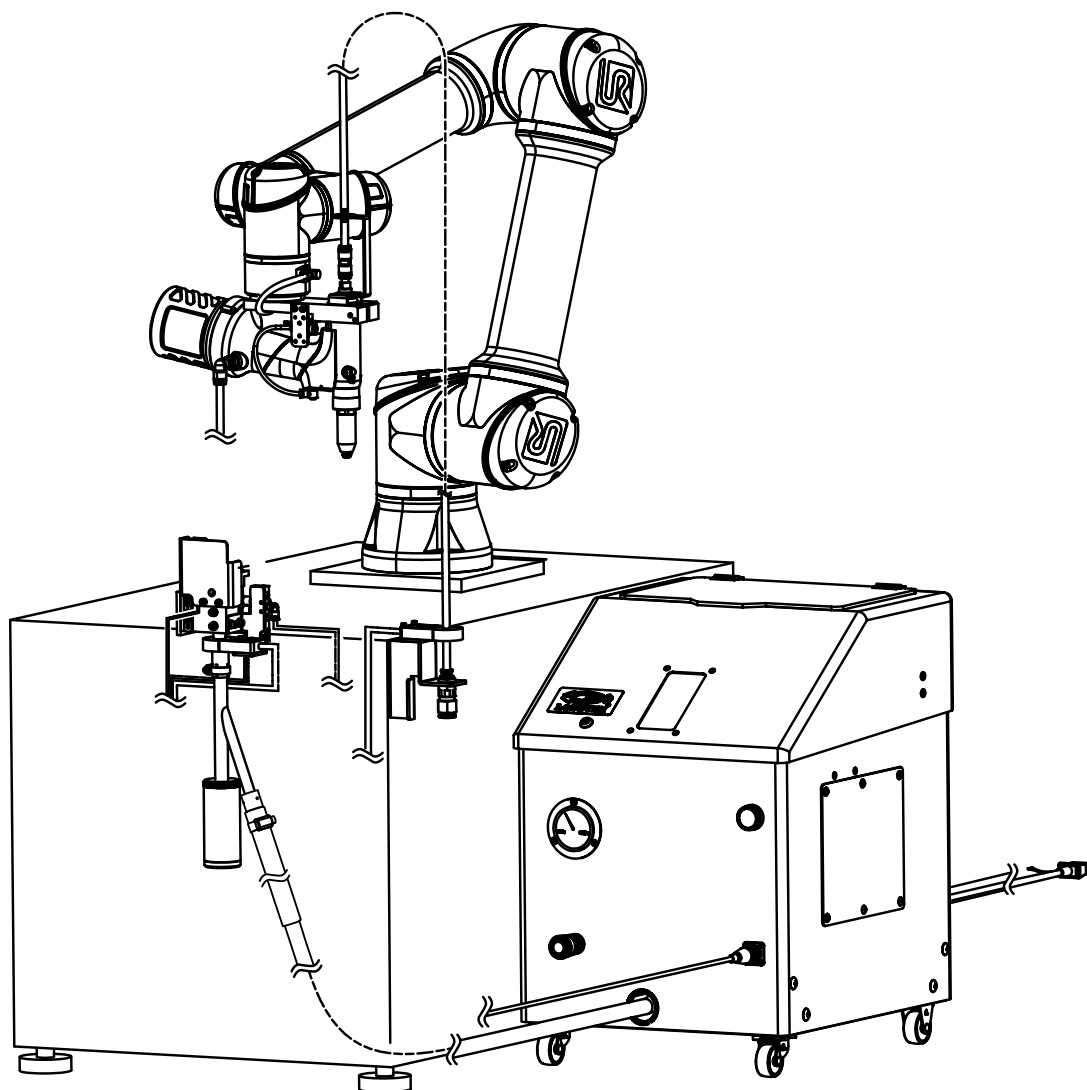




AUTOMATIC RIVETING UNIT ARU-R2A1-UR INSTRUCTION MANUAL



- Thank you very much for purchasing “LOBSTER” Automatic Riveting Unit. To ensure correct operation, please read this instruction manual carefully, and keep it in a safe place for later reference.
- This is Original instructions. (Original Instruction Manual is written in English language.)

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No.RA-R2A1-S-U911-0

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1. INTRODUCTION

Thank you very much for purchasing “LOBSTER” Automatic Riveting System.

- This system is an automated system which is only used for fixing blind rivets (hereinafter referred to as “rivets”). This system is not designed for other purposes.
- This instruction manual shows how to use the system safely, work properly, maintenance and inspection which will make this system more effectively.
- Please check the blind rivets specification and durability on customers side before using it.

1-1. Important Notices

- Read this manual carefully before using this system. Follow instructions in this manual for handling this system, replacing accessories or replacing parts as needed.
- If you have any questions about this manual, contact the “LOBSTER” dealer where you purchased the system.
- It is impossible to foresee all potential dangers and describe them in this manual. You must operate this system paying attention to safety as well as observing the instructions in this manual.
- This manual is translated from Japanese, its original language. It is your own responsibility to achieve a full understanding of the contents of this manual before using the equipment described.
- Lobtex Co., Ltd. has the copyright of this manual. It is prohibited to publish, copy or translate to other language without prior consent.

1-2. Disclaimer

- Our warranty does not apply to direct and indirect damages and lost income caused by the misuse, abuse, and unauthorized modification of the system. We do not guarantee the strength or quality of blind rivet.
- We do not guarantee any damages and failures caused by any modifications without our written approval.
- We do not guarantee any damages and failures caused by use of parts other than our recommendation.

2. IMPORTANT SAFETY INSTRUCTIONS



- ◆ Be sure to read the following Important Safety Instructions carefully and make sure that you understand them thoroughly before using this system.



- ◆ Always wear protective goggles while using the system. The cut mandrels may jump out by accident and cause injuries.



- ◆ Use hearing protection as directed by the work supervisor and as required by occupational health and safety regulations.



- ◆ This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- ◆ These Important Safety Instructions are divided into **⚠ WARNING** and **⚠ CAUTION**. The differences between these two levels are described below.

⚠ WARNING	Indicates a potentially hazardous situation which, if ignored, may result in death or serious injury to the operator.
⚠ CAUTION	Indicates a potentially hazardous situation which, if ignored, may result in moderate injury to the operator or physical damage.

Moreover, failure to follow the instructions marked with the **⚠ CAUTION** symbol or cautions without a **⚠ CAUTION** symbol which appear in the text of this manual may also have serious results in some cases. Always be sure to observe the instructions given in the Important Safety Instructions.

- ◆ After reading this manual, keep it in a safe place where it is easily accessible to all users.

⚠ WARNING



Mandatory

1. The production system designer or specifier must determine whether or not this unit is compatible with the production system.

- Due to the wide variety of conditions under which this unit will be used, the designer or specifier of the production system must analyze and test this unit as appropriate to determine how it will be used.
- It is the responsibility of the person who has determined that this unit is suitable for the production system to ensure the specifications and safety of the production system in which this unit is installed. Please configure the production system after considering and taking into account the specifications of this unit.

2. Operate within the recommended air pressure range of 0.5 ~ 0.6 MPa.

- If an air pressure which is greater than this is used, the system may become damaged, and injury or damage to property may result.

3. Wear protective glasses during use.

- Failure to do so may result in an accident or personal injury in case that a rivet or a piece of cut-mandrels jumps out toward you.

4. The power supply for ARF-700F must be used at the voltage indicated on the nameplate (on the rear panel of the ARF-700F).

- Use of the ARF-700 with a voltage exceeding the indicated voltage may cause abnormal operation, resulting in an accident or injury.

5. To prevent electrical shock hazard, always ground the ARF-700F when connecting the plug.

- Lack of grounding may lead to electric shock.

6. Turn off the air supply before disconnecting this unit from the air source.

- Compressed air may cause the air hose to whip around, and injury may result.

7. Make sure to put the Chute Hose when using.

- Spent mandrels may come out and cause the injuries.
- Make sure to put the Chute Hose properly all the way (Push-in Fitting). If the Chute Hose was not set properly, the hose may fall off and cause injuries.

8. Be sure to connect the air hose (tube) and the cable securely.

- If connection to a Push-in Fitting or coupler is insufficient, the air hose (tube) may come off during operation and cause injury.
- Use hose bands to securely connect the air hose joint and air hose. If they are not connected securely enough, the air hose may become disconnected during use and injury may result.
- If it comes off during operation, it may cause rivet ejection or electric leakage.

9. Check that all parts of the system are free from damage before use. Any damaged parts should be repaired before the system is used.

- Before using the system, check any damage in each portion carefully, and check if it operates normally and it fulfills its specified functions.
- If the system is used while any parts are still damaged, injury may result.
- If the system is damaged by objects being dropped onto it, for instance, the damaged part may break and accident or injury may result.

10. Switch off the robot and the ARF-700F, and unplug from power source when;

- The system is not used or is repaired.
- Any hazard can be expected.

11. Keep workplace well lit. Working in dark place may cause an accident.

12. Understand the operation of this system and implement safety measures to prevent harm to persons.

⚠ WARNING

 Prohibited	1. When incorporating the unit into equipment, do not perform work with the power supply and compressed air connected. • The unit may operate and cause an accident or injury. 2. Never look into the Nosepiece of the R2A1-UR, and never point the Nosepiece toward other persons. • If the R2A1-UR is used while the cut mandrels are still inside the R2A1-UR not being ejected, these mandrels may be ejected from the R2A1-UR's Nosepiece during use and cause serious injury.	3. Do not put your fingers into the Feed Head Unit. • Your fingers may be caught in the Fingers of the Feed Head Unit and cause injury. 4. Never look into the Feed Head Unit. • Rivets may be popped out and cause an injury. 5. Do not put in hands or keep your face close inside the ARF-700F or to the Feed Head Unit when the electric switch is on. • Rivets may come out and cause injury. 6. Keep the unit away from rain or wet place. 7. Keep the the ARF-700F away from flammable liquids or gases.
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⚠ CAUTION

 Mandatory	1. Before starting maintenance or disassembling the unit to replace parts, disconnect the power supply and compressed air so that the unit cannot operate. • Performing maintenance or disassembly with air supplied may cause a part to jump out, oil to squirt out, or the unit to perform unexpected behavior, and may result in an accident or personal injury. • The unit may operate unexpectedly and cause injury. 2. When installing/assembling this system into equipment, be sure to use proper tools. • Otherwise, the system may be damaged. 3. Use the R2A1-UR with the Oil Retaining Screw firmly tightened. • If the Oil Retaining Screw is loose or coming off during use, oil may squirt out resulting in an accident or personal injury. 4. Be careful not to pinch your hands/fingers when opening/closing the ARF-700F Cover. • Neglecting this caution may cause an injury. 5. Handle the ARF-700F carefully when transporting it. • It is heavy; be careful not to injure your back, etc. when lifting. • Protect your hand with gloves to lift it. The sharp edge of the bottom area may hurt your hand. 6. The parts to be used must be those supplied from us or recommended by us. Select and attach parts applicable to your rivet. • Otherwise the system may not produce maximum performance and may sometimes malfunction resulting in an accident or personal injury. 7. Make sure that the workplace is safe, clean and organized. • Accidents can easily occur in untidy workplaces. • If the cut mandrels are allowed to fall onto the floor, you may slip on them, and injury may result.	8. Maintain the system with proper care. • Maintenance such as oil filling and attachments replacement must be done according to this instruction manual. Otherwise, it may cause injury. • Avoid skin contact with hydraulic oil. It may cause skin irritation. • Inspect the cord periodically and replace it if damaged. 9. Ask Lobtex to carry out any repair work required. • This system complies with appropriate safety standard. Do not remodel it. • Repair work should only be carried out by a qualified technician. Please contact your nearest "LOBSTER" distributor, representative, or direct to Lobtex Co., Ltd., Osaka. If the system is repaired by someone without the necessary qualifications and experience, the system may not perform to optimum standards, and accidents or injury may result. 10. Only for EU countries, do not dispose of electric tools together with household waste material ! • In observance of European Directive 2002/96/EC on waste electrical and electronic equipment and its implementation in accordance with national law, electric tools that have reached the end of their life must be collected separately and returned to an environmentally compatible recycling facility. 11. The warning labels on the R2A1-UR contain important information for safe use. If the labels become dirty or damaged and cannot be read, obtain new labels and replace them. New labels can be ordered from our company through your dealer. 12. If you are using this system for the first time, receive instruction from an experienced operator and use it only after fully understanding this manual. • Wear protective goggles or safety glasses. • Do not operate this system if it is damaged. 13. Please perform regular inspection and maintenance on the R2A1-UR. As a guideline, inspect fastening every 30,000 rivets or once a year, and request repair if any abnormality is suspected.
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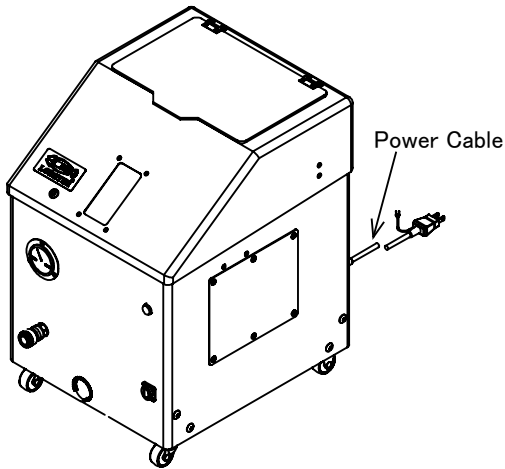
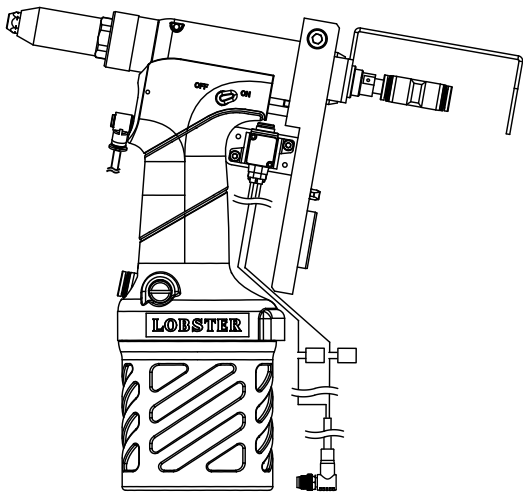
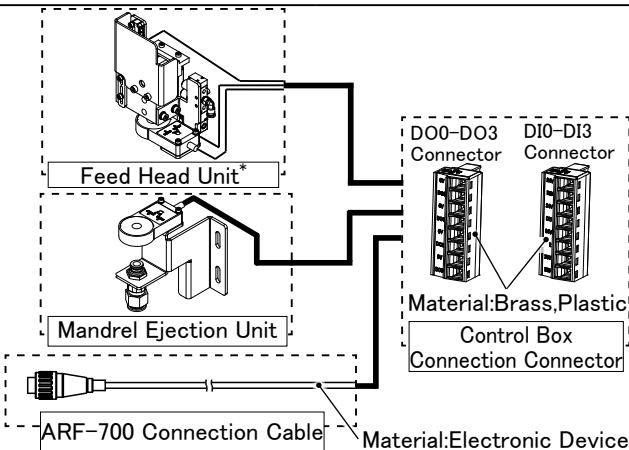
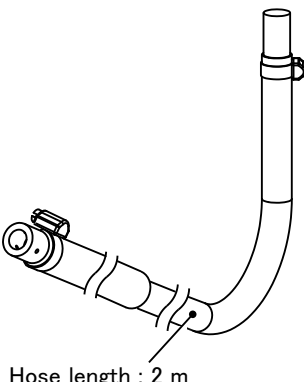
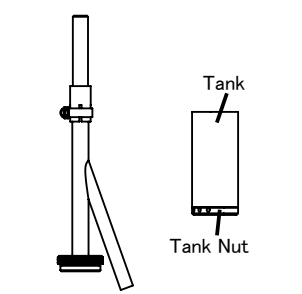
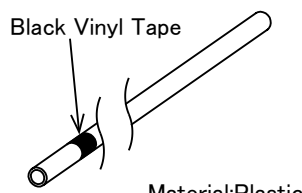
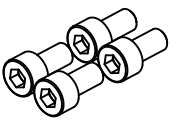
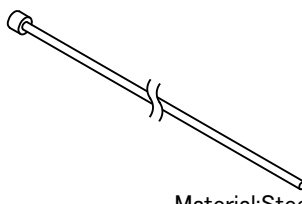
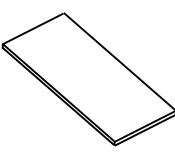
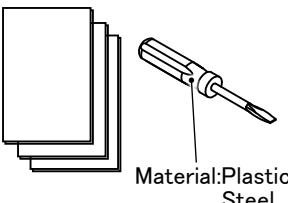
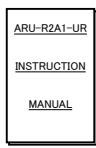
⚠ CAUTION

 Mandatory	14. Only persons who are well trained and qualified should use, adjust, and maintain this product. 15. Operators must wear adequate clothes. • Voluminous clothes and accessory like neckless may get caught in the system. Do not wear such items when using the system. • Long hair must be covered by a cap or a hair cover. 16. Be aware of slippery surfaces caused by use of the system and also of trip hazards caused by the air line or hydraulic hose. 17. Proceed with care in unfamiliar surroundings. There can be hidden hazards, such as electrical or other utility cables. 18. Ensure that there are no electrical cables, gas pipes, etc., which can cause a hazard if damaged by use of the system.	19. When not in use, store the system in a dry place out of the reach of children. 20. Compressed air can cause severe injury. • Be sure to disconnect the tool from the air supply source when it is not in use or before replacing or repairing it. • Never direct air at yourself or anyone else. 21. Always check for damaged or loose hoses and fittings. • Whipping hoses can cause severe injury. 22. Preventative maintenance should be carried out, after a specified time of operation, a specified number of cycles/operations or a stated number of times per year. 23. When you handle oil or grease, obtain the material safety data sheet (SDS) from the supplier, and follow the described instructions.
 Prohibited	1. Do not operate the R2A1-UR with the Frame Head removed. • Items such as fingers may become caught in the mechanism. 2. Do not bring your face close to the exhaust ports. • Pressurized air containing fine particles is discharged from the exhaust ports during use. Keep eyes away from this area. 3. The ARF-700F must be placed on flat place without slope. • Tumbling may cause an accident. 4. Avoid skin contact with substances such as hydraulic oil, lubricating oil and grease. • Such substances may cause inflammation of the skin. If they come into contact with your skin, wash the affected area thoroughly. 5. Keep people who are not involved in work away from the workplace. • Accidents or injury may result. 6. Avoid uncomfortable postures while working. • Be sure to have a good foothold and a good body balance. You may fall down and injury may result. 7. Handle the Power Cable with care. • Do not pull the Power Cable to move the ARF-700F or to unplug the Power Plug from the the outlet. • Keep the Power Cable away from heat, oils or sharp edge.	8. Start up the ARF-700F with adequate process. • Do not unplug the Power Plug from the outlet while the Power Switch is ON. • Make sure that the Power Switch is OFF before you plug the Power Plug into the outlet. 9. Do not step on or snag the Supply Hose during use of this unit. • Doing so may damage this unit or prevent rivets from being blow-fed. 10. Do not leave the floor littered with cut mandrels. • Cut mandrels are dangerous because their ends are sharp. Stepping on them is also dangerous • easily causing a slip and fall accident. 11. Do not attempt to modify this unit. • Unauthorized modifications may cause malfunctions which can lead to accidents or injury. 12. This product is an automatic system for Blind Rivet fastening two boards by riveting. We do not design, manufacture or sell intending to other applications. 13. This unit is not intended for use in potentially explosive atmospheres. This unit is not electrically insulated.

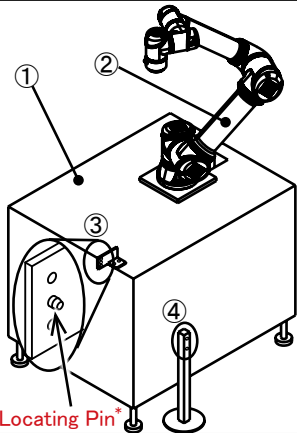
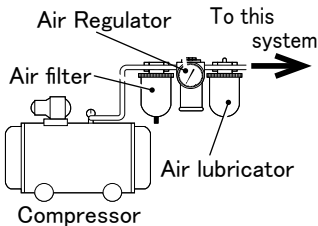
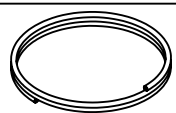
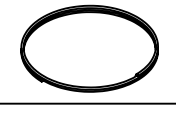
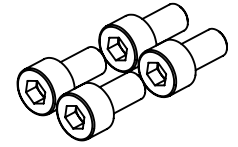
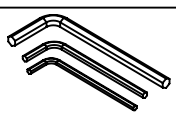
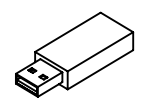
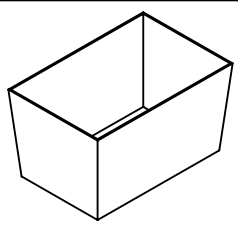
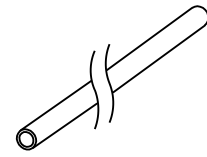
3. PACKAGE CONTENTS AND INSTALLATION

3-1. Package Contents

Some items in this product and in the package contents listed below (items marked with an asterisk “*”) have different official part numbers depending on the applicable rivet diameter. For the official part numbers, refer to “12. PARTS CONFIGURATION” (P.49 ~ 54). Unless otherwise noted, this manual uses generic names (series names).

 Power Cable			
Feeder ARF-700F* (includes key, instruction manual, and Power Cable) 1 unit		Air Riveter R2A1-UR* 1 unit	
		 Hose length : 2 m	 Tank Tank Nut
Control Box Connection Unit* 1 unit		Supply Hose* 1 unit	Guide Shaft Unit* 1 unit
 Black Vinyl Tape Material: Plastic	 Material: Steel	 Material: Steel	 Material: Steel
Chute Hose (white, OD 8 mm × 1.8 m) 1 pc	Hex Socket Head Cap Screw M6 × 10 4 pcs M4 × 8 2 pcs M3 × 18 4 pcs M3 × 5 3 pcs	Washer Flat Washer M4 2 pcs Flat Washer M3 4 pcs Spring Washer M4 2 pcs Spring Washer M3 7 pcs	Straight Ejector Pin* (L = 300 mm) 1 pc
 Material: Stainless	 Material: Plastic Steel		† This folder contains this manual, the ARF-700F Instruction Manual, and the ARF-700F Technical Manual.
Gap Gauge (t = 1.5mm) 1 pc	Accessories for sensors (instruction sheet, sensitivity adjustment screwdriver) 1 set each	Instruction Manual Folder† 1 set	

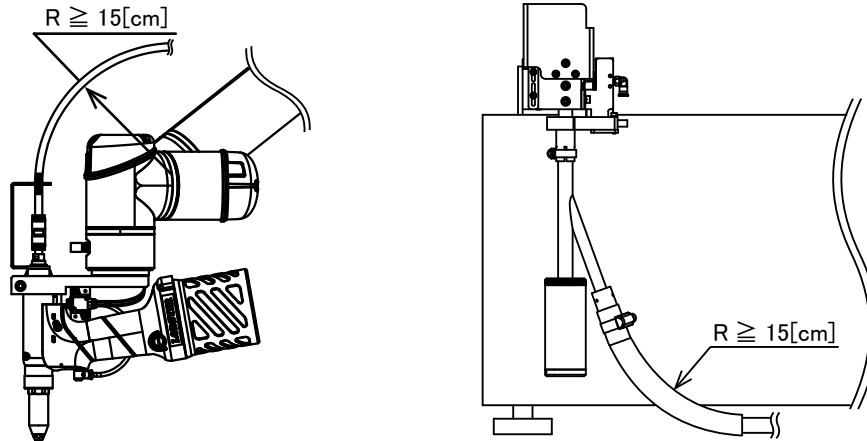
3-2. Items to Be Prepared by the Customer

Item	Description	Qty.	Intended Use / Recommendations / Precautions
	① Stand	1	Select a suitable stand according to the robot you use.
	② Robot	1	- For handling methods and precautions for the robot, refer to the user manual of the selected robot. - A compatible robot must have a tool flange compliant with ISO 9409-1-50-4-M6, a payload of 2 kg or more, and PolyScope X (v10.12.0 or later).
	③ Installation space for the Feed Head Unit	1 each	- Prepare locations for installing the Feed Head Unit and the Mandrel Ejection Unit. For an installation example, see “3-3. Installation Conditions” (P.7). - For the mounting-hole dimensions for fixing each unit, see “4-4. Detailed Specifications of Each Unit” (P.10 ~ 12). *The Feed Head Unit has a locating-pin hole (Ø6 H7). The Locating Pin is not supplied with this system; prepare one if necessary.
	④ Installation space for the Mandrel Ejection Unit		
	Compressor Air filter Air Regulator Air lubricator	1 each	- Set up the compressor, and be sure to install an air filter, air regulator and air lubricator between the compressor and each unit. - Select the compressor by comparing its discharge capacity (per minute) with the air consumption of this system (see P.9). - Adjust the drip-feed amount of the air lubricator to the minimum setting. - If moisture enters inside of the unit, it may freeze in cold temperature or accelerate degradation of O-rings and packings, resulting in malfunction of the unit. To avoid that, use an air dryer as necessary in addition to an air filter, regulator and an air lubricator.
	Polyurethane Tube (OD 8 mm)	1	- Used to supply air to the R2A1-UR Air Riveter. Use PISCO UB0850 or an equivalent product. - Recommended length: 2 m. If you select a tube longer than 2 m, the riveting time may become longer.
	Polyurethane Tube (OD 4 mm)	1	- Used to supply air to the Feed Head Unit. Use PISCO UB0425 or an equivalent product. - Recommended length: 2 m.
	Bolts or screws (M6)	4	- Used to fix the Feed Head Unit and the Mandrel Ejection Unit. For mounting locations, see “4-4. Detailed Specifications of Each Unit” (P.10 ~ 12) and “5-3. Set up Feed Head Unit/Mandrel Ejection Unit” (P.20). - Select bolts/screws with suitable material and length according to your installation environment.
	Hex Keys (width across flats 2.5 mm, 3 mm, 5 mm)	1 each	Used for assembling this system.
	Empty USB flash drive	1	A memory capacity of 256 MB or more is recommended. This is required when installing the urcapx file downloaded from our website (https://www.lobtex.co.jp/products/tabid/140/pdtd/URplus/catid/141/Default.aspx) to the robot.
	Waste Mandrel Collection Container	1	- This is a container for collecting ejected mandrels. Select a container with sufficient strength, depth, and stability to prevent injuries and to prevent mandrels from popping out. - If necessary, place an impact-absorbing material (e.g., sponge) on the bottom of the container. - If the container has a lid, a gap is required to allow exhaust air for mandrel ejection to escape. If the container is sealed, the Air Riveter may fail to pick up rivets.
	Tube (OD 12 mm)	1	- Attach this tube to the Mandrel Ejection Unit to guide mandrels into the Waste Mandrel Collection Container (to prevent scattering and rebound). During normal operation, use the system with the tube installed. - Keep the tube as short as possible and avoid kinks, crushing, and sharp bends. Increased flow resistance may weaken the vacuum and cause rivet pick-up failure. - If the vacuum of the R2A1-UR is weak, follow “11. TROUBLE SHOOTING” (P.46 ~ 48) and temporarily remove the tube to isolate the cause.

3-3. Installation Conditions

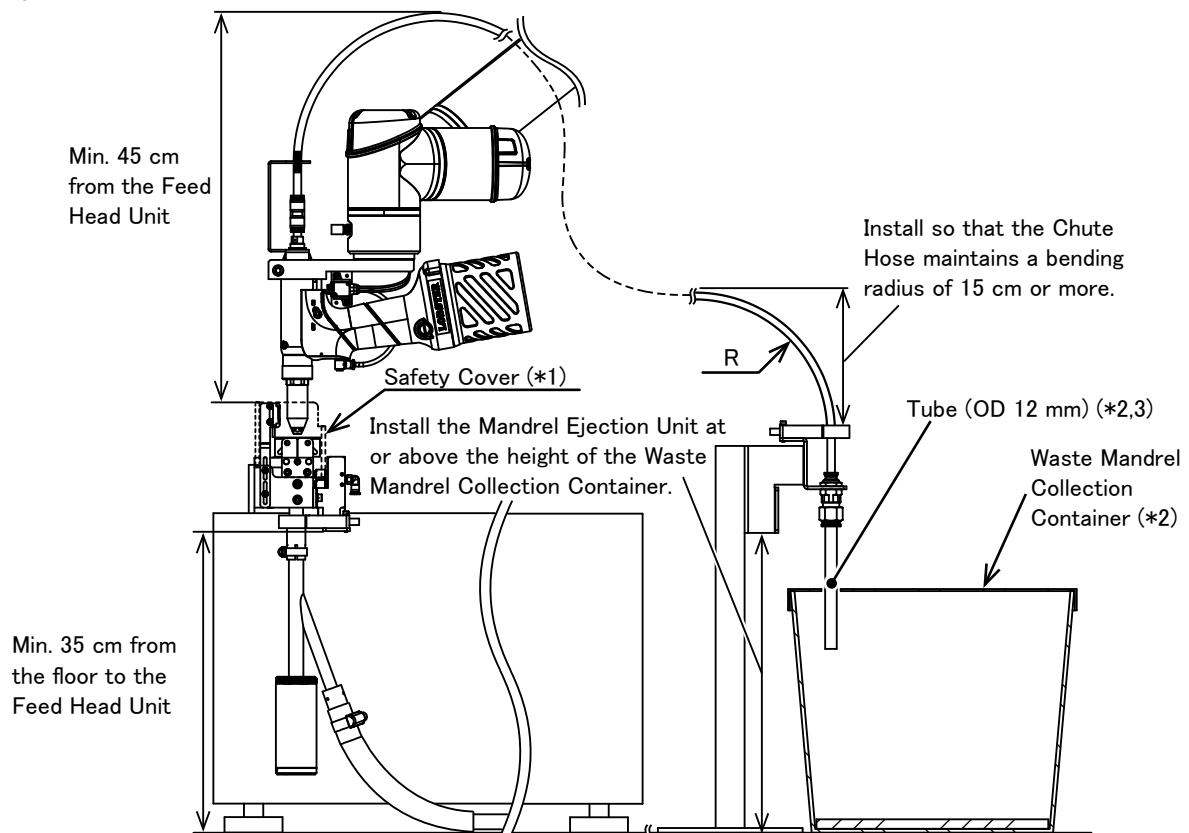
① Supply Hose and Chute Hose

- The allowable bending radius guideline for the Supply Hose and Chute Hose is 15 cm.
- After installing the Chute Hose, do not apply a load exceeding its own weight to the hose. If it is bent tighter than the allowable bending radius, mandrel ejection may become difficult and cause malfunction.
- If you secure the Chute Hose to the robot, stand, or surrounding walls, perform a trial run and confirm that the hose is not being pulled and that mandrels can be ejected properly. If the Chute Hose becomes entangled or is pulled, the system may be damaged or mandrels may fail to be ejected.



② Installation example for the Feed Head Unit and Mandrel Ejection Unit

- Install each unit away from the floor and/or wall as shown below. If this is not possible, rivets may not be fed, or mandrels may fail to be ejected.
- Install the Feed Head Unit so that the rivet feed direction is vertical, and install the Mandrel Ejection Unit so that the mandrel ejection direction is vertical. Otherwise, rivets may not drop into the Tank, or mandrels may fail to be ejected.



* 1 For illustration purposes, the Safety Cover is shown with dashed lines.

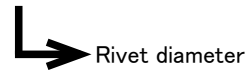
* 2 For recommendations and precautions for selection, see P.6.

* 3 Connect the tube to the Push-in Fitting PC12-03 of the Mandrel Ejection Unit, and insert the other end into the Waste Mandrel Collection Container. Keep the tube as short as possible and avoid kinks, crushing, and sharp bends.

4. SPECIFICATIONS

4-1. Official Model No.

ARU-R2A1-UR-□-100V

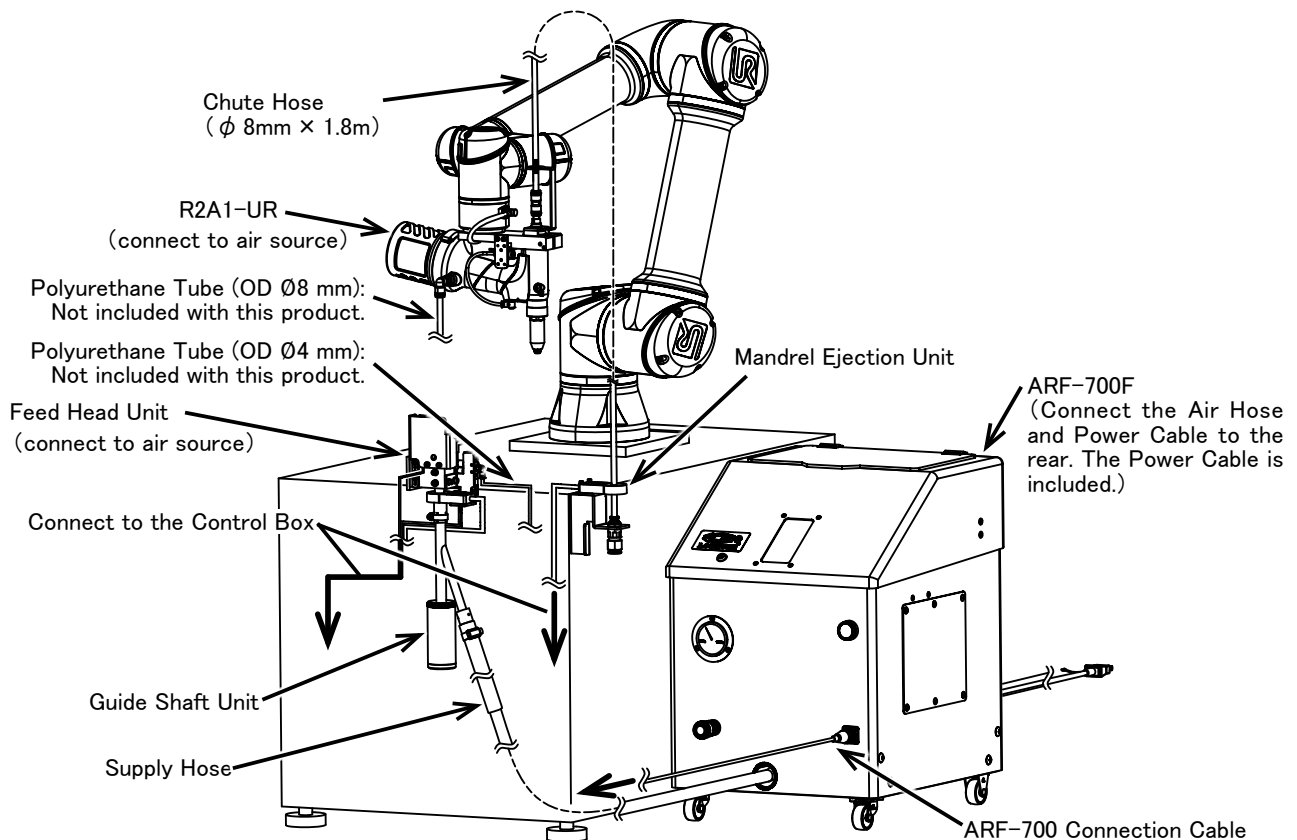
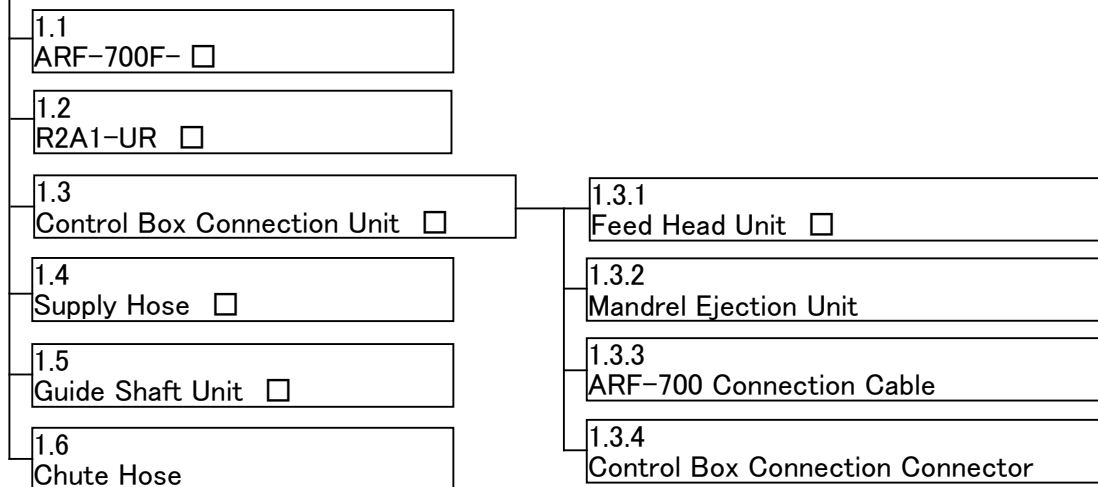


3.2	φ 3.2mm(Type 4)
4.0	φ 4.0mm(Type 5)
4.8	φ 4.8mm(Type 6)

4-2. Unit Configuration (Overview)

The following shows an overview of the unit configuration of this system. Tubes, Hex Socket Head Cap Screws, washers, pins, gap gauge, and this instruction manual are excluded. For detailed parts configuration and code numbers, refer to “12. PARTS CONFIGURATION” (P.49) .

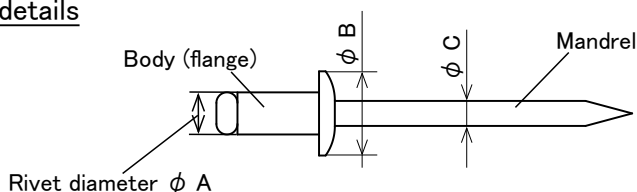
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ARU-R2A1-□-UR *□ : applicable rivet diameter



4-3. System Specifications

Model No.			ARU-R2A1-UR Series
Compatible robot manufacturer			UNIVERSAL ROBOTS
Applicable Robot	Hardware	Tool flange	ISO9409-1-50-4-M6(PCD 50mm、 4 × M6, Locating Pin supported)
		Payload	2 kg or more
		Tool I/O	IEC 61076-2-104 compliant M8 circular connector (A-coded, 8-pin)
		Software	
Applicable rivets diameters			φ 3.2mm、 φ 4.0mm、 φ 4.8mm (cannot be used together; Ø4.8 mm excludes all-stainless rivets)
Basket Capacity (ARF-700F)			2,000 pcs (φ 3.2mm), 1,500 pcs (φ 4.0mm), 1,000 pcs (φ 4.8mm)
R2A1-UR	Weight		1.6 ^{*2} kg
	Mounting interface		compliant with the robot tool-flange standard (ISO 9409-1-50-4-M6)
	Tool stroke		19mm
	Traction power at 0.6 MPa		9 kN (vacuum ON)
Operating air pressure MPa			0.5 ~ 0.6 ^{*3,4}
Air consumption (0.6 MPa, vacuum ON, feeding a rivet in 1 sec)			7.1 L/s ^{*2}
Power source	ARF-700F		AC100V 50/60Hz (power cable length : 2 m)
	Feed Head Unit Mandrel Ejection Unit R2A1-UR		DC24V (cable length : 2 m)
Power consumption			65 W ^{*2}
Noise			75.4 dB (vacuum ON, ARF-700F operating) ^{*2,5}
Compressed air connections	ARF-700F		Air Plug 20PM
	Feed Head Unit		Push-in Fitting PL4-01 (PISCO)
	R2A1-UR		Push-in Fitting PL8-01 (PISCO)
Operating environment	Temperature		4 ~ 35℃
	Relative humidity		80%RH max. (No condensation)

Applicable rivet details



φ A mm (Rivet diameter) ^{※6}	Rivet material	Rivet size	φ B mm (Head diameter) ^{※6}	φ C mm (Mandrel diameter) ^{※6}
3.2	NSA, NST, NSS, NS, NTA NSA-A, NST-A, NSS-A, NS-A	4-1, 4-2, 4-3, 4-4, 4-5, 4-6	6.4	1.8 ~ 2.0
4.0	NSA, NST, NSS, NS, NTA NSA-A, NST-A, NSS-A, NS-A	5-2, 5-3, 5-4, 5-5, 5-6	7.9 ~ 8	2.2 ~ 2.5
4.8	NSA, NSS, NS, NTA NSA-A, NSS-A, NS-A	6-2, 6-3, 6-4, 6-5, 6-6	9.5 ~ 9.6	2.6 ~ 2.9

※ 1.Product specifications and design are subject to change for improvement without notice.

※ 2.Weight and dimensions given are standard values. Actual products may differ slightly from the values given.

※ 3.If the diameter of your stainless rivet (NST, NST-A, NSS, NSS-A) is 4.8mm(3/16"), set the air pressure to 0.54~0.6 MPa (78~87 psi).

※ 4.If the air pressure is too high, damage to parts may occur. If the pressure is too low, some size of the rivet may not be correctly installed (cut).

※ 5.Measured as the equivalent continuous sound level.

※ 6.Dimension names conform to ISO 14588 (expressions may differ depending on the standard/manufacturer).

※ 7.The warning label is located on the side of the Cylinder Cup.

※ 8.The ARF-700F and R2A1-UR have separate Serial No.; the display location and reading method differ.

ARF-700F The Serial No. is shown on the nameplate on the rear of the main body (see P.12 for the location).

Read the manufacturing date as follows:

(Example) No. 2024 02 28 2 → Manufactured on 28 Feb 2024; 2nd in the production sequence.

R2A1-UR The first three letters of the Serial No. indicate the manufacturing year/month code (last two digits of the year + month). Convert the letters using the table below (code → number). See P.14 for the location.

(Example) B W N O O O O → year: 20②⑥ month: ④
 ↓ ↓ ↓
 2 6 4

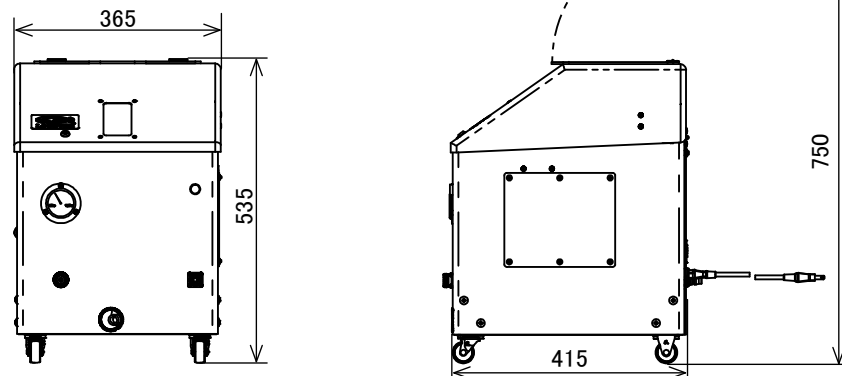
Code	A	B	M	N	K	W	T	Y	U	O	L	Z
Number	1	2	3	4	5	6	7	8	9	0/10	11	12

4-4. Detailed Specifications of Each Unit

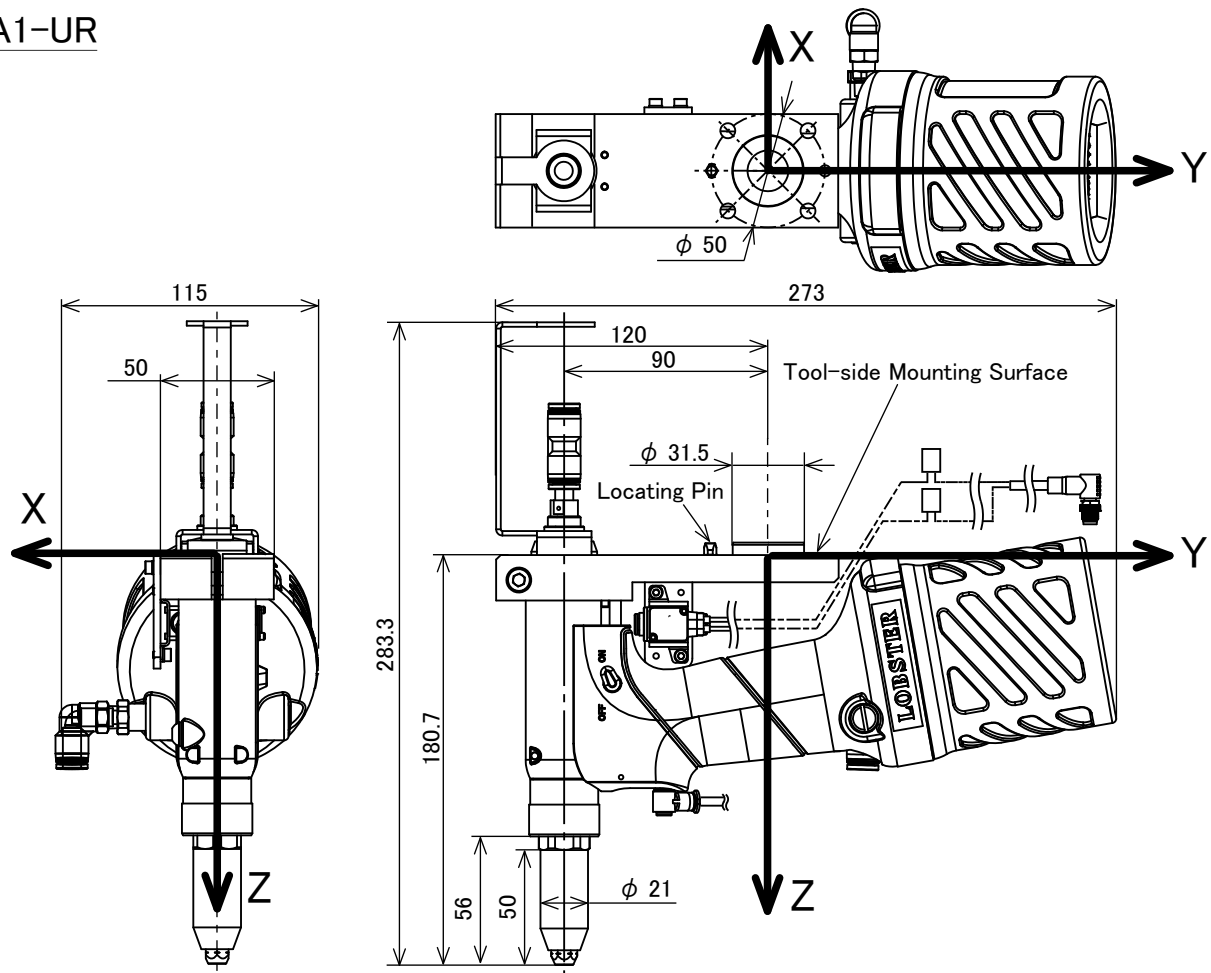
Section 4-4 provides the weight, dimensions, and other specifications of each unit that are not described in Section 4-3. For parts inside each unit, refer to “4-5. Main Parts Names of Each Unit” (P.12 ~ 16) or “12-2. PARTS LIST” (P.50 ~ 54). For I/O connections, refer to “4-6. I/O Connection Diagram” (P.17).

Unit Name	Feeder ARF-700F	Air Riveter R2A1-UR
Weight	31 kg	1.6 kg
Depth × Height × Width	415 mm × 535 mm (max. 750 mm) × 365 mm	273 mm × 283.3 mm × 115 mm
Air consumption (at 0.6 MPa)	5.7L per rivet (Operation time : 1 sec)	82 L / min (Vacuum ON)
Power consumption	60W	2.5W
Fuse	ϕ 5.2 × 20 mm 250V(125V)/1.0 ~ 1.5A	

ARF-700F



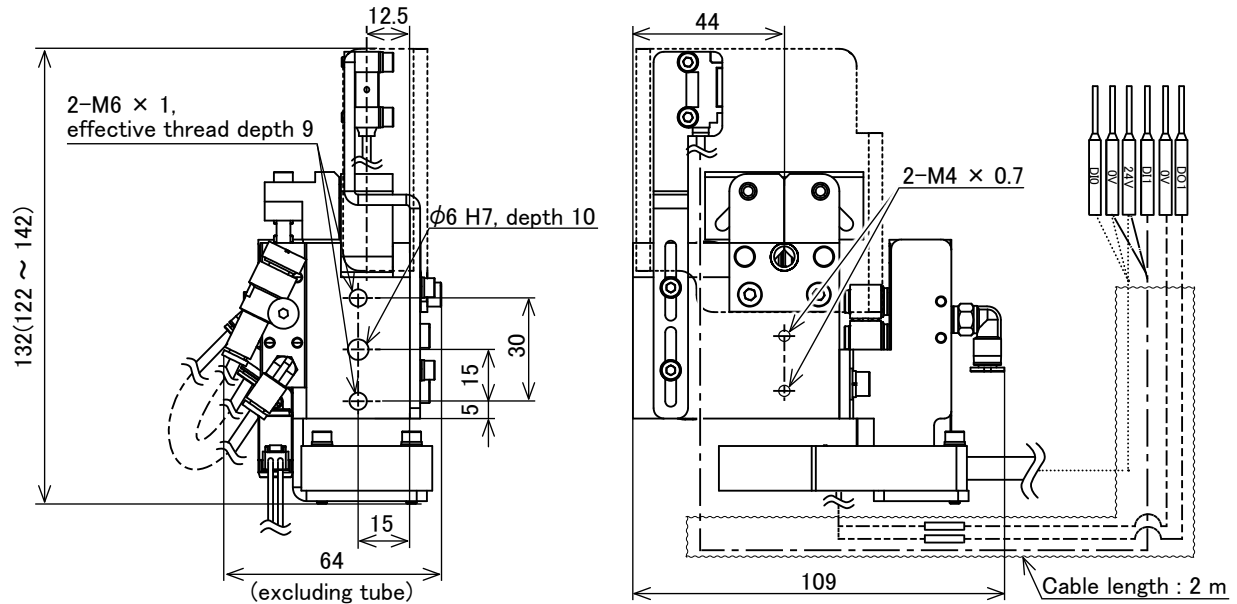
R2A1-UR



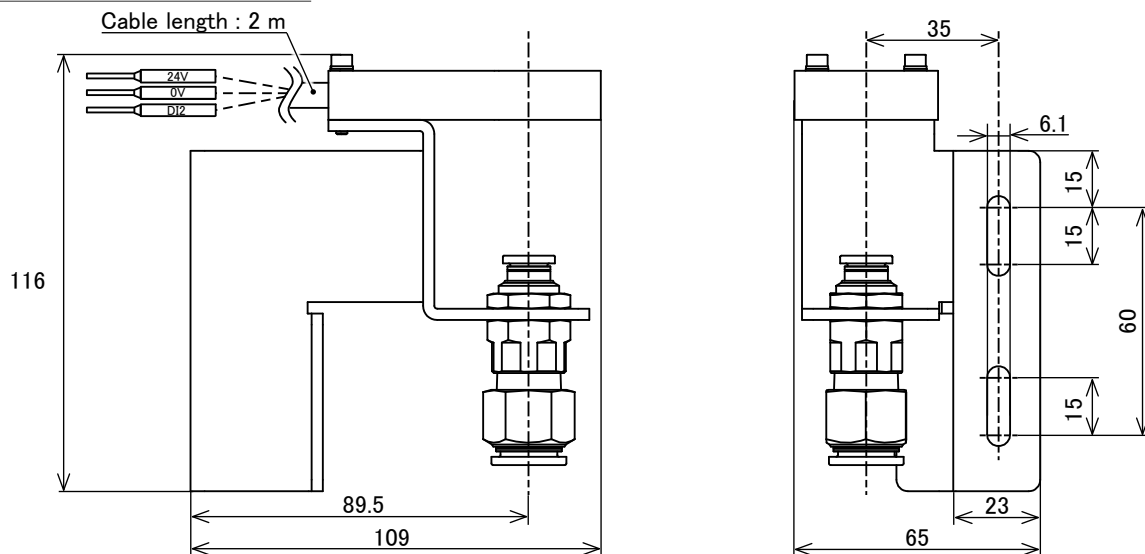
	X[mm]	Y[mm]	Z[mm]
Tool Center Point (TCP)	0	-90	180.7
Center of Gravity (reference)	0	-11	49

Unit Name	Control Box Connection Unit		
Each Unit Names	Feed Head Unit	Mandrel Ejection Unit	ARF-700 Connection Cable
Cable length	2m		Overall length 6m
Depth × Height × Width	64mm × 132mm (122 ~ 142) × 109mm	65mm × 116mm × 109mm	
Weight	720 g	390 g	230 g

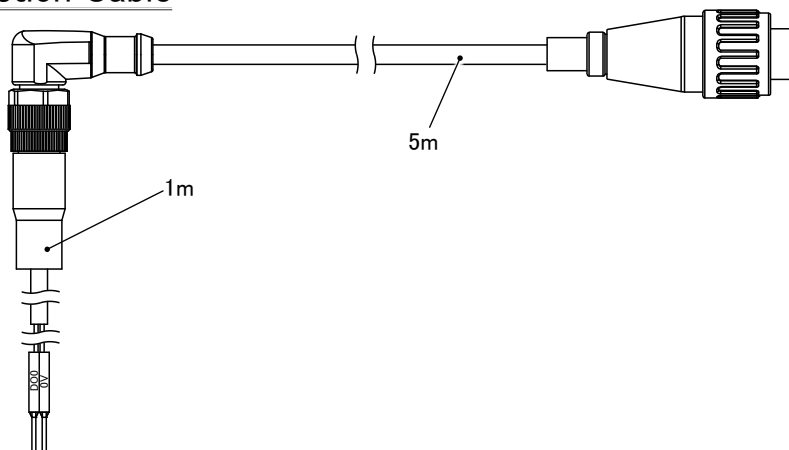
Feed Head Unit



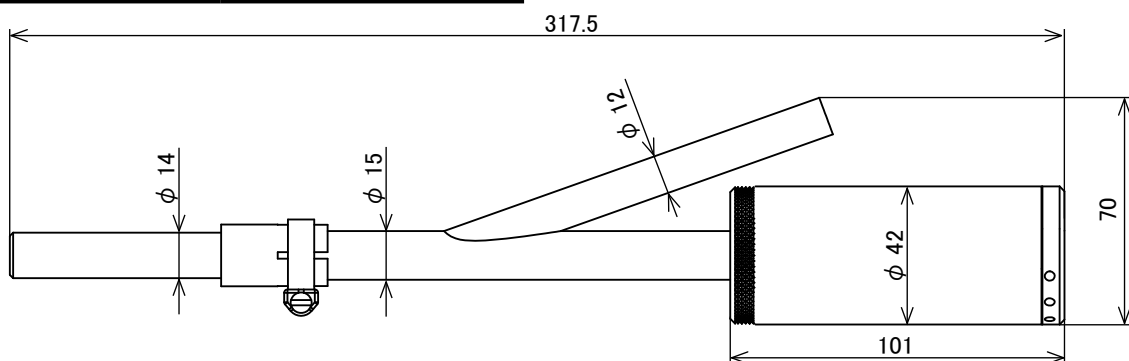
Mandrel Ejection Unit



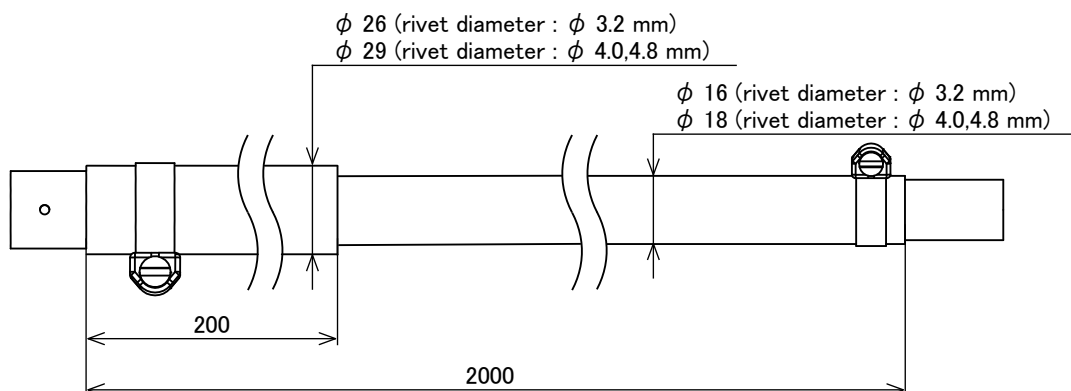
ARF-700 Connection Cable



Unit Name	Guide Shaft Unit
Depth × Height × Width	42mm × 317.5mm × 70mm
Weight	250 g

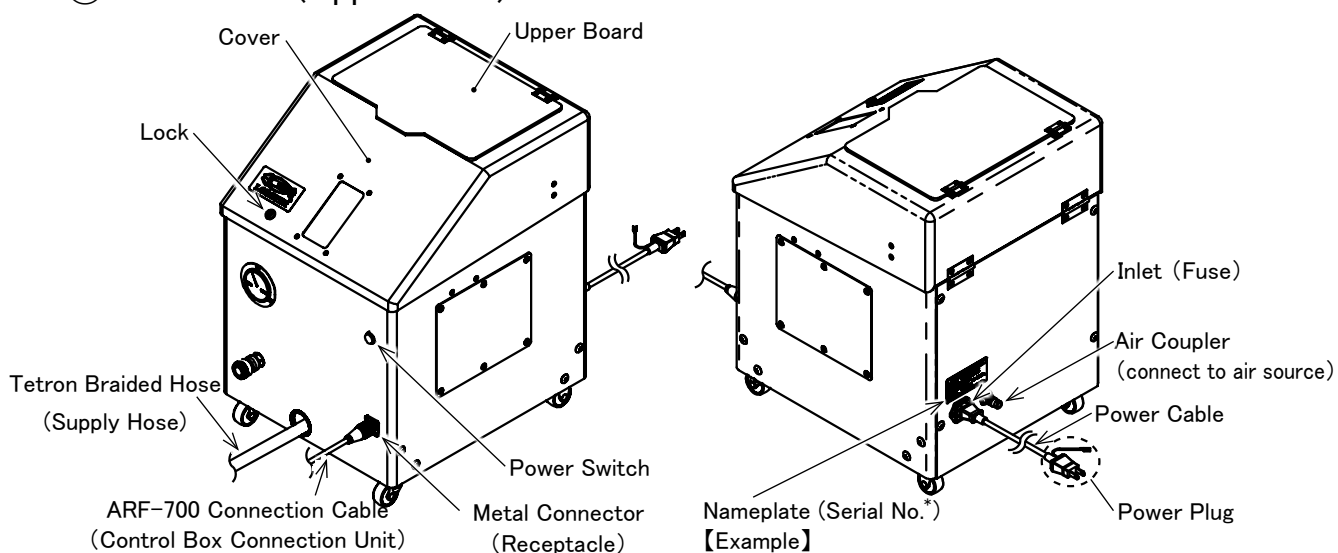


Unit Name	Supply Hose
Hose length	2 m
Weight	550 g



4-5. Main Parts Names of Each Unit

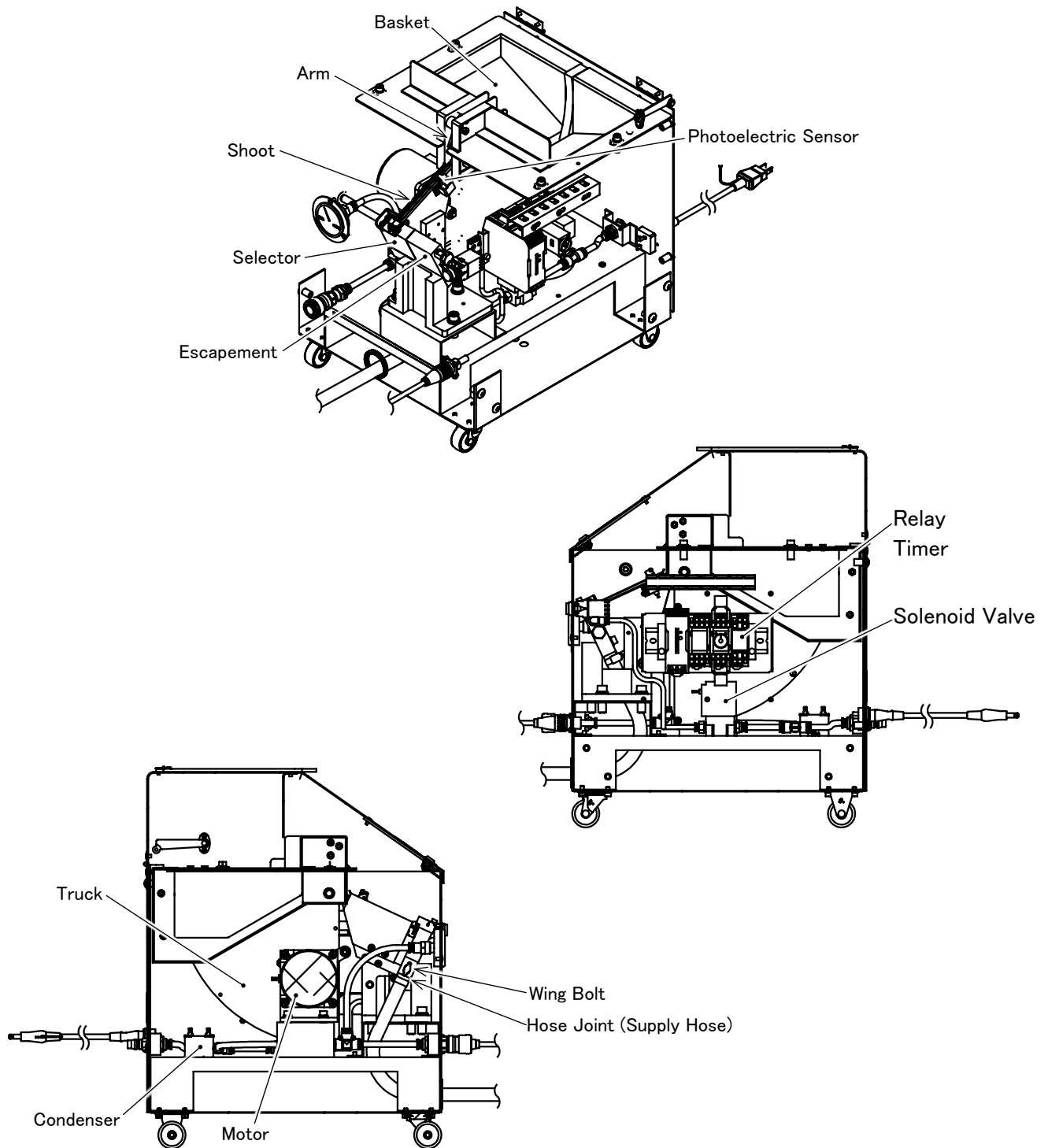
① ARF-700F (Appearance)



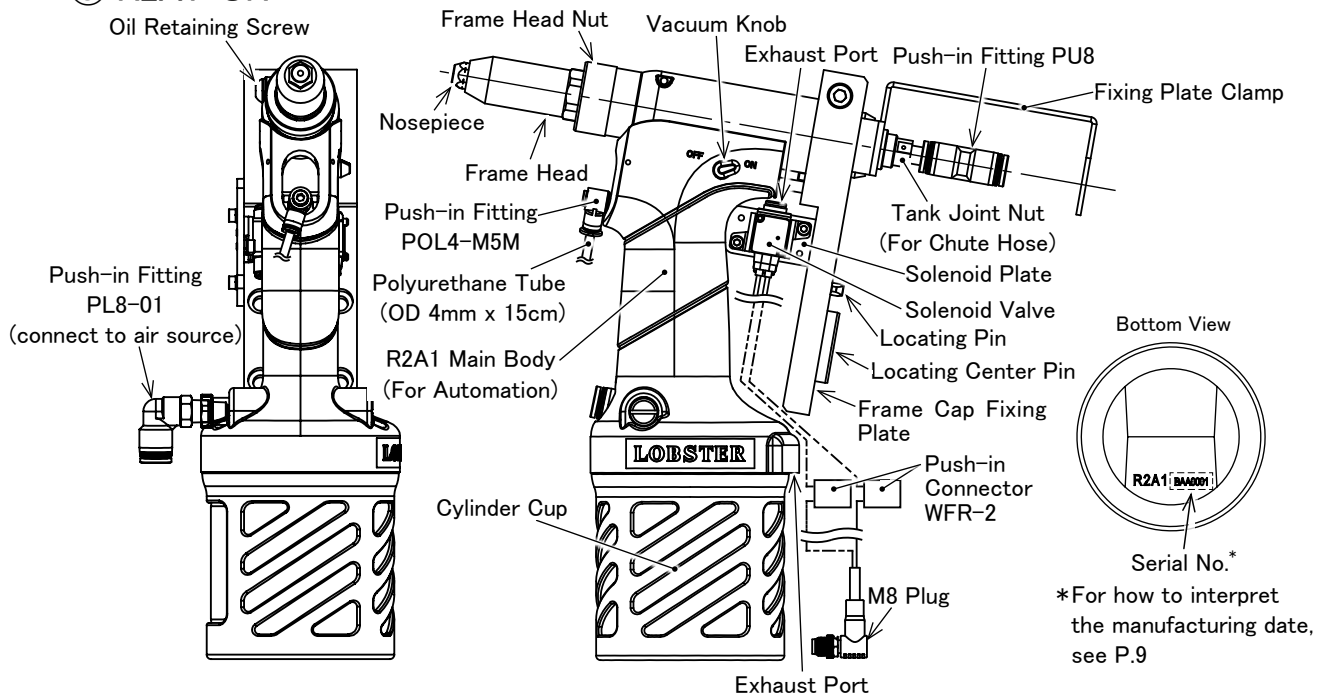
*For how to interpret the manufacturing date, see P.9.

② ARF-700F (Inside)

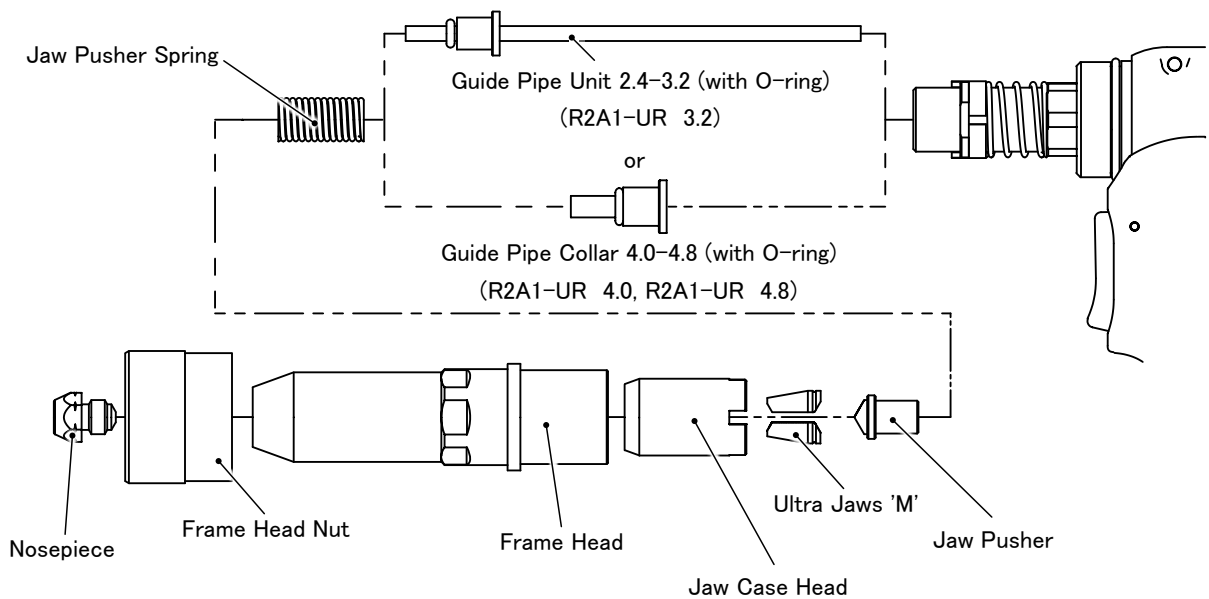
If you have any questions about the parts shown in the figure below or their names, refer to the supplied ARF-700F Instruction Manual and Technical Manual.



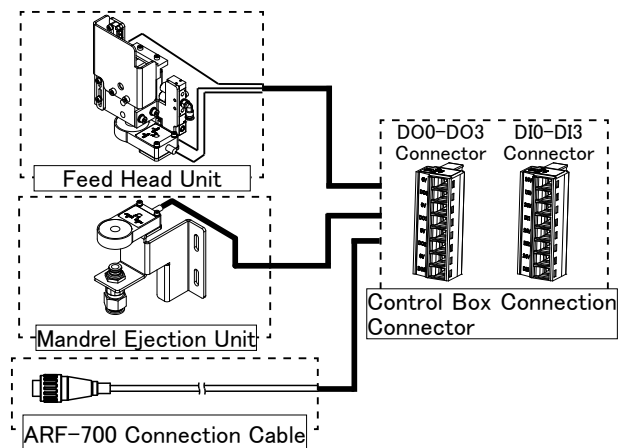
③ R2A1-UR



④ R2A1-UR (Inside the Frame Head)



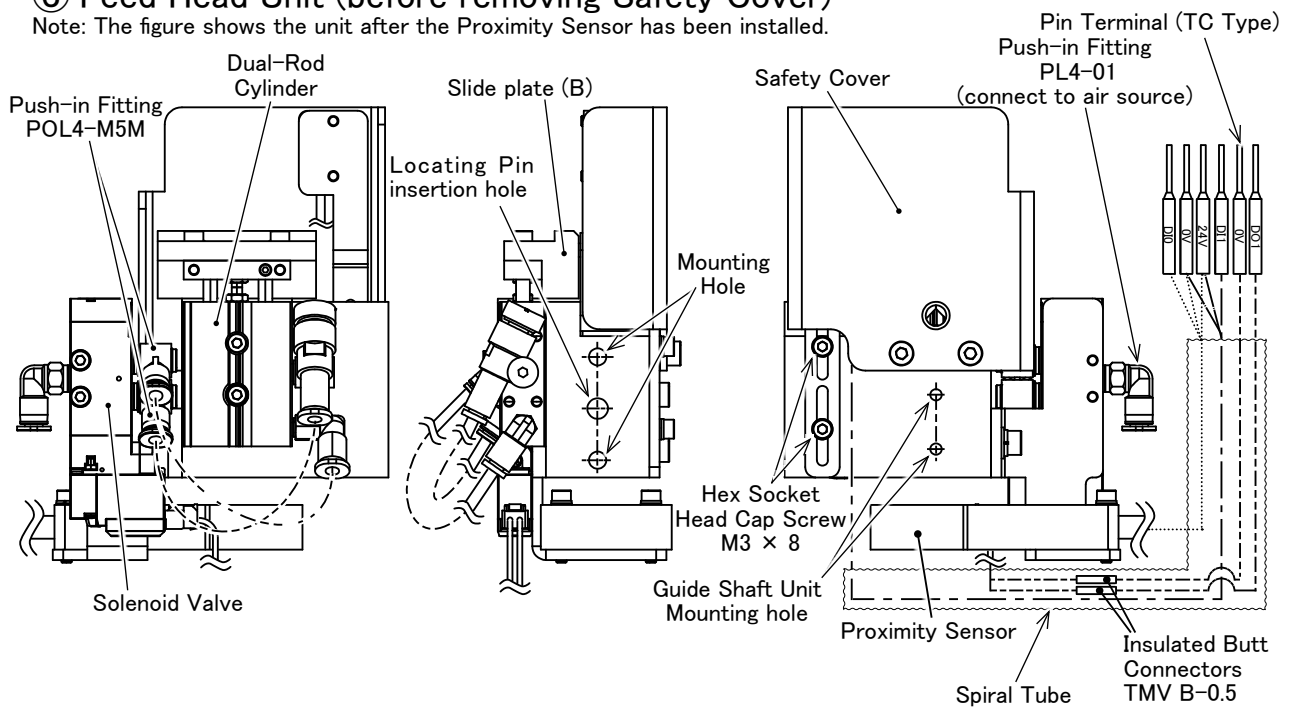
⑤ Control Box Connection Unit



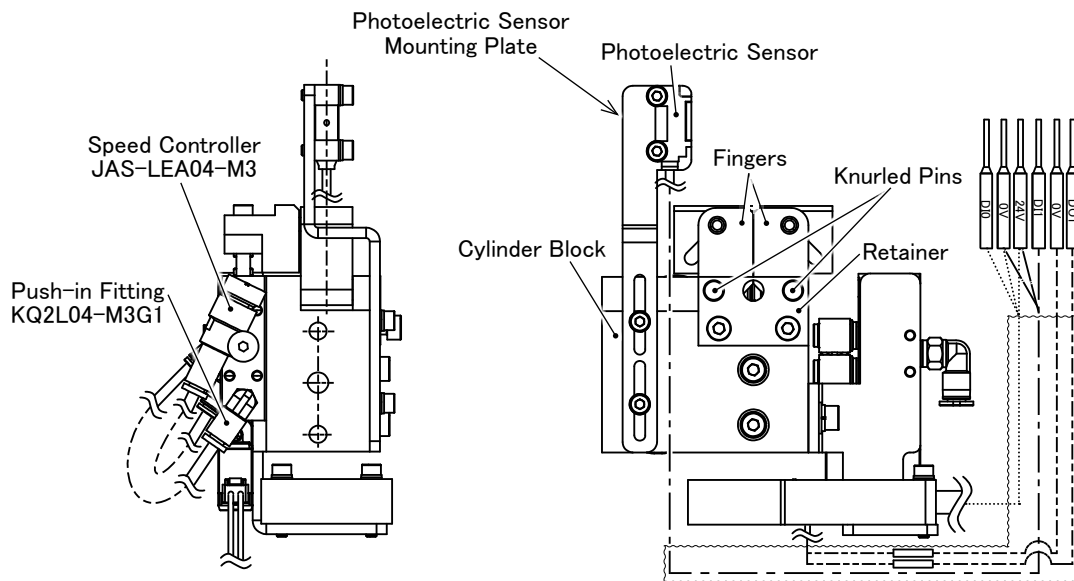
*Each unit and cable is connected to the D10-D13 connector and the D00-D03 connector.

⑥ Feed Head Unit (before removing Safety Cover)

Note: The figure shows the unit after the Proximity Sensor has been installed.

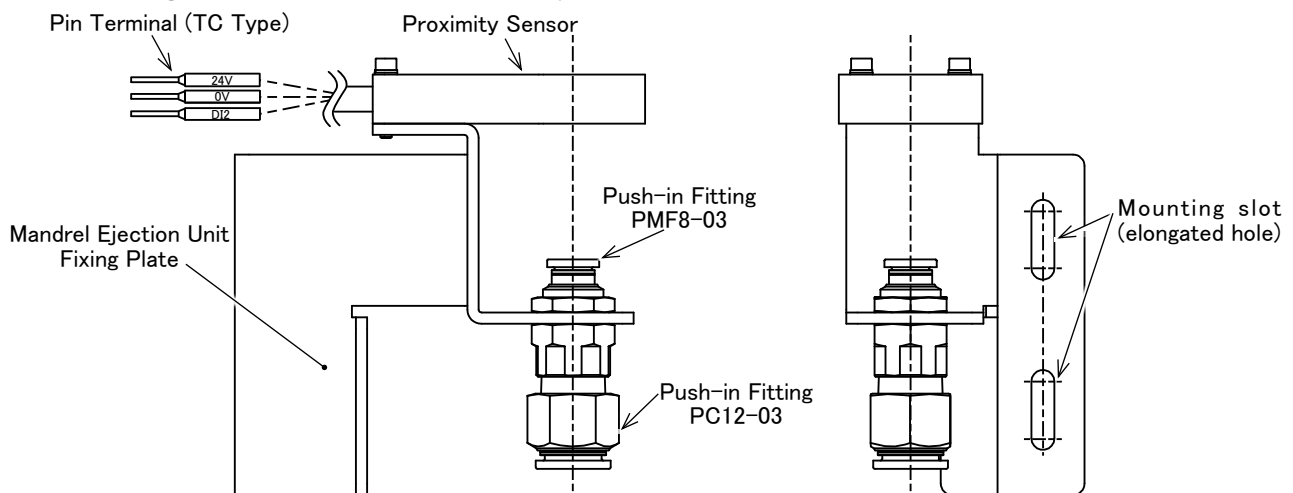


⑥ Feed Head Unit (after removing Safety Cover)

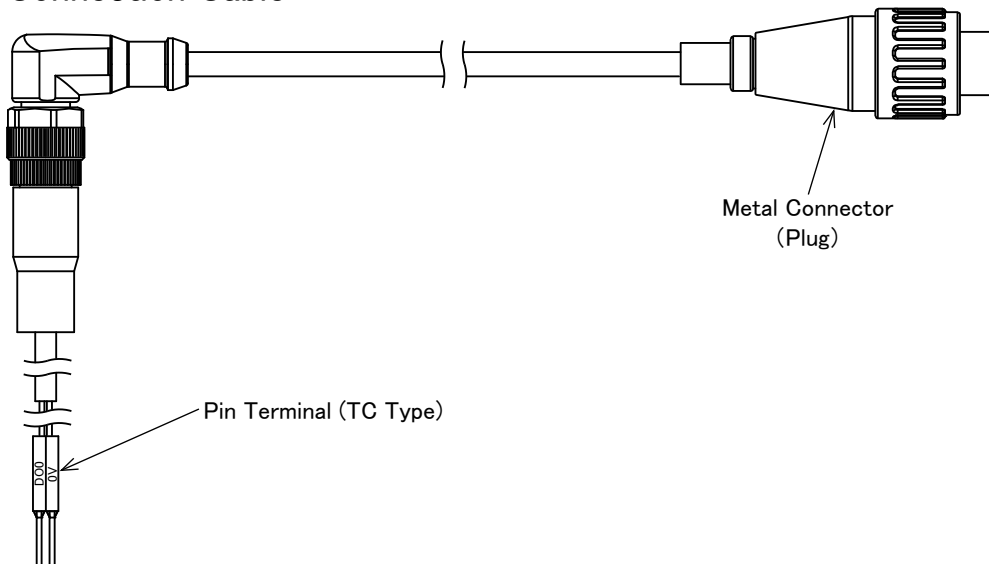


⑦ Mandrel Ejection Unit

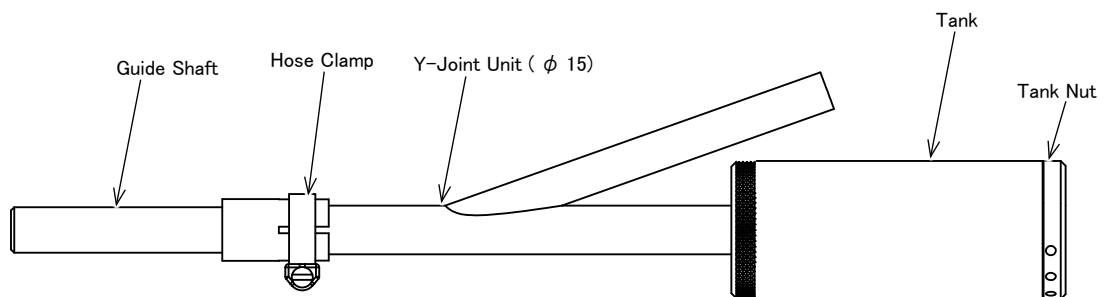
Note: The figure shows the unit after the Proximity Sensor has been installed.



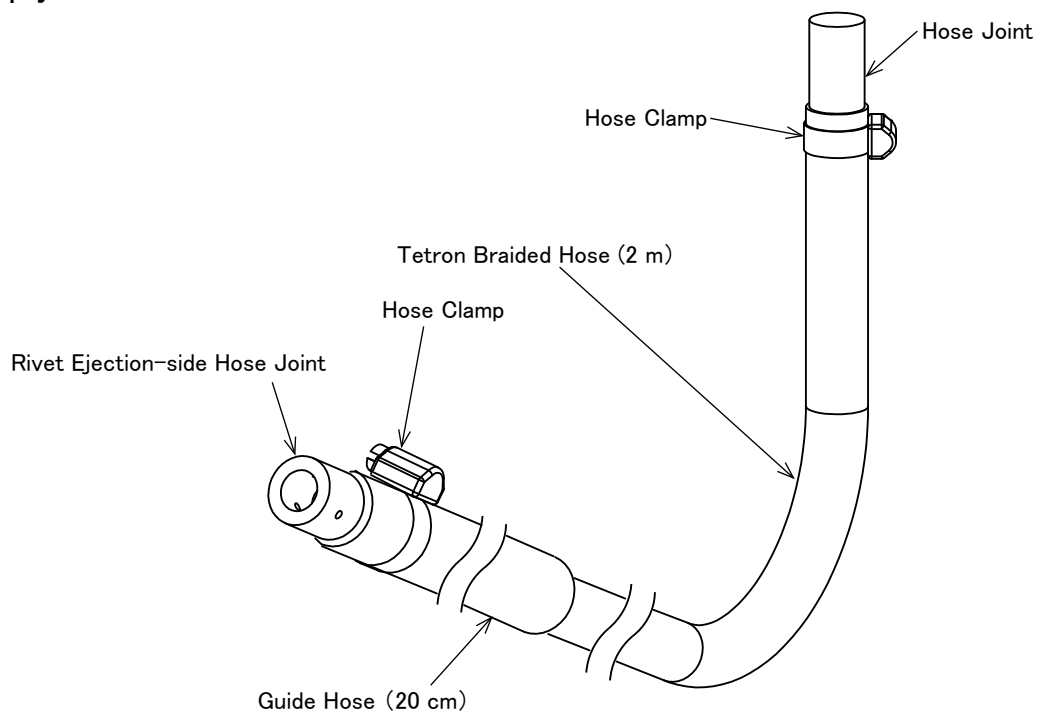
⑧ ARF-700 Connection Cable



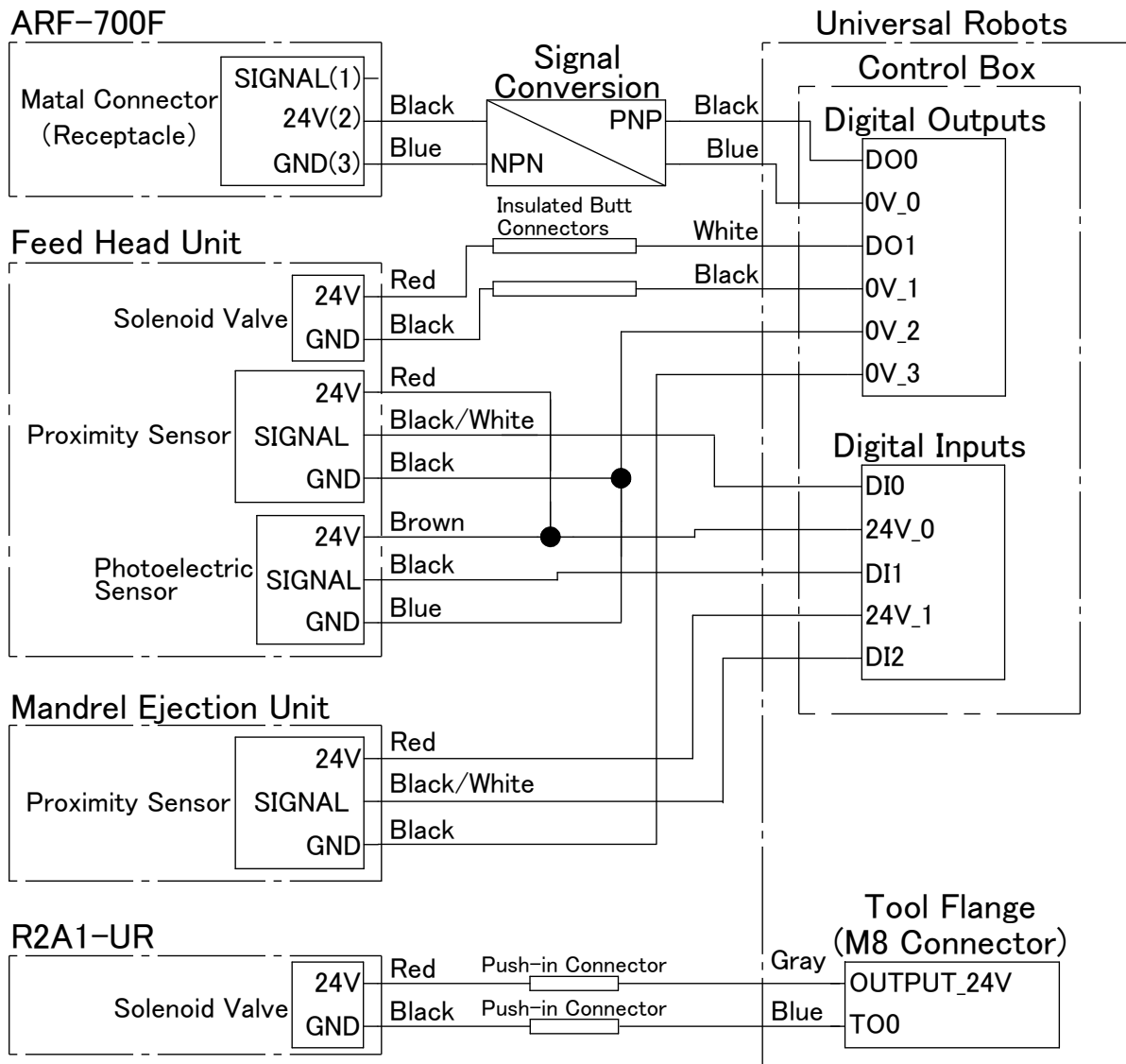
⑨ Guide Shaft Unit



⑩ Supply Hose



4-6. I/O Connection Diagram



Digital Outputs (DO)

DO	Destination	Port name	Operation
0	ARF-700F	Rivet feed request output port	Feed a rivet
1	Solenoid Valve (Feed Head Unit)	Fingers open/close output port	Fingers open/close
7	-	Error output port	Error output to external equipment

Digital Inputs (DI)

DI	Destination	Port name	Signal overview
0	Proximity Sensor (Feed Head Unit)	Rivet Proximity Sensor input port	Rivet passage
1	Photoelectric Sensor (Feed Head Unit)	Photoelectric Sensor input port	Rivet set confirmation
2	Proximity Sensor (Mandrel Ejection Unit)	Mandrel Proximity Sensor input port	Mandrel ejection

Tool Outputs (TO)

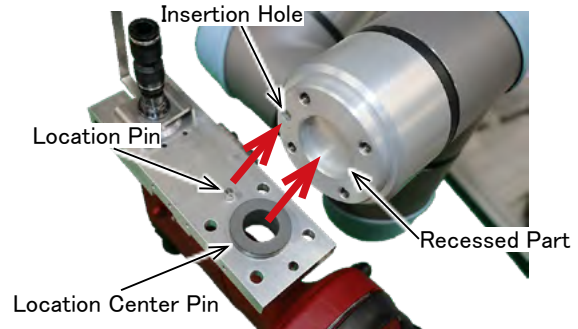
TO	Destination	Port name	Operation
0	Solenoid Valve (R2A1-UR)	Riveting output port	Riveting

5. HOW TO SET UP

Until instructed otherwise in this chapter, KEEP THE ROBOT POWER TURNED OFF during assembly for safety.

5-1. Set up R2A1-UR

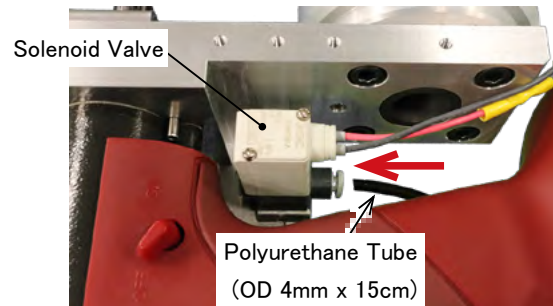
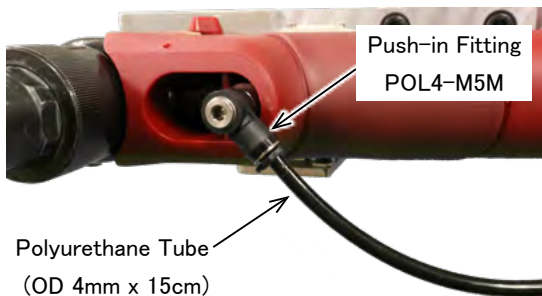
- ① Push the Frame Cap Fixing Plate of the R2A1-UR till it touches to the tool flange of robot. Make sure the Location Pin fits into the insertion hole, and the Location Center Pin fits into the recessed part.



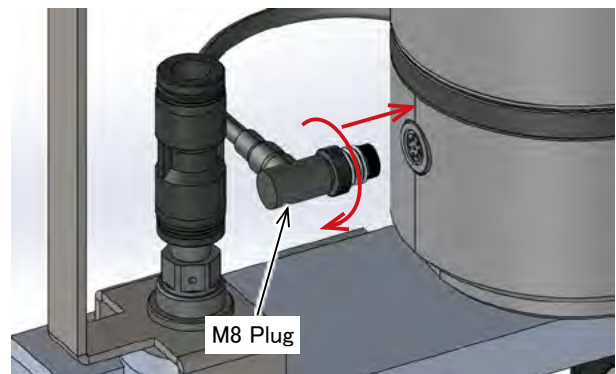
- ② Secure the R2A1-UR to Robot by tightening 4 Hex Socket Head Cap Screws (M6 × 10) which were included.



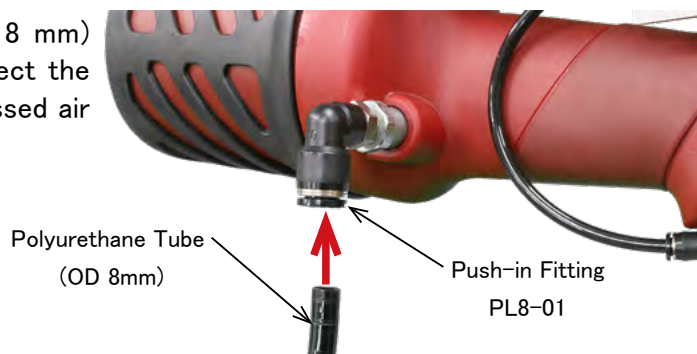
- ③ Connect the Polyurethane Tube (OD 4mm × 15cm) already connected to the Push-in Fitting POL4-M5M to the Solenoid Valve.



- ④ Connect a Solenoid Valve's M8 Plug to M8 receptacle on the side of the flange.

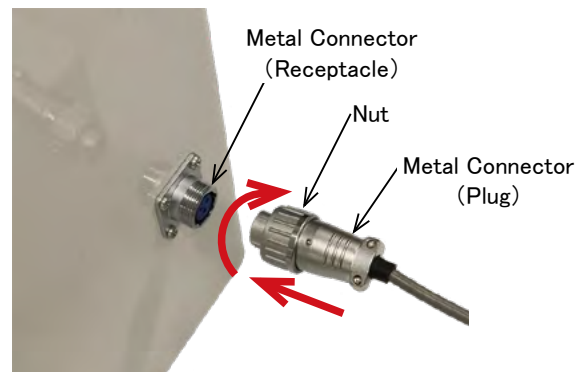
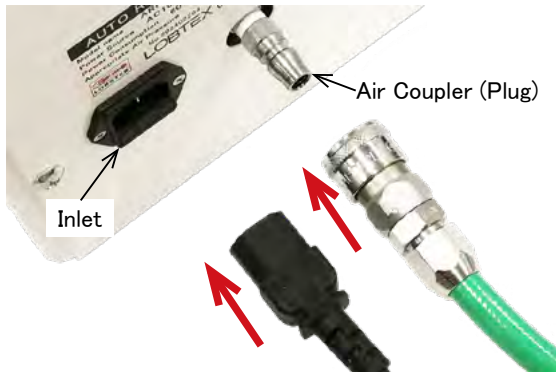


- ⑤ Connect a Polyurethane Tube (OD 8 mm) to the Push-in Fitting PL8-01. Connect the other end of the Tube to the compressed air source.

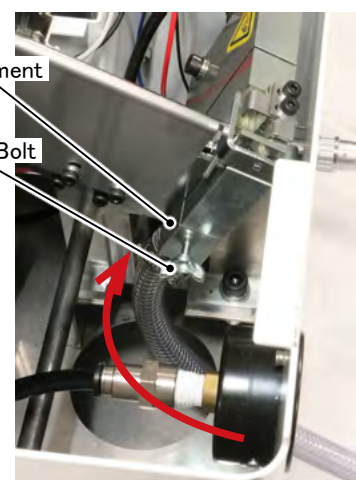
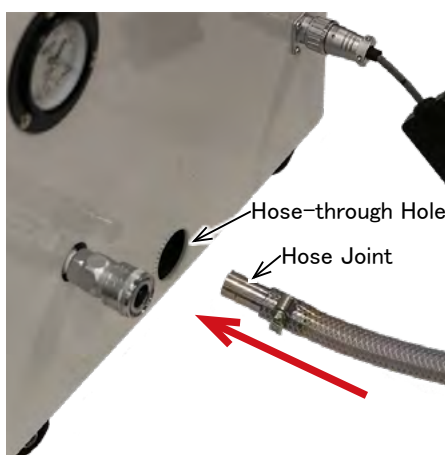
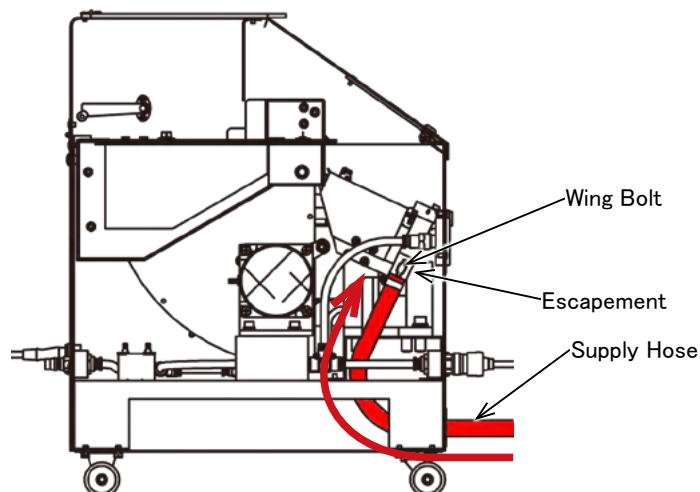


5-2. Set up ARF-700F

- ① .Place the ARF-700F at any position
- ② .Connect the Power Cable to the Inlet on the rear of the ARF-700F. Connect an air hose to the Air Coupler (Plug). Connect the other end of the air hose to the compressed air source.
- ③ .Connect the Metal Connector (Plug) to the Metal Connector (Receptacle) on the front.
 - The metal connector has a keyway (mis-insertion prevention groove). Align the positions, then push in while turning the nut on the Plug to connect



- ④ .Unlock ARF-700F's cover and open it.
- ⑤ .Connect the supply hose to the ARF-700F.
 - Put through the Hose Joint of Supply Hose to the hole on the front of the ARF-700F, and plug it into the hole at the bottom of the Escapement. Secure the Supply Hose by tightening the Wing Bolt.



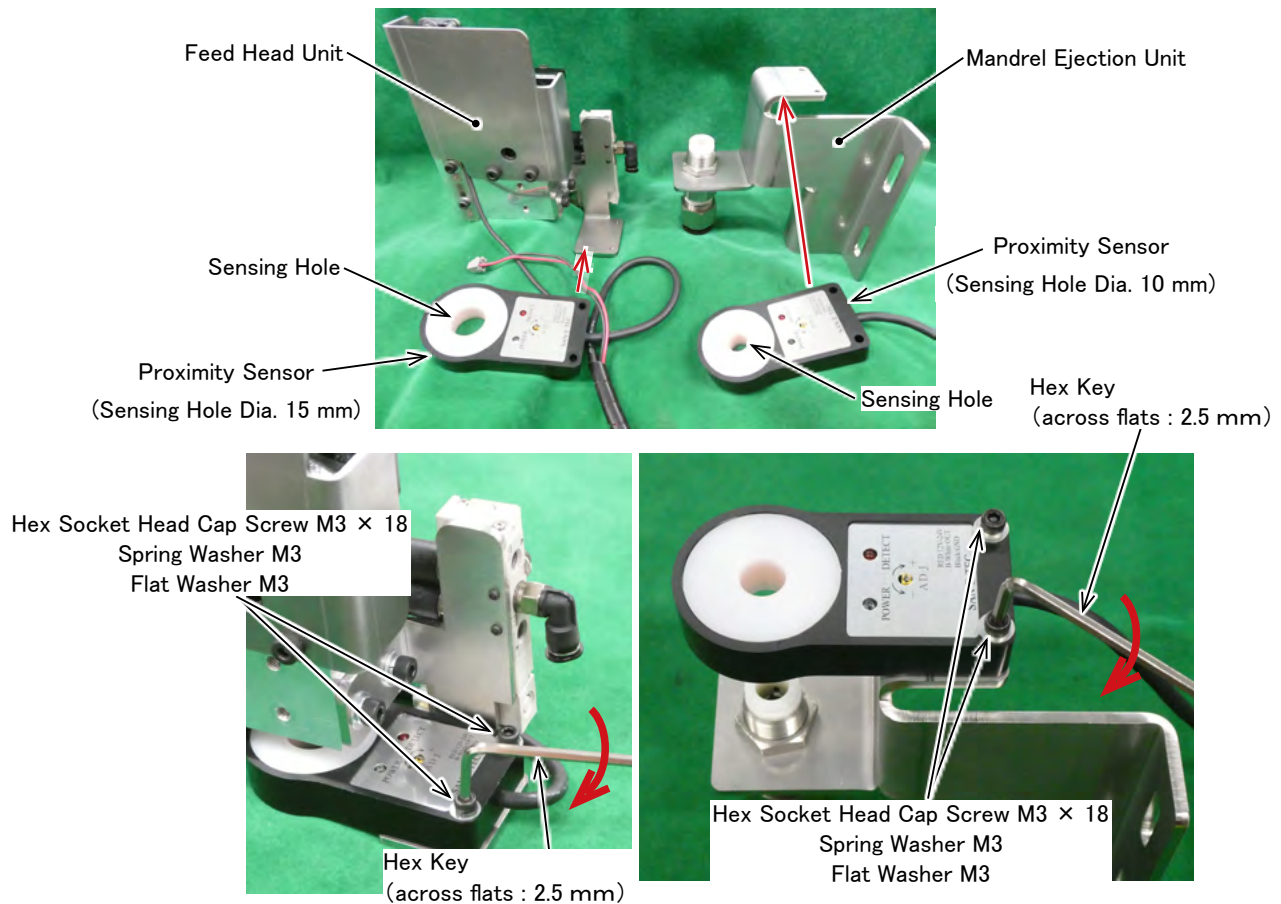
⚠ CAUTION

- Rivets pass through the Supply Hose. Please observe the allowable bending radius(15cm). The rivets can get stuck inside the Hose when navigating tight bends.

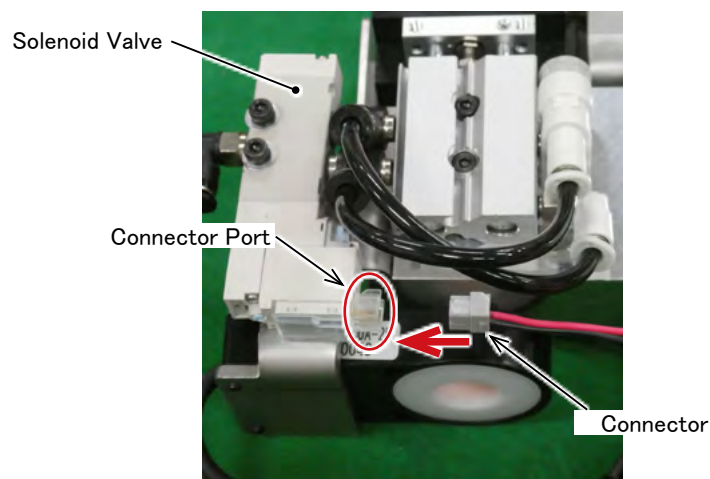
- ⑥ .Close the Cover and lock it.

5-3. Set up Feed Head Unit/Mandrel Ejection Unit

- ① .Secure the Proximity Sensors to the Feed Head Unit and the Mandrel Ejection Unit using the supplied Hex Socket Head Cap Screws M3 × 18, Spring Washers M3, and Flat Washers M3. Use two of each for each sensor.



- ② .Connect the Connector to the Solenoid Valve on the Feed Head Unit.



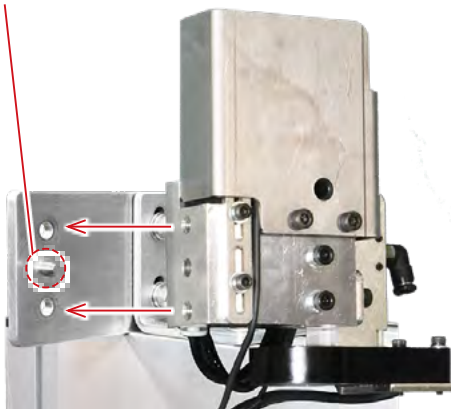
③ .Secure the Feed Head Unit / the Mandrel Ejection Unit at any position with bolts or screws (M6).

- There is an insertion hole for Locating Pin on the Cylinder Block of the Feed Head Unit. Confirm the insertion hole's position and size referring to “4-4. Detailed Specifications of Each Unit” (P.11). You can secure it with the Pin that you prepared on your own as you like.

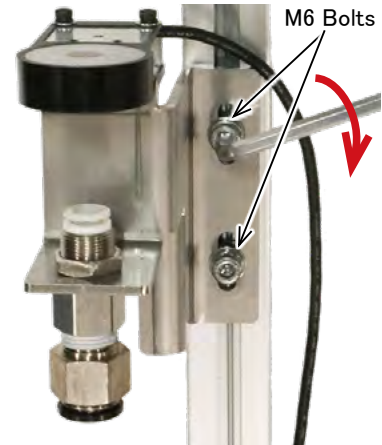
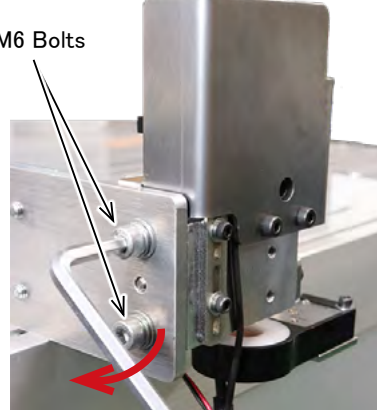
⚠ CAUTION

- Set up the Feed Head Unit / the Mandrel Discharge Unit referring to “3-3. Installation Conditions” (P.7). It can cause rivet feeding or mandrel ejection failures if they aren't set up correctly.

If you use locating pins, prepare them in advance.

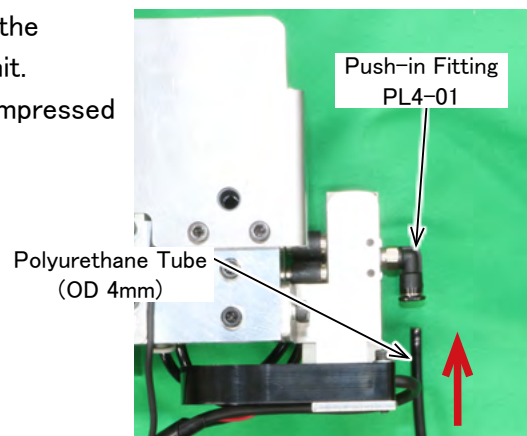


Installation example
“Feed Head Unit”



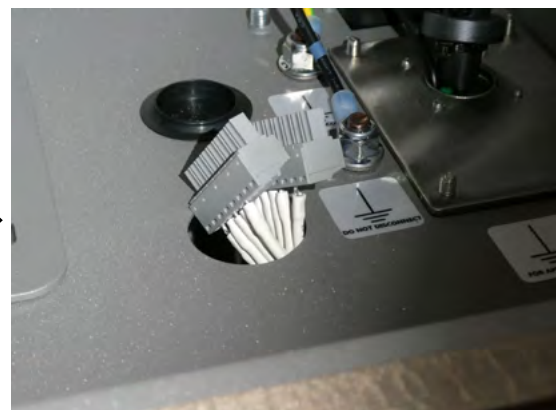
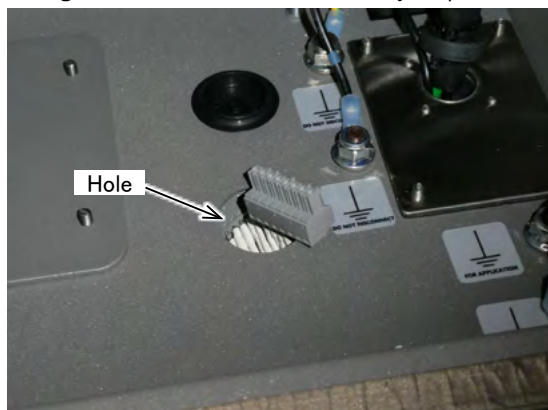
Installation example
“Mandrel Ejection Unit”

- ④ .Connect a Polyurethane Tube (OD 4mm) to the Push-in Fitting PL4-01 of the Feed Head Unit. Connect the other end of the tube to the compressed air source.



5-4. Connect Control Box Connection Unit to Robot

- ① .Remove a Cable Cover on the bottom of the Control Box.
 - ② .Put through the DI0-DI3 Connector and the DO0-DO3 Connector to the hole.
- Pass the connectors through one at a time. If you try to pass two connectors at the same time, they may not fit through the hole and the terminals may be pulled out of the connector.

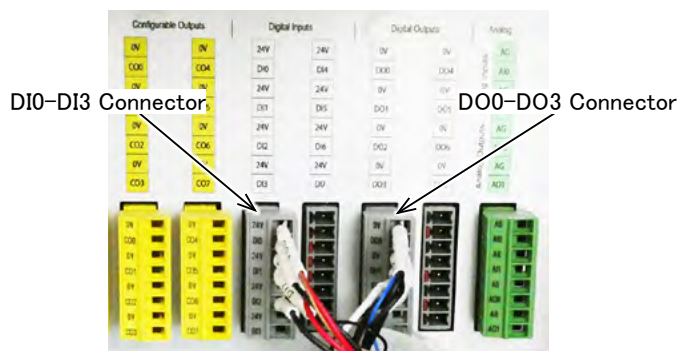


③ .Plug in the DI0-DI3 Connector and the DO0-DO3 Connector.

- Unplug if there are any plugs plugged in before plugging the DI0-DI3 Connector and the DO0-DO3 Connector.



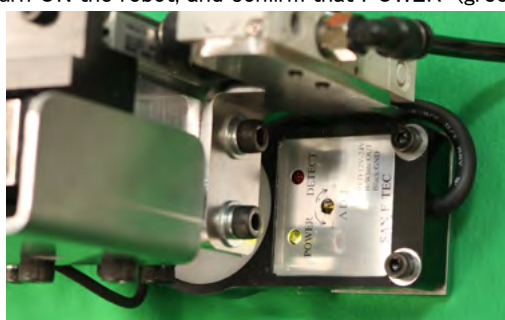
DI0-DI3 Connector DO0-DO3 Connector



5-5. Adjust the Sensors of Feed Head Unit and Mandrel Ejection Unit

① .Start up the robot

- Turn ON the robot, and confirm that POWER (green LED) on each sensor is lit.



Proximity Sensor (Feed Head Unit)



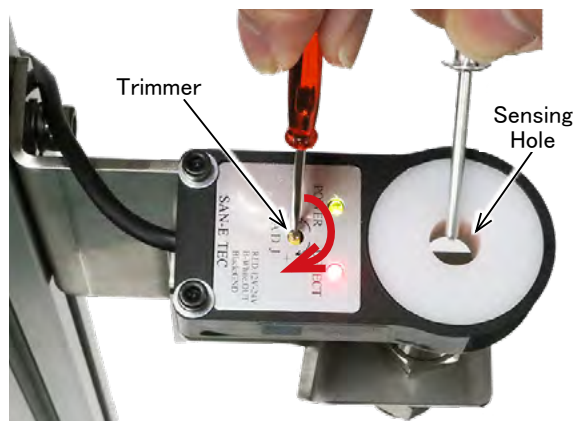
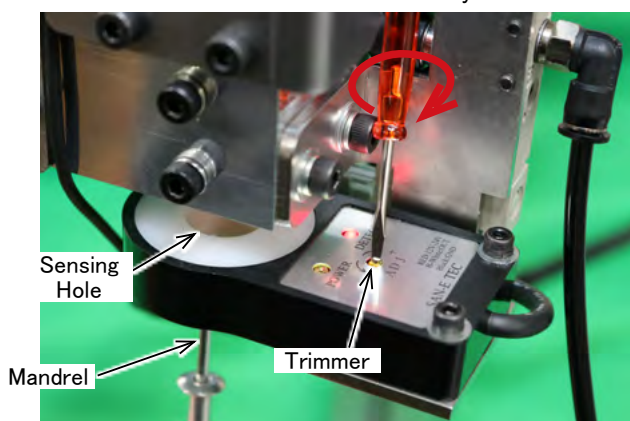
Proximity Sensor (Mandrel Ejection Unit)



Photoelectric Sensor (Feed Head Unit)

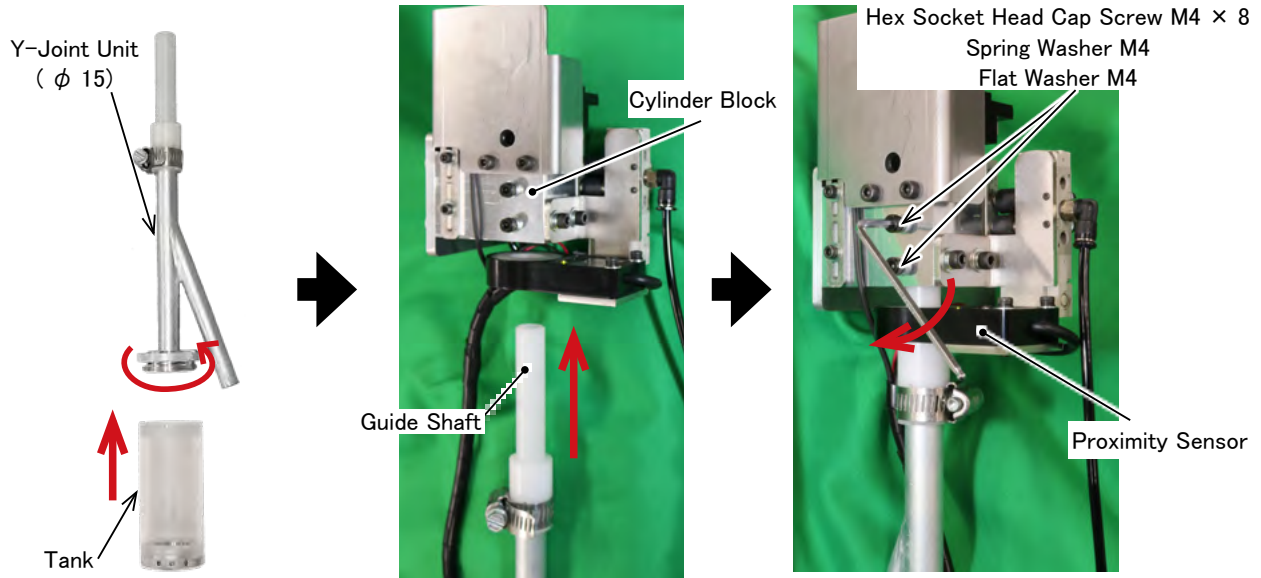
② .Adjust the sensor sensitivity of the Feed Head Unit and the Mandrel Ejection Unit.

- Use the flathead screwdriver which was included to adjust the sensor sensitivity.
- If DETECT (red LED) lights even though no metal object is passing through the sensing hole, turn the trimmer counterclockwise until the LED turns off.
- With the mandrel of the rivet you use positioned at the center of the sensing hole, turn the trimmer clockwise until DETECT (red LED) turns on.
- Insert and remove the mandrel through the sensing hole several times. If detection is insufficient, turn the trimmer further clockwise to increase sensitivity.



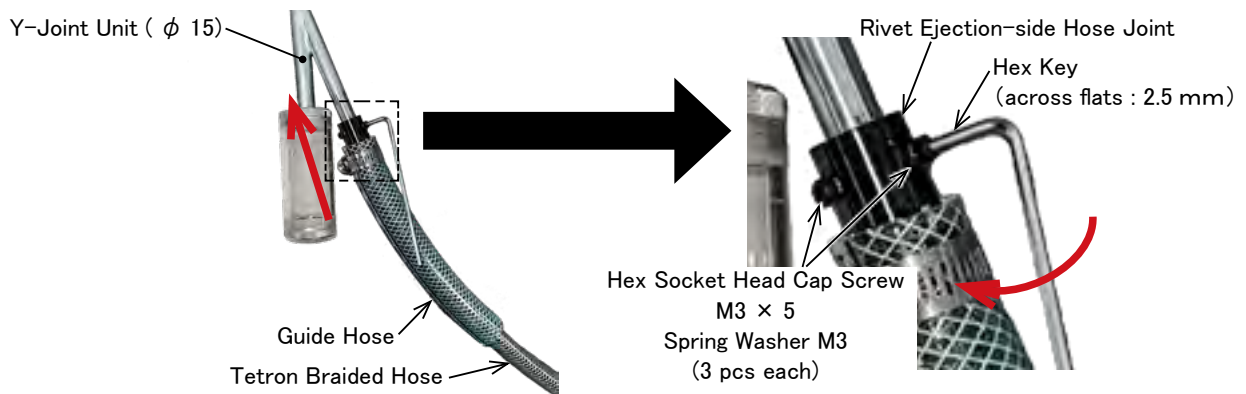
5-6. Assembling and Installing Guide Shaft Unit

- ① .Screw the Tank onto the Y-Joint Unit (ϕ 15).
 - ② .Insert the Guide Shaft of the assembled Guide Shaft Unit fully into the Cylinder Block of the Feed Head Unit (until the stepped portion of the Guide Shaft contacts the Proximity Sensor), then secure it using the supplied Hex Socket Head Cap Screws M4 $\times$ 8, Spring Washers M4, and Flat Washers M4 (2 pcs each).
- Confirm that the Guide Shaft Unit cannot come out.

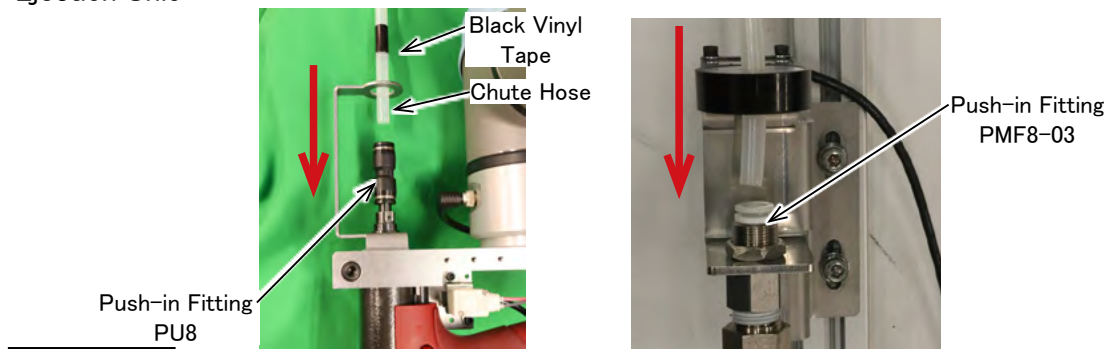


5-7. Routing the Supply Hose and Chute Hose

- ① .Insert the Rivet Ejection-side Hose Joint of the Supply Hose into the Y-Joint Unit (ϕ 15), and fasten it at three locations using the supplied Spring Washer M3 and Hex Socket Head Cap Screws M3 $\times$ 5.



- ② .Insert the end of the Chute Hose with black vinyl tape into the Push-in Fitting PU8 on the R2A1-UR, and insert the other end into the Push-in Fitting PMF8-03 on the Mandrel Ejection Unit



⚠ CAUTION

- The recommended minimum bending radius of the Chute Hose is approximately 15 cm. Confirm that the Chute Hose is not bent excessively. Excessive bending may cause mandrel ejection failures.

6. URCap INSTALLATION AND TOOL SETUP

To program and teach with the robot, install URCap and enter the information for Air Riveter the R2A1-UR.

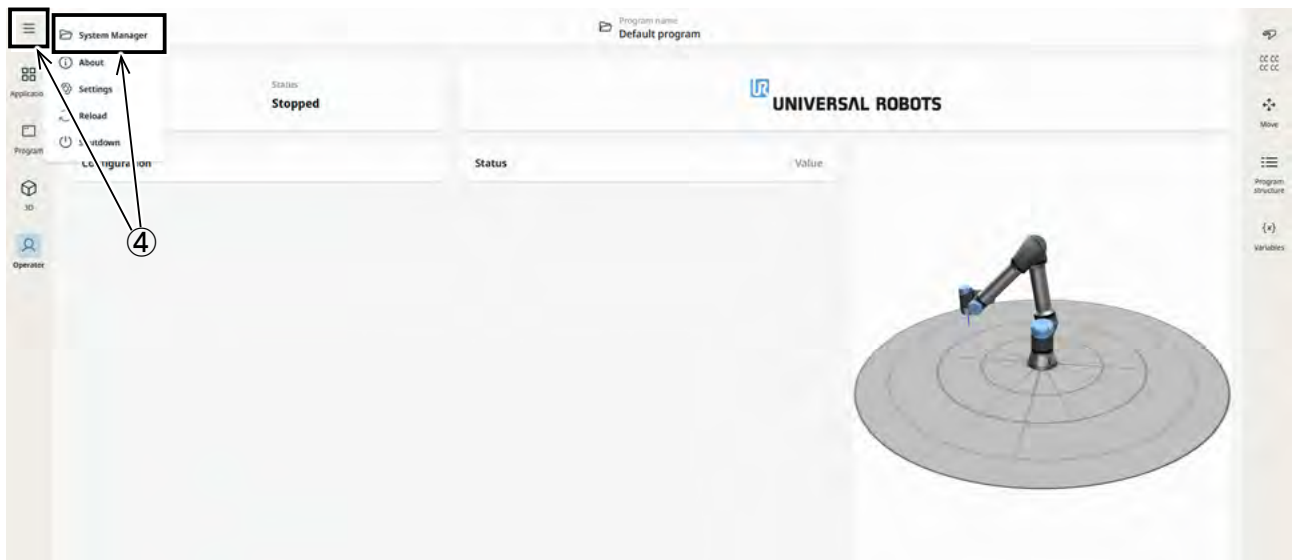
6-1. Installing URCap

To make programming riveting operations with this system easier, we provide URCap software dedicated to Universal Robots. Install it by following the procedure below.

⚠ CAUTION

● The system will restart during installation. If you have unsaved work, save it before starting the installation.

- ① .Prepare an empty USB flash drive.
- ② .Download the urcapx file (arur2a1ur-x.x.x.urcapx) from our website (<https://www.lobtex.co.jp/products/tabid/140/pdid/URplus/catid/141/Default.aspx>), and copy it to the USB flash drive prepared in step ① .
- ③ .Insert the USB flash drive into the Control Box. For the insertion location, refer to the robot user manual.
- ④ .After starting the robot, from the main navigation screen, tap [≡] tab ⇒ [System Manager].



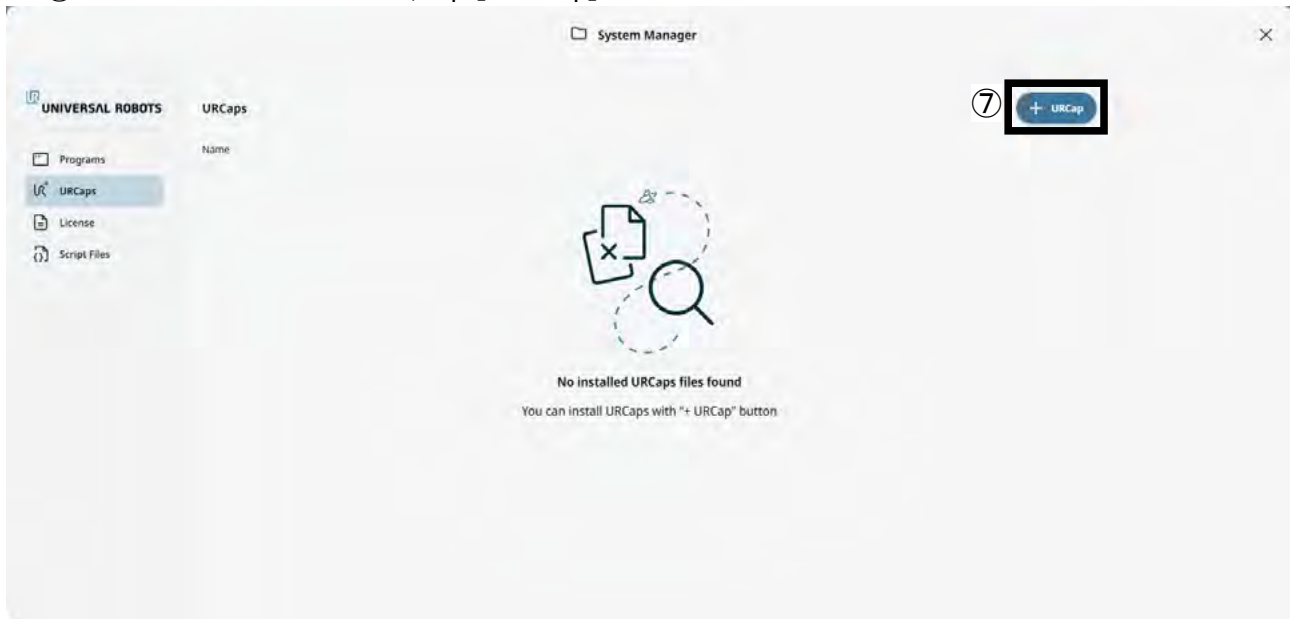
⑤ .In the [System Manager] panel, tap [URCaps] to switch the panel.

⑥ .Tap [Unlock] → enter the administrator password → tap [Confirm].

* If the administrator password has not been changed from the default “easybot”, change it to a new password by referring to the robot user manual before performing this procedure.



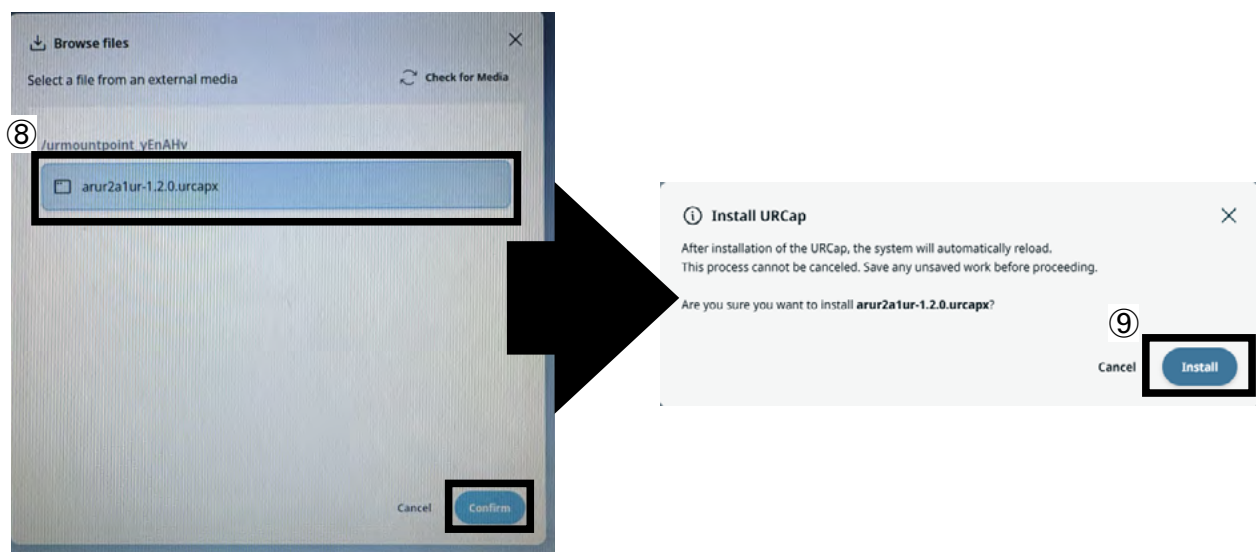
⑦. Once the lock is released, tap [+URCap].



⑧. Tap the urcapx file (arur2a1ur-x.x.x.urcapx) downloaded to the USB flash drive, then tap [Confirm].

⑨. The screen will switch to the installation screen. Tap [Install].

* When you tap it, the system restarts automatically. Save any unsaved work before installing.



⑪. After the restart is complete, URCap installation is finished. Remove the USB flash drive from the Control Box after shutting down the robot.

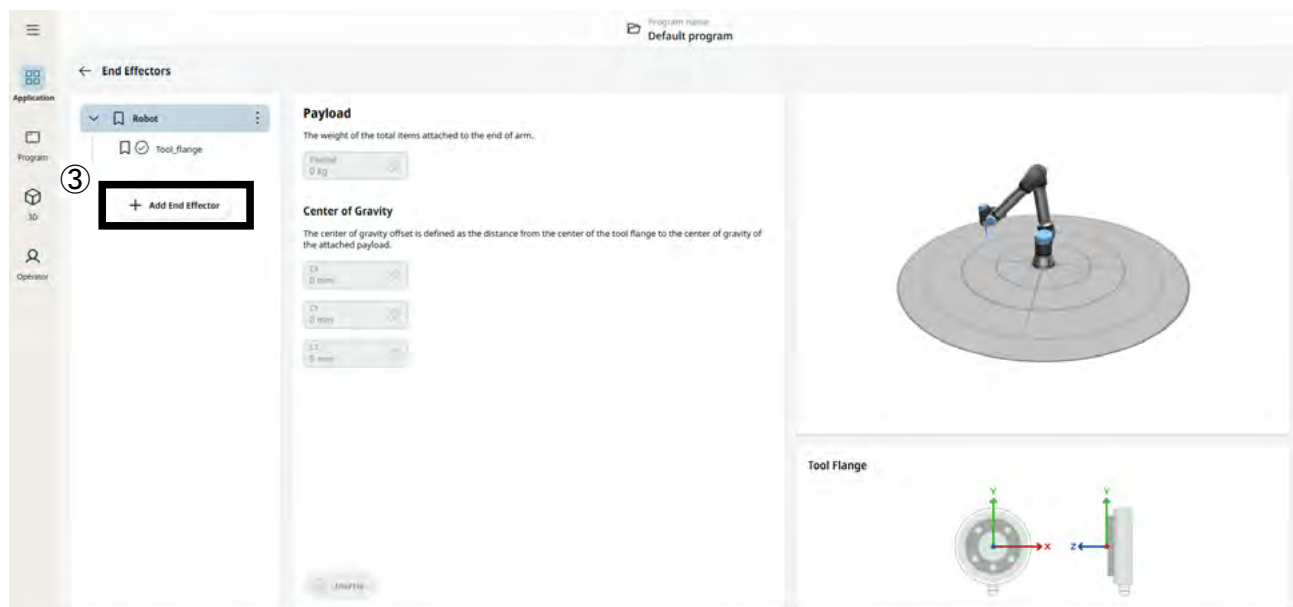
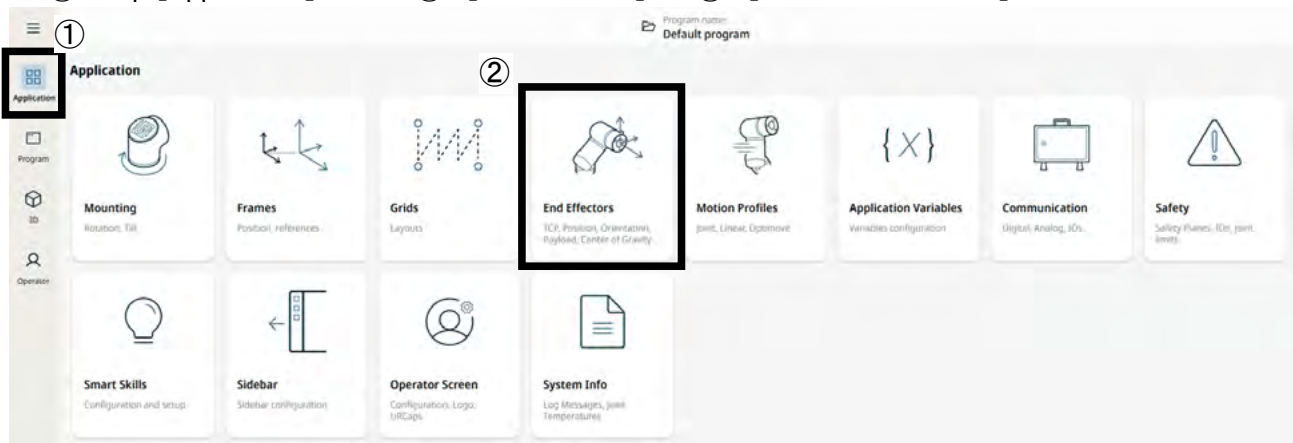
⚠ WARNING

● If you remove the USB flash drive while the robot is running, internal data may be damaged.

6-2. Tool Setup

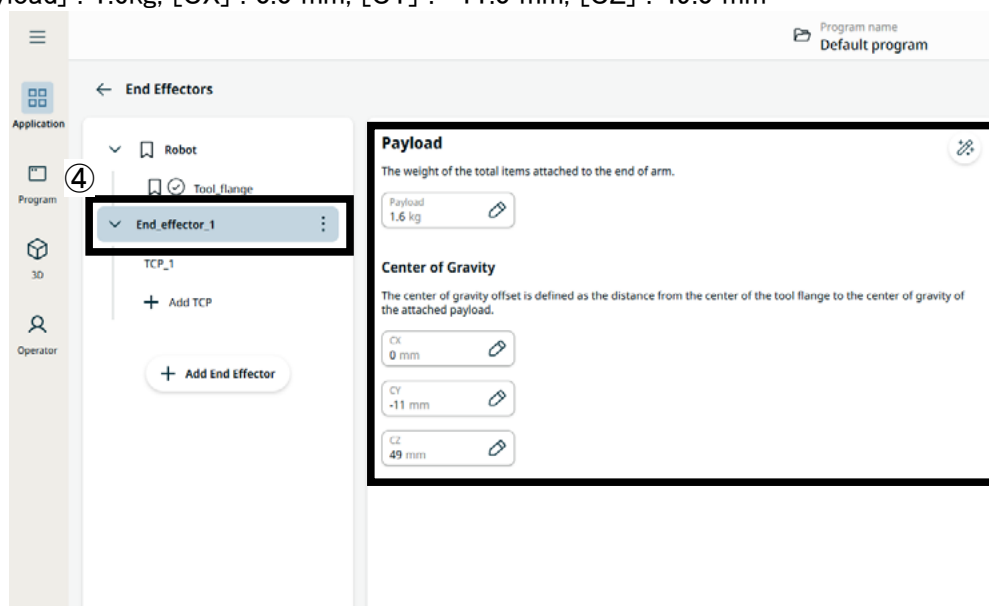
Enter the R2A1-UR weight, tool tip position, and center-of-gravity position shown in “4-4. Detailed Specifications of Each Unit” (P.10) by operating the teach pendant as described below.

① . Tap [Application] tab ⇒ ② . [End Effector] ⇒ ③ . [+ Add End Effector].

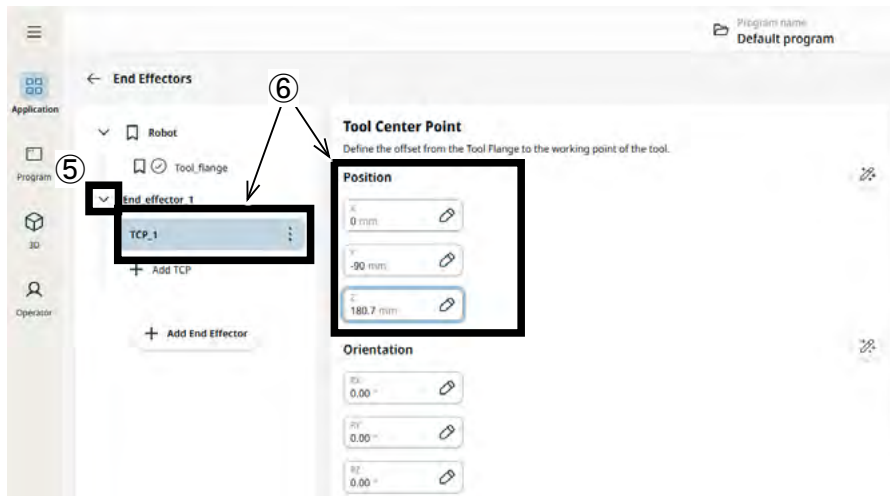


④ . Tap [End_effector_1] and enter the payload and center of gravity as follows:

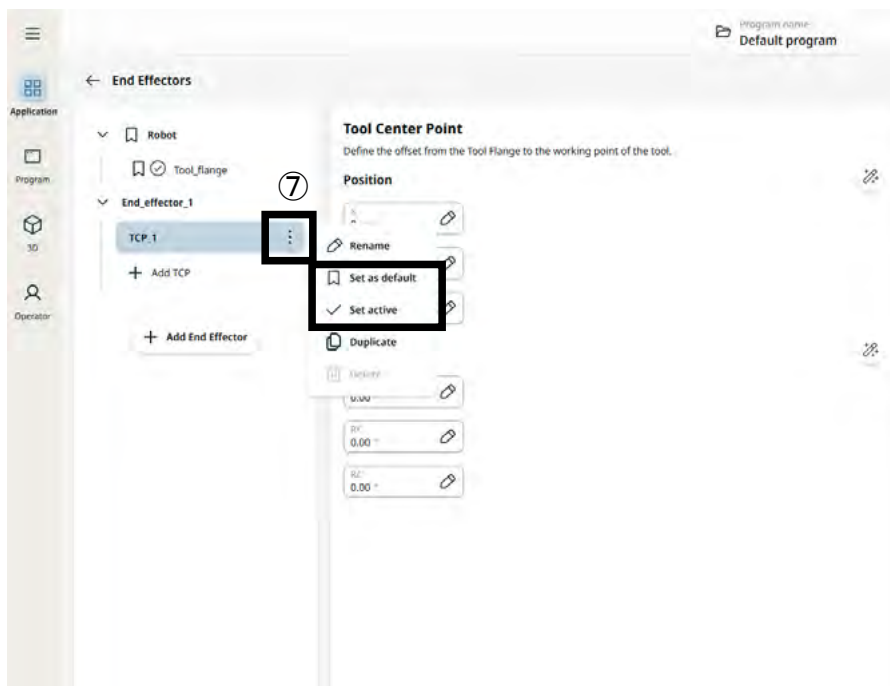
[Payload] : 1.6kg, [CX] : 0.0 mm, [CY] : -11.0 mm, [CZ] : 49.0 mm



- ⑤ .Tap the icon  to the left of [End_effector_1] to display [TCP_1].
- ⑥ .Tap [TCP_1] and enter the Tool Center Point (distance from the tool flange to the Nosepiece) as follows:
[X] : 0.0 mm, [Y] : -90.0 mm, [Z] : 180.7 mm



- ⑦ .Tap the icon  to the right of [TCP_1], then tap  to set [TCP_1] as the active TCP. If you use this system regularly, also tap the icon  to set it as the default TCP. The default TCP is automatically set as the active TCP when a program starts. For details, refer to the robot user manual.

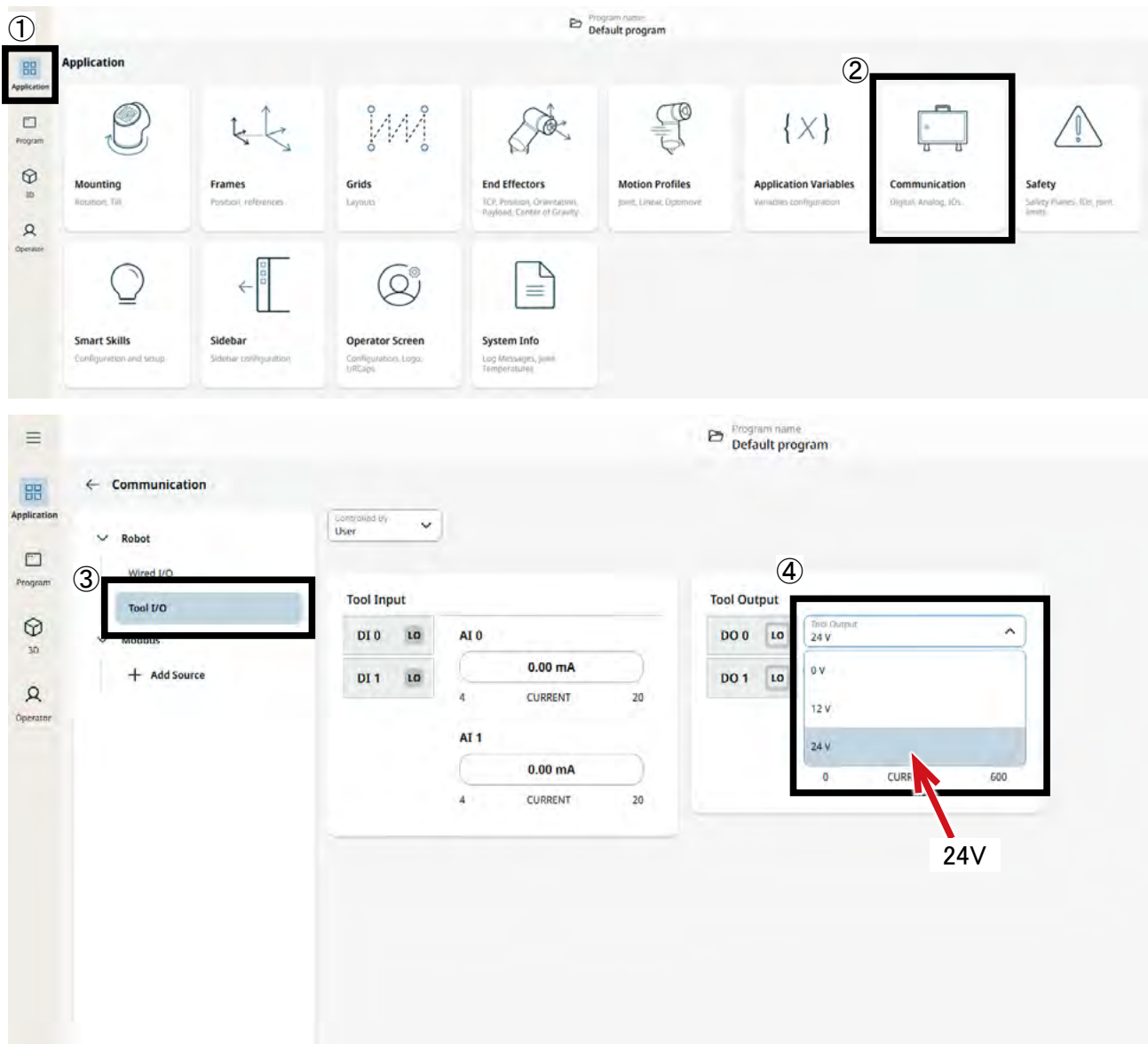


6-3. Setting the Tool Output Voltage

Set the output voltage for the Solenoid Valve installed on the R2A1-UR.

Tap ① [Application] tab ⇒ ② [Communication] ⇒ ③ [Tool I/O].

④ . Tap [Tool Output] → “24V” .

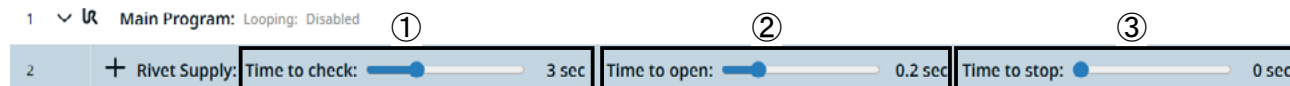


7. URCap

This section explains each URCap node. Read this together with “9. EXAMPLE OF OPERATING PROCEDURE” (P.39 ~ 41).

7-1. Rivet Supply

《Screen displayed when selecting the node》

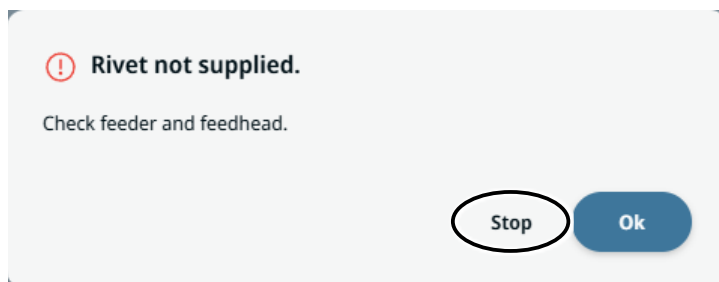


《Operation》

- A rivet is fed from the ARF-700F. When the rivet passes the Proximity Sensor of the Feed Head Unit, the Fingers open and rivet feeding stops. Each operation can be set using the parameters below.

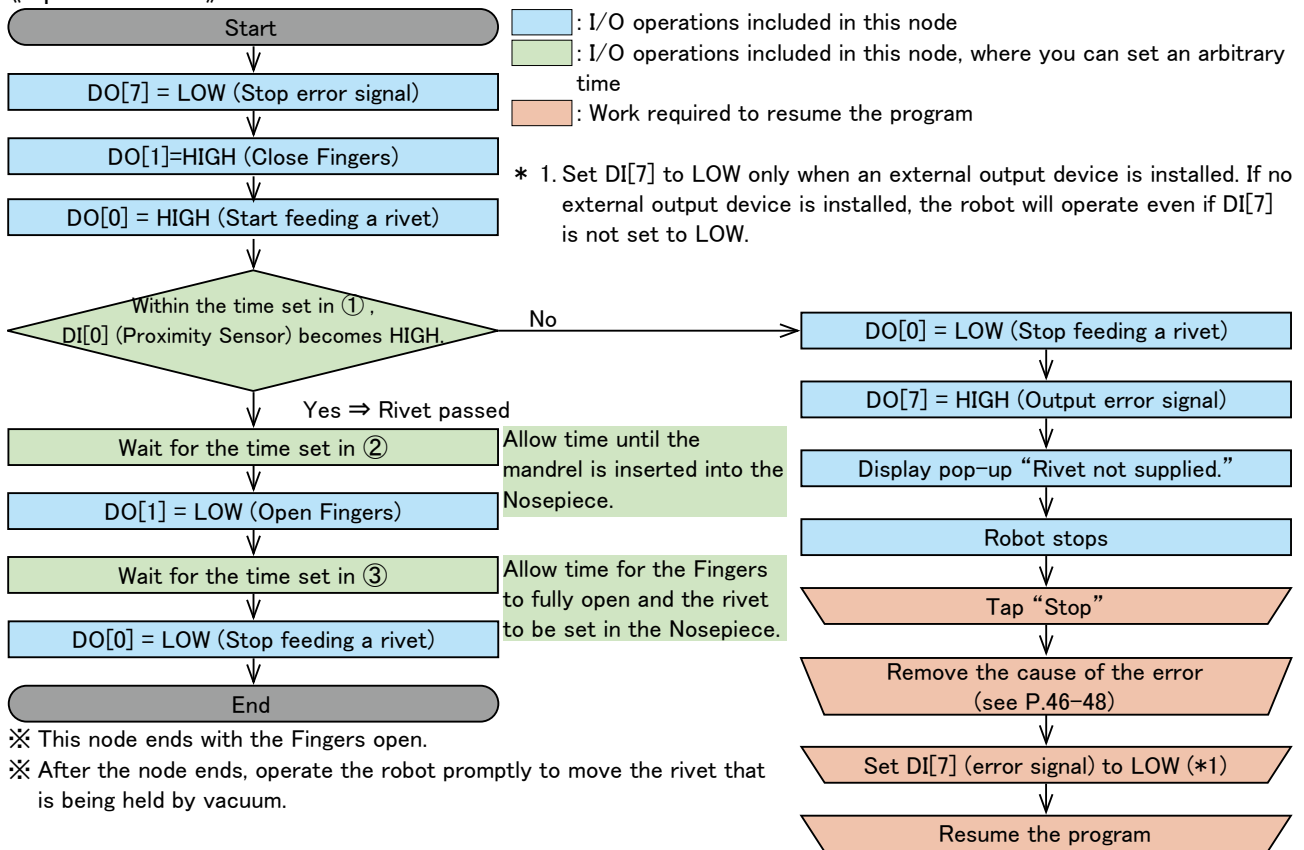
《Parameter description》

- ① .Maximum time for rivet pass judgment (default: 3 sec; adjustable range: 0-10 sec; step: 1 sec)
 - The maximum allowed time from the start of rivet feeding until the Proximity Sensor detects the rivet. If this time is exceeded, an error occurs and a pop-up like the one below is displayed. The robot motion and rivet feeding stop, and DO[7] goes HIGH as an error signal.
 - When the pop-up is displayed, tap “Stop” and remove the cause of the error. (See P.46 ~ 48)



- ② .Finger closed time (default: 0.2 sec; adjustable range: 0-1 sec; step: 0.1 sec)
 - Sets the time the Fingers remain closed after the rivet passes the Proximity Sensor, until the Fingers open on the Feed Head Unit.
- ③ .Feed stop delay time (default: 0 s; adjustable range: 0-1 s; step: 0.1 s)
 - Sets the time from when the Fingers open on the Feed Head Unit until feeding from the ARF-700F stops.

《Operation flow》



7-2. Rivet Check

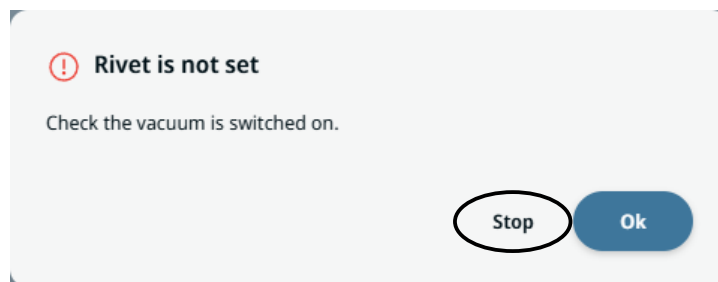
《Screen displayed when selecting the node》

1  **Main Program:** Looping: Disabled

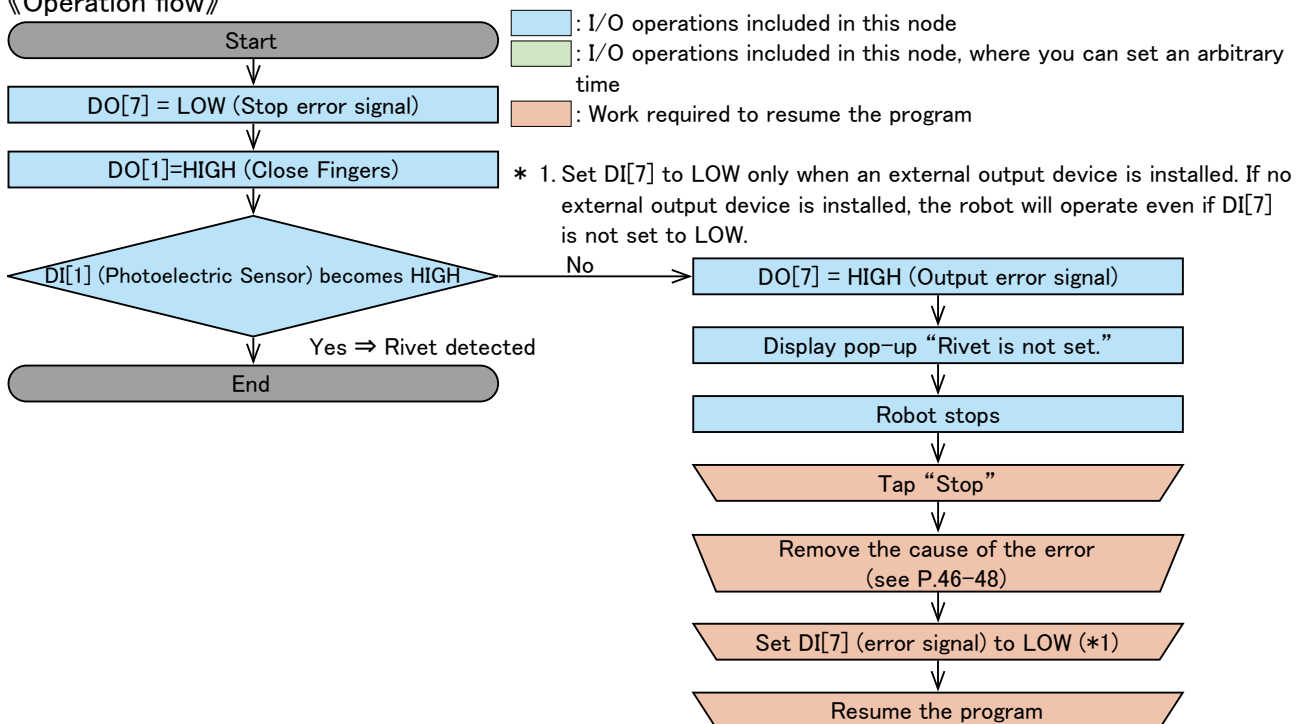
2  **Check a rivet by the optical sensor.**

《Operation》

- The Photoelectric Sensor checks whether a rivet is set in the Nosepiece of the R2A1-UR.
- If no rivet is set, DO[7] goes HIGH as an error signal. A pop-up such as the one below is displayed, and the robot stops. When the pop-up is displayed, tap “Stop” and remove the cause of the error. (See P.46 ~ 48.)

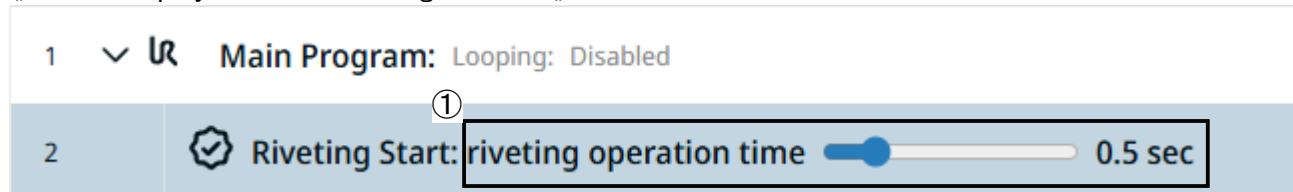


《Operation flow》



7-3. Riveting Start

《Screen displayed when selecting the node》



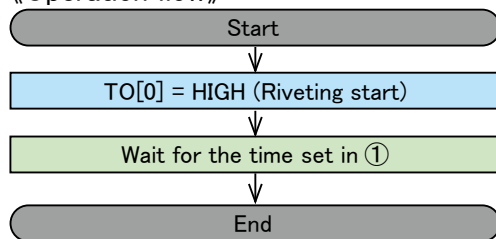
《Operation》

Rivet the rivet set in the Nosepiece of the R2A1-UR.

《Parameter description》

- ① .Time to turn ON the riveting switch (default: 0.5 sec; adjustable range: 0-3 sec; step: 0.1 sec)
- The riveting switch of the R2A1-UR goes HIGH for the set time to rivet the rivet.

《Operation flow》

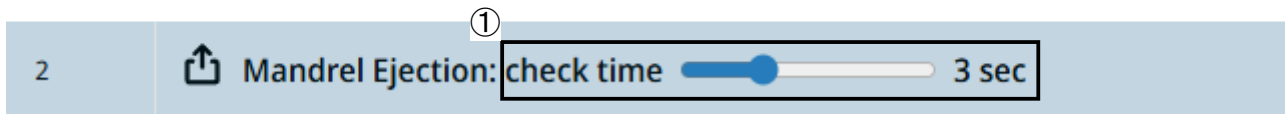


- : I/O operations included in this node
- : I/O operations included in this node, where you can set an arbitrary time

7-4. Mandrel Ejection

《Screen displayed when selecting the node》

1 Main Program: Looping: Disabled

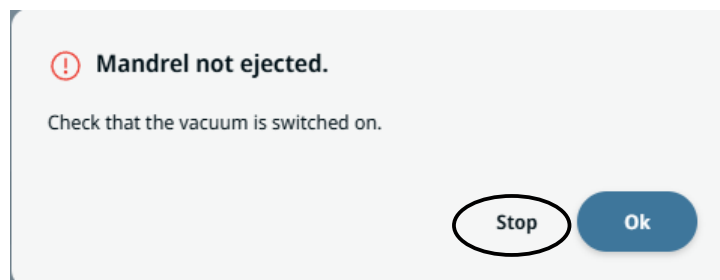


《Operation》

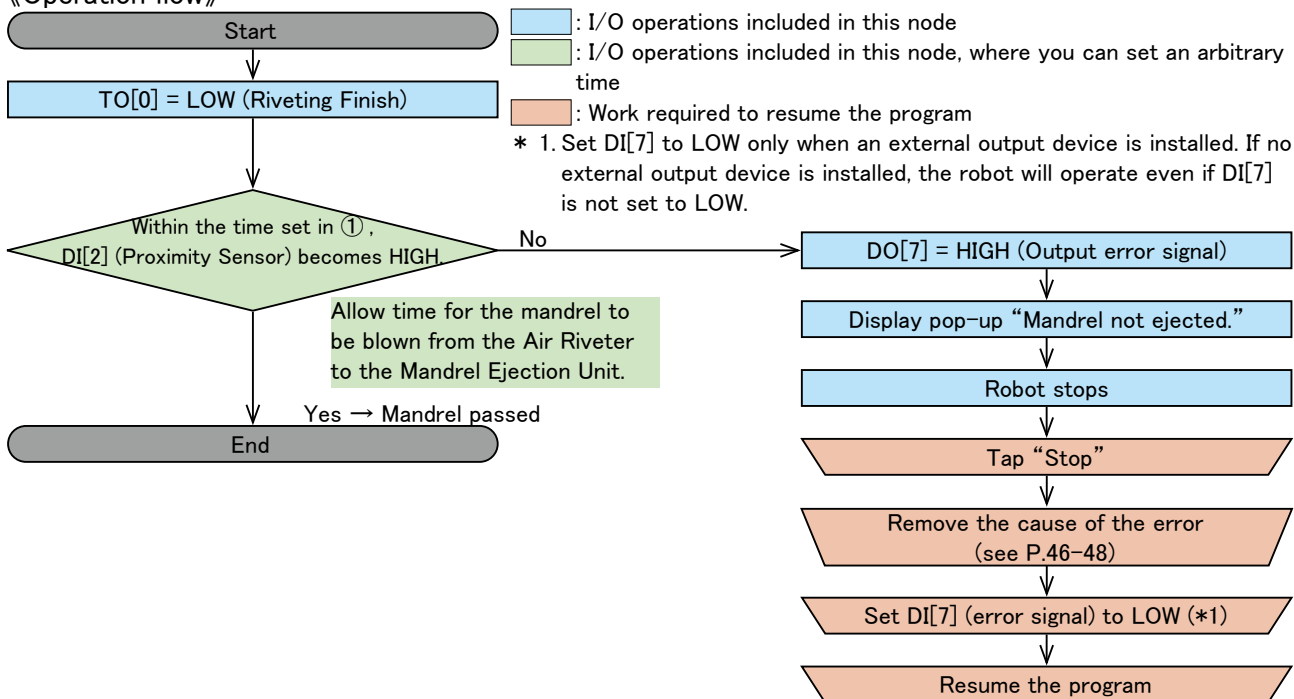
- Set the riveting switch of the R2A1-UR to LOW to eject the mandrel.
- Detect that the mandrel passes the Proximity Sensor of the Mandrel Ejection Unit.

《Parameter description》

- ①. Mandrel ejection check time (default: 3 sec; adjustable range: 0-10 sec; step: 1 sec)
- If the Proximity Sensor cannot detect the mandrel passing within the set time, an error occurs and a pop-up like the one below is displayed. The robot stops, and DO[7] goes HIGH as an error signal.
 - When the pop-up is displayed, tap “Stop” and remove the cause of the error. (See P.46 ~ 48.)



《Operation flow》



7-5. Riveting Finish

《Screen displayed when selecting the node》

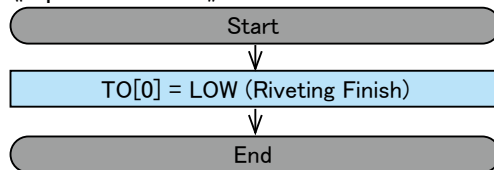
1 ✓ UR **Main Program:** Looping: Disabled

2 ✓ **Finish the riveting operation. TO[0] is OFF.**

《Operation》

- Set the riveting switch of the R2A1-UR to LOW.

《Operation flow》



7-6. ARU Reset

《Screen displayed when selecting the node》

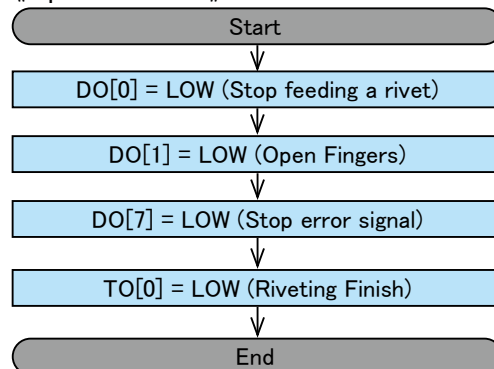
1 ✓ UR **Main Program:** Looping: Disabled

2 ↶ **Reset the ARU output to its initial (OFF) state. DO[0], DO[1], DO[7] TO[0] are OFF.**

《Operation》

- Set all output ports to LOW to return the ARU to its initial state.

《Operation flow》



8. POSITIONING METHOD

The positioning methods required for riveting operations are shown in 8-1 to 8-2. For detailed robot teaching, operation, and programming procedures, refer to the robot user manual.

8-1. Recording the Rivet Supply Position

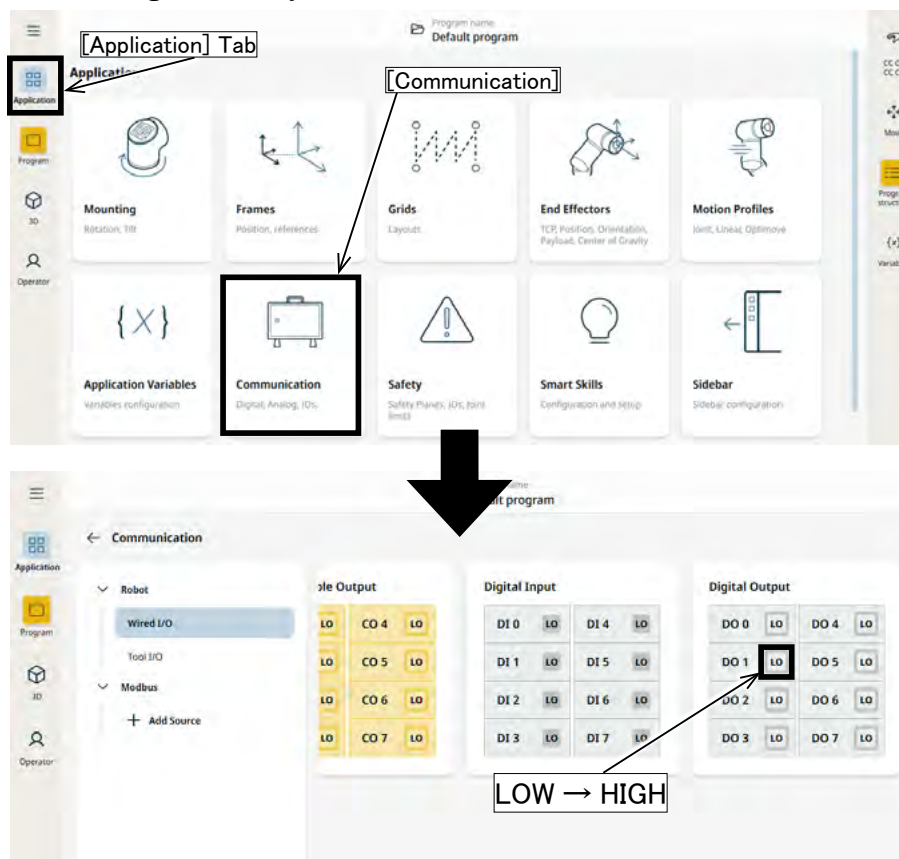
Record the robot position for supplying rivets to the R2A1-UR. Operate the robot following steps 8-1-1 to 8-1-4 below.

8-1-1. Removing the Safety Cover

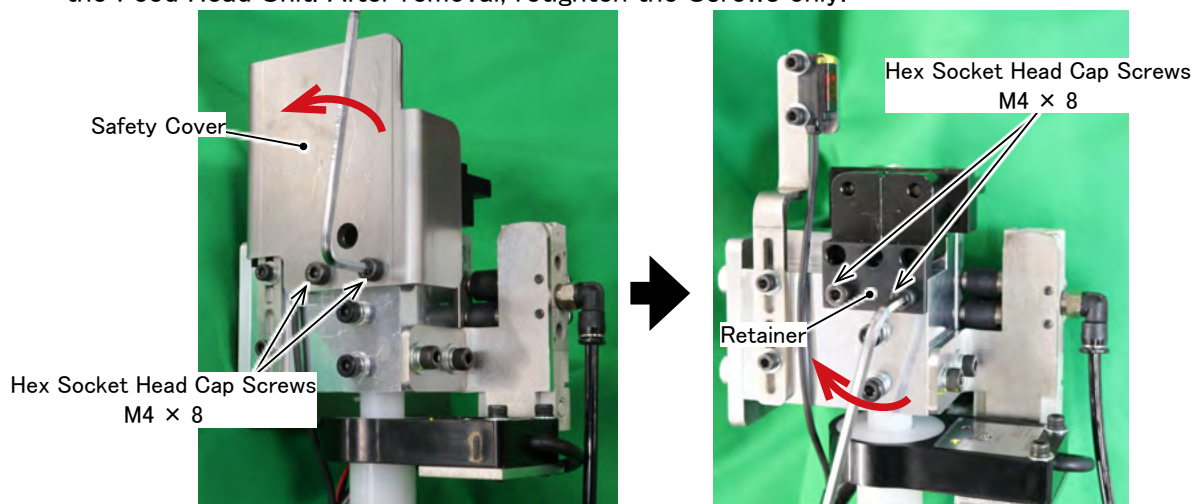
- ① . On the teach pendant, tap [Application] → [Communication], then change DO[1] from LOW **LO** to HIGH **HI** to close the Fingers.

CAUTION

- If the Fingers of the Feed Head Unit are open, there is a risk of pinching your fingers when removing the Safety Cover.



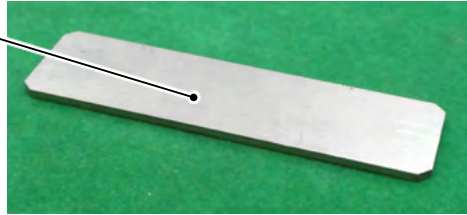
- ② . Loosen the Hex Socket Head Cap Screws M4 × 8 (2 pcs) and remove the Safety Cover from the Feed Head Unit. After removal, retighten the Screws only.



8-1-2. Height (Z-Axis) Adjustment

Adjust the height of the rivet supply position. Use the gap gauge (thickness: 1.5 mm) to set the clearance between the nosepiece of the R2A1-UR and the fingers of the Feed Head Unit. Take the Gap Gauge out of the package.

Gap Gauge

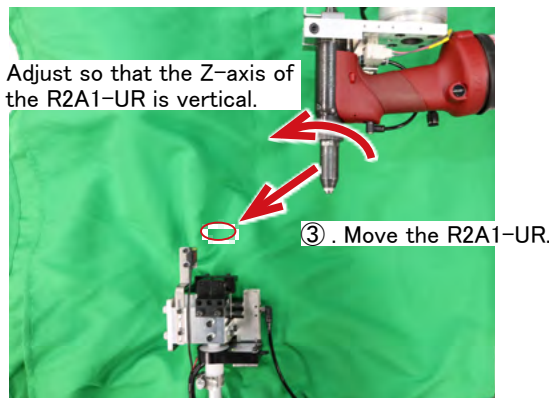


- ① . Orient the robot so that the Z-axis of the R2A1-UR points downward and is parallel to the vertical direction.
- ② . On the teach pendant, from the “Move” tab in the right sidebar of the program screen, tap “Smart Skills” → “Align Z to Nearest Axis” to make the Z-axis of the R2A1-UR vertical.

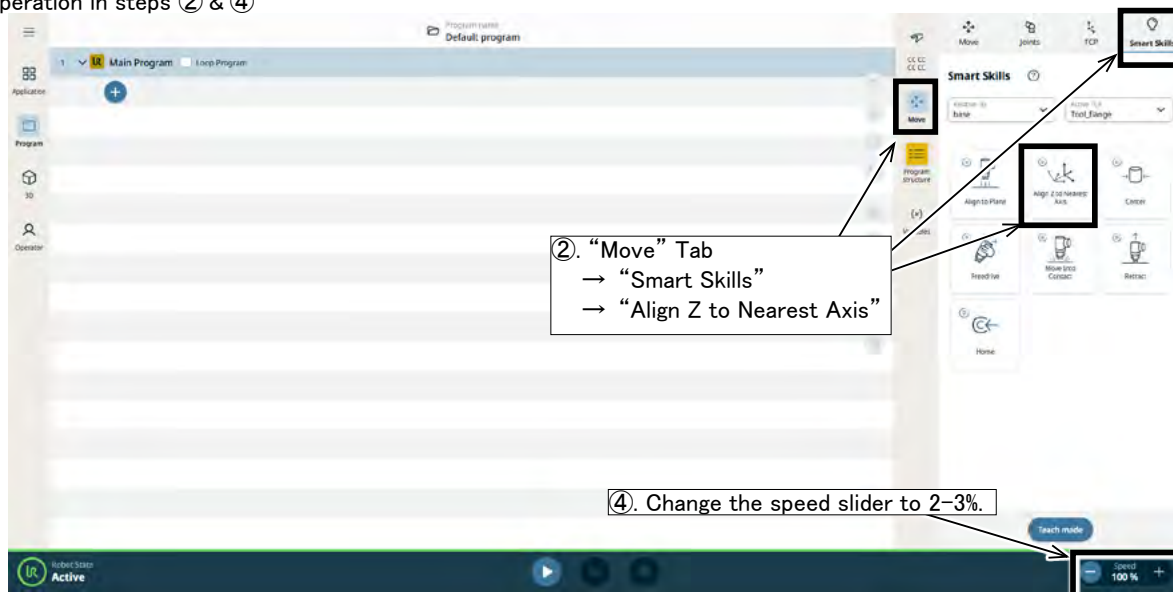
⚠ CAUTION

- “Align Z to Nearest Axis” aligns the Z-axis of the Active TCP to the nearest coordinate axis in the specified coordinate system (Relative To). Confirm that [TCP_1] set in “6-2. Tool Setup” (P.26,27) is selected as the Active TCP.
 - Confirm that the rivet feed direction of the Feed Head Unit is installed vertically. If the Z-axis of the R2A1-UR is not parallel to the rivet feed direction, the rivet may not be set in the Nosepiece during rivet feeding.
- ③ . Move the robot and bring the tip of the R2A1-UR close to the Fingers.
 - ④ . For safety, set the robot speed to 2-3% using the speed slider.

- ① & ② . Adjust so that the Z-axis of the R2A1-UR is vertical.



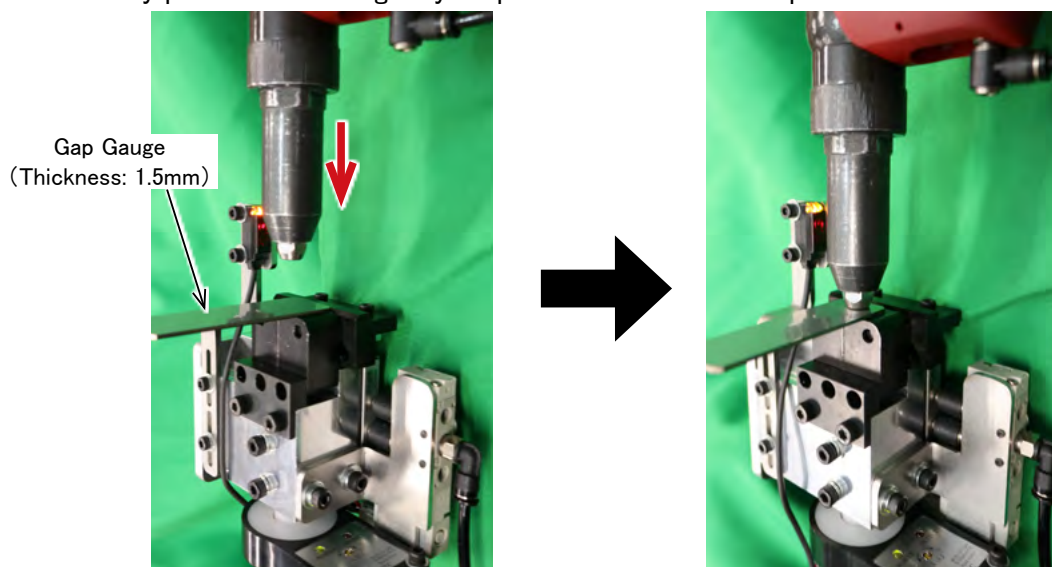
Operation in steps ② & ④



- ⑤ .Place the Gap Gauge on top of the Fingers, and lower the R2A1-UR until the Gauge lightly contacts the Nosepiece.

⚠ CAUTION

- Lower the tool carefully. If you lower it too far, the units may be damaged or the robot may perform an emergency stop due to excessive torque.



- ⑥ .After lowering, pull out the Gap Gauge.

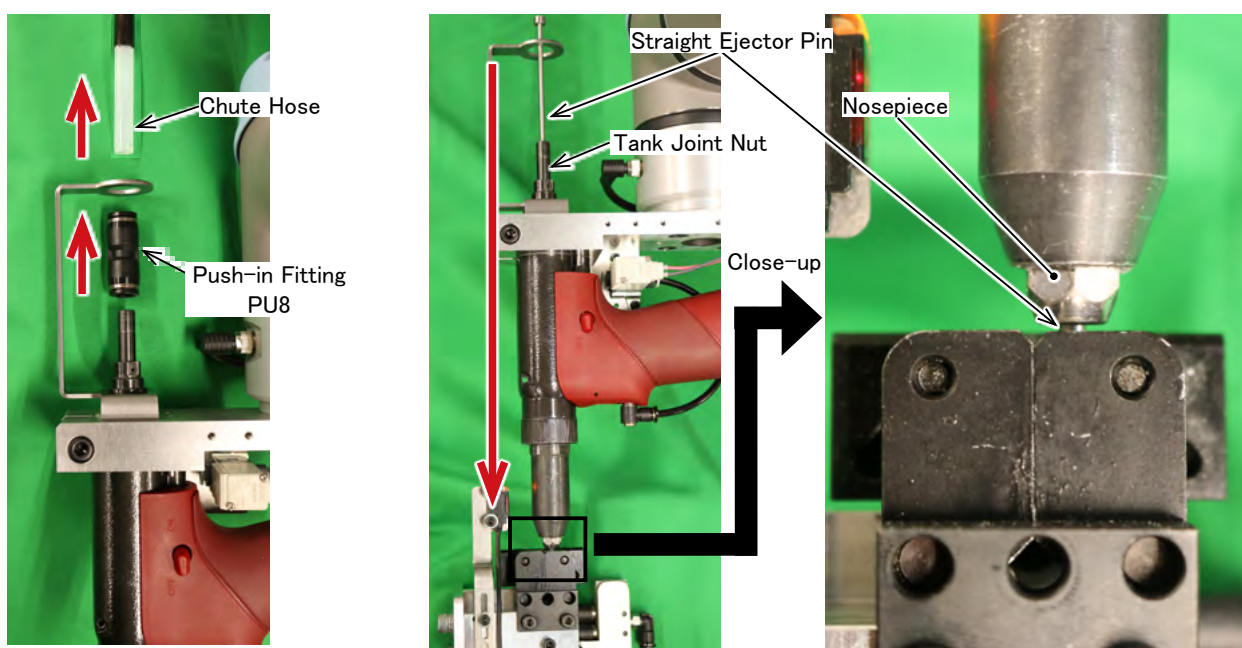
8-1-3. XY Adjustment

After the supply height (Z direction) is set, adjust in the X and Y directions to align the centers. Use the supplied Straight Ejector Pin; take it out of the package.

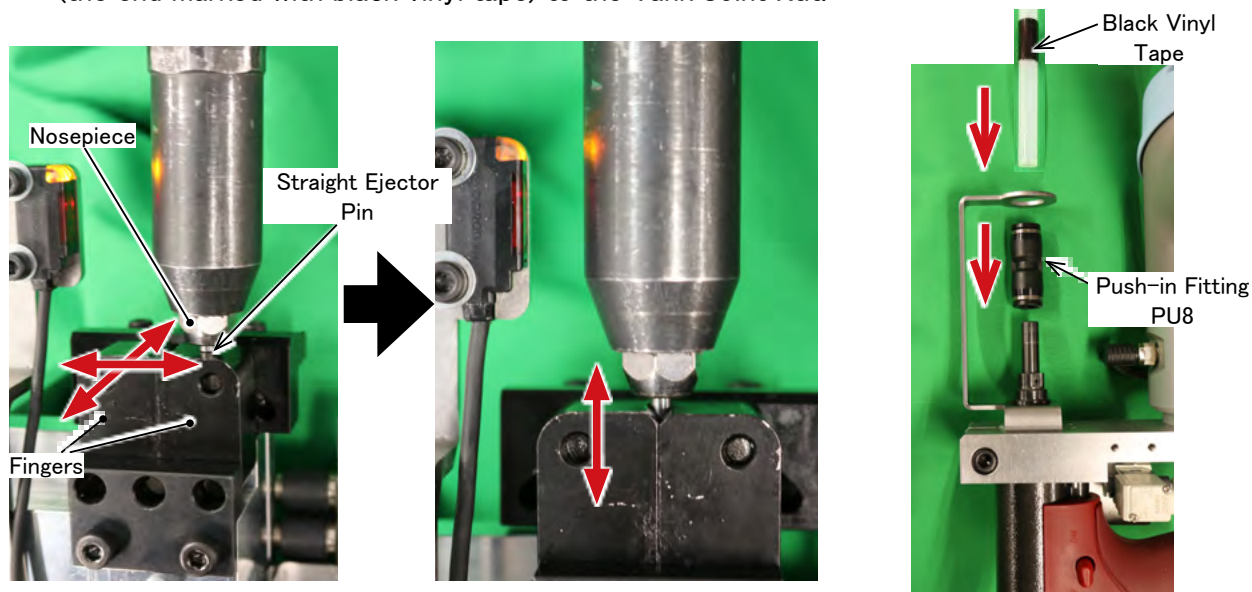
- ① .Remove the Chute Hose and the Push-in Fitting PU8 from the R2A1-UR.
- ② .Insert the Straight Ejector Pin through the Tank Joint Nut and push it in until it protrudes from the tip of the Nosepiece.

⚠ CAUTION

- The Straight Ejector Pin may contact internal parts of the R2A1-UR during insertion. You can pass it through by gently wiggling the Pin tip forward/backward and left/right.



- ③ .Move the R2A1-UR in the X and Y directions so that the protruding Straight Ejector Pin enters the hole in the Fingers. Confirm several times that the Pin can be inserted smoothly into the Finger hole, and then record the position.
- ④ .After pulling out the Straight Ejector Pin, attach the Push-in Fitting PU8 and the Chute Hose (the end marked with black vinyl tape) to the Tank Joint Nut.



8-1-4. Installing the Safety Cover

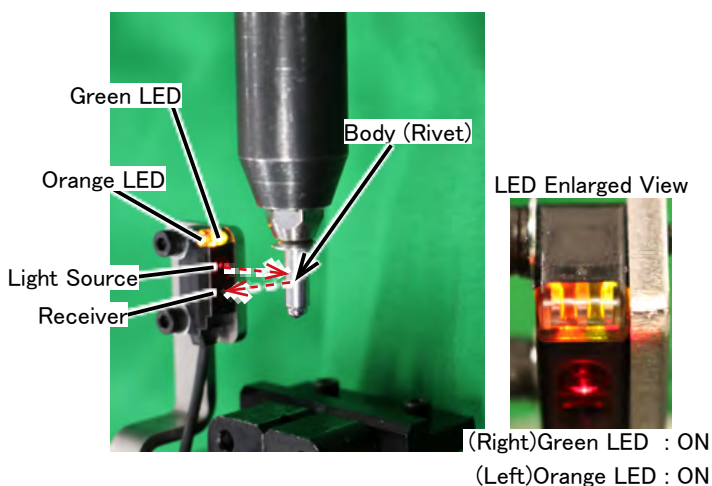
Reinstall the Safety Cover removed in “8-1-1. Removing the Safety Cover” (P.35) by following the reverse procedure. However, if you continue to the next section “8-2. Recording the Rivet Detection Position” , install the Safety Cover after recording the detection position.

8-2. Recording the Rivet Detection Position

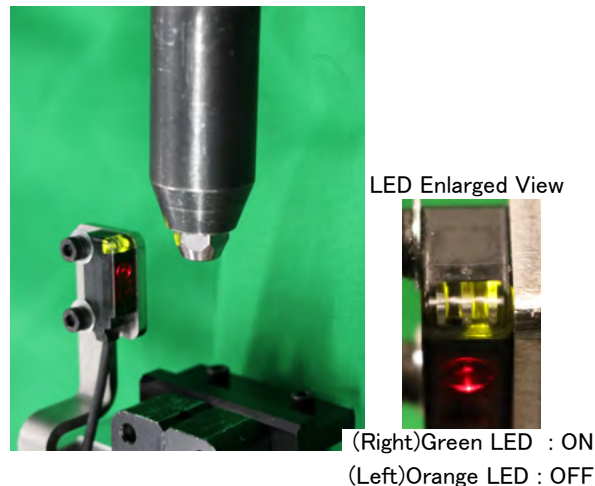
Before riveting, use the Photoelectric Sensor to detect whether the R2A1-UR is holding a rivet. Operate the robot according to the steps below.

- ① .Turn ON the vacuum of the R2A1-UR and set a rivet in the Nosepiece.
- ② .Move the robot to the position where the Photoelectric Sensor's red beam irradiates the rivet body and the sensor's orange LED turns on. Record this position to the robot.
 - Confirm that both the green LED and orange LED of the Photoelectric Sensor are lit. The green LED indicates POWER; the orange LED lights when light enters the receiver.
 - If the sensor's red beam irradiates something other than the rivet (e.g., the nosepiece or Frame Head), the sensor may detect even when no rivet is set in the Nosepiece. Without changing the R2A1-UR position, remove the rivet and confirm that only the green LED is lit.

<<When a Rivet Is Held>>



<<When a Rivet Is Not Held>>



9. EXAMPLE OF OPERATING PROCEDURE

Follow the steps below to program and teach the robot and perform riveting operations.

9-1. Supply Air

- Supply air to the R2A1-UR, the Feed Head Unit, and the ARF-700F

⚠ WARNING

- Always use the specified supply air pressure of 0.5–0.6 MPa. Using air pressure above the specified range may damage this system and may cause injury or equipment damage. Even if it does not fail immediately, the service life may be significantly reduced.

⚠ CAUTION

- Be sure to install an air filter, air regulator, and lubricator on the air source. Air quality greatly affects operation and service life.

9-2. Open the Upper Board of the ARF-700F and Load Rivets into the Basket

⚠ CAUTION

- Do not load more than the specified capacity (rivet diameter ϕ 3.2 mm: 2,000 pcs; ϕ 4.0 mm: 1,500 pcs; ϕ 4.8 mm: 1,000 pcs). Overfilling may cause jamming.
- If the remaining number of rivets in the Basket becomes low, feeding performance decreases. We recommend keeping about 10% of the specified capacity in the Basket.

9-3. Turn ON the ARF-700F Power

- When the ARF-700F power is ON, the Power Switch lights.

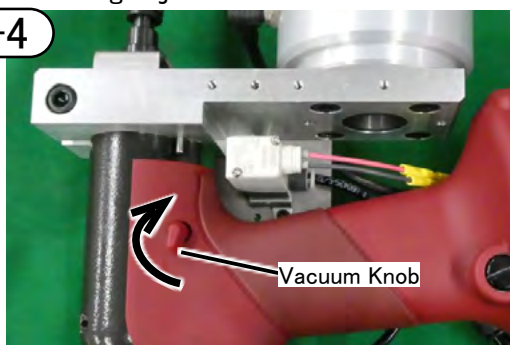
9-4. Turn ON the vacuum of the R2A1-UR

- Confirm that suction is present at the Nosepiece of the R2A1-UR.

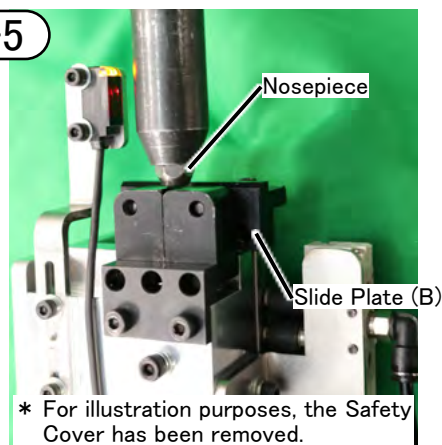
9-5. Move the Robot to the Rivet Supply Position

- Move the robot to the rivet supply position. For how to record the rivet supply position, see “8-1. Recording the Rivet Supply Position” (P.35 ~ 38)
- Execute while checking the robot travel path so that the tip of the R2A1-UR does not collide with surrounding objects.

9-4



9-5

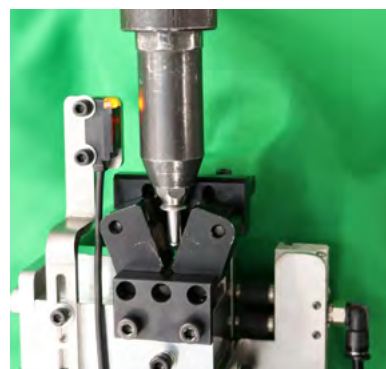


9-6. Supply a Rivet

- Using the URCap “Rivet Supply” node, feed one rivet from the ARF-700F. (See “7-1. Rivet Supply” (P.29))

⚠ CAUTION

- If a rivet is not fed within the time specified in the node, an error pop-up is displayed on the teach pendant and the robot stops. For the cause and countermeasure, see “11. TROUBLE SHOOTING” (P.46 ~ 48).



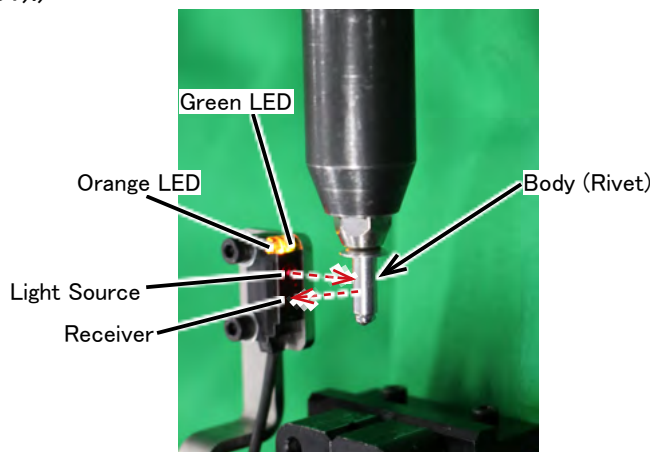
* For illustration purposes, the Safety Cover has been removed.

9-7. Move the Robot to the Rivet Detection Position

- Move the robot to the rivet detection position. For how to record the rivet detection position, see “8-2. Recording the Rivet Detection Position” (P.38).
- Execute while checking the robot travel path so that the tip of the R2A1-UR does not collide with surrounding objects.

9-8. Detect the Rivet Set in the R2A1-UR

- Using the URCap “Rivet Check” node, detect that the rivet is set in the Nosepiece. (See “7-2. Rivet Check” (P.31).)



CAUTION

- If the rivet is not detected, an error pop-up is displayed on the teach pendant and the robot stops. For the cause and countermeasure, see “11. TROUBLE SHOOTING” (P.46 ~ 48).

9-9. Move the Robot to the Riveting Position and Insert into the Prepared Hole

- While adjusting so that the R2A1-UR is perpendicular to the workpiece, move the R2A1-UR to the prepared hole position and insert the rivet body (flange) into the hole.
- Execute while checking the travel path so that the rivet and the R2A1-UR do not collide with surrounding objects.

9-10. Riveting

- Using the URCap “Riveting Start” node, perform riveting. (See “7-3. Riveting Start” (P.32).)
- Adjust the riveting time according to the rivet used. (Default: 0.5 sec)

9-11. End Riveting and Collect the Mandrel

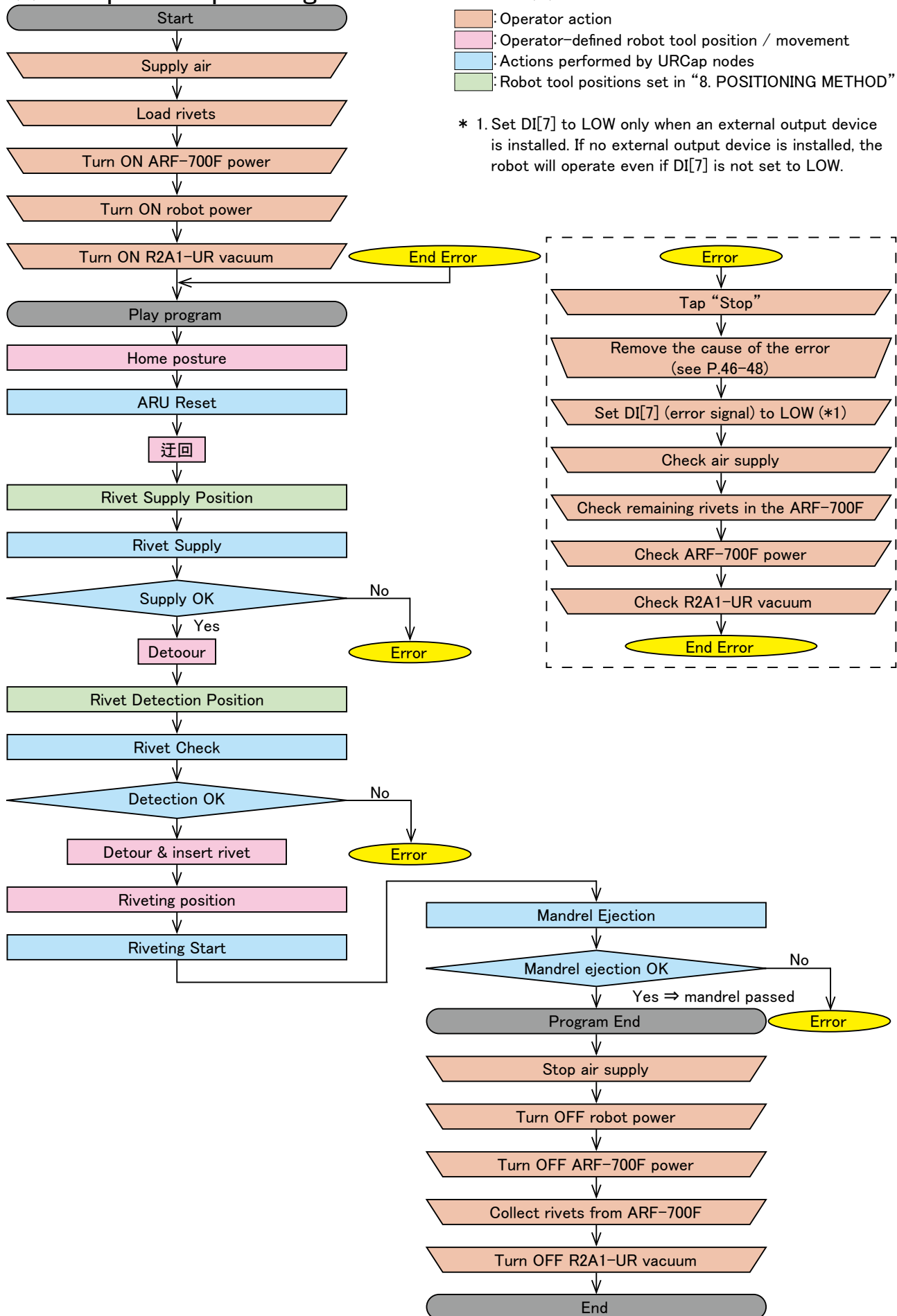
- Using the URCap “Mandrel Ejection” node, eject the mandrel. (See “7-4. Mandrel Ejection” (P.33).)
- During Mandrel Ejection, the time required for the mandrel to be ejected varies depending on the distance between the Mandrel Ejection Unit and the R2A1-UR, and on the robot posture. Adjust the checking time for mandrel ejection to your operation. (Default: 3 sec)

CAUTION

- The recommended minimum bending radius of the Chute Hose is approximately 15 cm. Confirm that the Chute Hose is not bent excessively. Excessive bending may cause mandrel discharge failures. (See “3-3. Installation Conditions” (P.7))

After this, you can perform continuous riveting by repeating steps 9-5 to 9-11.
An example flowchart of the work procedure is shown on the next page.

<<Example of Operating Procedure Flow>>



10. MAINTENANCE

After long periods of use, debris from cut mandrels and other foreign materials tend to build up in various parts of the air riveter R2A1-UR, and the hydraulic oil level also drops, both of which can lead to operating problems. The R2A1-UR should be cleaned periodically.

* For maintenance, remove the R2A1-UR from the robot. Performing maintenance while installed may impose excessive loads on the robot during the work and may cause failures.

10-1. Jaw maintenance

* If debris builds up, the Jaws will not move smoothly and normal operation will not be possible.

* The Jaws should be cleaned on average once every 3,000 riveting operations.

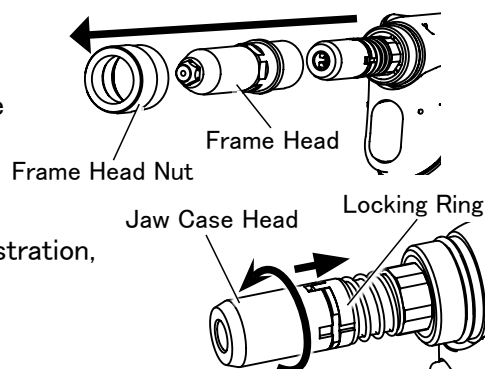
CAUTION

- Before starting maintenance or disassembling the unit to replace parts, be sure to stop air supply. Performing maintenance or disassembly with air supplied may cause a part to jump out, oil to squirt out, or the unit to perform unexpected behavior, and may result in an accident or personal injury.
- Jaws are consumable items and must be replaced periodically. The R2A1-UR uses Ultra Jaws that are highly durable. When replacing, please order "Ultra Jaws 'M'" .
- Never loosen the Oil Retaining Screw for any purpose other than refueling. Hydraulic oil may leak or air may get in to the R2A1-UR.
- Do not operate the tool with the Frame Head removed. Items such as fingers may become caught in the mechanism.

10-1-1. Disassembly

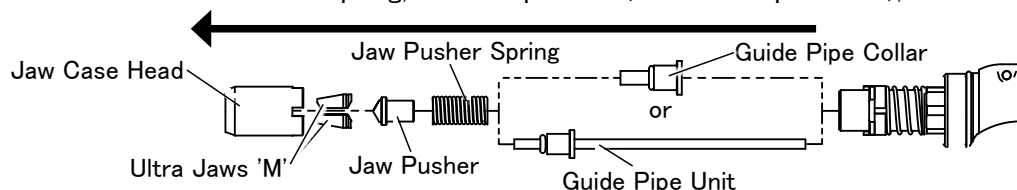
① .Turn off the air supply.

② .Loosen and remove the Frame Head Nut and remove the Frame Head.



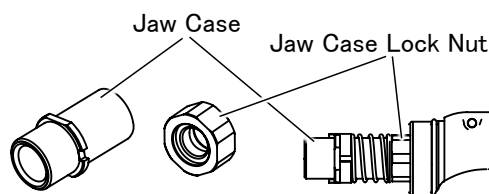
③ .Pull the Locking Ring in the direction shown in the illustration, and loosen and remove the Jaw Case Head.

④ .Remove the Jaw Pusher Spring, Guide Pipe Unit (or Guide Pipe Collar), Jaw Pusher, and Jaws.



CAUTION

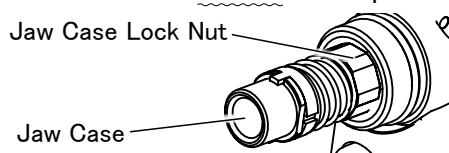
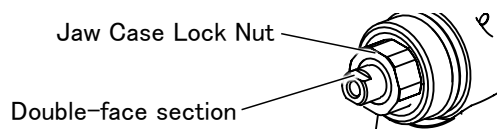
- Never loosen the Jaw Case and Jaw Case Lock Nut. Doing so readily exposes parts inside the R2A1-UR to damage.
- Should you have loosened these parts, tighten them as explained in the following procedure or have the air riveter serviced.



Tightening method (When only the Jaw Case is loose, begin your work from step ② .)

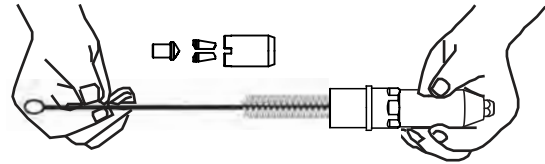
① .Immobilize the double-face section at the tip of the male screw and tighten the Jaw Case Lock Nut with 15 N·m of torque.

② .Grip the Jaw Case Lock Nut and tighten the Jaw Case with 15N·m of torque.



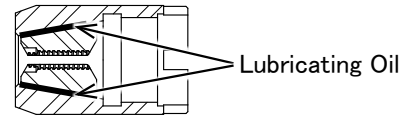
10-1-2. Cleaning

- ① .Using a brush or the like, clean parts.
In particular, carefully clean the following areas.
 - Back of the Frame Head
 - Toothed section of the Jaws
 - Sliding section between the Jaw Case Head and the Jaws

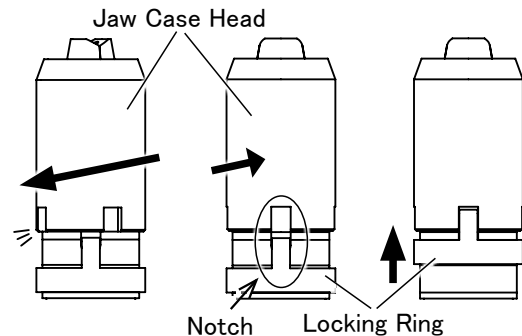


10-1-3. Re-Assembly

- ① .Assemble the R2A1-UR in the reverse order of “10-1-1. Disassembly” .Apply lubricant to the back of the Jaws (conical surface) and the inside of the Jaw Case Head (conical surface), and fit the Jaw into the Jaw Case Head.

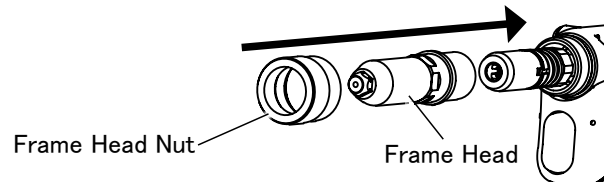


Put the Guide Pipe Unit (or Guide Pipe Collar), Jaw Pusher Spring, and the Jaw Pusher into the Jaw Case in that order. Tighten the Jaw Case Head to the end. From there, return it to the position where the upper notch and the lower notch meet each other for the first time, and set the Locking Ring.



- * Jaw Case Head, Ultra Jaws ‘M’ , Jaw Pusher, O-ring, Jaw Case, Guide Pipe Unit, Guide Pipe Collar and Jaw Pusher Spring are consumable items. Replace them on a regular base.
- * If the O-ring of the Guide Pipe Unit and the Guide Pipe Collar are damaged, please replace them with new ones. The O-ring function as cushions, and continued use without them may result in damage to internal components.
- * Be careful not to leave out any parts, and tighten all connections securely.

- ② .Insert the Frame Head and tighten the Frame Head Nut to fasten the Frame Head.
 - * To prevent scratching from occurring, apply lubricant to the screw of the Frame Head Nut.

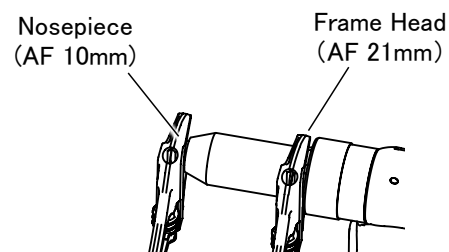


10-2. Replacement of the Nosepiece

- * If the Nosepiece is damaged, replace it with a new one.

10-2-1. Disassembly

- ① .Turn off air supply.
- ② .Remove the Nosepiece from the FrameHead using a wrench or spanner.



10-2-2. Re-Assembly

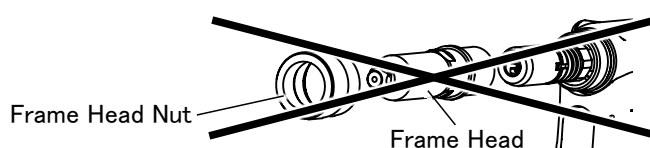
- ① .Firmly set a Nosepiece to the Frame Head
 - * Please check periodically whether there is any slack of a Nosepiece during work.
 - * If you work after the Nosepiece is loosened, damage to the parts may occur.

10-3. Oil Supply

* A syringe unit and hydraulic oil are not included with this system; prepare them separately.

⚠ CAUTION

- In principle, refueling by the customer is not required. However, if refueling is necessary, use the refueling device (syringe unit) “B29624” (sold separately) and follow the steps below to refill with Ebi Mark hydraulic oil “B10012” (sold separately). If insufficient stroke occurs immediately after refilling hydraulic oil, or if a large amount of air is mixed into the hydraulic oil, this indicates seal wear or other issues. Please request repairs.
- Prevent oils such as hydraulic oil, lubricating oil, and grease from contacting skin and eyes. This may cause irritation. If contacted, wash completely from the contacted area.
- Do not lubricate the R2A1-UR with the Cylinder Cup removed.
- Do not lubricate the R2A1-UR with the Frame Head Nut and the Frame Head removed.
Doing so may result in an improper amount of hydraulic oil and cause trouble with the R2A1-UR.

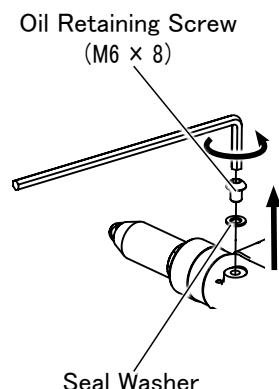


10-3-1. Preparation and Disassembly

①. Turn off air supply.

②. To remove the Oil Retaining Screw and the Seal Washer, loosen the Oil Retaining Screw with a Hex Key (width across flats: 4 mm) or the like, with the R2A1-UR placed horizontally so that the Oil Retaining Screw is to the upper side.

- * When you loosen the Oil Retaining Screw, hydraulic oil may spew vigorously. Therefore, loosen the Oil Retaining Screw slowly at first.
- * Hydraulic oil from the R2A1-UR may appear black, which is not a cause for concern.

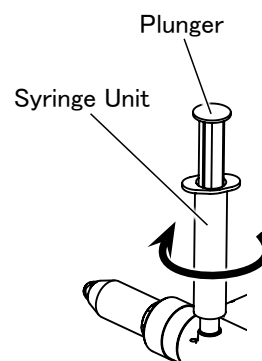


③. Remove the O-ring (P-6) at the tip of the oiler, and attach the Seal Washer that was removed in step ②, to the tip of the oiler instead of the O-ring.

10-3-2. Oil Supply and Re-Assembly

①. Attach the oiler containing the hydraulic oil to the oiling port in the R2A1-UR (the part to which the Oil Retaining Screw was attached).

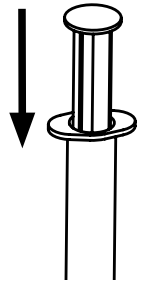
- * Make sure that the Seal Washer is attached to the tip of the oiler. Without a Seal Washer in place, air can mix with the hydraulic oil during oiling or prevent oil from being sufficiently supplied.
- * If air (in the form of air bubbles) is found inside the oiler, point the tip of the oiler upward and slowly insert the plunger to purge air, and then attach the oiler to the R2A1-UR.
- * When you purge air from the oiler, hydraulic oil may spew from the tip of the oiler. Keep your face away and cover the tip of the oiler with cloth or the like while purging.
- * Be careful not to allow a gap to form between the oiler and the R2A1-UR. Gapping may allow air to mix with the hydraulic oil.



② .Insert the plunger of the oiler and inject the hydraulic oil into the R2A1-UR.

③ .Insert the plunger of the oiler several times and make sure that the R2A1-UR is adequately filled with hydraulic oil.

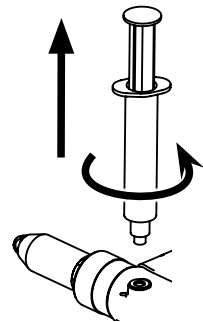
* When the R2A1-UR is adequately filled with hydraulic oil, the plunger returns after being inserted and then released.



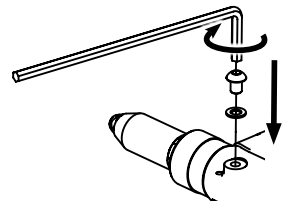
⚠ WARNING ● Do not oil the R2A1-UR in ways other than that described in this instruction manual. Doing so may supply an excessive amount of hydraulic oil, damage parts and cause injuries.

● Do not try forcing an excessive amount of oil into the R2A1-UR.

④ .Loosen the oiler and remove it from the R2A1-UR.
Remove the Seal Washer from the tip of the oiler.



⑤ .Attach the Oil Retaining Screw and Seal Washer to the R2A1-UR using a Hex Key (width across flats: 4 mm).



⑥ .Wipe off hydraulic oil adhering to the main body or spilling out before use.

* During disassembly/assembly, be careful to prevent cutting dusts of metal and other objects from getting into the hydraulic oil.

11. TROUBLE SHOOTING

If a problem occurs, check the followings. If the problem persists after checking the items in the table below, contact your nearest "LOBSTER" dealer or direct to us.

In making any enquiries about this product or requests for repair work, first check the trouble-shooting items below, and then make a note of the model number, the usage conditions and the trouble symptoms in as much detail as possible. If you can provide this kind of information, it will contribute to reducing the amount of time required for delivery or repairs to be completed.

Trouble		Cause	Countermeasure
The Truck does not move up/down even when the ARF-700F Power Switch is turned ON.	1	The Power Plug is disconnected.	Connect the Power Plug securely.
	2	The Fuse is blown out.	Change Glass Fuse inside the Fuse Holder of inlet. (Fuse specification: see P.10.)
	3	The Capacitor is broken. (In this case, the Motor is groaning.)	Request repair from our company.
	4	Disconnection of the wire.	Request repair from our company.
	5	A foreign substance intervenes between the Truck and the Basket.	Remove the substance.
No air flows from the ARF-700F even when the "Rivet Supply" node is executed or DO[0] is set to HIGH.	1	The Power Plug is disconnected.	Connect the Power Plug securely.
	2	ARF-700F Power Switch is not ON.	Turn ON the ARF-700F Power Switch.
	3	Air source is not connected to the ARF-700F.	Connect the air source with the Plug on the back side of the ARF700F
	4	The Fuse is blown out.	Change Glass Fuse inside the Fuse Holder of inlet. (Fuse specification: see P.10.)
	5	The Control Box Connection Connector is unplugged, or the Crimp Terminal has come out of the connector.	- Confirm that the Crimp Terminal is secured in the Control Box Connection Connector. - Confirm that the Control Box Connection Connector is fully inserted.
	6	Failure of the Solenoid Valve inside the ARF-700F.	Request repair from our company.
	7	Failure of sequence Relays/Timer.	Request repair from our company.
When the rivet supply node is executed, no air flows from the ARF-700F and the next node is executed.	1	The Proximity Sensor DETECT (red LED) is continuously lit.	Turn the Proximity Sensor trimmer to adjust sensitivity. (See P.22.)
Air flows from the ARF-700F when the "Rivet Supply" node is executed or DO[0] is set to HIGH, but the Selector does not move.	1	A rivet or foreign matter is caught in the Selector.	Remove the rivet or foreign matter.
	2	Rivets are jammed inside the Supply Hose.	Release the Hose Joint fixing and remove the rivets jammed in the Supply Hose.
	3	Air pressure is not enough.	Adjust the air pressure to the specified value. (See P.9.)
When the "Rivet Supply" node is executed or DO[0] is set to HIGH, air flows from the ARF-700F and the selector operates, but rivets are not fed (blown) to the Feed Head Unit.	1	Rivets are jammed in the Truck and do not flow into the Shoot.	Remove the jammed rivets.
	2	The centers of the basket outlet and the tip of the Shoot are misaligned, so rivets do not flow into the Shoot.	Request repair from our company.
	3	Rivets are jammed in the Shoot and do not flow.	A mandrel whose body has come off is jammed in the Shoot. Remove the mandrel using tweezers or needle-nose pliers.
	4	Bend radius of the Supply Hose is not enough, and rivets got stuck inside the Supply Hose.	Adjust the bend radius of the Supply Hose so the rivets can go through.

Trouble		Cause	Countermeasure
The Proximity Sensor does not detect a fed rivet or a ejected mandrel.	1	Proximity Sensor sensitivity is low.	Increase sensitivity by turning the Proximity Sensor trimmer. (See P.22.)
	2	The Control Box Connection Connector is unplugged, or the Crimp Terminal has come out of the connector.	- Confirm that the Crimp Terminal is secured in the Control Box Connection Connector. - Confirm that the Control Box Connection Connector is fully inserted.
	3	The Guide Shaft or Chute Hose is dirty.	Clean the Guide Shaft and Chute Hose.
A rivet is not set in the Nosepiece, or the mandrel is not ejected after riveting.	1	Vacuum is OFF.	Turn on the vacuum by turning the Vacuum Knob.
	2	The centers of the Nosepiece and the Fingers are misaligned at the rivet supply position.	Correct the rivet supply position. (See P.35 ~ 38.)
	3	Nosepiece or Frame Head is loose.	Use a spanner or similar to tighten securely.
	4	Jaw Case is incorrectly assembled.	Check the assembly procedure of parts inside the Jaw Case. (See P.42,43.)
	5	Contact surface between Jaws and Jaw Case 'Head' are not smooth. (friction).	Clean the Jaws and the inside of Jaw Case Head, and apply "LOBSTER" brand lubricant oil to the back of Jaws. (See P.42,43.)
	6	Oil filling was not performed correctly, so that there is excess hydraulic oil inside the R2A1-UR.	Loosen the Oil Retaining Screw to allow the excess hydraulic oil to drain out.
	7	A mandrel is jammed in the Jaw Pusher or inside the R2A1-UR.	Eliminate the mandrels jammed in the Jaw Case or the Guide Pipe Unit. (See P.42,43.)
The Photoelectric Sensor does not detect a rivet even though a rivet is set in the Nosepiece.	1	The Control Box Connection Connector is unplugged, or the Crimp Terminal has come out of the connector.	- Confirm that the Crimp Terminal is secured in the Control Box Connection Connector. - Confirm that the Control Box Connection Connector is fully inserted.
	2	The sensor beam is not irradiating the rivet.	Correct the rivet detection position. (See P.38.)
The Photoelectric Sensor detects even though no rivet is set in the Nosepiece.	1	The light source is dirty and the beam is not properly irradiating the rivet.	Clean the Photoelectric Sensor. Do not use thinner, as it may melt the sensor surface.
	2	The sensor beam is irradiating something other than the rivet.	Correct the rivet detection position. (See P.38.)
Rivet working does not complete with a single riveting operation.	1	The rivet length is not correct for the workpiece thickness.	Use rivet which match the workpiece thickness.
	2	Compressor air pressure is incorrect.	Increase air pressure. (By making air pressure more than maximum 0.6 MPa or more will lead to damage to parts. If the rivet does not break even with the maximum air pressure, that rivet cannot be used.) (See P. 9.)
	3	Jaw Case is incorrectly assembled.	Check the assembly procedure of parts inside the Jaw Case. (See P.42,43.)
	4	Jaws are worn.	Replace the Jaws. (See P.42,43.)
	5	The Jaw Pusher Spring has been worn.	Replace Jaw Pusher Spring. (See P.42,43.)
	6	Insufficient hydraulic oil, causing a shorter stroke.	Add hydraulic oil. (See P.44,45.)
	7	The riveting time of the "Riveting Start" node is too short.	Increase the riveting time. If the riveting time is too short, riveting cannot be performed.

Trouble		Cause	Countermeasure
The Piston of the R2A1-UR does not operate, or returns very slowly, or operation is not smooth.	1	Insufficient and excess pressure of supplied air.	Adjust to obtain an appropriate pressure of supplied air. (See P.9.)
The suction power is weak and the cut mandrels (shafts) cannot be drawn out.	1	Insufficient turning of Vacuum Knob.	Turn the Vacuum Knob until it stops.
	2	A mandrel is jammed in the Jaw Pusher or inside the R2A1-UR.	Eliminate the mandrels jammed in the Jaw Case or the Guide Pipe Unit. (See P.42,43)
	3	The tube connected to the Push-in Fitting PC12-03 on the Mandrel Ejection Unit is bent / crushed / sharply bent / clogged, resulting in insufficient flow rate.	Eliminate bending, crushing, sharp bending, or clogging and, if necessary, shorten the tube. If you temporarily remove the tube to check operation for troubleshooting, the mandrel will be ejected directly, so place the collection container close to the discharge outlet.

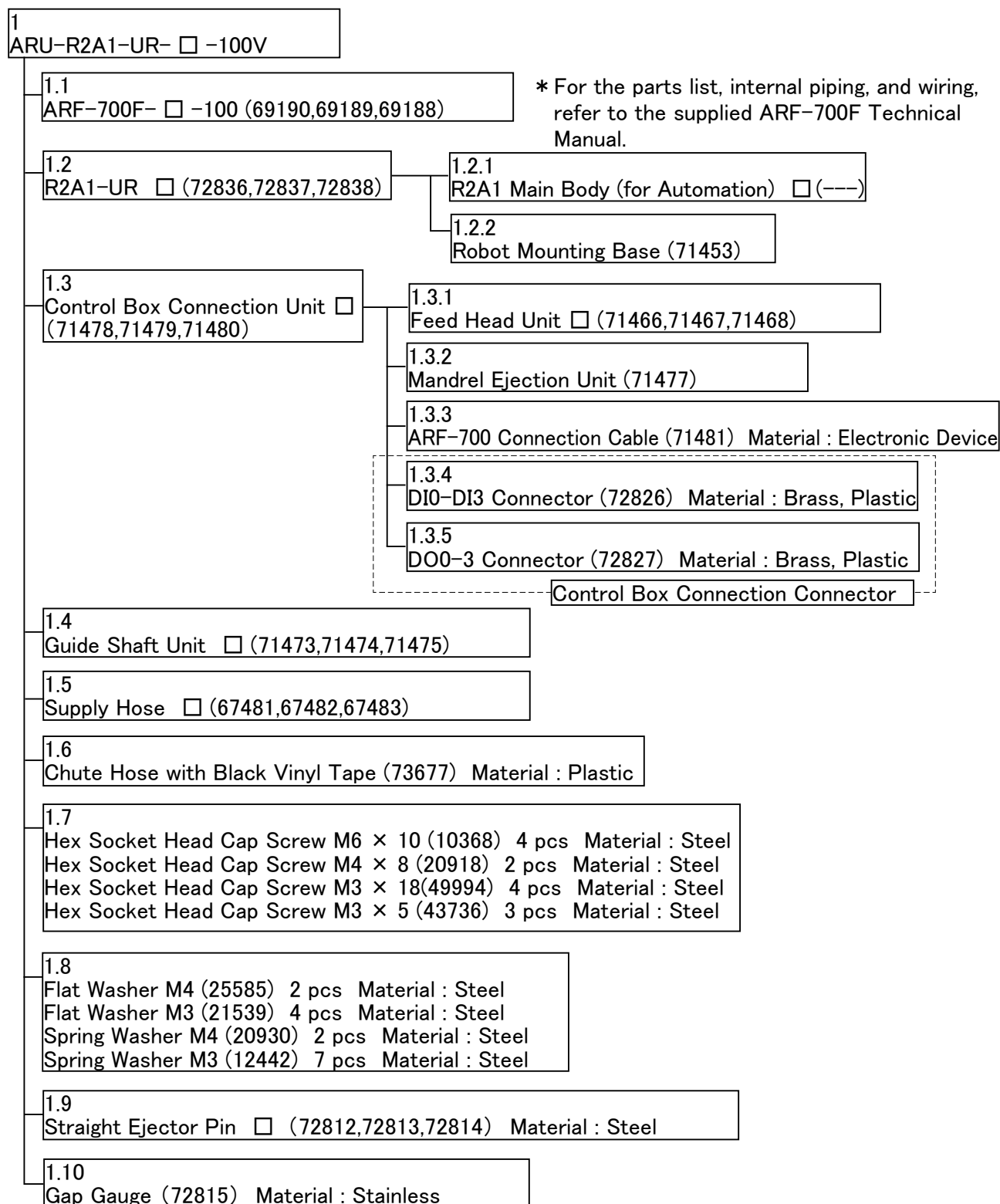
- If the system stops due to a power outage, turn OFF the ARF-700F Power Switch.
- Perform maintenance and inspection in a sufficiently bright area with a flat, level floor.
- Maintenance must be performed only by persons with technical knowledge and maintenance skills.
- During maintenance, disconnect the air source and power supply from the system to avoid injury or electric shock.

12. PARTS CONFIGURATION

12-1. Assembly Hierarchy

The above is the assembly hierarchy of this system. The 5-digit numbers in () are the code No. for the unit or part.

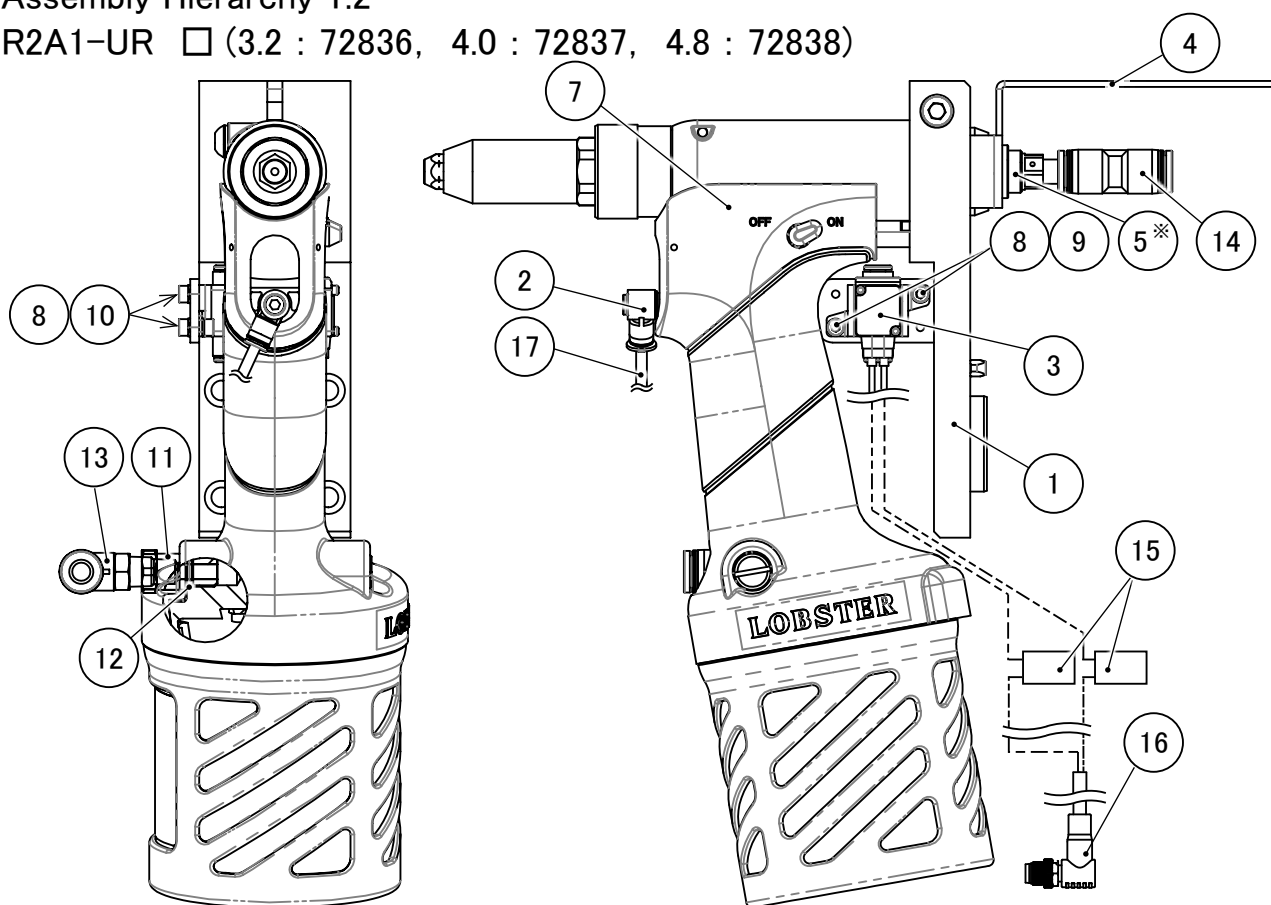
For units/parts whose configuration differs by applicable rivet diameter, the code Nos. are listed from left to right in the order ϕ 3.2 mm, ϕ 4.0 mm, ϕ 4.8 mm. “□” indicates the applicable rivet diameter (see P.8).



12-2. PARTS LIST

Assembly Hierarchy 1.2

R2A1-UR □ (3.2 : 72836, 4.0 : 72837, 4.8 : 72838)



No.	Part name	Code No.	Size	Material
1	Robot Mounting Base	71453	---	---
2	Push-in Fitting POL4-M5M	71454	---	①
3	Solenoid Valve	71455	---	②
4	Fixing Plate Clamp	71456	---	Stainless
5*1	Tank Joint Nut (for Chute Hose)	71133	---	Steel
6	Solenoid Plate	71457	---	Stainless
7*2	R2A1 Main Body (for Automation) 3.2	---	3.2	---
	R2A1 Main Body (for Automation) 4.0	---	4.0	---
	R2A1 Main Body (for Automation) 4.8	---	4.8	---
8	Spring Washer M3	12442	---	Steel
9	Hex Socket Head Cap Screw M3 × 5	43736	---	Steel
10	Hex Socket Head Cap Screw M3 × 8	61443	---	Steel
11	Spool Connector U	71460	---	Steel
12	O-ring S-8	14475	---	Rubber
13	Push-in Fitting PL8-01	72823	---	①
14	Push-in Fitting PU8	63568	---	①
15	Push-in Connector WFR-2	72825	---	③
16	M8 Plug	72824	---	④
17	Polyurethane Tube (OD 4mm × 15cm)	63212	---	Plastic

(See P.51)

① : Brass, Plastic, Stainless, Rubber

② : Copper, Plastic, Stainless, Steel, Rubber

③ : Copper, Plastic, Stainless

④ : Brass, Copper, Plastic

* 1.Recommended tightening torque when fastening No.5 to No.7: 10N・m.

* 2.No.7 has some parts added/changed from the R2A1 Air Riveter, but the internal frame head configuration is the same as the R2A1. For consumables such as jaws and the jaw pusher spring, check the Code No. as follows:

Open the R2A1 product page via the URL or QR code below, then go to:

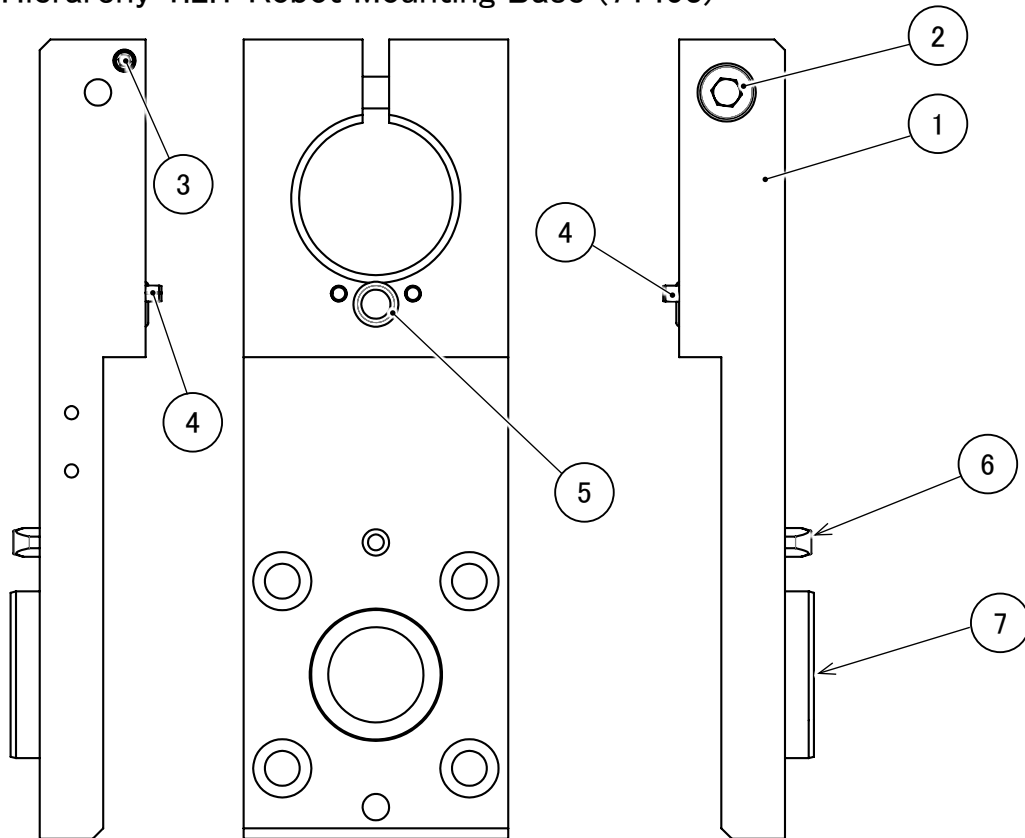
“★ Click here to download the instruction manual.” ⇒ Manual(R2A1) ⇒ P.17 “R2A1 PART LIST”

URL:<https://www.lobtex.co.jp/english/products/tabid/153/pdid/E-R2A1/catid/108/Default.aspx>



For smartphone users: ⇒

Assembly Hierarchy 1.2.1 Robot Mounting Base (71453)

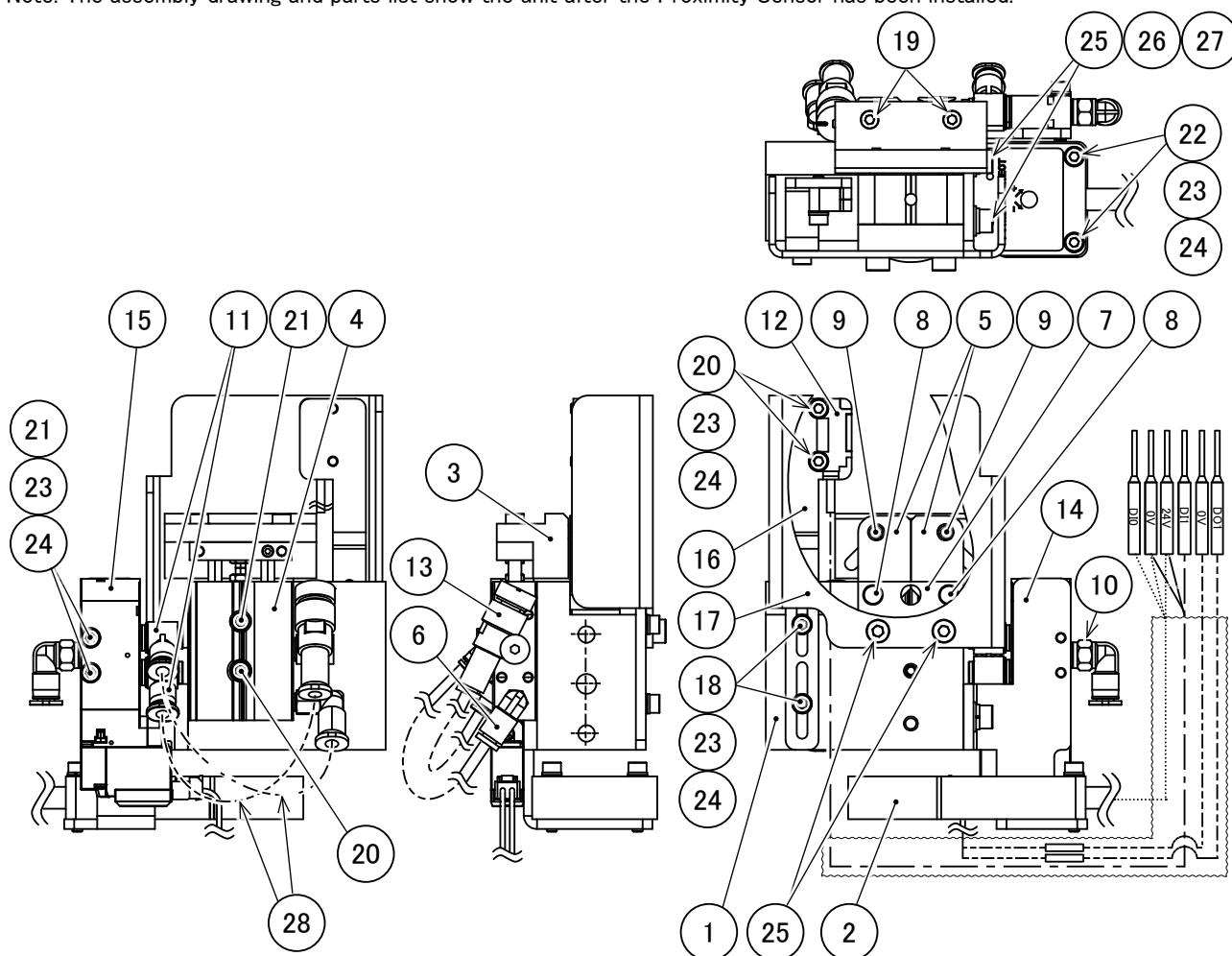


No.	Part name	Code No.	Material
1	Frame Cap Fixing Plate	71461	Aluminum
2	Hex Socket Head Cap Screw M6 × 40	60711	Steel
3	Hex Socket Set Screw M4 × 20	71463	Steel
4	Spring Pin	71462	Stainless
5	O-ring S-6	10220	Rubber
6	Locating Pin	71458	Stainless
7	Center Locating Pin	71459	Steel

Assembly Hierarchy 1.3.1

Feed Head Unit □ (3.2 : 71466, 4.0 : 71467, 4.8 : 71468)

Note: The assembly drawing and parts list show the unit after the Proximity Sensor has been installed.



No.	Part name	Code No.	Size	Material	No.	Part name	Code No.	Material
1	Cylinder Block (for Automation)	72818	---	Aluminum	14	Proximity Sensor Fixing Plate	71469	Stainless
2	Proximity Sensor	71464	---	Electronic Device	15	Solenoid Valve	71470	④
3	Slide plate (B)	70327	---	Plastic	16	Photoelectric Sensor Mounting Plate	72819	Stainless
4	Dual-Rod Cylinder	70328	---	①	17	Safety Cover	72820	Stainless
5	Finger (3.2)	28696	3.2	Steel	18	Hex Socket Head Cap Screw M3 × 8	61443	Steel
	Finger (4.0)	28697	4.0	Steel	19	Hex Socket Head Cap Screw M3 × 10	49799	Steel
	Finger (4.8)	28698	4.8	Steel	20	Hex Socket Head Cap Screw M3 × 12	61423	Steel
6	Push-in Fitting KQ2L04_M3G1	70326	---	②	21	Hex Socket Head Cap Screw M3 × 15	61337	Steel
7	Retainer	49739	---	Steel	22	Hex Socket Head Cap Screw M3 × 18	49994	Steel
8	Knurled Pin 6 × 27	49983	---	Steel	23	Flat Washer M3	21539	Steel
9	Grooved Pin (G type) φ 4 × 20	25586	---	Steel	24	Spring Washer M3	12442	Steel
10	Push-in Fitting PL4-M5M	68588	---	③	25	Hex Socket Head Cap Screw M4x8	20918	Steel
11	Push-in Fitting POL4-M5M	71454	---	③	26	Spring Washer M4	20930	Steel
12	Photoelectric Sensor	71465	---	Electronic Device	27	Flat Washer M4	25585	Steel
13	Speed Controller JAS-LEA04-M3	70937	---	③	28	Polyurethane Tube (OD 4mm × 10cm)	72821	Plastic

① : Aluminum, Steel, Stainless, Rubber, Plastic

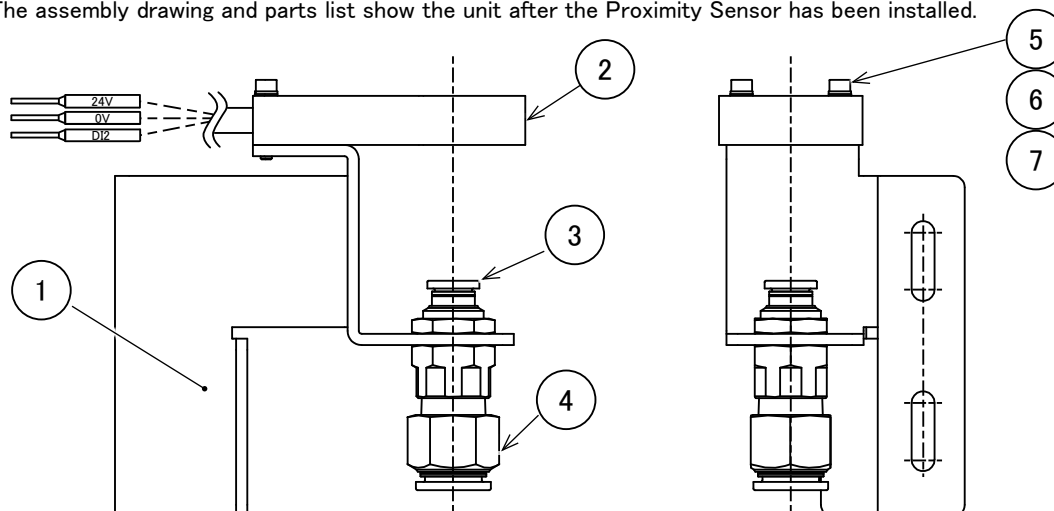
② : Plastic, Stainless, Rubber

③ : Brass, Plastic, Stainless, Rubber

④ : Copper, Plastic, Stainless, Steel, Aluminum, Rubber

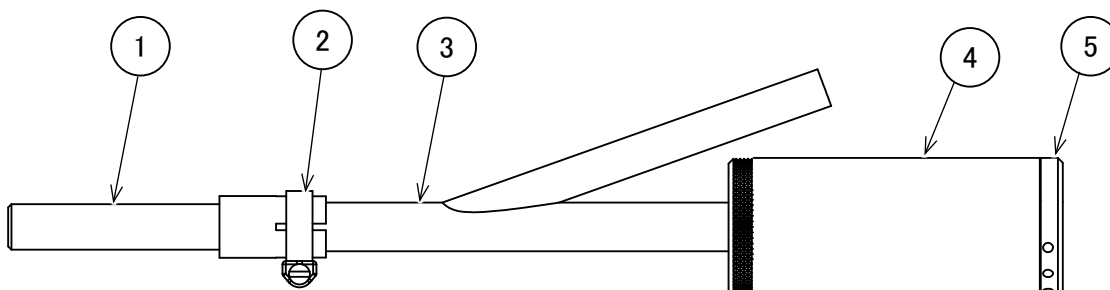
Assembly Hierarchy 1.3.2 Mandrel Ejection Unit (71477)

Note: The assembly drawing and parts list show the unit after the Proximity Sensor has been installed.



No.	部品名	Code No.	Material
1	Mandrel Ejection Unit Fixing Plate	71476	Stainless
2	Proximity Sensor	71482	Electronic Device
3	Push-in Fitting PMF8-03	72801	Brass, Plastic, Stainless, Rubber
4	Push-in Fitting PC12-03	72802	Brass, Plastic, Stainless, Rubber
5	Hex Socket Head Cap Screw M3 × 18	49994	Steel
6	Flat Washer M3	21539	Steel
7	Spring Washer M3	12442	Steel

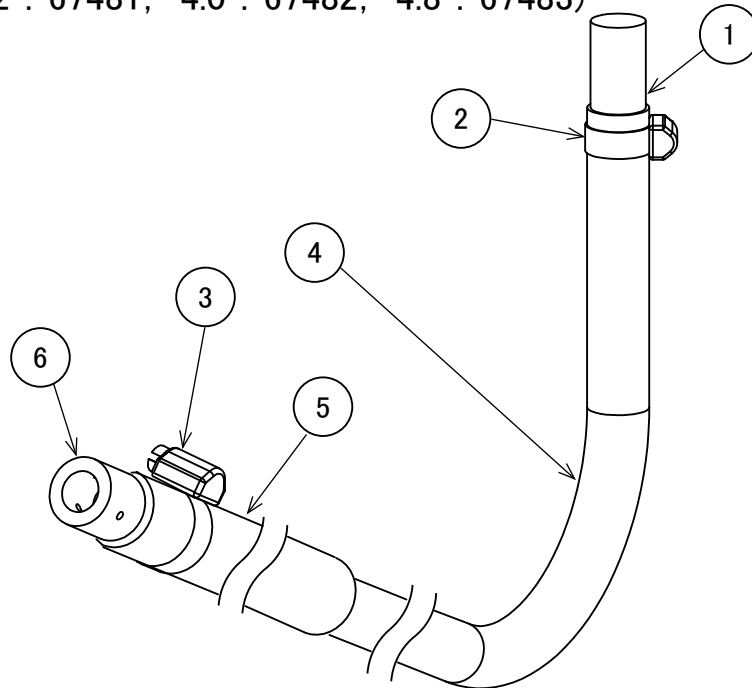
Assembly Hierarchy 1.4 Guide Shaft Unit □ (3.2 : 71473, 4.0 : 71474, 4.8 : 71475)



No.	Part name	Code No.	Size	Material
1	Guide Shaft ϕ 3.2 (for Automation)	72807	3.2	Plastic
	Guide Shaft ϕ 4.0 (for Automation)	72808	4.0	Plastic
	Guide Shaft ϕ 4.8 (for Automation)	72809	4.8	Plastic
2	Hose Clamp MH6	20883	---	Steel
3	Y-Joint Unit(ϕ 15)	72805	---	Steel
4	Tank	10261	---	Plastic
5	Tank Nut	10263	---	Aluminum

Assembly Hierarchy 1.5

Supply Hose □ (3.2 : 67481, 4.0 : 67482, 4.8 : 67483)



No.	Part name	Code No.	Size	Material
1	Hose Joint 3.2	18189	3.2	Steel
	Hose Joint 4.0	18200	4.0	Steel
	Hose Joint 4.8	18210	4.8	Steel
2	Hose Clamp MH6	20883	----	Steel
3	Hose Clamp MH12	72806	----	Steel
4	Tetron Braided Hose (10 × 16)	20885	3.2	Plastic
	Tetron Braided Hose (12 × 18)	18277	4.0, 4.8	Plastic
5	Guide Hose 3.2 (19 × 26)	71471	3.2	Plastic
	Guide Hose 4.0,4.8 (21.5 × 29)	71472	4.0, 4.8	Plastic
6	Rivet Ejection-side Hose Joint 3.2	72830	3.2	Steel
	Rivet Ejection-side Hose Joint 4.0,4.8	72831	4.0, 4.8	Steel

13. ORDERING PARTS

Indicate the tool model, part name, code no. and quantity as shown below when ordering.

Model	Part name	Code No.	Qty.
R2A1-UR	Ultra Jaws 'M'	10281	1
R2A1-UR	Frame Head	69468	1

* When parts are modified for improvement, the older parts are kept in stock for a period of five years.