JANOME DESKTOP ROBOT

JR3000 Series

JANOME CARTESIAN ROBOT

JC-3 Series

JANOME SCARA ROBOT

JS3 Series

Operation Manual

PC Operation

Thank you for purchasing this Janome Robot.

- **Before using your robot, read this manual thoroughly and always make sure you use the robot correctly. In particular, be sure to thoroughly read "For Your Safety" as it contains important safety information.**

- **After reading this manual, store in a safe place which is easily accessible at any time by the operator.**

Compliant Version: Ver. 9

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JANOME

PREFACE

This operation manual explains how to use JR C-Points II for the JR3000, JC-3, and JS3 Series.

There are several manuals pertaining to these robots.

Manual	Details	JR3000	JC-3	JS3
Read This First	• For Your Safety Be sure to thoroughly read “For Your Safety” as it contains important safety information. (Refer to the operation manual *Special Specifications* if you use the special specifications.) • Package Contents (JS3 Series only) Check the items included with your robot. • CD-ROM Contents Explains the CD-ROM contents.	✓	✓	✓
Setup (JR3000 / JC-3) Installation (JS3)	Explains how to set up the robot. ■ Make sure you read this manual when installing the robot ■ NOTE: This manual is designed for people who have received safety and installation training regarding the robot.	✓	✓	✓
Maintenance	Explains maintenance procedures for the robot. ■ Make sure you read this manual when performing maintenance ■ NOTE: This manual is designed for people who have received safety and maintenance training regarding the robot.	✓	✓	✓
Basic Instructions	Explains the basic knowledge necessary to operate the robot, such as part names and data configurations. ■ Make sure you read this manual when installing the robot unit and performing maintenance ■	✓ (Common)		✓
Quick Start	Explains the actual operation of the robot by creating and running simple programs.	✓ (Common)		✓
Teaching Pendant Operation	Explains how to operate the robot via the teaching pendant.	✓ (Common)		✓
Functions I	Explains point teaching.	✓ (Common)		
Functions II	Explains commands, variables, and functions.	✓ (Common)		
Functions III	Explains functions such as All Program Common Settings and PLC programs.	✓ (Common)		
Functions IV	Explains Customizing Functions.	✓ (Common)		
External Control	Explains I/O and Fieldbus.	✓	✓	✓
Communication Control	Explains COM 1 to 3 and LAN communication control.	✓ (Common)		

Manual	Details	JR3000	JC-3	JS3
Camera & Sensor Functions	Explains the functions of the attachable camera and Z position sensor.	✓ (Common)		
Specifications	Outlines general specifications such as the robot's operating range, mass, etc.	✓	✓	–
Auxiliary Axis Functions	Explains the auxiliary axis functions.	✓ (Common)		

NOTE: Depending on the specifications of the robot you purchased, an operation manual dedicated to that specification may be included in addition to the above.

⚠ Warning

Do not handle or operate the robot in ways not covered in the manuals listed here. Contact Janome (details on the back of this manual) or a Janome dealer for repairs. Failure to adhere to this may cause electric shock or injury.

⚠ Caution

To make full use of the machine's functions and capabilities, make sure that you use the robot according to the correct handling/operation procedures that are written in the manuals pertaining to this robot.

If the power to the robot is cut OFF after changing the settings and/or data without saving the data, those changes are lost and the robot will revert to its original settings. Make sure that you save any changes to data and/or settings.

Before using this robot for the first time, make sure you back up robot data and save the individual configuration information. Individual configuration information is needed when replacing internal circuit boards.
For details on how to back up robot data, refer to "3. BACKING UP AND RESTORING ROBOT DATA" in the operation manual *Setup* for the JR3000 Series, "7.1 Backing Up and Restoring Robot Data" in the operation manual *Setup* for the JC-3 Series, and "9.1 Backing Up and Restoring Robot Data" in the operation manual *Installation* for the JS3 Series.

Before sending C&T data to or from a PC and robot, make a back-up copy and save it to a PC in case of error.

- Mouse operation and the use of dialog boxes for JR C-Points II are the same as those in Microsoft Windows® 10 / 11 applications. For information about Windows® 10 / 11 operating methods, refer to the instruction manual supplied with Windows® 10 / 11.
- The information within this manual is based on the PC software Ver. 9.
- The descriptions within this manual are based on standard specifications. The menu item names, etc., may vary depending on the model type.
- Menu items related to the Z axis may appear with 2 axes specifications; however settings made for these items are not applied.
- For information regarding optional additions for this robot, refer to “24. SPECIFICATIONS” in the operation manual *Specifications* for the JR3000 Series, “13. SPECIFICATIONS” in the operation manual *Specifications* for the JC-3 Series, or “15. SPECIFICATIONS” in the operation manual *Basic Instructions* for the JS3 Series. The notation “optional” is not used in the main text of this manual except for diagrams.
- Machine specifications may be modified without prior notice to improve quality.

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- Microsoft and Windows are either registered trademarks or trademarks of Microsoft corporation in the United States and/or other countries.
- Excel and Word are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- Autodesk, AutoCAD and DXF are either registered trademarks or trademarks of Autodesk, Inc. in the United States and/or other countries.

Remarks:

- The operation methods described in this manual are indicated as follows:

  TP Operation via the teaching pendant

  PC Operation via PC (JR C-Points II)

- Click text that appears in blue and is underlined to jump to that section.
  Example: Refer to “1. PC MAIN SCREEN”.

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FOR YOUR SAFETY

The safety notes outlined below are provided in order to ensure safe and correct usage of the product in addition to preventing injury to the operator, other people and damage to property as well.

・・・・・Be sure to follow the safety guidelines detailed here・・・・・

Symbols are also listed alongside the safety note explanations. Refer to the list below for an explanation of these symbols.

■ Symbols that indicate the level of danger and/or damage.
The level of danger or damage that could occur as a result of ignoring these safety guidelines and misusing the robot are classified by the following symbols.

Danger	This symbol indicates an imminent risk of serious injury or death.
Warning	This symbol indicates a risk of serious injury or death.
Caution	This symbol indicates the possibility of serious injury or damage to property.

■ The following symbols list the nature of the danger and any necessary safety methods to be taken.

	Indicates caution must be taken
	Take Caution (General Precaution)
	Indicates a forbidden action
	Never do this (General Prohibition)
	Do not disassemble, modify or repair
	Do not touch (Contact Prohibition)
	Indicates a required action
	Be sure to follow instructions (General Requirement)
	Be sure to unplug the power cord
	Make sure the machine is grounded

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JR3000 Series ■■■■■■■■■■■■■■■■■■■■

If using auxiliary axis functions to operate a motor, such as a servo motor, that produces feedback and/or a motor with high output, etc., or when using auxiliary axes as a robot axes, etc., we ask that you perform a risk assessment on your side and take any necessary safety measures.

If Using Auxiliary Axis Functions in a Way that Require Safety Measures

⚠ Danger

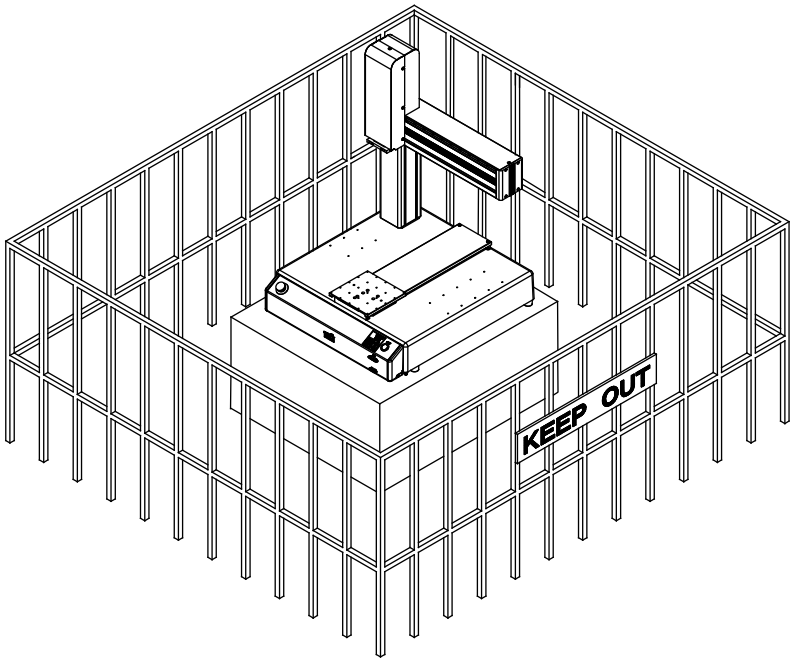
Always set up safety guards around the robot or the auxiliary axes so the moveable parts cannot be touched.

Anyone within the maximum reach of the robot and the auxiliary axes being controlled by the robot may be injured. Set up an **emergency stop interlock device that cuts OFF the motor power to the auxiliary axes when the entrance to the safety guard is opened** and make sure this entrance is the only way to access the machine.

NOTE: A stop made via the I/O-S connector is a stop category 2. Make sure to perform a separate risk assessment of the interlock device.

Furthermore, put up a **"Keep Out"** or **"Do Not Operate"** warning sign in a clearly visible place.

Example:



FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JR3000 Series ■■■■■■■■■■■■■■■■■■■■

If Using Auxiliary Axis Functions in a Way that Require Safety Measures

⚠ Danger

When power to the robot is ON, never enter the safety guard or put your head, hands, or any part of your body inside.
Entering the safety guard could result in injury.

When entering the safety guard due to something wrong with the robot or a peripheral device, or to inspect or lubricate the machine, etc., **with both the power supply breaker and the robot switched OFF, make sure to lockout and tagout and confirm there is no electricity flowing to the robot.**
Failure to do so can cause electric shock or injury.

⚠ Warning

When creating a robot system using auxiliary axis functions, if the system can be categorized as an industrial robot, make sure to use the robot in accordance with the laws and guidelines of the country where it is used.

Before performing a run or operation, always check the following:

- Obstacles : Make sure there are no obstacles or people within the safety guard.
- Installation : Make sure the robot is installed properly, that there are no abnormalities with the robot and the surrounding devices, and that the teaching pendant and tools are in the appropriate places.
- Emergency Stop Switch : Make sure the I/O-S circuit (interlock) and emergency stop switch(es) are functioning properly.

It is potentially dangerous to operate the robot without making these checks first.

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JR3000 Series ■■■■■■■■■■■■■■■■■■■■

If Using Auxiliary Axis Functions in a Way that Require Safety Measures

⚠ Warning	
!	**Construct safety guards that are strong enough to protect the operator against such dangers as the tool or workpiece splintering, etc.** When working within the safety guard, use protective gear such as a helmet, protective gloves, protective goggles, and safety shoes. Failure to follow these safety measures can result in injury.
!	If objects that the robot grasps have a risk of falling or being projected, **take into account the size, mass, and chemical composition of the objects for the required safety precautions.** Failure to do so can result in injury or unit breakdown.
!	**When working within the safety guard, make sure not to come within the maximum range of the robot.** Failure to do so can cause injury.
!	When starting a run, first confirm there are **no people inside of the safety guard and there are no obstacles that could interfere with the run.** Failure to do so can cause injury or unit breakdown.

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JR3000 Series ■■■■■■■■■■■■■■■■■■■■

⚠ Danger	
	Do not use where flammable or corrosive gas is present. Leaked gas accumulating around the unit causes explosions or fire.
	Make sure to perform a risk assessment when installing the unit. If you determine that the safety measures are required based on a risk assessment, set up area sensors and safety guards, etc. If there are no safety measures in place and someone enters the area of operation when the robot is running, they may be injured.
	Keep the emergency stop switch in a state where it can be immediately pushed when running or operating the robot. If you put the obstacle to the emergency stop switch operation around it, it may not be possible to stop the robot immediately and safely. This is potentially dangerous.
	Make sure that you regularly perform a function check of the emergency stop switch(es) referring to the operation manual *Maintenance*. **Also, for models with I/O-S*, regularly perform an I/O-S function check.** If the robot is operated without making these checks, it may not be possible to stop the robot immediately and safely in an emergency. This is potentially dangerous.

* A stop made via the I/O-S is a stop category 2.

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JR3000 Series ■■■■■■■■■■■■■■■■■■■■

⚠ Warning	
	Use protective gear such as a helmet, protective gloves, protective goggles, and safety shoes when installing the robot and performing maintenance. Failure to do so can cause injury.
	Make sure that you securely install the unit in a place that can fully withstand both the unit's weight and its usage. Install the robot on a workbench 600 mm or higher above floor level, in the center of the workbench. In addition, **for units with a cooling fan on the back, allow for 300 mm or more clearance between the back of the unit and the wall.** Install the switchbox 600 mm or more above floor level in an easily accessible place. If installation is inadequate, the unit can drop or fall over causing injury and unit breakdown. Also, inadequate installation causes overheating or fire.
	Make sure to power the unit within its rated current range. Failure to do so causes electric shock, fire, or unit breakdown.
	Use the dedicated power cord. Do not modify the power cord. Modification causes electric shock or unit breakdown. We cannot take any responsibility for machines that malfunction due to modification.
	Plug the power cord into the power outlet firmly. Failure to do so causes the plug to heat up resulting in fire.
	Be sure to use the unit within its indicated voltage range. Failure to do so causes unit breakdown, fire, or electric shock.
	When replacing fuses, or inspecting or lubricating the unit, unplug the power cord from the power outlet, then remove the cord from the main unit and make sure there is no electrical current. When doing this, do not touch any of the power inlet pins within 5 seconds of removing the power cords. Failure to follow these steps causes electric shock or injury.
	Always **make sure the machine is grounded through the power cord.** **Do not use the machine when it is not grounded.** Improper grounding causes electric shock, fire, malfunction, or unit breakdown.
	Wipe the power plug with a clean, dry cloth periodically to eliminate dust. Dust accumulation deteriorates the electrical insulation or causes fire.

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JR3000 Series ■■■■■■■■■■■■■■■■■■■■

⚠ Warning

	Be sure to unplug the power cord from the power outlet when the unit is not in use for long periods of time. Dust accumulation causes fire.
	If connecting a tool not included with the robot, make sure to perform a risk assessment and take the necessary safety precautions. Failure to do so causes injury or unit breakdown.
	Be sure to turn OFF the unit before inserting or removing cords and cables such as the teaching pendant cable or LAN cable. Failure to do so causes electric shock, data loss, unit breakdown, or malfunction.
	If disassembling this machine, follow the instructions in the operation manual *Maintenance*, and do not disassemble in any way other than those specified. Do not modify the machine in any way. Inappropriate disassembly or modification causes electric shock or unit breakdown. We cannot take any responsibility for machines that malfunction due to modification.
	Keep the dust, water, or oil mist, etc., away from the robot and power cord. Contact with water or oil mist, etc., causes electric shock, fire, or breakdown. IP Protection Rating is IP20. It is unprotected against dust, oil mist, etc., and water.
	If anything unusual occurs, such as a burning smell or unusual sound, stop operation and unplug the power cord immediately. Contact Janome or a Janome dealer. Continuing to use the robot without addressing the problem causes electric shock, fire, or unit breakdown.

⚠ Caution

	Do not drop or jar the unit during transport and/or installation. This can cause injury or damage the unit.
	Before performing any operation, ensure there is no imminent danger to any of the operators. Failure to do so causes injury.

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JR3000 Series ■■■■■■■■■■■■■■■■■■■■

⚠ Caution	
❗	**Use the robot in an environment that meets the following conditions:** • **Ambient temperature of 0 to 40 °C** • **Relative humidity of 20 to 90 % (No condensation)** • **Altitude not exceeding 1,000 m** Use outside of these conditions may cause malfunction or unit breakdown.
❗	**Install the robot in the place of use and take measures against electrical noise such as grounding before using the robot.** Failure to do so causes unit malfunction or breakdown of the robot or peripheral devices.
❗	**When attaching tools, a camera, or any other device, make sure they are securely fitted before running the robot.** Failure to do so causes injury or breakdown.
❗	**Check and make sure none of the main unit's mounting screws are loose, and perform a routine inspection every 3 months or after every 750 hours of operation.** Failure to do so causes injury or breakdown.
❗	**Be sure to check the connections of the cords and cables to the main unit.** Improper connection causes unit malfunction or breakdown.
❗	**When lifting or transporting the robot, do so in accordance with the following:** • **Secure the movable parts of the unit (the Z/ZR mechanism) before transport.** • **Lift and transport the JR3200 Series with 2 or more people.** • **Lift and transport the JR3300 to JR3600 Series with 2 or more people or use a lifter.** • **Hold the bottom of the base and keep the robot horizontal.** • **Do not hold the robot by the column, Y body or the Z/ZR mechanism.** Failure to adhere to these can cause injury or damage the robot.
❗	**Use the unit in an environment that is not exposed to direct sunlight.** Direct sunlight causes unit malfunction or breakdown.
⊘	Individual Configuration Information varies for each individual unit even if they are the same model. **Do not use backup data with a different robot. The robot cannot function normally with backup data from a different robot.**

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JC-3 Series ■■■■■■■■■■■■■■■■■■■■

Industrial Robot Safety Standards

Make sure to use the robot in accordance with the laws and guidelines of the country where it is used.

FOR YOUR SAFETY

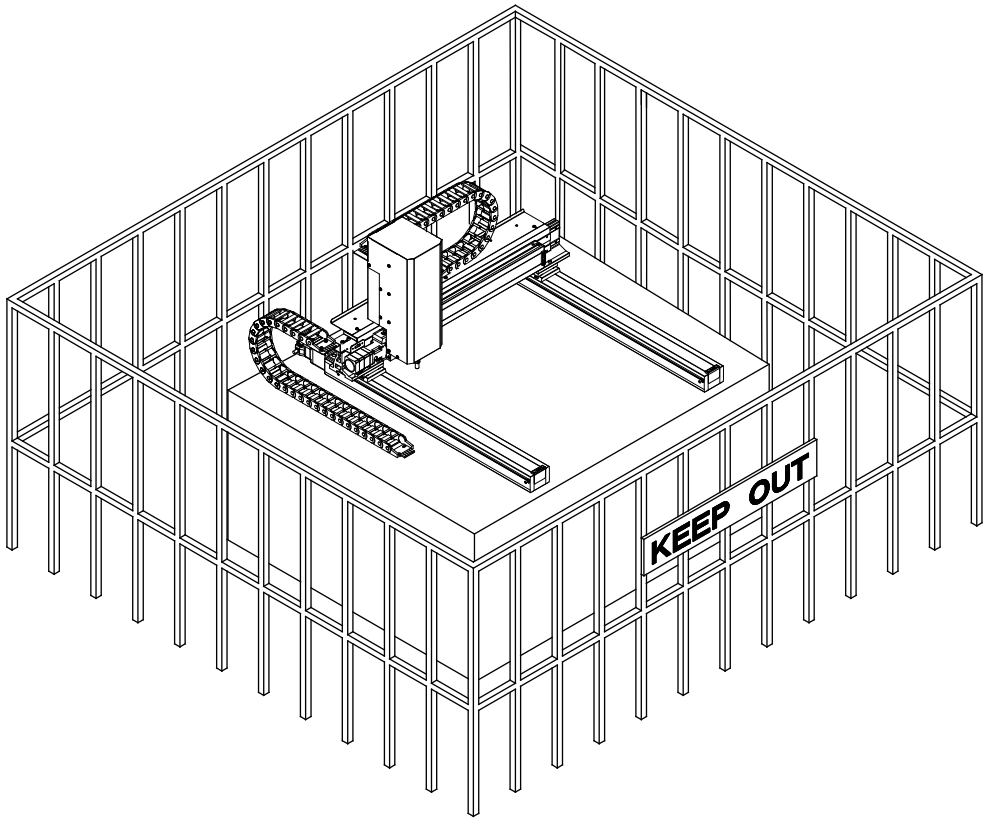
JC-3 Series

⚠ Danger

Do not use where flammable or corrosive gas is present.
Leaked gas accumulating around the unit causes explosions or fire.

Always set up safety guards.
Anyone within the maximum reach of the robot may be injured.
Using the included **EMG-OUT connector (unit)**, set up an **emergency stop interlock system that is triggered when the entrance to the safety guard is opened** and make sure this entrance is the only way to access the machine.
Furthermore, put up a **"Keep Out"** or **"Do Not Operate"** warning sign in a clearly visible place.

Example:



FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JC-3 Series ■■■■■■■■■■■■■■■■■■■■

⚠ Danger

Construct a safety circuit before operating the robot.
Use the EMG-OUT connector (unit) to maintain safety by installing a relay such as an external stop device on the power supply line which cuts the DC 48 V power input. Construct the safety circuit so it operates as a stop category 0 when the emergency stop switch is pushed.
Without the construction of a safety circuit, motor power 48 V will not be cut OFF even if the emergency stop switch is pushed, leading to unexpected accidents and injury. An error will occur if you construct the safety circuit without it operating as a stop category 0 when the emergency stop switch is pushed.

When power to the robot is ON, never enter the safety guard or put your head, hands, or any part of your body inside.
Entering the safety guard could result in injury.

Before entering the safety guard or inspecting or performing maintenance on the robot, make sure there is no electrical current.

- **Unplug the controller power cord from the power outlet (AC). Do not touch any of the power inlet pins within 5 seconds after removing the power cord.**
- **If using a controller with a terminal block (DC 48 V), turn the power OFF and remove the wiring from the terminal block.**

Failure to follow these steps can cause electric shock, injury, or the robot may move unexpectedly.

Before performing a run or operation, always check the following:

- Obstacles : Make sure there are no obstacles or people within the safety guard.
- Installation : Make sure the robot is installed properly, that there are no abnormalities with the robot and surrounding devices, and that the teaching pendant and tools are in the appropriate places.
- Emergency Stop Switch : Make sure the EMG OUT circuit (interlock) and emergency stop switch(es) are functioning properly.

It is potentially dangerous to operate the robot without making these checks first.

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JC-3 Series ■■■■■■■■■■■■■■■■■■■■

⚠ Danger

!	**Keep the emergency stop switch in a state where it can be immediately pushed when running or operating the robot.** If you put the obstacle to the emergency stop switch operation around it, it may not be possible to stop the robot immediately and safely. This is potentially dangerous.
!	**Make sure that you regularly perform a function check of the emergency stop switch(es). Also regularly perform an EMG OUT circuit function check.** If the robot is operated without making these checks, it may not be possible to stop the robot immediately and safely in an emergency. This is potentially dangerous.

⚠ Warning

!	**Use protective gear such as a helmet, protective gloves, protective goggles, and safety shoes when installing the robot and performing maintenance.** Failure to do so can cause injury.
!	**Make sure to power the unit within its rated current range.** Failure to do so causes electric shock, fire, or unit breakdown.
⊘	**Use the dedicated power cord. Do not modify the power cord.** Modification causes electric shock or unit breakdown. We cannot take any responsibility for machines that malfunction due to modification.
!	**Plug the power cord into the power outlet firmly.** Failure to do so causes the plug to heat up resulting in fire.
!	**Make sure to connect and use crimp terminals with the power cord connecting to the terminal block (DC 48 V input) and to securely tighten the terminal block screws.** Failure to do so causes electric shock, fire, or unit breakdown.
!	**Make sure to perform work from outside of the safety guards when the power is ON.** Failure to do so can cause injury.

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JC-3 Series ■■■■■■■■■■■■■■■■■■■■

⚠ Warning	
	Be sure to use the unit within its indicated voltage range. Failure to do so causes unit breakdown, fire, or electric shock.
	Install the controller within an industrial control panel, and make sure when the industrial control panel door is opened, the controller power is automatically cut OFF. In addition, for controllers with a cooling fan, allow for a clearance of 300 mm or more from the top of the controller, as well as 100 mm or more from the air vent on the side. Inadequate installation can cause overheating, fire, electric shock, or injury.
	With the 3 axes specifications, if releasing the brake, do so after either removing the attached tool or taking measures to prevent the tool from dropping. If you release the brake when turning the power ON in Teaching Mode, Switch Run Mode, or External Run Mode, the axis may drop down depending on the mass attached to the Z axis. If the Z axis drops down, it can cause injury or unit breakdown.
	If anything unusual occurs, such as a burning smell or unusual sound, stop the run, unplug the controller power cord from the power outlet, and make sure there is no electrical current. Contact Janome or a Janome dealer. • **Unplug the controller power cord from the power outlet. Do not touch any of the power inlet pins for at least 5 seconds after removing the power cord.** • **If using a controller with a terminal block (DC 48 V), turn the power OFF and remove the wiring from the terminal block.** Continuing to use the robot without addressing the problem causes electric shock, fire, or unit breakdown.
	When inspecting or performing maintenance on the controller, **make sure there is no electrical current and perform the following**: • **Unplug the controller power cord from the power outlet (AC). Do not touch any of the power inlet pins within 5 seconds of removing the power cords.** • **If using a controller with a terminal block (DC 48 V), turn the power OFF and remove the wiring from the terminal block.** Failure to follow these steps can cause electric shock, injury, data loss, unit breakdown, or malfunction.
	Always **make sure the machine is grounded through the power cord.** **Do not use the machine when it is not grounded.** Improper grounding causes electric shock, fire, malfunction, or unit breakdown.

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JC-3 Series ■■■■■■■■■■■■■■■■■■■■

⚠ Warning

	Wipe the power plug with a clean, dry cloth periodically to eliminate dust. Dust accumulation deteriorates the electrical insulation or causes fire.
	Be sure to unplug the power cord from the power outlet when the unit is not in use for long periods of time. Dust accumulation causes fire.
	If connecting a tool not included with the robot, make sure to perform a risk assessment and take the necessary safety precautions. Failure to do so causes injury or unit breakdown.
	If disassembling this machine, follow the instructions in the operation manual *Maintenance*, and do not disassemble in any way other than those specified. Do not modify the machine in any way. Inappropriate disassembly or modification causes electric shock or unit breakdown. We cannot take any responsibility for machines that malfunction due to modification.
	Keep the dust, water, or oil mist, etc., away from the robot, controller and power cord. Contact with water or oil mist, etc., causes electric shock, fire, or breakdown. IP Protection Rating is IP20. It is unprotected against dust, oil mist, etc., and water.

⚠ Caution

	Do not drop or jar the unit during transport and/or installation. This can cause injury or damage the unit.
	Before performing any operation, ensure there is no imminent danger to any of the operators. Failure to do so causes injury.
	Use the robot in an environment that meets the following conditions: • **Ambient temperature of 0 to 40 °C** • **Relative humidity of 20 to 85 % (No condensation)** • **Altitude not exceeding 1,000 m** Use outside of these conditions may cause malfunction or unit breakdown.

FOR YOUR SAFETY

JC-3 Series

⚠ Caution

Install the robot in the place of use and take measures against electrical noise such as grounding before using the robot.
Failure to do so causes unit malfunction or breakdown of the robot or peripheral devices.

When attaching tools, a camera, or any other device, make sure they are securely fitted before running the robot.
Failure to do so causes injury or breakdown.

Check and make sure none of the main unit's mounting screws are loose, and perform a routine inspection every 3 months or after every 750 hours of operation. Failure to do so causes injury or breakdown.

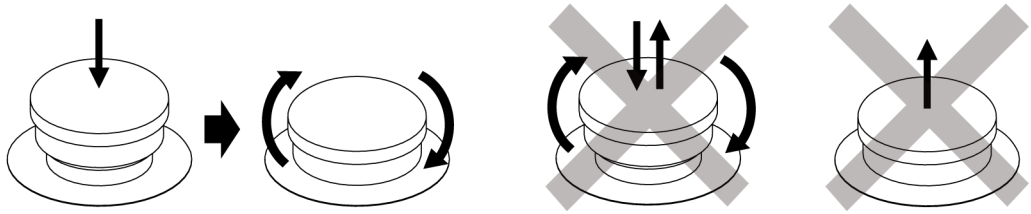
Be sure to check the connections of the cords and cables to the main unit and controller.
Improper connection causes unit malfunction or breakdown.

Make sure to wait for 1 second or more to power cycle after the DC 48 V external power supply to the controller is cut OFF.
Failure to do so can cause breakdown.

- Wait for 1 second or more to power cycle after the DC 48 V external power supply is cut OFF.
- Wait for 1 second or more to release the emergency stop after the emergency stop switch is pushed.
- Wait for 1 second or more to release the emergency stop after the external emergency stop device is activated.

Make sure to operate the emergency stop switch correctly as shown in the diagram below.
Failure to do so can cause breakdown.

Correct Operation **Incorrect Operation**



Push straight down | Turn and release | Do not press and pull when in releasing position | Do not pull

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JC-3 Series ■■■■■■■■■■■■■■■■■■■■

⚠ Caution

Make sure to construct a power circuit with enough margin for the rated current described on the rated identification plate on the side of controller to avoid momentary interruption of the DC 48 V external power supply.
Failure to do so can cause breakdown

Example: Rated Current of JC-3C-3

```
INPUT : AC 100-240V～ 50/60Hz  1.0-0.4A
        DC 48V ===             6.25  A ◄──── Rated Current
```

When the emergency stop device via the EMG-OUT connector (unit) is activated, make sure to release the emergency stop after resolving the cause of the emergency stop.
Failure to do so can cause injury or unit breakdown.

Make sure to adhere to the following precautions to stop a robot operation.
Failure to do so can cause breakdown.

- Use the start / stop switch on the switchbox or use the I/O-SYS signal to stop an operation when not in an emergency.
- Use the external emergency stop device only in an emergency. Do not use it to stop an operation when not in an emergency.
- Do not cut OFF the DC 48 V external power supply to stop an operation when not in an emergency.

Secure the movable parts of the unit before transportation.
Failure to do so causes injury or breakdown.

When lifting and transporting the robot, do so with 2 or more people.
Failure to do so causes injury or breakdown.

Use the unit in an environment that is not exposed to direct sunlight.
Direct sunlight causes unit malfunction or breakdown.

Individual Configuration Information varies for each individual unit even if they are the same model. **Do not use backup data with a different robot. The robot cannot function normally with backup data from a different robot.**

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JS3 Series ■■■■■■■■■■■■■■■■■■■■■■

Industrial Robot Safety Standards

Make sure to use the robot in accordance with the laws and guidelines of the country where it is used.

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JS3 Series ■■■■■■■■■■■■■■■■■■■■

Safety Precautions Regarding Installation

Robot Unit

⚠ Danger

Anyone within the maximum reach of the robot may be injured.
Install safety guards in adherence with the following:

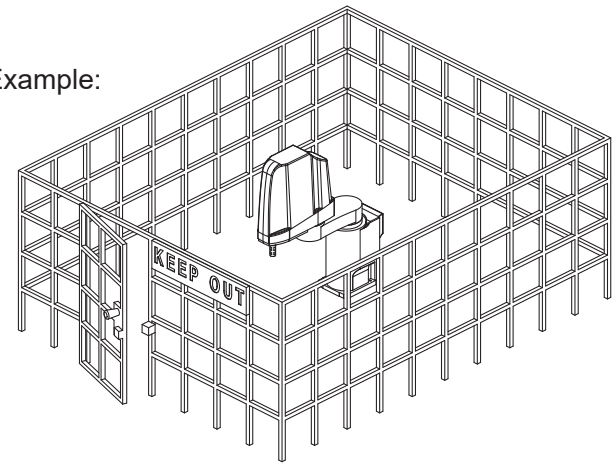
- The safety guards cannot easily be moved.
- The safety guards cannot easily fall over or be broken.
- Allow enough clearance between the robot and the safety guards so that even if the robot falls over, it does not hit the safety guards.
- No part of your body, such as your head or hands, can enter the safety guards.
- Install an interlock device on the entrance to the safety guards that activates an emergency stop when opened and make sure this entrance is the only way to access the machine. Connect the interlock device to the controller by using the included I/O-S connector.
- Place a warning sign such as “Keep Out” or “Do not Operate” on the safety guard entrance in a location that is easily visible.
- Affix the included danger sticker (shown below) in a location that is easily visible.

NOTE:

- A stop made via the I/O-S connector is a stop category 1. Make sure to perform a risk assessment for the interlock device.
- Refer to the operation manual *Installation* for details regarding I/O-S connections.
- After installing the unit, make sure to perform pre-operation checks from outside of the safety guards.

Warning Sticker

Example:



FOR YOUR SAFETY

JS3 Series

⚠ Danger

Do not remove the fixing plates from the robot arm until after transportation is complete.
Failure to do this can cause injury or breakdown.

If temporarily placing the robot on a mount, etc., make sure to secure the robot to the mount by tightening 2 or more bolts into the mounting holes on the mounting base to prevent the robot from tipping over.
Failure to do this may cause the robot to fall, resulting in injury or breakdown.

To set the home position for the J3 or J4-axis, release the brake and move the J3-axis (shaft) manually with two hands. When releasing the brake, take the following precautions:

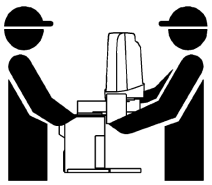
- Always release the brake with at least 2 people present.
- After the brake is released, the tool mass may cause the J3-axis to drop down. Make sure no people are within the operating range of the robot before releasing the brake.
- If there is risk that the robot may hit a peripheral device, make sure to position the robot arm appropriately before releasing the brake.

Failure to adhere to this can cause injury or breakdown.

⚠ Warning

Construct safety guards that are strong enough to protect the operator against such dangers as the tool or workpiece splintering, etc.
For the safety of the operator when working within the safety guard, use protective gear such as a helmet, protective gloves, protective goggles, and safety shoes.
Failure to follow these safety measures can result in injury.

Always have 2 people carry the robot with the fixtures attached as shown in the illustration to the right.
Mass: JS3-3520: Approx. 39 kg, JS3-4520: Approx. 40 kg
JS3-5520: Approx. 41 kg
Refer to “2.3 Transporting the Robot Unit” in the operation manual *Installation* for further details.



FOR YOUR SAFETY

JS3 Series

⚠ Warning

!	Avoid using the robot in operating environments such as the ones below. If using the robot in environments such as these, take measures to protect the robot from the direct effects of the work environment. • An environment where the robot vibrates or is bumped at 3.5 G or more during transportation. • An environment where the robot vibrates or is bumped at 0.5 G or more during operation. Using the robot in these environments can cause malfunction or breakdown.
!	Avoid using the robot in an environment that exceeds the radiation tolerance value for the average person. If using the robot in an environment such as this, take measures to protect the robot from the direct effects of the work environment. Using the robot in this environment can cause malfunction or breakdown.

⚠ Caution

⊘	**Do not hold the robot from the left and right sides or hold the robot by the covers.** Doing so may tip the robot over or the covers may break; causing the robot to fall resulting in injury.
⊘	Do not hold the robot by the J2 arm cover during transportation. Doing so can damage the cover.
!	**Do not apply force to the shaft (J3-axis).** Doing so can damage the shaft and cause an overload error to occur when the robot is run.
⊘	**Do not tip or place the robot on its side.** Doing so can cause a grease leak or breakdown.
!	Mount the robot on a steel base that is designed to withstand both the robot's mass and the force generated during runs. Inadequate installation may cause the robot to fall, resulting in injury or breakdown.

FOR YOUR SAFETY

JS3 Series

⚠ Caution	
	Firmly fix the robot to a specified horizontal mounting surface using the fixing bolts and make sure that positional displacements cannot occur.
	Install the robot in a location that provides enough clearance to replace the battery at the front of the robot and enough clearance to connect the motor power cable and the encoder cable to the back of the robot. Also, do not install the robot in a place where it is exposed to direct sunlight or heat from lighting. The robot surface may heat up and cause errors to occur.
	The robot requires periodic lubrication. Make sure you install the robot in a location where greasing is possible. (Refer to “4.8 Lubrication” in the operation manual *Maintenance*.
	Check the air tubing is connected correctly, has not come loose, or cannot easily come loose. If there is a problem, reconnect the tubing as required. Failure to do so can cause injury or breakdown.
	After installing the robot, make sure to remove the fixing plates attached to the robot arm. Failure to do so may cause breakdown.
	After installation, perform a periodic inspection (every 3 months or 750 hours of use, depending on how often the robot is in use) to check the tightening torque of the mounting screws with a torque wrench, etc.
	Adhere to the following when constructing or selecting a hand for the robot: • Make sure the total mass of the hand and the workpiece does not exceed the rated payload capacity of the robot. Especially if attaching an unconventional hand, check that the wrist does not exceed the allowable moment of inertia. • Use a hand or tool that has sufficient ability to grasp workpieces. • Secure the hand to the mechanical interface using bolts that are sized accordingly for the attachment dimensions. Make sure the tool has no protruding parts or sharp edges, other than those required for operation, and construct a cover for the tool if required. Failure to adhere to this can cause injury or breakdown.

FOR YOUR SAFETY

JS3 Series

⚠ Caution	
	If connecting cables or hoses to the hand, make sure they do not restrict the robot movements and make sure the robot operations do not cause the cables or hoses to get tangled and/or cause them to break. Improperly attached cables or hoses can cause breakdown.
	If using a pneumatic hand, make sure to provide clean air at the specified pressure. Also, make sure the air pressure does not exceed 0.7 MPa (7 kgf/cm^2). Air pressure higher than this may cause the robot's internal air hoses to burst.

Robot Unit and Controller

⚠ Danger	
	Do not use the robot where flammable or corrosive gas is present. Leaked gas accumulating around the unit causes explosions and fire.

⚠ Warning	
	Use protective gear such as a helmet, protective gloves, protective goggles, and safety shoes when installing the robot. Failure to follow these safety measures can result in injury.
	Before wiring the power cords, make sure there is no electrical current and perform the following: • **Lockout/tagout with the power source circuit breaker in the OFF position, and remove the power cords from the terminal block.** • Do not touch the terminal block within 5 seconds of removing the power cords. Failure to adhere to these may cause electric shock, injury, data loss or breakdown.

FOR YOUR SAFETY

JS3 Series

⚠ Warning

	Be sure to use the unit within its indicated voltage range. Failure to do so causes unit breakdown, fire, or electric shock.
	Make sure to isolate the robot motor power cable, the encoder cable, and external I/O cables from the power cable or grounding wire of other devices. Also make sure the external I/O cables are shielded. Do not apply voltages to terminals other than those specified in the operation manuals. Doing so can damage the robot or cause the terminal to explode.

⚠ Caution

	When transporting the robot, **do not excessively shock or vibrate the robot.** Doing so can cause malfunction or breakdown.
	Do not drop or jar the unit during transport and/or installation. This can cause injury or damage the unit.
	Use the robot in an indoor environment where it is not exposed to direct sunlight. Direct sunlight can cause unit malfunction or breakdown.
	Place the machine in a well-ventilated area for the health and safety of the operator.
	Use the robot in an environment that meets the following conditions: • **Ambient temperature of 0 to 40 °C** • **Relative humidity of 45 to 85 % (No condensation)** • **Altitude not exceeding 1,000 m** Use outside of these conditions may cause malfunction or unit breakdown. If the robot is used where these conditions are not met, we cannot guarantee its operation. IP protection rating for the both the robot and the controller is IP20.

FOR YOUR SAFETY

JS3 Series

⚠ Caution	
	Install the robot in the place of use and take measures against electrical noise such as grounding before using the robot. Failure to do so causes unit malfunction or breakdown of the robot or peripheral devices.
	Keep the dust, water, or oil mist, etc., away from the robot and controller. Contact with water or oil mist, etc., causes malfunction or breakdown. IP Protection Rating for both robot and controller is IP20. It is unprotected against dust, oil mist, etc., and water.
	Install the cables and connectors so there is no stress on them and do not forcefully bend or pull, or stand on them after they are installed. Protect the cables and connectors by using piping and covers, etc., as necessary. Make sure the latches and screws securing the cables and connectors are firmly secured. If the cables and connectors are not secure, they may come loose during a run.
	If the hand input cable (optional) has free terminals, make sure to insulate them before supplying power to the hand input cable (optional). Uncovered terminals can cause a short circuit to occur.

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JS3 Series ■■■■■■■■■■■■■■■■■■■■

Controller

⚠ Danger	
!	**Mount the controller outside of the safety guards in a location where the switches can easily be reached and the controller can always be monitored by the operator without turning their back on the robot unit itself.** Mount the controller so that the operation panel is 600 mm or more above floor level for maintenance work.
!	Before connecting a Fieldbus, make sure safety can be maintained at all times when the robot is run. If signals such as a start signal, etc., are assigned to the Fieldbus, the Fieldbus may standby waiting to send signals and cause the robot to start running immediately after it is connected. Failure to do so can cause injury or breakdown.

⚠ Warning	
!	Use a lifter, etc., to transport the controller. Failure to do so can cause injury or breakdown.
!	If external vibrations can cause the controller to move, fix it in place using the base plate of the controller. (Do so without removing the rubber feet)
!	**Make sure that you securely install the unit in a place that can fully withstand both the unit's mass and its usage.** If installation is inadequate, the unit can drop or fall over causing injury and unit breakdown. Inadequate installation can also cause overheating and fire.
!	The controller has a fan and ventilation intakes for cooling. Do not block these openings and make sure there is a clearance of at least 20 mm on both the left and right sides and at least 40 mm on the back side. Blocking these openings can cause overheating or breakdown.
!	Leave approximately 200 mm or more clearance from the front of the controller so there is no stress on the connectors and enough room to work. Failure to do so can cause malfunction or breakdown.

FOR YOUR SAFETY

JS3 Series

⚠ Warning	
	In addition to the clearance required for installation, leave sufficient space around the controller for removing covers (with a screwdriver) as a contingency for maintenance work. The controller may get hot during a malfunction. Do not touch the controller immediately after use.
	Make sure the power cord prepared on your side uses the **correct crimped terminals for connecting to the terminal block. Make sure they are within the sizes outlined below and never forcefully connect them.** Incorrect connections may cause fire or breakdown. • Conductor size: AWG10 (cross-sectional area: 6.0 mm^2) • Crimped terminal: M4, with a terminal width of 9.5 mm or less
	After wiring the power supply terminal block, attach the cover included to prevent electric shock. An unprotected terminal block can cause electric shock, fire, or unit breakdown.
	Always make sure to connect the protective ground through the power cord. Do not use the machine when the protective ground is not connected. Make sure the protective grounding resistance is 100 Ω or less. Improper grounding causes electric shock, fire, malfunction, or unit breakdown, etc.

FOR YOUR SAFETY

JS3 Series

⚠ Caution	
!	Do not apply pressure to any protruding parts, such as a switch, the terminal block, or a connector when transporting the controller. Doing so can cause breakdown.
!	If you want to use the controller, operation box (optional), or teaching pendant as a monitor while in Run Mode, **mount the respective device 600 mm or more above floor level in an easily accessible place so that the emergency stop switch can be immediately reached in the event of an emergency.** It is dangerous to operate the machine without the emergency stop switch within reach; you will not be able to stop the robot immediately and safely in the event of an emergency. Installing one of these devices too low can also result in malfunction from people knocking the device with their feet, etc.
!	Make sure installation allows for access to the memory port during maintenance.

FOR YOUR SAFETY

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Safety Precautions Regarding Usage

Robot Unit

⚠ Warning	
❗	If objects that the robot grasps have a risk of falling or being projected, **take into account the size, mass, and chemical composition of the objects for the required safety precautions.** Failure to do so can result in injury or unit breakdown.
⊘	**When manually moving the robot arm, do not insert your hands or fingers into any of the joints or openings.** Your hands or fingers may get caught in these openings depending on the robot pose.

⚠ Caution	
❗	Before performing any operation, make sure there is no imminent danger to any of the operators. Failure to do so causes injury.
❗	**When attaching tools, a camera, or any other device, make sure they are securely fitted before running the robot.** A loose tool can cause injury or breakdown.
❗	If weight is applied to the J3 (Z) / J4 (R) axis, the load may cause the J3/J4 axis to drop down when the power to the robot is turned OFF. To prevent this from happening, remove the load from the J3/J4 axis or install a safety block, etc.
❗	When performing work inside the safety guards, perform your own risk assessment and establish **"work regulations", as outlined below, with thorough planning for safety.** Entering the safety guards may result in injury. • Work regulations should be relevant and appropriate for the type of work, and consist of details such as robot operating procedures and signs to be used between operators. • When creating work regulations, incorporate the opinion of operators and work safety specialists. Make sure to review and update the contents of the work regulations regularly.

FOR YOUR SAFETY

JS3 Series

⚠ Caution	
	If manually moving the robot arm, do so slowly. Moving the arm at high speed can cause large amounts of backlash, reducing the robot's accuracy and damage the backup data.
	Depending on the arm pose, the shaft may come in contact with the robot base even when operating the robot within the movement range. Make sure the shaft does not come in contact with the base while making JOG operation.
	The J3 (Z) axis is equipped with a brake. Do not forcibly move the J3-axis using an external source when the brake is active. Forcibly moving the axis can reduce accuracy and/or wear the brake, damaging the reduction drive.
	If the robot picks up a workpiece that is charged with static electricity, the electricity is discharged through the hand and the robot arm. To prevent the robot from malfunctioning, make sure to insulate the hand and robot arm. Also, when the robot places a charged workpiece on a device, the electricity is discharged through the device and may cause it to malfunction. Configure the system so that it provides a route for appropriate electrical discharge from charged workpieces. Failure to do so can cause malfunction or unit breakdown.
	The grease is not completely effective at low temperatures. Make sure to use the warmup function to prevent loss of positioning accuracy and to prevent servo errors such as Excessive Margin of Error.
	Take care when affixing tape that has a strong adhesive, such as gummed tape, to the painted surfaces on the robot. The tape may damage the painted surfaces when it is peeled off.

FOR YOUR SAFETY

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Robot Unit and Controller

⚠ Danger	
	When power to the robot is ON, never enter the safety guard or put your head, hands, or any part of your body inside. Entering the safety guards could result in injury.
	When changing modes or starting a run, first confirm there are **no people inside of the safety guard and there are no obstacles that could interfere with the run.** Failure to do so causes injury.
	Before performing a run or operation, always check the following: • **Obstacles** Make sure there are no obstacles or people within the safety guard. • **Installation** Make sure the robot is installed properly, that there are no abnormalities with the robot and the surrounding devices, and that the teaching pendant and tools are in the appropriate places. • **Emergency Stop Function Check** Make sure the I/O-S circuit (interlock) and emergency stop switch(es) are functioning properly. Operating the robot without making these checks is dangerous.
	If entering the safety guards without cutting OFF the power, **always make sure the select switch on the teaching pendant is set to "TEACH" (Teaching Mode).** If the select switch is set to "AUTO" (Run Mode), external commands can start the robot while you are inside the safety guards. Failure to adhere to this can cause injury or breakdown.
	If there are any safety devices that you disable while teaching, make sure to enable them after teaching to reestablish full functionality. Example: Enable the interlock device on the safety guard entrance, etc. Failure to do so can result in injury.

FOR YOUR SAFETY

JS3 Series

⚠ Warning	
	Make sure to use a power source that is in accordance with the range indicated on the rating identification plate. Failure to do so causes electric shock, fire, or unit breakdown.
	Keep the dust, water, or oil mist, etc., away from the robot and power cord. Contact with water or oil mist, etc., causes electric shock, fire, or breakdown. IP Protection Rating is IP20. It is unprotected against dust, oil mist, etc., and water.
	Make sure that no foreign objects can enter the robot or controller. In particular, a conductive or flammable foreign matter, such as a screw, metal shard or oil, can cause an explosion or damage the unit, etc.
	Be sure to turn OFF the unit before inserting or removing cords and cables such as the teaching pendant cable or LAN cable. Failure to do so can cause electric shock, data loss, unit breakdown, or malfunction.
	Firmly connect and secure the power cord after checking that the connection area is not covered with dust, etc. If the power cord is not firmly plugged in, the connectors may heat up and cause a fire.
	Be sure to unplug the power cord from the power outlet when the unit is not in use for long periods of time. Dust accumulation may cause fire.
	If connecting a tool not included with the robot, make sure to perform a risk assessment and take the necessary safety precautions. Failure to do so causes injury or unit breakdown.
	If anything unusual occurs, such as a burning smell or unusual sound, stop operation and turn the power supply circuit breaker OFF. Unplug the power cord after confirming there is no power supplied to the robot and then contact Janome or a Janome dealer. Continuing to use the robot without addressing the problem causes electric shock, fire, or unit breakdown.

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JS3 Series ■■■■■■■■■■■■■■■■■■■■

⚠ Caution	
!	**Be sure to check the connections of the cords and cables to the main unit.** Improper connection may result in unit malfunction or breakdown.
!	Make sure to save if you modify any settings or data. When the robot power is turned OFF after changing settings and data without saving, those changes are lost and the robot will revert to its original settings.
!	“Diagnostic Mode” and “Mechanical Adjustment Mode” are for maintenance personnel* use only.

* “Maintenance Personnel” are individuals who have received maintenance training from Janome or from a Janome dealer.

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JS3 Series ■■■■■■■■■■■■■■■■■■■■

Controller

⚠ Warning

Do not touch the terminal block when there is an electrical current present.
Touching the terminal block can result in electric shock or injury.

⚠ Caution

Keep the emergency stop switch in a state where it can be immediately pushed when running or operating the robot.
If you put the obstacle to the emergency stop switch operation around it, it may not be possible to stop the robot immediately and safely. This is potentially dangerous.

Individual Configuration Information varies for each individual unit even if they are the same model. **Do not use backup data with a different robot.**
The robot cannot function normally with backup data from a different robot.

Do not turn OFF the power while the robot is running.
Turning OFF the power during a run can cause the arm to drop down or coast to a stop, which may result in the arm hitting a peripheral device.

When an error occurs, the error code that appears on the 7 segment LED and the teaching pendant display are useful indicators for finding the source of the error. Record the error number and then refer to the operation manual *Maintenance* for the countermeasure.

FOR YOUR SAFETY

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Safety Precautions Regarding Maintenance

Robot Unit

⚠ Warning	
	Do not touch or come in contact with any potentially hot components on the robot. Doing so can result in burns and serious accidents. The servomotor may get hot. Do not touch or come in contact with the servomotor while the power is ON, only do so when the power is OFF and after it has cooled down.

⚠ Caution	
	Check that the mounting screws are always firmly tightened with a periodic inspection (every 3 months or 750 hours of use, depending on how often the robot is in use). A loose tool can cause injury or breakdown.
	Periodically replace the robot unit battery. Failure to do so can cause malfunction or breakdown. Replace the battery approximately every 1 year.

Robot Unit and Controller

⚠ Danger	
	If entering the safety guards, turn the power source circuit breaker OFF, lock and tag it, and then make sure there is no power supplied to the robot before continuing. Failure to do so can cause electric shock, injury, or the robot may move unexpectedly.
	If entering the safety guards, perform your own risk assessment and establish "work regulations", as outlined below, with thorough planning for safety. • Work regulations should be relevant and appropriate for the type of work, and consist of details such as robot operating procedures and signs to be used between operators. • When creating work regulations, incorporate the opinion of operators and work safety specialists. Make sure to review and update the contents of the work regulations regularly.

FOR YOUR SAFETY

JS3 Series

⚠ Danger

When setting the home position or other such work that requires you to enter the safety guards with the power ON, make sure to activate the emergency stop switch before entering the safety guards and to perform the work with the robot in this state. Failure to do so can result in injury.

⚠ Warning

Use protective gear such as a helmet, protective gloves, protective goggles, and safety shoes when performing maintenance.
Failure to do so can cause injury.

When inspecting or performing maintenance on the controller, **make sure there is no electrical current and perform the following:**

- **Lockout/tagout with the power source circuit breaker in the OFF position, and remove the power cords from the terminal block.**
- Do not touch the terminal block within 5 seconds of removing the power cords.

Failure to adhere to this may cause electric shock, injury, data loss or breakdown.

If disassembling this machine, follow the instructions in the operation manual *Maintenance*, and do not disassemble in any ways other than as specified. Do not modify the machine in any way.
Inappropriate disassembly or modification causes electric shock or unit breakdown.
We cannot take any responsibility for machines that malfunction due to modification.

For your safety, **do not modify the machine in any way.**
Inappropriate disassembly or modification causes electric shock or unit breakdown.
We cannot take any responsibility for machines that malfunction due to modification.

After cutting OFF power to the system, energy stored by the devices is potentially dangerous, so make sure to establish means to reduce this risk.

- Controller
  Make sure the energy stored by the controller is discharged before opening the controller.
- Hand
  Use a hose connected to the solenoid valve to expel compressed air from a pneumatic chuck hand.

FOR YOUR SAFETY

JS3 Series

⚠ Caution	
	Perform daily and periodic inspections to check and make sure there are no abnormalities with the robot or peripheral devices. Additionally, keep records of the inspections and store them for 3 years or more so that the details can be referred to for future inspections.
	Place a sign such as “Robot Inspection in Progress” in the necessary locations and establish means so as to prevent operation of the robot by those who may be unaware of the maintenance work. Whenever possible, also perform maintenance with at least one other person present so as to stop any unexpected robot movements.
	For a smooth and long operating life, **lubricate the shaft once for every 2,000 km the robot is run.** Grease the robot more frequently if running it continuously for long periods, such as 24 hour runs. The lubrication periods are calculated based on runs at maximum speed.
	Make sure to use the specified grease. Use of grease other than the specified grease can adversely affect the robot’s performance or cause breakdown.
	If the arm joints or the Z-axis is subject to only minute operational angles or distances, fretting may occur in the part of the internal robot bearings. Fretting refers to wear that occurs when minute operation angles do not allow the grease within the bearings to fully coat the working parts as required. This is also applies to axes that are inactive, as the counterforce from other axis operations or vibrations from the robot mounting surface cause minute movements in the inactive axes, which may result in fretting damage. To prevent fretting damage, we recommend running the arm joints more than 30 degrees and the Z-axis more than 20 mm per day.
	Do not charge, dispose of in a fire, or reuse the robot unit battery or controller battery (unit) in any way.
	The robot unit battery and controller battery (unit) are considered industrial waste. Make sure they are disposed of in accordance with the national and/or local authority laws and legislations.

FOR YOUR SAFETY

■■■■■■■■■■■■■■■■■■■■ JS3 Series ■■■■■■■■■■■■■■■■■■■■

Controller

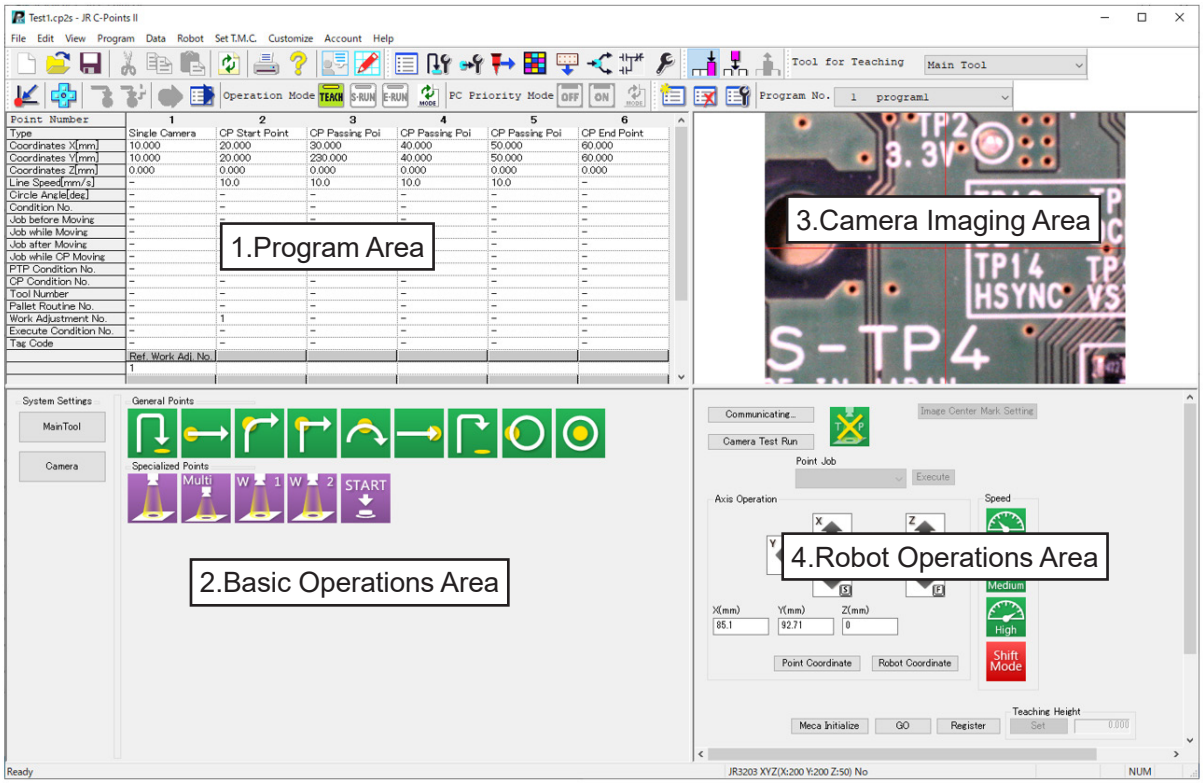
⚠ Danger

Before entering the safety guard because of something wrong with the robot or a peripheral device, or to **inspect or lubricate the machine, etc., always make sure to turn the controller and power source circuit breakers OFF, lock and tag them, and make sure there is no electrical current.**
Failure to follow these steps can cause electric shock or injury.

⚠ Warning

When replacing fuses, or inspecting or lubricating the unit, turn OFF the power supply, then remove the cord from the main unit and make sure there is no power supplied to the robot before continuing.
Also, **do not touch the terminal block within 5 seconds of removing the power cords.** Failure to follow these steps can cause electric shock or injury.

1. PC MAIN SCREEN

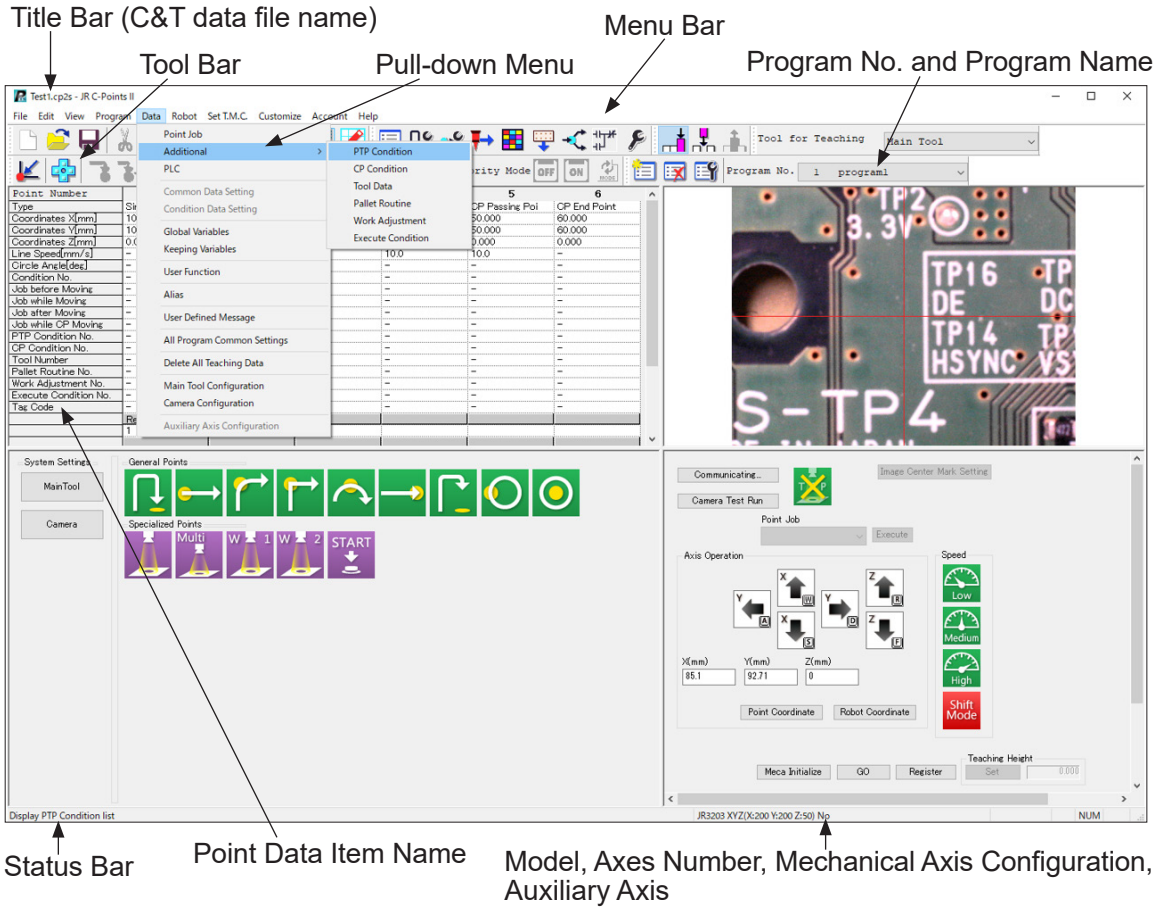


The main screen is made up of four areas: the program area, basic operations area, camera imaging area, and the robot operations area.
The camera imaging area is only displayed when you are using a robot equipped with a USB camera and IS8200 camera / AS200 camera (Manufacturer: COGNEX) (optional). The point teaching and the camera set up required for point teaching is made easy with this software. For details on how to make these settings, refer to “9. TOOL CONFIGURATION”.

NOTE: Connect the USB camera to the PC. Do not connect it to the robot.

1.1 Program Area

This is the area on the main screen used for creating and displaying program data. Here you can use the menu bar and tool bar to create and edit programs.



- Title bar
  Displays the name of the C&T data file currently open.
- Menu bar
  JR C-Points II menu: Click an item to display its pull-down menu.
- Tool bar
  Shortcut icon alignment.
- Pull-Down menu
  Appears when clicking an item on the menu bar.
- Program number and name
  The number and name of the currently open (selected) program appears.
  For the twin table specifications, “X-L” appears for odd-numbered program numbers and “X-R” appears for even-numbered program numbers.
- Point data item
  Items which can be set to point data.
- Status bar
  Displays an explanation.
- Model name, axis info, axis configuration, auxiliary axis
  Displays the model and axes number of the connected robot.

1.1.1 Icon Function List

The table below describes the icons used with this software. You can select to show/hide these icons by clicking the [View] tab and selecting “Tool Bar” from the pull-down menu.

Icon	Function	Corresponding Menu Operation
	Opens a new (C&T data) file	File → NEW
	Opens an existing file	File → Open
	Overwrites the file currently open	File → Save
	Cuts the selected point	Edit → Cut
	Copies the selected cell to the clipboard	Edit → Copy
	Pastes the selected item from the clipboard to the cell	Edit → Paste
	Refresh	View → Refresh
	Print	File → Print...
	Displays the JR C-Points II version information	Help → About...
	Changes the display language	View → Set Language
	Edits the point as a graphic	Edit → Edit Graphic Point
	Point Job	Data → Point Job
	PTP Condition	Data → Additional → PTP Condition
	CP Condition	Data → Additional → CP Condition
	Tool Data	Data → Additional → Tool Data
	Pallet Routine	Data → Additional → Pallet Routine
	Work Adjustment	Data → Additional → Work Adjustment
	Execute Condition	Data → Additional → Execute Condition
	PLC Program	Data → PLC
	All Program Common Settings	Data → All Program Common Settings
	Point Add Mode	Edit → Point Add Mode
	Point Insert Mode	Edit → Point Insert Mode
	Deletes a point	Edit → Delete Point
	Mechanically initializes the robot*	Robot → Meca Initialize*

Icon	Function	Corresponding Menu Operation
	Operates the robot in JOG mode	Robot → JOG
	The robot makes a GO movement	Robot → Go Move
	The robot makes a GO movement and then moves to the next point	Robot → Go Plus Move
	Instructs the robot to make a point run	Robot → Point Playback
	Instructs the robot to make a test run	Robot → Test Running
	Run Mode	Robot → Run Mode • Teaching Mode • External Run Mode • Switch Run Mode • Update Run Mode
	PC Priority Mode (JS3 Series only)	Robot → PC Priority Mode • OFF • ON • Update
	Adds a program	Program → Add Program
	Deletes the currently selected program	Program → Delete Program
	Program individual settings	Program → Program Individual Settings

* With JC-3 absolute encoder models and JS3 Series, this is the “Return to Work Home” function

1.2 Basic Operations Area

This displays buttons for accessing the configuration settings screens and registering point types. This area contains the following system settings buttons: [Main Tool] and [Camera].
Select and click the button of the point type you want to add or insert to the program area. (Add and Insert are performed according to the Point Add Mode and Point Insert Mode statuses.)
If the robot operations area appears, the point coordinates displayed in the robot operations area are set as the point coordinates for an added point type.

1.2.1 Point Type Buttons

Icon	Function
PTP Point	This adds a PTP Point to the end of the point array. The robot makes a PTP movement to the specified point. The main tool TCP tool data is applied for this point.
CP Start Point	This adds a CP Start Point to the end of the point array. The point where the robot changes from PTP movement and starts CP movement. The main tool TCP tool data is applied for this point.
CP Passing Point	This adds a CP Passing Point to the end of the point array. The point where the robot changes direction in a CP movement. The robot moves to the succeeding point at the same speed as from the previous point.
CP Stop Point	This adds a CP Stop Point to the end of the point array. The point where the robot performs a point job or changes direction in a CP movement. The speed is temporarily slowed to 0 mm/s at this point.
CP Arc Point	This adds a CP Arc Point to the end of the point array. This point is necessary for specifying an arc in a CP movement drawn between the CP Start Point and CP End Point. You can set the line speed for this point.
CP End Point	This adds a CP End Point to the end of the point array. The point where the robot completes a CP movement and then moves to the next point by PTP movement.
PTP Evasion Point	This adds a PTP Evasion Point to the end of the point array. The point where the robot evades obstacles in a PTP movement. The main tool TCP tool data is applied for this point.

Icon	Function
Circle Start Point	This adds a Circle Start Point to the end of the point array. Specify a Circle Center Point and Circle, and then use this point to make an arc movement (CP movement). The subsequent point, the Circle Center Point, is the center of the arc. The circle angle is set in the subsequent point; the Circle Center Point. If you set a workpiece adjustment, the Circle Center Point is offset together with the Circle Start Point. The main tool TCP tool data is applied for this point. NOTE: This does not have settings for an arc end point.
Circle Center Point	This adds a Circle Center Point to the end of the point array. This point is used to indicate the center and angle of the arc movement (CP movement) started by the Circle Start Point.
Single Camera Shoot Point	This adds a Single Camera Shoot Point to the end of the point array. The robot makes a PTP movement and photographs marks on the workpiece. The adjustment values from the workpiece adjustment data set in “Ref. Work Adj. No.” are applied. You can use these workpiece adjustments by setting them to PTP Points, etc. By applying “No Tool” tool data to this point, the robot does not deviate from the taught position. The robot position will not change even if the tool data for the main tool TCP is modified.
Multi Camera Shoot Point	This adds a Multi Camera Shoot Point to the end of the point array. Use this point type when you want to split and take photographs and make adjustments separately when photographing multiple workpieces. Use this to collectively photograph the multiple workpieces. After doing so, you can collectively make adjustments so that these adjustments are applied to PTP Points, etc., according to the mark photograph results. Register the workpiece adjustment type as “CCD Camera Adjst. with Counter/Z-Adjst.” for workpiece adjustment data set to “Ref. Work Adj. No.”. By applying “No Tool” tool data to this point, the robot does not deviate from the taught position. The robot position will not change even if the tool data for the main tool TCP is modified.

Icon	Function
Double Camera Shoot Point 1	These add a Double Camera Shoot Point 1 or Double Camera Shoot Point 2 to the end of the point array respectively. An image acquired with the Double Camera Shoot Points is done by splitting the photographing into two separate shots, allowing you to make adjustments using a wider area than you can with one imaging point. This makes for even more precise adjustments. To execute the Double Camera Shoot Points, you need to consecutively teach Double Camera Shoot Point 1 and Double Camera Shoot Point 2. Create two work adjustment numbers in sequence for the work adjustment used at the two photographing locations. Set the smaller workpiece adjustment number to “Ref. Work Adj. No.” for Double Camera Shoot Point 1. The other workpiece adjustment number, which was created in sequence, is automatically applied to Double Camera Shoot Point 2. The robot makes a PTP movement to the photographing locations and photographs the marks on the workpiece. The photograph results are applied as adjustment values to the workpiece adjustment data set in “Ref. Work Adj. No.”. You can use the adjustment data by setting this workpiece adjustment data to PTP Points, etc. By applying “No Tool” tool data to this point, the robot does not deviate from the taught position. The robot position will not change even if the tool data for the main tool TCP is modified.
Double Camera Shoot Point 2	
Wait Start Point	This adds a Wait Start Point to the end of the point array. The robot waits at this position until the start switch is pressed or until a start signal comes ON. The robot makes a PTP movement to the next point. The main tool TCP tool data is applied for this point.

1.3 Camera Imaging Area

This is the camera imaging area for displaying the camera image. Select [Type-C1(IS/ AS)] for the camera type in the camera configuration. When the camera is connected to the set IP address, select [USB] for the camera type. If you select a USB camera connected to your PC in the camera imaging settings, the camera image appears.

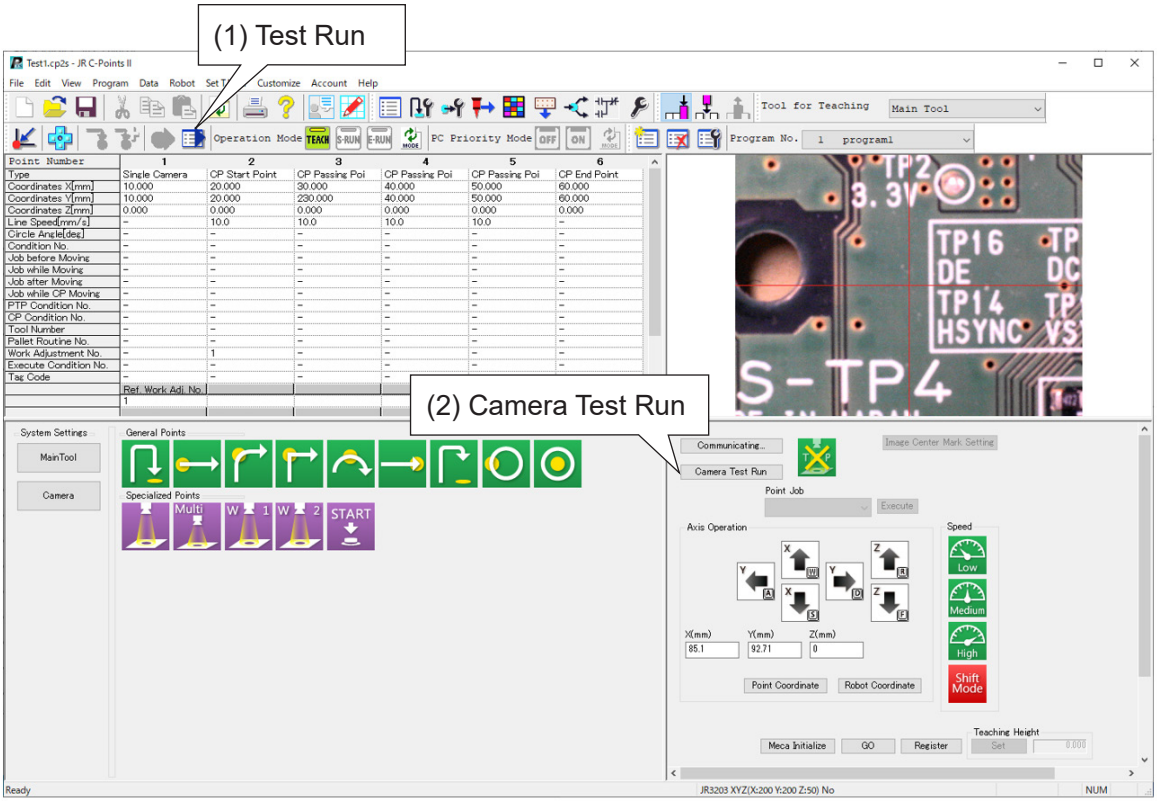
1.4 Robot Operations Area

This is used for performing operations with the robot. You can use this area to perform point coordinate JOG teaching.

NOTE: From the menu bar, click [Robot] → [JOG] or click the icon on the main screen to display this area.

- [Communicating] Button
  Click this to connect and disconnect communication with the robot and camera, etc. (If you perform a separate operation that requires communication with the robot or camera, a simultaneous connection cannot be maintained and communication between the PC and robot/camera is stopped. After you finish the operation, communication is attempted to be reestablished, however if for some reason communication cannot be established, the screen will stay in a disconnected state. Use this button to reestablish connection after communication with the robot and camera is again possible.)

- [Test Run]
- [Camera Test Run]



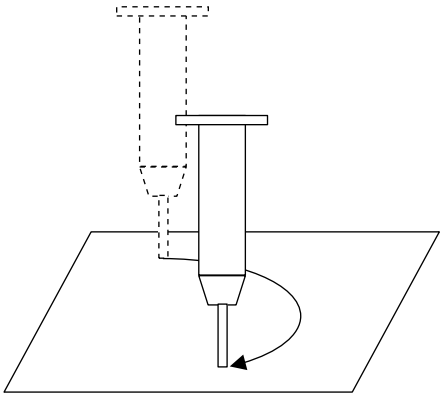
(1) Test Run

Test Run executes a program the same as an actual program run in Run Mode.
Use this to check positioning of the main tool with the workpiece.

(2) Camera Test Run

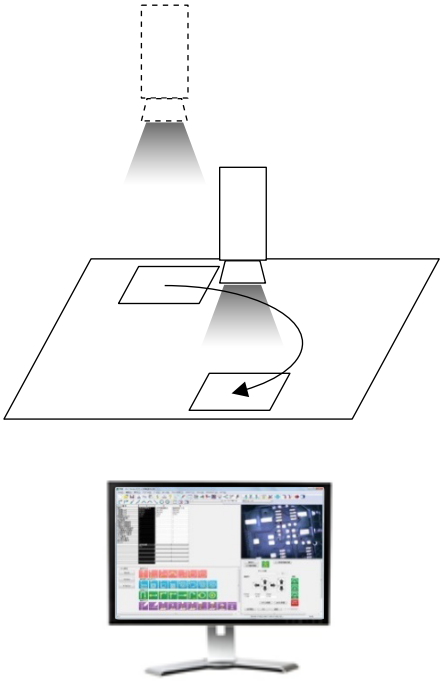
[Camera Test Run] is a function for performing a test run on points set with the main tool (tool data number 61). Execute [Camera Test Run] after teaching points to check the robot movement using camera imaging.

NOTE: Workpiece adjustment functions are not applied to runs using Camera Test Run.



(1) Test Run

Executes the program using the main tool (needle, etc.).



(2) Camera Test Run

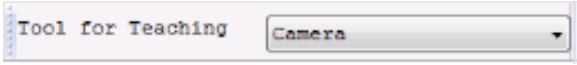
Executes the program using the center of the camera in substitute to the main tool (needle, etc.).

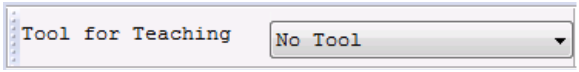
- Tool for Teaching Button

  You can select tool data (Tool for Teaching) used during robot operations with this button. Click this button to change [Tool for Teaching].

  The coordinates in the robot operation area display coordinate values according to the selected tool data TCP.

  Refer to the table below for details regarding the various [Tool for Teaching] settings:

Button Icon	Tool for Teaching Selection
	 This selects the camera tool data and the camera tool TCP is applied. When teaching a point position by looking into the camera imaging area, perform teaching with [Camera] selected. NOTE: The camera image appears when the camera type [Type-C1(IS/AS)] or [USB] is selected in the camera configuration dialog or the target camera is connected.

Button Icon	Tool for Teaching Selection
	 This selects the main tool data and applies the main tool TCP when teaching. Select this if you want to teach points and positions using the main tool (needle, etc.), tip as a reference.
	 The tool data TCP values are all set to zero. Select this if you want to teach a “Needle Measure Point”, a “Single Camera Shoot Point”, or a point without applying a TCP from a tool, such as when configuring the robot and camera.
	 Tools #1 to #5 are used when you want to teach with a tool other than the camera or main tool. If you do not attach a tool other than the camera or main tool, there is no need to select this.

- [Point Job]
  Select the point job you want to confirm and execute from a list of registered point jobs.

- [Execute]
  Executes the point job selected in [Point Job].

- [Coordinate System] (JS3 Series only)
  Select the robot coordinate system. If you select the axial coordinate system, the JOG operations switch from X, Y , Z, and R to J1, J2, J3, and J4. The coordinates in the robot operations area are also displayed using the axial coordinate system.

- [Axis Operation]

  Click an arrow button to make a JOG movement for the corresponding robot axis. The JOG movement is continued while the button is pressed. Release the button to stop the JOG movement. The robot may terminate a JOG movement even when an arrow is being pressed depending on the communication environment. The robot will sound its buzzer once and stop movement when the JOG movement is terminated. To restart the JOG movement, release and then click the arrow button again.

  You can also use the keyboard instead of the arrow buttons to perform these movement operations.

JR3000/JC-3 Series	
Cartesian Coordinates	
Icon	Key
	W
	S
	A
	D
	F
	R
	E
	Q

JS3 Series			
Cartesian Coordinates		Axial Coordinates	
Icon	Key	Icon	Key
	W		W
	S		S
	A		A
	D		D
	F		F
	R		R
	E		E
	Q		Q

NOTE: If a JOG movement attempts to move outside of the robot's movement range, the following occurs:

JR3000/JC-3 Series : The buzzer sounds once, the robot stops moving, and an error dialog indicating the position is out of range appears.

JS3 Series : The buzzer sounds once, the robot stops moving; however, an error dialog indicating the position is out of range does not appear.

- [Point Coordinate]

  Click this to display the point coordinates for the specified program.

- [Robot Coordinate]

  Click this to display the current position coordinates of the robot.

- [Arm Configuration] (JS3 Series only)

  Select the robot arm configuration. Select the arm configuration and click [GO] to move the robot to specified coordinates using the selected arm configuration. If you are controlling the robot using the axial coordinate system, you cannot select the arm configuration, but instead, the angle of the J1 and J2 axes automatically determines the arm configuration.

- [Speed]
  Click this to set the speed at which the axes move. If using a JR3000/JC-3 Series, you can select [Shift Mode] to use the “Shift” key on your PC to change speeds as follows:
  First hold down an arrow button and then press the “Shift” key to accelerate up to high speed.
  Hold down the “Shift” key and then press an arrow button to move at high speed from the start.

- [Meca Initialize] (JR3000/JC-3 Series only)
  Click this to mechanically initialize the robot.

NOTE: Whenever you turn the robot ON, you need to perform mechanical initialization.

- [Return to Work Home] (JC-3 absolute encoder models and JS3 Series only)
  JC-3 absolute encoder models and JS3 Series have a [Return to Work Home] button instead of a [Meca Initialize] button.
  Click this to move the axes to the work home.

- [Motor Power ON] (JS3 Series only)
  Turns the robot’s motor power ON.

NOTE: The robot cannot move unless the motor power is ON.

- [GO]
  Click this to move the axes to the coordinates currently displayed.

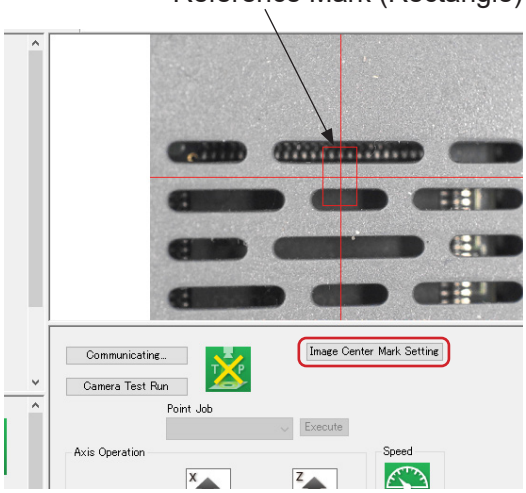
- [Register]
  Click this to apply the current coordinates to the selected point.

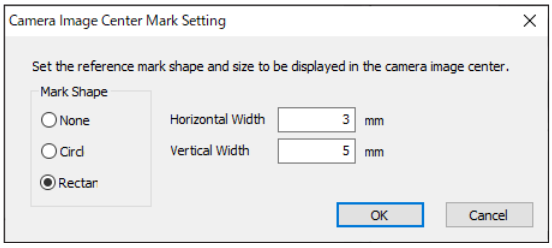
- [Teaching Height]
  Click on [Tool for Teaching] button and select [Camera]. The [Set] button of [Teaching Height] can be selected.
  This button sets the height entered for the Z axis when point teaching with the camera.
  The height set appears next to the [Set] button.
  For further details on how to set the teaching height, refer to “11.7 Teaching Height Settings”.

- [Image Center Mark Setting]
  This button appears when the [USB] is selected for camera type in camera configuration dialog and the auto camera TCP setting is executed, and the camera is calibrated.
  Click this button to display the Camera Image Center Mark Setting dialog.

  If you select [None] for Mark Shape, the mark does not appear.
  If you select [Cird] or [Rectan] for Mark Shape, the reference mark is shown in the center of the camera image.
  By setting the mark size (Horizontal Width and Vertical Width), you can use the mark size as a guide to check the approximate size of the shapes displayed in the camera image and the distance between the shapes.

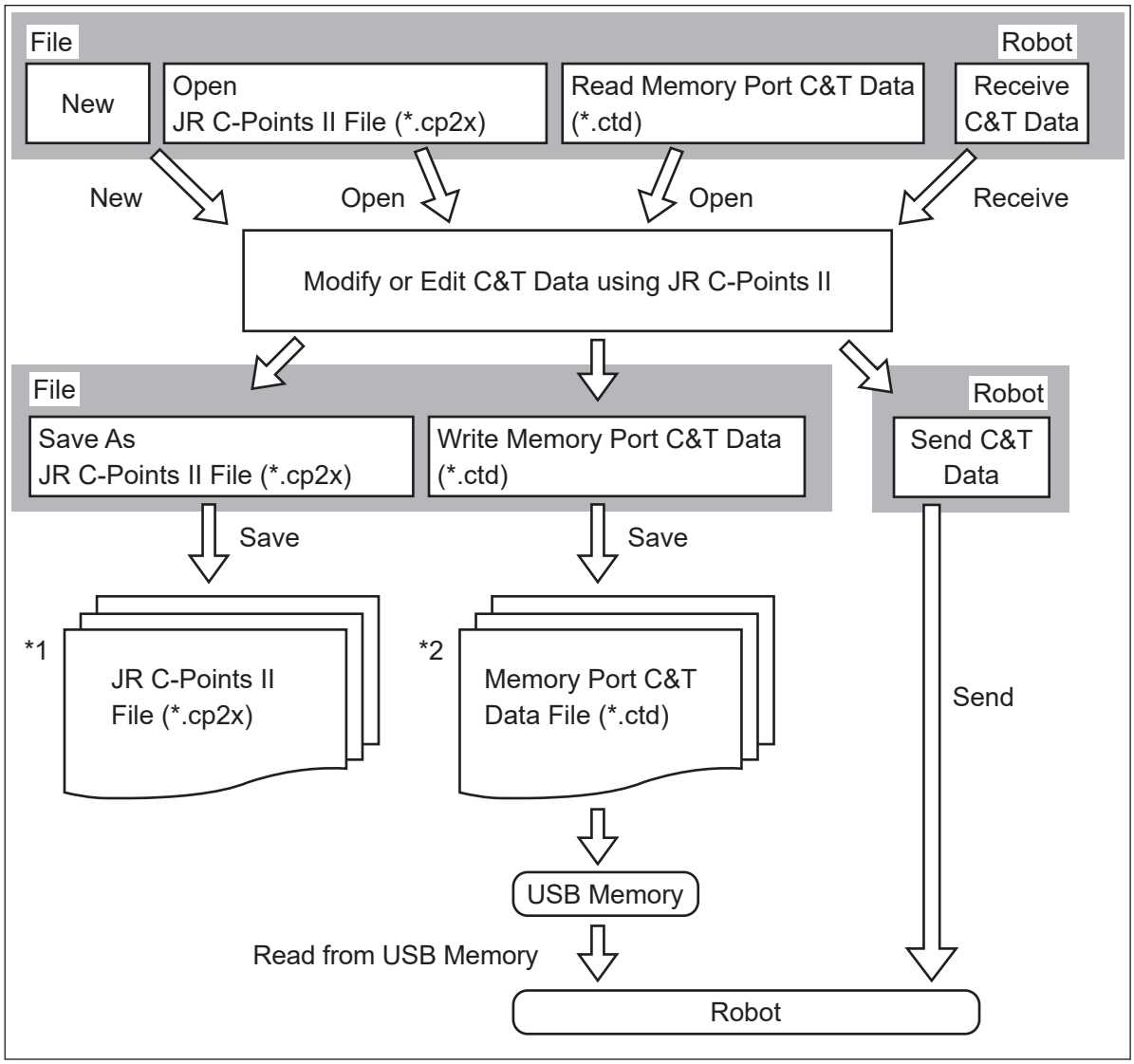
Reference Mark (Rectangle)





2. OPERATION PROCESS

Use this application to create C&T data and use it on the robot according to the following process:



The “x” in the file extension “.cp2x” varies depending on the robot application type.

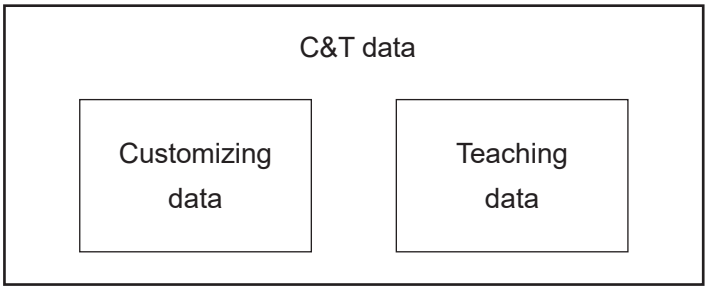
*1: Use “Save As” to back up and save the C&T data as a file with the “.cp2x” extension as protection against a possible transmission error.

*2: A memory port C&T data file with the extension “.ctd” does not include point graphic editing data (page settings, grid size settings, auxiliary lines, imported figures, etc.), and auxiliary axis configuration data.

3. C&T DATA

This section explains C&T (customizing and teaching) data handled by this application.
When opening, saving, sending, or receiving data through this application, everything is handled as one unit (C&T data) as shown below. However, with program or point data, you can save a specified program/point data number and individually send/receive this to the robot.
Only one unit of C&T data can be kept in the robot at one time. Therefore, if you send C&T data from the PC, the data stored on the robot is overwritten (once the data is overwritten the original data is lost).

Point graphic editing data (page settings, grid size settings, auxiliary lines, imported figures, etc.), are not included in C&T data and therefore cannot be sent/received from the robot. Point graphic editing data content is saved onto file only, therefore open the saved file and reedit the data from there.



C&T data includes the robot's setting values and data.
There are teaching pendant settings and other such robot setting values which cannot be modified from a PC.

3.1 Teaching Data Configuration

Teaching data retains data for robot movements.

To execute basic robot operations, it is possible to do this from teaching data settings alone.

- Teaching Data
  - Program 1 to 999
    - Point Data
    - Individual Program Settings
  - Point Jobs (1 to 500)
  - Point Jobs (1 to 50) *
  - User Defined Messages (1 to 50)
  - PLC Programs (1 to 50)
  - Common Data Settings (common value settings of variables)
  - Condition Data Settings (condition settings for values of variables)
  - Global Variable (when created without logging in)
  - Keeping Variable (when created without logging in)
  - User Functions (when created without logging in)
  - Aliases (when created without logging in)
  - All Program Common Settings
  - Main Tool Configuration
  - Camera Configuration
  - Auxiliary Axis Configuration

* Workpiece adjustments 1 to 3000

3.2 Customizing Data Configuration

Customizing data saves data for customizing robot movements. Settings other than T.M.C. settings are owned by the account which created them and can be set with a protection mode. T.M.C. settings are data for content display and default values when teaching.
With customize data, if you are not logged in as a given user, you cannot create or delete customize data.

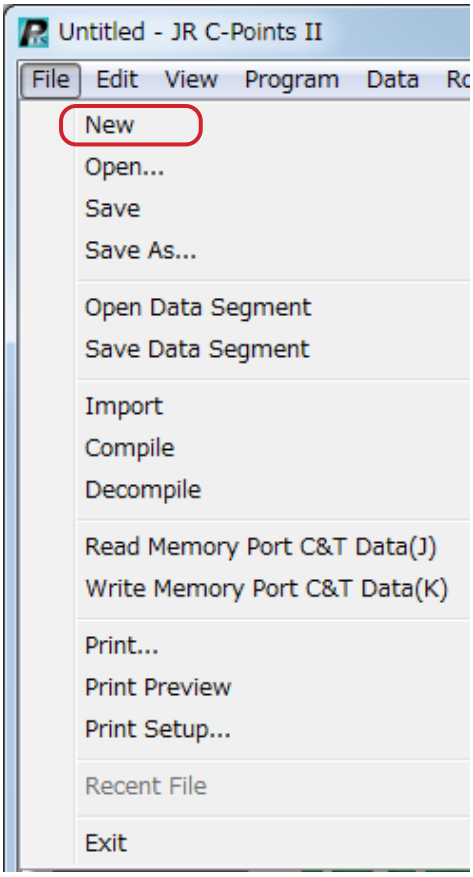
- Customizing Data
  - T.M.C. Settings
    - Default All Program Common Settings
    - Display Order
    - Caption Settings
    - Teaching Mode Display Items
    - Teaching Operations
  - Common Setting Variables
  - Condition Setting Variables
  - Program Setting Variables
  - Point Types
  - Point Jobs (501 to 1000)
  - Additional Functions (51 to 100)
  - User Defined Messages (51 to 100)
  - PLC Programs (51 to 100)
  - Global Variables (when created logged in)
  - Keeping Variables (when created logged in)
  - User Functions (when created logged in)
  - Aliases (when created logged in)

4. CREATING A NEW C&T DATA FILE

This creates a new C&T data file.
Select “File” on the menu bar and click “New” from the pull-down menu, or click on the “New File” icon on the tool bar.
If you have an unsaved C&T data file open, a save confirmation dialog will appear.

A new C&T data file is created.
The C&T data is in its initial state with no program or point data registered and therefore the screen is blank.

A new C&T data file opens when the application starts up.



NOTE: You cannot open multiple C&T data files at one time. If a C&T data file is already open, close it before opening a new C&T data file.

5. OPENING/SAVING A FILE

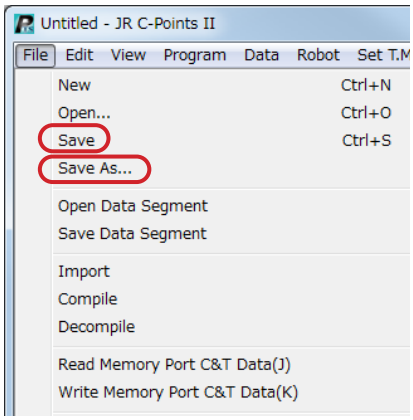
This section explains how to open or save to a C&T data file stored on the PC. To modify or open the C&T data stored on the robot, refer to “5.3 Opening a C&T Data File” to “5.5 Reading a JCS (.jcs) File”.
Before sending the C&T data to the robot, save the data as a backup file to safeguard against contingencies. The saved file can be used as a C&T data backup.

Also, if you want to use the robot MEMORY port and modify a C&T data file (“.ctd” file extension), refer to “5.6 Reading a Memory Port C&T Data (.ctd) File” and “5.7 Writing a Memory Port C&T Data (.ctd) File”.

When you select [New Item], [Points II CP2* Document] (“*” varies depending on the specifications) from the Windows® Explorer, etc.,a new C&T data file is created. The C&T file created using this method acquires the model information last used previously in JR C-Points II; however, do not create files using this method, as the model information may be inaccurate.

5.1 Saving a File

Click [Save] or [Save As] on the [File] pull-down menu:



When saving data to a file, if any numerical data parameters included in the C&T data exceed the input range, the data is saved as the minimum/maximum parameter value for that input range.
However, if point job data and/or additional function data numbers set to point data exceed the input range, they are not registered.

5.2 Saving Partial Data to a File

You can save a portion of C&T data, such as a specific program or specific point job data. Select the location where you wish to save the file and enter the file name. The Save File selection dialog box (tree view) appears. Check the data box you wish to save and click [OK]. Only the checked data is saved.

5.3 Opening a C&T Data File

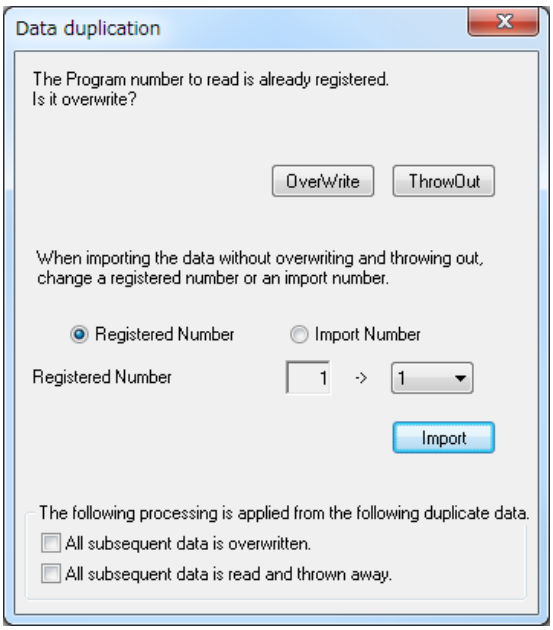
1. Select [File] on the menu bar and click [Open] from the pull-down menu.
   You cannot open multiple C&T data files at one time. If a C&T data file is already open, close it before opening the new C&T data file you want.

2. Select the file you wish to open.

5.4 Opening a Data Segment File

1. Click [Open Data Segment] on the [File] pull-down menu.

2. If C&T data is open, the selected portion of C&T data is loaded to the open C&T data file.
   If the open C&T data and the selected partial data have overlapping content, the Data Duplication dialog to the right appears. Content that does not overlap is automatically written to the open C&T data file.



Example: The file and data content is as follows:

Data source	Data contained in program
Open C&T data file	1, 2, 3, 4, 5
Data segment file	1, 2, 3

For this above example, the data duplication confirmation dialog for Program 1 appears since Program 1 is contained in both the open C&T data file and in the data segment file.

■ OverWrite

Program 1 in the open C&T data file is deleted, program 1 from the selected data segment file is registered, and then the data duplication dialog for program 2 appears.

■ ThrowOut

Program 1 of the data segment file is not registered and the data duplication dialog for program 2 appears.

■ Import

Select (check) the method for program import. Refer to the following import handling methods:

- Change the registered program number
  Change the number for program 1 of the currently open C&T data to the number designated as the “Registered Number” while program 1 of the data segment file is registered as is with its original number.
- Change the imported program number
  Change the number for program 1 of the data segment file to the number designated as the “Import Number” and register it.

NOTE: If the selected data has only one setting (such as [All Program Common Settings] or [Common Data Settings]), you can select either [Import] or [ThrowOut].

5.5 Reading a JCS (.jcs) File

You can read a created JCS file. A JCS file is a CSV (comma-separated-values) descriptor file for point data type information and coordinate information. Refer to “20. JCS FILE FORMAT” for JCS file format information.

1. Click [Import] on the [File] pull-down menu.
2. Select the file you wish to open.

NOTE: Even if you select “inches” for the unit of length measurement for JCS file when selecting files, the unit is displayed in “millimeters” in JR C-Points II.

3. Select which program number in the C&T data to attribute to the data in the JCS file. Then click [OK].

■ If there is no open C&T Data
New C&T data is opened as if there is only one program.

■ If the C&T Data Is Already Open
This opens the selected program number of the open C&T data. A new program is added to the currently open C&T data.

NOTE: Once opened, a JCS file cannot be saved again as a JCS file; it must be saved as a C&T data file (.cp2*). (“*” varies depending on the specifications).

5.6 Reading a Memory Port C&T Data (.ctd) File

Using the procedure below, the robot can read C&T data files saved to USB memory from the MEMORY port on the robot.

1. Click [Read Memory Port C&T Data] from the [File] pull-down menu on the menu bar.

2. Select the C&T data file (extension “.ctd”) you want to open and click [Open]. The PC reads the content from the memory port C&T data file you selected.

NOTE: The robot application type for the C&T data file and JR C-Points II must be the same.

5.7 Writing a Memory Port C&T Data (.ctd) File

Using the procedure below, you can write teaching data edited on JR C-Points II to a USB memory type C&T data file. The robot can then read this C&T data file from the MEMORY port on the robot. Refer to “1.1.2 Read Teaching Data from USB Memory” in the operation manual *Maintenance*.)

1. Click [Write Memory Port C&T Data] from the [File] pull-down menu on the menu bar.

2. Specify the C&T data file (extension “.ctd”) to record the teaching data.
   The teaching data is written to the specified file.

NOTE:

- The save file name appears with the default file name. This can be modified to any given file name.
  The time and date set in administration settings appears in the default file name.
  Default Save File Name:
  JR3000: JR3_CandT_YYYYMMDD_hhmm
  JC-3: JC-3_CandT_YYYYMMDD_hhmm
  JS3: JS3_CandT_YYYYMMDD_hhmm
  (Y: year, M: month, D: day, h: hour, m: minute)

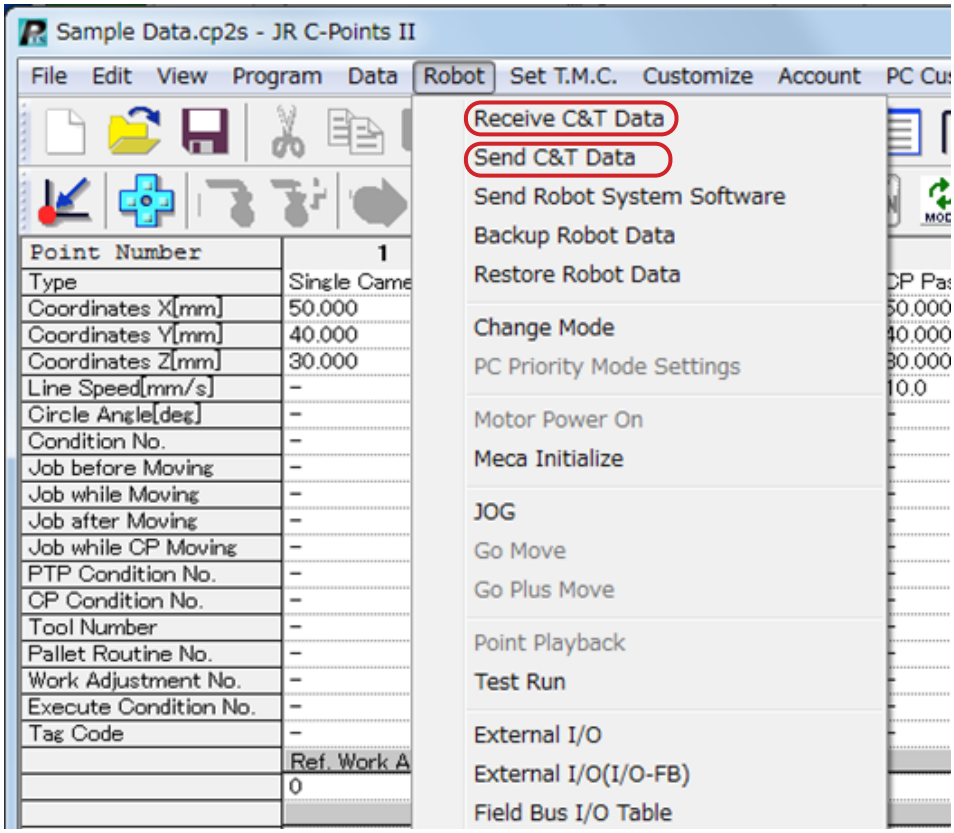
- Do not use full-width characters in the file name if reading C&T data on the robot side. The robot cannot recognize file names that include full-width characters.

- If you want to load C&T data from USB memory in the JR3000 / JC-3 Series Startup Menu, you must change the saved file name to the fixed file name “JR3_CandT_data.CTD”. (Refer to “15. STARTUP MENU” in the operation manual *Basic Instructions*.)

6. SENDING AND RECEIVING C&T DATA

To actually use created C&T data, it is necessary to send it to the robot. Also, to open C&T data currently being used by the robot, your PC needs to receive it from the robot.

Example: JR3000 Series

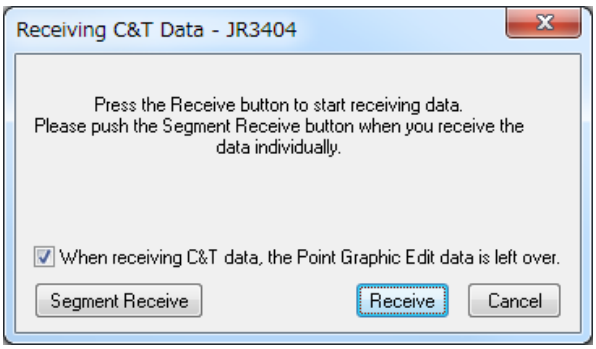


⚠ Caution

With the PC software JR C-Points II Ver. 5 or higher, the C&T data cannot be sent or received with the system program Ver. 3.
For details regarding the precautions for upgrading from Ver. 3 to Ver. 5 or higher, refer to "17.2 Precautions for Upgrading from Ver. 3 to Ver. 5 or Higher".

6.1 How to Receive C&T Data

Click [Robot] on the menu bar, then click on [Receive C&T Data] on the pull-down menu. The dialog box to the right appears.



■ Receive

Click [Receive] to begin receiving the aforementioned C&T Data from the robot. When the transmission is complete, the received C&T data opens.

NOTE: If the axis configuration of the auxiliary axes on the robot side matches those on the PC side, the auxiliary axis configuration data is received from the robot and saved to the PC software.

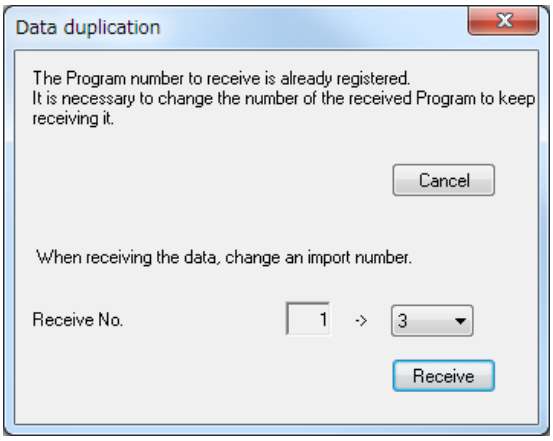
If you put a check in “When receiving C&T data, the Point Graphic Edit data is left over” and receive data, Point Graphic Editor’s page settings, grid settings, auxiliary lines, imported figure information are saved and the C&T data is received. If you receive data without putting a check here, this information is erased.

NOTE: You cannot open multiple C&T data files at one time. If a C&T data file is already open, close it before receiving new C&T data from the robot.

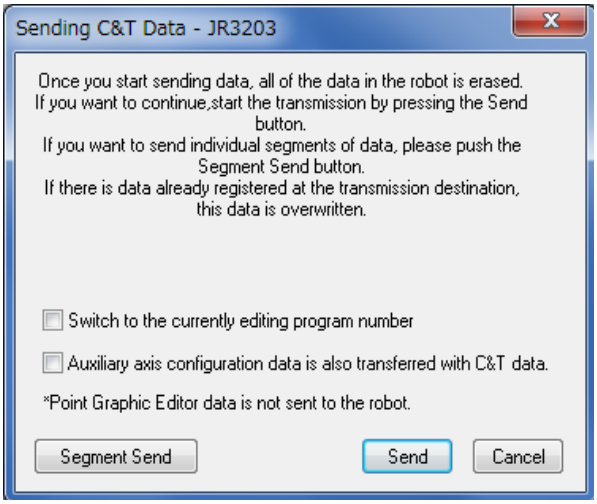
■ Segment Receive

If you wish to receive a specified program or point job data, click [Segment Receive] on the Receiving C&T Data dialog box. A data selection screen (tree view) appears. Check the data you want to receive and click [OK]. You will receive only the data you checked.

NOTE: If you click [Segment Receive] while another C&T data file is open with duplicate data, a data duplication confirmation dialog for the received data file appears. If you wish to overwrite the contents, click [Yes]. If you wish to change the number, select [No]. Select the desired number on the pull-down menu in the data duplication dialog shown to the right, and then click [Receive].



6.2 How to Send C&T Data



Click [Robot] on the menu bar, then click [Send C&T Data] on the pull-down menu. The dialog box to the right appears.

■ Send

Click [Send] to start sending the C&T data from the PC to the robot.

NOTE:

- Put a check in [Auxiliary axis configuration data is also sent with C&T data] and then click [Send] to send the auxiliary axis configuration data from the PC to the robot if the axis configuration of the auxiliary axes matches those on the robot side. The auxiliary axis configuration data is not sent if this is unchecked.
- Put a check in [Switch to the currently editing program number] and then click [Send] to switch the currently running program number in the robot to the program number currently being edited in the JR C-Points II after the C&T data is sent. This check is also valid when using [Segment Send].
- The robot can only hold one unit of C&T at one time. Accordingly, if you send C&T data from the PC to the robot, the data stored in the robot will be overwritten (deleted).
  If you want to keep the C&T data currently stored in the robot, close the data file, click [Receive C&T Data] and save the data as a file on your PC or save it to USB memory.

■ Segment Send

If you wish to send only specific programs or point job data, click [Segment Send] on the Sending C&T Data dialog box. A data selection screen (tree view) appears. Check the data you wish to send and click [OK]. The PC sends only the checked data. When sending data, if any parameters of numerical data included in the C&T data exceed the input range, the data is saved within the minimum/maximum input range for that parameter. However, if point job data and/or additional function data numbers set to point data exceed the entry range, the data is not registered.

NOTE:

- If you send a segment of data which contains duplicate data, the robot's data is overwritten by the data that was sent. Note that no confirmation message appears.
- When sending C&T data while logged in on the robot side, if the account you are logged in under is not included in the C&T data being sent the robot will forcibly log out.
- The code displayed at the time of a communication error is for malfunction inquiries. Be sure to relay the code and error content when making an inquiry.

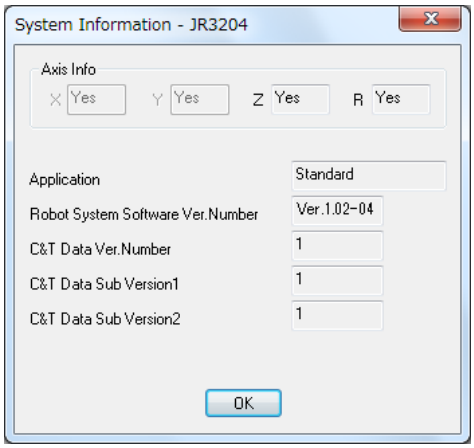
7. HOW TO CHECK THE CONNECTION AND SYSTEM INFORMATION

Click “Robot” on the menu bar and then click “SystemInfo” on the pull-down menu. System information for the subject robot is loaded.

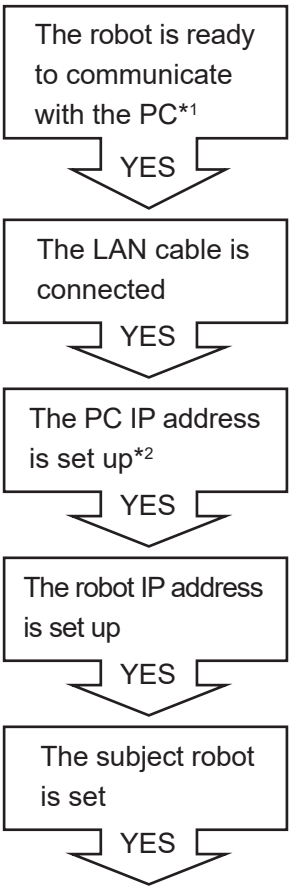
NOTE: “Robot System Software Ver. Number” is the version number for system program built into the robot, not the JR C-Points II version number.

Also, use “SystemInfo” to check the connection between the PC and the robot. When communication with the robot fails or when the robot does not operate, check to see if the robot configuration information can be loaded.

If the robot configuration information cannot be loaded, check the “When you can’t interface” chart shown below:



■ When you can’t interface



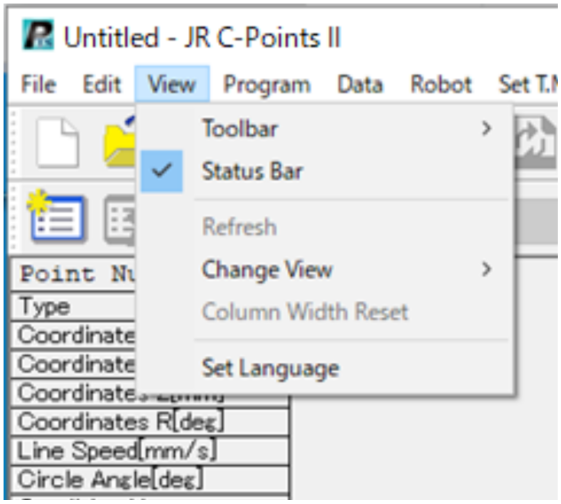
*1: Refer to “6. SENDING AND RECEIVING C&T DATA”.

*2: For details regarding the settings, refer to the operation manual *Setup* for the JR3000 and JC-3 Series or the operation manual *Installation* for the JS3 Series.

If the robot system information still cannot be loaded after confirming all of this, perform a diagnostic check of [Ethernet] in [Administration] → [Diagnostic Mode] or contact Janome or a Janome dealer.

8. SCREEN DISPLAY

This section explains how to edit or refresh the screen display.
Click [View] on the menu bar to display the pull-down menu shown to the right.



8.1 Tool Bar

Click [Tool Bar] to display or to hide the icon blocks on the tool bar.

8.2 Status Bar

Click [Status Bar] to display or hide the status bar.

8.3 Refresh

Click [Refresh] to redisplay the point data.
When redisplaying the data, if any numerical data parameters exceed the input range, the data appears within the minimum/maximum parameter input range. However if point job data and/or additional function data numbers set to point data exceed the entry range, the data appears as unregistered.

8.4 Change View

Click [Change View] to select the point data alignment method: horizontal or vertical.

8.5 Column Width Reset

This resets the column width to the default setting when point data appears vertically.
(With the horizontal view, the column width is reset to the default setting when the program is changed.)

8.6 Set Language

Select the display language for JR C-Points II from the following 5 languages in the Application Language section. By selecting the application language you also select the corresponding caption display language.

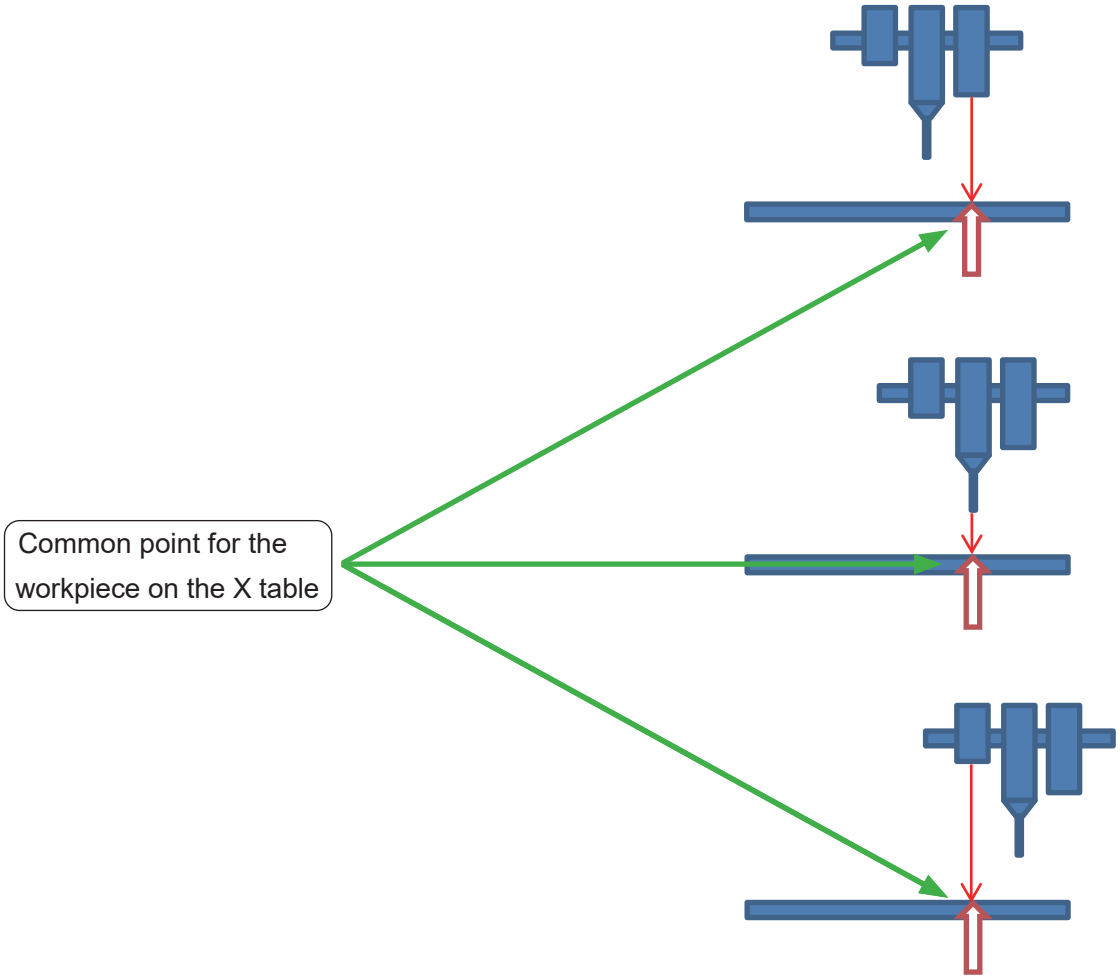
■ Application Language
- English
- Japanese
- German
- Simplified Chinese
- Traditional Chinese

You can select which language to display the captions for point type and Customizing Mode defined variables from the following languages:

■ Caption Language
- English
- Japanese
- German
- Simplified Chinese
- Traditional Chinese
- Italian
- Spanish
- French
- Korean
- Czech
- Vietnamese

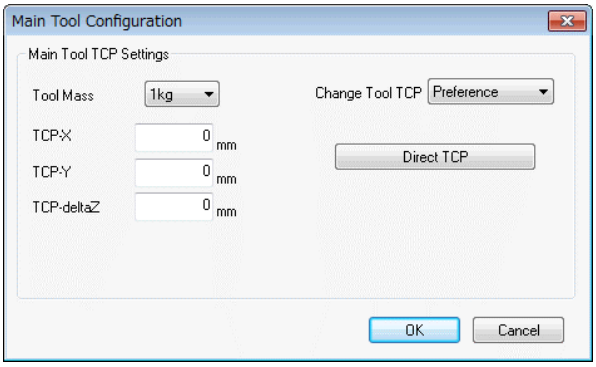
9. TOOL CONFIGURATION

You can set tool data (TCP: tool center point) using the respective tool configuration screens. Set tool data in the tool configuration screen by preparing and using a common tool point on the X table. By using this common points for all tools, set the tool data for the various tool configurations. If using this software with a USB camera and IS8200 camera / AS200 camera (Manufacturer: COGNEX) (optional) connected, after you set tool data, you can teach points using live imaging and images taken by the camera.



9.1 Main Tool Configuration

Main tool configuration sets the main tool attached to the robot. Click the [Main Tool] button on the main screen. The Main Tool Configuration dialog shown to the right appears.



1. Set [Tool Mass].
   Select a [Tool Mass] value that is greater than "Mass of the tool itself" + "Mass of the tool holder".

2. Set the main tool TCP.
   - Numerical Entry
     If you know the tool data information in advance, directly enter the values into Main Tool TCP Settings to set the tool tip position.
   - [Direct TCP] Button
     Sets the tool tip position using JOG operation. Click the [Direct TCP] button to display the direct TCP settings dialog.

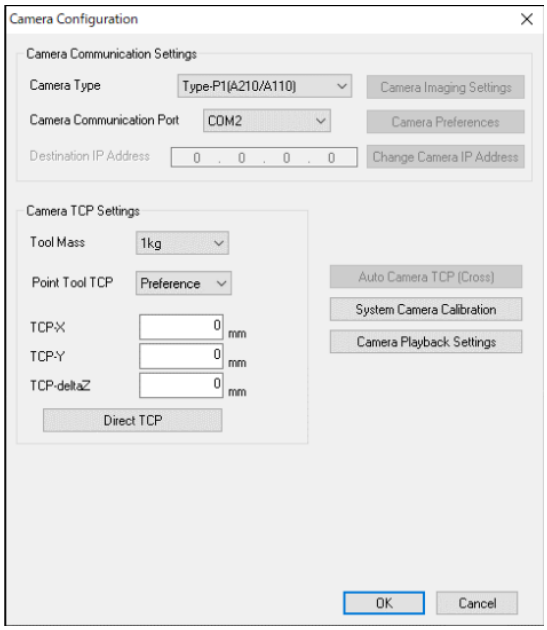
3. Click [OK] to finish Main Tool Configuration.

NOTE

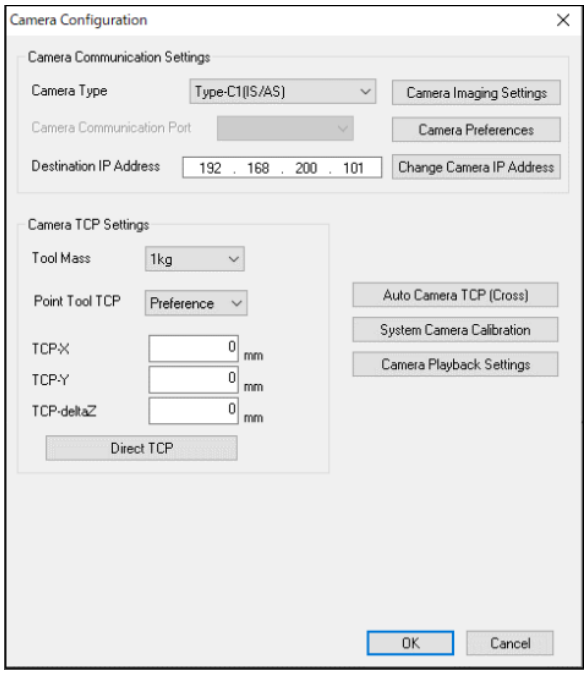
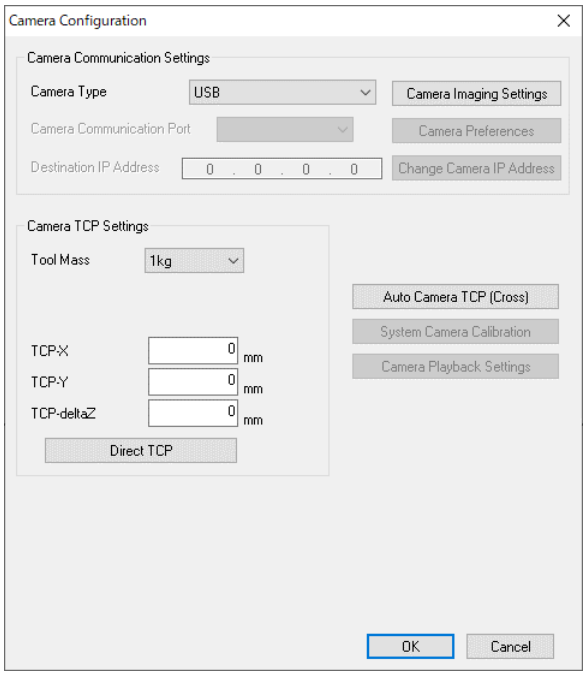
- The tool center point data values are applied to the following point types: [PTP Point], [CP Start Point], [CP Passing], and [CP End Point], etc. For further information regarding point types, refer to "1.2.1 Point Type Buttons".
- If you want to teach points using the main tool, set [Tool for Teaching] to [Main Tool] on the main screen.

9.2 Camera Configuration

Click the [Camera] button on the main screen. The Camera Configuration dialog appears.
Set the camera information here, such as the camera communication settings, camera TCP settings, and system camera calibration settings.
With the system camera calibration, the calculation setting of the coordinate conversion coefficient from the camera coordinates to the robot coordinates is performed (this is referred to as “calibration” from here onwards).



Depending on the camera selected by camera type, the contents displayed in the camera configuration dialog change.

When the camera type [Type-C1(IS/AS)] is selected	When the camera type [USB] is selected
	
(Refer to “9.2.2 Camera Communication Settings (When the Camera Type is [Type-C1(IS/AS)])”.)	(Refer to “9.2.3 Camera Communication Settings (When the Camera Type is [USB])”.)

NOTE: The [Auto Camera TCP (Purge)] button appears only for dispensing specifications.

9.2.1 Camera Lens Adjustment (When the Camera Type is [Type-C1(IS/AS)])

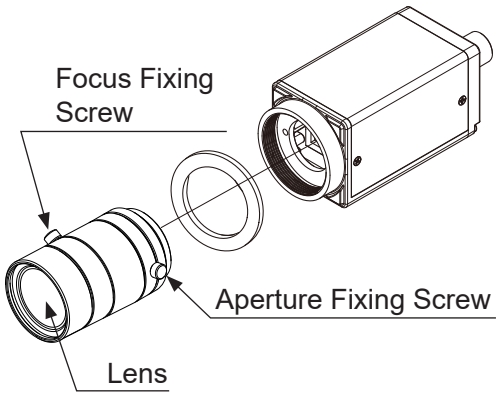
When the camera type is [Type-C1(IS/AS)], adjust the camera lens before setting the camera by PC.

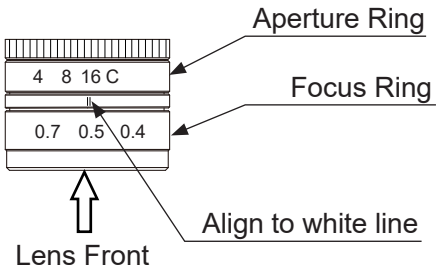
■ When using IS8200 camera

(1) If you know the open height (distance) between the camera and workpiece in advance, position the camera and workpiece according to the open height and display the image on the screen.

(2) Loosen the aperture fixing screw and focus fixing screw and turn the aperture ring and focus ring to adjust to the best focus while observing the image on the screen.

(3) After adjusting the aperture and focus, tighten the aperture fixing screw and focus fixing screw.





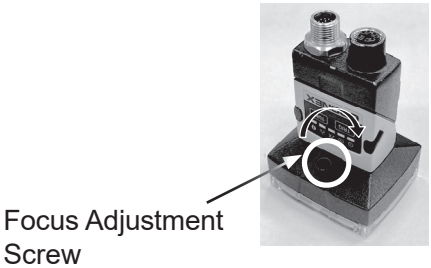
NOTE:

- After making adjustments to the camera lens, do not make any further adjustments using the focus ring, otherwise you may reduce precision or cause positioning misalignment.
- Adjust the aperture as required. If you cannot acquire a clear image using camera adjustment settings (refer to "9.2.2 Camera Communication Settings (When the Camera Type is [Type-C1(IS/AS)])") you may need to adjust the aperture.

■ When using AS200 camera

(1) If you know the open height (distance) between the camera and workpiece in advance, position the camera and workpiece according to the open height and display the image on the screen.

(2) Turn the focus adjustment screw to adjust to the best focus while observing the image on the screen.



9.2.2 Camera Communication Settings (When the Camera Type is [Type-C1(IS/AS)])

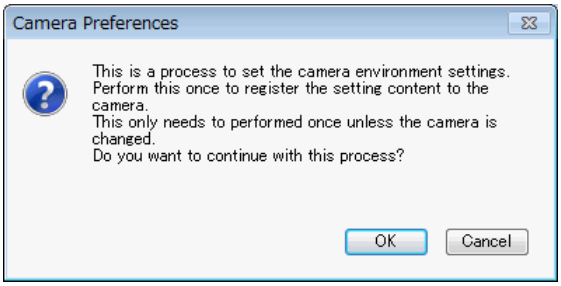
When the camera type is [Type-C1(IS/AS)], set the followings:

- IP address of the connecting camera
- Camera image information
- Preferences for using the camera
- Change the IP address in the camera

1. Set the camera IP address.
   Set the camera IP address you are connecting.

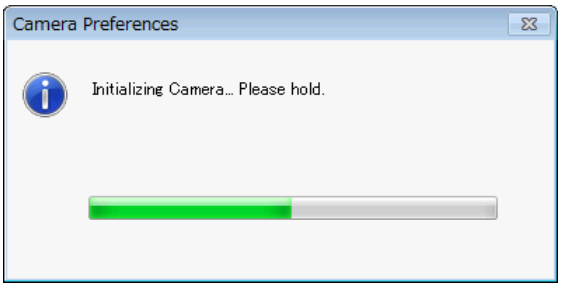
NOTE: Since the camera IP address set at the time of purchase is unknown, set the IP address using the camera's dedicated software (AS200 Alignment Sensor or In-Sight Explorer). Then set the set IP address.

2. Click [Camera Preferences] to initialize the camera settings for use with JR C-Points II. Set this first when making your initial settings.

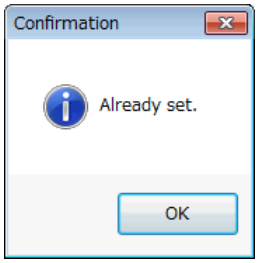


NOTE:

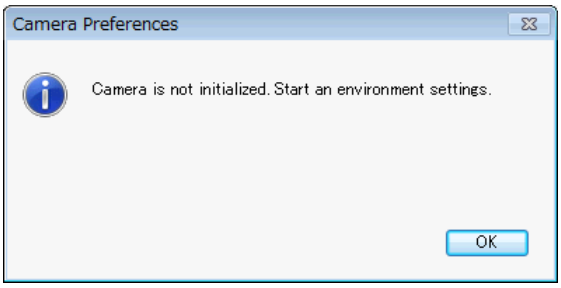
- Initialization may take several minutes. During initialization, the progress bar shown to the right appears.



- If the camera is already properly initialized, the confirmation dialog to the right appears and execution is not executed.



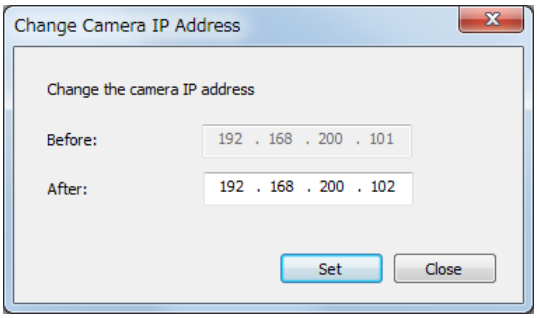
- When executing camera processing such as [Camera Imaging Settings], etc., and the camera is not yet initialized, the message shown to the right appears. Click [OK] to set the Camera Preferences.



3. Click [Camera Imaging Settings] to display the Camera Imaging Settings dialog. You can set exposure time, and flip and/or rotate the image here.

NOTE: For the operation method of the image settings, refer to “Camera Imaging Settings (When the camera type is [Type-C1(IS/AS)])”.

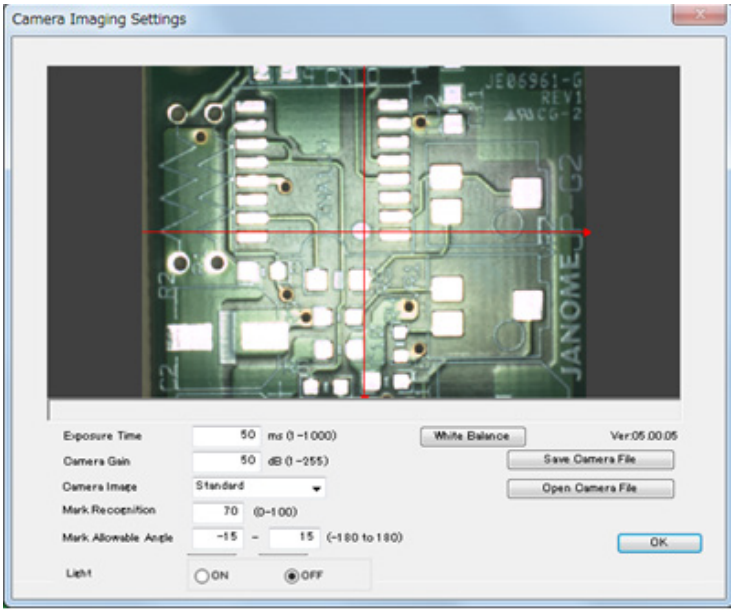
4. Change Camera IP Address.
   Click [Change Camera IP Address] to display the Change Camera IP Address dialog.
   Set the IP address you want and click [Set] to change the camera IP address.



NOTE: After setting the IP address, you need to power cycle the robot to enable these settings.

■ Camera Imaging Settings (When the camera type is [Type-C1(IS/AS)])

Click [Camera Imaging Settings] on the camera configuration screen. The Camera Imaging Settings dialog appears. Use these settings to set the system camera imaging information.



You can make the following settings on this screen:

Item	Explanation	Setting Range / Selection	
		IS8200 Camera	AS200 Camera
Exposure Time	Set this longer to brighten the image. However, the longer this is set, the easier the image can blur.	1 to 1000 ms (default setting: 50)	0.000 to 99.999 ms (default setting: 10)
Camera Gain	You can adjust the camera sensitivity by raising/lowering this value. Set this higher to brighten the image. However, the higher this is set, the higher the occurrence of noise.	1 to 255 dB (default setting: 50)	1 to 3 dB (default setting: 1)
Camera Image	Adjust the values for step 1 and step 2 so the image is clear.	Standard / Flip Horizontal / Flip Vertical / 180° Rotation (default setting)	Standard / Flip Horizontal / Flip Vertical / 180° Rotation (default setting)
Mark Recognition	When searching for marks, the robot finds marks with a match rate higher than the rate set here. The match rate is indicated by numerical values.	0 to 100 (default setting: 70)	0 to 100 (default setting: 70)

Item	Explanation	Setting Range / Selection	
		IS8200 Camera	AS200 Camera
Mark Allowable Angle	Sets the angle range of recognizable marks. The robot searches for marks within the angle range set here.	-180 to 180° (default setting: -15 to 15°)	-180 to 180° (default setting: -15 to 15°)
Light (For AS200 Camera)	Set whether or not to turn ON/OFF the light each time you release the camera shutter.		ON / OFF

- [Save Camera File] button
  Back up the settings file saved in the camera to PC. The settings file includes camera imaging settings and mark settings. The file is saved as “+++ (arbitrary character string).job”

NOTE: In the case of AS200 camera, since there are multiple files saved in the camera, the camera file is saved by specifying a folder instead of saving by file name.

- [Open Camera File] button
  Send the settings file saved on the PC to the camera. Select and send the “+++ (arbitrary character string).job” file from the file selection screen. Click [Open] to start the file transfer and update the camera imaging and mark settings. Take care with this operation as you cannot revert to previous settings after updating.

NOTE:
- After the PC software JR C-Points II is installed, a camera backup file (JCP_II_CAMERAINS.JOB) is created in the folder to which JR C-Points II is installed. Use this backup file if other backup files are corrupted or you misplace them.
- In the case of AS200 camera, since there are multiple files required by the camera, the camera file is not processed by the file name, but is the process of expanding the files required for the camera in the specified folder.

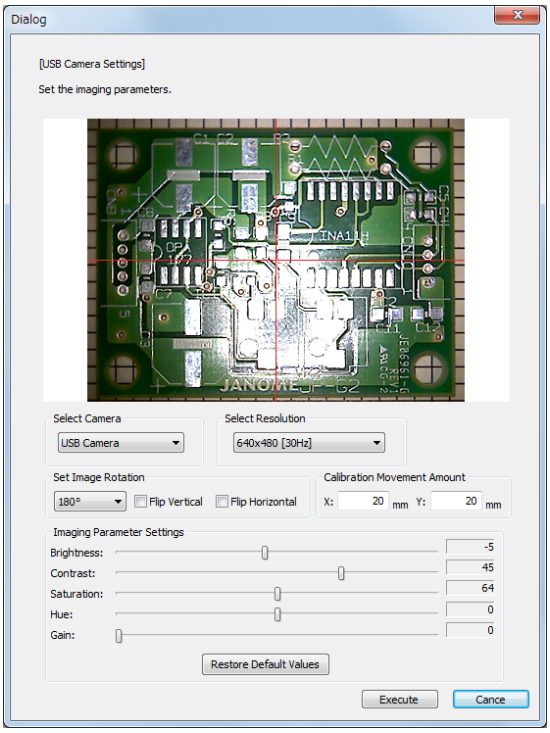
9.2.3 Camera Communication Settings (When the Camera Type is [USB])

When the camera type is [USB], the [Camera Imaging Settings] button appears. Then you can set the connected USB camera selection, camera exposure time, image inversion, and rotation display, etc.

For the operation method of image settings, refer to "Camera Imaging Settings (When the camera type is [USB])".

■ Camera Imaging Settings (When the camera type is [USB])

Click the [Imaging Settings] button in the camera configuration dialog to display the camera imaging settings dialog. Set the system camera image information.



You can make the following settings on this dialog:

(1) Select Camera
Select the USB camera used for the system camera.

(2) Select Resolution
Select the USB camera resolution used for the system camera.

(3) Set Image Rotation (0° /90° /180° /270° / Flip Vertical/Flip Horizontal)

(4) Calibration Movement Amount
Use this to set a movement offset when calibrating for the first time. If there is a positioning discrepancy with the mark when calibrating for the first time and it is not displayed within the imaging area, adjust the calibration movement here.

(5) Imaging Parameter Settings
- Brightness: move the bar to the right to increase the brightness.
- Contrast: move the bar to the right to increase the contrast.
- Saturation: move the bar to the right to increase the saturation.
- Hue: move the bar left and right to adjust the hue.
- Gain: move the bar left and right to adjust the camera sensitivity.
  Set this higher to brighten the image. However, the higher this is set, the higher the occurrence of noise.
  Adjust these values so that the image is clear. Use the [Default] button to revert these values to the default setting.

Click [Execute] to apply the values modified here.
Click [Cancel] to cancel the values modified here.

9.2.4 Camera Communication Settings (When the Camera Type is Another Camera)

Select the camera communication port.

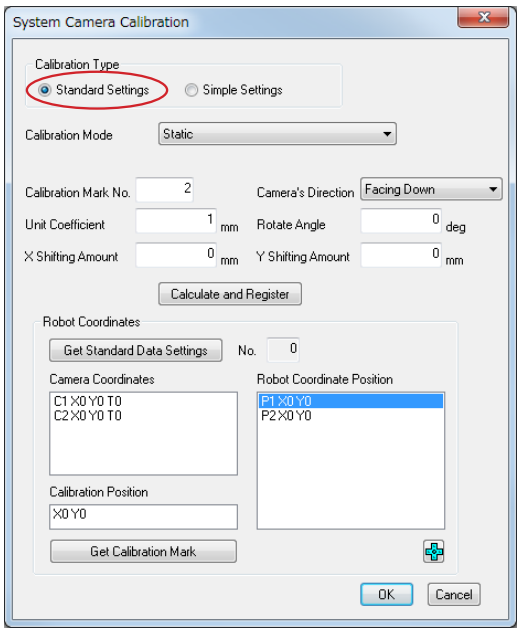
9.2.5 Camera TCP Settings

Set the camera TCP here.

- Numerical Entry
  If you know the tool data information in advance, directly enter the values here to set the camera center position.
- [Direct TCP] Button
  Sets the camera center position using JOG operation. Click the [Direct TCP] button to display the direct TCP settings dialog.

9.2.6 Manual System Camera Calibration

Click the [System Camera Calibration] button on the [Camera Configuration] dialog. The [System Camera Calibration] dialog appears.



This section explains how to manually calibrate the camera. Set the calibration type radio button to “Standard Settings”.
With manual settings, you first need to set multiple marks to the workpiece and shoot them with the camera to obtain camera coordinates for the mark positions. Next, manually enter the robot coordinates for these marks to calculate and set the coordinate conversion coefficient.

■ Standard Settings Window Items

- [Calibration Type]
  Switch between [Standard Settings] and [Simple Settings].
- [Calibration Mode]
  Switch between [Static] / [Dynamic (Y)]* / [Dynamic (R)].
  Select to always photograph the workpiece from the same position, or to photograph from a position different to that of the calibration mark position.
  * Only available for JR3000/JC-3 Series.
- [Calibration Mark No.]
  Set the number of marks to use for the calibration standard (2 to 6).
- [Facing Up] / [Facing Down]
  Set the camera direction and whether it faces up or down.

- [Unit Coefficient]
  Displays the calculated coordinate conversion coefficient (K).
- [Rotate Angle] (deg)
  Displays the calculated coordinate conversion coefficient (ϕ).
- [X Shifting Amount]
  Displays the calculated coordinate conversion coefficient (ΔX).
- [Y Shifting Amount]
  Displays the calculated coordinate conversion coefficient (ΔY).
- [Calculate and Register] Button
  Calculates and registers the coordinate conversion coefficient (the previous 4 items).
- [Robot Coordinate Position]
  Specify the points corresponding to the camera coordinates using the robot and enter these robot coordinates here.
- [Calibration Position]
  The tool center point position when the calibration marks were obtained.
- [Get Calibration Mark] Button
  Acquires (photographs) the marks used as the calibration standard. Select this after setting the calibration mark number.

Coordinate Conversion Formula

$X = K * \times * \cos(\phi) - K * y * \sin(\phi) + \Delta X$

$Y = K * \times * \sin(\phi) + K * y * \cos(\phi) + \Delta Y$

$\theta = T + \phi$

Camera coordinates (x, y, T), Robot coordinates (X, Y, θ)

■ Standard Settings Workflow

1. Enter in the value for [Calibration Mark No.].
   For example, if there are 2 marks you want to detect, enter in “2”.

2. Click [Get Calibration Mark].
   The CCD camera takes a photograph, and the image is acquired.
   Make sure to acquire the image under the same conditions (camera position, focus, and data acquisition range) as you will during the run. Also, after you have calibrated the camera and robot, do not change the camera data acquisition point coordinates or the camera attachment position, etc. If the number of marks acquired by the camera at this time do not coincide with [Calibration Mark No.], a “Camera Data Acquisition Error” occurs.

NOTE: Depending on the camera type, an image acquisition error will occur if the mode on the camera side is not set to photography mode.

3. Check the direction the camera is facing (up or down) and enter values into [Robot Coordinate Position]. C1 and C2 are camera coordinates of the marks (+) acquired by the camera with [Get Calibration Mark]. Enter robot coordinates corresponding to the C1 and C2 coordinates into P1 and P2. First select P1, then match the robot's tool center point with the C1 mark and fix the coordinates. Likewise, enter and fix the corresponding coordinates for P2 and all other marks.
   The camera coordinate axes and the robot coordinate axes sometimes face different directions. Make sure to thoroughly check which mark is C1 before entering robot coordinates.
   C1, C2, and P1, P2 only display their respective [Calibration Mark Number] settings. The camera coordinate "T" indicates the mark angle.

4. Click [Calculate and Register].
   This calculates and registers the coefficient to convert the camera coordinates into robot coordinates. The calculated values are saved as the following items:
   - Unit Coefficient
   - Rotate Angle
   - X Shifting Amount
   - Y Shifting Amount

9.2.7 Automatic System Camera Calibration

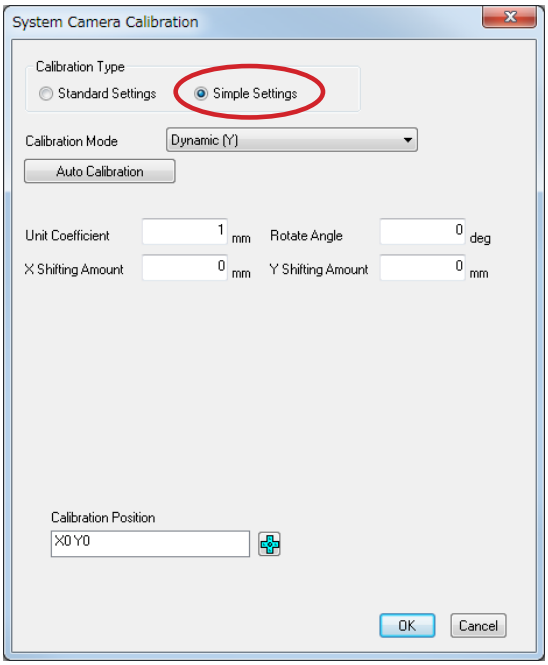
Click the [System Camera Calibration] button on the [Camera Configuration] dialog. The “System Camera Calibration” dialog appears.

This section explains how to automatically calibrate the camera. Set the calibration type radio button to [Simple Settings].
Simple Settings is a function that automatically enters the items entered manually in Standard Settings by the robot's own operation.

The one mark (referred to as “calibration mark” from here onwards) placed on the X table with this procedure is photographed while the XY axes are moving.
With this you can complete calibration within a short period of time compared to manual calibration.

In comparison with Standard Settings, the following settings are automatically set by Auto Calibration:

- Calibration Mark No.
- Get Calibration Mark
- Robot Coordinate Position
- Coefficient Calculation and Register



■ Simple Settings Window Items

- Calibration Type
  Switch between [Standard Settings] and [Simple Settings].

- Calibration Mode
  Switch between [Dynamic (Y)] / [Dynamic (R)].
  Select to always photograph the workpiece from the same position, or to photograph from a position different to that of the calibration mark position.

- Auto Calibration
  The robot performs this operation when selected Before selecting this, confirm the surrounding area and execute only when it is safe to do so. Only set one workpiece mark. One operation at a time is photographed with auto calibration, and 6 points are registered per workpiece. When auto calibration is made normally, the values for [Reference Coefficient] and [Calibration Position] are updated.

NOTE: Before executing auto calibration, make sure to perform main tool configuration. If you perform auto calibration without making main tool configuration settings, the robot and camera cannot be calibrated correctly.

- Unit Coefficient, Rotate Angle, X Shifting Amount, Y Shifting Amount
  The unit coefficients calculated with auto calibration appear here.

- Calibration Position
  This registers the automatic calibration finishing position.

■ Simple Settings Workflow

(1) Automatic Calibration Preparation
To perform automatic calibration, you need to prepare a dedicated calibration mark. Adjust the size of the dedicated calibration mark on the screen so that it is shown as approximately 1/5 of the lateral side of the screen.
Note that an error occurs if the calibration mark size is either too big or too small.

(2) Set the calibration marks you want to detect on the camera side.
Calibration calculation is performed on the robot side.

NOTE: You do not need to make calibration settings on the camera side. Make settings to detect the center of the calibration mark with the camera.

(3) Select [Automatic Calibration]

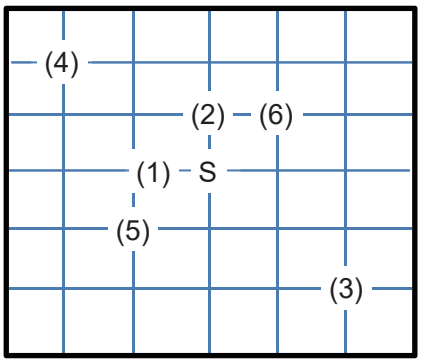
Once you select [Automatic Calibration], the axes operate automatically.

If you do not make these settings, the robot cannot operate normally.

⚠ Caution

The axes move when you perform automatic calibration. Confirm the surrounding area and execute once it is safe to do so.

Failure to do so can cause injury or breakdown.



S : Mark Position

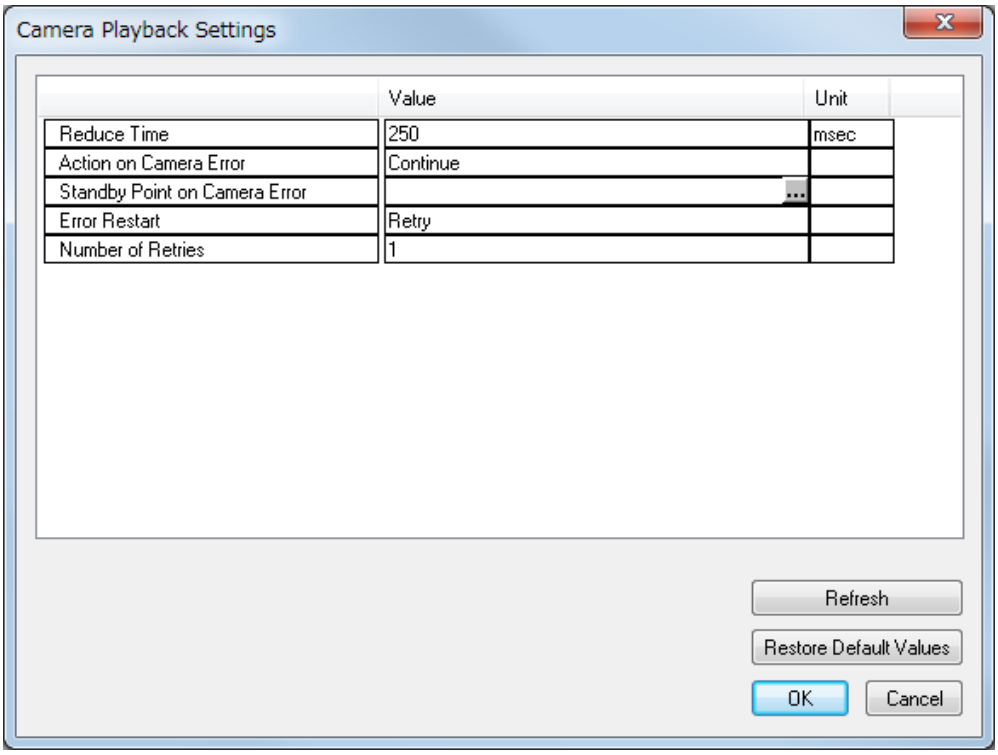
(1) to (6) : Photograph Areas

NOTE: The robot movement is repeated several times for photographing.

Example Automatic Calibration Mark Acquisition Positions

9.2.8 Camera Playback Settings

Click the [Camera Playback Settings] button on the [Camera Configuration] dialog. The Camera Playback Settings dialog box appears and you can set here.



1. Reduce Time

   Sets a time to control oscillation generated after a PTP movement is stopped. You can reduce the camera unit oscillation and increase imaging success by setting a longer time in Reduce Time. The default setting is 250 (msec). You can make settings from 0 to 9999 (msec).

2. Action on Camera Error

   If an image acquisition error occurs or there is a communication error with the camera, etc., alternately “St” and a number corresponding to the error content in the list below appears on the switchbox program display.

Display		Error Content	Countermeasure
St	1	There is a standard mark number discrepancy	The number of marks in the acquired image do not match the number of marks set. Check the number of marks on the workpiece.
St	2	A camera communication error	Communication has timed out.
St	3	A camera data acquisition error	Conversion of the received data failed. An error has occurred with the acquired image (the camera has output an error, such as no detection of a workpiece, etc.).

You can set the robot operation to execute when a camera error occurs. Click the value column of [Action on Camera Error], and select the item you want.

- Continue
  Continues the run.
- Stop Instantly
  Stops at its current position during imaging and stands by for start.
- Go to Standby Point on Camera Error
  Moves to the Standby Point on Camera Error and stands by for start.
- Z axis Up
  Moves only the Z axis from the position stopped at during imaging to 0 mm and stands by for start.

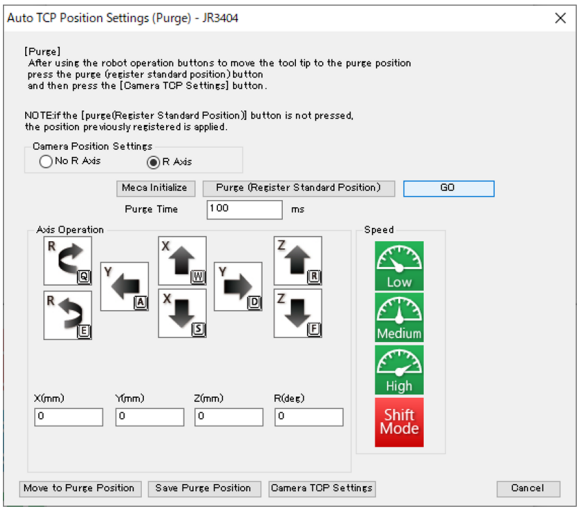
3. Standby Point on Camera Error
   Click the [･･･] button. The Standby Point on Camera Error screen appears.
   The axes move to this point and holds here when a camera error occurs.
   Note that the axes will not go to this point and standby if [Action on Camera Error] is not set to [Go to Standby Point on Camera Error], even if an error occurs.

4. Error Restart
   Sets the operation to be executed after restarting operation from a standby caused by a camera error. Click the value column of [Error Restart], and select the item you want.
   - Retry
     Restarts operation from the camera shoot point (execute camera photography again).
     If an error occurs at the second camera shoot point when using the double camera shoot points and [Error Restart] is set to [Retry], the axes return to the first camera shoot point. Double Camera Shoot Point 1 and Double Camera Shoot Point 2 need to be set in sequence respectively.
   - Next Point
     Moves to the next point.
   - Program End
     Ends the program.

5. Number of Retries
   This setting is valid when [Error Restart] is set to [Retry]. You can set this from 1 to 9. The program is terminated if the number of retries exceeds the number set here.

9.2.9 Auto TCP Position Settings (Purge) (When the Camera Type for Dispensing Specifications is [Type-C1(IS/AS)] or [USB])

Click the [Auto Camera TCP (Purge)] button on the Camera Configuration dialog. The Auto TCP Position Settings (Purge) dialog appears. From here you can move the axes to the standard position for processing the auto camera TCP.

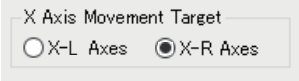


Follow the procedure below to make the necessary settings for this dialog. Refer to the table on the next page for each button.

1. Set [Camera Position Settings] according to the information below:
   - R-axis: 4 axes specifications when the camera is attached to a rotating axis.
   - Other than R-axis: 4 axes specifications when the camera is not attached to a rotating axis.

NOTE: [Camera Position Settings] appears only for 4 axes specifications.

2. Use the arrow buttons in [Axis Operation], the [Meca Initialize]* button, and the [GO] button to operate and move the axes to the purge position.
   For the twin table specifications, [X Axis Movement Target] (diagram to the right) appears at the top of the dialog, so select the X axis you want to move.



3. Click the [Purge (Register Standard Position)] button to purge the dispensing agent. Also, you can register the purge position (standard position) simultaneously. Click the [Save Purge Position] button to save the registered position. You can move to the saved position by clicking the [Move to Purge Position] button.

4. Click the [Camera TCP Settings]. The “Auto TCP Mark Settings (Purge)” dialog appears. Refer to “9.2.10 Auto TCP Mark Settings (Purge) (When the Camera Type for Dispensing Specifications is [Type-C1(IS/AS)] or [USB])” for operation details.

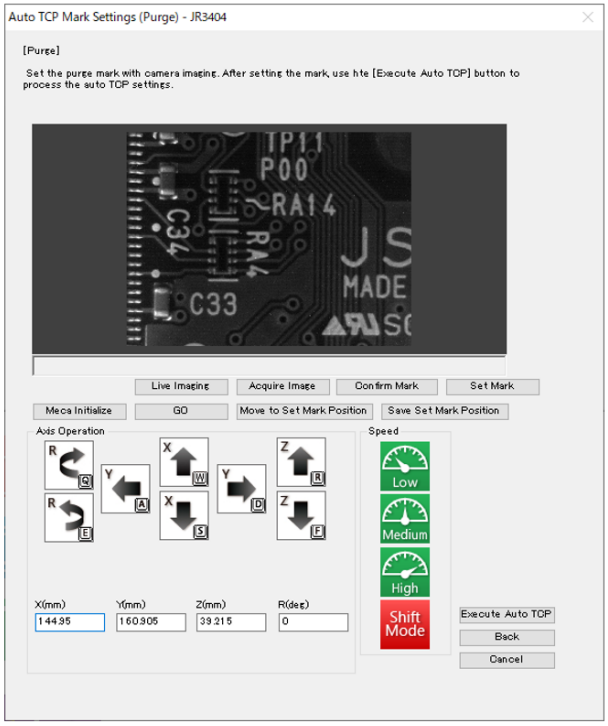
* With JC-3 absolute encoder models and JS3 Series, the [Meca Initialize] button is a [Return to Work Home] button.

Button	Explanation
[Meca Initialize]	Click this to mechanically initialize the robot.
[Return to Work Home]	JC-3 absolute encoder models and JS3 Series have a [Return to Work Home] button instead of a [Meca Initialize] button. Click this to move the axes to the work home.
[Purge (Register Standard Position)]	Click this to purge dispensing agent for the time set in [Purge Time] and to internally register the coordinates as the standard position for processing the auto TCP settings. The standard position set here is important information required for other processes. Because the values set here are also used as camera imaging standard values to process calibration, set the [R(deg)] value to 0° for 4 axes specifications.
[GO]	Click this to move the axes to the coordinates currently displayed.
[Purge Time]	Set the purging time here.
[Axis Operation]	Click the arrow buttons to move the axes in the directions indicated. You can also use the keyboard instead of the arrow buttons to perform these movement operations. For further details regarding [Axis Operation], refer to [Axis Operation] in “1.4 Robot Operations Area”.
[Speed]	Click these to set the speed the axes move. If you select [Shift Mode], you can use the “Shift” key on your PC to change speeds as follows: First hold down an arrow button and then press the “Shift” key to accelerate up to high speed. Hold down the “Shift” key and then press an arrow button to move at high speed from the start.
[Move to Purge Position]	Click this to process and move to the coordinates saved with the [Save Purge Position] button.
[Save Purge Position]	Click this to save the current robot coordinates.
[Camera TCP Settings]	Click this to finish the [Auto TCP Position Settings (Purge)] and to display the [Auto TCP Mark Settings (Purge)]. NOTE: For details regarding [Auto TCP Mark Settings (Purge)], refer to “9.2.10 Auto TCP Mark Settings (Purge) (When the Camera Type for Dispensing Specifications is [Type-C1(IS/AS)] or [USB])”.
[Cancel]	Click this to return to the previous screen.

9.2.10 Auto TCP Mark Settings (Purge) (When the Camera Type for Dispensing Specifications is [Type-C1(IS/AS)] or [USB])

■ When the camera type is [Type-C1(IS/AS)]

Click [Camera TCP Settings] on the Auto TCP Position Settings (Purge) screen to display the Auto TCP Mark Settings (Purge) screen. Here you can set the mark used to find and process the auto camera TCP standard position. After setting the mark, use the [Execute Auto TCP] to automatically set the camera TCP.



Follow the procedure below to make the necessary settings for this screen. Refer to the table on the next page for each button.

(1) Click [Live Imaging] to display a live image in the camera imaging area.

(2) Use the arrow buttons in [Axis Operation], the [Meca Initialize] and the [GO] to operate and move the purge position to the center of the screen.

(3) Click [Save Set Mark Position] to save this position for later reference.

(4) After the position is saved, you can use the [Move to Set Mark Position] to move to the saved position.

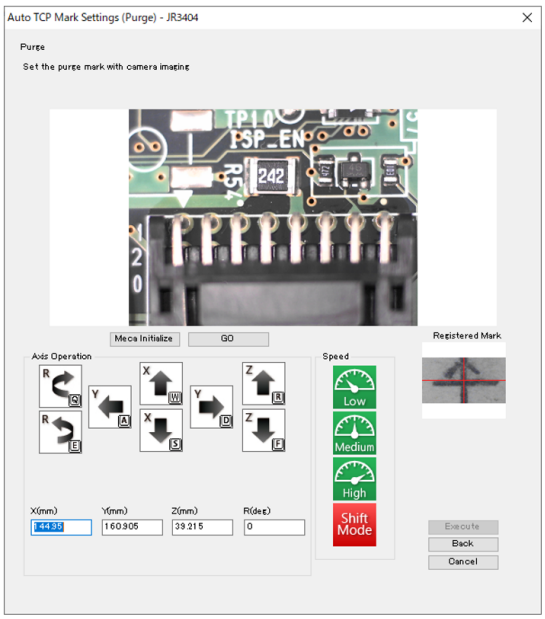
(5) Click [Acquire Image] to acquire and display a still image.
Click [Set Mark] to display the [Set Mark] screen and register the purge mark.
If there is a mark already registered, you can click [Confirm Mark] to check and display it in the imaging area. For details regarding the [Set Mark] screen operations, refer to "9.2.11 Mark Settings (When the Camera Type is [Type-C1(IS/AS)])".

(6) Click [Execute Auto TCP] after the mark is registered.

Button	Explanation
[Live Imaging]	Click this to display live imaging in the camera imaging area.
[Acquire Image]	Click this to acquire and display the current camera image in the imaging area.
[Confirm Mark]	Click this to display the mark that is currently registered in the imaging area.
[Set Mark]	Click this to display the [Set Mark] screen and set the mark. For details about operating the [Set Mark] screen, refer to "9.2.11 Mark Settings (When the Camera Type is [Type-C1(IS/AS)])".
[Meca Initialize]	Click this to mechanically initialize the robot.
[GO]	Click this to move the axes to the coordinates currently displayed.
[Move to Set Mark Position]	Click this to process and move to the coordinates saved with the [Save Mark Position].
[Save Set Mark Position]	Click this to save the current robot coordinates.
[Axis Operation]	Click the arrows to move the axes in the directions indicated. You can also use the keyboard instead of the arrow buttons to perform these movement operations. For details, refer to [Axis Operation] in "1.4 Robot Operations Area".
[Speed]	Click these to set the speed the axes move. If you select [Shift Mode], you can use the Shift key on your PC to change speeds as follows: First hold down an arrow button and then press the Shift key to accelerate up to high speed. Hold down the Shift key and then click an arrow button to move at high speed from the start.
[Execute Auto TCP]	After clicking this, a confirmation screen for executing this item appears. Click [OK]. Use the set mark to set the calibration coefficient and camera TCP. NOTE: • Because the X, Y, Z axes values are provided by the TCP setting process, set R(deg) to 0° for 4 axes specifications. • Pay attention to the operating robot as the R-axis is rotated 90° in order to get the Camera TCP for 4 axes specifications.
[Back]	Click this to return to the auto TCP position settings (purge).
[Cancel]	Click this to end auto camera TCP settings and return to camera configuration.

■ When the camera type is [USB]

Click the [Camera TCP Settings] button on the Auto TCP Position Settings (Purge) dialog to display the Auto TCP Mark Settings (Purge) dialog. Here you can set the mark used to find and process the auto camera TCP standard position. After setting the mark, use the [Execute] button to automatically set the camera TCP.



Follow the procedure below to make the necessary settings for this dialog. Refer to the following table for each button.

(1) Use the arrow buttons in [Axis Operation], the [Meca Initialize]* button, and the [GO] button to operate and move the purge position to the center of the screen.
For the twin table specifications, the X axis selected in [X Axis Movement Target] of "9.2.9 Auto TCP Position Settings (Purge) (When the Camera Type for Dispensing Specifications is [Type-C1(IS/AS)] or [USB])" moves.

(2) Click the [Save Set Mark Position] button to save this position for later reference.
After the position is saved, you can use the [Move to Set Mark Position] button to move to the saved position.

(3) Click the [Set Mark] position. The purge mark settings dialog appears.
Register the purge marks on the purge mark settings dialog.

(4) Click the [Execute] button after the mark is registered.

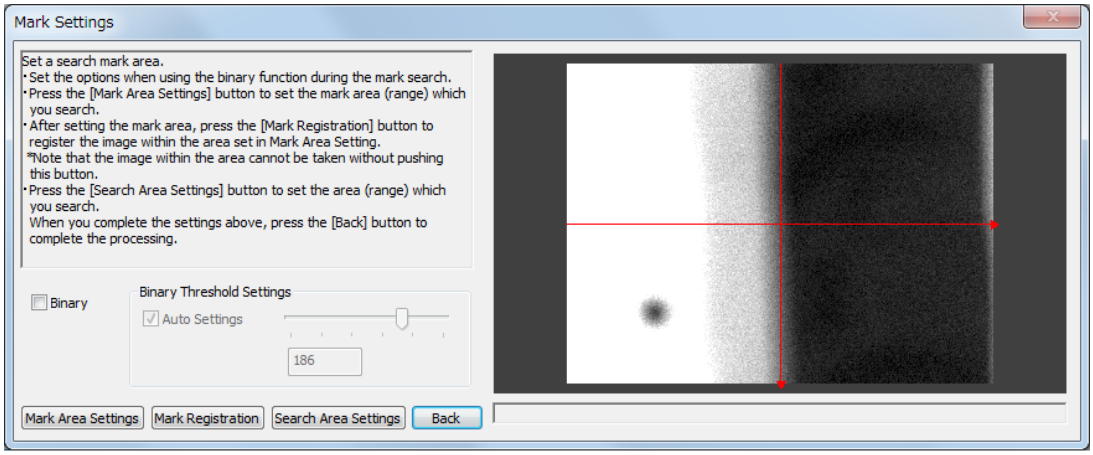
* With JC-3 absolute encoder models and JS3 Series, the [Meca Initialize] button is a [Return to Work Home] button.

Button	Explanation
[Set Mark]	Click this button to display a screen for setting the cross mark. Click and hold down the left mouse button to display a box for registering the mark. Use the mouse to select the center of the purge mark and click the "Execute" button to confirm and register it. After registering the mark, click the [Return] button to return to the Auto TCP Mark Settings (Purge) dialog.
[Meca Initialize]	Click this to mechanically initialize the robot
[Return to Work Home]	JC-3 absolute encoder models and JS3 Series have a [Return to Work Home] button instead of a [Meca Initialize] button. Click this to move the axes to the work home.

Button	Explanation
[GO]	Click this to move the axes to the coordinates currently displayed.
[Move to Set Mark Position]	Click this to process and move to the coordinates saved with the [Save Mark Position] button.
[Save Set Mark Position]	Click this to save the current robot coordinates.
[Axis Operation]	Click the arrows to move the axes in the directions indicated. You can also use the keyboard instead of the arrow buttons to perform these movement operations. For further details regarding [Axis Operation], refer to [Axis Operation] in “1.4 Robot Operations Area”.
[Speed]	Click these to set the speed the axes move. If you select [Shift Mode], you can use the “Shift” key on your PC to change speeds as follows: First hold down an arrow button and then press the “Shift” key to accelerate up to high speed. Hold down the “Shift” key and then press an arrow button to move at high speed from the start.
[Execute]	After clicking this, the robot uses the set mark to set the calibration coefficient and camera TCP. After these settings are complete, a result screen appears. Press [OK] to complete the settings and return to the Camera Configuration dialog. NOTE: • Because the X, Y, Z axes values are provided by the TCP setting process, set [R(deg)] to 0° for 4 axes specifications. • Pay attention to the operating robot as the R-axis is rotated 90° to calculate the Camera TCP for 4 axes specifications.
[Back]	Click this return to the [Auto TCP Position Settings (Purge)].
[Cancel]	Click this to end [Auto Camera TCP Settings] and return to [Camera Configuration].

9.2.11 Mark Settings (When the Camera Type is [Type-C1(IS/AS)])

Register the mark to search and the search area.



Follow the procedure below to set the mark settings. Refer to the table on the next page for each button.

1. If you put a check in [Binary], you can search using binary images.
   If you remove a check in [Binary], you can search using normal images.
2. When searching using a binary image, set the binary threshold value.
   If you put a check for [Auto Settings], the threshold value calculated based on the camera function is automatically set.
   If you remove the check for [Auto Settings], you can set the threshold value manually by using the slider bar or inputting a numerical value.
3. Click Mark Area Settings to set the mark area.
   The mark area box and center point appear in the imaging area. You can move the box so that the mark is within the range or move to the mark center point, then press [Enter] (Press [Esc] to cancel the settings).
4. After setting the mark area, click [Mark Registration] to register the image inside of the mark area to the camera.
5. Click [Search Area Settings] to display the search range box in the imaging area. Move the box to set the search area and press [Enter] (Press [Esc] to cancel the settings).
6. When these settings are complete, click [Back] to close the mark settings screen.

Button	Explanation
[Mark Area Settings]	Click this to display a box for setting the mark area and a targeting point for setting the center of the mark in the imaging area. Move the box and targeting point by selecting and dragging them using the mouse to set the mark area. For details regarding the operation functions during mark settings, refer to "9.2.12 Operations for Settings Marks (When the Camera Type is [Type-C1(IS/AS)])". If you right-click on the mouse in the mark area box, the subregion setting menu displays and you can set the subregion in the mark area box. Refer to "9.2.13 Subregion (When the Camera Type is [Type-C1(IS/AS)])" for how to set the subregion.
[Mark Registration]	Click this to start up and register the image in the area to the camera as a mark image after setting the mark area in [Mark Area Settings].
[Search Area Settings]	Click this to display a box for setting the search area in the imaging area. Set the search area you want by using the mouse to modify or move the box. For details regarding the operation functions during search area settings, refer to "9.2.12 Operations for Settings Marks (When the Camera Type is [Type-C1(IS/AS)])". If you right-click on the mouse in the search area, the subregion setting menu displays and you can set the subregion in the search area. Refer to "9.2.13 Subregion (When the Camera Type is [Type-C1(IS/AS)])" for how to set the subregion.
[Back]	Click this to return to the previous screen.

9.2.12 Operations for Settings Marks (When the Camera Type is [Type-C1(IS/AS)])

When setting marks, you can use the following keyboard shortcut functions:

Setting Object	Function	Operation
Mark Center Point	Move the mark center point 1 pixel	Use the following keys after clicking and selecting (changes to red) the mark center point: Move up: ↑ key Move down: ↓ key Move left: ← key Move right: → key Move up and right: Page Up key Move down and right: Page Down key Move up and left: Home key Move down and left: End key
	Change the color of the mark center point	Enter the following keys after clicking the mark center point: Shift key + F9 key
Mark Area Box Movement	Move the mark area box 1 pixel	Use the following keys after clicking within the mark area box (after it changes to red): Move up: ↑ key Move down: ↓ key Move left: ← key Move right: → key Move up and right: Page Up key Move down and right: Page Down key Move up and left: Home key Move down and left: End key
	Change the color of the mark area box	Use the following keys after clicking within the mark area box: Shift key + F9 key
Mark Area Box Settings	Modify the size of the mark area box 1 pixel	Use the following keys after clicking the frame of the mark area box (after it changes to red): Shrink vertically: ↑ key Enlarge vertically: ↓ key Shrink horizontally: ← key Enlarge horizontally: → key Shrink vertically, enlarge horizontally: Page Up key Enlarge vertically, shrink horizontally: Page Down key Shrink vertically and horizontally: Home key Enlarge vertically and horizontally: End key
	Change the color of the mark area box	Enter the following keys after clicking the frame of the mark area box: Shift key + F9 key

9.2.13 Subregion (When the Camera Type is [Type-C1(IS/AS)])

You can set the subregion in the mark area or the search area.
Also, you can add, remove or adjust the subregion by selecting the items in the subregion setting menu shown by right-clicking in the mark area or the search area.

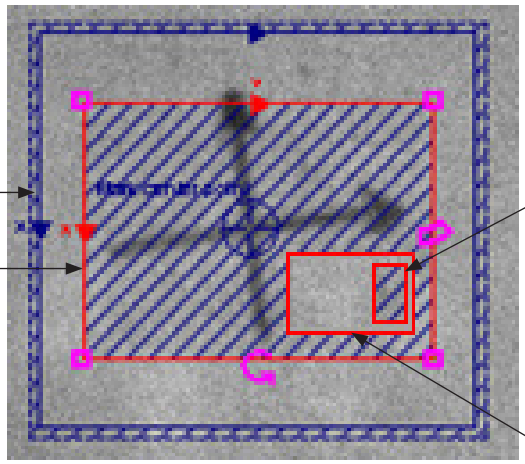
■ Subregion Setting Menu

1. [Add Subregion]
   Select this to add the subregion with the following shapes.
   - [Annulus]
     Select this to display an annulus in the mark area or the search area. You can change the size of the annulus you selected.
   - [Circle]
     Select this to display a circle in the mark area or the search area. You can change the size of the circle you selected.
   - [Polygon]
     Select this to display a triangle in the mark area or the search area. You can change the size of the triangle you selected. Also, you can make the polygon by adding or deleting the points on each sides.
   - [Region]
     Select this to display the square in the mark area or the search area. You can change the square size if you select the respective corner parts or sides of the square.

2. [Remove Subregion]
   Select this to remove the subregion.

3. [Subregion Operation]
   - [Add]
     Select this to set the subregion in selection to be included in the mark area or the search area.
   - [Subtract]
     Select this to set the subregion in selection not to be included in the mark area or the search area.

Example:

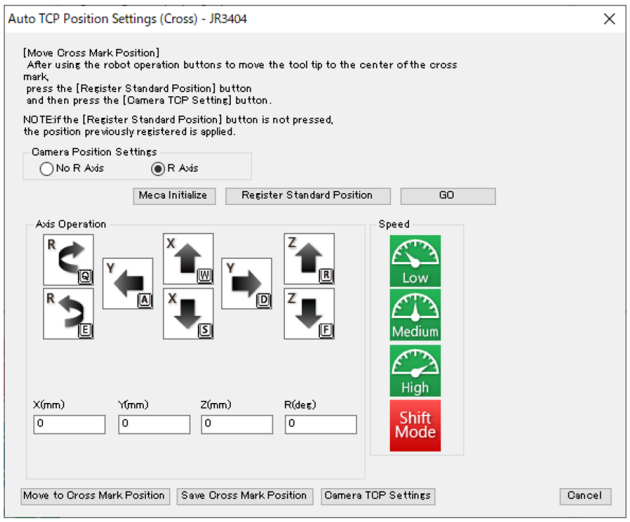


NOTE:

- If you select the mark area or the search area box that has one or more subregions and then select [Remove Subregion] in the subregion setting menu, this box is removed and the remaining subregion changes into the mark area or the search area.
  If the original subregion was not included in the mark area or the search area, the current setting box (the subregion which changed into the mark area or the search area) keeps the subtraction element. To change this box into the mark area or the search area, select [Subregion Operation] → [Add] in the subregion setting menu with this box selected.
- The subregion setting menu display language depends on the OS system language. It may be different from the display language selected in [Set Language] on the PC software JR C-Points II.

9.2.14 Auto TCP Position Settings (Cross) (When the Camera Type is [Type-C1(IS/AS)], [USB])

Click the [Auto Camera TCP (Cross)] button on the [Camera Configuration for Teaching] dialog.
From here you need to move the axes to the standard position for processing the auto camera TCP.



Follow the procedure below to make the necessary settings for this dialog. Refer to the table on the next page for each button.

1. Set [Camera Position Settings] according to the information below:
   - R-axis: 4 axes specifications when the camera is attached to a rotating axis.
   - Other than R-axis: 4 axes specifications when the camera is not attached to a rotating axis.

NOTE: [Camera Position Settings] appears only for 4 axes specifications.

2. Use the arrow buttons in [Axis Operation], the [Meca Initialize]* button, and the [GO] button to operate and move the axes to the standard mark on the X table (cross mark position).
   For the twin table specifications, [X Axis Movement Target] (diagram to the right) appears at the top of the dialog, so select the X axis you want to move.

   * With JC-3 absolute encoder models and JS3 Series, the [Meca Initialize] button is a [Return to Work Home] button.

3. Click the [Register Standard Position] button to save the standard position. Click the [Save Cross Mark Position] button to save the registered position. You can move to the saved position by clicking the [Move to Cross Mark Position] button.

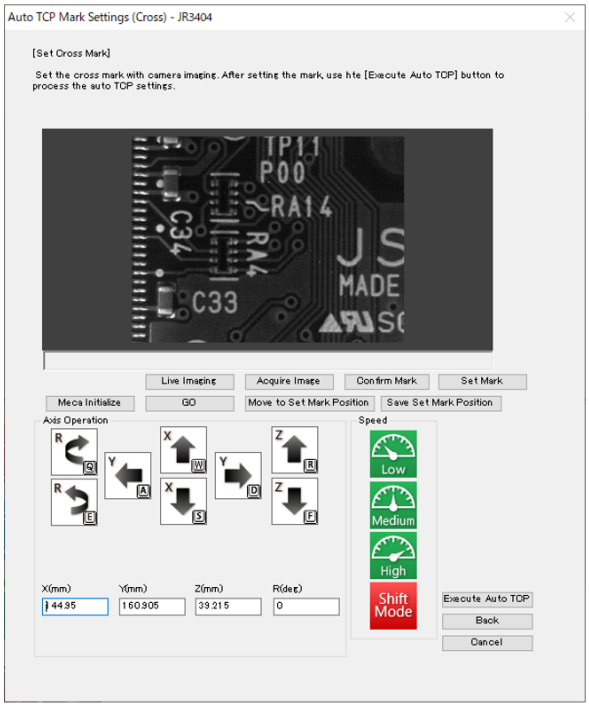
4. Click the [Camera TCP Settings]. The Auto TCP Mark Settings (Cross) dialog appears. Refer to "9.2.15 Auto TCP Mark Settings (Cross) (When the Camera Type is [Type-C1(IS/AS)], [USB])" for operation details.

Button	Explanation
[Meca Initialize]	Click this to mechanically initialize the robot.
[Return to Work Home]	JC-3 absolute encoder models and JS3 Series have a [Return to Work Home] button instead of a [Meca Initialize] button. Click this to move the axes to the work home.
[Register Standard Position]	Click this to internally register the axes coordinates as the standard position for processing the auto TCP settings. NOTE: • The standard position set here is important information required for other processes. • Because the values set here are also used as camera imaging standard values to process calibration, set the [R(deg)] value to 0° for 4 axes specifications.
[GO]	Click this to move the axes to the coordinates currently displayed.
[Axis Operation]	Click the arrow buttons to move the axes in the directions indicated. You can also use the keyboard instead of the arrow buttons to perform these movement operations. For further details regarding [Axis Operation], refer to [Axis Operation] in "1.4 Robot Operations Area".
[Speed]	Click these to set the speed the axes move. If you select [Shift Mode], you can use the "Shift" key on your PC to change speeds as follows: First hold down an arrow button and then press the "Shift" key to accelerate up to high speed. Hold down the "Shift" key and then press an arrow button to move at high speed from the start.
[Move to Cross Mark Position]	Click this to process and move to the coordinates saved with the [Save Cross Mark Position] button.
[Save Cross Mark Position]	Click this to save the current axes coordinates.
[Camera TCP Settings]	Click this to finish the [Auto TCP Position Settings (Cross)] and to display the [Auto TCP Mark Settings (Cross)]. NOTE: For details regarding auto TCP mark settings (cross), refer to "9.2.15 Auto TCP Mark Settings (Cross) (When the Camera Type is [Type-C1(IS/AS)], [USB])".
[Cancel]	Click this to return to the previous screen.

9.2.15 Auto TCP Mark Settings (Cross) (When the Camera Type is [Type-C1(IS/AS)], [USB])

■ When the camera type is [Type-C1(IS/AS)]

Click [Camera TCP Settings] on the Auto TCP Position Settings (Cross) screen to display the Auto TCP Mark Settings (Cross) screen. Here you can set the mark used to find and process the auto camera TCP standard position. After setting the mark, use the [Execute Auto TCP] to automatically set the camera TCP.



Follow the procedure below to make the necessary settings for this screen. Refer to the following table for each button.

(1) Click [Live Imaging] to display a live image in the camera imaging area.

(2) Use the arrow buttons in [Axis Operation], the [Meca Initialize] and the [GO] to operate and move the cross mark to the center of the screen.

(3) Click [Save Set Mark Position] to save this position for later reference.
After the position is saved, you can use the [Move to Set Mark Position] to move to the saved position.

(4) Click [Acquire Image] to acquire and display a still image.

(5) Click [Set Mark] to display the [Set Mark] screen and register the cross mark.
If there is a mark already registered, you can click [Confirm Mark] to check and display it in the imaging area. For details regarding the [Set Mark] screen operations, refer to "9.2.11 Mark Settings (When the Camera Type is [Type-C1(IS/AS)])".

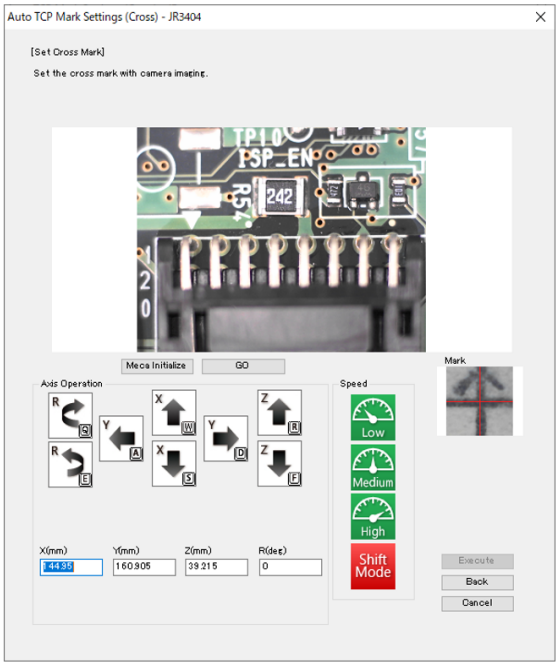
(6) Click [Execute Auto TCP] after the mark is registered.

Button	Explanation
[Live Imaging]	Click this to display live imaging in the camera imaging area.
[Acquire Image]	Click this to acquire and display the current camera image in the imaging area.
[Confirm Mark]	Click this to display the mark that is currently registered in the imaging area.
[Set Mark]	Click this to display the [Set Mark] screen and set the mark. For details about operating the [Set Mark] screen, refer to "9.2.11 Mark Settings (When the Camera Type is [Type-C1(IS/AS)])".

Button	Explanation
[Meca Initialize]	Click this to mechanically initialize the robot.
[GO]	Click this to move the axes to the coordinates currently displayed.
[Move to Set Mark Position]	Click this to process and move to the coordinates saved with the [Save Mark Position].
[Save Set Mark Position]	Click this to save the current axes coordinates.
[Axis Operation]	Click the arrow buttons to move the axes in the directions indicated. You can also use the keyboard instead of the arrow buttons to perform these movement operations. For details, refer to [Axis Operation] in "1.4 Robot Operations Area"
[Speed]	Click these to set the speed the axes move. If you select [Shift Mode], you can use the Shift key on your PC to change speeds as follows: First hold down an arrow button and then press the Shift key to accelerate up to high speed. Or, hold down the Shift key and then click an arrow button to move at high speed from the start.
[Execute Auto TCP]	After clicking this, a confirmation screen for executing this item appears. Click [OK]. Use the set mark to set the calibration coefficient and camera TCP. NOTE: • Because the X, Y, Z axis values are provided by the TCP setting process, set [R(deg)] to 0° for 4 axes specifications. • Pay attention to the operating robot as the R-axis is rotated 90° in order to get the Camera TCP for 4 axes specifications.
[Back]	Click this to return to the auto TCP position settings (cross).
[Cancel]	Click this to end auto camera TCP settings and return to camera configuration.

■ When the camera type is [USB]

Click the [Camera TCP Settings] button on the [Auto TCP Position Settings (Cross)] dialog to display the [Auto TCP Mark Settings (Cross)] dialog. Here you can set the mark used to find and process the auto camera TCP standard position. After setting the mark, use the [Execute] button to automatically set the camera TCP.



Follow the procedure below to make the necessary settings for this dialog. Refer to the following table for each button.

(1) Use the arrow buttons in [Axis Operation], the [Meca Initialize]* button, and the [GO] button to operate and move the cross mark to the center of the screen.
For the twin table specifications, the X axis selected in [X Axis Movement Target] of "9.2.14 Auto TCP Position Settings (Cross) (When the Camera Type is [Type-C1(IS/AS)], [USB])" moves.

(2) Click the [Save Set Mark Position] button to save this position for later reference.
After the position is saved, you can use the [Move to Set Mark Position] button to move to the saved position.

(3) Click the [Set Mark] position. The Cross Mark Settings dialog appears.
Register the cross marks on the cross mark settings dialog.

(4) After the marks are registered, click the [Execute] button.

* With JC-3 absolute encoder models and JS3 Series, the [Meca Initialize] button is a [Return to Work Home] button.

Button	Explanation
[Set Mark]	Click this button to display a dialog for setting the cross mark. Click and hold down the left mouse button to display a box for registering the mark. Use the mouse to select the center of the cross mark and click the "Execute" button to confirm and register it. After registering the mark, click the [Return] button to return to the Auto TCP Mark Settings (Cross) dialog.
[Meca Initialize]	Click this to mechanically initialize the robot.

Button	Explanation
[Return to Work Home]	JC-3 absolute encoder models and JS3 Series have a [Return to Work Home] button instead of a [Meca Initialize] button. Click this to move the axes to the work home.
[GO]	Click this to move the axes to the coordinates currently displayed.
[Move to Set Mark Position]	Click this to process and move to the coordinates saved with the “Save Set Mark Position” button.
[Save Set Mark Position]	Click this to save the current axes coordinates.
[Axis Operation]	Click the arrow buttons to move the axes in the directions indicated. You can also use the keyboard instead of the arrow buttons to perform these movement operations. For further details regarding [Axis Operation], refer to [Axis Operation] in “1.4 Robot Operations Area”.
[Speed]	Click these to set the speed the axes move. If you select [Shift Mode], you can use the “Shift” key on your PC to change speeds as follows: First hold down an arrow button and then press the “Shift” key to accelerate up to high speed. Hold down the “Shift” key and then press an arrow button to move at high speed from the start.
[Execute]	The robot uses the set mark to set the calibration coefficient and camera TCP. After these settings are complete, a result screen appears. Press [OK] to complete the settings and return to the Camera Configuration dialog. NOTE: • Because the X, Y, Z axes values are provided by the TCP setting process, set [R(deg)] to 0° for 4 axes specifications. • Pay attention to the operating robot as the R-axis is rotated 90° to calculate the Camera TCP for 4 axes specifications.
[Back]	Click this return to the [Auto TCP Position Settings (Cross)].
[Cancel]	Click this to end auto camera TCP settings and return to the Camera Configuration dialog.

9.3 Checking Tool Settings

After tool settings are complete, check to make sure the overall system and robot operates correctly. Before you check tool settings, set [Teaching Height Settings] otherwise you cannot align the tool positions.
For further details on how to set the teaching height, refer to “11.7 Teaching Height Settings”.

Use [Tool for Teaching] function and confirm the tool settings. Click and select one of the tools previously set [Main Tool] or [Camera] from [Tool for Teaching] on the main screen. Set and position each of the tools using a common point (on the X table with a JR3000 Series).

Example:

1. Select [Camera] and move to the tool common point. Set a “PTP Point”, click the [GO Move] icon on the tool bar while [Camera] is selected, and check that the tool common point appears in the center of the cross hairs on the screen.
2. Next, select [Main Tool] from [Tool for Teaching]. Select the PTP point set for step 1 and click the [GO Move] while [Main Tool] is selected to check that the main tool tip (needle, etc.), moves to the tool common point.

If there are position displacements for the various tools, set the tool data values for each of the tools again. When you change tools using [Tool Data], if each tool aligns to a common position, tool configuration is complete.

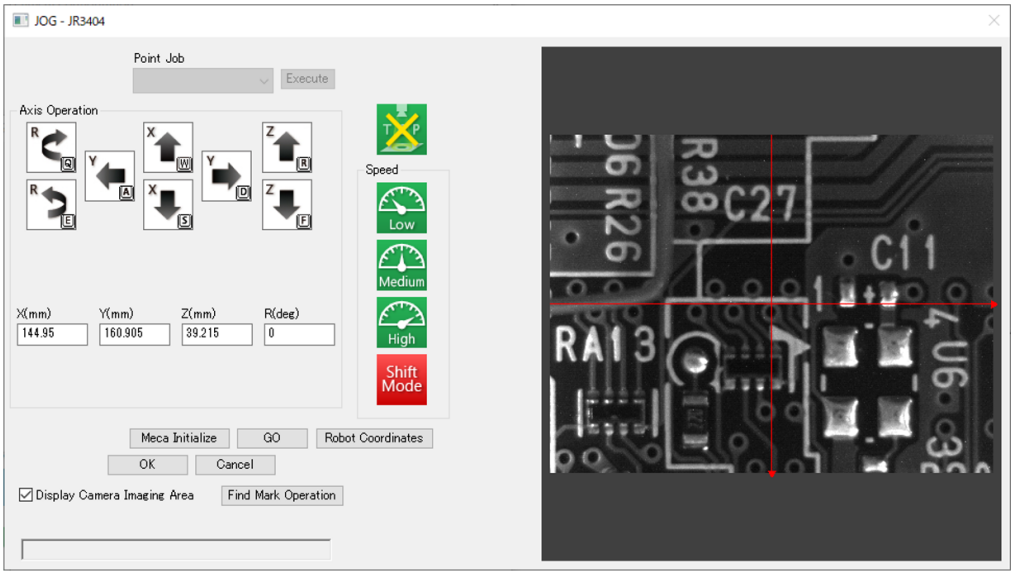
9.4 JOG

When you click the button from an individual dialog (not on the main screen), the dialog below appears.

NOTE: For information regarding when you click the button on the main screen or select [Robot] from the tool bar and click [JOG], refer to “1. PC MAIN SCREEN”.

If you select [Type-C1(IS/AS)] or [USB] for the camera type in [Camera Configuration], the camera image appears.

Example: JR3000 Series



NOTE: The items that appear on this screen vary depending on the robot model you are using.

When you click the [Execute] button of [Point Job], you can select a registered point job and check its operation.

NOTE:

- For the twin table specifications, [X Axis Movement Target] appears at the top of the screen, so select the X axis you want to move from this item.
- Other button operations are the same as they are for the robot operation area on the main screen. For further details, refer to “1. PC MAIN SCREEN”.

10. TEACHING DATA

10.1 Program

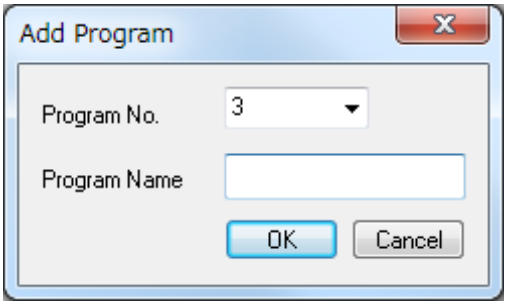
10.1.1 Open a Program

A program is a part of the C&T data. To open a program, first open the C&T data.

■ Opening a New Program

To open a new program, click [Add Program] on the [Program] pull-down menu or select the icon on the tool bar. The dialog box to the right appears.

Select a new program number you wish to register and enter a program name.



Once the program name is sent to the robot, it is valid for the first 40 to 120 characters on the robot side (teaching pendant display) depending on the characters used.

Note that you cannot select any program number that is already registered.

For the twin table specifications, the odd-numbered program is responsible for the X-L axis operation and the even-numbered program is responsible for the X-R axis operation.

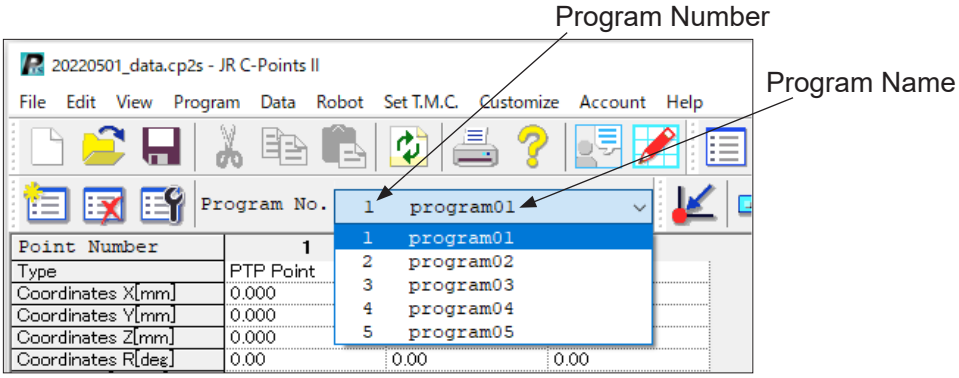
Select an odd number when teaching the X-L axis operation. When teaching the X-R axis operation linked to this, select an even number (which is a serial number) following the X-L axis program number.

The odd and even numbers, which are serial numbers, form one set, and the operation is executed alternately. For example, “No. 1 and No. 2”, “No. 3 and No. 4” ... “No. 99 and No. 100” ... “No. 997 and No. 998” are one set.

NOTE: Since odd and even numbers of serial numbers form one set, combinations such as “No. 1 and No. 3” are not possible.

■ Opening an Existing Program

Click on the program name display area on the tool bar. The list of programs included in the C&T data appears. Select the program you wish to open.



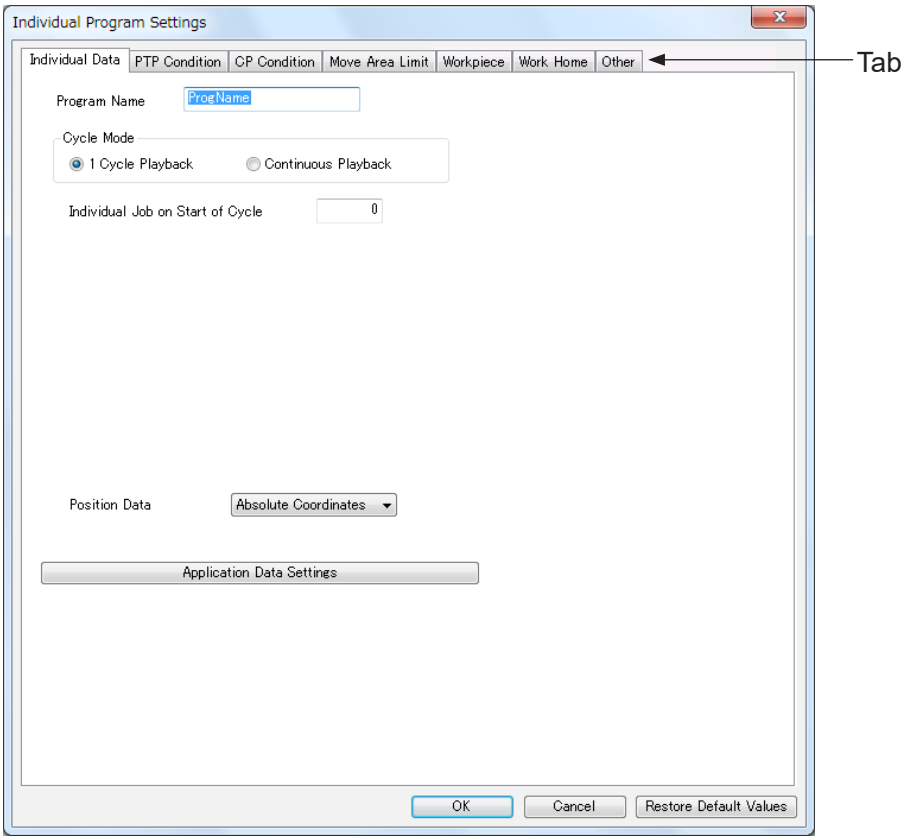
You can also display and select from the program list by clicking [Program] on the menu bar and [Program Change] on the pull-down menu.

10.1.2 Individual Program Settings

Click [Program] on the menu bar and either click [Individual Program Settings] on the pull-down menu or select the icon on the tool bar. The dialog box shown below appears. Click the tab you want to set and enter or select the desired values. After setting the values, click [OK].
If editing items in tabs other than individual data, you need to put a check in [Individually Set Program Data].
If you do not put a check in [Individually Set Program Data], the contents set in All Program Common Settings apply when the robot makes a run. By putting a check in [Individually Set Program Data] the contents set here apply when the robot makes a run.
If you click the [Restore Default Values] button, the values revert to the default values set in the All Program Common Data Settings.

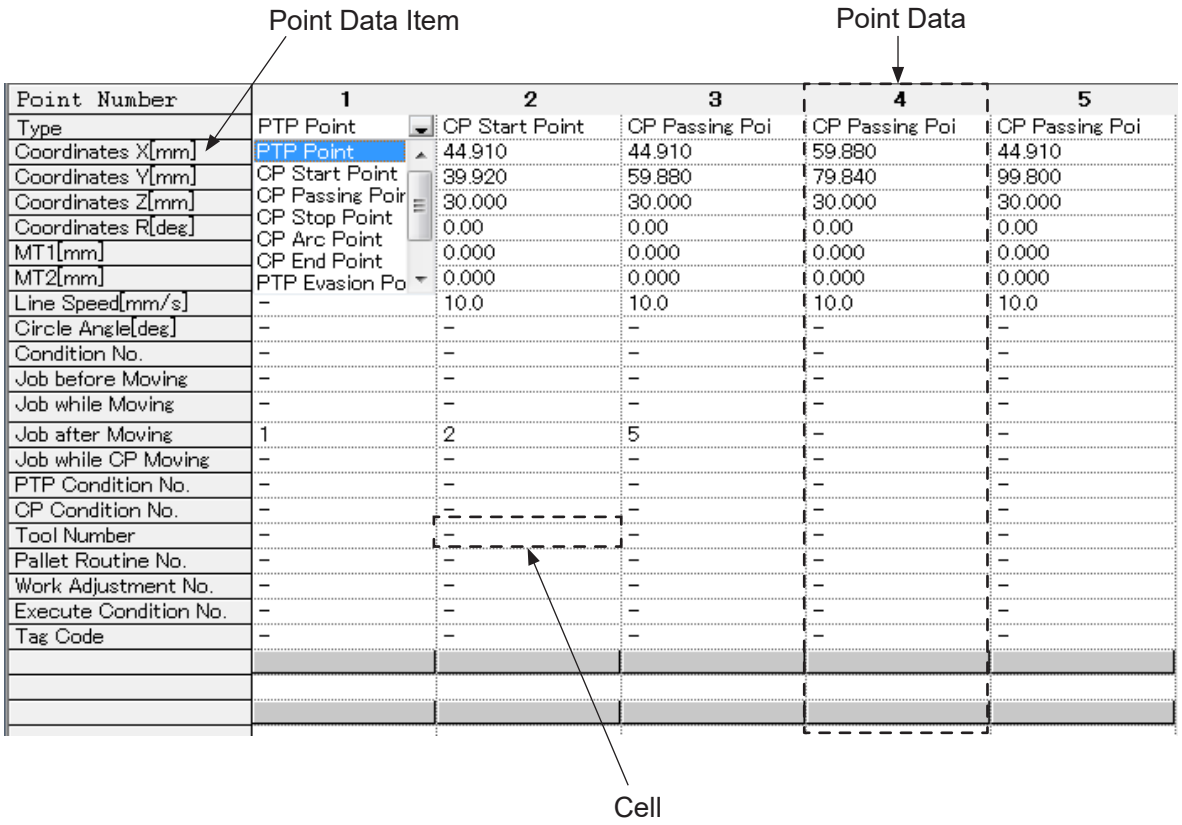
NOTE

- Take caution if you execute [Restore Default Values] as the program name is deleted.
- Depending on the Customizing Data settings the [Application Data Settings] button is sometimes not shown in the dialog box or it appears under a different name.



10.1.3 Point Data

If you open a program by clicking [Add Program], you need to add new points to the program. Click [Edit] on the menu bar and select [Point Add Mode] from the pull-down menu or select the icon from the toolbar. You can also right-click within the point data window to perform data entry operations.



■ Enter/Change a Value

Click the cell and enter the value you want to register.

In the [Type] row, the " ▼ " mark appears on the right of the cell when you click on it. Click this to display a list of point types. Select the point type you want to register from the list.

NOTE: For values such as coordinates, etc., you can enter up to 3 digits after the decimal point, however, after the third digit the values are rounded off when displayed on JR C-Points II. In addition, when a value that has more than 3 digits after the decimal point is forwarded to the robot, the digits after the third decimal place are cut off. The R-axis settings have up to 2 decimal digits and the line speed settings have up to 1 decimal digit.

■ Edit

Select a cell or point you want to edit and click [Edit] on the menu bar. The “Edit” menu appears.

This menu also appears by selecting a cell or a point you want to edit and right-clicking on it.

To select a point, select all cells included with that point (excluding the point number cell) or click on the point number.

■ Cut

Cut operations are made with single point units.

Select a cell and click [Cut] on the [Edit] pull-down menu. The points included in the selected cells are deleted.

After the [Cut] operation, select a cell and click [Paste] on the [Edit] pull-down menu. The cut points are inserted in front of the selected cell.

■ Copy

- Cell

  Select a cell as the copy source and click [Copy] on the [Edit] pull-down menu.

  Then select a copy destination and click [Paste] on the [Edit] pull-down menu.

  The copy source cell is overwritten into the copy destination cell.

- Point

  Select a point as the copy source and click [Copy] on the [Edit] pull-down menu.

  Then select a copy destination and click [Paste] on the [Edit] pull-down menu. The copied point is inserted in front of the point where the cursor is placed.

  Click [Paste After Last Point] to add the copied point to the end of the program.

■ Paste/Paste After Last Point

By using these functions, you can paste not only the “clipped” or “copied” cells and points but also data from tables in other applications, such as Microsoft Excel® and Word®.

■ Point Add Mode

From [Edit] pull-down menu, click and select [Point Add Mode] to enter Point Add Mode. In Point Add Mode, a point is added to the tail end of the point data string when a point type button is pressed in the Basic Operations Area.

■ Point Insert Mode

From [Edit] pull-down menu, click and select [Point Insert Mode] to enter Point Insert Mode. In Point Insert Mode, a point is inserted in front of the point where the cursor is placed when a point type button is pressed in the Basic Operations Area.

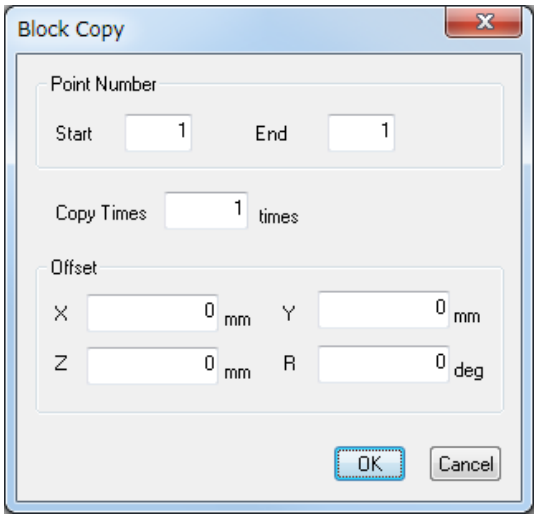
■ Delete Point

Click [Delete Point] on the [Edit] pull-down menu. The point data where the cursor is placed is deleted.

■ Block Copy*

Block copying is done with single point units. Select a cell and click [Block Copy] on the [Edit] pull-down menu. The “Block Copy” dialog appears.

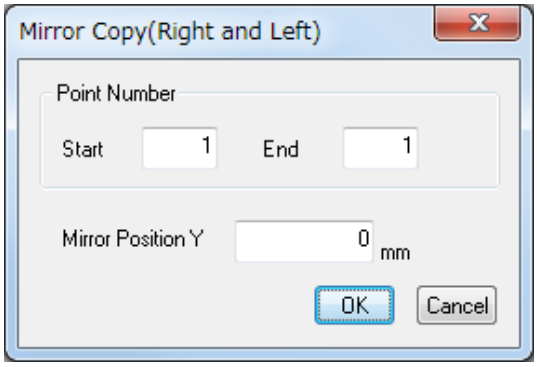
Specify the point range for the copy source, copy count (number of copies), the offset amount, and click [OK]. The copied point(s) are inserted directly behind the copy source points.



■ Mirror Copy (Right and Left), Mirror Copy (Front and Back)*

Mirror copying is done with single point units. Select a cell and then click [Mirror Copy (Right and Left)] from the [Edit] menu. The “Mirror Copy (Right and Left)” dialog appears.

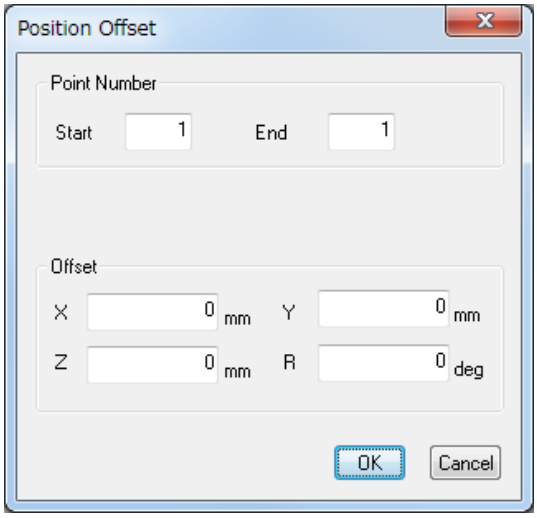
Specify the point range for the copy source and the mirror position and click [OK]. The copied points are inserted directly behind the copy source.



■ Position Offset*

Offset the position with single point units. Select a cell and click [Position Offset] from the “Edit” menu. The “Position Offset” dialog appears.

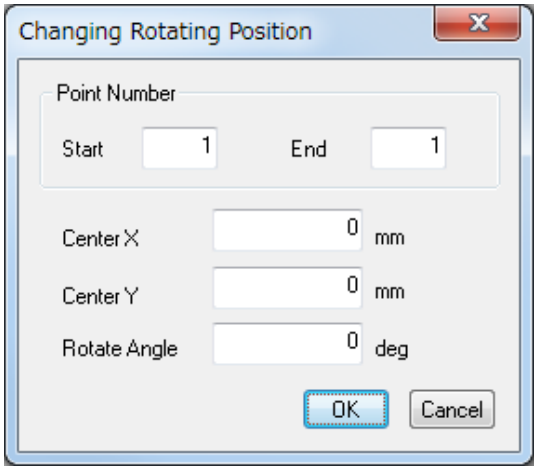
Specify the position range and offset amount for the point you want to offset and click [OK]. The coordinates for the designated point are converted.



■ Block Rotation*

Coordinates are converted with single point units. Select a cell and click [Block Rotation] on the “Edit” pull-down menu. The “Block Rotation” dialog appears.

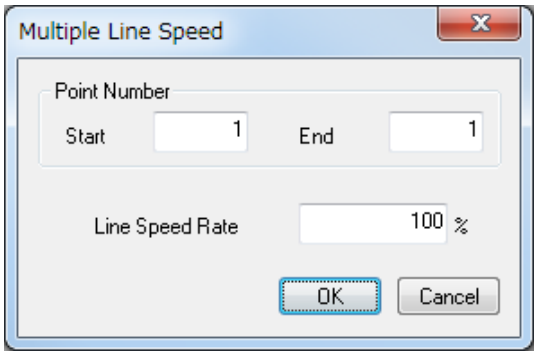
Enter the range, center of rotation, and rotation angle for the points you want to change and click [OK]. The designated point coordinates are converted.



■ Multiple Line Speed

A line speed ratio is implemented using single point units.
Select a cell and click [Multiple Line Speed] on the “Edit” pull-down menu. The “Multiple Line Speed” dialog box appears.

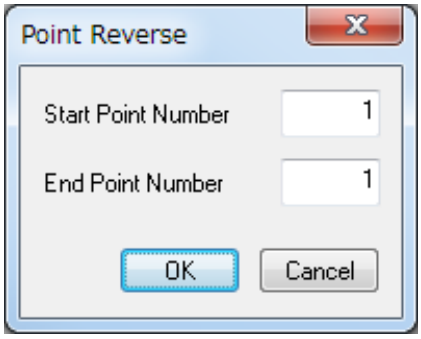
Enter the start point/end point numbers and the line speed ratio (rate). The line speed of the points included within the specified range is converted using the line speed ratio (rate).



■ Reverse Point

Use this function to reverse the order of points within a designated range.
Select a cell and click [Reverse Point] on the [Edit] pull-down menu. The “Reverse Point” dialog appears.

Enter the Start Point/End Point Numbers.
Example: Start Point Number: 3, End Point Number: 5
P1, P2, P3, P4, P5, P6 → P1, P2, P5, P4, P3, P6

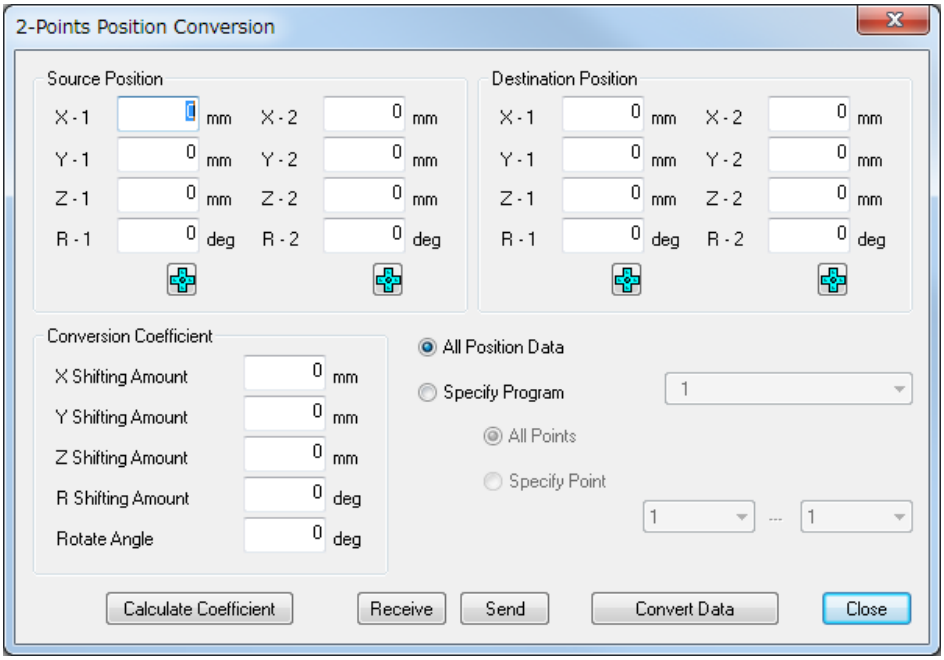


■ Convert to Relative Coordinates*

Use this function to convert the point coordinates included in the currently selected program to relative coordinates.

■ 2-Points Position Conversion*

Offset the point coordinates or rotation so as to overlap all of the lines joined up from the two points of the conversion source and the two points of the conversion destination. Select a cell and click [2 Points Position Conversion] from the [Edit] menu. The “2 Points Position Conversion” dialog appears.



You can select to specify the target data to either a program or all data.
With a Specify Program, you can select “All Points” or “Specify Point”.
After entering the two points for the conversion source position and the two points for the conversion destination position, click the [Converting Amount] button to convert and display the conversion coefficient.
Press the [Converting Data] button to apply the conversion.
You can save the conversion source position, conversion destination position and the conversion coefficient to the robot. When the robot and PC are able to interface, click the [Send] button to record this data to the robot. Also, if you click the [Receive] button, you can load the conversion source position, conversion destination position and conversion coefficient to the 2 Points Position Conversion dialog.

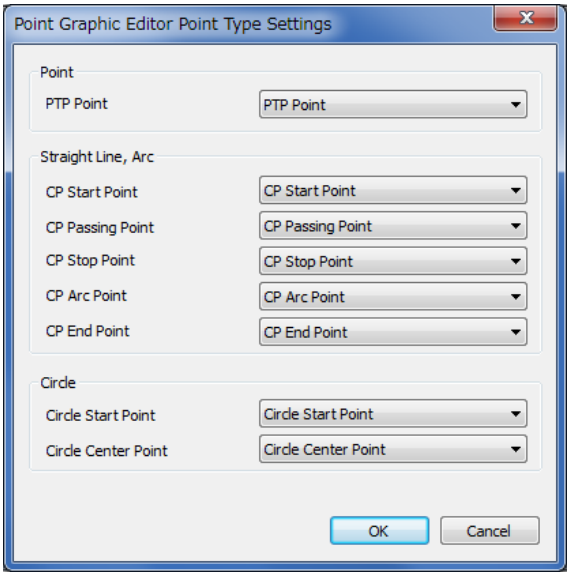
■ Edit Graphic Point

You can visually display and edit point data.
Load a DXF file or a Gerber data file, and while using the loaded data you can also teach point data. For further details, refer to “15. POINT GRAPHIC EDITOR”.

■ Point Graphic Editor Point Type Settings

Set the point type to register when entering the graphics in point graphic editor.

Click on [Point Graphic Editor Point Type Settings] from the “Edit” menu. The [Point Graphic Editor Point Type Settings] dialog appears.



NOTE:

- If there is no definition for the point type set here when a point is added, the point type for another point with the same base point type is added.
- This setting information is saved as JR C-Points II information and is not included in the C&T data file. Therefore, the list contents cannot be restored to its previous state even if the previous C&T data file is opened or JR C-Points II is started up.

■ Call up the Edit screen from the number setting items

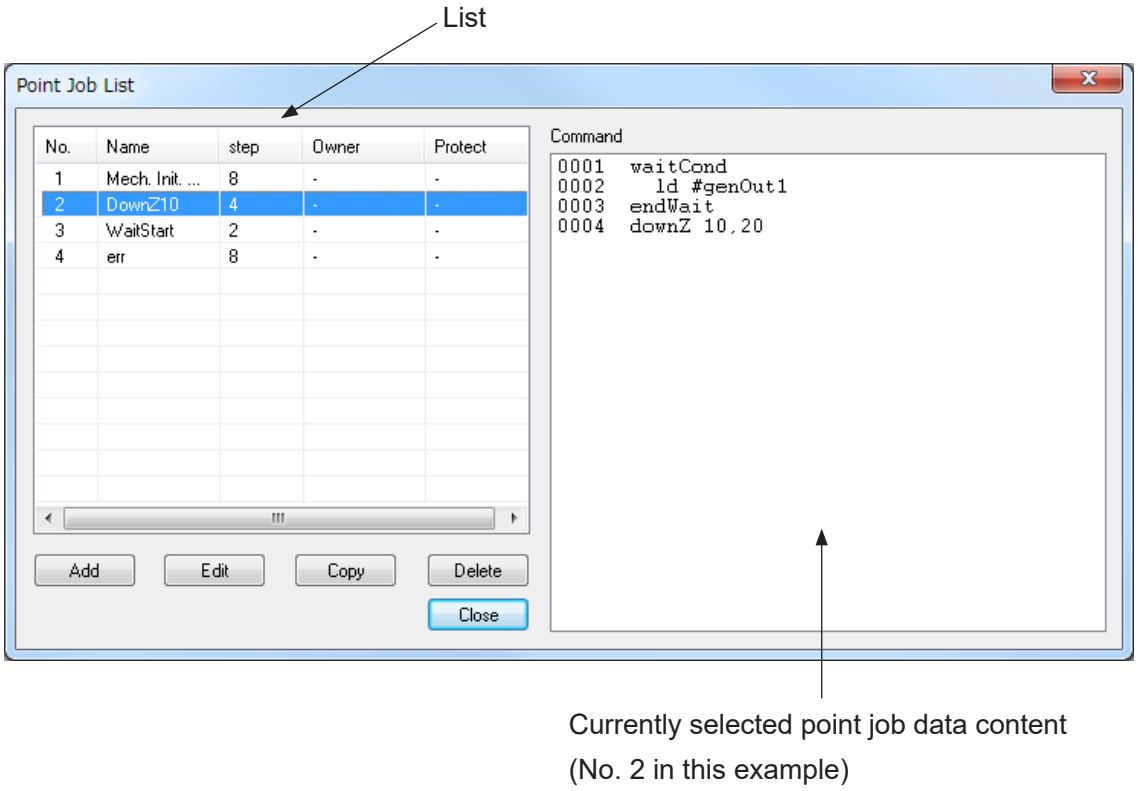
Click on the cell for each number setting, input or select the number, then right click and select [Data Edit] in the pull-down menu. The Edit screen for the corresponding number appears, and you can check and edit data.

If a number has not been set, or if the target number does not exist, the display changes to a create new data window.

10.2 Point Job Data

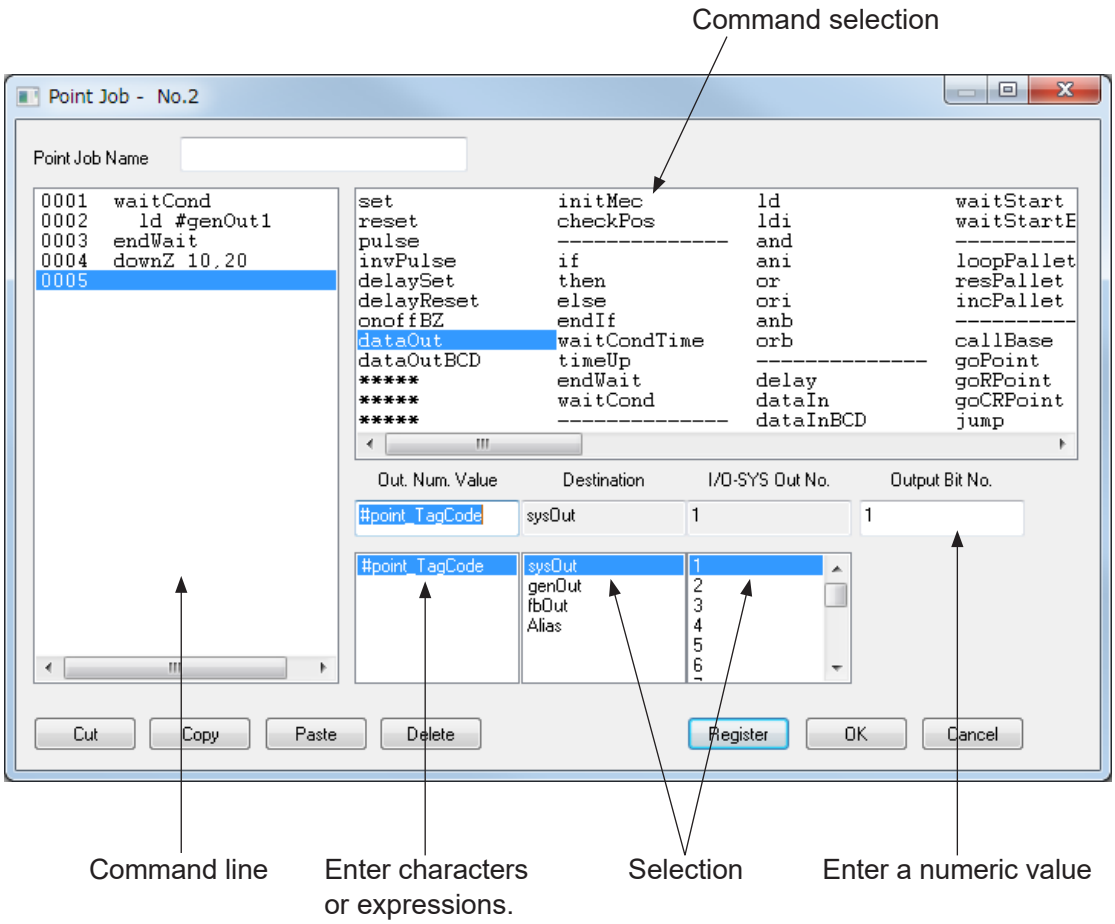
Point job data is a portion of C&T data. To create and edit point job data, you need to open the C&T data first.

Either click [Point Job] on the [Data] pull-down menu or click the icon from the tool bar. A list of the point job data appears.



10.2.1 Add

1. Click [Add] located under the list and select the point job number you want to create. You cannot select numbers which are already registered with teaching data. Once you select the number, the point job data editing dialog appears.



You can change the size of the point job data editing dialog box. Click the button on the upper right corner of the dialog box to make it full-screen. Click and drag the edge of the dialog box. Its size will change according to how much you have moved it.

2. Select (click) the command you want. The necessary parameters for the selected command can now be selected or entered.
3. Enter or select (click) the parameter(s). Numeric values, characters, and expressions can be entered directly using the keyboard.
4. Click [Register]. One command line is registered and the highlight bar shifts to the next line.

5. Repeat the above steps 2 to 4 for the commands that you want to input.
6. After entering all the commands, click [OK].

   To name the point job data, you can use up to 40 one-byte characters.

   The above steps 2 to 6 are also used when entering Additional Function Data and PLC Program commands.

10.2.2 Edit

1. If you want to modify existing point job data, select the point job data number you want from the list and click [Edit] at the bottom. The point job data editing dialog box appears.

2. After the following operations, click [OK]:
   - Add a Command
     Select the line after the last command line (the line that contains no command) from the list on the left side of the screen, and just the same as you do for entering a command; select (click) or enter the command and the necessary parameter (s) and click [Register].
   - Insert a Command
     On the left side of the screen select the line where you want to add a command. Then, the same as you do for entering a command; select (click) or enter the command and the necessary parameter (s) and click [Register].
     A command line is inserted, and all subsequent command lines shift down.
   - Delete a Command
     On the left side of the screen, select the command you wish to delete and click [Delete]. The selected command is deleted and the proceeding commands shift up.
   - Change a Command
     Insert a new command and delete the old command.

This editing operation is also used when changing Additional Function Data and PLC Program commands.

10.2.3 Copy

When you want to create new point job data similar to existing point job data, it is convenient to make a copy and edit the copied data.
Select the point job data you want to copy from the list and click [Copy]. A selection dialog or entry dialog box for the copy destination job number appears.
Select or enter the copy destination point job number.

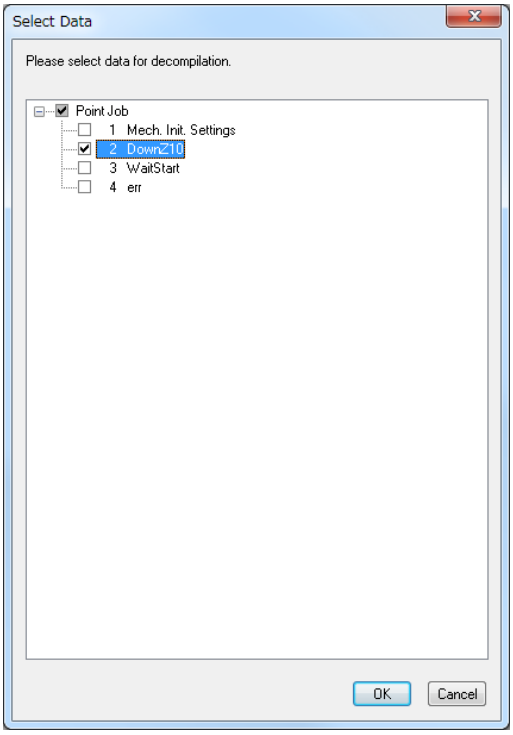
10.2.4 Delete

1. Select the point job data you want to delete from the list and click [Delete].
2. The Delete confirmation screen appears. Check that the number is correct and click [OK].

10.2.5 Decompile (Save as a Text File)

Point job data can be saved in text file format.

Click [File] on the menu bar and select [Decompile] on the pull-down menu. The dialog box shown to the right appears.
Check the point job data you want to save as a text file and click [OK].
The decompile results appear.
To save the data, click [Save As] and enter a file name. The file extension is saved as “.cds”; however, you can change it to “.txt”.



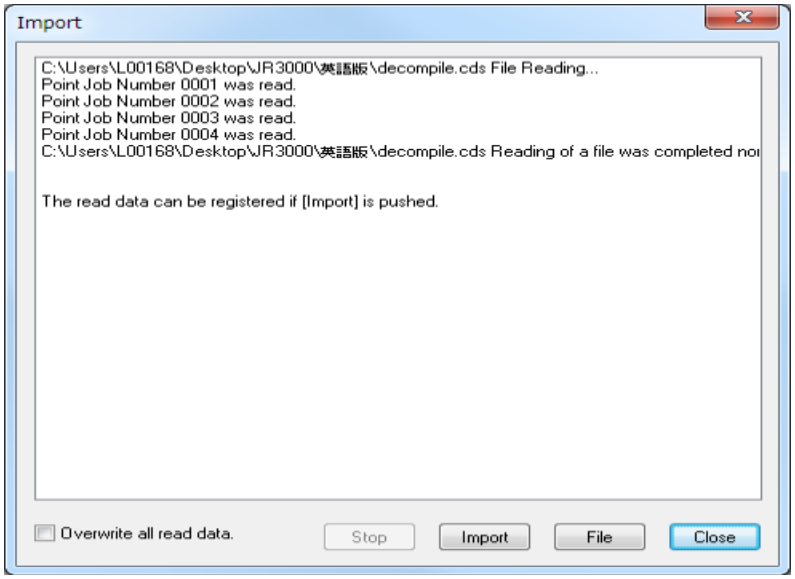
NOTE:

- Job before Moving, Job while Moving, Job after Moving, and Job while CP Moving in the Point Type Definition can be saved together with the user function data.
- Note that loading will fail if the unit of length measurement or the axis function are not the same at the time of compiling compared to the time of reverse compiling.

10.2.6 Compile (Import a Text File)

JR C-points II can read point job data saved in text file format by clicking [File] on the menu bar and selecting [Compile] on the pull-down menu.
Text files created using other applications, such as Microsoft Word® can also be loaded. (However, note that the data format must be the same as a “.cds” file.)

After loading the data, the dialog box shown below appears.

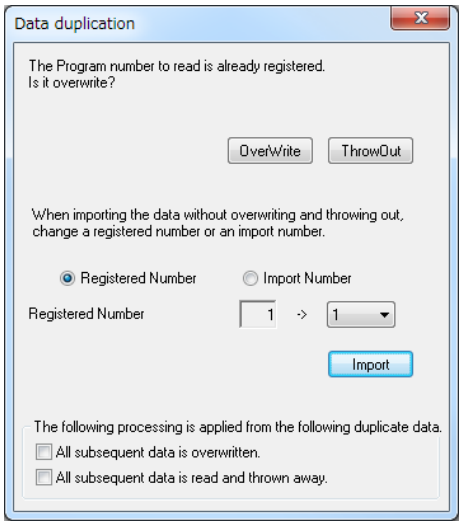


Click [File] to select the next file you want to load.
Click [Import] to register the loaded data to the currently open C&T data.
After loading the data, the Data Duplication confirmation screen shown below appears if the C&T data and the imported point job data overlap. However, if you put a check in [Overwrite all read data.] and click [Import], overwrite confirmations are not displayed and all data is overwritten.

- [OverWrite]
  The point job data currently registered is deleted, and the data being imported is registered in its place.

- [ThrowOut]
  The point job data being imported is not registered (discarded).

- [Import]
  Select (check) the program import handling method and click this button.



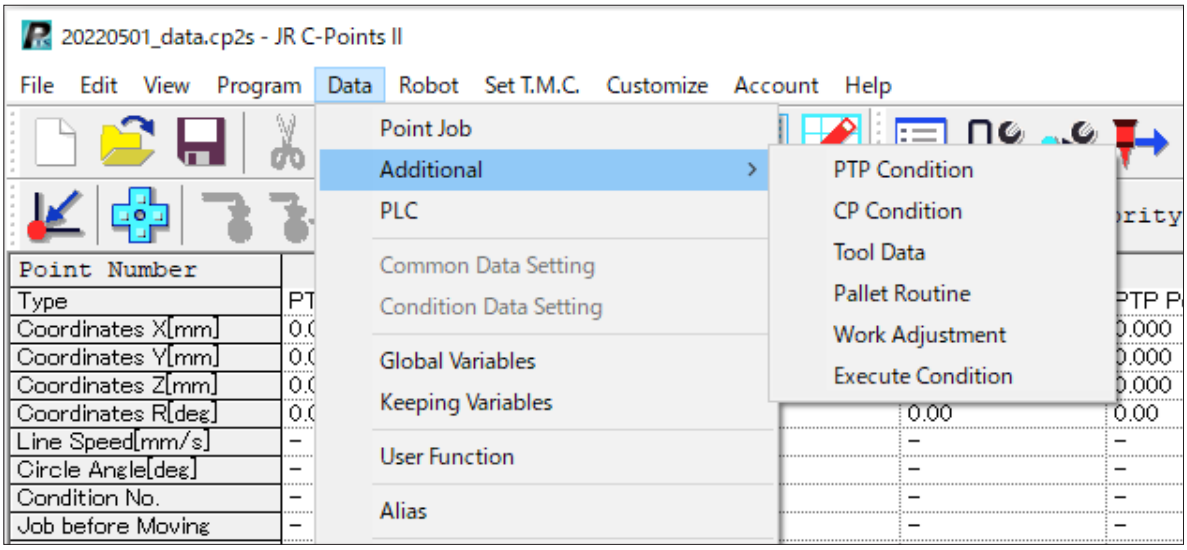
- Change the number of registered programs.
  Put a check in [Registered Number] and specify the number to which you want to change the currently registered point job data. The point job data being imported is registered with no change to its point job data number.

- Change the imported program number
  Put a check in [Import Number] and specify the number to which you want to import the point job.

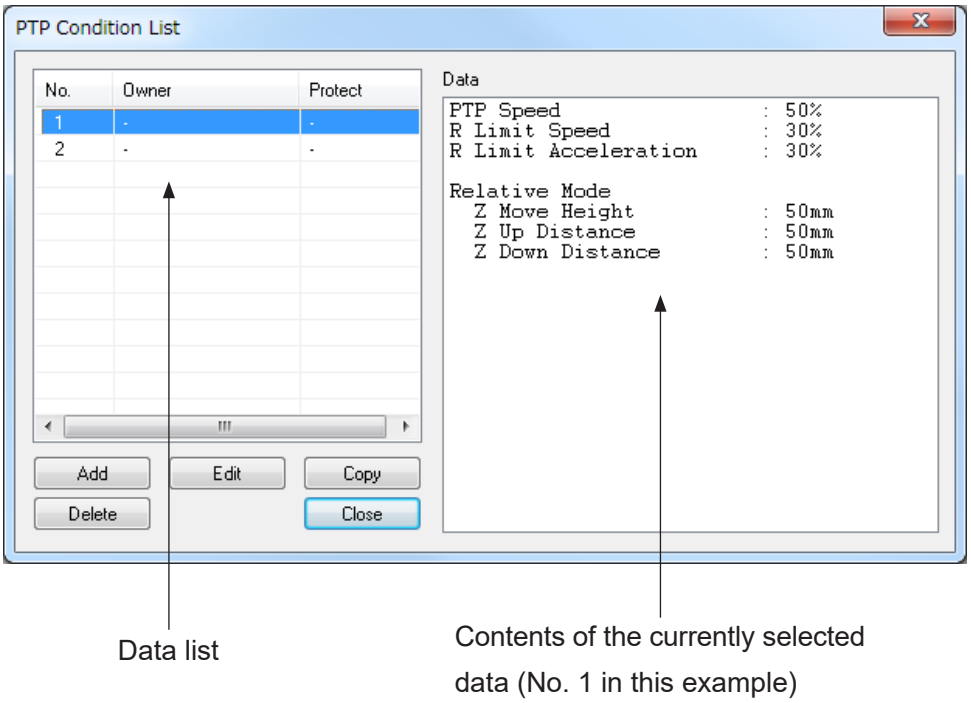
- The following processing is applicable from the following duplicate data.
  Put a check in [All subsequent data is overwritten.] to overwrite all subsequent duplicate data.
  Put a check in [All subsequent data is read and thrown away.] to dismiss all subsequent duplicate data.

10.3 Additional Function Data

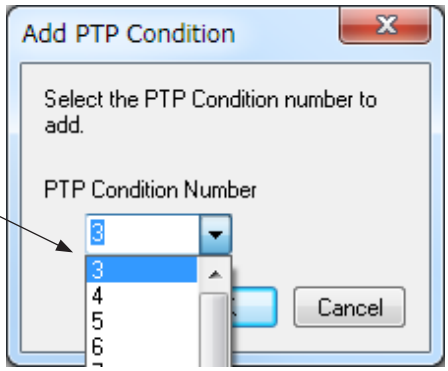
Additional function data is a part of C&T data. To create or edit additional function data, first open the C&T data.
Either click [Additional] on the [Data] pull-down menu and select the additional function data you want to create or change or select the icon ( ) from the tool bar. A list of the selected additional function data appears.



To create new additional function data, click [Add] and select the additional function data you want. To change existing additional function data, select the data number you want to change from the existing data list (on the left of the window) and click [Edit]. The edit dialog box for the additional function data you selected appears.



Click [Add] on the settings dialog box to display the unregistered number list.



10.3.1 Edit

To edit existing additional function data, select the data number you want from the existing data list and click [Edit]. The edit dialog box for the selected additional function data appears.

- [PTP Condition], [CP Condition], [Tool Data], [Pallet Routine], [Work Adjustment]
  Select or enter the item you wish to register from the edit dialog box. You can enter names for [Pallet Routine] and [Work Adjustment]. Once the name is sent to the robot, it is valid with up to 40 half-width characters on the robot side (teaching pendant display).

- [Execute Condition]
  Enter or change commands the same as you do for point job data. After entering or changing commands, click [OK] in the edit dialog box.

10.3.2 Copy

Select the additional function data number you wish to copy from the existing data list and click [Copy]. The selection or entry dialog for the copy destination additional function data number appears. Select or enter the copy destination data number.

10.3.3 Multi-Copy

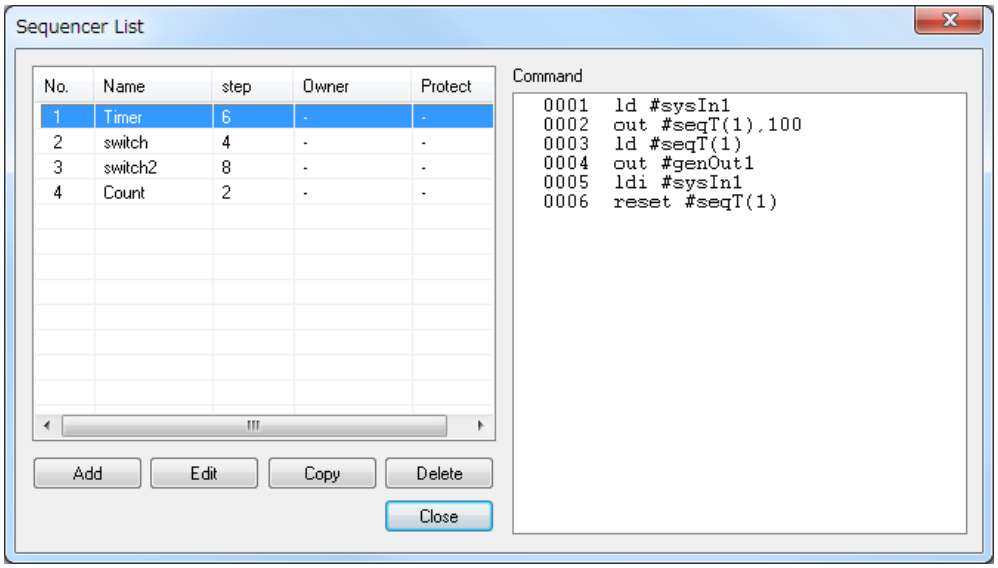
For [Work Adjustment] you can use one work adjustment and make multiple copies.
Select the additional function data you want to copy from the existing list and click [Multi-Copy].
A dialog for entering or selecting the copy destination's [Start No.] and [End No.] appears. Select or enter the additional function copy destination numbers.

10.3.4 Delete

Select the desired additional function data number you wish to delete from the existing data list and click [Delete].

10.4 PLC Programs

A PLC program is part of C&T data. Before creating and editing a PLC program, you first need to open the C&T data.
Either click [Data] on the menu bar and click [PLC] on the pull-down menu or click the icon on the tool bar. The PLC program data list appears.



10.4.1 Add

Below the list, click [Add] and select the PLC program number you want. The edit dialog box for the PLC program for the number you selected appears.

10.4.2 Edit

To edit an existing PLC program, select the data number you want from the existing data list and click [Edit]. The edit dialog box for the PLC program for the number you selected appears.
Entering or editing PLC program data is the same as with point job data. You can add a name to a PLC program. Once the name is sent to the robot, it is valid with up to 40 half-width characters on the robot side (teaching pendant display).

10.4.3 Copy

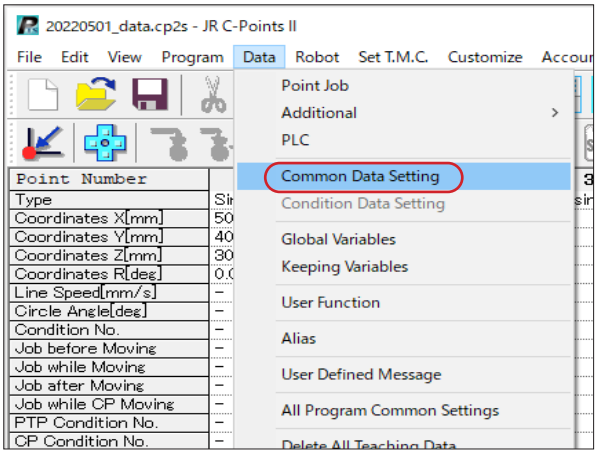
Select the PLC program number you want to copy from the existing data list and click [Copy].
Select the number for the copy destination, or enter the number and the dialog box appears.
Select or enter the copy destination data number.

10.4.4 Delete

Select the PLC program number you wish to delete from the data list and click [Delete].

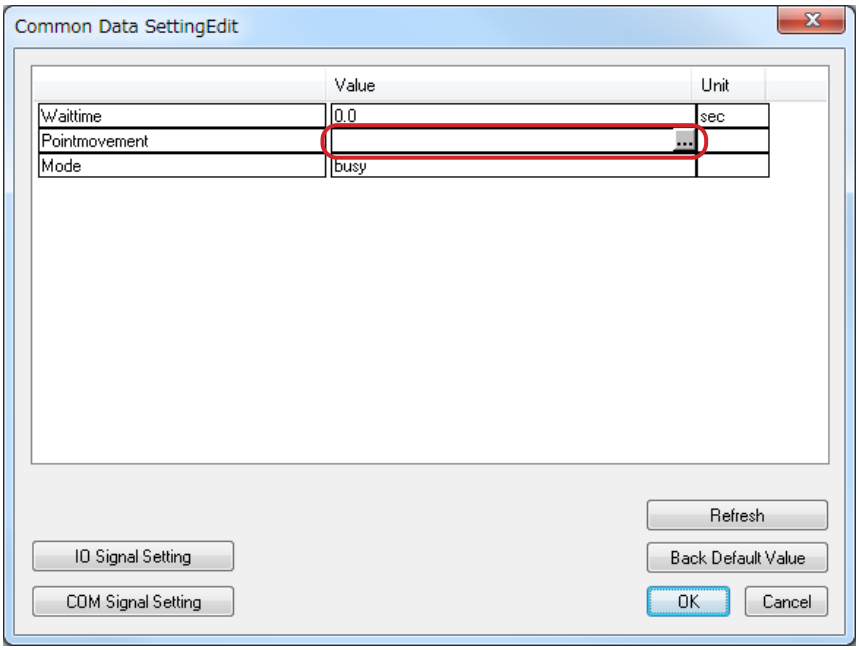
10.5 Common Data Settings

[Common Data Settings] is an item defined in Customizing Mode with items and numerical values set in Teaching Mode. [Common Data Settings] cannot be selected if not defined (the default settings for standard specification models are not defined).
Also, item names and item names set in Customizing Mode (captions) appear here. “Dispenser” for dispensing specifications and “Devices Signals” for screw tightening specifications are also considered [Common Data Settings].



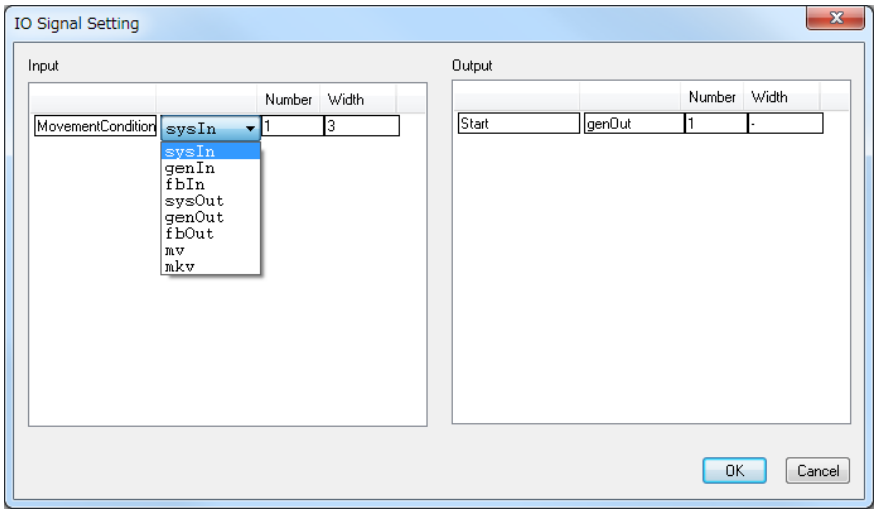
NOTE: The item appears gray when you cannot select it.

Click [Data] on the menu bar and click [Common Data Settings] on the pull-down menu. The Common Data Setting Edit dialog box shown below appears.
When you want to change the value of an item, click the corresponding value cell. If the item is categorized as Number Type, you can enter the value into the cell. If the item is categorized as [Select Type], the [▼] mark appears on the right side of the cell. Click the [▼] mark and select the item you want to set. If the item is categorized as a [String Type], the [...] mark appears on the right side of the cell. Click the [...] mark, and the edit dialog box appears. Set the items you want.



If the I/O alias settings are defined, the [I/O Signal Setting] button appears on the Common Data Setting Edit dialog. If COM alias settings are defined in Customizing Mode, the [COM Signal Setting] button appears.

Click the [I/O Signal Setting] or [COM Signal Setting] button. A signal list included in the [Common Data Settings], similar to the one below, appears.
If you want change a setting, click the column for the signal you wish to change. If the item is categorized as [Number Type], you can enter the value. If the item is categorized as [Select Type], the [▼] mark appears. Click the [▼] mark and select the item you want to set.
Note that the signal width may be unchangeable depending on the Customizing Mode settings. In this case the " – " signal appears in the column.

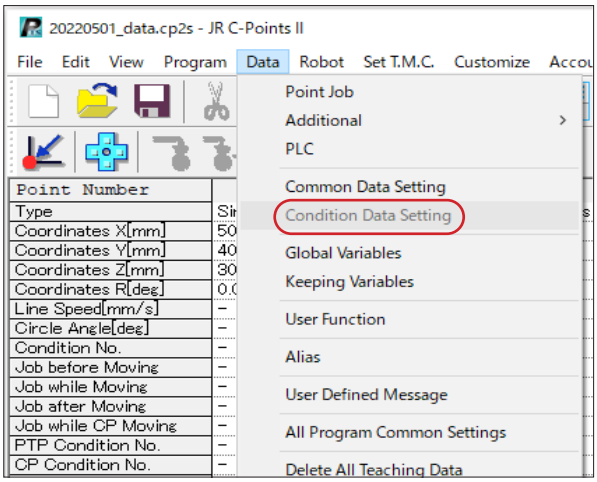


In some cases I/O-SYS (sysIn and sysOut) and Fieldbus (fbIn and fbOut) signal functions are pre-assigned. To use these signals for something other than such pre-assigned functions, it is necessary to change the function assignment of the All Program Common Settings [I/O-SYS Function Assignment] or [Field Bus Function Assignment] to [Free].

10.6 Condition Data Settings

[Condition Data Settings] is an item defined in Customizing Mode. If it is not defined (such as with the default setting for standard specifications), you cannot select this item (from the menu).
Item names and item names set in Customizing Mode (captions) appear here. "Devices Signals" for screw tightening specifications, are not program individual settings, but they are [Common Data Settings].

Click [Data] on the menu bar and click [Condition Data Setting] on the pull-down menu. A list of condition data settings appears.



NOTE: The item appears gray when you cannot select it.

10.6.1 Add

Click the [Add] button below the list, and select a number from the unregistered number list. The condition data settings dialog for the selected number appears.

10.6.2 Edit

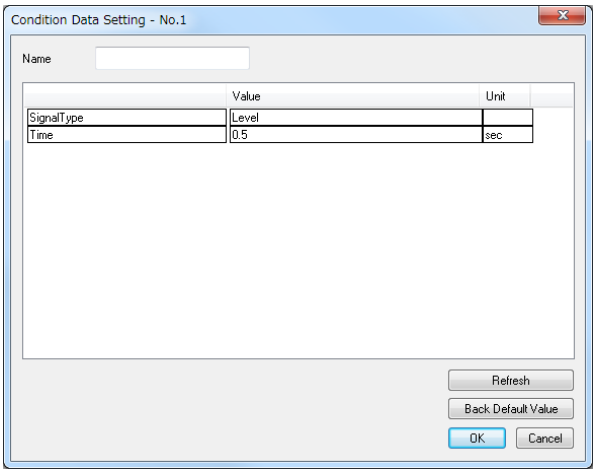
To edit existing condition data, select the condition data number you want from the existing data list and click [Edit]. The condition data settings dialog for the selected number appears.

10.6.3 Copy

Select the condition data number you want from the existing data list and click [Copy]. The Copy Condition Data dialog box will appear. Select or enter the copy destination data number.

10.6.4 Delete

Select the condition data number you wish to delete from the list and click [Delete].



When you want to change a parameter value, click the corresponding “value” cell. If the item is categorized as [Number Type], you can enter the value into the cell. If the item is categorized as [Select Type], the [▼] mark appears. Click the [▼] mark and select the item you want to register. If the item is categorized as [String Type], the [...] mark appears. Click the [...] mark, and the edit dialog box appears. Set the item you want.
You can also enter a name for the condition data. Up to 40 one-byte characters can be used.

10.7 Identifiers

Identifiers are the names given to each set of data. These are needed for all of the following types of data: Common Setting Variables, Condition Setting Variables, Program Setting Variables, Point Type Definitions, Global Variables, Keeping Variables, User Functions, and Aliases, etc.
Also note that you cannot have duplicate identifiers within the same C&T data.

- You can use up to 40 characters from a combination of uppercase letters, lowercase letters, numbers, and underbars. You cannot use blank spaces.

NOTE: Make sure to use a uppercase letter for the starting character. Also, you cannot use full-width characters.

- Even if the data type is different, you cannot have data with a duplicate identifier. For example, if you have the identifier “Time” for a common setting variable, you cannot define a keeping variable with the identifier “Time”.

- Even from a different account you cannot have a duplicate identifier. If the identifier you entered is not accepted, there is a possibility this identifier is already being used by a different account.

- Identifiers and captions are different. Captions are names used to make displays easy to understand. You are able to use duplicate captions.

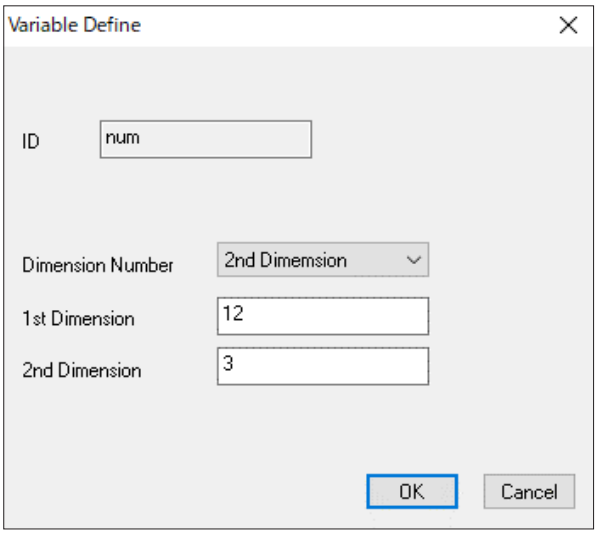
10.8 Variables

You can define variables which are useable within point job data.
Click [Data] on the menu bar and then select [Global Variables]/[Keeping Variables] from the pull-down menu. Once selected, a list of variables appears. If you want to define a new variable, click [Add] and enter an identifier. If you want to edit an existing variable, select the variable you want to edit from the list and click [Edit].
You can also copy or delete variables from the list by selecting [Copy] or [Delete] respectively.

You can define up to 100 “Global Variables”/“Keeping Variables” respectively.

A variable can be defined from an element to a 3 dimensional array.

(1) Element
(2) 1st Dimension
(3) 2nd Dimension
(4) 3rd Dimension

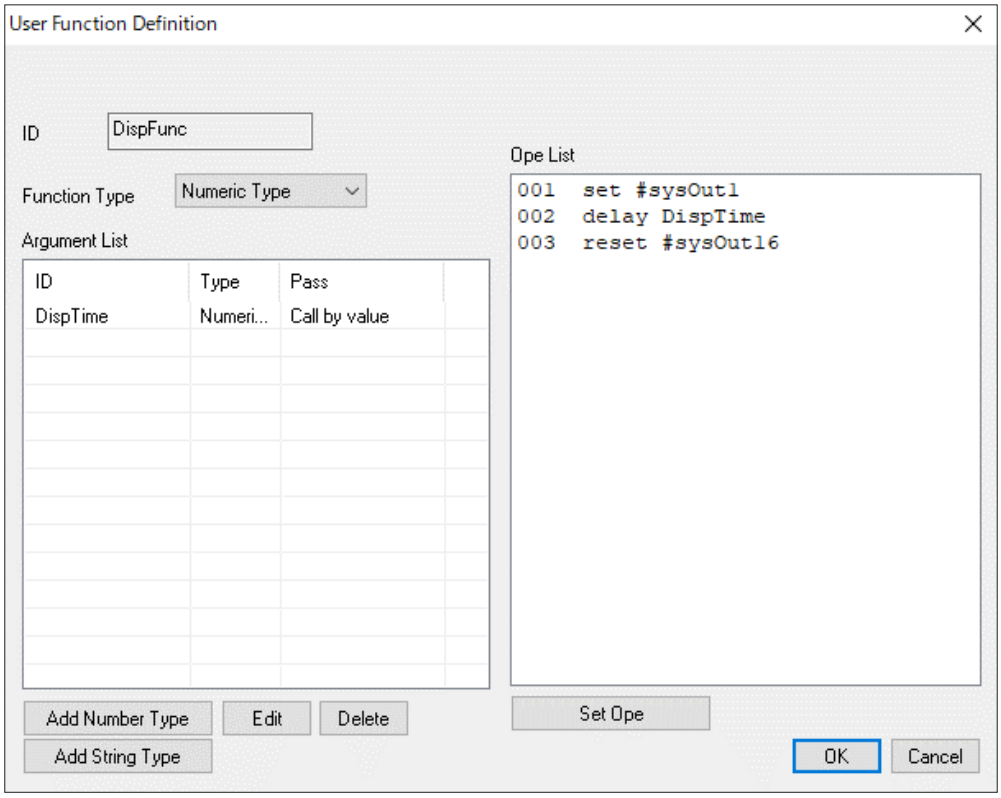


- Variables are classified into two types; local variables and global variables. Local variables are declared by the *declare* command and only retain values of point job data which include *declare* commands. Global variables are the opposite of local variables and can be referred to from any program and any point. All variables other than local variables declared by *declare* commands are global variables.
- Keeping variables are variables that maintain their values even when the power is turned OFF. Keeping values defined here are global variables that maintain their values.

10.9 User Functions

You can define functions which are useable within point job data.
Click [Data] on the menu bar and select [User Functions] from the pull-down menu. Once selected, a list of functions appears. If you want to define a new function, click [Add] and enter an identifier. If you want to edit an existing function, select the function you want to edit from the list and click [Edit].
You can also copy and delete functions from the list by selecting [Copy] or [Delete] respectively.

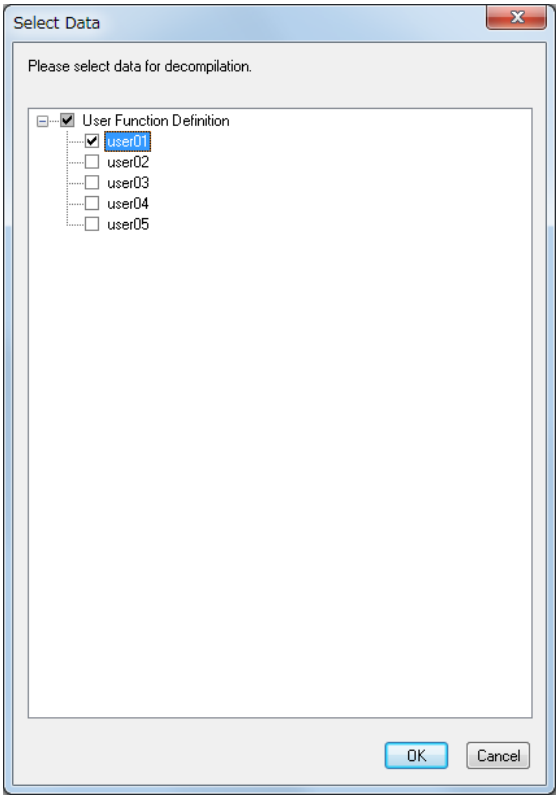
You can define up to 500 user functions.



You can set up to 100 arguments per each function.
If you want to define a new argument, click [Add Number Type]/[Add String Type] and enter an identifier. If you want to edit an existing argument, select the argument you want to edit from the list and click [Edit].
You can also delete arguments from the list by selecting [Delete].

10.9.1 Decompile (Save as Text File)

User function data can be saved in text file format. Select [Decompile] under [File] on the menu bar. A dialog similar to the one on the right appears. Check the box for the user function data you want to save in text format, then click “OK”. The result of reverse compilation appears.
To save, click on [Save] then enter the desired file name.
By default setting the data is saved with the “.cds” extension, but it can be changed to “.txt”.



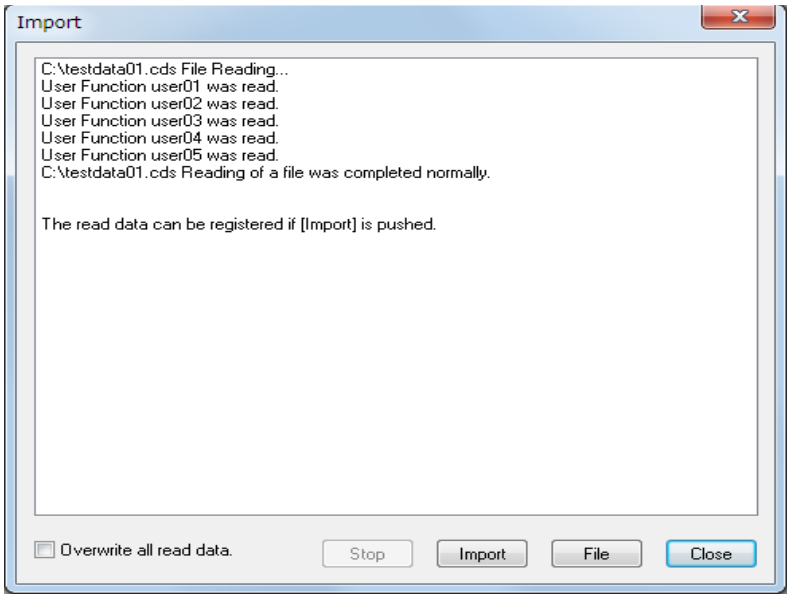
NOTE:

- Point jobs, as well as Job before Moving, Job while Moving, Job after Moving, and Job while CP Moving in the Point Type Definition can be saved together with the data.
- Note that loading will fail if the unit of length measurement or the axis function are not the same at the time of compiling compared to the time of reverse compiling.

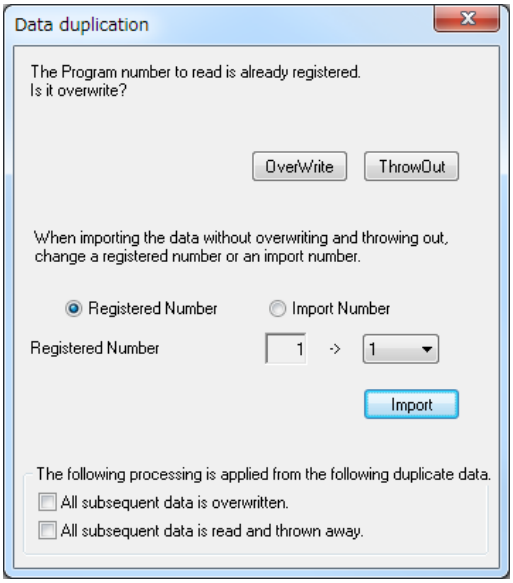
10.9.2 Compile (Load Text File)

User function data saved in text file format can be loaded using [Compile] under [File] on the menu bar. Text files created in Microsoft Word® or other text editors can be loaded in the same way (but the data format must be the same as a “.cds” file).

When a file is loaded, a dialog similar to the one below appears.



Click on [File], then text files can be loaded one after another.
Click [Load] to register the loaded data into the currently open C&T data.
If loaded data contains user function data which conflicts with the C&T data, an overwrite confirmation screen appears. However, if you check [Overwrite all with loaded data] and click on [Load], all data will be overwritten without displaying thy confirmation screen.



- Overwrite
  Delete the currently registered user function data, and register the loaded user function data.

- Dismiss
  Read and throwout the loaded user function data (it is not registered).

- Import
  Select (check) the processing method, and click.

- Change the Registered Number
  Change the number of registered user function data to the number specific under [Registered Number], then register the loaded user function data under the original number.

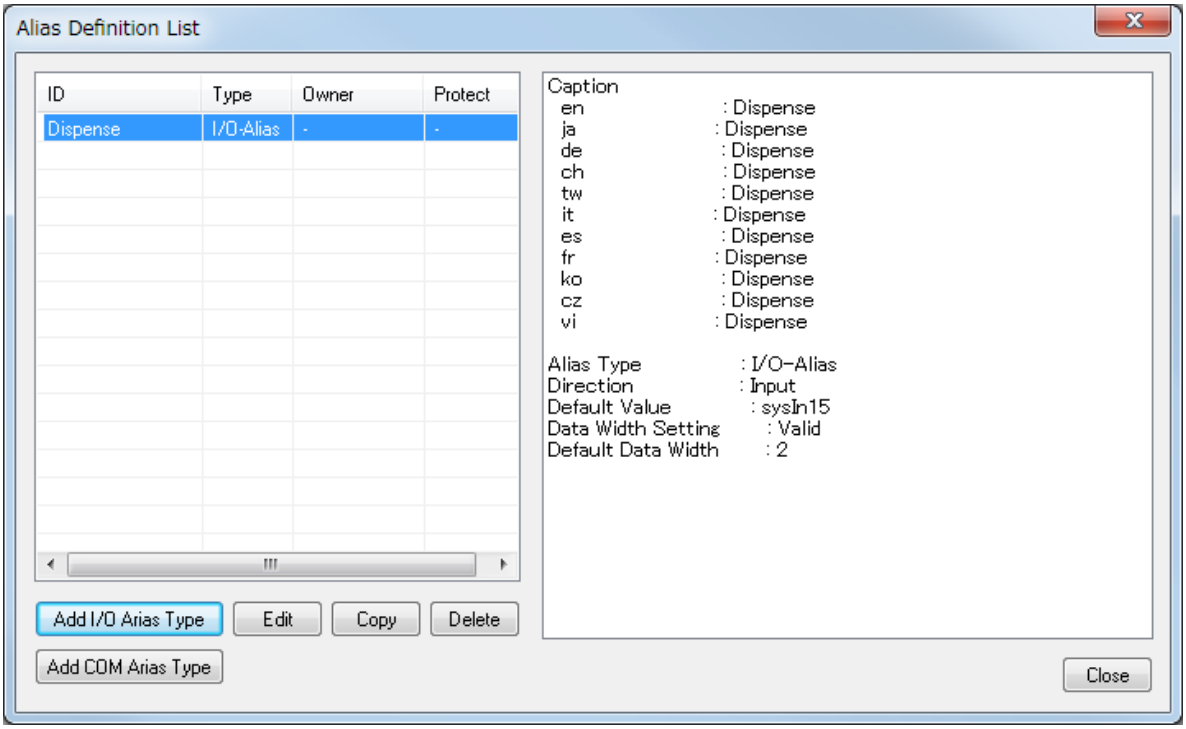
- Change the Import Number
  Change the number of loaded user function data to the number specified under “Import Number”, then register it.

- The following processing is applicable from the following data.
  Put a check in [Overwrite using all subsequent data] to overwrite all subsequent duplicate data.
  Put a check in [Dismiss all subsequent data] to dismiss all subsequent duplicate data.

10.10 Aliases

With aliases you can set names to I/O or COM signals.
Click [Data] on the menu bar and select [Alias] from the pull-down menu. Once selected, an alias list appears. If you want to define a new alias, click [Add] and enter an identifier. If you want to edit an existing alias, select the alias you want to edit from the list and click [Edit].
You can also delete aliases from the list by selecting [Delete].

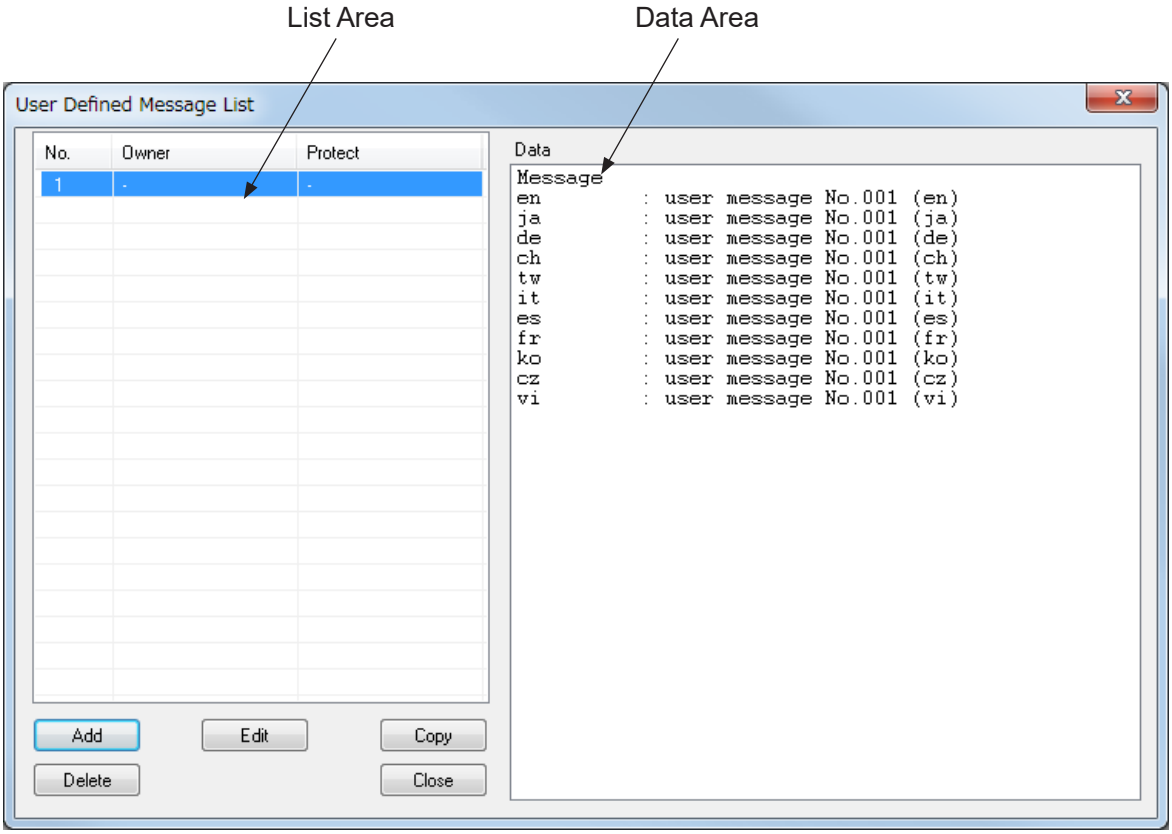
You can define up to a combined total of 100 I/O and COM aliases.



NOTE: Some I/O-SYS signals and Fieldbus signals have functions assigned to them in advance. If you want to use these signals with functions other than the ones assigned to them, you need to set All Program Common Settings [I/O-SYS Function Assignment] or [Field Bus Function Assignment] to “Free”.

10.11 User Defined Messages

You can create and edit error messages, etc., in various languages with this function.
User defined messages are a part of C&T data. To create or edit a user defined message, open the C&T data. Click [Data] on the menu bar and select [User Defined Message] from the pull-down menu. A list of user defined messages appears. Select a user defined message from the list area to display the content for that message in the data area.

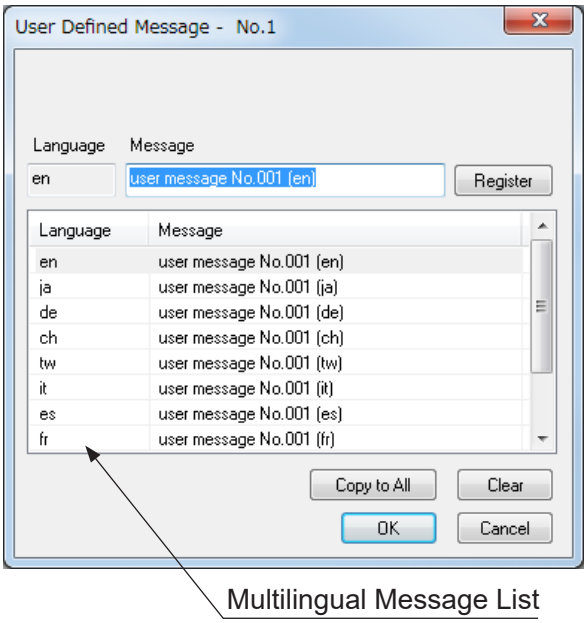


10.11.1 Add

Click [Add] from below the list area and select the user defined message number for which you want to create a message. You cannot select a number with a user defined message already registered to it.
After you select a number, the User Defined Message dialog appears.

10.11.2 Edit

If you want to edit an existing user defined message, select the message you want to modify from the list and click [Edit]. A dialog for editing the user defined message of the selected number appears.



Languages

en: English
ja: Japanese
de: German
ch: Simplified Chinese
tw: Traditional Chinese
it: Italian
es: Spanish
fr: French
ko: Korean
cz: Czech
vi: Vietnamese

By default setting, “user message No. 001 (xx)” (“xx” indicates the language) is set as the message. Select the language you want to edit from the multilingual message list, enter the message and click [Register] to register the message. If you want to copy the message to all languages, enter the message and click [Copy to All]. The message that you entered is copied to the Message column for all languages.
Click [Clear] to clear the message for the selected language.

10.11.3 Copy

Select the user defined message you want to copy from the list and click [Copy].
Select or enter the copy destination number into the dialog that appears. The user defined message you selected from the list is copied to the destination number you selected.

10.11.4 Delete

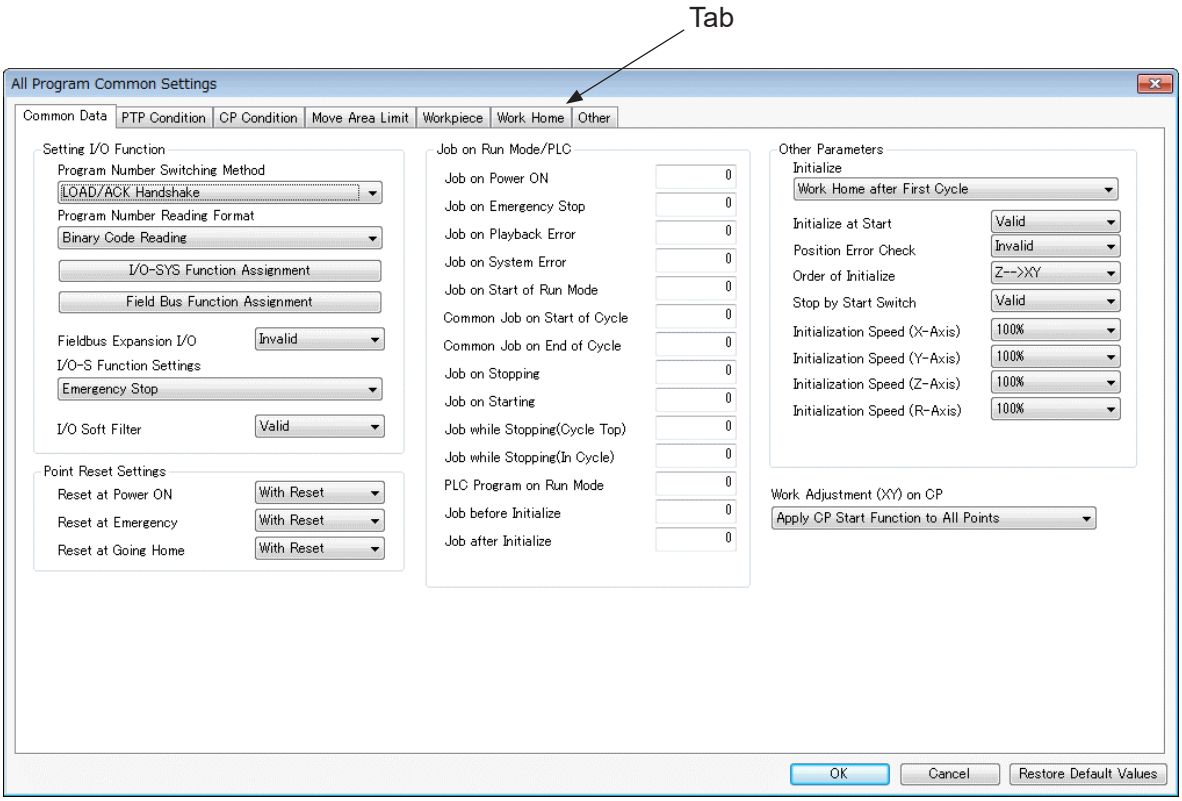
Select a user defined message from the list and click [Delete].
The user defined message you selected is deleted.

10.12 All Program Common Settings

All Program Common Settings is a part of C&T data. To set All Program Common Settings, you must first open the C&T data.

Select and change the settings for the item you want.

(See the operation manual *Functions III* for details about each parameter.)



NOTE: The items that appear on this screen vary depending on the robot model you are using.

■ Restore Default Values

This resets All Program Common Settings to their default values. You can set the All Program Common Settings default values in [Set T.M.C.] → [Default All Program Common Settings].

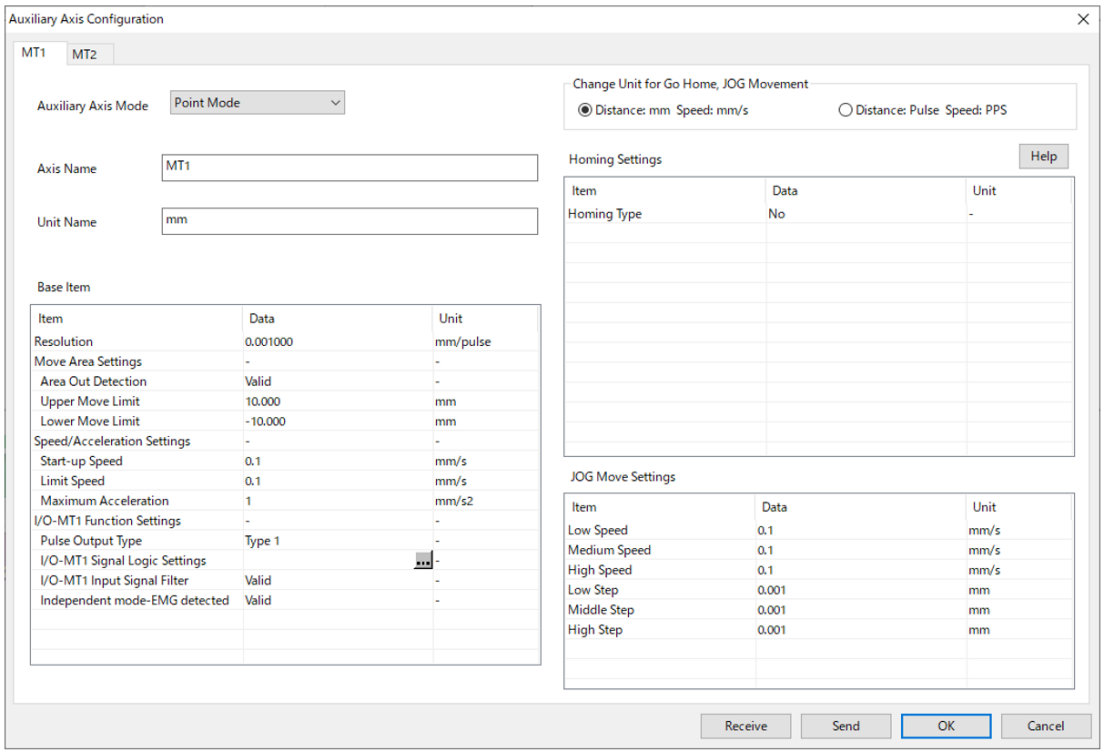
NOTE: The items related to mechanical initializations are different for JC-3 absolute encoder models and JS3 Series.

10.13 Auxiliary Axis Configuration

Here you can make auxiliary axis settings. Click [Data] from the main screen and click [Auxiliary Axis Configuration] to display the Auxiliary Axis Configuration screen. However, this screen is not displayed if the robot is not equipped with an auxiliary axis. Refer to the operation manual *Auxiliary Axis Functions* for further details.

■ MT1/MT2 Tab

Make settings for the MT1 or MT2 auxiliary axis using these tabs.



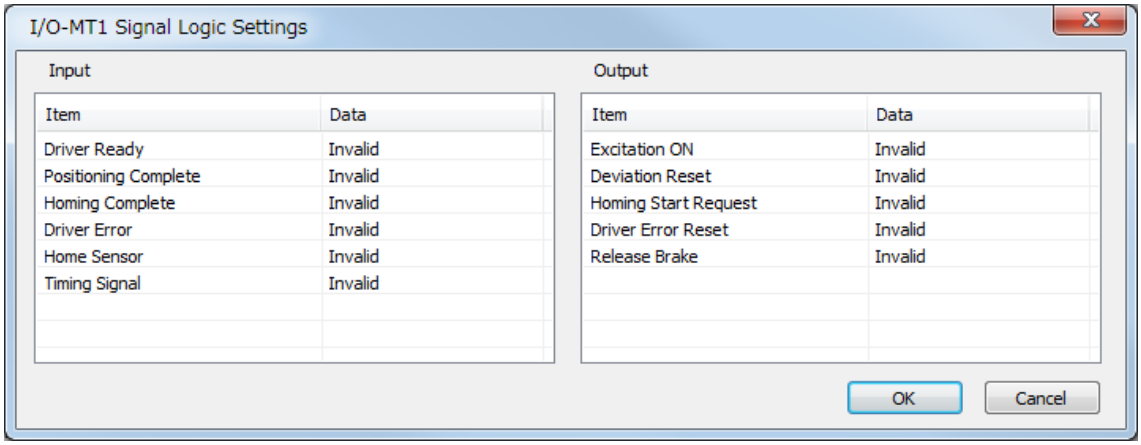
- Auxiliary Axis Mode
  - [Point Mode]
    If this mode is selected, it operates based on the coordinate values set in the point data in the program during operation.
  - [Independent Mode]
    This mode allows to perform the auxiliary axis operation independently (asynchronously) from the X, Y, Z, or R axes.
    The operation command methods are point job or PLC program.

- Axis Name
  Enter display names for the axes. Depending on the characters used, you can enter 10 to 20 characters for each display name.

- Unit Name
  Enter the measurement unit name here. Depending on the characters used, you can enter 10 to 20 characters for the unit.

- Base Item
  Set the fundamental auxiliary axis settings, such as the resolution, and speed/acceleration settings, etc. Click the [...] button to display the I/O-MT1 Signal Logic Settings dialog. Refer to the next page for details on “I/O-MT1 Signal Logic Settings”.

- I/O-MT Signal Logic Settings
  Set the required I/O functions for the axis movements and homing operation. You can set each I/O to disabled / positive logic / negative logic.



- Change Unit for Go Home, JOG Movement
  For the unit display, you can switch between either a “unit display” or a “pulse display”. (If you select “Pulse Display”, you cannot edit values.)

- Homing Settings
  Settings for homing movements. Press the [Help] button to display the Homing Settings help screen.

- JOG Move Settings
  Settings for JOG movements.

- Receive
  Import the auxiliary axis configuration data from the robot.

- Send
  Export the auxiliary axis configuration data from the PC to the robot.

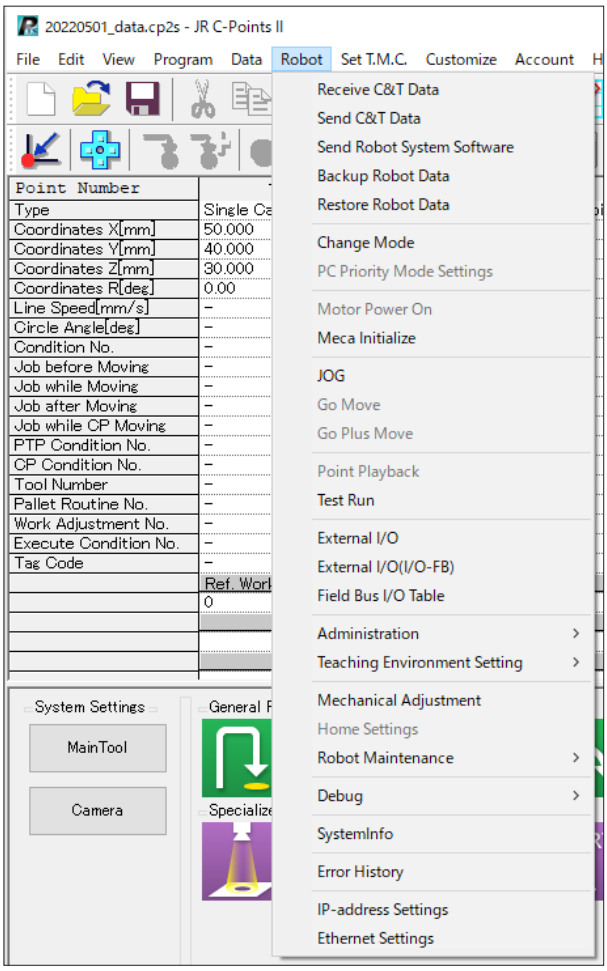
- OK
  Save the auxiliary axis configuration data and return to the main screen.

- Cancel
  Return to the main screen without saving the auxiliary axis configuration data set here.

11. ROBOT OPERATION VIA PC

To establish communication between the PC and the robot or to operate the robot via the PC, click [Robot] on the menu bar and open the pull-down menu shown below.

Example: JR3000 Series



NOTE:

- If operating a JR3000/JC-3 Series from JR C-Points II, you need to set the robot to Teaching Mode from [Change Mode]. For further details, refer to "12.1 Changing Modes".
- If operating a JS3 Series from JR C-Points II, you need to set the robot to Run Mode and switch PC Priority Mode to ON. For further details, refer to "7. CHANGING MODES" in the operation manual *Basic Instructions.*

⚠ Caution

Confirm the tool tip will not interfere with the workpiece before operating the robot.
Operating the robot without checking the tool height can cause breakdown.

11.1 Mechanical Initialization (JR3000 / JC-3 Series Only)

This initializes the robot.
Either click [Robot] on the menu bar and select [Meca Initialization] on the pull-down menu or click the icon on the toolbar. The robot initializes. If the robot is not initialized after the robot is turned ON, you cannot make the axes move.

NOTE: If the robot model set in JR C-Points II and the actual robot model are different, you cannot perform a mechanical initialization and you may not be able to select [Meca Initialization] from the pull-down menu. If you cannot perform a mechanical initialization or you cannot select [Meca Initialize] from the pull-down menu, refer to the status bar and check to make sure JR C-Points II is set with the correct robot model.

11.2 Return to Work Home (JC-3 Absolute Encoder Models and JS3 Series Only)

This moves the axes to the work home.
Either click [Robot] on the menu bar and select [Return to Work Home] from the pull-down menu or click the icon on the toolbar. The axes move to the work home position registered in the internal RAM of the robot unit. If you want to move the axes to the work home position saved in the JR C-Points II teaching data, send the C&T data from JR C-Points II to the robot before executing this function.

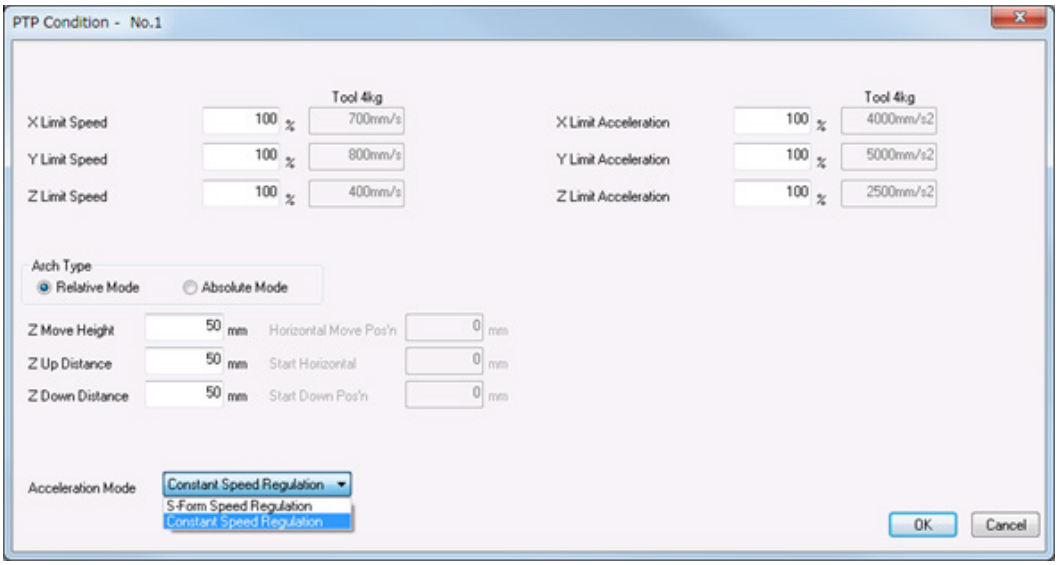
11.3 Motor Power ON (JS3 Series Only)

This turns the motor power ON.
Click [Robot] from the menu bar and select [Motor Power ON]. You cannot operate the robot unless the motor power is switched ON.

NOTE: If the robot model set in JR C-Points II and the actual robot model are different, you cannot turn the motor power ON and you may not be able to select [Motor Power ON] from the pull-down menu. If you cannot turn the motor power ON or you cannot select [Motor Power ON] from the pull-down menu, refer to the status bar and check to make sure JR C-Points II is set with the correct robot model.

11.4 Go Move

With a point selected (when the point number is highlighted after clicking on it), click [Robot] on the menu bar and click [Go Move] on the pull-down menu, or click the icon on the toolbar.
The axes move to the selected point coordinates.
With the JC-3/JS3 Series, select [GO Move] → [PTP Settings] to choose an acceleration mode from among [Constant Speed Regulation] and [S-Form Speed Regulation], as shown in the diagram below.



For details regarding [Constant Speed Regulation] and [S-Form Speed Regulation], refer to “4.1.3 GO Function” in the operation manual *Teaching Pendant Operation.*

11.5 Go + Move

With a point selected (when the point number is highlighted after clicking on it), click [Robot] on the menu bar and select [Go Plus Move] on the pull-down menu, or click the icon on the toolbar.
The axes move to the coordinates of the selected point, and the succeeding point is then selected.

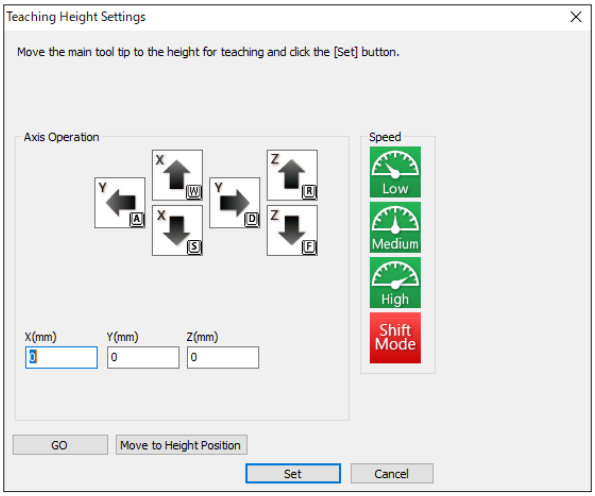
11.6 Point Playback/Test Running

Click [Robot] on the menu bar and select [Test Run] on the pull-down menu, or click the icon on the toolbar. For a point run, when a point is selected (when the point number is highlighted after clicking on it), click [Robot] on the menu bar and click [Point Playback] on the pull-down menu, or click the icon on the toolbar.
These operations are performed according to the C&T data stored in the robot RAM. If you wish to do Point Playback/Test Running using C&T data created with JR C-Points II, first you need to click [Send C&T Data].

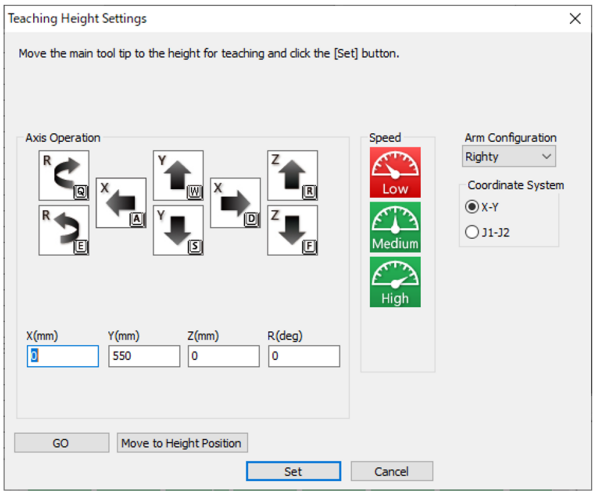
11.7 Teaching Height Settings

When the USB camera (optional) or “Type-C1(IS/AS)” camera (optional) is connected, you can teach points using the camera.
Set the height of the Z-axis when performing the point teaching with the camera.
Click on [Tool for Teaching] button in the robot operations area and select [Camera]. The [Set] button of [Teaching Height] can be selected. Click the [Teaching Height Settings] button to display the dialog below.

Example: JR3000/JC-3 Series



Example: JS3 Series



Follow the procedure below to make the necessary settings for this screen. Refer to the table on the next page for each button.

1. Use the arrow buttons in [Axis Operation] and the [GO] button to operate and move the main tool (needle, etc.), tip to the position (height) where you want to perform a job on the workpiece. For the twin table specifications, the X-L axis moves when the selected program number is odd and the X-R axis moves when the selected program number is even.
2. Click the [Set] button to save the current main tool position. The axes then move the camera to display this position. Confirm that the location set for the main tool appears using the camera.
3. If the same position is not displayed, the main tool position and camera position do not match and the main tool and camera need to be configured once again. Refer to “9. TOOL CONFIGURATION”.

After settings are made here, the tool tip is applied with the height set here while teaching with the camera.

Button	Explanation
[Axis Operation]	Click the arrows to move the axes in the directions indicated. You can also use the keyboard instead of the arrow buttons to perform these movement operations. For further details regarding [Axis Operation], refer to [Axis Operation] in “1.4 Robot Operations Area”.
[Speed]	Click these to set the speed the axes move. If you select [Shift Mode], you can use the Shift key on your PC to change speeds as follows: First hold down an arrow button and then press the Shift key to accelerate up to high speed. Hold down the Shift key and then press an arrow button to move at high speed from the start.
[Arm Configuration] (JS3 Series only)	Click the drop-down box to select the arm configuration. Select the arm configuration and click the [GO] button to move the robot to the specified coordinates using that arm configuration. You cannot select the arm configuration when the coordinate system is set to [J1, J2]; the robot automatically selects the arm configuration according to the angles of the J1 and J2 axes.
[Coordinate System] (JS3 Series only)	Select the coordinate system from [X-Y] and [J1-J2]. If you set the coordinate system to [J1-J2], the JOG axis operation keys switch from X, Y, Z, R to J1, J2, J3, J4. The coordinates in the robot operation area are also displayed using the coordinate system set here.
[GO]	Click this to move the axes to the coordinates currently displayed.
[Move to Height Position]	Click this to process and move to the tool coordinates saved with the [Set] button.
[Set]	Click this to save the current tool position and fix the value set here as the Camera TCP height.
[Cancel]	Click this to return to the previous screen.

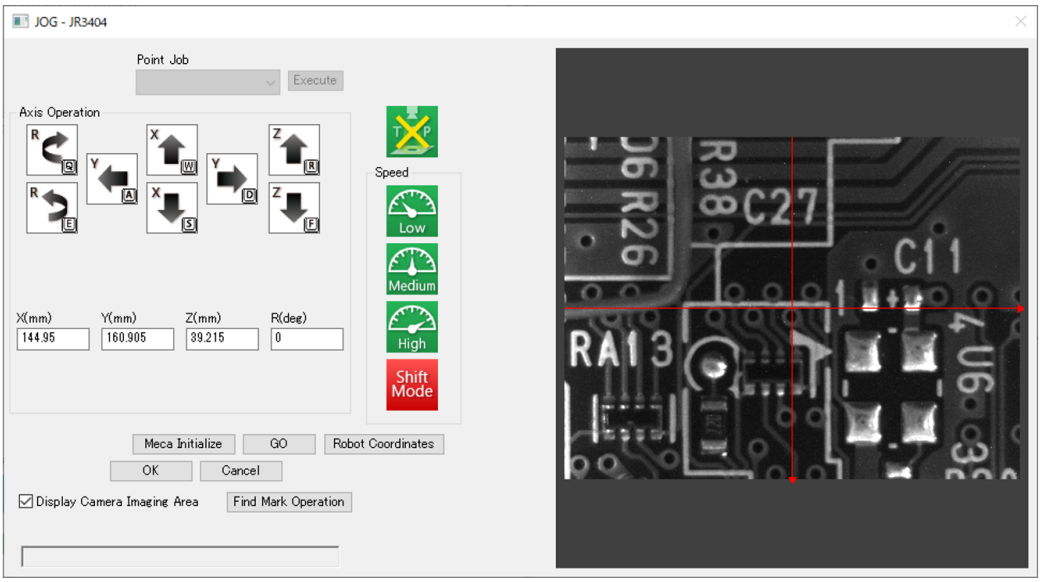
11.8 JOG

When you click the button from an individual dialog (not on the main screen), the dialog below appears.

NOTE: For information regarding when you click the button on the main screen or select [Robot] from the tool bar and click [JOG], refer to “1. PC MAIN SCREEN”.

If the camera type registered in “Camera Configuration” is [Type-C1(IS/AS)] or [USB], the camera image appears.

Example: JR3000 Series



NOTE: The items that appear on this screen vary depending on the robot model you are using.

When you click the [Execute] button of [Point Job], you can select and execute registered point job.

NOTE:

- For the twin table specifications, [X Axis Movement Target] (diagram to the right) appears at the top of the screen, so select the X axis you want to move.

- Other button operations are the same as they are for the robot operation area on the main screen. For further details, refer to “1. PC MAIN SCREEN”.
- If a JOG movement attempts to move outside of the axes movement range, the following occurs:

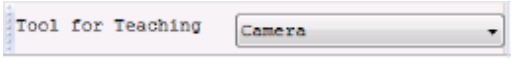
  JR3000/JC-3 Series : The buzzer sounds once, the axes stop moving, and an error dialog indicating the position is out of range appears.

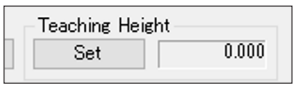
  JS3 Series : The buzzer sounds once, the axes stop moving; however, an error dialog indicating the position is out of range does not appear

11.9 Teaching Operation Using a Camera

If using this software with a USB camera (optional) or “Type-C1(IS/AS)” camera (optional) connected, you can use and refer to the camera imaging to teach points and programs. This is an example procedure on how to teach using the camera. To teach while viewing camera images, you first need to set up [Teaching Height Settings]. This enables correct teaching and main tool tip positioning (such as for the needle if using a dispensing model).

1. Set [Teaching Height Settings] to Apply the Calibrated Height.
   (1) Set the [Teaching for Tool] to [Camera] in the main screen and click the [Set] button of [Teaching Height] in the robot operations area.

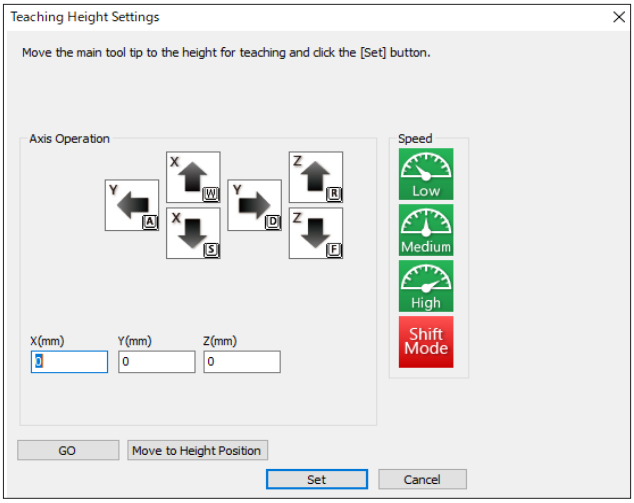
   Main screen: 

   Robot operations area: 

   (2) Use JOG operations on the Teaching Height Settings dialog to move the tool tip to the location where you want to perform the job on the workpiece. Click the [Save Height Position] button and then click [Set].
   For the twin table specifications, the X-L axis moves if the selected program number is odd, and the X-R axis moves if the selected program number is even.

NOTE: With the [Move to Height Position] button, the axes move to that registered position. The next time you perform this same operation, you do not need to perform position alignments again. Additionally, if you make a position alignment using [Teaching Height Settings] at a point, such as a CP Start Point, where you want to start teaching, you can teach using camera imaging.

Example: JR3000 Series



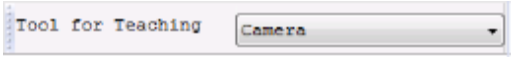
⚠ Caution

Confirm the tool tip will not interfere with the workpiece before operating the robot. Operating the robot without checking the tool height can cause breakdown.

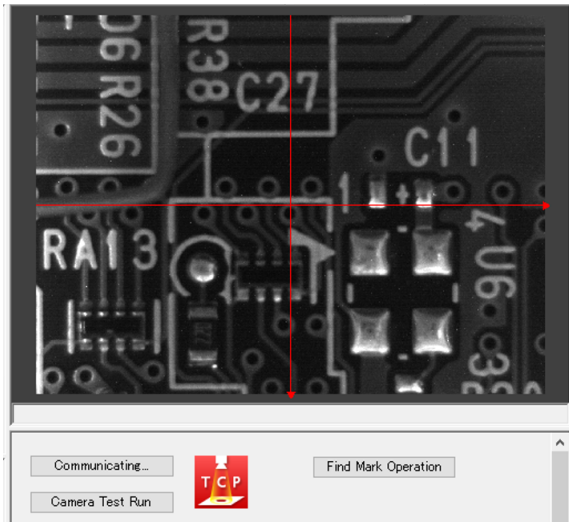
   (3) After the height is set, a confirmation screen appears. Click [OK] to move the camera to the location where the tool tip was pointing.

2. Teaching while Viewing Camera Imaging (CP movement example)

Below is an example of teaching using a CP Start Point, CP Passing Point, and CP End Point. Teaching is made with the [Tool for Teaching] still set as [Camera].



(1) Move the XY coordinates in the camera image using JOG operation to where you want to start the CP movement. After making the movement, click the CP Start Point button to add and set that point type with the coordinates from the center of the camera image to the program.



Point Number	1
Type	CP Start Point
Coordinates X[mm]	234.828
Coordinates Y[mm]	180.920
Coordinates Z[mm]	110.000
Line Speed[mm/s]	10.0
Circle Angle[deg]	–
Condition No.	–
Job before Moving	–
Job while Moving	–
Job after Moving	–
Job while CP Moving	–
PTP Condition No.	–
CP Condition No.	–
Tool Number	–
Pallet Routine No.	–
Work Adjustment No.	–
Execute Condition No.	–
Tag Code	–

(2) Next, move the XY coordinates in the camera image to where you want to set a CP Passing Point. Click the CP Passing Point button to add it to the program.

(3) Lastly, move the XY coordinates in the camera image to where you want to set a CP End Point. Click the CP End Point button to add it to the program.

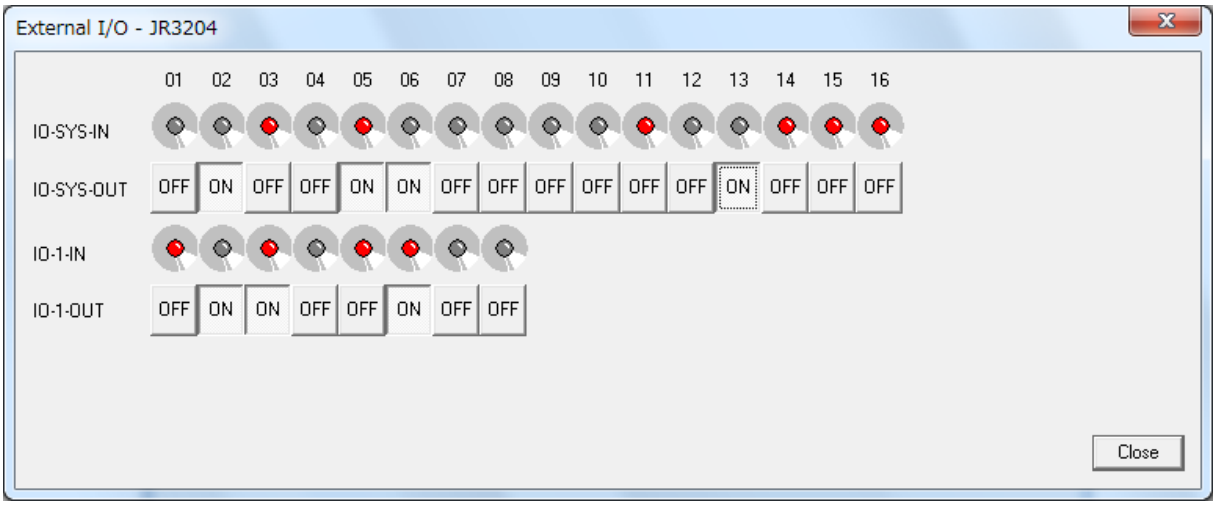
Teaching can be performed by looking at the above camera image and operating the CP movement to connect the 3 points.

Point Number	1	2	3
Type	CP Start Point	CP Passing Poi	CP End Point
Coordinates X[mm]	234.828	233.323	297.278
Coordinates Y[mm]	180.920	314.625	325.410
Coordinates Z[mm]	110.000	110.000	110.000
Line Speed[mm/s]	10.0	10.0	–
Circle Angle[deg]	–	–	–

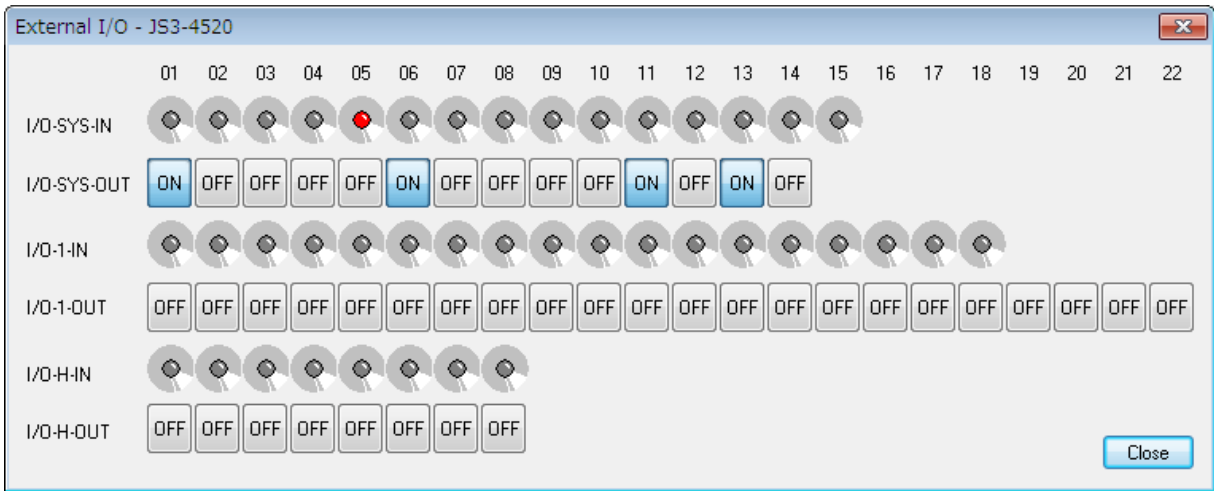
11.10 External I/O

Click [Robot] on the menu bar and click [External I/O] on the pull-down menu. The robot's current external I/O status appears.

Example: JR3000/JC-3 Series



Example: JS3 Series

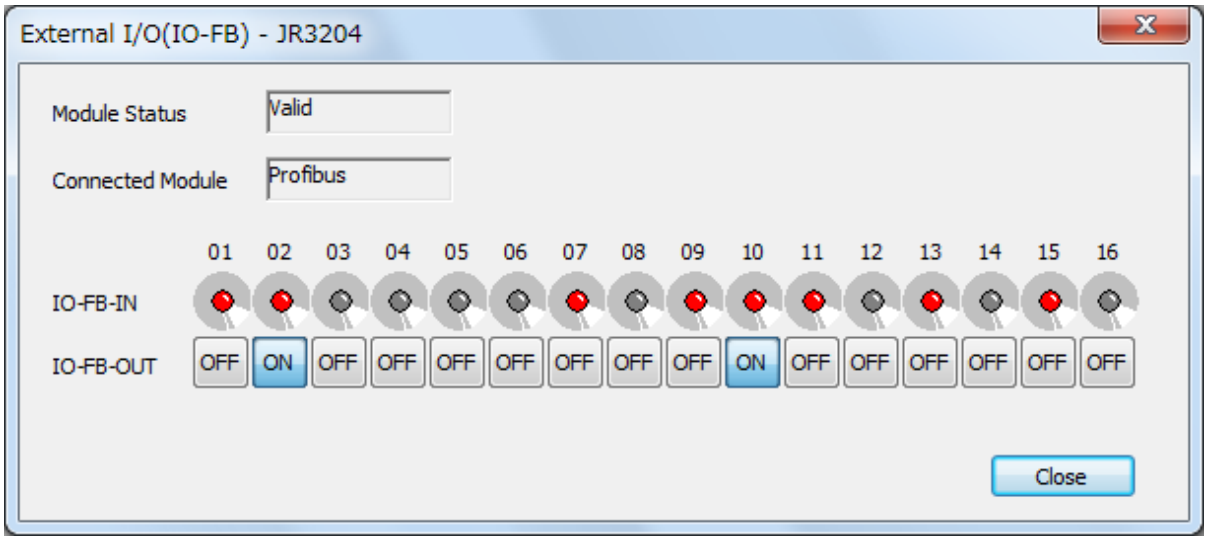


Red lamps indicate the signals currently ON.

Click the [ON] and [OFF] buttons on the dialog box to turn the output signals ON and OFF.

11.11 External I/O (I/O-FB)

From [Robot] on the menu bar select [External I/O (I/O-FB)] on the pull-down menu. The status of the Fieldbus I/O range used for the robot's function assignments appears.



Red lamps indicate the signals currently ON.
Click the ON and OFF on the dialog box to turn the output signals ON and OFF.

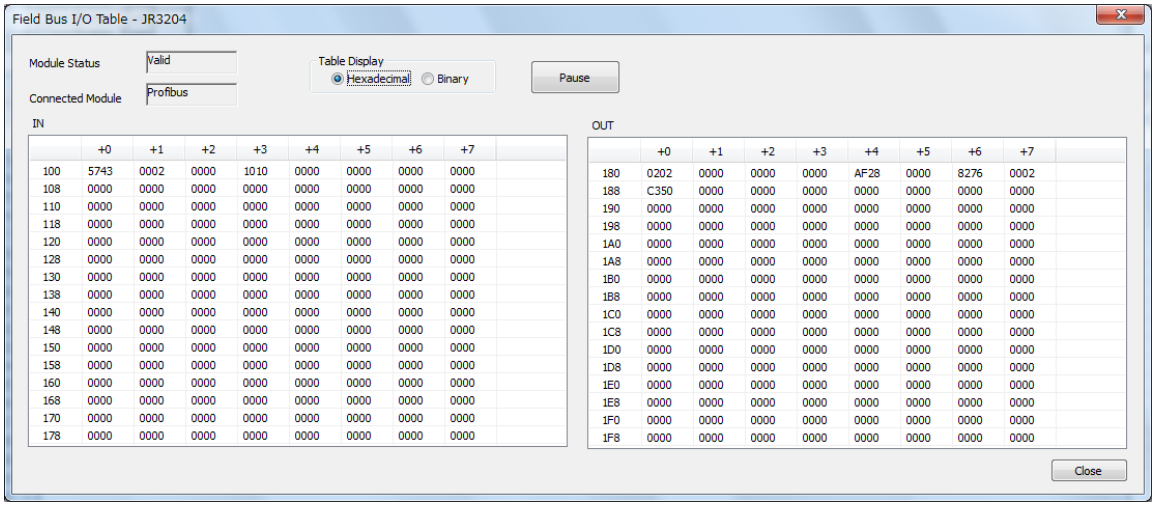
11.12 Fieldbus I/O Display

From [Robot] on the menu bar select [Field Bus I/O Table] from the pull-down menu. The Fieldbus I/O statuses for all areas of the robot appear. This dialog is only a display. You cannot set values here.

Depending on the display format, you can switch between hexadecimal and binary displays.

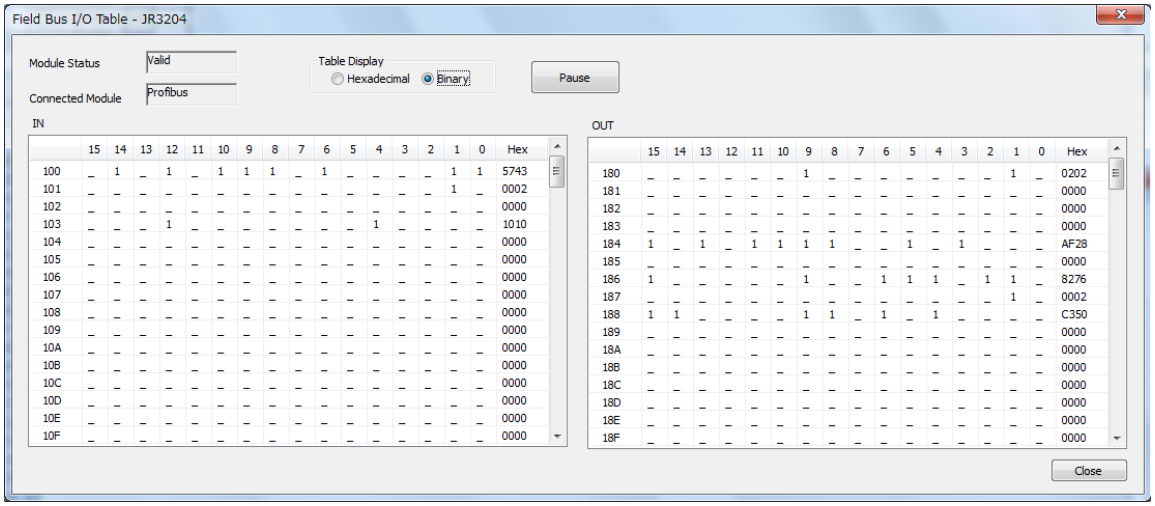
If you click the [Pause] button, you can stop the display updating. Press the [Pause] button again to restart updating the dialog.

■ Hexadecimal Display



With the hexadecimal display, one word appears as a hexadecimal.

■ Binary Display



With the binary display, “1” appears for every bit when it is ON, and “_” when it is OFF.

In the Hex column on the right side of the screen, one word appears as a hexadecimal.

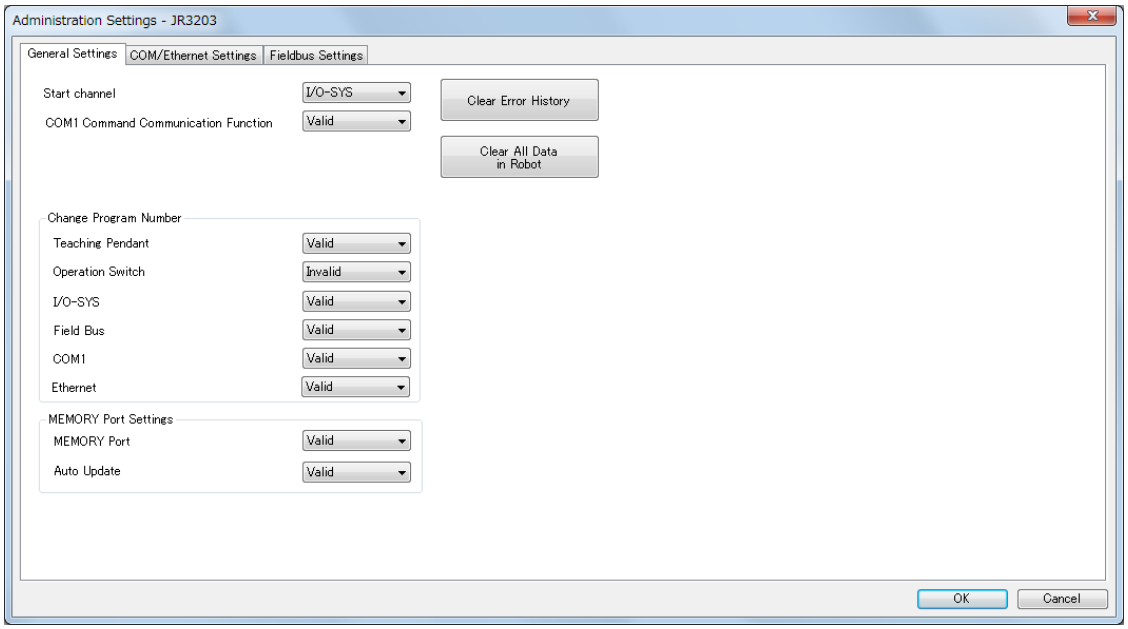
11.13 Administration

From [Robot] on the menu bar, select [Administration] on the pull-down menu and then select one of the items displayed.

11.13.1 Administration Settings

Here you can set various settings such as the robot start channel, COM, Fieldbus, auxiliary axes, etc.

■ General Tab



- Start Channel
  You can select from where to receive the start instruction when the robot is in External Run Mode (JR3000/JC-3 Series) or in Run Mode (JS3 Series): “I/O-SYS”, “Fieldbus”, “COM 1”, “User Definition”, or “Ethernet”.

- COM1 Command Communication Function
  You can enable/disable command communication functions for COM1.
  Select [Valid] to enable command communication for COM1 and select [Invalid] to disable command communication for COM1. Set this to [Invalid] if you want to process arbitrary communication other than command communication using COM1.
  For further details, refer to the operation manual *Communication Control.*

- Change Program Number
  You can restrict which devices can be used to change program numbers. For example, if you disable COM1, you will not be able to change program numbers from a device connected to COM1 on the robot.

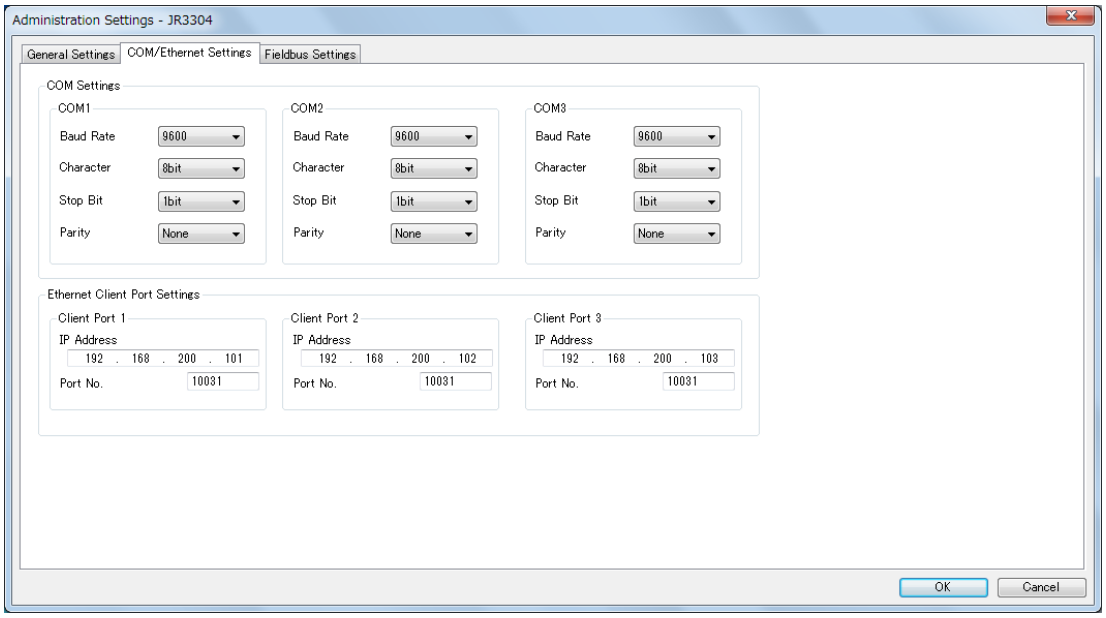
- MEMORY Port Settings
  You can make settings to enable/disable the memory port and enable/disable automatic updates of the system program from the memory port.

- Emergency Stop Buzzer Settings (JS3 Series Only)
  You can enable or disable the buzzer for when an emergency stop occurs.

- Clear Error History
  This deletes all of the error history.

- Clear All Data In Robot
  This deletes all C&T data. Take caution; if you have not backed up the C&T data, erased data cannot be restored.

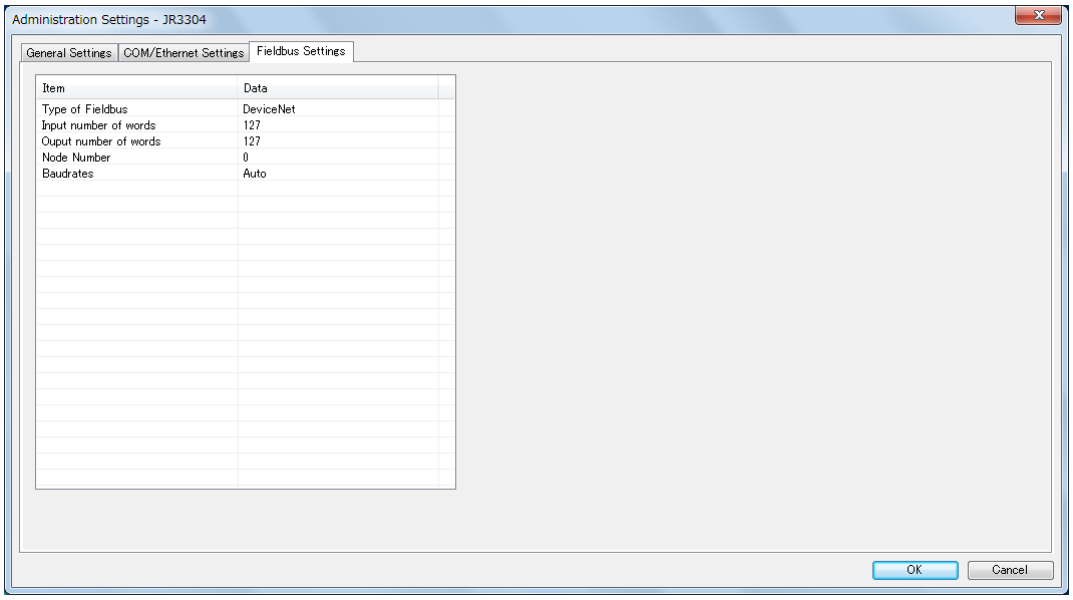
■ COM/Ethernet Settings Tab



- COM Settings
  This sets the COM 1 to 3 baud rate (COM1 and COM2 for JS3 Series), character length, stop bit, and parity settings on the robot side.

- Ethernet Client Port Settings
  This sets an IP address and port number for Client Port 1 to Client Port 3, needed for the Ethernet client function on the robot side.

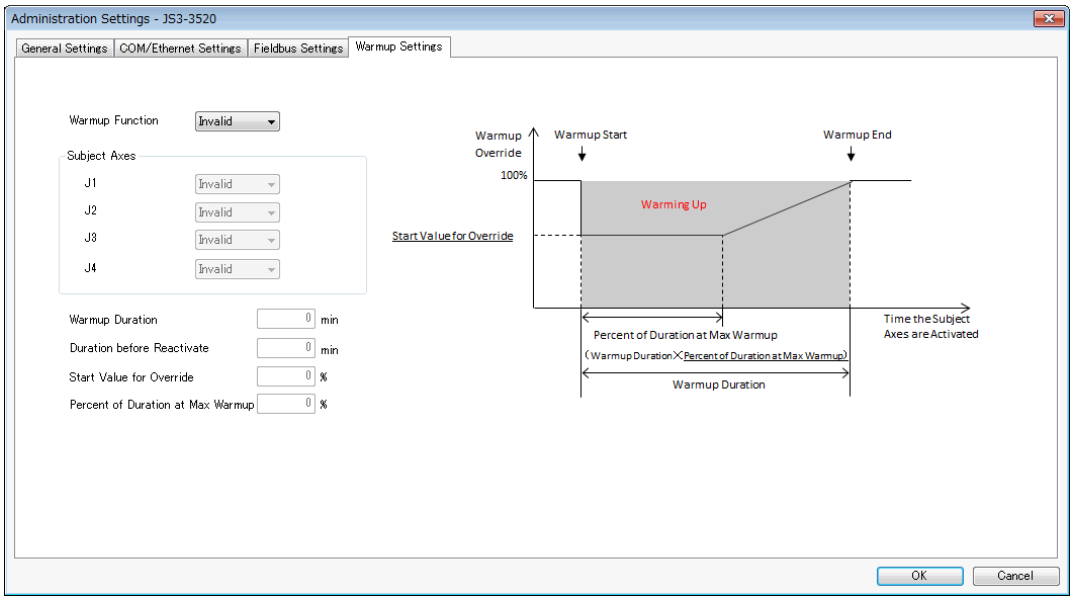
■ Fieldbus Settings Tab



- Fieldbus Settings

  These are Fieldbus settings for the robot side. Select the Fieldbus type and go through the set up. For further details about each Fieldbus module's settings, refer to the operation manual *External Control.*

■ Warmup Settings Tab (JS3 Series Only)



You can enable/disable the warmup function, set the subject axes, and set the warmup duration, etc.

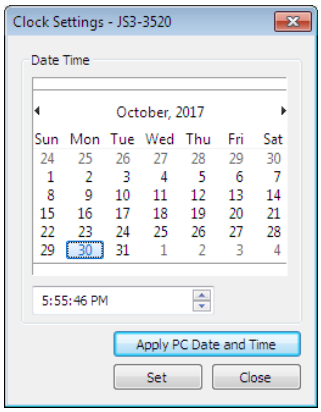
For details regarding the setting items, refer to "1.15 Warmup Settings (JS3 Series)" in the operation manual *Functions III.*

11.13.2 Version Information

Here you can refer to the robot information. You can check the system program version number, application, base model, axis information, Fieldbus type, Fieldbus version number, MAC address, ON time, playback time and the free disk space available for teaching data, etc.
You can make a text copy of the display contents by pressing [Copy] on the dialog.

11.13.3 Clock Settings

This sets the robot's system time and date.
The time and date displayed immediately after opening the time settings dialog are the time and date currently set.
After editing the date and/or time, click [OK] to set the specified date and time to the robot.
Click on [Apply PC Date and Time] to synchronize the robot's system date and time with the PC's current time.

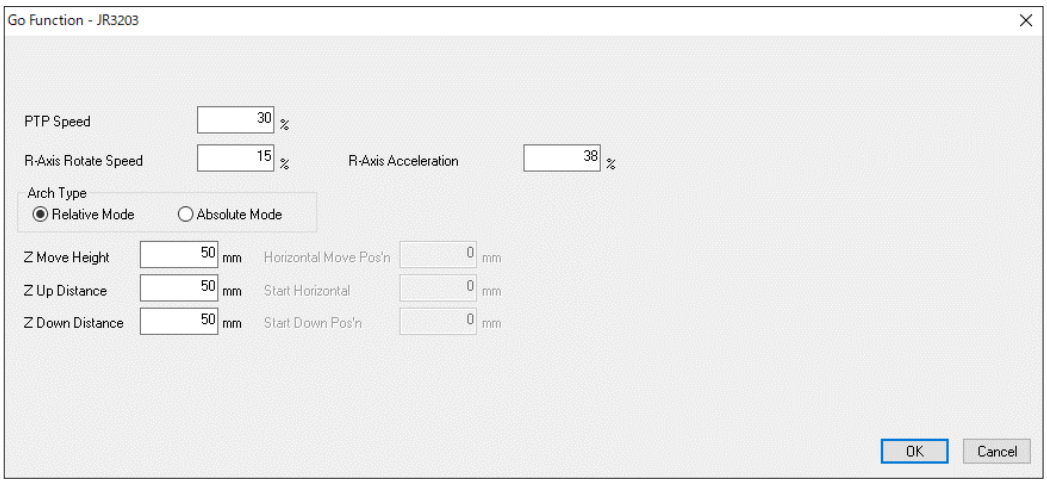


11.14 Teaching Environment Settings

From [Robot] on the menu bar, select [Teaching Environment Setting] on the pull-down menu and then select one of the items displayed.

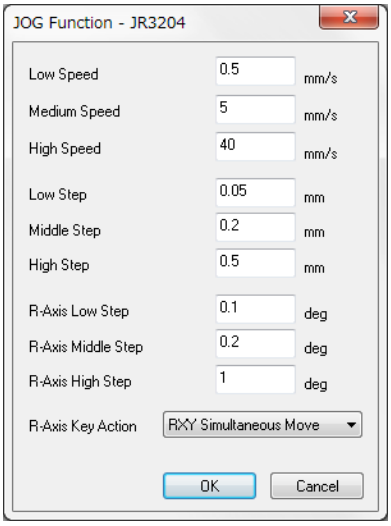
■ GO Function

If you press the [GO] key in the JOG dialog ([Robot] → [JOG]), the axes move to the coordinates currently displayed in the JOG dialog. You can set the moving speed as well as the PTP arch motions for these movements in [GO Function].



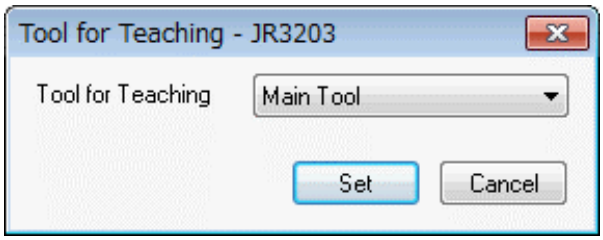
■ JOG Function

You can set the speed at which the axes move when operating the robot in JOG mode and the distance moved for one JOG key click in the JOG dialog (Robot → JOG) using [JOG Function].



■ Tool for Teaching

You can select the tool to use on the robot side during teaching.

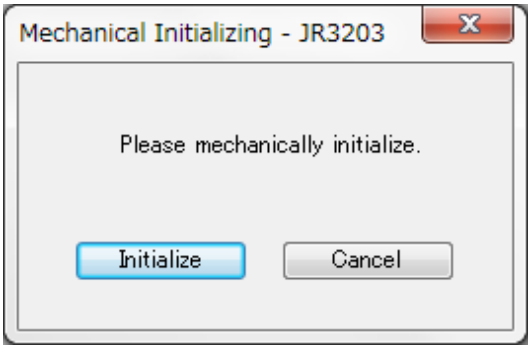


11.15 Mechanical Adjustment (JR3000 / JC-3 Series Only)

This executes the robot's Mechanical Adjustment Mode.
From the [Robot] pull-down menu on the menu bar select [Mechanical Adjustment].
The robot performs mechanical initialization and then the position deviation between the sensors and the motor driver Z phase for each axis appear on the "Mechanical Adjustment" dialog.

11.15.1 Mechanical Initialization Dialog

The robot performs mechanical initialization, from which the sensor phase deviation is detected.



- Initialize Button
  The robot performs mechanical initialization and then the phase deviation values and results appear on the "Mechanical Adjustment" dialog.

- Cancel Button
  The operation is cancelled and you are returned to the main screen.

11.15.2 Mechanical Adjustment Dialog

The values and results of deviations between the sensor and the motor driver Z phase for each axis according to the robot model and axis information appear on this dialog.
If you to use the "Initialize" button while adjusting the sensor positions you can continue to check the phase deviations and results.

Sensor Adjustment
Sensor Adjustment is used to confirm the results of physical adjustments made to the positions of the initialization sensor mounting plates and/or initialization sensor shielding plates.
For further details, refer to the operation manual *Maintenance*.

Register/Confirm Phase Deviation (JC-3 Series 3 axes specifications only)
Register/Confirm Phase Deviation is used with models which do not have initialization sensors. With models that do not have initialization sensors, you cannot make a physical adjustment of the sensors. The displayed phase deviation is information particular to the robot model and once registered is data managed by the robot system. For further details, refer to the JC-3 Series operation manual *Maintenance*.

Mechanical Reset (JC-3 absolute encoder models only)
After setting up the robot, you need to perform a mechanical reset the first time you power on the robot.
For further details, refer to the JC-3 Series operation manual *Maintenance*.

■ Sensor Adjustment

This displays the sensor phase deviations and the results for each axis.

■ Register/Confirm Phase Difference*

This displays the sensor phase deviations in pulse units for each axis for the JC-3 series.

- Register Button

  This registers the robot phase deviation values to the robot.

* With JC-3 absolute encoder models, the “Register/Confirm Phase Difference” function is named “Mechanical Reset”.

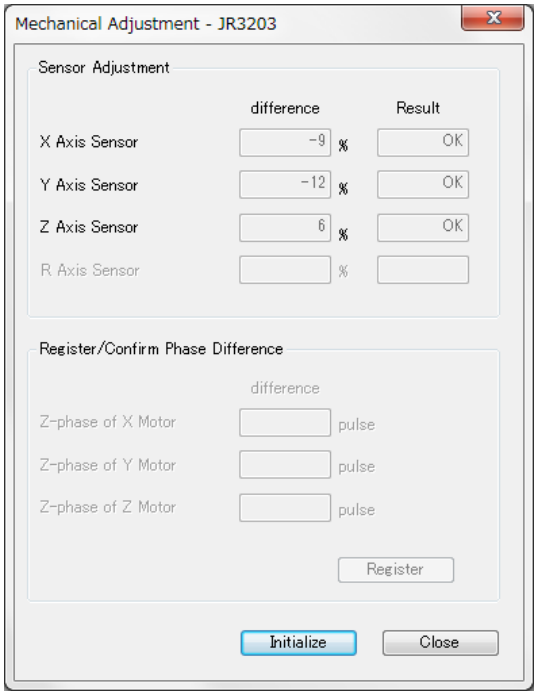
■ Initialize Button

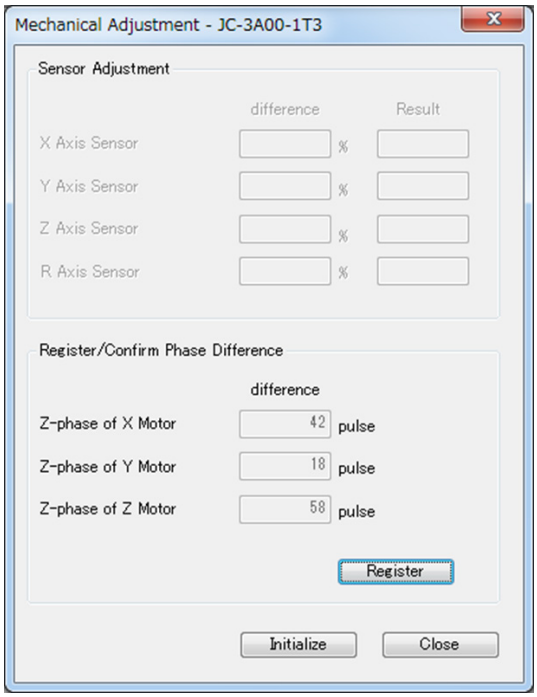
Click this to initialize the robot and redisplay the sensor deviation and the results for each axis according to the detected robot model and the axis information.

NOTE: With JC-3 absolute encoder modes, this button is used when you first set up the robot system. Refer to “8.1 Mechanical Reset (Absolute Encoder Models)” in the operation manual *Setup*.

■ Close Button

Click this to close the mechanical adjustment window.





11.16 Home Settings (JS3 Series Only)

“Home settings” allow you to use the robot with high accuracy. By setting the home position, the robot does not need to perform a homing operation each time the robot is turned ON.
You need to recalibrate the home position after changing the controller and robot combination, after replacing a motor, or after an encoder error occurs, etc.
Refer to “5.3 Reconfiguring the Home Position” in the operation manual *Maintenance.*

11.17 Robot Maintenance (JS3 Series Only)

You can set functions related to robot maintenance with this setting.
The “robot maintenance function” displays maintenance estimates, notifications for replacement or lubrication, and other such information based on the registered robot battery, belt, and lubrication information. Refer to “4.3 Robot Maintenance Function” in the operation manual *Maintenance* for further information.

11.18 Debug

This is a function used to debug point jobs.
From [Robot] on the menu bar, select [Debug] → [Reference Value] on the pull-down menu.
If you input “Pause” in the middle of your point job data, you can refer to the discretionary expression values at that point. You can also overwrite expressions; however, drive commands are disabled.

NOTE:

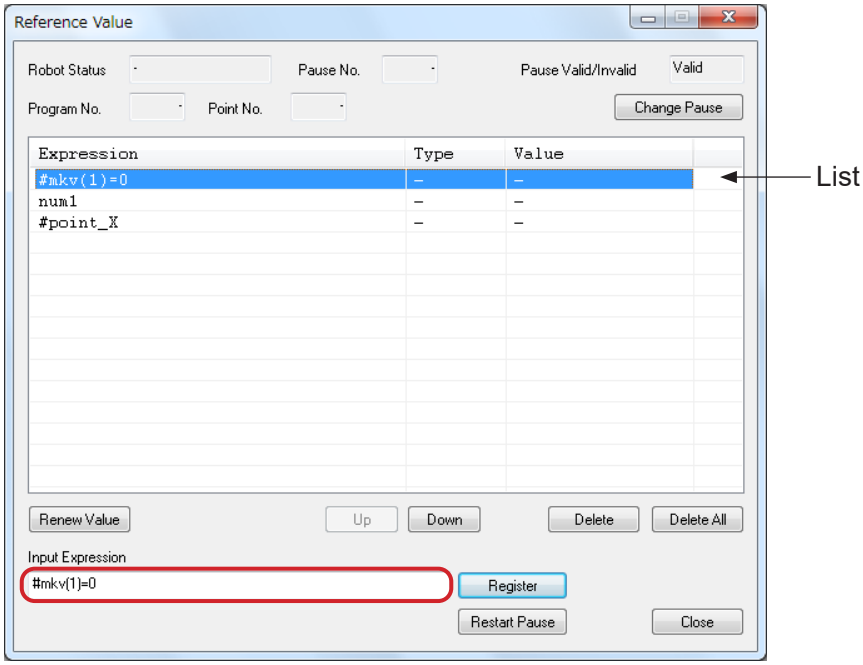
- “Pause” is a built-in variable used in point job commands. When “Pause” is read, the robot stops temporarily. However, even if [Pause] is set to [Valid], it is disabled when the robot is moving.
- For example, when the robot is performing a job while moving or performing a job during a CP movement and you have set [Pause], it is disabled and the robot will not stop.
  (Job While Moving: When the set point job data is repeatedly executed between two points.
  Job While CP Moving: A job done during a CP movement).

■ Change Pause
Switches “Pause” to [Valid]/[Invalid]. If this is set to invalid, even if “Pause” is read, the robot does not stop. In addition, regardless of whether Pause is set to valid or invalid, when the power is turned OFF, Pause is invalid the next time the power is turned ON.

■ Restart Pause
This cancels the pause when the robot has stopped temporarily due to the “Pause” function.

■ Renew Value

Overwrites the expression value registered in the list with the current expression value (the value is not updated automatically).



Input a *Pause* command in the middle of a point job command that you want to debug and do the following. If you enter multiple *Pause* commands in a single point job data, you can confirm which *Pause* command is currently being used by referring to “Pause No.”.

1. Click on [Change Pause] and set to “Valid”.
2. Input the expression you want to refer to in “Expression Input” and click on [Register]. Also, if you register a substitute expression, the discretionary values can be substituted.
3. Run the points that have the point job commands you want to debug. You can open the “Robot” pull-down menu with the above Reference Value dialog still open.
4. If the robot stops due to a *Pause* command, click [Renew Value]. The current values of the expressions registered in the list appear (the Reference Value dialog cannot be used if other dialogs are open).
5. Click [Pause Restart] to resume the robot’s run.
   By selecting a registered expression (it is highlighted) and clicking on [Move Up] or [Move Down] you can move the expression up or down in the sequence. To delete a registered expression select [Delete] or [Delete All].

For the local variables defined in the point job, you can refer to the values only within the scope of variables that exist.

The registered expression information in debug is saved as JR C-Points II information and is not included in the C&T data file. For this reason, if you change the list contents, they will not be restored even if you open the previous C&T data file and restart JR C-Points II.

12. MODES

The mode types and their functions are distinctively different for the JR3000 (desktop robot) Series/ JC-3 (Cartesian robot) Series and the JS3 (SCARA robot) Series, as shown in the table below.

	JR3000/JC-3 Series	JS3 Series
Changing Mode Method	Software setting	Teaching pendant select switch
Mode Type	(1) Teaching Mode (2) Switch Run Mode (3) External Run Mode	(1) TEACH (Teaching Mode) (2) AUTO (Run Mode)
Online teaching using the PC software JR-C Points II	1) Set the mode to (1) Teaching Mode. 2) Remove the teaching pendant.	1) Switch the mode to (2) AUTO (Run Mode) 2) Turn ON PC Priority Mode.

With the JR3000/JC-3 Series, the system program provides the following 3 modes of operation in the form of software settings:

(1) Teaching Mode
(2) Switch Run Mode
(3) External Run Mode

With the JR3000/JC-3 Series, you need to set the robot to (1) Teaching Mode and remove the teaching pendant if you want to teach online and/or perform operations such as JOG movements and test runs, etc., using JR C-Points II.

With the JS3 Series, use the select switch on the teaching pendant to change to the following 2 modes:

(1) TEACH (Teaching Mode)
(2) AUTO (Run Mode)

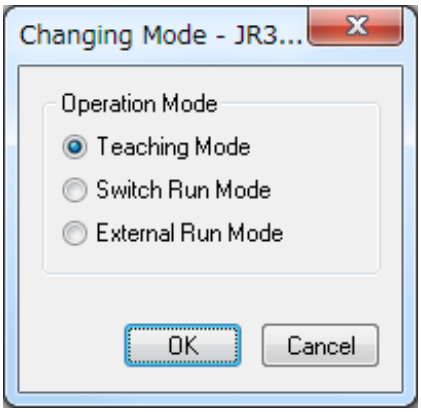
The robot enters (2) AUTO (Run Mode) when the teaching pendant is disconnected.
NOTE: You need to connect the TP II short connector to the controller to operate the robot using JR C-Points II when the teaching pendant is disconnected.

With the JS3 Series, you need to set the select switch on the teaching pendant to (2) AUTO (Run Mode) and set PC Priority Mode to ON in JR C-Points II if you want to teach online and/or perform operations such as JOG movements and test runs, etc., using JR C-Points II.
The robot enters (2) AUTO (Run Mode) when the teaching pendant is disconnected. If you connect the TP II short connector and turn ON PC Priority Mode you can teach online in JR C-Points II with the teaching pendant disconnected.

12.1 Changing Modes

With the JR3000/JC-3 Series, you can switch the robot operation mode using JR C-Points II.
If the teaching pendant is connected to the robot/controller, turn the power OFF and remove the teaching pendant before changing modes in JR C-Points II.

From menu bar, click [Robot] and select [Change Mode].
The dialog to the right appears.
Select the mode you want to switch to and press [OK].



NOTE:

- With the JR3000/JC-3 series, you need to connect the short connector when the teaching pendant with emergency stop is disconnected. Without any connection, the device do not function.
- If using a JS3 Series and the teaching pendant is connected or a JR3000/JC-3 Series has a switchbox with a select switch (mode select switch), use the select switch (mode select switch) to change modes.
- With the JS3 Series, you need to switch PC Priority Mode to ON if you want to teach online and/or operate the robot using JR C-Points II. Refer to "12.2 PC Priority Mode (JS3 Series)" for further details.

- Teaching Mode
  Select this to operate the robot using JR C-Points II.

- Switch Run Mode
  Select this to operate the robot using the robot's start/stop switch.

- External Run Mode
  Select this to operate the robot using the set start channel.

12.2 PC Priority Mode (JS3 Series)

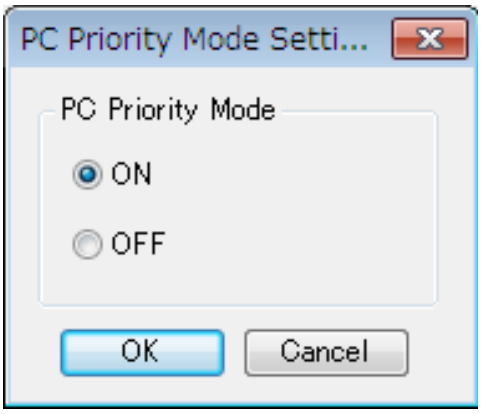
With the JS3 Series, you need to set PC Priority Mode to ON if you want to teach online with JOG movements, etc., using JR C-Points II. You can toggle the PC Priority Mode by selecting [Robot] → [PC Priority Mode] from the menu bar or selecting PC Priority Mode on the tool bar.

- ON
  Select this to operate a JS3 Series using JR C-Points II.
  When this is set to ON, you cannot run the robot from any other source other than JR C-Points II.

NOTE: With the JS3 Series, you cannot set PC Priority Mode to ON in the following situations:
  - The select switch is set to TEACH (Teaching Mode)
  - An emergency stop is activated

- OFF
  Select this to operate the robot using the set start channel.

When you select [Robot] → [PC Priority Mode] from the menu bar, the dialog to the right appears.
Set PC Priority Mode ON/OFF and click [OK].



The robot enters Run Mode when you remove the Teaching Pendant, however if you want to operate the robot from JR C-Points II, you need to set PC Priority Mode to ON.

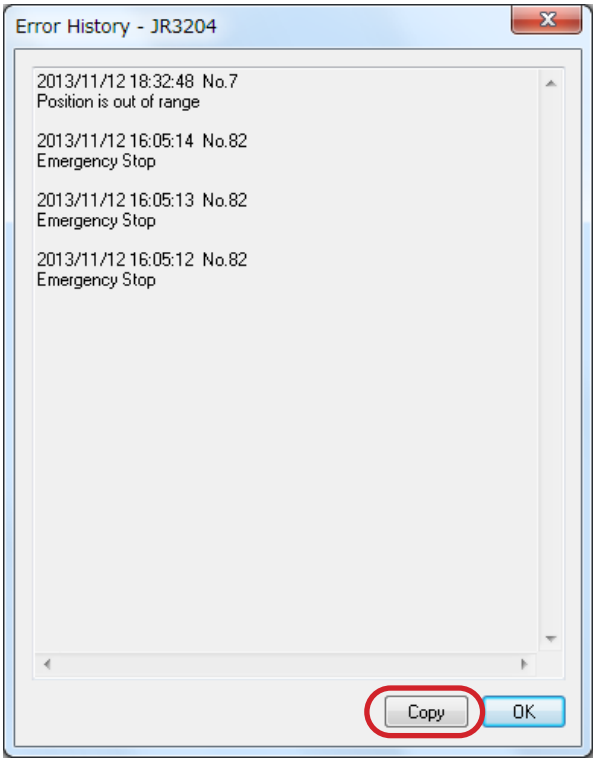
NOTE:
- Connect the TP II short connector to the controller when you remove the Teaching Pendant.
- After setting PC Priority Mode to ON in JR C-Points II, PC Priority Mode turns OFF when the following occurs:
  - The controller is power cycled
  - An emergency stop is activated
  - The select switch on the teaching pendant is switched to TEACH (Teaching Mode)

  Note that you can also perform the above if you want to turn OFF PC Priority Mode when JR C-Points II is not available.
- If you use one of the above methods to turn OFF PC Priority Mode, the PC Priority Mode icon in the tool bar of JR C-Points II stays shown as ON. Click the (refresh) button to apply the PC Priority Mode setting from the JS3 Series to JR C-Points II.

13. ERROR HISTORY

Click [Robot] on the menu bar and click [Error History] on the pull-down menu. Error history for the connected robot is read out and displayed.
Error history shows the history for up to 1000 errors.

You can copy the contents of the error history to the clipboard by selecting [Copy] on the dialog. The text copied onto the clipboard can be pasted onto applications such as Microsoft Word®, etc.

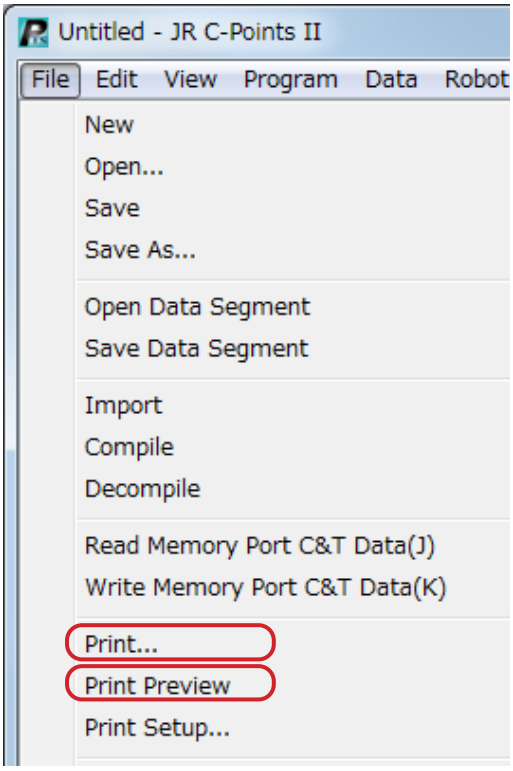


14. DATA PRINT-OUT

You can output C&T Data to your printer.

Click [File] on the menu bar and click [Print] on the pull-down menu.
The “Setting of Print Item” dialog box appears.

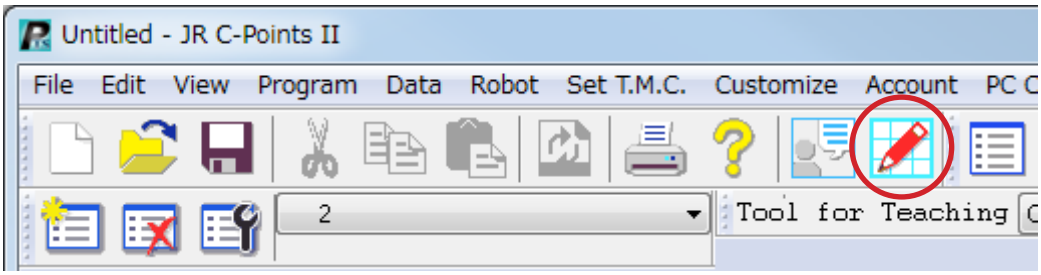
Select the item you want to print and click [OK].
You can select all of the C&T data (the aforementioned data unit) by setting the print range to [Select All].
Click [OK] on the print confirmation dialog box to start printing.
Click [Print Preview] to confirm the printing image. If you want to print out a particular program or point job, locate the page numbers using the print preview and then set the page numbers in the print dialog box.
Click [Print Setup] to change the printer settings.



15. POINT GRAPHIC EDITOR

With Point Graphic Editor, path data can be created and edited graphically as a diagram.
Path generation is easy to understand and can be done simply by creating it based on a DXF file made in CAD software, or Gerber format data displayed in the support layer used by printed circuit board (PCB) industry software.
Also, you can use image data (JPEG) taken by a digital camera, display it in the background, and refer to it while editing the path.

Point Graphic Editor displays and edits the point row data of the program currently open.
If you start up Point Graphic Editor as shown below, you can edit program number 2.



NOTE: In Point Graphic Editor, drawing takes place on the XY plane, and only coordinates on the X and Y axes can be edited.
By default setting, the Z coordinate of a newly created point is 0. Therefore, at the end of Point Graphic Editor, set the value in the Program area of the Main screen.

15.1 Start Up and Exit

15.1.1 Start Up

Select [Edit] from the menu bar and select [Edit Graphic Point] on the pull-down menu. You can also click the icon on the tool bar to boot it up.

15.1.2 Exit

To exit Point Graphic Editor, on the Point Graphic Editor menu bar select [File] and click [End Point-Graphic Editor]. You can also click the icon on the top right of the screen to exit or double click the icon at the top left of the screen.

15.2 Procedure for Standard Operations

This section explains how to operate Point Graphic Editor through a series of operations.

15.2.1 Editing Mode Selections

From the menu or tool bar turn Edit Trajectory ON.
(Further details regarding Edit Trajectory are later in the section)

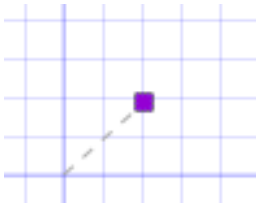
15.2.2 Graphic Placement to Movement

With this function you can place 4 types of graphics: Point, Straight Line, Ellipse, and Arc. Straight lines and arcs can be linked with other graphics; however points and circles are positioned independently. When you want to place a graphic, select the graphic from the menu or the tool bar. Additionally, if you want to move or resize a positioned graphic, select the graphic from the menu again or click the selection button from the tool bar to switch to the select/move mode.

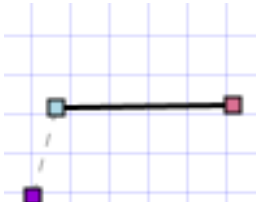
(From the left: select/move button, point button, straight line button, ellipse button, ellipse by center point button, arc button, create auto arc button, convert to passing point button, convert to stop point button, path order settings button, and tool width offset button).

Examples of placing all of the graphic types:

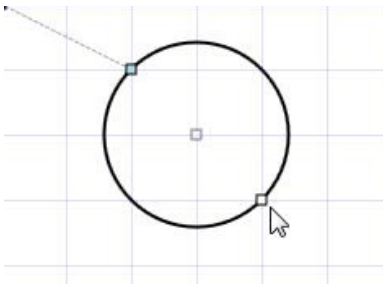
■ Point Placement
Click the point button to enter the point button positioning mode.
A point is placed by clicking the area where you want to position the point on the coordinate grid.



■ Straight Line Placement
This places a straight line. Click the straight line button to enter the straight line positioning mode.
A straight line is placed by clicking a start point and an end point, in that order.

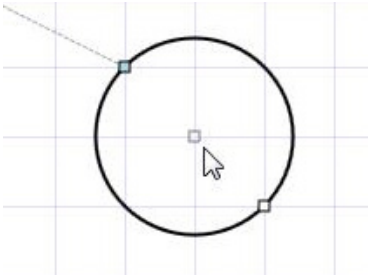


■ Ellipse Placement
Click the ellipse button to enter the ellipse mode. Position the circle by clicking 2 points, a start point and a diameter point (support point) that links to the start point. The circle is placed on the diameter of the start point and the support point.



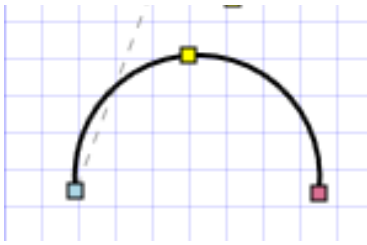
■ Ellipse by Center Point Placement

Click the ellipse by center point button to enter the ellipse by center point mode. Place the ellipse by clicking two points: a start point and a center point. A support point, following a direct line from the start point and center point, positions the circle.



■ Arc Placement

Click the arc button to enter the arc mode. Click the three points in the order of start point, end point and support point. An arc joining the start point – support point – end point is positioned.



■ Colors of the Various Points

The colors of the various points show the start and end of the robot's path.

Purple: independent point (PTP Point)

Light blue: start point (CP Start Point)

Light red: end point (CP End Point)

Green: passing point (CP Passing Point)

Orange: stop point (CP Stop Point)

Yellow: arc support point (CP Arc Point)

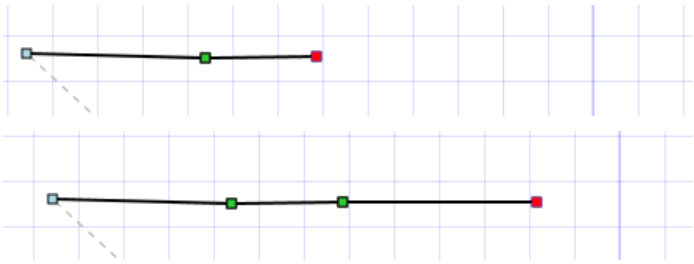
For further details, refer to the Trajectory Point Color section in "15.3.3 Edit View".

■ Snap Function and Coupling

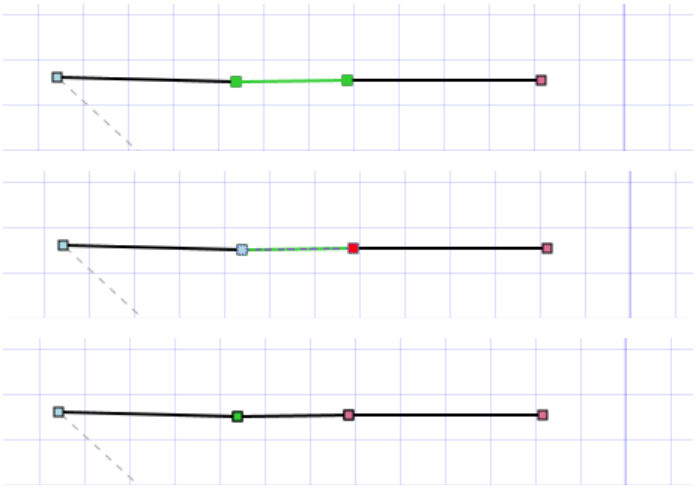
The snap function allows you to easily draw a consecutive path for the robot. When you are deciding on each point's location, move the mouse close to points already placed or corners of the grid lines to snap the points into place. By deciding on point locations with this function, you can place points with the same coordinates as points already positioned or to the same coordinates as grid line corners.

You can snap all existing points; however, points can only be linked consecutively, basically, when you place and snap start points to end points which are already positioned.

If you want an end point consecutively linked to a start point that is already positioned, select the start point items and snap it to the end point to make a consecutive link.



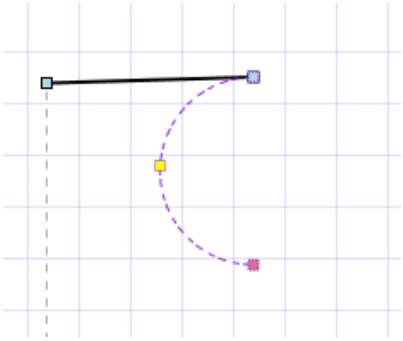
Also, if you want to cancel a consecutive point, select the consecutive item (the item that will be on the end point side after canceling the consecutive point) in the preceding sequence within the consecutively linked item. Move the point and by snapping it back into place you can have the same point no longer linked consecutively.



If you do not want to snap points into place, hold down both the Ctrl key and the Shift key when moving and placing points.

■ When you want to place a circle that continues on from another graphic.

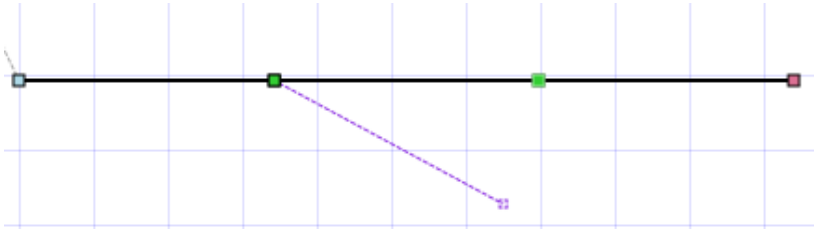
As previously mentioned, a circle graphic cannot be linked consecutively with another graphic. If you want to consecutively link a circle with another graphic, use an arc. By placing two arcs with a central angle of 180 degrees, you can place a whole circle.



When placing the arc point (the third point), hold down the Ctrl key. If you hold the Ctrl key, the arc is fixed with a central angle of 180 degrees.

■ Moving Points and Items

You can move graphics already positioned. Place the mouse cursor over the item you want to move and move it by dragging and dropping it. When you want to move the whole item, click and drag with the cursor on the line, and when you want to move only a point, click and drag with the cursor on the point. When you move an item, the points connected do not follow.



■ Selecting Items and Moving Multiple Points and Items

Click the edit button and in the edit mode click the item you want to select, or by creating and dragging the range you want with the mouse, you can select items.

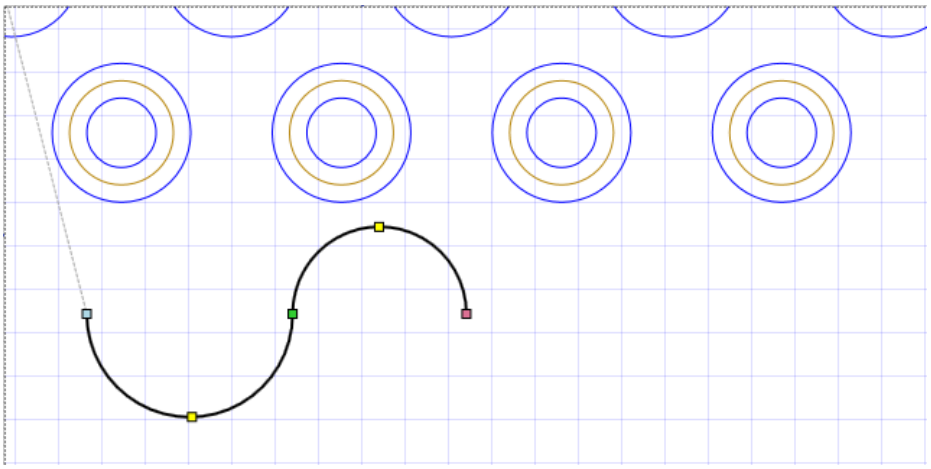
Additionally, if you double click an item, the consecutively linked items can be selected all at once. (If selecting by range, when all of the points that make up a given graphic are within the range, the items are selected. For a circle or an arc graphic, you do not need to include the whole graphic within the range.)

When multiple items are selected, you can move the entire set of items by using the mouse to drag and drop the lines or by using the arrow keys on the keyboard.

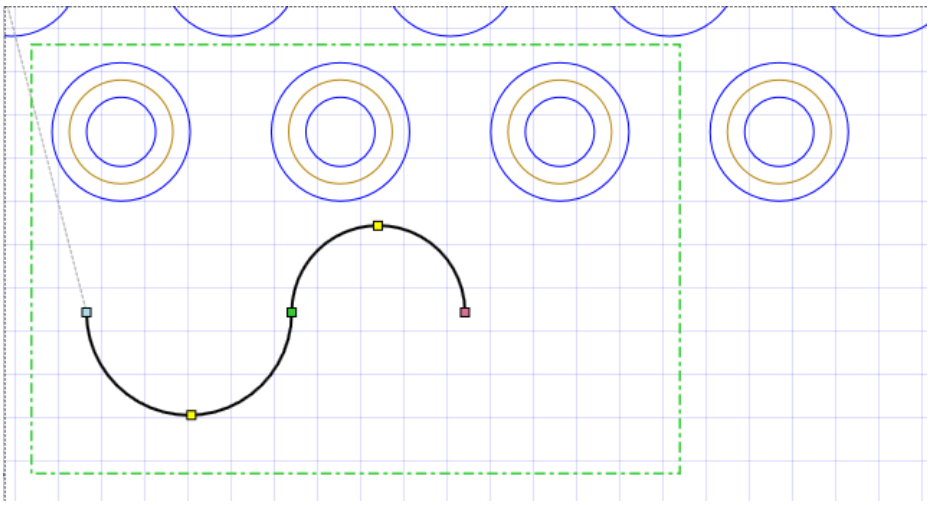
Additionally, if selecting by using a range, you can also select items for which the editing function is OFF at the same time. (If trajectory lines are ON, you can also select auxiliary lines and the imported figure.)

If you only want to select trajectory lines (editable items only), hold the Shift key and a drag out the range you want.

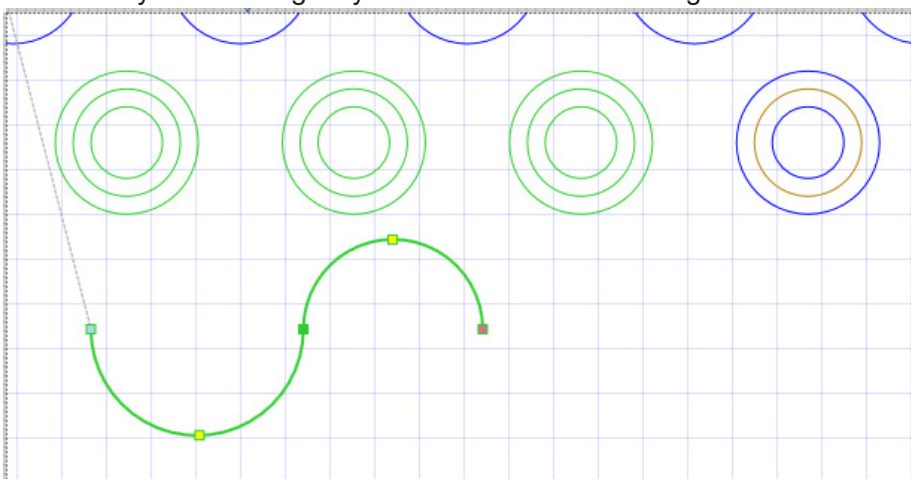
Before Selection



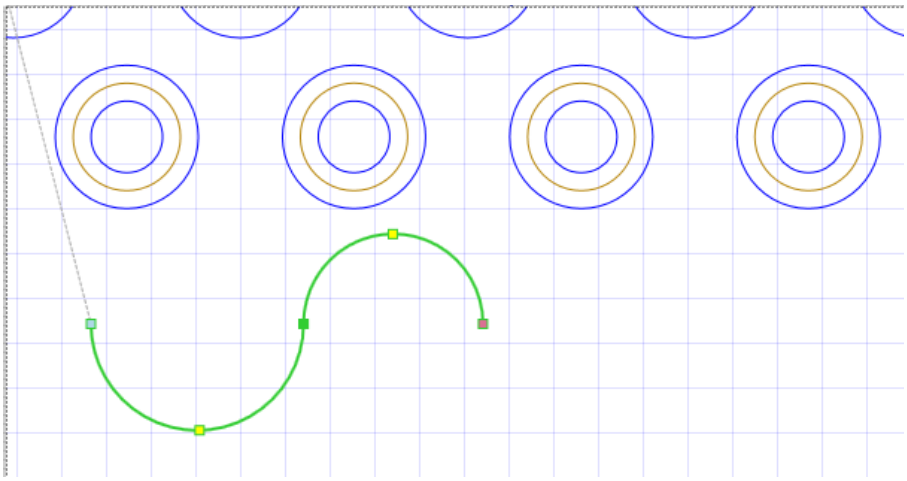
After Selection



Select by mouse drag only → all items within the range are selected



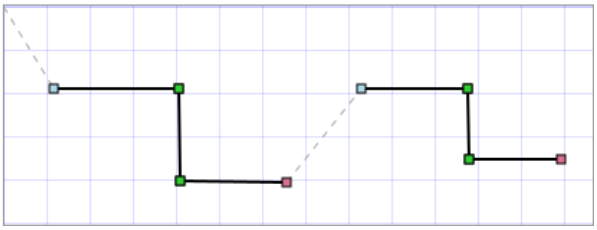
Selection by dragging the mouse with the Shift key → Only editable items are selected

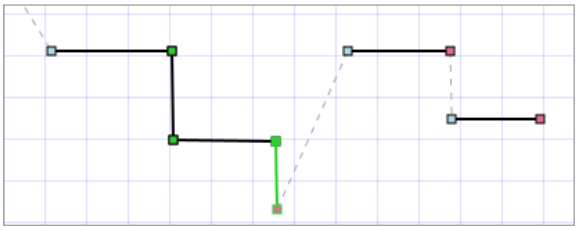


■ Modifying the Sequence Through Insertion

Graphics positioned using this function start at the home point and are made up of one type of line. Newly created graphics are generally at the end of the sequence.

When creating new graphics or by moving and snapping graphics into place, the sequence order changes if these are consecutively linked to existing items.

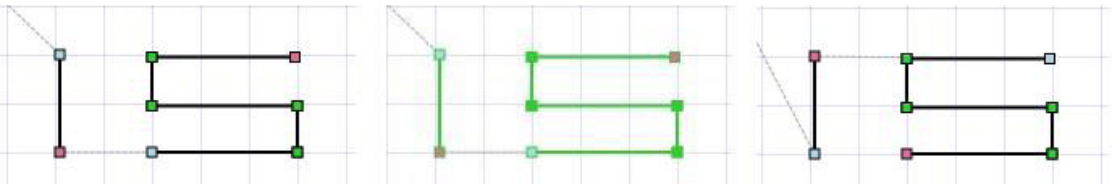




■ Reverse Start/End Point Function

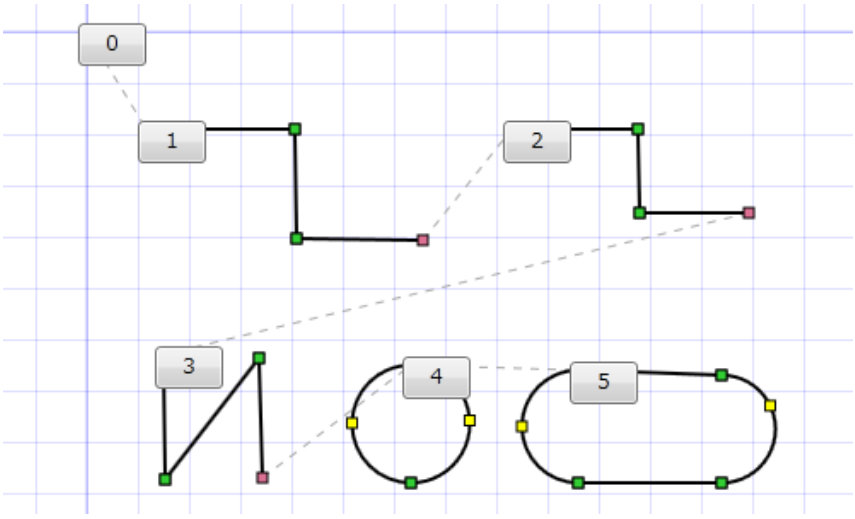
By pressing the Reverse Start/End Point Function button on the tool bar when an item is selected, you can reverse the item's start point and end point. Points and circles do not have start points and end points therefore they cannot be reversed.

By selecting and reversing the whole item of a consecutively linked item, you can reverse the start point and end points while preserving the consecutive sequence.



■ Path Order Function

The Path Order Settings button is a function for changing the path sequence for a group of items. Press the Path Order Settings button on the toolbar to enter the path order function. Buttons of the current sequence appear on the screen at the various start point positions, as shown in the diagram below.



The sequence up until the first button pressed is fixed, and the path sequence changes according to the order in which the subsequent buttons are pressed after this.

For example, if you want to change the sequence from the first number, click the numbers "0 → an arbitrary number". Once fixed, the buttons can no longer be selected.

If you want to switch only graphics 3 and 4 in the above diagram, select number 2, the number directly before the first diagram you want to switch. By doing this, numbers 0, 1, 2 are no longer selectable. After this, by clicking 4 → 3 on this screen the sequence changes. This method is enabled when you want to change only some of the path within a sequence of various paths.

Once you finish changing the sequence, the software returns to the Edit Mode, etc.

■ Edit Trajectory Mode and Edit Auxiliary Line Mode

With this program you can edit “trajectory lines” and “auxiliary lines”. Trajectory lines are registered graphics that are added to point row data and are sent to the robot by the sending of C&T data. Auxiliary lines are a mode for drawing support graphics for trajectory line drawing. Auxiliary lines are not sent to the robot.

You can switch to Edit Trajectory Mode or Edit Auxiliary Line Mode from the tool bar or menu.

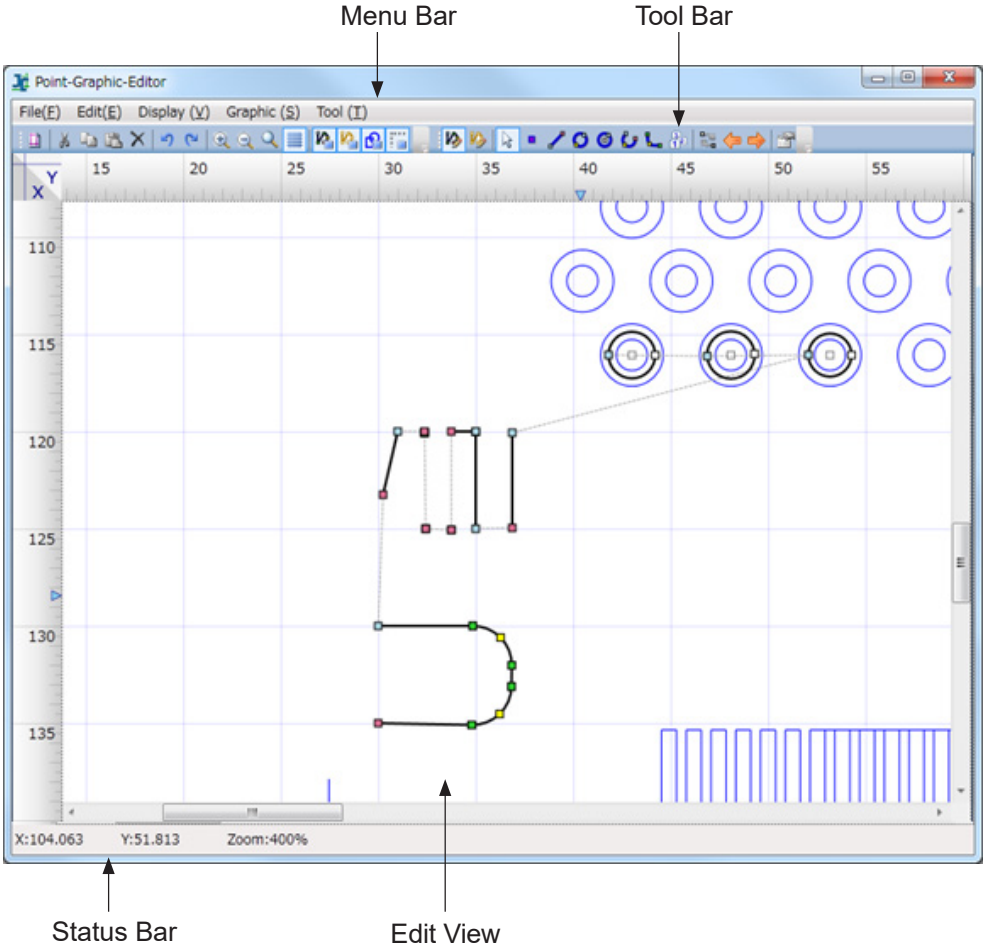
Edit Trajectory Mode is on the left, and Edit Auxiliary Line Mode is on the right

Also, you can change the displays for both trajectory lines and auxiliary lines. The movement line (offline) display and grid line display can be switched ON and OFF.

(From the left)
Grid line display
Snap to grid corner
Trajectory line display
Auxiliary line display
Import figure display
Offline display

15.3 User Interface

This section explains the Point Graphic Editor user interface.



The user interface is made up of 4 main items.

- Menu bar
- Tool bar
- Editing view
- Status bar

■ Menu Bar

Refer to “15.3.1 Menu Bar”.

■ Tool Bar

Refer to “15.1.1 Start Up”.

■ Editing View

Refer to “15.3.3 Edit View”.

■ Status Bar

This displays the cursor’s position information and the current display screen zoom percentage.

15.3.1 Menu Bar

You can use all the functions from the menu bar.

File(F) Edit(E) Display (V) Graphic (S) Tool (T)

■ File Menu

Import DXF File	:	Converts and loads a DXF file into JR C-Points II data
Import Gerber Data File	:	Converts and loads a Gerber data file into JR C-Points II data
Clear Imported Figure	:	Clears imported figure
Background Image Settings	:	Loads a JPEG file as a background image
Clear Background Image	:	Clears the background image
Page Setting	:	Opens the page setting dialog
End Point Graphic Editor	:	Exits Point Graphic Editor

■ Edit Menu

Cut	:	Cuts the selected graphic
Copy	:	Copies the selected graphic
Paste	:	Pastes the cut/copied graphic
Delete	:	Deletes the selected graphic
Undo	:	Undoes the operation. Only works with graphic creation, movement, deletion, and sequence change operations. Also, the operation history is cleared when you import a file
Redo	:	Redoes the operation. Only works with graphic creation, movement, deletion, and sequence change operations. Also, the operation history is cleared when you import a file
Select All*	:	Selects all graphics

* After selecting all graphics, if you want to remove the work home position from the selection, select the select/move button (the leftmost button) from the tool bar below and click on the work home position whilst holding down either the Ctrl key or Shift key on the keyboard.

■ Display Menu

Zoom In	:	Zooms in the edit view
Zoom Out	:	Zooms out the edit view
Zoom (50 % to 400 %)	:	Changes the edit view to the selected zoom percentage
Display Entire Window	:	Changes the zoom percentage to display the entire the edit view area
Arbitrary Zoom (10 % to 40,000 %)	:	Opens the zoom percentage dialog and from here you can change the edit view to an arbitrary zoom percentage
Display Grid	:	Shows/hides the grid lines
Snap to Grid Corner	:	Toggles whether or not to snap objects to the grid lines
Grid Interval Setting (0.01 mm to 100 mm)	:	Sets the grid intervals
Display Trajectory	:	Shows/hides the trajectory lines
Display Auxiliary Line	:	Shows/hides the auxiliary lines
Display Import Graphic	:	Shows/hides imported graphic
Show Offline	:	Shows/hides the robot's offline movements
Show Point Number	:	Shows/hides the point numbers
Tool Settings	:	Sets the tool width, the type of offset, and shows/hides the tool path

■ Graphic Menu

Edit Trajectory	:	Turns the Trajectory Edit Mode ON/OFF When Trajectory Edit Mode is turned ON, Auxiliary Line Edit Mode is turned OFF
Edit Auxiliary Line	:	Turns the Auxiliary Line Edit Mode ON/OFF When Auxiliary Line Edit Mode is turned ON, Trajectory Edit Mode is turned OFF
Create at Passing Point(default)	:	Turn this function ON to draw a CP movement consisting of passing points*1 When [Create at Passing Point] is ON, [Create at Stop Point] is OFF
Create at Stop Point	:	Turn this function ON to draw a CP movement consisting of stop points*2 When [Create at Stop Point] is ON, [Create at Passing Point] is OFF
Select/Move	:	Selects the Select/Move Mode
Point	:	Selects the Point Creation Mode
Straight Line	:	Selects the Straight Line Creation Mode
Circle	:	Selects the Circle Creation Mode
Circle-by-Center	:	Selects the Circle and Circle Center Point Creation Mode
Arc	:	Selects the Arc Creation Mode
Create Auto Arc	:	Selects the Auto Arc Creation Mode
Convert to Passing Point	:	Selects the Convert to Passing Point Mode When this mode is activated, click a stop point to convert it into a passing point

Convert to Stop Point	:	Selects the Convert to Stop Point Mode When this mode is activated, click a passing point to convert it into a stop point
Path Order Setting	:	Selects the Path Order Setting Mode
Tool Width Offset	:	Selects the Tool Width Offset Mode
Start Point End Point Reverse	:	Reverses the start point and end point of the selected graphic This function can only be used when an editable graphic is selected
Previous Item	:	Moves you to the item immediately before the currently selected item in the trajectory sequence This function is only valid in Trajectory Edit Mode
Next Item	:	Moves you to the item immediately after the currently selected item in the trajectory sequence This function is only valid in Trajectory Edit Mode
Graphic Properties	:	Opens the graphic properties dialog

*1: With dispensing specifications, the CP movement is created using Line Passing Points. With depaneling specifications, the CP movement is created using CP Passing Points.

*2: With dispensing specifications, the CP movement is created using CP Stop Points. With depaneling specifications, the CP movement is created using Cut Relay Points.

■ Tool Menu

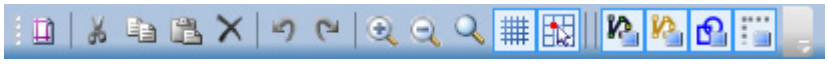
Create Graphic	:	Opens the graphic creation dialog, and from here you can create graphics using numerical input
Edit Graphic	:	Opens the graphic editing dialog, and from here you can edit the graphic's information
Move Graphic	:	Opens the graphic displacement dialog, and from here you can arbitrarily change the relative position of the graphic from the current one
R-Axis Angle Batch Settings	:	Open the R-Axis Angle Batch Settings dialog to set the R-axis angle for the selected point all at once for 4 axes specifications.
Coordinate Conversion	:	Opens the coordinate conversion dialog, and from here you can convert coordinates for the given line types
Auto Connect	:	Automatically connects all possible consecutive lines in the sequence towards the end point from the selected item
Import AutoConnect	:	Automatically connects all possible consecutive lines and creates a trajectory toward a specified direction based on the imported figure
Sort by Direction	:	Opens the sort by direction dialog, and from here you can change the path order from the various selections
Create Circle by Designated Radius	:	Opens the create circle by designated radius dialog, and from here you can create a circle centered around the selected point graphic

Create Circle by Intermediate Radius	:	Select two circles, and then use this to create a circle centered between the two circle's center points and the average diameter
Create Circle/Arc Center Point	:	Places a point graphic at the circle/arc center point position of the selected graphic
Create Line in Rectangle Center	:	Places a straight line in between the two longest lines of the selected graphic

15.3.2 Tool Bar

You can use each of the various functions from the tool bar.

■ Tool Bar 1



(From the left)

Page Settings	:	Opens the page setting dialog
Cut	:	Cuts the selected graphic
Copy	:	Copies the selected graphic
Paste	:	Pastes the cut/copied graphic
Delete	:	Deletes the selected graphic
Undo	:	Undoes the operation Only works with graphic creation, movement, deletion, and sequence change operation Also, the operation history is cleared when you import a file
Redo	:	Redoes the operation Only works with graphic creation, movement, deletion, and sequence change operations Also, the operation history is cleared when you import a file
Zoom In	:	Zooms in the edit view
Zoom Out	:	Zooms out the edit view
Zoom	:	Opens the zoom percentage dialog and from here you can change the edit view to an arbitrary zoom percentage
Display Grid	:	Shows/hides grid lines
Snap to Grid Corner	:	Toggles whether or not to snap objects to the grid lines
Display Trajectory	:	Shows/hides the trajectory lines
Display Auxiliary Line	:	Shows/hides the auxiliary lines
Display Import Figure	:	Shows/hides the imported figure
Display Offline	:	Shows/hides the robot's offline movements

■ Tool Bar 2

(From the left)

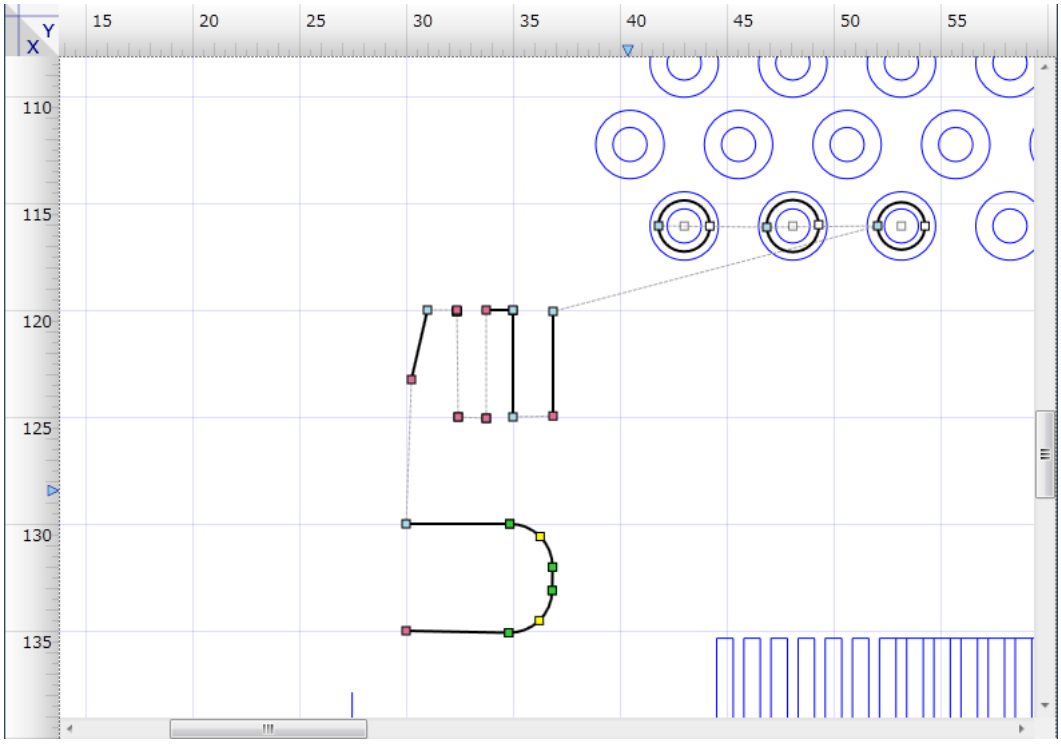
Edit Trajectory	:	Turns the Trajectory Edit Mode ON/OFF When Trajectory Edit Mode is turned ON, Auxiliary Line Edit Mode is turned OFF
Edit Auxiliary Line	:	Turns the Auxiliary Line Edit Mode ON/OFF When Auxiliary Line Edit Mode is turned ON, Trajectory Edit Mode is turned OFF
Create at Passing Point (default)	:	Turn this function ON to draw a CP movement consisting of passing points*1 When [Create at Passing Point] is ON, [Create at Stop Point] is OFF
Create at Stop Point	:	Turn this function ON to draw a CP movement consisting of stop points*2 When [Create at Stop Point] is ON, [Create at Passing Point] is OFF
Select/Move	:	Sets the Edit Mode to Select/Move Mode
Point	:	Sets the Edit Mode to Point Creation Mode
Straight Line	:	Sets the Edit Mode to Straight Line Creation Mode
Ellipse	:	Sets the Edit Mode to Circle Creation Mode
Ellipse by Center Point	:	Sets the Edit Mode to Circle and Circle Center Point Creation Mode
Arc	:	Sets the Edit Mode to Arc Creation Mode
Create Auto Arc	:	Sets the Edit Mode to Auto Arc Creation Mode
Convert to Passing Point	:	Selects the Convert to Passing Point Mode When this mode is activated, click a stop point to convert it into a passing point
Convert to Stop Point	:	Selects the Convert to Stop Point Mode When this mode is activated, click a passing point to convert it into a stop point
Path Order Setting	:	Sets the Edit Mode to Path Order Setting Mode
Tool Width Offset	:	Selects the Tool Width Offset Mode
Import AutoConnect	:	Automatically connects all possible consecutive lines and creates a trajectory toward a specified direction based on the imported figure
Reverse Start/End Point	:	Reverses the start point and end point of the selected graphic This function can only be used when an editable graphic is selected
Previous Item	:	Moves you to the item immediately before the currently selected item in the trajectory sequence This function is only valid in Trajectory Edit Mode
Next Item	:	Moves you to the item immediately after the currently selected item in the trajectory sequence This function is only valid in Trajectory Edit Mode
Graphic Properties	:	Opens the graphic properties dialog

*1: With dispensing specifications, the CP movement is created using Line Passing Points. With depaneling specifications, the CP movement is created using CP Passing Points.

*2: With dispensing specifications, the CP movement is created using CP Stop Points. With depaneling specifications, the CP movement is created using Cut Relay Points.

15.3.3 Edit View

This section explains the items that appear in the edit view.



■ Ruler

There is a guide ruler along the top and left of the edit view. The measurement units are mm. By default setting the horizontal axis is the Y axis and the vertical axis is the X axis. You can change this from the menu [File] → [Page Setting].

(If you want to change the horizontal axis, you must do so during project creation.)

■ Work Area

The white background area is the work area. You can change the size of the work area from the menu [File] → [Page Setting].

■ Grid Lines

Grid lines to guide editing appear on the work area. You can turn these ON/OFF from the tool bar or the menu [Display] → [Display Grid].

For grid line spacing, you can change this from the menu [Display] → [Grid Interval Setting].

If the grid spacing is too narrow and the current zoom ratio cannot display the grid, the grid lines are not displayed.

■ Trajectory, Auxiliary Line, Imported Figure, and Offline (movement lines)

Graphics edited (or graphics shown) in the edit view are as follows:

	Black: solid lines	These represent the trajectory movements of the robot. This data is sent to the robot. When Trajectory Edit Mode is ON, these lines appears as the above thickness, however, when Trajectory Edit Mode is OFF, these appear as thin lines. You can turn the trajectory display OFF/ON with the “Display Trajectory” function.
	Yellow: solid lines	These represent auxiliary lines for guiding editing operations. This data is sent to the robot. When Auxiliary Line Edit Mode is ON, these lines appear with the thickness shown above; however, when Auxiliary Line Edit Mode is OFF, these appear as thin lines. You can turn the auxiliary line display OFF/ON with the “Display Auxiliary Line” function.
	Gray: dashed lines	These represent the trajectory movements of the robot; however, the robot’s tip is raised. This data is sent to the robot. However, you cannot directly edit these lines. By modifying trajectories, these are automatically changed. You can display these movements ON/OFF with the “Show Offline” function.
	Blue: solid lines	These represent imported external data (an imported figure). These cannot be edited, however, when creating trajectories/auxiliary lines these can be snapped to the imported figure. Also, these can be copied, and pasted as trajectories or auxiliary lines. You can display these lines ON/OFF with the “Display Import Graphic” function.

■ Trajectory Point Colors

The trajectories’ various points are color coded as follows:

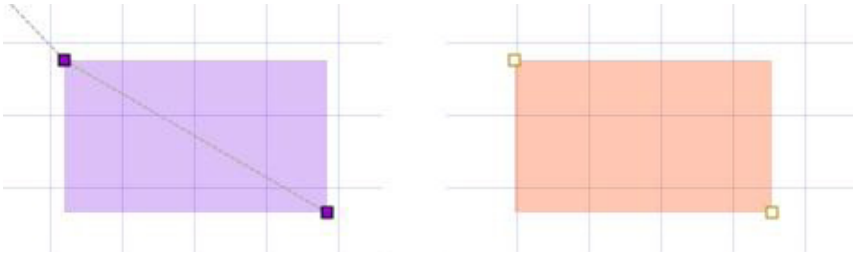
	Purple	represents a PTP point.
	Light blue	represents a CP start point.
	Red	represents a CP end point.
	Yellow	represents an arc point.
	Green	represents a CP passing point.
	Orange	represents a CP stop point.
	White	represents a circle assist point. This is an assistant point only for Point Graphic Editor.
	Clear	represents a circle center point.
	Gray	represents a point with a broken point link.

■ Dispense Filling Points

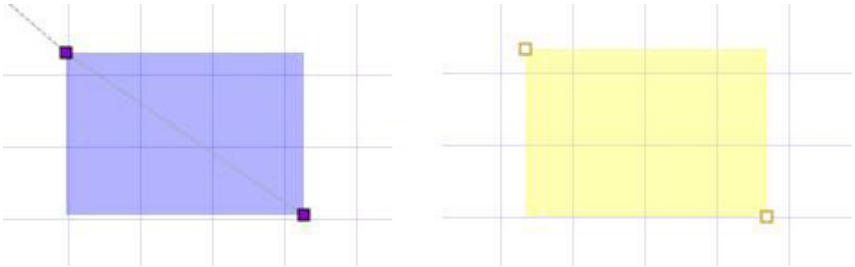
Dispense filling points cannot be newly positioned or set in Point Graphic Editor. Only coordinate editing can be done in Point Graphic Editor

NOTE: Dispense filling points are useable only with Dispensing Specifications.

The dispensing area is represented by a rectangle or circle enclosed by the specialized points.



(Magenta: rectangle) this represents the work area enclosed by a trajectory zigzag start point and a rectangle end point.
(Orange: rectangle) this represents the work enclosed by an auxiliary line zigzag start point and a rectangle end point.



(Indigo: rectangle) this represents the work area enclosed by a trajectory rectangular spiral start point and a rectangle end point.
(Yellow: rectangle) this represents the work area enclosed by an auxiliary line rectangular spiral start point and a rectangle end point.

(Indigo: circle) This represents the work area enclosed by three trajectory points: a spiral start point, circumference of spiral area 1, and circumference of spiral area 2.
(Yellow: circle) This represents the work area enclosed by three auxiliary line points: a spiral start point, circumference of spiral area 1, and circumference of spiral area 2.

15.4 Graphic Editing

■ Overview

The items that can be placed are points, straight lines (consecutive straight lines), circles, or arcs. Each item is made up of all, or a combination of start points, end points, or support points. Each start point, end point, or support point is part of an item's configuration and differ from the function of a Point.

The selected/unselected statuses of the items are as follows:

	Unselected	Selected
Point		
Line		

■ Placement Rules

When placing each item, select the item to be placed from either the menu or tool bar. Items are placed in this order: start point → end point → support point.

(Depending on the item there are some points which are not used. Refer to the table below).

	Start Point	End Point	Support Point	Reference
Point	✓			The starting point is the placed point.
Straight line	✓	✓		A straight line connecting the start point and end point is drawn.
Circle	✓		✓	For a circle graphic, the placement methods are either of the following: • A circle with a diameter of the start point and the support point is drawn. • A circle with a radius of the start point and circle center point is drawn.
Arc	✓	✓	✓	An arc connecting the start point → support point → end point is drawn.

- Key operations and combinations for placing items

  You can manage the placement of items with the following key and mouse combinations:

	Ctrl Key	Shift Key	Ctrl + Shift Key
Point	N/A	N/A	No snapping
Straight Line	When placing the end point, the position from the start point is rounded to a 45° angle.	N/A	No snapping
Circle	When placing the support point (or circle center point), the position from the start point is rounded to a 45° angle.	N/A	No snapping
Arc	When placing the end point, the position from the start point is rounded to a 45° angle When placing the arc point, the center angle is rounded to a 180° angle.	N/A	No snapping

■ Movement Rules/Apex Movement Rules

You can move the items by dragging them with the left mouse button. The position of the item's movement is set when you click and release the mouse button.

If you drag a point within an item (start point, end point, etc.), only that point moves and the graphic's shape (size) changes.

If you drag an item's line (a line connecting various points), the whole item is moved. Also, if multiple items are selected, all of the selected items are moved.

- Key operations and combinations for moving items

  You can manage the placement of items with the following key and mouse combinations:

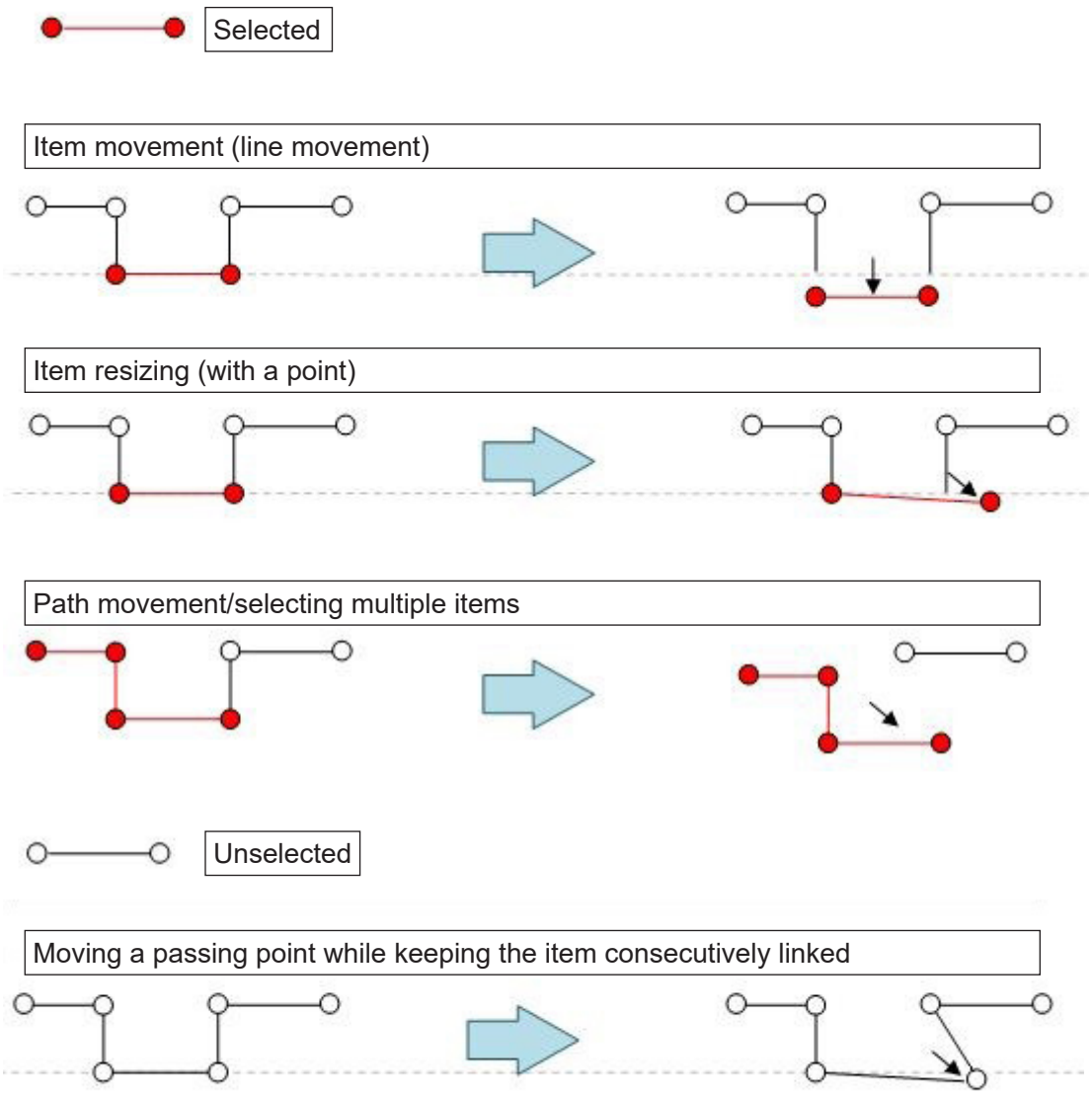
	Ctrl Key	**Shift Key**	**Ctrl + Shift Key**
Point	N/A	N/A	No snapping
Straight Line	When moving a point, the angle with the unmoved point is fixed.	When moving a point, the distance with the other point is fixed.	No snapping
Circle	When moving the start point, the angle with the support point is fixed. When moving the center point / support point, the angle with the start point is fixed.	When moving the start point/support point, the center point is fixed (only when moving the support point).	No snapping
Arc	When moving the start point (end point), the angle with the end point (start point) is fixed at the time of placement. When placing the arc point, the central angle is fixed at 180°.	When moving the arc point, the center point is fixed.	No snapping

■ Delete

Select the graphic you want to delete, and then select [Edit] → [Delete] on the menu bar, or press the Delete key to delete the graphic.

■ Movement Example

Below is an example of actual movement operations.



■ Snap function and consecutively linking items (Path Generation)

With the snap function you can consecutively link an item's start point to a different graphic's end point. (However, you can only do this with end points that are not already consecutively linked). The points connected become consecutive points and these two items become part of the same path. You cannot split the path; therefore, the consecutive link is made up of these two items.

(It is possible to have multiple passing points, start points and end points at the same coordinates).

Point you are snapping	Point it is snapped to	Outcome
Start point	End point	Consecutively linked
End point	Start point	Not consecutively linked
Start point	Start point	Not consecutively linked
End point	End point	Not consecutively linked

- Rules for consecutively linking/removing consecutive links

  Generally if you want to make a consecutive link, you can do this by snapping a start point to any given end point you want to link with consecutively. Conversely, if you want remove a consecutive link; select the end point in the consecutively linked item, move the end point to remove the consecutive link, and snap it back to the same point. By doing this, the end point is being snapped to the start point and therefore is no longer consecutively linked (the consecutive link is removed).

  As an exception to snapping an end point and consecutively linking a start point, if you place a new graphic in between the two graphics you want to consecutively link, you can consecutively snap both the start point and end point.

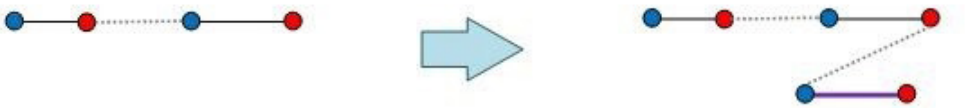
■ Rules for changing the sequence

If items are consecutively linked, the order of the item in the robot's trajectory sequence may change. Only the order of the moved item will change. If you want to change the sequence of the path units, use the aforementioned path order function.

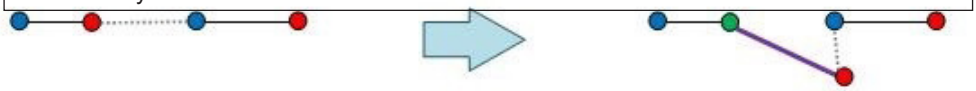
- Operation Example

- Placing New Items

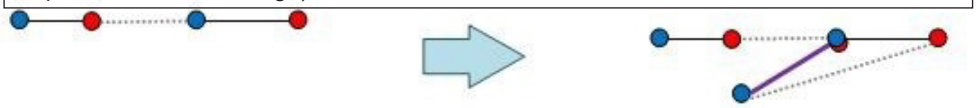
Place the item without snapping it to anything → it is placed at the end of the sequence



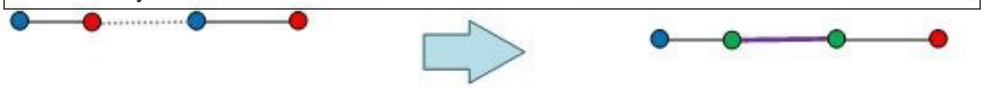
Snap the start point to an end point → it comes after the item it was snapped to and it is consecutively linked.



The end point is snapped to a start point → it is placed at the end of the sequence (the sequence does not change).

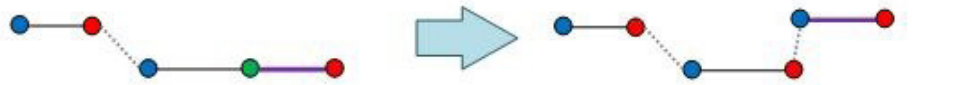


Snap items so they are connected → insert the item; both the start point and end point become consecutively linked.

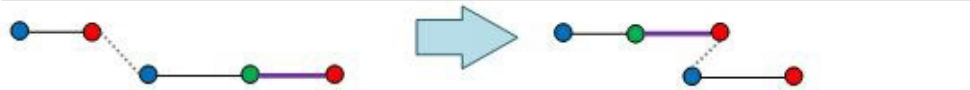


- Editing and Moving Items

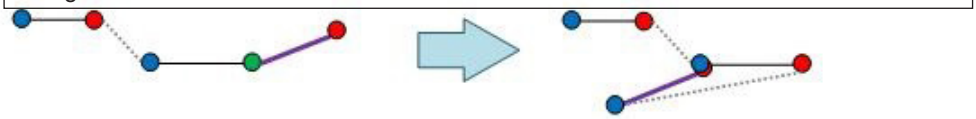
Move the item without snapping it to anything → the sequence does not change



Snap the start point to an end point → it comes after the item it was snapped to and it is consecutively linked.

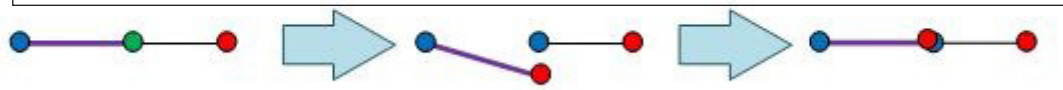


Snap the end point to a start point → it is not consecutive and the sequence does not change.

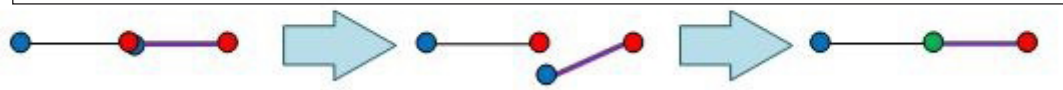


- Consecutively Linking Items/Removing a Consecutive Link

Remove the consecutive link → use the item on the preceding side of the link, temporarily move it to different coordinates and snap it back into place.



Consecutively link unconnected items → use the item on the latter side of the link, temporarily move it to different coordinates and snap it back into place.



■ Path Order Function

You can change the path's sequence with the path order function. (You cannot change the sequence within the path).

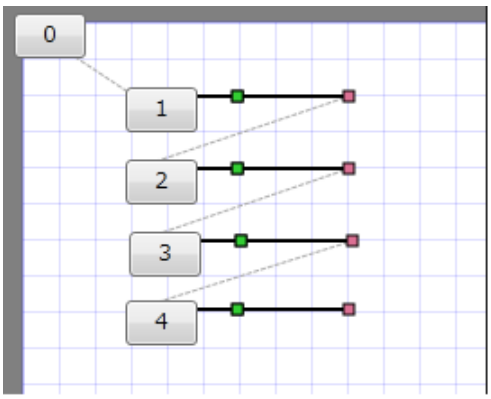
From the menu or the tool bar, select the path order function to display buttons with numbers showing the order at the start point positions (CP start points in the JCS format) from among trajectory items already placed. The sequence is set in the order you press the buttons. The first button you press means that the sequence up until that button does not change. The sequence changes from the second button onwards that you press. The path order function is finished when you select another mode, therefore you do not need to continue pressing the buttons to the end.

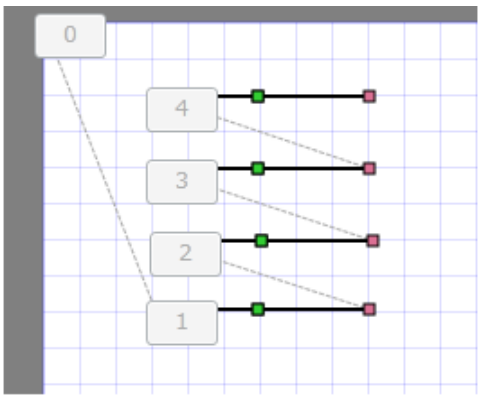
- Example of operation procedure

Example1: With the current numbers, you want to switch the sequence to 4 → 3 → 2 → 1.

→ With the current display, press the buttons in this order 0 → 4 → 3 → 2 → 1.

NOTE: Each time you press a button the displayed numbers change.

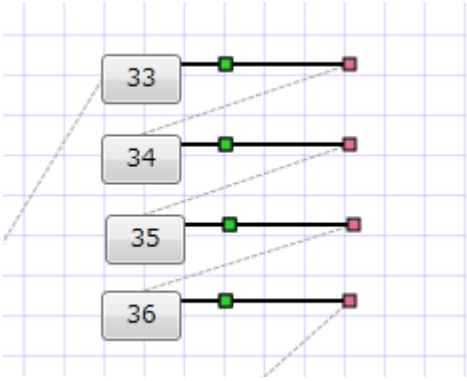


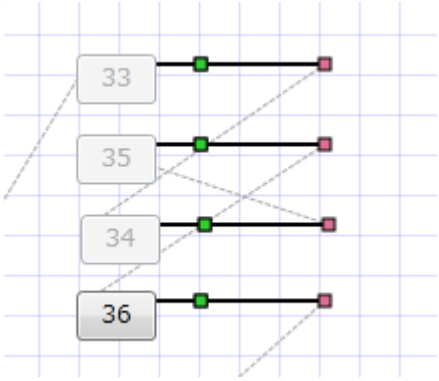


Example2: With the current numbers, you want to switch only 34 and 35.

→With the current display, press the numbers in this order 33 → 35 → 34.

NOTE: Each time you press a button the displayed numbers change.





■ Selection Operations and Selectable Items

With this application you can select items with the two following main selection operations:

- Selection by mouse click
- Selection by mouse drag

1. Selection by mouse click

Selection by mouse click is limited to editable items. By using Shift key/Ctrl key combinations you can select multiple items. Also, if you select an item by double clicking it, the clicked item and all items connected to that item are selected.

Selection	Keyboard	Outcome
Editable Item	N/A	The clicked item is selected (all other items are unselected)
Editable item	+Ctrl	The clicked item switches to the selected state
Editable item	+Shift	The clicked item switches to the selected state
All other areas	N/A	All items are unselected

2. Selection by mouse drag

When you make a selection by dragging the mouse, non-editable items can be selected. Also, you can select only editable items by using a Shift key combination.

Selection	Keyboard	Outcome
All displayed items	N/A	The items within the range created by dragging the mouse are selected.
Editable items	+Shift	The editable items within the range created by dragging the mouse are selected.

■ Reverse Start/End Point Function

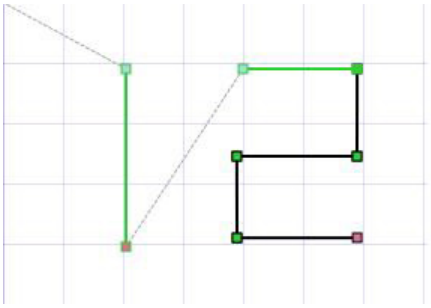
You can reverse the start point and end point of an item with the reverse start/end point function.

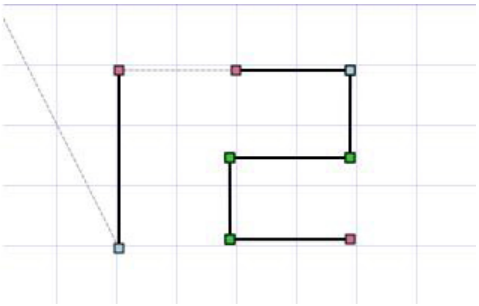
Select the item you want to reverse and from the menu or tool bar select the reverse start/end point function to reverse the start point and end point of the selected item.

By performing a reversing operation with the whole path selected, you can reverse that path's start point and end point.

Example1: Reversing the start point and end point of individual items

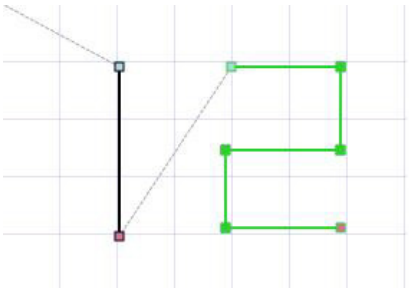
→Select the individual items or part of the path, and reverse the start point and end point. The start point and end point of the selected items are reversed. Consecutively linked items are no longer linked.

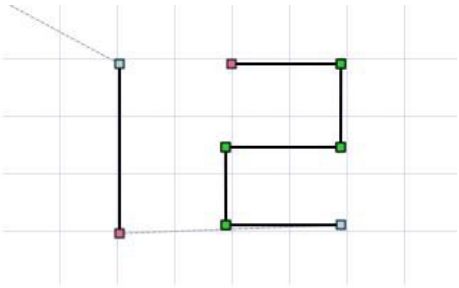




Example2: Reversing the start point and end point of an entire path

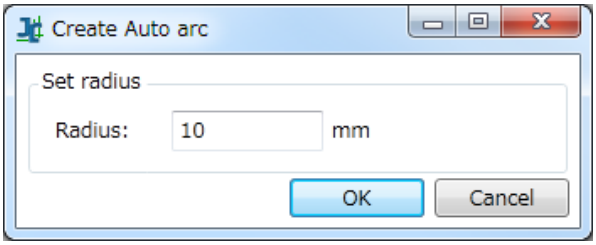
→ Select all of the items included in the path, and reverse the start point and end point. The path stays consecutively linked and the start point and end point are reversed.





■ Create Auto Arc Function

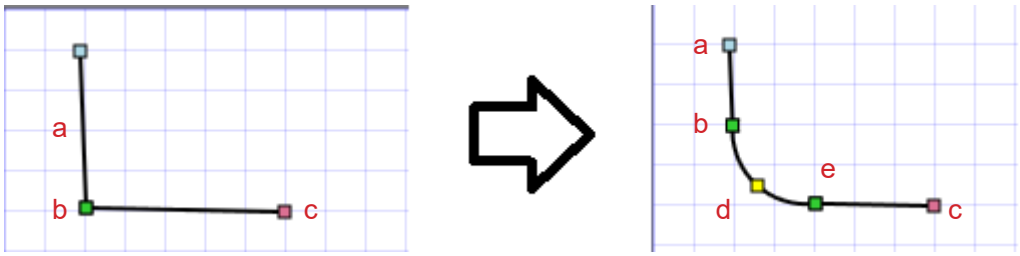
This is a function used to round the path angle of an intermediate point.
When the Create Auto Arc function is selected from the tool bar, click a consecutive point and the Create Auto Arc dialog appears.



- Settable Items

  Radius

  Specify the arc's diameter to create it automatically. An arc is created automatically so that the two lines connected to the consecutive point are inscribed as an arc.



The points types used to create the d and e points are defined according to the Create at Passing Point and Create at Stopping Point settings. Refer to "15.3.1 Menu Bar" or "15.3.2 Tool Bar" for further details.
If you hold down the Ctrl key and click a continuous point, an arc is created using the previously set radius without the Create Auto Arc dialog appearing.

15.4.1 Create Graphic/Edit Graphic Dialog

You can create/edit graphics from the Create Graphic/Edit Graphic dialog.

This dialog appears after you right click the edit view and select "Create Graphic" or you right click a graphic you want to edit and select "Edit Graphic". When creating, select the tab of the graphic you want to create, and enter the arbitrary values to create the graphic. When editing, only the tab of the object you are editing is enabled.

- Tabs

  Point

  Straight Line

  Circle (Diameter)

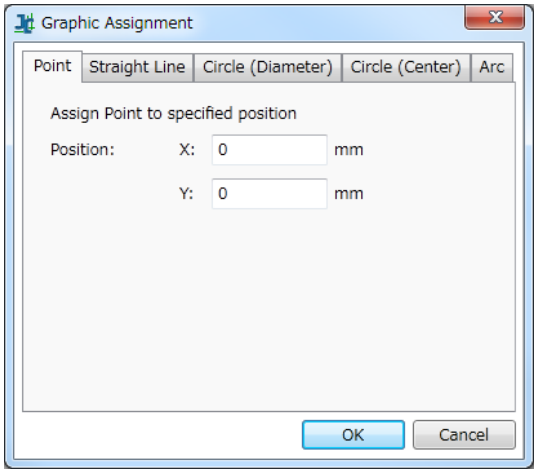
  Circle (Center)

  Arc

■ Creating/Assigning a Point

- Settable Items
  Position (X, Y)

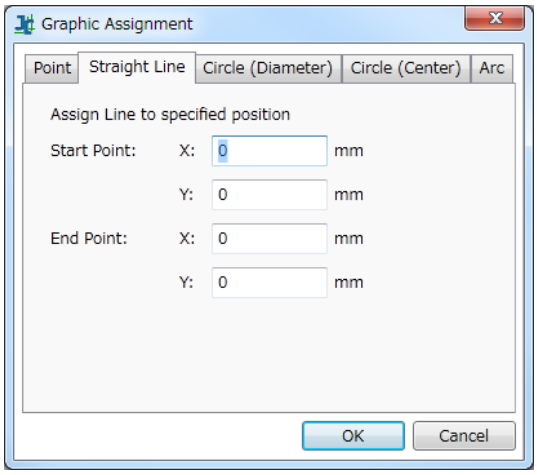
  An individual point is created or edited on the position (X, Y)



■ Creating/Assigning a Straight Line

- Settable Items
  Start Point (X, Y)
  End Point (X, Y)

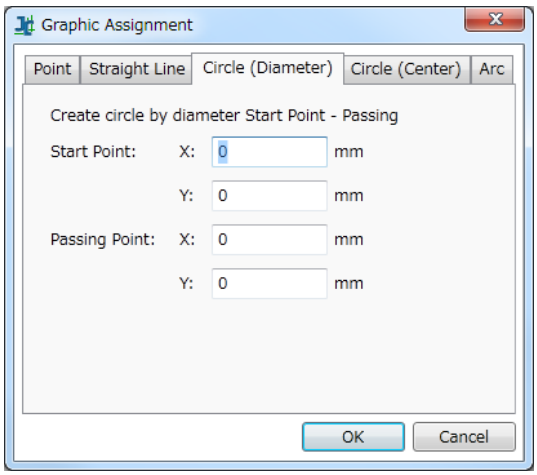
  A straight line (line segment) connecting the start point and end point is created or edited.



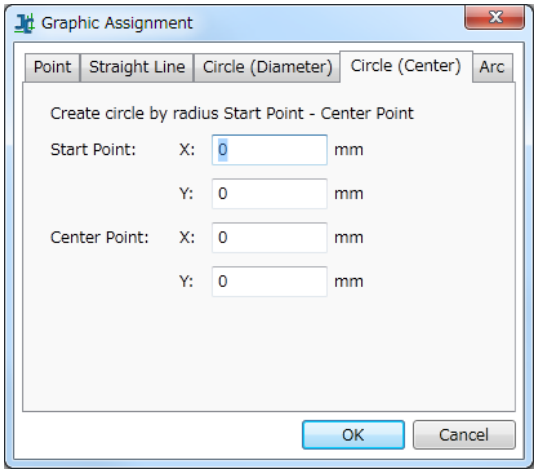
■ Creating/Assigning a Circle (Diameter)

- Settable Items
  Start Point (X, Y)
  Passing Point (X, Y)

  A circle with the diameter of the start point and the passing point is created or edited.



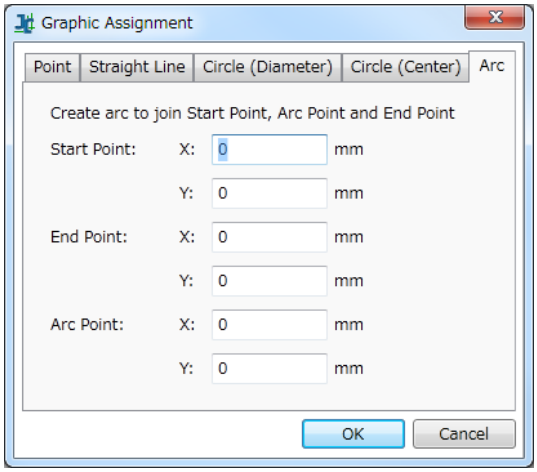
■ Creating/Assigning a Circle (Center)



- Settable Items
  Start Point (X, Y)
  Center Point (X, Y)

  A circle with center point as the center of the circle is created or edited by using the start point and the center point as the diameter.

■ Creating/Assigning an Arc



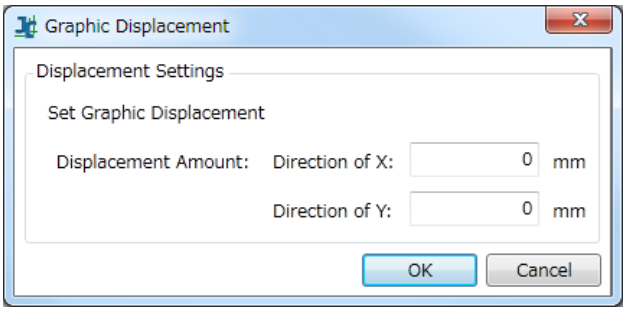
- Settable Items
  Start Point (X, Y)
  End Point (X, Y)
  Arc Point (X, Y)

  An arc joining the start point – arc point – end point is created or edited.

15.4.2 Graphic Displacement Dialog

You can move a graphic from the Graphic Displacement dialog.

Select the graphic you want to move, and by selecting [Tool] - [Graphic Displacement], the Graphic Displacement Dialog appears.



Set the amount to move the graphic from the current position, and click the [OK] button to move the graphic from the current position by that specified amount.

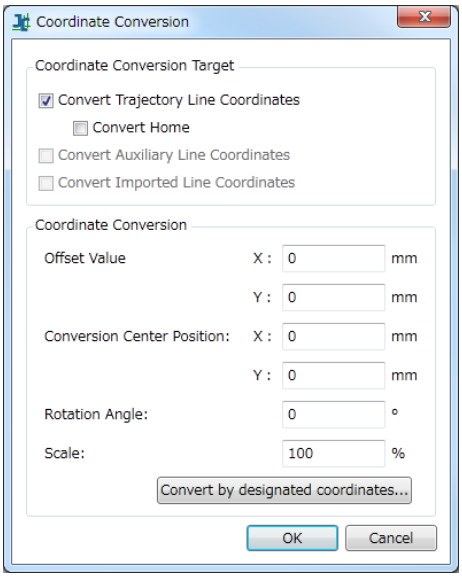
15.4.3 Coordinate Conversion

You can change the coordinates of a positioned item with the coordinate conversion function.

■ Operation Procedure

From [Tool] on the menu bar select [Coordinate Conversion].

The Coordinate Conversion dialog appears. Enter the type and coordinate conversion settings and click the [OK] button to perform the conversion. Select “Convert by designated coordinates...” to calculate the conversion data from entering values into the robot’s coordinate system and the corresponding editing view coordinates. (Further details follow).



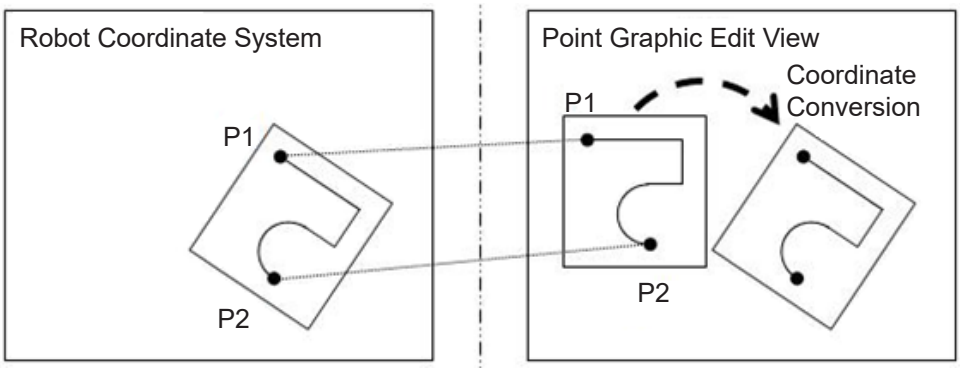
- Settable Items

Convert Trajectory Line Coordinates	:	Designate whether to target the trajectories for conversion.
Convert Home	:	Designate whether to target the home position for conversion.
Convert Auxiliary Line Coordinates	:	Designate whether to target the auxiliary lines for conversion.
Converted Imported Line Coordinates	:	Designate whether to target the imported figure for conversion.
Offset Value	:	Specify the additional offset for conversion.
Conversion Center Position	:	Specify the rotation’s center or the reference point for enlargement/reduction.
Rotation Angle	:	Specify the angle of rotation for conversion.
Scale	:	Specify the scale for conversion.

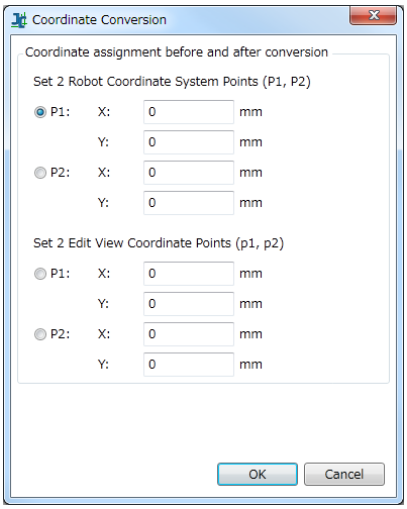
If you select trajectory lines as a target of conversion, all trajectories are targeted, and if you select auxiliary lines as a target of conversion, all auxiliary lines are targeted. Therefore you cannot convert only “some” of the trajectory lines, etc.

■ Convert by Designated Coordinates

When you load an external graphic into the edit view, the position coordinates in the edit view and the position coordinates of the actual item on the robot sometimes do not match. To match the coordinates to the actual coordinates of the robot, use the Convert by Designated Coordinates function.



By designating the two robot reference points, P1 and P2, and the edit view's corresponding reference points, p1 and p2, each setting value is automatically calculated to matchup the robot coordinate system's reference points, P1 (X1 and X2) and P2 (X2 and Y2) and the edit view's reference points, p1 (x1 and y1) and p2 (x2 and y2).

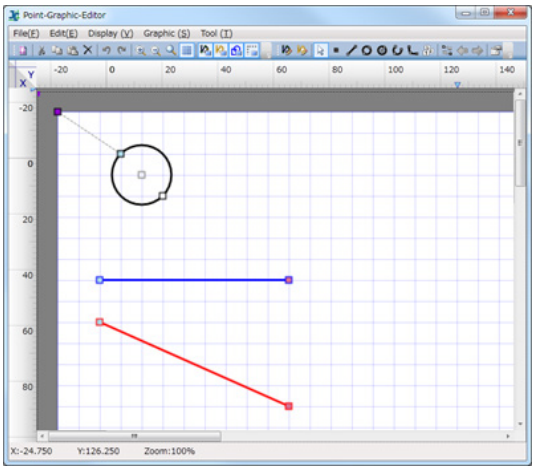


- Settable Items

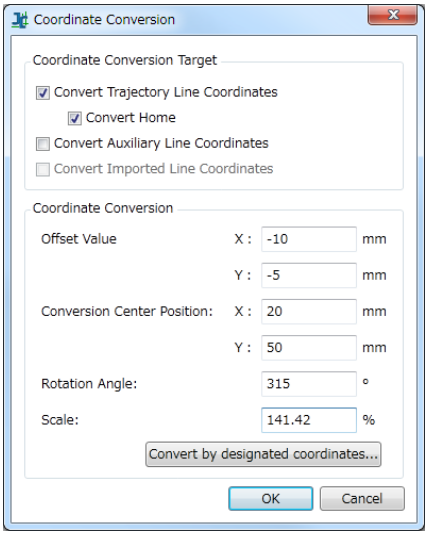
Robot Coordinate System	:	These two reference points are for specifying the position after coordinate conversion.
Edit View Coordinates	:	These two reference points are for specifying the position before the coordinate conversion.

If you display the Coordinate Conversion dialog, a straight red line linking the two points of the robot system coordinates and a straight blue line linking the two points of the edit view coordinates appear in the edit view.

Also, when you click on the edit view when the Coordinate Conversion dialog is open, you can set coordinates to the item which is selected by the radio button by clicking on coordinates in the edit view.



After setting the coordinates, click the [OK] button to automatically set the offset values, the conversion center point, the rotation angle and the expansion/contraction scale.



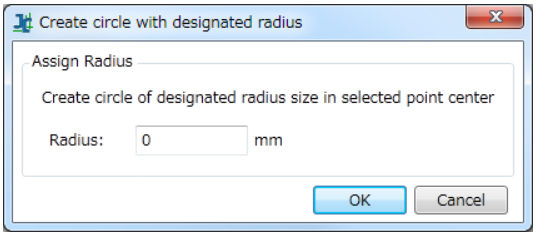
15.4.4 Using the Graphic Creation Function with an Existing Graphic

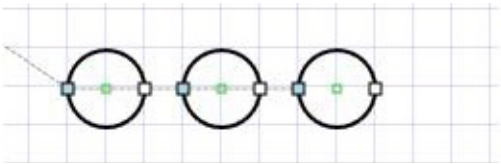
With Point Graphic Editor, there are functions to “place” or “assign” new graphics using existing graphics you have created. These functions can be executed from these menus:

- [Tool] – [Create Circle by Designated Radius]
- [Tool] – [Create Circle by Intermediate Radius]
- [Tool] – [Create Circle/Arc Center Point]
- [Tool] – [Create Line in Rectangle Center]

■ Create Circle by Designated Radius

This creates a circle of a designated radius centered on the selected point (independent point). If there are multiple points within the selected graphic, multiple circles are created. If there are no points, a graphic is not created.

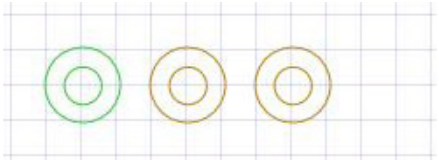


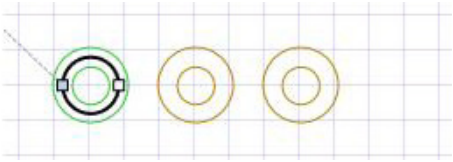


■ Create Circle by Intermediate Radius

A circle with an average position between two circles (a center point positioned in between the two circles) and with an average size (the average radius of the two circles) is created between the selected graphics. If there are 3 or more circles, the circle is created using the information from the two circles found first. If the number of selected circular graphics is one or less, the graphic is not created. This is a useful function for placing a circle in between two concentric circles of different sizes.

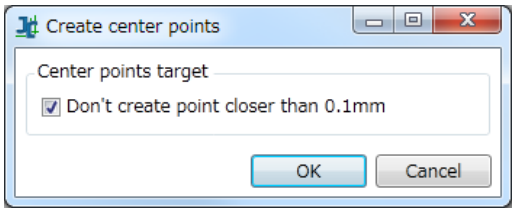
NOTE: The order that the circles are found varies depending on the trajectory line order or auxiliary line order; however, in general, the order cannot be known from appearance alone.

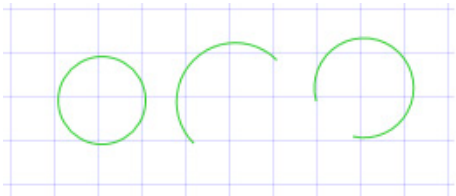


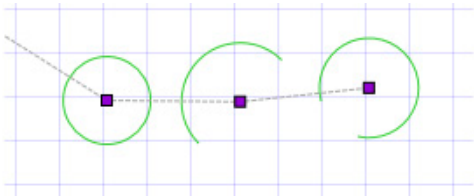


■ Create Circle/Arc Center Point

This creates a circle center point for the selected circle/arc. If there are multiple circles/arcs within the selected graphic, you can select whether to create points closer than 0.1 mm or not. If there are no circles/arcs within the selected graphic, no graphics are created.



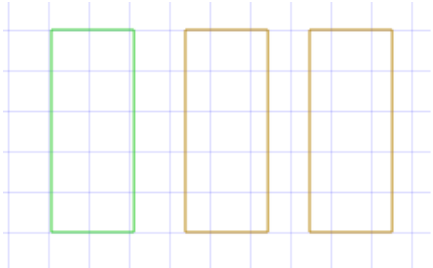


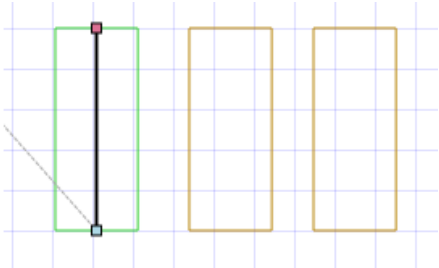


■ Create Line in Rectangle Center

With this application, the idea of a rectangle does not exist; however, there is a function to place a straight line in the middle of a combination of multiple straight lines that have the appearance of a rectangle. If the selected graphic has more than two straight lines, a straight line is placed in between the two longest lines. If there are 1 or fewer straight lines, this graphic is not created. This is a useful function for placing a line in between a rectangle, etc.

NOTE: If there are multiple lines with the same lengths, the lines found first are selected. The order that the lines are found varies depending on the trajectory line order or auxiliary line order; however, in general, the order cannot be known by external appearance alone.





15.4.5 Auto Connect

■ Function for automatically connecting a selected graphic

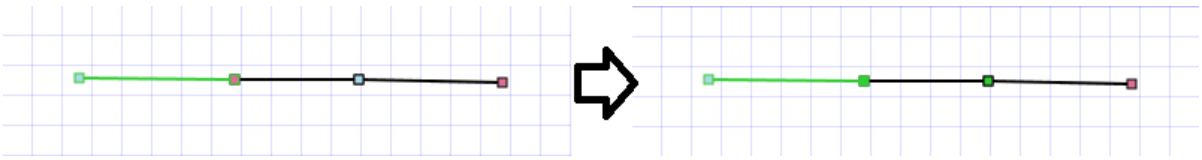
With a graphic selected, execute [Auto Connect] from the [Tool] menu to automatically connect all possible consecutive items in the sequence towards the end point.

Auto Connect Conditions	
The source end point of the consecutive item has a start point/end point with the same coordinates.	The point found is a start point and the item on the start point side is not already consecutive
	The point found is an end point and the item on both the start point and end point side is not already consecutive

If the above conditions are met, the graphic is automatically connected as follows:

If linking a start point, the items are consecutively linked with no change.
If linking an end point, reverse the start point and end point and then perform auto connect.

Example:



15.4.6 Import AutoConnect

■ Function for creating a trajectory automatically connected based on the imported figure

Import DXF file or Gerber Data as the imported figure. With the imported figure selected, select [Tool] - [Import AutoConnect] to display the Imported Figure Auto Connect dialog. It automatically connects all possible consecutive lines and creates a trajectory in the direction you specify.

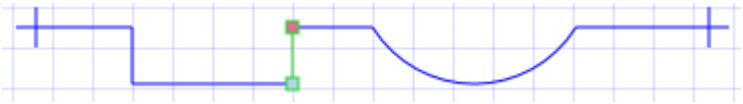
By using this function, you can easily edit the trajectory on the graphics with the densed imported figures. The conditions to auto connect is the same as "15.4.5 Auto Connect".

■ Operation Procedure

Import the DXF file and Gerber Data in advance.

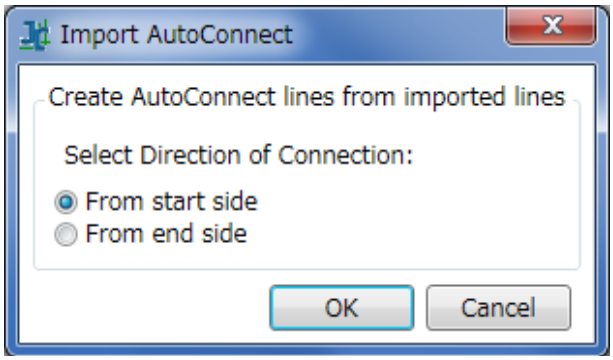
Select icon and turn the Edit Trajectory ON.

Select the auto connect reference line from the imported figure.



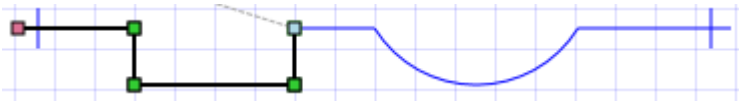
Select [Menu] - [Tool] - [Import AutoConnect] to display the Imported Figure Auto Connect dialog.

Select the direction you want to connect and press OK button to create the trajectory.



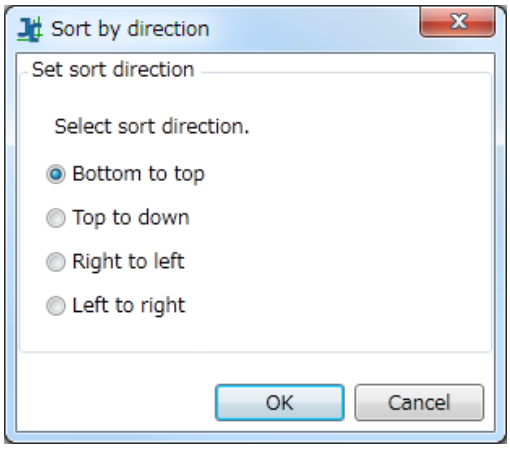
Example: When [From start side] is performed

Example: When [From end side] is performed



15.4.7 Sort by Direction Dialog

If you select [Sort by Direction] from the [Tool] menu when multiple paths are selected, you can switch the order of the multiple paths.

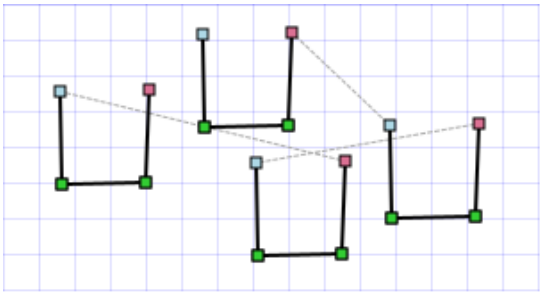


- Settable Items
  Bottom to top
  Top to down
  Right to left
  Left to right
  The paths are sorted from the direction specified from the start point.

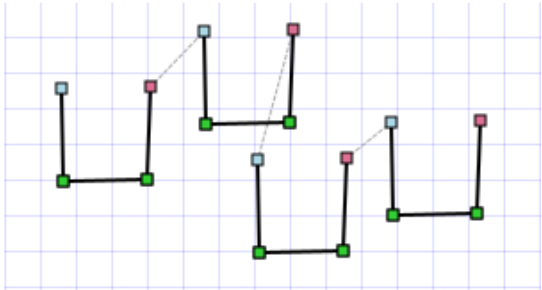
Examples for sorting various paths

Example of sorting paths by specifying the “Left to right” sort direction:

Before sorting

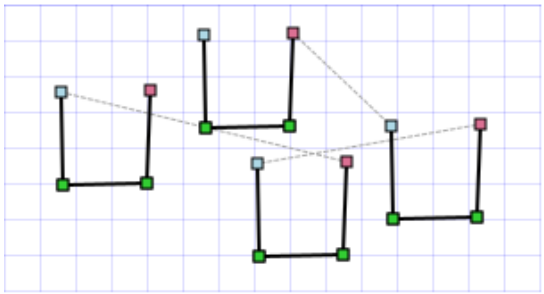


After sorting

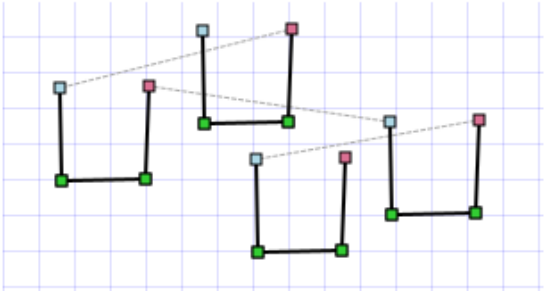


Example of sorting paths by specifying the “Top to bottom” sort direction:

Before sorting



After sorting

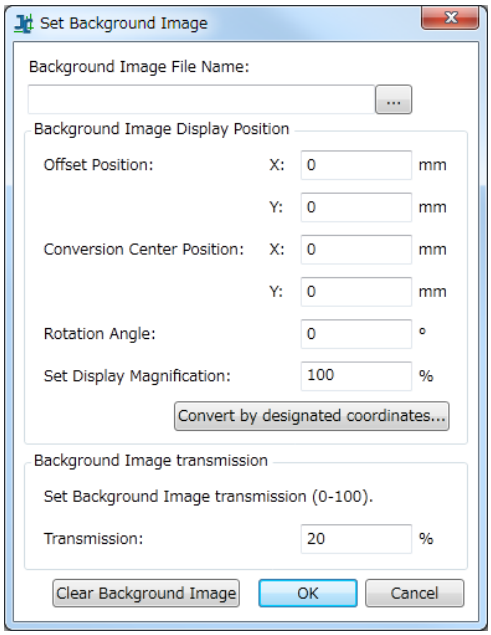


15.5 Loading a Background Image

You can load a JPEG image as a background image.

■ Operation Procedure

- Select [File] → [Background Image Setting].
- The background image setting dialog appears. Select the JPEG file to load as the background, after it is loaded, set the display position for the image, and click the [OK] button to load the image as the background. Select “convert by designated coordinates”, enter the robot’s coordinate system and the conversion data is calculated (details to follow).

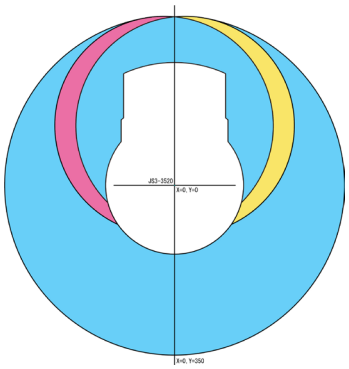


In addition, if you load the image using the default setting, the reference point of the loaded position is treated as 0,0 regardless of the coordinate system settings, and the image is loaded using the Windows® coordinate system (horizontal axis is X/vertical axis is Y, the right direction is positive, and the down direction is positive).

- Settable Items

Background Image File Name	:	From the file selection dialog, specify the image file to display as the background.
Offset Position	:	Specify the offset position for loading the image.
Conversion Center Position	:	Specify the rotation’s center or the reference point for the enlargement/reduction.
Rotation Angle	:	Specify the rotation angle for loading the image.
Set Display Magnification	:	Specify the zoom percentage for loading the image.
Transmission	:	Specify the transparency ratio of the background image.

With the JS3 Series, a JPEG file containing the work envelope of the robot is included in the “180919002_JS3_work envelope_xxxxxxxx” folder on the JR C-Points II CD-ROM. (“xxxxxxxx” indicates the date of the file updated)



File Name	Offset Pos.	
	X	Y
JS3-3520_work envelope.jpg	351	-371
JS3-4520_work envelope.jpg	451	-471
JS3-5520_work envelope.jpg	551	-571

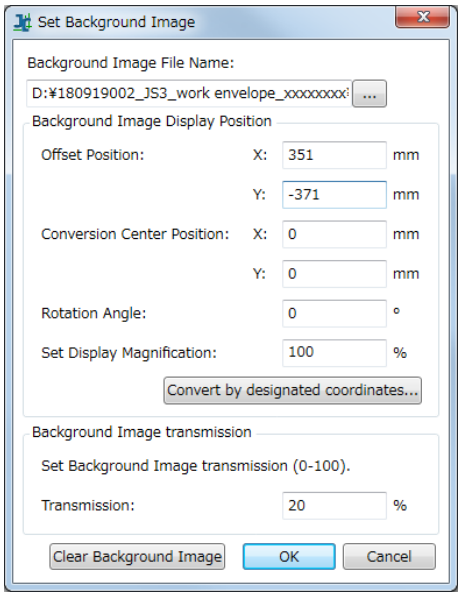
NOTE: The diagram is an example of the JS3-3520_work envelope.jpg file.

■ Example: Servo Scara JS3-3520

This is an example of how to load the JS3-3520_work envelope.jpg (background image for the JS3-3520 model).

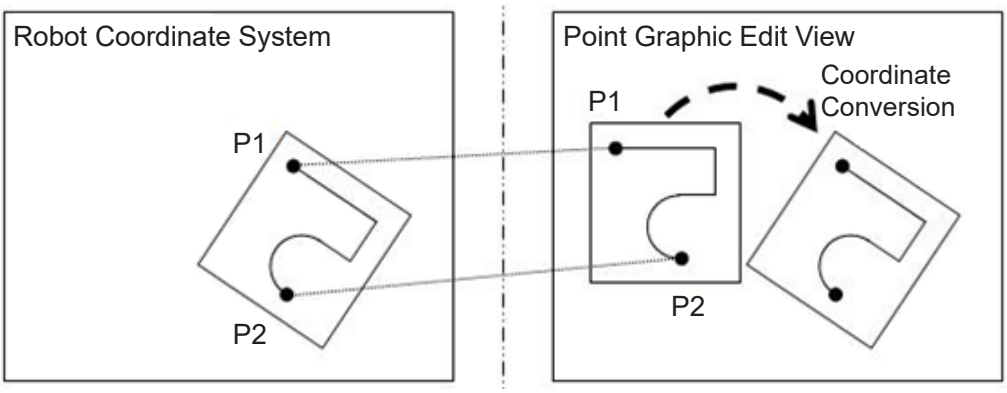
From [Background Image File Name], click the [...] button, open the “\180919002_JS3_work envelope_xxxxxxxx” folder and select “JS3-3520_work envelope.jpg”.
(“xxxxxxxx” indicates the date of the file updated)

The top left of the background image appears at the 0, 0 coordinates. To offset the image to the correct coordinates, enter values into [Offset Position] (in the Background Image Display Position area). Refer to the table on the previous page for the position offset values. For a JS3-3520 model, enter the following values:
X: 351, Y: -371.
Click [OK].



■ Convert by Designated Coordinates

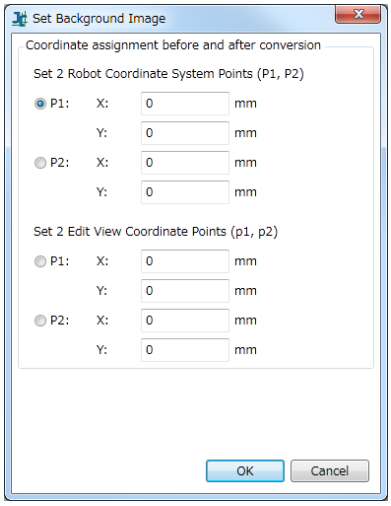
When you load an external graphic into the edit view, the position coordinates in the edit view and the position coordinates of the actual item on the robot sometimes do not match. To match the coordinates to the actual coordinates of the robot, use the Convert By Designated Coordinates function.



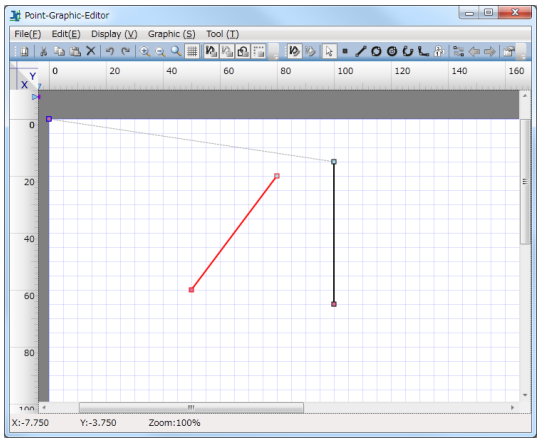
By designating the two robot reference points, P1 and P2, and the edit view’s corresponding reference points, p1 and p2, each setting value is automatically calculated to matchup the robot coordinate system’s reference points, P1 (X1 and X2) and P2 (X2 and Y2) and the edit view’s reference points, p1 (x1 and y1) and p2 (x2 and y2).

- Settable Items

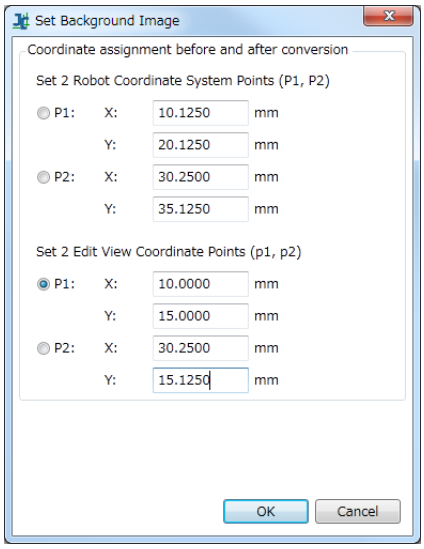
Robot Coordinate System	:	These two points are a reference for specifying the position after coordinate conversion.
Edit View Coordinates	:	These two points are a reference for specifying the position before coordinate conversion.

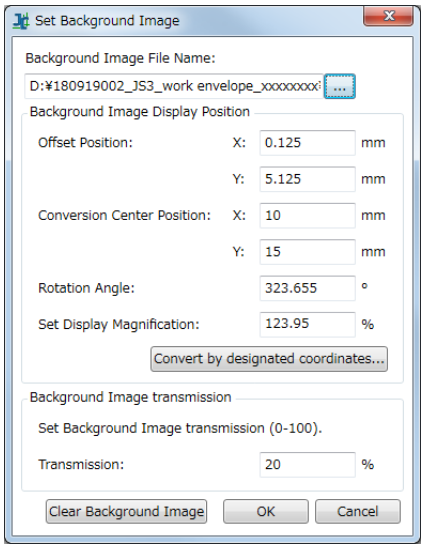


If you display the Coordinate Conversion dialog, a straight red line linking the two points of the robot system coordinates, and a straight blue line linking the two points of the edit view coordinates appears in the edit view.
Also, when you click on the edit view when the Coordinate Conversion dialog is open, you can set coordinates to the item which is selected by the radio button by clicking on coordinates in the edit view.



After setting the coordinates, click the [OK] button to automatically set the offset values, the conversion center point, the rotation angle and the display magnification.





15.6 Import Function

With Point Graphic Editor, you can import the following data formats, and use them for graphic editing.

DXF : AutoCAD data format. You can load this data format as an imported figure.
Gerber Data : Plot data format. Combatable with RS-274D/RS-274-X. You can load this data as an imported graphic.

15.6.1 DXF File/Gerber Data Import Function

■ Overview

You can convert and load DXF data regulated by Autodesk, Inc., or plot data in the form of Gerber data (RS-274D/RS-274-X) to JR C-Points II data.
Not all DXF/Gerber data is loaded; the coordinate values in DXF data are used as is, and information that can be expressed in JR C-Points II data is converted and loaded.
In addition, only one DXF or Gerber data file can be loaded at the same time. If you import DXF/Gerber data when there already is a graphic loaded, the previously loaded data is discarded.

■ Compatibility

Below are the compatible items for DXF files and Gerber Data.

■ DXF Data

The readable group codes within DXF data are as shown below.

POINT	:	Points
LINE	:	Lines
POLYLINE	:	Line and arc combination information
LWPOLYLINE	:	Line and arc combination information
CIRCLE	:	Circles
ARC	:	Independent arcs
TRACE	:	Thick lines (not filled in)
SOLID	:	Filled in (not filled in)

NOTE: Graphics other than the ones listed above, macros, or data that contains elements that are called up externally, cannot be drawn or imported.

■ Gerber Data

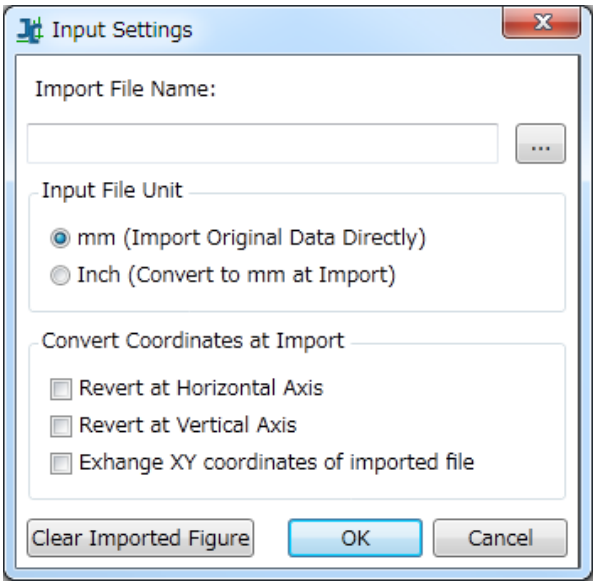
Straight lines, arcs, and circles

■ Operation Procedure

Select [File] from the menu bar and then select [Import] – [Import DXF File] / [Import Gerber Data File].

The import settings dialog appears. Select the subject file to load, enter the load settings, and click the [OK] button.

The offset dialog appears. Specify the offset to set to the file and click the [OK] button to load the file.
The offset has initial values entered that fit the loaded image to the border of the work area.



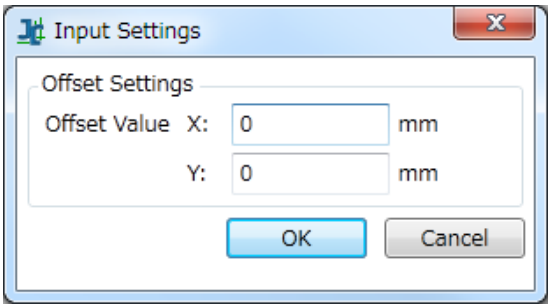
NOTE: When loading Gerber data, if the specified number of digits cannot be found within the Gerber data file, the file is analyzed by 3 digit decimal LZO actions.

• Settable Items

Import File Name	:	From the file selection dialog, specify the file to import.
Input File Input	:	Select whether the import file is uses a mm system or an inch system. (This software uses a mm system).
Revert at Horizontal Axis	:	Specify whether to invert the horizontal axis when the file is loaded.
Revert at Vertical Axis	:	Specify whether to invert the vertical axis when the file is loaded.
Exchange XY Coordinates of Imported File	:	Specify whether to switch the X coordinates and Y coordinates when the file is loaded.

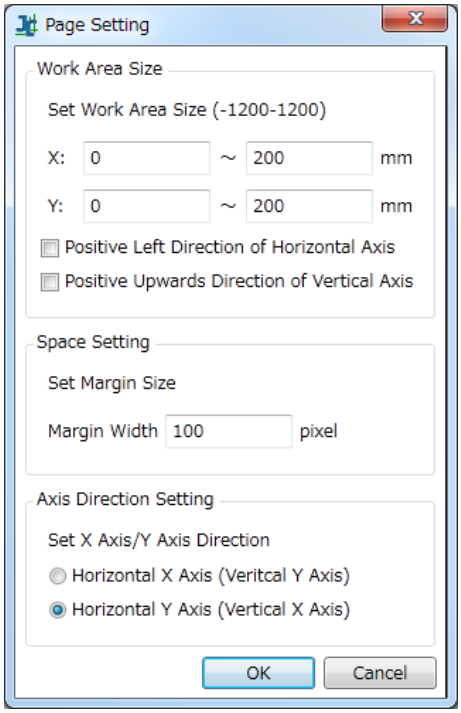
Offset Value

X : Specify the offset for the X coordinates.
Y : Specify the offset for the Y coordinates.



15.7 Page Settings Dialog

On the page setting dialog there are settings for the work area, etc., of the diagrams being edited. The initial settings are automatically set according to the robot model information. These settings are saved to the C&T data file. However, these settings cannot be sent to the robot.



- Work Area Size

  X (min to max) : This sets the X value's work area range. Enter values so the right box has larger values than the left box.

  Y (min to max) : This sets the Y value's work area range. Enter the values so the right box has larger values than the left box.

  Positive Left Direction of Horizontal Axis : Normally the right direction is positive, however, by putting a check in this, the left direction becomes positive.

  Positive Upwards Direction of Vertical Axis : Normally the downwards direction is positive, however, by putting a check in this, the upwards direction becomes positive.
- Space Setting

  Margin Width : This specifies pixel units for the margin width around the work area.
- Axis Direction Setting

  Horizontal X Axis : This sets the horizontal axis as the X axis and the vertical axis as the Y axis.

  Horizontal Y Axis : This sets the horizontal axis as the Y axis and the vertical axis as the X axis.

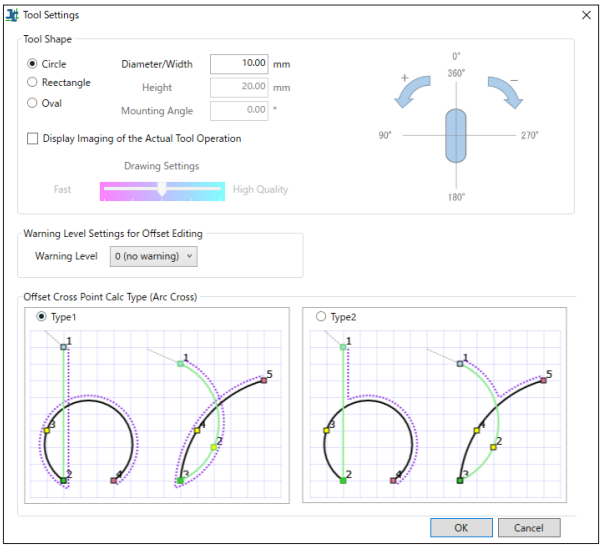
15.8 Tool Settings

With the tool settings in Point Graphic Editor, you can enter the tool shape to display imaging of the actual tool operation in Point Graphic Editor and also edit the tool offset.

15.8.1 Tool Settings Dialog

Use the Tool Settings dialog to show/hide imaging of the actual tool operation and edit the tool shape offset. These settings are saved to the C&T data file. However, this content is not sent to the robot.

■ Setting the Tool Width and Offset
Select [Display] → [Tool Settings] from the menu bar.
The Tool Settings dialog appears.



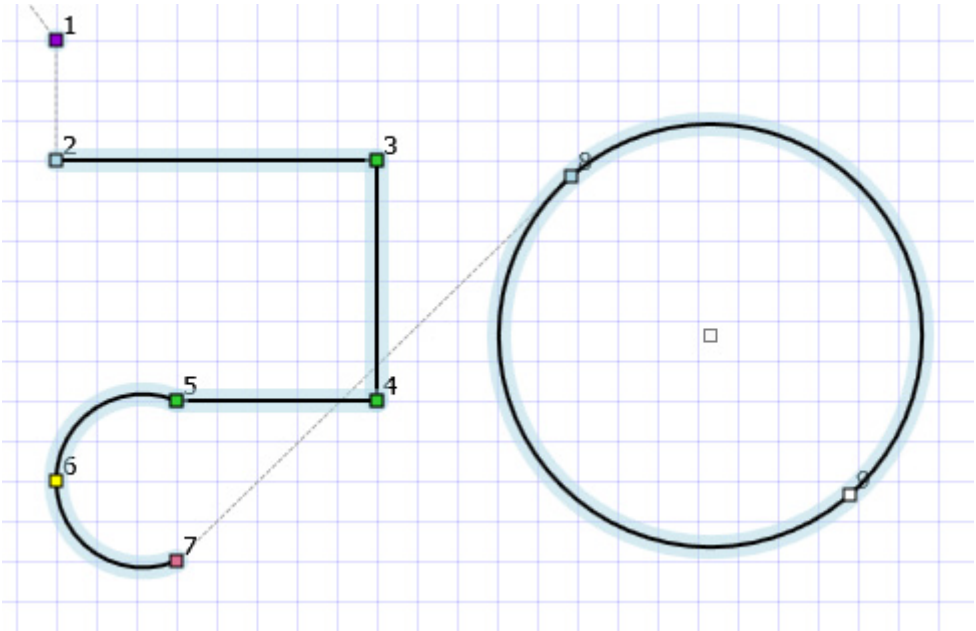
- Tool Shape

Shape	:	Select the tool shape from the Circle, Rectangle, or Oval. NOTE: Select a similar shape of the tool shape used.
Diameter / Width	:	Set the diameter or width of the tool.
Height	:	Set the height of the tool.
Setting angle	:	Set the setting angle of the tool. NOTE: When the tool shape is circle, you can select from Diameter/Width only.
Draw settings	:	Set the drawing interval by the tool shape in 5 levels. NOTE: With the Speed priority, the drawing interval becomes wider with coarse display, but the display time becomes faster. Conversely, with the Image quality priority, the drawing interval becomes narrower with fine display, but the display time becomes slower.
Display Imaging of the Actual Tool Operation	:	Place a check in this item to display imaging of the actual tool operation in light blue around the path of the robot. The tool width that you set determines the width of the tool imaging.

- Warning Level Settings for Offset Editing : Set this to display a warning (this is set to “0 (no warning)” by default setting).

  Warning Levels : Set whether or not to receive a warning when the tool operation range conflicts with other areas of robot paths according to the tool width and the offset that you set.
  Set to [no warning] to receive no warning.
  Set to [within the path only] to receive warnings when the tool operation range conflicts with other areas in the current path.
  Set to [within the program] to receive warnings when the tool operation range conflicts with other areas among all paths in the program.
- Offset Cross Point Calc Type (Arc Cross) : Select [Type 1] to include all areas of the path.
  Select [Type 2] to skip areas of the path that intersect.

Example: Tool Operation Imaging



15.8.2 Editing the Tool Width Offset

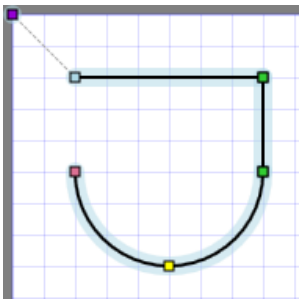
If the tool operation range is set with a tool with a large diameter, the robot may operate the tool at a location further inwards or outwards on the workpiece than you want. You can prevent this by using the editing function to offset the path in units equal to the radius of the tool.
For example, a depaneling robot may cut PCBs at a diameter larger than the actual tool thickness when the robot makes a run with no path offset. You can use this editing function to offset the path and cut the PCB as intended.

NOTE:

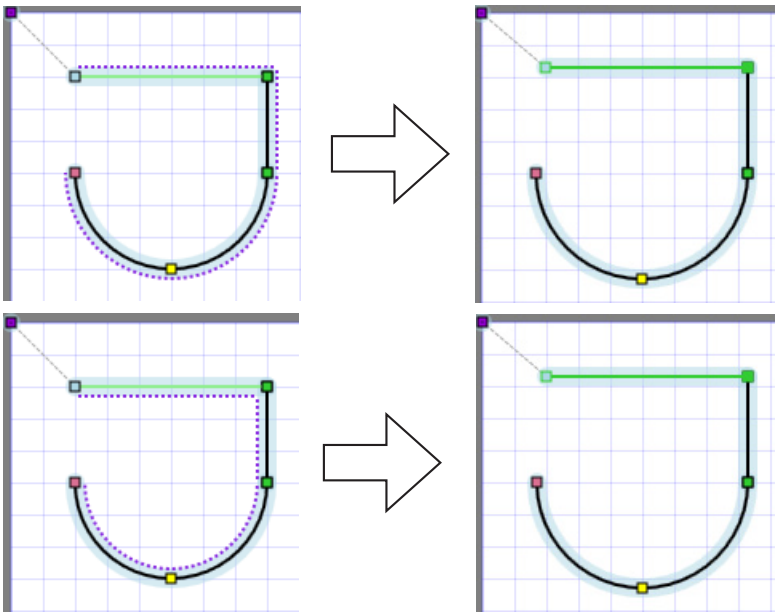
- This function can be used when “Circle” is selected as the tool setting for tool shape.
- You cannot use this offset function with points (such as PTP Points, etc.).

■ How to Set an Offset

Click the icon to enter the Tool Offset Mode.



Click and drag the path to the outer or inner side of the figure.
While holding the mouse button down, the offset path appears as a dashed line.
Release the mouse button to move the path to where the dashed line was and complete the offset.
Press the Esc key during the drag operation to cancel offset editing.



NOTE: Depending on the figure, you may not be able to revert to the original shape after repeatedly editing the offset. If you want to revert to the original shape, use the [Undo] function from the [Edit] menu.

15.9 R-Axis Angle Batch Settings (4 Axes Specifications)

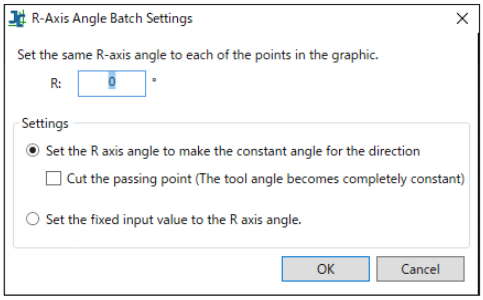
With the 4 axes specifications, you can set the R-Axis angle information as coordinate information. The R-Axis angle information can be set all at once by various setting methods.

15.9.1 R-Axis Angle Batch Setting Dialog

With the R-Axis Angle Batch Setting dialog, you can set the R-Axis angle for the selected point by various setting methods.

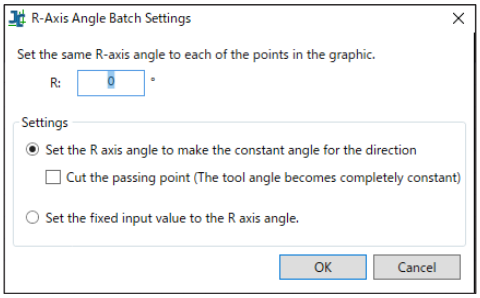
■ Operation Procedure

Select the point you want to set as the R-Axis angle and select [Tool] → [R-Axis Angle Batch Settings] from the menu or select [R-Axis Angle Batch Settings] from the pull-down menu when right-clicking on the mouse to display the R-Axis Angle Batch Setting dialog.



- R: : The batch setting angle is determined by the value set here.
- Setting Method : The batch setting angle is determined by the following settings.

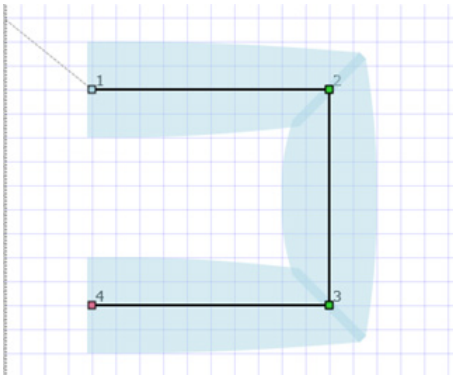
(1) When [Set the R axis angle to make the constant angle for the direction] is selected and [Cut the passing point] box is not checked



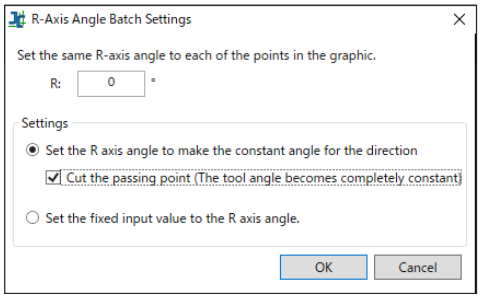
- If the points are not connected, the angle set for [R:] above is set.
- If the points are connected, the passing point is set by adding the angle set in [R:] to the middle value of the front and rear R-Axis angles.*

* When the calculated value is ±720° or more, the value is rounded at ±720° and set.

Operation Image

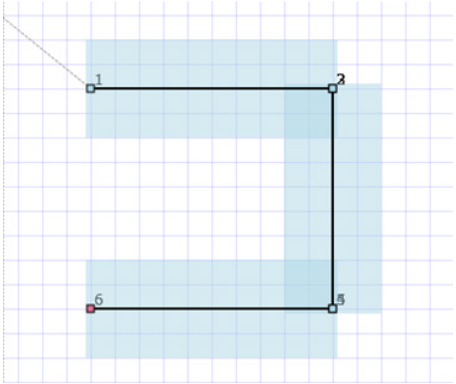


(2) When [Set the R axis angle to make the constant angle for the direction] is selected and [Cut the passing point] box is checked

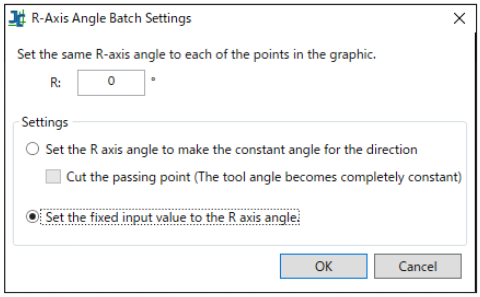


- If the points are not connected, the angle set for [R:] above is set.
- If the points are connected, the point is divided and the angle set in [R:] is added to the angle that is constant to the movement direction and set.

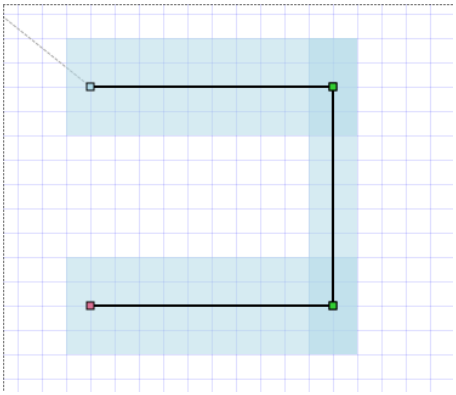
Operation Image



(3) When [Set the fixed input value to the R axis angle.] is selected
Sets the angle set in [R:].

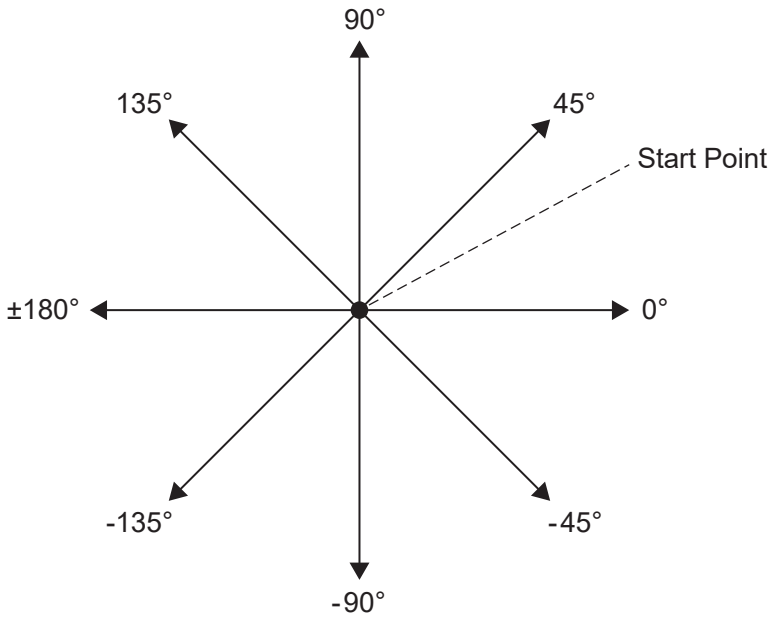


Operation Image



■ Angle and Movement Direction Settings

When [Set the R axis angle to make the constant angle for the direction] is selected, the angle setting is calculated and set using the angle corresponding to the following directions.

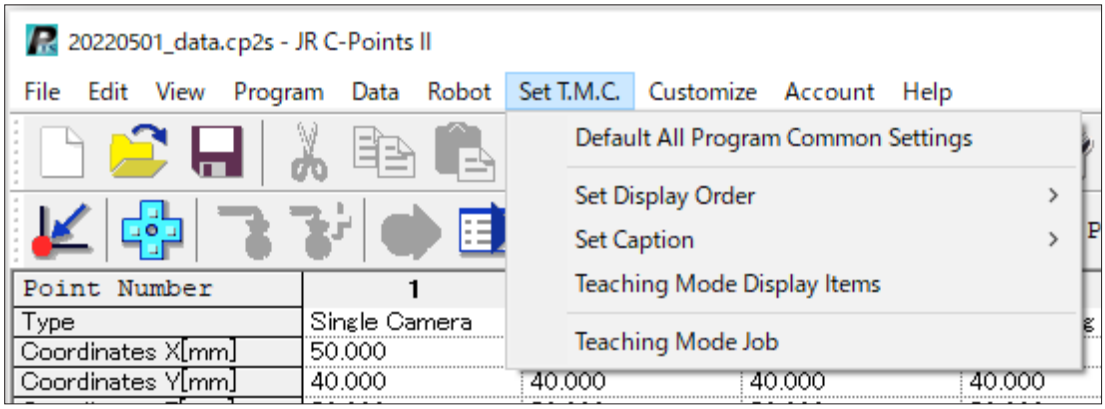


16. CUSTOMIZING DATA

16.1 TMC Settings

TMC settings (Teaching Mode Customizing Data) are customizing data which are not restricted by account (other customizing data apart from TMC settings are protected by user accounts). Settings can be changed without logging in.

Click [Set T.M.C.] on the menu bar and select the item you want to set. The settings dialog for the selected item appears.
Select or enter the item you wish to set from the dialog box and click [OK].



16.1.1 Default All Program Common Settings

Here you can set the default values for All Program Common Settings.
If you return All Program Common Settings to their default values (by clicking [Data] → [All Program Common Settings] → [Restore Default Values]), All Program Common Settings revert to the values set here.

16.1.2 Set Display Order

Here you can set the view order for [Common Setting Variables], [Condition Setting Variables], and [Program Setting Variables] included in the Customizing Data.

16.1.3 Set Caption

Here you can set caption names for the [Common Setting Variables], [Condition Setting Variables], or [Program Setting Variables] included in Customizing Data. [Common Data Settings], [Condition Data Settings] and [Program Individual Settings] in teaching data appear using the captions set here.
Also, when setting captions for [Application], the caption appears in parentheses after the title “JR C-Points II” on the title bar. For application specification robots, the caption appears in place of the application name.

16.1.4 Teaching Mode Display Items

If you uncheck any of the boxes here and send C&T data of the unchecked settings to the robot, the unchecked items are not displayed in the Teaching Mode menu. To return the hidden items, check the desired boxes and send the C&T data of the checked settings to the robot. Use this function to hide unused items and make the menu easier to read.

- Point Job
- Point Additional
- PLC
- All Program Common Settings
- Variable, Function, Alias Settings
- User Defined Message
- Main Tool Configuration
- Camera Configuration

16.1.5 Job in Teaching Mode

Use this to set point job data numbers. When you send C&T data containing set number(s) to the robot, the following jobs are operable in Teaching Mode:

- Job on Start of Teaching Mode
- Job on Emergency in Teaching Mode
- Job Before Initialization*
- Job After Initialization*
- Job on 0 to 9 Keys (valid at the teaching base screen or when using JOG keys)

* With JC-3 absolute encoder models, this is [Job before Drive Unit Initialize]. Not displayed for JS3 Series.

16.2 Accounts

You need to set and login into an account when defining or creating customizing data (with the exception of T.M.C. settings). You can set up to 100 accounts. Once logged in you remain logged in until you either log out or close JR C-Points II. Also, you cannot log into multiple accounts at one time.
Customizing data (with the exception of T.M.C. settings) are protected by their accounts (account restricted). The level of account accessibility varies according to the type set in the Protect Mode for each datum (refer to the table below).

■ Access Restriction from Other Accounts

Protect Mode	No Limit	Public	Protected	Private
Use data	✓	✓	✓	
View data	✓	✓		
Edit data	✓			

For further details, refer to “4.1 Types of Accessibility” in the operation manual *Functions IV.*

16.2.1 Login

If you want to login using an existing account (login name and security code), click [Account] on the menu bar and select [Login] from the pull-down menu. The Login dialog box shown to the right appears.
Enter the login name and security code (4 to 8 numerical digits) and click [OK].

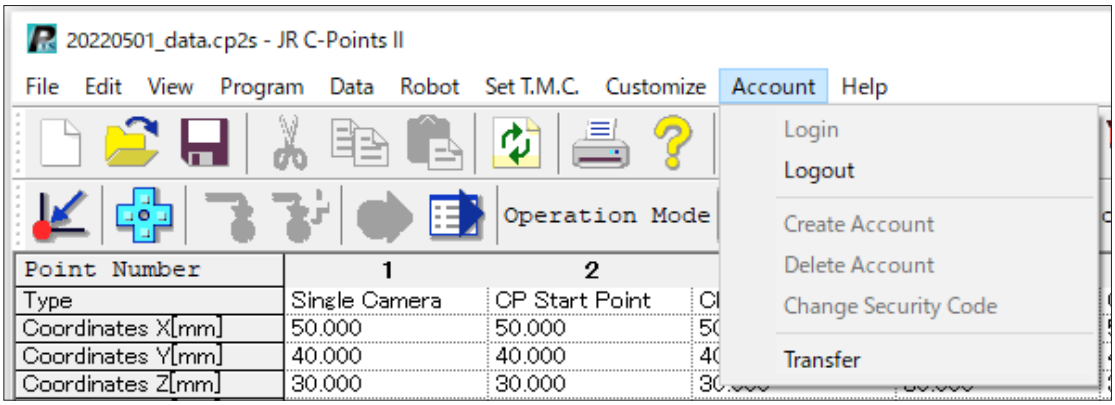
To login using a new account, refer to “16.2.3 Create Account”.

The robot has an account “User” which does not require a security code. This account is useful for creating or setting customizing data which does not require protection by an account.

NOTE: There is no way to recover your security code. As such, make sure you never forget your security code.

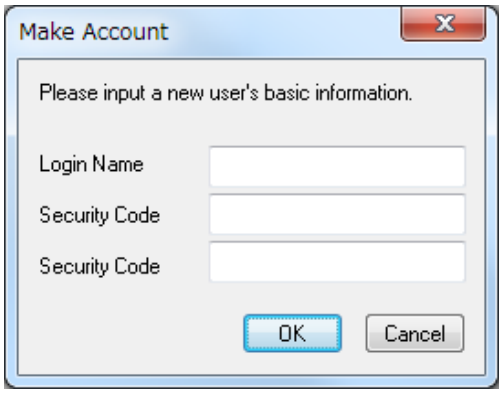
16.2.2 Logout

To logout, click [Account] on the menu bar and click [Logout] on the pull-down menu.



16.2.3 Create Account

To make a new account, click [Account] on the menu bar and click [Make Account] on the pull-down menu. The dialog box shown to the right appears.
Enter the login name and the security code twice and click [OK]. Enter 4 to 8 numerical digits for the security code.



16.2.4 Delete Account

To delete an account, click [Account] on the menu bar and click [Delete Account] on the pull-down menu. If you delete an account, all the customizing data included in that account is also deleted. You cannot delete the special preset account “user”.

16.2.5 Change Security Code

Use this to change the security code used for logging into the account.

16.2.6 Transfer

You can transfer all the customizing data from the currently logged in account to any other account. Click [Account] on the menu bar and select [Transfer] on the pull-down menu and enter the destination account. Once you move data, all of the original customizing data in the transfer source account is deleted.

16.3 Point Jobs, Additional Functions, and PLC Programs

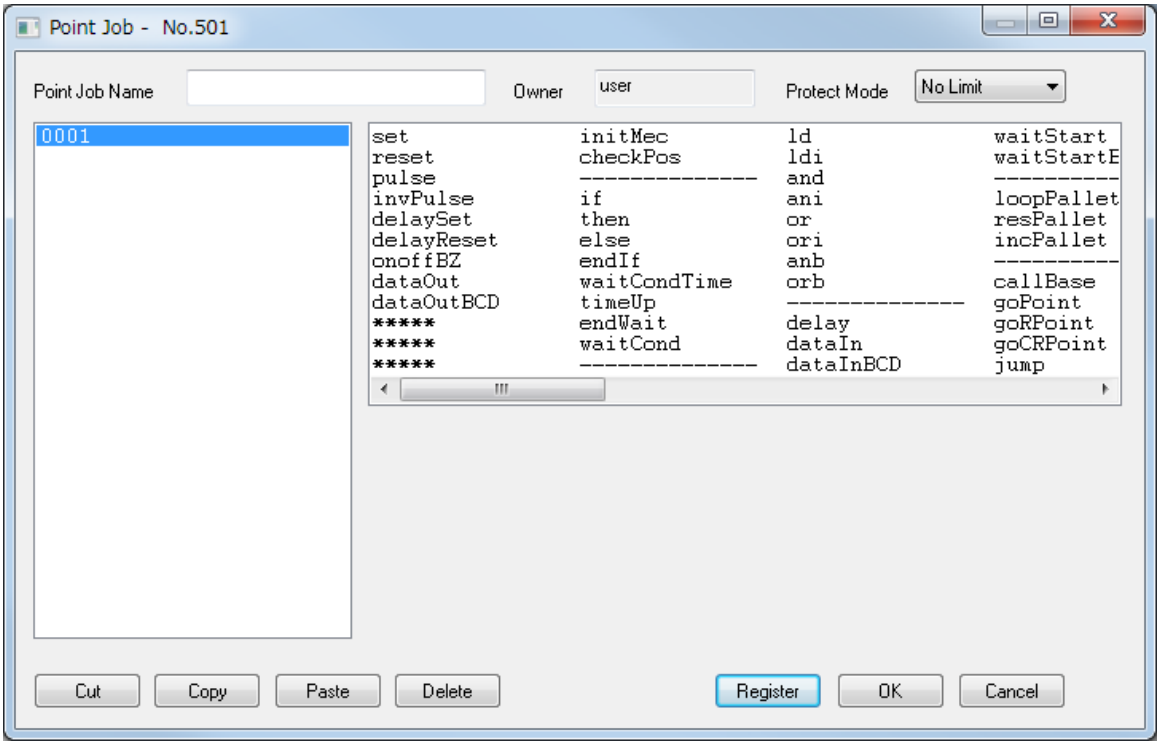
Customizing data is protected by its account. You cannot edit customizing data belonging to other accounts. Before creating or defining customizing data, first make an account and login.

16.3.1 Point Job Data, Additional Function Data, and PLC Programs

Once you are logged in, you can create and edit the point job data numbers 501 to 1000, additional function data numbers 51 to 100 (not including work adjustments), and PLC program numbers 51 to 100 included in the customizing data (excluding any customizing data which is protected by another account).

Methods for creating and editing are the same as for point jobs/additional function data in teaching data. Click [Data] on the menu bar and select [Point Job], [Additional], or [PLC]. When selecting [Additional], select the additional function data type. A list for the corresponding choice appears.
When you select a number included in customizing data its edit dialog box appears.
Methods for creating and editing are the same as that for teaching data, however, the owner (login name) appears in the editing dialog box and it is possible to set Protect Mode.

Example: Point Job Data List



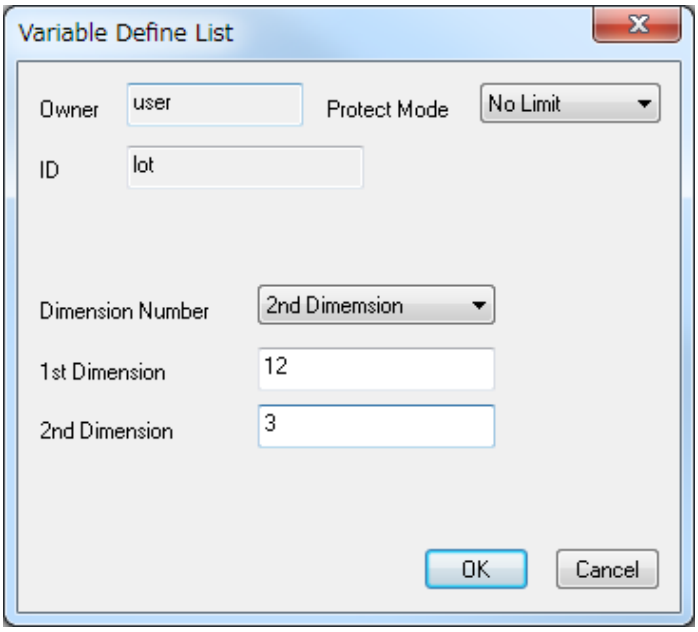
16.4 Global Variables, Keeping Variables, User Functions, Aliases, and User Defined Messages

If you create any of the following data while logged in, these are created as customizing data and owned by the account logged in at the time of creation:

- Global Variable
- Keeping Variable
- User Function
- Alias
- User Defined Message

The method of creating these is the same as for teaching data, however, the owner (login name) appears at the top of the editing dialog and you can set a Protect Mode to this data.

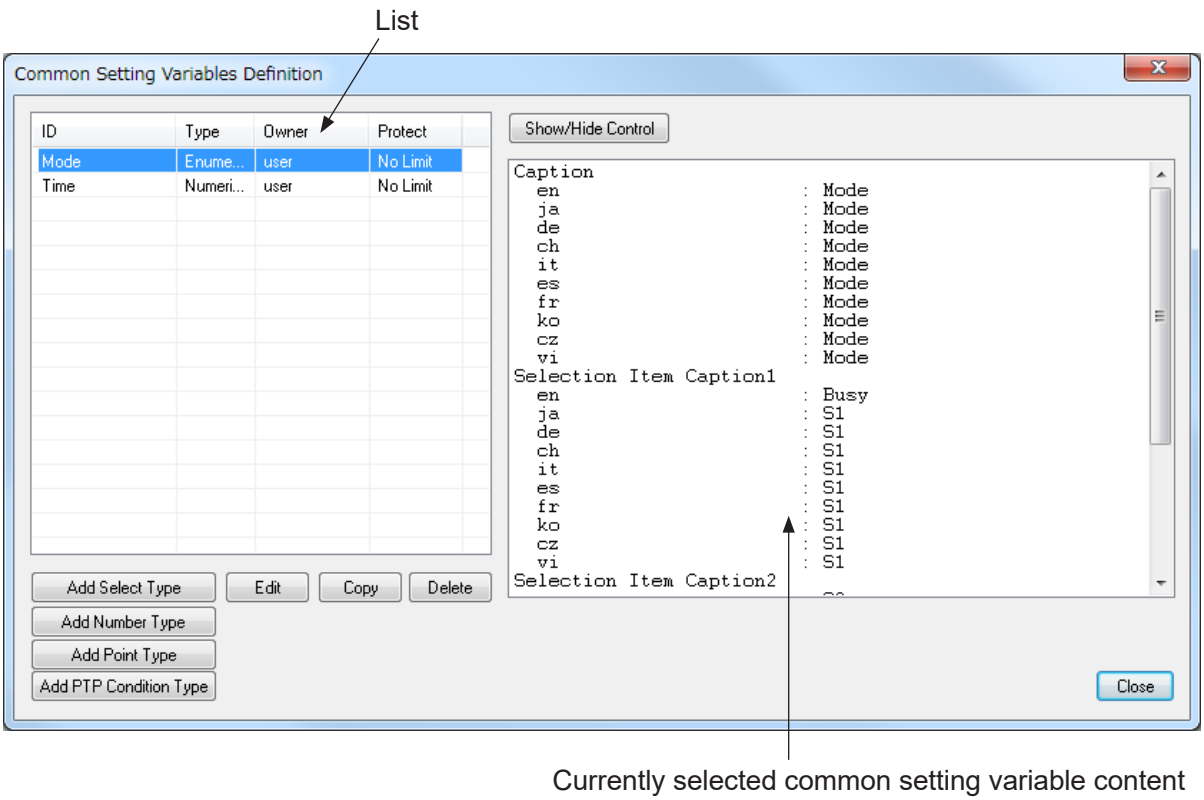
Example: Global Variable



16.5 Setting Variables

16.5.1 Common Setting Variables

A common setting variable is a variable that can be set with only one value. Common setting variables are declared in Customizing Data and the values are set in the teaching data. You can set the values for the defined common setting variables as “Common Setting Data”.
Typically, settings for a connected device, etc., and settings for programs with values that don’t change are defined as common setting variables.
Click [Customize] on the menu bar and select [Common Setting Variables] on the pull-down menu. The Common Setting Variables list appears. To define a new common setting variable, click on the type you want to add and enter an identifier. To edit an existing common setting variable, select the variable you want from the list and click [Edit]. The settings dialog box for the selected variable type appears. Refer to the following pages for explanations regarding each variable type.
Also, select the data you want and click [Copy] to copy the data and click [Delete] to delete the data.
You can define up to 100 common setting variables.



16.5.2 Condition Setting Variables

Condition setting variables are variables that can be set with a maximum of 500 values. These are declared in the Customizing data and the values are set in the teaching data. Values of defined condition setting variables can be set as “Condition Setting Data”.
Click [Customize] on the menu bar and click [Condition Setting Variables] on the pull-down menu. The Condition Setting Variables list appears. To define a new one, click on the type you want to add and enter an identifier. To edit an existing condition setting variable, select the variable you want from the list and click [Edit]. The settings dialog box for the selected item appears. Refer to the proceeding pages for explanations regarding each variable type.
Also, select the data you want and click [Copy] to copy the data and click [Delete] to delete the data.
You can define up to 100 condition setting variables.

16.5.3 Program Setting Variables

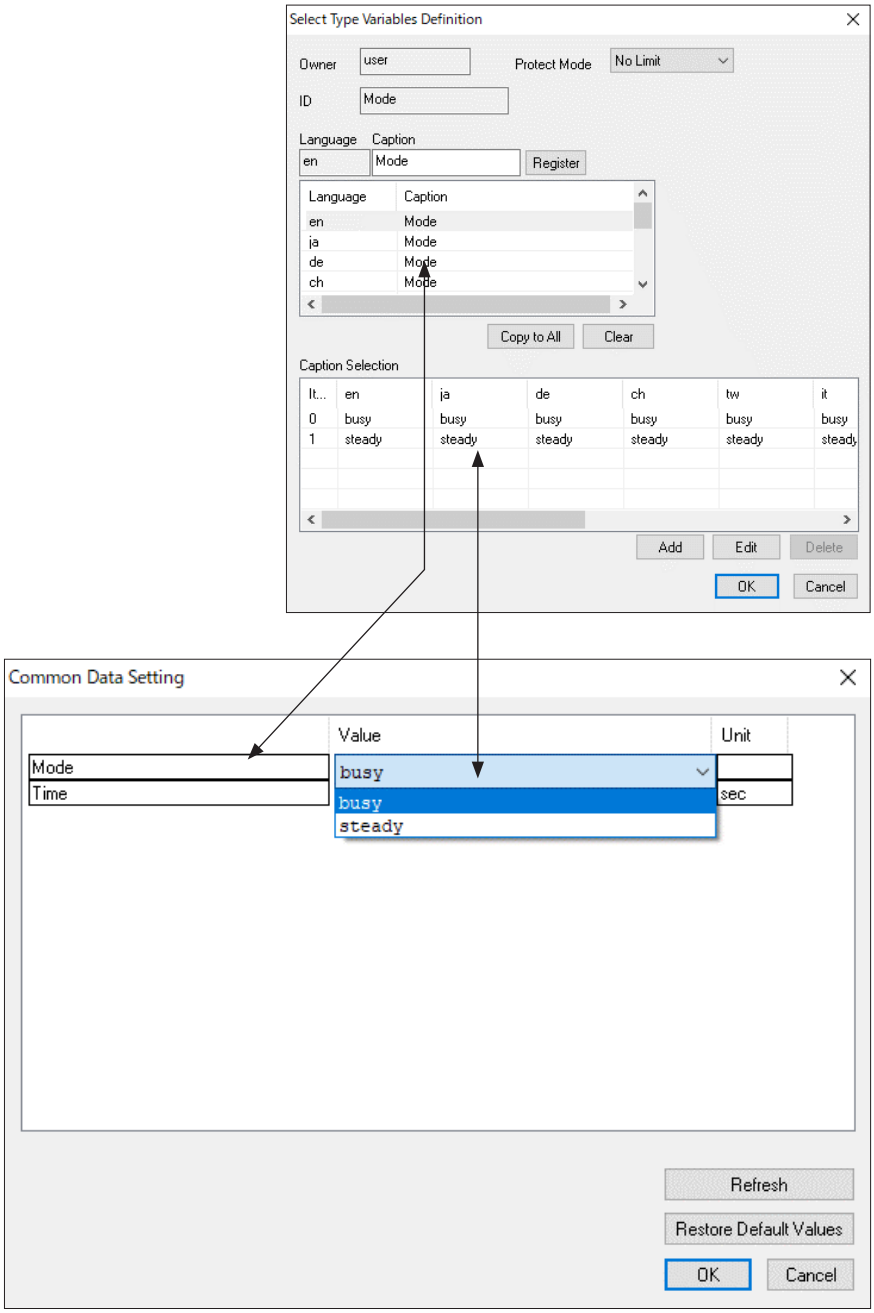
Click [Customize] on the menu bar and click [Program Setting Variables] on the pull-down menu. The Program Setting Variables list appears. To define a new program setting variable, click on the type you want to add and enter an identifier. To edit an existing program setting variable, select the variable you want from the list and click [Edit]. The settings dialog box for the selected variable type appears. Refer to the following pages for explanations regarding each variable type.
Also, select the data you want and click [Copy] to copy the data and click [Delete] to delete the data.
You can define up to 100 program setting variables.

16.5.4 Select Type Setting Variables

The Select Type Variable Define List shown below appears when you click [Add Select Type] or when you select a Select Type variable and then click [Edit].
By default setting the identifier is set as the caption. If you want to set a caption, select a language, enter the caption, and then click [Register].

Languages

en:	English
ja:	Japanese
de:	German
ch:	Simplified Chinese
tw:	Traditional Chinese
it:	Italian
es:	Spanish
fr:	French
ko:	Korean
cz:	Czech
vi:	Vietnamese



For selectable types, you can also set captions for the selectable items. Select the item you want from [Select Caption] and click [Edit]. Then enter the caption and click [Register].
If you want to copy a caption to all languages, enter the caption and click [Copy to All]. The caption that you entered is copied into the Caption column for all languages.

Also, by default setting there are two selections, however, you can add selections by clicking [Add]. You can set up to 20 selections.

If you open [Common Data Setting] or [Condition Data Setting] in the Teaching Data*, the caption set here appears (see diagram on the previous page).
However, the teaching data appears in the language set in [Set Application Language]. In the example on the previous page, [English] is selected in [Set Application Language]. If other languages are selected, the selections appear as “S1” and “S2” instead of “busy” and “steady”.

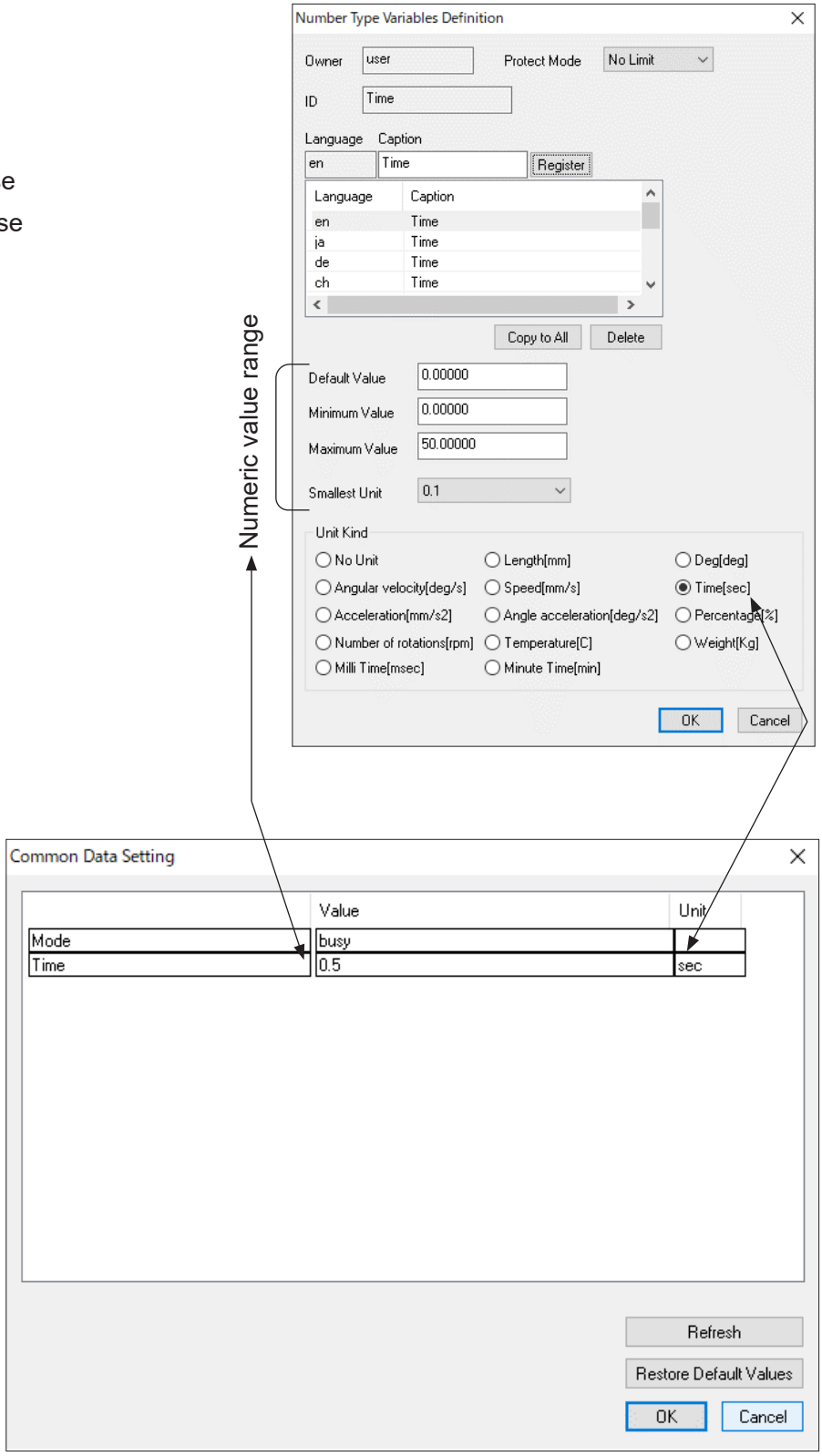
* [Common Data Setting] and [Condition Data Setting] appear as the captions set under [Set Caption] in the [Set T.M.C.] menu.

16.5.5 Number Type Setting Variables

The dialog box shown on the next page appears when you click [Add Number Type] or when you select a number type variable and then click [Edit].
By default setting the identifier is set as the caption. If you have a caption you want to set, select a language, enter the caption, and then click [Register].
If you want to copy a caption to all languages, enter the caption and click [Copy to All]. The caption that you entered is copied into the Caption column for all languages.

Languages

en:	English
ja:	Japanese
de:	German
ch:	Simplified Chinese
tw:	Traditional Chinese
it:	Italian
es:	Spanish
fr:	French
ko:	Korean
cz:	Czech
vi:	Vietnamese



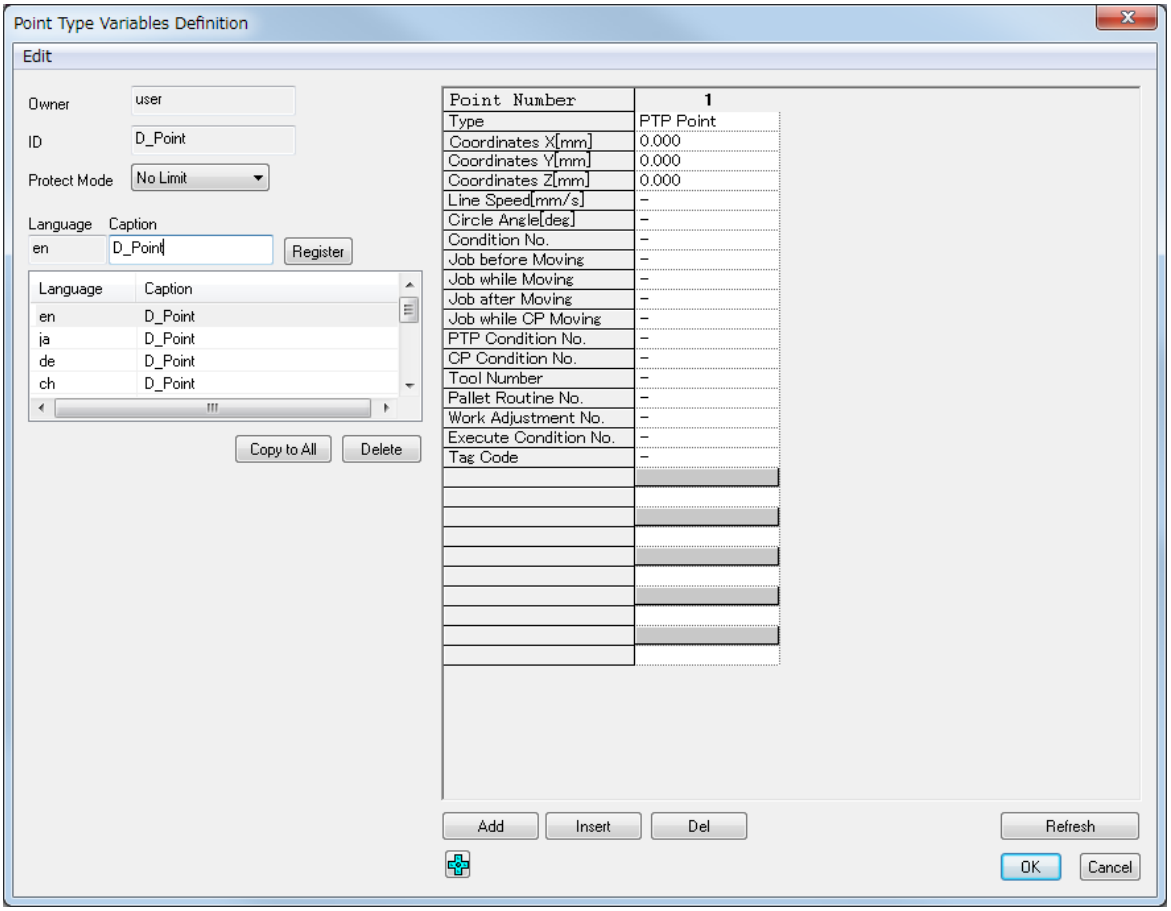
Enter the numeric value range and select the unit you are using.

- Default Value: The values set as default setting
- Minimum Value: The minimum value you can enter
- Maximum Value: The maximum value you can enter
- Decimal Figure: The decimal place to where a value is rounded
  (If [Decimal Figure] is set to [0.1], values entered as [0.27] or [0.33] are rounded to [0.3])

If you open [Common Data Setting] or [Condition Data Setting] of the teaching data*, the caption set here appears (see diagram on the previous page).

* [Common Data Setting] and [Condition Data Setting] appear as captions set under [Set Caption] in the [Set T.M.C.] menu.

16.5.6 Point Type Setting Variables



The dialog box shown above appears when you click [Add Point Type] or when you select a point type variable and then click [Edit].
By default setting the identifier is set as the caption. If you wish to set a caption, select a language, enter the caption, and then click [Register].

en:	English	ja:	Japanese	de:	German
ch:	Simplified Chinese	tw:	Traditional Chinese	it:	Italian
es:	Spanish	fr:	French	ko:	Korean
cz:	Czech	vi:	Vietnamese		

If you want to copy a caption to all languages, enter the caption and click [Copy to All]. The caption that you entered is copied into the Caption column for all languages.

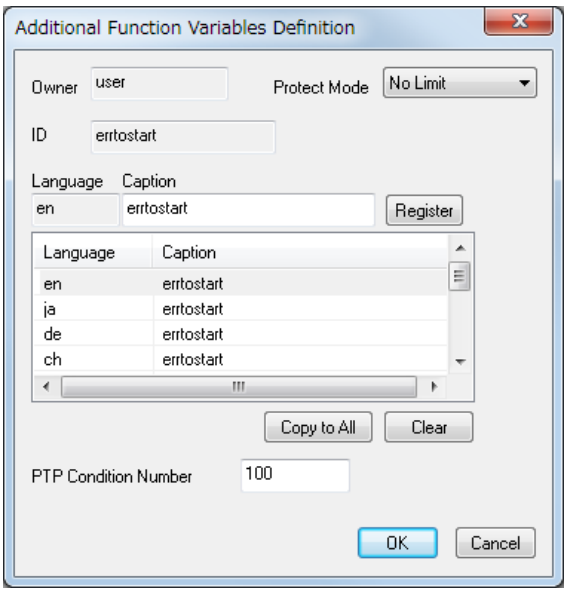
Click [Add] to add a new point to the end of an array of points. Click [Insert] to add a new point in front of the point where the cursor is currently placed. Click [Delete] to delete the point where the cursor is currently placed.
Enter the point data you want to set. If you wish to register the point coordinates in JOG Mode, place the cursor on the point you wish to register and click the JOG icon ( ). The JOG dialog box appears.

16.5.7 PTP Condition Type Setting Variables

The dialog box shown below appears when you click [Add PTP Condition Type] or when you select a PTP condition type variable and then click [Edit]. By default setting the identifier is set as the caption. If there is a caption you want to set, select a language, enter the caption, and then click [Register].
If you want to copy a caption to all languages, enter the caption and click [Copy to All]. The caption that you entered is copied into the Caption column for all languages.

Languages

en:	English
ja:	Japanese
de:	German
ch:	Simplified Chinese
tw:	Traditional Chinese
it:	Italian
es:	Spanish
fr:	French
ko:	Korean
cz:	Czech
vi:	Vietnamese



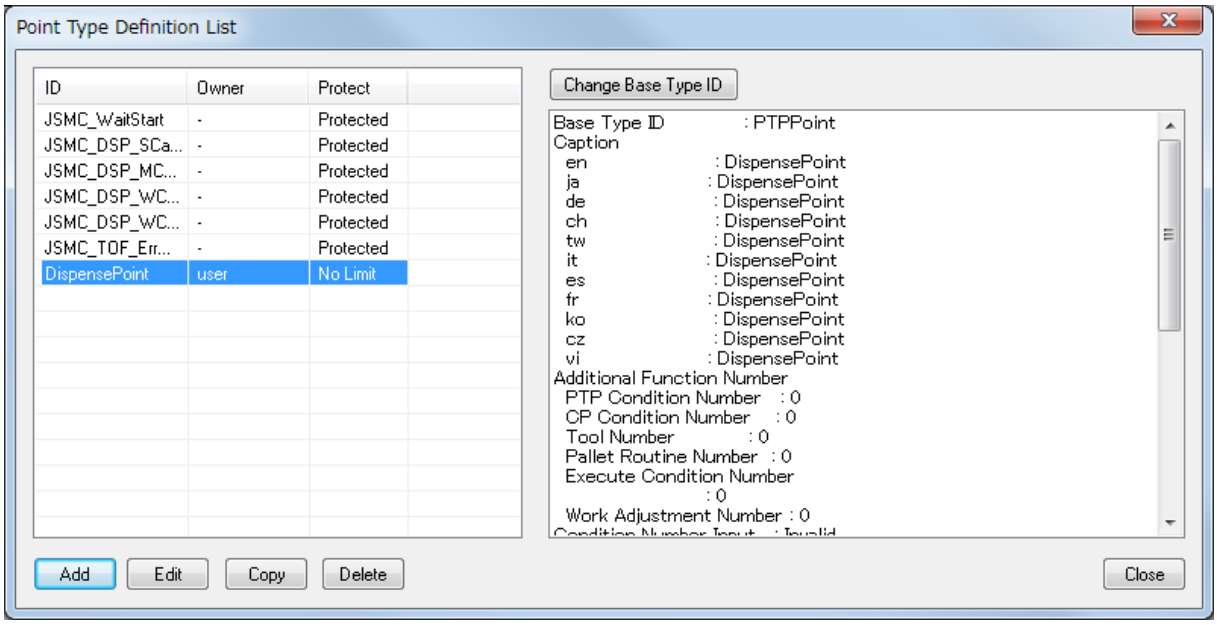
You can now edit the number for the PTP condition specified in [PTP Condition Number] in the teaching data [Common Data Settings].
You can activate a defined or edited PTP Condition by setting it to a point.

16.6 Point Types

Click [Customize] on the menu bar and click [Point Type Setting] on the pull-down menu. A point type list appears. Click [Add] and enter an identifier to define a new point type. To edit an existing point type, select the point type you want from the list and click [Edit]. The Edit dialog box appears.

Also, select the data you want from the list and click [Copy] to copy the data and click [Delete] to delete the data.

You can define up to 100 point types.

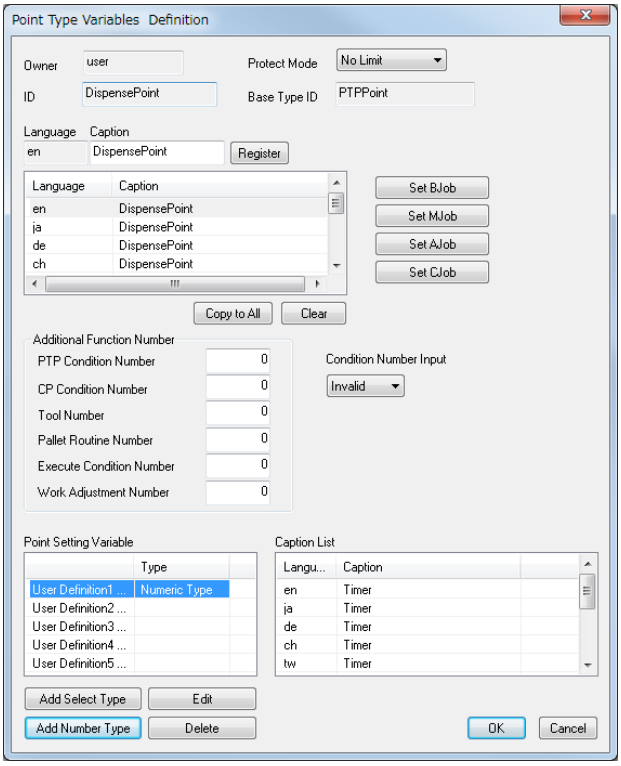


NOTE: To change the base point type, select the point type you want from the list and click [Change Base Type ID]. You cannot change the base point type from the edit dialog box.

The edit dialog box shown on the next page appears when you click [Add] and then select a base point type or when you click [Edit].

Languages

en: English
ja: Japanese
de: German
ch: Simplified Chinese
tw: Traditional Chinese
it: Italian
es: Spanish
fr: French
ko: Korean
cz: Czech
vi: Vietnamese



By default setting the identifier is set as the caption. If you wish to set a caption, select a language, enter the caption, and then click [Register]. If you want to copy a caption to all languages, enter the caption and click [Copy to All]. The caption that you entered is copied into the Caption column for all languages.

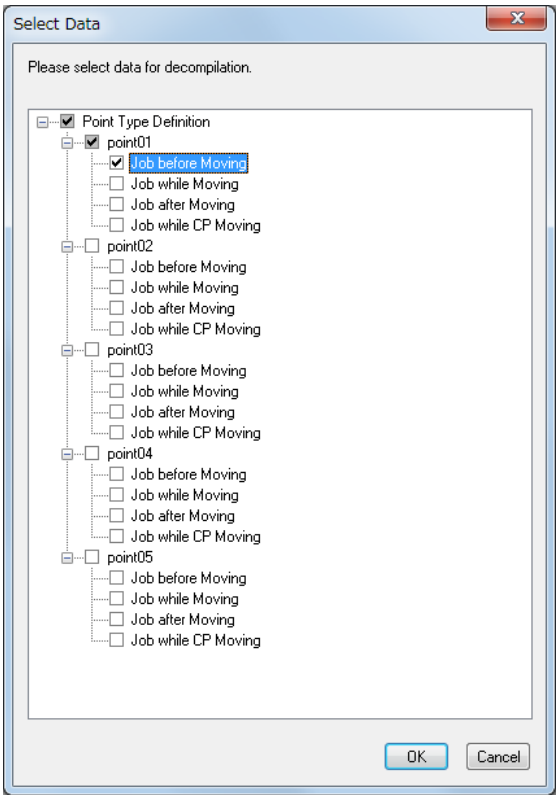
Select and set the [Job] type you want to set to the point job data you want. Simply set the point type during teaching and the set point job data is executed when the program is run.

To set a point setting variable to a point type, click the type you want to add and enter an identifier. Once you have set a variable to a point, simply set the point type at the time of teaching, and the variable (default values) point is registered to the point.

NOTE: During teaching, when you set point job data to a user-defined point type, if the same point job settings are included in the point type they are not executed. For example, if “Job before Moving” is set as the user-defined point type, the “Job Before Moving” job data registered to the point type is not performed. In these situations, use the *callBase* command for point job data set to the user-defined point, the point job, etc., attached to the type can be called up as a subroutine.

16.6.1 Decompile (Save as a Text File)

Point type data of Job before Moving, Job while Moving, Job after Moving, and Job while CP Moving can be saved in text file format.
Click [File] on the menu bar and select [Decompile]. The dialog box shown on the right appears. Check the point type data you want to save as a text file and click [OK]. The decompile results appear. To save the data, click [Save As] and enter a file name. The file extension is saved as ".cds", however, you can change it to ".txt".



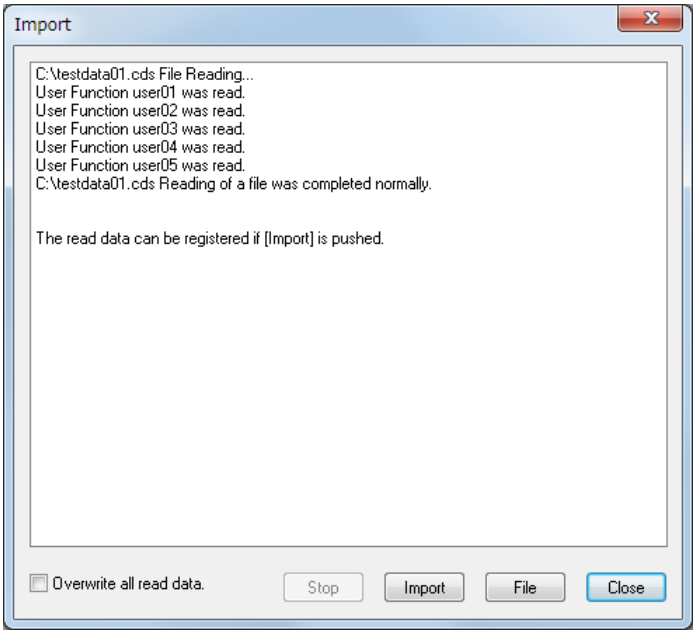
NOTE:

- Point job data and User Functions data can be saved together.
- Note that loading will fail if the unit of length measurement or the axis function are not the same at the time of compiling compared to the time of reverse compiling.

16.6.2 Compile (Import Text File)

You can read point job data saved in text format for [Job before Moving], [Job while Moving], [Job after Moving], and Job while CP Moving by clicking [File] on the menu bar and selecting [Compile] on the pull-down menu.
Text files created using other applications, such as Microsoft Word®, can also be loaded. (However, note that the data format must be the same as a ".cds" file.)

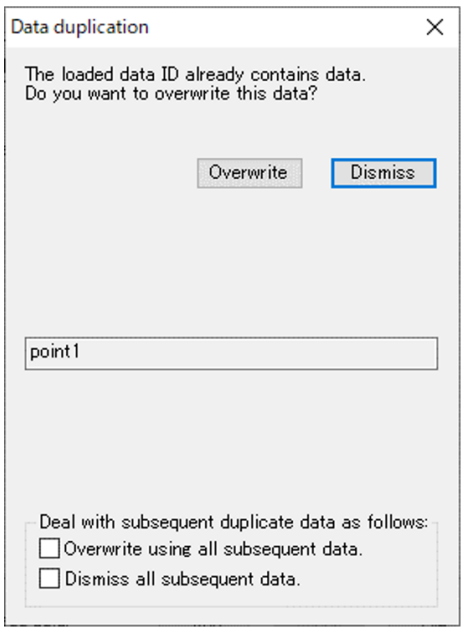
After loading the data, the dialog box shown to the right appears.
Click [File] to select the next file you want to load.
Click [Import] to register the loaded data to the currently open C&T data.
After loading the data, the Data Duplication confirmation screen shown below appears if the C&T data and the imported point job data overlap.
However, if you put a check in [All subsequent data is overwritten.] and click [Import], overwrite confirmations are not displayed and all data is overwritten.



- Overwrite
  The point job data currently registered is deleted, and the data being imported is registered in its place.

- Dismiss
  The point job data being imported is not registered (discarded).

- The following processing is applicable from the following duplicate data.
  Put a check in [Overwrite using all subsequent data] to overwrite all subsequent duplicate data.
  Put a check in [Dismiss all subsequent data] to dismiss all subsequent duplicate data.



17. SENDING SYSTEM SOFTWARE

Before upgrading the system program, make sure to create a backup using the PC software JR C-Points II in case of unexpected behavior.
C&T data created with a system program Ver. 3 is not compatible with a system program Ver. 5 or higher.

This robot is controlled by the built-in system program. Use the “Send System Software” function to upgrade the system program.
You may also be able to use the recovery function to restore the system program if you mistakenly turn OFF the robot during an update or the update failed causing the robot to malfunction.
The system software is one of the following files found on the Operation Manual CD-ROM:

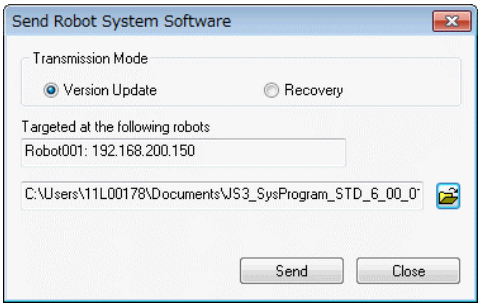
- JR3000 Series: JR3000_SysProgram_Ver.+++_***(JSY Ver3).jsy
- JC-3 Series: JC-3_SysProgram_Ver.+++_***(JSY Ver3).jsy
- JS3 Series: JS3_SysProgram_Ver.+++_***(JSY Ver3).jsy

(“+++” indicates the version number.
“***” varies according to robot specifications.)

17.1 Version Upgrade

Perform the following when you want to upgrade the system program.

1. Turn ON the robot (JR3000 Series) or the controller (JC-3/JS3 Series) and place the Operation Manual CD-ROM into the CD drive of the PC.
2. Start up JR C-Points II and select [Send Robot System Software] from the [Robot] pull-down menu on the menu bar. The dialog box to the right appears.
3. Select [Version Update] as the Transmission Mode.
4. Click the icon, specify the drive where the Operation Manual CD-ROM is placed, then select the system software file and click [Open]. The selected file name appears.
5. Click [Send] and the system software starts sending.



⚠ Caution

When sending the system software, never turn OFF the power to the robot/controller or the PC. If power to the robot/controller is cut OFF during the transfer, there is a risk the robot will not be able to start up again.

6. After the transmission, power cycle the robot or controller. (Power breaker for JS3 Series)

17.2 Precautions for Upgrading from Ver. 3 to Ver. 5 or Higher

- Depending on the system program version and the JR C-Points II version, the robot and PC software may not be able to communicate.

✓: Compatible; blank: not compatible

PC Software / System Program	Ver. 3	Ver. 5 or Higher
Ver. 3	✓	
Ver. 5 or Higher		✓

⚠ Caution

If you upgrade the system program to Ver. 5 or higher, you cannot communicate with a PC running Ver. 3 of JR C-Points II.

- C&T data created with a system program Ver. 3 is not compatible with a system program Ver. 5 or higher.

- When sending C&T data saved with the PC software “JR C-Points II” Ver.3 to a robot with a system program Ver.5 or higher, send it with “JR C-Points II” Ver.5 or higher.
  JR C-Points II Ver. 3 C&T data is automatically converted to Ver. 5 system program data when opened using JR C-Points II Ver. 5 or higher.

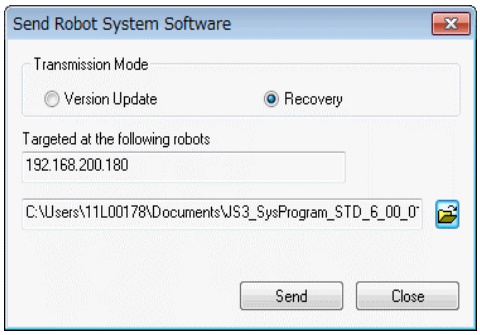
17.3 Recovery

Use the system program recovery function in the following situations:

- The power was turned OFF during a version upgrade
- The version upgrade was not successful and the robot is not starting up normally

Follow the steps below to recover the system program:

1. Turn ON the robot (JR3000 Series) or the controller (JC-3/JS3 Series) and place the Operation Manual CD-ROM into the CD drive of the PC.
2. Start up JR C-Points II and select [Send Robot System Software] from the [Robot] pull-down menu on the menu bar. The dialog box to the right appears.
3. Select [Recovery] as the Transmission Mode. (The robot IP address used for recovery is 192.168.200.180.)
4. Click the icon, specify the drive where the Operation Manual CD-ROM is placed, then select the system software file and click [Open]. The selected file name appears.



5. Click [Send]. The confirmation screen appears. Click [Yes] to start sending the system software.

NOTE: If you make a recovery using application specification system software such as for screw tightening specifications or dispensing specifications, etc., the robot reverts to standard specification system program (the robot has no movement modes for the application specification) after recovery is made. Upgrade the system program using the application specification system software once again to resolve this.

⚠ Caution

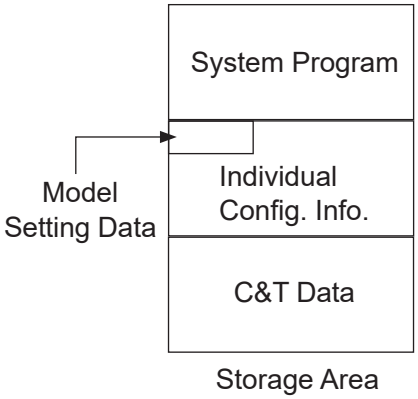
When sending the system software, never turn OFF the power to the robot/controller or the PC. If power to the robot/controller is cut OFF during the transfer, there is a risk the robot will not be able to start up again.

6. After the transmission, power cycle the robot or controller. (Power breaker for JS3 Series)
7. If you are using an application specification robot such as screw tightening specifications or dispensing specifications, upgrade the system program with the application specification system software.

NOTE: Refer to "17.1 Version Upgrade" for details on how to upgrade the system program.

18. ROBOT DATA BACKUP

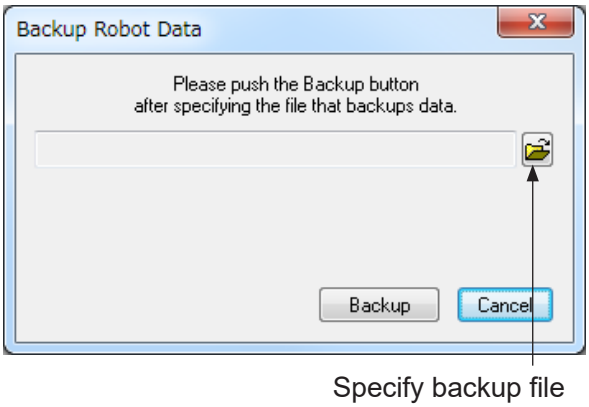
The robot (data) storage area is partitioned as shown by the diagram to the right. All of the storage area partitions including the system program storage partition are subject to backup and data restoration operations.



18.1 Data Backup

The system program, C&T data, individual configuration information and model setting data saved by the robot are read and saved as a file. If you do not specify an extension name, the file is saved with the extension “JRB”.
Select [Backup Robot Data] from the [Robot] pull-down menu to display the dialog below.

Click the icon and specify the name of the backup file and the location where you want to save it. You can also specify an existing file. Click [Backup] and the backup starts.



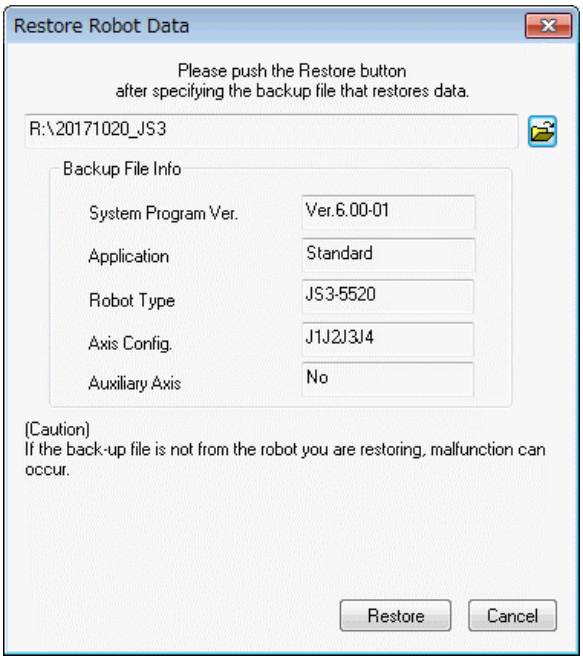
⚠ Caution

Individual Configuration Information varies for each individual unit even if they are the same model. **Do not use backup data with a different robot. The robot cannot function normally with backup data from a different robot.**

18.2 Restore Robot Data

This restores the data saved by [Robot Data Backup] to the robot.
Executing robot data restoration deletes all of the data in the robot (system program, C&T data, individual configuration information and model setting data) and overwrites it with the backup file.

Click [Robot] on the menu bar and select [Restore Robot Data] from the pull-down menu. The dialog box to the right appears.
Click the icon, specify the backup file and click [Restore].



⚠ Caution

Individual Configuration Information varies for each individual unit even if they are the same model. Do not use backup data with a different robot. The robot cannot function normally with backup data from a different robot.

19. CONVERTING OLD SERIES DATA TO JR3000 / JC-3 / JS3 SERIES DATA

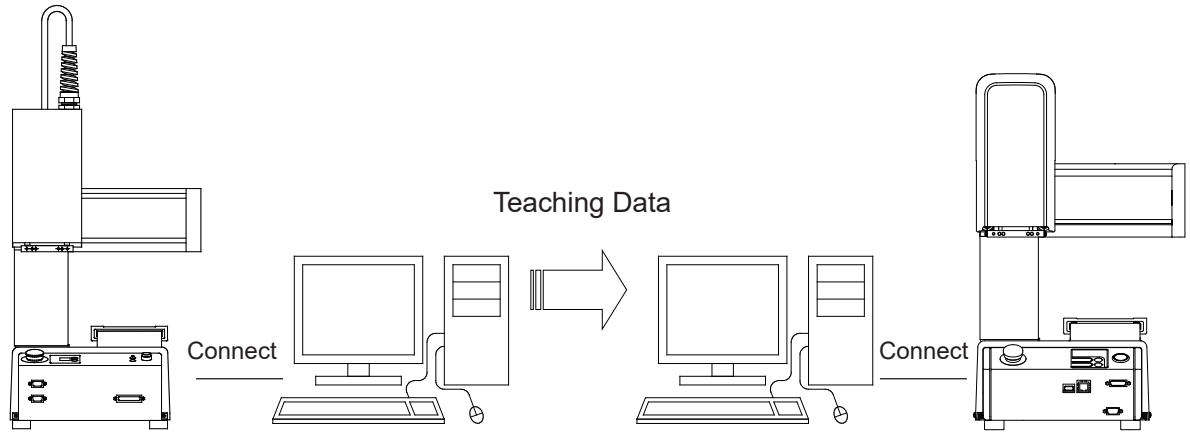
19.1 Converting from JR2000 / JR2000N / JR-V2000 Series to JR3000 Series

To use JR2000 / JR2000N / JR-V2000 teaching data as JR3000 C&T data, it is necessary to convert the data. The following three steps are needed to convert the data.

1. Use JR Points (JR2000 Series option) or JR C-Points (JR2000N / JR-V2000 Series option) to send the data to the PC and from there save it with a name you choose.
2. Open the received data from step 1 above using JR C-Points II. Change the file type to a JR C-Points file or JR-Points file and then select the target file.
3. Send the data from the PC to the JR3000 using JR C-Points II.

Only the following data conversions can be performed: JR2000 / JR2000N / JR-V2000 Series → JR3000 Series.

■ JR2000 / JR2000N / JR-V2000 Series → JR3000 Series



JR2000 / JR2000N / JR-V2000
Example: JR2203N

PC
(JR-Points/JR C-Points)

PC
(JR C-Points II)

JR3000
Example: JR3203N-AC

It is possible to connect one PC to both robots; JR2000 / JR2000N / JR-V2000 Series and JR3000 Series at the same time. You can also connect a PC to the JR2000 / JR2000N / JR-V2000 Series to receive data, then disconnect the JR2000 / JR2000N / JR-V2000 Series and connect the JR3000 Series to the PC. (To convert data using a PC, JR-Points or JR C-Points and JR C-Points II must be installed on the PC.)

⚠ Caution

Be sure to turn OFF the robot before disconnecting or connecting the cable.
Failure to do so may cause unit malfunction or data loss.

Carry out the following operations:
(This is done using a PC with JR-Points or JR C-Points and JR C-Points II installed and connected to the JR2000 / JR2000N / JR-V2000 Series and JR3000 Series.)

1. Turn ON the robot and the PC. If the robot is in Run Mode, make sure it is waiting to start, and for other modes, have the robot at the base screen.

2. When sending from the PC to the robot, startup JR-Points for the JR2000 Series or JR C-Points for the JR2000N / JR-V2000 Series, and set the port to match the COM port connected to the JR2000 / JR2000N / JR-V2000 Series.

■ Operation Procedure
[Robot] Menu → [COM Status]

3. Receive the teaching data from the JR2000 / JR2000N / JR-V2000 Series.

■ Operation Procedure
[Robot] Menu → [Receive C&T Data]

4. Name the data and save it. For JR-Points, the file is saved an “.rp*” extension. For JR C-Points, the file is saved as a “.cp*” extension (“*” varies depending on the specifications).

■ Operation Procedure
[File] Menu → [Save As]

5. Exit JR-Points or JR C-Points and startup JR C-Points II.

6. Set the destination JR3000 Series for sending data to in the Ethernet Settings.

■ Operation Procedure

[Robot] Menu → [Ethernet Settings]

7. Select [Open] from the [File] pull-down menu and change [File Type] to [JR Points File (*.rp*)] for JR2000 Series or [JR C-Points File (*.cp*)] for JR2000N / JR-V2000 Series and open the data file from the JR2000 / JR2000N / JR-V2000 Series.
(“*” varies depending on the specifications.)

■ Operation Procedure

[File] Menu → [Open]

8. Send the data to the JR3000 Series.
When data is sent from the PC to the robot, any data stored in the robot is deleted, so take caution.

■ Operation Procedure

[Robot] Menu → [Send C&T Data]

NOTE:

- For the JR-Points operating environment, etc., refer to the JR-Points operation manual.
- For the JR C-Points operating environment, etc., refer to the JR C-Points operation manual.

■ Precautions when converting from JR-Points to JR C-Points II

- The sysFlag numbers for point jobs, execute conditions, PLC programs, etc., do not change when they are converted over from JR-Points, however, contents of some items have changed with JR C-Points II. Confirm after converting over to JR C-Points II.

■ Precautions when converting from JR C-Points to JR C-Points II

- Point job numbers 101 to 200 for JR C-Points are, depending on the protection mode, converted as follows:
  The point job numbers of items in “No Limit” and “Public” protection modes do not change. For this reason, these items can be run as they are.
  Items in “Protected” and “Private” protection modes are converted with +400 added to their point job number to protect the defined content. For this reason, these items cannot be run as they are. Correct this data.
- With JR C-Points II, TPIF (Port 4) has been removed from the COM ports. For this reason, items which are specified to TPIF (Port 4) in JR C-Points are converted to COM 1. However, point jobs are not converted, so correct this data.
- The various display order of T.M.C. settings are not converted.
- With JR-V2000 Series, the I/O-SYS Function Assignment set in the All Program Common Settings and All Program Common Default Settings in the T.M.C settings does not change.

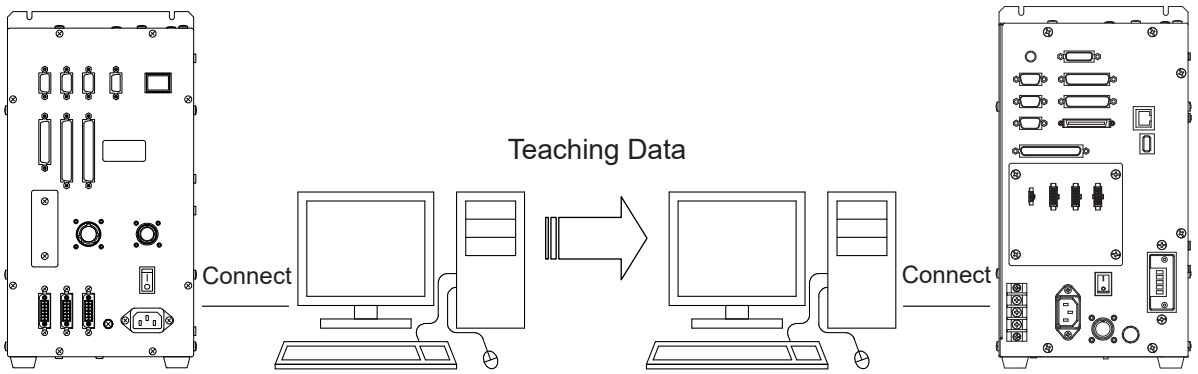
19.2 Converting from JC-2 Series to JC-3 Series

To use JC-2 teaching data as JC-3 C&T data, it is necessary to convert the data. The following three steps are needed to convert the data.

1. Use JR Points (JC-2 option) to send the data to the PC and from there save it with a name you choose.
2. Open the received data from step 1 above using JR C-Points II. Change the file type to a JR C-Points file and then select the target file.
3. Send the data from the PC to the JC-3 using JR C-Points II.

Only JC-2 → JC-3 data conversions can be performed.

■ JC-2 → JC-3



JC-2 Series | PC (JR C-Points) | PC (JR C-Points II) | JC-3 Series Example: JC-3C-3

It is possible to connect one PC to both robots; JC-2 Series and JC-3 Series at the same time. You can also connect a PC to the JC-2 Series to receive data, then disconnect the JC-2 and connect the JC-3 Series to the PC. (To convert data using a PC, JR-Points and/or JR C-Points and JR C-Points II must be installed on the PC.)

⚠ Caution

Be sure to turn OFF the robot before disconnecting or connecting the cable.
Failure to do so may cause unit malfunction or data loss.

Carry out the following operations:
(This is done using a PC with JR-Points and/or JR C-Points and JR C-Points II installed and connected to the JC-2 and JC-3 Series.)

1. Turn ON the robot and the PC. If the robot is in Run Mode, make sure it is waiting to start, and for other modes, have the robot at the base state.

2. When sending from the PC to the robot, startup JR-Points for the JC-2 Series and JR C-Points for the JC-3 Series, and set the port to match the COM port connected to the JC-2 Series.

■ Operation Procedure
[Robot] Menu → [COM Status]

3. Receive the teaching data from the JC-2 Series.

■ Operation Procedure
[Robot] Menu → [Receive C&T Data]

4. Name the data and save it. For JR-Points, the file is saved an ".rp*" extension. For JR C-Points, the file is saved as a ".cp*" extension ("*" varies depending on the specifications).

■ Operation Procedure
[File] Menu → [Save As]

5. Exit JR-Points or JR C-Points and startup JR C-Points II.

6. Set the destination JC-3 Series for sending data to in the Ethernet Settings.

■ Operation Procedure
[Robot] Menu → [Ethernet Settings]

7. Select [Open] from the [File] pull-down menu and change [File Type] to [JR C-Points File (*.cp*)] for JC-2 Series and open the data file from the JC-2 Series.
("*" varies depending on the specifications.)

■ Operation Procedure
[File] Menu → [Open]

8. Send the data to the JC-3 Series.
   When data is sent from the PC to the robot, any data stored in the robot is deleted, so take caution.

■ Operation Procedure
   [Robot] Menu → [Send C&T Data]

NOTE: For the JR C-Points operating environment, etc., refer to the JR C-Points operation manual.

■ Precautions when converting from JR C-Points to JR C-Points II

- Point job numbers 101 to 200 for JR C-Points are, depending on the protection mode, converted as follows:
  The point job numbers of items in “No Limit” and “Public” protection modes do not change. For this reason, these items can be run as they are.
  Items in “Protected” and “Private” protection modes are converted with +400 added to their point job number to protect the defined content. For this reason, these items cannot be run as they are. Correct this data.
- With JR C-Points II, TPIF (Port 4) has been removed from the COM ports. For this reason, items which are specified to TPIF (Port 4) in JR C-Points are converted to COM 1. However, point jobs are not converted, so correct this data.
- The various display order of T.M.C. settings are not converted.
- I/O-SYS function assignments set in [All Program Common Settings] are not converted.
- I/O-SYS function assignments set in [Set T.M.C.] → [Default All Program Common Settings] are not converted.

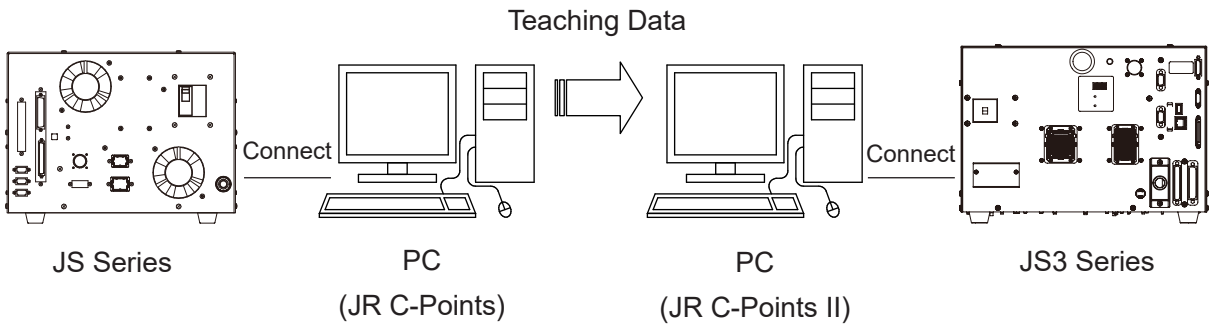
19.3 Converting from JS to JS3

If you want to use JS Series teaching data as JS3 Series C&T data, you need to convert the data first. Convert the data by following the three steps below.

1. Use the PC software JR C-Points to receive the data from the JS to a PC and save it using a file name of your choice.
2. Open the data received from step 1 using JR C-Points II. Do so by specifying the JR C-Points file type in the open file dialog and then selecting the target file.
3. Use JR C-Points II to send the data from the PC to the JS3.

Only JS C&T data can be converted to JS3 data.

■ JS → JS3



You can connect one PC to both the JS Series and the JS3 Series at the same time. You can also connect the PC to the JS Series, receive the data, disconnect the JS, and then connect the JS3 Series. (To convert data using one PC, JR C-Points and JR C-Points II must be installed on the PC.)

⚠ Caution

Always turn OFF the controller and PC before connecting or disconnecting cables. Failure to do so can cause electric shock, data loss, unit breakdown, or malfunction.

Convert the data by carrying out the following:
(This is done using a PC that has JR C-Points and JR C-Points II installed and that is connected to both the JS Series and JS3 Series.)

1. Turn ON the robot and the PC. If the robot is in Run Mode, make sure it is standing by to run. For other modes, have the robot at the base screen.

2. When sending from the PC to the JS Series, start up JR-Points and set the port to match the COM port connected to the JS Series.

■ Operation Procedure
[Robot] Menu → [COM Status]

3. Receive the teaching data from the JS Series.

■ Operation Procedure
[Robot] Menu → [Receive C&T Data]

4. Name the data and save it. For JR C-Points, the data is saved as an ".cp*" extension file. ("*" varies depending on the application model.)

■ Operation Procedure
[File] Menu → [Save As]

5. Exit JR C-Points and startup JR C-Points II.

6. From Ethernet Settings, register the JS3 Series to which you want to send data.

■ Operation Procedure
[Robot] Menu → [Ethernet Settings]

7. From the [Open] dialog box, change [File Type] to "JR C-Points File" (*.cp*) for the JS Series and open the data received from the JS Series. ("*" varies depending on the application model.)

■ Operation Procedure
[File] Menu → [Open]

8. Send the data to the JS3 Series.
   When data is sent from the PC to the robot, any data stored in the robot is deleted, so take caution.

■ Operation Procedure
   [Robot] Menu → [Send C&T Data]

NOTE: For the JR C-Points operating environment, etc., refer to the JR C-Points operation manual.

■ Precautions when converting from JR C-Points to JR C-Points II

- Point job numbers 101 to 200 for JR C-Points are converted as follows according to the Protect Mode: There are no changes to point job numbers set to No Limit or Public Protect Mode, and so these point jobs can be run with no modification.
  Point job numbers set to “Protected” or “Private” Protect Mode are converted with +400 added to their point job number to protect the defined content. Meaning that these items cannot be run as they are. Correct this data.
- With JR C-Points II, TPIF (Port 4) is no longer a COM port. Items that are specified to TPIF (Port 4) in JR C-Points are converted to COM 1. However, point jobs are not converted, so correct this data.
- The various display order of T.M.C. settings are not converted.
- I/O-SYS function assignments set in all program common settings are not converted.
- The I/O-SYS function assignments set for T.M.C. settings in all program common default settings are not converted
- The types of tool mass are different with the JS Series and the JS3 Series. The tool mass setting is converted to 1 kg (default value).
- The JS3 Series does not have a COM3 port. Items that are specified to COM3 in JR C-Points are converted to COM 1. (Point job values are not modified)
- If the move area limit is set as 150 mm on the JS Series, this is converted to 145 mm on the JS3 Series.

20. JCS FILE FORMAT

JCS files are a file format that holds recorded point row data in a CSV format. You can import JCS files into JR C-Points II.
The JCS file format is as follows:

20.1 Format

■ Header Line
Specify “JR Points_CSV” is in the first line.
This line is used so that the file specified by JR C-Points II is identified as a JCS file.

■ Data Lines
Specify the second line onwards as data lines.
Separate the items using commas, as follows:
Point type code, X coordinates, Y coordinates, Z coordinates, R coordinates, MT1 coordinates, MT2 coordinates.

NOTE: The MT1 coordinates and MT2 coordinates can be omitted.

Details of each item are as follows:

Item	Content
Point type code	Specify the point type code (described later).
X coordinates*	Specify the X coordinates -2000 to 2000. Smaller decimals are rounded to the 4th digit.
Y coordinates*	Specify the Y coordinates -2000 to 2000. Smaller decimals are rounded to the 4th digit.
Z coordinates*	Specify the Z coordinates -999.999 to 999.999. Smaller decimals are rounded to the 4th digit.
R coordinates	Specify the R coordinates -720 to 720. The units which can be used are degrees only. Smaller decimals are rounded to the 3rd digit.
MT1 coordinates*	Specify the MT1 synchronized axis coordinates. Specify the coordinates -9999.999 to 9999.999. Smaller decimals are rounded to the 4th digit.
MT2 coordinates*	Specify the MT2 synchronized axis coordinates. Specify the coordinates -9999.999 to 9999.999. Smaller decimals are rounded to the 4th digit.

* Even if you select “inches” for the unit of length measurement for JCS file when importing JCS files, the unit is displayed in “millimeters” in JR C-Points II.

Point type codes include the codes below. Depending on the application specifications you are using, some point types are set automatically for the dedicated application point types often used.

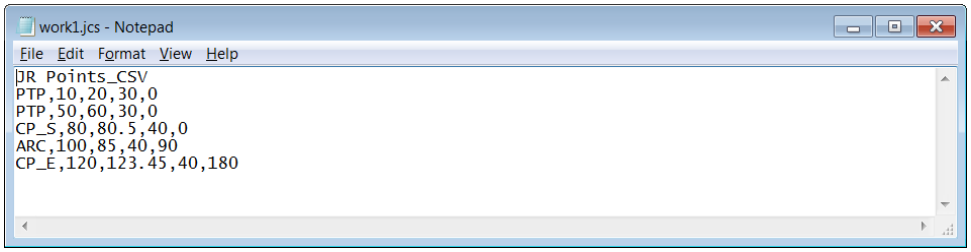
Point Type Code	Point Type
PTP	PTP point
CP_S	CP start point
CP_P	CP passing point
CP_E	CP end point
ARC	CP arc point
CP_CS	Circle start point
CP_CC	Circle center point
ZA_S*	Zigzag start point
RA_S*	Rectangle spiral start point
AREA_E*	Rectangle end point
CA_S*	Spiral start point
CA_P1*	Circumference of spiral area 1
CA_P2*	Circumference of spiral area 2

* You can only use these point types with Dispensing Specifications.
The following point types are not compatible with JCS file format:

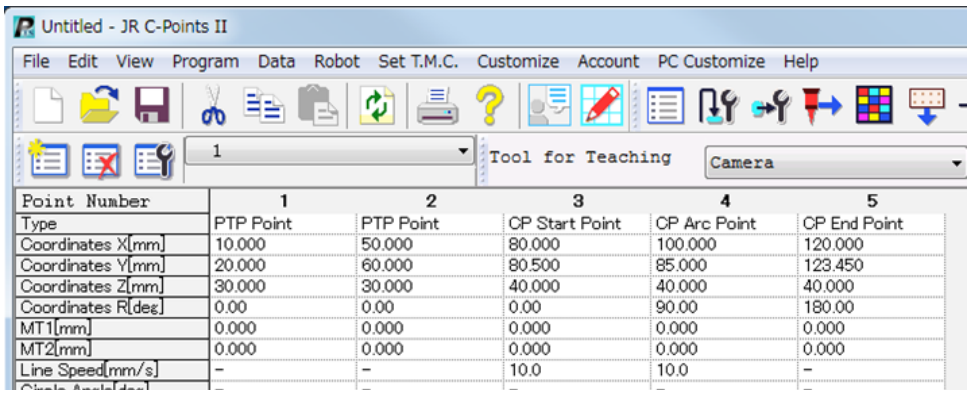
- CP Stop Point
- PTP Evasion Point

20.2 JCS File Data Example

A JCS file data example is as follows:



If you import the above JCS file to JR C-Points II, the data is imported as follows:



Point Number	1	2	3	4	5
Type	PTP Point	PTP Point	CP Start Point	CP Arc Point	CP End Point
Coordinates X[mm]	10.000	50.000	80.000	100.000	120.000
Coordinates Y[mm]	20.000	60.000	80.500	85.000	123.450
Coordinates Z[mm]	30.000	30.000	40.000	40.000	40.000
Coordinates R[deg]	0.00	0.00	0.00	90.00	180.00
MT1[mm]	0.000	0.000	0.000	0.000	0.000
MT2[mm]	0.000	0.000	0.000	0.000	0.000
Line Speed[mm/s]	-	-	10.0	10.0	-

21. HELP MENU

21.1 About...

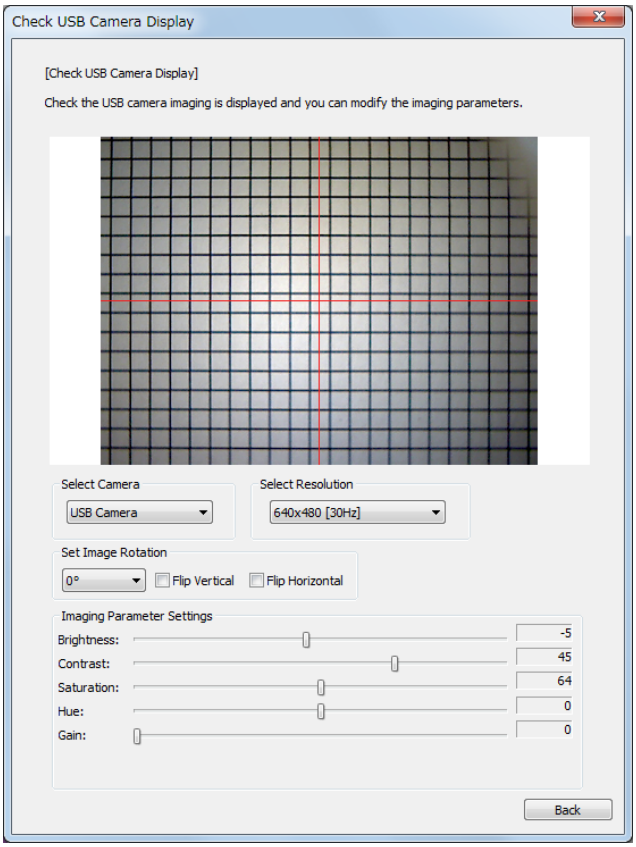
This displays the version information dialog.

21.2 Operation Manual

The operation manual will open.

21.3 Check USB Camera Display

Click [Check USB Camera Display] from the Help menu to display the Check USB Camera Display dialog. You can check if the image is displayed from the USB camera and if the parameters can be set.



You can make the following settings on this dialog:

1. Select Camera
   Select a USB camera.
2. Select Resolution
   Select the USB camera resolution.

3. Set Image Rotation (0 ° / 90 ° / 180 ° / 270 ° / Flip Vertical / Flip Horizontal)
4. Imaging Parameter Settings
   - Brightness: move the bar to the right to increase the brightness.
   - Contrast: move the bar to the right to increase the contrast.
   - Saturation: move the bar to the right to increase the saturation.
   - Hue: move the bar left and right to adjust the hue.
   - Gain: move the bar left and right to adjust the camera sensitivity. Set this higher to brighten the image. However, the higher this is set, the greater the noise.

Click the [Back] button to end the process.

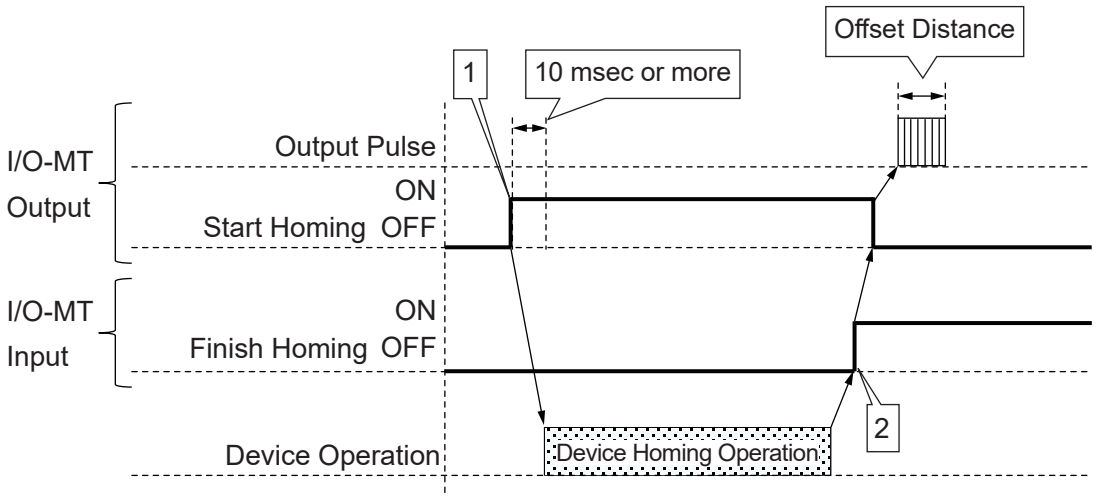
22. APPENDIX

22.1 Homing Operation Methods (JR3000 / JC-3 Series Only)

22.1.1 Start and Completion

The section explained here is for robots equipped with auxiliary axis functions.

■ Timing Chart.



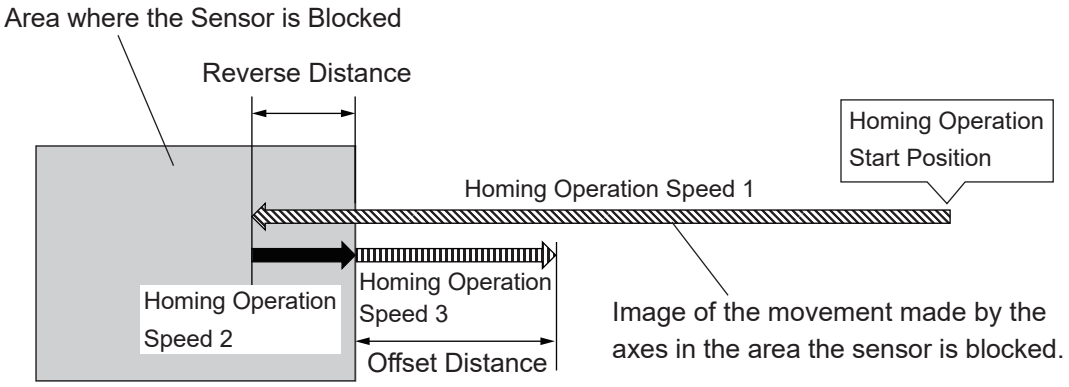
The error in the table below occurs if there is a problem with the homing operation.

Error	Details
Homing Move Timeout Error	The time from when the “Homing Start Request” signal came ON until the “Homing Complete” signal turns ON exceeds the homing operation parameter “Timeout Period”. (The time from 1 until 2 exceeded the setting “Timeout Period”)

22.1.2 Sensor Position Type

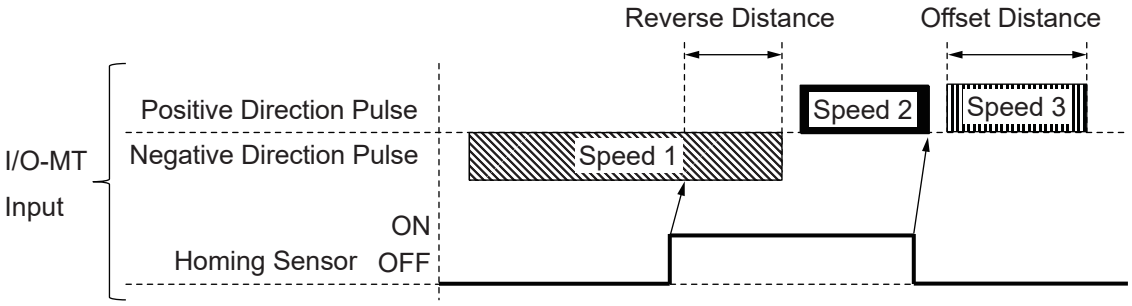
This section explained here is for robots equipped with auxiliary axis functions.

■ Operation Image



At the start of the homing operation, if the axes are already in the area where the sensor is blocked, the axes move at homing operation speed 1 in the positive direction until they exceed the area where the sensor is blocked, and then continue to move in the positive direction by the exact offset distance.
After this, the operation in the above diagram starts.

■ Timing Chart



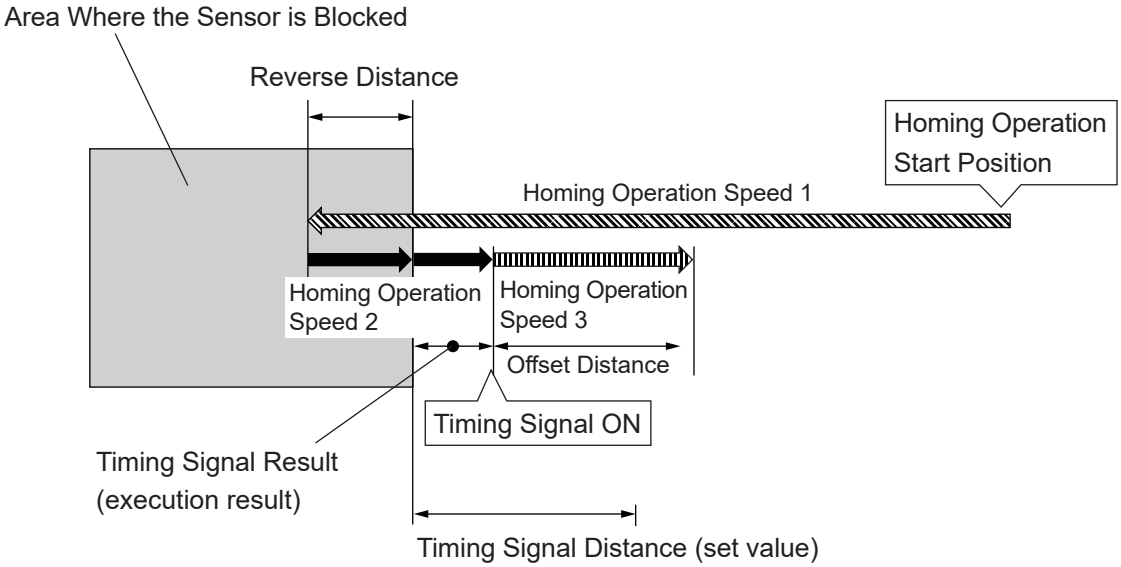
The errors in the table below occurs if there is a problem with the homing operation.

Error	Details
Homing Move Timeout Error	The elapsed time from the start of the homing operation exceeded the homing operation parameter “Timeout Period”.
Homing Operation Sensor Error	1. Movement started from outside of the area where the sensor is blocked and even though the axes moved the distance specified in the homing operation parameter “Valid Distance”, the axes did not enter the area where the sensor is blocked. 2. Movement started from inside the area where the sensor is blocked and even though the axes moved the distance specified in the homing operation parameter “Valid Distance”, the axes did not exceed the area where the sensor is blocked.

22.1.3 Timing Signal Type

This section explained here is for robots equipped with auxiliary axis functions.

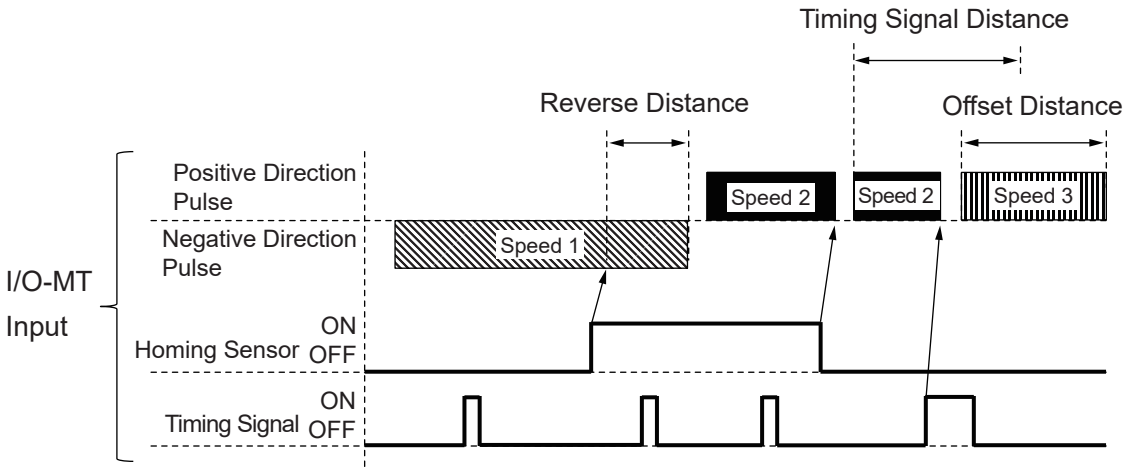
■ Operation Image



At the start of the homing operation, if the axes are already in the area where the sensor is blocked, the axes move at homing operation speed 1 in the positive direction until the sensor is released, and then continue to move in the positive direction by the exact offset distance. After this, the operation in the diagram above starts.

The “timing signal result” is the execution result of the homing operation. The timing signal varies depending on the position relationship between the position which is output and the position detected by the sensor. “Timing signal result” can be confirmed by using the Configuration Check Mode.

■ Timing Chart



The errors in the table below occurs if there is a problem with the homing operation.

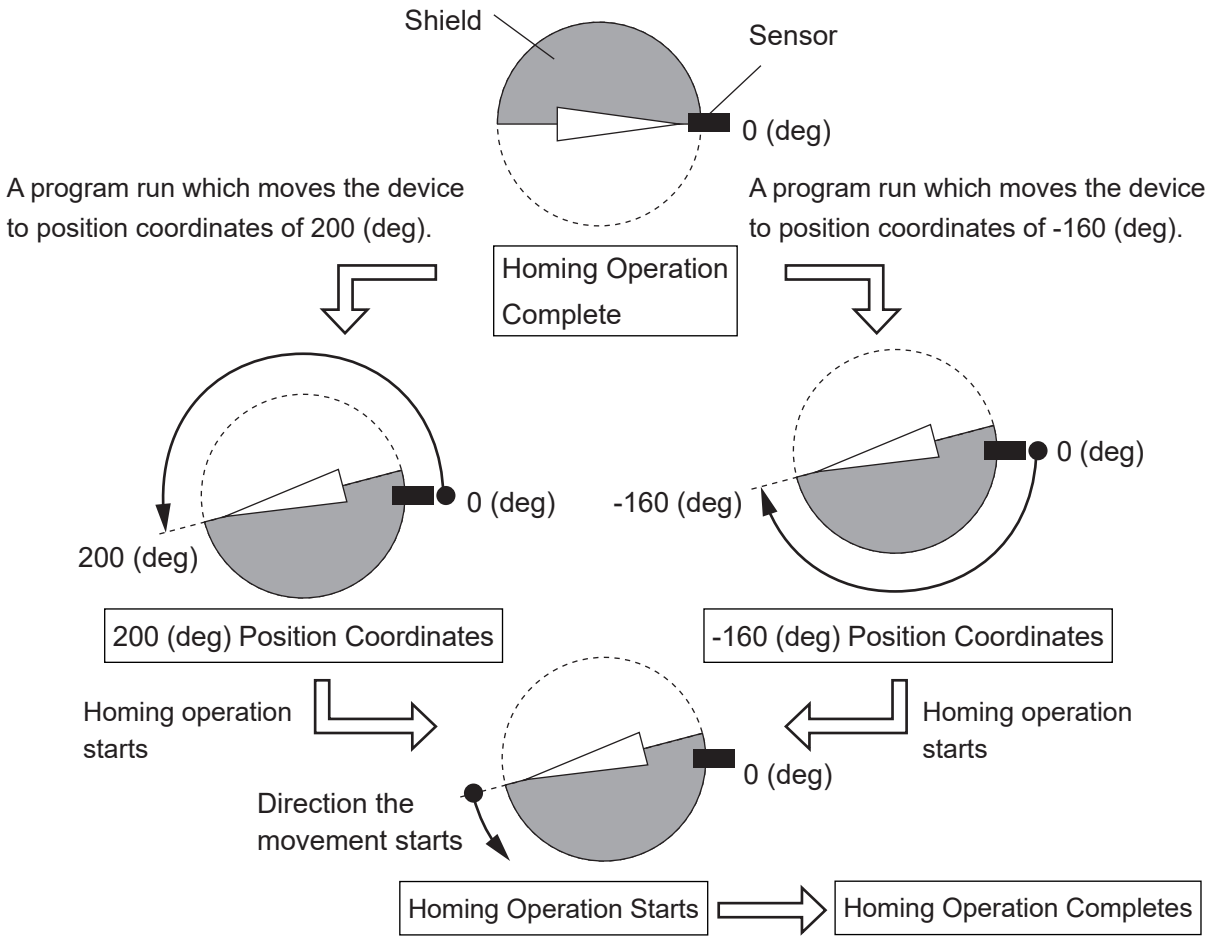
Error	Details
Homing Move Timeout Error	The elapsed time from the start of the homing operation exceeded the homing operation parameter [Timeout Period].
Homing Operation Sensor Error	Movement started from outside of the area where the sensor is blocked and even though the axes moved the distance specified in the homing operation parameter [Valid Distance], the axes did not enter the area where the sensor is blocked. Movement started from inside the area where the sensor is blocked and even though the axes moved the distance specified in the homing operation parameter [Valid Distance], the axes did not exceed the area where the sensor is blocked.
Homing Move Timing Signal Error	Even though the axes moved the exact distance specified in the homing operation parameter [Timing Signal Distance], the timing signal did not come ON.

■ Homing Operation Precautions for Devices with Rotational Motions

The direction of operation for homing operations performed via the “Sensor Position Type” or “Timing Signal Type” are determined depending on the sensor ON/OFF status, regardless of the position coordinate values at the start of the operation.

For controlled devices with rotational motions such as for a dispense syringe, etc., you need to take note of the rotation.

For example, if using a semicircular shield to block the sensor, a homing operation from 200 (deg) position coordinates and a homing operation from -160 (deg) position coordinates start the homing operation in the same direction.



In addition, homing operations are performed in accordance to the sensor switching ON/OFF even if the total angle exceeds 360 (deg) due to multiple rotations. Devices will not make return operations according to the sum of multiple rotations.

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