

# **JANOME DESKTOP ROBOT**

## **JR3000 Series**

# **Operation Manual**

## **PC Operation**

Thank you for purchasing this Janome Robot.

- Before using your robot, please 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 that can be easily accessed at any time by the operator.
- This manual is written according to IEC 62079.

**Original Instructions**

# **JANOME**

# PREFACE

The Janome Desktop Robot JR3000 Series are new low-cost, high-performance robots. With these robots we succeeded in reducing the price while maintaining functionality. The combined use of stepping motors and specialized micro step driving circuits saves both energy and installation space. This operation manual explains how to use JR C-Points II for the JR3200, JR3300, JR3400, JR3500\* and JR3600\* series (\*under development). There are several manuals pertaining to these robots as listed below.

Mouse operation and the use of dialog boxes for JR C-Points II are the same as those in Microsoft Windows® 7/8/8.1 applications. For information about Windows® 7/8/8.1 operating methods, refer to the instruction manual supplied with Windows® 7/8/8.1. The information within this manual is based on the PC software Ver. 2.0x. Windows, Excel, Word are registered trademarks of Microsoft Corporation.

## JR3000 Series

For Your Safety	This is important safety information. Make sure you read this before using the robot.
Setup	Explains how to set up the robot. ■ Make sure you read this manual ■ <u>NOTE</u> : 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 ■ <u>NOTE</u> : This manual is designed for people who have received safety and maintenance training regarding the robot.
Basic Instructions	Provides part names, data configurations, and the basic knowledge necessary to operate the robot.
Quick Start	Explains the actual operation of the robot by creating and running simple programs.
Teaching Pendant Operation	Explains how to operate the robot via the teaching pendant.
Functions I	Explains point teaching.
Functions II	Explains commands, variables, and functions.
Functions III	Explains functions such as All Program Common Settings and PLC programs.
Functions IV	Explains Customizing Functions.
External Control I (IO/Fieldbus)	Explains IO and Fieldbus. Please refer to this manual if you are using Fieldbus.
Communication Control (COM/LAN)	Explains COM 1 – 3 and LAN communication control.
Camera & Sensor Functions	Explains the functions of the attachable camera and Z position sensor.
Specifications	Outlines general specifications such as the robot's operating range, mass, etc.
Auxiliary Axis Functions	Explains the auxiliary axis functions.
PC Operation	Explains how to use the PC software JR C-Points II.
Application Specifications	Explains the specialized functions of each of the application specifications.

Note: The content of this manual may differ from the robot in your possession due to updates to the product specifications.

The descriptions within this manual are based on standard specifications. The menu item names etc. may vary depending on the model type.

## Attention

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 listed on the previous page.

## Attention

If you turn OFF the power after making changes to robot's settings or data without saving, these changes are lost and the robot will revert to its original settings. Make sure that you save any changes to data and/or settings.

## Attention

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.

## Attention

Before transmitting 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.



## Warning

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 shocks, fires, malfunction, and unit breakdown.



## Warning

**Make sure that the machine power supply is OFF before connecting the power cord.**

Failure to do so could cause electric shock and/or injury.



## Warning

Do not handle or operate the robot in ways not covered in the manuals listed on the previous page. Contact Janome (listed on the back page of this manual) for repairs.

Failure to do so can cause electric shock and/or injury.

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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. Please 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.

 <b>Danger</b>	This symbol indicates an imminent risk of serious injury or death.
 <b>Warning</b>	This symbol indicates a risk of serious injury or death.
 <b>Caution</b>	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 Precaution)
	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 supply cord
	Make sure the machine is grounded

# FOR YOUR SAFETY



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 in the formation of a robot 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**

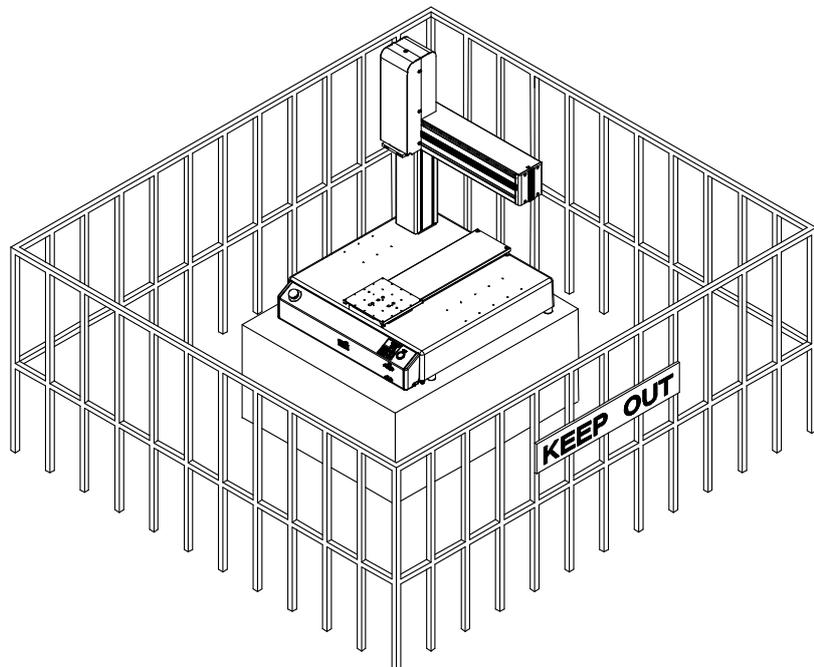


**Always set up a safety enclosure or cover the robot with a guard so the moveable parts cannot be touched.**

Anyone within the maximum reach of the robot and the auxiliary axes it is controlling may be injured. Using the IO-S connector accessory, set up an **emergency stop interlock system that cuts off the motor power to the auxiliary axes and is triggered when the entrance to the safety enclosure is opened**. Make sure there is no other way of entering the restricted area.

Furthermore, put up a **“No Entry”** or **“Do Not Operate”** warning sign in a clearly visible place.

Example:



# FOR YOUR SAFETY

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

## **Danger**



**When power to the robot is ON, never enter the safety enclosure or put your face, hands, or any part of your body inside.**

Failure to do can result in injury.



**When entering the safety enclosure** 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, operators in Japan who engage in teaching, inspections, adjustments and/or repairs **must take lectures as part of the “special education” for industrial robots as stipulated by Article 59 of the Japan Industrial Safety and Health Act and the related regulations.**

Likewise, when using the robot outside of Japan, make sure to do so according to 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 enclosure.
- **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 IO-S circuit (interlock) and emergency stop switch(s) are functioning properly.

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

# FOR YOUR SAFETY

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

## **Warning**



**Construct a safety enclosure that is strong enough to protect the operator against such dangers as the tool or workpiece splintering, etc.**

When working within the safety enclosure, 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, weight, 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 enclosure, 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 enclosure and there are no obstacles that could interfere with the run.**

Failure to do so can cause injury or unit breakdown.

# FOR YOUR SAFETY

## **Danger**



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

## **Warning**



**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 and switchbox on a workbench 60cm or higher above floor level, and install the robot in the center of the workbench. In addition, **for units with a cooling fan on the back, allow for 30cm or more clearance between the back of the unit and the wall.** If installation is inadequate, the unit can drop or fall over causing injury and unit breakdown. Also, inadequate installation causes overheating and fire.



**Make sure to power the unit within its rated current range.**  
Failure to do so causes electric shocks, fires, and unit malfunction.



**Plug the power cord into the wall 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 fires and unit malfunction.



**When replacing fuses, or inspecting or lubricating the unit, unplug the power cord from the wall outlet, then remove the cord from the main unit and make sure there is no electrical current. Also, do not touch any of the power inlet pins within 5 seconds of removing the power cord.** Failure to follow these steps causes electric shocks and injury.

# FOR YOUR SAFETY

## **Warning**



**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 shocks, fires, malfunction, and unit breakdown.



**Wipe the power plug with a clean, dry cloth periodically to eliminate dust.**  
Dust accumulation deteriorates the electrical insulation and causes fires.



**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 fires.



**Be sure to turn OFF the unit before inserting or removing cords and cables such as the teaching pendant cable.**  
Failure to do so causes electric shock, fire, data loss, and unit malfunction.



**Do not attempt to disassemble or modify the unit.**  
Disassembly or modification causes electric shocks and unit malfunction.



**Do not allow water or oil to come in contact with the unit, control box or the power cord.**  
Contact with water or oil causes electric shock, fire, or unit malfunction.  
IP Protection Rating: IP20.



**If anything unusual occurs, such as a burning smell or unusual sound, stop operation and unplug the power cord immediately. Contact the dealer from whom you purchased the robot or the office listed on the last page of this manual.**  
Continuing to use the robot without addressing the problem causes electric shock, fire, or unit breakdown.

# FOR YOUR SAFETY

## **Caution**



**Do not drop or jar the unit during transport and/or installation.**

This causes injuries or damages 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 unit in an environment between 0 and 40°C, with a humidity level of 20 – 90%, and without condensation.**

Use outside of these conditions can cause unit malfunction.



**Use the unit in an environment where no electrical noise is present.**

Failure to do so causes unit malfunction or breakdown.



**For models with IO-S circuits, when installing the unit, take safety measures such as setting up area sensors and an enclosure.**

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 within reach of the operator when running or operating the robot.**

If the robot is operated when the emergency switch is not within reach, 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 for the emergency stop switch. Also, for models with IO-S circuits, regularly perform an IO-S circuit function check.**

If you perform work without making a circuit check, you or the operator will not be able to immediately and safely stop the robot in an emergency. This is potentially dangerous.

# FOR YOUR SAFETY

## **Caution**



**When attaching tools etc., make sure they are securely fitted before running the robot.**

Failure to do so causes injury or breakdown.



**When using the machine for extended periods of time, check and make sure none of the main unit's mounting screws are loose, and perform a routine inspection every 3 months.** Failure to do so causes injury or breakdown.



**Be sure to check the connections of the cords and cables to the main unit.**

Improper wiring causes unit malfunction or breakdown.



**Be sure to 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.**

# 1. OPERATING ENVIRONMENT

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The following system configurations are necessary to run the software JR C-Points II or JR C-Points II Limited Edition (included in the operation manual CD-ROM).

- Personal Computer  
Capable of running Windows® 7/8/8.1.
- Memory Capacity  
A minimum of **512 MB** of memory is required to operate JR C-Points II or JR C-Points II Limited Edition properly.
- Operating System  
Microsoft Windows® 7/8/8.1  
NOTE: Compatible with both 32bit/64bit.
- Hard Disk Capacity  
After installing Windows® 7/8/8.1 a minimum of **2 GB** of open hard disk space is required.
- LAN Cable (Ethernet)  
A LAN cable with the specifications below is required to connect the robot and the computer.
  - Straight cable (CAT5)
- Connectable Ethernet (PC side) specifications are as follows:
  - **10/100BASE-TX**            - LAN Port: **RJ-45**

The required memory capacity or hard disk space may vary depending on the system environment. Please note that insufficient hard disk space may lead to a memory shortage or trouble during operation.

## 2. INSTALLATION AND UNINSTALLATION

---

To use JR C-Points II, first install the software onto a PC.

### NOTE

Install the software using your PC's administrator account.

Do not attempt to install JR C-Points II when JR C-Points II Limited Edition is already installed. If JR C-Points II Limited Edition is installed, first uninstall JR C-Points II Limited Edition and then install JR C-Points II.

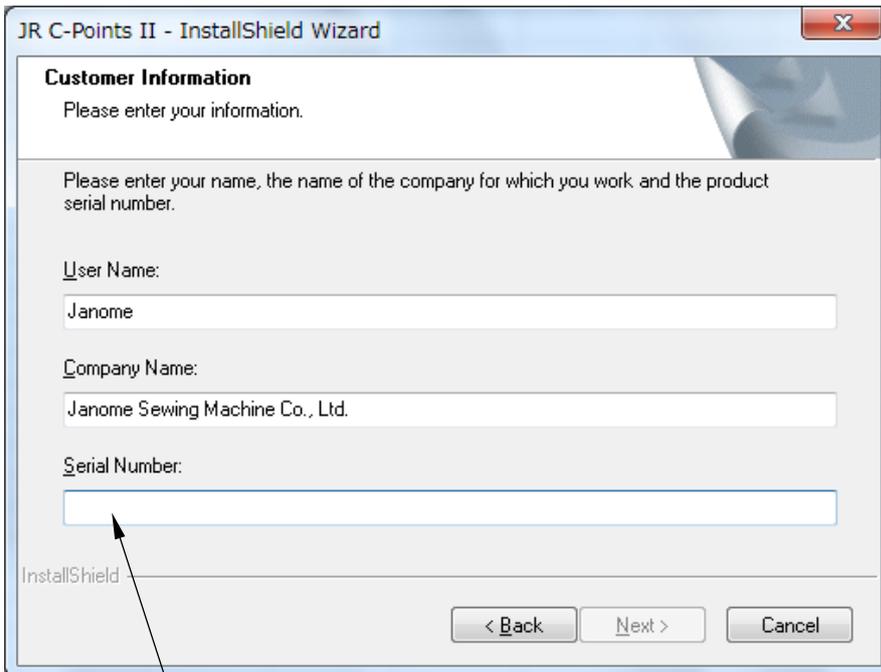
### 2.1 Installation

1. Start Windows® and check that it is functioning properly. Before installation, close all applications.
2. Place the JR C-Points II CD-ROM in the CD-ROM drive.
3. The installer will automatically start up. Follow the instructions on the screen.

Additionally, to use JR C-Points II you need Microsoft.NET Framework 4 Client Profile and Microsoft.NET Framework 4 Extended software framework. When installing JR C-Points II, these are also installed. Agree with the User Agreement and install them.

### NOTE

Microsoft.NET Framework 4 Client Profile and Microsoft.NET Framework 4 Extended are registered trademarks of Microsoft Corporation.



Enter the Serial Number listed on the label on the back of the CD-ROM case.

■ If the Installer Doesn't Start up Automatically,

1. Click on Windows® Explorer or [CD-ROM Drive] from [My Computer].
2. Double-click [¥SETUP.EXE] icon in the [CD-ROM Drive].
3. Follow the instructions on the screen.

NOTE

If you are using Windows 7, the Program Compatibility Assistant dialog may appear after you install JR C-Points II. If this dialog is displayed, select "This program installed correctly".

Additionally, this dialog may also appear after using JR C-Points II. Check "Don't show this message again" to stop this dialog from appearing.

## 2.2 Uninstallation

1. Start Windows® and check that it is functioning properly. Close all open applications.
2. Place the JR C-Points II CD-ROM in the CD-ROM drive.
3. The installer will start up automatically. If it does not start, click on Windows® Explorer or the [CD-ROM Drive] icon under [My Computer].
4. Follow the instructions on the screen. Running the installer when the software is already installed causes uninstallation to occur.

NOTE

To upgrade the software, start up the installer to uninstall the existing application, and then start up the installer again to install the new software.

# 3. STARTUP AND EXIT

## 3.1 Start Up

Select “Program” from the Start Menu of Windows® and select “JR C-Points II”, or click on the JR C-Points II shortcut icon on the desktop.

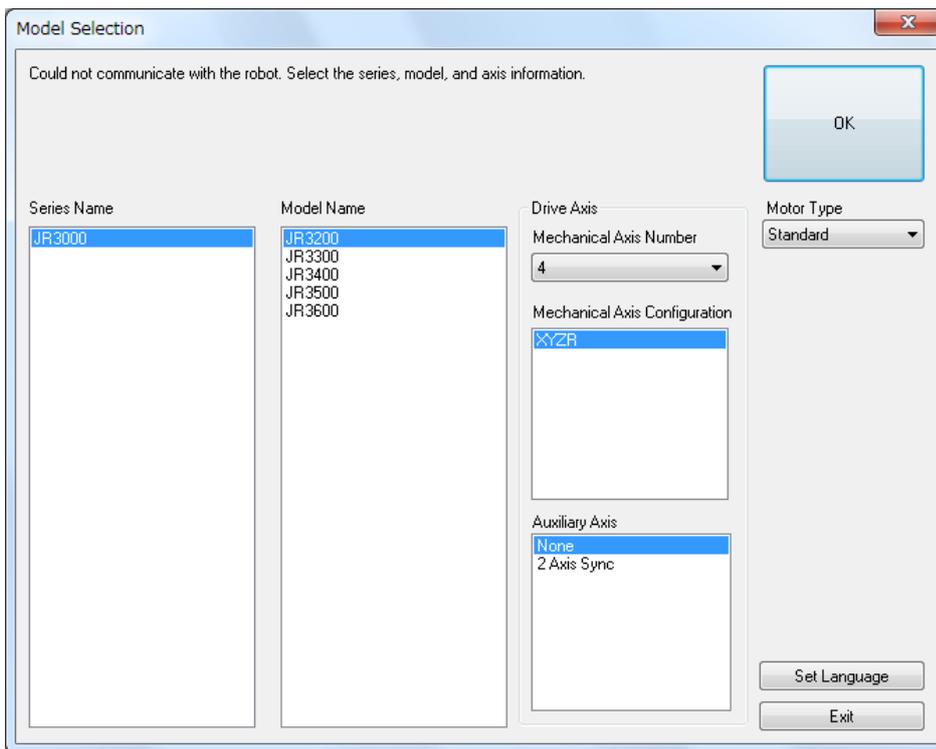


Shortcut Icon

You can teach off-line (while the robot is not connected to the PC or the robot is turned off) using JR C-Points II.

However, in this case, communication between the robot and the PC cannot be established so the robot's configuration information cannot be read. The dialog shown below is displayed. Set the robot model name, axes info, motor type and click [OK]. In this case, you cannot operate the robot from the PC.

(If you start up JR C-Points II when your PC is connected to the robot, the robot's configuration information is loaded automatically.)



### NOTE

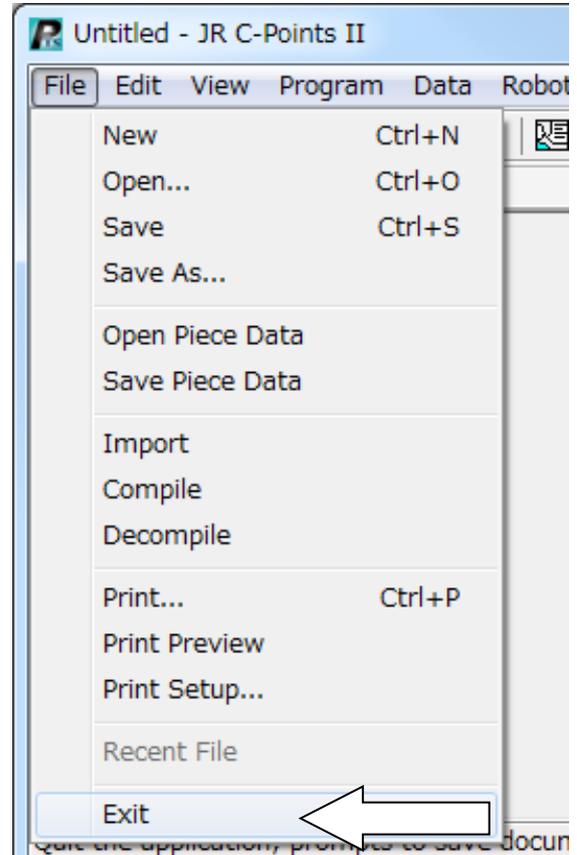
- Depending on your robot's application specifications, the shortcut icon, and the robot series and/or models you can select in the model selection dialog may vary.
- If you start up JR C-Points II while the robot is offline, the auxiliary axes' names and the units displayed are not what are displayed on the robot, but are the JR C-Points II defaults.

## 3.2 Exit

You can exit JR C-Points II, using any of the following methods:

- Click the  button on the upper right corner of the screen.
- Click [Exit] on the [File] pull-down menu.
- Double click  on the top left of the screen.

If unsaved C & T data is open, an exit confirmation dialog appears.



## 4. CONNECTING THE ROBOT TO A PC (ETHERNET)

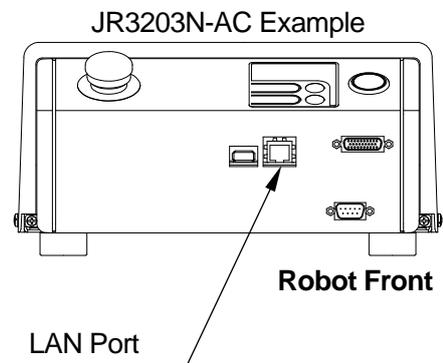
### 4.1 Ethernet Overview

The robot is fitted with an Ethernet connector (10/100BASE-TX) by standard.

The LAN port is on the front of the robot.

By using Ethernet and transmitting commands and data from a PC, you can use functions such as the ones below:

1. Send and receive C & T data
2. Overwrite the system program
3. Online teaching such as JOG and GO movements etc.
4. Monitor functions such as external I/O and Fieldbus I/O display etc.
5. Online settings such as administration settings and teaching environment settings etc.
6. Robot information display such as system information and error history etc.



### Caution

If you instruct an urgent stop from a network other than IO-SYS, a small amount of time is needed for the robot to actually stop after the command is sent.

To back up the robot's C&T data (customizing and teaching data) and upgrade the robot's system software, connect the robot to a PC and make sure they are able to interface.

When using Ethernet, you can connect to and use multiple robots with one PC through a hub.

If you are using JR C-Points II (optional) to operate the robot from the PC, please remove the teaching pendant.

You cannot operate the robot with the teaching pendant connected.

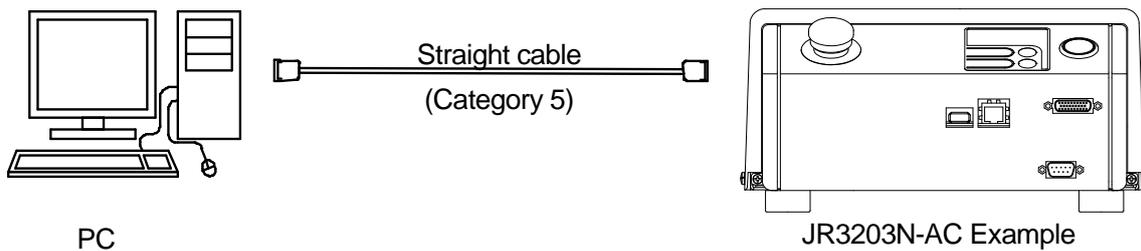
You cannot use a teaching pendant with an emergency stop switch (optional) unless a short connector is connected.

## 4.2 LAN Cable

Use a straight cable (category 5) compatible with the 10/100BASE-TX standard to connect the robot to a PC. Insert one end of the LAN cable into the robot's LAN port and one end into the PC's LAN port.

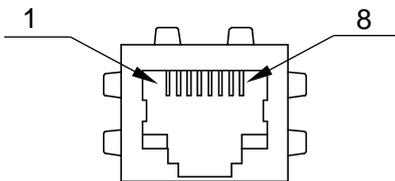
### Attention

Make sure the power to both the robot and the PC are OFF before attaching or removing the cable. Failure to do so causes malfunction.



## 4.3 LAN Port

LAN Port (Diagram RJ-45)



LAN Connector (LAN) Pin Assignment

Pin No.	Name	Function
1	TD+	Transmit signal+
2	TD-	Transmit signal-
3	RD+	Receive signal+
4	NC	Not connected
5	NC	Not connected
6	RD-	Receive signal-
7	NC	Not connected
8	NC	Not connected

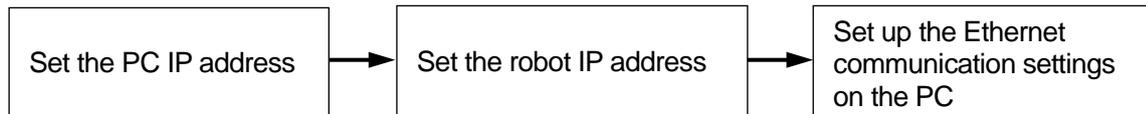
# 5. COMMUNICATION PREPARATION

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## 5.1 Communication Preparation Procedure

To communicate with the robot, set up the communication settings.

To connect with Ethernet, you need to set up an IP address and subnet mask on the robot and register this IP address on the PC.



To use the Ethernet function, you need to have TCP/IP settings complete on the PC with JR C-Points II installed. However, before setting up TCP/IP, please take note of the following:

- To use Ethernet function, a TCP/IP network environment is required.
- The robot uses a fixed IP address; therefore please do not use a DHCP server etc.

## 5.2 Setting Up an IP Address on Your PC

If an IP address is not set to the PC, please set one.

The robot is not compatible with IPv6, therefore please use IPv4.

If an IP address is already set to the PC, you do not need to set this up again.

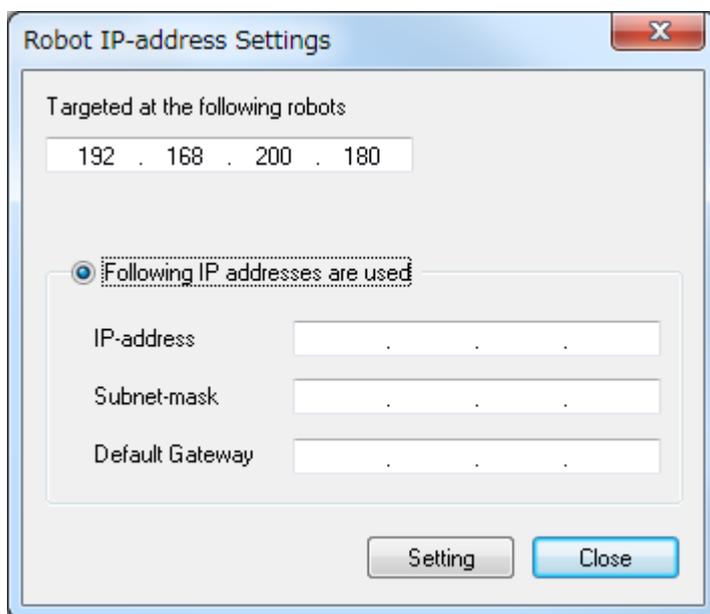
### NOTE

- Methods for setting up an IP address on a PC vary depending on your Windows® version. Please refer to your PC's manual.
- We recommend using a private IP address class C (192.168.0.0 – 192.168.255.255). However, you cannot set 0 or 255 to the 4<sup>th</sup> octet (the far right digits).
- If you are setting up a new IP address to your PC, please consult your network administrator.

## 5.3 Setting Up an IP Address on Your Robot

By default the robot is initially set with the IP address “192.168.200.180”. You can set the robot’s IP address with the following procedure. Also, you can change the robot’s IP address from the teaching pendant.

1. Select [Robot] on the menu bar and click [IP-address Setting] from the pull-down menu.
2. On the robot IP-address settings dialog enter the IP address, subnet-mask and default gateway. You can omit the default gateway if you are using the PC and robot on the same network segment. Click [Setting] to set the specified IP address etc., to the robot.

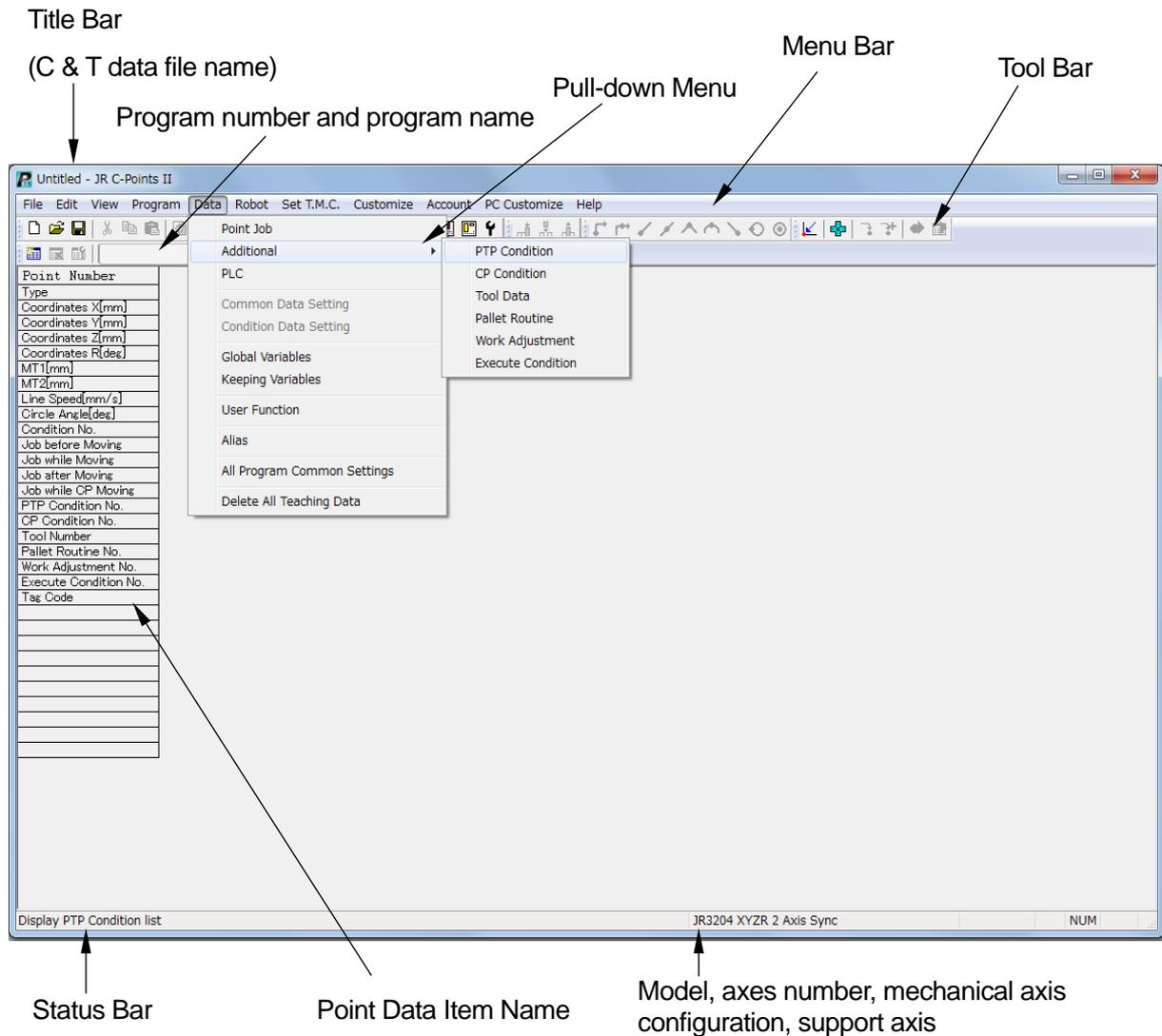


3. Turn the power to the robot OFF and then ON again to apply the settings.





# 6. HOW TO READ THE DISPLAY SCREEN



- 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 program currently open (selected)
- Point data item: .....Items which can be set to point data.
- Status bar .....Displays an explanation.
- Model name, axis info, axis-configuration, support axis .....Displays the model and axes number of the connected robot.

## 6.1 Icon Function List

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
	Print	File → Print...
	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
	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
	Adds a (PTP) point to the end of the program	Edit → Add Point
	Inserts a (PTP) point	Edit → Insert Point
	Deletes a point	Edit → Delete Point
	Adds a PTP point to the end of the program* <sup>1</sup>	These are tool bar icons only
	Adds a PTP evasion point to the end of the program* <sup>1</sup>	
	Adds a CP start point to the end of the program* <sup>1</sup>	
	Adds a CP passing point to the end of the program* <sup>1</sup>	
	Adds a CP stop point to the end of the program* <sup>1</sup>	
	Adds a CP arc point to the end of the program* <sup>1</sup>	
	Adds a CP arc point to the end of the program* <sup>1</sup>	

	Adds a CP end point to the end of the program* <sup>1</sup>	These are tool bar icons only
	Adds a circle start point to the end of the program* <sup>1</sup>	
	Adds a circle center point to the end of the program* <sup>1</sup>	
	Performs mechanical initialization	Robot → Meca Initialize
	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
	Adds a program	Program → Add Program
	Deletes the currently selected program	Program → Delete Program
	Program individual settings	Program → Program Individual Settings

#### NOTE

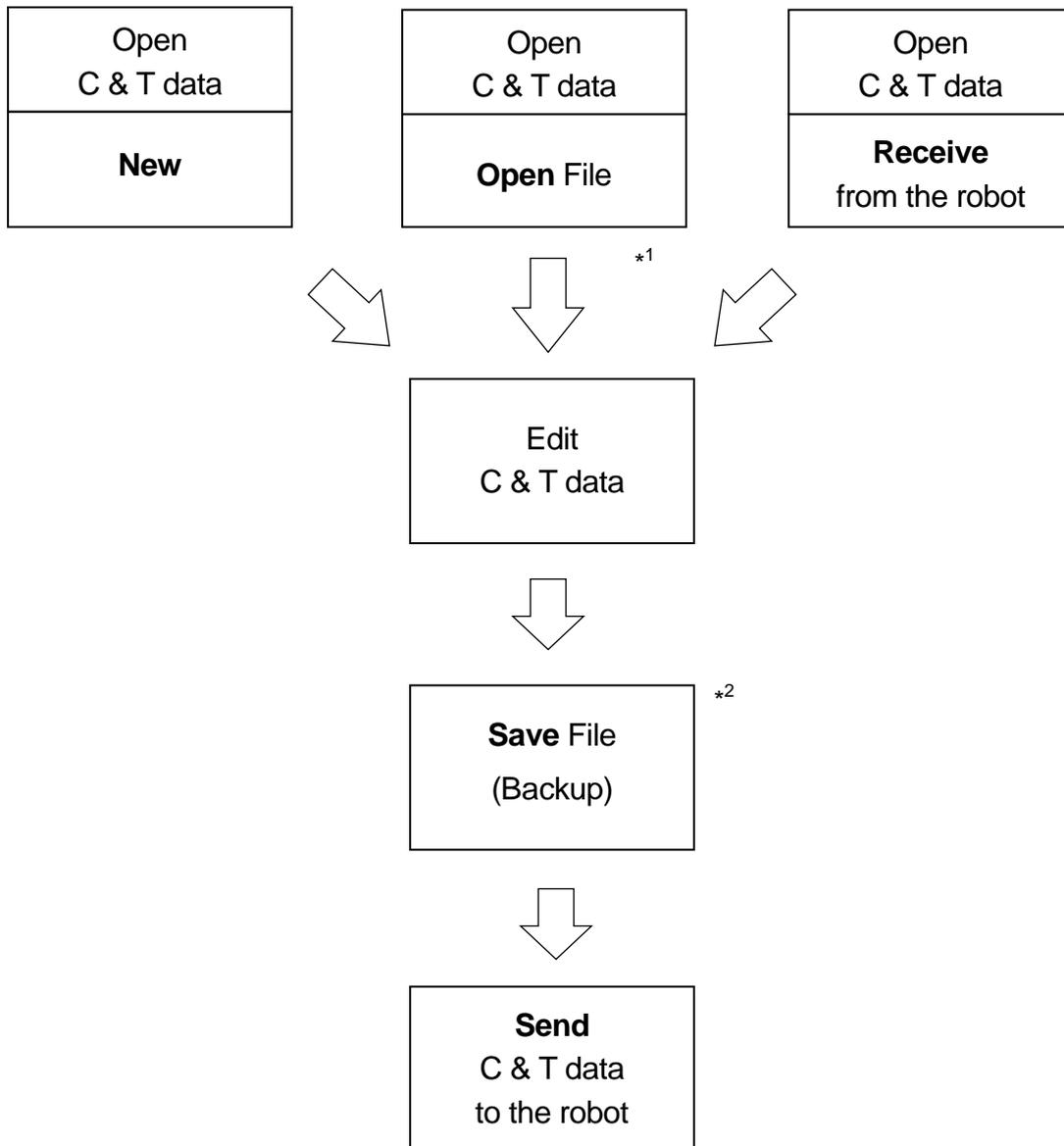
You can select to display or hide icons from [Toolbar] on the [View] pull-down menu.

\*<sup>1</sup> The point string added varies depending on the application specifications. The point string also varies depending on the settings for new point types entered with PC customizing.

# 7. OPERATION PROCESS

---

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



\*1 "File" refers to the C & T data file saved on the PC.

\*2 Back up the data file as protection against a possible transmission error before sending C&T data to the robot.

## 8. C & T DATA

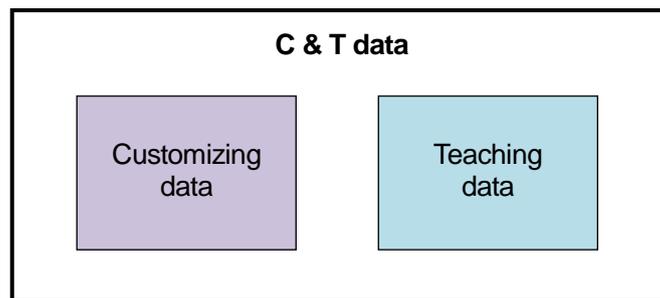
---

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).

PC customizing setting information and 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.

# 8.1 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 – 999

Point Data

Individual Program Settings

Point Jobs (1 – 500)

Additional Functions (1 – 50), Work Adjustments (1 – 3000)

PLC Programs (1 – 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

## 8.2 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. The content of PC customizing settings is not included in customizing data.

With customize data, if you are not logged in as a given user, you cannot create or delete customize data.

The image shows a screenshot of a software interface for configuring data. It is organized into a large light purple container with a dark border. At the top, there is a white box labeled "T.M.C. Settings" containing five sub-items: "Default All Program Common Settings", "Display Order", "Caption Settings", "Teaching Mode Display Items", and "Teaching Operations". Below this, a series of white boxes with dark borders list other configuration categories: "Common Setting Variables", "Condition Setting Variables", "Program Setting Variables", "Point Types", "Point Jobs (501 – 1000)", "Additional Functions (51 – 100)", "PLC Programs (51 – 100)", "Global Variables (when created logged in)", "Keeping Variables (when created logged in)", "User Functions (when created logged in)", and "Aliases (when created logged in)".

## 9. CREATING A NEW C & T DATA FILE

---

This creates a new C & T data file.

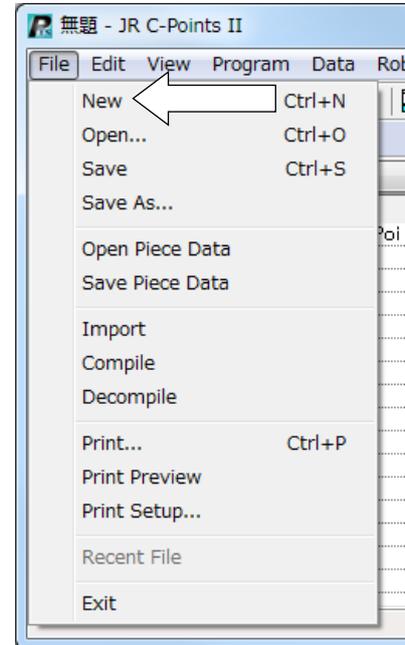
Select “File” on the menu bar and click “New” from the pull-down menu, or click on the “new file” icon on the tool bar.

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.

# 10. OPENING/SAVING A FILE

---

This section explains how to open or save to a C & T data file stored on the PC. To change or open the C & T data stored in the robot, refer to “10.3 Opening a C & T Data File” – “10.5 Load a JCS (.jcs) File”. Before sending the C & T data to the robot, save the data onto a backup file as a safeguard against contingencies. The saved file is used as a C & T data backup file.

## NOTE

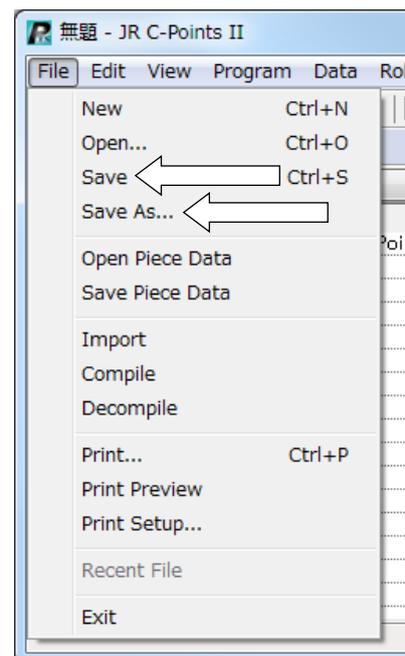
When you select “New”, “Points II CP2\*Document” (“\*” varies depending on the specifications) from the “File” tab in the menu bar in Windows Explorer etc., a new C&T data file is created. The C&T file created using this method acquires the model information last used previously in JR C-Points II; however,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

## 10.1 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.



## 10.2 Save Partial Data to a File

You can save a portion of C & T data, such as a specific program or specific point job data.

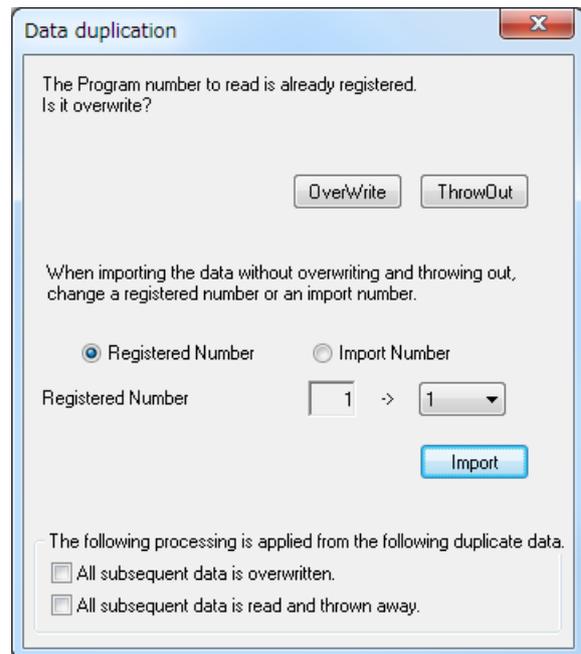
Select the location where you wish to save the file and enter the file name. The Save File selection dialog box (tree view) appears. Check the data box you wish to save and click [OK]. Only the checked data is saved.

## 10.3 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.

## 10.4 Open 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 confirmation screen 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
Portion of C & T data file	1, 2, 3

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

### ■ OverWrite

Program 1 in the open C & T data file is deleted, program 1 from the selected partial C & T data is registered, and then the data duplication screen for program 2 is displayed.

### ■ ThrowOut

Program 1 of the selected portion of C & T data is not registered and the data duplication screen for program 2 is displayed.

#### ■ 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 partial data is registered as is with its original number.
- Change the imported program number  
Change the number for program 1 of the partial data 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].

## 10.5 Load a JCS (.jcs) File

You can load a created JCS file. A JCS file is a CSV (comma-separated-values) descriptor file for point data type information and coordinate information. Please refer to “25. 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.  
In the JCS file, the unit of length measurement is not registered. Here you can select a measurement unit (millimeters/inches).
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

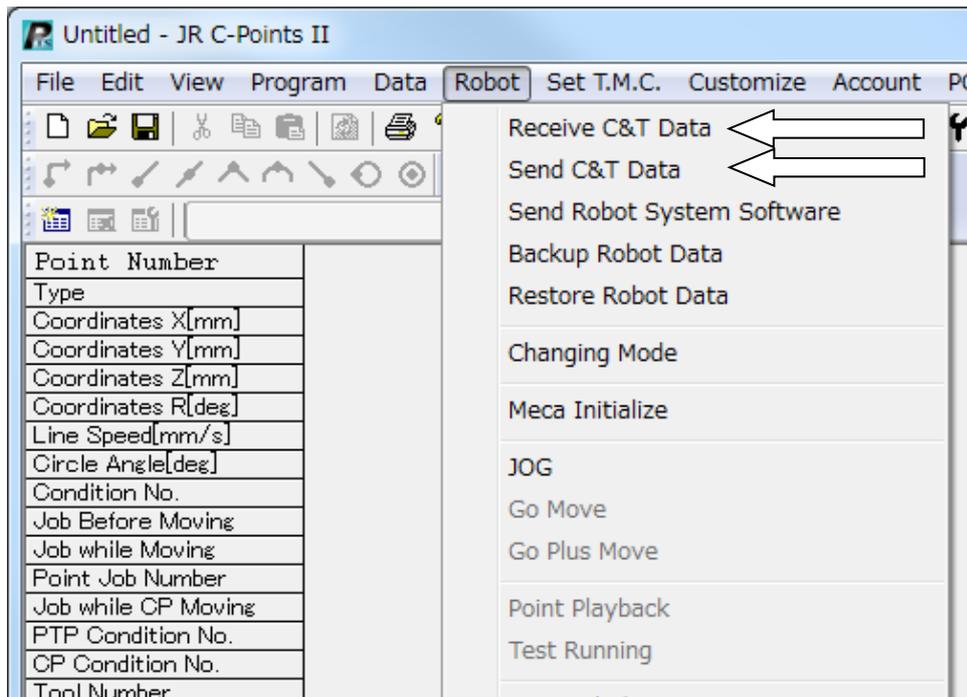
This opens the selected program number of the open C & T data. A new program is added to the currently open C & T data.

#### 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).

# 11. 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.



## 11.1 How to Receive C&T Data

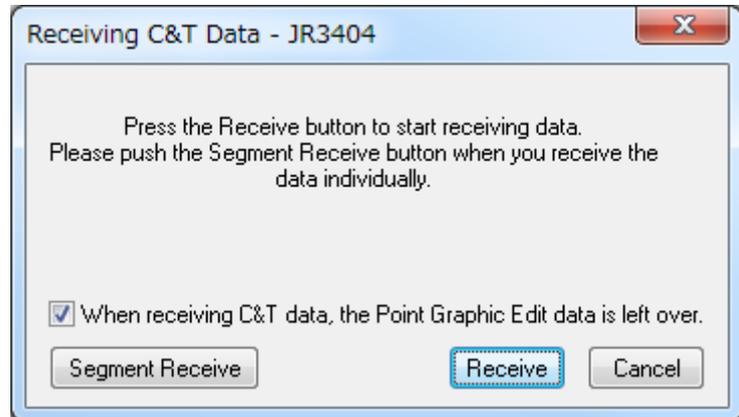
Click [Robot] on the menu bar, then click on [Receive C & T Data] on the pull-down menu. The following window appears.

### ■ 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.

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

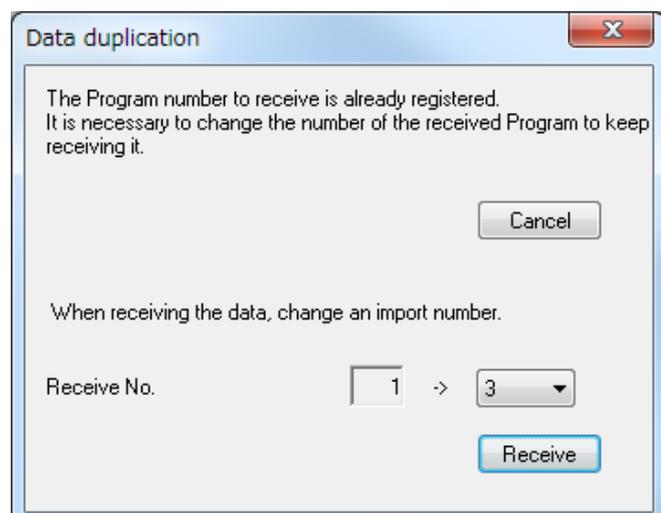
You cannot open multiple C & T data files at one time. If a C & T data file is already open, close it before receiving new C & T data from the robot.

### ■ 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.

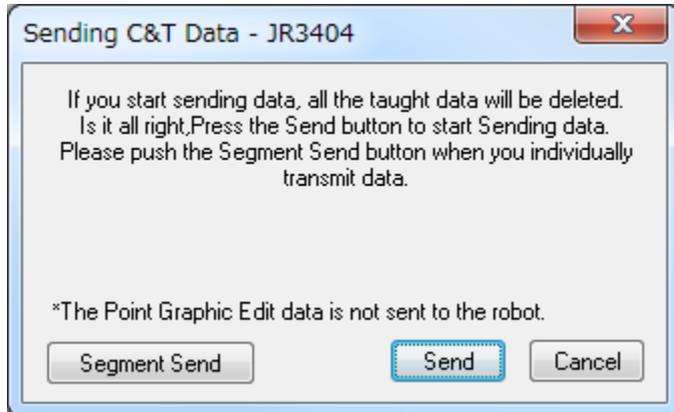
### NOTE

If you click [Segment Receive] while another C & T data file is open with duplicate data, a data duplication confirmation screen 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 screen shown to the right, and then click [Receive].



## 11.2 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 shown below appears.



### ■ Send

Click [Send] on the Sending C & T Data dialog box. The PC starts to send the C & T data to the robot.

#### NOTE

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.

### ■ [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 transmitting 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 you out.
- The code displayed at the time of a transmission error is for malfunction inquiries. Be sure to relay the code and error content when making an inquiry.

# 12. HOW TO CHECK THE CONNECTION AND SYSTEM INFORMATION

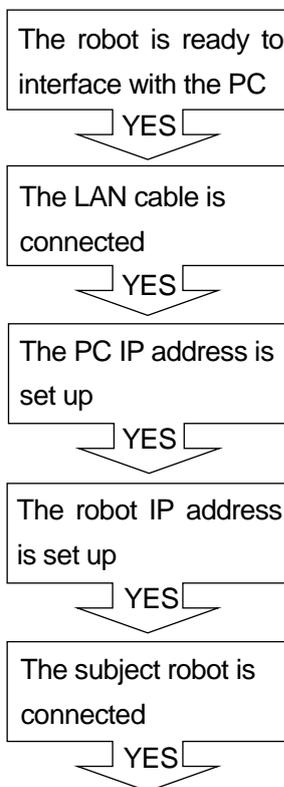
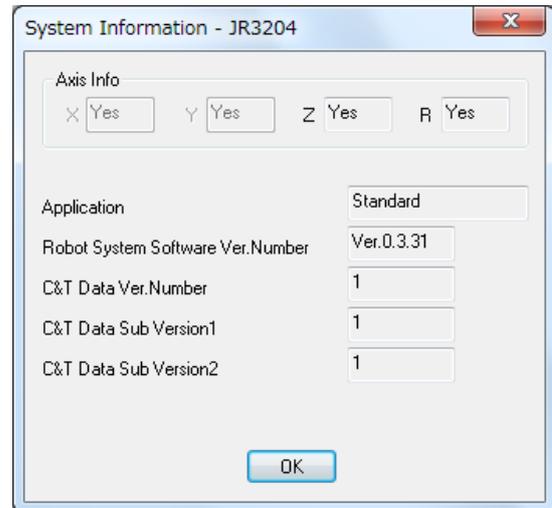
Click “Robot” on the menu bar and then click “SystemInfo” on the pull-down menu. System information for the subject robot is loaded.

### NOTE

“Robot System Software Ver. Number” is the version number for system software 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:

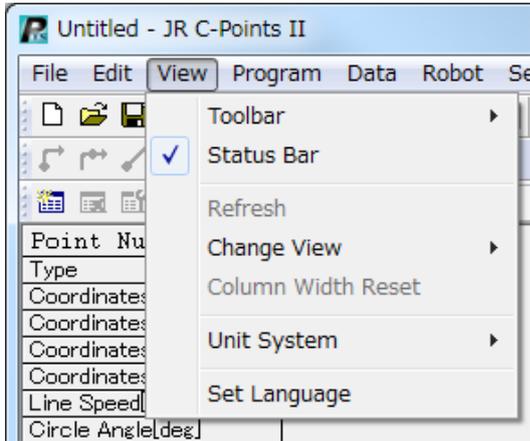


# 13. SCREEN DISPLAY

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This section explains how to edit or refresh the screen display.

Click [View] on the menu bar to display the pull-down menu shown below.



## 13.1 Tool Bar

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

## 13.2 Status Bar

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

## 13.3 Refresh

Click [Refresh] to redisplay the point data.

When redisplaying the data, if any numerical data parameters exceed the input range, the data is displayed 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 is displayed as unregistered.

## 13.4 Change View

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

## 13.5 Column Width Reset

This resets the column width to the default setting when point data is displayed vertically.

(With the horizontal view, the column width is reset to the default setting when the program is changed.)

## 13.6 Unit System

Click [Unit System] to select the unit of length or coordinates from the following:

- Millimeters
- Inches

## 13.7 Set Language

Select the display language for JR C-Points from the following four 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

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
  - Italian
  - Spanish
  - French
  - Korean
  - Chinese (simplified)
  - Czech
  - Vietnamese

# 14. TEACHING DATA

## 14.1 Program

### 14.1.1 Open a Program

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

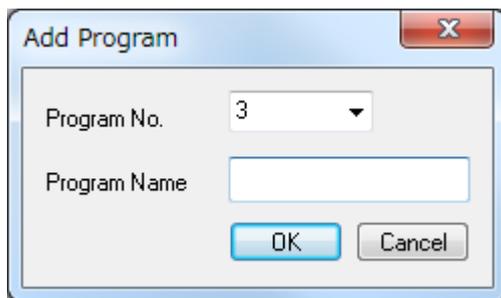
#### ■ Opening a New Program

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 shown below appears.

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

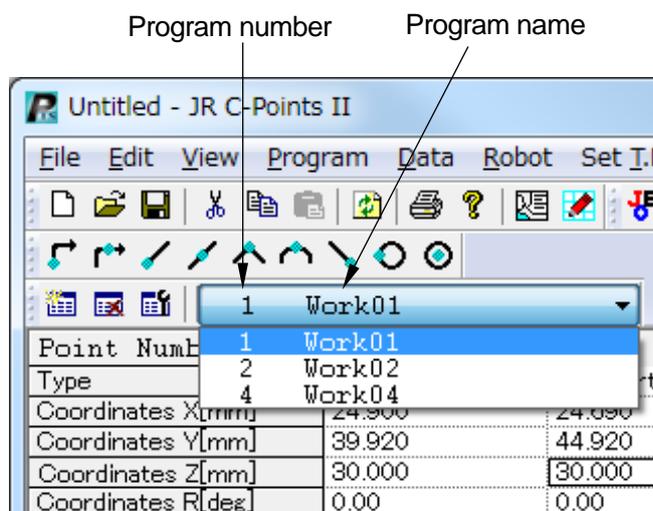
Once the program name is transmitted to the robot, it is valid for the first 40 – 120 characters on the robot side (teaching pendant display) depending on the characters used.

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



#### ■ 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.

### 14.1.2 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].

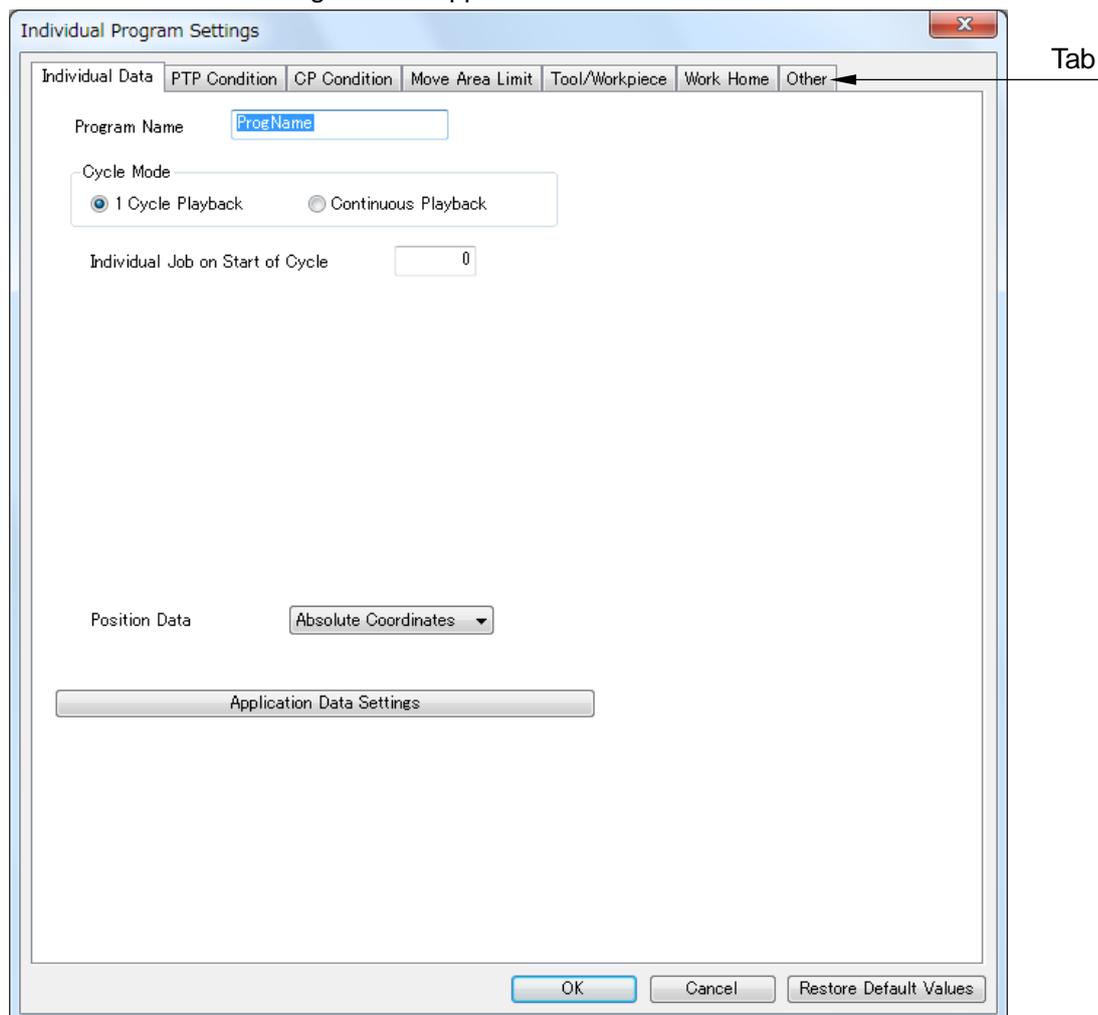
If editing items in tabs other than individual data, you need to put a check in [Individually Set Program Data].

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.



### 14.1.3 Point Data

When opening a program by clicking [Add Program], the point data are blank.

To register one or more points in a program, click [Add Point] as many times as necessary.

Point Number	1	2	3	4	5
Type	PTP Point ▼	CP Start Point	CP Passing Poi	CP Passing Poi	CP Passing Poi
Coordinates X[mm]	PTP Point ▲	44.910	44.910	59.880	44.910
Coordinates Y[mm]	CP Start Point	39.920	59.880	79.840	99.800
Coordinates Z[mm]	CP Passing Poi	30.000	30.000	30.000	30.000
Coordinates R[deg]	CP Stop Point	0.00	0.00	0.00	0.00
MT1[mm]	CP Arc Point	0.000	0.000	0.000	0.000
MT2[mm]	CP End Point	0.000	0.000	0.000	0.000
Line Speed[mm/s]	PTP Evasion Po ▼	10.0	10.0	10.0	10.0
Circle Angle[deg]	-	-	-	-	-
Condition No.	-	-	-	-	-
Job before Moving	-	-	-	-	-
Job while Moving	-	-	-	-	-
Job after Moving	1	2	5	-	-
Job while CP Moving	-	-	-	-	-
PTP Condition No.	-	-	-	-	-
CP Condition No.	-	-	-	-	-
Tool Number	-	-	-	-	-
Pallet Routine No.	-	-	-	-	-
Work Adjustment No.	-	-	-	-	-
Execute Condition No.	-	-	-	-	-
Tag Code	-	-	-	-	-

#### ■ 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®.

#### ■ Add Point

Click [Add Point] on the [Edit] pull-down menu. A point is added to the tail end of the point data alignments.

#### ■ Insert Point

Click [Insert Point] on the [Edit] pull-down menu. A point is inserted in front of the point data where the cursor is placed.

#### ■ Delete Point

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

#### NOTE

[Add Point], [Insert Point], and [Delete Point] can also be done by clicking the icons on the tool bar.

#### ■ 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-Left/Front-Back)\*

Mirror copying is done with single point units.

Select a cell and then click [Mirror Copy] from the [Edit] menu. The Mirror Copy 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

Point line speeds included within specified ranges can be converted by a percentage. If the converted values exceed the line speed setting range, the values are set to the appropriate maximum or minimum value.

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.

#### ■ Reverse Point

Use this function to reverse the order of points within a designated range.

Click [Reverse Point] on the [Edit] pull-down menu. 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.

You can select to specify the target data to either a program or all data.

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.

Push 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.

#### ■ Point Graphic Editor\*

You can put the point data into a visual display and edit it.

Load a DXF file or a Gerber data file and while using the loaded data you can teach point data.

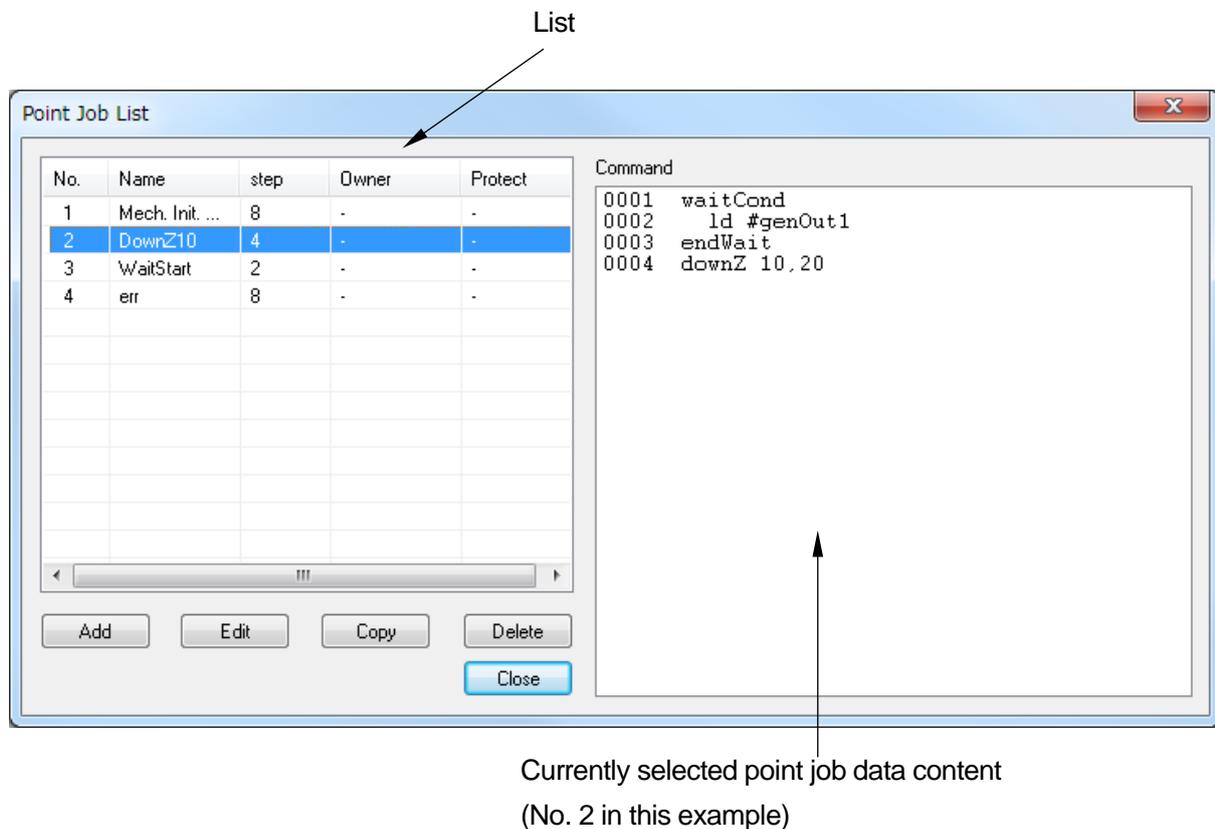
For further details, please refer to "18. Point Graphic Editor".

\*If there are multiple axes with the same assignments, the axes enabled (set to valid) in the Drive Axis Valid/Invalid settings (robots equipped with auxiliary axis functions) of the “Other” tab in Individual Program Settings, and/or All Program Common Settings are subject to modification. Also, if there are multiple axes enabled (valid), or if there are no enabled axes (invalid), modification is performed on the axes with the smaller numbers.

## 14.2 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.



### 14.2.1 Copy

1. 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.
2. Select or enter the copy destination point job number.

### 14.2.2 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].

### 14.2.3 New (Add)

1. Click [Add] at the bottom of the dialog box and select the point job data number you want to create. Numbers already registered cannot be selected. Select a number and the point job data editing dialog appears.

#### NOTE

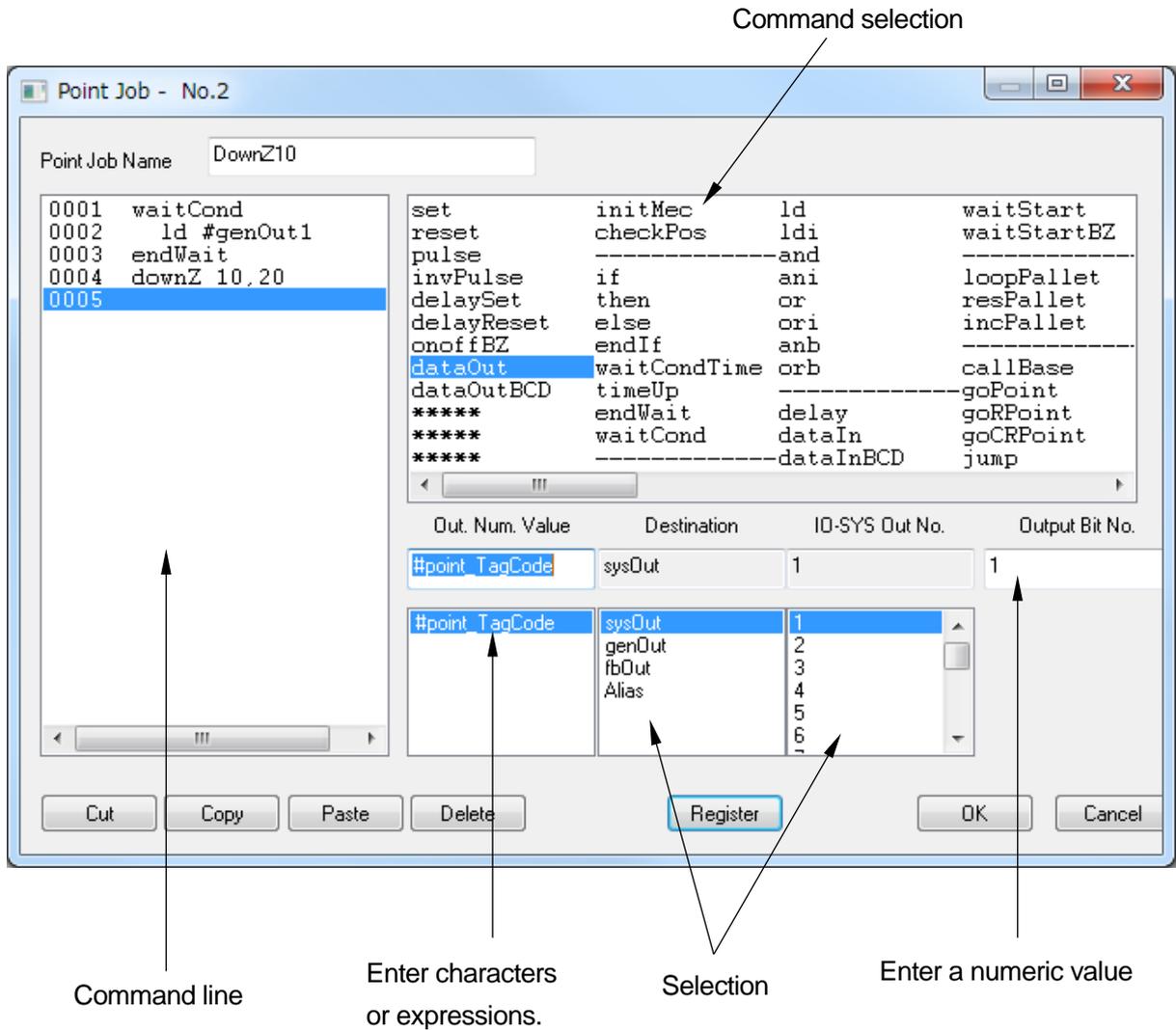
You can change the size of the point job data editing dialog box. Click the  button on the upper right corner of the dialog box to make it full-screen. Click and drag the edge of the dialog box. Its size will change according to how much you have moved it.

2. Select (click) the desired command. 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 – 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.

#### NOTE

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



#### 14.2.4 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 you want to add a command to. 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 line you wish to delete and click [Delete]. The selected command line is deleted and the proceeding commands shift up.
  - Change a Command  
Insert a new command and delete the old command.

#### NOTE

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

### 14.2.5 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].

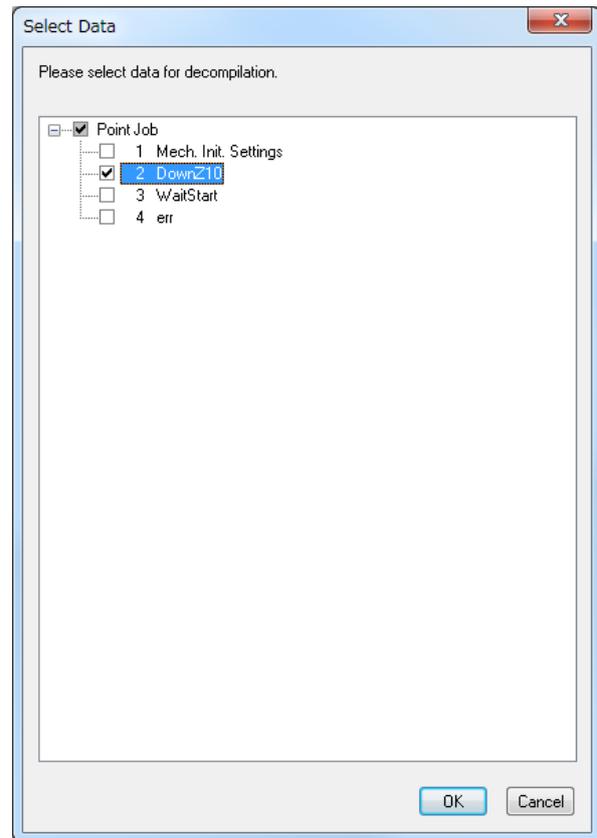
The decompile results appear.

To save the data, click [Save As] and enter a file name.

The default file extension is saved as “.cds”; however, you can change it to “.txt”.

#### NOTE

Please be careful when decompiling or compiling if there are discrepancies in the measurement units (millimeters/inches) as the data may not be able to load correctly.

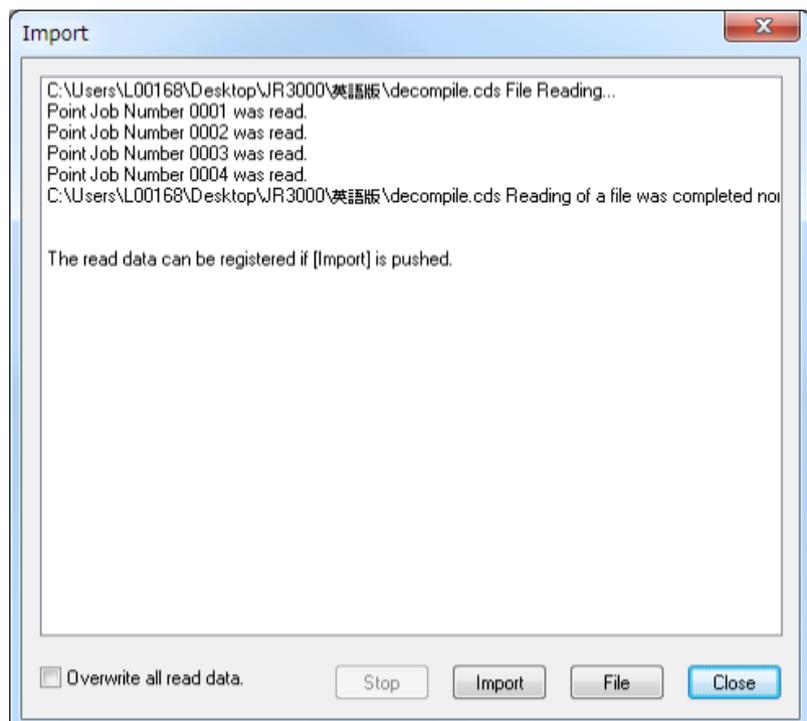


### 14.2.6 Compile (Import a text file)

You 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 above 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 is displayed 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.

- [ThrowOut]

The point job data being imported is not registered (thrown out).

- [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.

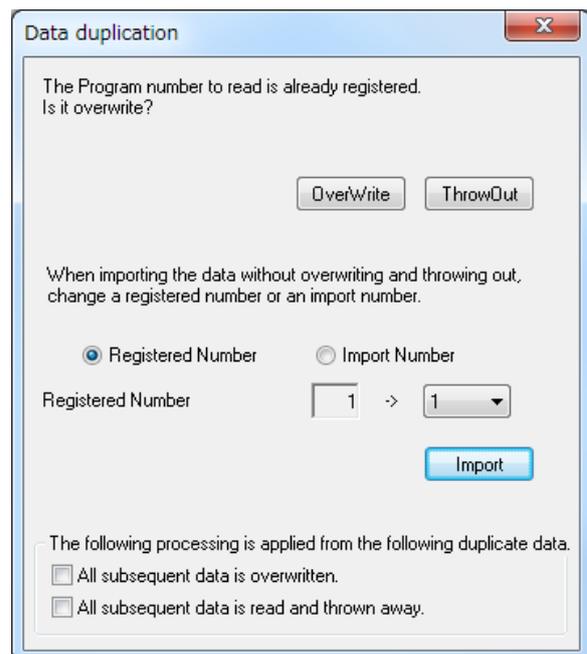
- Change the imported program number

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.

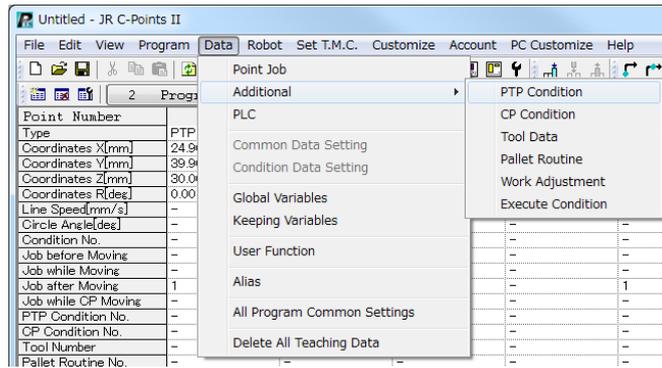
Put a check in [All subsequent data is read and thrown away.] to dismiss all subsequent duplicate data.



## 14.3 Additional Function Data

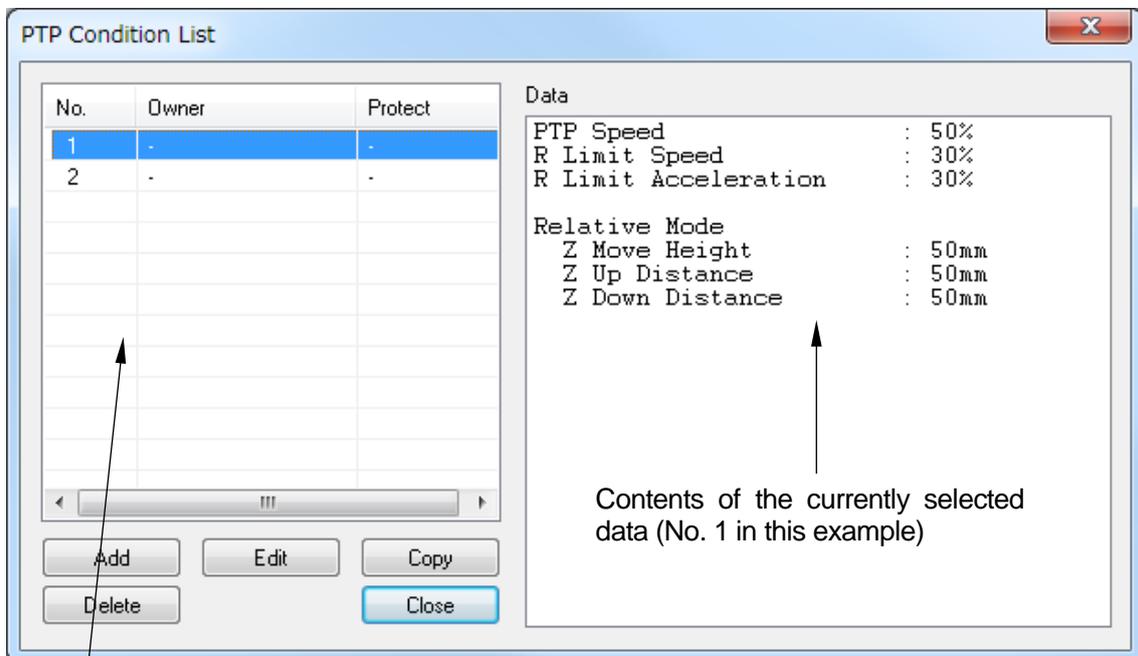
Additional function data is a part of C & T data. To create or edit additional function data, first open the C & T data.

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 is displayed.



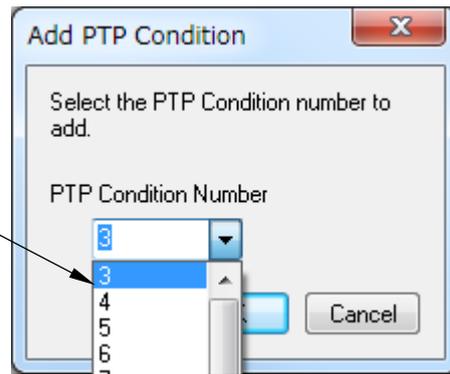
To create new additional function data, click [Add] and select the additional function data you want.

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 is displayed.



Data list

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



### 14.3.1 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 is displayed.

- [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 transferred to the robot, it is valid with up to 40 halfwidth 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.

### 14.3.2 Copy

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

### 14.3.3 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.

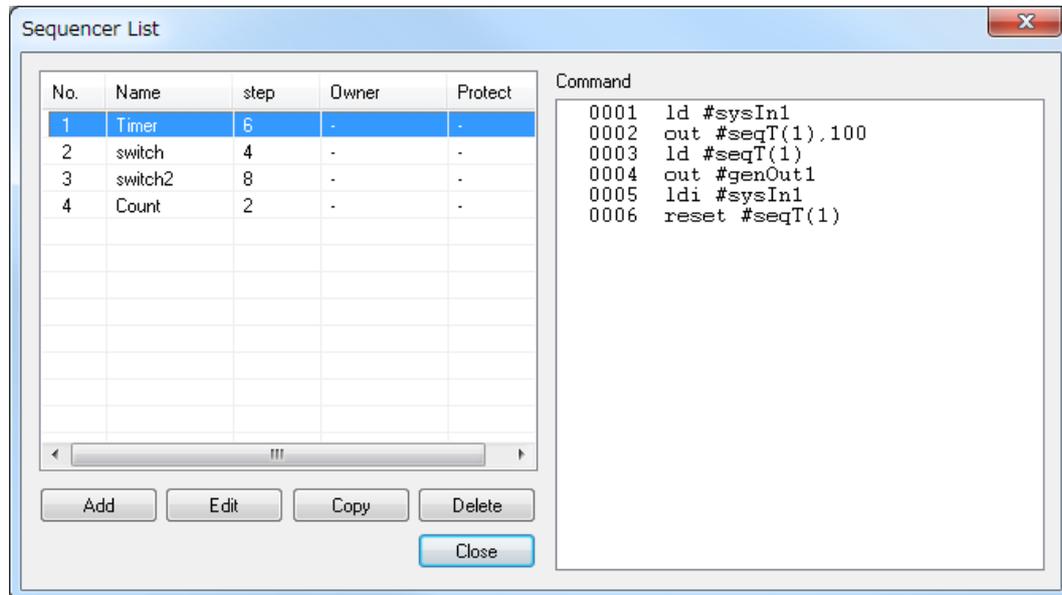
### 14.3.4 Delete

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

## 14.4 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 is displayed.



### 14.4.1 New (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 is displayed.

### 14.4.2 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 is displayed.

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 transferred to the robot, it is valid with up to 40 halfwidth characters on the robot side (teaching pendant display).

### 14.4.3 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.

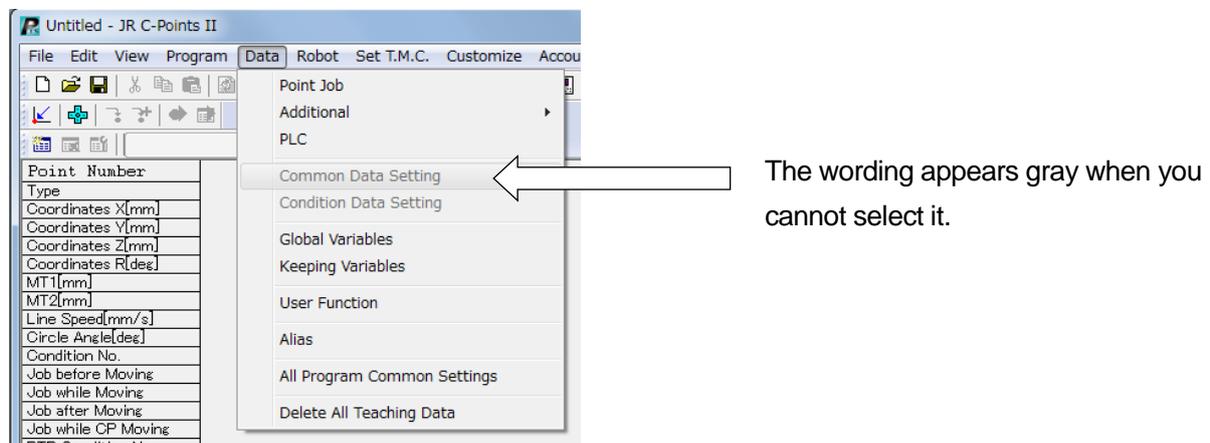
#### 14.4.4 Delete

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

### 14.5 Common Data Settings

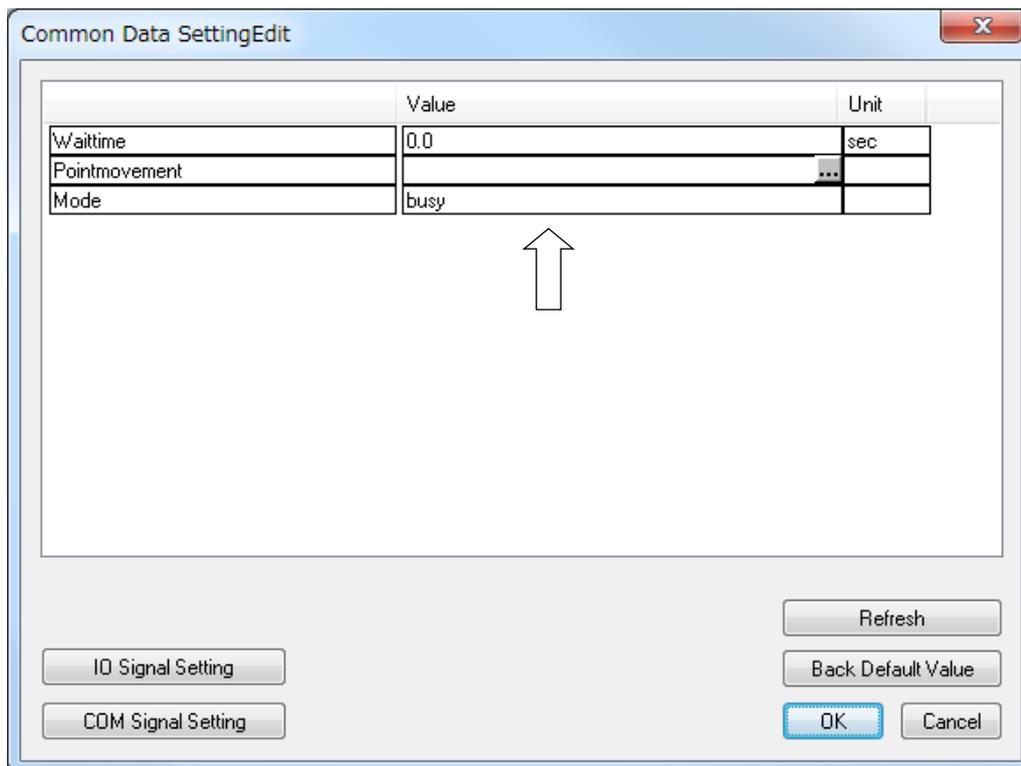
[Common Data Settings] is an item defined in Customizing Mode with items and numerical values set in Teaching Mode. [Common Data Settings] cannot be selected if not defined (the default settings for standard specification models are not defined).

Also, item names and item names set in Customizing Mode (captions) are displayed here. [Dispenser] for dispensing specifications and [Devices Signals] for screw tightening specifications are also considered [Common Data Settings].



Click [Data] on the menu bar and click [Common Data Settings] on the pull-down menu. The Common Data Setting Edit dialog box shown on the next page is displayed.

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 is displayed 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 is displayed on the right side of the cell. Click the [...] mark, and the edit dialog box appears. Set the items you want.

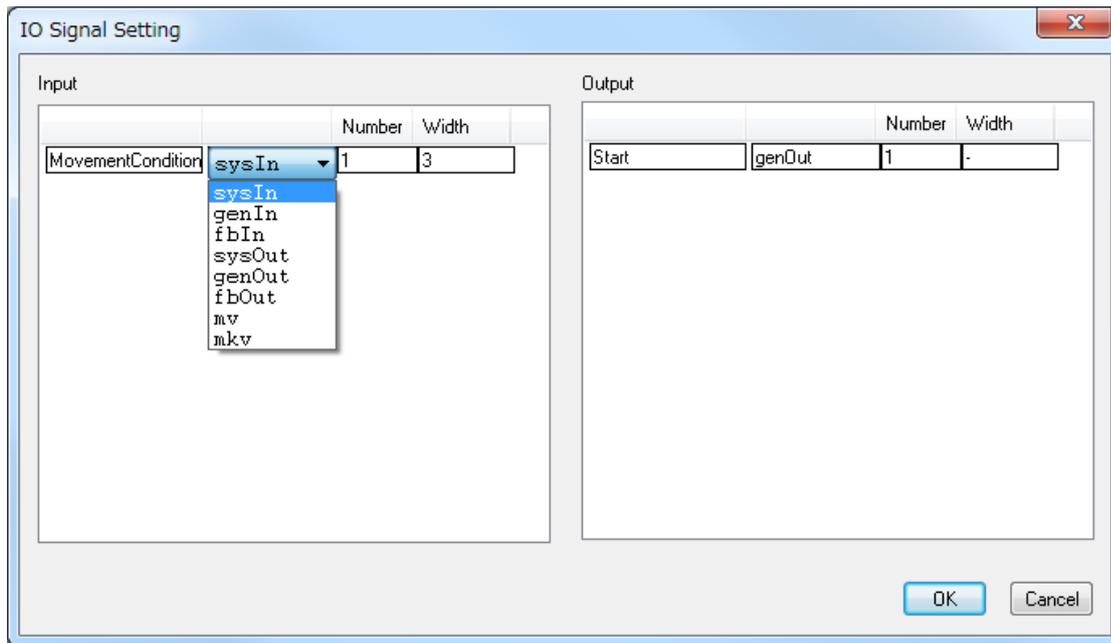


If the IO alias settings are defined, the [IO Signal Setting] button is displayed on the Common Data Setting Edit screen. If COM alias settings are defined in Customizing Mode, the [COM Signal Setting] button is displayed.

Click the [IO Signal Setting] or [COM Signal Setting] button. A signal list included in the [Common Data Settings], similar to the one on the next page, is displayed.

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 is displayed. 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.



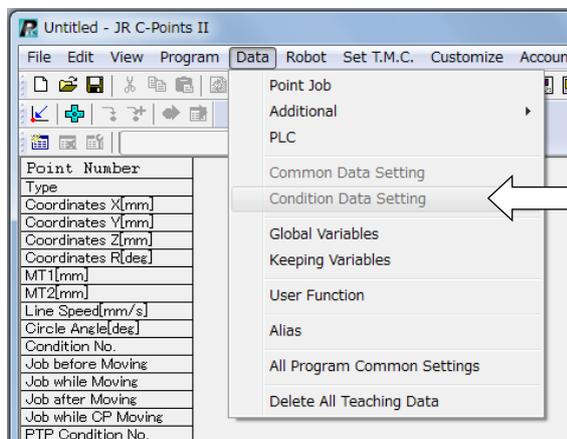
#### NOTE

In some cases IO-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 [IO-SYS Function Assignment] or [Field Bus Function Assignment] to [Free].

## 14.6 Condition Data Settings

[Condition Data Settings] is an item defined in Customizing Mode. If it is not defined (such as with the default for standard specifications), you cannot select this item (from the menu).

Item names and item names set in Customizing Mode (captions) are displayed here. [Devices Signals] for screw tightening specifications, are not program individual settings, but they are [Common Data Settings].



The wording appears gray when you cannot select it.

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

### 14.6.1 New (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 is displayed.

### 14.6.2 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 is displayed.

### 14.6.3 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.

### 14.6.4 Delete

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

The screenshot shows a dialog box titled "Condition Data Setting - No.1". At the top, there is a "Name" label followed by an empty text input field. Below this is a table with three columns: "SignalType", "Value", and "Unit". The table contains two rows of data:

SignalType	Value	Unit
Level	0.5	sec
Time		

At the bottom right of the dialog box, there are four buttons: "Refresh", "Back Default Value", "OK", and "Cancel".

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 is displayed. Click the [▼] mark and select the item you want to register. If the item is categorized as [String Type], the [...] mark is displayed. 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.

## 14.7 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 Roman uppercase letters, Roman lowercase letters, numbers, and underbars. You cannot use blank spaces.

### NOTE

Make sure to use a Roman uppercase letter for the starting character. Also, you cannot use fullwidth 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.

## 14.8 Variables

You can define variables which are useable within point job data.

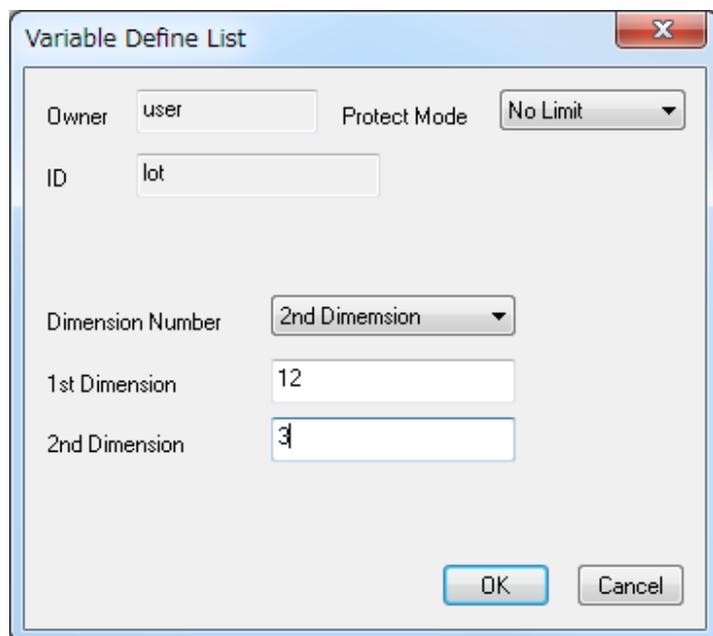
Click [Data] on the menu bar and then select [Global Variables]/[Keeping Variables] from the pull-down menu. Once selected, a list of variables is displayed. If you want to define a new variable, click [Add] and enter an identifier. If you want to edit an existing variable, select the variable you want 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) 1<sup>st</sup> Dimension
- 3) 2<sup>nd</sup> Dimension
- 4) 3<sup>rd</sup> Dimension



The screenshot shows a dialog box titled "Variable Define List". It has a close button (X) in the top right corner. The dialog contains the following fields and controls:

- Owner:** A text box containing "user".
- Protect Mode:** A dropdown menu currently showing "No Limit".
- ID:** A text box containing "lot".
- Dimension Number:** A dropdown menu currently showing "2nd Dimension".
- 1st Dimension:** A text box containing "12".
- 2nd Dimension:** A text box containing "3".
- Buttons:** "OK" and "Cancel" buttons at the bottom right.

### NOTE

- 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.



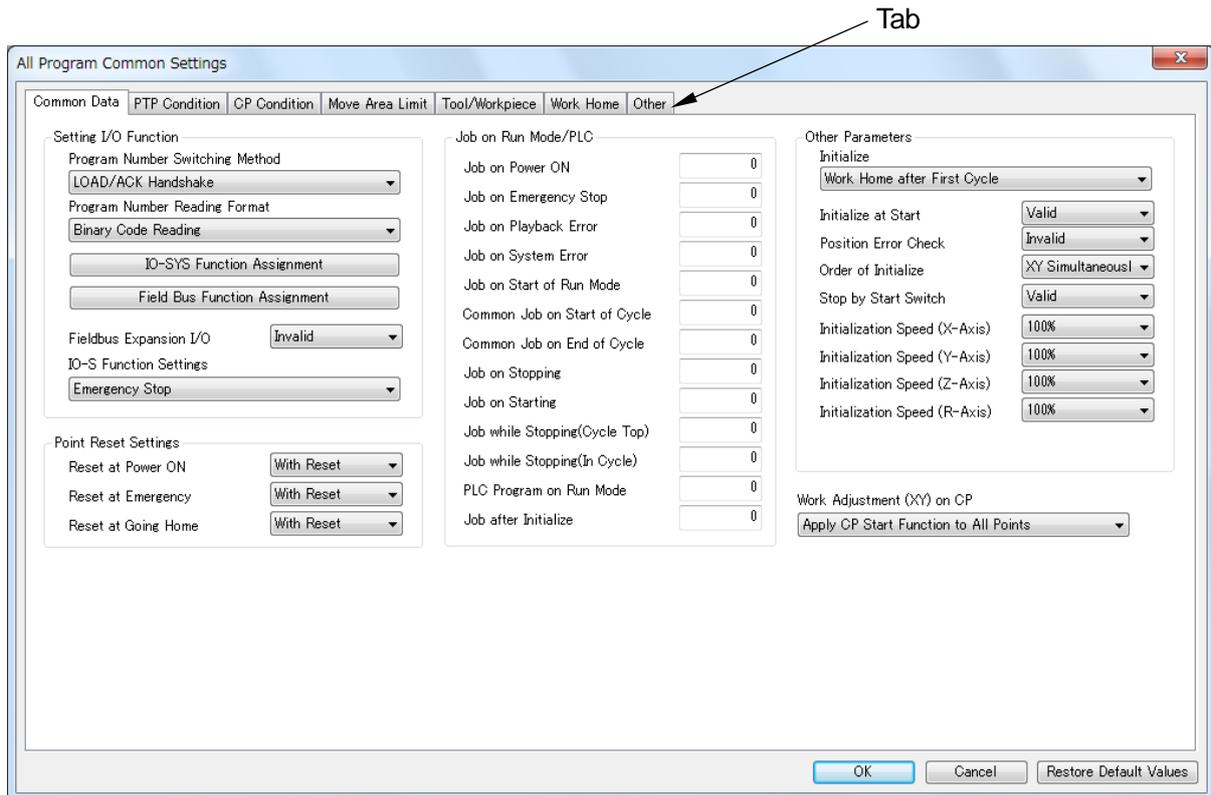


## 14.11 All Program Common Settings

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 (All Program Common Settings / PLC Programs)* for details about each parameter.)

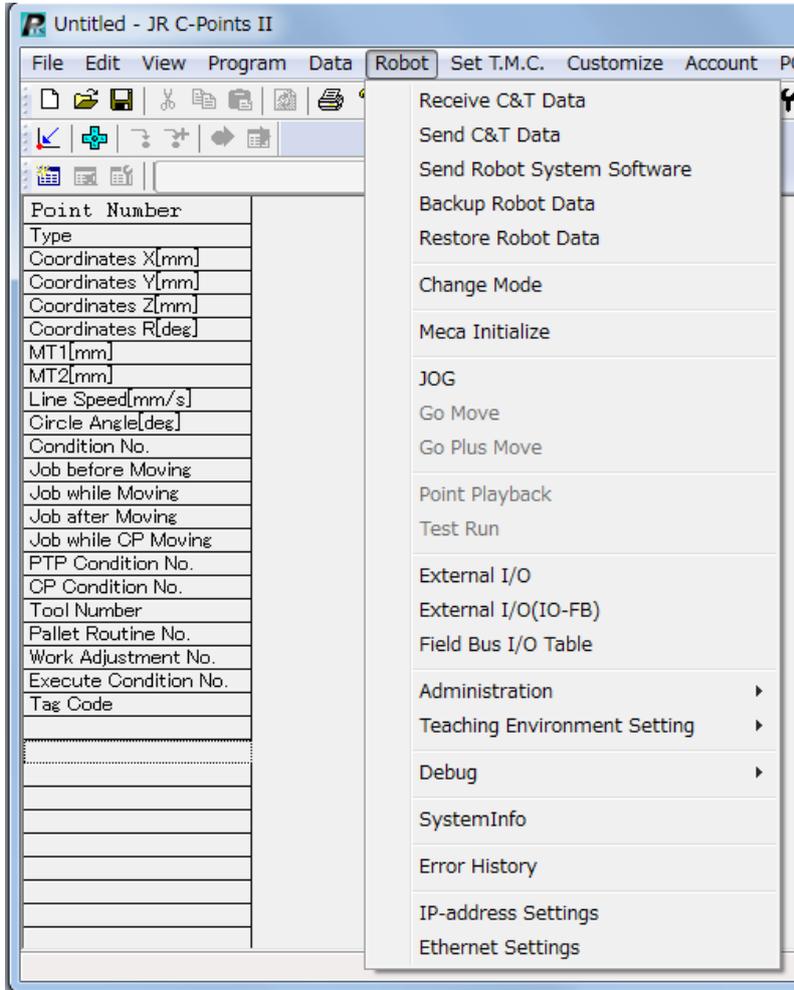


### ■ Restore Default Values

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].

# 15. 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.



## Caution

Be sure to turn OFF the robot and the PC before connecting or removing the cable. Failure to do so may cause data loss or malfunction.

### NOTE

You need to remove the teaching pendant from the robot and then use [Changing Modes] to switch over to Teaching Mode to set and use [JOG] (JOG Teaching), [GO Move], and [GO Plus Move].



## 15.4 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].

## 15.5 JOG (JOG Teaching)

You can register point coordinates in JOG Mode.

Place the cursor on the point you wish to register and click [Robot] on the menu bar and click [JOG] on the pull-down menu. The JOG dialog box (next page) is displayed.

To register a point other than a regular point such as the work home position, click the JOG icon (  ) in the settings dialog box for that point.

## 15.5.1 JOG Tab

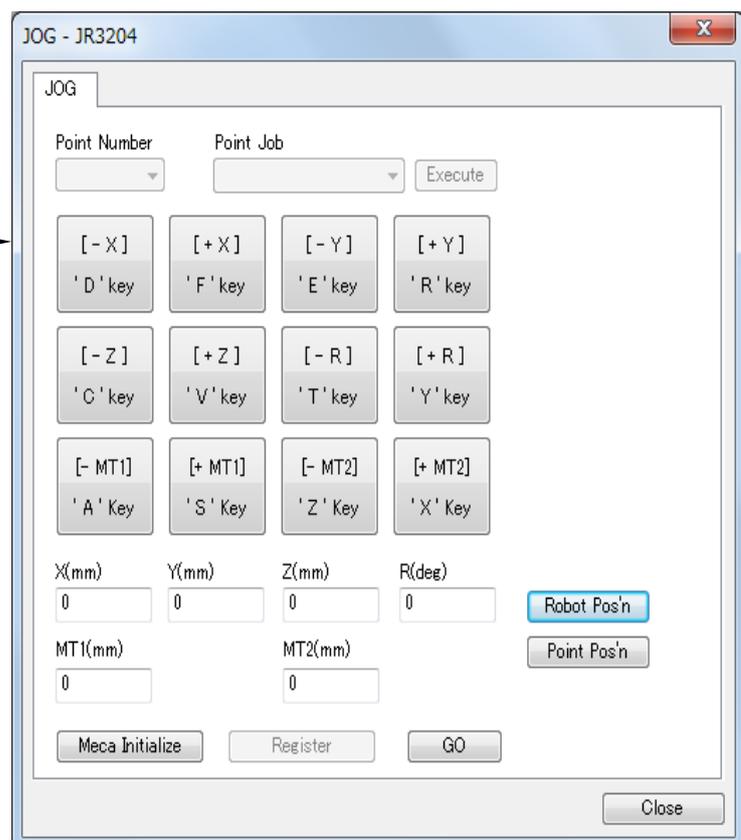
With this you can do JOG teaching for each axis. If the robot has an R axis, Z axis, or synchronized control auxiliary MT1 axis or MT 2 axis, JOG keys and point coordinates for those axes are displayed. The auxiliary MT1 axis and MT2 axis JOG keys, point coordinate names, and units are displayed as the [Axis Name] and [Unit] settings made with the auxiliary axis configuration for each auxiliary axis. For information regarding auxiliary axis configuration, refer to the operation manual *Auxiliary Axis Functions*.

### ■ JOG Keys

Using the JOG keys, move the robot axes with the corresponding key. Release the key to stop.

### ■ Point Number Teaching

The point number where the cursor is placed when the JOG dialog box opens is displayed. You can change this point number. If you use JOG mode for any point other than a regular point (such as work home position), this is not displayed.



### ■ Point Job

Click the [▼] mark and a list of the point job data entered into the C&T data is displayed. The robot performs the selected point job data.

However, the robot executes point job data from the C&T data stored in the robot, therefore if the point job data you want to execute differs from the point job data in the robot's C&T data, it is necessary to first use the [Send C&T Data] function.

Also note that for the point jobs performed here, the point job data numbers are not set to the points. To set the point job data to a point, close the JOG dialog box, click the desired point data cell and select the number you want to set.

#### ■ Speed

Push the JOG key continuously to start moving the corresponding axis at a low speed. Keep continuing to push the JOG key to gradually increase the axis speed to medium speed. Press the SHIFT key (PC) while pressing the JOG key to gradually increase the axis to high speed. When moving at high speed, if you release the SHIFT key (PC) while pressing the JOG key you will gradually reduce the axis speed to medium speed.

#### ■ Coordinates

The point coordinates where the cursor is placed when the JOG dialog box is open.

Click [Robot Pos'n] to display the current robot position coordinates and [Point Pos'n] to display the point coordinates of the designated program. You can also directly enter the coordinate values here.

#### ■ Register

Click [Register] to register the coordinates.

#### ■ GO

The robot axes move to the coordinates currently displayed in the [Coordinates] cells.

#### ■ Mechanical Initialization

This initializes the robot. The robot will not move unless it is initialized after being turned ON.

#### ■ Close

This closes the JOG dialog box.

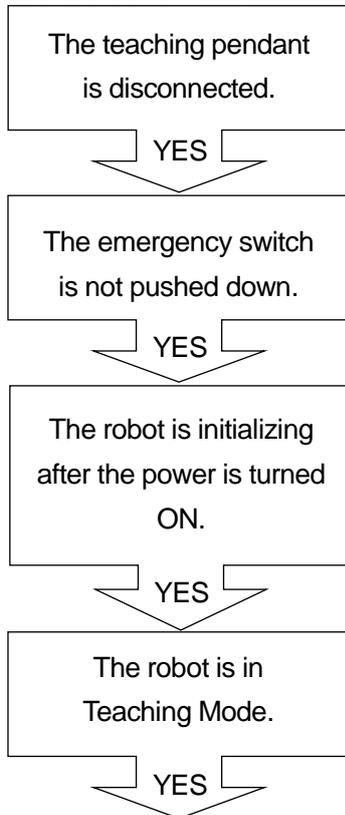
If the JOG dialog box is open, you can move the robot axes using a PC keyboard.

Axis	Key
-X	D
+X	F
-Y	E
+Y	R
-Z	C
+Z	V
-R	T
+R	Y
-MT1	A
+MT1	S
-MT2	Z
+MT2	X

**NOTE**

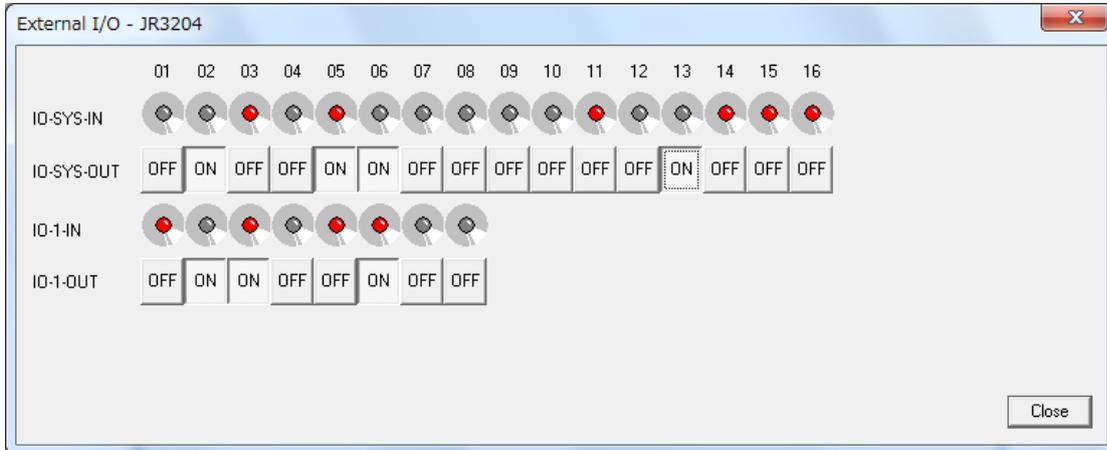
If you cannot operate the robot via the PC in JOG mode, click [SystemInfo] on the [Robot] pull-down menu and check the connection between the PC and the robot. Once you have the System Information open, check using the “If you cannot operate the robot in JOG Mode” chart on the next page. If you still cannot operate the robot via the PC in JOG mode after making all these checks, conduct [Failure Diagnosis] (in which case you need a teaching pendant) or contact Janome for assistance.

**If you cannot operate the robot from the PC**



## 15.6 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.

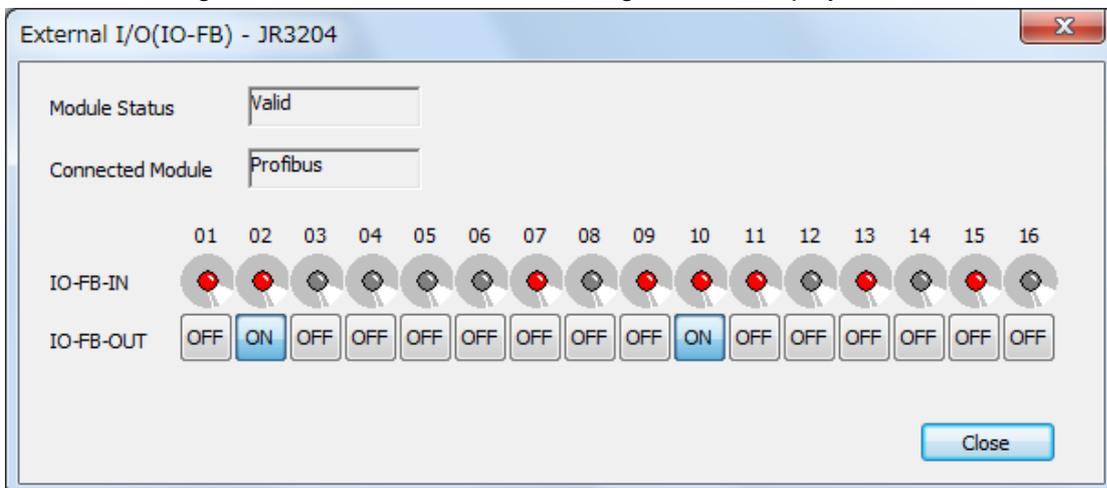


Red lamps indicate the signals currently ON.

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

## 15.7 External I/O (IO-FB)

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



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.

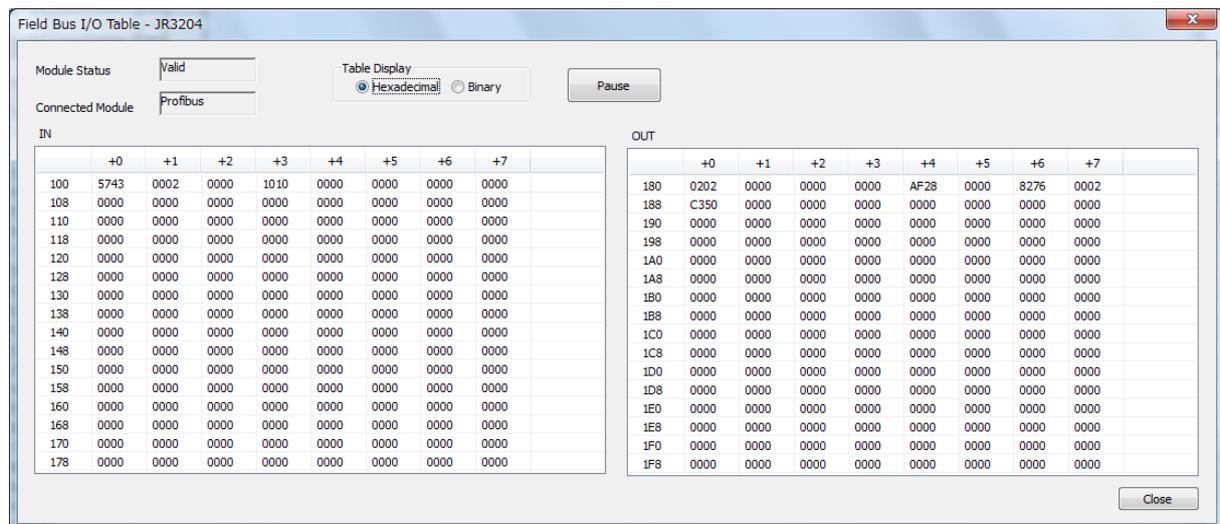
## 15.8 Fieldbus I/O Display

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 are displayed. This dialog is only a display. You cannot set values here.

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

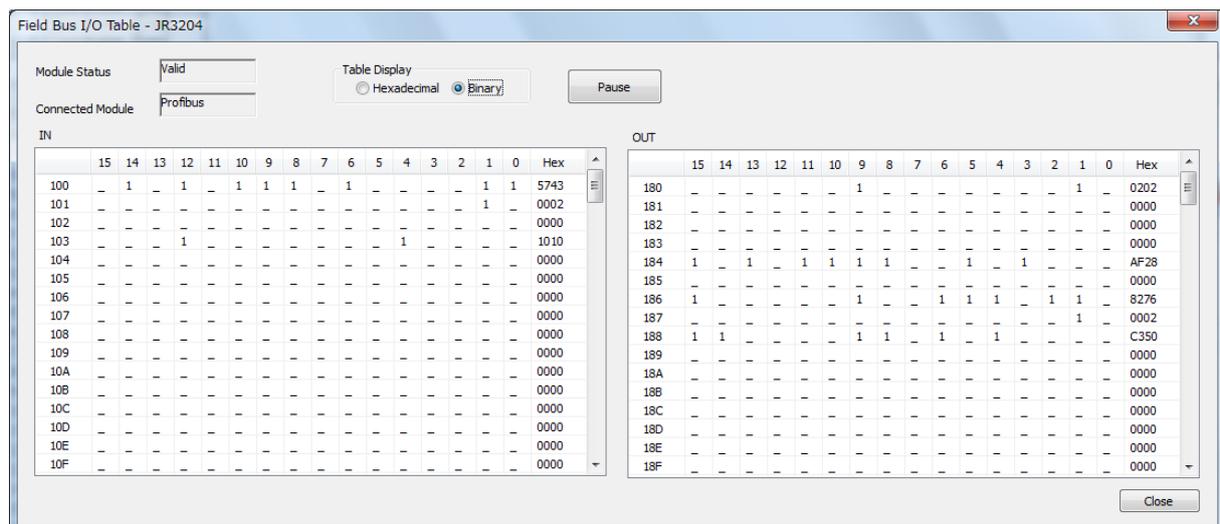
If you click the [Pause] button, you can stop the display updating. Push the [Pause] button again to restart updating the dialog.

### ■ Hexadecimal Display



With the hexadecimal display, one word is displayed as a hexadecimal.

### ■ Binary Display



With the binary display, "1" is displayed 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 is displayed as a hexadecimal.

## 15.9 Administration Settings

### 15.9.1 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: “IO-SYS,” “Fieldbus,” “COM 1,” “User Definition,” or “Ethernet.”

- 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.

- Clear Error History

This deletes all of the error history.

- Clear All Data In Robot

This deletes all C & T data. Please take caution; if you have not backed up the C & T data, erased data cannot be restored.

#### ■ COM Settings Tab

- COM Settings

This sets the COM 1 – 3 baud rate, character length, stop bit, and parity settings 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, please refer to the operation manual *External Control (IO/Fieldbus)*.

#### ■ MT1/MT2

These are settings for the axillary axes on the robot side. This does not appear if there are no axillary axes. For further details, refer to the operation manual *Auxiliary Axis Functions*.

- **Standard Items**  
Standard settings such as the resolution and pulse output type of the support axes.
- **Homing Type\***  
Settings for homing movements.  
Press the [Help] button to display the Go Home Method help screen.
- **JOG Movement Speed\***  
Settings for JOG movements.
- **Axis Name Display**  
Enter names for the axes. Depending on the font (or typeface), you can enter up to 10 – 20 characters for the axes' names.
- **Unit Display**  
Enter the measurement unit display. Depending on the type, you can enter up to 10 – 20 characters for the measurement unit display.
- **IO-MT Function Settings**  
Set up the necessary IO functions for axis movements and returning home operations. You can set each IO to be disabled / positive logic / reverse logic.

\*You can switch between either a “Unit Display” or a “Pulse Display” by changing the “Unit Display” of the homing/JOG movement. If you select “Pulse Display”, you cannot edit values.

### **15.9.2 Version Information**

Here you can refer to the robot information. You can check the robot's system software (system program) version number, axis information, MAC address, ON time, run time and the free disk space available for teaching data etc.

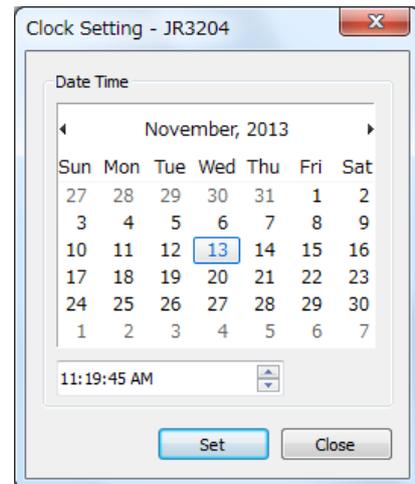
You can make a text copy of the display contents by pressing [Copy] on the dialog.

### 15.9.3 Time 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.



## 15.10 Teaching Environment Settings

### ■ 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

Here you can enable/disable tools and input tool data during teaching.

## 15.11 Debug

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

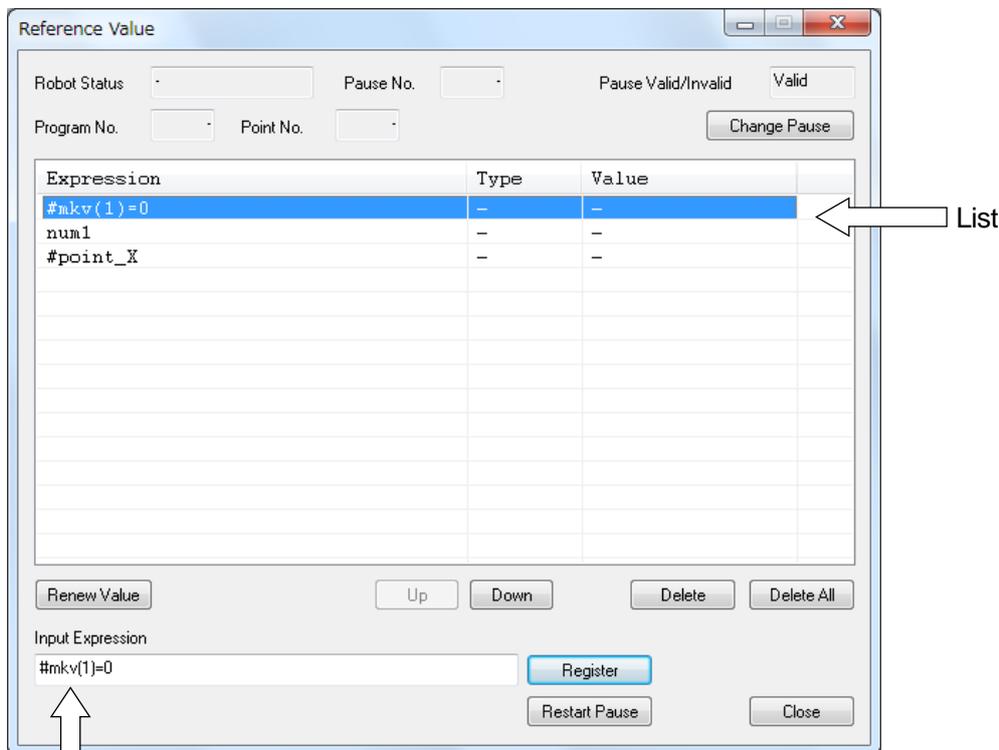
Switches “Pause” to [Valid]/[Invalid]. If this is set to invalid, even if “Pause” is read, the robot does not stop. In addition, regardless of whether Pause is set to valid or invalid, when the power is turned OFF, Pause is invalid the next time the power is turned ON.

### ■ 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 [Update Value]. The current values of the expressions registered in the list are displayed (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].

#### NOTE

- 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.

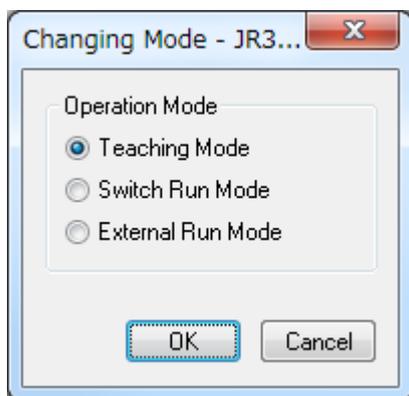
# 16. MODE CHANGE

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You can change the robot's operating mode from the following:

- Teaching Mode
- Switch Run Mode
- External Run Mode

Click [Robot] on the menu bar and click [Changing Mode] on the pull-down menu. The Changing Mode dialog box below is displayed. Select the operation mode you want and click [OK].



# 17. ERROR HISTORY

---

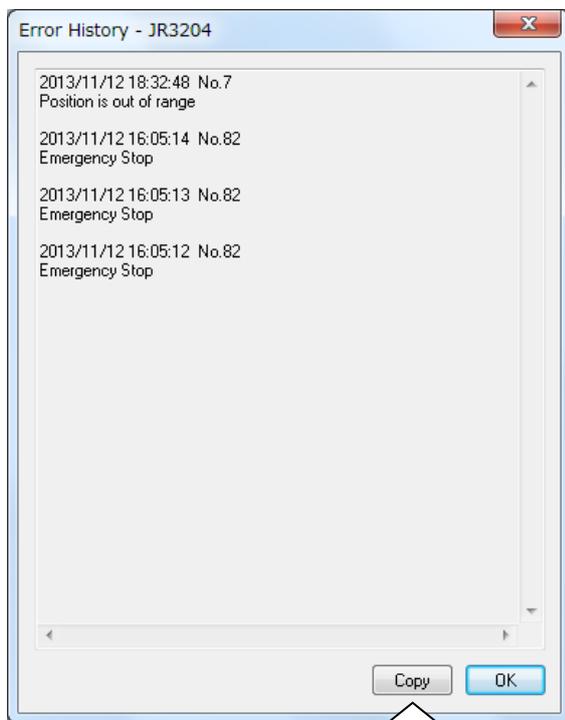
Click [Robot] on the menu bar and click [Error History] on the pull-down menu. Error history for the connected robot is read out and displayed.

Error history shows the history for up to 1000 errors.

## NOTE

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.



# 18. DATA PRINT-OUT

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You can output C & T Data to your printer.

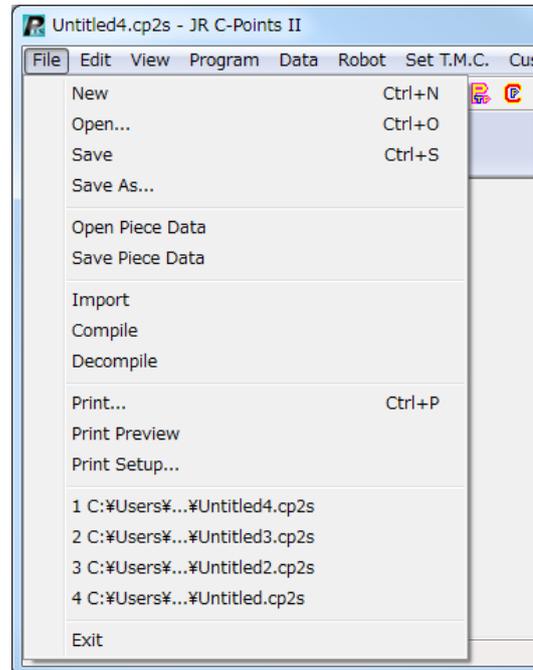
Click [File] on the menu bar and click [Print] on the pull-down menu.

The “Setting of Print Item” dialog box is displayed.

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.

# 19. POINT GRAPHIC EDITOR

---

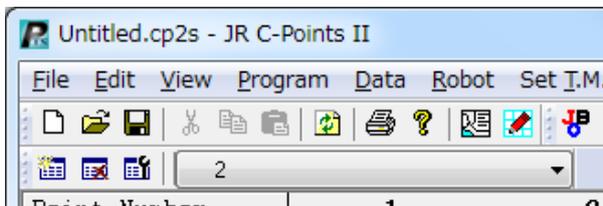
With Point Graphic Editor, path data can be created and edited graphically as a diagram.

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.



## 19.1 Start Up and Exit

### 19.1.1 Start Up

Select [Edit] from the menu bar and select [Edit Graphic Point] on the pull-down menu. You can also start it up from the tool bar button.

### 19.1.2 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.

## 19.2 Procedure for Standard Operations

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

### 19.2.1 Editing Mode Selections

From the menu or tool bar turn Edit Trajectory ON.

(Further details regarding Edit Trajectory are later in the section)

## 19.2.2 Graphic Placement – 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.



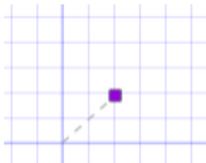
(From the left: edit button, point button, straight line button, ellipse button, ellipse by center point button, arc button, auto arc button, and path order settings button).

Examples of placing all of the graphic types:

### ■ Point Placement

Click the point button to enter the point button positioning mode.

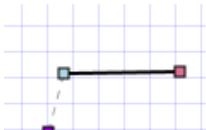
A point is placed by clicking the area where you want to position the point on the coordinate's grid.



### ■ Straight Line Placement

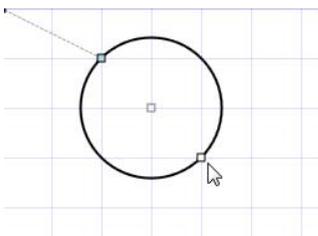
This places a straight line. Click the straight line button to enter the straight line positioning mode.

A straight line is placed by clicking a start point and an end point, in that order.



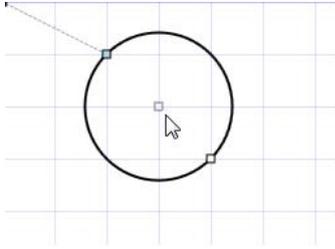
### ■ Ellipse Placement

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.



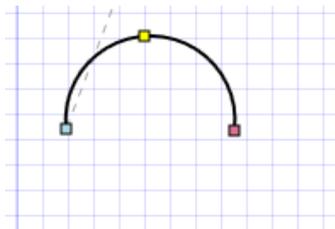
### ■ Ellipse by Center Point Placement

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)

Yellow: arc support point (CP Arc Point)

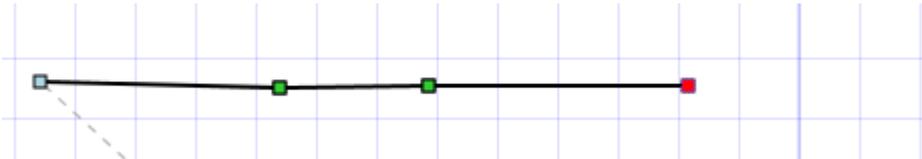
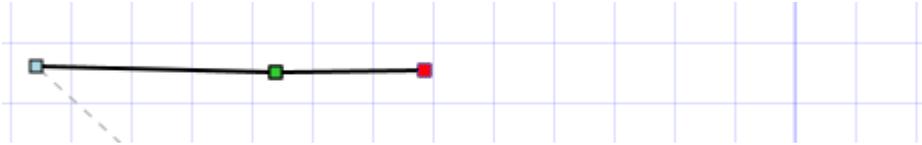
For details regarding the color of trajectory line points, please refer to "19.3.3 Edit View."

### ■ Snap Function and Coupling

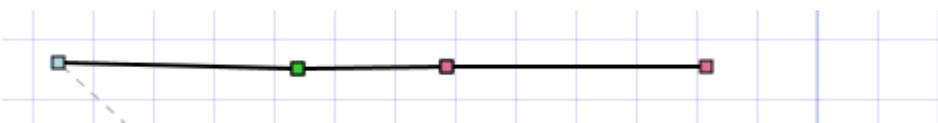
The snap function allows you to easily draw a consecutive path for the robot. When you are deciding on each point's location, move the mouse close to points already placed or corners of the grid lines to snap the points into place. By deciding on point locations with this function, you can place points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

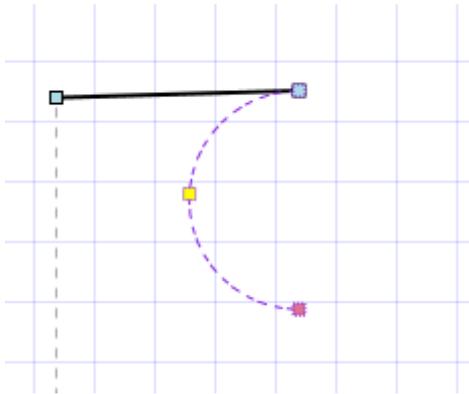


If you do not want to snap points into place, hold down both the Ctrl key and the Shift key when moving and placing points.

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

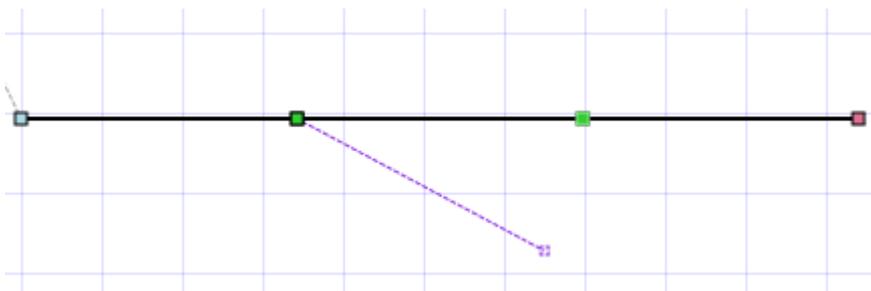
As previously mentioned, a circle graphic cannot be linked consecutively with another graphic. If you want to consecutively link a circle with another graphic, use an arc. By placing two arcs with a central angle of 180 degrees, you can place a whole circle.

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.

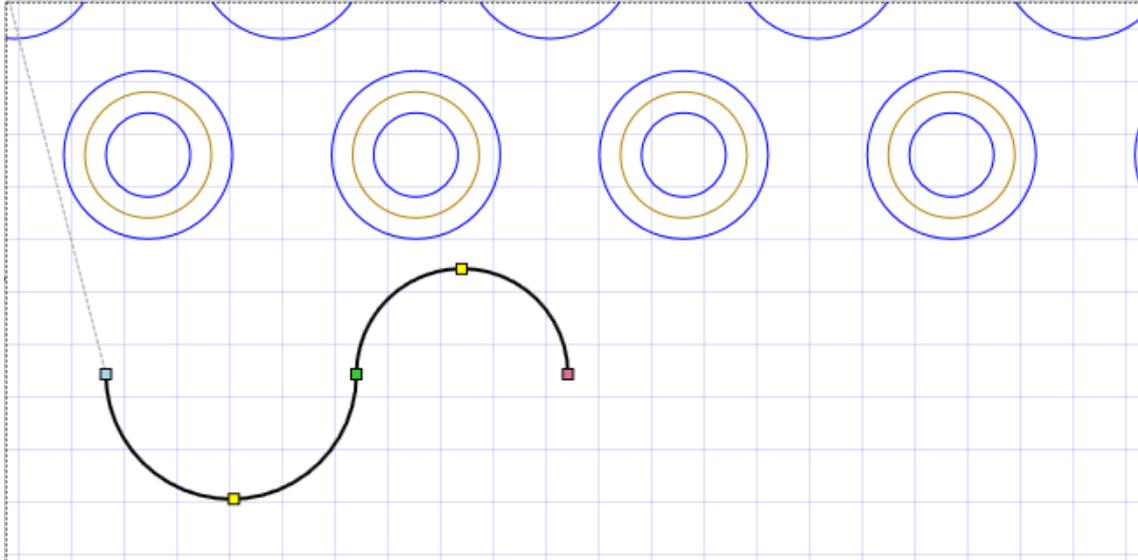
(If selecting by range, when all of the points that make up a given graphic are within the range, the items are selected. For a circle or an arc graphic, you do not need to include the whole graphic within the range.)

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.

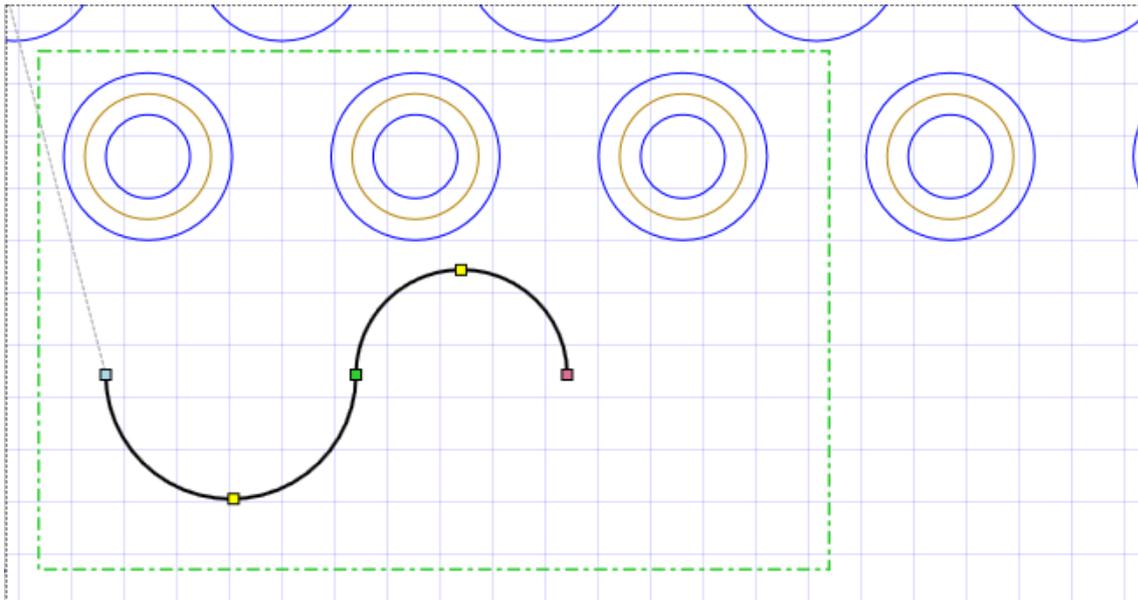
Additionally, if selecting by using a range, you can also select items for which the editing function is OFF at the same time. (If trajectory lines are ON, you can also select auxiliary lines and the imported figure.)

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

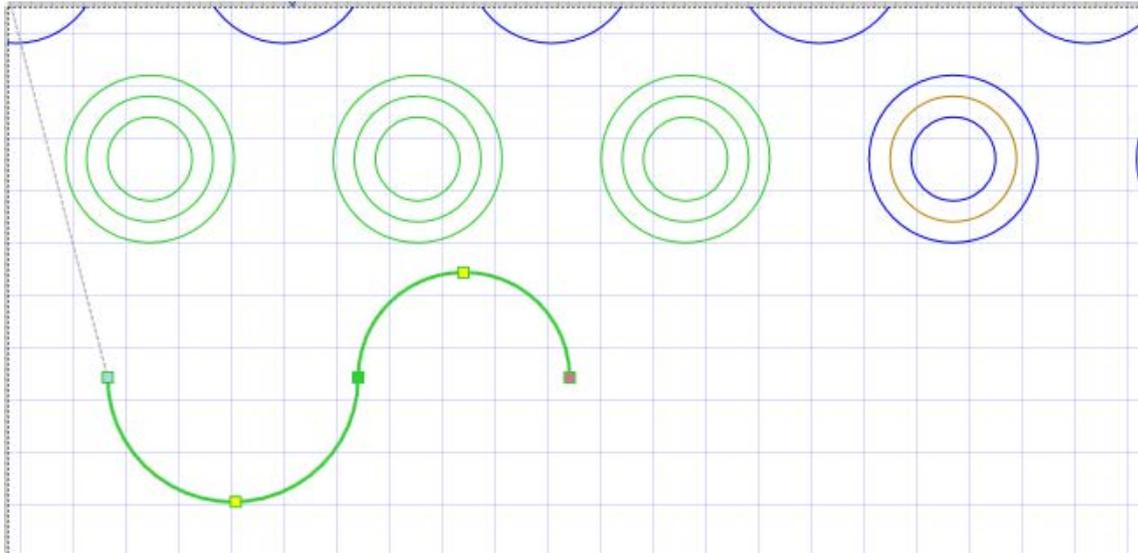
Before Selection



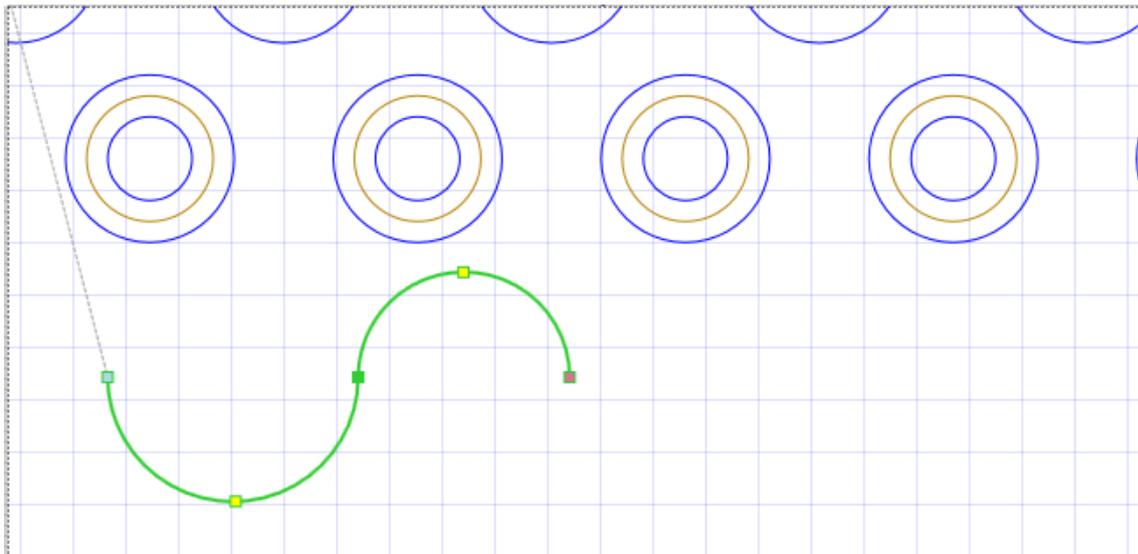
After Selection



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



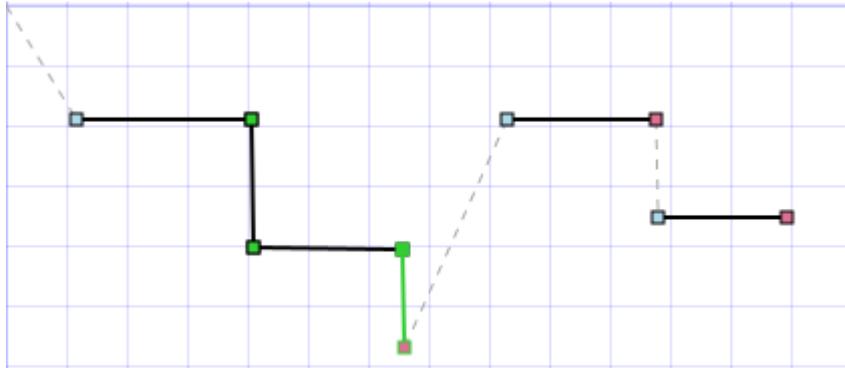
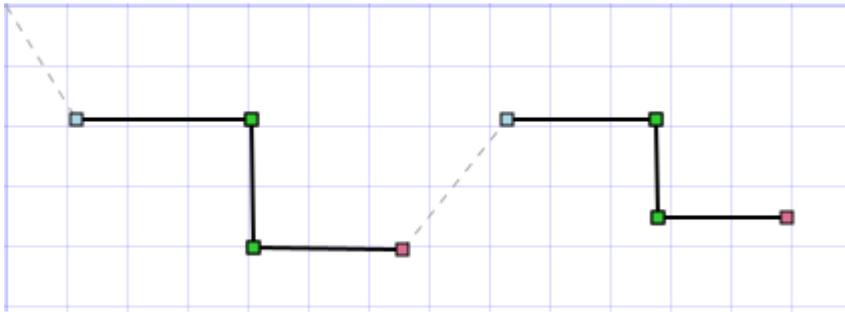
Selection by dragging the mouse with the Shift key → Only editable items are selected



#### ■ 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.

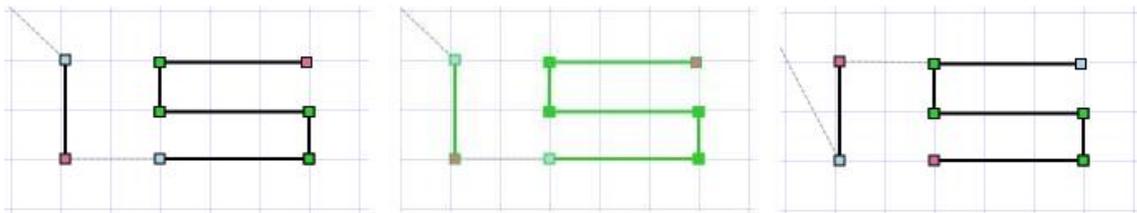
When creating new graphics or by moving and snapping graphics into place, the sequence order changes if these are consecutively linked to existing items.



■ Reverse Start/End Point Function

By pushing 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.

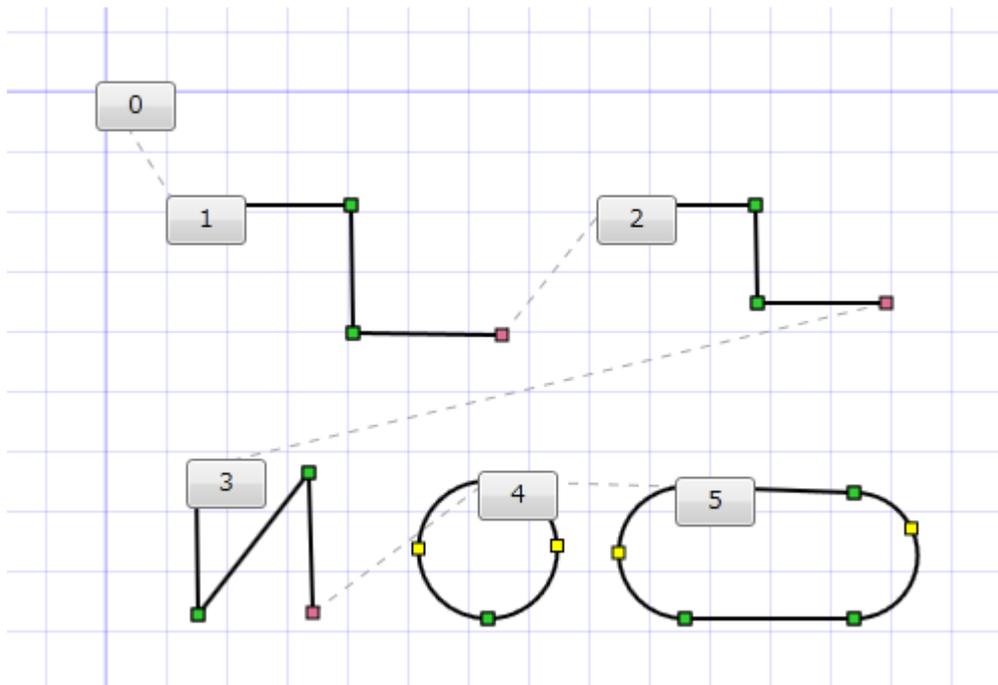
By selecting and reversing the whole item of a consecutively linked item, you can reverse the start point and end points while preserving the consecutive sequence.



■ Path Order Function

The Path Order Settings button is a function for changing the path sequence for a group of items. Push the Path Order Settings button to enter the path order function.

Buttons of the current sequence are displayed on the screen at the various start point positions, as shown in the diagram on the next page.



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

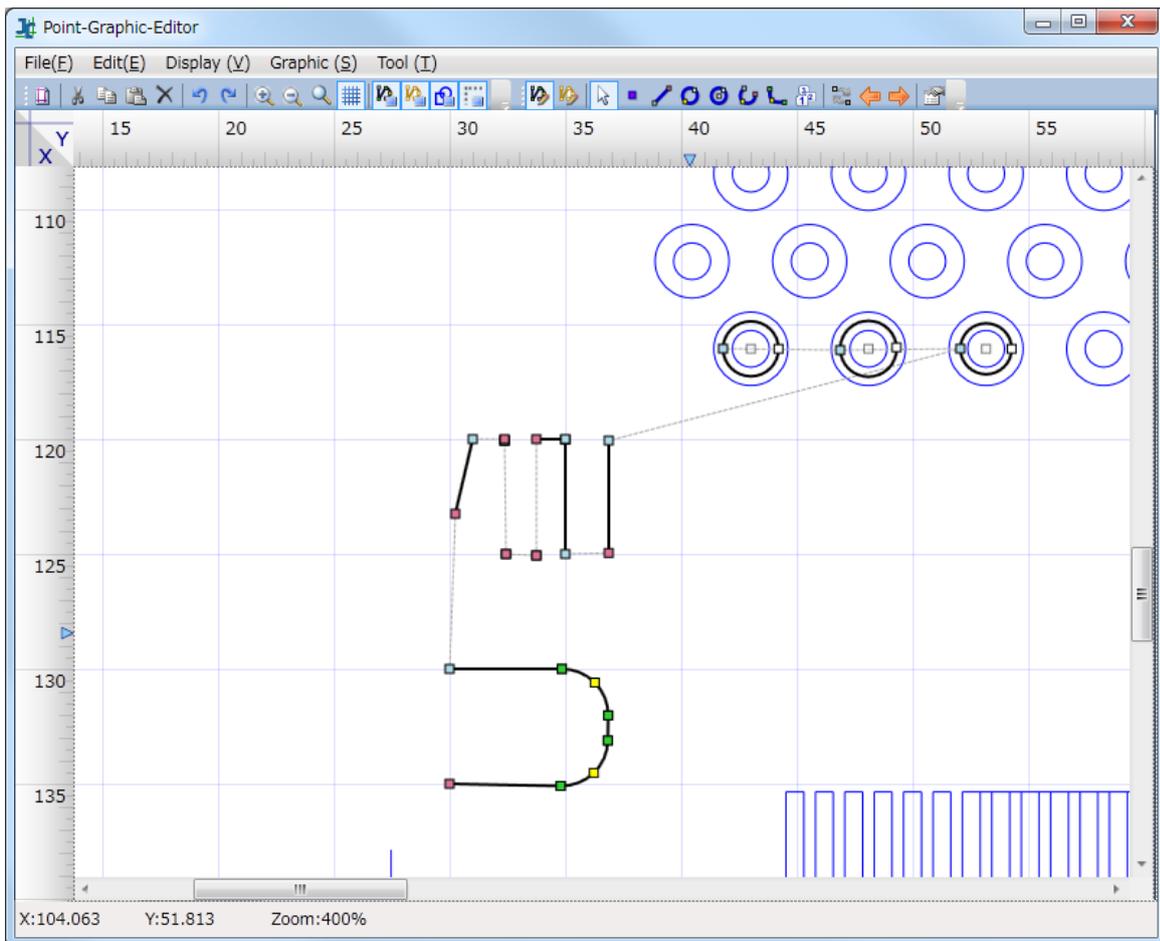
Also, you can change the displays for both trajectory lines and auxiliary lines. The movement line (offline) display and grid line display can be switched ON and OFF.



- (From the left)
- Grid line display
- Trajectory line display
- Auxiliary line display
- Import figure display
- Offline display

### 19.3 User Interface

This section explains the Point Graphic Editor's main UI.



The UI is made up of 4 main items.

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

#### ■ Menu Bar

Please refer to “19.3.1 Menu Bar”.

#### ■ Tool Bar

Please refer to “19.3.2 Tool Bar”.

#### ■ Editing View

Please refer to “19.3.3 Edit View”.

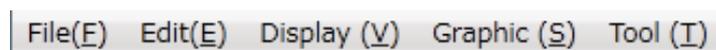
#### ■ Status Bar

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



### 19.3.1 Menu Bar

You can use all the functions from the menu bar.



#### ■ 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 JPG 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% – 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% – 40,000%)	:	Opens the zoom percentage dialog and from here you can change the edit view to an arbitrary zoom percentage
Display Grid	:	Turns the grid lines ON/OFF
Grid Interval Setting (0.01mm – 100mm)	:	Sets the grid intervals Also, you can select whether or not to snap objects to the corners of the grid
Display Trajectory	:	Turns the trajectory line display ON/OFF
Display Auxiliary Line	:	Turns the auxiliary line display ON/OFF
Display Import Graphic	:	Switches between displaying/hiding the import graphic
Show Offline	:	Switches between displaying/hiding the robot's offline movements
Show Point Number	:	Switches between displaying/hiding the point numbers

## ■ 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
- 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
- Path Order Setting : Selects the Path Order Setting 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

## ■ 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
- 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 items in the sequence towards the end point from the selected item.

- 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.

### 19.3.2 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 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
- 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 : Turns the grid lines ON/OFF
- Display Trajectory : Turns the trajectory display ON/OFF
- Display Auxiliary Line : Turns the auxiliary line display ON/OFF

- Display Import Figure : Switches between displaying/hiding the import figure
- Display Offline : Switches between displaying/hiding the robot's offline movements

■ Tool Bar 2

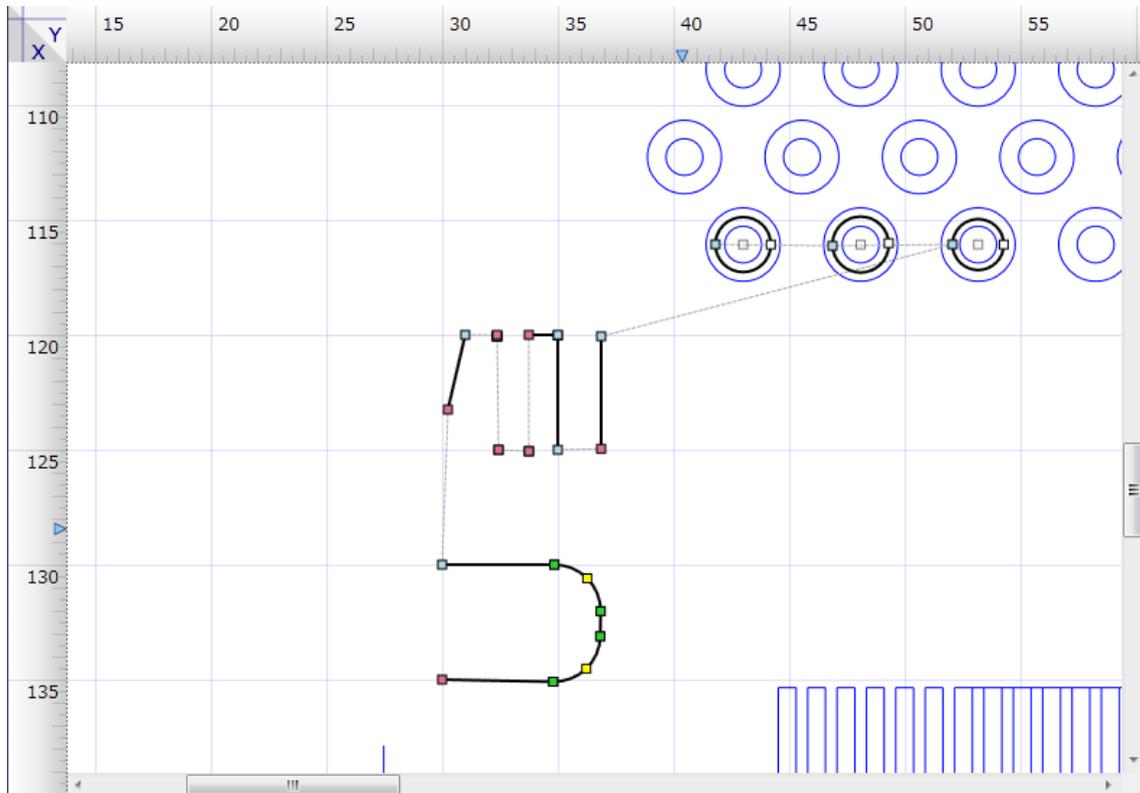


(From the left)

- 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
- 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
- Path Order Setting : Sets the Edit Mode to Path Order Setting Mode
- 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

### 19.3.3 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 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 are displayed 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 appear 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: dotted 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.



(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.

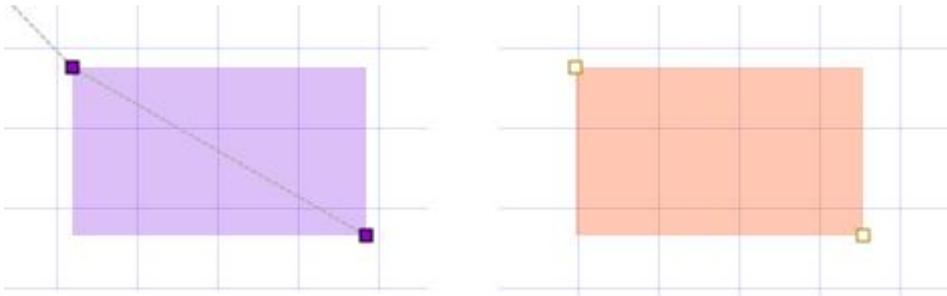
### ■ Dispense Filling Points

Dispense filling points cannot be newly positioned or set in Point Graphic Editor. Only coordinate editing can be done in Point Graphic Editor

#### NOTE

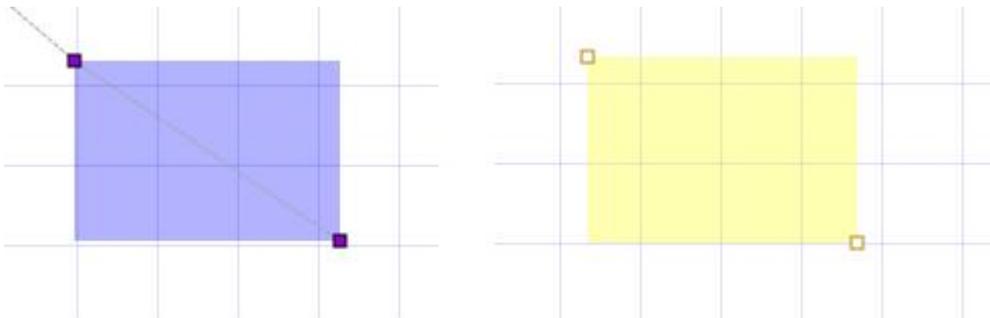
Dispense filling points are useable only with Dispensing Specifications.

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.

## 19.4 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 a 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:

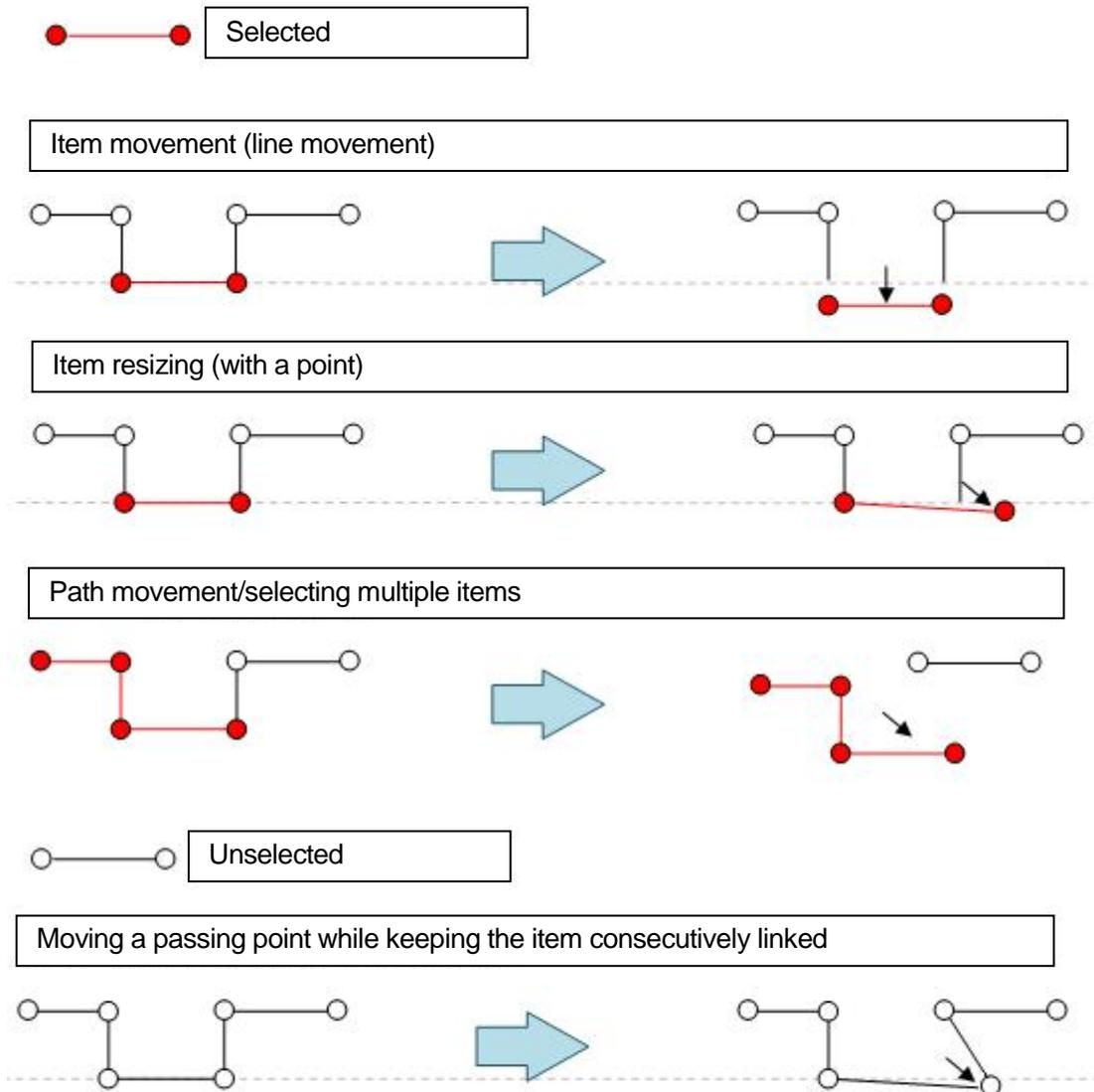
	Ctrl Key	Shift Key	Ctrl + Shift Key
Point	N/A	N/A	No snapping
Straight Line	When moving a point, the angle with the unmoved point is fixed.	When moving a point, the distance with the other point is fixed.	No snapping
Circle	<ul style="list-style-type: none"> <li>• When moving the start point, the angle with the support point is fixed.</li> <li>• When moving the center point/support point, the angle with the start point is fixed.</li> </ul>	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 to 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

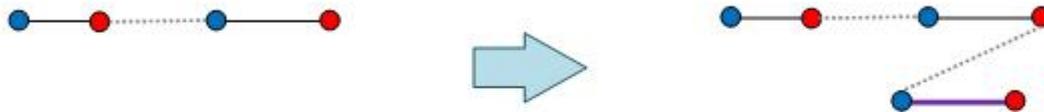
If items are consecutively linked, the order of the item in the robot's trajectory sequence may change. Only the order of the moved item will change. If you want to change the sequence of the path units, use the aforementioned path order function.

- Operation Example

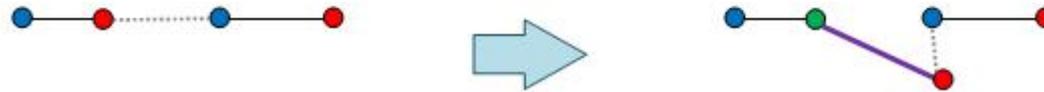


- Placing New Items

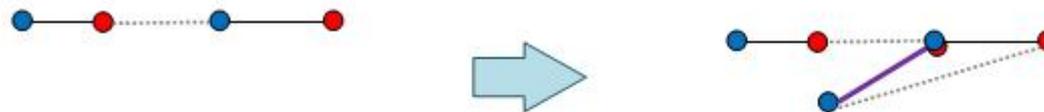
Place the item without snapping it to anything → it is placed at the end of the sequence



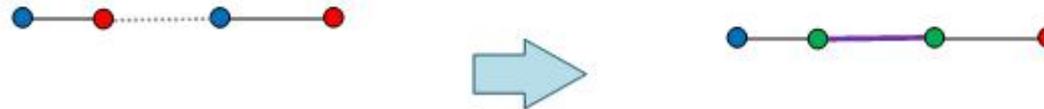
Snap the start point to an end point → it comes after the item it was snapped to and it is consecutively linked.



The end point is snapped to a start point → it is placed at the end of the sequence (the sequence does not change).

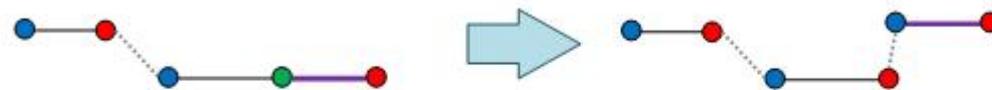


Snap items so they are connected → insert the item; both the start point and end point become consecutively linked.



- 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.

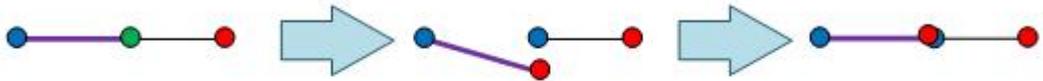


Snap the end point to a start point → it is not consecutive and the sequence does not change.



- 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 push the buttons. The first button you push means that the sequence up until that button does not change. The sequence changes from the second button onwards that you push. The path order function is finished when you select another mode, therefore you do not need to continue pushing the buttons to the end.

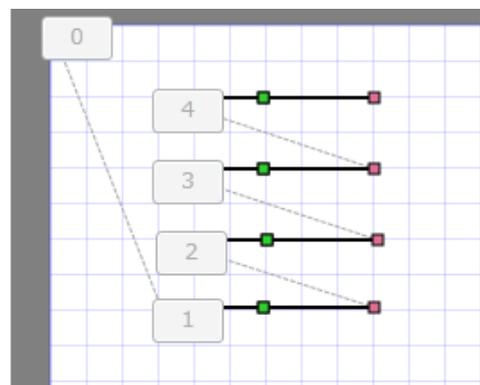
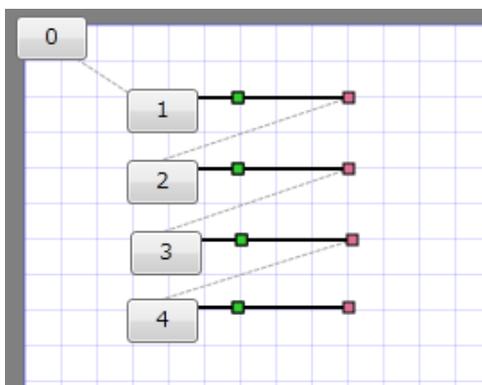
- Example of operation procedure

Example 1: With the current numbers, you want to switch the sequence to 4 → 3 → 2 → 1.

→ With the current display, push the buttons in this order 0 → 4 → 3 → 2 → 1.

NOTE

Each time you press a button the displayed numbers change.

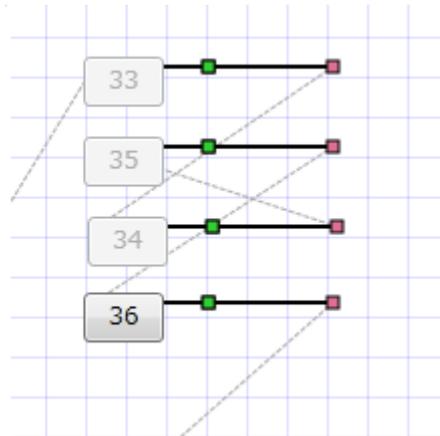
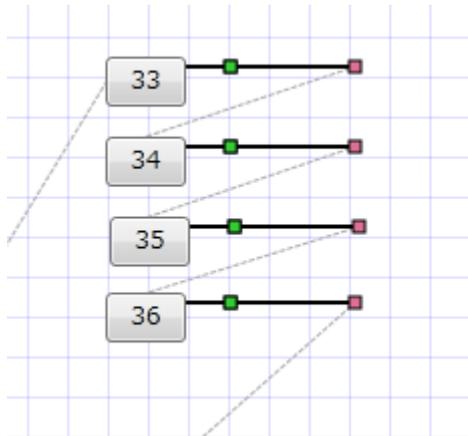


Example 2: With the current numbers, you want to switch only 34 and 35.

→ 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.

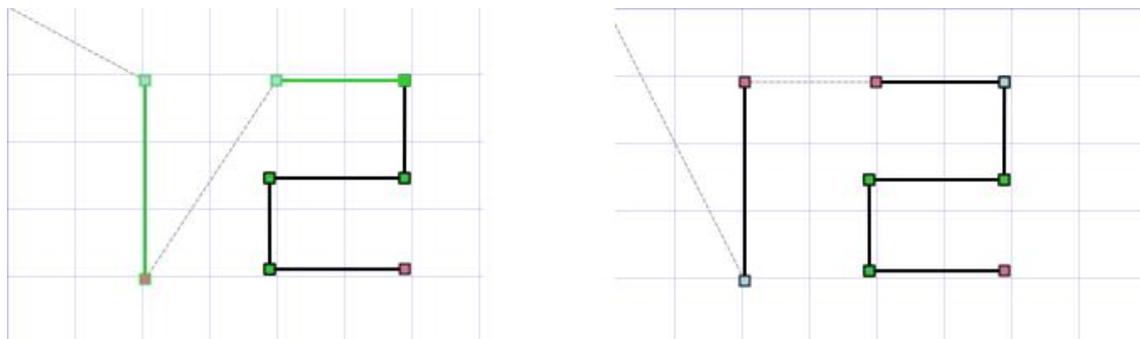
Select the item you want to reverse and from the menu or tool bar select the reverse start/end point function to reverse the start point and end point of the selected item.

By performing a reversing operation with the whole path selected, you can reverse that path's start point and end point.

Example 1: 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.

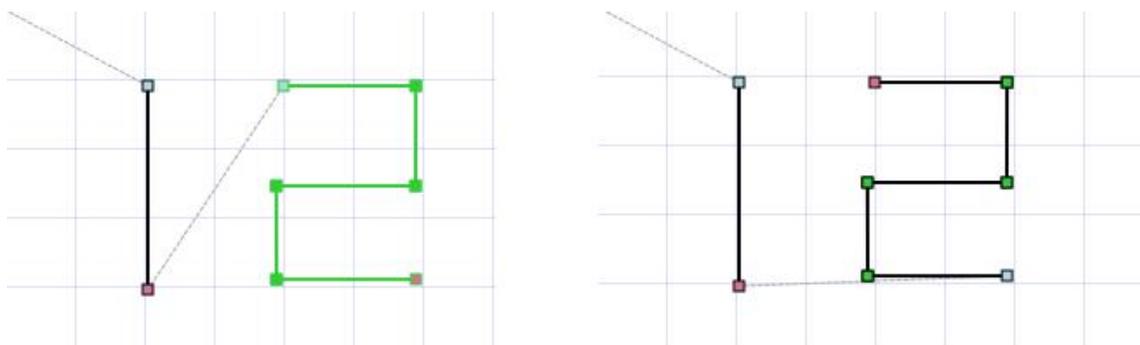
The start point and end point of the selected items are reversed. Consecutively linked items are no longer linked.



Example 2: Reversing the start point and end point of an entire path

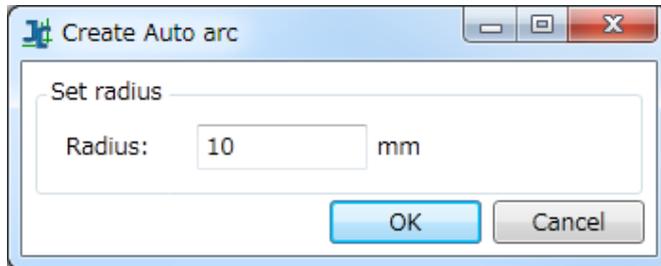
→ Select all of the items included in the path, and reverse the start point and end point.

The path stays consecutively linked and the start point and end point are reversed.



## ■ Create Auto Arc Function

When the Create Auto Arc function is selected from the tool bar, click a consecutive point and the Create Auto Arc dialog is displayed.

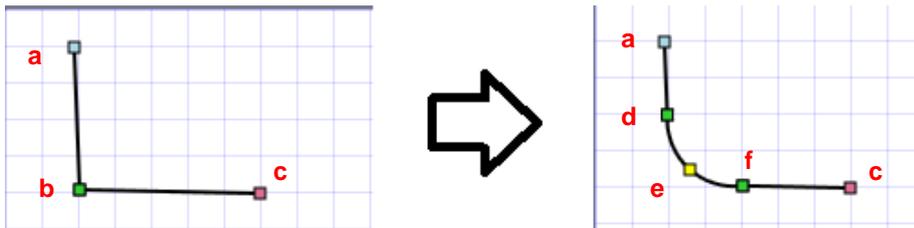


- Settable Items

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.



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.

### 19.4.1 Create Graphic/Edit Graphic Dialog

You can create/edit graphics from the Create Graphic/Edit Graphic dialog.

This dialog is displayed when you chose Create Graphic or 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, the tab of the object you are editing is enabled.

- Tabs

Point

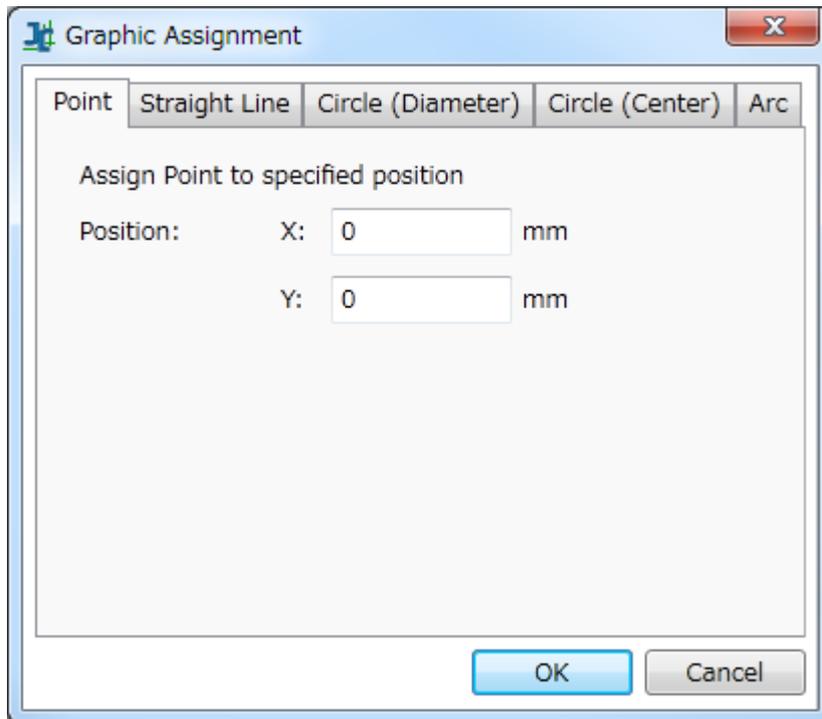
Straight Line

Circle (Diameter)

Circle (Center)

Arc

■ Creating/Assigning a Point

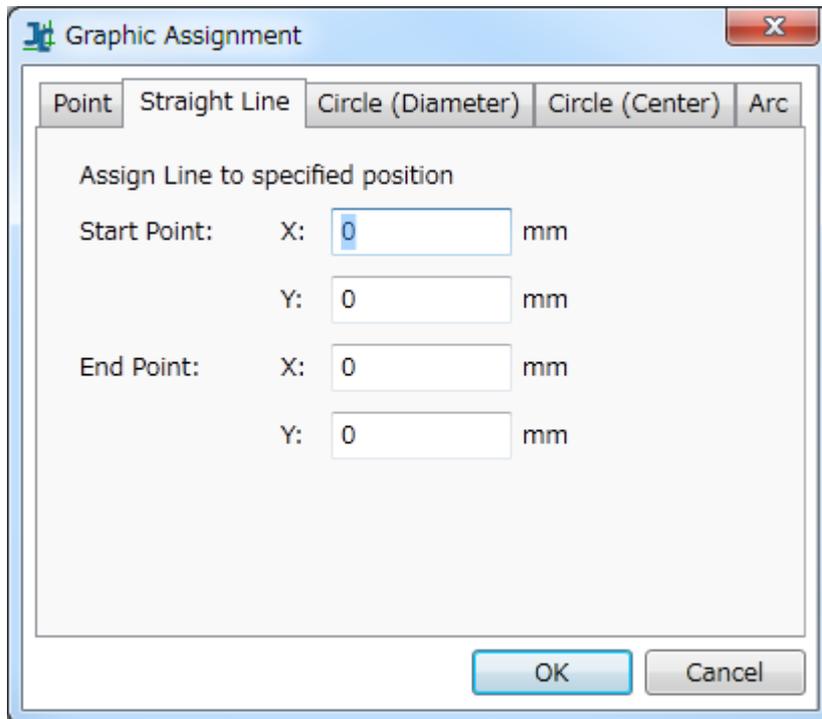


- Settable Items

Position (X, Y)

An individual point is created or edited on the position (X, Y)

■ Creating/Assigning a Straight Line



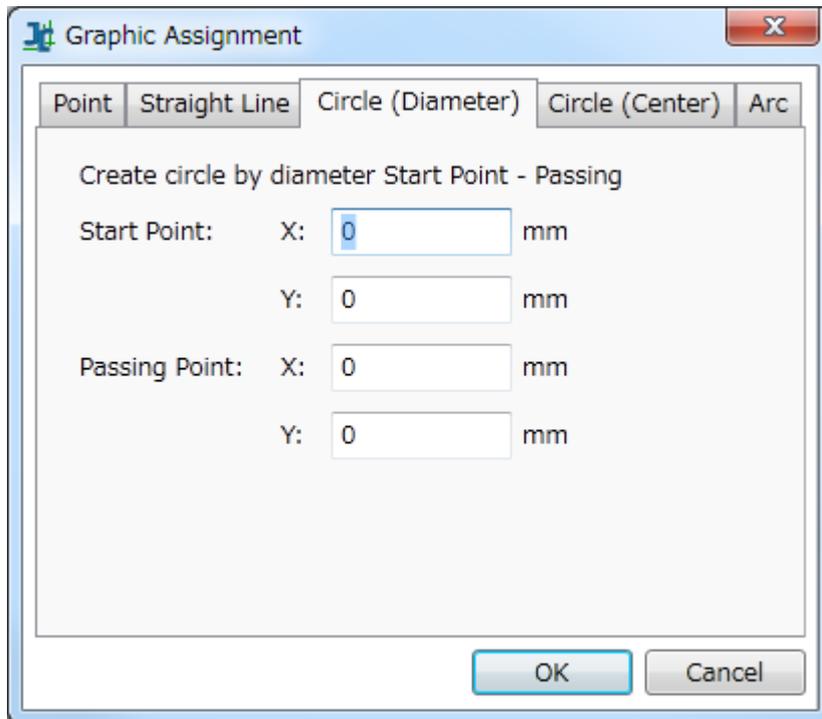
- Settable Items

Start Point (X, Y)

End Point (X, Y)

A straight line (line segment) connecting the start point and end point is created or edited.

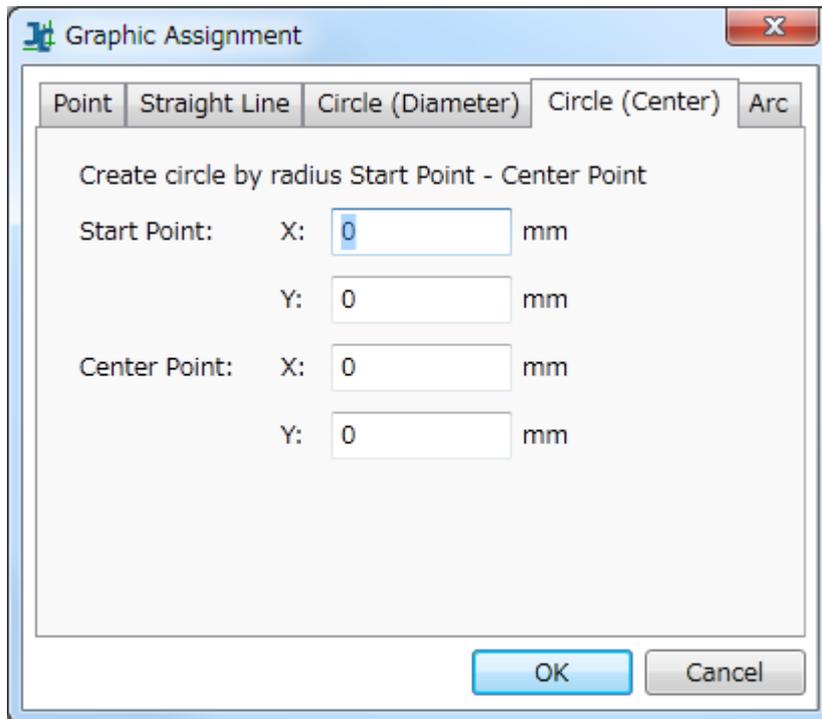
■ Creating/Assigning a Circle (Diameter)



- 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.

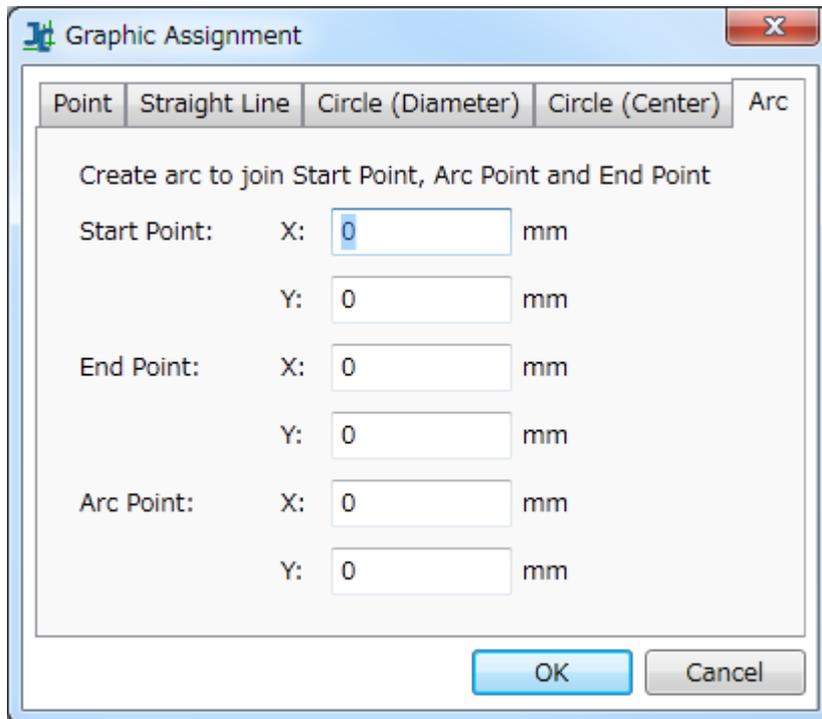
■ Creating/Assigning a Circle (Center)



- 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)

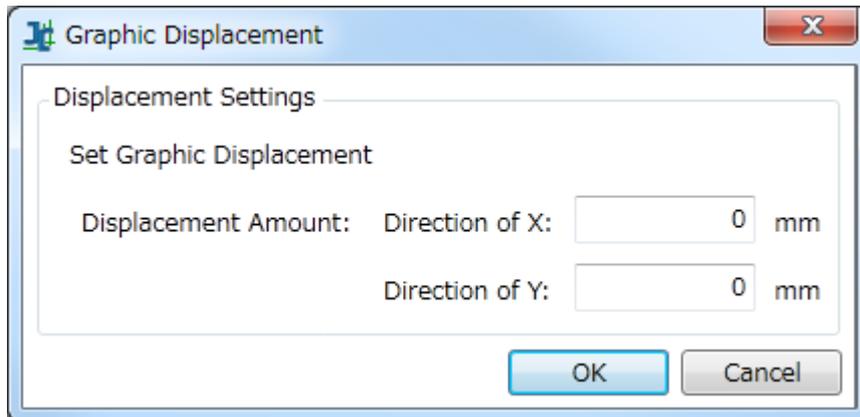
Arc Point (X, Y)

An arc joining the start point – arc point – end point is created or edited.

### 19.4.2 Graphic Displacement Dialog

You can move a graphic from the Graphic Displacement dialog.

Select the graphic you want to move, and by selecting [Tool] [Move Graphic], 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.

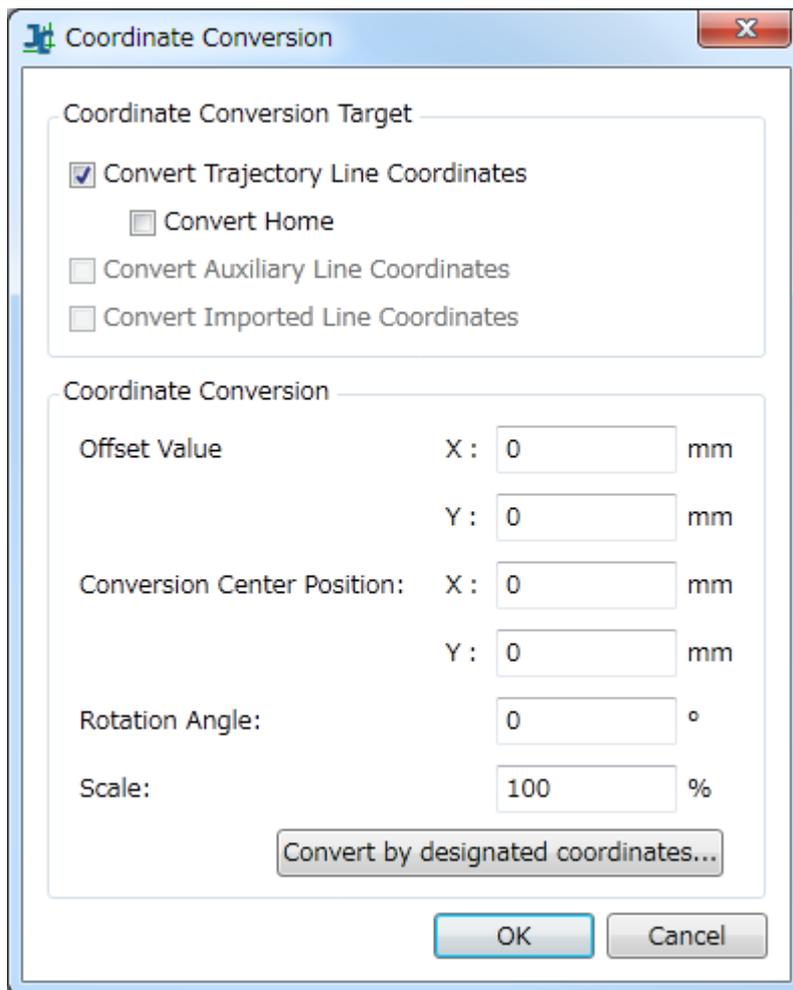
### 19.4.3 Coordinate Conversion

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 is displayed. 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).



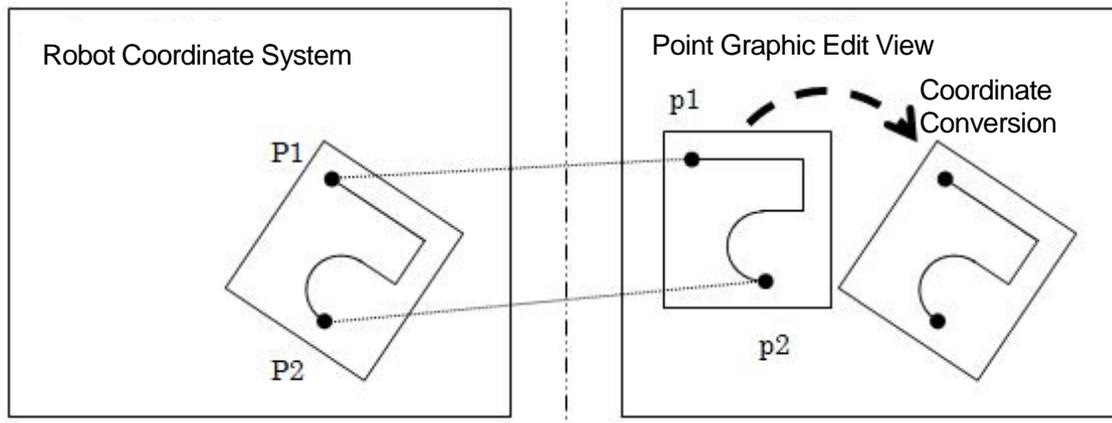
- Settable Items

- |                                     |   |   |
|-------------------------------------|---|---|
| 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.   |

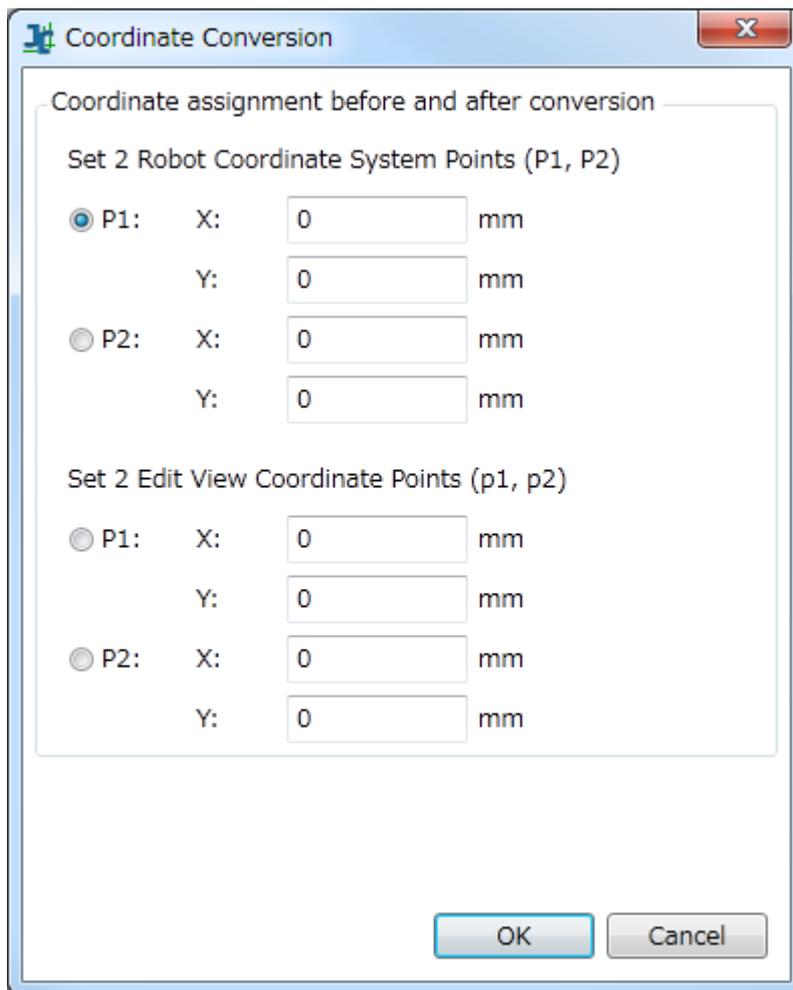
If you select trajectory lines as a target of conversion, all trajectories are targeted, and if you select auxiliary lines as a target of conversion, all auxiliary lines are targeted. Therefore you cannot convert only "some" of the trajectory lines etc.

### ■ 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).



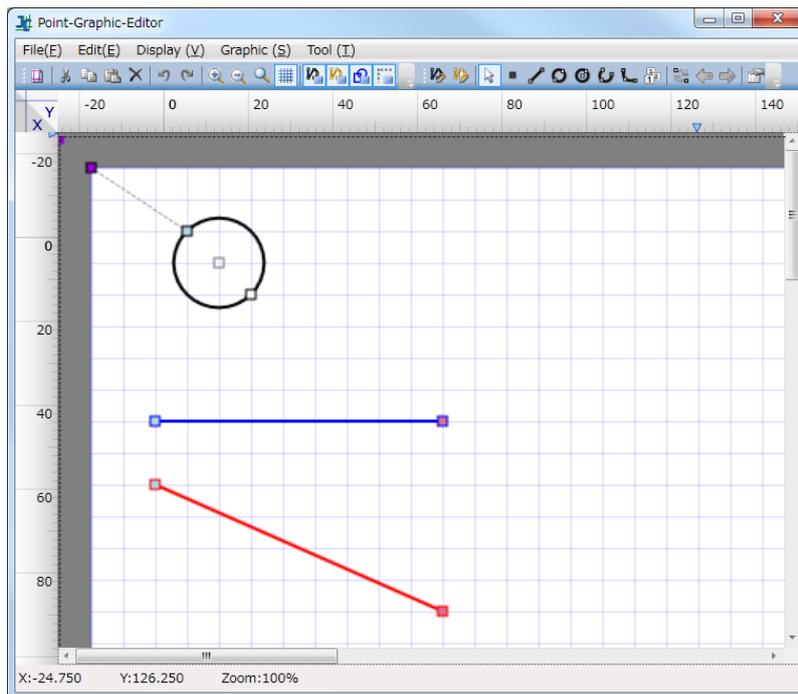
- **Settable Items**

**Robot Coordinate System :** These two reference points are for specifying the position after coordinate conversion.

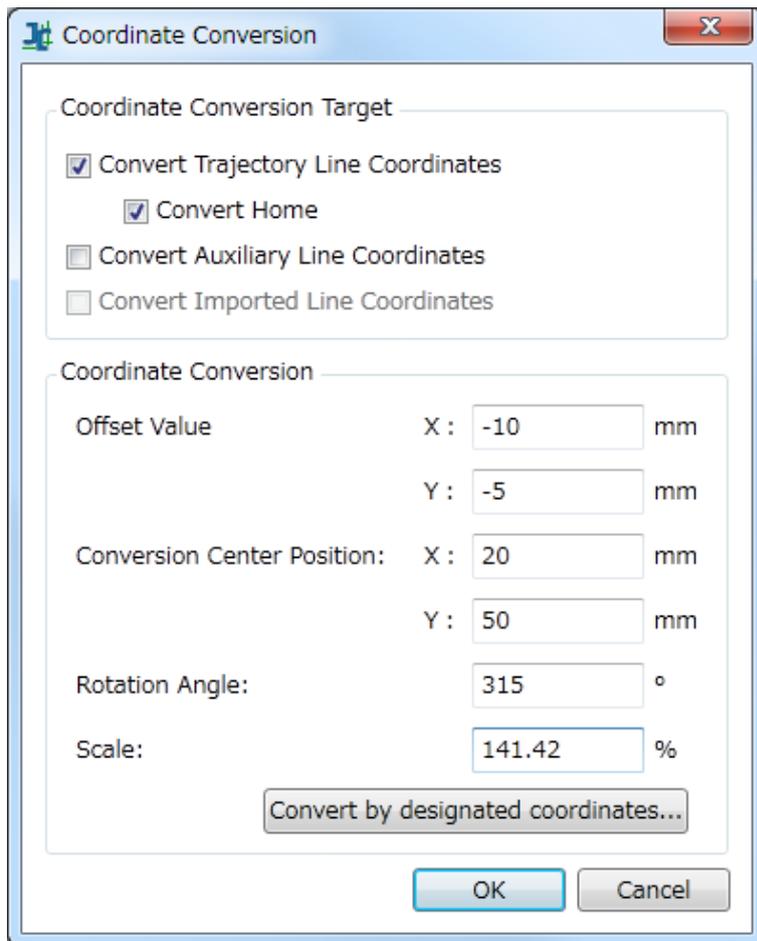
**Edit View Coordinates :** These two reference points are for specifying the position before the coordinate conversion.

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.



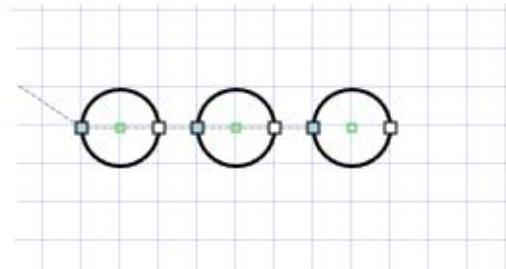
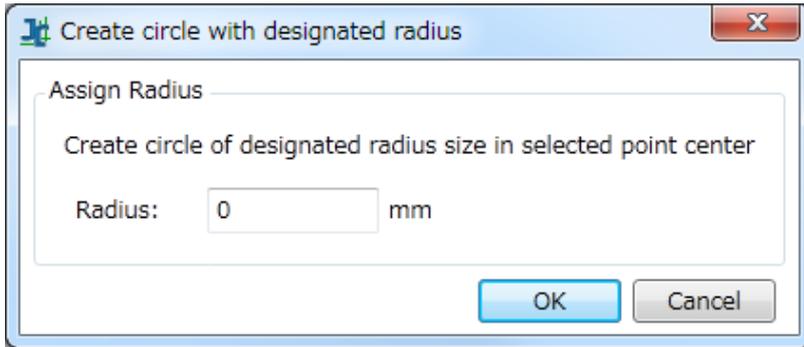
#### 19.4.4 Using the Graphic Creation Function with an Existing Graphic

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.

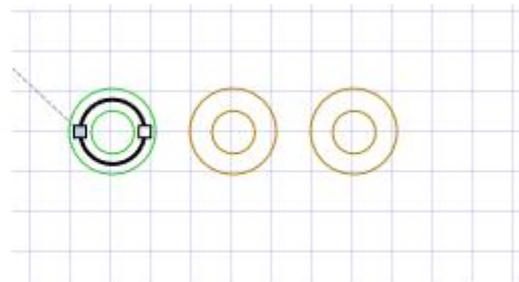
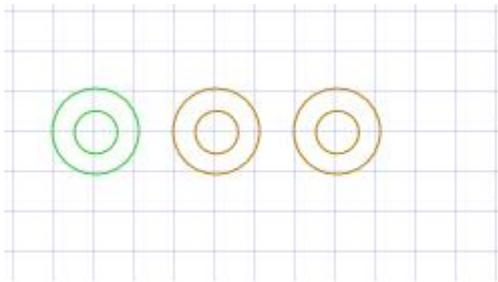


#### ■ Create Circle by Intermediate Radius

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.

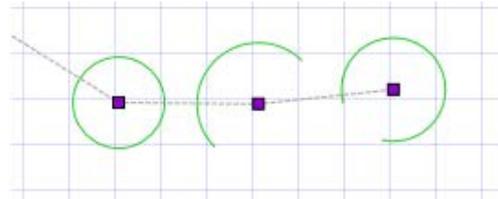
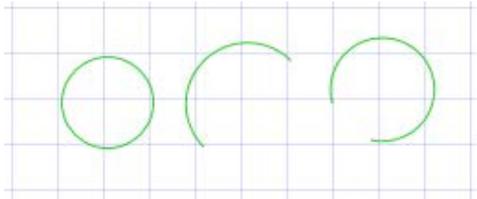
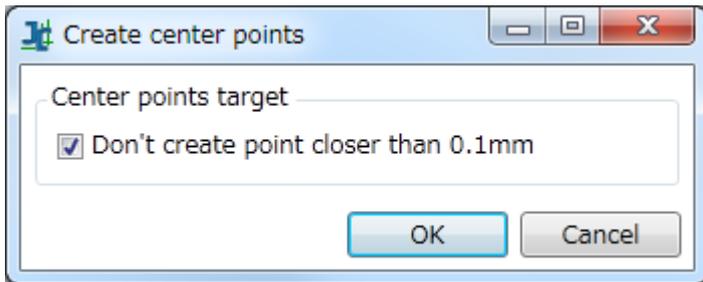
#### NOTE

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 0.1mm or not. If there are no circles/arcs within the selected graphic, no graphics are created.

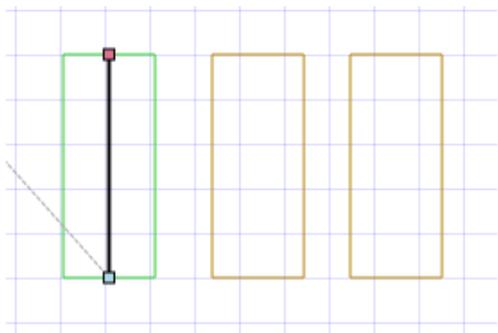
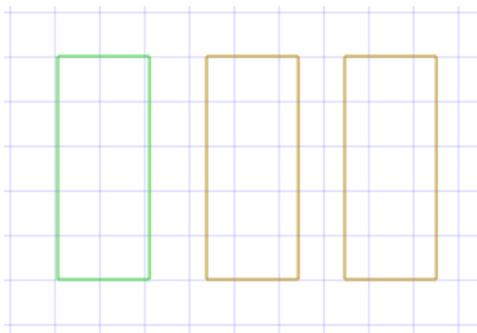


#### ■ Create Line in Rectangle Center

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.



### 19.4.5 Auto Connect

- Function for automatically connecting a selected graphic

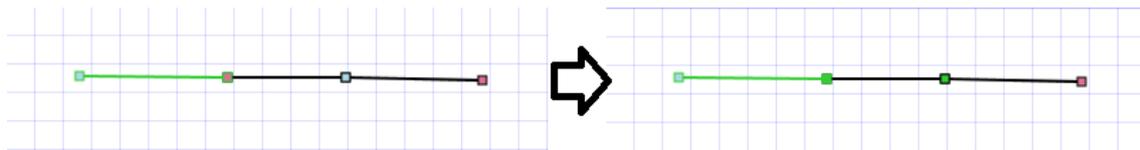
With a graphic selected, execute [Auto Connect] from the [Tool] menu to automatically connect all possible consecutive items in the sequence towards the end point.

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.

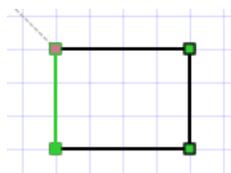
Example:



### Caution

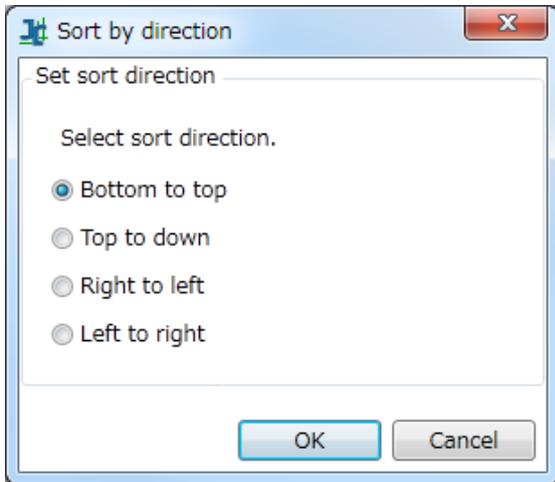
With a graphic such as the one below where the CP Start Point and CP End Point have the same coordinates, if you select and execute auto connect on a line other than the CP Start Point, all the points become CP Passing Points.

Change the point to a CP Start Point and/or CP End Point in the point row on the main screen.



### 19.4.6 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 bottom

Right to left

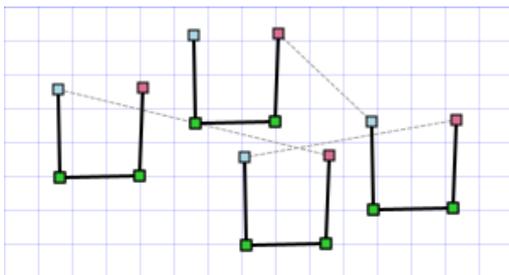
Left to right

The paths are sorted from the direction specified from the start point.

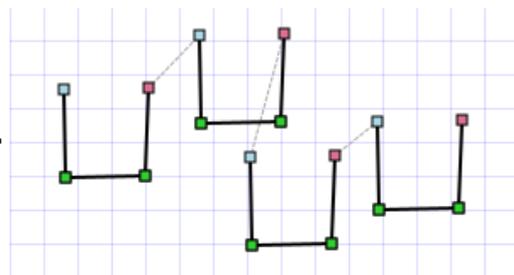
Examples for sorting various paths

Example of sorting paths by specifying the "Left to right" sort direction:

Before sorting

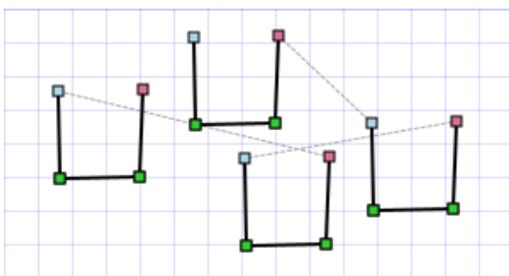


After sorting

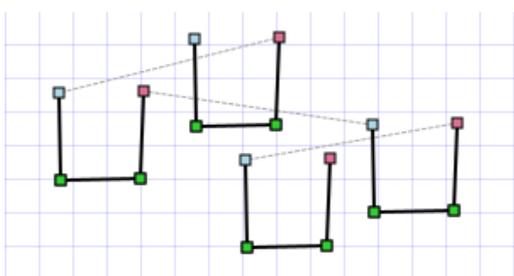


Example of sorting paths by specifying the "Top to bottom" sort direction:

Before sorting



After sorting



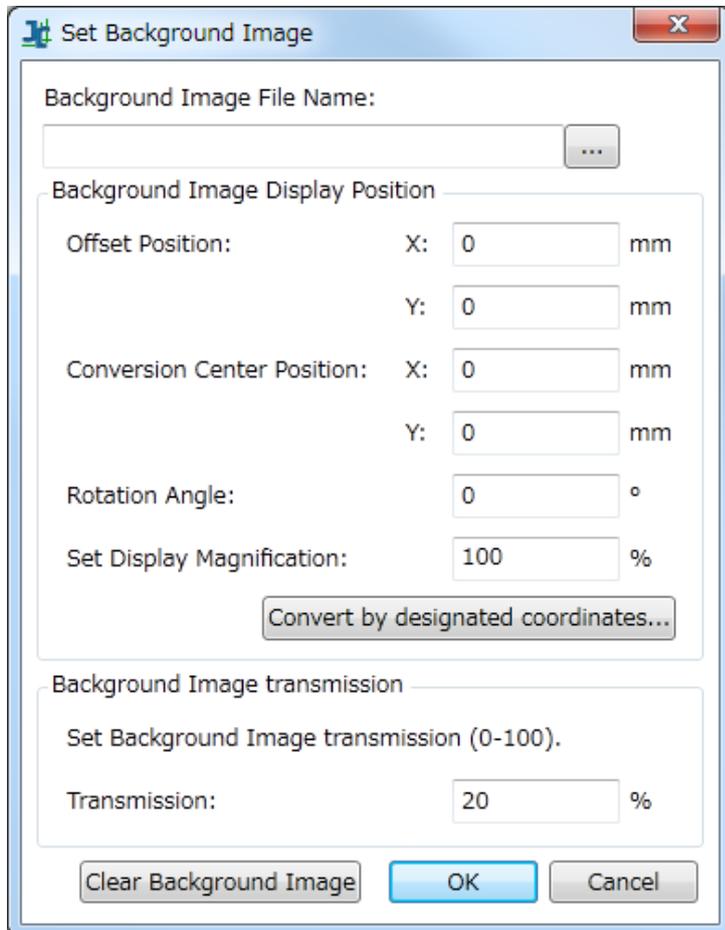
## 19.5 Loading a Background Image

You can load a JPG image as a background image.

### ■ Operation Procedure

- Select [Menu] – [Background Image Setting].
- The background image setting dialog appears. Select the JPG 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 values, 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).

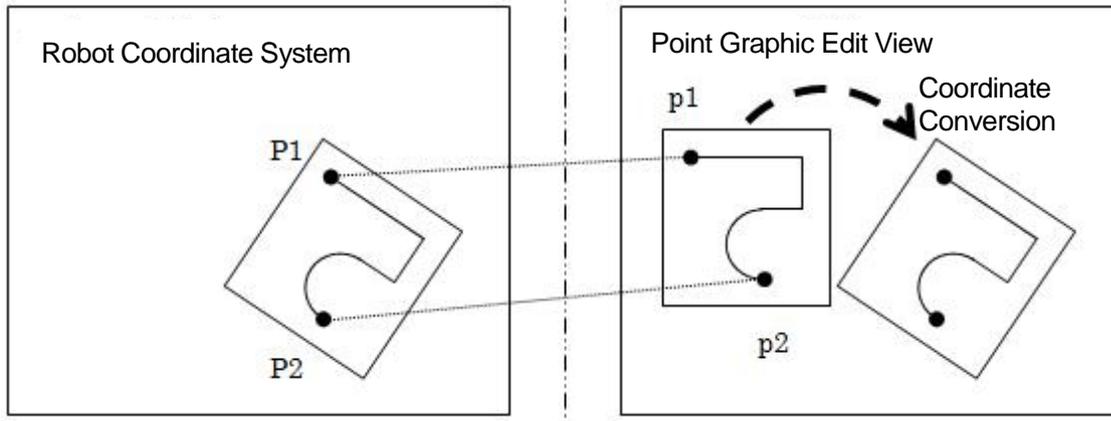


- Settable Items

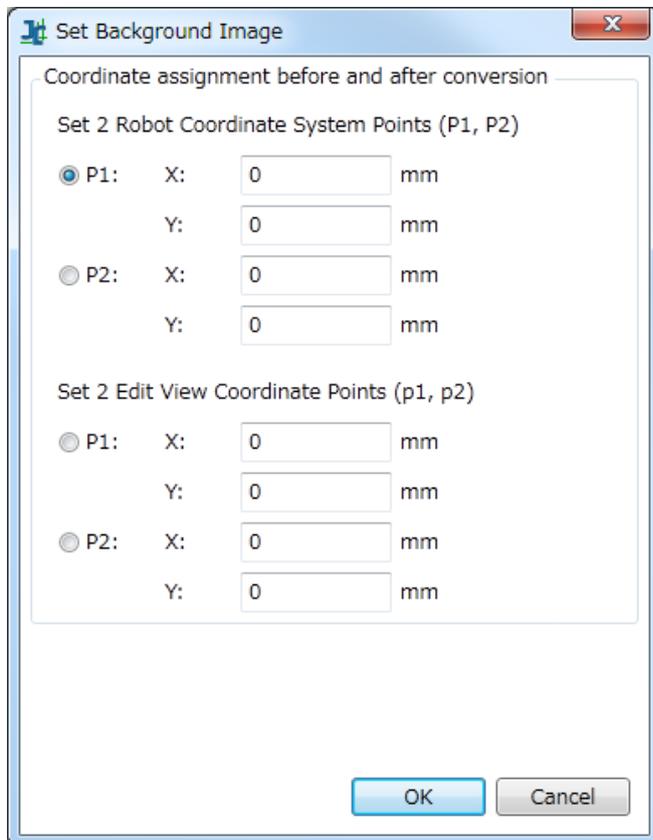
- Background Image File Name : From the file selection dialog, specify the image file to display as the background.
- Offset Position : Specify the offset position for loading the image.
- Conversion Center Position : Specify the rotation's center or the reference point for the enlargement/reduction.
- 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

■ 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 match up 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).



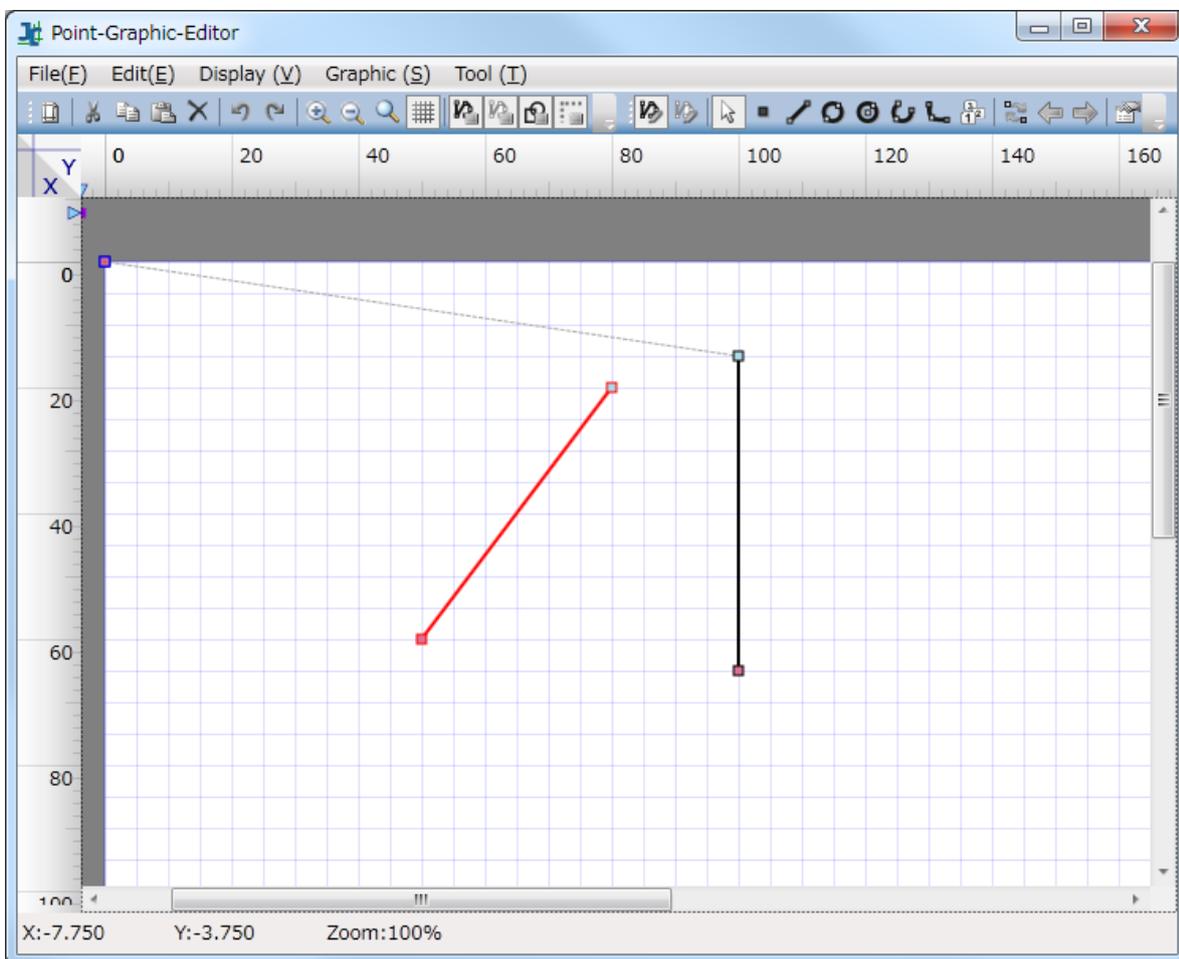
- Settable Items

Robot Coordinate System : These two points are a reference for specifying the position after coordinate conversion.

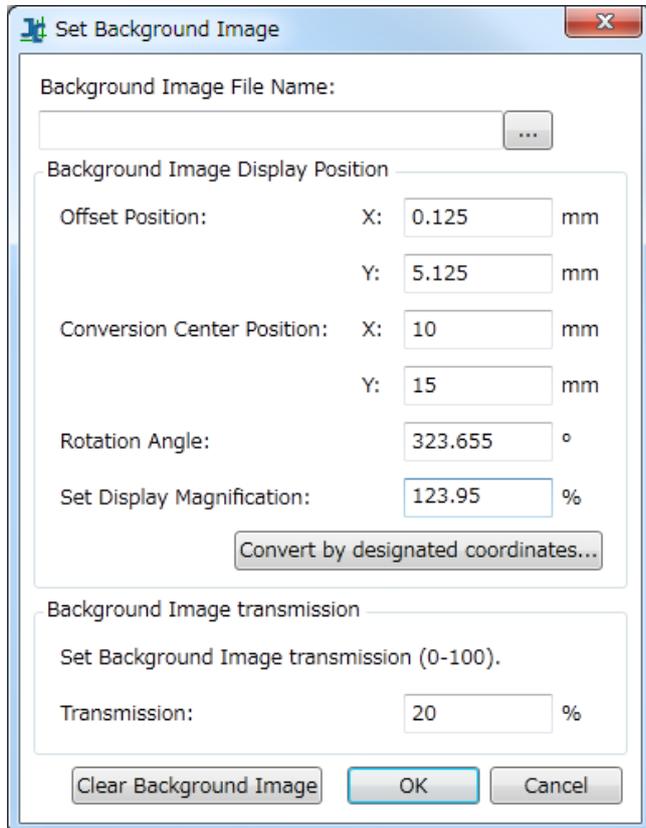
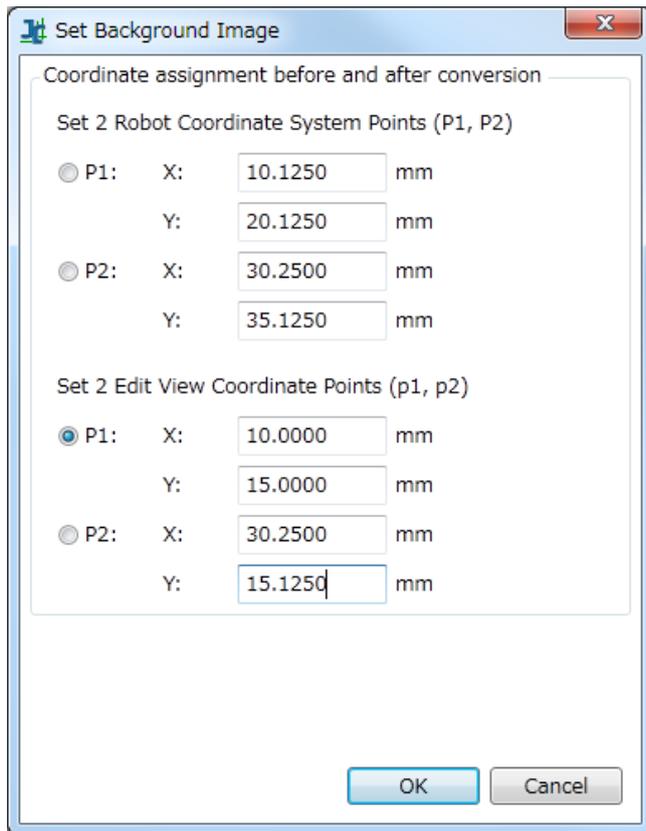
Edit View Coordinates : These two points are a reference for specifying the position before coordinate conversion.

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 expansion/contraction scale.



## 19.6 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. Compatible with RS-274D/RS-274-X. You can load this data as an imported graphic.

### 19.6.1 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

Compatible Group Code

- 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)

■ Gerber Data

Straight lines, arcs, and circles

■ Operation Procedure

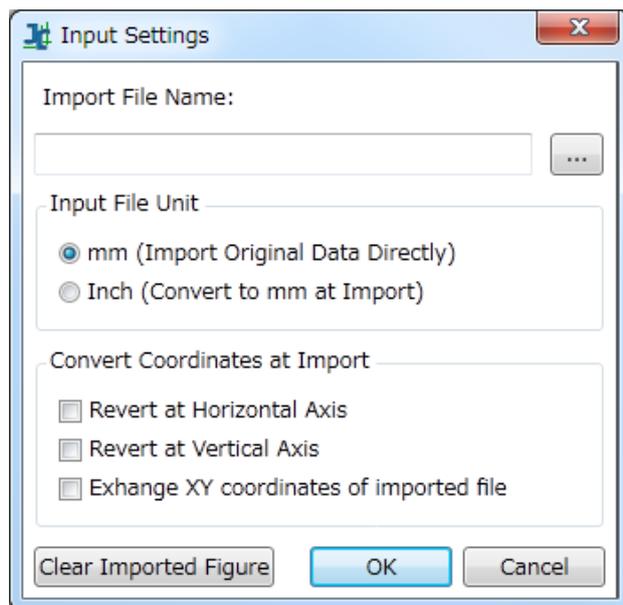
Select [File] from the menu bar and then select [Import] – [Import DXF File] / [Import Gerber Data File].

The import settings dialog is displayed. Select the subject file to load, enter the load settings, and click the OK button.

The offset dialog is displayed. 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.

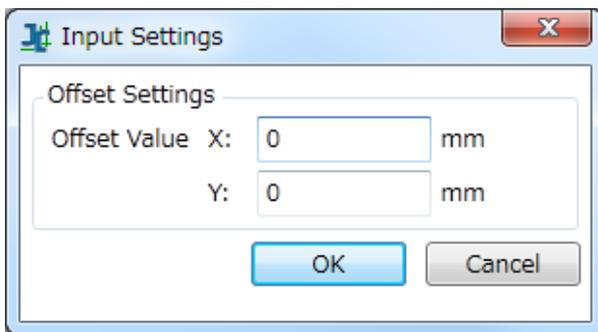
**NOTE**

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.

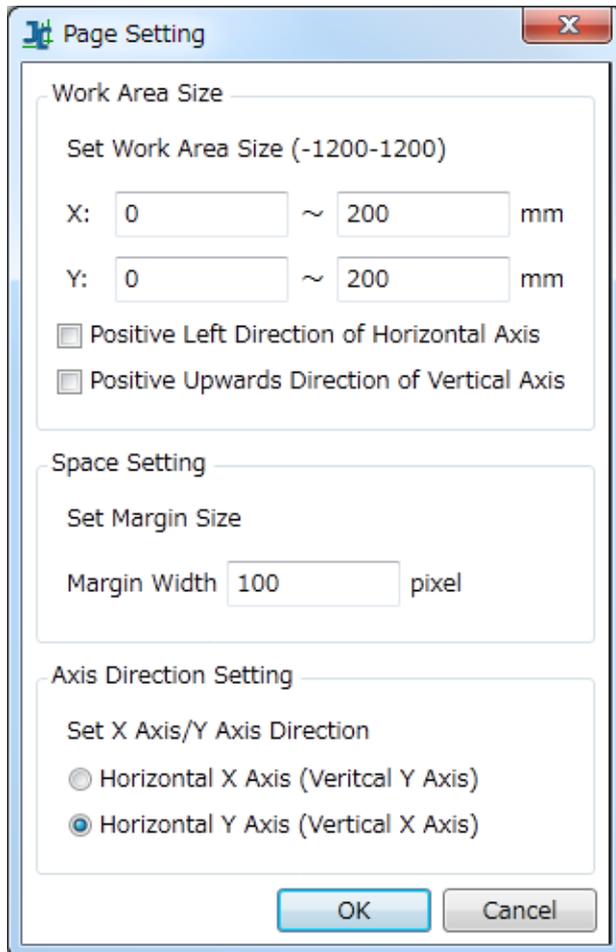


Offset Value

- X : Specify the offset for the X coordinates.
- Y : Specify the offset for the Y coordinates.

## 19.7 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 – 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 – 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.

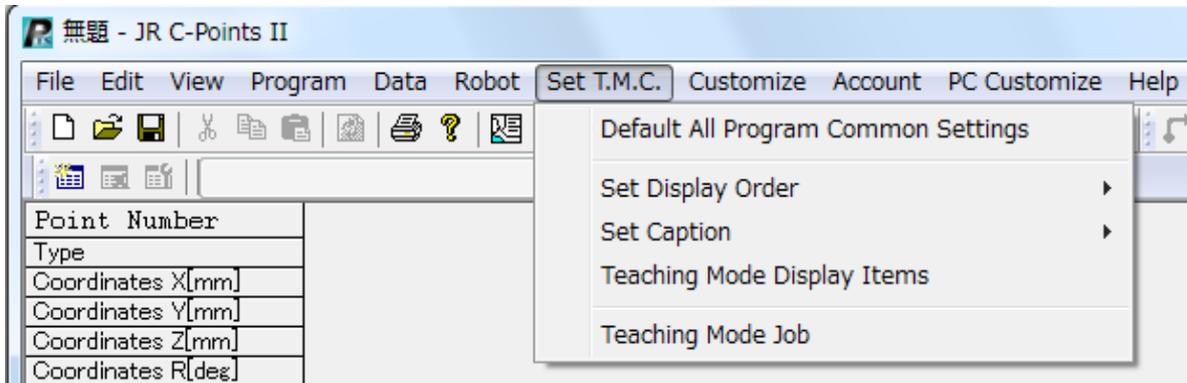
# 20. CUSTOMIZING DATA

## 20.1 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 is displayed.

Select or enter the item you wish to set from the dialog box and click [OK].



### 20.1.1 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.

### 20.1.2 Set View Order

Here you can set the view order for [Common Setting Variables], [Condition Setting Variables], and [Program Setting Variables] included in the Customizing Data.

### **20.1.3 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 are displayed using the captions set here. Also, when setting captions for [Application], the caption is displayed 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.

### **20.1.4 Set Menu YN (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 Data
- Additional Function Data
- PLC Programs
- All Program Common Settings

### **20.1.5 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 on 0 – 9 Keys (valid at the teaching base screen or when using JOG keys)

## 20.2 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 (Customizing)*.

### 20.2.1 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 below is displayed. Enter the login name and security code (4 – 8 numerical digits) and click [OK].

To login using a new account, refer to “20.2.3 Create Account”.

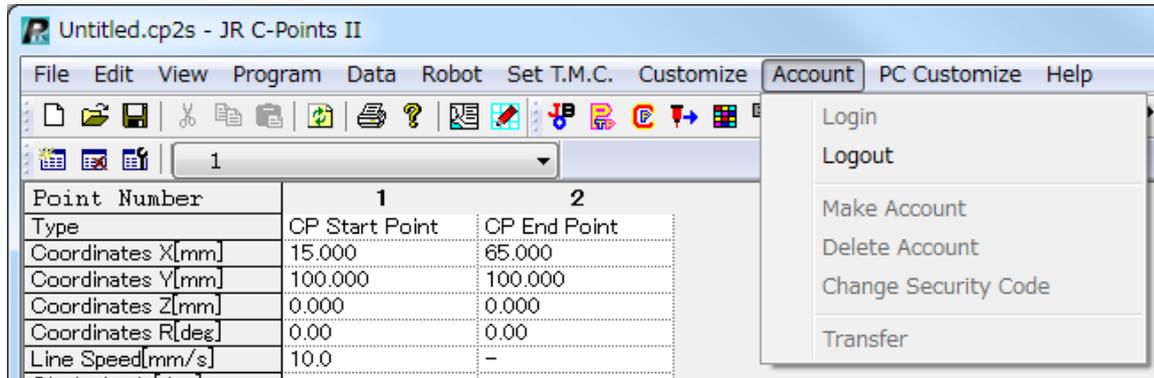


#### NOTE

- 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.
- There is no way to recover your security code. As such, please make sure you never forget your security code.

## 20.2.2 Logout

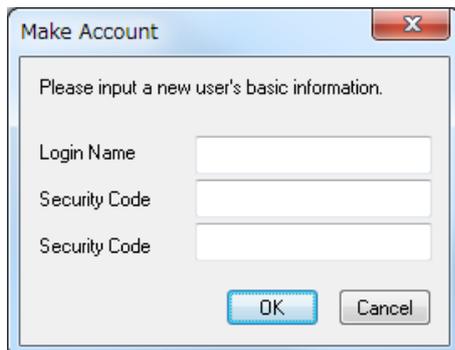
To logout, click [Account] on the menu bar and click [Logout] on the pull-down menu.



## 20.2.3 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 below is displayed.

Enter the login name and the security code twice and click [OK]. Enter 4 – 8 numerical digits for the security code.



## 20.2.4 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].

## 20.2.5 Change Security Code

Use this to change the security code used for logging into the account.

### **20.2.6 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.

## **20.3 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.

### **20.3.1 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 – 1000, additional function data numbers 51 – 100 (not including work adjustments), and PLC program numbers 51 – 100 included in the customizing data (excluding any customizing data which is protected by another account).

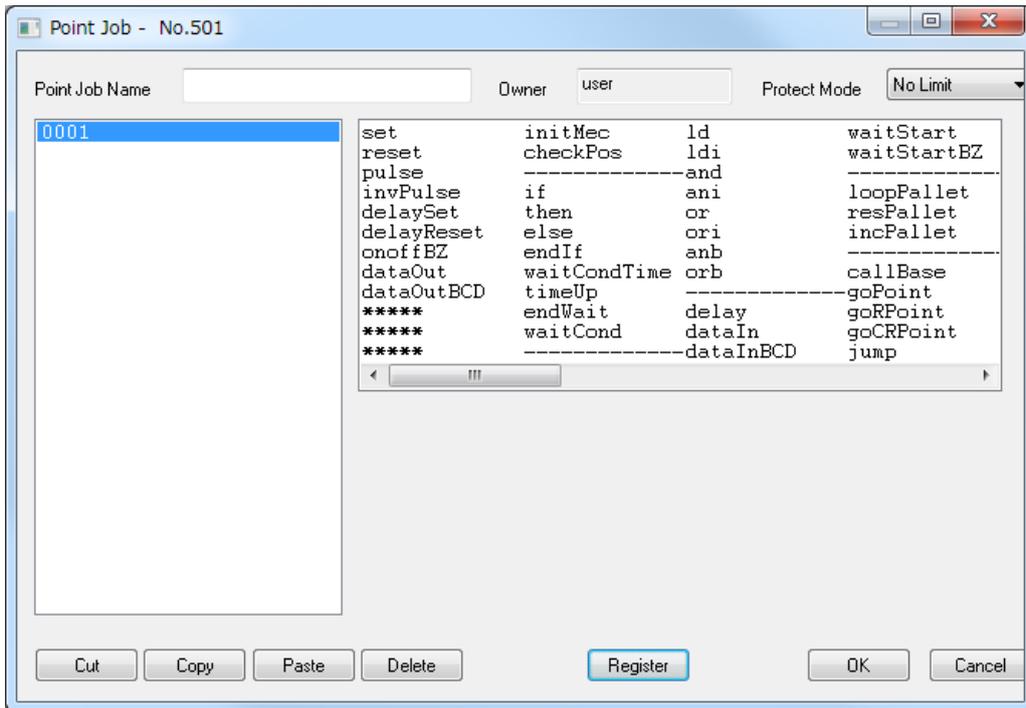
Methods for creating and editing are the same as for point jobs/additional function data in teaching data.

Click [Data] on the menu bar and select [Point Job], [Additional], or [PLC]. When selecting [Additional], please select the additional function data type. A list for the corresponding choice is displayed.

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) is displayed in the editing dialog box and it is possible to set Protect Mode.

### Example: Point Job Data List

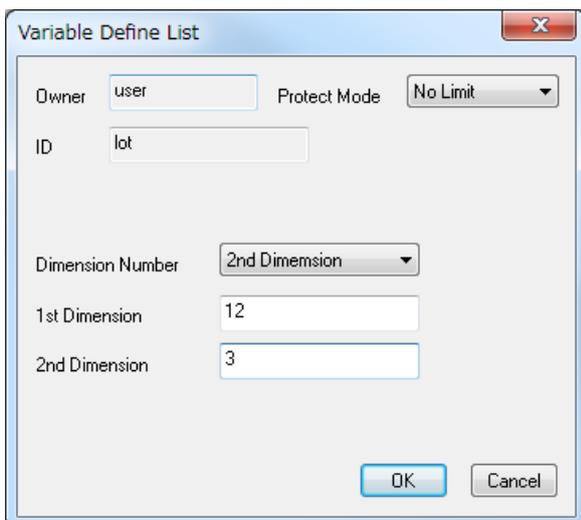


## 20.4 Global Variables, Keeping Variables, User Functions, and Aliases

If you create global variables, keeping variables, user functions and aliases while logged in, these are created as customizing data and owned by the account logged in at the time of creation.

The method of creating these is the same as for teaching data, however, the owner (login name) is displayed at the top of the editing dialog and it is possible to set Protect Mode.

### Example: Global Variable





### **20.5.2 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 is displayed. 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 is displayed. 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.

### **20.5.3 Program Setting Variables**

Click [Customize] on the menu bar and click [Program Setting Variables] on the pull-down menu. The Program Setting Variables list is displayed. 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 is displayed. 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.

## 20.5.4 Select Type Setting Variables

The Select Type Variable Define List shown to the right is displayed when you click [Add Select Type] or when you select a Select Type variable and then click [Edit].

By default the identifier is set as the caption. If you want to set a caption, select a language, enter the caption, and then click [Register].

en: English

ja: Japanese

de: German

it: Italian

es: Spanish

fr: French

ko: Korean

ch: Chinese

cz: Czech

vi: Vietnamese

Select Type Variable Define List

Owner: user      Protect Mode: No Limit

ID: Mode

Language: en      Caption: Mode      Register

Language	Caption
en	Mode
ja	Mode
de	Mode
ch	Mode

Clear

Selection Item

It...	en	ja	de	ch	it	es
0	Busy	S1	S1	S1	S1	S1
1	Steady	S2	S2	S2	S2	S2

Add      Edit      Delete

OK      Cancel

Common Data SettingEdit

	Value	Unit
Mode	Busy	
Time	Busy	
	Steady	

Refresh

IO Signal Setting      Back Default Value

CDM Signal Setting      OK      Cancel

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].

Also, by default 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 is displayed (see diagram on the previous page).

However, the teaching data is displayed 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 are displayed as [S1] and [S2] instead of [busy] and [steady].

\*[Common Data Setting] and [Condition Data Setting] are displayed as the captions set under [Set Caption] in the [Set T.M.C.] menu.

## 20.5.5 Number Type Setting Variables

The dialog box shown to the right is displayed when you click [Add Number Type] or when you select a number type variable and then click [Edit].

By default 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].

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

The dialog box 'Number Type Variable Define List' contains the following fields and options:

- Owner: user
- Protect Mode: No Limit
- ID: Time
- Language/Caption table:
 

Language	Caption
en	Time
ja	Time
de	Time
ch	Time
- Default Value: 0.00000
- Minimum Value: 0.00000
- Maximum Value: 50.00000
- Decimal Figure: 0.1
- Unit Kind:
  - No Unit
  - Length[mm]
  - Deg[deg]
  - Angular velocity[deg/s]
  - Speed[mm/s]
  - Time[sec]
  - Acceleration[mm/s<sup>2</sup>]
  - Angle acceleration[deg/s<sup>2</sup>]
  - Percentage[%]
  - Number of rotations[rpm]
  - Temperature[C]
  - Weight[Kg]
  - Milli Time[msec]
  - Minute Time[min]

Numeric value range

The dialog box 'Common Data SettingEdit' contains a table with the following data:

	Value	Unit
Mode	Busy	
Time	0.5	sec

Buttons at the bottom: ID Signal Setting, COM Signal Setting, Refresh, Back Default Value, OK, Cancel.

Enter the numeric value range and select the unit you are using.

Default Value: The values set as defaults

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 is displayed (see diagram on the previous page).

\*[Common Data Setting] and [Condition Data Setting] are displayed as captions set under [Set Caption] in the [Set T.M.C.] menu.

## 20.5.6 Point Type Setting Variables

Point Number	1
Type	PTP Point
Coordinates X[mm]	0.000
Coordinates Y[mm]	0.000
Coordinates Z[mm]	0.000
Coordinates R[deg]	0.00
Line Speed[mm/s]	-
Circle Angle[deg]	-
Condition No.	-
Job Before Moving	-
Job while Moving	-
Point Job Number	-
Job while CP Moving	-
PTP Condition No.	-
CP Condition No.	-
Tool Number	-
Pallet Routine No.	-
Work Adjustment No.	-
Execute Condition No.	-
Tag Code	-

The dialog box shown above is displayed when you click [Add Point Type] or when you select a point type variable and then click [Edit].

By default 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	es: Spanish	ch: Chinese (simplified)
ja: Japanese	fr: French	cz: Czech
de: German	ko: Korean	vi: Vietnamese
it: Italian		

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 wish to set.

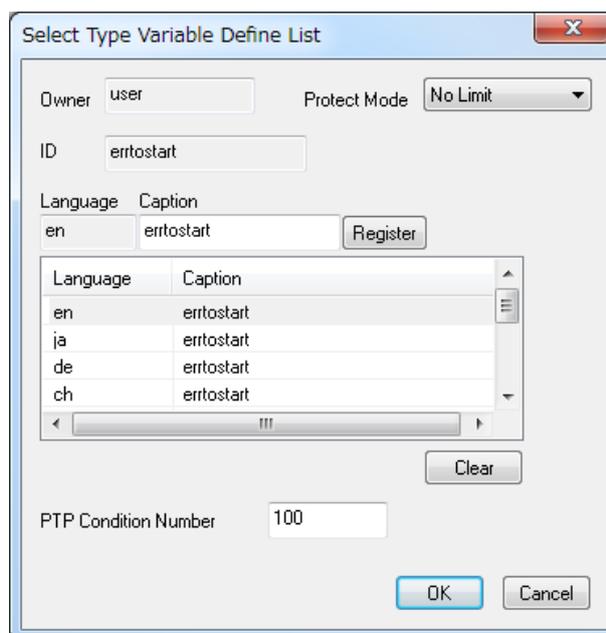
If you wish to register the point coordinates in JOG Mode, place the cursor on the point you wish to register and click the JOG icon (  ). The JOG dialog box is displayed.

### 20.5.7 PTP Condition Type Setting Variables

The dialog box shown to the right is displayed when you click [Add PTP Condition Type] or when you select a PTP condition type variable and then click [Edit].

By default the identifier is set as the caption. If there is a caption you wish to set, select a language, enter the caption, and then click [Register].

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



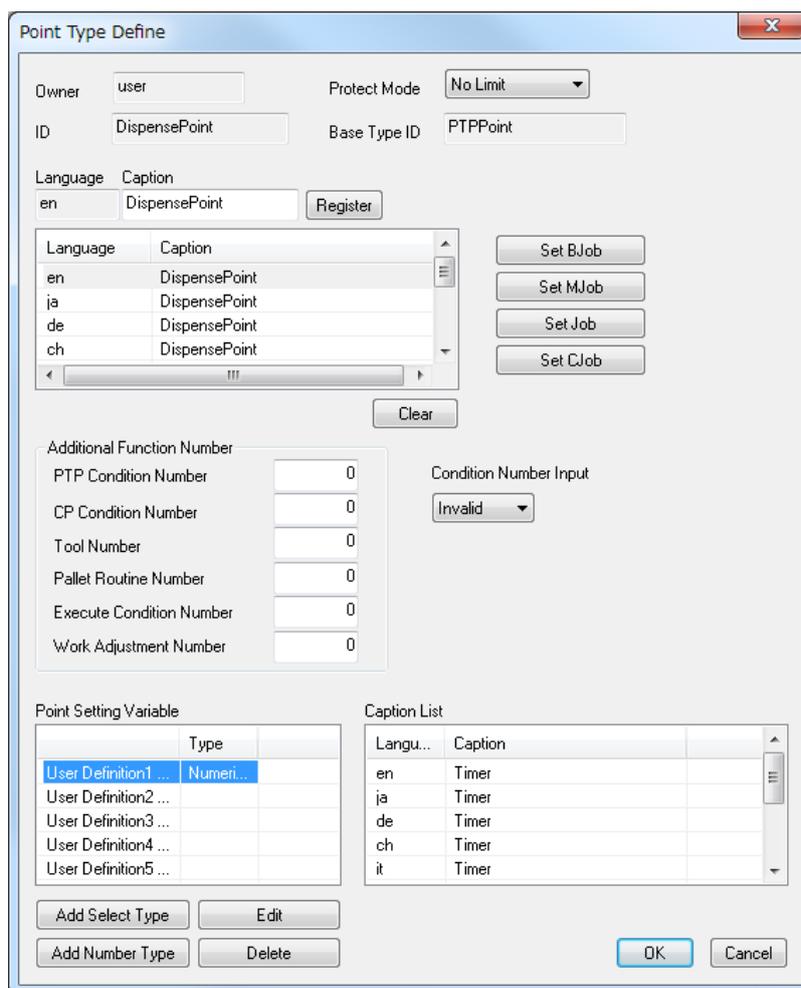
You can now edit the number for the PTP condition specified in [PTP Condition Number] in the teaching data [Common Data Settings]. You can activate a defined or edited PTP Condition by setting it to a point.



The edit dialog box shown to the right is displayed when you click Add and then select a base point type or when you click [Edit].

By default 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
- it: Italian
- es: Spanish
- fr: French
- ko: Korean
- ch: Chinese
- cz: Czech
- vi: Vietnamese



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.

# 21. PC CUSTOMIZE

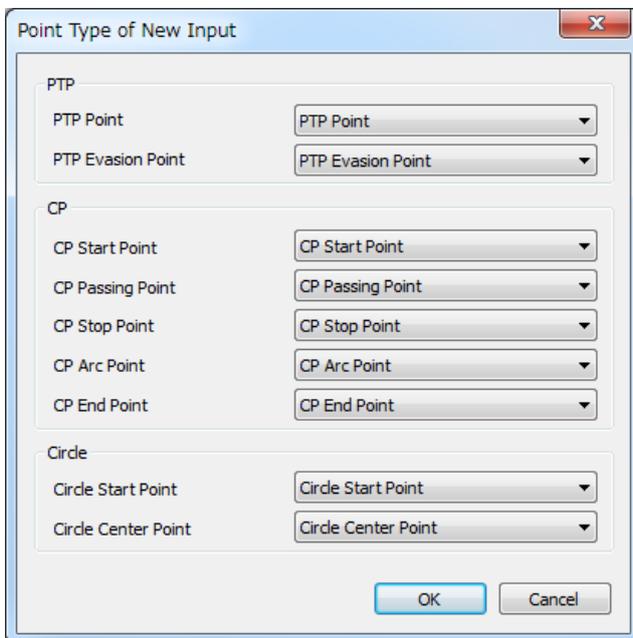
You can customize the JR C-Points II functions. This is different from the robot's customizing data and content customized here is not applied to the robot. These settings are only applied to JR C-Points II.

## 21.1 Point Type of New Input

Set the point type for the point that is set when you push the point adding buttons on the tool bar or when you add a graphic in Point Graphic Editor.

From [PC Customize] on the menu bar, select [Point Type of New Input].

Set the base point type for every point type which is entered here and click the [OK] button.



### NOTE

- When you are adding a point, if the point type definition set here does not exist, the point type which holds the same base point type has another point type added to it.
- PC Customize information is saved as JR C-Points II information and is not included in the C & T data file. Accordingly, when you modify the PC Customize settings, even if you open a previous C & T data file and startup JR C-Points II, the list content will not revert to its previous state.

## 22. TRANSFERRING ROBOT SYSTEM SOFTWARE

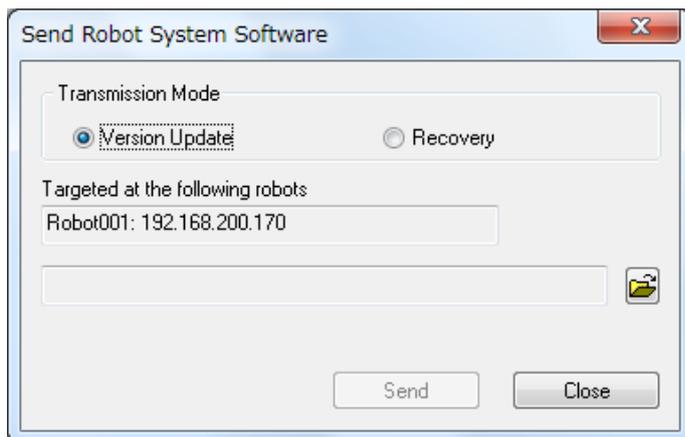
This robot is controlled by built-in robot system software. To upgrade the robot system software, follow the instructions below.

Also, if you mistakenly turn OFF the robot during an update or the update failed causing the robot to malfunction, you can also use the following instructions to restore the robot system software.

■ JR3000 Series: JR3\_SysProgram\_V.+++\_\*\*\*.jsy

(“+++” indicates the version number. “\*\*\*” varies according to robot specifications.)

1. Turn ON the robot and place the operation manual CD-ROM in the drive.
2. Start JR C-Points II and select [Send Robot System Software] from the [Robot] pull-down menu on the menu bar. The dialog box shown below is displayed.



3. If updating, select [Version Update] as the Transmission Mode. If restoring the system software, select [Recovery] as the Transmission Mode. (The robot IP address needed for recovery is “192.168.200.180”).
4. Click [Open], specify the drive where the Operation Manual CD is placed, then select the robot system software file and click [Open]. The selected file name is displayed. Click [Send] and the robot system software starts sending.
5. After the transmission, turn the robot OFF and then ON again.

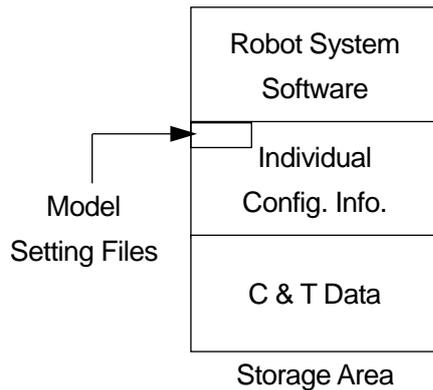
### Attention

**Never turn OFF the robot or PC while sending the robot system software.** Otherwise, the robot may not be able to start up.

## 23. ROBOT DATA BACKUP

---

The robot (data) storage area is partitioned as shown by the diagram below. All of the storage area partitions including the robot system software storage partition are subject to backup and data restoration operations.

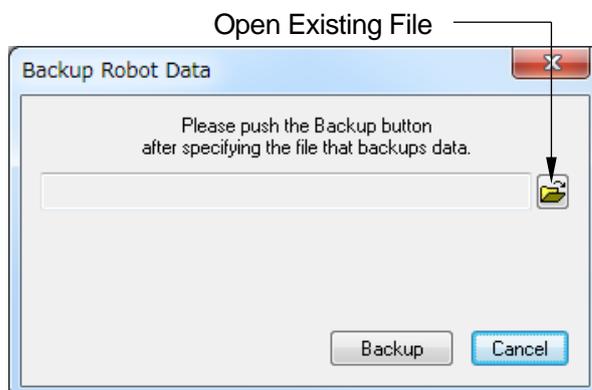


### 23.1 Data Backup

The robot system software, C&T data, individual configuration information and model setting files 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 file 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.**

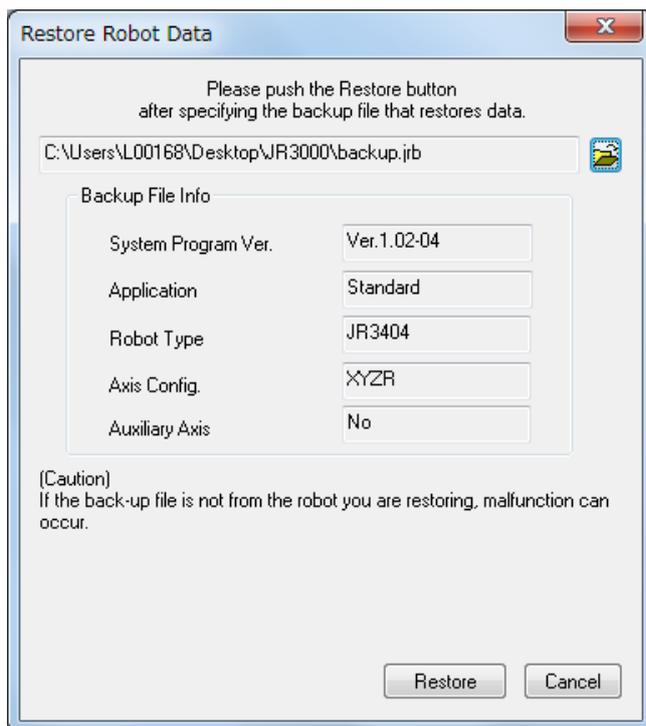
## 23.2 Restore Robot Data

This restores the data saved in [Robot Data Backup] to the robot.

Executing robot data restoration deletes all of the data in the robot (robot system software, C&T data, individual configuration information and model setting files) 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 below is displayed.

Click the [Open File] icon, specify the backup file and click [Restore].



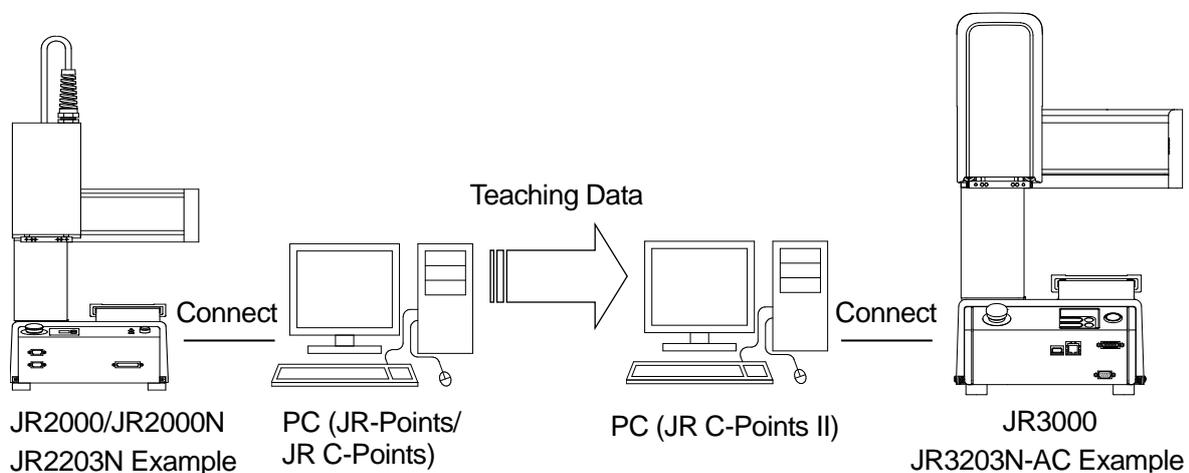
## Caution

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.**

## 24. CONVERTING JR2000/JR2000N DATA TO JR3000 DATA

To use JR2000/JR2000N 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 option) and/or JR C-Points (JR2000N option) to send the data to the PC.
2. Open the received data in 1 above using JR C-Points II\*.
3. Send the data from the PC to the JR3000 using JR C-Points II\*.



\*In place of JR C-Points II (optional), JR C-Points II Limited Edition (included in the operation manual CD) can also be used to convert data.

### NOTE

It is possible to connect one PC to both robots; JR2000/JR2000N Series and JR3000 Series at the same time. You can also connect a PC to the JR2000/JR2000N Series robot to receive data, then disconnect the JR2000/JR2000N and connect the JR3000 Series robot 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 removing or connecting the cable. Failure to do so may cause unit malfunction or data loss.

Please 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 JR2000/JR2000N and JR3000 Series robots.)

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 transferring from the PC to the robot, startup JR-Points for the JR2000 Series and JR C-Points for the JR2000N Series, and set the port to match the COM port connected to the JR2000/JR2000N Series robot.

■ Operation Procedure

[Robot] Menu → [COM Status]

3. Transfer the teaching data from the JR2000/JR2000N Series robot.

■ Operation Procedure

[Robot] Menu → [Receive C&T Data]

4. Name the data and save it. For JR-Points, the file is saved as a ".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 robot 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 and [JR C-Points File (\*.cp\*)] for JR2000N Series and open the data file from the JR2000/JR2000N Series robot.

("\*" varies depending on the specifications.)

■ Operation Procedure

[File] Menu → [Open]

8. Transfer the data to the JR3000 Series robot.

When data is transferred 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. Please 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 – 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. Please amend 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 please amend this data.
  - The various display order of T.M.C settings are not converted.

# 25. 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:

## 25.1 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 – 2000. Smaller decimals are rounded to the 4 <sup>th</sup> digit.
Y coordinates (*)	Specify the Y coordinates -2000 – 2000. Smaller decimals are rounded to the 4 <sup>th</sup> digit.
Z coordinates (*)	Specify the Z coordinates -999.999 – 999.999. Smaller decimals are rounded to the 4 <sup>th</sup> digit.
R coordinates	Specify the R coordinates -720 – 720. The units which can be used are degrees only. Smaller decimals are rounded to the 3 <sup>rd</sup> digit.
MT1 coordinates (*)	Specify the MT1 synchronized axis coordinates. Specify the coordinates -9999.999 – 9999.999. Smaller decimals are rounded to the 4 <sup>th</sup> digit.
MT2 coordinates (*)	Specify the MT2 synchronized axis coordinates. Specify the coordinates -9999.999 – 9999.999. Smaller decimals are rounded to the 4 <sup>th</sup> digit.

### NOTE

There is no unit specification for JCS files. When importing the JCS file into JR C-Points II, specify the unit of length (millimeters/inches).

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 (*)	Rectangle spiral start point
RA_S (*)	Zigzag 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.

## 25.2 JCS File Data Example

A JCS file data example is as follows:

```

work1.jcs - Notepad
File Edit Format View Help
JR Points_CSV
PTP,10,20,30,0
PTP,50,60,30,0
CP_S,80,80.5,40,0
ARC,100,85,40,90
CP_E,120,123.45,40,180
  
```

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
Line Speed[mm/s]	-	-	10.0	10.0	-
Circle Angle[deg]	-	-	-	-	-

# 26. HELP MENU

---

## 26.1 About...

This displays the version information dialog.

## 26.2 Help

This displays information and explanations regarding the use of JR C-Points II.

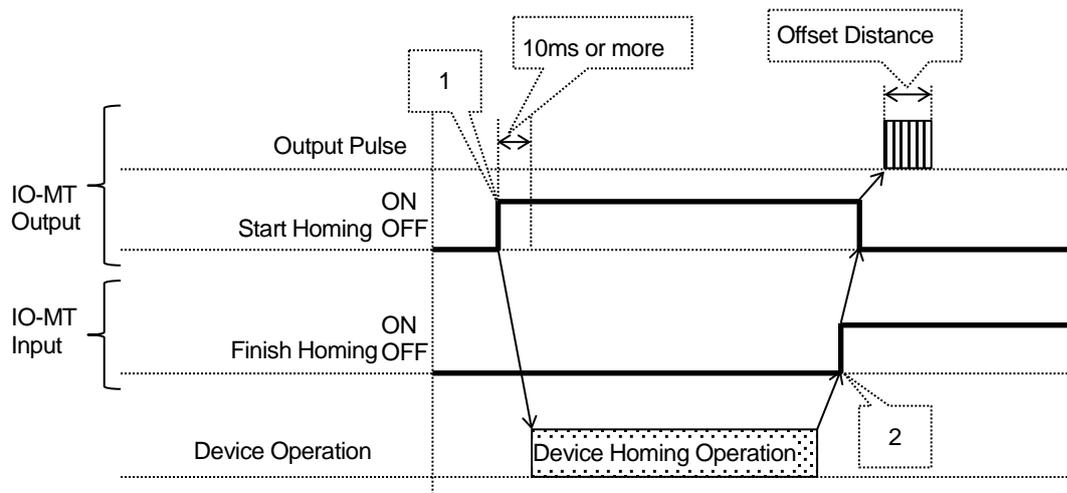
# 27. APPENDIX

## 27.1 Homing Operation Methods

### 27.1.1 Start & Completion

The item explained here is for robots equipped with auxiliary axis functions.

■ Timing Chart



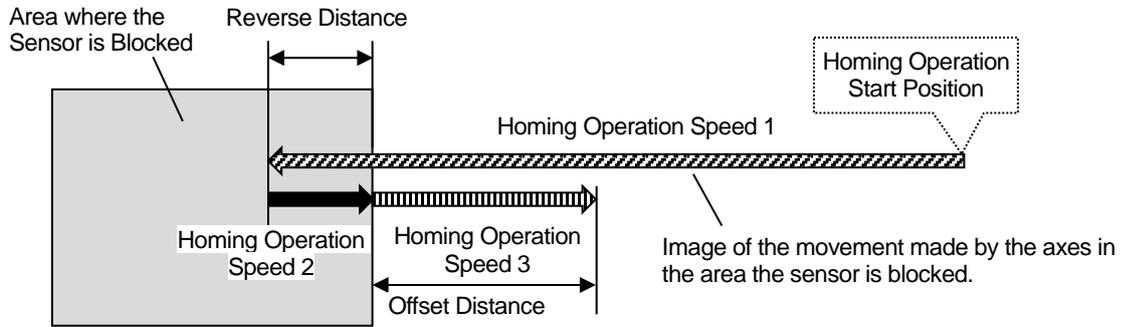
The error in the table below can occur if there is a problem with the homing operation.

Error	Details
Homing Move Timeout Error	The time from when the “start homing” signal came ON until the “finish homing” signal turns ON exceeds the homing operation parameter [Timeout]. (The time from 1 until 2 exceeded the setting [Timeout])

### 27.1.2 Sensor Position Type

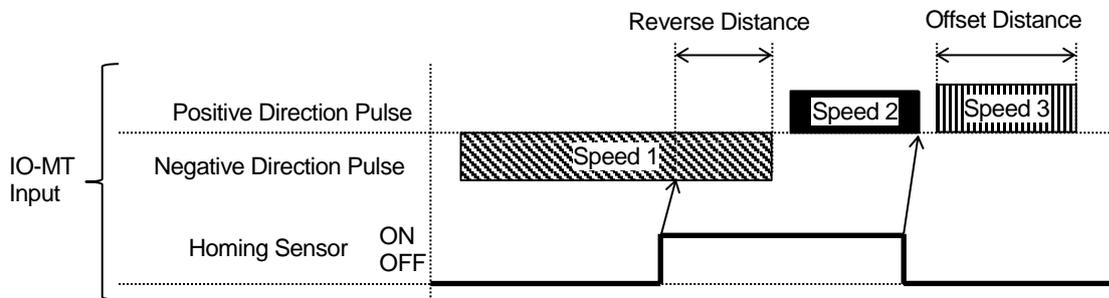
This item explained here is for robots equipped with auxiliary axis functions.

#### ■ 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



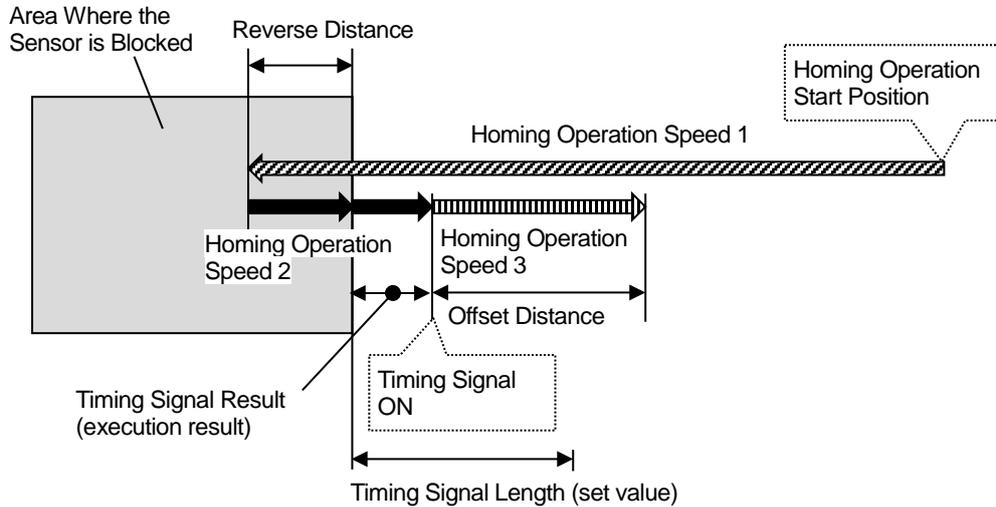
The errors in the table below can occur if there is a problem with the homing operation.

Error	Details
Homing Move Timeout Error	The elapsed time from the start of the homing operation exceeded the homing operation parameter [Timeout].
Homing Operation Sensor Error	<ol style="list-style-type: none"> <li>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 Length], the axes did not enter the area where the sensor is blocked.</li> <li>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 Length], the axes did not exceed the area where the sensor is blocked.</li> </ol>

### 27.1.3 Timing Signal Type

This item explained here is for robots equipped with auxiliary axis functions.

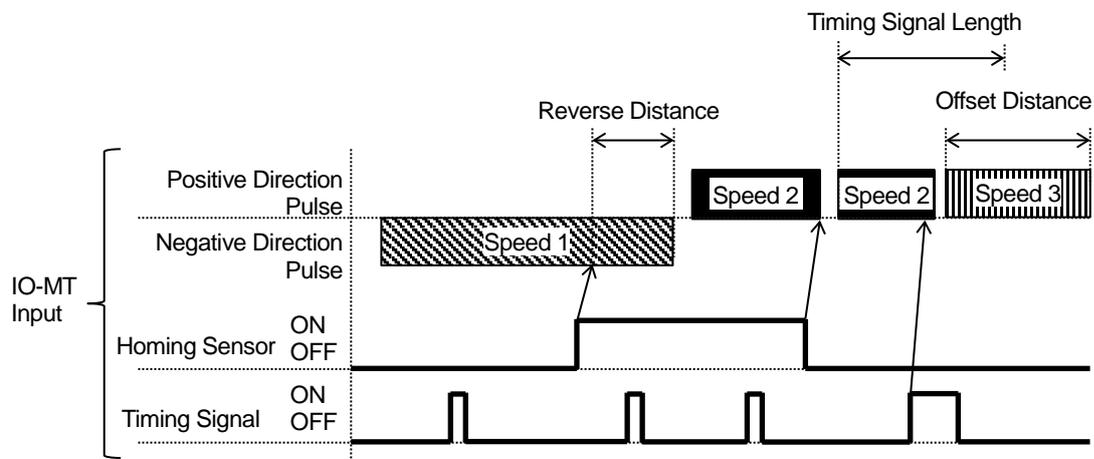
#### ■ Operation Image



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 can occur if there is a problem with the homing operation.

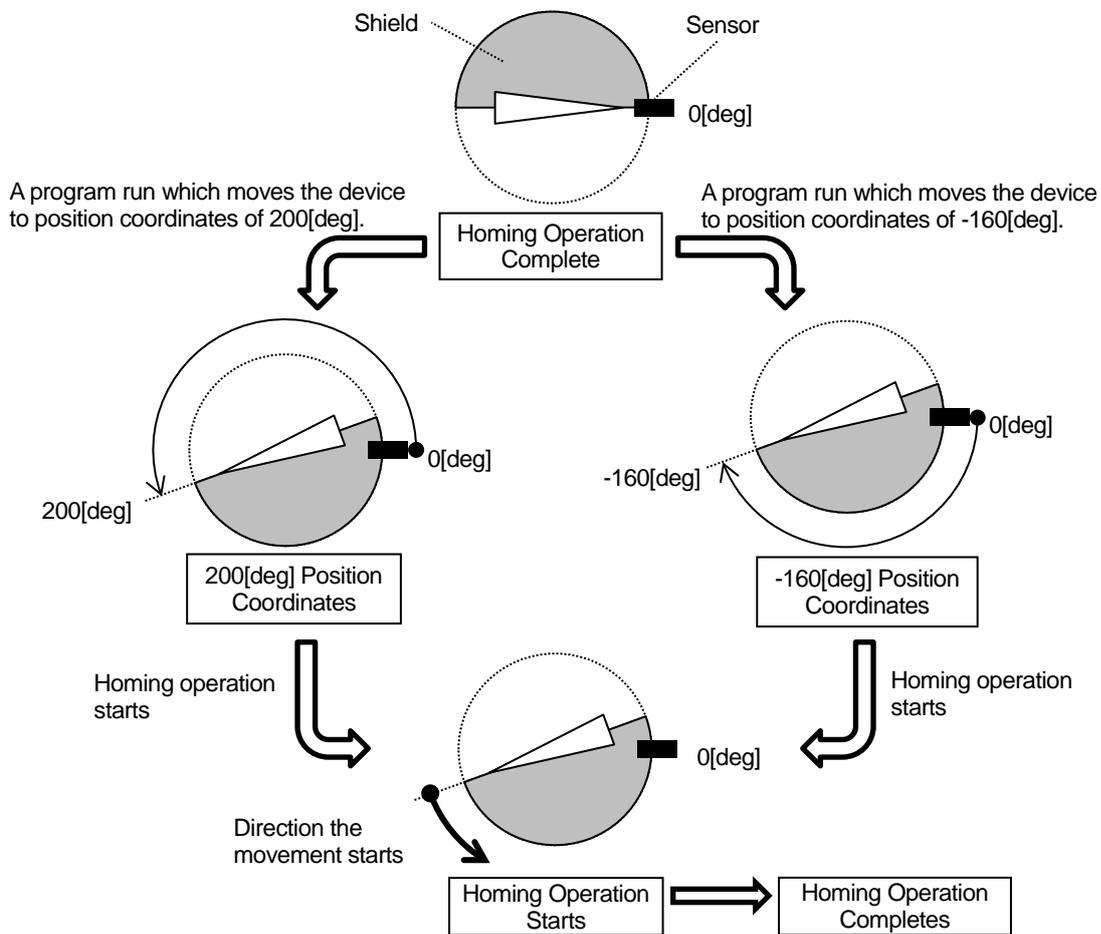
Error	Details
Homing Move Timeout Error	The elapsed time from the start of the homing operation exceeded the homing operation parameter [Timeout].
Homing Operation Sensor Error	Movement started from outside of the area where the sensor is blocked and even though the axes moved the distance specified in the homing operation parameter [Valid Length], 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 Length], 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 Length], 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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