.

Also, confirm that it swings about $\pm 1^\circ$.(Figure 37)

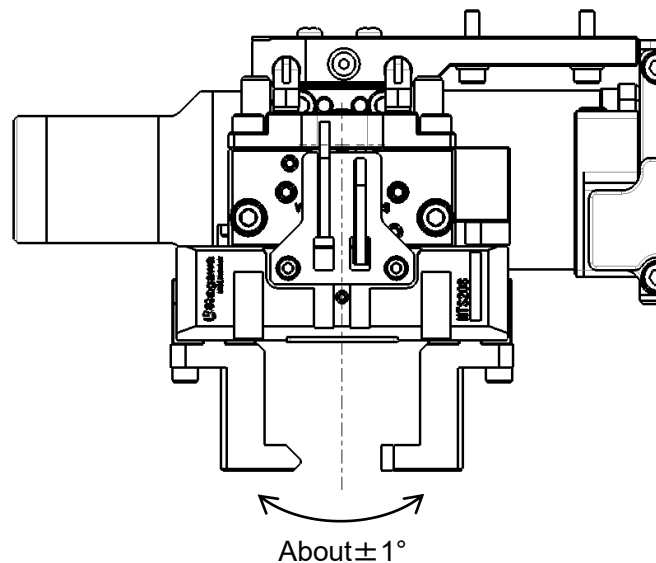


Figure 37 Gripper swing

6.1.5. Inspecting the Reaction lever

Confirm that the lever swings about ± 7 to 8° .

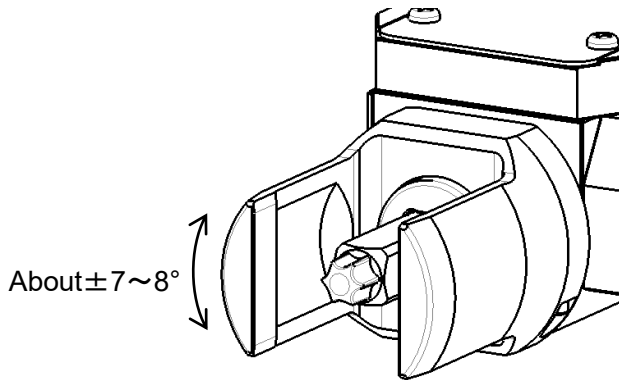


Figure 38 Reaction lever swing

6.2. Periodic Replacement

The jaw mounting bolts and the wrench are consumables. Never use them for more than the specified number of years or times.

- Take the following measures against them being used exceeding the use limit.
- Determine the rule of replacement timing based on the use frequency of the BR-AJC T-nut.
- Record the number of times of use on the host control unit that controls the BR-AJC end effector, and when the number of times for replacement is reached, notify of the manager or workers.

! Danger Failure to follow the safety precautions below will result in death or serious injuries.

! Do not use the jaw mounting bolts for more than the specified number of years or times.

- Otherwise, they may be broken, causing the workpiece to fly out.

6.2.1. Jaw Mounting Bolt

Be sure to replace the jaw mounting bolts when they reach the "number of years of use", "number of times of tightening", or "number of times of holding" shown in Table 31, whichever comes first.

The jaw mounting bolts will be broken by fatigue due to two factors: the tightening torque, and the load that the jaw mounting bolts receive when the chuck holds a workpiece. Therefore, the limited number of times of use is determined respectively.

Table 31 Use limit of jaw mounting bolts

Chuck size	Years of use (years)	Bolt tightening (times)	Chuck gripping (times)
6 inch	1	1,000	100,000
8 inch	1	1,000	100,000
10 inch	0.3	300	10,000

- Example of determining replacement rule

Assume that the use conditions are as follows.

- Chuck size : 8 inch
- Number of times the jaws are used per day : 1
- Number of times the jaws hold per day : 300
- Number of days in operation per year : 365

- Number of years of use according to the chuck size: 1 year
- Calculate the number of years required for reaching the use limit based on the number of times of tightening.

$$\frac{\text{Use limit according to the number of times of tightening}}{\frac{\text{Number of times the jaws are used (/day)} \times \text{Number of days in operation (day/year)}}{1 \times 365}} = \frac{1000}{1 \times 365} \cong 2.7 \text{ years}$$

- Calculate the number of years required for reaching the use limit based on the number of times the chuck gripped.

$$\frac{\text{Use limit according to the number of times the chuck holds}}{\frac{\text{Number of times the jaws hold (/day)} \times \text{Number of days in operation (day/year)}}{300 \times 365}} = \frac{100000}{300 \times 365} \cong 0.9 \text{ years}$$

"0.9 years" calculated based on the number of times the chuck holds is reached first. The replacement rule is determined to be replacing in 0.5 year for safety reasons.

6.2.2. Wrench

Replace the wrench when the number of times of tightening reaches 10,000 times.

Table 32 Use limit of wrench

Bolt Tightening(times)
10,000

- Example of determining replacement rule

Assume that the use conditions are as follows.

- Number of times the jaws are changed per day : 4
- Chuck : BR08 (3-jaw)
- Number of days in operation per year : 365


- Calculate the number of years required for reaching the use limit.

Number of times of tightening per jaw change (times)
 = Bolt quantity per one jaw × Number of jaws = 2 × 3 = 6 times

$$\frac{\text{Use limit}}{\begin{matrix} \text{Number of times the jaws are changed (times/day)} \\ \times \text{Number of times of tightening per jaw change (times)} \\ \times \text{Number of days in operation (day/year)} \end{matrix}} = \frac{10000}{4 \times 6 \times 365} \cong 1.1 \text{ years}$$

The use limit is 1.1 years.

The replacement rule is determined to be replacing in 1 year for safety reasons.

Notice	Indicates instructions which, if you do not heed given instructions, could result in damage to the product or shortened service life, or damage to peripheral equipment.
	<p>Do not use the wrench more than the determined number of times.</p> <ul style="list-style-type: none"> ● Otherwise, the wrench may be broken, causing failure of tightening/loosening the jaw mounting bolts, resulting in breakage of parts and suspension of facilities.

6.2.3. Overhaul

An overhaul is required when the system has been used for a long time. For details, consult our sales agents, the sales agent you purchased the product, the machine manufacturer, or our service office nearest you.

The number of times of tightening can be confirmed on the monitor. (Refer to 7.1.3. Displaying the Number of time Tightening.)

Table 33 Approximate number of times to overhaul

Tightening times(times)
50,000

6.3. Replacement Work

6.3.1. Wrench Replacement Procedure

Read the following procedure also referring to "4.1. Assembling the BR-AJC End Effector".

- ① Before start of work, be sure to turn off the main power of the machine.
 - ② Loosen the screw [6] and remove the reaction lever [5].
 - ③ Loosen the hex. socket head cap screw [3] and the washer [4], and remove the wrench [1] and the spring [2].
 - ④ Replace the wrench [1], and assemble by referring to "4.1. Assembling the BR-AJC End Effector".
- After the replacement, conduct a test run for operation check.

6.4. Maintenance of the Air Circuit

- Drain the air filter, etc. periodically.
- To prevent malfunction of the nutrunner and the gripper, be careful not to let foreign matter, such as a carbide of compressor oil, enter the circuit during maintenance and inspection of the compressor.

7. Setting the Main Body

Each parameter can be confirmed or changed.

However, do not change them basically as the parameters are set at the time of shipment.

Notice

Indicates instructions which, if you do not heed given instructions, could result in damage to the product or shortened service life, or damage to peripheral equipment.



Do not change the parameters except when restoring the system after misoperation, or except when specified by Kitagawa.

- Otherwise, jaw change may fail, resulting in breakage of parts and suspension of facilities.

7.1. Operation Key and Monitor

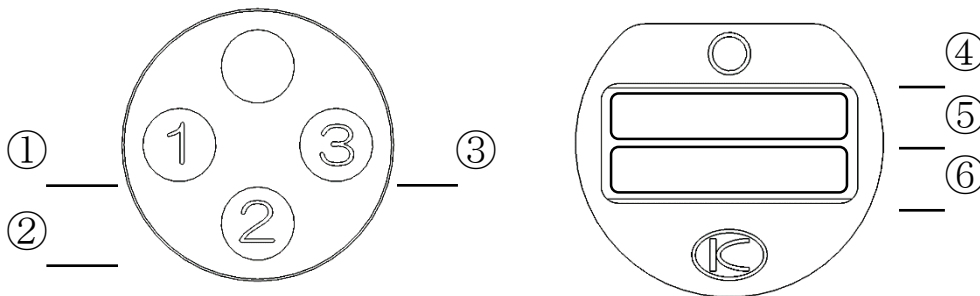


Figure 39 Operation key and monitor

Table 34 Name and function of each part

Name		Function	
		Standby state	Torque change mode Parameter Setting Mode
1	①Key	Long press: Transitioning to the set torque change mode	+ (plus) key
2	②Key	Short press: Displaying the number of bolts tightened	SET key
3	③Key	Long press: Transitioning to the parameter setting mode	- (minus) key
4	Judgment lamp	Rotating: Green lamp ON Outputting ERR: Red lamp ON	-
5	Display	Set torque	Refer to "7.1.1. Changing the Set Torque".
6		Status/Tightening torque	

7.1.1. Changing the Set Torque

- A) Press and hold the ① key for at least two seconds.
- B) The torque change mode is activated. Increase or decrease the value using the ① (+) or ③ (-) key.
- C) To confirm the value, press the ② (SET) key.

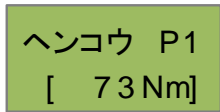


Table 35 Default setting

Tupe		BR-AJC06E	BR-AJC08E	BR-AJC10E
Set torque	N·m	47	80	107
Setting range	N·m	20~150		

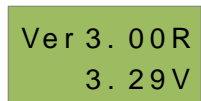
7.1.2. Parameter Setting Mode

To activate the parameter setting mode, press and hold the ③ key for at least two seconds.

7.1.2.1. Version Display and Voltage Monitor

The version of the firmware and the voltage of the internal circuit (not the voltage of the external power supply) are displayed.

- When the displayed voltage is less than 3 V, check the voltage of the external power supply.
- Press the ② (SET) key to transition to the next item.

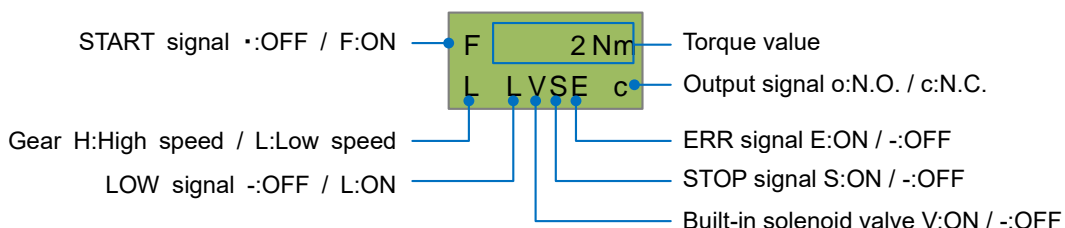


7.1.2.2. Manual Maintenance

The current sensor status and torque selection signal can be monitored.

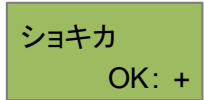
Also, the integrated STOP/ERR signal can be turned ON and OFF manually.

- Each time the ① (+) key is pressed and held, the STOP/ERR signal output system can be switched between N.O. (normal open) and N.C. (normal close).
- Press and hold the ② (SET) key to transition to the next item.



7.1.2.3. Initialization

Each parameter can be reset.



- The parameters are initialized by pressing and holding the ① (+) key.
- When not initializing the parameter, press the ② (SET) key to transition to the next item.

Table 36 Initial setting*1

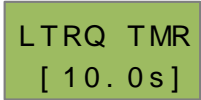
Type	BR-AJC06E	BR-AJC08E	BR-AJC10E
Set tightening torque N·m	100		
Insufficient Torque Timer Second	10.0		
Output signal	N.O. Normal open		

*1 The specification values for each BR-AJC end effector type different from the initial values.

7.1.2.4. Insufficient Torque Timer

This timer is used for detecting insufficiency of torque when tightening is not completed within the predetermined tightening time.

When tightening starts, the insufficient torque timer starts. When tightening is not completed within the set time, it determines insufficiency of torque and the operation stops automatically. Then, the STOP and ERR signals are output.



- Increase or decrease the value using the ① (+) and ③ (-) keys.
- Press the ② (SET) key to confirm the value and transition to the next item.

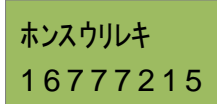
Table 37 Insufficient torque timer specifications

Type	BR-AJC06E	BR-AJC08E	BR-AJC10E
Default setting Second	10.0		
Setting range Second	0.1~19.9		

7.1.3. Displaying the Number of time Tightening

The total number of times of tightening can be checked.

- Press the ② (SET) key shortly in the standby state, and the bolt count is displayed.
- Three seconds later, the display transitions to the standby state.
- Maximum value: 16777215



8. Troubleshooting

8.1. Troubleshooting

If a failure is suspected, check the contents in Table 38 again and take necessary measures. If the problem persists, please contact the dealer where you purchased the product or us.

Table 38 Troubleshooting

Problem	Cause	Countermeasures
Tightening/loosening of the jaw mounting bolts has failed.	The jaw mounting bolts are broken.	Replace the jaw mounting bolts. (Replacement of the jaw mounting bolts)
	The wrench is broken.	Replace the wrench. (Wrench replacement)
	The control program is created incorrectly.	Check and correct the program. (Control program)
	The bolt tightening/loosening position is improper.	Check and correct the program.(Robot teaching)
	The reed switch is positioned incorrectly.	Adjust in the proper range. (Installation of the reed switch)
	The nutrunner malfunctions due to noise.	Eliminate the noise source. Take measures against the noise by changing the cable connected to the BR-AJC end effector to a shielded cable, etc.
	The pneumatic pressure is reduced.	Confirm that the pneumatic pressure falls within the range specified in the specifications. Check for air leakage.
	The pneumatic pressure flow is reduced.	Ensure the pneumatic consumption specified in the specifications. Check for air leakage.
	The nutrunner is faulty.	Immediately stop the use, and consult our sales agents or our service office.
	Chips accumulate on the jaw mounting bolts.	Remove the chips.
The reaction lever bites the jaw when the jaw mounting bolts are tightened.	The low speed reverse rotation time is improper.	In the bolt tightening operation program, adjust the low speed reverse rotation time after the set torque is reached. (Control program)
Inserting/removing the jaws in/from the chuck has failed.	The jaw insertion/removal position is improper.	Check and correct the jaw insertion/removal position. (Robot teaching)

	Chips accumulate on the chuck.	Remove the chips.
	Chips accumulate on the BR-AJC T-nut.	Remove the chips.
Gripper does not operate.	Gripper internal part is broken.	Replace the gripper with a new one.
	The reed switch is faulty or mounted improperly.	Check that the reed switch can detect normally.
	The pneumatic pressure is reduced.	Confirm that the pneumatic pressure falls within the range specified in the specifications. Check for air leakage.

9. Others

9.1. Marking

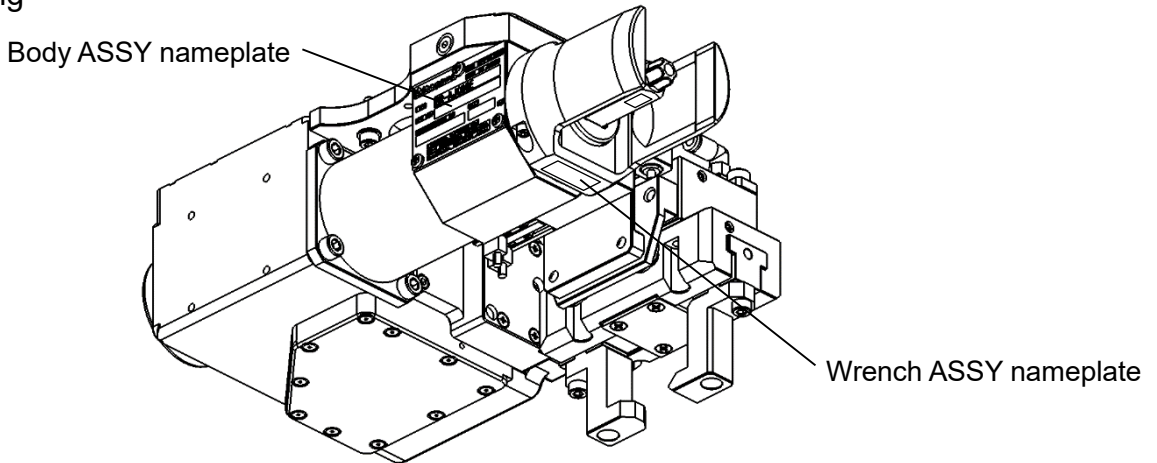


Figure 40 Marking position

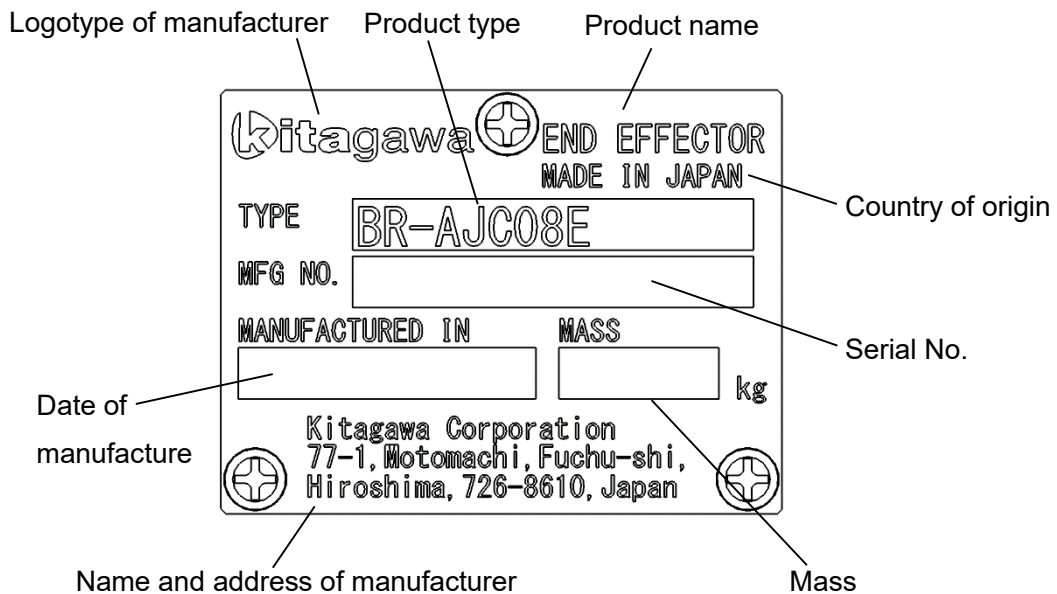


Figure 41 Body ASSY nameplate

9.2. Disposal

Dispose of this unit in accordance with the laws and regulations of your country.

Kitagawa Corporation Kitagawa Global hand Company

77-1, Motomachi, Fuchu-shi, Hiroshima, 726-8610, Japan

Tel. +81-847-40-0561

Fax. +81-847-45-8911

■ JAPAN DOMESTIC

Tokyo office	1-405-1, Kita-ku, Yosino-cho, Saitama-shi, Saitama, 331-9634, JAPAN Tel. +81-48-667-3469 Fax. +81-48-663-4678
Sendai office	4-15-13, Yamatomachi, Wakabayashi-ku, Sendai-shi, Miyagi, 984-0042, Japan Tel. +81-22-232-6732 Fax. +81-22-232-6739
Nagoya office	2-62, Kamitakabata, Nakagawa-ku, Nagoya-shi, Aichi, 454-0873, Japan Tel. +81-52-363-0371 Fax. +81-52-362-0690
Osaka office	3-2-9, Kitakagaya, Suminoe-ku, Osaka-shi, Osaka, 559-0011, Japan Tel. +81-6-6685-9065 Fax. +81-6-6684-2025
Hiroshima office	77-1, Motomachi, Fuchu-shi, Hiroshima, 726-8610, Japan Tel. +81-847-40-0541 Fax. +81-847-46-1721
Kyushu office	7-6-39, Itazuke, Hakata-ku, Fukuoka-shi, Fukuoka, 812-0888, Japan Tel. +81-92-501-2102 Fax. +81-92-501-2103
Overseas office	77-1, Motomachi, Fuchu-shi, Hiroshima, 726-8610, Japan Tel. +81-847-40-0526 Fax. +81-847-45-8911

■ OVERSEAS

America Contact	KITAGAWA-NORTHTECH INC. https://www.kitagawa-usa.com 301 E. Commerce Dr, Schaumburg, IL. 60173 USA Tel. +1 847-310-8787 Fax. +1 847-310-9484
	KITAGAWA MEXICO S.A. DE C.V. Circuito Progreso No. 102, Parque Industrial Logistica Automotriz, Aguascalientes, Ags., C.P.20340 Tel. +52 449-917-8825 Fax. +52 449-971-1966
Europe Contact	KITAGAWA EUROPE LTD. https://www.kitagawa.global/en Unit 1 The Headlands, Downton, Salisbury, Wiltshire SP5 3JJ, United Kingdom Tel. +44 1725-514000 Fax. +44 1725-514001
	KITAGAWA EUROPE GmbH https://www.kitagawa.global/de Borsigstrasse 3, 40880, Ratingen Germany Tel. +49 2102-123-78-00 Fax. +49 2102-123-78-69
	KITAGAWA EUROPE GmbH Poland Office https://www.kitagawa.global/pl 44-240 Zory, ul. Niepodleglosci 3 Poland Tel. +48 607-39-8855
	KITAGAWA EUROPE GmbH Czech Office https://www.kitagawa.global/cz Purkynova 125, 612 00 Brno, Czech Republic Tel. +420 603-856-122 Fax. +420 549-273-246
	KITAGAWA EUROPE GmbH Romania Office https://www.kitagawa.global/ro Strada Heliului 15, Bucharest 1, 013991, Romania Tel. +40 727-770-329
	KITAGAWA EUROPE GmbH Hungary Office https://www.kitagawa.global/hu Dery T.u.5, H-9024 Győr, Hungary Tel. +36 30-510-3550
Asia Contact	KITAGAWA INDIA PVT LTD. https://www.kitagawa.global/in Plot No 42, 2nd Phase Jigani Industrial Area, Jigani, Bangalore – 560105, Karnataka, India Tel. +91-80-2976-5200 Fax. +91-80-2976-5205
	KITAGAWA TRADING (THAILAND) CO., LTD. https://www.smri.asia/jp/kitagawa/ 9th FL, Home Place Office Building, 283/43 Sukhumvit 55 Rd. (Thonglor 13), Klongton-Nua, Wattana, Bangkok 10110, Thailand Tel. +66 2-712-7479 Fax. +66 2-712-7481
	Kitagawa Corporation (Shanghai) https://www.kitagawa.com.cn Room 308 3F Building B. Far East International Plaza, No. 317 Xian Xia Road, Chang Ning, Shanghai, 200051, China Tel. +86 21-6295-5772 Fax. +86 21-6295-5792
	Kitagawa Corporation (Shanghai) Guangzhou Office B07, 25/F, West Tower, Yangcheng International Trading Centre, No. 122 East Tiyu Road, Tianhe District, Guangzhou, China Tel. +86 20-2885-5276
	DEAMARK LIMITED https://www.deamark.com.tw No. 6, Lane 5, Lin Sen North Road, Taipei, Taiwan Tel. +886 2-2393-1221 Fax. +886 2-2395-1231
	KITAGAWA KOREA AGENT CO., LTD. http://www.kitagawa.co.kr 803 Ho, B-Dong, Woolim Lion's Valley, 371-28 Gasan-Dong, Gumcheon-Gu, Seoul, Korea Tel. +82 2-2026-2222 Fax. +82 2-2026-2113
Oceania Contact	DIMAC TOOLING PTY. LTD. https://www.dimac.com.au 69-71 Williams Rd, Dandenong South, Victoria, 3175 Australia Tel. +61 3-9561-6155 Fax. +61 3-9561-6705